# Final Environmental Assessment and Finding of No Significant Impact/Record of Decision

# Amazon Prime Air
# Drone Package Delivery Operations in College Station, Texas

December 2022

**United States Department of Transportation**
**Federal Aviation Administration**

Washington, D.C.

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Cover Image: Amazon Prime Air

**DEPARTMENT of TRANSPORTATION**
**Federal Aviation Administration**
**Washington, D.C.**

**Notice of Availability of the Final Environmental Assessment and Finding of No Significant Impact/Record of Decision for Amazon Prime Air's Drone Package Delivery Operations in College Station, Texas**

The Federal Aviation Administration (FAA) hereby gives Notice of Availability (NOA) for the Final Environmental Assessment (EA) and Finding of No Significant Impact/Record of Decision (FONSI/ROD) following the FAA's evaluation of the potential effects of the FAA decision to authorize Amazon Prime Air (Prime Air) to conduct unmanned aircraft (UA) commercial package delivery operations from one Prime Air Drone Delivery Center, or "PADDC," in College Station, Texas.

Prime Air is seeking to amend its Part 135 Air Carrier Operations Specifications (OpSpecs) to include package delivery operations from its PADDC in College Station to approved delivery locations within 3.73 miles of the PADDC. The federal action subject to this EA is the requested FAA approval of Prime Air's amended OpSpecs to include a paragraph with descriptive language about the operating area boundaries, which includes the specific locations and operational profile in Prime Air's request.

The Final EA has been prepared in accordance with the requirements set forth in the Council on Environmental Quality (CEQ) regulations at Title 40, Code of Federal Regulations (CFR), parts 1500-1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The Final EA reflects consideration of comments received during the public comment period for this EA, which was open from September 30, 2022 through October 14, 2022.

The Final EA and FONSI/ROD are available to view/download electronically at https://www.faa.gov/uas/advanced_operations/nepa_and_drones/

CONTACT INFORMATION: For any questions or to request a copy of the EA, please email 9-FAA-Drone-Environmental@faa.gov.

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# DEPARTMENT OF TRANSPORTATION

# Federal Aviation Administration

# Finding of No Significant Impact/Record of Decision for Final Environmental Assessment for Amazon Prime Air Drone Package Delivery Operations in College Station, Texas

## Introduction

The Federal Aviation Administration (FAA) prepared the attached Environmental Assessment (EA) to analyze the potential environmental impacts that may result from the FAA's amendment of the Part 135 air carrier Operations Specifications (OpSpecs) requested by Amazon Prime Air (Prime Air) to conduct drone package delivery operations in and around College Station, Texas, as a Part 135 air carrier (described in more detail in the Proposed Action section below). The requested approval would, among other things, add descriptive language to Prime Air's OpSpecs about operating area boundaries. This approval would enable Prime Air to conduct unmanned aircraft (UA)[1] commercial delivery operations from its Prime Air Drone Delivery Center (PADDC) to approved delivery locations within a radius of 3.73 miles from the PADDC. Operating boundaries are depicted in Figure 1 of the EA. The approval of Prime Air's OpSpecs amendment to include this operating area is considered a major federal action subject to National Environmental Policy Act (NEPA) review requirements.

The FAA prepared the EA in accordance with the National Environmental Policy Act of 1969, as amended (42 United States Code [U.S.C.] § 4321 et seq.); Council on Environmental Quality's (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] parts 1500 to 1508); and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

After reviewing and analyzing available data and information on existing conditions and potential impacts – including consideration of public comments – and completing the EA, the FAA has determined that the proposed action will not significantly affect the quality of the human environment. Therefore, the preparation of an Environmental Impact Statement is not required, and the FAA is issuing this Finding of No Significant Impact (FONSI) and Record of Decision (ROD). The FAA has made this

[1] Drone and UA may be used interchangeably.

determination in accordance with applicable environmental laws and regulations. The EA is incorporated by reference into and supports this FONSI/ROD.

## Purpose and Need

The FAA has multiple approvals associated with Prime Air's commercial delivery operations for the operating area. However, the FAA issuance of the OpSpecs amendment is the approval that will ultimately enable UA commercial delivery operations in this area (as depicted in Figure 1 of the EA). Prime Air's OpSpecs request for operations in College Station requires FAA review and approval.[2] The FAA has a statutory obligation to review Prime Air's request to amend the OpSpecs and determine whether the amendment would affect safety in air transportation or air commerce and the public interest. After making this determination, the FAA must take an action to amend the OpSpecs.

The purpose of Prime Air's request is to conduct its UA commercial deliveries under Part 135 operating conditions and demonstrate that it can conduct operations safely and meet its compliance obligations. The approval could also help Prime Air to further gauge public demand for UA commercial delivery services and evaluate whether scalable and cost-effective UA delivery expansion is possible in the area. Prime Air has determined that it needs the OpSpecs approval in order to safely conduct its commercial package delivery operations in College Station.

See Section 1.3 of the EA for further information.

## Proposed Action

In order for Prime Air to conduct UA commercial package deliveries in a new location, it must receive a number of approvals from the FAA, such as a Certificate of Waiver or Authorization (COA) and amended OpSpecs. Prime Air has requested that the FAA approve its OpSpecs amendment in its Part 135 air carrier certificate; this is the FAA approval that ultimately would enable the commercial delivery operations in the operating area. The proposed action is the FAA amendment of the OpSpecs for Prime Air's B050 OpSpec, *Authorized Areas of En Route Operations, Limitations, and Provisions*, specifically a reference section titled Limitation, Provisions, and Special Requirements. The approval would include a paragraph with descriptive language about the operating area boundaries (depicted in Figure 1 of the attached EA), including the specific locations and operational profile proposed in Prime Air's request. The operating area is also the study area for the EA.

[2] Prime Air's Part 135 air carrier certificate was issued in August 2019.

Under the scope of the proposed action (discussed in Section 2.1 of the attached EA), Prime Air projects operating a maximum of approximately 200 delivery flights per operating day, during daylight hours up to five days per week from the College Station PADDC, with daylight hours defined as approximately 30 minutes before sunrise to 30 minutes after sunset. Delivery flights may occur during evening hours, but no later than approximately 30 minutes after sunset and never after 10 p.m. No nighttime deliveries are anticipated or requested under the proposed action. The College Station PADDC will support four sectors, with each sector having one takeoff and landing pad with its own dedicated operating area that can support up to five flights per hour. Only one aircraft in each sector can be airborne at any time.

The OpSpecs will restrict Prime Air to the operating area identified in Figure 1 of the EA. The FAA's analysis was completed for the known PADDC location identified in Figure 1 of the EA. Any future expansion beyond the authorization and limitations for the area of operations described in the B050 OpSpec, or beyond the current 1:1 pilot to aircraft ratio described in Prime Air's A003 OpSpec, *Airplane/Aircraft Authorization*, will require additional OpSpec amendments from the FAA and will receive appropriate NEPA review at that time.

See Section 2.1 of the EA for further information.

## Alternatives

Alternatives analyzed in detail in the EA include the proposed action and the no action alternative. Under the no action alternative, the FAA would not issue the approvals necessary to enable Prime Air to conduct UA commercial delivery operations in the College Station operating area. Under the no action alternative, Prime Air would not be authorized to conduct package delivery flights from the College Station PADDC. This alternative does not support the stated purpose and need.

See Section 2.2 of the EA for further information.

## Environmental Impacts

The potential environmental impacts from the proposed action and no action alternative were evaluated in the attached EA for each of the environmental impact categories identified in FAA Order 1050.1.F. Section 3 of the attached EA describes the physical, natural, and human environment within the project study area, and identifies those environmental impact categories that are not analyzed in detail, explaining why the proposed action would have no potential effects on those environmental impact categories. Those categories are Air Quality; Climate; Coastal Resources; Farmlands; Hazardous

Materials, Solid Waste, and Pollution Prevention; Land Use; Natural Resources and Energy Supply; Socioeconomic Impacts and Children's Environmental Health and Safety Risks; Visual Effects (Light Emissions Only); and Water Resources (Wetlands, Floodplains, Groundwater, and Wild and Scenic Rivers).

Section 3 of the EA also provides detailed evaluations of the potential environmental consequences for each of the remaining environmental impact categories and documents the finding that no significant environmental impacts would result from the proposed action. A summary of the documented findings for each category, including requisite findings with respect to relevant special purpose laws, regulations, and executive orders, is presented below:

- **Biological Resources (including Fish, Wildlife, and Plants), EA Section 3.2.** Biological resources include plant and animal species and their habitats, including special status species (federally listed or state-listed threatened or endangered species, species proposed for listing, species that are candidates for federal listing, marine mammals, and migratory birds) and environmentally sensitive or critical habitat. The Endangered Species Act (ESA) of 1973 requires the evaluation of all federal actions to determine whether a proposed action is likely to jeopardize any proposed, threatened, or endangered species or proposed or designated critical habitat. Federal agencies are responsible for determining if an action "may affect" listed species or critical habitat, which determines whether formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) is needed. If the FAA determines that the action will have no effect on listed species, consultation is not required. If the FAA determines that the action may affect listed species, consultation with the USFWS must be initiated.

  The Migratory Bird Treaty Act of 1918 protects migratory birds, including their nests, eggs, and parts, from possession, sale, purchase, barter, transport, import, export, and take. The USFWS is the federal agency responsible for the management of migratory birds as they spend time in habitats of the U.S. The Bald and Golden Eagle Protection Act of 1940 prohibits anyone from "taking" a bald or golden eagle, including their parts, nests, or eggs, without a permit issued by the USFWS. The USFWS National Bald Eagle Management Guidelines, provide for additional protections against "disturbances." Similar to take, "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle or causes either a

decrease in its productivity or nest abandonment due to a substantial interference with breeding, feeding, or sheltering.

The Texas Parks and Wildlife Department's database of Rare, Threatened, and Endangered Species of Texas lists 67 species of amphibians, birds, fish, insects, mammals, mollusks, plants and reptiles in Brazos County, including some that are considered Species of Greatest Conservation Need as defined in the 2012 Texas Conservation Action Plan. Additionally, the State of Texas maintains a list of fish and wildlife that are protected under the Texas Parks and Wildlife Code. The Texas Administrative Code (Title 31, Part 2, Chapter 65, Subchapter G RULE, § 65.171) states that "no person may: (1) take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed by the department as endangered; or (2) take, possess, propagate, transport, import, export, sell, or offer for sale any species of fish or wildlife listed in this subchapter as threatened."[3]

The proposed action will not involve ground construction or habitat modification, as the landing and take off locations are in places that are already developed. The operations will be taking place within airspace, and typically well above the tree line and away from sensitive habitats. The average number of daily operations and altitude of the flights (between 160 feet and 180 feet above ground level) are not expected to significantly influence wildlife behavior in the study area.

The EA identifies several special status bird species that could breed in the study area, including the Bald Eagle (see the U.S. Fish and Wildlife Service Information for Planning and Consultation report, or IPaC report, and official species list in Appendix A of the EA). Prime Air has stated to the FAA that it will monitor the operating area for any active Bald Eagle nests that may occur. If Prime Air identifies a Bald Eagle nest or is notified of the presence of a nest, Prime Air will establish an avoidance area such that there is a 1,000 feet vertical and horizontal separation distance between a vehicle's flight path and the nest. This avoidance area will be maintained until the end of the breeding season or until a qualified biologist indicates the nest has been vacated. The official species list identifies Birds of Conservation Concern (BCC) that could occur

[3] Texas Administrative Code Title 31 Part 2 Chapter 65 Subchapter G RULE § 65.171. Available: https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=65&rl=171. Accessed: September 28, 2022

in the operating area, along with information on the likelihood that they may be nesting in the area (see Appendix A).

There is one ESA-listed bird species that could be present in the study area: the Whooping Crane, an endangered species. While it is possible that Whooping Cranes could use the small agricultural fields in the eastern part of the operating area as stopover habitat on their way to wintering grounds along the Gulf Coast, the FAA found that there were no recorded sightings of Whooping Crane within the study area boundaries. The FAA also found that there is no known stopover habitat in the study area based on the Texas Parks and Wildlife Nature Trackers Project, Texas Whooper Watch. Additionally, Whooping Crane migration flights are usually between 1,000 and 6,000 feet; therefore, it is not expected that occasional drone flights at 160-180 feet AGL would affect transitory Whooping Cranes if they were to migrate through the study area. Because the FAA has determined that Whooping Cranes would not be present where effects are likely to occur, the FAA has determined that there would be *no effect* to the Whooping Crane as a result of the proposed action.

The Monarch Butterfly, a candidate for federal listing, also has the potential to occur in the operating area. Information regarding drone impacts on insects is limited and there have been no widespread negative impacts identified in the scientific literature. Some research shows that Monarch Butterflies are not commonly observed at altitudes where Prime Air is proposing to operate. Therefore, based on the information available and the limited scale of operations, the proposed action is not expected to cause significant impacts to the Monarch Butterfly or any other insect populations.

In the Affected Environment section of the EA, Table 3-1 identifies the federal and state-listed threatened and endangered species that could occur in Brazos County. However, given the habitat type and distribution required by state-listed species that may occur in Brazos County, and due to the lack of suitable habitat in the study area, no effects to state-listed species or species habitat are anticipated.

- **Department of Transportation (DOT) Act, Section 4(f) Resources, EA Section 3.3.** Section 4(f) of the DOT Act protects significant publicly-owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) states that, subject to exceptions for

de minimis impacts[4]: "The Secretary may approve a transportation program or project requiring the use of [4(f) resources]…only if—(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use." The term "use" includes both direct or physical and indirect or "constructive" impacts to Section 4(f) resources.

The FAA identified several properties that could meet the definition of a Section 4(f) resource within the operating area, including Bee Creek Park, Central Park, Woodcreek Park, Rock Prairie School and Church, and Richard Carter Homesite. The potential Section 4(f) resources in the study area are listed in Table 3-2 of the EA. There are no historic sites within the operating area, as listed on the Texas State Historic Preservation Office (SHPO) and Brazos Historical Commission websites. There are several historical markers in the operating area; however, these historical markers would not be affected by UA operations.[5] There are no state parks, national parks, or wildlife or waterfowl refuges within the operating area.

There will be no physical use of Section 4(f) resources under the proposed action. The FAA has determined that infrequent UA overflights as described in the proposed action would not cause substantial impairment to Section 4(f) resources, and therefore would not be considered a constructive use of any Section 4(f) resource. As described in the Section 3.5 of the EA and the Noise Analysis Report (Appendix C of the EA), noise and visual effects from Prime Air's occasional overflights are not expected to diminish the activities, features, or attributes of any resources in the study area. Therefore, there will be no significant impacts to Section 4(f) resources as a result of the proposed action.

- **Historical, Architectural, Archaeological, and Cultural Resources, EA Section 3.4.** Section 106 of the National Historic Preservation Act (NHPA) of 1966 [54 U.S.C. § 306108] requires federal agencies to consider the effects of their undertakings on properties listed or eligible for listing in the National Register of Historic Places (NRHP). This includes properties of traditional religious

[4] The FAA may make a de minimis impact determination with respect to a physical use of Section 4(f) property if, after taking into account any measures to minimize harm, the result is either: (1) a determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or wildlife or waterfowl refuge for protection under Section 4(f); or (2) a Section 106 finding of no adverse effect or no historic properties affected. See 1050.1F Desk Reference, Paragraph 5.3.3

[5] Brazos County Historical Commission. Map of Historical Markers. Available: https://brazoscountyhistory.org/map-of-historical-markers. Accessed: August 26, 2022.

and cultural importance to an American Indian/Alaska Native (AI/AN) tribe or Native Hawaiian organization that meets the NRHP criteria. Compliance with Section 106 requires consultation with the SHPO and applicable other parties, including AI/AN tribes and Native Hawaiian organizations. The FAA identified several historical markers that were listed on the Texas SHPO website; however, no NRHP-listed sites were identified within the Area of Potential Effects (APE).[6] The 12 historical markers are shown in Table 3-3 of the EA. In accordance with 36 CFR § 800.4(a)(1), the FAA consulted with the Texas SHPO and with six tribes that may potentially attach religious or cultural significance to resources in the APE. Three of the tribes have Tribal Historic Preservation Offices (THPOs): Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Wichita and Affiliated Tribes of Oklahoma (Wichita, Keechi, Waco & Tawakonie). The FAA sent a consultation letter to the Texas SHPO on July 12, 2022. On August 4, 2022, the Texas SHPO responded to the FAA and confirmed that no historic properties are present or affected by the proposed action. The FAA sent letters on July 12, 2022 to the Alabama-Coushatta Tribe, Apache Tribe of Oklahoma, Comanche Nation of Oklahoma THPO, Coushatta Tribe of Louisiana THPO, Tonkawa Tribe of Indians of Oklahoma, and Wichita and Affiliated Tribes of Oklahoma (Wichita, Keechi, Waco & Tawakonie) THPO. On July 28, 2022, the Coushatta Tribe of Louisiana THPO responded to the FAA and stated that the proposed action will not have a negative impact on any archaeological, historic, or cultural resources of the Coushatta people. The other five tribes did not provide a response. The FAA's tribal and historic outreach letters can be found in Appendix B of the EA.

Based on the nature of potential UA effects on historic properties - namely limited to non-physical, reversible impacts – as well as the limited number of daily flights in conjunction with the FAA's noise exposure analysis in Appendix C that concluded noise levels would not exceed Day-Night Average Sound Level (DNL) 45 dB in any location within the study area other than the PADDC property, a few properties immediately surrounding the PADDC, and in the immediate vicinity of locations that may receive a delivery, the FAA has determined that no historic properties or cultural resources would be affected by the proposed action.

- **Noise and Noise-Compatible Land Use, EA Section 3.5 and Appendix C.** The FAA has issued requirements for assessing aircraft noise in FAA Order 1050.1F, Appendix B. The FAA's required

[6]Texas Historical Commission. Texas Historical Sites Atlas: Brazos County. Available: https://atlas.thc.texas.gov/. Accessed: August 26, 2022.

noise metric for aviation noise analysis is the yearly DNL metric. A significant noise impact is defined in Order 1050.1F as an increase in noise of DNL 1.5 decibel (dB) or more at or above DNL 65 dB DNL noise exposure or a noise exposure at or above the 65 dB level due to a DNL 1.5 dB or greater increase.

The proposed action is not anticipated to result in any significant changes in the overall noise environment within the affected area. There is no construction and therefore no construction noise that will result from the proposed action. The PADDC property and a few of the properties surrounding the PADDC location are likely to experience the highest noise levels as a result of the proposed action. The maximum noise exposure levels within the study area will occur at the PADDC site; noise levels at or above DNL 45 dB would extend approximately 1,150 feet from the College Station PADDC, and noise levels at or above DNL 65 dB would extend approximately 100 feet from the PADDC but not extend beyond the PADDC property. The extent of DNL 45 dB and greater noise exposure for the PADDC is shown in Figure 4 of the EA.

For delivery operations, the estimated noise exposure for the anticipated maximum number of deliveries at a delivery location, including en route overflights, would not have the potential to exceed DNL 58 dB.

For en route operations, the estimated noise exposure for en route flight paths would not exceed DNL 45 dB at any location within the study area.

Based on FAA's noise analysis, the proposed action will not have a significant noise impact.

- **Environmental Justice, EA Section 3.6.** Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, Section 1-101 requires all federal agencies, to the greatest extent practicable and permitted by law, to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

  Based on census block data, obtained through the FAA's Aviation Environmental Design Tool (AEDT), the percentage of low-income individuals residing within the study area at the census block group level is approximately 30.05 percent as compared to 25.86 percent in the reference community. Based on the analysis, the FAA identified a low-income population since the

percentage of low-income individuals residing within the study area is greater than that of the reference community. The FAA's AEDT analysis data is included in Appendix F of the EA.

The percentage of minority individuals residing within the study area at the census block group level, approximately 36.17 percent, is lower than that of the reference community, which is approximately 46.42 percent. Based on the analysis, the FAA determined that there was not a minority population present since the percentage of minorities residing within the study area is both less than 50 percent and is not meaningfully greater than the percentage of minorities residing within the reference community.

The proposed action will not result in significant impacts in any environmental resource category. In particular, as noted in Section 3.5, *Noise and Noise-Compatible Land Use*, the UA's noise emissions could be perceptible in areas within the operating area but will stay well below the level determined to constitute a significant impact. As described in Section 3.7, *Visual Effects (Visual Resources and Visual Character)*, there are not expected to be significant adverse visual impacts since any UA en route would be observable only for a short time by an observer on the ground. Therefore, the FAA determined that the proposed action would not result in a disproportionately high and adverse effect on a low-income or a minority population.

- **Visual Effects (Visual Resources and Visual Character), EA Section 3.7.** Visual resources and visual character impacts deal with the extent to which the proposed action would result in visual impacts to resources in the operating area. Visual impacts can be difficult to define and evaluate because the analysis is generally subjective, but are normally related to the extent that the proposed action would contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Impacts to visual resources from the proposed action are not expected to be significant. The proposed action makes no changes to any landforms, or land uses, thus there would be no effect to the visual character of the area. The proposed action is unlikely to result in visual impacts anywhere in the study area, including sensitive areas such as Section 4(f) properties where the visual setting is an important resource of the property. However, the short duration that each UA flight could be seen from any particular resource in the operating area combined with the low number of proposed flights per day minimizes any potential for significant impacts. Accordingly, any potential impacts of the proposed action on visual resources and visual character will not be significant.

- **Water Resources (Surface Waters), EA Section 3.8.** Surface water resources generally consist of oceans, wetlands, lakes, rivers, and streams. The Clean Water Act (CWA) established the National Pollutant Discharge Elimination System (NPDES) program, which regulates the discharge of point sources of water pollution into waters of the United States and requires a permit under Section 402 of the CWA. Waters of the United States are defined by the CWA and are protected by various regulations and permitting programs administered by the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers.

  Approximately 0.09 square miles of surface waters occur within the operating area, based on the Environmental Justice Screening and Mapping Tool (EJSCREEN) report for this proposed action (Appendix E). As there are no construction activities occurring under the proposed action that could impact surface waters, the proposed action would not be expected to result in impacts to surface water resources. While it is highly unlikely for one of Prime Air's aircraft to crash, and even less likely for a crash to happen within a surface water, the EA considers the potential effects of a drone crashing into surface waters covered by the CWA. Prime Air is a certificated Part 135 air carrier and must comply with all applicable regulatory requirements. This includes compliance with requirements to notify the FAA and/or National Transportation Safety Board (NTSB) in accordance with regulatory requirements in the event of an aircraft accident. Prime Air's FAA-accepted checklists include procedures to notify local emergency services in the event of an accident or incident. In accordance with 14 CFR § 135.23(d), Prime Air is required to locate and secure any downed aircraft pending guidance from the FAA or NTSB. In addition, the lithium-ion battery packs are well-secured within the aircraft, and are not expected to detach from the aircraft or become lost in the event of an incident. For these reasons, the proposed action would not have the potential to 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 proposed action would not be anticipated to result in cumulative impacts to environmental resources within the operating area.

## Public Involvement and Coordination

The Draft EA was made available for public review. The public Notice of Availability (NOA) was distributed on September 30, 2022 to local interest groups, government officials, Section 4(f) resource

authorities, community points of contact as provided by Amazon, and the SHPO and THPOs (see section 5.0 of the EA). The Draft EA was available on the FAA's website and was open for comment from September 30, 2022 through October 14, 2022. The FAA received 58 unique comment submissions during the comment period for this EA. Appendix G in the EA contains the public comments and FAA responses.

## Finding

The FAA finding is based on a comparative examination of environmental impacts for each of the alternatives studied during the environmental review process. The EA discloses the potential environmental impacts for each of the alternatives and provides a full and fair discussion of those impacts. Based on the FAA's review and analysis and consideration of comments, it has determined that there would be no significant impacts to the natural environment or surrounding population as a result of the proposed action.

The FAA believes the proposed action best fulfills the purpose and need identified in the EA. In contrast, the no action alternative fails to meet the purpose and need identified in the EA. An FAA decision to take the required actions and approvals is consistent with its statutory mission and policies supported by the findings and conclusions reflected in the environmental documentation and this FONSI.

After careful and thorough consideration of the facts contained herein and following consideration of the environmental impacts described, the undersigned finds that the proposed federal action is consistent with existing national environmental policies and objectives as set forth in section 101(a) of the National Environmental Policy Act of 1969 and other applicable environmental requirements and will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to Section 102(2)(C) of NEPA.

## Decision and Order

The FAA recognizes its responsibilities under NEPA, CEQ regulations, and its own directives. Recognizing these responsibilities, I have carefully considered the FAA's goals and objectives in reviewing the environmental aspects of the proposed action to approve Prime Air's request to conduct its UA commercial delivery operations in the proposed operating area. Based upon the above analysis, the FAA has determined that the proposed action meets the purpose and need.

The environmental review included the purpose and need to be served by the proposed action, alternatives to achieving them, the environmental impacts of these alternatives, and conditions to preserve and enhance the human environment. This decision is based on a comparative examination of the environmental impacts for each of these alternatives. The attached EA provides a fair and full discussion of the impacts of the proposed action. The NEPA process included appropriate consideration for avoidance and minimization of impacts, as required by NEPA, the CEQ regulations, and other special purpose environmental laws, and appropriate FAA environmental orders and guidance.

The FAA has determined that environmental concerns presented by interested agencies and the general public have been addressed in the EA. The FAA believes that, with respect to the proposed action, the NEPA requirements have been met. FAA approval of this environmental review document indicates that applicable federal requirements for environmental review of the proposed action have been met.

After careful and thorough consideration of the facts contained herein, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives as set forth in Section 101 of NEPA and other applicable environmental requirements and will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to Section 102(2)(C) of NEPA.

Issued on: December 9, 2022

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2022.12.09 06:55:12 -08'00'

Dave Menzimer
Aviation Safety
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

## Right of Appeal

This FONSI/ROD constitutes a final agency action and a final order taken pursuant to 49 U.S.C. §§ 40101 et seq., and constitutes a final order of the FAA Administrator which is subject to exclusive judicial review by the Courts of Appeals of the United States in accordance with the provisions of 49 U.S.C. § 46110. Any party having substantial interest in this order may apply for a review of the decision by

filing a petition for review in the appropriate U.S. Court of Appeals no later than 60 days after the order is issued in accordance with the provisions of 49 U.S.C. § 46110.

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# 1.0 PURPOSE AND NEED

## 1.1 Introduction

Amazon Prime Air (Prime Air) is seeking to amend its air carrier Operations Specifications (OpSpecs) and other Federal Aviation Administration (FAA) approvals necessary to begin unmanned aircraft (UA) commercial package delivery operations from one Prime Air Drone Delivery Center (PADDC) located in College Station, Texas, using its 87-pound MK27-2 UA.[1] The Prime Air UA can carry packages weighing up to five pounds, and has a maximum takeoff weight of approximately 92 pounds. Prime Air projects operating a maximum of approximately 200 delivery flights per operating day over 260 operating days per year, for a total of roughly 52,000 annual delivery operations from the College Station PADDC based on the scope of the proposed action, discussed in Section 2.1. The operating area is divided into four sectors, with each sector having a maximum of approximately 50 delivery flights per operating day. The proposed commercial delivery operations from the College Station PADDC would occur during daylight hours up to five days per week, including occasional weekend days.[2] The FAA's amendment to Prime Air's OpSpecs to include this new operating area is considered a major federal action subject to environmental review requirements.

This Draft Environmental Assessment (EA) is being prepared by the FAA to evaluate the potential environmental impacts that may result from FAA's approval of the proposed action, which would enable UA commercial delivery operations from the PADDC located at 400 Technology Parkway, College Station, TX 77845. The circle-shaped operating area has a radius of approximately 3.73 miles from the PADDC. It is roughly 43.7 square miles in area. The operating area, which is also the study area for this EA, is depicted in Figure 1 (the study area).

The FAA has prepared this EA pursuant to the National Environmental Policy Act of 1969 (NEPA) [42 United States Code (U.S.C.) § 4321 et seq.] and its implementing regulations (40 Code of Federal Regulations (CFR) §§1500-1508)). Under NEPA, federal agencies are required to consider the environmental effects of proposed federal actions and to disclose to decision-makers and the interested public a clear and accurate description of the potential environmental impacts of proposed major federal actions. Additionally, under NEPA, federal agencies are required to consider the environmental effects of a proposed action, the reasonable alternatives to the proposed action, and a no action alternative (assessing the potential environmental effects of not implementing the proposed action). The FAA has established a process to ensure compliance with the provisions of NEPA through FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* and the FAA Order 1050.1F Desk Reference.

## 1.2 Background and Location

In 2012, Congress first charged the FAA with integrating unmanned aircraft systems (UAS) into the National Airspace System (NAS).[3] The FAA has engaged in a phased, incremental approach to integrating UAS into the NAS and continues to work toward full integration of UAS into the NAS. Part of that approach involves providing safety review and oversight of proposed operations to begin commercial UA[4] delivery in the NAS.

[1] An Amazon PADDC is a ground based service area where UA are assigned and where flights originate and return.
[2] Daylight hours of operation include approximately ~30 min before sunrise to ~30 min after sunset.
[3] 49 U.S.C. 44802; FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, Sec. 332. 126 Stat. 11, 73 (2012).
[4] The terms UA and drone may be used interchangeably.

Over the past several years Prime Air has been working under various FAA programs, including the Partnership for Safety Plan (PSP) Program,[5] as well as the FAA's established processes to bring certificated commercial UA delivery into practice. Participants in these programs are among the first to prove their concepts, including package delivery by UA, through the use of current regulations and exemptions and waivers from some of these regulatory requirements.

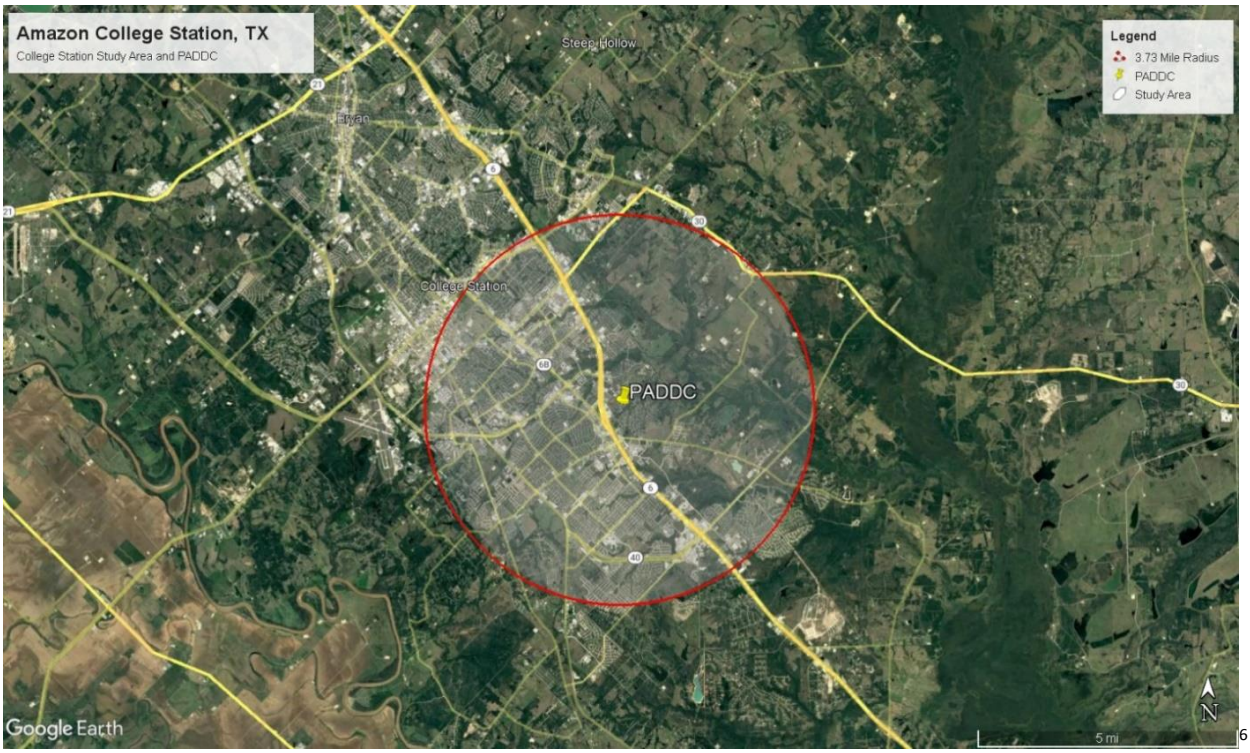
In 2020, Prime Air received its Part 135 air carrier operating certificate, which allows it to carry the property of another for compensation or hire beyond visual line of sight (BVLOS). The certificate contains a stipulation that operations must be conducted in accordance with the provisions and limitations specified in its OpSpecs. Prime Air's current request for amended OpSpecs to specify a new area of operations, in conjunction with other related FAA approvals, such as a Certificate of Waiver or Authorization (COA), would enable commercial delivery operations in the operating area.

The College Station operating area is shown in Figure 1 below. The operating area is outlined in red and the PADDC location is identified using the yellow pin. A closer view of the operating area is shown in Figure 2. The PADDC is located at 400 Technology Parkway, College Station, TX.

The western side of the operating area extends just to the edge of the Reed Arena located at 730 Olsen Blvd, and the eastern side of the operating area is approximately 540 feet from the intersection of William D. Fitch Pkwy and Tonkaway Lake Road. State Highway 6 runs through the operating area from the northwest corner to the southeast corner. The northern edge of the circle is approximately 0.73 miles from the intersection of University Drive East and State Highway 158 and the southern edge of the circle is approximately 815 feet from the intersection of Etonbury Avenue and Greens Praire Road.

There are no airports in the operating area. There are two heliports in the operating area: one is located at Baylor Scott & White Medical Center, 800 Scott & White Drive, and the other is at St. Joseph Health College Station Hospital, 1604 Rock Prairie Road. The operating area is the study area for the purposes of this Draft EA.

[5] https://www.faa.gov/uas/programs_partnerships/psp/




[6]

***Figure 1*** *Study Area with PADDC in the Center*

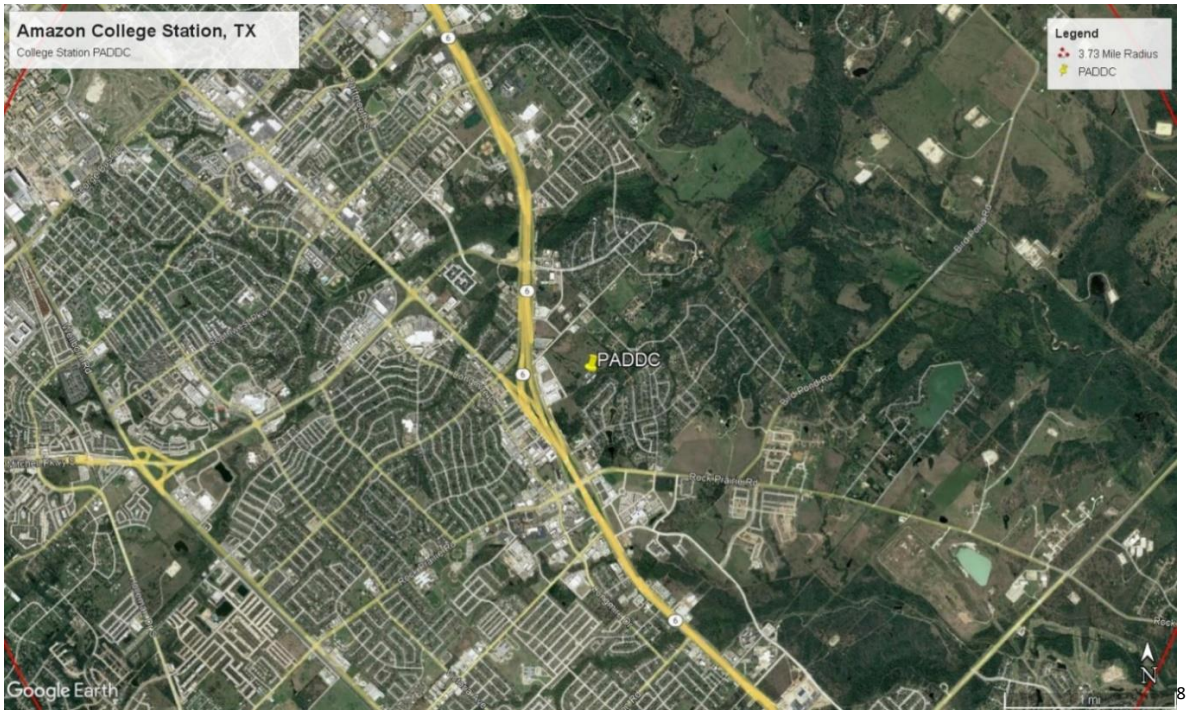
### 1.2.1 PADDC Location

The PADDC is located at 400 Technology Parkway in College Station, Texas, in Brazos County. College Station is approximately 85 miles east of Austin and 75 miles northwest of Houston.

The PADDC facility includes a warehouse building with office space, ground control station, aircraft maintenance area, battery storage area, parking, truck loading areas, landscaped grounds, paved departure and arrival pads, and perimeter fencing. The PADDC site is zoned for Research and Development. The PADDC is located near the intersection of Texas 6 Frontage Road and Sebesta Road with State Highway 6 approximately 0.33 miles to the west of the site. The properties adjacent to the PADDC are a mix of privately-owned rural, commercial, and residential. The closest residential neighborhood is approximately 500 feet from the site. Prime Air proposes to conduct deliveries from the PADDC to eligible delivery sites such as private residences and commercial facilities.[7] See the PADDC location Figures 2 and 3 below.

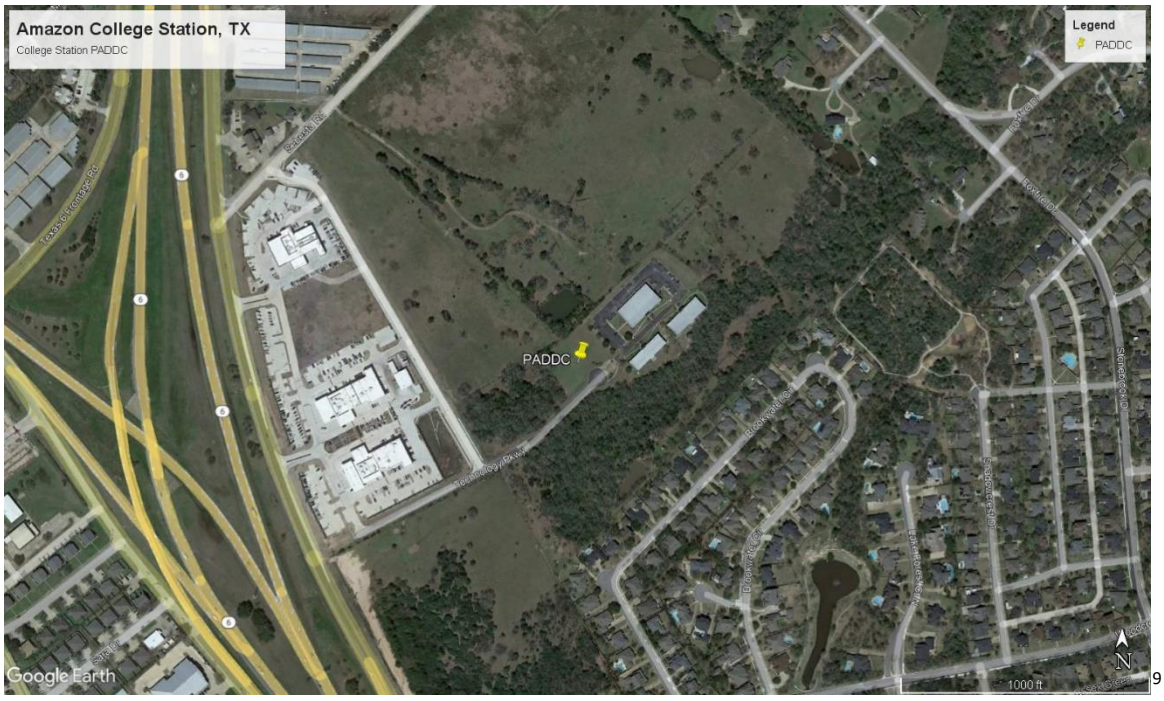
[6] Image: Google Earth, as modified by the FAA

[7] Each delivery site is pre-approved by Amazon to ensure that the area is capable of receiving deliveries.



[8]

***Figure 2*** *Prime Air's PADDC Location in College Station, TX*



[9]

***Figure 3*** *Closer View of Prime Air's PADDC Location in College Station, TX*

[8] Image: Google Earth, as modified by the FAA
[9] Image: Google Earth, as modified by the FAA

## 1.3 Purpose and Need

As described in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, the Purpose and Need section of an EA briefly describes the underlying purpose and need for the proposed federal action. It presents the problem being addressed and describes what the FAA is trying to achieve with the proposed action.

### 1.3.1 FAA Purpose and Need

Prime Air is seeking to amend its Part 135 air carrier OpSpecs and other FAA approvals necessary to begin UA commercial package delivery operations in College Station. The FAA has multiple approvals associated with the proposed operations; however, the FAA amendment of the OpSpecs is the approval that will ultimately enable UA commercial delivery operations in this area. Prime Air's request for OpSpecs to add a new area of operations requires FAA review and approval.

The FAA has a statutory obligation to review Prime Air's request to amend the OpSpecs and determine whether the amendment would affect safety in air transportation or air commerce, and to determine whether the public interest requires the amendment. In general, Congress has charged the FAA with the safety of air commerce in the United States and to encourage the development of civil aeronautics. 49 U.S.C. § 40104.

In addition, the FAA has specific statutory and regulatory obligations related to its issuance of a Part 135 certificate and the related OpSpecs. The FAA is required to issue an operating certificate to an air carrier when it "finds, after investigation, that the person properly and adequately is equipped and able to operate safely under this part and regulations and standards prescribed under this part." 49 U.S.C. § 44705. An operating certificate also specifies "terms necessary to ensure safety in air transportation; and (2)…the places to and from which, and the airways of the United States over which, a person may operate as an air carrier." 49 U.S.C. § 44705. Also included in air carrier certificates is a stipulation that the air carrier's operations must be conducted in accordance with the provisions and limitations specified in OpSpecs. 14 CFR § 119.5 (g), (l). The regulations also specify that a Part 135 certificate holder may not operate in a geographical area unless its OpSpecs specifically authorize the certificate holder to operate in that area. 14 CFR § 119.5(j). The regulations implementing Section 44705 specify that an air carrier's approved OpSpecs must include, among other things, "authorization and limitations for routes and areas of operations." 14 CFR § 119.49(a)(6). An air carrier's OpSpecs may be amended at the request of an operator if the FAA "determines that safety in air commerce and the public interest allows the amendment." 14 CFR § 119.51(a); see also 49 U.S.C. § 44709. After making this determination, the FAA must take an action on the OpSpec amendment.

### 1.3.2 Prime Air's Purpose and Need

The purpose of Prime Air's request is to begin UA commercial delivery service in College Station, TX, which, in its business judgment, Prime Air has determined is an appropriate market for expanded commercial delivery operations. The requested OpSpec amendments are needed so that Prime Air can begin UA commercial delivery operations from its College Station PADDC location. The approval will offer Prime Air an opportunity to further assess the viability of the UA commercial delivery option under real world conditions and demonstrate that it can conduct operations safely and meet its compliance obligations. The approval could also help Prime Air gauge public demand for UA commercial delivery services and evaluate whether scalable and cost-effective UA delivery expansion is possible in this area. In addition, the approval could provide an opportunity to assess community response to commercial delivery operations in this area.

## 1.4 Public Involvement

The FAA provided a Notice of Availability (NOA) of the Draft EA to local interest groups, local government officials, public park authorities, and the State Historic Preservation Office (SHPO), tribes and Tribal Historic Preservation Offices (THPOs). The NOA provided information about the proposed action and requested review and comments on the Draft EA, which was made available to the general public on the FAA website for a 14-day comment period. Interested parties were invited to submit comments on any environmental concerns relating to the proposed action to a specifically assigned email address. The public comments and FAA responses are included in Appendix G.

# 2.0 PROPOSED ACTION AND ALTERNATIVES

FAA Order 1050.1F, Paragraph 6-2.1(d) states that, "[a]n EA may limit the range of alternatives to the proposed action and no action alternative when there are no unresolved conflicts concerning alternative uses of available resources." The FAA has not identified any unresolved conflicts concerning alternative uses of available resources associated with Prime Air's proposal. Therefore, this EA only considers the proposed action and the no action alternative.

## 2.1 Proposed Action

In order for Prime Air to conduct UA commercial package deliveries in a new location, it must receive a number of approvals from the FAA, such as a COA and amended OpSpecs. Prime Air has requested the FAA to approve its OpSpec amendment so that they can begin UA commercial delivery operations in this new operating area. The OpSpec amendment is the FAA action that ultimately would enable commercial delivery operations in the operating area, located in east-central Texas. Initial operations would be conducted within visual line of sight using visual observers (VOs); however, with subsequent certifications of its detect and avoid technology anticipated in the future, Prime Air intends to operate BVLOS. The analysis in this EA includes any effects from operating BVLOS within the operating area.

The B050 OpSpec, *Authorized Areas of En Route Operations, Limitations, and Provisions*, includes a reference section titled Limitations, Provisions, and Special Requirements. The FAA's approval of this OpSpec amendment – including the paragraph in the B050 OpSpec's reference section with descriptive language about the operating area boundaries, including the specific location and operational profile proposed in Prime Air's request – is the proposed federal action for this EA. The B050 OpSpec will restrict Prime Air to this particular location; any future expansion beyond the authorization and limitations for the area of operations described in the B050 OpSpec, or beyond the current 1:1 pilot to aircraft ratio described in Prime Air's A003 OpSpec, *Airplane/Aircraft Authorization*, will require additional OpSpec amendments from the FAA and will receive appropriate NEPA review at that time.

### 2.1.1 Description of Proposed Operations

Prime Air projects operating a maximum of approximately 200 delivery flights per operating day, up to five days per week, from the College Station PADDC. These operational levels would result in a projected total of approximately 260 operating days and 52,000 delivery operations per year based on the scope of the proposed action. The College Station PADDC will support four sectors, with each sector having one takeoff and landing pad with its own dedicated operating area that can support up to five flights per hour. Only one aircraft in each sector can be airborne at any time. The operations would occur during daylight hours up to five days per week, with daylight hours defined as approximately 30 minutes before sunrise to 30 minutes after sunset. Delivery flights may occur during evening hours, but no later than approximately 30 minutes after sunset and never after 10 p.m. No nighttime deliveries are anticipated or requested under the proposed action. Delivery operations are anticipated to be distributed rather evenly across the four PADDC sectors.

### 2.1.2 Description of UA

The UA has a maximum takeoff weight of 92 pounds, including a maximum payload of five pounds. It is a hybrid multicopter-fixed wing drone that uses electric power from rechargeable lithium ion batteries. It is launched vertically using powered lift, and converts to using wing lift during en route flight.

### 2.1.3 Description of Delivery Operations

After launch, Prime Air's UA will rise to an altitude below 400 feet above ground level (AGL) and follow a predefined route to its delivery site. Aircraft will typically fly en route at approximately 160-180 feet AGL, except when descending to drop a package. Packages are carried internally in the aircraft's fuselage, and are dropped by opening a set of payload doors on the aircraft. When making a delivery, the UA descends and packages are dropped to the ground from approximately 13 feet AGL. Prime Air's aircraft will not touch the ground in any other place than the PADDC (except during emergency landings), since it remains airborne while conducting deliveries. After the package is dropped the UA then climbs vertically and follows the predefined route to return for landing at the PADDC.

## 2.2 No Action Alternative

The alternative to the proposed action is the no action alternative, in which the FAA would not issue the approvals necessary to enable Prime Air to conduct UA commercial package delivery operations in the College Station operating area. Council on Environmental Quality (CEQ) regulations at 40 CFR § 1502.14(c) require agencies to consider a no action alternative in their NEPA analyses. Under the no action alternative, Prime Air would not be authorized to conduct package delivery flights from the College Station PADDC. This alternative does not support the stated purpose and need.

# 3.0 AFFECTED ENVIRONMENT and ENVIRONMENTAL CONSEQUENCES

This section provides a description of the environmental resources that would be affected by the proposed action, as required by the CEQ regulations and FAA Order 1050.1F. The level of detail provided in this section is commensurate with the importance of the impact on these resources (40 CFR § 1502.15). The study area for each resource is the entire area within the red-lined boundary of Figure 1 in this report. As required by FAA Order 1050.1F, this EA presents an evaluation of impacts for the environmental impact categories listed below.

- Air Quality
- Biological Resources (including Fish, Wildlife, and Plants)
- Climate
- Coastal Resources
- Department of Transportation Act, Section 4(f) Resources
- Farmlands
- 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
- Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety Risks
- Visual Effects (Light Emissions)
- Water Resources (including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)

For each of the resources covered in this section, the following information is provided:

- Regulatory Setting
- Affected Environment
- Environmental Consequences

## 3.1 Resources Not Analyzed in Detail

This EA does not analyze potential impacts on the following environmental impact categories in detail, for the reasons explained below:

- **Air Quality and Climate** – The drone is battery-powered and would not generate criteria air pollutants or greenhouse gas emissions that could result in air quality or climate impacts. Electricity used to support drone battery charging and PADDC operations would be supplied by the local power grid and is expected to be minimal, given the limited number of anticipated

drone operations. The PADDC would be equipped with an emergency generator, but its use is expected to be very infrequent, and only in times of emergency.

- **Coastal Resources** – The proposed action would not directly affect any shorelines, change the use of shoreline zones, or be inconsistent with any National Oceanic and Atmospheric Administration (NOAA)-approved state Coastal Zone Management Plan (CZMP) since there are no coastal zones or shorelines in the area of operations. The proposed action is expected to occur more than 125 miles from the nearest shoreline resource.

- **Farmlands** – The proposed action would not involve the development or disturbance of any land regardless of use, nor would it have the potential to convert any farmland to non-agricultural uses.

- **Hazardous Materials, Solid Waste, and Pollution Prevention** – The proposed action would not result in any further construction or development or any physical disturbances of the ground, beyond what was already constructed without the need for FAA approval. Data from the US Environmental Protection Agency (EPA) and Texas Commission on Environmental Quality (TCEQ) indicate no presence of Superfund Sites within the operating area. TCEQ data indicates the presence of 44 sites where clean-up operations for leaking petroleum storage tanks have occurred; however, the proposed action does not include any new construction or ground disturbance which could impact hazardous materials. Furthermore, the delivery drones are assembled from recoverable materials that would be properly managed and disposed of in accordance with 14 CFR Part 43. Therefore, the potential for impact in relation to hazardous materials, pollution prevention, and solid waste is not anticipated.

- **Land Use** – The proposed action would not involve any changes to existing, planned, or future land uses within the area of operations.

- **Natural Resources and Energy Supply –** The proposed action would not require the need for unusual natural resources and materials, or those in short supply. The drones are battery-powered, but would likely not require excessive fuel resources, given the planned low number of operations.

- **Socioeconomic Impacts and Children's Environmental Health and Safety Risks** – The proposed action would not involve acquisition of real estate, relocation of residents or community businesses, disruption of local traffic patterns, loss in community tax base, or changes to the fabric of the community. Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to ensure that children do not suffer disproportionately from environmental or safety risks. The proposed action would not affect products or substances that a child would be likely to come into contact with, ingest, use, or be exposed to, and would not result in environmental health and safety risks that could disproportionately affect children. Additionally, Prime Air's proposal includes avoiding operations near schools during operational hours, which will help reduce the potential for environmental health or safety impacts to children. There are 16 public K-12 schools and four private pre-K and elementary schools in the study area. Additionally, Texas A&M University, a public four-year institution, is located partially within the study area. The closest school to the PADDC is Southwood Valley Elementary School, which is approximately one mile from the PADDC. This distance is outside of the potential DNL 45 dB noise exposure around the PADDC. Consistent with EO 13045, it is unlikely the proposed action would affect products or substances

that a child could come into contact with, ingest, use, or be exposed to, or would result in environmental health and safety risks that could disproportionately affect children.

- **Visual Effects (Light Emissions Only)** – The proposed action would not result in significant light emission impacts because flights would not be conducted during the nighttime.
- **Water Resources (Wetlands, Floodplains, Groundwater, Wild and Scenic Rivers)** – The proposed action would not result in any further construction of facilities and would not encroach upon areas designated as navigable waters or directly impact wetlands. The proposed operation would not encroach upon areas designated as a 100-year flood event area as described by the Federal Emergency Management Agency (FEMA). The proposed action would not result in any changes to existing discharges to water bodies, create a new discharge that would result in impacts to surface waters, or modify a water body. The proposed action does not involve land acquisition or ground disturbing activities that would withdraw groundwater from underground aquifers or reduce infiltration or recharge to ground water resources through the introduction of new impervious surfaces. The proposed action would not affect any river segments in the Wild and Scenic River System (WSRS) as there are no WSRS river segments nearby. The proposed action would not affect any river segments in the Nationwide Rivers Inventory (NRI) as the nearest NRI river segment is Village Creek and Big Sandy Creek, approximately 90 miles from the operating area boundary.

## 3.2 Biological Resources (Including Fish, Wildlife and Plants)

### 3.2.1 Regulatory Setting

Biological resources include plant and animal species and their habitats, including special status species (federally listed or state-listed threatened or endangered species, species proposed for listing, species that are candidates for federal listing, marine mammals, and migratory birds) and environmentally sensitive or critical habitat. In addition to their intrinsic values, biological resources provide aesthetic, recreational, and economic benefits to society.

#### *Threatened and Endangered Species*

The Endangered Species Act (ESA) of 1973 [16 U.S.C. § 1531 et seq.] requires the evaluation of all federal actions to determine whether a proposed action is likely to jeopardize any proposed, threatened, or endangered species or proposed or designated critical habitat. Critical habitat includes areas that will contribute to the recovery or survival of a listed species. Federal agencies are responsible for determining if an action "may affect" listed species, which determines whether formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) is needed. If the FAA determines that the action will have no effect on listed species, consultation is not required. If the FAA determines that the action may affect listed species, consultation with the USFWS must be initiated.

A significant impact to federally-listed threatened and endangered species would occur when the USFWS or NMFS determines that the proposed action would be likely to jeopardize the continued existence of a federally-listed threatened or endangered species, or would be likely to result in the destruction or adverse modification of federally-designated critical habitat. An action need not involve a threat of extinction to federally listed species to meet the NEPA standard of significance. Lesser impacts including impacts on non-listed or special status species could also constitute a significant impact.

#### *Migratory Birds*

The Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) protects migratory birds, including their nests, eggs, and parts, from possession, sale, purchase, barter, transport, import, export, and take. The USFWS is the federal agency responsible for the management of migratory birds as they spend time in habitats of the U.S. For purposes of the Migratory Bird Treaty Act, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR § 10.12). The Migratory Bird Treaty Act applies to migratory birds identified in 50 CFR § 10.13 (defined hereafter as "migratory birds").

#### *Bald and Golden Eagles*

The Bald and Golden Eagle Protection Act prohibits anyone from "taking" a bald or golden eagle, including their parts, nests, or eggs, without a permit issued by the USFWS. Implementing regulations (50 CFR § 22), and USFWS guidelines as published in the National Bald Eagle Management Guidelines, provide for additional protections against "disturbances." Similar to take, "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle or causes either a decrease in its productivity or nest abandonment due to a substantial interference with breeding, feeding, or sheltering. A permitting process provides limited exceptions to the Bald and Golden Eagle Protection Act's prohibitions. The USFWS has issued regulations for the permitting process in 50 CFR Part 22, which include permits for the incidental take of Bald Eagles. Such permits are only needed when avoidance of incidental take is not possible. According to federal guidelines, if conservation measures can be implemented such that no aircraft are flown within 1,000 feet of a nest, incidental take of Bald Eagles is unlikely to occur and no permit is needed.[16]

### 3.2.2 Affected Environment

This section describes the existing biological environment of the operating area. The operating area is in the Post Oak Savanna ecoregion, a transitional area between woodlands and prairies. The Post Oak Savanna ecoregion is characterized by gently rolling to hilly land scattered with a variety of trees, including oaks, black hickory, cedar elm, and persimmon. Today the region is mostly improved pasture land and vast acreage of grassland.[17]

The proposed action would take place over urban and commercial areas, and some rural areas. These areas provide habitat for many of the more common and ubiquitous bird and mammal species in the region, including deer, squirrels, raccoons, armadillos, wild boar, jackrabbits, mice, badgers, songbirds, raptors, waterfowl, and insects.[18]

#### *Special Status Species*

##### Federally Listed Species

The potential for impacts to federally-listed species was assessed using the USFWS Information for Planning and Consultation (IPaC) map tool and resource. The study area covered the entire operating

[16] U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management guidelines. Available: https://fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf. Accessed: February 4, 2022.
[17] Texas Parks and Wildlife. Ecoregion 3 – Post Oak Savannah. Available. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/wildscapes/ecoregions/ecoregion_3.phtml. Accessed August 19, 2022.
[18] iNaturalist. Brazos County, US, TX Species. Available: Brazos County, TX, US · https://www.inaturalist.org/places/brazos-county.Accessed August 19, 2022.

area, outlined in red in Figure 1 of this EA. The USFWS official species list, obtained through IPaC, is included with this EA (see Appendix A).

Based on the official species list, there are five federally listed endangered and threatened species and one candidate species with potential to occur in study area. This includes three bird species: the Piping Plover (*Charadrius melodus*), a threatened species; the Red Knot (*Calidris canutus rufa*), a threatened species; and the Whooping Crane (*Grus americana*), an endangered species. As noted in the official species list, both the Piping Plover and the Red Knot only need to be considered for wind energy projects, so no further analysis was conducted for those two species. In addition, the Monarch Butterfly *(Danaus plexippus*) is a candidate for listing that has the potential to occur in the study area. Additionally, there is one clam species and one flowering plant species identified in the official species list (see Appendix A).

There is no critical habitat in the operating area for any ESA-listed species.

### State Species of Concern

The Texas Parks and Wildlife Department's database of Rare, Threatened, and Endangered Species of Texas lists 67 species amphibians, birds, fish, insects, mammals, mollusks, plants, and reptiles in Brazos County, including some that are considered Species of Greatest Conservation Need as defined in the 2012 Texas Conservation Action Plan.[19] The State of Texas maintains a list of fish and wildlife that are protected under the Texas Parks and Wildlife Code. This list includes all species that the director of the Texas Parks and Wildlife Department deems threatened with statewide extinction (Title 31, Part 2, Chapter 65, Subchapter G RULE, § 65.176).[20] In addition, a species that is indigenous to the State of Texas and listed by the federal government as endangered automatically receives state protection as an endangered species. Species on this list are protected under state law: the Texas Parks and Wildlife Code (§ 68.015, *Prohibited Acts*) states that "no person may capture, trap, take, or kill, or attempt to capture, trap, take, or kill, endangered fish or wildlife."[21] Additionally, the Texas Administrative Code (Title 31, Part 2, Chapter 65, Subchapter G RULE, § 65.171 states that "no person may: (1) take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed by the department as endangered; or (2) take, possess, propagate, transport, import, export, sell, or offer for sale any species of fish or wildlife listed in this subchapter as threatened."[22]

Because any federally-listed species with potential to occur in the study area would be identified in the USFWS official species list, the FAA did not analyze state endangered species that are not included the official species list for this study area. The Interior Least Tern (*Sternula antillarum athalassos*) is the only species on the state endangered list with potential to occur in Brazos County. However, the FAA determined that the Interior Least Tern is known to occur at specific locations in Texas, and these locations are outside of the study area.

[19] Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs. TPWD County Lists of Protected Species and Species of Greatest Conservation Need. Available: https://tpwd.texas.gov/gis/rtest/. Accessed: August 18, 2022.
[20] Texas Endangered Species List. Available: https://texreg.sos.state.tx.us/fids/202001043-2.pdf. Accessed: September 29, 2022.
[21] Texas Parks and Wildlife Code, § 68.015 *Prohibited Acts*. Under the Federal ESA, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. Available: https://texas.public.law/statutes/tex._parks_and_wild._code_section_68.015. Accessed: September 28, 2022.
[22] Texas Administrative Code Title 31 Part 2 Chapter 65 Subchapter G RULE § 65.171. Available: https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=2&ch=65&rl=171. Accessed: September 28, 2022

The likelihood of state-listed species' occurrence in the study area depends on the presence of species' preferred habitats. Much of the study area is densely developed, and potential wildlife habitat is limited to riparian and prairie areas east of the PADDC.

The state-listed endangered, threatened, and rare species in Brazos County, Texas, are presented in Table 3-1. While these species are listed for Brazos County, it does not automatically convey that they have the potential to occur in the study area. Additionally, state-listed fishes are included in the list; however, the FAA does not anticipate that fish species could be affected as there is no ground disturbance or construction under the proposed action.

**Table 3-1 State-Listed Species with Potential to Occur in Brazos County**

| Species Type | Species Scientific Name / Common Name | State Designated Category | Potential to Occur within the Study Area |
|---|---|---|---|
| Invertebrates | *Potamilus streckersoni* / Brazos heelsplitter | ST | This species of muscle is found to exist just outside the study area. Typically, this species is found within the substrate of freshwater waterbodies. |
| | *Bombus pensylvanicus* / American bumblebee | SR | The American bumble bee can be found throughout the State of Texas. They nest on the ground and forage within a variety of large open fields where they collect nectar from a variety of blooming plant species. |
| | *Pogonomyrmex Comanche* / Comanche harvester ant | SR | Native to Texas, the Comanche harvester ant can be found in open, sandy, upland woodland areas. |
| | *Neotrichia mobilensis* / N. mobilensis – Caddisflies | SR | *N. mobilensis* is a species of caddisflies that are freshwater aquatic insects found in flowing streams. |
| | *Bombus variabilis* / Variable cuckoo bumblebee | SR | The cuckoo bumblebee is one of the rarest bee species in N. America. Typically found in open fields and meadows in southern Texas. This species relies exclusively on the American bumble bee as its host species |
| Fish | *Atractosteus spatula* / Alligator gar | SR | The alligator gar can be found in large rivers and reservoirs, as well as in coastal bays of Texas. This species of gar is associated with near surface habitats in slack water and backwater habitats of rivers. |
| | *Anguilla rostrata* / American eel | SR | The American eel is found within a variety of habitats throughout the northern hemisphere where the adult eel spends most of their time in freshwater systems. |
| | *Notropis atrocaudalis* / Blackspot shiner | SR | This species is considered endemic to the United States and found in the lower Brazos River drainage of eastern Texas. Typically found in small to moderate size tributary streams. |

| | | | |
|---|---|---|---|
| | *Notropis potteri* / Chub shiner | ST | This species can be found in the Brazos, San Jacinto, Trinity, and Colorado Rivers, in Texas. Typically found within large, turbid rivers and in smaller tributaries |
| | *Hybognathus nuchalis* / Mississippi silvery minnow | SR | The Mississippi silvery minnow is found from the Mississippi basin south to the Brazos River, in Texas. It is usually found in calm pools and backwater stream systems. |
| | Silver chub | SR | The silver chub has a widespread distribution within the United States and is found within the Red River and the lower Brazos River within Texas. This species is typically restricted to large, often silty rivers. |
| | *Notropis shumardi* / Silverband shiner | SR | This species is distributed throughout most of eastern Texas's rivers, including Brazos River, Galveston Bay and the Red River. It is common to find the silverband shiner in large rivers but can also be found in smaller tributaries and oxbows associated with turbid water over silt, sand, and gravel. |
| | *Erimyzon claviformis* / Western creek chubsucker | ST | The western creek chubsucker is found from the Gulf Slope drainages from Apalachicola River drainage in Georgia to San Jacinto River in Texas. This fish species prefer backwater and undercut banks in creeks and small rivers. |
| Amphibians | *Ambystoma tigrinum* / Eastern tiger salamander | SR | This species range includes the east coast from southern New York to northern Florida, west from Ohio to Minnesota and southward through eastern Texas to the Gulf. As juveniles, Eastern tiger salamanders are aquatic and as adults they are terrestrial inhabit moist areas near woodlands, wetlands, and prairies. Breeding habitat primarily consists of wetlands or waterbodies. |
| | *Lithobates areolatus areolatus* subspecies *Rana Carolina Carolina* / Southern crawfish frog | SR | This subspecies of *Lithobates areolatus areolatus* that can be found in the states of Texas, Oklahoma, Arkansas, Louisiana, Missouri, Ohio, Indiana, Tennessee, and Kansas. Preferred habitat includes grasslands, prairies, and woodlands, where the frog lives underground most of the year in burrows of other animals. |
| | *Pseudacris streckeri* / Strecker's chorus frog | SR | Mostly found throughout the eastern counties of Texas, this frog species can live in a variety of habit types, including moist woods, sand prairies, streams, swamps, ponds, temperate grasslands, wetlands, canals, and drainage channels. They spend most of their lives burrowed underground. |
| | *Bufo woodhousii* / Woodhouse's toad | SR | This species can be found throughout most of Texas, especially within the eastern counties. |

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| | | | Habitat for this species includes open woodland areas, prairies, and grasslands, as well as open range lands and pastures. |
| Reptiles | *Terrapene Carolina* subspecies in Texas (*triunguis*) / Eastern box turtle | SR | Primarily found throughout the Eastern Counties of Texas, Eastern box turtles are primarily a woodland species, although they may also be found along forest edges and brushy fields. |
| | *Plestiodon septentrionalis* obtusirostris / Prairie skink | SR | The prairie skink is a subspecies of *P. septentrionalis* and occurs in Central and Northern Texas. Prairie skinks can be found in habitat that contains sandy soils in grasslands and along rivers. |
| | *Sistrurus miliarius* / Pygmy rattlesnake | SR | Pygmy rattlesnakes are located throughout the Southeastern United States and mainly within the Eastern Counties of Texas. Pygmy's typically can be found in flatwoods, sandhills, mixed forests, floodplains lakes and marshes. |
| | *Ophisaurus attenuates* / Slender glass lizard | SR | The slender glass lizard distribution in Texas ranges from the Central to the Eastern Counties and can be found in prairies, old fields, or open woodlands, often near water. |
| | *Apalone mutica* / Smooth softshell turtle | SR | The smooth softshell turtle is known to occur in Brazos County. These turtles can be found in large streams, big lakes, and rivers that contain sandy or muddy bottoms, free of a rocky bottom. |
| | *Phrynosoma cornutum* / Texas horned lizard | ST | The Texas horned lizards ranges from the South-Central United States to Northern Mexico. This species is found in arid and semiarid habitats in open areas with sparse plant cover that contains loose sand or loamy soils. |
| | *Crotalus Horridus* / Timber (canebrake) rattlesnake | SR | Timber rattlesnakes can be found throughout the Eastern Counties of Texas, in upland woods and rocky ridges. |
| | *Terrapene ornate* / Western box turtle | SR | The Western box turtle can be found throughout Texas. These species are typically found in shallow burrows located within grassland habitats. |
| | *Deirochelys reticularia miaria* / Western chicken turtle | SR | The Western chicken turtle is an elusive freshwater turtle found in ephemeral wetlands located west of the Mississippi River, including Louisiana, Oklahoma and extending to the Guadalupe River in Texas. |

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| | *Heterodon nasicus* / Western hognose snake | SR | The Western hognose snake can be found throughout Texas, within sandhills, prairies, and river floodplains and typically like environments that are dry and sandy. |
| | *Sistrurus tergeminus* / Western massasauga rattlesnake | SR | The Western massasauga has two subspecies that exist in Texas. The desert massasauga that is commonly associated with xeric prairie habitat from western Texas and the prairie massasauga, which prefer mesic grasslands and wetland communities. Both subspecies have a patchy distribution throughout Texas, |
| Birds | *Haliaeetus leucocephalus* Bald eagle | SR | Although no nests have been identified through database searches within the study area, nonbreeding populations typically occur throughout the state. |
| | *Calcarius ornatus* / Chestnut-collared longspur | SR | Species distribution of the chestnut-collared longspur within Texas primarily lies just west of the study area and throughout the Western Counties of Texas. Longspur are ground-feeding birds that breeds in prairie habitats in Canada and the northern United States and winters to the south in the United States and Mexico. |
| | *Leucophaeus pipixcan* / Franklin's gull | SR | Franklin's Gull is not a common occurrence within the study area, although occasionally large flocks are observed in migration. This species breeds in northern prairies and winters on the west coast of South America. |
| | *Sterna antillarum athalassos* / Interior least tern | SR | This is a state endangered species.<br><br>In Texas, interior least terns are found at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, on the Prairie Dog Town Fork of the Red River in the eastern Panhandle, and along the Red River. These habitats are located outside of the study area. They can be found on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs. The interior least tern is not expected to occur in the study area. |
| | *Elanoides forficatus* / Swallow-tailed kite | ST | This species occurs within the Southeast portion of Texas near the coast and the lower Sabine River in the Coastal Prairies regions.<br>Swallow-tailed kites breed in Texas from sea level to 230 meters in bottomland forests with nearby open areas, freshwater marshes skirting large lakes and pine glades adjoining cypress swamps. |
| | *Athena funicular hypugaea* Western burrowing owl | SR | Found throughout Texas, in grassland habitat that supports open areas with short vegetation and bare ground. These owls can excavate their own burrows but usually select |

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| | | | existing burrows or burrows that were excavated by mammals. A majority of suitable habitat within the study areas has been heavily developed. |
| | *Plegadis chihi* / White-faced ibis | ST | This species frequents marshes, swamps, ponds and rivers. In Texas, they breed and winter along the Gulf Coast and may occur as migrants in the Panhandle and within west Texas |
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| | *Mycteria americana* / Wood stork | ST | Wood storks typically observed east of Dallas to San Antonio to Zapata. Wood stork nesting habitat consists of shrubby wetland systems and swamps. Their nests are typically constructed in short shrubs, especially red mangroves or in medium or tall trees such as cypress. |
| Mammals | *Eptesicus fuscus* / Big brown bat | SR | This species of bat is widely distributed within the Eastern and Western Counties of Texas. Big brown bats emerge just before or just after sundown, though they will emerge even in mid-day to drink or feed when they are especially stressed. Feeding activity is most intense within the first two hours after sunset but may occur anytime during the day. |
| | *Nyctinomops macrotis* / Big free-tailed bat | SR | The big free-tailed bat typically ranges from South America northward to Mexico, Arizona, New Mexico, and southern and western Texas. This species likes to occupy rocky habitats in arid landscapes, but has also been found in desert shrub, woodlands, and evergreen forests. This species forages late in the evening but is sometimes seen flying early in the afternoon |
| | *Lasiurus borealis* / Eastern red bat | SR | Mostly found within Western Texas, the Eastern red bat likes a variety of habitats, including along the edges of pastures, crop lands, or other openings dotted with large deciduous trees, in cypress stands, and near pecan trees along rivers. This species is often the first bats to emerge after sunset and feed most actively during the first several hours after sundown but may feed all night. |
| | *Spilogale putorius* / Eastern spotted skunk | SR | The range of the Eastern spotted skunk in Texas extends across the Central Counties, including Brazos County, where they occupy tall-grass prairies, wooded areas and rocky habitats. |
| | *Aeorestes cinereus* / Hoary bat | SR | None.<br>Known to occur in Brazos County, the hoary bat typically roosts singly in deciduous or coniferous tree foliage 3–19 m tall and often near the edge of clearings. The bat will usually emerge late in the evening and is |

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| | | seen during the daylight hours during migration. |
| *Mustela frenata* / Long-tailed weasel | SR | Long-tailed weasels can be found throughout Texas except for the Panhandle region. They occupy a variety of habitats, including brush lands, fencerows, upland woods, bottomland hardwoods, forest edges, and rocky deserts. The presence of water is a habitat requirement for this species. |
| *Puma concolor* / Mountain lion | SR | Native to Texas, however populations have become extinct in the eastern Counties. Mountain lions are typically found in remote mountains, canyon lands, or hilly areas. |
| *Ondatra zibethicus* / Muskrat | SR | Muskrats are known to occur throughout much of North America. They are found around water habitats that contain thick vegetation suck as ponds, wetlands, marshes, streams, lakes, swamps, and bogs. |
| *Lasiurus intermedius* / Northern yellow bat | SR | Northern Yellow Bat is a non-migratory species that lives along the Gulf Coast, in areas where Spanish moss is prevalent. In Texas, they are best known from coastal palm groves. Foraging typically begins at dusk in areas such as pastures, golf courses, and the edges of lakes and forests. |
| *Perimyotis subflavus* / Tricolored bat | SR | This species can be found in Eastern and Western Texas, where they typically hibernate singly and up to six to nine months, on cave walls or ceilings. Tricolored bat forages along forest edges and over ponds and waterways. |

### *Migratory Birds*

Migratory bird species found within the operating area will vary throughout the year. During certain weeks in the spring and fall, hundreds of species of songbirds, raptors, and waterfowl may potentially pass through the operating area. Additionally, several dozen species of birds may potentially nest in the operating area at certain times of the year.

The official species list identifies 10 Birds of Conservation Concern (BCC) that could occur in the operating area, along with information on the likelihood that they may be nesting in the area (see Appendix A). Habitat used by BCC species listed in the study area would occur mostly in grasslands and riparian environments.

The Bald Eagle (*Haliaeetus leucocephalus)* is listed by USFWS as a BCC in the operating area, and it is protected under the Bald and Golden Eagle Protection Act. Bald Eagles could nest in areas near bodies of water such as Carter Lake, Lake Placid, Bee Creek, Carters Creek, or Hudson Creek in the operating area. The National Bald Eagle Management Guidelines state that aircraft should stay at least 1,000 feet from

Bald Eagle nests during the breeding season unless the aircraft is operated by a trained wildlife biologist.[23]

### 3.2.3 Environmental Consequences

There will be no further ground construction or habitat modification associated with the proposed action, beyond what Prime Air has already completed at their PADDC site. Earlier construction was not part of the proposed action reviewed by the FAA, and any future ground construction at the PADDC site will not require approval or authorization by the FAA.

Prime Air's aircraft will not touch the ground in any other place than the PADDC (except during emergency landings) since it remains airborne while conducting deliveries. The operations will be taking place within airspace, and typically well above the tree line and away from sensitive habitats. After launch, Prime Air's UA will rise to a cruising altitude between 160 feet and 180 feet AGL and follow a preplanned route to its delivery site. The pre-planned route is optimized to avoid terrain and object obstructions, areas of high aircraft traffic, and areas where people may gather in large numbers such as highways, parks, and schools.

Aircraft will typically stay at 160-180 feet AGL or higher except when descending to drop a package. When making a delivery, the aircraft descends and packages are dropped to the ground from approximately 13 feet AGL. Packages are carried internally in the aircraft's fuselage, and are dropped by opening a set of payload doors on the aircraft. After the package is dropped the UA then climbs vertically to approximately 160-180 feet and reverses the path taken, returning to the takeoff/landing pad at the PADDC. The UA will take approximately 53 seconds to complete a delivery, which includes the descent from en route altitude, dropping the package, and returning back to en route altitude. As a result, the duration of exposure by most wildlife on the ground to the visual or noise impacts from the UA would be of very short duration (less than a minute).

A noise descriptor for noise effects on wildlife has not been universally adopted, but some research indicates sound exposure level (SEL) is the most useful predictor of responses.[24] Characteristic of the bulk of research to date has been lack of systematic documentation of the source noise event. Many studies report "sound levels" without specifying the frequency spectrum or duration. A notable exception is a study sponsored by U.S. Air Force that identifies SEL as the best descriptor for response of domestic turkey poults to low-altitude aircraft overflights (Bradley et al. 1990).[25] This study identified a threshold of response for disturbance of domestic turkeys as SEL 100 dBA. As described in Appendix C, the UA noise events only approach this threshold at the delivery point. A more recent study found that, in most instances, drones within four meters of birds did not cause a behavioral response (Vas et al. 2015[26]). In another study, drones barely elicited behavioral responses in terrestrial mammals (Mulero-Pazmany et Al. 2017).[27] As stated above, the duration of exposure to the UA during any given flight

[23] U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines. Available: https://www.fws.gov/sites/default/files/documents/national-bald-eagle-management-guidelines.pdf. Accessed: October 19, 2021.

[24] Sound exposure level (SEL) is a single event metric that considers both the noise level and duration of the event, referenced to a standard duration of one second.

[25] Bradley, F., C. Book, and A.E. Bowles. 1990. Effects of Low-Altitude Aircraft Overflights on Domestic Turkey Poults. Report No. HSD-TR-90-034, U.S. Air Force Systems Command, Noise and Sonic Boom Impact Technology Program, June.

[26] Vas, E., A. Lescroel, O. Duriez, G. Boguszewski, and D. Gremillet. 2015. Approaching Birds with Drones: First Experiments and Ethical Guidelines. Biology Letters (The Royal Society).

[27] Mulero-Pázmány, M., S. Jenni-Eiermann, N. Strebel, T. Sattler, J. José Negro, and Z. Tablado. 2017. Unmanned aircraft systems as a new source of disturbance for wildlife: A systematic review. *PloS One* 12 (6).

would be less than a minute. Therefore, the proposed action is not expected to result in significant impacts to wildlife from UA noise or visual presence.

Based on the noise analysis, as discussed in Section 3.5 and Appendix C, the maximum SEL (96.5 A-weighted decibels [dBA]) occurs when the UA is approximately 32.8 feet from a delivery location. The en route SEL is estimated at 67.7 dBA. It is not likely that listed species would be in the vicinity of the delivery location because such locations would be developed areas. However, even if species were expected to be exposed to this noise level, the noise would be unlikley to cause significant disturbance (for context, an air conditioning unit at 100 feet is approximately 60 dB).[28] The low number of daily operations and nature of the flights are not expected to affect wildlife behavior in the study area.

The FAA has looked at the potential effects of wildfires that may be caused by the proposed action. While the Prime Air UA has been evaluated for airworthiness and is considered to be safe for the proposed operations over the operating area, the FAA acknowledges that a crash may occur and could result in a wildfire. However, Prime Air's FAA-accepted checklists include procedures to notify local emergency services in the event of an accident or incident. In accordance with 14 CFR § 135.23(d), Prime Air is required to locate and secure any downed aircraft pending guidance from the FAA or National Transportation Safety Board (NTSB). The FAA understands that Prime Air would immediately notify local emergency fire response services if one of its UA were to crash, and that fire responders would be be able to manage any wildfire that could occur before the wildfire could cause significant impacts to biological resources in the operating area.

### *Special Status Species*

Since the operations will be occuring within airspace only, and there will be no construction or ground disturbance under the proposed action, the FAA has determined that there will be *no effect* on the clam or flowering plant species identified in the official species list.

The Monarch Butterfly, a candidate for federal listing, has the potential to occur in the operating area. Information regarding drone impacts on insects is limited and there have been no widespread negative impacts identified in the scientific literature. Some research shows that Monarch Butterflies are not commonly observed at higher AGL altitudes, and would not be expected to frequently occur at the altitudes where Prime Air is proposing to operate.[29]

The federally endangered Whooping Crane was identified in the official species list as possibly occuring in the area, although it nests much further north in Canada so there is no threat of disturbing that critical part of their lifecycle. The Whooping Crane's traditional wintering grounds and closest critical habitat is approximately 171 miles south of the study area, in Aransas National Wildlife Refuge.[30]

While it is possible that Whooping Cranes could use the small agricultural fields in the eastern part of the operating area as stopover habitat on their way to wintering grounds along the Gulf Coast, the FAA found that there were no recorded sightings of Whooping Crane within the study area boundaries. The FAA also found that there is no known stopover habitat in the study area based on the Texas Parks and

[28] Federal Agency Review of Selected Airport Noise Analysis Issues (Federal Interagency Committee on Noise), August 1992, Table B.1.
[29] Altitudes attained by migrating monarch butterflies, *Danaus p. plexippus* (Lepidoptera: Danaidae), as reported by glider pilots. Available: https://cdnsciencepub.com/doi/abs/10.1139/z81-084. Accessed April 25, 2022.
[30] USFWS Whooping Crane, Critical Habitat Spatial Extents. Available: https://ecos.fws.gov/ecp/species/758#crithab. Accessed: August 24, 2022.

Wildlife Nature Trackers project, Texas Whooper Watch.[31] Additionally, Whooping Crane migration flights are usually between 1,000 and 6,000 feet; therefore, it is not expected that occasional drone flights at 160-180 feet AGL would affect transitory Whooping Cranes if they were to migrate through the study area. Because the FAA has determined that Whooping Cranes would not be present where effects are likely to occur, the FAA has determined that there would be *no effect* to the Whooping Crane as a result of the proposed action.

In the Affected Environment section, Table 3-1 identifies the federal and state-listed threatened and endangered species that could occur in Brazos County. The Interior Least Tern (*Sternula antillarum athalassos*) was identifed on the Texas state endangered list, and was identified on the Texas Species of Greatest Conservation Need list as potentially being found within Brazos County. However, because the known habitat locations for the Interior Least Tern are not within the study area, the FAA determined that there would be no effects to this species.

Given the habitat type and distribution required by state-listed species that may occur in Brazos County, and due to the lack of suitable habitat in the study area, no effects to state-listed species or species habitat are anticipated.

### *Migratory Birds*

Prime Air has stated to the FAA that it will monitor the operating area for any active Bald Eagle nests that may occur. Bald Eagle nests are typically very conspicuous, usually five to nine feet in diameter, with a vertical depth up to eight feet, and Prime Air should be able to visually identify any nests that may be present in the area.[32] Online resources such as iNaturalist may also be used to identify Bald Eagle nests that may be active in the operating area. If Prime Air identifies a Bald Eagle nest or is notified of the presence of a nest by a state regulator or naturalist group, Prime Air will establish an avoidance area such that there is a 1,000 feet vertical and horizontal separation distance between the vehicle's flight path and the nest. This avoidance area will be maintained until the end of the breeding season (September 1 through July 31 in the study area),[33] or a qualified biologist indicates the nest has been vacated.

The Red-headed Woodpecker (*Melanerpes erythrocephalus*) is a BCC within the operating area. Red-headed Woodpeckers typically nest in tall, dead trees near marshes and open bodies of water. Throughout the red-headed species range, their population numbers are in decline. It is possible that Red-headed Woodpeckers may be nesting within the operating area and, while it is not anticipated, there is possibility that drone operations in close proximity could disturb birds at nesting sites during its breeding season (May 10 – September 10). While it is not expected that infrequent drone overflights will cause adverse effects to Red-headed Woodpeckers, Prime Air will continually monitor the operating area for their nesting sites and take avoidance measures if determined to be necessary by Prime Air.

The Chimney Swift (*Chaetura pelagica*) is another BCC within the operating area. Chimmney Swifts often make their nests in manmade vertical surfaces such as within a chimney, air shaft, or abandoned buildings.[34] It is possible that Chimney Swifts may be nesting within the operating area and that drone

[31] Texas Parks and Wildlife, Nature Trackers, Texas Whooper Watch. iNaturalist. Available: https://www.inaturalist.org/projects/texas-whooper-watch. Accessed: August 24, 2022.
[32] USFWS Midwest Region: Identification of Large Nests. Available: https://www.fws.gov/midwest/eagle/Nhistory/nest_id.html. Accessed: December 13, 2021
[33] See IPaC report in Appendix A for Bald Eagle breeding dates in the study area.
[34] Texas Parks and Wildlife. Chimney Swift. Available: https://tpwd.texas.gov/huntwild/wild/species/cswift/. Accessed: August 24, 2022.

operations in close proximity could affect its nesting sites during its breeding nesting season (March 15 – August 25). While it is not expected that infrequent drone overflights will cause adverse effects to nesting or feeding Chimney Swifts, Prime Air will continually monitor the operating area for active Chimney Swift nesting sites and take avoidance measures if determined to be necessary by Prime Air.

The other BCC species identified in the IPaC official species list breed elsewhere or they are not likely to be nesting out in the open and within close proximity to human presence such as the Bald Eagle, Red-headed Woodpecker, or Chimney Swift. These other BCC species typically nest in forests and riparian corridor environments that are not within close proximity to locations where the Prime Air UA will be completing is ascent and descent. Additionally, the UA's en route overflights are not expected to result in effects to any lifecycles of these species.

Due to the limited operating area and proposed number of daily operations, occasional drone overflights at approximately 160-180 feet AGL are not expected to impact critical lifecycles of wildlife species or their ability to survive.

Our analysis finds that the proposed action is not expected to cause any of the following impacts:

- A long-term or permanent loss of unlisted plant or wildlife species, i.e., extirpation of the species from a large project area;
- 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.

## 3.3 Department of Transportation Act, Section 4(f) Resources

### 3.3.1 Regulatory Setting

Section 4(f) of the Department of Transportation Act [DOT Act, codified at 49 U.S.C. § 303(c)] protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) states that, subject to exceptions for de minimis impacts[35]: "The Secretary may approve a transportation program or project requiring the use of [4(f) resources]…only if—(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."

The term "use" includes both direct or physical and indirect or "constructive" impacts to Section 4(f) resources. Direct use is the physical occupation or alteration of a Section 4(f) property or any portion of a Section 4(f) property. A constructive use does not require direct physical impacts or occupation of a Section 4(f) resource. A constructive use would occur when a proposed action would result in

[35] The FAA may make a de minimis impact determination with respect to a physical use of Section 4(f) property if, after taking into account any measures to minimize harm, the result is either: (1) a determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or wildlife or waterfowl refuge for protection under Section 4(f); or (2) a Section 106 finding of no adverse effect or no historic properties affected. See 1050.1F Desk Reference, Paragraph 5.3.3

substantial impairment of a resource to the degree that the protected activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. The determination of use must consider the entire property and not simply the portion of the property used for a proposed project.[36]

Section 4(f) resources where a quiet setting is a generally recognized feature or attribute receive special consideration. In assessing constructive use, FAA Order 1050.1F, Appendix B, page B-11, requires that the FAA "…must consult all appropriate federal, state, and local officials having jurisdiction over the affected Section 4(f) properties when determining whether project-related impacts would substantially impair the resources." Parks, recreation areas, and wildlife and waterfowl refuges that are privately owned are not subject to Section 4(f) provisions.

A significant impact would occur pursuant to NEPA when a proposed action either involves more than a minimal physical use of a section 4(f) property or is deemed a "constructive use" based on an FAA determination that the proposed action would substantially impair the 4(f) property, and mitigation measures do not eliminate or reduce the effects of the use below the threshold of significance.

### 3.3.2 Affected Environment

The FAA identified properties that could meet the definition of a Section 4(f) resource within the operating area. There are no state parks, national parks, or wildlife or waterfowl refuges within the operating area. However, there are several local parks that have the potential to be recognized as Section 4(f) resources. These properties include Bee Creek Park, Central Park, Woodcreek Park, Rock Prairie School and Church, and Richard Carter Homesite. The potential Section 4(f) resources in the study area are listed in Table 3-2 below.

**Table 3-2** Section 4(f) Resources in the College Station Study Area

| Name | Address |
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| Anderson Park | 900 Anderson St, College Station, TX 77840 |
| Andy Anderson Arboretum | 900 Anderson St, College Station, TX 77840 |
| Art & Myra Bright Park | 2505 Raintree Dr, College Station, TX 77845 |
| Bachmann Park | 1600 Rock Prairie Rd, College Station, TX 77845 |
| Barracks Park | 30.570781432787836, -96.31753371534207 |
| Bee Creek Park | 1900 Anderson St, College Station, TX 77840 |
| Bonfire Memorial | Texas A&M University, History Walk / Spirit Ring, College Station, TX 77843 |
| Bridgewood Park | 30.55180810371838, -96.28806381534207 |
| Brison Park | 400 Dexter Dr, College Station, TX 77840 |
| Brothers Pond Park | 3100 Rio Grande Blvd, College Station, TX 77845 |

[36] Federal Highway Administration (FHWA) Section 4(f) Policy Paper. (Note: FHWA regulations are not binding on the FAA; however, the FAA may use them as guidance to the extent relevant to aviation projects.) Available: https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.pdf. Accessed: February 2, 2021

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| Carter's Crossing Park | 2115 N Forest Pkwy, College Station, TX 77845 |
| Castlegate Park | 4455 Castlegate Dr, College Station, TX 77845 |
| Castlerock Park | 4550 Castle Rock Pkwy, College Station, TX 77845 |
| College Station Cemetery | 2530 Texas Ave S, College Station, TX 77840 |
| Creek View Park | 1001 Eagle Ave, College Station, TX 77845 |
| Cy Miller Park | 2615 Texas Ave, College Station, TX 77840 |
| Edelweiss Gartens Park | 500 Hartford Dr, College Station, TX 77845 |
| Edelweiss Park | 3900 Victoria Ave, College Station, TX 77845 |
| Emerald Forest Park | 8400 Appomattox Dr, College Station, TX 77840 |
| G.Hysmith Skatepark | 1520 Rock Prairie Rd, College Station, TX 77845 |
| Gabbard Park | 1201 Dexter Dr S, College Station, TX 77840 |
| Georgie K. Fitch Park | 1100 Balcones Dr, College Station, TX 77845 |
| Holleman Crossing Dog Park | 1300 Harvey Mitchell Pkwy S, College Station, TX 77840 |
| Jack & Dorothy Miller Park | 501 Rock Prairie Rd, College Station, TX 77845 |
| John Crompton Park | 201 Holleman Dr W, College Station, TX 77840 |
| Kiwanis Trail | 30.62797349018994, -96.32021325767103 |
| Kyle Field | 756 Houston St, College Station, TX 77843 |
| Lemontree Park | 1300 Lemon Tree Ln, College Station, TX 77840 |
| Lick Creek Greenbelt | 30.574254218950944, -96.2496116797288 |
| Longmire Park | 2600 Longmire Dr, College Station, TX 77845 |
| Luther Jones Park | 501 Park Pl, College Station, TX 77840 |
| Merry Oaks Park | 1401 Merry Oaks Dr, College Station, TX 77840 |
| Midtown Reserve | 1136 Amistad Loop, College Station, TX 77845 |
| Oaks Park | 1601 Stallings Dr, College Station, TX 77840 |
| Parkway Park | 1106 Munson Ave, College Station, TX 77840 |
| Pebble Creek Park | 401 Parkview Dr, College Station, TX 77845 |
| Phillips Park | 30.545718198645407, -96.285021 |
| Raintree Park | 2505 Raintree Dr, College Station, TX 77845 |
| Reatta Meadows Park | 30.559038735322304, -96.2804719 |
| Richard Carter Park | 1800 Brazoswood Dr, College Station, TX 77840 |
| Sandstone | 1730 Sebesta Road, College Station, TX 77845 |

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| Schob Nature Preserve | 906 Ashburn Ave, College Station, TX 77840 |
| Smith Track | 30.62944944558417, -96.29437517560841 |
| Sonoma Park | City of College Station, 1101 Texas Ave S, College Station, TX 77840 |
| Southern Oaks Park | 1398 Southern Plantation Dr, College Station, TX 77845 |
| Southwest Park | 300 Southwest Pkwy, College Station, TX 77840 |
| Spring Creek Greenbelt | 30.573703777720876, -96.26876971534206 |
| Steeplechase Park | 301 W Ridge Dr, College Station, TX 77845 |
| Stephen C. Beachy Central Park | 1000 Krenek Tap Rd, College Station, TX 77840 |
| Texas A&M University Numerous Athletic Fields in Area | 400 Bizzell St, College Station, TX 77843 |
| The London Beach Volleyball Court | 601 Luther W St, College Station, TX 77840 |
| Thomas Park | 1300 James Pkwy, College Station, TX 77840 |
| Tiger Stadium | 1801 Harvey Mitchell Pkwy S, College Station, TX 77840 |
| TruFit Athletic Clubs | 3526 Longmire Dr, College Station, TX 77845 |
| Veterans Park and Athletic Complex | 3101 Harvey Rd, College Station, TX 77845 |
| W.A. Tarrow Park | 107 Holleman Dr, College Station, TX 77840 |
| Wallace Lake Park | 4200 WS Phillips Pkwy, College Station, TX 77845 |
| Windwood Park | 2650 Brookway Ct, College Station, TX 77845 |
| Wolf Pen Creek Park | 1015 Colgate Dr, College Station, TX 77840 |
| Wolf Pen Creek Trail | 1015 Colgate Dr, College Station, TX 77840 |
| Woodcreek Park | 9100 Shadowcrest Dr, College Station, TX 77845 |
| Woodland Hills Park | 4418 Woodland Ridge Dr, College Station, TX 77845 |

There are no historic sites within the operating area, as listed on the Texas SHPO and Brazos County Historical Commission websites. There are several historical markers in the operating area; however, these historical markers would not typically be affected by UA operations.[37] Additionally, as discussed in Section 3.4, *Historical, Architectural, Archaeological, and Cultural Resources*, the FAA conducted

[37] Brazos County Historical Commission. Map of Historical Markers. Available: https://brazoscountyhistory.org/map-of-historical-markers. Accessed: August 26, 2022.

outreach with the Texas SHPO and six tribes (including three THPOs) regarding Prime Air's proposed operations to determine whether historic or traditional cultural properties would be affected by the proposed action.

### 3.3.3 Environmental Consequences

There will be no physical use of Section 4(f) resources because there will be no construction on any Section 4(f) resource. The FAA has determined that infrequent UAS overflights as described in the proposed action are not considered a constructive use of any Section 4(f) resource, and will not cause substantial impairment to any of the Section 4(f) resources in the operating area. As described in the Section 3.5, Noise and Noise-Compatible Land Use, and the Noise Analysis Report (Appendix C), the proposed operations will not result in significant noise levels at any location in the operating area other than the PADDC property. Noise and visual effects from Prime Air's occasional overflights are not expected to diminish the activities, features, or attributes of the resources that contribute to their significance or enjoyment.

Additionally, Prime Air identifies areas where open air gatherings of people typically occur, such as open air concert venues and school yards, and avoids these properties through the creation of keep-out areas via Prime Air's route planning software, which prepares an optimized flight path from the PADDC to each designated delivery site. The software ensures that each route integrates and respects all of the restrictions entered into the database, including Section 4(f) properties, which can be automatically avoided based on the time of day and other factors. The FAA has determined that there will be no significant impacts to Section 4(f) resources as a result of the proposed action.

## 3.4 Historical, Architectural, Archaeological, and Cultural Resources

### 3.4.1 Regulatory Setting

Section 106 of the National Historic Preservation Act (NHPA) of 1966 [54 U.S.C. § 306108] requires federal agencies to consider the effects of their undertakings on properties listed or eligible for listing in the National Register of Historic Places (NRHP). This includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meets the NRHP criteria. Regulations related to this process are contained in 36 CFR Part 800, Protection of Historic Properties. Compliance with Section 106 requires consultation with the State Historic Preservation Officer (SHPO) and applicable other parties, including American Indian and Alaska Native tribes.

Major steps in the Section 106 process include identifying the Area of Potential Effects (APE), identifying historic and cultural resources within the APE, consulting with the SHPO and any tribe (and THPO) that is identified as potentially having traditional cultural interests in the area, and determining the potential impacts to historic properties as a result of the action.

The FAA has not established a significance threshold for this impact category; however, the FAA has identified a factor to consider when evaluating the context and intensity of potential environmental impacts for historical, architectural, archeological, and cultural resources. A factor to consider in assessing significant impact is when an action would result in a finding of adverse effect through the Section 106 process. However, under 36 CFR § 800.8(a), a finding of adverse effect on a historic property does not necessarily result in a significance finding under NEPA.

### 3.4.2 Affected Environment

The APE for the proposed action is the entire operating area where Prime Air is planning to conduct UA package deliveries, as shown in Figure 1 in this EA. The FAA identified several historic markers that were listed on the Texas SHPO website; however, no NRHP-listed sites were within the APE.[38] Data from the Texas Historical Commission (THC) indicates that 12 historical markers have been established within the APE on sites with state or local historical significance. These historical markers are show in Table 3-3 below.

**Table 3-3** Historical Markers of State or Local Significance in the APE

| THC Marker Number | Name |
|---|---|
| 8628 | African American Education in College Station |
| 8662 | A&M College Consolidated Rural School |
| 8672 | Carter, Richard, Homesite |
| 8674 | College Station Railroad Depots |
| 8675 | Early Texas A&M Campus Housing |
| 8692 | Rock Prairie School and Church |
| 8696 | Shiloh Community |
| 8698 | Texas A&M Corps of Cadets |
| 8699 | Texas A&M University |
| 13065 | Early Play-By-Play Radio Broadcast of a College Football Game |
| 13369 | Main Drill Field, Texas A&M University |
| 18810 | Texas AMC and WWI |

SOURCE: Texas Historical Commission, 2022.

THC historical markers are placed to commemorate various topics including, “history and architecture of houses, commercial and public buildings, religious congregations, and military sites; events that changed the course of local and state history; and individuals who have made lasting contributions to our state, community organizations, and businesses.” There are three types of markers established by the THC: subject markers, Historic Texas Cemetery markers, and Recorded Texas Historic Landmark markers. None of the historical markers in the APE are recorded as Texas Historic Landmarks. Not all locations with historical markers are necessarily historic places with characteristics with potential to be impacted by drone delivery operations.

[38]Texas Historical Commission. Texas Historical Sites Atlas: Brazos County. Available: https://atlas.thc.texas.gov/. Accessed: August 26, 2022.

### 3.4.2 Environmental Consequences

The nature of UA effects on historic properties is limited to non-physical, reversible impacts (i.e., the introduction of audible and/or visual elements). In addition, the distribution of daily flights that Prime Air is proposing –divided into four separate sectors – means that any historic or cultural resource would be subject to only a small number of overflights per day, if any.-

In an accordance with 36 CFR § 800.4(a)(1), the FAA consulted with the Texas SHPO and six tribes that may potentially attach religious or cultural significance to resources in the APE. Three of the tribes have THPOs: Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Wichita and Affiliated Tribes of Oklahoma (Wichita, Keechi, Waco & Tawakonie). The FAA sent a consultation letter to the Texas SHPO on July 12, 2022. On August 4, 2022, the Texas SHPO responded to the FAA and confirmed that no historic properties are present or affected by the proposed action. The FAA's tribal and historic outreach letters are included as Appendix B.

The FAA sent letters on July 12, 2022 to the Alabama-Coushatta Tribe, Apache Tribe of Oklahoma, Comanche Nation of Oklahoma THPO, Coushatta Tribe of Louisiana THPO, Tonkawa Tribe of Indians of Oklahoma, and Wichita and Affiliated Tribes of Oklahoma (Wichita, Keechi, Waco & Tawakonie) THPO. On July 28, 2022, the Coushatta Tribe of Louisiana THPO responded to the FAA and stated that the proposed action will not have a negative impact on any archaeological, historic, or cultural resources of the Coushatta people. This response is available in Appendix B. The other five tribes did not provide a response.

Additionally, the FAA's noise exposure analysis for the proposed action concluded that noise levels are not likely to exceed DNL 45 dB in any location other than the PADDC property, a few properties immmediately surrounding the PADDC, and in the immediate vicinity of locations that may receive a delivery. Based on a review of the proposed action and the nature of the historic properties identified in the APE, the FAA has determined that no historic properties or cultural resources will be affected by the proposed action, in accordance with 36 CFR § 800.4(d)(1). The proposed action will not have a significant impact on historical, architectural, archaeological, or cultural resources.

## 3.5 Noise and Noise-Compatible Land Use

### 3.5.1 Regulatory Setting

Aircraft noise is often the most noticeable environmental effect associated with any aviation project. Several federal laws, including the Aviation Safety and Noise Abatement Act of 1979, as amended (49 U.S.C. §§ 47501-47507) regulate aircraft noise. Through 14 CFR Part 36, the FAA regulates noise from aircraft.

FAA Order 1050.1F, Appendix B, Paragraph B-1.3 requires the FAA to identify the location and number of noise sensitive areas that could be significantly impacted by noise. As defined in FAA Order 1050.1F, Paragraph 11-5b, a noise sensitive area is "[a]n area where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historical sites."

Sound is measured in terms of the decibel (dB), which is the ratio between the sound pressure of the sound source and 20 micropascals, which is nominally the threshold of human hearing. Various weighting schemes have been developed to collapse a frequency spectrum into a single dB value. The A-

weighted decibel, or dBA, corresponds to human hearing accounting for the higher sensitivity in the mid-range frequencies.

To comply with NEPA requirements, the FAA has issued requirements for assessing aircraft noise in FAA Order 1050.1F, Appendix B. FAA's primary noise metric for aviation noise analysis is the yearly DNL metric. The DNL metric is a single value representing the logarithmically average aircraft sound level at a location over a 24-hour period, with a 10 dB adjustment added to those noise events occuring from 10:00 p.m. and up to 7:00 a.m. the following morning. A significant noise impact is defined in Order 1050.1F as an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure or a noise exposure at or above the 65 dB level due to a DNL 1.5 dB or greater increase.

### 3.5.2 Affected Environment

The study area is approximately 43.7 square miles, and the estimated population within the area is roughly 101,719. The population density is approximately 2,445 persons per square mile.[39] There are no airports in the study area. The closest airport is Easterwood Airport, a regional airport approximately 0.70 miles west of the operating area boundary. There are two heliports in the operating area: one is located at Baylor Scott & White Medical Center, 800 Scott & White Drive, and the other is at St. Joseph Health College Station Hospital, 1604 Rock Prairie Road. Existing aviation noise is not expected to be significant. The study area is depicted in Figure 1.

### 3.5.3 Environmental Consequences

Human perception of noise depends on a number of factors, including overall noise level, number of noise events, the extent of audibility above the background ambient noise level, and acoustic frequency content (pitch). UA noise generally has high acoustic frequency content, which can often be more discernable from other typical noise sources.

To ensure that noise would not cause a significant impact to any residential land use or noise sensitive resource within the study area, the FAA initiated an analysis of the potential noise exposure in the area that could result from implementation of the proposed action. Away from the actual PADDC property, the rural, commercial, and residential properties surrounding the PADDC location are likely to experience the highest noise levels as a result of the proposed action. This is due to noise from UA departures and arrivals, as well as more concentrated en route noise from the aircraft.

#### Noise Exposure

Utilizing the operational projections defined in Sections 1 and 2, the noise analysis methodology detailed in Appendix C was then used to the estimate DNL levels for the proposed College Station operations. Noise levels were calculated for each flight phase and are presented in the following three sub-sections:

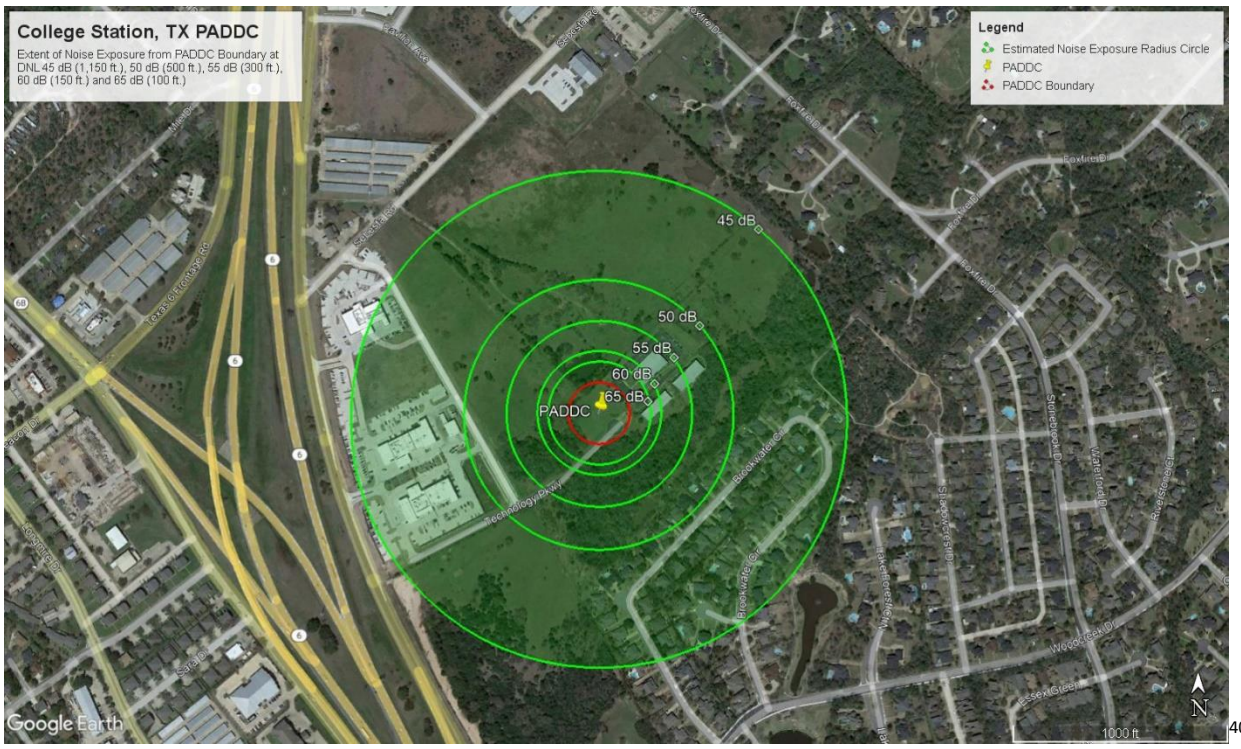
- Noise Exposure for PADDC Operations
- Noise Exposure for En route Operations
- Noise Exposure for Delivery Operations

#### Noise Exposure for PADDC Operations

Based on the anticipated average daily maximum number of deliveries provided by Prime Air, the extent of DNL 45 dB associated with PADDC operations is shown in Figure 4. This region was determined based

[39] Environmental Protection Agency's (EPA) Environmental Justice Screening Tool (EJSCREEN). Available: https://www.epa.gov/ejscreen. Accessed: August 26, 2022

on a review of the layout of the College Station PADDC location, and using the noise level information presented in referencing Table 7 of Appendix C. The DNL extents include departure and vertical ascent to en route altitude from the PADCC, the outbound accelerating transition maneuver from vertical flight at en route altitude to horizontal en route flight, the inbound decelerating transition maneuver from horizontal flight to vertical flight at en route altitude, and the vertical descent from en route altitude to land at the PADCC as discussed in noise analysis report.



[40]

***Figure 4*** *DNL Noise Exposure at College Station PADDC Location*

## Noise Exposure for En route Operations

Based on the information provided by Prime Air, it is anticipated that the UA will typically cruise at altitudes between 160-180 feet AGL at an airspeed of 50-60 knots during en route flight. The noise exposure was calculated assuming operations at roughly 160 feet AGL and at an airspeed of 52.4 knots. As described in the Noise Analysis Report (Appendix C), the UA is expected to typically fly the same outbound flight path between the PADDC and the delivery point and inbound flight path back to the PADDC. Therefore, each location under the en route path would be overflown twice for each delivery served by the respective overhead en route path. The en route noise exposure can be determined by referencing Tables 8 and 9 of Appendix C. This analysis shows that en route noise levels would not exceed DNL 45 dB in any location within the study area.

## Noise Exposure for Delivery Operations

Due to the inherent uncertainty of the exact delivery site locations, the noise analysis developed a minimum and maximum representative distribution of deliveries in the study area based on data provided by Prime Air. The noise analysis conservatively assumes the minimum and maximum distribution of average daily deliveries that could occur at a single delivery location. The distribution of

[40] Google Earth, as modified by the FAA

average annual daily deliveries based on the projections provided by Prime Air range from 0.1 to 4.0 deliveries per operating day. The DNL values include the decelerating transition maneuver from en route horizontal flight to vertical flight at en route altitude, the delivery maneuver, and the accelerating transition maneuver from vertical flight at en route altitude to horizontal en route flight as discussed in noise analysis report. The noise exposure for delivery operations also includes en route overflights at the lower end of the typical operating altitude of 160 feet AGL for operations associated with deliveries to other locations.

A conservative estimate of delivery noise exposure can then be determined by referencing Tables 9 and 10 of Appendix C. The estimated delivery DNL includes values at the minimum and maximum distribution of DNL equivalent deliveries based on the distributions provided by Prime Air at various distances from the delivery point. They include the minimum listener distance from the delivery point at 16.4 feet, which is representative of the closest distance a person may approach before the aircraft takes automated actions to safely cancel the delivery. This is in addition to the minimum measured distance from the UA for which noise measurement data was available for a delivery, which is 32.8 feet. Values were also calculated at distances of 50 feet, 75 feet, 100 feet, and 125 feet from the delivery point, and are representative of distances from which nearby properties may experience noise from a delivery based on the average lot size for sold homes as reported in the 2021 US Census.[41] The DNL for the minimum and maximum distribution of average annual daily DNL deliveries are presented below in Table 3-4.

Table 3-4 DNL for a Delivery Location Based on the Minimum and Maximum Distribution of Deliveries

| Annual Average Daily DNL Equivalent Deliveries | Annual DNL Equivalent Deliveries | Estimated Delivery DNL (dB) at 16.4 feet (Minimum Possible Listener Distance) | Estimated Delivery DNL (dB) at 32.8 feet (Minimum Measured Listener Distance) | Estimated Delivery DNL (dB) at 50 feet | Estimated Delivery DNL (dB) at 75 feet | Estimated Delivery DNL (dB) at 100 feet | Estimated Delivery DNL (dB) at 125 feet |
|---|---|---|---|---|---|---|---|
| 0.1 | 52.0 | 45.8 | 44.4 | 44.1 | 43.8 | 43.5 | 43.3 |
| 4.0 | 1456.0 | 57.2 | 53.6 | 52.6 | 51.1 | 48.9 | 47.2 |

Table 3-4 shows that, with the maximum number of average annual daily deliveries at a single location, including overflights and the transition maneuver to and from horizontal en route flight, noise levels at or above DNL 45 dB could extend beyond 125 feet from the delivery location and may reach adjacent properties. However, these noise levels would not exceed the FAA's significance threshold for noise of DNL 65 dB in any of the areas where Prime Air anticipates providing deliveries.

[41] The 2021 US Census national average lot size for single-family sold homes was 15,218 square feet. This is representative of a property with dimensions of a 123.36 x 123.36 foot square. 125 feet represents a 125 foot lateral width of the parcel rounded up to the nearest 25 feet. Available: https://www.census.gov/construction/chars/xls/soldlotsize_cust.xls. Accessed: August 17, 2022.

#### Total Noise Exposure Results

The maximum noise exposure levels within the study area will occur at the PADDC site; where noise levels at or above DNL 45 dB would extend approximately 1,150 feet from the College Station PADDC. Noise levels at or above DNL 65 dB would extend approximately 100 feet from the PADDC, although this is within the PADDC property. Additionally, the estimated noise exposure for en route operations would not exceed DNL 45 dB at any location within the study area, and the estimated noise exposure for delivery operations, including en route overflights, would not have the potential to exceed DNL 58 dB at any location in the study area and is below the FAA's threshold of significance for noise.

College Station has a noise ordinance under Section 26.8 of the College Station Code of Ordinances which declares a nuisance and prescribes an offense for unreasonable noise between 7 a.m. and 10 p.m. measured from the property line of a residence located in a residential-zoned property that exceeds 63 decibels and would disturb or annoy a person of ordinary sensibilities.[42] Likewise, Section 26.8 declares a nuisance and prescribes an offense for unreasonable noise between 10:01 p.m. and 6:59 a.m. that exceeds 56 decibels and would disturb or annoy a person of ordinary sensibilities.

As explained in Section 3.5.1 above, the FAA has an established noise significance threshold, defined in FAA Order 1050.1F, which is used when assessing noise impacts in a particular project area. A significant noise impact is defined as an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure or a noise exposure at or above the 65 dB level due to a DNL 1.5 dB or greater increase. Based on the results of the noise analysis performed for this EA, noise impacts from the College Station operations are not expected to result in a significant impact. Nor is the noise generated by the College Station operations expected to be incompatible with noise sensitive resource within the study area. The maximum noise exposure at any property line in residential zoned property will not exceed DNL 58 dB.[43]

This is well below the FAA DNL 65 dB significance threshold.[44]

Based on the FAA's noise analysis, the proposed action will not have a significant impact.

## 3.6 Environmental Justice

### 3.6.1 Regulatory Setting

EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, Section 1-101 requires all federal agencies to the greatest extent practicable and permitted by law, to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

DOT Order 5610.2C defines a minority person as a person who is Black; Hispanic or Latino; Asian American; American Indian and Alaskan Native; or Native Hawaiian and other Pacific Islander. A minority population is any readily identifiable group of minority persons who live in geographic proximity, and if

[42] City of College Station, Texas. Code of Ordinances Sec. 26-8 – Noise. Available: https://library.municode.com/tx/college_station/codes/code_of_ordinances?nodeId=SPAGEOR_CH26MIPROF_S26-8NO. Accessed: August 26, 2022.
[43] City of College Station GIS. Planning and Development Map. Available: https://cstx.maps.arcgis.com/apps/webappviewer/index.html?id=1b2d3c188cd5479e9dbc61b6448f714b. Accessed: August 26, 2022.
[44] This discussion of the College Station noise ordinance is provided for informational purposes only.

circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity.

The DOT Order 5610.2C defines a low-income person as a person whose median household income is at or below the Department of Health and Human Services poverty guidelines. A low-income population is any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity.

While the FAA has not established a significance threshold for environmental justice, Section 4-3.3, Exhibit 4-1 of FAA Order 1050.1F outlines the FAA's factors to consider in determining the significance of impacts to environmental justice communities. As stated in Exhibit 4-1, the FAA should consider whether 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. If a significant impact would affect low income or minority populations at a disproportionately higher level than it would other population segments, an environmental justice issue is likely.

A disproportionately high and adverse effect on minority or low-income populations means an adverse effect that:

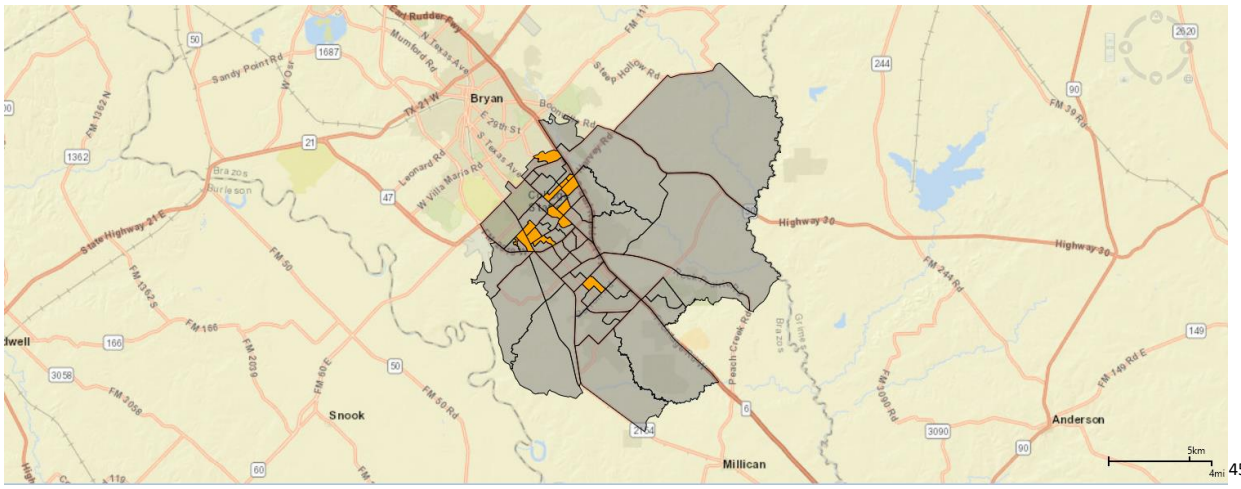
1. Is predominately borne by a minority population and/or a low-income population; or
2. Will be suffered by the minority population and/or low-income population and is appreciable more severe or greater in magnitude than adverse effects that will be suffered by the non-minority population and/or low-income population.

### 3.6.2 Affected Environment

The estimated population within the area is roughly 102,000. Minority and low-income populations were mapped at the Census Block Group level using 2020 American Community Survey (ACS) 5-year estimates from the U.S. Census Bureau. The analysis was performed using the Aviation Environmental Design Tool (AEDT). The FAA utilized a combination of the *fifty-percent analysis* and *meaningfully greater analysis* to complete the analysis for the study area. Low-income populations in the study area were identified by using *the Low-Income Threshold Criteria* analysis. The census block group data used for the analysis is provided in Appendix F.

Minority Population Fifty-Percent Analysis

As depicted in Figure 6, there are 14 census block groups out of 67 that have minority populations at or above 50 percent. The percentage of minority individuals residing within the study area at the census block level is below 50 percent at approximately 36.17 percent.



[45]

**Figure 5** Census Block Groups in the Study Area with Minority Populations ≥ 50 Percent

Minority Population Meaningfully Greater Analysis

The minority population in the study area at the census block group level was compared to the reference community, which is the percentage of minority individuals residing within Brazos County. Because the study area is within Brazos County, the FAA determined that it would be an appropriate geographical region for comparison.

The percentage of minority persons residing within the study area at the census block group level, approximately 36.17 percent, is lower than that of the reference community, which is approximately 46.42 percent. Based on the analysis, the FAA determined that the percentage of minority persons residing within the study area is both less than 50 percent and is not meaningfully greater than the percentage of minority persons residing within the reference community.

Low-Income Threshold Criteria Analysis

The low-income population in the study area at the census block group level was compared to the reference community, which is the percentage of low-income individuals residing within Brazos County. Because the study area is within Brazos County, the FAA determined that it would be an appropriate geographical region for comparison.

The percentage of low-income individuals residing within the study area at the census block group level is approximately 30.05 percent as compared to 25.86 percent in the reference community. Based on the analysis, the FAA identified a low-income population since the percentage of low-income individuals residing within the study area is greater than that of the reference community. The FAA's AEDT analysis data is included in Appendix F.

### 3.6.3 Environmental Consequences

The proposed action would not result in adverse or significant impacts in any environmental resource category. As noted in Section 3.5, *Noise and Noise-Compatible Land Use*, and the Noise Analysis Report in Appendix C, the drone's noise emissions could be perceptible in areas within the study area, but will stay well below the level determined to constitute a significant impact. Using the fifty-percent analysis and meaningfully greater analysis, the FAA determined that there was not a minority population

[45] Image: AEDT, as modified by the FAA.

present. The percentage of low-income individuals was higher in the study area than the reference community; however, the low-income populations would not be subject to significant noise or visual effects that could occur at the PADDC location. Since the proposed action would not result in significant noise or visual effects at any location beyond the PADDC property, and because any effects in the study area would not be predominately or uniquely born by an environmental justice population, the FAA determined that the proposed action would not result in a disproportionately high and adverse effect on a low-income or a minority population.

## 3.7 Visual Effects (Visual Resources and Visual Character)

### 3.7.1 Regulatory Setting

Visual resources and visual character impacts deal with the extent to which the proposed action would result in visual impacts to resources in the operating area. Visual impacts can be difficult to define and evaluate because the analysis is generally subjective, but are normally related to the extent that the proposed action would contrast with, or detract from, the visual resources and/or the visual character of the existing environment. In this case, visual effects would be limited to the introduction of a visual intrusion – a UA in flight – which could be out of character with the suburban or natural landscapes.

The FAA has not developed a visual effects threshold of significance similar to noise impacts. Factors FAA considers in assessing significant impacts include the degree to which the action would have the potential to: (1) affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources; (2) contrast with the visual resources and/or visual character in the study area; or (3) block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

### 3.7.2 Affected Environment

The proposed action would take place over mostly rural properties. As noted in Section 3.3, *DOT Act Section 4(f) Resources*, there are public parks that could be valued for aesthetic attributes within the study area. Prime Air's proposal is to avoid overflights of large open-air gatherings of people during the scope of the proposed action, which includes public parks and other public properties that may be covered under Section 4(f).

### 3.7.3 Environmental Consequences

The proposed action makes no changes to any landforms, or land uses, thus there would be no effect to the visual character of the area. The operations will be happening in airspace only. The FAA estimates that at typical operating altitude and speeds the UA en route would be observable for approximately 3.6 seconds by an observer on the ground. The proposed action involves airspace operations that are unlikely to result in visual impacts on anywhere in the study area, including Section 4(f) properties. The short duration that each drone flight could be seen from any resource in the operating area – approximately 3.6 seconds while the drone is traveling en route at 52.4 knots – and the distribution of flights throughout the 43.7-square mile operating area, would minimize any potential for significant visual impacts at any location in the study area. Any visual effects are expected to be similar to existing air traffic in the vicinity of the operating area.

## 3.8 Water Resources (Surface Waters)

### 3.8.1 Regulatory Setting

Surface water resources generally consist of oceans, wetlands, lakes, rivers, and streams. Surface water is important for its contribution to the economic, ecological, recreational, and human health of a community. The Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) program, which regulates the discharge of point sources of water pollution into waters of the United States and requires a permit under Section 402 of the Clean Water Act. Waters of the United States are defined by the Clean Water Act and are protected by various regulations and permitting programs administered by the EPA and the U.S. Army Corps of Engineers. An action would be considered significant to surface waters when it would: (1) exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or (2) contaminate public drinking water supply such that public health may be adversely affected.

### 3.8.2 Affected Environment

Approximately 0.09 square miles of surface waters occur within the operating area, or less than one percent of the area, based on the Environmental Justice Screening and Mapping Tool (EJSCREEN) report for this proposed action (Appendix E). Notable surface waters include Carters Creek, Hudson Creek, Wolf Pen Creek, Bee Creek, Carter Lake, and Lake Placid. Prime Air's operations will not require a NPDES permit or any other authorization under the CWA.

### 3.8.3 Environmental Consequences

While it is highly unlikely for one of Prime Air's aircraft to crash, and even less likely for a crash to happen within a surface water, this EA considers the potential effects of a drone crashing into surface waters covered by the Clean Water Act.

Prime Air is a certificated Part 135 air carrier and must comply with all applicable regulatory requirements. This includes compliance with requirements to notify the FAA and/or NTSB in accordance with regulatory requirements in the event of an aircraft accident. Prime Air's FAA-accepted checklists include procedures to notify local emergency services in the event of an accident or incident. In accordance with 14 CFR Part 135.23(d), Prime Air is required to locate and secure any downed aircraft pending guidance from the FAA or NTSB.

In the event of an in-flight malfunction or deviation, the Operator in Command can initiate two commands: urgent land, or return to PADDC. In addition, the lithium ion battery packs are well-secured within the aircraft, and are not expected to detach from the aircraft or become lost in the event of an accident or incident.

There will be no further construction activities associated with the proposed action. Prime Air's Part 135 operations will not require a NPDES permit or any other authorization under the Clean Water Act. The proposed action would not have the potential to adversely affect natural and beneficial water resource values to a degree that substantially diminishes or destroys such values, or to adversely affect surface waters such that the beneficial uses and values of such waters are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated. For all of these reasons, the proposed action would not cause an exceedance of water quality standards established by federal, state, local, and tribal regulatory agencies, and the proposed action would not contaminate public drinking water supply such that public health may be adversely affected. Therefore, the potential for impacts to surface waters is not significant.

## 3.9 Cumulative Impacts

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the proposed action along with other actions. The CEQ regulations define cumulative impact as "effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR § 1508.1(g)(3))

As discussed in Section 1.2, there are currently no airports and only two heliports in the study area, and existing aviation noise is not expected to be significant. Additionally, because these are the first commercial package delivery operations by drone within the operating area, and due to airspace safety constraints that will limit the number of package delivery drones operating within the same airspace without further safety and environmental reviews, the proposed action would not be anticipated to result in cumulative impacts to environmental resources within the operating area.

# 4.0 LIST OF PREPARERS and CONTRIBUTORS

Table 4-1 lists the principal preparers, reviewers, and contributors to this EA.

**Table 4-1** List of Preparers and Contributors

| Name and Affiliation | Years of Industry Experience | EA Responsibility |
|---|---|---|
| Mike Millard, Flight Standards, FAA Aviation Safety | 41 | Flight Standards Environmental Specialist and Document Review |
| Christopher Couture, FAA Aviation Safety | 16 | Program Management, Environmental Science, and Document Review |
| Shawna Barry, FAA Office of Environment and Energy | 16 | NEPA subject matter expert, Biological Resources, and Document Review |
| Adam Scholten, FAA Office of Environment and Energy | 12 | Noise Analysis and Document Review |
| Contractor Contributors | | |
| Jodi Jones, FAA Aviation Safety, PrimCorp, LLC | 13 | NEPA subject matter expert, Research, and Document Review |
| Brad Thompson, FAA Aviation Safety, Science Applications International Corporation (SAIC) | 8 | NEPA subject matter expert, Research, and Document Review |

# 5.0 LIST of AGENCIES CONSULTED

Federal Agencies

U.S. Fish and Wildlife Service, Texas Coastal Ecological Services Field Office

State Agencies

Texas Historical Commission

Tribes

Alabama-Coushatta Tribe

Apache Tribe of Oklahoma

Comanche Nation of Oklahoma

Coushatta Tribe of Louisiana

Tonkawa Tribe of Indians of Oklahoma

Wichita and Affiliated Tribes of Oklahoma (Wichita, Keechi, Waco & Tawakonie)

Appendix A

Official Species List

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Texas Coastal Ecological Services Field Office
4444 Corona Drive, Suite 215
Corpus Christi, TX 78411
Phone: (281) 286-8282 Fax: (281) 488-5882

In Reply Refer To:
Project Code: 2022-0068643
Project Name: College Station

July 28, 2022

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

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: http://www.fws.gov/southwest/es/TexasCoastal/Map.html. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and

implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.
A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF
Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities

that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code 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
- 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".

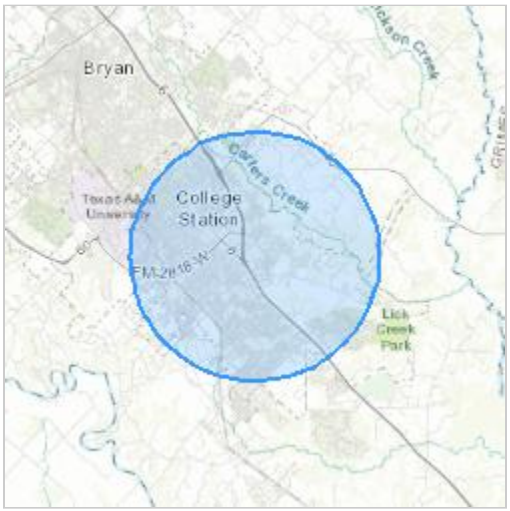
This species list is provided by:

**Texas Coastal Ecological Services Field Office**
4444 Corona Drive, Suite 215
Corpus Christi, TX 78411
(281) 286-8282

# Project Summary

Project Code: 2022-0068643
Project Name: College Station
Project Type: Drones - Use/Operation of Unmanned Aerial Systems
Project Description: 3.73 Mile Radius from 400 Technology Parkway
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@30.593894849999998,-96.28439702548829,14z




Counties: Brazos County, Texas

# Endangered Species Act Species

There is a total of 6 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. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], 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.

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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.

## Birds

| NAME | STATUS |
|---|---|
| Piping Plover *Charadrius melodus*<br>Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>This species only needs to be considered under the following conditions:<br>▪ Wind related projects within migratory route.<br>Species profile: https://ecos.fws.gov/ecp/species/6039 | Threatened |
| Red Knot *Calidris canutus rufa*<br>There is **proposed** critical habitat for this species. The location of the critical habitat is not available.<br>This species only needs to be considered under the following conditions:<br>▪ Wind related projects within migratory route.<br>Species profile: https://ecos.fws.gov/ecp/species/1864 | Threatened |
| Whooping Crane *Grus americana*<br>Population: Wherever found, except where listed as an experimental population<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/758 | Endangered |

## Clams

| NAME | STATUS |
| --- | --- |
| Texas Fawnsfoot *Truncilla macrodon*<br>There is **proposed** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/8965 | Proposed Threatened |

## Insects

| NAME | STATUS |
| --- | --- |
| Monarch Butterfly *Danaus plexippus*<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/9743 | Candidate |

## Flowering Plants

| NAME | STATUS |
| --- | --- |
| Navasota Ladies-tresses *Spiranthes parksii*<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/1570 | Endangered |

## Critical habitats

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

# Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

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.

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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)

**The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location.** To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

| NAME | BREEDING SEASON |
|---|---|
| American Golden-plover *Pluvialis dominica*<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds elsewhere |
| Bald Eagle *Haliaeetus leucocephalus*<br>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.<br>https://ecos.fws.gov/ecp/species/1626 | Breeds Sep 1 to Jul 31 |

| NAME | BREEDING SEASON |
|---|---|
| Chimney Swift *Chaetura pelagica*<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Mar 15 to Aug 25 |
| Kentucky Warbler *Oporornis formosus*<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Apr 20 to Aug 20 |
| Lesser Yellowlegs *Tringa flavipes*<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9679 | Breeds elsewhere |
| Little Blue Heron *Egretta caerulea*<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA | Breeds Mar 10 to Oct 15 |
| Long-billed Curlew *Numenius americanus*<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/5511 | Breeds elsewhere |
| Prothonotary Warbler *Protonotaria citrea*<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Apr 1 to Jul 31 |
| Red-headed Woodpecker *Melanerpes erythrocephalus*<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 10 to Sep 10 |
| Sprague's Pipit *Anthus spragueii*<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/8964 | Breeds elsewhere |

## Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

**Probability of Presence (■)**

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see

below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

**Breeding Season** (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

**Survey Effort** (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

**No Data** (–)
A week is marked as having no data if there were no survey events for that week.

**Survey Timeframe**
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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■ probability of presence ■ breeding season | survey effort – no data


Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

## 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 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 list of migratory birds that potentially occur 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 Rapid Avian Information Locator (RAIL) 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 or migrating in my 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 query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. 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.

RIVERINE

- Riverine

FRESHWATER POND

- Palustrine

LAKE

- Lacustrine

# IPaC User Contact Information

Agency: Federal Aviation Administration
Name: Jodi Jones
Address: 800 Independence Ave SW
City: Washington
State: DC
Zip: 20591
Email jodi.a-ctr.jones@faa.gov
Phone: 2022670509

Appendix B

Tribal and Historic Outreach Letters

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

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

*Via electronic submission to https://xapps.thc.state.tx.us/106Review/*

Dear Mr. Wolfe:

The purpose of this letter is to inform you of a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for an Unmanned Aircraft System (UAS) delivery operation in College Station, TX. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.4(d), Finding of no historic properties affected.

**Proposed Activity Description**
The FAA has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an MK27-2 unmanned aircraft at approximately 200 feet, but no more than 400 feet above ground level (AGL) within a 3.73 mile radius in College Station, TX (see attached operations area map). The purpose is for package delivery, consisting of no greater than approximately 200 flights each day, with each flight lasting approximately 15 minutes. Flights will occur primarily Mon-Fri, no holidays, with operations being conducted for 8-10 hours per day, during daylight hours. The dimension of the UAS area defines the Area of Potential Effect (APE). According to the National Park Service online database of the National Register of Historic Places, no historical places were identified within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a drone delivery center in College Station, TX

**Consultation**
Based on the results of the FAA's search of the National Park Service online database of the National Register of Historic Places, the FAA has determined that this undertaking will have no historic properties affected. In accordance with to § 800.4(d) please review this finding

and the enclosed documentation, and provide either your concurrence or non-concurrence within the 30 day regulatory time frame.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

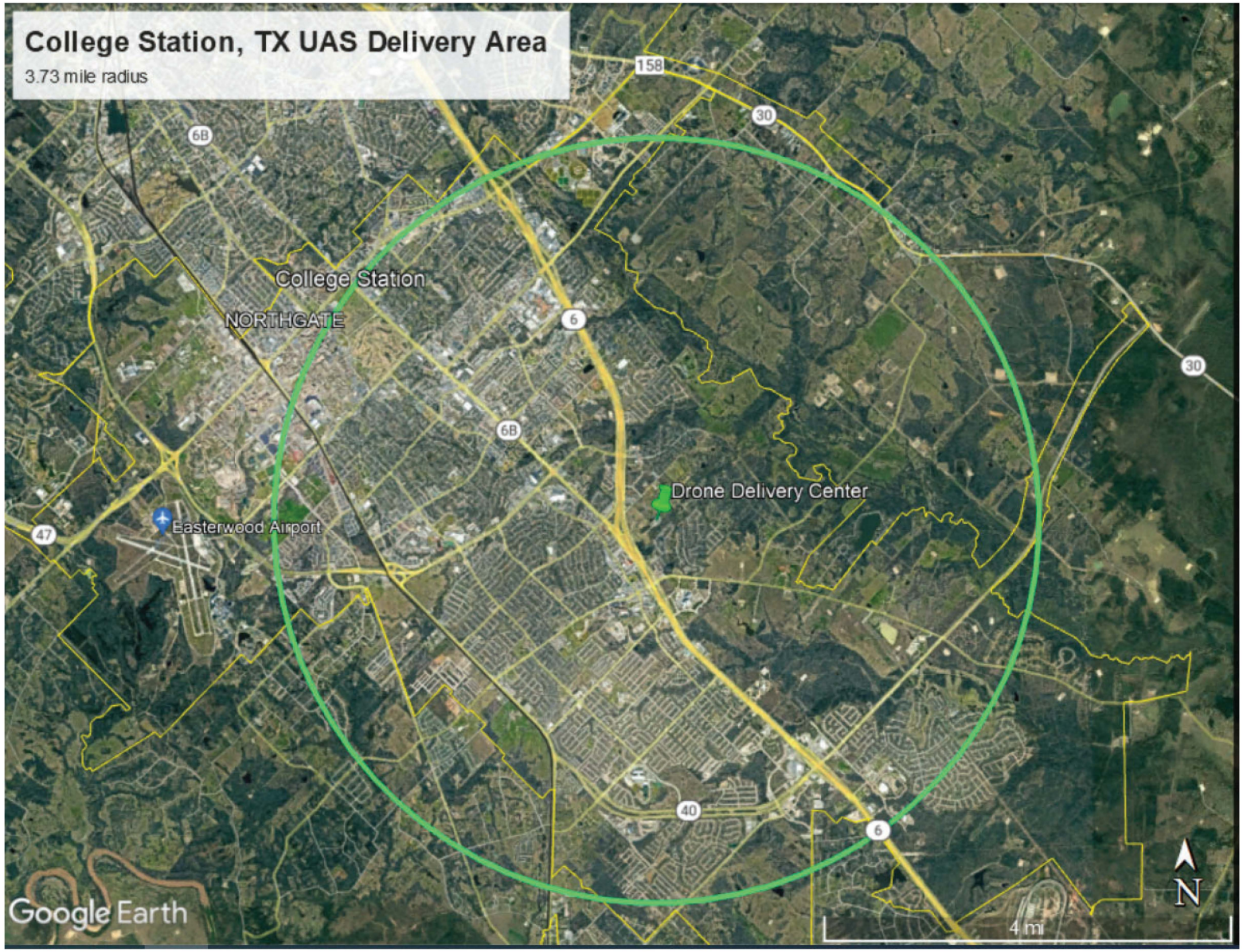
Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2022.07.12 11:00:01 -07'00'

David Menzimer
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure


College Station, TX UAS Delivery Area
3.73 mile radius
College Station
NORTHGATE
Easterwood Airport
Drone Delivery Center
158
30
6B
6
47
40
Google Earth
4 mi
N

**From:** noreply@thc.state.tx.us
**Sent:** Thursday, August 4, 2022 2:27 PM
**To:** Millard, Mike (FAA); reviews@thc.state.tx.us
**Subject:** Section 106 Submission

TEXAS HISTORICAL COMMISSION
*real places telling real stories*

**Re:** Project Review under Section 106 of the National Historic Preservation Act
**THC Tracking #202212464**
**Date:** 08/04/2022
Unmanned Aircraft System (UAS) delivery operation in College Station, TX.
400 Technology Parkway
College Station,TX 77845

**Description:** FAA approval of a Certificate of Waiver and/or Exemption for an Unmanned Aircraft System (UAS) delivery operation in College Station, TX.

Dear Mike Millard:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act.

The review staff, led by Justin Kockritz and Marie Archambeault, has completed its review and has made the following determinations based on the information submitted for review:

**Above-Ground Resources**

- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

**Archeology Comments**

- No historic properties affected. However, if cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- THC/SHPO concurs with information provided.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: justin.kockritz@thc.texas.gov, marie.archambeault@thc.texas.gov.

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit http://thc.texas.gov/etrac-system.

Sincerely,

for Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission

**Please do not respond to this email.**

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

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

THPO Kristian Poncho
Coushatta Tribe of Louisiana
PO Box 10
Elton, LA, 70532

Dear Mr. Poncho:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System (UAS) operation area in College Station, TX. We wish to solicit your views regarding potential effects on tribal interests in the area.

**Proposed Activity Description**
The FAA has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area described below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an MK27-2 unmanned aircraft at approximately 200 feet, but no more than 400 feet above ground level (AGL) within a 3.73 mile radius in College Station, TX (see attached operations area map). The purpose is for package delivery, consisting of no greater than approximately 200 flights each day, with each flight lasting approximately 15 minutes. Flights will occur primarily Mon-Fri, no holidays, with operations being conducted for 8-10 hours per day, during daylight hours. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a drone delivery center in College Station, TX.

**Consultation**
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Based on a review of the area, as well as our increasing knowledge with respect to the level of environmental impacts from drone operations, FAA has determined that this new approval has no potential to effect historic properties. FAA expects that drone operations will continue to grow and that we all will continue to learn more about this emerging technology.

FAA is amenable to answer any questions you may have generally on this new technology. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2022.07.13 11:25:28 -07'00'

David Menzimer
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

**From:** Kassie Dawsey <KDawsey@coushatta.org>
**Sent:** Thursday, July 28, 2022 4:24 PM
**To:** 9-AWA-AVS-AFS-ENVIRONMENTAL (FAA)
**Subject:** Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System(UAS) operation area in College Station, TX

Thank you for requesting our 106/EA determination. Based on the information provided, I do not believe that this project will have a negative impact on any archaeological, historic, or cultural resources of the Coushatta people. Accordingly, we do not wish to consult further on this project. If any inadvertent discoveries are made in the course of this project, we expect to be contacted immediately and reserve the right to consult with you at that time.

**Aliilamo** (thank you),

**Kassie Dawsey**
Section 106 Coordinator
Coushatta Tribe of Louisiana
Coushatta Heritage Department

**Phone** 337-246-1275
**Email** kdawsey@coushatta.org
P.O. Box 10, Elton, LA 70532

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

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Chairman Bobby Komardley
Apache Tribe of Oklahoma
PO Box 1330
Anadarko, OK, 73005

Dear Mr. Komardley:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System (UAS) operation area in College Station, TX. We wish to solicit your views regarding potential effects on tribal interests in the area.

**Proposed Activity Description**
The FAA has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area described below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an MK27-2 unmanned aircraft at approximately 200 feet, but no more than 400 feet above ground level (AGL) within a 3.73 mile radius in College Station, TX (see attached operations area map). The purpose is for package delivery, consisting of no greater than approximately 200 flights each day, with each flight lasting approximately 15 minutes. Flights will occur primarily Mon-Fri, no holidays, with operations being conducted for 8-10 hours per day, during daylight hours. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a drone delivery center in College Station, TX.

**Consultation**
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Based on a review of the area, as well as our increasing knowledge with respect to the level of environmental impacts from drone operations, FAA has determined that this new approval has no potential to effect historic properties. FAA expects that drone operations will continue to grow and that we all will continue to learn more about this emerging technology.

FAA is amenable to answer any questions you may have generally on this new technology. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2022.07.13 11:35:33 -07'00'

David Menzimer
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

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

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

THPO Bryant Celestine
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, TX, 77351

Dear Mr. Celestine:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System (UAS) operation area in College Station, TX. We wish to solicit your views regarding potential effects on tribal interests in the area.

**Proposed Activity Description**
The FAA has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area described below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an MK27-2 unmanned aircraft at approximately 200 feet, but no more than 400 feet above ground level (AGL) within a 3.73 mile radius in College Station, TX (see attached operations area map). The purpose is for package delivery, consisting of no greater than approximately 200 flights each day, with each flight lasting approximately 15 minutes. Flights will occur primarily Mon-Fri, no holidays, with operations being conducted for 8-10 hours per day, during daylight hours. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a drone delivery center in College Station, TX.

**Consultation**
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Based on a review of the area, as well as our increasing knowledge with respect to the level of environmental impacts from drone operations, FAA has determined that this new approval has no potential to effect historic properties. FAA expects that drone operations will continue to grow and that we all will continue to learn more about this emerging technology.

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If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

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Date: 2022.07.13 11:22:55 -07'00'

David Menzimer
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

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

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

THPO Martina Minthorn
Comanche Nation, Oklahoma
6 SW D Avenue
Lawton, OK, 73502

Dear Ms. Minthorn:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System (UAS) operation area in College Station, TX. We wish to solicit your views regarding potential effects on tribal interests in the area.

**Proposed Activity Description**
The FAA has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area described below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an MK27-2 unmanned aircraft at approximately 200 feet, but no more than 400 feet above ground level (AGL) within a 3.73 mile radius in College Station, TX (see attached operations area map). The purpose is for package delivery, consisting of no greater than approximately 200 flights each day, with each flight lasting approximately 15 minutes. Flights will occur primarily Mon-Fri, no holidays, with operations being conducted for 8-10 hours per day, during daylight hours. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a drone delivery center in College Station, TX.

**Consultation**
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Based on a review of the area, as well as our increasing knowledge with respect to the level of environmental impacts from drone operations, FAA has determined that this new approval has no potential to effect historic properties. FAA expects that drone operations will continue to grow and that we all will continue to learn more about this emerging technology.

FAA is amenable to answer any questions you may have generally on this new technology. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

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Date: 2022.07.13 11:24:53 -07'00'

David Menzimer
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

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

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

THPO Lauren Norman-Brown
Tonkawa Tribe of Indians of Oklahoma
1 Rush Buffalo Road
Tonkawa, OK, 74653

Dear Ms. Norman-Brown:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System (UAS) operation area in College Station, TX. We wish to solicit your views regarding potential effects on tribal interests in the area.

**Proposed Activity Description**
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**Consultation**
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Sincerely,

DAVID M MENZIMER

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Date: 2022.07.13 11:25:54 -07'00'

David Menzimer
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

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

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

THPO Gary McAdams
Wichita and Affiliated Tribes (Wichita, Keechi, Waco & Tawakonie), Oklahoma
PO Box 729
Anadarko, OK, 73005

Dear Mr. McAdams:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System (UAS) operation area in College Station, TX. We wish to solicit your views regarding potential effects on tribal interests in the area.

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Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2022.07.13 11:26:21 -07'00'

David Menzimer
Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

Appendix C

Noise Analysis Report

# Noise Assessment for Amazon Prime Air Proposed Package Delivery Operations with Amazon Prime Air MK27-2 Unmanned Aircraft

## In support of U.S. Code of Federal Regulations Title 14, Part 135

## Final

HMMH Report No. 309990.003-7
August 19, 2022

Prepared for:

**JD RoVolus, LLC**
121 Pearl Street
Ypsilanti, MI 48197

**Federal Aviation Administration**
Aviation Safety, Flight Standards Service
Office of Environment and Energy
Policy, Engineering, Analysis, and Research (PEARS II)
693KA9-18-D-00005

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# Noise Assessment for Amazon Prime Air Proposed Package Delivery Operations with Amazon Prime Air MK27-2 Unmanned Aircraft

## In support of U.S. Code of Federal Regulations Title 14, Part 135

## Final

HMMH Report No. 309990.003-7

August 19, 2022

Prepared for:

**JD RoVolus, LLC**
121 Pearl Street
Ypsilanti, MI 48197

**Federal Aviation Administration**
Aviation Safety, Flight Standards Service
Office of Environment and Energy
Policy, Engineering, Analysis, and Research (PEARS II)
693KA9-18-D-00005

Prepared by:

David Crandall
Paul Krusell
Brandon Robinette

**HMMH**
700 District Avenue, Suite 800
Burlington, MA 01803
T 781.229.0707

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# Contents



# Figures

# Tables

# 1 Introduction and Background

This document presents the methodology and estimation of noise exposure related to proposed Unmanned Aircraft (UA) package delivery operations conducted by Amazon Prime Air (Amazon) as a commercial operator under the provisions of 14 CFR Part 135. Amazon is proposing to perform small package delivery operations at multiple potential locations in the continental United States.

Amazon is proposing to conduct operations with the Amazon Prime Air MK27-2 UA. This UA features a multi-rotor design with six propellers mounted on equally spaced arms extending horizontally from a center frame. The UA can transition between vertical and horizontal flight. According to data provided by Amazon, the maximum allowable takeoff weight of the UA is 91.5 pounds, its empty weight (including battery) is 86.6 pounds, and its maximum allowable package weight is 4.9 pounds.[1] The package is carried in an internal cargo bay.

Figure 1 depicts the UA considered in this report.

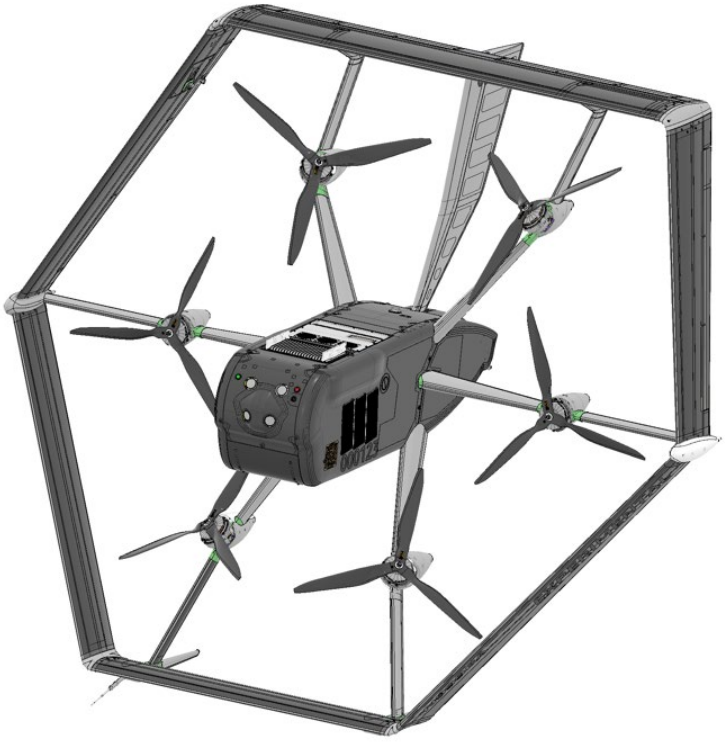

**Figure 1: Amazon Prime Air MK27-2 Unmanned Aircraft**

*Source: Amazon*

Amazon's UA package distribution sites are known as Prime Air Drone Delivery Centers (PADDCs). Each PADDC supports multiple sectors, with each sector having a dedicated launch and landing pad. A single

[1] Amazon January 13, 2022. Converted from data originally presented in kilograms.

PADDC is expected to have four sectors and each sector will have no more than one UA operating at a time. Operations in adjacent sectors do not overlap, though sector boundaries may change over time.

PADDCs and routes will be implemented in areas as determined by business and operational needs utilizing Amazon internal procedures that consider various factors.

The MK27-2 can climb and descend vertically, hover, and fly upright with its propellers facing forward like a fixed-wing aircraft for en route flight. Airspeeds during normal en route flight are expected to be approximately 52 knots. Typical flights begin with the UA ascending vertically from a PADDC launch pad at ground level to an en route altitude of between 160 and 180 feet Above Ground Level (AGL). The UA then flies a pre-assigned route between 160 and 180 feet AGL and 52 knots to a selected delivery point. Once near the delivery point, the UA decelerates and descends vertically over the delivery point. The UA descends to 13 feet AGL, drops the package, and ascends back to en route altitude. Once back at en route altitude, the UA accelerates to 52 knots and follows a predefined track to return to its originating PADDC. When the UA arrives at the PADDC, it decelerates and vertically descends to its sector's assigned landing pad. Once it lands, the UA is serviced and prepared for the next delivery.

The methodology proposed in this document provides quantitative guidance to FAA Environmental Specialists to inform environmental decision making on UA noise exposure from proposed Amazon package delivery operations. The methods presented here are suitable for review of Federal actions under the requirements of the National Environmental Policy Act (NEPA) and other applicable environmental special purpose laws or other federal environmental review requirements at the discretion and approval of the FAA. In particular, this report is intended to function as a nonstandard equivalent methodology under FAA Order 1050.1F, and as such, would require prior written approval from FAA's Office of Environment and Energy (AEE) for each individual project for which a NEPA determination is sought.[2]

The methodology has been developed with data provided by Amazon and FAA to date and, therefore, is limited to Amazon operations with the Amazon Prime Air MK27-2 UA and the flight phases and maneuvers described herein. The noise analysis methodology and estimated noise levels of the proposed activities are based upon noise measurement data provided by Amazon and processed by FAA.[3] Results of the noise analysis are presented in terms of the Yearly Day-Night Average Sound Level (DNL) based on varying levels of operations for areas at ground level below each phase of the flight. The Community Noise Equivalent Level (CNEL) may be used in lieu of DNL for FAA actions in California. Discussion of modification of this process for use of the CNEL is discussed in Section 3.1.

Section 2 of this document describes the relevant noise and operations data provided by Amazon and FAA. Section 3 describes the methodology to develop noise exposure estimates for the various UA flight phases associated with typical operations using available data. Section 4 presents the estimated DNL levels for various flight phases based on varying levels of typical operations as described to date.

[2] Discussion of the use of "another equivalent methodology" is discussed in FAA Order 1050.1F, July 16, 2015, Appendix B, Section B-1.2, available online at https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf#page=113

[3] FAA's Memorandum, "Estimated Noise Levels for Amazon Prime Air MK27-2 UA," dated August 4, 2022.

# 2 Unmanned Aircraft Delivery Operations and Noise Measurement Data Set Descriptions

Six data sets form the basis of the noise assessment for the proposed Amazon delivery operations. The data sets include three Amazon provided documents titled "Prime Air Drone Delivery Center (PADDC) Concept of Operations", "MK27-2 Concept of Operations" Rev 3.0 dated January 13, 2022, and "FAA Request for Unmanned Aircraft Operational Data from Amazon Prime Air -- in Support of Environmental Analysis of 14 CFR Part 135 Operations in College Station, Texas and Lockeford, California", all marked "Amazon Confidential and Propriety Trade Secret Information." Amazon also provided a July 12, 2022 document titled "NEPA RFI_071222_Final.docx" marked "Amazon Confidential." Amazon also provided various figures displayed in this document in August 2022. The FAA's Memorandum, "Estimated Noise Levels for Amazon Prime Air MK27-2 UA," dated August 4, 2022, was also used in support of the noise assessment and is provided with this report as Attachment A.[4]

## 2.1 Operations, Flight Paths, and Flight Profile Data

Operations and flight profile data for the UA provided by Amazon and FAA were reviewed to determine the characteristics of typical operations for a proposed operating area. Based on this review, the following subsections describe the assumptions made about the operations and flight profiles that were used to inform the development of the estimated noise exposure and the methodology for the noise analysis.

### 2.1.1 Operations

The methodology presented in this report can be used to assess UA noise over a range of proposed activity levels; however, FAA review and approval of its use at specified activity levels is required. The activity ranges shown in Section 4 represent what FAA considers low to moderate activity levels, and as appropriate for consideration with this methodology. At higher activity levels, this methodology may not be sufficient to inform an environmental determination and further consideration or refinements at the discretion of the FAA may be needed.

This report provides variations to the methodology that can be used with either DNL or CNEL, provided that the proper equivalent operations are calculated.

- The DNL noise levels presented in this report are all shown consistent with effective daytime (7 AM to 10 PM) operations levels. For consideration of nighttime (10 PM to 7 AM) noise levels, a ten times operational weighting (equivalent to 10-decibel [dB] increase) should be applied.
- The CNEL noise levels presented in this report are all shown consistent with effective daytime (7 AM to 7 PM) operations levels. For consideration of evening time (7 PM to 10 PM) a three times operational weighting (equivalent to 4.77-dB increase) should be applied and for consideration

[4] Most of these documents have various markings indicating that the contents are "Confidential & Proprietary". Only elements required to support the noise analysis methodology have been disclosed in this report.

of nighttime (10 PM to 7 AM) noise levels, a ten times operational weighting (equivalent to 10-dB increase) should be applied.

Section 3.1 provides techniques to apply the operational weighting necessary to calculate effective operations for analysis with the DNL and CNEL metrics.

### 2.1.2 Flight Paths and Profiles

The UA will fly a predefined flight path between sites chosen and approved by Amazon. Amazon's PADDC and delivery sites are entirely customer driven, and Amazon has internal procedures for developing routes.

The UA takeoff pads are 4 meters by 4 meters and landing pads are 8 meters by 8 meters. Both are contained within a launch area that will generally be 35 meters by 45 meters. Figure 2 presents a diagram of a representative PADDC.

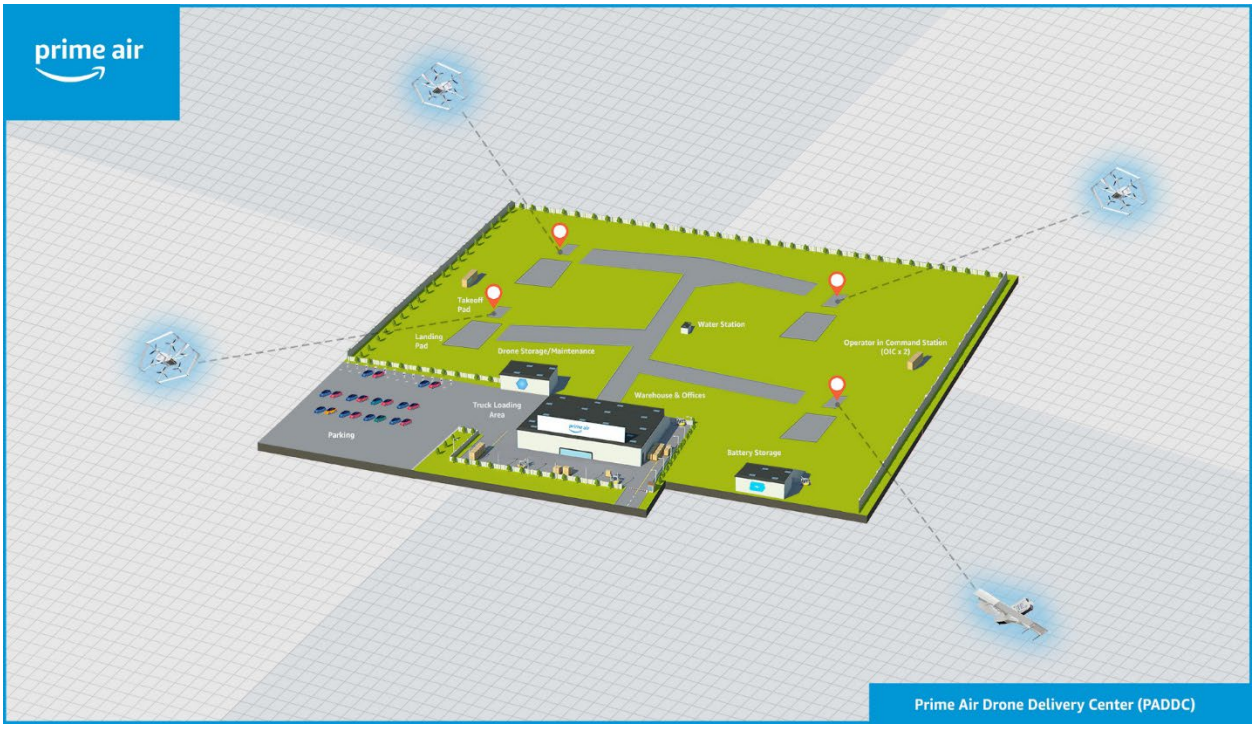


**Figure 2: Representative PADDC Layout**

*Source: Amazon, August 2022*

Analysis of flight profile data provided by Amazon and the FAA describes that a typical operation profile of the UA can be broken into five general flight phases: takeoff, transitions to and from vertical to horizontal flight, en route, delivery, and landing.

These five general flight phases can be combined to represent a typical operational profile further identified as:

1. Takeoff and vertical ascent
2. Transition and climb outbound
3. Fixed-wing cruise outbound
4. Delivery descent and transition
5. Backyard descent, delivery, and ascent
6. Transition and climb inbound
7. Fixed-wing cruise inbound
8. Landing descent and transition
9. Vertical descent and landing

These phases are shown in Figure 3 and are representative of the typical flight profile that Amazon is expected to use for delivery operations. The subsections that follow provide a narrative description of each of the nine flight phases.

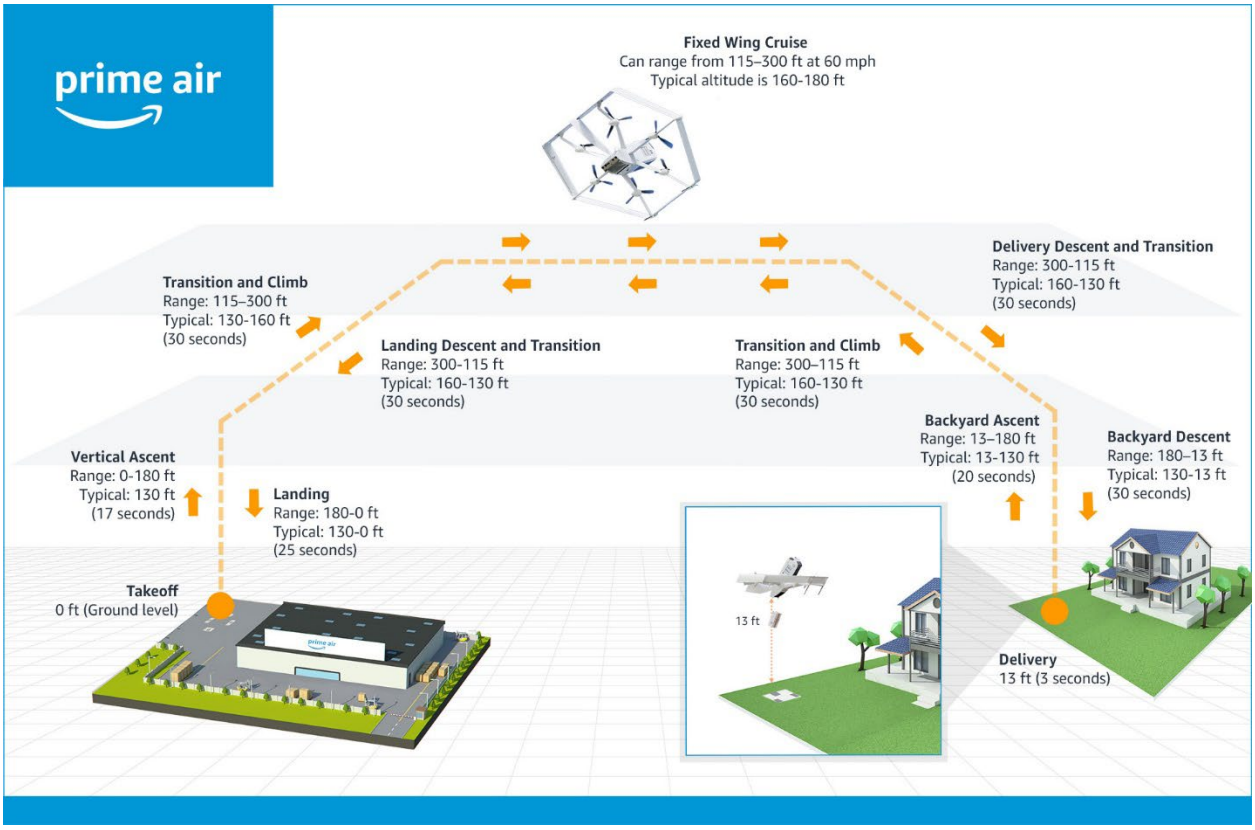


**Figure 3: Graphical Depiction of the Proposed Amazon Prime Air MK27-2 Flight Profile to a Destination**

*Source: Amazon, August 2022*

#### 2.1.2.1 Takeoff and vertical ascent

For takeoff, the UA starts at the launch pad. Once it is cleared for takeoff, the UA takes off from the ground vertically to the en route altitude (165 feet AGL) in vertical flight mode (pointed upward).[5]

#### 2.1.2.2 Transition and climb outbound

Once at the en route altitude of 165 feet and still above the launch pad, the UA transitions from zero speed to cruise speed (52.4 kts) while changing from vertical flight mode to horizontal flight mode.

#### 2.1.2.3 Fixed-wing cruise outbound

The UA continues to fly at en route altitude of 165 feet and en route speed of 52.4 knots to the delivery point.

#### 2.1.2.4 Delivery descent and transition

The UA decelerates from 52.4 knots in horizontal flight and transitions to vertical flight mode, coming to a position over the delivery point with zero speed.

#### 2.1.2.5 Backyard descent, delivery, and ascent

The UA vertically descends from en route altitude to 13 feet AGL delivery altitude while maintaining position over the delivery point. Once at 13 feet AGL, the UA drops the package and then proceeds to climb vertically back to en route altitude. The closest that any person could be from the delivery point during this manuver is 16.4 ft.[6]

#### 2.1.2.6 Transition and climb inbound

Once at the en route altitude of 165 feet and still above the delivery point, the UA transitions from zero speed to cruise speed (52.4 kts) while changing from vertical flight mode to horizontal flight mode.

#### 2.1.2.7 Fixed wing crusie Inbound

The UA continues to fly at en route altitude of 165 feet and en route speed of 52.4 knots towards the PADDC.

[5] En Route altitude will be assumed to be 165 feet AGL, corresponding to the measurement data reviewed in FAA's August 4, 2022 memorandum (Attachment A).

[6] Amazon's July 12, 2022 document mentions that: "Note: As the aircraft descends below 40m, it is searching for a clear descent path, under 25m and in a 5m radius cylinder the aircraft's perception system is looking for people, animals, or other obstacles. At any time, if the delivery area becomes unclear, the vehicle will automatically perform a backyard abort, terminate the delivery, and return home with its package."

#### 2.1.2.8 Landing descent and transition

The UA decelerates from 52.4 knots in horizontal flight and transitions to vertical flight mode, coming to a position over its assigned landing pad with zero speed.

#### 2.1.2.9 Landing

While in vertical flight mode, the UA descends over its assigned landing pad down to the ground and shuts down its motors.

Table 1 provides a summary of the prior subsections and includes the assumptions regarding altitude, ground speed, and durations.

**Table 1. Amazon Prime Air MK27-2 Typical Flight Profile**

*Source: FAA August 4, 2022 (Attachment A)*

| Phase | Description | Altitude (ft AGL) | Ground Speed (knots) | Duration (s) |
|---|---|---|---|---|
| Takeoff and Vertical Ascent | Vertical launch from PADDC on ground to en route altitude (165 ft AGL) in vertical flight mode (pointed upward) | Ascend from 0 to 165’ | 0 | 21 |
| Transition and Climb Outbound | Transition from zero speed above PADDC at en route altitude to cruise speed (52.4 kts) while changing from vertical flight mode to fixed-wing flight mode (pointed horizontally) | 165’ | 0 to 52.4 | 20 |
| Fixed-wing Cruise Outbound | Flying at operational altitude (165 feet AGL) and speed (52.4 kts) to delivery point | 165’ | 52.4 | Variable |
| Delivery Descent and Transition | Transition from cruise speed at en route altitude and fixed-wing flight mode to zero speed above delivery point at en route altitude and in vertical flight mode | 165’ | 52.4 to 0 | 20 |
| Backyard Descent, Delivery, and Ascent | Vertically descend from en route altitude to 13 ft AGL delivery altitude | Descend from 165’ to 13’ | 0 | 32 |
| | Drop a package | 13’ | 0 | 2 |
| | Vertical ascent back to en route altitude in vertical flight mode | ascend from 13’ to 165’ | 0 | 24 |
| Transition and Climb Inbound | Transition from zero speed above delivery point to en route altitude to cruise speed while changing from vertical flight mode to fixed-wing flight mode | 165’ | 0 to 52.4 | 20 |
| Fixed-wing Cruise Inbound | Fixed-wing flight mode at operational en route altitude and cruise speed | 165’ | 52.4 | Variable |
| Landing Descent and Transition | Transition from cruise speed at en route altitude and fixed-wing flight mode to zero speed above PADDC’s landing pad at en route altitude and in vertical flight mode | 165’ | 52.4 to 0 | 20 |
| Landing | Descend from en route altitude to landing pad on ground in vertical flight mode | Descend from 165 to 0’ | 0 | 38 |

## 2.2 Acoustical Data

Noise measurements of the Amazon Prime Air MK27-2 UA were collected at the Pendleton UAS Range located at the Eastern Oregon Regional Airport (KPDT) in Pendleton, Oregon in April 2021. The FAA then processed and analyzed the measurement data to calculate estimated noise levels for each of the five flight phases (takeoff, transitions to and from vertical to horizontal flight, en route, delivery, and

landing) described in Section 2.1.2. The summarized acoustical data used in this report is included as Attachment A. The following tables show either the A-weighted Sound Exposure Levels (SELs) or formulas to calculate the estimated SELs used for this analysis as detailed in Attachment A, which can be matched to each flight phase detailed in Table 1. The formula is based on Equation (1) presented below.

$$SEL = m \times \log_{10}(d) + b(dB) \quad (1)$$

Where:

- *d is the distance along the ground in feet between the UA and the receiver*
- *m and b are parameters provided in the tables below*

Table 2 presents the parameters to use within Equation (1) to estimate SEL areas associated with takeoff as a function of distance from the launch pad, located within the PADDC boundary, to the receiver.

**Table 2. Parameters for Estimating Sound Exposure Level for Takeoff versus Distance**

*Source: FAA, August 4, 2022 (Attachment A)*

| Range for d (ft from launch pad) | m | b |
|---|---|---|
| 32.8 to 49.2 | -9.09 | 109.47 |
| 49.2 to 65.6 | -16.41 | 121.86 |
| 65.6 to 85.3 | -26.39 | 140 |
| 85.3 to 142.2 | -27.79 | 142.71 |
| 142.2 and greater | -23.39 | 134.99 |
| Notes:<br>a) Distance is along ground from launch pad to receiver. | | |

Table 3 presents the parameters to use within Equation (1) to estimate SEL areas associated with landing as a function of distance from the landing pad, located within the PADDC boundary, to the receiver.

**Table 3. Parameters for Estimating Sound Exposure Level for Landing versus Distance**

*Source: FAA, August 4, 2022 (Attachment A)*

| Range for d (ft from landing pad) | m | b |
|---|---|---|
| 32.8 to 49.2 | -9.26 | 108.81 |
| 49.2 to 65.6 | -8.8 | 108.05 |
| 65.6 to 85.3 | -17.1 | 123.12 |
| 85.3 to 142.2 | -24.56 | 137.53 |
| 142.2 and greater | -23.39 | 134.99 |
| Notes:<br>a) Distance is along ground from landing pad to receiver. | | |

Table 4 presents the parameters to use within Equation (1) to estimate SEL areas associated with delivery, as described in Section2.1.2.5, as a function of distance from the delivery point to the receiver.

**Table 4. Parameters for Estimating Sound Exposure Level for Delivery versus Distance**

*Source: FAA, August 4, 2022 (Attachment A)*

| Range for d (ft from delivery point) | m | b |
|---|---|---|
| 32.8 to 49.2 | -5.85 | 105.35 |
| 49.2 to 65.6 | -7.2 | 107.64 |
| 65.6 to 85.3 | -16.92 | 125.3 |
| 85.3 to 142.2 | -26.31 | 143.42 |
| 142.2 and greater | -21.9 | 133.91 |
| Notes:<br>a) Distance is along ground from delivery point to receiver. | | |

Table 5 presents the estimated SELs associated with the transition between vertical flight mode to horizontal flight mode. The values in this table are for distances relative to the point under the vertical flight path. Table 5 is applicable to all transitions discussed in Sections 2.1.2.2, 2.1.2.4, 2.1.2.6, and 2.1.2.8. These levels should be combined with those from appropriate phases of flight (e.g., to estimate maximum possible landing noise combine the transition noise from Table 5 with the landing noise from Table 3.)

**Table 5. Estimated Sound Exposure Levels from Transition Phase of Flight Profile at 165 Feet Above Ground Level**

*Source: FAA, August 4, 2022 (Attachment A)*

| Distance from launch pad, landing pad or delivery point (ft) | SEL (dB) |
|---|---|
| 0 | 69.9 |
| 100 | 70.6 |
| 200 | 70.3 |
| 400 | 69.4 |
| 800 | 68.2 |
| 1600 | 67.7 |
| 3200 | 67.7 |

Table 6 presents the en route sound exposure levels for en route SEL.

**Table 6. Estimates of En Route SEL**

*Source: FAA August 4, 2022 (Attachment A)*

| Aircraft Config | Reference air speed (KTS) | Reference Altitude (ft AGL) | SEL (dB) |
|---|---|---|---|
| Max Weight | 52.4 | 165 | 67.7 |

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# 3 Methodology for Data Analysis

The previously described data sets were used to develop a method to estimate community noise exposure that could result from Amazon delivery operations. These would be operations originating from a single PADDC within each proposed area of operations and occurring daily between the hours of 7:00 AM and 10:00 PM. Numbers of daily and equivalent annual delivery operations would vary for different operating areas. There are currently no standardized tools or processes in place to conduct a noise assessment for the proposed operational scenario and UA. Therefore, HMMH, with detailed technical guidance from the FAA Office of Environment and Energy, developed a customized noise exposure prediction process based on the available data to conduct this analysis. The process was developed around FAA's understanding of typical use of the UA by Amazon. The following subsections describe the noise analysis methodology.

## 3.1 Application of Operations

The DNL metric applies a 10 dB weighting for operations between 10 PM and 7 AM. The 10 dB weighing is mathematically equivalent to 10 times the number of operations. Therefore, the operations near point *i* can be weighted to develop a daytime equivalent number of operations ($N_{equiv,i}$). The generalized form is expressed in Equation (2).[7]

$$N_{Equiv,i} = W_{Day} \times N_{Day,i} + W_{Eve} \times N_{Eve,i} + W_{Night} \times N_{Night,i} \quad (2)$$

Where:

- $N_{Day,i}$ is the number of user-specified operations between 7 AM and 7 PM local time
- $N_{Eve,i}$ is the number of user-specified operations between 7 PM and 10 PM local time
- $N_{Night,i}$ is the number of user-specified operations between 10 PM and 7 AM local time
- $W_{Day}$ is the day-time weighting factor, which is 1 operation for DNL
- $W_{Eve}$ is the evening weighting factor, which is 1 operation for DNL
- $W_{Night}$ is the night-time weighting factor, which is 10 operations for DNL

For the DNL metric, the number of DNL daytime equivalent operations, $N_{DNL,i}$ simplifies to

$$N_{DNL,i} = N_{Day,i} + N_{Eve,i} + 10 \times N_{Night,i} \quad (3)$$

In practice, Equation (2) can be further simplified by defining the user-defined operations between 7 AM and 10 PM as a single value, rather than tracking $N_{Day,i}$ and $N_{Eve,i}$ separately.

[7] Equation (2) includes the three time periods of day, evening, night for consistency with other FAA documents that discuss the development of time averaging metrics such as DNL from individual SELs. Presentation of Equation (2) also allows the practitioner to modify this process for the CNEL metric for use in California.

For the CNEL metric, which may be used in California, the number of CNEL daytime equivalent operations, $N_{CNEL,i}$ simplifies to:

$$N_{CNEL,i} = N_{Day,i} + 3 \times N_{Eve,i} + 10 \times N_{Night,i} \quad (4)$$

## 3.2 PADDC Infrastructure

As noted in Section 1 and Section 2.1.2, Amazon operates UAs from a central PADDC. A single PADDC is anticipated to support four sets of launch and landing pads, with each set of pads serving a sector. For the purpose of the noise analysis, only one PADDC is assumed to be considered at a time. All the operations for the PADDC (all the launch and landing pads) can be conservatively represented at the nearest single launch or landing pad closest to the noise sensitive location(s) under consideration. If the nearest single launch or landing pad location is not known, then the respective PADDC boundary should be used.

## 3.3 Application of Acoustical Data

The DNLs can be estimated with a summation of the SELs. SEL values for the Amazon UA operations covered in this report are detailed in FAA's August 4, 2022 Memorandum and provided with this report as Attachment A.

For calculating SEL, five specific activities are considered:

- The UA taking off from the PADDC
- The UA transitioning from either vertical to horizontal flight or horizontal to vertical flight
- En route travel of the UA in horizontal flight between the PADDC and the delivery point
- Delivery
- The UA landing at the PADDC

### 3.3.1 General Assumptions

This analysis is based on the tables presented in Section 2.2. Table 5 presents noise exposure values at discrete increments relative to the UA's vertical profile from 0 to 3,200 feet. If additional values between 0 to 3,200 feet are needed, then SEL values at intermediary distances can be approximated by linear interpolation.

SEL values at distances less than 32.8 feet for takeoff, landing, or delivery should not be extrapolated because the deviation of the method of estimation value increases closer to the source.

### 3.3.2 Takeoff

The process for calculating SELs for the takeoff profile described in Section 2.1.2.1 are presented in Section 2.2, specifically Equation (1) combined with the parameters presented Table 2.

Application of the SEL should be based on the position of the launch pad at a PADDC. If the exact location of the launch pad is not known, then using an outer boundary of the PADDC, at a point closest

to the receiver, would be slightly conservative. It should be noted that the SEL values provided only include climb to altitude and do not include transitioning to horizontal flight or accelerating to en route speed that would occur after climb.

### 3.3.3 Transitions between Vertical and Horizontal Flight Modes

The available SELs for transitioning between vertical and horizontal flight modes are presented in Section 2.2, specifically Table 5. Table 5 presents noise exposure values at discrete increments relative to the UA's vertical profile's ground location for distances from 0 to 3,200 feet. If additional values between 0 to 3,200 feet are needed, then SEL values at intermediary distances can be approximated by linear interpolation. Application of these values are suitable for the UA in level flight at 165 feet AGL and either accelerating or decelerating between 0 knots and 52.4 knots over the course of 20 seconds.

### 3.3.4 En Route

Typical flight speed of the UA in still air is anticipated to be 52.4 knots, with a typical cruise altitude of 165 feet AGL. Sound exposure level for a given point i ($SEL_i$) with the aircaft flying directly overhead at altitude ($Alt_i$) in feet and a ground speed ($V_i$) in knots, will be calculated based on the guidance in *14 CFR Part 36 Appendix J, Section J36.205 Detailed Data Correction Procedures*.[8] It should be noted that the equations presented in this section are only applicable for a UA that is moving relative to a stationary receptor. The discussion of the variables are presented in the context of the application of this methodology.

In particular, the sound exposure level adjustment for the altitude of a moving UA, is presented here as Equation (5).

$$\Delta J_1 = 12.5 \times \log_{10}\left(\frac{H_A}{H_T}\right), dB \quad (5)$$

Where $\Delta J_1$ is the quantity in decibels that must be algebraically added to the measured SEL in order to estimate the SEL for a level flight path at an altitude differing from the altitude corresponding to the measured SEL; $H_A$ is the reference height, in feet, corresponding to the measured SEL; $H_T$ is the altitude at which an estimate of the SEL is being made; and the constant (12.5) accounts for the effects on spherical spreading and duration from the off-reference altitude. The value of $\Delta J_1$ is 0 if $H_T$ is equal to $H_A$ and can be negative if $H_T$ is greater than (higher altitude) than $H_A$.

The sound exposure level adjustment for speed is presented here as Equation (6).

$$\Delta J_3 = 10 \times \log_{10}\left(\frac{V_R}{V_{RA}}\right), dB \quad (6)$$

Where $\Delta J_3$ is the quantity in decibels that must be algebraically added to the measured SEL noise level to estimate the SEL of the UA at speed $V_{RA}$ when the measured SEL corresponds to the UA traveling at a reference speed $V_R$. This adjustment represents the influence of the different speed on the duration of

[8] 14 CFR Part 36 Noise Standards: Aircraft Type and Airworthiness Certification available at https://www.ecfr.gov/current/title-14/chapter-I/subchapter-C/part-36

the overflight at the stationary receptor. If the UA is to be estimated at a speed $V_{RA}$ that is greater than the reference speed $V_R$ of the measured SEL, then the correction $\Delta J_3$ will be negative. The value of $\Delta J_3$ is 0 if $V_R$ is equal to $V_{RA}$. Conversely, if the estimated speed is less than the reference speed, the estimated SEL will be greater than the measured SEL. This stands to reason because a slower moving UA will result in a greater time exposure of its emitted noise at a stationary receptor on the ground.

As shown in Table 6, the SEL is 67.7 dB when the UA is at maximum weight, at 165 feet from the ground receiver and traveling at approximately 52.4 knots; therefore, adapting that to the maximum weight (outbound) en route condition when the UA is flying at an altitude of $Alt_i$ feet AGL and ground speed of $V_i$ knots can be made using Equation (7) to arrive at an estimate $SEL_{maximum\ weight}$ dB for that respective phase of flight.

$$SEL_{maximum\ weight} = 67.7 + 12.5 \times \log_{10}\left(\frac{165}{Alt_i}\right) + 10 \times \log_{10}\left(\frac{52.4}{V_i}\right), dB \quad (7)$$

For the purpose of this noise analysis, it should be assumed that Equation (7) is applicable for all en route activity. This will be a conservative assumption since it is based on the highest average level measured beneath the UA during level flyovers.[9]

### 3.3.5 Delivery

The available SELs for delivery are presented in Section 2.2, specifically in Equation (1), with the appropriate parameters presented in Table 4 for the delivery profile described in Section 2.1.2.5. Application of the SEL should be based on the distance of the receiver relative to the position of the delivery point. The minimum distance that should be used for calculation between the delivery point and a person is 16.4 feet.[10] The values in Table 4 are valid for distances from the delivery point of 32.8 feet or greater.

Figure 4 provides comparisons of the delivery profile and a constant speed passby. The delivery profile has a distance compared to time for a given receiver similar to the constant speed passby represented by Equation (5).

[9] FAA August 4, 2022, included as Attachment A, Section 1.3

[10] According to Amazon, there should not be an person, animal or object within 5 meters of the delivery point. If the UA detects an person, animal or object within 5 meters of the delivery point, it will abort the delivery.

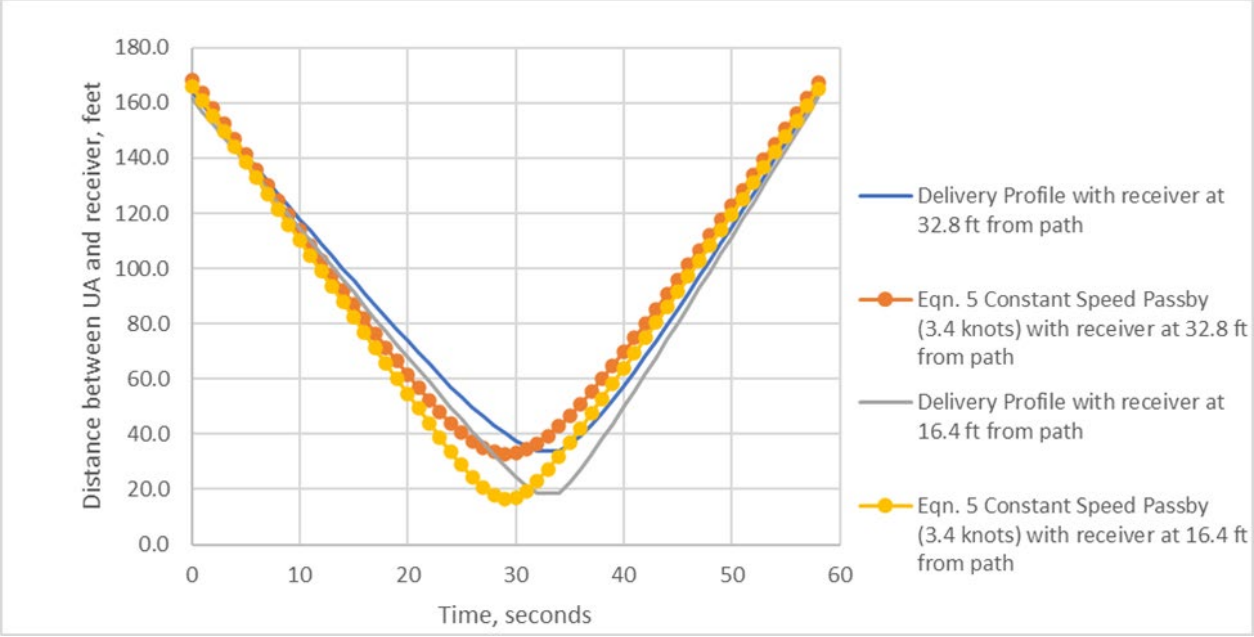


**Figure 4: Comparison of Distance versus Time from a Receiver**

SEL values for distances of between 16 and 32.8 feet will be adjusted by distance to the delivery point and sound level adjustment of a stationary source as provided by Equation (8).

$$SEL_{Delivery\ Close} = 96.5 + 12.5 \times \log_{10}\left(\frac{32.8}{Distance\ from\ Delivery\ Point\ (ft)}\right),\ dB \quad (8)$$

It should be noted that the SEL values provided only include descent from en route altitude to delivery altitude, various maneuvers associated with the delivery, and climb back to en route altitude. The SEL values do not provide the noise contribution from the horizontal flight associated with either the UA transitioning from en route speed to vertical flight before delivery, or the transition between vertical flight to en route speed after delivery.

### 3.3.6 Landing

The available sound exposure levels for landing are presented in Section 2.2, specifically in Equation (1), with the parameters presented in Table 3 for the landing profile described in Section 2.1.2.9.

Application of the SEL should be based on the position of the landing pad at a PADDC. If the exact location of the landing pad is not known, then using an outer boundary of the PADDC, at a point closest to the receiver, would be slightly conservative. It should be noted that the SEL values provided only include descent from en route altitude and do not include the deceleration from en route speed or transition to vertical flight that would occur after descent.

## 3.4 Proposed DNL/CNEL Estimation Methodology

The number of operations overflying a particular receiver's location on the ground will vary based on the proposed operating area and demand. For a given receiver location *i*, and a single instance of sound source *A*, the SEL for that sound source $SEL_{iA}$ is (energy) summed for the average annual daily number of DNL daytime equivalent operations ($N_{DNL,iA}$) to compute the DNL, or equivalently, by Equation (9).

$$DNL_{iA} = SEL_{iA} + 10 \times \log_{10}\left(N_{DNL,\,iA}\right) - 49.4,\ (dB) \tag{9}$$

The above equation applies to an SEL value representing one noise source such as a UA takeoff or a UA landing. For cases where a particular receiver would be exposed to multiple noise sources (A through Z), the complete DNL at that point would be calculated with Equation (10).

$$DNL_i = 10 \times \log_{10}\left(10^{\left(\frac{DNL_{iA}}{10}\right)} + 10^{\left(\frac{DNL_{iB}}{10}\right)} + \cdots + 10^{\left(\frac{DNL_{iZ}}{10}\right)}\right),\ (dB) \tag{10}$$

The calculation for the CNEL metric is nearly identical to Equations (9) and (10), with the exception that the DNL daytime equivalent operations ($N_{DNL,iA}$) used compute DNL is replaced with the CNEL daytime equivalent operations ($N_{CNEL,iA}$). The equations for CNEL are presented below as Equations (11) and (12).

$$CNEL_{iA} = SEL_{iA} + 10 \times \log_{10}\left(N_{CNEL,\,iA}\right) - 49.4,\ (dB) \tag{11}$$

The above equation applies to an SEL value representing one noise source such as a UA takeoff or a UA landing. For cases where a particular receiver would be exposed to multiple noise sources (A through Z), the complete DNL at that point would be calculated with Equation (10).

$$CNEL_i = 10 \times \log_{10}\left(10^{\left(\frac{CNEL_{iA}}{10}\right)} + 10^{\left(\frac{CNEL_{iB}}{10}\right)} + \cdots + 10^{\left(\frac{CNEL_{iZ}}{10}\right)}\right),\ (dB) \tag{12}$$

For each of the conditions presented below, results will be presented in tabular format based on the equivalent daytime operations, either DNL daytime equivalent or CNEL daytime equivalent, for the estimated DNL or CNEL. The proper output of either DNL or CNEL is dependent on the calculation of respective daytime equivalent operations.

### 3.4.1 DNL/CNEL for PADDC

The takeoff and landing operations are anticipated to occur at the same location. Therefore, the results for both will be calculated for a single set of receptors. Operations will be assumed to be "head-to-head" in which case the takeoff and the landing flight paths will be the same.

Takeoff operations will be represented by two sound levels. First, the UA will take off and climb to en route altitude with the relationship discussed in Section 3.3.2. Second, the UA will begin en route flight by transitioning from vertical flight to horizontal flight and accelerating to en route speed of 52.4 knots assuming that the UA will pass directly over the representative receiver using the relationship in Section 3.3.3.

Landing operations will be represented by two sound levels. First, the UA will fly to the PADDC at en route altitude while slowing down and transition from horizontal to vertical flight (Section 3.3.3).

Second, the UA will descend from en route altitude to the ground and come to rest, which will be represented by the relationships defined in 3.3.6.

The four noise sources representing the complete takeoff and landing cycle associated with a single delivery departing and returning at the PADDC will be added together with Equation (10).

### 3.4.2 DNL/CNEL for En Route

En route includes the UA flying to and from the PADDC to destinations as discussed in Sections 2.1.2.3 and 2.1.2.7. A representative receiver will be positioned directly under the flight path, and the DNL will be calculated based on the altitude and speed-adjusted delivery SEL calculated in Section 3.3.4. Operations will be based on representative numbers defined in relevant materials and assume that a UA directly overflies the receiver while it is at maximum weight for both outbound and inbound for a single delivery. The en route outbound noise level and the en route inbound noise level will be added together with Equation (10).

### 3.4.3 DNL/CNEL for Delivery Points

Delivery operations will be represented by three sound levels consisting of the UA:

1. Decelerating from en route speed and transitioning from horizontal flight to vertical flight over the delivery point at the en route altitude of 165 ft;
2. Conducting the delivery phase as described in Section 2.1.2.5 and Table 1; and
3. Transitioning from vertical flight to horizontal flight after reaching the en route altitude of 165 feet AGL and accelerating to en route speed.

The three sound levels will be added together with Equation (10).

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# 4 Noise Exposure Estimate Results

This section presents the estimated noise exposure for Amazon's proposed operations for a given set of average annual day (AAD) deliveries. The values presented are in tabular format and use of the table requires estimating the number of DNL Equivalent deliveries associated with the PADDC. One delivery includes the outbound takeoff and inbound landing and is representative of two operations.

The DNL Equivalent deliveries, $N_{DNL,i}$ as described in Section 3.1, is presented below as Equation (13).

$$Deliveries_{DNL,\,i} = Deliveries_{Day} + 10 \times Deliveries_{Night} \quad (13)$$

$Deliveries_{Day}$ are between 7 AM and 10 PM and $Deliveries_{Night}$ are between 10 PM and 7 AM. If a portion of a delivery (either takeoff or landing) occurs in the nighttime hours, then it should be counted within $Deliveries_{Night}$.

The CNEL Equivalent deliveries, $N_{CNEL,i}$ as described in 3.1, is presented below as Equation (14).

$$Deliveries_{CNEL,i} = Deliveries_{Day} + 3 \times Deliveries_{Eve} + 10 \times Deliveries_{Night} \quad (14)$$

$Deliveries_{Day}$ are between 7 AM and 7 PM, $Deliveries_{Eve}$ are between 7 PM and 10 PM, and $Deliveries_{Night}$ are between 10 PM and 7 AM.[11] If a portion of a delivery (either takeoff or landing) occurs in two time periods, then it should be counted within with the time night or evening, rather than the time evening or day, respectively.

For estimating noise exposure, the noise levels for each flight phase should be considered separate based on the level of proposed operations for a given location. If a particular location is at the transition of different flight phases, the cumulative noise exposure should then be determined by adding the noise from each phase. For example, a typical mission profile will include noise from multiple flight phases:

1. UA departure from and return to a PADDC, including transition to and from vertical to horizontal fixed-wing en route flight;
2. Horizontal fixed-wing en route flight at a defined altitude and speed from a PADDC to a delivery point and back to a PADDC; and
3. Transition to and from horizontal fixed-wing en route flight to vertical flight at the delivery point, vertical descent to complete a delivery at the delivery point, and vertical ascent back to en route altitude for return to a PADCC.

The cumulative noise from the UA is then determined by adding the noise from each of these phases.

## 4.1 Noise Exposure for Operations at the PADDC

For operations at the PADDC, the UA-related noises include that from takeoff, landing, and transitions from vertical to fixed-wing horizontal flight between the respective en route flight phases. To provide a

[11] Discussion of modification of this process for use in California with the CNEL metric is discussed in Section 3.1.

conservative view, all operations are assumed to be on the same en route flight path with outbound and inbound flights traversing it in opposite directions.

Table 7 presents data for a given number of daily average DNL or CNEL Equivalent deliveries (including the takeoff and climb, transition to en route outbound, transition from en route inbound, and descent and landing as detailed in Section 2.1.2, the estimated extent of DNL/CNEL 45 dB, 50 dB, 55 dB, 60 dB, and 65 dB contours under the flight path for a PADDC extents as described in Section 3.2. The analyses presented in Table 7 were rounded up conservatively to the nearest interval available from the data from Section 2.2, out to 3,500 feet. The actual noise levels, should they be calculated with greater precision or measured, are anticipated to be within the estimated extents depicted.[12]

[12] The calculation of the equations presented in Section 3 require that distance is provided. The DNL levels were calculated at 32.8 feet and then 50-foot intervals from 50 to 3,500 feet as provided in Section 2.2.

**Table 7. Estimated Extent of Noise Exposure from PADDC per Number of Deliveries**

| Number of DNL/CNEL Equivalent Deliveries Served by PADDC | | Estimated Extents, feet, for | | | | |
|---|---|---|---|---|---|---|
| Average Daily | Annual | DNL/CNEL 45 dB | DNL/CNEL 50 dB | DNL /CNEL 55 dB | DNL/CNEL 60 dB | DNL/CNEL 65 dB |
| <= 1 | <= 365 | 75 | 32.8 | 32.8 | 32.8 | 32.8 |
| <= 5 | <= 1,825 | 150 | 100 | 50 | 32.8 | 32.8 |
| <= 10 | <= 3,650 | 250 | 150 | 75 | 32.8 | 32.8 |
| <= 15 | <= 5,475 | 250 | 150 | 100 | 50 | 32.8 |
| <= 20 | <= 7,300 | 300 | 200 | 100 | 75 | 32.8 |
| <= 40 | <= 14,600 | 450 | 250 | 150 | 100 | 32.8 |
| <= 60 | <= 21,900 | 550 | 300 | 200 | 100 | 75 |
| <= 80 | <= 29,200 | 650 | 350 | 200 | 150 | 75 |
| <= 100 | <= 36,500 | 750 | 400 | 250 | 150 | 75 |
| <= 120 | <= 43,800 | 850 | 400 | 250 | 150 | 100 |
| <= 140 | <= 51,100 | 1000 | 450 | 250 | 150 | 100 |
| <= 160 | <= 58,400 | 1150 | 500 | 300 | 150 | 100 |
| <= 180 | <= 65,700 | 1400 | 500 | 300 | 200 | 100 |
| <= 200 | <= 73,000 | 1650 | 550 | 300 | 200 | 100 |
| <= 220 | <= 80,300 | 2650 | 600 | 300 | 200 | 100 |
| <= 240 | <= 87,600 | Note c | 600 | 350 | 200 | 150 |
| <= 260 | <= 94,900 | Note c | 650 | 350 | 200 | 150 |
| <= 280 | <= 102,200 | Note c | 700 | 350 | 200 | 150 |
| <= 300 | <= 109,500 | Note c | 700 | 350 | 200 | 150 |
| <= 340 | <= 124,100 | Note c | 800 | 400 | 250 | 150 |
| <= 360 | <= 131,400 | Note c | 800 | 400 | 250 | 150 |
| <= 380 | <= 138,700 | Note c | 850 | 400 | 250 | 150 |
| <= 400 | <= 146,000 | Note c | 900 | 450 | 250 | 150 |
| <= 420 | <= 153,300 | Note c | 950 | 450 | 250 | 150 |
| <= 440 | <= 160,600 | Note c | 1000 | 450 | 250 | 150 |
| <= 460 | <= 167,900 | Note c | 1050 | 450 | 250 | 150 |
| <= 480 | <= 175,200 | Note c | 1100 | 450 | 250 | 150 |
| <= 500 | <= 182,500 | Note c | 1150 | 500 | 300 | 150 |

Notes:
a) One delivery includes the outbound takeoff and inbound landing and is representative of two operations.
b) If a value for deliveries is not specifically defined in this table, use the next highest value. For example, if there are 50 average daily DNL Equivalent deliveries, use the entry for 60 average daily DNL Equivalent deliveries.
c) The DNL/CNEL noise level noted extends more than 3,500 feet from the PADDC based on the level of operations specified as the aircraft continues along its en route flight path. En route results in Section 4.2 may be more applicable in these instances for determining noise levels.

## 4.2 Noise Exposure under En Route Paths

For en route conditions, the UA is expected to fly the same outbound flight path between the PADDC and the delivery point and inbound flight path back to the PADDC (Section 3.4.2). Therefore, each location under the en route path would be overflown twice for each delivery served by the respective overhead en route path.

Table 8 provides the estimated DNL or CNEL for a location on the ground directly under an en route path for various counts of daily average DNL or CNEL Equivalent deliveries. The en route noise calculated for

each delivery includes both the inbound and outbound traversal of the en route path at 165 feet AGL and a ground speed of 52.4 knots.

**Table 8. Estimated Noise Exposure Directly Under En Route Flight Paths**

| Number of DNL/CNEL Equivalent Deliveries Served by Route | | DNL/CNEL |
|---|---|---|
| Average Daily | Annual | |
| <= 1 | <= 365 | 21.3 |
| <= 5 | <= 1,825 | 28.3 |
| <= 10 | <= 3,650 | 31.3 |
| <= 15 | <= 5,475 | 33.1 |
| <= 20 | <= 7,300 | 34.4 |
| <= 40 | <= 14,600 | 37.4 |
| <= 60 | <= 21,900 | 39.1 |
| <= 80 | <= 29,200 | 40.4 |
| <= 100 | <= 36,500 | 41.3 |
| <= 120 | <= 43,800 | 42.1 |
| <= 140 | <= 51,100 | 42.8 |
| <= 160 | <= 58,400 | 43.4 |
| <= 180 | <= 65,700 | 43.9 |
| <= 200 | <= 73,000 | 44.4 |
| <= 220 | <= 80,300 | 44.8 |
| <= 240 | <= 87,600 | 45.1 |
| <= 260 | <= 94,900 | 45.5 |
| <= 280 | <= 102,200 | 45.8 |
| <= 300 | <= 109,500 | 46.1 |
| <= 340 | <= 124,100 | 46.7 |
| <= 360 | <= 131,400 | 46.9 |
| <= 380 | <= 138,700 | 47.1 |
| <= 400 | <= 146,000 | 47.4 |
| <= 420 | <= 153,300 | 47.6 |
| <= 440 | <= 160,600 | 47.8 |
| <= 460 | <= 167,900 | 48.0 |
| <= 480 | <= 175,200 | 48.2 |
| <= 500 | <= 182,500 | 48.3 |

In some instances, the UA may overfly locations at operational levels that differ from both an inbound and outbound traversal of the en route path by the UA as described above and presented in Table 8. For these circumstances, Table 9 presents the equations for calculating the estimated DNL or CNEL for a receiver directly under a specified given number of DNL or CNEL Equivalent average daily individual overflights, defined as $N_o$.

**Table 9. Estimated Noise Exposure Directly Under Overflights**

| Altitude for Overflight | Weight for Overflight | SEL for 1 Overflight (dB) | DNL for 1 Overflight between 7 AM and 10 PM (dB)[c] | DNL/CNEL equation for the number of DNL/CNEL Equivalent Overflights |
|---|---|---|---|---|
| 115 feet AGL | Maximum | 69.7 | 20.3 | $10 \times \log_{10}(N_o) + 20.3$ |
| 160 feet AGL | Maximum | 67.9 | 18.5 | $10 \times \log_{10}(N_o) + 18.5$ |
| 165 feet AGL | Maximum | 67.7 | 18.3 | $10 \times \log_{10}(N_o) + 18.3$ |
| 180 feet AGL | Maximum | 67.2 | 17.9 | $10 \times \log_{10}(N_o) + 17.9$ |
| 300 feet AGL | Maximum | 64.5 | 15.1 | $10 \times \log_{10}(N_o) + 15.1$ |
| N feet AGL | Maximum | $12.5 \times \log_{10}\left(\frac{165}{N_{ft}}\right) + 67.7$ | $SEL_1\ dB - 49.4$ | $10 \times \log_{10}(N_o) + DNL_1\ dB$ |

Notes:
a) The DNL value for a given number of average DNL Equivalent Operations, $N_o$, can be found by using the equations associated with operation of the UA at a specified altitude and speed interval. In this case, one operation represents a single overflight. The DNL values are applicable using CNEL equivalent ops as discussed in Section 3.1.
b) All values in this table are for level flight at 52.4 knots.
c) The DNL values presented here are also valid for CNEL for 1 Overflight between 7 AM and 7 PM.

## 4.3 Noise Exposure for Operations at Delivery Point

Table 10 presents the estimated DNL or CNEL values for a range of potential daily average DNL Equivalent delivery counts at a delivery point. Also included in Table 10 is the equation for calculating the estimated DNL or CNEL for a specific number of daily average DNL or CNEL Equivalent delivery counts at a delivery point, defined as $N_d$, for instances where the number of deliveries may fall between the range of presented delivery count intervals. The DNL or CNEL values include the transition from en route speed to vertical flight at en route altitude, the delivery maneuver, and the transition from vertical flight at en route altitude to en route speed as discussed in Section 3.4.3. The minimum listener distance is 16.4 feet from the delivery point and corresponds to minimum distance between a person and delivery point as discussed in Section 2.1.2.5. Values are also presented at 32.8 feet from the delivery point which corresponds to minimum distance from the available measurement data and analysis presented by FAA. Values were also calculated at distances of 50 feet, 75 feet, 100 feet, and 125 feet from the delivery point and are representative of distances from which nearby properties may experience noise from a delivery.[13]

[13] The 2021 US Census national average lot size for single-family sold homes was 15,218 square feet. This is representative of a property with dimensions of a 123.36 x 123.36 foot square. 125 feet represents a 125 foot lateral width of the parcel rounded up to the nearest 25 feet. https://www.census.gov/construction/chars/ See file "Soldlotsize_cust.xls" sheet MALotSizeSold. Accessed August 17, 2022.

**Table 10. Estimated Noise Exposure at Various Distances from a Delivery Point per Number of Deliveries**

| Average Daily DNL/CNEL Equivalent Deliveries | Annual DNL/CNEL Equivalent Deliveries | Estimated Delivery DNL/CNEL at 16.4 feet (Minimum Possible Listener Distance) | Estimated Delivery DNL/CNEL at 32.8 feet (Minimum Measured Listener Distance) | Estimated Delivery DNL/CNEL at 50 feet | Estimated Delivery DNL/CNEL at 75 feet | Estimated Delivery DNL/CNEL at 100 feet | Estimated Delivery DNL/CNEL at 125 feet |
|---|---|---|---|---|---|---|---|
| <= 1 | <= 365 | 51.0 | 47.2 | 46.1 | 44.3 | 41.6 | 39.1 |
| <= 5 | <= 1,825 | 57.9 | 54.2 | 53.1 | 51.3 | 48.6 | 46.1 |
| <= 10 | <= 3,650 | 61.0 | 57.2 | 56.1 | 54.3 | 51.6 | 49.1 |
| <= 15 | <= 5,475 | 62.7 | 58.9 | 57.9 | 56.1 | 53.3 | 50.8 |
| <= 20 | <= 7,300 | 64.0 | 60.2 | 59.1 | 57.3 | 54.6 | 52.1 |
| <= 40 | <= 14,600 | 67.0 | 63.2 | 62.1 | 60.3 | 57.6 | 55.1 |
| <= 60 | <= 21,900 | 68.7 | 65.0 | 63.9 | 62.1 | 59.3 | 56.9 |
| <= 80 | <= 29,200 | 70.0 | 66.2 | 65.1 | 63.3 | 60.6 | 58.1 |
| <= 100 | <= 36,500 | 71.0 | 67.2 | 66.1 | 64.3 | 61.6 | 59.1 |
| <= 120 | <= 43,800 | 71.7 | 68.0 | 66.9 | 65.1 | 62.4 | 59.9 |
| <= 140 | <= 51,100 | 72.4 | 68.6 | 67.6 | 65.8 | 63.0 | 60.5 |
| <= 160 | <= 58,400 | 73.0 | 69.2 | 68.2 | 66.3 | 63.6 | 61.1 |
| <= 180 | <= 65,700 | 73.5 | 69.7 | 68.7 | 66.9 | 64.1 | 61.6 |
| <= 200 | <= 73,000 | 74.0 | 70.2 | 69.1 | 67.3 | 64.6 | 62.1 |
| <= 220 | <= 80,300 | 74.4 | 70.6 | 69.5 | 67.7 | 65.0 | 62.5 |
| <= 240 | <= 87,600 | 74.8 | 71.0 | 69.9 | 68.1 | 65.4 | 62.9 |
| <= 260 | <= 94,900 | 75.1 | 71.3 | 70.3 | 68.5 | 65.7 | 63.2 |
| <= 280 | <= 102,200 | 75.4 | 71.7 | 70.6 | 68.8 | 66.0 | 63.6 |
| <= 300 | <= 109,500 | 75.7 | 72.0 | 70.9 | 69.1 | 66.3 | 63.9 |
| <= 340 | <= 124,100 | 76.3 | 72.5 | 71.4 | 69.6 | 66.9 | 64.4 |
| <= 360 | <= 131,400 | 76.5 | 72.8 | 71.7 | 69.9 | 67.1 | 64.6 |
| <= 380 | <= 138,700 | 76.8 | 73.0 | 71.9 | 70.1 | 67.4 | 64.9 |
| <= 400 | <= 146,000 | 77.0 | 73.2 | 72.1 | 70.3 | 67.6 | 65.1 |
| <= 420 | <= 153,300 | 77.2 | 73.4 | 72.4 | 70.5 | 67.8 | 65.3 |
| <= 440 | <= 160,600 | 77.4 | 73.6 | 72.6 | 70.7 | 68.0 | 65.5 |
| <= 460 | <= 167,900 | 77.6 | 73.8 | 72.7 | 70.9 | 68.2 | 65.7 |
| <= 480 | <= 175,200 | 77.8 | 74.0 | 72.9 | 71.1 | 68.4 | 65.9 |
| <= 500 | <= 182,500 | 77.9 | 74.2 | 73.1 | 71.3 | 68.6 | 66.1 |
| $N_d$ | $N_d \; x \; 365$ | $10 \times \log_{10}(N_d) + 51.0$ | $10 \times \log_{10}(N_d) + 47.2$ | $10 \times \log_{10}(N_d) + 46.1$ | $10 \times \log_{10}(N_d) + 44.3$ | $10 \times \log_{10}(N_d) + 41.6$ | $10 \times \log_{10}(N_d) + 39.1$ |

Notes:
a) The DNL/CNEL values presented in this table only reflect the UA conducting descent and climb flight maneuvers associated with a delivery. DNL/CNEL values associated with en route flight to and from a PADDC to a delivery point associated with a delivery, or nearby en route overflights, should be added to these values utilizing the DN/CNEL levels presented in Table 8.
b) If a value for deliveries is not specifically defined in this table, use the next highest value. For example, if there are 50 average daily DNL Equivalent deliveries, use the entry for 60 average daily DNL Equivalent deliveries.

# Attachment A

# Federal Aviation Administration

Date: August 4, 2022

To: Donald Scata, Manager, Noise Division,
Office of Environment and Energy (AEE-100)

From: Christopher Hobbs, General Engineer, Noise Division,
Office of Environment and Energy (AEE-100)

Subject: Estimated Noise Levels for Amazon Prime Air MK27-2 UA

This memo presents an analysis of noise measurements of the Amazon Prime Air MK27-2 Unmanned Aircraft (UA) by Amazon Prime Air (Amazon), measured between April 1 and April 16, 2022 at the Pendleton UAS Range located at the Eastern Oregon Regional Airport (KPDT) in Pendleton, Oregon. The purpose of the analysis is to provide estimates of expected sound exposure levels resulting from typical operations of the Amazon MK27-2 UA by Amazon and provides the methods used to create the noise estimates. Any deviation of the expected flight profile from those measured at Pendleton will need to be accounted for in the noise estimates using appropriate methodology.

**1. Flight Profile and Segment Noise**

The phases of a typical flight profile from takeoff to landing from a Prime Air Drone Delivery Center (PADDC) with an included delivery are listed in Table 1 for the MK27-2 UA. For the purposes of this analysis, the point on the ground that the UA takes off of (launch pad), delivers to (delivery point), and lands on (landing pad) will be referred to as the PADDC. For normal operations Amazon will be basing the UA at a PADDC containing the landing and takeoff pad infrastructure, and delivery will be completed at a remote location using a target on the ground at the delivery location to mark the specific delivery point. All noise measurements at Pendleton were made with the UA carrying a 5 lbs package representative of the UA operating at the max takeoff weight of 91.5 lbs. The package was not released during the delivery phase of the flight profile. It is assumed that the noise generated during the climb out after delivery with the package will be greater than if the package had been released; therefore, the noise measurements presented here are a conservative estimate of those during actual operations.

The method used to estimate the noise on the ground during each phase of flight is listed below. The methodology presented for estimating the noise for each flight phase uses the best available information from available measurement data for the MK27-2 UA and represents a conservative estimate of the noise levels resulting from operations of this UA.

**Table 1. Phases of Flight for Typical Flight Profile of MK27-2 UA**

| Phase of Flight | Description |
|---|---|
| Takeoff | Vertical launch from PADDC on ground to en route altitude (165 ft Above Ground Level (AGL)) in vertical flight mode (pointed upward) |
| Transition to Outbound En Route Flight | Transition from zero speed above PADDC at en route altitude to cruise speed (52.4 kts) while changing from vertical flight mode to fixed-wing flight mode (pointed horizontally) |
| Outbound En Route Flight | Fixed-wing flight mode at operational en route altitude and cruise speed |
| Transition to Delivery | Transition from cruise speed at en route altitude and fixed-wing flight mode to zero speed above PADDC/delivery point at en route altitude and in vertical flight mode |
| Delivery | Vertically descend from en route altitude to 13 ft AGL delivery altitude, drop a package at the PADCC/delivery point, and vertical ascent back to en route altitude in vertical flight mode |
| Transition to Inbound En Route Flight | Transition from zero speed above PADDC/delivery point at en route altitude to cruise speed while changing from vertical flight mode to fixed-wing flight mode |
| Inbound En Route Flight | Fixed-wing flight mode at operational en route altitude and cruise speed |
| Transition to Landing | Transition from cruise speed at en route altitude and fixed-wing flight mode to zero speed above PADDC at en route altitude and in vertical flight mode |
| Landing | Descend from en route altitude to PADDC on ground in vertical flight mode |

### 1.1 Transition Noise

Because the transition phase from vertical to fixed-wing flight mode or vice versa is involved in the takeoff, delivery, and landing phases of flight it will be discussed first. The measurements made by Amazon were done with the microphones oriented normal to the flight track as shown in Figure 1. As the figure shows, the UA did not fly over the microphones after takeoff. The same is true for the transitions before and after delivery and the transition before landing. To estimate the maximum noise at a distance from the takeoff/landing pad or delivery point on the ground one must combine the noise emitted from the UA during the vertical portion of the trajectory (descent or ascent) and the noise the UA make as it transitions from the vertical flight mode (pointed up) to fixed-wing flight mode (pointed horizontally). The microphones were not positioned to capture the majority of the transition noise; thus, an estimate of the noise made by the UA while transitioning had to be made based on the overflight measurements as discussed below.

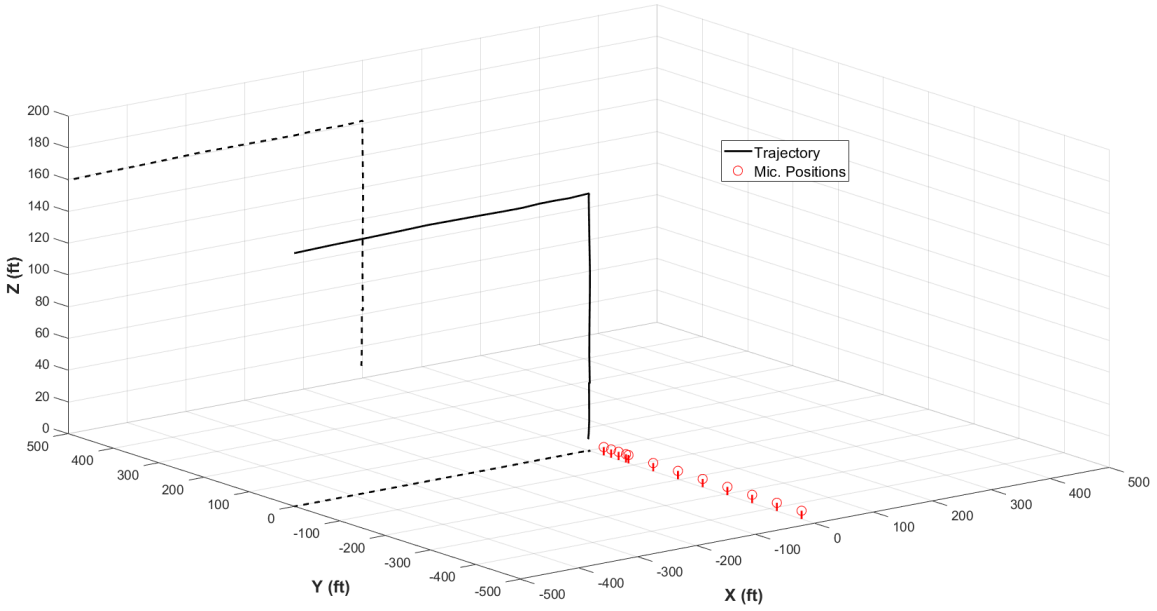



***Figure 1. Microphone locations for takeoff, delivery, and landing measurements for MK27-2 UA with example takeoff trajectory.***

The duration of the transition of the UA from vertical to fixed-wing flight mode was measured using the time it took the UA to reach cruise speed after it reached the top of the vertical climb during takeoff and post-delivery. The start of the duration for both phases was set as the time the UA began having non-zero ground speed. For the duration of the transition of the UA from fixed-wing flight mode to vertical flight during landing and pre-delivery, the transition duration was measured from the time the UA began to decelerate from cruise speed to zero ground speed. In all cases the acceleration was noted as being nearly constant. The pitch of the UA from vertical to horizontal fixed-wing flight mode was shown to coincide with this time as well. Table 2 shows the average durations for the UA to transition to and from fixed-wing flight mode. As presented in Table 2, the average duration for transition during takeoff and landing was the same 20 seconds. Assuming a constant acceleration to and from a 52.4 knot cruise speed, the distance to transition from vertical to fixed-wing flight mode is approximately 884 ft. It is the same approximate distance to transition from fixed-wing to vertical flight mode.

**Table 2. Description of Transition to and from Fixed-Wing Flight Mode**

| Phase | Description | Altitude (ft AGL) | Ground Speed (kts) | Duration (s) |
|---|---|---|---|---|
| Transition to Fixed-Wing Mode | Transition from vertical to horizontal fixed-wing flight | 165 | 0 accelerating to 52.4 | 20 |
| Transition from Fixed-Wing Mode | Transition from horizontal fixed-wing flight to vertical flight | 165 | 52.4 decelerating to 0 | 20 |

In order to estimate the noise made by the UA at positions undertrack as it transitions to or from fixed-wing flight mode, the following assumption has been made:

*The noise of the UA in fixed-wing flight mode is approximately the same it transitions; furthermore, the noise radiated from the UAS is assumed to be omnidirectional. That is to say that the noise level measured a fixed distance from the UA will be the same in all directions.*

To calculate the noise from the transition phase of the flight profile at distances from the PADDC undertrack, the following steps were performed:

1. The maximum noise level from measured overflights was corrected to the en route altitude distance (165 ft) using spherical spreading.
2. At each distance from the PADDC undertrack the estimated sound pressure level was calculated from 25 ft segments along the transition flight trajectory based on the maximum sound level measured during the overflight corrected to the distance between using spherical spreading. The duration applied to each respective segment's sound pressure level was found from the calculated motion of the UA as a function of time to / from a cruise speed of 52.4 kts to / from zero kts using constant acceleration.
3. The sound pressure level duration products were summed to find the estimated sound exposure level at each position.
4. The estimate of the sound exposure levels were corrected to match the overflight sound exposure level once past the effects of the transition at approximately 1600 ft from the PADDC.

The levels in Table 3 are the results of the calculations. It is recommended to use linear interpolation to find values between the distances in the table for the transition flight phases. This estimate of the transition phase of flight can be used for the transition from zero speed to the cruise speed as well as the transition from cruise speed to zero speed. The calculation was done for an estimated altitude of 165 ft AGL.

**Table 3. Estimated Sound Exposure Levels from Transition Phase of Flight Profile**

| Distance from PADDC (ft) | Sound Exposure Level $(dBA)_1$ |
|---|---|
| 0 | 69.9 |
| 100 | 70.6 |
| 200 | 70.3 |
| 400 | 69.4 |
| 800 | 68.2 |
| 1600 | 67.7 |
| 3200 | 67.7 |

*Notes: 1) Applicable to either profile described in Table 2.*

The sound exposure levels presented in Table 3 show that beyond 1600 ft from the PADDC the transition profile (Table 2) does not differ from the en route levels (Section 1.3); therefore, the transition phase noise levels present in Table 2 should be added to the noise created by the UA during takeoff, delivery, and landing out to a distance of 1,600 feet. The sound exposure levels from the overflight measurements should be combined with the other phases of flight for distances greater than 1,600 feet from the PADDC.

### 1.2 Takeoff and Landing Noise

There are two flight activities that generate noise in the vicinity of the takeoff and landing pads at the PADCC. The vertical portion of the trajectory (i.e., the climb or descent to/from the en route altitude), and the transition from vertical flight mode to horizontal fixed-wing flight mode as described above. During takeoff, the MK27-2 will climb from the ground vertically to an operational altitude of 165 feet AGL, then transition from vertical to fixed-wing flight for transit to the delivery location. After completing delivery, the UA returns from the delivery location at 165 feet AGL in fixed-wing flight, transitions to vertical flight, and then descends vertically to the ground at the landing pad. Table 4 details the takeoff and landing phases of the flight profile. The durations in the table are the average time it took the UA to ascend or descend from the cruise altitude.

**Table 4. MK27-2 UA Takeoff and Landing Profile Details**

| Phase of Flight | Flight Description | Altitude (ft AGL) | Ground Speed (kts) | Duration (s) |
|---|---|---|---|---|
| Takeoff | Vertical ascent to cruise altitude | 0 ascend to 165 | 0 | 21 |
| Landing | Descent from cruise altitude to land | 165 descend to 0 | 0 | 38 |

To estimate the sound exposure level from the takeoff and landing phases of the flight profile, measurements of the noise emissions of the MK27-2 UA were made when the UA was at maximum weight and was following a simulated takeoff and landing profile representative of typical operations. The profile included the vehicle climbing vertically from the PADDC to en route altitude where it transitioned to fixed-wing mode for en route flight, flying an oval “racetrack” pattern at en route altitude to simulate outbound en-route flight, and transitioning from en-route altitude in fixed-wing flight mode to the vertical flight mode for a descent to landing. The microphone positions relative to the takeoff and landing pad are shown in Figure 1. The PADDC

is located at the origin in the plot. It is important to note that only 4 microphones were used for each flight. They were moved to different positions between flights.

The sound exposure level was calculated from the data collected by each microphone for each flight. The sound exposure level was calculated from the entire A-weighted time history of the event. Because the microphone array is normal to the flight track, the noise during transition between en route fixed-wing flight to vertical flight mode is not completely captured as it would be under the vehicle for the inbound and outbound phases of the flight profile and is assumed to not be accounted for in the following tables. Because of this, the sound exposure values versus distance measured from the PADDC must be supplemented to estimate the most conservative sound exposure as detailed below.

There were a total of nine flights where the UA performed a takeoff, delivery, and landing. The microphones were moved for some of the flights. The number of flights for each positioning of the four microphone was not equal; however, the available data represents a good range of distance from the PADDC and has a behavior that can be used to adequately represent the noise emissions from the vertical portion of the flight profile. There were two other flights performed for overflight measurements. Because the aircraft's flight track on takeoff and landing was not the same orientation to the microphone array as the first nine flights, metrics for those four events were not included in the averages. Table 5 presents the averaged results at each microphone for all takeoff events, and Table 6 presents the averaged results for averaged landing events.

**Table 5. Average Sound Exposure Levels of MK27-2 UA during Takeoff versus Distance**

| Position | Distance (ft) | Sound Exposure Level (dBA)1 |
|---|---|---|
| 1 | 32.8 | 95.7 |
| 2 | 49.2 | 94.1 |
| 3 | 65.6 | 92.1 |
| 4 | 82.0 | 90.1 |
| 5 | 87.5 | 88.3 |
| 6 | 142.2 | 83.0 |
| 7 | 196.9 | 78.7 |
| 8 | 251.5 | 77.7 |
| 9 | 306.2 | 75.8 |
| 10 | 360.9 | 73.8 |
| 11 | 415.6 | 72.4 |
| 16 | 689.0 | 69.1 |
| 17 | 743.7 | 65.6 |
| 18 | 798.4 | 64.7 |
| 19 | 853.0 | 64.0 |

*Notes: 1) Applicable for the takeoff profile presented in Table 4.*

**Table 6. Average Sound Exposure Levels of MK27-2 during Landing versus Distance**

| Position | Distance (ft) | Sound Exposure Level $(dBA)_1$ |
|---|---|---|
| 1 | 32.8 | 94.8 |
| 2 | 49.2 | 93.2 |
| 3 | 65.6 | 92.1 |
| 4 | 82.0 | 90.2 |
| 5 | 87.5 | 90.1 |
| 6 | 142.2 | 85.0 |
| 7 | 196.9 | 80.7 |
| 8 | 251.5 | 79.0 |
| 9 | 306.2 | 77.3 |
| 10 | 360.9 | 74.9 |
| 11 | 415.6 | 73.7 |
| 16 | 689.0 | 69.7 |
| 17 | 743.7 | 67.6 |
| 18 | 798.4 | 67.0 |
| 19 | 853.0 | 66.2 |

*Notes: 1) Applicable for the landing profile presented in Table 4.*

The measured data are presented in the following figures. The curve fits in the Tables below represent the best estimates of the sound levels for the distance ranges listed. It is recommended to use the curve fit equations to calculate the sound exposure levels representing only the vertical portion of the flight profile noise emissions for the takeoff and landing phases. Positions four and five were averaged together and the effective distance weight-averaged because of their proximity. The distance of 149 feet from the PADDC is the minimum distance for which the behavior of the noise levels versus distance is consistently decreasing by approximately 6 dB per doubling of distance for the takeoff, delivery, and landing phases of flight. The same distance was chosen to begin the curve fit for consistency. The coefficients in the table for distance less than 149 feet are effectively linear interpolations between the average, measured values.

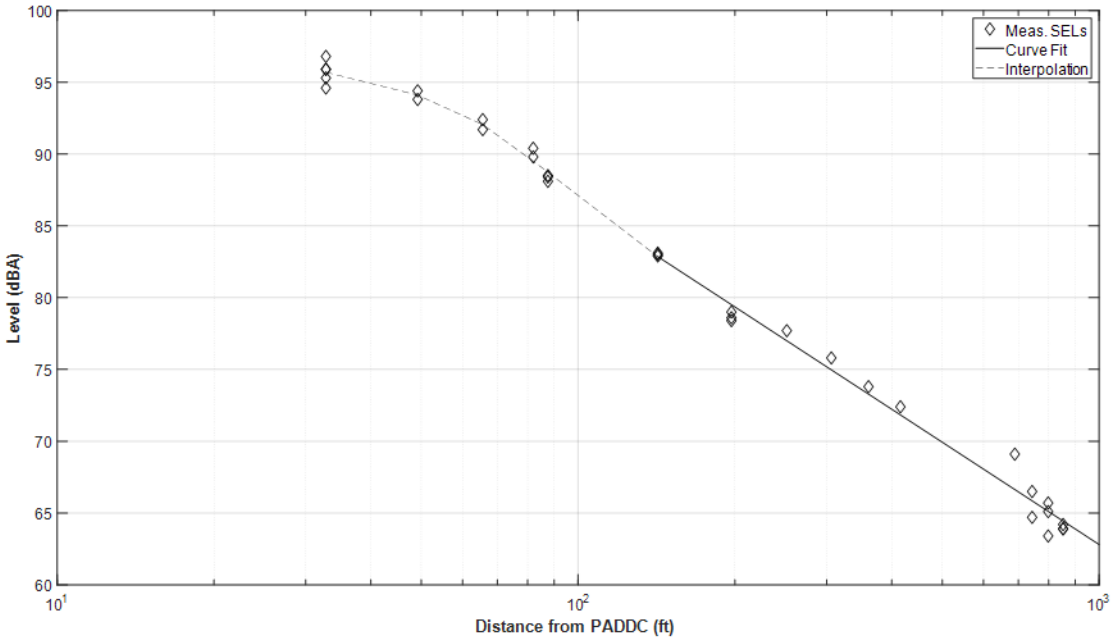



***Figure 2. Measured sound exposure levels during takeoffs as described in Table 4.***

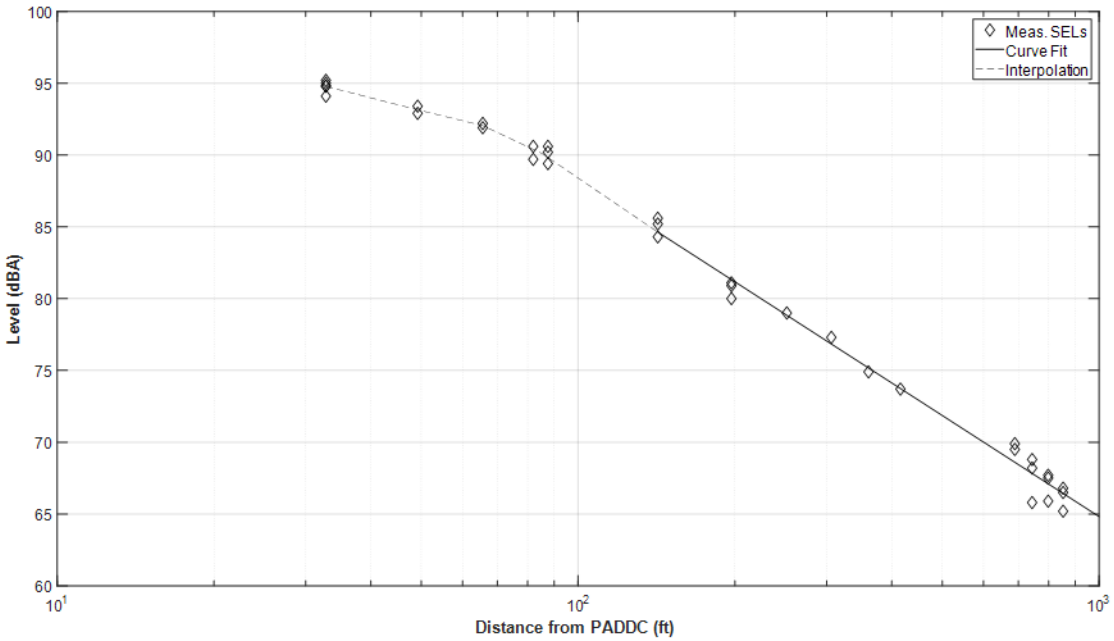



***Figure 3. Measured sound exposure levels during landings as described in Table 4.***

The following equation governs how to estimate the sound exposure level for a given distance, *d*, in feet from the PADDC resulting from the vertical portion of the takeoff, delivery, or landing portion of the flight

profile of the UA. The constants m and b are to be used in Eq. 1 for the appropriate row in the tables based on the Range. These estimates assume the UA reaches an en route altitude of 165 feet AGL.

$$SEL = m * \log_{10}(d + b) \qquad (dB) \qquad (1)$$

**Table 7. Parameters for Estimating Sound Exposure Level for Takeoff versus Distance[2]**

| Range for *d* (ft from PADDC) | m | b |
|---|---|---|
| 32.8 to 49.2 | -9.09 | 109.47 |
| 49.2 to 65.6 | -16.41 | 121.86 |
| 65.6 to 85.3[1] | -26.39 | 140.00 |
| 85.3[1] to 142.2 | -27.79 | 142.71 |
| Greater than 142.2 | -23.39 | 134.99 |

*Notes: 1) Average, weighted distance for the 82 and 87.5 ft position measurements*
*2) Applicable for the takeoff profile in Table 4*

**Table 8. Parameters for Estimating Sound Exposure Level for Landing versus Distance[2]**

| Range for *d* (ft from PADDC) | m | b |
|---|---|---|
| 32.8 to 49.2 | -9.26 | 108.81 |
| 49.2 to 65.6 | -8.80 | 108.05 |
| 65.6 to 85.3[1] | -17.10 | 123.12 |
| 85.3[1] to 142.2 | -24.56 | 137.53 |
| Greater than 142.2 | -23.39 | 134.99 |

*Notes: 1) Average, weighted distance for the 82 and 87.5 ft position measurements*
*2) Applicable for the landing profile in Table 4*

### 1.3 En Route Noise

Two flights were flown to measure noise from the en route phase of flight. The UA flew in a "dog bone" pattern in order to overfly the lead microphone in the array three times traveling in each direction. The microphone array was not moved between the flights and the four positions were the only distances measured from undertrack. A cross wind may be responsible for the microphone undertrack not measuring the highest noise level. The 12 sound exposure levels measured from the two flights were averaged at each of the positions and results presented in Table 9. The slant range column presented in Table 9 is the distance between the UA and position at the closest point of approach during the overflight.

It is recommended that 67.7 dBA sound exposure level be used to represent the noise generated by the UA at cruise speed of 52.4 kts and en route altitude of 165 ft AGL because it is the highest level measured; therefore, it is the most conservative estimate.

**Table 9. Average Sound Exposure Levels Measured During Level Overflights**

| Position | Sound Exposure Level[1] (dBA) | Maximum Level (dBA) | Distance from Undertrack (ft) | Slant Range (ft) | Sound Exposure Level Normalized to 165 ft[2] (dBA) | Maximum Level Normalized to 165 ft[3] (dBA) |
|---|---|---|---|---|---|---|
| 1 | 66.0 | 59.2 | 0 | 165 | 66.0 | 59.2 |
| 5 | 67.0 | 60.3 | 88 | 187 | 67.7 | 61.4 |
| 6 | 65.1 | 57.8 | 142 | 218 | 66.6 | 60.2 |
| 7 | 63.0 | 55.2 | 197 | 257 | 65.4 | 59.1 |

*Notes: 1) Measured levels normalized to 52.4 kts before averaging.*
*2) Using 12.5*log10(Slant/Distance)*
*3) Using 20*log10(Slant/Distance)*

To estimate the sound exposure level of the UA traveling at speed $v_1$ when the measured sound exposure level for a level overflight was done when the UA was traveling at speed $v_{ref}$ add the value *del1* calculated with Eq. 2 to the sound exposure level measured with the speed $v_{ref.}$

$$del1 = 10 * \log_{10}\left( v_1 / v_{ref} \right) \qquad (dB) \qquad (2)$$

To estimate the sound exposure level of the UA traveling at a height, $h_1$ ft, above the ground different than 165 ft AGL, add the value *del2* calculated with Eq. 3 to the 67.7 dBA sound exposure level.

$$del2 = 12.5 * \log_{10}\left( h_{ref} / h_1 \right) \qquad (dB) \qquad (3)$$

### 1.4 Delivery Noise

There are five flight activities that generate noise in the vicinity of a delivery location. The MK27-2 will approach the delivery location from fixed-wing en route flight at 165 feet AGL, transition to vertical flight, and then descend vertically to a delivery altitude of 13 ft AGL. At delivery altitude, the UA will drop the package while in hover which takes approximately 2 seconds. At completion of the delivery, the UA will climb from the delivery altitude vertically back to an en route altitude of 165 feet AGL, and then transition from vertical to fixed-wing flight mode for en route flight back to the PADDC. This section considers only the noise generated from the vertical phases of the flight profile during delivery. Table 10 details the vertical portion of the delivery procedure starting at en route altitude and positioned over the delivery point to return to en route altitude. Within this portion of the procedure, Table 10 details the average durations for the descent, delivery, and ascent portions of the profile.

**Table 10. MK27-2 UA Delivery Profile Details**

| Phase | Flight Description | Altitude (ft AGL) | Ground Speed (kts) | Duration (s) |
|---|---|---|---|---|
| Descent | After transition to above PADDC, descend to delivery height | 165 to 13 | 0 | 32 |
| Delivery | Drop package on PADDC | 13 | 0 | 2 |
| Ascent | Ascend to en route altitude before transitioning to en route flight | 13 to 165 | 0 | 24 |

To estimate the sound exposure level at a delivery location, measurements of the noise emissions of the MK27-2 UA were made when the UA was at maximum weight utilizing a simulated delivery profile representative of typical operations. The profile included the vehicle flying an oval "racetrack" pattern in fixed-wing mode flight at en route altitude to simulate outbound en route flight, transition from fixed-wing flight mode to vertical flight for descent and delivery at the PADDC, vertical descent to delivery altitude, delivery, vertical climb back to en-route altitude, and transition back to fixed-wing flight mode to simulate inbound en route flight. The microphone locations utilized for the delivery measurements are the same as shown Figure 1. As with the takeoff and landing measurements, the 4 microphones were moved between flights in order to measure the noise at different distances from the PADDC. As with the takeoff and landing measurements, the transition noise was not fully captured by the microphones because the UA did not perform the transition above them.

The average sound exposure level for the entire vertical portions of the delivery phase (descent, delivery, and ascent) were then calculated at each of the microphones. As with the takeoff and landing measurements each position did not have the same number of measurements. The results were then averaged together for each microphone position. Table 11 presents the averaged results at each microphone for all delivery events. Figure 4 shows a plot of the measurements versus distance along with lines showing the methods of estimating the levels between and beyond positions. Table 12 contains the parameters suggested for use in Eq. 1 for estimating the sound exposure level at distances from the delivery location for the noise emitted from the UA during the vertical portion of the delivery. As was the case for the takeoff and landing flight phases, it is recommended for the delivery phase to use the appropriate parameters in Table 12 for the required distance. In order to estimate the noise levels near the delivery location the transition noise would need to be logarithmically added to this noise in order to properly estimate the maximum levels expected for undertrack locations.

**Table 11. Average Sound Exposure Level of MK27-2 UA during Delivery versus Distance**

| Position | Distance (ft) | Sound Exposure Level $(dBA)_1$ |
|---|---|---|
| 1 | 32.8 | 96.5 |
| 2 | 49.2 | 95.5 |
| 3 | 65.6 | 94.6 |
| 4 | 82.0 | 93.1 |
| 5 | 87.5 | 92.3 |
| 6 | 142.2 | 87.4 |
| 7 | 196.9 | 82.8 |
| 8 | 251.5 | 81.6 |
| 9 | 306.2 | 79.8 |
| 10 | 360.9 | 77.9 |
| 11 | 415.6 | 76.3 |
| 16 | 689.0 | 72.3 |
| 17 | 743.7 | 70.9 |
| 18 | 798.4 | 70.4 |
| 19 | 853.0 | 69.6 |

*Notes: 1) Applicable for the delivery profile presented in Table 10*

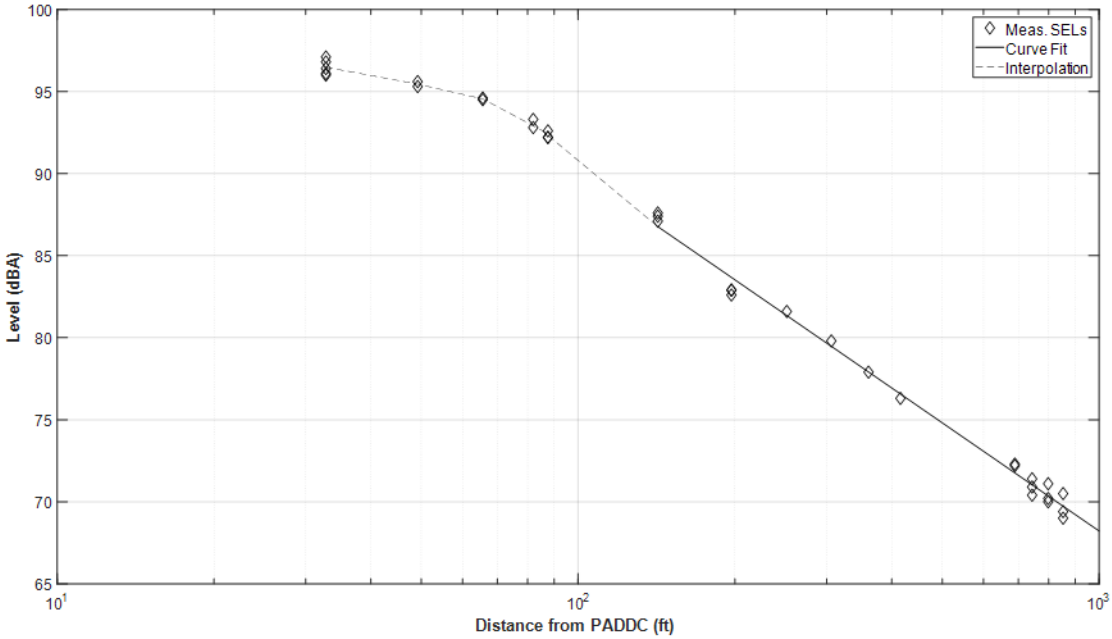



***Figure 4. Measured Sound Exposure Levels during deliveries as described in Table 10.***

**Table 12. Parameters for Estimating Sound Exposure Level for Delivery versus Distance[2]**

| Range for *d* (ft from PADDC) | m | b |
|---|---|---|
| 32.8 to 49.2 | -5.85 | 105.35 |
| 49.2 to 65.6 | -7.20 | 107.64 |
| 65.6 to 85.3[1] | -16.92 | 125.30 |
| 85.3[1] to 142.2 | -26.31 | 143.42 |
| Greater than 142.2 | -21.90 | 133.91 |

*Notes: 1) Average, weighted distance for the 82 and 87.5 ft position measurements*
*2) Applicable for the delivery profile presented in Table 10*

## 2. Analysis

The analysis of the measurements performed while the MK27-2 flew a typical profile can be used for estimating the noise created for each phase of flight. It is important to combine the transition noise with the takeoff, delivery, and landing phases in order to estimate the maximum noise expected undertrack for those portions of the flight profile. In order to estimate the noise from a flight profile with different speed or altitude, utilization of the correction for different cruise speed using equation 2 and a different en route altitude using equation 3 should be used. It is not expected that the contribution to the noise levels around the takeoff, delivery, or landing sites from the vertical part of the flight profile will change if the cruise speed or altitude are different.

## 3. Conclusion

This memo provides the means to estimate the sound exposure level from the typical flight profile for the MK27-2 delivering a package. By combining the transition noise with the noise from the vertical phases of the flight profile a conservative estimate of the noise created by the UA is achieved in that the estimate should be greater than the actual noise levels. The means for adjusting the provided noise levels for different flight profile parameters are provided with the assumption that minor changes to the en route altitudes will not change the noise levels for the takeoff, delivery, and landing phases of flight.

Appendix D

Non-Standard Noise Methodology Memos

# Federal Aviation Administration

# Memorandum

Date: September 22, 2022

To: Don Scata, Noise Division Manager, Office of Environment and Energy (AEE-100)

MICHAEL JAY MILLARD Digitally signed by MICHAEL JAY MILLARD Date: 2022.09.22 13:41:19 -04'00'

From: Mike Millard, Flight Standards (AFS), General Aviation Operations Branch, AFS-830

Subject: Environmental Assessment (EA) Noise Methodology Approval Request for Amazon Prime Air MK27-2 UA Part 135 Operations at College Station, TX

FAA Office of Flight Standards (AFS) requests FAA Office of Environmental and Energy, Noise Division (AEE-100) approval of the noise methodology to be used for the Environmental Assessment (EA) for Amazon operations using the Amazon Prime Air MK27-2 unmanned aircraft (UA) in College Station, TX to provide package delivery services as a 14 CFR Part 135 operator as described below.

As required under the National Environmental Policy Act (NEPA), the FAA must consider the potential for environmental impacts in informing the agency's decision to approve Federal actions, including the potential for noise impacts as detailed in FAA Order 1050.1F.

As the FAA does not currently have a standard approved noise model for UA, this memo serves as a request for written approval from AEE-100 to use the methodology proposed in the following sections to support the noise analysis for this EA.

**Description of Aircraft and Proposed Operations**

AFS is evaluating Amazon's proposed commercial package delivery operations using the Model MK27-2 UA from one Prime Air Drone Delivery Center (PADDC) located in the College Station, TX operating area. Approval of a Federal Action providing Amazon's air carrier Operations Specifications (OpSpecs) is required before these operations can occur.

Amazon is proposing to perform package delivery operations from the site within the proposed operating area to transport packages to delivery sites including residential homes in the area.

The MK27-2 UA is a multi-rotor design with six propellers mounted on equally spaced arms extending horizontally from a center frame. The UA can transition between vertical and horizontal flight. According to data provided by Amazon, the maximum allowable takeoff weight of the UA is 91.5 pounds, its empty

weight (including battery) is 86.6 pounds, and its maximum allowable package weight is 4.9 pounds. The package is carried in an internal cargo bay.

The MK27-2 can climb and descend vertically, hover, and fly upright with its propellers facing forward like a fixed-wing aircraft for en route flight. Airspeeds during normal en route flight are expected to be approximately 52 knots. Typical flights begin with the UA ascending vertically from a PADDC launch pad at ground level to an en route altitude between 160 and 180 feet Above Ground Level (AGL). The UA then flies a pre-assigned route between 160 and 180 feet AGL and 52 knots to a selected delivery point. Once near the delivery point, the UA decelerates and descends vertically over the delivery point. The UA descends to 13 feet AGL, drops the package, and ascends back to en route altitude. Once back at en route altitude, the UA accelerates to 52 knots and follows a predefined track to return to its originating PADDC. When the UA arrives at the PADDC, it decelerates and vertically descends to its sector's assigned landing pad. Once it lands, the UA is serviced and prepared for the next delivery.

A single PADDC is expected to have four sectors and each sector will have no more than one UA operating at a time. Amazon projects operating 52,000 annual deliveries, no night time flights, with 142.47 total deliveries on an average annual daily basis. Based on those overall levels Amazon expects deliveries to be distributed among delivery locations with a minimum number of 0.1 deliveries per day or less at any one location and maximum of 4.0 per day at any one location on an average annual daily basis.

**Noise Analysis Methodology**

AFS requests use of the noise analysis methodology described in HMMH Report No. 309990.003-7 for the "Noise Assessment for Amazon Prime Air Proposed Package Delivery Operations with Amazon Prime Air MK27-2 Unmanned Aircraft" dated August 19, 2022.

# Federal Aviation Administration

# Memorandum

Date: September 26, 2022

To: Mike Millard, Flight Standards (AFS), General Aviation Operations Branch, AFS-830

From: Don Scata, Manager, Noise Division, Office of Environment and Energy (AEE-100)

Digitally signed by DONALD S SCATA
Date: 2022.09.26 09:42:28 -04'00'

Subject: Environmental Assessment (EA) Noise Methodology Approval Request for Amazon Prime Air Commercial Package Delivery Operations with the MK27-2 UA from College Station, Texas

The Office of Environment and Energy (AEE) has reviewed the proposed non-standard noise modeling methodology to be used for Amazon Prime Air (Amazon) operations using the MK27-2 unmanned aircraft (UA) from College Station, Texas. This request is in support of an Environmental Assessment (EA) for Amazon to provide package delivery services as a 14 CFR Part 135 operator in College Station and a surrounding operating area.

The Proposed Action is to use the MK27-2 UA to deliver packages from a central distribution center, referred to as a Prime Air Drone Delivery Center (PADCC), to potential delivery locations such as residential homes within a proposed operating area in College Station. Typical operations of the UA will consist of departure from a launch/takeoff pad at the PADCC followed by a vertical climb to a typical en route altitude of 160 to180 feet above ground level (AGL). The UA then transitions from vertical to horizontal flight and accelerates to a typical en route speed of 52 knots for transit to a delivery location. Approaching the delivery location, the UA will deaccelerate and transition from horizontal to vertical flight, and then descend vertically over the delivery point. At 13 feet AGL, the UA drops the package at the delivery point, and ascends vertically back to en route altitude. Once back at en route altitude, the UA transitions from vertical to horizontal flight and accelerates to 52 knots for transit back to its originating PADDC. When the UA arrives at the PADDC, the UA will deaccelerate and transition from horizontal to vertical flight and vertically descends to its assigned landing pad. Once it lands, the UA is serviced and prepared for the next delivery.

Amazon expects to operate four sectors at the College Station PADCC and each sector will have no more than one UA operating at a time. Amazon projects operating a maximum of 52,000 annual deliveries, no night time flights, with 142.47 total deliveries on an average annual daily (AAD) basis. Amazon anticipates deliveries will be distributed throughout the operating area with a maximum of 4 per day at any one delivery location on an AAD basis as detailed in the proposed non-standard noise modeling methodology request, “Environmental Assessment (EA) Noise Methodology Approval Request for Amazon Prime Air MK27-2 UA Part 135 Operations at College Station, TX” dated September 22, 2022.

As the FAA does not currently have a standard approved noise model for assessing UA, and in accordance with FAA Order 1050.1F, all non-standard noise analysis in support of the noise impact analysis for the National Environmental Policy Act (NEPA) must be approved by AEE. This letter serves as AEE's response to the method developed in in HMMH Report No. 309990.003-7 for the "Noise Assessment for Amazon Prime Air Proposed Package Delivery Operations with Amazon Prime Air MK27-2 Unmanned Aircraft" dated August 19, 2022.

The proposed methodology appears to be adequate for this analysis; therefore, AEE concurs with the methodology proposed for this project. Please understand that this approval is limited to this particular Environmental Review, location, vehicle, and circumstances. Any additional projects using this or other methodologies or variations in the vehicle will require separate approval.

Appendix E

EJSCREEN Report

# EJScreen Report (Version 2.0)

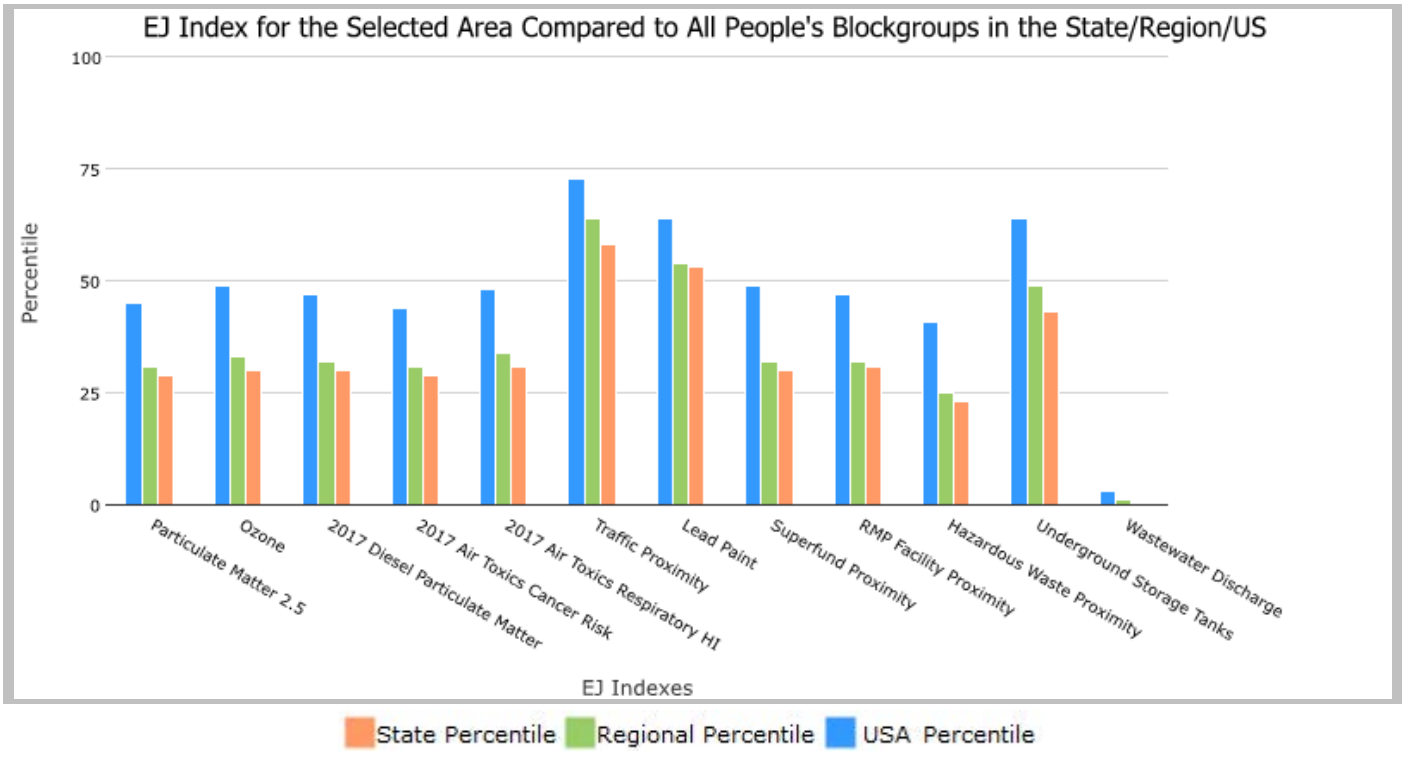
**the User Specified Area, TEXAS, EPA Region 6**

**Approximate Population: 101,719**

**Input Area (sq. miles): 43.48**

**College Station-3.73 mile radius**

| Selected Variables | State Percentile | EPA Region Percentile | USA Percentile |
|---|---|---|---|
| **Environmental Justice Indexes** | | | |
| EJ Index for Particulate Matter 2.5 | 29 | 31 | 45 |
| EJ Index for Ozone | 30 | 33 | 49 |
| EJ Index for 2017 Diesel Particulate Matter* | 30 | 32 | 47 |
| EJ Index for 2017 Air Toxics Cancer Risk* | 29 | 31 | 44 |
| EJ Index for 2017 Air Toxics Respiratory HI* | 31 | 34 | 48 |
| EJ Index for Traffic Proximity | 58 | 64 | 73 |
| EJ Index for Lead Paint | 53 | 54 | 64 |
| EJ Index for Superfund Proximity | 30 | 32 | 49 |
| EJ Index for RMP Facility Proximity | 31 | 32 | 47 |
| EJ Index for Hazardous Waste Proximity | 23 | 25 | 41 |
| EJ Index for Underground Storage Tanks | 43 | 49 | 64 |
| EJ Index for Wastewater Discharge | 0 | 1 | 3 |




This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

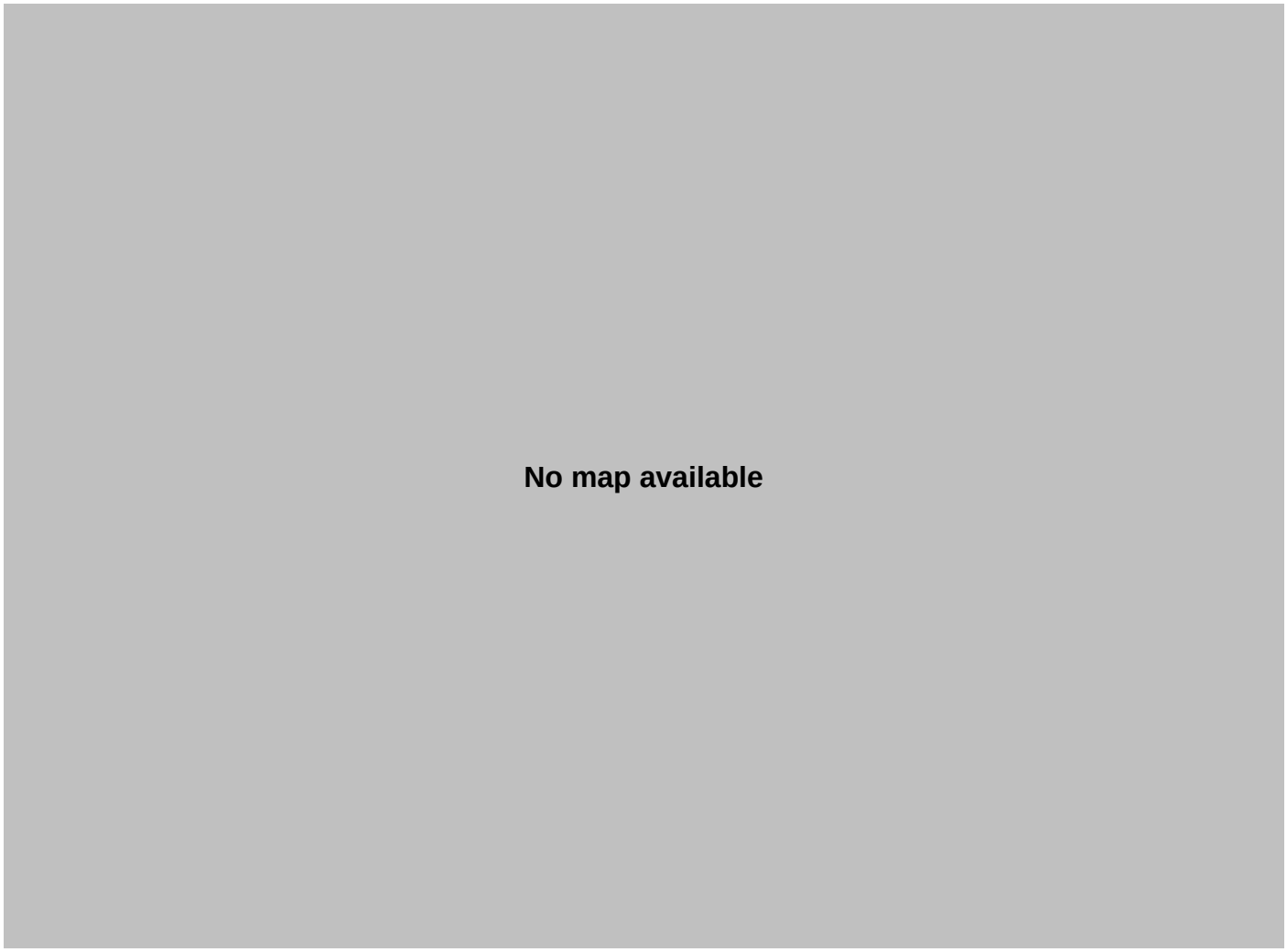
# EJScreen Report (Version 2.0)

**the User Specified Area, TEXAS, EPA Region 6**

**Approximate Population: 101,719**

**Input Area (sq. miles): 43.48**

**College Station-3.73 mile radius**




| Sites reporting to EPA | |
|---|---|
| Superfund NPL | 0 |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 0 |

# EJScreen Report (Version 2.0)

**the User Specified Area, TEXAS, EPA Region 6**

**Approximate Population: 101,719**

**Input Area (sq. miles): 43.48**

**College Station-3.73 mile radius**

| Selected Variables | Value | State Avg. | %ile in State | EPA Region Avg. | %ile in EPA Region | USA Avg. | %ile in USA |
|---|---|---|---|---|---|---|---|
| **Pollution and Sources** | | | | | | | |
| Particulate Matter 2.5 (µg/m$^3$) | 9.56 | 9.57 | 39 | 9.32 | 48 | 8.74 | 76 |
| Ozone (ppb) | 37.1 | 40 | 29 | 41.1 | 24 | 42.6 | 17 |
| 2017 Diesel Particulate Matter* (µg/m$^3$) | 0.233 | 0.214 | 58 | 0.219 | 50-60th | 0.295 | <50th |
| 2017 Air Toxics Cancer Risk* (lifetime risk per million) | 30 | 31 | 83 | 32 | 70-80th | 29 | 80-90th |
| 2017 Air Toxics Respiratory HI* | 0.31 | 0.36 | 48 | 0.37 | <50th | 0.36 | 50-60th |
| Traffic Proximity (daily traffic count/distance to road) | 540 | 510 | 75 | 470 | 77 | 710 | 70 |
| Lead Paint (% Pre-1960 Housing) | 0.035 | 0.15 | 47 | 0.16 | 40 | 0.28 | 24 |
| Superfund Proximity (site count/km distance) | 0.022 | 0.084 | 28 | 0.08 | 30 | 0.13 | 19 |
| RMP Facility Proximity (facility count/km distance) | 0.6 | 0.92 | 55 | 0.83 | 59 | 0.75 | 63 |
| Hazardous Waste Proximity (facility count/km distance) | 0.19 | 0.72 | 39 | 0.8 | 40 | 2.2 | 29 |
| Underground Storage Tanks (count/km$^2$) | 2.2 | 2.2 | 64 | 2 | 67 | 3.9 | 61 |
| Wastewater Discharge (toxicity-weighted concentration/m distance) | 1.1 | 0.33 | 98 | 0.5 | 97 | 12 | 93 |
| **Socioeconomic Indicators** | | | | | | | |
| Demographic Index | 39% | 46% | 42 | 44% | 47 | 36% | 62 |
| People of Color | 35% | 58% | 26 | 52% | 35 | 40% | 53 |
| Low Income | 46% | 34% | 69 | 36% | 68 | 31% | 76 |
| Unemployment Rate | 4% | 5% | 45 | 5% | 44 | 5% | 45 |
| Linguistically Isolated | 4% | 8% | 51 | 6% | 60 | 5% | 68 |
| Less Than High School Education | 6% | 16% | 29 | 15% | 27 | 12% | 35 |
| Under Age 5 | 5% | 7% | 35 | 7% | 37 | 6% | 46 |
| Over Age 64 | 7% | 12% | 27 | 13% | 22 | 16% | 14 |

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

# EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-miles radius
Description: College Station-3.73 mile radius

| Summary of ACS Estimates | 2015 - 2019 |
|---|---|
| Population | 101,719 |
| Population Density (per sq. mile) | 2,446 |
| People of Color Population | 35,992 |
| % People of Color Population | 35% |
| Households | 36,160 |
| Housing Units | 41,346 |
| Housing Units Built Before 1950 | 569 |
| Per Capita Income | 28,086 |
| Land Area (sq. miles) (Source: SF1) | 41.59 |
| % Land Area | 100% |
| Water Area (sq. miles) (Source: SF1) | 0.09 |
| % Water Area | 0% |

| | 2015 - 2019 ACS Estimates | Percent | MOE (±) |
|---|---|---|---|
| **Population by Race** | | | |
| Total | 101,719 | 100% | 846 |
| Population Reporting One Race | 98,917 | 97% | 2,121 |
| White | 79,930 | 79% | 786 |
| Black | 7,546 | 7% | 358 |
| American Indian | 302 | 0% | 110 |
| Asian | 9,735 | 10% | 379 |
| Pacific Islander | 36 | 0% | 44 |
| Some Other Race | 1,369 | 1% | 444 |
| Population Reporting Two or More Races | 2,802 | 3% | 183 |
| Total Hispanic Population | 16,750 | 16% | 546 |
| Total Non-Hispanic Population | 84,969 | | |
| White Alone | 65,727 | 65% | 698 |
| Black Alone | 7,189 | 7% | 358 |
| American Indian Alone | 245 | 0% | 110 |
| Non-Hispanic Asian Alone | 9,666 | 10% | 404 |
| Pacific Islander Alone | 36 | 0% | 44 |
| Other Race Alone | 166 | 0% | 73 |
| Two or More Races Alone | 1,940 | 2% | 183 |
| **Population by Sex** | | | |
| Male | 52,032 | 51% | 660 |
| Female | 49,687 | 49% | 481 |
| **Population by Age** | | | |
| Age 0-4 | 5,406 | 5% | 191 |
| Age 0-17 | 16,923 | 17% | 325 |
| Age 18+ | 84,795 | 83% | 709 |
| Age 65+ | 7,111 | 7% | 193 |

**Data Note:** Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019 .

# EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-miles radius
Description: College Station-3.73 mile radius

| | 2015 - 2019 ACS Estimates | Percent | MOE (±) |
|---|---|---|---|
| **Population 25+ by Educational Attainment** | | | |
| Total | 46,422 | 100% | 441 |
| Less than 9th Grade | 979 | 2% | 115 |
| 9th - 12th Grade, No Diploma | 1,777 | 4% | 133 |
| High School Graduate | 5,528 | 12% | 220 |
| Some College, No Degree | 8,155 | 18% | 335 |
| Associate Degree | 3,534 | 8% | 211 |
| Bachelor's Degree or more | 26,450 | 57% | 331 |
| **Population Age 5+ Years by Ability to Speak English** | | | |
| Total | 96,313 | 100% | 829 |
| Speak only English | 76,083 | 79% | 697 |
| Non-English at Home[1+2+3+4] | 20,230 | 21% | 393 |
| [1]Speak English "very well" | 14,012 | 15% | 278 |
| [2]Speak English "well" | 4,388 | 5% | 237 |
| [3]Speak English "not well" | 1,534 | 2% | 194 |
| [4]Speak English "not at all" | 296 | 0% | 133 |
| [3+4]Speak English "less than well" | 1,830 | 2% | 206 |
| [2+3+4]Speak English "less than very well" | 6,218 | 6% | 247 |
| **Linguistically Isolated Households*** | | | |
| Total | 1,480 | 100% | 112 |
| Speak Spanish | 304 | 21% | 75 |
| Speak Other Indo-European Languages | 82 | 6% | 37 |
| Speak Asian-Pacific Island Languages | 980 | 66% | 108 |
| Speak Other Languages | 113 | 8% | 69 |
| **Households by Household Income** | | | |
| Household Income Base | 36,160 | 100% | 254 |
| < $15,000 | 7,421 | 21% | 216 |
| $15,000 - $25,000 | 4,013 | 11% | 204 |
| $25,000 - $50,000 | 7,397 | 20% | 219 |
| $50,000 - $75,000 | 4,649 | 13% | 148 |
| $75,000 + | 12,679 | 35% | 315 |
| **Occupied Housing Units by Tenure** | | | |
| Total | 36,160 | 100% | 254 |
| Owner Occupied | 13,896 | 38% | 217 |
| Renter Occupied | 22,263 | 62% | 254 |
| **Employed Population Age 16+ Years** | | | |
| Total | 86,660 | 100% | 713 |
| In Labor Force | 52,238 | 60% | 542 |
| Civilian Unemployed in Labor Force | 1,947 | 2% | 181 |
| Not In Labor Force | 34,422 | 40% | 563 |

**Data Note:** Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

# EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-miles radius
Description: College Station-3.73 mile radius

| | 2015 - 2019 ACS Estimates | Percent | MOE (±) |
|---|---|---|---|
| **Population by Language Spoken at Home*** | | | |
| Total (persons age 5 and above) | 93,813 | 100% | 989 |
| English | 73,963 | 79% | 876 |
| Spanish | 8,526 | 9% | 443 |
| French | 197 | 0% | 212 |
| French Creole | N/A | N/A | N/A |
| Italian | N/A | N/A | N/A |
| Portuguese | N/A | N/A | N/A |
| German | 365 | 0% | 140 |
| Yiddish | N/A | N/A | N/A |
| Other West Germanic | N/A | N/A | N/A |
| Scandinavian | N/A | N/A | N/A |
| Greek | N/A | N/A | N/A |
| Russian | N/A | N/A | N/A |
| Polish | N/A | N/A | N/A |
| Serbo-Croatian | N/A | N/A | N/A |
| Other Slavic | N/A | N/A | N/A |
| Armenian | N/A | N/A | N/A |
| Persian | N/A | N/A | N/A |
| Gujarathi | N/A | N/A | N/A |
| Hindi | N/A | N/A | N/A |
| Urdu | N/A | N/A | N/A |
| Other Indic | N/A | N/A | N/A |
| Other Indo-European | 2,654 | 3% | 279 |
| Chinese | 3,383 | 4% | 322 |
| Japanese | N/A | N/A | N/A |
| Korean | 1,329 | 1% | 243 |
| Mon-Khmer, Cambodian | N/A | N/A | N/A |
| Hmong | N/A | N/A | N/A |
| Thai | N/A | N/A | N/A |
| Laotian | N/A | N/A | N/A |
| Vietnamese | 394 | 0% | 85 |
| Other Asian | 1,268 | 1% | 172 |
| Tagalog | 360 | 0% | 126 |
| Other Pacific Island | N/A | N/A | N/A |
| Navajo | N/A | N/A | N/A |
| Other Native American | N/A | N/A | N/A |
| Hungarian | N/A | N/A | N/A |
| Arabic | 515 | 1% | 214 |
| Hebrew | N/A | N/A | N/A |
| African | N/A | N/A | N/A |
| Other and non-specified | 418 | 0% | 199 |
| Total Non-English | 19,850 | 21% | 1,321 |

**Data Note:** Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019.
*Population by Language Spoken at Home is available at the census tract summary level and up.

Appendix F

AEDT Census Block Group Data

# College Station Operating Area Block Group ACS 2020 5-Year Estimate Data

| State | County | Block Group/Census Tract | Population Total | Population Minority | Percent Minority | Population Low-Income | Percent Low-income |
|---|---|---|---|---|---|---|---|
| TX | Brazos County | Block Group 3, Census Tract 13.02, Brazos County, Texas | 948 | 733 | 77.3 | 468 | 50.5 |
| TX | Brazos County | Block Group 2, Census Tract 16.05, Brazos County, Texas | 2575 | 1890 | 73.4 | 687 | 26.7 |
| TX | Brazos County | Block Group 4, Census Tract 13.02, Brazos County, Texas | 1050 | 734 | 69.9 | 343 | 36 |
| TX | Brazos County | Block Group 1, Census Tract 16.08, Brazos County, Texas | 610 | 397 | 65.1 | 425 | 69.7 |
| TX | Brazos County | Block Group 1, Census Tract 20.23, Brazos County, Texas | 446 | 286 | 64.1 | 231 | 51.8 |
| TX | Brazos County | Block Group 1, Census Tract 13.01, Brazos County, Texas | 1724 | 1094 | 63.5 | 705 | 40.9 |
| TX | Brazos County | Block Group 5, Census Tract 16.04, Brazos County, Texas | 952 | 592 | 62.2 | 187 | 19.6 |
| TX | Brazos County | Block Group 1, Census Tract 20.24, Brazos County, Texas | 866 | 521 | 60.2 | 497 | 57.4 |
| TX | Brazos County | Block Group 2, Census Tract 16.06, Brazos County, Texas | 1930 | 1159 | 60.1 | 913 | 49.8 |
| TX | Brazos County | Block Group 1, Census Tract 20.19, Brazos County, Texas | 1696 | 994 | 58.6 | 21 | 1.2 |
| TX | Brazos County | Block Group 2, Census Tract 17.04, Brazos County, Texas | 993 | 552 | 55.6 | 219 | 22.1 |
| TX | Brazos County | Block Group 2, Census Tract 13.03, Brazos County, Texas | 1200 | 650 | 54.2 | 624 | 52 |
| TX | Brazos County | Block Group 1, Census Tract 17.03, Brazos County, Texas | 1532 | 828 | 54 | 561 | 36.6 |
| TX | Brazos County | Block Group 4, Census Tract 16.04, Brazos County, Texas | 1151 | 580 | 50.4 | 114 | 9.9 |
| TX | Brazos County | Block Group 1, Census Tract 18.03, Brazos County, Texas | 3007 | 1495 | 49.7 | 518 | 17.2 |
| TX | Brazos County | Block Group 1, Census Tract 18.04, Brazos County, Texas | 1717 | 835 | 48.6 | 507 | 30.1 |
| TX | Brazos County | Block Group 1, Census Tract 17.04, Brazos County, Texas | 1123 | 545 | 48.5 | 419 | 37.3 |
| TX | Brazos County | Block Group 1, Census Tract 18.01, Brazos County, Texas | 3539 | 1686 | 47.6 | 577 | 16.3 |
| TX | Brazos County | Block Group 2, Census Tract 17.02, Brazos County, Texas | 1420 | 675 | 47.5 | 571 | 40.2 |
| TX | Brazos County | Block Group 1, Census Tract 17.02, Brazos County, Texas | 1491 | 702 | 47.1 | 864 | 57.9 |
| TX | Brazos County | Block Group 3, Census Tract 16.04, Brazos County, Texas | 1558 | 716 | 46 | 492 | 31.6 |
| TX | Brazos County | Block Group 3, Census Tract 17.03, Brazos County, Texas | 1399 | 639 | 45.7 | 865 | 61.8 |
| TX | Brazos County | Block Group 2, Census Tract 20.26, Brazos County, Texas | 4539 | 1996 | 44 | 343 | 7.6 |
| TX | Brazos County | Block Group 1, Census Tract 16.07, Brazos County, Texas | 1813 | 778 | 42.9 | 573 | 31.6 |
| TX | Brazos County | Block Group 3, Census Tract 21, Brazos County, Texas | 10016 | 4091 | 40.8 | 434 | 64.7 |
| TX | Brazos County | Block Group 1, Census Tract 20.26, Brazos County, Texas | 1344 | 528 | 39.3 | 0 | 0 |
| TX | Brazos County | Block Group 3, Census Tract 13.03, Brazos County, Texas | 1153 | 445 | 38.6 | 236 | 36.4 |
| TX | Brazos County | Block Group 2, Census Tract 20.23, Brazos County, Texas | 2309 | 863 | 37.4 | 1906 | 82.5 |
| TX | Brazos County | Block Group 2, Census Tract 20.19, Brazos County, Texas | 2892 | 1058 | 36.6 | 198 | 6.8 |
| TX | Brazos County | Block Group 1, Census Tract 20.16, Brazos County, Texas | 2520 | 902 | 35.8 | 532 | 21.1 |
| TX | Brazos County | Block Group 2, Census Tract 13.01, Brazos County, Texas | 947 | 333 | 35.2 | 435 | 45.9 |
| TX | Brazos County | Block Group 4, Census Tract 13.03, Brazos County, Texas | 1147 | 399 | 34.8 | 594 | 51.8 |
| TX | Brazos County | Block Group 2, Census Tract 17.03, Brazos County, Texas | 1017 | 345 | 33.9 | 506 | 49.8 |
| TX | Brazos County | Block Group 1, Census Tract 20.17, Brazos County, Texas | 1521 | 514 | 33.8 | 678 | 74.4 |
| TX | Brazos County | Block Group 2, Census Tract 18.03, Brazos County, Texas | 2335 | 789 | 33.8 | 205 | 9.4 |
| TX | Brazos County | Block Group 1, Census Tract 16.06, Brazos County, Texas | 1210 | 400 | 33.1 | 404 | 33.4 |
| TX | Brazos County | Block Group 1, Census Tract 20.06, Brazos County, Texas | 1512 | 476 | 31.5 | 141 | 9.3 |
| TX | Brazos County | Block Group 2, Census Tract 20.11, Brazos County, Texas | 4236 | 1308 | 30.9 | 108 | 2.5 |
| TX | Brazos County | Block Group 2, Census Tract 20.24, Brazos County, Texas | 1599 | 487 | 30.5 | 1283 | 80.2 |
| TX | Brazos County | Block Group 1, Census Tract 20.20, Brazos County, Texas | 681 | 208 | 30.5 | 196 | 28.8 |
| TX | Brazos County | Block Group 2, Census Tract 20.25, Brazos County, Texas | 2940 | 895 | 30.4 | 107 | 3.6 |
| TX | Brazos County | Block Group 1, Census Tract 16.05, Brazos County, Texas | 1925 | 585 | 30.4 | 570 | 29.6 |
| TX | Brazos County | Block Group 3, Census Tract 20.09, Brazos County, Texas | 809 | 239 | 29.5 | 34 | 4.2 |
| TX | Brazos County | Block Group 2, Census Tract 20.18, Brazos County, Texas | 1979 | 559 | 28.2 | 313 | 15.8 |
| TX | Brazos County | Block Group 1, Census Tract 13.03, Brazos County, Texas | 1604 | 449 | 28 | 718 | 44.8 |
| TX | Brazos County | Block Group 1, Census Tract 20.18, Brazos County, Texas | 1809 | 500 | 27.6 | 280 | 15.5 |
| TX | Brazos County | Block Group 2, Census Tract 20.22, Brazos County, Texas | 1746 | 456 | 26.1 | 55 | 3.2 |
| TX | Brazos County | Block Group 1, Census Tract 13.02, Brazos County, Texas | 2489 | 636 | 25.6 | 591 | 23.7 |
| TX | Brazos County | Block Group 1, Census Tract 20.01, Brazos County, Texas | 3107 | 789 | 25.4 | 263 | 8.5 |
| TX | Brazos County | Block Group 1, Census Tract 20.21, Brazos County, Texas | 2592 | 658 | 25.4 | 1626 | 62.7 |
| TX | Brazos County | Block Group 1, Census Tract 20.09, Brazos County, Texas | 1506 | 352 | 23.4 | 33 | 2.2 |
| TX | Brazos County | Block Group 2, Census Tract 20.09, Brazos County, Texas | 2735 | 625 | 22.9 | 20 | 0.7 |
| TX | Brazos County | Block Group 2, Census Tract 20.14, Brazos County, Texas | 1938 | 442 | 22.8 | 1363 | 70.3 |
| TX | Brazos County | Block Group 2, Census Tract 20.21, Brazos County, Texas | 2572 | 575 | 22.4 | 383 | 14.9 |
| TX | Brazos County | Block Group 2, Census Tract 13.02, Brazos County, Texas | 656 | 147 | 22.4 | 166 | 25.3 |
| TX | Brazos County | Block Group 3, Census Tract 18.01, Brazos County, Texas | 1466 | 269 | 18.3 | 213 | 14.5 |
| TX | Brazos County | Block Group 2, Census Tract 20.16, Brazos County, Texas | 992 | 180 | 18.1 | 15 | 1.6 |
| TX | Brazos County | Block Group 2, Census Tract 20.10, Brazos County, Texas | 2023 | 332 | 16.4 | 73 | 3.6 |
| TX | Brazos County | Block Group 1, Census Tract 20.25, Brazos County, Texas | 2372 | 328 | 13.8 | 45 | 1.9 |
| TX | Brazos County | Block Group 3, Census Tract 1.06, Brazos County, Texas | 1359 | 181 | 13.3 | 0 | 0 |
| TX | Brazos County | Block Group 3, Census Tract 18.03, Brazos County, Texas | 1599 | 195 | 12.2 | 505 | 31.6 |
| TX | Brazos County | Block Group 2, Census Tract 20.01, Brazos County, Texas | 2213 | 263 | 11.9 | 87 | 3.9 |
| TX | Brazos County | Block Group 1, Census Tract 16.04, Brazos County, Texas | 1206 | 142 | 11.8 | 979 | 81.2 |
| TX | Brazos County | Block Group 2, Census Tract 18.01, Brazos County, Texas | 1201 | 132 | 11 | 147 | 12.2 |
| TX | Brazos County | Block Group 2, Census Tract 16.08, Brazos County, Texas | 1679 | 105 | 6.3 | 837 | 49.9 |
| TX | Brazos County | Block Group 2, Census Tract 20.20, Brazos County, Texas | 1634 | 64 | 3.9 | 100 | 6.1 |
| TX | Brazos County | Block Group 2, Census Tract 16.04, Brazos County, Texas | 707 | 25 | 3.5 | 207 | 29.3 |
| | | | **124576** | **44346** | **36.17462687** | **29310** | **30.05373134** |

# Brazos County Block Group ACS 2020 5-Year Estimate Data

| State | County | Block Group/Census Tract | Population Total | Population Minority | Percent Minority | Population Low-Income | Percent Low-income |
|---|---|---|---|---|---|---|---|
| TX | Brazos County | Block Group 2, Census Tract 6.06, Brazos County, Texas | 771 | 724 | 93.9 | 68 | 8.8 |
| TX | Brazos County | Block Group 2, Census Tract 20.10, Brazos County, Texas | 2023 | 332 | 16.4 | 73 | 3.6 |
| TX | Brazos County | Block Group 3, Census Tract 13.03, Brazos County, Texas | 1153 | 445 | 38.6 | 236 | 36.4 |
| TX | Brazos County | Block Group 3, Census Tract 21, Brazos County, Texas | 10016 | 4091 | 40.8 | 434 | 64.7 |
| TX | Brazos County | Block Group 3, Census Tract 11.01, Brazos County, Texas | 784 | 50 | 6.4 | 157 | 20 |
| TX | Brazos County | Block Group 5, Census Tract 2.04, Brazos County, Texas | 1519 | 1003 | 66 | 886 | 58.3 |
| TX | Brazos County | Block Group 1, Census Tract 1.07, Brazos County, Texas | 1988 | 447 | 22.5 | 68 | 3.4 |
| TX | Brazos County | Block Group 4, Census Tract 13.02, Brazos County, Texas | 1050 | 734 | 69.9 | 343 | 36 |
| TX | Brazos County | Block Group 2, Census Tract 20.18, Brazos County, Texas | 1979 | 559 | 28.2 | 313 | 15.8 |
| TX | Brazos County | Block Group 1, Census Tract 20.01, Brazos County, Texas | 3107 | 789 | 25.4 | 263 | 8.5 |
| TX | Brazos County | Block Group 2, Census Tract 6.03, Brazos County, Texas | 975 | 920 | 94.4 | 374 | 38.4 |
| TX | Brazos County | Block Group 1, Census Tract 6.05, Brazos County, Texas | 547 | 547 | 100 | 180 | 32.9 |
| TX | Brazos County | Block Group 2, Census Tract 17.04, Brazos County, Texas | 993 | 552 | 55.6 | 219 | 22.1 |
| TX | Brazos County | Block Group 3, Census Tract 13.02, Brazos County, Texas | 948 | 733 | 77.3 | 468 | 50.5 |
| TX | Brazos County | Block Group 2, Census Tract 20.26, Brazos County, Texas | 4539 | 1996 | 44 | 343 | 7.6 |
| TX | Brazos County | Block Group 4, Census Tract 10.02, Brazos County, Texas | 1164 | 595 | 51.1 | 617 | 53 |
| TX | Brazos County | Block Group 2, Census Tract 16.04, Brazos County, Texas | 707 | 25 | 3.5 | 207 | 29.3 |
| TX | Brazos County | Block Group 2, Census Tract 2.04, Brazos County, Texas | 408 | 232 | 56.9 | 104 | 25.5 |
| TX | Brazos County | Block Group 5, Census Tract 16.04, Brazos County, Texas | 952 | 592 | 62.2 | 187 | 19.6 |
| TX | Brazos County | Block Group 2, Census Tract 18.03, Brazos County, Texas | 2335 | 789 | 33.8 | 205 | 9.4 |
| TX | Brazos County | Block Group 1, Census Tract 9, Brazos County, Texas | 1143 | 805 | 70.4 | 404 | 35.3 |
| TX | Brazos County | Block Group 1, Census Tract 7, Brazos County, Texas | 876 | 827 | 94.4 | 521 | 59.5 |
| TX | Brazos County | Block Group 4, Census Tract 6.05, Brazos County, Texas | 2206 | 2063 | 93.5 | 569 | 25.8 |
| TX | Brazos County | Block Group 1, Census Tract 20.20, Brazos County, Texas | 681 | 208 | 30.5 | 196 | 28.8 |
| TX | Brazos County | Block Group 3, Census Tract 10.01, Brazos County, Texas | 1552 | 927 | 59.7 | 1013 | 65.3 |
| TX | Brazos County | Block Group 3, Census Tract 18.01, Brazos County, Texas | 1466 | 269 | 18.3 | 213 | 14.5 |
| TX | Brazos County | Block Group 1, Census Tract 20.24, Brazos County, Texas | 866 | 521 | 60.2 | 497 | 57.4 |
| TX | Brazos County | Block Group 1, Census Tract 13.03, Brazos County, Texas | 1604 | 449 | 28 | 718 | 44.8 |
| TX | Brazos County | Block Group 1, Census Tract 21, Brazos County, Texas | 282 | 82 | 29.1 | 41 | 14.5 |
| TX | Brazos County | Block Group 1, Census Tract 11.01, Brazos County, Texas | 875 | 525 | 60 | 239 | 29.9 |
| TX | Brazos County | Block Group 2, Census Tract 16.08, Brazos County, Texas | 1679 | 105 | 6.3 | 837 | 49.9 |
| TX | Brazos County | Block Group 2, Census Tract 1.06, Brazos County, Texas | 733 | 103 | 14.1 | 44 | 6.1 |
| TX | Brazos County | Block Group 3, Census Tract 2.04, Brazos County, Texas | 1131 | 1018 | 90 | 198 | 17.5 |
| TX | Brazos County | Block Group 2, Census Tract 16.05, Brazos County, Texas | 2575 | 1890 | 73.4 | 687 | 26.7 |
| TX | Brazos County | Block Group 2, Census Tract 9, Brazos County, Texas | 1326 | 1085 | 81.8 | 722 | 54.4 |
| TX | Brazos County | Block Group 3, Census Tract 18.03, Brazos County, Texas | 1599 | 195 | 12.2 | 505 | 31.6 |
| TX | Brazos County | Block Group 1, Census Tract 20.17, Brazos County, Texas | 1521 | 514 | 33.8 | 678 | 74.4 |
| TX | Brazos County | Block Group 2, Census Tract 4.01, Brazos County, Texas | 1432 | 1099 | 76.7 | 207 | 14.5 |
| TX | Brazos County | Block Group 4, Census Tract 7, Brazos County, Texas | 881 | 329 | 37.3 | 35 | 4 |
| TX | Brazos County | Block Group 1, Census Tract 5.02, Brazos County, Texas | 896 | 896 | 100 | 165 | 18.4 |
| TX | Brazos County | Block Group 2, Census Tract 10.02, Brazos County, Texas | 274 | 200 | 73 | 134 | 48.9 |
| TX | Brazos County | Block Group 5, Census Tract 8, Brazos County, Texas | 980 | 636 | 64.9 | 117 | 13.1 |
| TX | Brazos County | Block Group 1, Census Tract 3.02, Brazos County, Texas | 2500 | 1707 | 68.3 | 204 | 8.2 |
| TX | Brazos County | Block Group 2, Census Tract 20.25, Brazos County, Texas | 2940 | 895 | 30.4 | 107 | 3.6 |
| TX | Brazos County | Block Group 1, Census Tract 19.02, Brazos County, Texas | 729 | 278 | 38.1 | 0 | 0 |
| TX | Brazos County | Block Group 1, Census Tract 13.02, Brazos County, Texas | 2489 | 636 | 25.6 | 591 | 23.7 |
| TX | Brazos County | Block Group 3, Census Tract 17.03, Brazos County, Texas | 1399 | 639 | 45.7 | 865 | 61.8 |
| TX | Brazos County | Block Group 1, Census Tract 11.02, Brazos County, Texas | 765 | 255 | 33.3 | 235 | 30.7 |
| TX | Brazos County | Block Group 1, Census Tract 17.02, Brazos County, Texas | 1491 | 702 | 47.1 | 864 | 57.9 |
| TX | Brazos County | Block Group 3, Census Tract 8, Brazos County, Texas | 726 | 191 | 26.3 | 145 | 20 |
| TX | Brazos County | Block Group 2, Census Tract 18.01, Brazos County, Texas | 1201 | 132 | 11 | 147 | 12.2 |
| TX | Brazos County | Block Group 2, Census Tract 20.01, Brazos County, Texas | 2213 | 263 | 11.9 | 87 | 3.9 |
| TX | Brazos County | Block Group 3, Census Tract 20.09, Brazos County, Texas | 809 | 239 | 29.5 | 34 | 4.2 |
| TX | Brazos County | Block Group 3, Census Tract 20.22, Brazos County, Texas | 2143 | 822 | 38.4 | 254 | 11.9 |
| TX | Brazos County | Block Group 1, Census Tract 5.01, Brazos County, Texas | 2368 | 1928 | 81.4 | 634 | 59.5 |
| TX | Brazos County | Block Group 1, Census Tract 17.04, Brazos County, Texas | 1123 | 545 | 48.5 | 419 | 37.3 |
| TX | Brazos County | Block Group 2, Census Tract 19.02, Brazos County, Texas | 1066 | 450 | 42.2 | 93 | 8.7 |
| TX | Brazos County | Block Group 2, Census Tract 20.09, Brazos County, Texas | 2735 | 625 | 22.9 | 20 | 0.7 |
| TX | Brazos County | Block Group 3, Census Tract 10.02, Brazos County, Texas | 1299 | 303 | 23.3 | 812 | 62.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TX | Brazos County | Block Group 1, Census Tract 10.01, Brazos County, Texas | 1059 | 681 | 64.3 | 523 | 50.3 |
| TX | Brazos County | Block Group 2, Census Tract 1.05, Brazos County, Texas | 605 | 72 | 11.9 | 0 | 0 |
| TX | Brazos County | Block Group 1, Census Tract 16.07, Brazos County, Texas | 1813 | 778 | 42.9 | 573 | 31.6 |
| TX | Brazos County | Block Group 2, Census Tract 17.02, Brazos County, Texas | 1420 | 675 | 47.5 | 571 | 40.2 |
| TX | Brazos County | Block Group 3, Census Tract 16.04, Brazos County, Texas | 1558 | 716 | 46 | 492 | 31.6 |
| TX | Brazos County | Block Group 1, Census Tract 1.08, Brazos County, Texas | 839 | 19 | 2.3 | 7 | 0.8 |
| TX | Brazos County | Block Group 1, Census Tract 18.03, Brazos County, Texas | 3007 | 1495 | 49.7 | 518 | 17.2 |
| TX | Brazos County | Block Group 4, Census Tract 8, Brazos County, Texas | 2000 | 1087 | 54.4 | 350 | 18.5 |
| TX | Brazos County | Block Group 2, Census Tract 7, Brazos County, Texas | 1055 | 853 | 80.9 | 163 | 15.5 |
| TX | Brazos County | Block Group 2, Census Tract 3.02, Brazos County, Texas | 1211 | 732 | 60.4 | 0 | 0 |
| TX | Brazos County | Block Group 1, Census Tract 20.23, Brazos County, Texas | 446 | 286 | 64.1 | 231 | 51.8 |
| TX | Brazos County | Block Group 1, Census Tract 6.06, Brazos County, Texas | 1007 | 894 | 88.8 | 331 | 32.9 |
| TX | Brazos County | Block Group 2, Census Tract 20.14, Brazos County, Texas | 1938 | 442 | 22.8 | 1363 | 70.3 |
| TX | Brazos County | Block Group 2, Census Tract 20.20, Brazos County, Texas | 1634 | 64 | 3.9 | 100 | 6.1 |
| TX | Brazos County | Block Group 4, Census Tract 13.03, Brazos County, Texas | 1147 | 399 | 34.8 | 594 | 51.8 |
| TX | Brazos County | Block Group 1, Census Tract 19.01, Brazos County, Texas | 1587 | 531 | 33.5 | 170 | 10.7 |
| TX | Brazos County | Block Group 2, Census Tract 20.24, Brazos County, Texas | 1599 | 487 | 30.5 | 1283 | 80.2 |
| TX | Brazos County | Block Group 1, Census Tract 20.11, Brazos County, Texas | 2033 | 423 | 20.8 | 107 | 5.3 |
| TX | Brazos County | Block Group 1, Census Tract 3.01, Brazos County, Texas | 754 | 723 | 95.9 | 0 | 0 |
| TX | Brazos County | Block Group 4, Census Tract 10.01, Brazos County, Texas | 452 | 149 | 33 | 192 | 42.5 |
| TX | Brazos County | Block Group 1, Census Tract 16.06, Brazos County, Texas | 1210 | 400 | 33.1 | 404 | 33.4 |
| TX | Brazos County | Block Group 1, Census Tract 17.03, Brazos County, Texas | 1532 | 828 | 54 | 561 | 36.6 |
| TX | Brazos County | Block Group 1, Census Tract 2.05, Brazos County, Texas | 1227 | 584 | 47.6 | 219 | 18.1 |
| TX | Brazos County | Block Group 3, Census Tract 1.06, Brazos County, Texas | 1359 | 181 | 13.3 | 0 | 0 |
| TX | Brazos County | Block Group 1, Census Tract 14.01, Brazos County, Texas | 1188 | 643 | 54.1 | 300 | 65.6 |
| TX | Brazos County | Block Group 1, Census Tract 20.19, Brazos County, Texas | 1696 | 994 | 58.6 | 21 | 1.2 |
| TX | Brazos County | Block Group 1, Census Tract 8, Brazos County, Texas | 818 | 684 | 83.6 | 39 | 4.8 |
| TX | Brazos County | Block Group 1, Census Tract 13.01, Brazos County, Texas | 1724 | 1094 | 63.5 | 705 | 40.9 |
| TX | Brazos County | Block Group 3, Census Tract 4.01, Brazos County, Texas | 820 | 505 | 61.6 | 0 | 0 |
| TX | Brazos County | Block Group 2, Census Tract 6.05, Brazos County, Texas | 939 | 834 | 88.8 | 292 | 31.1 |
| TX | Brazos County | Block Group 3, Census Tract 6.03, Brazos County, Texas | 2554 | 2350 | 92 | 947 | 37.3 |
| TX | Brazos County | Block Group 1, Census Tract 20.22, Brazos County, Texas | 1659 | 388 | 23.4 | 111 | 7.2 |
| TX | Brazos County | Block Group 2, Census Tract 1.04, Brazos County, Texas | 1222 | 610 | 49.9 | 85 | 7.1 |
| TX | Brazos County | Block Group 1, Census Tract 2.06, Brazos County, Texas | 1908 | 1045 | 54.8 | 46 | 2.4 |
| TX | Brazos County | Block Group 2, Census Tract 1.07, Brazos County, Texas | 2035 | 790 | 38.8 | 70 | 3.4 |
| TX | Brazos County | Block Group 2, Census Tract 2.03, Brazos County, Texas | 1211 | 461 | 38.1 | 39 | 3.2 |
| TX | Brazos County | Block Group 1, Census Tract 1.05, Brazos County, Texas | 2331 | 456 | 19.6 | 123 | 5.3 |
| TX | Brazos County | Block Group 1, Census Tract 20.14, Brazos County, Texas | 742 | 67 | 9 | 0 | 0 |
| TX | Brazos County | Block Group 1, Census Tract 1.03, Brazos County, Texas | 1814 | 557 | 30.7 | 246 | 13.6 |
| TX | Brazos County | Block Group 2, Census Tract 20.21, Brazos County, Texas | 2572 | 575 | 22.4 | 383 | 14.9 |
| TX | Brazos County | Block Group 2, Census Tract 2.07, Brazos County, Texas | 1657 | 564 | 34 | 125 | 7.6 |
| TX | Brazos County | Block Group 2, Census Tract 20.16, Brazos County, Texas | 992 | 180 | 18.1 | 15 | 1.6 |
| TX | Brazos County | Block Group 1, Census Tract 4.01, Brazos County, Texas | 1579 | 1538 | 97.4 | 885 | 56.7 |
| TX | Brazos County | Block Group 3, Census Tract 5.01, Brazos County, Texas | 1796 | 1796 | 100 | 705 | 39.3 |
| TX | Brazos County | Block Group 3, Census Tract 19.02, Brazos County, Texas | 1309 | 441 | 33.7 | 136 | 10.4 |
| TX | Brazos County | Block Group 1, Census Tract 20.09, Brazos County, Texas | 1506 | 352 | 23.4 | 33 | 2.2 |
| TX | Brazos County | Block Group 3, Census Tract 2.05, Brazos County, Texas | 1957 | 1156 | 59.1 | 20 | 2.9 |
| TX | Brazos County | Block Group 2, Census Tract 20.23, Brazos County, Texas | 2309 | 863 | 37.4 | 1906 | 82.5 |
| TX | Brazos County | Block Group 1, Census Tract 4.02, Brazos County, Texas | 1245 | 840 | 67.5 | 216 | 17.3 |
| TX | Brazos County | Block Group 2, Census Tract 13.01, Brazos County, Texas | 947 | 333 | 35.2 | 435 | 45.9 |
| TX | Brazos County | Block Group 1, Census Tract 18.01, Brazos County, Texas | 3539 | 1686 | 47.6 | 577 | 16.3 |
| TX | Brazos County | Block Group 1, Census Tract 2.03, Brazos County, Texas | 1252 | 677 | 54.1 | 42 | 3.4 |
| TX | Brazos County | Block Group 1, Census Tract 10.02, Brazos County, Texas | 1136 | 375 | 33 | 154 | 13.6 |
| TX | Brazos County | Block Group 2, Census Tract 19.01, Brazos County, Texas | 1395 | 355 | 25.4 | 383 | 28.4 |
| TX | Brazos County | Block Group 1, Census Tract 1.04, Brazos County, Texas | 864 | 360 | 41.7 | 134 | 15.5 |
| TX | Brazos County | Block Group 1, Census Tract 20.25, Brazos County, Texas | 2372 | 328 | 13.8 | 45 | 1.9 |
| TX | Brazos County | Block Group 2, Census Tract 5.02, Brazos County, Texas | 1001 | 969 | 96.8 | 593 | 59.2 |
| TX | Brazos County | Block Group 1, Census Tract 20.21, Brazos County, Texas | 2592 | 658 | 25.4 | 1626 | 62.7 |
| TX | Brazos County | Block Group 1, Census Tract 6.03, Brazos County, Texas | 1021 | 537 | 52.6 | 148 | 14.5 |
| TX | Brazos County | Block Group 3, Census Tract 7, Brazos County, Texas | 566 | 353 | 62.4 | 57 | 10.1 |
| TX | Brazos County | Block Group 1, Census Tract 18.04, Brazos County, Texas | 1717 | 835 | 48.6 | 507 | 30.1 |
| TX | Brazos County | Block Group 1, Census Tract 20.18, Brazos County, Texas | 1809 | 500 | 27.6 | 280 | 15.5 |
| TX | Brazos County | Block Group 2, Census Tract 11.02, Brazos County, Texas | 700 | 437 | 62.4 | 46 | 6.6 |
| TX | Brazos County | Block Group 1, Census Tract 16.08, Brazos County, Texas | 610 | 397 | 65.1 | 425 | 69.7 |
| TX | Brazos County | Block Group 1, Census Tract 16.05, Brazos County, Texas | 1925 | 585 | 30.4 | 570 | 29.6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TX | Brazos County | Block Group 1, Census Tract 1.06, Brazos County, Texas | 573 | 148 | 25.8 | 66 | 11.9 |
| TX | Brazos County | Block Group 2, Census Tract 11.01, Brazos County, Texas | 1273 | 363 | 28.5 | 100 | 7.9 |
| TX | Brazos County | Block Group 4, Census Tract 2.04, Brazos County, Texas | 680 | 613 | 90.1 | 320 | 47.1 |
| TX | Brazos County | Block Group 2, Census Tract 21, Brazos County, Texas | 855 | 702 | 82.1 | 506 | 59.5 |
| TX | Brazos County | Block Group 1, Census Tract 20.10, Brazos County, Texas | 1517 | 346 | 22.8 | 0 | 0 |
| TX | Brazos County | Block Group 2, Census Tract 13.03, Brazos County, Texas | 1200 | 650 | 54.2 | 624 | 52 |
| TX | Brazos County | Block Group 2, Census Tract 10.01, Brazos County, Texas | 306 | 98 | 32 | 194 | 63.4 |
| TX | Brazos County | Block Group 1, Census Tract 2.07, Brazos County, Texas | 553 | 300 | 54.2 | 124 | 22.4 |
| TX | Brazos County | Block Group 4, Census Tract 6.03, Brazos County, Texas | 1694 | 1567 | 92.5 | 175 | 10.3 |
| TX | Brazos County | Block Group 3, Census Tract 6.05, Brazos County, Texas | 1486 | 1166 | 78.5 | 719 | 48.4 |
| TX | Brazos County | Block Group 2, Census Tract 20.22, Brazos County, Texas | 1746 | 456 | 26.1 | 55 | 3.2 |
| TX | Brazos County | Block Group 1, Census Tract 20.16, Brazos County, Texas | 2520 | 902 | 35.8 | 532 | 21.1 |
| TX | Brazos County | Block Group 2, Census Tract 8, Brazos County, Texas | 1017 | 80 | 7.9 | 18 | 1.8 |
| TX | Brazos County | Block Group 2, Census Tract 5.01, Brazos County, Texas | 1402 | 1349 | 96.2 | 799 | 57 |
| TX | Brazos County | Block Group 2, Census Tract 20.19, Brazos County, Texas | 2892 | 1058 | 36.6 | 198 | 6.8 |
| TX | Brazos County | Block Group 4, Census Tract 16.04, Brazos County, Texas | 1151 | 580 | 50.4 | 114 | 9.9 |
| TX | Brazos County | Block Group 2, Census Tract 16.06, Brazos County, Texas | 1930 | 1159 | 60.1 | 913 | 49.8 |
| TX | Brazos County | Block Group 1, Census Tract 2.04, Brazos County, Texas | 596 | 350 | 58.7 | 14 | 2.3 |
| TX | Brazos County | Block Group 2, Census Tract 17.03, Brazos County, Texas | 1017 | 345 | 33.9 | 506 | 49.8 |
| TX | Brazos County | Block Group 1, Census Tract 20.06, Brazos County, Texas | 1512 | 476 | 31.5 | 141 | 9.3 |
| TX | Brazos County | Block Group 2, Census Tract 13.02, Brazos County, Texas | 656 | 147 | 22.4 | 166 | 25.3 |
| TX | Brazos County | Block Group 3, Census Tract 1.04, Brazos County, Texas | 1860 | 627 | 33.7 | 161 | 8.8 |
| TX | Brazos County | Block Group 2, Census Tract 2.05, Brazos County, Texas | 711 | 291 | 40.9 | 151 | 21.2 |
| TX | Brazos County | Block Group 2, Census Tract 3.01, Brazos County, Texas | 2384 | 1810 | 75.9 | 459 | 19.3 |
| TX | Brazos County | Block Group 1, Census Tract 20.26, Brazos County, Texas | 1344 | 528 | 39.3 | 0 | 0 |
| TX | Brazos County | Block Group 2, Census Tract 20.11, Brazos County, Texas | 4236 | 1308 | 30.9 | 108 | 2.5 |
| TX | Brazos County | Block Group 1, Census Tract 16.04, Brazos County, Texas | 1206 | 142 | 11.8 | 979 | 81.2 |
| | | | **226370** | **101739** | **46.9483444** | **50360** | **25.86092715** |

Appendix G

Public Comments and FAA Responses

**Appendix G: Public Comments and FAA Responses**

This appendix includes a summary of public comments received on the Federal Aviation Administration's (FAA) September 2022 *Draft Environmental Assessment for Amazon Prime Air Drone Package Delivery Operations in College Station, Texas* (Draft EA). The Notice of Availability (NOA) announcing the public availability of the Draft EA as well as the Draft EA were published on the FAA's website on September 30, 2022 for public review and comment through October 14, 2022. In total, 59 comment submissions were received, 58 that were unique submissions (one was a duplicate submission). Of these, comment submissions were received from private individuals (53), trade associations (4), and a homeowners association (1). The FAA reviewed each comment submission and sorted comments by the topics in Sections 1-12 below. The FAA then summarized all of the comments pertaining to each topic and provided responses (see Sections 1–12 below). In many cases, more than one commenter submitted similar comments addressing the same topic. In these cases, the FAA grouped the comment excerpts and summarized their content as applicable in the main topic header. Where comment excerpts have been groups and summarized, the FAA made every effort to capture the essence of each excerpt included in the summary of the comment topic. The comment summaries identify the comment submissions that are included in the summary. Copies of each unique individual comment submission and their assigned comment submission number (e.g., 01_Huffman) are included following the comment summaries and responses. Commenters were notified that any personally identifiable information included as part of their comment submission could be made publically available. The FAA has attempted to redact personally identifiable information when requested.

## 1.0 General Comments

### 1.1 General Opposition

**Comments**: A total of 42 commenters expressed opposition or concern regarding Amazon drone delivery in College Station. Of these commenters, 15 conveyed general opposition without providing a rationale or based on reasons not directly related to the topics discussed in Sections 2-12 below. The remaining 27 commenters noted opposition based on the topics discussed in Sections 2-12 below.

**Comments Summarized**: 02_Casto; 04_Paschal; 05_Legget; 06_Wheat; 07_Seago; 20_Derbes; 21_Eilers; 22_Lewis; 26_Concerned; 29_Ford; 30_Scanlan; 34_Snyder; 37_Tanel; 38_Snyder; 41_McWhirter; 42_Davis; 45_Hall; 47_Williams; 48_ Emerald Forest Homeowners Association

**FAA Response:** Thank you for your comments. The FAA's responses to concerns related to specific topics are provided in Sections 2-12 below.

### 1.2 General Support

**Comments**: A total of 16 commenters expressed general support for the prospect of Amazon drone delivery in College Station. Several of these commenters expressed excitement about employing new technology in the community and creating jobs. Commenters expressed support for having goods and materials (e.g., groceries, prescriptions, clothing, etc.) delivered to their homes via drones. One of these commenters suggested the project would reduce ground traffic and fuel consumption and associated air pollution.

**Comments Summarized**: 01_Huffman; 08_Crawford; 09_Thomas; 10_Boykin; 13_Gemini; 16_O'Farrell; 17_Williams; 19_Lange; 23_Browning; 24_Kissee; 27_Mchargue; 46_AUVSI; 50_Small UAV Coalition; 51_GAMA; 54_CDA; 59_Bullock

**FAA Response**: Thank you for your comments.

## 2.0 FAA Approval Process

### 2.1 Scope of FAA Authority

**Comments**: Several commenters made requests of the FAA that are outside the FAA's authority to constrain drone operations. They asked about flight altitudes, paths, and range and whether it is possible to geo-fence certain areas or properties. Commenters requested that the FAA require Amazon to hold a free public four-drone show, limit drone operations to a trial period of three months, and limit the number daily deliveries at delivery locations. Commenters requested that the FAA constrain flights to routes above streets and driveways to avoid conflicts with city hospital heliports, and outdoor gatherings. Commenters asked if the FAA would place a limit on applications by Amazon and other companies to complete drone operations in the area. Commenters requested written policies regarding flyaways, crashes, or uncontrolled descents, as well as creation of a website disclosing information about drone operations. Commenters also requested that their community be delegated the ability to terminate the drone service or otherwise questioned the ability for Amazon's authorization to be revoked.

One commenter asked several questions about Amazon's facility, including whether it adheres to the regulations for a heliport and how the facility complies with FAA regulations. This commenter posed several questions about Amazon's current exemptions and other approvals and the FAA's process for approving drone operations.

**Comments Summarized**: 04_Paschal; 12_Pritchard; 31_Wilson; 32_Mcilhaney; 33_Hampton; 34_Snyder; 35_McIlhaney; 36_Johnson; 37_Tanel; 38_Snyder; 39_Flournoy; 40_Johnson; 41_McWhirter; 44_Kovar; 47_Williams; 48_Emerald Forest Homeowners Association; 52_Smith; 53_Anonymous; 55_McCullough; 56_Allen; 57_Gurganus; 58_Charron

**FAA Response**: Congress has provided the FAA with exclusive authority to regulate airspace in the United States, as well as aviation safety, the efficiency of the navigable airspace, and air traffic control, among other things, through Title 49, Subtitle VII of the United States Code (U.S.C.). Because a UAS is considered an aircraft under both 49 U.S.C. § 40102 and 14 Code of Federal Regulations, any UAS flown outdoors is subject to FAA regulation. In addition, 49 U.S.C. § 40103(a)(2) dictates that airspace is public space, stating that "A citizen of the United States has a public right of transit through the navigable airspace." As a result, the FAA is limited in its authority to regulate drone operations to an assessment of whether the action meets a pre-determined level of safety. Any other requirements requested by commenters that do not pertain to safety are outside the scope of the FAA's regulatory authority.

The FAA responded to Amazon's request to extend Exemption No. 18602 separately in Exemption No. 18602A. Exemption No. 18602A was amended to 18602B in November 2022. Amazon's facility would not be regulated as a heliport; rather, the FAA prescribes conditions and limitations in the exemptions related to take-off and landing areas. Further information about the FAA's approval process for

Amazon's operations and Amazon's exemptions is available in Docket Nos. FAA-2019-0573 and FAA-2019-0622, available at Regulations.gov.

The FAA Hotline, accessed at: FAA Hotline | Federal Aviation Administration, accepts reports related to the safety of the National Airspace System, violation of a Federal Aviation Regulation (Title 14 CFR), aviation safety issues, and reports related to FAA employees or FAA facilities. The FAA Hotline provides a single venue for FAA employees, the aviation community and the public to file their reports.

The FAA has also created a noise portal through which the public may make noise complaints and inquiries directly to the FAA about any aircraft operation. The noise portal can be accessed at https://noise.faa.gov/noise/pages/noise.html. Please note that the details of any complaint or inquiry are protected by the privacy act and are not available to be shared or disclosed as suggested.

## 2.2 Safety

**Comments**: Commenters expressed a variety of concerns about the safety of drone operations. Commenters expressed concerns about the possibility of drone crashes, both mid-air and to resources on the ground, such as properties, persons, drivers, or power lines. Commenters worried that drone flights would distract drivers resulting in car accidents. Commenters also expressed concern that drone operations would adversely impact other aircraft, in particular, medical or military flights. Commenters asked for information on emergency procedures for grounding specific vehicles in the event of a catastrophic failure while in flight, and for grounding all drones in emergency situations. To avoid such incidents, one commenter suggested that Prime drones need to be equipped with transponders which will make them visible to Automatic Dependent Surveillance-Broadcast (ADS-B) systems. One commenters asked about the FAA's threshold for establishing safe flight over populations.

Several commenters expressed specific concerns about drone crashes creating a fire hazard for resources on the ground. Commenters expressed concern about energy and water infrastructure in the operating area, noting that there is a sewage treatment plant, electricity transmission lines, oil and gas pipelines, and numerous oil and gas wells in the operating area. Commenters mentioned media reports from early 2022 regarding drone incidents that occurred during Prime Air's research and development activities at their test location in Oregon, including one crash that reportedly caused a wildfire covering more than 20 acres. One commenter asked whether earlier problems from research and development activities have been addressed, and if the elevation from which a drone could crash and not have the lithium battery catch fire is known and can be communicated to the public. Commenters stated that Texas is very hot for many months of the year, with dry vegetation and active and orphan oil and gas wells and pipelines in the area.

Other commenters noted that Prime Air has been working under various FAA programs for several years, and has proven safety concepts within existing regulatory frameworks. Commenters stated that drone operations have the potential to reduce the number of vehicles on the road and thereby improve road safety. One commenter noted that air safety and reliability will never be 100% and stated their belief that Amazon would establish a high level of safety to ensure the public trust.

**Comments Summarized**: 04_Paschal; 06_Wheat; 07_Seago; 08_Crawford; 15_Ackerman; 18_Hays; 19_Lange; 22_Lewis; 29_Ford; 32_Mcilhaney; 34_Snyder; 36_Johnson; 38_Snyder; 39_Flournoy;

41_McWhirter; 46_AUVSI; 48_Emerald Forest Homeowners Association; 47_Williams; 49_Williams; 50_Small UAV Coalition; 52_Smith; 53_Anonymous; 54_CDA; 57_Gurganus

**FAA Response**: In evaluating the safety of UAS proposals, the FAA is responsible for ensuring that UAS operations are designed to minimize risks to other aircraft and people and property on the ground. The safety evaluation includes risk of vehicle failure that could result in fire or other catastrophic accidents on the ground. The risks of the proposed use of the system are evaluated to ensure that a level of safety equivalent to the current state of safety in the National Airspace System is met. As a result, FAA approval of the operations indicates that we have assessed that there should be little to no additional risks or hazards to the public resulting from drone operations. The FAA's safety determinations regarding the regulatory relief necessary to enable this operation are available in Docket Nos. FAA-2019-0573 and FAA-2019-0622, available at Regulations.gov.

The FAA Hotline, accessed at: FAA Hotline | Federal Aviation Administration, accepts reports related to the safety of the National Airspace System, violation of a Federal Aviation Regulation (Title 14 CFR), aviation safety issues, and reports related to FAA employees or FAA facilities. The FAA Hotline provides a single venue for FAA employees, the aviation community and the public to file their reports.

## 3.0 Privacy

**Comments**: Commenters stated that they felt drone operations would be intrusive. They expressed concern that cameras on the drones would record and store visual data during flights, resulting in impacts to citizens beyond those receiving packages. Commenters questioned what cameras, recording devices, or other sensors would be on the drones and whether Amazon would be recording flights or mapping out areas. Commenters also asked what cybersecurity or other measures were in place to prevent tampering from the system. Commenters requested that the FAA require disclosure of this information to address their concerns. Commenters asked about the possibility of 'opting out' such that drones would not fly over their property and questioned whether there are any safeguards for their privacy.

Two commenters indicated enthusiasm for drone operations and noted that they are not concerned about drones 'spying' on them.

**Comments Summarized**: 02_Casto; 07_Seago; 10_Boykin; 18_Hays; 19_Lange; 21_Eilers; 22_Lewis; 25_Droleskey; 31_Wilson; 33_Hampton; 34_Snyder; 35_McIlhaney; 36_Johnson; 37_Tanel; 38_Snyder; 40_Johnson; 41_McWhirter; 44_Kovar; 47_Williams; 48_Emerald Forest Homeowners Association; 52_Smith; 55_McCullough; 57_Gurganus; 58_Charron

**FAA Response**: Although the FAA is not authorized to impose regulations based on privacy concerns, the FAA intends to continue collaborating with the public, stakeholders, and other agencies with authority and subject matter expertise in privacy law and policy.[1] The FAA's mission is to provide the safest, most efficient aerospace system in the world, and does not include regulating privacy. However, this does not relieve Amazon from complying with other agency's laws or regulations (including those related to privacy) that are applicable to the purposes for which Amazon is using the UAS.

[1] Additional information on the FAA's Privacy Impact Assessments is available here: https://www.transportation.gov/individuals/privacy/privacy-impact-assessments

## 4.0 National Environmental Policy Act (NEPA) Process

**Comments**: Commenters recommended that the FAA prepare a programmatic environmental assessment to streamline its environmental review of UAS operations in national airspace. Commenters stated this would help the FAA fulfill its Congressional mandate to integrate drones into the national airspace and support future scaled commercial drone operations. One commenter recommended that the FAA develop drone-specific NEPA guidance and gather data to support development of a categorical exclusion. One commenter agreed that nine of the 14 environmental impact categories addressed in the EA do not warrant detailed evaluation. Another commenter indicated the proposed operations would not result in a significant environmental consequence and encouraged the FAA to issue a Finding of No Significant Impact.

**Comments Summarized**: 46_AUVSI; 50_Small UAV Coalition; 51_GAMA; 54_CDA

**FAA Response**: Thank you for your comments. The FAA is exploring ways to streamline its environmental review of UAS operations in the National Airspace System, including recommendations provided by the commenters.

## 5.0 Proposed Action

**Comments**: One commenter asked about the number of flights, duration, and location, and whether there would be testing for delivery in residential areas.

**Comments Summarized**: 48_Emerald Forest Homeowners Association

**FAA Response**: As discussed in Chapters 1 and 2 of the Draft EA, Prime Air projects operating a maximum of approximately 200 delivery flights per operating day over 260 operating days per year for a total of roughly 52,000 annual delivery operations from the College Station Prime Air Drone Delivery Center. The operating area is divided into four sectors, with each sector having a maximum of approximately 50 delivery flights per operating day. The purpose of Prime Air's request is to begin UA commercial delivery service in College Station, TX. The FAA's approval would offer Prime Air an opportunity to further assess the economic viability of the UA commercial delivery option under real world conditions and demonstrate that it can conduct operations safely and meet its compliance obligations. Refer to EA Chapters 1 and 2 for more information.

## 6.0 Biological Resources

**Comments**: Several commenters expressed concerns that wildlife would be impacted by drone operations, causing them to change their patterns of behavior or scaring them away. Commenters expressed specific concerns about birds, pollinating bees, deer, horses, and household pets, and wanted more information on the adverse effects of sound levels to wildlife and their habitat. One commenter noted that endangered plant and animal species, including the Navasota Ladies Tresses, are found in affected neighborhoods.

Several commenters noted that College Station is located in the Central Flyway, a major migratory path for birds of all types during the spring and fall months, and that drones may fly at the same height as many bird species. One commenter stated that during a city hearing on the proposal, homeowner and neighborhood associations were told that the drones would be flying at an altitude of 500 feet.

Commenters questioned whether higher flying species could strike a drone during flight, resulting in a rooftop crash and fire. One commenter expressed explicit concern regarding bald eagles and questioned how drone overflights would impact bald eagle nesting and feeding routines. Another commenter asked whether the U.S. Environmental Protection Agency (EPA) has completed a survey on the impacts of federally protected raptors or game birds in the area.

Commenters also indicated that College Station is on the migration path for butterflies; one commenter pointed out that monarch butterflies have been observed at the 44th floor of high rise buildings in downtown Houston; therefore, monarchs could fly at the same operating altitudes as drones.

One commenter expressed specific concern regarding stressors on livestock due to a test in which livestock ran for the barn during an overflight from a small drone. Similarly, another commenter worried that drones could startle horses during riding lessons.

**Comments Summarized**: 03_Pierce; 04_Paschal; 12_Pritchard; 18_Hays; 28_Dupriest; 29_Ford; 32_Mcilhaney; 44_Kovar; 45_Hall; 49_Williams; 52_Smith; 53_Anonymous; 56_Allen

**FAA Response**: Section 3.2.3 of the Draft EA discussed the potential impacts on plants and wildlife. As stated in the Draft EA, the proposed action does not include any construction or ground disturbance; therefore, the proposed action would not affect plants. As discussed in the noise report included in Appendix C to the Draft EA, the loudest noise levels associated with Prime Air's operations occur at the launch pad, landing pad, and delivery location, because that is when the unmanned aircraft (UA) is closest to the ground. According to the noise report, the maximum sound exposure level[2] (SEL) (96.5 A-weighted decibels [dBA]) occurs when the UA is approximately 32.8 feet from a delivery location. The en route SEL is estimated at 67.7 dBA. For context, this SEL is roughly equivalent to the sound level of a lawnmower at 100 feet.

A noise descriptor for noise effects on wildlife has not been universally adopted, but some research indicates SEL is the most useful predictor of responses. Characteristic of the bulk of research to date has been lack of systematic documentation of the source noise event. Many studies report "sound levels" without specifying the frequency spectrum or duration. A notable exception is a study sponsored by U.S. Air Force that identifies SEL as the best descriptor for response of domestic turkey poults to low-altitude aircraft overflights (Bradley et al. 1990[3]). This study identified a threshold of response for disturbance of domestic turkeys as SEL 100 dBA. As noted in the EA and noise report, none of the UA's noise events come close to SEL 100 dBA. A more recent study found that, in most instances, drones within four meters of birds did not cause a behavioral response (Vas et al. 2015[4]). In another study, drones barely elicited behavioral responses in terrestrial mammals (Mulero-Pazmany et al. 2017[5]). As stated in the Draft EA, the duration of exposure to the UA during any given flight would be less than a minute.

[2] Sound exposure level (SEL) is a single event metric that considers both the noise level and duration of the event, referenced to a standard duration of one second.

[3] Bradley, F., C. Book, and A.E. Bowles. 1990. Effects of Low-Altitude Aircraft Overflights on Domestic Turkey Poults. Report No. HSD-TR-90-034, U.S. Air Force Systems Command, Noise and Sonic Boom Impact Technology Program, June.

[4] Vas, E., A. Lescroel, O. Duriez, G. Boguszewski, and D. Gremillet. 2015. Approaching Birds with Drones: First Experiments and Ethical Guidelines. Biology Letters (The Royal Society).

[5] Mulero-Pázmány, M., S. Jenni-Eiermann, N. Strebel, T. Sattler, J. José Negro, and Z. Tablado. 2017. Unmanned aircraft systems as a new source of disturbance for wildlife: A systematic review. *PloS One* 12 (6).

Therefore, the proposed action is not expected to result in significant impacts to wildlife from UA noise or visual presence.

As stated in Section 2.1.3 of the EA, the UA will rise to an altitude below 400 feet above ground level and follow a predefined route to its delivery site. Proposed operations would occur within airspace, typically well above the tree line and away from sensitive habitats. Birds and butterflies could be struck by the UA in-flight, particularly during migration seasons. However, it is unlikely that a bird strike would occur, as Prime Air is required to use visual observers during operations that would monitor for all air hazards—including birds—during flight operations. Prime Air reports that neither its test nor commercial operations to date have resulted in a known bird strike.

As described in the Draft EA, the FAA considered the potential effects of the proposed action on species protected by the federal Endangered Species Act and determined the proposed action would have *no effect* on ESA-listed species.

As stated in the Draft EA, Prime Air states it will monitor the operating area for any active bald eagle nests. If Prime Air identifies a bald eagle nest or is notified of the presence of a nest, Prime Air will establish an avoidance area such that there is a 1,000-foot vertical and horizontal separation distance between the UA's flight path and the nest. This avoidance area will be maintained until the end of the breeding season (September 1 through July 31 in the study area) or a qualified biologist indicates the nest has been vacated.

The FAA is not aware of an EPA study regarding raptors or game birds for the study area.

Regarding safety and fire hazards, please refer to the responses above in Sections 2.2, *Safety*, and 2.3, *Fire Hazard*.

## 7.0 Climate

**Comments**: One commenter stated that commercial drone deployments have demonstrated a net positive impact on the environment through reductions in $CO_2$ greenhouse gas emissions, citing a report that found that enabling drone delivery in a metropolitan area would take cars off the road.

**Comment Summarized**: 54_CDA

**FAA Response**: Thank you for your comment.

## 8.0 Department of Transportation Act Section 4(f)

**Comments**: Several commenters expressed concern regarding drone flights over local parks in College Station, noting that drone flights are prohibited in national parks. One commenter expressed support for the assessment in the Draft EA that infrequent UAS flights over 4(f) resources are not of concern and cited Amazon's pledge to avoid operations over schoolyards and large open-air assemblies.

**Comments Summarized:** 28_Dupriest; 32_Mcilhaney; 48_Emerald Forest Homeowners Association; 50_Small UAV Coalition

**FAA Response**: As stated in the Draft EA, there are no national parks located within the operating area. Prime Air's UA operations could occur over local parks. As documented in the Draft EA and associated noise report (see Appendix C of the Draft EA), noise levels associated with en route operations over local

parks would be low (approximately SEL 67.7 dBA) and less than significant. Any increase over ambient sound levels would be of short duration (less than a minute). As described in the Draft EA, the proposed action is not expected to result in significant impacts on properties protected by Section 4(f) of the Department of Transportation Act. Regarding safety concerns, please refer to the response above in Section 2.2, *Safety*.

## 9.0 Children's Environmental Health and Safety Risks

**Comments**: Several commenters expressed concerned regarding drones operating over daycare centers, childcare centers, schools, kindergartens, community pools, soccer fields, playgrounds, and parks. One commenter stated that the operating area includes major community parks, including Central Park and Wolf Pen Creek, where large numbers of individuals assemble for sporting events, outdoor festivals and concerts. One commenter noted that Amazon pledges to avoid operations over schoolyards during operational hours and will avoid operating over any large open-air assembly of persons.

**Comments Summarized:** 31_Wilson; 32_Mcilhaney; 33_Hampton; 34_Snyder; 35_McIlhaney; 36_Johnson; 37_Tanel; 38_Snyder; 40_Johnson; 41_McWhirter; 44_Kovar; 48_Emerald Forest Homeowners Association; 50_Small UAV Coalition; 55_McCullough; 58_Charron

**FAA Response**: Regarding parks, please refer to the response above in Section 8.0, *Department of Transportation Act Section 4(f)*. Regarding safety concerns, please refer to the response above in Section 2.2, *Safety*. As stated in the Draft EA, Prime Air's proposal includes avoiding operations near schools. As documented in the Draft EA and associated noise report (see Appendix C of the Draft EA), noise levels associated with en route operations over childcare centers and other institutions would be low (approximately SEL 67.7 dBA) and less than significant. If the UA flew over a childcare facility, the UA might not be heard within the facility.

## 10.0 Noise

### 10.1 General

**Comments**: Commenters stated that drone operations would result in additional noise pollution in College Station, impacting their quality of life, anxiety and stress levels of residents, and those that work in the area. Several commenters expressed concern about "buzzing" and vibration resulting from drone operations and requested a vibration analysis be included in the EA. Commenters stated that drone noise has a 'high acoustic frequency content' and that dB is not a good indicator of noise impact. Other commenters noted that while drones may be quieter than lawnmowers or power tools, they could still startle people who are unaware of their presence. Commenters expressed concern that repeated flights over the same location could be detrimental to quality of life, even at low noise levels. Commenters also shared concerns related to the impacts of drone noise on pets and other local wildlife.

Conversely, other commenters stated that they are not concerned about noise impacts and expressed support for the analysis included in the Draft EA.

**Comments Summarized**: 07_Seago; 18_Hays; 20_Derbes; 21_Eilers; 22_Lewis; 26_Concerned; 34_Snyder; 29_Ford; 38_Snyder; 39_Flournoy ; 41_McWhirter; 44_Kovar; 47_Williams; 49_Williams;

52_Smith; 57_Gurganus; 48_Emerald Forest Homeowners Association; 08_Crawford; 50_Small UAV Coalition; 19_Lange; 32_Mcilhaney; 56_Allen; 37_Tanel

**FAA Response**: The FAA implements National Environmental Policy Act (NEPA) through FAA Order 1050.1F, Environmental Impacts: Policies and Procedures (FAA Order 1050.1). Associations between aviation noise and disruption to normal activity are key components in the establishment of FAA's residential noise impact thresholds defined in FAA Order 1050.1F. Use of the Day-Night Average (DNL) 65dB (including the 10dB nighttime penalty) as the threshold for significant noise exposure is designed to account for sleep disturbance, speech interference, and annoyance among other factors. The Draft EA for proposed Amazon Prime Air Drone Package Delivery Operations College Station, Texas considered the potential effects on the environmental resource categories identified in FAA Order 1050.1F. As discussed in Section 4, Amazon Prime Air's proposed operations would not result in significant impacts for the resource categories analyzed in the Draft EA.

The FAA uses the A-Weighted sound level to calculate DNL consistent with the Environmental Protection Agency's (EPA) recommendations as detailed in the 1974 report entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety".

The 1974 EPA report, often referred to as the "Levels Document", stated that a frequency-weighted sound pressure level is the most appropriate choice for describing the magnitude of environmental noise. The EPA also concluded that:

- The A-Weighted sound level has been shown to correlate well with human response to noise,
- Has been widely used for describing transportation and community noise exposure, and
- Can be easily measured by sound monitoring equipment and represents the most suitable choice for quantifying noise exposure levels.

In addition to use of the A-weighted sound level, the 1974 EPA report recommended the DNL metric as the best metric to describe the effects of environmental noise in a simple, uniform, and appropriate way.

The EPA noted that representing a fluctuating noise level in terms of a steady state noise having an equivalent energy content, such as is the case with the DNL metric, accurately describes the onset of noise-induced hearing loss and is supported by substantial evidence that correlates with annoyance for a variety of circumstances as it relates to environmental noise.

The FAA's use of the A-weighted sound level and the DNL metric is also consistent with the findings of the June 1980 Federal Interagency Committee on Urban Noise (FICUN) report entitled "Guidelines for Considering Noise in Land Use Planning and Control."

The 1980 FICUN report was adopted by the U.S. Department of Transportation (DOT) and the U.S. Environmental Protection Agency (EPA), both of which were FICUN members. FAA represented DOT at proceedings of FICUN and continues to coordinate across the Federal government to carry out interagency coordination on matters related to aviation noise research including with FICUN's successor bodies.

Additionally, the FAA Reauthorization Act of 2018 (the Act) (Pub. L. 115-254) (Section 188) directed the FAA to submit a report evaluating alternative noise metrics to the current DNL standard. The report entitled: "Study regarding day-night average sound levels" (https://www.faa.gov/about/plans_reports/congress/media/Day-Night_Average_Sound_Levels_COMPLETED_report_w_letters.pdf). This report includes information on the A-Weighted sound level and DNL used to inform federal policies as it relates to aircraft noise.

The FAA has considered the use other noise metrics as a supplement to DNL, such as Number Above (NA) a Maximum Sound Level ($L_{max}$) as detailed in the report referenced above, for quantifying the noise exposure from UA operations. However, due to the low noise levels associated with UA operations, DNL to-date has represented a better metric for quantifying noise exposure for UA. As DNL is a cumulative noise metric, it considers the additive effect of multiple noise events including duration and loudness of the event regardless if the event exceeds a specified sound level threshold. Other supplemental noise metrics such as $NAL_{max}$ only account for noise exposure if a specified $L_{max}$ is exceeded, and as such do not sufficiently capture the additive effect of exposure to repeated low noise operations such as is the case with UA. Based on the acoustic characteristics measured for the UA, vibration was not analyzed because it is not expected to be noticeable at the noise levels and frequencies for which the UA is expected to operate.

The FAA does however recognize the interest in gaining further understanding of any potential health impacts, potential sleep disturbance, and disruption to normal activity from aviation activity and has assembled a portfolio of research activities through interagency and academic partnerships as part of ASCENT, the Aviation Sustainability Center. This research includes close coordination with NASA and work through ASCENT with the Pennsylvania School of Medicine on a National Sleep Study and the Boston University School of Public Health on research to better understand the relationship between aviation noise exposure and cardio vascular health (https://ascent.aero/project/noise-impact-health-research/). Review of that study is ongoing.

## 10.2 Noise Affected Environment

**Comments**: One commenter pointed out an error in the Draft EA, which states that there is one heliport in the operating area located at Baylor Scott & White Medical Center, at 800 Scott & White Drive. The commenter noted that there is a second heliport located at St. Joseph Health College Station Hospital, 1604 Rock Prairie Road.

**Comments Summarized**: 36_Johnson

**FAA Response**: Section 3.5.2 of the EA will be revised to reflect the presence of the second heliport.

## 10.3 Analytical Methodology

### 10.3.1 PADCC Operations

**Comments**: Commenters noted that the noise analysis assumed one active drone at the PADCC and requested that it include the impact of two, three, and four drones arriving and/or departing from the PADDC at the same time. They questioned whether multiple drones would slow their speed in order to stagger their arrivals and departures and wondered what impact this would have on noise around the

PADCC. They suggested that homeowners closest to the PADDC could be subjected to as many as 8-10 overflights per hour. Commenters interpreted Figure 4, *DNL Noise Exposure at College Station PADDC Location* as showing both homes and businesses that would experience 45 dB to over 50 dB of noise from the arrival/departure of a single drone.

**Comments Summarized**: 34_Snyder; 37_Tanel; 38_Snyder; 56_Allen

**FAA Response**: As discussed in Section 3 and Appendix C of the Draft EA, multiple concurrent Unmanned Aircraft (UA) operations of the Amazon prime Air MK27-2 from the PADCC were considered in the noise analysis using the cumulative Day-Night Average Sound Level Metric (DNL). Use of the DNL metric is required for evaluating noise exposure in accordance with the provisions of NEPA as defined under FAA Order 1050.1F, Environmental Impacts: Policies and Procedures (FAA Order 1050.1).

The DNL metric calculates the cumulative noise energy of events averaged over a 24 hour period based on an Average Annual Day and takes into account the frequency, duration, time, and intensity of noise events. An Average Annual Day represents the total number of noise events that would occur on an annual basis divided by the number of days in a year (365) to derive an average daily noise dose. The DNL metric also assumes that the noise levels occurring at night (defined as 10 p.m. to 7 a.m.) are 10 dB louder than they actually are. However, no nighttime operations were evaluated in this draft EA based on expected operational information provided by Amazon Prime Air in the scope of the Proposed Action.

Due to the cumulative nature of the DNL metric, all noise events were accounted for in the noise analyses. DNL considers the noise energy from all noise events and time at which the events occurred in the calculation of the metric regardless of whether they occurred individually or all at once. The noise analysis methodology in Appendix C in this Draft EA evaluated operations levels at the PADCC based on anticipated Average Annual Day operations provided by Amazon Prime Air in the scope of the Proposed Action.

The noise analysis methodology presented in Appendix C of this draft EA was also conservative in evaluating noise originating from the PADCC. The noise analysis assumes all takeoff and landing operations originate from a single location within the PADCC and include the transition to and from en route horizontal flight to vertical flight to conduct deliveries. Additionally, the noise analysis assumes all flights to and from the PADCC to delivery locations, including the transitions to and from en route horizontal flight to vertical flight would overfly the same location. The extent of noise exposure for takeoff, landing, and flights to and from the PADCC including the transitions to and from en route horizontal flight to vertical flight was then applied to the entirety of the perimeter of the PADCC for generating the noise exposure results. In the operational data provided by Amazon Prime Air, it is anticipated each PADCC will contain multiple takeoff and landing locations at varying distances from one another and the PADCC perimeter. Furthermore, Amazon Prime Air anticipates operations will be distributed among the PADCC takeoff and landing locations based on customer demand. As such, the noise resulting from these operations would be more distributed over the extents of the PADCC and likely be lower than considered in this noise analysis and would result in lower levels of noise exposure than disclosed in this Draft EA.

### 10.3.2 Transition Noise

**Comments**: Commenters stated that the analysis should capture peak noise levels throughout the drone journey. Commenters questioned whether transition noise was fully captured in the noise analysis. Commenters also expressed concern that the drone's avoidance of schools, hospitals, parks would increase the frequency of flights over some residences, thereby increasing their noise exposure. Commenters indicated that including these considerations would more accurately reflect the noise impact to the College Station community.

**Comments Summarized**: 34_Snyder; 38_Snyder; 32_Mcilhaney

**FAA Response**: Section 3 and Attachment A in Appendix C of the Draft EA describes the noise analysis methodology and includes a discussion of the addition of transition noise and duration to and from en route horizontal flight to vertical flight to the other relevant flight phases which includes takeoff, landing, and delivery. Transition noise from the Amazon Prime Air MK27-2 UA was included in the calculation of noise exposure for these flight phases and is reflected in the noise exposure results presented in Section 4 of Appendix C.

### 10.3.3 Delivery Noise

**Comments**: Commenters stated that the delivery descent and ascent speed changes were excluded and questioned whether that would increase the duration of noise exposure during deliveries. Commenters requested an estimate of the 'worst case' and 'average case' in terms of the duration of drone delivery noise. Commenters also noted that the minimum measured distance from the drone for which noise measurement data was available is 32.8 feet and expressed concern that residents would be closer to the drone than this distance. Commenters also questioned whether the noise from next door deliveries would comply with the City noise ordinance and the FAA's Part 150 requirements for land use compatibility.

**Comments Summarized**: 34_Snyder; 48_Emerald Forest Homeowners Association

**FAA Response**: Section 3 and Appendix C of the Draft EA describe the noise analysis methodology and results. It includes the estimated noise exposure from Amazon Prime Air's proposed delivery operations. As presented in Appendix C, Section 2, Table 1, the duration of Amazon's Prime Air's proposed delivery operations are anticipated to be 98 seconds, and include:

- Transition from en route horizontal flight to vertical flight,
- vertical descent to deliver and drop a package,
- vertical climb out from delivery, and
- transition from vertical flight at en route altitude to horizontal en route flight to return to the PADCC.

Sections 2 and 3 of Appendix C also describe the noise measurements collected for the Amazon Prime Air MK27-2 UA and application of the measurements in the noise analysis. As part of the noise analysis, delivery noise measurements were acoustically adjusted from the minimum measured distance of 32.8 feet to a distance of 16.4 feet as detailed in Section 3.3.5 of Appendix C. The distance of 16.4 feet represents the minimum radius from which a person or obstruction can be safely located from the UA as it descends during delivery as provided by Amazon Prime Air. If any person or obstruction is located

within this radius as the UA descends to conduct a delivery, it will abort the delivery and return to the PADCC.

Section 3.5.3 of the Draft EA presents the noise exposure results for delivery based on the minimum and maximum operational distributions of deliveries within the College Station, Texas operating area as provided by Amazon Prime Air. The results conservatively assume all deliveries will occur at a single delivery location, and include the decelerating transition maneuver from en route horizontal flight to vertical flight at en route altitude, the delivery maneuver, and the accelerating transition maneuver from vertical flight at en route altitude to horizontal en route flight. The noise exposure for delivery operations also includes en route overflights at the lower end of the typical operating altitude of 160 feet AGL for operations associated with deliveries to other locations. Table 3-4 of the Draft EA presents the estimated noise exposure of deliveries for the minimum and maximum distributions of deliveries for varying distances from the delivery point out to a distance of 125 feet. The noise results in Table 3-4 show that at the minimum distance of 16.4 feet for the maximum distribution of deliveries, noise levels would not exceed DNL 57.2 dB.

## 10.4 Noise Measurement

**Comments**: Commenters questioned the adequacy of data collected for the noise analysis. Commenters noted that data was collected for only one drone rather than simultaneous operation of multiple drones. Commenters requested that an independent study be conducted during the trial period of peak decibel readings, at various phases of the drone journeys, speeds, elevations, etc. Commenters questioned the efficacy of the noise data collected in Pendleton, OR and that transition noise was not fully captured. Commenters also requested a mechanism through which resident complaints and experiences could be collected and disclosed.

**Comments Summarized**: 31_Wilson; 33_Hampton; 34_Snyder; 35_McIlhaney; 36_Johnson; 37_Tanel; 38_Snyder; 40_Johnson; 41_McWhirter; 44_Kovar; 47_Williams; 55_McCullough; 56_Allen; 58_Charron

**FAA Response**: The noise analysis methodology and acoustical results as presented in Appendix C of the Draft EA as provided by Amazon Prime Air represent the best available information available to the FAA on the acoustical characteristics of the Amazon Prime Air MK27-2 UA to-date and represents the best data set from which to evaluate noise exposure to comply with the provisions of NEPA as defined under FAA Order 1050.1F, Environmental Impacts: Policies and Procedures (FAA Order 1050.1). The FAA does however recognize that the data available for UA's on their acoustic footprint and how they interact with communities is rapidly evolving and is conducting a portfolio of research activities through interagency coordination and academic partnerships including participating in ASCENT, the Aviation Sustainability Center. This research includes close coordination with NASA and the DOT Volpe center to measure, model, and better understand the acoustics characteristics of UA and how they interact with communities in addition to work through ASCENT with the Georgia Institute of Technology on tools to evaluate noise exposure from large numbers of UAS operations (https://ascent.aero/project/6680/) and Pennsylvania State University on research on how the FAA can develop noise measurement and analysis methods that will improve the ability to characterize external noise radiation and allow manufacturers to better tailor vehicle designs for low noise (https://ascent.aero/project/measurements-to-support-noise-certification-for-uas-uam-vehicles-and-identify-noise-reduction-opportunities/).

The FAA has also created a noise portal through which the public may make noise complaints and inquiries directly to the FAA about any aircraft operation. The noise portal can be accessed at https://noise.faa.gov/noise/pages/noise.html. Please note that the details of any complaint or inquiry are protected by the privacy act and are not available to be shared or disclosed as suggested.

## 11.0 Socioeconomics

**Comments:** Commenters raised concerns about home and property values potentially being affected. Commenters expressed concern of over potential drone crashes and the resulting property damage and costs. Commenters expressed excitement about creating new jobs. Other commenters expressed concern that Prime Air's UA package delivery would take away the jobs of those currently delivering Amazon packages via mail carriers and trucks. One commenter stated concern about their livelihood and quality of life impacts. Commenters expressed support for having goods and materials (e.g., groceries, prescriptions, clothing, etc.) delivered to their homes via drones. One of these commenters suggested the project would reduce ground traffic and fuel consumption and associated air pollution. One commenter expressed concern about the potential effect of UA operations on birds and butterflies and suggested that city and local businesses that rely on income from tourists (birders) would be adversely affected if the drones drive the birds and butterflies away. Commenters stated the EA must include an analysis of impacts on those covered by the Americans with Disabilities Act.

**Comments Summarized:** 12_Pritchard; 13_Gemini; 14_Pena; 19_Lange; 22_Lewis; 28_Dupriest; 34_Snyder; 57_Gurganus

**FAA Response**: As stated in the Draft EA, the proposed action would not involve acquisition of real estate, relocation of residents or community businesses, disruption of local traffic patterns, loss in community tax base, or changes to the fabric of the community. Based on the information presently available regarding commercial drone operations, the FAA cannot speculate on the economic impact to ground delivery operations. Regarding safety, please refer to the response above in Section 2.2, *Safety*. Regarding potential impacts to wildlife, see the response above in Section 6.0, *Biological Resources*. Population-level impacts on wildlife are not expected; therefore, the proposed action is not expected to affect birding activities in the study area.

Regarding the request to analyze impacts to those covered by the Americans with Disabilities Act (ADA), commenters have not identified specific disabilities that would be uniquely impacted by drone operations. The FAA believes that the analysis presented in the Draft EA is representative of impacts to all individuals, including those with disabilities addressed in the ADA.

The proposed action is not expected to affect the value of homes or property. A limited number of studies have attempted to measure the impact of aviation related noise on property values. Specific studies of the impact of aviation noise on real property values have not been conducted and are not required. Studies conducted at national airports to-date have concluded that aviation noise only has a slight impact on property values within the Day Night Average Sound Level (DNL) of 65 decibels or greater noise levels around airports.

The FAA does however recognize that there is ongoing interest in measuring the potential impact of aviation related noise on property values and is conducting an ongoing research study in this area through ASCENT, the Aviation Sustainability Center. This research involves work through ASCENT with

the Massachusetts Institute of Technology to quantify the capitalized impact of aircraft noise exposure for a sample of US airports on transaction values for residential properties and changes in business activity (https://ascent.aero/project/aircraft-noise-exposure-and-market-outcomes-in-the-us). Review of that study is ongoing.

## 12.0 Visual

**Comments**: Several commenters expressed concern that drone operations would result in visual pollution, with one commenter specifically concerned that drones would be a visual distraction to drivers near U.S. Highway 6. One commenter noted that as the drone is expected to be seen only up to 3.6 seconds at any point and that it is not likely to have any significant visual impact.

**Comments Summarized:** 07_Seago; 26_Concerned; 39_Flournoy; 44_Kovar; 50_Small UAV Coalition

**FAA Response**: The FAA evaluated the potential visual impacts resulting from Prime Air's drone operations in Section 3.7.3 of the Draft EA. As noted in the Draft EA, it is expected that an observer on the ground would see the vehicle for approximately 3.6 seconds during en route flight operations. In addition, UAs leaving the PADDC would quickly reach cruise altitude (160–180 feet above ground level). At this elevation, it is likely most drivers would not be able to see the UA given its small size.

The proposed action includes a maximum of 200 delivery flights per day distributed over the 43.7 square mile operating area. The operating area is divided into four sectors, with each sector having a maximum of approximately 50 delivery flights per operating day. This distribution would minimize the potential for significant visual impacts at any one location in the study area.

**Public Comments Received on Draft EA**

| Submission No. | Submitter Name |
|---|---|
| 01_Huffman | Haley Huffman |
| 02_Casto | Maria Casto |
| 03_Pierce | Tim Pierce |
| 04_Paschal | Robert Paschal |
| 05_Leggett | John Leggett |
| 06_Wheat | Malerie Wheat |
| 07_Seago | Karen Seago |
| 08_Crawford | Scott and Teasha Crawford |
| 09_Thomas | John Thomas |
| 10_Boykin | Ann Boykin |
| 11_Boykin | Ann Boykin |
| 12_Pritchard | Lucinda Pritchard |
| 13_Gemini | Marcella Gemini |
| 14_Pena | Rafael Pena |
| 15_Ackerman | Joel Ackerman |
| 16_O'Farrell | Paul O'Farrell |
| 17_Williams | Carole Williams |
| 18_Hays | Sally Hays |
| 19_Lange | Justin Lange |
| 20_Derbes | Chris Derbes |
| 21_Eilers | Tom Eilers |
| 22_Lewis | Stuart Lewis |
| 23_Browning | Mark Browning |
| 24_Kissee | Joshua Kissee |
| 25_Droleskey | Suzanne Droleskey |
| 26_Concerned | Concerned College Station Resident |
| 27_Mchargue | Montgomery Mchargue |
| 28_Dupriest | Shirley Dupriest |
| 29_Ford | Connie Ford |
| 30_Scanlan | Glenda Scanlan |
| 31_Wilson | Troyce Wilson |
| 32_Mcilhaney | George Mcilhaney |
| 33_Hampton | Sarah Hampton |
| 34_Snyder | Denise Snyder |
| 35_McIlhaney | Jeff McIlhaney |
| 36_Johnson | Rob Johnson |
| 37_Tanel | Tom Tanel |
| 38_Snyder | Jim Snyder |
| 39_Flournoy | Matthew Flournoy |

| | |
|---|---|
| 40_Johnson | Becky Johnson |
| 41_McWhirter | David McWhirter |
| 42_Davis | Lloyd Davis |
| 43_Fernandez-Solis | Jose Fernandez-Solis |
| 44_Kovar | Cindy Kovar |
| 45_Hall | John Hall |
| 46_AUVSI | Michael Robbins |
| 47_Williams | Mary Williams |
| 48_Emerald Forest Homeowners Association | David Higdon |
| 49_Williams | Monica Williams |
| 50_Small UAV Coalition | Gregory Walden |
| 51_GAMA | David Dunning |
| 52_Smith | Claudia Smith |
| 53_Anonymous | Anonymous |
| 54_CDA | Lisa Ellman |
| 55_McCullough | Michael McCullough |
| 56_Allen | Dwight Allen |
| 57_Gurganus | Charles and Elizabeth Gurganus |
| 58_Charron | C Charron |
| 59_Bullock | Matt Bullock |

**01_Huffman**

To whom it may concern,

I am writing in my support of Amazon Air Delivery Drones in College Station, TX. Though College Station isn't a small town, we often are overlooked when seeking new and advanced opportunities, especially when it comes to delivery.

I am very excited to see fast delivery, new technology, and job creation in College Station. Please approve.

**02_Casto**

I am completely opposed to the establishment of an Amazon drone facility in College Station. Such a project is intrusive and ill-conceived. It must be categorically rejected.

**03_Pierce**

Hi, I’m concerned because we have livestock and I did a test to see how they would react with just a small drone from 400ft and it stressed the animals where they ran for the barn. As you can imagine stressed livestock don’t gain muscle like unstressed livestock, and I expect the same behavior from a

larger drone. I expect wildlife in the area to react as well, such as deer and birds causing them to change their pattern of behavior and causing them to migrate away.

**04_Paschal**

To whom it may concern,

The Amazon drone delivery system is a worrisome project for many residents. There has been no clear understanding of the following issues:

When a medical helicopter flies from a medical facility, will the drone automatically ground themselves?

There are three hospitals in the area that operate 5 different helicopters for medical use. Can the emergency services ground drones? What is the procedure?

The Untied States military uses Bryan and College Station Air space to conduct drills routinely. Will These drone be grounded during those operations?

What are the conditions to which the drone will ground themselves?

Where can a from ground itself in the even of a catastrophic failure while in flight? What it the flight ceiling of the drones?

What is the minimum altitude they are allowed to fly too? What happens when a drone is taken down by a bird strike?

There are several bald eagles that live in the college station area. What impact will the drones have on their nesting and feeding routine?

Has the EPA done a survey on the impacts of federally protected raptors or game birds in the area? What is amazon's emergency procedures for ground all drones?

What exactly is the flight path that the drones will be using? What is the maximum allowed range for these drones?

These are questions I feel that must be answered before commercial flights continue. These are questions that I myself have not heard the answers too. I feel that the use of drones at this time is unsafe and unjustifiable to operate for a commercial delivery system. I believe that the city of college station has rushed this decision to favor Amazon without realizing the implications of their decision. I would request the FAA halt the use of drones until further information is made available to the public. I also believe that the safety of all medical and military flights are going to be placed at unnecessary risk with the continued operation of these drones until safety procedures are implemented and made public.

**05_Leggett**

I do not want Amazon Prime Drone Delivery in College Station, Texas. It is a quality of life issue for me. I believe it is also an unnecessary service.

**06_Wheat**

Please do not approve this. If one of those things crashes who knows what kind of damage it will cause.

**07_Seago**

Dear FAA and Amazon,

As a citizen of the region who drives in the proposed area every day for work, I'm opposed to this proposal.

This proposal has severe implications for the privacy of average citizens who are non- participants (those who aren't Amazon and not customers receiving packages) because flights will necessarily be recording visually and that data will then be stored and can be subpoenaed at a later time for legal purposes.

In addition, there are already enough distractions for drivers and the accident rate in B/CS is ever increasing. Having aerial distractions as an added congestion will not be positive for our community.

We should not add visual and noise pollution to our skies, the last free open space in our community. A plane might pass every few hours, but the constant buzzing hum of 50 drone flights a day will be maddening to those who live/work in the area. And what happens when technology fails and packages randomly fall from the sky onto a car windshield or in front of a school bus carrying children, or an ambulance on its way to save a life? Whatever flight paths they have proposed can be altered and no one will be safe.

Amazon is a progressive tech giant posing as a consumer product retail business and we don't want them polluting our air and stealth spying on our community.

This doesn't just affect citizens of College Station. Bryan is closely linked by commerce and the university, that the City of College Station should not have the only vote. I vote no to the proposal and no to whatever tax breaks the City of College Station is giving Amazon that will be passed onto consumers whose quality of life will then be diminished by the invasion of drones.

**08_Crawford**

To those who are concerned,

We are residents in Emerald Forest community in College Station Texas and we are excited to welcome Air prime into our community. We are interested in having this business and we are not concerned about the noise impact and other air related concerns as far as it doesn't impact the routes of the emergency facilities or commercial air routes. We are excited to have it move forward and be available to all of those who are interested in using the services at the end of 2022 and into 2023. The idea that packages could be delivered to the back door yard is awesome and may reduce the desire for the dishonest to pursue stealing packages. Please consider our request and support of Air Prime. We appreciate this opportunity.

**09_Thomas**

Improving our nation's infrastructure through distribution of goods is always at the forefront of an accelerating economy. As such we must not forget that service is just as important for growth and prosperity. I ask that this business provides sustainable jobs and outsourced services from the city of College Station. Otherwise, we will only fall prey to their parasitic monetary gain.

**10_Boykin**

I am a disabled senior living alone. The thought of drone delivery is just one more way that I can have products delivered to me. Since I am unable to drive, I depend on having groceries, prescriptions, clothing, gifts, stamps, greeting cards, paper, printer ink, shoes, and just about everything delivered.

My concern is that I live in a patio home. I don’t have a backyard but I have a fenced in patio. I am hoping that it is large enough to have drone delivery.

I am not concerned about anyone spying on me. I am rarely outside due to mobility issues. And at 73, there is little worth spying on.

So, I say, bring it on!

**12_Pritchard**

I live in an environmental designed community called Indian Lakes. Move here with my horses on 4 acreages to ride, give lesson and have a private life.

Recently I was at the Chattanooga Hill horse trail in Georgia. A photography launched his drone while the horses were on course. Several of the horses spooked and 2 girl were taken to the hospital for sever injuries. Three horses were also injured.

I am sure I am not the first person to feel I do not want any drones above my property and horses.

If a child is injured ridding one of my lesson horses because one of your drones flew over who is responsible for their injuries?

Is there a way to Geo-fence off certain areas/properties?

Please take my lively hood and quality of life into consideration before launching this effort.

**13_Gemini**

Dear Federal Aviation Agency,

I attended both Amazon drone demonstrations at the City Hall and at Century Square. I am a resident of the Bryan-College Station area and I am thrilled to have our town pilot the Amazon drone program in

our area! This will continue to raise jobs in our area along with leading this new technology across our country. What a fantastic opportunity for our wonderful community that includes over 80,000 students from our local university and community college. This will also provide another source to get medications and supplies to individuals in a quick and efficient manner which will have a smaller environmental carbon footprint.

**14_Pena**

To whom it may concern, I represent a local chapter of the tx letter carriers association with over 100 members who deliver Amazon packages everyday out of the college station post office. If the FAA were to give the green light for Amazon to deliver packages via drone this would cause economical harm to the carriers who deliver your mail everyday. We rely on Amazon packages to deliver to our customers everyday. We are the last mile delivery where we delivery service with a smile. Please vote this down so that us mail carriers can continue to provide great service with a smile. Thank you for your consideration

**15_Ackerman**

The package delivery drone s

While if I'm correct they will operate at 400' to surface

This is the same airspace that helicopters and other recreational vehicle pilots operate in Yet the pilots are required to give right of way to a drone?

It needs to be the other way around

It has been in my mind that the individuals that might be considering this have never actually piloted an aircraft while attempting to avoid a drone or let's just use a flock of birds as an example

It's very difficult to see to the rear of a helicopter during landing Let alone a small quick moving drone

I feel this will be a mistake that will cause mid air collisions yet the drone operators get immunity

So not fair

Each drone needs to be required to carry 1 million $ liability insurance since it's unknown what damages might arise?

The drone needs to utilize its ability to detect and to avoid aircraft not the other way around.

What is the process and procedure if a drone collision would occur? I noted a recent drone landed on a power line and caused an electrical outage these are going to cause your office to be extremely busy.

A crash or collision with aircraft so somebody can have their eggs and coffee delivered isn't the risk vs reward pilots are taught.

**16_O'Farrell**

I fully support this project.

**17_Williams**

We are very looking forward to having this capability in our community.

**18_Hays**

I am submitting my concerns for the Amazon use of drones in College Station, TX.

I am concerned about noise pollution and privacy that these drones will bring. I am concerned about my privacy and security with drones traveling over my home. I also live in an peaceful secluded area with wildlife and these drones may disrupt the natural wildlife and scare off animals from the noise. There are also concerns if a drone crashes during bad weather what damage that could bring to my home, roof, power lines, etc.

**19_Lange**

To whom it may concern:

I live in the Carters Crossing neighborhood and within 2 miles of the Amazon Prime Air buildings in College Station, TX.

After considerate research of our rules/covenants/restrictions for both my HOA (of which I am a current Board Member) and City, I have no problem with their air space usage and delivery services Amazon is requesting to provide.

Of the biggest "complaints" I have found, these tend to be the most heated due to passionate opinions and misunderstandings:

Noise (pollution)

I work from home 4 out of 5 days a week and am sensitive to loud noises, but the Amazon drones arrival/departures will not generate as much noise as people's lawnmowers and power tools, so this is a pointless argument. Even if the drones were dead silent, I personally would feel more uneasy about them because people would be (even more) unaware of them and would likely be more startle/frighten by their sudden appearances.

Increased Highway/Residential traffic due to Amazon's supply trucks and vans.

Highway 6 is the busiest road through Bryan/College Station. The majority of the traffic is residents running errands and driving to/from work. Ultimately, if Amazon Prime Air can reduce the number of errands to the store by home deliveries, the amount of traffic will in fact reduce despite a marginal increase in Amazon Supply Trucks replenishing their local warehouse stock.

Air Safety

Air safety & reliability will never ever be 100% perfect no matter how hard we try. Increasing the number of objects we have floating through the airspace will of course statically increase the odds of an accident occuring. The best perspective I have found of all this is that despite Amazon's expansive empire of services, the majority of the population still trusts them.

Keeping this in perspective, if they hypothetically were to find disastrous flaws in their service or drones, they of all people/companies/government agencies would have the most to lose. In the event of some sort of drone flaw that causes distruction/harm/deaths/etc., the likelihood of it being handled "properly and professionally" is much higher with Amazon maintaining the liability than any other giant firm protected with lobbyists/etc. The first disaster that comes to mind where things were not handled properly is BP's oil spill in the Gulf of Mexico. Long story short, despite BP being directly to blame, consumers continued to buy/consume gas/oil products because BP's public relations had the benefit of hiding behind upstream processing and ambiguous gas stations. This gave BP an easy haven to hide and "wait out the storm." Amazon is directly responsible for their "Amazon Prime Air" service and will go above and beyond to keep their name and services clean and trustworthy. They could have easily gone through a subcontractor to push for these services, but they took the high road and are willing to put their own name on the line. I respect that.

"Big brother" Surveillance

Ring a Doorbell Cameras and Amazon Alexa devices and services have far greater security concerns considering they can easily ease-drop into the utmost private details of our lives. Even if the drones were a sponsored government agency spying on residents and companies, there are far better ways of conducting this type of reconnaissance than giant (6ft wide drones) flying in very restrictive 2-4mi radius from the warehouse.

These are just my own thoughts and opinions. Hopefully, it helps to give balance to the ill- minded and uninformed opinions who relish in fear-mongering and imaginary conspiracy theories.

Thank you for your time and consideration.

**20_Derbes**

I am against the permitting of drone delivery in college station. The noise pollution will negatively impact quality of life, raise anxiety and stress levels beyond the benifits it offers which other than having the same shit delivered to peoples houses in a novel way , I can see none .

**21_Eilers**

Hello,

I am emailing to express my concerns about Amazon Prime Air College Station Draft EA.

I am in opposition of using drones for Amazon delivery in College Station, Texas. I feel the use of drones will only have a negative impact on the privacy and noise pollution of my city. The negative risks greatly outweigh any positive impacts. The drones will impose on my personal privacies and securities. The

noise pollution these drones will provide will have a great impact on our community. I do not believe drone delivery will add anything beneficial to College Station.

**22_Lewis**

Dear FAA: I live in a neighborhood reasonably close to and in the delivery range of Amazon's Proposed College Station Prime Air Drone Terminal. I am very much opposed to this terminal location. The neighborhoods adjacent to this proposed terminal tend to be older and well established areas with lots of trees with 30 to 50 years of growth.

Amazon chose this particular location because the homes in the proposed delivery range tend to have back yards and have high cell phone usage and because Amazon was able to purchase this particular terminal location inexpensively. Amazon's business model is to use an experimental 80 pound drone contraption to try to deliver relatively light packages by hovering over a backyard delivery pad and then dropping the package several feet onto the delivery pad. Amazon's only previous experience with drone deliveries was in a small town of 3,000. This proposed delivery zone is much more densely populated with citizens who like to live in a nice quiet neighborhood. This particular Amazon terminal proposal raises obvious problems with increased noise, the safety of these still experimental regular drone flights over the affected neighborhoods, and the possible compromised privacy of those who live there. The cumulative effect of these negative factors could undermine property values in the affected neighborhoods. At the College Station city council meeting that approved a technical rezoning of this particular delivery terminal location, the City leadership kept saying "Safety and Environmental Concerns Are Up to the FAA" and all the City Council was doing was approving a proposed zoning designation for a location that Amazon liked the best. Actually there were other areas of College Station that already had the necessary zoning designation which would have also posed the same problems of noise, safety, and privacy.

The bottom line is this is a dangerous experiment, and I do not want to be part of Amazon's experiment in a fairly densely populated area of our town. I do not want to hear the racket of hovering noisy 80 pound drones, I do not want one of these 80 pound drones to crash on anyone or anyone's property changing their lives forever, and I do not want cameras recording everything necesssary to fly a drone to compromise anyone's privacy. The College Station city council was desperate not to disappoint Amazon with visions of jobs and growth dancing in their heads, and city leaders and city staff at a meeting conveniently held at midnight kept spouting the same company line that "But Safety and Environmental Concerns Are Up to the FAA". Another selling point of this location was that Amazon would work with Texas A&M, the city's largest employer, at a more remote location in the same county to perfect further their experimental drone contraptions. I said great, "Amazon likes Texas A&M and Texas A&M likes Amazon"—go out to this more remote location in the county and experiment out there along with Texas A&M where you would be less likely to hurt anybody. So these are my environmental concerns for this experimental drone terminal in a densely populated area near my home—I am very much against it. I am not against progress.

But I do not wish to be a "guinea pig" in Amazon's grand drone experiment. Stuart F. Lewis, a resident of the Emerald Forest neighborhood in College Station, Texas.

Sent from my iPhone

**23_Browning**

This email is my positive feedback for the Amazon Prime Air delivery drone program in College Station, TX. In my opinion, this innovative technology will result in efficient delivery while at the same time reducing traffic resulting from ground delivery. This program will also have the effect of reducing fuel consumed and resulting pollution from delivery trucks.

**24_Kissee**

As a College Station, Texas, resident for 13 years, I encourage the FAA to allow Amazon a permit for drone delivery service. Since this is only the 2nd city in the United States to have such a service, all of the unknowns and concerns are not fully known. The best way to learn is to permit the use and ensure that Amazon the company is legally responsible to change operations where safety hazards become clear. As long as they are bound to adjust their services for the public good, then permit them and let them and the residents of College Station, Texas, evaluate the service.

**25_Droleskey**

How do you assure residents that the drones are from Amazon delivering or returning to HQ vs. being drones from thieves who want to get a good view of your home, assets that are in the back yard, how the spaces are laid out, etc?

I think this has a strong possibility to be very attractive to people wanting to case properties for future criminal activities.

**26_Concerned**

Dear Federal Aviation Administration,

I am against the FAA's decision (or potential decision) "to authorize Amazon Prime Air (Prime Air) to conduct unmanned aircraft (UA) commercial package delivery operations from one Prime Air Drone Delivery Center, or “PADDC,” in College Station, Texas”.

To put it simple, the noise pollution and “visual pollution” in the sky which will be caused by this program is absolutely unacceptable, we have a human right to enjoy the nature of our community, it has already been obfuscated enough, we do not need any more. Amazon is already functioning at an efficient rate currently, just let things remain the way they are, do not destroy the little peace and quiet we have left. The juice is not worth the squeeze. Think of the children in the future, they will never know a world devoid of the constant droning buzzing of drones.

**27_Mchargue**

Good afternoon FAA, I wanted to submit my comment on drones in college station for Amazon and potentially other companies in the future, not only in CS but in cities all around america. I think that drones should be allowed to fly in the area. College station and Texas A&M are a forefront for innovation and the delivery drones are a huge leap and a next step towards a more sustainable future offering faster and more cost effective delivery times.

Thank you fir reading this and I hope the correct decision is made for this great revelation.

**28_Dupriest**

According to the Audubon Society, the National Parks in the US have banned drones over parks without special permits, so I have concerns about our local parks in College Station. The city parks are our greatest asset, second only to Texas A&M. College Station is along the migration path for hundreds of birds and butterflies and attracts "birders" from across the United States. Drones weighing 80 to 90 pounds will likely cause havoc with most birds except perhaps hawks. The city and our local businesses rely on income from these tourists. With protection placed around the blades of each drone, some protection for birds will help this potential problem. I anticipate other issues will arise but until then, good luck.

**29_Ford**

I am asking out of safety, software, and environmental issues to wildlife, pollinating bees and birds, pets, and human life that this drone application be REJECTED.

Amazon PRIME AIR COLLEGE STATION does not have the advanced technology or safety requirements needed to get any certification from the FAA. If your expert engineers would look at how advanced Matternet is in comparison to the Amazon Prime Air drone this would be a denial and rejection. Amazon had launched in Europe a couple of years ago and they have been banned according to a video I saw from Europe.

The birds and bees needed for pollination are going to be adversely affected as well deer, horses, and especially household pets. The dogs will bark and howl with the noise hurting their ears and out of violation of their innate territory alertness causing havoc in our neighborhoods. The sound decibels is way beyond the Matternet. Some people will have it resounding in their hearing range causing ear drum and neurological issues. Please check with the experts in wildlife and honey bees at our major universities and veterinarians on sound levels adversely affecting their habitat and discover the negative consequences IF you grant this application for air certification.

Amazon’s software for accident avoidance and every aspect that this drone embodies is INFERIOR to MATTERNET. Matternet has a human being monitoring the flights UNLIKE the AMAZON PRIME AIR DRONE which will be attacked by large aggressive dogs and can’t abort quickly enough if a stubborn pet refuses to move. Please hold the AMAZON AIR PRIME DRONE COLLEGE STATION to the HIGHER

standards that MATTERNET has achieved. Please review their inadequate and unsafe drone and deny it and save our city from HARM.

**30_Scanlan**

I live in Emerald Forest in College Station, Tx. Am opposed to Amazon

**31_Wilson**

The City claims only the FAA can protect us (other than limited City noise regulations) so we need the FAA to include written protections for this experiment, including time limits. Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements:

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment.

Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration.

Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act).

Give our community, in writing, the ability to terminate this drone service.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

**32_Mcihaney**

As a resident of College Station residing within close proximity-about 3/4 mile as the crow flies- to the location of the Amazon Prime Air Drone delivery site in College Station, TX, I share the following comments based on information I have received in a small group setting with three representatives of Amazon, a public show-and-tell event for interested citizens, and review of published information and the information in Amazon's application to the FAA.

Primary Concerns:

Discrepancies in Amazon's application and information previously provided to the public.

Noise level

The application mentions a decibel level of 45 decibels.

Amazon representatives described the noise on ascent and descent as "no louder than a lawn mower."

The decibel level of a lawnmower is 85 decibels and higher. Even an electric mower produces 75 decibels.

If the flight patterns result in repeated flights over the same location, even lesser noise levels could be detrimental to the quality of life where you live. It is difficult to predict how a child with autism or a pet will respond to repeated intrusions.

Operating altitude

The application mentions an operating altitude of 160-180 feet.

Amazon reps(depending on who you were talking with) described altitudes of 200-400 feet.

Proximity to hospitals with helipads

The application mentions one hospital with a helipad.

There is a second hospital with a helipad a short distance from the one mentioned in the application.

Flight Patterns of the drones

Although the implied/assumed flight pattern is "as the crow flies", the necessity to avoid schools, hospitals, parks, and any other area deemed a safety risk, will likely increase the odds of a drone flying over some residences more often than would occur in the "as the crow flies" pattern. This would increase the exposure of these properties to noise and exposure to risk in the event of a failure of the drone to operate safely. Accidents happen.

Wildlife

The drones are said to be able to avoid any hazards encountered in flight. The area of operation is frequented by buzzards flying at varying altitudes during all seasons of the year. College Station is located in the Central Flyway, which is a major migratory path for birds of all types in the spring and fall. Hawks, waterfowl, and songbirds can appear in large numbers during these times. The Monarch

butterfly is mentioned as not flying at altitudes the drone would operate at. On the contrary, Monarchs have been observed at the 44th floor of high rise buildings in downtown Houston.

Churches, schools, malls

There are numerous churches located in the proposed area of operation. Are they considered "public gatherings?" Same for malls, strip centers. By my count there are more daycare centers and childcare centers in the area than the draft mentions.

The UNKNOWN-Will the FAA place a limit on further applications by Amazon or other companies(UPS, WING, etc.) to increase the number of drone flights above the current limit?

**32_Mcilhaney**

Please consider and enact; think about if this was in your backyard, overhead, etc.

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment.

Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration.

Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act).

Give our community, in writing, the ability to terminate this drone service.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

**33_Hampton**

The City claims only the FAA can protect us (other than limited City noise regulations) so we need the FAA to include written protections for this experiment, including time limits. Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements: 1. Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service. 2. Limit this experiment to a maximum trial period of three months. 3. Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community. 4. Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

5. Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment. 6. Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

7. Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property. 8. Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration. 9. Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act). 10. Give our community, in writing, the ability to terminate this drone service. 11. At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

**34_Snyder**

Please do NOT approve this Draft EA.

The fire danger from an uncontrolled descent of an Amazon drone needs to be fully considered. There is a large sewage treatment plant (Carter Creek Wastewater Treatment Plant) located immediately to the east of transmission lines (for electricity) which are above several large oil and gas pipelines, adjacent to neighborhoods containing thousands of homes. Texas is very hot for many months each year and vegetation is dry and flammable. This area is also an oil and gas fracking zone, with numerous active wells. Gas pipeline leaks are very common throughout the area.

Other concerns are the noise and vibrations of these huge, heavy drones. We need a vibration analysis included in an updated EA. Additionally, please include the impact of two, three, and four drones arriving and/or departing from the heliport (PADDC) at the same time. To be a viable service, several drones will be flying in and out of the heliport (active drones). The current analysis which assumes only one active drone underestimates the impacts. Also, it is critical to capture peak noise levels throughout the journey and include transition noise, the majority of which was not captured (see point 10 below).

These considerations and their impact on delivery times, noise, and vibration effects will more accurately reflect the impact to our community.

Since we are the first large suburban test site it is also important to have the actual impacts measured and publicly reported.

It is critical to include a stated maximum time limit for this drone delivery experiment, ideally a maximum of three months. Our community, not just Amazon, should be legally able to terminate this service.

Our City claims the FAA offers OUR ONLY PROTECTION (other than limited City noise regulations). We are counting on the FAA to protect our community.

Necessary Considerations:

Our City officials tell us only the FAA can control and regulate the air space and this drone program. Please ensure specific FAA requirements are included which will protect our community since during this experiment our homes will turn into heliports and we will live under potentially thousands of new drone flight zones. Without adequate FAA safeguards this drone service will reduce our privacy, security, home values and the peace and quiet of our community.

We need a drone show BEFORE the FAA approves an EA. Chancellor John Sharp of Texas A&M, a strong proponent, should host this event on campus property. Let's see, hear, and feel what FOUR of these almost 100 pound drones are like taking off, flying, dropping off a package, returning, and landing.

We need a time limit for this experiment, preferably three months or less. With this

Draft EA it appears only Amazon can shut this down.

Should the desires and values of AP and AP drone delivery customers trump those of existing residents? If this draft EA is approved and the noise, vibration, safety risk, etc., is too high present FAA regulations of this AP drone delivery service give us no remedies.

However, our drone experience will likely be similar to Australian neighborhoods that had a six month drone test trial a few years ago: https://www.youtube.com/watch?v=8v5hCxBZTh0 Neighbors begged for it to be stopped early since: TOO NOISY, makes you angry, distressing, lots of birds left the area. In this video actual drone sounds start at 0:50 (first part is ad for service, no sound of drone). Their experiences underscore how critical it is that the FAA LIMITS the length of this study to protect our health and sanity.

We need a public website where problems, issues, and complaints can be posted in real-time by the public AND also by Amazon about drone collisions with wildlife, flyaways, etc.This website should include FAA incident reports and AP responses.

We need specific, posted, policies and procedures regarding drone crashes, especially those on private property. Retrieval is mentioned in this EA (Section 3.8.3) but will AP have the ability to retrieve from private property without owner consent? What happens when private property is damaged? Will AP pay without a lawsuit being filed? What insurance will AP carry? What if a pet bites the person retrieving the drone from private property?

One AP FAA incident report mentioned the "intense" lithium battery fire that consumed an Amazon drone and resulted in smoke and flames in under FIVE SECONDS, burned 25 acres in Oregon last year and MELTED the metal components of the drone. There have also been problems with CATTO propellers and the MK27 drone itself. How have these problems been addressed? From what elevation can the drone crash and NOT have the lithium battery catch fire? Several of the reported crashes occurred AFTER replacement parts were installed due to installation, part issues, or part being installed in wrong place. What FAA regulations, policies and procedures are in place to ensure this doesn't happen here?

How many drones and flammable lithium batteries will be stored at their drone heliport? The EA does mention that in the event of a fire, CS Fire Department will be called.

A NASA study concluded drone noise is much more annoying than other noises and flying higher did NOT reduce level of annoyance. The NASA study found that drone decibel level is NOT a good indicator of the level of annoyance and irritation. Drones produce noise that is qualitatively MORE annoying even at the same decibel level. Also, the drone noise seemed to come on more suddenly and loiter much longer. To not disturb and annoy residents drones must be significantly quieter than ground vehicles.

Acoustic engineer, Garth Paine, reports even domestic drones (which are much smaller and quieter) can raise baseline sound pressure levels by at least 20 decibels which means one single, small domestic drone can make an area eight to 12 times louder than it is now. It's not just loudness. Drone propellers move air very rapidly. The amount of energy put into moving the air equates to its volume or loudness. The speed of the spinning equates to its pitch, or frequency. Refinements to propeller shapes can change the pitch, but companies will only research noise reduction if the FAA or their customers demands it. Adding a payload to a drone means the propellers must put more energy into the air by spinning faster—making a louder and higher-pitched sound. The frequencies they generate are, in fact, the very frequencies people are most sensitive to.

We need the FAA to implement regulations that will protect us from the noise, vibrations, and other frequencies generated by drones. Amazon's drones are much larger, heavier & noisier than the irritating domestic drones.

We need a drone show & adequate FAA regulations and restrictions in place BEFORE this AP drone delivery program is approved.

Decibel level projections (3.2.3 (page 20); Section 3.5; and a Noise Analysis Report 1/2 way through the EA in Appendix C) based on a very short test period (4/1-4/16, 2022) done in Pendleton, Oregon using four microphones and very few actual test flights during which time they 'did NOT capture the majority of transition noise'; 'transition noise not fully captured'.

This analysis states 'for simplicity only one launching pad is assumed to be used at a time' (3.2).

Does AP plan to launch or allow the arrival of only one drone at a time?

If not, how will dB levels increase when two, three or four drones are arriving or taking off at a time? Will they slow their speed (impacting those of us in the flight zone even more) in order to stagger their arrivals and departures and/or will drones remain in a holding pattern in the sky above the airport/heliport or elsewhere?

To get the delivery drop off to 58 seconds the delivery descent and ascent speed changes were excluded, but these will actually keep the drone overhead for longer (3.3.4) possibly another 40 seconds of noise exposure, changing the actual delivery time to at least 98 seconds?

There is 'no standard approved noise model for UA' (Appendix D). The analysis uses a 'customized noise exposure prediction process'.

I recommend the FAA instead use actual dB data collection in College Station with four drones (vs one drone).

It is important to take and report PEAK readings.

PEAK readings matter more for health and harm. Just like with driving, average speed isn't important, peak is what gets the ticket.

The FAA should require AP to pay for ACTUAL dB readings (PEAK and average) and data collection, including resident complaints, to determine the actual impact to our community.

UA (drone) noise has a 'high acoustic frequency content' (3.5.3, page 30). dB is NOT a good indicator of how annoying drone noise is, especially for those of us trapped in our homes due to disability, illness, lack of money or other resources to escape.

Why no mention of the impact on those covered by the ADA (Americans with Disabilities Act)? Does the ADA offer any additional protections?

What are the vibratory impacts of these drones? We need measurements BEFORE approval.

Amazon projects 52,000 annual deliveries in our area (Appendix D), 104,000 departures and arrivals at this drone airport/heliport (PADDC) EVERY YEAR. 142.47 average deliveries per day, 285 departures and arrivals per day. Page 31, Figure 4, DNL Noise Exposure at College Station PADDC Location. This photo shows numerous homes and several businesses that, if this EA is approved, will soon experience 45 dB to over 50 dB of noise with just ONE drone taking off or arriving. Acoustic experts report that drone noise is much more annoying than other vehicular noise. How will this impact those living or working at or near this new drone airport/heliport (PADDC)?

The analysis estimates a given single delivery location could have 0.1 to 4.0 deliveries per day (page 31). They are paying customers (one reported receiving two $50 credits) to sign up. AP could further incentivize customers to allow for even more deliveries, especially if they aren't getting enough customers to participate.

There needs to be an FAA-imposed limit on the number of deliveries made to a single location and a given area each day. Without additional protections this EA grants AP the ability to turn ALL of our homes into heliport zones in perpetuity.

The minimum measured distance from the UA (drone) for which noise measurement data was available is 32.8 feet (page 32). It is likely that some unfortunates will unintentionally get a lot closer than that, especially since these drones will be delivering to front yards too, and the drones won't actually retreat until within 16.4 feet. We need additional safeguards to protect residents and visitors.

The draft EA gives AP the ability to change the sector boundaries over time. This will increase the negative impacts in some areas and residents deserve input on this.

No mention is made of the cameras, recording devices, transmitters, sensors, etc., on the drones - what safeguards do we have that our privacy is being respected? AP mentions proprietary information being withheld.

We should have the right to know what these drones and support technology are capable of seeing, recording, transmitting, and storing/saving before this EA is approved. We need FAA regulations and privacy safeguards.

The fire danger from the uncontrolled descent of an Amazon drone needs to be fully considered. There is a large sewage treatment plant (Carter Creek Wastewater Treatment Plant) located immediately to the east of transmission lines (for electricity) which are above several large oil and gas pipelines, adjacent to hundreds of homes. In the event of a fire, thousands of homes could quickly be impacted. Texas is very hot for many months each year with dried out vegetation and active and orphan oil and gas wells and pipelines. Gas pipeline leaks are very common throughout the area.

This drone heliport (PADDC) is extremely close to State Highway 6 (approximately 0.33 miles to the west per 1.2.1) which runs right through the center of the drone delivery target zone. Large trucks and other vehicles often speed along at 75-80 miles an hour. Will accidents, especially initially and/or in bad weather, be caused by drivers distracted by these UFOs?

Please do NOT approve this FAA Amazon Prime Air College Station Draft Environmental Assessment (EA). Despite repeated requests, Amazon Prime Air representatives have refused to allow residents to see, hear and feel their drones in action. They are paying customers to sign up and use this service and pitting neighbor-against- neighbor in their quest to subject our community to their drone delivery program. Amazon Prime Air refuses to be transparent in their dealings with us.

We need additional FAA regulations and safeguards to protect our quality of life.

Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements:

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to six per day.

Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment.

Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration.

Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act).

Give our community, in writing, the ability to terminate this drone service.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone delivery service.

City of College Station residents and visitors are relying on the FAA to ensure this drone delivery experiment is adequately regulated, monitored, and reviewed.

**36_Johnson**

The Draft Environmental Assessment: Amazon Prime Air Drone Package Delivery Operations in College Station, TX contains a rather glaring error of omission in that there are in fact two heliports located within the service area.

1.0 Purpose and Need 1

Draft Environmental Assessment for Amazon Prime Air – College Station, TX

There are no airports in the operating area. There is one heliport located at Baylor Scott & White Medical Center, at 800 Scott & White Drive in the operating area. The operating area is the study area for the purposes of this Draft EA.

3.5.2 Affected Environment

There is one heliport in the operating area located at Baylor Scott & White Medical Center, at 800 Scott & White Drive. Existing aviation noise is not expected to be significant. The study area is depicted in Figure 1.

In addition to one at Baylor Scott &White, there is one located at St. Joseph Health College Station Hospital, 1604 Rock Prairie Rd

The Amazon Prime Drones are painted sky blue and white and will be allowed to travel at speeds up to 99 mph. These factors will make their visual detection almost impossible for recreational or other commercial drone activity within the service area.

For the safety of the public, the Prime drones need to be equipped with transponders which will make them visible to Automatic Dependent Surveillance-Broadcast (ADS-B) systems.

Before the FAA approves this drone experiment, I would respectfully request the FAA to add the following written requirements:

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of

Give our community, in writing, the ability to terminate this drone service for cause.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

**37_Tanel**

The Amazon Prime Air College Station Draft Environmental Assessment (EA), if approved, will leave our City of College Station, TX unprotected. Amazon actually plans to have four drones flying in four distinct zones (which they can change the boundaries of at any time), so it is more likely they will have at least two, possibly three or even four drones making noise at the heliport (PADDC) at any one time. How will decibel levels and vibrations increase and what will the impact be on those homes and businesses closest to the heliport? Please note that on Page 31 of EA, Figure 4, DNL Noise Exposure at College Station PADDC Location which this map shows both numerous homes and several businesses that, if this EA is approved, will soon experience 45 dB to over 50 dB of noise with just ONE drone taking off or arriving.

The City of College Station claims only the FAA can protect us (other than limited City noise regulations) and both the City Council and the Planning and Zoning Commission has abrogated their responsibility to protect the public vis-a vis Amazon Prime Air, so we, the citizens, need the FAA to include written protections for this experiment, including time limits.

I vehemently oppose approval of this EA by the FAA based on the potential environmental impacts of the proposed authorizations and the potential impacts to the human environment from the Amazon Prime Air Drone Package Delivery Operations' proposed activities; as I wish the FAA to take applicable actions before approving this drone experiment as enumerated below.

Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements:

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment.

Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration.

Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act since I am a 100% VA Certified Disabled Veteran)

Give our community, in writing, the ability to terminate this drone service.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this Amazon Prime Air Drone Service.

Thank you for your consideration and amending the proposed EA! Sincerely yours,

**38_Snyder**

Please do NOT approve this Draft EA.

The fire danger from an uncontrolled descent of an Amazon drone needs to be fully considered. There is a large sewage treatment plant (Carter Creek Wastewater Treatment Plant) located immediately to the east of transmission lines (for electricity) which are above several large oil and gas pipelines, adjacent to neighborhoods containing thousands of homes. Texas is very hot for many months each year and vegetation is dry and flammable. This area is also an oil and gas fracking zone, with numerous active wells. Gas pipeline leaks are very common throughout the area.

Other concerns are the noise and vibrations of these huge, heavy drones. We need a vibration analysis included in an updated EA. Additionally, please include the impact of two, three, and four drones arriving and/or departing from the heliport (PADDC) at the same time. To be a viable service, several drones will be flying in and out of the heliport (active drones). The current analysis which assumes only one active drone underestimates the impacts. Also, it is critical to capture peak noise levels throughout the journey and include transition noise, the majority of which was not captured (see point 10 below). These considerations and their impact on delivery times, noise, and vibration effects will more accurately reflect the impact to our community.

Since we are the first large suburban test site it is also important to have the actual impacts measured and publicly reported.

It is critical to include a stated maximum time limit for this drone delivery experiment, ideally a maximum of three months. Our community, not just Amazon, should be legally able to terminate this service.

Our City claims the FAA offers OUR ONLY PROTECTION (other than limited City noise regulations). We are counting on the FAA to protect our community.

We need additional FAA regulations and safeguards to protect our quality of life.

Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements:

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to six per day.

Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment.

Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration.

Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act).

Give our community, in writing, the ability to terminate this drone service.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone delivery service.

City of College Station residents and visitors are relying on the FAA to ensure this drone delivery experiment is adequately regulated, monitored, and reviewed.

Again I ask that the FAA not approve this Draft EA.

**39_Flournoy**

As a citizen of College Station, TX, I'd like to share some of my concerns regarding the proposed Amazon Prime Air service.

Safety is a primary concern. Although drone technology is constantly improving, I do not feel comfortable with automated aircraft flying above a residential area, or over a busy roadway, such as Highway 6. So-called "self-driving" automobiles have not been proven to be safe, nor their technology reliable, so how much more dangerous is an aircraft with similar technology? Additionally, can this technology be trusted to recognize powerlines, trees, utility poles, vehicles, a person on the sidewalk, etc., and have the capability to avoid such objects without causing damage or injury? Furthermore, can these aircraft be trusted to maintain a safe distance from children playing in the front yard or near the landing zone?

Nuisance is another concern. I would imagine that hundreds or even thousands of these drones will be in flight at any given point (anything less would seem like a waste of time and money for Amazon). One drone may not make a noticeable amount of noise, but an entire fleet? I am under the impression that this would create a constant "buzzing" around the delivery radius. Not to mention the constant sight of drones flying through the air day after day.

A general concern is that our city will be treated like a proving ground for a new technology. However, unlike a true proving ground that has been designated for testing with established parameters to ensure safety, College Station is an actual city with thousands of civilians, homes, schools, businesses, and so forth that should not be subjected to "guinea pig" status. If something does go awry, real people and property will be affected by the outcome. Additionally, if the technology fails, or the service is deemed inconsistent with the future of the city? Can Amazon's authorization be revoked?

Some of these concerns may be beyond the scope of the FAA's authority. However, I believe it is necessary to be completely forthcoming as a concerned citizen. Although I appreciate the continued growth of our city, and that a successful company such as Amazon has placed so much faith in this community, it is important to note that we are still, in fact, a city. College Station is not a testing facility or a laboratory, but a thriving community full of students, families, and professionals, and it should be treated as such.

**40_Johnson**

The City claims only the FAA can protect us (other than limited City noise regulations) so we need the FAA to include written protections for this experiment, including time limits. Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements: 1. Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service. 2. Limit this experiment to a maximum trial period of three months. 3. Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community. 4. Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

5. Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment. 6. Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

7. Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property. 8. Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration. 9. Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act). 10. Give our community, in writing, the ability to terminate this drone service. 11. At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

**41_McWhirter**

To whom it may concern:

I write to express my strong opposition to allowing Amazon Prime to begin drone deliveries in College Station. As a longtime resident whose home is less than a mile from the proposed “drone airport,” I share with many of my neighbors a deep skepticism about Amazon’s ability to operate such a facility safely and in ways that will not severely impact our quality of life. Given Amazon’s less than stellar record of workplace safety (at their warehouses, for example), and the evidence provided by news reports and videos regarding their previous test site in California, I have very little faith that Amazon will operate this facility in an open, honest, and safe manner. The site in California, a largely treeless small community, has already witnessed one drone crash; the area for this proposed experiment in College Station – an experiment in which I and my neighbors are to be the guinea pigs – is heavily wooded and much more densely populated, making safe operation far more difficult. In addition, the noise that will be produced by the operation of the drones (4 operating out of the heliport at one time) is very likely to damage my quality of life. Also, although I will definitely NOT use this service, what happens if my next door neighbor has multiple deliveries every day? There are so many unanswered questions here – about noise, safety, even about privacy (these drones have cameras), and frankly, Amazon’s presentations about the project locally have been nothing more than PR stunts, complete with swag bags, but with no real answers to very real questions.

I urge the FAA to reject approval of the EA: this project, in its current, uncertain, potentially dangerous state of development, does not belong in our community. Short of that, I urge the FAA to condition any approval on the inclusion of written protections for this experiment, including time limits. Before the FAA approves this drone experiment, please ensure the FAA adds the following requirements:

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment.

Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration.

Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act).

Give our community, in writing, the ability to terminate this drone service.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

Thank you for your attention to the very real concerns of myself and my neighbors. Sincerely,

**42_Davis**

I'm writing in opposition to Amazon Air drones in College Station, TX. My rationale is manifold. First, this is nothing more than a gimmick, as the range is far too short, and the need for literally tens of thousands of small distribution centers across the US is an absolute deal breaker. I look for Amazon to push for larger, louder and inherently more dangerous drones in the near future, should this endeavor be approved.

The pressure on the FAA will be enormous, and politicians with their special interests will quickly become involved. DO NOT SUCCUMB to the fantasy of drone delivery, and stop this now.

**43_Fernandez-Solis**

Attached please find my letter to the City Council.

Why is this project not done close or at the airport that is hardly used? Or since the Chancellor likes so much close to his vacant properties?

The problem is not one amazon but all the others that like car dealerships and Pharmacies they come in bunches.

Our City Council has let us down by passing on the approval buck to you'll. Our subdivision will be voting en mass against all incumbents and so will other adjacent subdivisions. We may be able to overturn the current council decision after this election.

Are we upset, you bet.

24 August 2022

College Station City Council (Council) City of College Station

1101 Texas Avenue

College Station, Texas 77840

Re: Amazon Prime Drones (Amazon) Dear Council,

Since each of you individually, and the council as a whole voted unanimously to approve the Amazon Prime Drone request for rezoning, this presentation addresses each one of you.

The Amazon business model is not the council's concern. Nonetheless, it did report that Amazon will employ forty new workers. This increase in employment can be expected to offset a loss of forty amazon truck drivers each with an average delivery load of one hundred packages. Four thousand daily drone deliveries are an incredible number of drone air traffic just for Amazon Prime.

Question: In your zoning approval, did you include a provision to limit the number of daily drone trips or took Amazon word for the start number of trips, knowing that it will need to be scaled up immensely?

Comment: The council has abdicated your leadership to the city by approving the rezoning and passing the final approval to the FAA.

Question: Has the FAA approved Amazon Prime Drone initiative for the rezoned area?

Unfortunately, the ramifications of your leadership abdication goes further and deeper than the zoning approval for Amazon use of the land for drone activities. If the drone delivery model is successful, you have established a precedent that FedEx, UPS, USPS, Walgreens, Walmart, and all other businesses could follow.

Therefore, the council has established a precedent for future drone use in the vicinity that is much more damaging to the fabric of the College Station community than just the Amazon Prime Drone initiative.

Respectfully,

**44_Kovar**

This a family friendly active neighborhood and adjoining neighborhoods that enjoy the peace and quite that the neighborhood offers, the neighborhood has a active creek and lots of native animals including deer, rabbits, birds, racoons, squirrels etc. that will also be affected by the noise pollution that the drones will cause. These drones could also crash causing bodily harm or damage to homes and cars. The drones will be a visual distraction as they will be flying near highway 6 and will increase the likelihood of additional crashes because of distraction from drivers.

From talk on the neighborhood site Amazon is providing gift cards to some neighbors as a means to win approval.

Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service.

Limit this experiment to a maximum trial period of three months.

Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community.

Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment.

Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

Require written policies and procedures to be followed by AP in the event of flyway's, crashes, or uncontrolled descents, including those on private property.

Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyway's, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration.

Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act).

Give our community, in writing, the ability to terminate this drone service.

At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

Help us to protect the American dream and the peace and quite we now enjoy in our neighborhood. Thanks,

**45_Hall**

We are unequivocally opposed to a waiver of Amazon Air delivery in our neighborhood, and in College Station city limits.

We have not been given adequate cause to believe this service will not result in Amazon liability should a drone fail, much less damage to our environment.

We would ask for an Environmental Impact study Immediately, as we are over a neighborhood wildlife sanctuary, a College Station sewer treatment plant, and US Hwy 6. Please respond.

**46_AUVSI**

Please see attached Thank you

October 12, 2022

To Whom It May Concern:

The Association for Uncrewed Vehicle Systems International (AUVSI) supports the amendment by Amazon Prime Air (Prime Air) to its Part 135 air carrier Operations Specification (OpSpecs) to begin its commercial package delivery operations from one Prime Air Drone Delivery Center (PADDC) in College Station, Texas. Prime Air seeks to bring commercial package delivery to this area via drone operations conducted at a 1:1 pilot to aircraft ratio during daylight hours.

AUVSI is the world's largest non-profit devoted exclusively to advancing the uncrewed systems and robotics community. Thousands of businesses – large and small, across the country – are embracing advanced aerospace technologies, including drones, to simultaneously provide workforce, economic, and environmental benefits. AUVSI and its members, including Prime Air, work closely with the U.S. government to ensure that operations remain safe and compliant with federal regulations, and we have built an enviable track record.

It is noteworthy that Prime Air has been working under various FAA programs for several years, including the Partnership for Safety Plan Program, and has proved concepts within existing regulatory frameworks. Prime Air's amendment to its Part 135 is a reasonable extension of this extensive regulatory compliance and market research effort. The approval will enable an industry leader to further assess the economic viability and demonstrate the safety of commercial drone operations.

I also write to encourage FAA to ensure NEPA reviews for UAS operations are documented and streamlined in order to fulfill FAA's Congressional mandate to integrate drones into the national

airspace. For scaled commercial operations over a broad geographic area, FAA should consider a programmatic approach to NEPA reviews that is similar to the approach used for traditional air carrier operations. A system-neutral approach will improve regulatory clarity and consistency and avoid disproportionate burdens on the still growing UAS industry.

AUVSI encourages the approval of Prime Air's Part 135 air carrier OpSpecs amendment to launch package delivery operations in College Station, Texas. Thank you for the opportunity to comment.

**47_Williams**

I am greatly concerned about the news that Amazon is planning to begin using drones for delivery to much of College Station without sufficient protection for residents and no time limit.

There will be a fire risk as was caused by Amazon's drone in Oregon which burned over 25 acres. It is very dry here and I do not feel this is a wise decision in such a populated area.

I cannot imagine the noise that will come from drones flying all over our neighborhoods and homes. This is a very quiet area of College Station, the reason many of us purchased our homes in this area.

We need the FAA to either cancel these plans or ensure the following:

A maximum three-month trial period with an independent study, paid for by Amazon of actual peak decibel readings

Maximum daily drone deliveries of two per home.

Disclosure of equipment on Amazon's drones or auxiliary equipment that could compromise resident safety, privacy and security and implement protections.

Disclosure of policies and procedures to be followed by Amazon in the event of flyaways or uncontrolled descents including those on private property

A website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports, complaints and issues of residents and independent measurements of noise and vibration.

The community needs the ability to terminate this drone service.

After the trial period, the city of College Station should hold a public hearing to determine if this program should continue.

Please reconsider this terrible plan!!

**48_Emerald Forest**

Emerald Forest is a single family use community of 434 properties directly adjacent to the proposed Amazon Prime Air location. I am responding to your request for feedback at the request of our Board of Directors and a number of our residents who have expressed significant concerns about the troubled

history of the Amazon Prime Air project and the high consequences to the safety and quality of life in our neighborhoods.

We have several questions regarding the Amazon Prime Air proposition that I believe need to be answered before Amazon proceeds.

These questions fall into four categories:

Application of the appropriate zoning criteria.

The scope of the intended testing in our densely populated cit

The safety and liability associated with the testing.

The direct impact on our quality of life.

Appropriate zoning consideration

Is the Amazon Prime Air test facility adhering to the zoning requirements and regulations for a heliport?

Note: Amazon Prime Air has been issued an 14 CFR Part 135 Air Carrier and Operator Certification, which means it is treated the same as a commercial air cargo delivery service. It also a FAA Exemption No. 18602 section 44807 exemption for certain unmanned systems which specifies how it can differ from crewed commercial air operations.

The take-off and landing area of a Part 135 air carrier is subject to local, county, state, and federal zoning regulations. The MK27 series of drones are vertical takeoff, thus would be considered a heliport. The location of heliports next to neighborhoods, major highways, and other heliports (e.g., Baylor Scott and White's heliport is within the 4 mile radius) is usually discouraged and factored into land use decisions.

Is FAA Exemption No. 18602 for Amazon Prime Air still in effect?

I could find no revocation of the exemption; if so, that Exemption has 28 points, of which two state (cut and pasted from the federal record):

Prior to each operation, Amazon must designate safe emergency landing area(s) which the UA can reach if it is unable to complete the intended flight; and, identify such emergency landing area(s) to the PIC and GSO operating aircraft in that area. The emergency landing area(s) must:

Be no less than 100 feet in diameter;

Be known in advance to the PIC and GSO operating aircraft in that area;

Be at least 250 feet from structures, vehicles, human beings, and roads; and

Provide for a landing without undue hazard to human beings or property on the ground.

Amazon must adhere to all of the following requirements when conducting operations under this exemption: a. Operations over or within 250 feet laterally of moving vehicles are prohibited. b. Sustained flight within 250 feet laterally of roadways is prohibited. c. Operations over human beings and structures are prohibited. Additionally, the UA must remain at least 100 feet laterally from any person or

structure during all phases of flight. d. Transitions over roadways are prohibited except as provided in the FAA- approved Amazon Prime Air MK27, Concept of Operations. e. Operations are permitted only in sparsely populated areas.

The presence of exemption 18602 from the FAA 14 CFR Part 61 and Part 135 regulations indicates that

Testing cannot be currently conducted in the College Station area as the area is populated (22.e), there is a network of roads and vehicular traffic (22.a,b), these are active neighborhoods with multiple parks, schools, playgrounds, and a hospital along with homeowners, children, landscapers, etc. such that it seems unlikely for the M27 to remain at least 100 feet laterally from any person or structure at all time (22.c).

Amazon Prime Air has not requested appropriate zoning and land use (especially as 21 requires emergency landing areas, and the zoning request is only for the base of operations). Or is the City giving Amazon a de facto four mile radius zoning variance?

It appears that in 2019 Amazon has requested a relaxation of the 28 requirements as to the training of the pilots but I was unable to locate the precise requirements that were to be asked to be changed and whether the FAA has approved the request.

How will the location of a testing facility in College Station adhere to these 28 FAA conditions? Does Amazon expect to transition from testing to commercial delivery from this site in the near future, i.e., December 2022? How many test flights are expected to be necessary to show reliability? What happens if the FAA does not approve that transition?

Scope of testing

What type of testing will be conducted? Is this flight testing, e.g., does it work in the Texas hot winds?, or full operational testing, where packages will be delivered to individuals to see if the concept works in practice with residential backyards?

Note: The FAA 14 CFR Part 135 Certification Process focuses primarily on platform safety, essentially that the drone is likely to fly productively for testing purposes, not on general population safety. (https://www.faa.gov/licenses_certificates/airline_certification/135_certification/cert_process, https://www.faa.gov/uas/advanced_operations/package_delivery_drone) The recent crashes suggest that Amazon Prime Air has not yet produced a reliable platform for flying (https://www.bloomberg.com/news/features/2022-04-10/amazon-drone-crashes-delays-put- bezos-s-delivery-dream-at-risk).

Note: The FAA requirements for safe testing of drones are evolving, with many provisions ambiguous, such as what constitutes flying over assemblies of people and thus a company meeting FAA requirements may not be sufficient for a city. Typically, requirements lag technology and thus FAA approval should not be interpreted as meaning testing would occur with the same level of safety that a commercial product would have. This disconnect between testing and expectations of safety is being seen in the regulations for testing self-driving cars, where evolving federal and state DOT regulations lag and have not prevented pedestrian deaths during testing. (https://www.brookings.edu/blog/techtank/2018/05/01/the-state-of-self-driving-car-laws-across- the-u-s/)

Does Amazon Prime Air hold any Institutional Review Board approvals for experimenting with civilian populations? Note that delivery is not strictly a technical problem; while a civilian might never be expected to touch the drone or attached payload, the platform flies over people, lands in their yard or spaces where children may be playing, etc. Plus people tend to interact unpredictably to technology, hence there is always the possibility of human interaction.

What is the expected number of flights, duration, and location?

Will there be testing for delivery in residential areas, such as backyards with trees, playgrounds, swimming pools, and pets, children, landscapers, etc. which move unpredictably?

Will flying over schools, kindergartens, community pools, soccer fields, playgrounds, and parks be permitted as part of the experiments?

Note: The proposed area includes major community parks, including Central Park where large numbers of citizens gather for sports and Wolf Pen Creek which holds outdoor festivals and concerts, and numerous churches with pre-school programs and playgrounds, and College Station ISD schools where students play and participate in sports. College Station has a higher population density than in rural testing in fields or in a test site such as RELLIS.

What is the probability and potential impact of a crash on Hwy 6 bypass? Has the probability of this been computed? Or are the probabilities of events averaged over the entire radius with assumptions of lower vehicular density and do not consider higher density of traffic next to the take off and landing site?

Note: From the proposed location, drones will have to transit a highly trafficked area of College Station to reach approximately half of the proposed 4 mile radius. This increases the chance that a drone crash will hit a vehicle or crash in such a way as to lead to a vehicular incident.

Safety and liability

What is the justification for moving from testing in fields in the Pacific Northwest to testing in College Station or any dense population; for example, has the platform and payload delivery system reached a NASA Technical Readiness Level of 8 and thus is ready for testing with civilian populations meeting civilian reasonable expectations of safety? Or is it at a TRL of 6, with the intent to use College Station in order to reach TRL 7 and 8?

Note: NASA TRL is used as a standard for any engineering technology.

(https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level)

What is the current mean time between failures (MTBF) over how many flights and flight hours? Are flight and general navigational MTBF (e.g., get to right location) and delivery payload MTBF (lowers the payload without mishap) kept track separately? Are there other metrics?

As of June, 2022, Amazon does not appear to have a significant number of flights to merit airworthiness around dense populations in residential areas.

What is the minimum MTBF threshold Amazon considers safe for testing over populations? Note that MTBF is usually in the thousands of hours for commercial products and equipment.

Who will be liable for accidents: Amazon or a contractor? Will testing and evaluation be contracted out? For example, the FAA requirements are that human supervises only one drone, will they be an Amazon employee or a contractor? What about the other team members such as the safety visual observer?

Consider that in 2018 an Uber self-driving car hit and killed a pedestrian when the software failed and the human safety driver did not respond in time. Uber was found not to be liable because the human driver was a contractor. (https://slate.com/technology/2020/10/uber- self-driving-car-death-arizona-vs-vasquez.html)

Corporations may use contractors as a shield from economic consequences; this also undermines a safety culture and corporate responsibility.

What would happen if the drone crashed into a swimming pool? Would there be a possibility of electrocution? A fire?

What is the cybersecurity for the system, especially since it appears to rely on wireless communication and GPS signals? What is the physical safety from tampering?

Can a neighborhood, business, or landowner opt out of testing so that Amazon Air drones do not fly over their property at all? Or can they only choose not to sign up for deliveries and hope a drone never flies over them? What would be the penalties for non-compliance?

Direct quality of life impact on citizens

What is the noise level for deliveries being made next door- does it meet City ordinance

26.8 with regards to 63dB outdoors measured from the neighbor's property line and 55 dB indoors? Will it meet the FAA's Part 150 requirements for the aircraft to meet the DNL (the day-night average sound level metric of 65 dBA) for land use compatibility guideline for residential and other land uses? (https://www.faa.gov/regulations_policies/policy_guidance/noise/history)

Can the City halt operations if the noise exceeds this?

What is the duration of the noise? For example, would a resident playing music on their deck be drowned out by a drone delivering a package next door- for 5 minutes? For 10 minutes? while a drone descends and delivers to a neighbor (or repeatedly attempts to deliver)? What is the worst case and average case, not just the best case?

Note: https://slate.com/technology/2019/05/delivery-drones-amazon-google-noise- buzzing.html

Will Amazon Prime Air be recording flights or mapping out areas? If so, how will they preserve citizen's expectations of privacy?

While I see the opportunity for Amazon Prime Air to provide a useful service to the community in the future, I am confident that these are issues that cannot be overlooked before going into full operation.

Thank you for allowing us to present our questions and reservations for the record. Your written response to our concerns would be valuable in reassuring our community as to the long term safety and quality of life of this project.

**49_Williams**

To Whom It May Concern,

It has been proven that drone noise is very irritating. People living around the base would be greatly affected by the sound. Many animals live in Foxfire, my neighborhood, and the buzzing might scare them away from their homes. I also would like to know why Amazon would put the headquarters right next to our homes. There are many risks that come with drone delivery. The neighborhoods around it may become the victims of crashes and falls. I do not think anyone would like it if a drone suddenly came crashing into their yard. They are also bigger than a human and weigh one hundred pounds. They could do tons of damage to cars, roofs, play sets, houses, or any other thing in the yard. They will fly over homes even if they do not buy from Amazon. The drones can only carry an up to five pound package, and I do not think that it is worth the risk. Amazon said at the city council meeting they would fly over different dwellings every time they released a drone, but in the newspaper it said that they would go over the same houses. That really bothers me because that means either Amazon or the newspaper gave false information. An old saying is, “If you can not trust someone in small things, then you can not trust them in big things.” I think that this would apply in this case.

**50_Small UAV Coalition**

Please find attached the Small UAV Coalition’s comments in the above-captioned proceeding. Thank you

DGA was recently named the top “Innovation in New Solutions” with our partners at Dentons at the Financial Times Innovative Lawyers Awards North America.

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The Small UAV Coalition ("Coalition") is pleased to submit these comments in support of the FAA's draft Environmental Assessment ("EA") and recommends the FAA issue a Finding of No Significant Impact ("FONSI") promptly after consideration of the public comments.

The Coalition recommends that the FAA develop clear and transparent drone-specific guidance on compliance with the National Environmental Policy Act ("NEPA") to inform its environmental reviews such as this one, to consider the development of a broad and high level programmatic environmental assessment, and to gather data to determine certain operations and operational environments that would qualify for a categorical exclusion.

Commercial delivery by drone will result in quick and safe delivery of a variety of products that will benefit both businesses and the public. Amazon Prime Air's delivery of packages up to 5 pounds using its MK27-2 battery-powered drone will obviate the use of carbon-emitting ground vehicles, whether by a customer driving to a business or a business that delivers goods to a residence. Apart from its

environmental benefits, drone operations have the potential to reduce the number of vehicles on the road and thereby improve road safety.

Amazon seeks an amendment to its Part 135 Operations Specifications ("Op Specs") to conduct flight operations from its Prime Air Drone Delivery Center ("PADDC") to destinations within a four-mile radius. This Op Specs amendment is the Federal action triggering review under the National Environmental Policy Act ("NEPA"). These flights will be distributed among four sectors. Flights will be conducted during daylight hours, thereby eliminating the risk of any sleep disturbance, and flown up to five days per week. Amazon pledges to avoid operations over schoolyards during operational hours and will avoid operating over any large open-air assembly of persons.

The Coalition agrees with the FAA's conclusion that nine of the fourteen areas of evaluation of environmental impacts do not warrant any detailed consideration and expects the FAA will be able to make this same determination with respect to other drone operations unless the particular location or nature of operation implicates one of those nine areas.

For the noise impacts, the FAA examined noise at three stages: the PADDC; en route while the drone will operate between 160 and 180 feet Above Ground Level ("AGL"); and at the point of delivery, when the drone descends to about 13 feet AGL Using its DNL metric, the draft EA concludes that at no point will the noise exceed 57.2 dB, except within a 100 feet radius from the PADDC, which area is entirely on Amazon Prime Air's property. Otherwise, the highest noise levels will be at delivery, but the maximum number of deliveries per day at one point will not exceed four. During the delivery route, the noise will at no point exceed 45 dB. It is worth noting that delivery locations will be chosen by the person or business requesting the delivery, although other individuals may be nearby. The draft EA states: "The maximum noise exposure at any property line in residential zoned property will not exceed 50 dB."

With respect to section 4(f) resources, the Coalition agrees with the FAA's conclusion that "infrequent UAS overflights ... are not a constructive use of any section 4(f) resource, and will not cause any substantial impairment to any of the section 4(f) resources in this area."

With respect to visual impacts, the Coalition agrees that a drone that is seen only up to

3.6 seconds at any point is not likely to have any significant visual impact.

In sum, the Coalition agrees with the findings in the draft EA and urges the FAA to issue a FONSI after it considers comments from the public.

Respectfully submitted,

**51_GAMA**

Please see attached comment for submission, on behalf of the General Aviation Manufacturers Association(GAMA), regarding the Draft Environment Assessment for Amazon Prime Air’s proposed commercial package delivery operations in College Station, Texas.

October 14, 2022

Subject: Draft Environmental Assessment - Amazon Prime Air Drone Package Delivery Operations

The General Aviation Manufacturers Association (GAMA) values the opportunity to provide comment in support of the FAA's draft Environmental Assessment (EA) of Amazon Prime Air's (Prime Air) proposed commercial package delivery operations. GAMA exists to foster and advance the general welfare, safety, interests, and activities of the global business and general aviation industry. This includes strategic activities to foster the development and entry-into- service of innovations in aviation technologies, products, and services.

GAMA recognizes the critical importance of environmental review as an enabler for UAS commercial package delivery operations to scale. Prime Air's amendment to its Part 135 air carrier Operations Specifications (OpSpecs) is a natural evolution in concert with the FAA's action to support commercial UAS operations that are safe, efficient, and environmentally friendly. GAMA commends the FAA's collaboration with Amazon to collect the necessary noise data and perform a robust analysis of the various environmental impacts.

We encourage the FAA to work with industry in the development of documented and streamlined FAA NEPA procedures that will support future scaled commercial drone operations. The FAA's commitment to developing a programmatic approach to NEPA is a critical step toward advancing aviation technologies across the United States.

GAMA supports the FAA's activities and efforts to approve the amendments to Prime Air's OpSpecs to establish its package delivery operations. These operations will serve to prove the viability of drone delivery under real world conditions and showcase how commercial UAS operations may be maximized nationwide.

**52_Smith**

To whom it may concern,

I am a citizen from College Station that has various concerns about this program:

Our City government has delegated all the responsibility of regulating the drone operations to the FAA. I realize that the main guidelines have to come from this Agency, but I know each city can come up with ordinances to protect its citizens quality of life.

I am not against drones but just as airports have certain parameters and guidelines for placement, the drone launch pad locations should meet some criteria as well. This Prime Air launch pad is located very near a church, a pre-school and residential neighborhoods. They will be launching drones heavily from our neighborhood destroying and disturbing our quality of life.

I am also very worried about a potential disaster happening if a drone hits a power line. Again, as these drones will fly at lower altitudes the possibility of this happening is always there. Since this pad I so close to our neighborhood, imagine the danger this represents.

For now, Amazon claims there will not be any surveillance cameras, however if this changes, this MUST be informed to the public in a way that everyone is aware of this change.

The impact this will have on wild life.

**53_Anonymous**

To Whom It May Concern:

Until Unmanned Drone regulations are developed and enforced; we respectfully request that the Amazon Experimental Prime Air Drones fly above existing College Station streets and driveways. Below are several reasons why we make this request.

Unmanned Drones Will Affect the College Station Natural Environment – Probably in A Harmful Way

These Unmanned Drones will be flying at 160' high, the same height as many bird species. During the City of College Station Planning & Zoning and City Council Hearings, all affected College Station Homeowner and Neighborhood Associations were told that the Unmanned Drones would be flying at 500' high. All affected neighborhoods had no opportunity to provide opposition until the FAA included flight altitude in the Draft EA Document.

Sandstone Neighborhood is an early 1980's subdivision that was planned and designed for single family homes on 2-4 acres. Sandstone Neighborhood with its no curbs and no sidewalk streets, was specifically planned to also be the home of Brazos Valley Wildlife and Native Plants.

Sandstone is home to over 200 native animals – most of them are birds. If these large (7' Diameter) Unmanned Drones are permitted to fly over Sandstone, these birds will be forced to share their air space and expose their native tree and shrub habitats.

Endangered plants and animal species including the Navasota Ladies Tresses are in the Sandstone, Emerald Forest, Woodcreek, and all affected neighborhoods.

Unmanned Drones Will Not Be Individually Watched or Regulated in College Station

Once the FAA approves the Amazon Drone EA application, individual drone delivery flights will not be manned in person or remotely.

Other Texas Cities have created drone regulations for use in their cities. The City of College Station has not researched or developed any such policies yet.

These Unmanned Drones will be sharing air space with two Hospital Heliports – not just one. Both Baylor Scott & White and St. Joseph's Hospital at 1600 Rock Prairie Road have heliports within a 5- mile radius of the PADCC.

Unmanned Drones Will Cause Fires And Explosions Upon Crashing

Lithium-Ion Battery fires – The Unmanned Drones will use Lithium-Ion batteries which can and will cause fire explosions when and if the Unmanned Drones collide with the ground or other objects.

Do we need to increase our Homeowner Liability Insurance?

Unmanned Drones Will Fly Over Large Outdoor, Neighborhood and Backyard Gatherings with More Than 50 people

Can individual homeowners and/or neighborhoods apply for Special Event EAUs?

We respectfully request that our name, address and personal information be withheld from Public Review.

**54_CDA**

Please find the attached comment from the Commercial Drone Alliance for the Amazon Prime Air College Station Draft EA.

October 14, 2022

Re: Notice of Availability, Notice of Public Comment Period, and Request for Comment on the Draft Environmental Assessment for Amazon Prime Air's Drone Package Delivery Operations in College Station, Texas

To Whom it May Concern:

The Commercial Drone Alliance ("CDA")1 appreciates the opportunity to submit comments on the Federal Aviation Administration's ("FAA") "Notice of Availability, Notice of Public Comment Period, and Request for Comment on the Draft Environmental Assessment for Amazon Prime Air's Drone Package Delivery Operations in College Station, Texas" (hereafter the "Draft EA"). For the reasons set forth below, the CDA strongly supports the FAA's efforts to authorize uncrewed aircraft systems ("UAS") commercial package delivery operations by Amazon Prime Air ("Prime Air") from the Prime Air Drone Delivery Center ("PADDC") in College Station, Texas. FAA's approval of Prime Air's UAS operations supports the federal government's ongoing efforts to implement its congressional mandate to fully integrate UAS into the National Airspace System ("NAS"). FAA approval of Prime Air's proposed operations will help normalize safe, scalable, economically viable, and environmentally advantageous commercial UAS package delivery operations in the United States.

The CDA recognizes that environmental review is a critical piece of the regulatory framework enabling UAS package delivery operations to scale commercially in the U.S. The CDA supports the FAA's efforts to approve the amendment of Prime Air's air carrier Operations Specifications ("OpSpecs") to allow expanded operations from the PADDC in College Station, TX. Existing commercial drone deployments have already demonstrated a net positive impact on the environment—including reductions in overall noise levels

1 The CDA is an independent non-profit organization led by key leaders in the commercial drone industry. The CDA has actively participated in rulemakings and policy efforts to facilitate the safe and secure development and expansion of commercial drone operations. The CDA works with all levels of government to collaborate on policies for industry growth and seeks to educate the public on the safe and responsible use of commercial drones to achieve economic benefits and humanitarian gains. We bring together commercial drone end-users, manufacturers, service providers, advanced air mobility companies, drone security companies, and vertical markets including oil and gas, precision agriculture, construction, security, communications technology, infrastructure, newsgathering, filmmaking, and

more. Learn more at https://www.commercialdronealliance.org/. and CO2 greenhouse gas emissions. For example, a September 2020 economic report published by the Virginia Tech Office of Economic Development found that enabling drone delivery in a single metropolitan area could avoid up to 294 million miles per year in road use and up to 580 car crashes per year, equivalent to taking 25,000 cars off the road or planting 46,000 acres per year of new forest, reducing carbon emissions by up to 113,900 tons per year. 2 And UAS play an increasingly important role in reducing global greenhouse gas emissions associated with infrastructure construction and sustainment. 3 In its Draft EA, the FAA has evaluated potential impacts that may result from the proposed action including: Department of Transportation Act, Section 4(f) resources, environmental impacts, the range of alternatives, noise and noise compatible land use, socioeconomics, environmental justice, health and safety risks, cultural resources, among others. We agree with the FAA's conclusions that Prime Air's proposed operations will not have a significant environmental consequence, particularly for noise analysis and exposure. According to the Draft EA, none of the environmental effects meet the FAA's significance thresholds (where established) or raise significant adverse impacts. CDA encourages the FAA to determine that Prime Air's operations will not significantly affect the quality of the human environment (individually or cumulatively) and issue a Finding of No Significant Impact.

Prime Air continuously demonstrates its commitment to safety and community engagement, which are critical to the success of commercial drone delivery operations. The CDA supports Prime Air's efforts as leading drone technology company to continually innovate their drone technology and approach to operations to minimize community noise.

By enabling operations such as those proposed by Prime Air, the FAA is taking important steps to support the UAS industry's viability and enable safe, efficient and environmentally friendly commercial UAS operations that will benefit the American public.

2 Virginia Tech Office of Economic Development, "Measuring the Effects of Drone Delivery in the United States," (September 2020), available at https://vtechworks.lib.vt.edu/bitstream/handle/10919/100104/Effects%20of%20Drone%20Delivery%20US_Septe mber%202020.pdf?sequence=1&isAllowed=y.

3 World Bank, "Low-Carbon Infrastructure, Private Participation in Infrastructure (PPI) 2002 to H1 2017" (2018) ("Approximately 70 percent of global greenhouse-gas emissions emanate from infrastructure construction and operations such as power plants, buildings and transportation systems."). See also Groves, Brendan, "How Drones Can Unlock Greener Infrastructure Inspection," World Economic Forum (Aug. 10, 2021), available at https://www.weforum.org/agenda/2021/08/how-drones-unlock-greener-infrastructure-inspection/.

**55_McCullough**

The City of College Station claims only the FAA can protect us (other than limited City noise regulations) so we, of this neighborhood, need the FAA to include written protections for this experiment, including time limits. Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements:

1. Amazon Prime Air (APA) mus hold a free public four-drone show before approval of this drone service. 2. Limit this experiment to a maximum trial period of three months. 3. Require an independent sudy, paid for by Amazon Prime Air (APA), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community. 4. Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day. 5. Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment. 6. Require written safeguards ensuring the protection of resident privacy and security and limit the recording and sorage of this data. 7. Require written policies and procedures to be followed by APA in the event of fyaways, crashes, or uncontrolled descents, including those on private property. 8. Require creation of a website with detailed information about this tes program, policies and procedures and real-time posings of accidents and fyaways, incident reports by APA, complaints and issues of residents, and independent measurements of noise and vibration. 9. Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act). 10. Give our community, in writing, the ability to terminate this drone service. 11. At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this APA drone service.

**56_Allen**

By way of introduction, My name is. My wife and I have been homeowners in College Station since 1978. We built our current home here in 1998 and live in the operating area and adjacent to the Amazon Prime Air Drone Delivery Center site. I am president of our homeowner's association. College Station is a beautiful, dynamic city, popular destination for new, innovative R&D industry and home of one of the finest university systems in the world. It's easy to see why a commercial enterprise like Amazon would want to locate here. Our experience thus far, however, indicates that , as expected, Amazon's campaign for this new, innovative marketing and delivery system, has failed in efforts to acquire and consider the concerns of the residents that will be most effected by activities in the operating area. The following comments are submitted for consideration:

PADDC Location – PADDC is surrounded 180 degrees on the northeast by approximately eleven dense, well established, residential subdivisions. Homes in these areas are well maintained, single-family majority owner- occupied properties. Their position occupies an approximate 2 mile radius of the operating area to the northeast - an overflight area of two sectors of the operating area. Homes closest to the PADDC would still be impacted by the activities of all four drone launch/recovery operations.

Noise Exposure – Sound testing for the unique characteristics of drone noises barely scratched the surface. Numerous areas of noise testing and research were lacking. Data was collected for only one drone when simultaneous operation on the launch pad would be more the norm.

The noise levels for those neighbors closest to the launch pads could be an ongoing irritation daily. Also, considerable research exists supporting the premise that the irritation (and possible health issues) go beyond the normal comparison of decibel levels. As noted in EA 3.5.3, "UA noise generally has high acoustic frequency content, which can often be more discernable from other typical noise sources". The annoyance and irritation is significant.

Impact on Wildlife – Our residents have lived in concert with our forest friends for years. In addition to a significant Deer population, Brazos County is home to about 35 bird species. Our animals depend on their acute hearing as a survival tool. We have no way of assessing the damage or distress the high frequency presence of UAs will effect them. Our bird population has enjoyed the airspace above the rooftops as their safe space but now some will be threatened. The higher flying species (vultures, hawks and waterfowl) pose another problem. An inflight bird strike with a drone at the cruising altitude of 150-160 ft.

AGL with a heavier bird, resulting in a rooftop crash and fire, is not an unrealistic possibility.

Daily Launch/Flight/Recovery – There is no reason to believe that Amazon will not eventually meet its goal of 200 deliveries per operating day. One delivery, however, is two overflights or 400 a day. When viewed with the location surrounding the PADDC, it is conceivable that some homeowners closest to the site could be subjected to as many as 8-10 overflights per hour. Those residents closest to the launch and recovery location of the site would be subjected to the constant disturbance associated with all the 4-point activity. Each of the overflights carries with it the constant annoyance, disruption in daily activities, loss or diminishment of what was once serenity, peace and quiet in the privacy of your own home.

Amazon's Marketing Program - From the beginning of Amazon's campaign to bring their Prime Air drone delivery program to College Station, the strategy was apparent. Their slick marketing team had their presentations to the city staff and the City Council. Every question we had was answered quickly or with "we've got that covered"! The MK27 drone was never seen or heard until after the rezoning recommendation was made to the City Council and the council approved it. Although requests to see the drone were made earlier by interested homeowners, it didn't happen. Amazon then had a public welcome celebration and the drone, on a display dolly, appeared. (that's when the immense size of the MK27 was a shocker) A request to see and hear the drone fly after that still has not been granted. With all the speculation concerning drone noise being pushed aside by the Amazon team, the reason we have not heard the drone becomes clearer. The history of the Amazon movement of the drone for Amazon has been suspect at best.( Crashes, fire, poor citizen reports from the Australian venture, location change to Canada for drone tests to bypass

U.S. regulation delays) Amazon's transparency with the citizenry has been extremely disappointing. Much of what we're experiencing now could have been addressed if they had been more forthright in their dealings with us.

Amazon moves in a full speed forward dynamic to achieve their objectives – whatever it takes to move on! Now is our opportunity to slow it down and get it right – for the benefit of College Station and the folks who are the welcoming committee for Amazon Prime Air

Conclusion – It is requested that FAA defer approval of the environmental assessment until further study is undertaken to ensure the Amazon operation is a safe, well regulated benefit for the citizenry within the proposed operating area.

Note: I am a retired Marine aviator with 25 years experience, much of which in rotary wing flight, command and flight test and evaluation.

I've had nothing but the utmost respect for the FAA that has helped keep me safe and accident free for all those years.

**57_Gurganus**

Please do NOT approve the FAA Amazon Prime Air Drone Package Delivery Operations in College Station Draft Environmental Assessment (EA)
https://www.faa.gov/sites/faa.gov/files/EA_Amazon_Prime_Air_College_Station_TX.pdf

Our issues/complaints about the Draft EA:

Our City officials tell us only the FAA can control and regulate the air space and this drone program. We are relying on the FAA to protect us but approval of this Draft EA will turn our homes into airports/heliports and we will live under potentially thousands of new drone flight zones. This will negatively impact our bodies, reduce privacy, and make our homes less valuable.

We need a drone show BEFORE the FAA approves an EA. Chancellor John Sharp of Texas A&M, a strong proponent, should host this event on campus property. Let's see, hear, and feel what FOUR of these almost 100 pound drones are like taking off, flying, dropping off a package, returning, and landing.

We need a time limit for this experiment, preferably three months or less. With this Draft EA it appears only Amazon can shut this down. Our drone experience will likely be similar to Australian neighborhoods that had a six month drone test trial a few years ago: https://www.youtube.com/watch?v=8v5hCxBZTh0 Neighbors begged for it to be stopped early since: TOO NOISY, makes you angry, distressing, lots of birds left the area. In this video actual drone sounds start at 0:50 (first part is ad for service, no sound of drone). Their experiences underscore how critical it is that the FAA LIMITS the length of this study to protect our health and sanity.

We need a public website where problems, issues, and complaints can be posted in real-time by the public AND also by Amazon about drone collisions with wildlife, flyaways, etc. This website should include FAA incident reports and AP responses.

We need specific, posted, policies and procedures regarding drone crashes, especially those on private property. Retrieval is mentioned in this EA (Section 3.8.3) but will AP have the ability to retrieve from private property without owner consent? What happens when private property is damaged? Will AP pay without a lawsuit being filed? What insurance will AP carry? What if a pet bites the person retrieving the drone from private property?

One AP FAA incident report mentioned the "intense" lithium battery fire that consumed an Amazon drone and resulted in smoke and flames in under FIVE SECONDS, burned 25 acres in Oregon last year and MELTED the metal components of the drone. There have also been problems with CATTO propellers and the MK27 drone itself. How have these problems been addressed? From what elevation can the drone crash and NOT have the lithium battery catch fire? Several of the reported crashes occurred AFTER replacement parts were installed due to installation, part issues, or part being installed in wrong place. What FAA regulations, policies and procedures are in place to ensure this doesn't happen here?

How many drones and flammable lithium batteries will be stored at their drone airport? The EA does mention that in the event of a fire, CS Fire Department will be called.

A NASA study concluded drone noise is much more annoying than other noises and flying higher did NOT reduce level of annoyance. The NASA study found that drone decibel level is NOT a good indicator of the level of annoyance and irritation. Drones produce noise

that is qualitatively MORE annoying even at the same decibel level. Also, the drone noise seemed to come on more suddenly and loiter much longer. To not disturb and annoy residents drones must be significantly quieter than ground vehicles.

Acoustic engineer, Garth Paine, reports even domestic drones (which are much smaller and quieter) can raise baseline sound pressure levels by at least 20 decibels which means one single, small domestic drone can make an area eight to 12 times louder than it is now. It's not just loudness. Drone propellers move air very rapidly. The amount of energy put into moving the air equates to its volume or loudness. The speed of the spinning equates to its pitch, or frequency. Refinements to propeller shapes can change the pitch, but companies will only research noise reduction if the FAA or their customers demands it. Adding a payload to a drone means the propellers must put more energy into the air by spinning faster—making a louder and higher-pitched sound. The frequencies they generate are, in fact, the very frequencies people are most sensitive to. We need the FAA to implement regulations that will protect us from the noise, vibrations, and other frequencies generated by drones. Amazon's drones are much larger, heavier & noisier than the irritating domestic drones. We need a drone show & adequate FAA regulations and restrictions in place BEFORE this AP drone delivery program is approved.

Decibel level projections (3.2.3 (page 20); Section 3.5; and a Noise Analysis Report 1/2 way through the EA in Appendix C) based on a very short test period (4/1-4/16, 2022) done in Pendleton, Oregon using four microphones and very few actual test flights during which time they 'did NOT capture the majority of transition noise'; 'transition noise not fully captured'. This analysis states 'for simplicity only one launching pad is assumed to be used at a time' (3.2). Does AP plan to launch or allow the arrival of only one drone at a time? If not, how will dB levels increase when two, three or four drones are arriving or taking off at a time? Will they slow their speed (impacting those of us in the flight zone even more) in order to stagger their arrivals and departures and/or will drones remain in a holding pattern in the sky above the airport/heliport or

elsewhere? To get the delivery drop off to 58 seconds the delivery descent and ascent speed changes were excluded, but these will actually keep the drone overhead for longer (3.3.4) possibly another 40 seconds of noise exposure, changing the actual delivery time to more like 98 seconds? There is 'no standard approved noise model for UA' (Appendix D). The analysis uses a 'customized noise exposure prediction process'. I recommend the FAA instead use actual dB data collection in College Station with four drones (vs one drone). It is important to take and report PEAK readings in addition to averages. PEAK readings matter more for health and harm. Just like with driving, average speed isn't important, peak is what gets the ticket. The FAA should require AP to pay for ACTUAL dB readings (PEAK and average) and data collection, including resident complaints, to determine the actual impact to our community.

UA (drone) noise has a 'high acoustic frequency content' (3.5.3, page 30). dB is NOT a good indicator of how annoying drone noise is, especially for those of us trapped in our homes due to disability, illness,

lack of money or other resources to escape. Should the desires and values of AP and AP drone delivery customers trump those of existing residents? If this draft EA is approved and the noise, vibration, safety risk, etc., is too high this draft EA gives us no remedies.

Why no mention of the impact on those covered by the ADA (Americans with Disabilities Act)? Does the ADA offer any additional protections?

What are the vibratory impacts of these drones? We need measurements BEFORE approval.

Amazon projects 52,000 annual deliveries in our area (Appendix D), 104,000 departures and arrivals at this drone airport/heliport (PADDC) EVERY YEAR. 142.47 average deliveries per day, 285 departures and arrivals per day. Page 31, Figure 4, DNL

Noise Exposure at College Station PADDC Location. This map shows numerous homes and several businesses that, if this EA is approved, will soon experience 45 dB to over 50 dB of noise with just ONE drone taking off or arriving. Acoustic experts report that drone noise is much more annoying than other vehicular noise. How will this impact those living and working at or near this new drone airport/heliport (PADDC)?

The analysis estimates a given single delivery location could have 0.1 to 4.0 deliveries per day (page 31). They are paying customers (one reported receiving two

$50 credits) to sign up. AP could further incentivize customers to allow for even more deliveries, especially if they aren't getting enough customers to participate. There needs to be a limit on the number of deliveries made to a single location and a given area each day. Without additional protections this EA grants AP the ability to turn ALL of our homes into airport/heliport zones in perpetuity.

The minimum measured distance from the UA (drone) for which noise measurement data was available is 32.8 feet (page 32). It is likely that some unfortunates will unintentionally get a lot closer than that, especially since these drones will be delivering to front yards too, and the drones won't actually retreat until within 16.4 feet. We need additional safeguards to protect residents and visitors.

The draft EA gives AP the ability to change the sector boundaries over time. This will increase the negative impacts in some areas and residents deserve input on this.

No mention is made of the cameras, recording devices, transmitters, sensors, etc., on the drones - what safeguards do we have that our privacy is being respected? AP mentions proprietary information being withheld. We should have the right to know what these drones and support technology are capable of seeing, recording, transmitting, and storing/saving before this EA is approved. We need privacy safeguards written into the EA.

This drone airport/heliport (PADDC) is extremely close to State Highway 6 (<6>) (approximately 0.33 miles to the west per 1.2.1). The <6> cuts right through the center of the drone delivery target zone. Large trucks and other vehicles often speed along at 75-80 miles an hour. Will accidents, especially initially and/or in bad weather, be caused by drivers distracted by these UFOs?

**58_Charron**

The City claims only the FAA can protect us (other than limited City noise regulations) so we need the FAA to include written protections for this experiment, including time limits. Before the FAA approves this drone experiment, please ensure the FAA adds the following written requirements: 1. Amazon Prime Air (AP) must hold a free public four-drone show before approval of this drone service. 2. Limit this experiment to a maximum trial period of three months. 3. Require an independent study, paid for by Amazon Prime Air (AP), taken during the trial period of ACTUAL PEAK decibel (dB) readings, at various phases of the drone journeys, speeds, elevations, etc. Also, collect and disclose resident complaints and experiences to determine the actual impact to our community. 4. Limit daily deliveries: to individual homes to a maximum of two per day and to any block of homes to four per day.

5. Require disclosure of all cameras, sensors, transmitting and recording devices that are on either their drones or auxiliary equipment. 6. Require written safeguards ensuring the protection of resident privacy and security and limit the recording and storage of this data.

7. Require written policies and procedures to be followed by AP in the event of flyaways, crashes, or uncontrolled descents, including those on private property. 8. Require creation of a website with detailed information about this test program, policies and procedures and real-time postings of accidents and flyaways, incident reports by AP, complaints and issues of residents, and independent measurements of noise and vibration. 9. Require an analysis of impacts on children, seniors, and those covered by the ADA (Americans with Disabilities Act). 10. Give our community, in writing, the ability to terminate this drone service. 11. At the end of the trial period, hold a public hearing in our community and seriously consider the experience and complaints of our community before considering the continuation of this AP drone service.

**59_Bullock**

Let me first start by saying that I'm extremely excited by Amazon's drone delivery being launched in BCS. It is something that I've been anticipating coming out for a long time; imagine my excitement when I found out that it was coming to my own city of College Station.

I have mixed feelings about Amazon as a corporation, but I believe this is the future of small- package delivery. Please grant them and other such companies the licenses needed to do this kind of business.

# Appendix H

## Acronyms and Abbreviations

**Appendix H: Acronyms and Abbreviations**

ACS - American Community Survey

AEDT - Aviation Environmental Design Tool

AGL - Above Ground Level

APE - Area of Potential Effects

BCC - Birds of Conservation Concern

BVLOS - Beyond Visual Line of Sight

CEQ - Council on Environmental Quality

CFR - Code of Federal Regulations

COA - Certificate of Waiver or Authorization

CZMP - Coastal Zone Management Plan

CWA - Clean Water Act

dB - Decibel

DNL - Day-Night Average Sound Level

DOT - Department of Transportation

EA - Environmental Assessment

EJSCREEN - Environmental Justice Screening and Mapping Tool

EO - Executive Order

EPA - Environmental Protection Agency

ESA - Endangered Species Act

FAA - Federal Aviation Administration

FEMA - Federal Emergency Management Agency

FHWA - Federal Highway Administration

FONSI - Finding of No Significant Impact

IPaC - Information for Planning and Consultation

NAS - National Airspace System

NEPA - National Environmental Policy Act

NHPA - National Historic Preservation Act

NMFS - National Marine Fisheries Service

NOA - Notice of Availability

NOAA - National Oceanic and Atmospheric Administration

NPDES - National Pollutant Discharge Elimination System

NRHP - National Register of Historic Places

NRI - Nationwide Rivers Inventory

NTSB - National Transportation Safety Board

OpSpecs - Operations Specifications

PADDC - Prime Air Drone Delivery Center

Prime Air - Amazon Prime Air

PSP - Partnership for Safety Program

ROD - Record of Decision

SE - Listed as Endangered by the State of Texas

ST - Listed as Threatened by the State of Texas

SR - Listed as Rare by the State of Texas

SHPO - State Historic Preservation Office(r)

THPO - Tribal Historic Preservation Office(r)

TCEQ - Texas Commission on Environmental Quality

U.S.C - United States Code

UA - Unmanned Aircraft

UAS - Unmanned Aircraft Systems

USFWS - United States Fish and Wildlife Service

VOs - Visual Observers

WSRS - National Wild and Scenic Rivers System