

Appendix I.
Responses to Public Comments

1. Introduction

The Federal Aviation Administration (FAA) is evaluating Space Exploration Technologies Corporation’s (SpaceX) proposal to operate its Starship/Super Heavy launch vehicle at its existing Boca Chica Launch Site in Cameron County, Texas. SpaceX’s proposed operations include launches originating from this site, as well as landings at this site, in the Gulf of Mexico, or in the Pacific Ocean off the coast of Kauai, Hawaii. SpaceX must obtain an experimental permit and/or a vehicle operator license from the FAA for Starship/Super Heavy launch operations. Issuing an experimental permit or a vehicle operator license is considered a major federal action under the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321, et seq.), and the Council on Environmental Quality (CEQ) NEPA-implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508 [2020]) and requires an environmental review. The FAA evaluated the potential environmental impacts of the activities associated with SpaceX’s Starship/Super Heavy program in the September 2021 *Draft Programmatic Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas* (PEA).

In accordance with CEQ’s NEPA-implementing regulations and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, the FAA released the draft PEA for a 30-day public review on September 17, 2021. The FAA sent an email announcing the availability of the draft PEA on the FAA’s project website, notice of a public comment period and request for comments, and notice of two virtual public hearings. After receiving requests for an extension, the FAA extended the public review period to 45 days. The 45-day public comment period ended on November 1, 2021. The FAA received approximately 17,000 public comment submissions.

In addition to posting the draft PEA, the FAA posted a summary of the draft PEA in both English and Spanish on the FAA’s project website. The draft PEA and summary were also available in three public buildings in Brownsville, Texas, which were chosen after the FAA consulted with Cameron County, Texas officials. The FAA also held two virtual public hearings on October 18, 2021, and October 20, 2021. Notice of all this information appeared on FAA’s website and FAA social media pages.

The FAA posted all comments received on the draft PEA on FAA’s project website: <https://www.faa.gov/spacexstarship/starshipsuperheavy/comments-draft-programmatic-environmental-assessment-pea-spacex>. The comments are posted in PDF format and include 25 volumes (PDFs) of comments. The website includes a table listing the commenter’s name and the PDF volume in which the comment is located. In response to public comments, the FAA revised the draft PEA, as appropriate, and prepared a final PEA. The FAA reviewed all comments received on the draft PEA; the final PEA reflects the FAA’s consideration of comments.

2. Responses to Comments

This section provides a summary of comments received, by topic, during the public comment period for the draft PEA and the FAA’s responses to those comments.

A. General Comments

The majority of the public comments submitted during the public comment period were non-substantive comments (i.e., comments that expressed a non-substantive personal preference or opinion not tied to a

specific topic) or non-germane comments (i.e., comments outside the scope of the Proposed Action). The FAA acknowledges all comments received and thanks the commenters for their input.

B. Role of the Federal Aviation Administration

The FAA received comments regarding the FAA's regulatory authority over the activities described in the draft PEA. Some commenters questioned the FAA's ability to authorize closures/access restrictions (e.g., temporarily restricting access to Boca Chica Beach). Commenters questioned the level of supervision the FAA is currently providing over SpaceX's actions in the Boca Chica area regarding reports of environmental and social damages.

Comment Response

As stated in PEA Section 1.2.1, the Commercial Space Launch Act of 1984, as amended and codified at 51 U.S.C. §§ 50901–50923, authorizes the Secretary of Transportation to oversee, license, and regulate commercial launch and reentry activities, and the operation of launch and reentry sites within the United States or as carried out by U.S. citizens. Section 50905 directs the Secretary to exercise this responsibility consistent with public health and safety, safety of property, and the national security and foreign policy interests of the United States. In addition, Section 50903 requires the Secretary to encourage, facilitate, and promote commercial space launches and reentries by the private sector. As codified at 49 CFR § 1.83(b), the Secretary has delegated authority to carry out these functions to the FAA Administrator.

The regulatory requirements pertaining to commercial launches and individual launch operators are described in 14 CFR Chapter III, Parts 400–460. In October 2020, the FAA issued a new streamlined launch and reentry rule that replaced prescriptive requirements with performance-based criteria. Four separate regulations, Parts 415, 417, 431, and 435, were combined into a single performance-based Part 450 rule to better accommodate the evolving commercial space transportation industry. It allows an applicant to use a means of compliance identified by the FAA or propose alternate means of compliance that meet the safety standards of the regulation.

The FAA exercises regulatory oversight of pre-flight activities that constitute preparing a launch vehicle for flight. Therefore, SpaceX's unlicensed production and manufacturing activities in the Boca Chica area does not require FAA oversight or authorization. These activities, however, are included as part of the existing conditions (or baseline) described in the PEA Chapter 3.

The FAA must conduct an environmental review in compliance with NEPA, CEQ's NEPA-implementing regulations, and FAA's NEPA-implementing Order 1050.1F prior to making a decision (in this case, issuing or denying a license or permit). The FAA is responsible for analyzing the potential environmental consequences of the Proposed Action. SpaceX's proposed annual launch operations include suborbital launches and/or orbital launches. SpaceX's proposal also includes launch-related activities and infrastructure at the Boca Chica Launch Site, including tank tests, static fire engine tests, expansion of the Vertical Launch Area (VLA) and solar farm, and construction of additional infrastructure. SpaceX's proposed Starship/Super Heavy operations and associated construction identified in PEA Chapter 2 would require several environmental and regulatory permits and approvals in addition to the FAA's license or permit (see final PEA Section 1.5).

The FAA is also responsible for creating airspace closure areas in accordance with FAA Order 7400.2M, *Procedures for Handling Airspace Matters*, to ensure public safety.

As described in PEA Section 2.1.3.5, the FAA does not have a role in approving road and beach access restrictions. Rather, SpaceX is responsible for publicizing, surveying, controlling, and evacuating each flight hazard area, which includes areas of land. See 14 § CFR 450.161. Cameron County agreed to help SpaceX protect public safety by evacuating people from safety zones and closing public access during SpaceX's activities, including both those that are licensed and unlicensed. See 14 CFR § 450.147(a). Cameron County has the discretion to exercise its power to evacuate and close off areas when it is necessary to protect the health and safety of the public. The Texas Natural Resources Code Section 61.132 permits the Texas General Land Office (TGLO) and Cameron County to enter into a Memorandum of Agreement (MOA) under the terms of which Boca Chica Beach may be closed temporarily for space launches. Under the authority granted in the 2013 MOA, Cameron County would coordinate access restrictions with SpaceX (TGLO 2013).¹ The MOA between Cameron County and TGLO delineates the circumstances under which the County is authorized to close the beach and beach access points for the limited purpose of protecting public health and safety during spaceflight activities.

C. Level of Environmental Review

Several commenters requested that an Environmental Impact Statement (EIS), rather than an EA, be prepared due to the size and complexity of the operation and to address cumulative impacts. Commenters expressed concerns about the substantial differences between SpaceX's proposed scope of construction described in the draft PEA compared to that described in the FAA's 2014 EIS prepared for SpaceX's proposed Falcon launch operations at the launch site. Commenters raised concerns over the PEA's Proposed Action having greater impacts than the Falcon vehicles analyzed in the 2014 EIS, stating that the impact analysis in the 2014 EIS is now out of date. Commenters also raised challenges and uncertainties with not having established significance thresholds for multiple resources being reviewed in the PEA.

Comment Response

The Proposed Action analyzed in the PEA is a separate, independent action than the action analyzed in the 2014 EIS.² The 2014 EIS analyzed the environmental consequences of issuing SpaceX licenses and/or experimental permits for Falcon 9 and Falcon Heavy launch operations, as well as operation of reusable suborbital launch vehicles, from a new launch site in Cameron County, Texas (i.e., the Boca Chica Launch Site). The analysis in the 2014 EIS also analyzed the potential impacts from initial construction of infrastructure and operation of the launch site.

Subsequent to publishing the 2014 EIS and Record of Decision, the FAA prepared Written Re-evaluations (WRs) to determine if the contents of the 2014 EIS remain valid as the Boca Chica Launch Site (and the operations thereon) changed. Per Paragraph 9-2 of FAA Order 1050.1F, a WR is a document used to determine whether the contents of a previously prepared environmental document (i.e., a draft or final EA or EIS) remain valid or a new or supplemental environmental document is required. The FAA posted

¹ SpaceX and Cameron County are updating its coordination agreement based on the Starship/Super Heavy.

² See: https://www.faa.gov/space/environmental/nepa_docs/spacex_texas_eis/.

the WRs on the FAA’s project website.³ Some of the WRs included an analysis of the Starship experimental test program. Each WR concluded that: 1) SpaceX’s modifications conformed to the prior environmental documentation; 2) the data contained in prior environmental documentation remained substantially valid; 3) there were no significant environmental changes; and 4) all pertinent conditions and requirements of the prior approvals were met or would be met in the current action at the time.

After reviewing a description of SpaceX’s current Starship/Super Heavy proposal, the FAA determined that SpaceX’s proposed launch operations and associated construction fell outside the scope of the 2014 EIS, and therefore, a new NEPA document was needed. SpaceX no longer plans to conduct launches of its Falcon launch vehicles at the launch site. As described in the PEA, over the past six years, SpaceX has constructed launch facilities, including a control center and VLA. In 2019, SpaceX developed the Starship technology as part of the reusable suborbital launch vehicle classification analyzed in the 2014 EIS. SpaceX is currently testing Starship prototypes under an existing license at the launch site as part of its Starship experimental test program. This involves static fire engine tests and a series of suborbital launches from just a few inches above ground level to up to 30 kilometers (18 miles) above ground level. To support the test operations, SpaceX developed additional infrastructure at the VLA.

SpaceX prepared the PEA under the supervision of the FAA in accordance with 40 CFR § 1506.5, and the FAA conducted an independent review of the PEA. The FAA believes that the PEA accurately describes the Proposed Action, defines the purpose and need, evaluates alternatives, and represents the potential effects associated with the Proposed Action. The PEA provides a detailed description of the potential environmental impacts that could occur under the Proposed Action. The appendices provide technical information that substantiates the analysis in the PEA.

Under the 2020 CEQ regulations,⁴ agencies are directed to consider *effects* or *impacts* that are reasonably foreseeable and have a reasonably close causal relationship to the Proposed Action or alternatives. They include effects that occur at the same time and place as the Proposed Action or alternatives and may include effects that are later in time or farther removed in distance from the Proposed Action or alternatives.⁵ The term “cumulative impacts,” as defined in the previous iteration of CEQ’s regulations, was eliminated. Rather, in an environmental assessment, agencies should consider effects in the context of the potentially affected environment (i.e., baseline conditions).⁶ Here, the FAA

³ Id.

⁴ Under 40 CFR § 1506.13, agencies do not have the discretion to apply the 1978 regulations to NEPA processes that began after September 14, 2020. The FAA initiated its NEPA process for this action on June 21, 2021 and applied the 2020 CEQ regulations.

⁵ Under the 2020 regulations, agencies continued to analyze direct and indirect effects without the requirement that such effects are categorized separately. See *Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act*, 85 Fed. Reg. 43,304, 43,343 (“‘[E]ffects that occur’ at the ‘same time and place’ . . . must nevertheless be reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives.”); see also *Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, Final Rule Response to Comments*, at 480 (“[A]gencies will continue to analyze indirect effects that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action, *but agencies will not have to categorize effects.*”) (emphasis added).

⁶ 40 CFR §1501.3(b)(1) (“In considering the potentially affected environment, agencies should consider, as appropriate to the specific action, the affected area (national, regional, or local) and its resources . . .”).

included the baseline conditions, including the local resources surrounding the Boca Chica Launch Site and existing facilities, in describing the affected environment.

FAA Order 1050.1F identifies thresholds that serve as specific indicators of significant impact for some of the FAA's environmental impact categories (FAA Order 1050.1F, Exhibit 4-1). CEQ determined these indicators to be sufficient for purposes of determining significance.⁷ For example, for biological resources, impacts would be significant if "[t]he U.S. Fish and Wildlife Service or the National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species, or would result in the destruction or adverse modification of federally designated critical habitat" (FAA Order 1050.1F, Exhibit 4-1). FAA actions that would result in impacts at or above these thresholds require the preparation of an EIS, unless impacts can be reduced below threshold levels. Quantitative significance thresholds do not exist for all impact categories; however, the FAA has identified factors that should be considered in evaluating the significance of potential environmental impacts (FAA Order 1050.1F, Paragraph 4-3.3 and Exhibit 4-1).

The PEA considers the significance thresholds, as well as the factors to consider, identified in FAA Order 1050.1F and additional guidance on these thresholds found in the FAA Order 1050.1F Desk Reference. As explained in the PEA, the Proposed Action, along with SpaceX's implementation of the mitigation measures identified throughout Chapter 3, is not expected to result in significant environmental impacts. As noted in the PEA, the FAA would ensure that SpaceX implements the mitigation and monitoring measures identified in Chapter 3. These mitigation measures will be a condition of any license or permit issued to SpaceX for Starship/Super Heavy launch operations at the Boca Chica Launch Site. SpaceX must implement these measures. Absent implementation of the mitigation measures, significant impacts related to some environmental impact categories would occur and an EIS would be required. Should this occur, the FAA may modify, suspend, or revoke SpaceX's license or permit for failing to comply with the terms and conditions of the license or permit. 14 CFR § 405.3(b).

As explained in the PEA, SpaceX will be required to implement mitigation measures to reduce impacts on visual effects, Section 4(f) resources, and wetlands to a less than significant level. The Proposed Action would not result in significant environmental impacts on air quality; climate; noise and noise-compatible land use; cultural resources; water resources (except wetlands); biological resources; coastal resources; land use; hazardous materials, solid waste, and pollution prevention; natural resources and energy supply; socioeconomics, environmental justice, and children's environmental health and safety risks. Nonetheless, measures to mitigate these impacts will also be required to avoid or minimize impacts.

In summary, the final PEA provides sufficient evidence and analysis for determining whether to prepare an EIS or issue a finding of no significant impact. The PEA includes all actions connected to the FAA's federal action of issuing a license or permit to SpaceX for Starship/Super Heavy launch operations at the Boca Chica Launch Site. Based on the analysis in the final PEA, including the expected environmental consequences along with the mitigation and monitoring that SpaceX must implement, the FAA has determined that the Proposed Action would not result in significant impacts. The FAA made this determination based on FAA Order 1050.1F, which contains the FAA's significance thresholds and/or factors to consider when assessing the significance of potential impacts. SpaceX must implement all

⁷ See 40 CFR § 1507.3 (1978) (CEQ reviewed FAA Order 1050.1F prior to its issuance in 2015).

mitigation measures identified in the final PEA, which includes those measures associated with interagency consultations.

D. Proposed Action

Commenters questioned why the environmental assessment was a programmatic document. Commenters requested that the PEA provide more information about construction activities associated with the proposed infrastructure, including the power plant, natural gas pretreatment system, liquefier, and desalination plant. Commenters also requested that all of SpaceX's site plans referenced in the PEA be provided for review. Commenters questioned whether the project includes a gas pipeline. Commenters stated the FAA ignored interrelated actions, such as the Magic Valley Electric Cooperative's (MVEC) proposal to realign and upgrade a powerline from Brownsville to the Boca Chica area. Some commenters raised concerns about the duration of construction and segmenting activities associated with SpaceX's project. Commenters stated concerns about an increase of annual launches greater than the proposed five orbital and suborbital launches. Some commenters questioned the scope of the program covered in the PEA.

Comment Response

Programmatic NEPA documents may be prepared for broad federal actions, such as a proposed program, policy, plan, or suite of projects, which address actions occurring over large areas or systems and may include groupings of similar actions or repeating actions over longer periods of time than other NEPA reviews.⁸ The FAA has recognized that a programmatic review and tiering may be appropriate "to sequence environmental documents from the early stage of a proposed action to a subsequent stage to help focus on issues that are ripe for decision and exclude from consideration issues not yet ripe or already decided."⁹

The proposed Federal action is the issuance of a vehicle operator license to SpaceX for its Starship/Super Heavy launch vehicle program. The length of a vehicle operator license is five years. It is likely that during these five years, there may be aspects of the Starship/Super Heavy program that could change, including, but not limited to, launch/re-entry sites, frequency of operations, technical aspects of the vehicle, or more launch-related infrastructure. The FAA would conduct an environmental review of any changes to SpaceX's current proposal or new proposals when they are made. Such reviews may be tiered off the PEA, as appropriate, allowing the FAA to focus on assessing any changed aspects of the program rather than repeating previous analyses.¹⁰

⁸ Compare 40 CFR § 1501.11 (2022) with 40 CFR § 1502.20 (2020). CEQ clarified agency tiering practice in its 2020 amendments to the regulations implementing NEPA but kept its substantive content intact. Also, CEQ's December 2014 guidance, *Effective Use of Programmatic NEPA Reviews*, states "In the absence of certainty regarding the environmental consequences of future proposed actions, agencies may be able to make broad program decisions and establish parameters for subsequent analyses based on a programmatic review that adequately examines the reasonably foreseeable consequences of a proposed program, policy, plan, or suite of projects."

⁹ See Paragraph 3-2, FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

¹⁰ See 40 CFR § 1501.11(a) (2022) ("Agencies should tier their. . . environmental assessments when it would eliminate repetitive discussions of the same issues, focus on the actual issues ripe for decision, and exclude from consideration issues already decided or not yet ripe at each level of environmental review.").

Chapter 2 of the PEA describes the Proposed Action, including the number of annual launch operations as proposed by SpaceX. The Proposed Action does not include a gas pipeline. In response to public comments and other corporate decisions, SpaceX revisited and refined its proposed launch-related infrastructure elements tied to the Proposed Action. SpaceX is no longer proposing a desalination plant, natural gas pretreatment system, liquefier, or power plant. The desalination plant was included in the draft PEA because it would be used to facilitate deluge for the launch pad. SpaceX is still considering whether to use deluge water for the launch pad, but, in the event it will, it has decided that it will truck in water, as described in the PEA. SpaceX no longer needs the natural gas pretreatment system and liquefier due to advances in the design and capabilities of SpaceX's Raptor engines. Previously, additional refinement of methane to purer levels than commercially available was anticipated to be needed. However, as a result of engine advances, SpaceX can rely on commercially available methane without refinement. Accordingly, the natural gas pretreatment system and liquefier are no longer proposed. Because the desalination plant, natural gas pretreatment system, and liquefier are no longer proposed, SpaceX does not require a power plant, which had been proposed to power this infrastructure. SpaceX has also reduced the scope of projected launch operations (see Table 2-2 in the final PEA). The removal of this infrastructure and reducing the scope of operations reduces the anticipated effects of the Proposed Action as discussed in the draft PEA.

As stated in the PEA, construction activities connected to the Proposed Action are expected to occur over 24 months; however, construction activities are not anticipated to continuously occur throughout the duration of the 24 months.

As noted above, the FAA does not have oversight of SpaceX's production and manufacturing activities. These activities and associated development occur on private land, are privately funded, do not require any federal approval, and are planned to continue regardless of whether the FAA issues SpaceX licenses or permits for Starship/Super Heavy operations. For example, SpaceX can manufacture components for its vehicles from its Boca Chica facilities and send them to other locations for use. Accordingly, these anticipated activities have independent utility and are not included as part of the Proposed Action. However, these activities are considered part of the existing conditions (or baseline) described in the PEA Chapter 3.

SpaceX's license application and supporting documentation, including the operational plans noted in the PEA, cannot be provided for public review as it contains business confidential information. As part of interagency consultations, the FAA has shared SpaceX's launch site plans with the cooperating and participating agencies identified in the PEA. Relevant information from the plans and license application, as it pertains to potential environmental impacts, is disclosed in the PEA.

Actions taken by MVEC are not connected to the Proposed Action or the FAA's licensed activities. MVEC, a public utility, is the project owner of work to realign and upgrade existing power lines. Such a power line upgrade would serve a wider area and has independent utility. As stated in the U.S. Fish and Wildlife Service's (USFWS) final EA for MVEC's project (USFWS 2021),¹¹ the power line upgrade would service existing customers in the Boca Chica area. The Proposed Action does not depend on MVEC's power line upgrade, as demonstrated by the fact that SpaceX has been conducting launch operations under its

¹¹ USFWS. 2021. Final Environmental Assessment: Magic Valley Electric Cooperative Power Line Right-of-Way Permit and Special Use Permit along State Highway 4, Cameron County, Texas.

existing suborbital launch licenses for several years. The USFWS has evaluated the proposed power line upgrade and found that it will have no significant impacts and, in fact, will reduce impacts by removing portions of the existing line that cross National Wildlife Refuge (NWR) and other land and realigning these segments within the existing State Highway 4 (SH 4) right-of-way.

E. Alternatives

Commenters suggested that the PEA should analyze additional alternatives regarding the location of the Starship/Super Heavy testing and launch site. Suggestions included moving to a federal launch site (e.g., Cape Canaveral Space Force Station or Vandenberg Space Force Base), using a launch pad in the ocean, or moving to a less populated area. Commenters suggested that the PEA revisit the action alternative evaluation criteria. Commenters raised concerns regarding the FAA’s decision to defer the alternatives analysis to SpaceX. Commenters offered alternatives to beach and road closures (e.g., creating new service roads for SpaceX transport along SH 4, creating a tunnel, or developing new routes to the beach and/or new beach access points in order to maintain public access).

Comment Response

In this project, the Federal action is the issuance of a license or permit by the FAA to SpaceX. Under NEPA, the FAA must consider the purpose and need for the action¹² and from that, “study, develop, and describe appropriate alternatives to recommended courses of action.”¹³ Agencies may rely on many different factors to determine the purpose and need of an action. CEQ recently stated that this includes “the agency’s mission and the specifics of that agency decision, including statutory and regulatory requirements.”¹⁴

In this project, the determination of purpose and need and, in turn, alternatives, is influenced by the FAA’s interaction with the commercial space industry. Generally, the FAA’s interaction is two-fold: 1) encouraging, facilitating, and promoting commercial space activities and 2) regulating the safety of commercial space activities.¹⁵ The FAA’s authority with respect to SpaceX’s license application is further stated in PEA Section 1.2. In light of this authority and agency mission, the FAA has historically based the purpose and need of an action on the goals of the applicant because of the applicant’s role in the development of the United States commercial space industry. SpaceX’s goals are identified in the purpose and need statement (PEA Section 1.3).

“Reasonable alternatives” are those that meet the purpose and need of the action.¹⁶

SpaceX’s goal for the Starship/Super Heavy program is to test prototypes from its Boca Chica Launch Site and eventually launch full-scale Starship/Super Heavy launch vehicles to orbit and beyond. As described in PEA Section 2.3, which includes revised evaluation criteria for alternative sites, SpaceX evaluated its existing launch facilities in Florida and California and determined those facilities do not satisfy the criteria needed to meet SpaceX’s goals due to factors such as scheduling flexibility, utilization of existing

¹² 40 CFR § 1501.5(c)(2) (2022).

¹³ 42 U.S.C. § 4332(2)(E) (2020).

¹⁴ National Environmental Policy Act Implementing Regulations Revisions, 87 Fed. Reg. 23,453, 23 458 (Apr. 20, 2022).

¹⁵ 51 U.S.C. §§ 50903(b)–(c) (2020).

¹⁶ 40 CFR § 1508.1(z) (2022).

infrastructure, land ownership (and associated regulations), geographic diversity, trajectory, latitude, annual launch capacity, the ability to support the evolution of the Starship/Super Heavy program, access to propellants, and proximity to SpaceX's Starship/Super Heavy manufacturing and production facilities. SpaceX is unable to take Starship/Super Heavy operations offshore as SpaceX is still designing and evaluating the feasibility of a fixed offshore launch platform; therefore, technology and infrastructure needed to support an offshore launch site and operations are not available at this time. SpaceX has already invested in the Boca Chica Launch Site and is currently conducting test flights of Starship prototypes at this site. SpaceX's application, including public safety analyses, is based on conducting launch operations at the Boca Chica Launch Site.

Also, FAA Order 1050.1F states:

The alternatives discussed in an EA must include those that the approving official will consider. There is no requirement for a specific number of alternatives or a specific range of alternatives to be included in an EA. An EA may limit the range of alternatives to the proposed action and no action when there are no unresolved conflicts concerning alternative uses of available resources. Alternatives are to be considered to the degree commensurate with the nature of the proposed action and agency experience with the environmental issues involved. Generally, the greater the degree of impacts, the wider the range of alternatives that should be considered. The preferred alternative, if one has been identified, should be indicated. For alternatives considered but eliminated from further study, the EA should briefly explain why these were eliminated.

The FAA considered CEQ's NEPA-implementing regulations, FAA Order 1050.1F, and PEA Section 2.3, and determined that additional action alternatives are not necessary. PEA Section 2.3 documents examination of several alternatives and explains why they would not meet the purpose and need of the Proposed Action or otherwise be infeasible or unreasonable.

Finally, the FAA disagrees that the suggested alternatives to mitigate beach and road closures/access restrictions are necessary. Access to public land and beaches would be temporarily and intermittently limited. At all other times, public land and beaches would remain open. Mitigation measures that are being implemented to address impacts from road closures/access restrictions are identified in PEA Section 3.8.4.

F. Air Quality and Climate

Some commenters questioned the assumptions used in the air quality analysis. Commenters stated that rocket engine emissions adversely affect the ozone layer. Commenters stated that the draft PEA failed to analyze the climate impacts of SpaceX's emissions on the environment. Others stated that the analysis in the draft PEA was flawed, and that emissions for a singular entity should not be compared to the annual emissions of the entire country to determine the level of impact.

Commenters expressed concerns regarding climate change, requesting that climate mitigation measures (e.g., electrical generation from alternative fuels such as solar, wind, and wave energy and other practices to offset carbon dioxide [CO₂] emissions generated from launch activities) be included as part of the proposed project. Other commenters noted the impact of methane as a greenhouse gas. A

commenter suggested SpaceX should consider capturing all residual methane to decrease potential impacts on climate.

Comment Response

The analysis of potential air quality and climate impacts was conducted pursuant to FAA's NEPA-implementing policy, procedures, and guidance. The air emissions noted in the final PEA are less than the emissions noted in the draft PEA, because SpaceX has removed the desalination plant, natural gas pretreatment system, liquefier, and power plant from the project, as well as reduced the scope of launch operations (see Table 2-2 in the final PEA).

The Clean Air Act does not list rocket engine combustion emissions as ozone depleting substances; therefore, rocket engine combustion emissions are not subject to limitations on production or use in the United States. Rocket engine combustion is known to produce gases and particles that reduce stratospheric ozone concentrations locally and globally. Starship and Super Heavy do not emit particles, including soot and alumina, which are the main source for climate and ozone impacts. Starship and Super Heavy (which use only liquid methane [LCH₄] and liquid oxygen [LOX] as propellants) emit only gases into the stratosphere, including CO₂, water vapor, and nitrogen oxide. Gaseous emissions such as water vapor and CO₂ from rockets, even at increased launch rates, do not significantly affect the global climate or ozone layer and are dwarfed by atmospheric inputs from other sources.¹⁷ In any case, a maximum of five orbital launches per year would not cause a significant impact on the ozone layer or air quality, as further explained in the PEA.

Projected greenhouse gas (GHG) emissions, including methane emissions, are disclosed in PEA Table 3-3. As explained in the PEA, the projected emissions are not expected to result in significant climate-related impacts. Emissions resulting from any anomalies are not expected to change these figures. Anomalies are particularly unlikely to occur during ascent when the rocket contains a fuller fuel load. An anomaly that occurs during landing, after fuel has been expended, would involve little to no fuel releases beyond expected venting. Regardless of timing, any anomaly is not expected to result in GHG or other emissions that are substantially different than those disclosed and evaluated in the PEA. As explained above, SpaceX refined the Proposed Action's launch-related infrastructure elements, which will further reduce effects on climate and other resources, including by reducing methane and other GHG emissions.

SpaceX remains committed to exploring new technologies for reducing GHG emissions and recycling liquid methane as technology and design progress. However, none are feasible at this time.

G. Noise and Noise-Compatible Land Use

Commenters suggested the noise analysis in the draft PEA was flawed. Commenters mention that there have been noticeable increases in noise levels during testing, launching, and landing stages and expressed concern for damage to personal property (e.g., window breaking, house rattling) due to noise and vibrations. Other commenters warned that the sound levels would result in a shock wave/sonic boom causing significant impacts to humans. Commenters expressed concern that the Proposed Action would result in significant noise levels and would cause negative impacts to wildlife and residents in Mexico. Commenters said the PEA should discuss the noise impacts of operating some of the proposed

¹⁷ Ross, M.N., and D.W. Toohey. 2019. The Coming Surge of Rocket Emissions. Eos, September 24, 2019. Available: <https://eos.org/features/the-coming-surge-of-rocket-emissions>.

infrastructure (desalination plant, natural gas pretreatment system, liquefier, and power plant). Commenters offered alternatives to decreasing noise impacts, including a water deluge system and sound dampening barriers. One commenter requested additional information regarding the use of a portable sound detection and ranging (SODAR) device. Commenters said the PEA should discuss noise impacts from anomalies.

Comment Response

The analysis of potential noise and noise-compatible land use impacts was conducted pursuant to FAA's NEPA-implementing policy, procedures, and guidance. All processes used to calculate noise levels and assess noise impacts are current and have been reviewed and approved by the FAA. As explained in the PEA, the Proposed Action would result in short-term increases in sound levels. Structural damage on South Padre Island from sonic booms generated during Super Heavy landings at the launch site is expected to be rare with only minor impacts, such as glass breakage, if it does occur. As discussed in the PEA, the Proposed Action would not result in significant noise impacts.

The FAA assessed the significance of predicted noise impacts based on FAA Order 1050.1F, which states impacts would be significant if the action would increase noise by day-night average sound level (DNL) 1.5 decibels (dB) or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe. The FAA also assessed noise in the context of land use compatibility and human annoyance (see PEA Section 3.5). Noise impacts on wildlife are considered under the assessment of impacts on biological resources (biological resources and noise are two distinct environmental impact categories identified in FAA Order 1050.1F; see also the FAA's Order 1050.1F Desk Reference¹⁸ for more information). The final PEA evaluates the impact on wildlife from general operations (including operations of launch-related infrastructure), launches, landings, and static fire tests. As explained in the PEA, the Proposed Action would be expected to interrupt normal wildlife behavior periodically in the study area during launch operations, which would be up to a few minutes in duration. Because impacts from operations would be intermittent and of short duration, they are not expected to significantly affect wildlife. Refer to Section K, Biological Resources, below, as well as PEA Section 3.10.4 for more information.

Regarding potential sound-induced damage, as stated in the PEA Section 3.5.5, per FAA regulations and the Commercial Space Launch Act, SpaceX is required to carry insurance to cover claims by third parties that result from licensed activities, including any structural damage. The FAA requires that SpaceX carry insurance in the amount of the "Maximum Probable Loss," which is determined on a launch-by-launch basis by the FAA and is up to \$500,000,000 per launch. In the event that structural damage results from noise-induced vibrations or sonic booms, any such claims of damage would be subject to the insurance policy terms and process specified by the Commercial Space Launch Act and FAA regulations.

The FAA would ensure that SpaceX utilizes its notification plan to educate the public and announce when a launch or landing event would occur, as stated in PEA Section 3.5.5. Announcements of upcoming Starship/Super Heavy launches and landings would serve to warn people about these noise

¹⁸ See:

https://www.faa.gov/about/office_org/headquarters_offices/apl/enviro_nepa_order/desk_ref.

events and would likely help reduce human adverse reactions to these noise events. The plan would involve issuing statements to news outlets and law enforcement so that when noise is heard, the public would understand what has occurred. This approach is consistent with the public notification efforts conducted by SpaceX at Cape Canaveral Space Force Station and Vandenberg Space Force Base. While the overall impact of sonic booms would not be significant, SpaceX's advance public notice would help reduce human adverse reactions.

Regarding noise impacts from operation of infrastructure, as stated above, SpaceX is no longer proposing a desalination plant, natural gas pretreatment system, liquefier, or power plant. Refer to the response above under Section C, *Proposed Action*, for more information.

SpaceX is still considering whether to use a deluge water system used during launch for noise suppression. Noise from individual launch, landing, and static fire engine test events is expected to be heard by people in the surrounding communities, including Brownsville, Laguna Vista, Port Isabel, and South Padre Island, as well as portions of Mexico. These individual noise events are not expected to cause general annoyance or pose health concerns due to the sound levels and expected frequency of events, though noise complaints may occur. Cumulative noise in these surrounding communities, whether from multiple events of a single operation type or from all these individual events combined, is estimated to be below levels associated with adverse noise exposure.

As stated in the PEA, SpaceX plans to use a SODAR device to collect weather data needed for launch and landing. The SODAR sends out a short sonic pulse every 15 minutes that can reach 92 dB at the source and dissipates to 60 dB within 100 feet. The SODAR would be located on SpaceX property in the production and manufacturing area, north of the solar farm.

H. Visual Effects

Commenters expressed concerns about adverse visual effects from the current amount of lighting that SpaceX is emitting and associated night-time light pollution.

Comment Response

As described in the PEA, all of SpaceX's lighting at the VLA would comply with SpaceX's Lighting Management Plan, which is being developed in collaboration with the National Park Service (NPS), USFWS, Texas Parks and Wildlife Department (TPWD), and Texas Historical Commission. Design of the proposed expansion of the VLA is ongoing, including final design of lighting features related to launch-related infrastructure, which may be subject to further environmental review by the FAA. SpaceX's Lighting Management Plan includes measures that are intended to reduce nighttime lighting impacts in the surrounding areas and minimize sky glow. As documented in the PEA, the FAA would ensure that SpaceX implements measures to minimize visual effects (see PEA Section 3.6.5 for the list of measures).

I. Cultural Resources

Commenters expressed a need for safeguarding historic sites from vibration impacts. Commenters expressed concerns regarding the field survey methods of the cultural survey; specifically, commenters expressed that metal detectors are not sufficient to capture prehistoric deposits and this methodology would limit the number of historic artifacts identified. Commenters raised concerns regarding lack of minimization and mitigation of potential negative effects on 13 local historic resources, including

national battlefields and local cemeteries. Commenters suggested the Cultural Resources Survey should evaluate several additional historic-age properties eligible for listing in the NRHP. Other commenters expressed concerns regarding a lack of coordination with the Carrizo Comecrudo Tribe of Texas.

Comment Response

As explained in PEA Section 3.7, the FAA conducted consultation with the Texas State Historic Preservation Officer (SHPO) and other consulting parties in accordance with Section 106 of the National Historic Preservation Act to resolve adverse effects to historic properties. In accordance with 36 CFR § 800.4(a)(1), the FAA, in consultation with the SHPO, determined an Area of Potential Effects (APE) in consideration of the undertaking's potential effects on cultural resources. In defining the APE, the FAA considered the potential visual, auditory, and vibrational effects on historic properties from launches and daily operations, including engine noise and sonic booms, potential direct effects from ground-disturbing activities from potential anomalies and construction, increased traffic and visitors, and temporary access restrictions for launch operation or anomalies. Within the APE, the FAA, in consultation with the SHPO, identified an archeological resources study area for the ground-disturbing activities, including construction activities and potential launch anomalies.

As described in the PEA, extensive archaeological surveys have previously been conducted within the study area. On behalf of SpaceX, SEARCH conducted an inventory of previously recorded sites within the archaeological resources study area for the current undertaking by searching the Texas Historic Sites and Texas Archaeological Sites databases. SEARCH also conducted archaeological surveys that consisted of a combination of intensive pedestrian survey, systematic shovel testing, deep testing, metal detection, and magnetometer survey. SEARCH performed a shovel probe and auger survey on landforms characterized as having high to moderate sensitivity for containing buried archaeological resources. High sensitivity areas were defined as being Mesa del Gavilan and Boca Chica Beach; moderate sensitivity areas were defined as being the margins of Boca Chica Inlet. Finally, SEARCH conducted a remote-sensing survey along the beachfront areas of the archeological study area using a near-shore magnetometer. The SHPO concurred with the FAA's identification and evaluation of historic properties.

As part of the Section 106 consultation process, SpaceX prepared an Unanticipated Discoveries Plan. SpaceX would follow this plan if cultural resources were identified during construction, including protocols for notifying and consulting with tribes in the event of a discovery of human remains and/or funerary objects.

The FAA, Texas SHPO, NPS, Advisory Council on Historic Preservation, SpaceX, USFWS, and TPWD executed a Section 106 Programmatic Agreement (PA) (see PEA Appendix C). The FAA's undertaking will be implemented in accordance with the PA's stipulations in order to take into account for and resolve the adverse effects of the undertaking on historic properties. In accordance with the PA, SpaceX is required to conduct vibration monitoring to determine if vibrations from launch operations are affecting historic properties.

The FAA respects the ancestral ties of the Esto'k Gna, commonly referred to as the Carrizo/Comecrudo, to the immediate region of the Lower Rio Grande Valley. The FAA has invited the Carrizo/Comecrudo to participate in the Section 106 consultation process. The FAA has not received a response from the tribe.

J. Department of Transportation Act, Section 4(f)

Commenters expressed concern regarding potential impacts on recreational activities within the nearby Lower Rio Grande Valley NWR, Texas state parks, and the South Bay Coastal Preserve, which are considered Section 4(f) properties protected by Section 4(f) of the Department of Transportation Act. Commenters also expressed concerns regarding the protection of the NWR, stating that falling debris from launch failures, potentially harmful substances, and elevated noise levels could negatively impact biological resources and the soundscape; these commenters requested assurances that protective measures would be implemented. Some commenters suggested SpaceX commit to land acquisition for future wildlife preserves to mitigate impacts, while other commenters suggested SpaceX model its mitigation measures after those at NASA's Kennedy Space Center and Vandenberg Space Force Base.

Commenters stated that the ability to enjoy the NWR, parks, and beach enhances their quality of life. Commenters expressed concerns about adverse impacts to these properties as they are of significant value/importance to the community. Commenters expressed concerns of substantial SH 4 closures inhibiting access to several thousand acres of public land and Boca Chica Beach, leading to interruption and hindrance of refuge access and management.

Comment Response

As described in PEA Section 3.8, Section 4(f) of the U.S. Department of Transportation Act of 1966 (now codified at 49 U.S.C. § 303) provides that the Secretary of Transportation may approve a transportation program or project requiring the *use* of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance, only if there is no feasible and prudent alternative to using that land and the program or project includes all possible planning to minimize harm resulting from the *use*.

A Section 4(f) *use* would occur if the Proposed Action or alternative(s) would involve an actual physical *use* of Section 4(f) property through purchase of land or a permanent easement, physical occupation of a portion or all of the property, or alteration of structures or facilities on the property. Another type of physical *use*, known as *temporary occupancy*, results when a transportation project results in activities that require a temporary easement, right-of-entry, project construction, or another short-term arrangement involving a Section 4(f) property. A *temporary occupancy* is considered a Section 4(f) *use* unless all the conditions listed in 23 CFR § 774.13(d) are satisfied. *Temporary occupancy* is a different category of Section 4(f) *use* than *constructive use* and the potential for both types of *use* were evaluated in the draft and final PEA.

A physical *use* may be considered *de minimis* if, after taking into account avoidance, minimization, mitigation, and enhancement measures, 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.

Use, within the meaning of Section 4(f), includes not only the physical taking of such property, but also *constructive use*. The concept of *constructive use* is that a project that does not physically use land in a park, for example, may still, by means of noise, air pollution, water pollution, or other proximity-related impacts, substantially impair important features, activities, or attributes associated with the Section 4(f)

property. *Constructive use* may also occur if restrictions in access substantially diminish the utility of a significant publicly owned park, recreation area, or a historic site. The Section 4(f) regulations do not identify access restrictions as a potential form of constructive use of a wildlife or waterfowl refuge. *Constructive use* occurs when the impacts of a project on a Section 4(f) property are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the Section 4(f) property that contribute to its purpose and significance are substantially diminished. This means that the value of the Section 4(f) property, in terms of its prior purpose and significance, is substantially reduced or lost. *Constructive use*, as a result of substantial impairment, is rare. As noted in FHWA's Section 4(f) Tutorial, "[c]onstructive use involves an indirect impact to the Section 4(f) property of such magnitude as to effectively act as a permanent incorporation [emphasis added]." Per the FAA 1050.1F Desk Reference, which provides guidance for FAA NEPA practitioners and is used to help FAA integrate applicable special purpose laws and requirements, **a proximity-related impact's consequences must amount to "taking" a property or a portion of a property in order for a constructive use determination to be made.**

PEA Section 3.8 addresses the potential for the Proposed Action to result in a *use* of Section 4(f) properties, including parks and recreation areas, wildlife refuges, and historic sites. As discussed, the Proposed Action would not result in a *use* of a Section 4(f) property exceeding a *de minimis* impact. In making this determination, the FAA coordinated with the officials that have jurisdiction over the Section 4(f) properties in the study area. Refer to PEA Appendix E for a copy of the correspondence. Determinations specific to the issues and properties identified in public comments are addressed below.

Under the Section 4(f) regulations, the FAA must consider reasonable and prudent alternatives to the Proposed Action that avoid the *use* of a Section 4(f) property, only if FAA determines that the Proposed Action would result in a Section 4(f) *use*. Because the FAA has determined that the Proposed Action would not result in a *use* of a section 4(f) property exceeding a *de minimis* impact, an evaluation of prudent and reasonable avoidance alternatives is not required. Likewise, the Section 4(f) requirement to consider all possible planning to minimize harm is required only if there is no feasible and prudent alternative to using the Section 4(f) property. Again, because the FAA has determined that the Proposed Action would not result in a *use* of a section 4(f) property exceeding a *de minimis* impact, there is no requirement under Section 4(f) to consider all possible planning to minimize harm from a *use*.

The potential for launch noise to result in a *constructive use* of Section 4(f) properties is described in PEA Section 3.8.2.2. As described there, FAA's noise modeling demonstrates that all or a portion of several Section 4(f) properties, including portions of the NWR, would be within the 90 dB L_{Amax} noise contour for the launch event scenarios. However, due to temporary access restrictions, no people would be present in the NWR during launches, and as such, the public's experience of the properties' setting will not be substantially impaired by noise impacts. With mitigation measures provided, access restrictions to these properties will not substantially impair their recreational value. As explained in the PEA, the effects of the Proposed Action also would not substantially impact the wildlife and conservation values of these properties.

The FAA considered whether the potential for debris and debris-response activities could result in a *temporary occupancy* of two surrounding Section 4(f) properties: Boca Chica State Park and Brazos Island State Park. The FAA has not historically analyzed potential impacts from debris and debris-

response activities arising from commercial space launch activity to public parks, recreation areas, or wildlife and waterfowl refuges under Section 4(f). The FAA nonetheless opted to consider the possibility of a *temporary occupancy* resulting from debris and debris-response activities in order to more broadly inform review of the potential effects. Based on Starship prototype testing and input from officials with jurisdiction over these 4(f) resources, the FAA examined a 700-acre area surrounding SpaceX's VLA for this analysis. As described in PEA Section 3.8.3.3, the FAA has determined that the potential physical use or *temporary occupancy* of Boca Chica State Park and Brazos Island State Park resulting from anomalies would cause not more than *de minimis* impacts. The FAA has determined that, through the implementation of the terms of the MOA between SpaceX and TPWD dated September 2, 2021, the debris and response activities would not adversely affect the activities, features, or attributes that make Boca Chica State Park and Brazos Island State Park eligible for Section 4(f) protection and any such impacts are expected to be *de minimis* because debris and debris-response activities would only occur in the event of an unplanned anomaly, be temporary, and there would be no permanent effects to the property. In the MOA, TPWD and SpaceX acknowledge the need to restore lands owned by TPWD and commit to implementing, monitoring, and learning from restoration efforts in order to develop adaptive management strategies to minimize or offset long-term impacts to TPWD lands. The MOA outlines anomaly-response procedures and state park restoration measures. The FAA understands the MOA is intended to be a dynamic, working document and SpaceX and TPWD agree to periodically amend and update the MOA in response to changing conditions, new data and information, and lessons learned. The FAA will ensure that SpaceX follows the terms of the MOA as a condition of any future license or permit. Further, in its concurrence letter to the FAA, TPWD imposed additional special conditions upon SpaceX. The FAA added these special conditions to the list of required mitigation measures in PEA Section 3.8.4. Note, in the event of an anomaly that creates debris on NWR fee-owned or managed lands, SpaceX would be required to obtain a Special Use Permit on an emergency basis from the USFWS, as applicable, for clean-up activities.

Regarding closures/access restrictions, the majority of road closures to date have been for SpaceX tests that are not licensed by the FAA. As noted in the response in Section A above, Cameron County has the discretion to exercise its power to evacuate and close off areas when it is necessary to protect the health and safety of the public during SpaceX operations at the Boca Chica Launch Site. The MOA between Cameron County and TGLO delineates the circumstances under which the County is authorized to close the beach and beach access points for the limited purpose of protecting public health and safety during spaceflight activities. SpaceX and Cameron County also have an agreement that further establishes how access restrictions are to be issued. PEA Section 3.8.4 includes mitigation measures to minimize impacts to the public visiting Boca Chica beach and the surrounding public land.

Table 2-2 in the PEA outlines SpaceX's proposed annual launch operations that would occur under an FAA license or permit. Temporary access restrictions associated with these nominal operations would be limited to 500 hours per year. Overall, the temporary access restrictions on all Section 4(f) properties affected by the Proposed Action, including properties under the management of TPWD and USFWS, would be intermittent, temporary, short, subject to advance-notice requirements, planned to avoid times of high visitation, and conducted to minimize disruption for agencies that own or manage the property. Temporary access restrictions for anomalies would be even rarer than those for launch operations. Therefore, the FAA has determined that no *constructive use* under Section 4(f) would result

from temporary access restrictions from launch operations or anomalies. Refer to PEA Section 3.8.4 for a list of required mitigation measures.

K. Water Resources

Commenters expressed concerns about the permanent filling of wetlands and modifications to floodplains. Commenters requested additional alternatives be developed to allow the USACE to identify the least environmentally damaging practicable alternative (LEDPA). Commenters suggested the PEA consider the unique and high-quality adjacent habitats that could be impacted by the project (e.g., special aquatic sites that are unique habitats with limited distributions found near the Boca Chica Launch Site). Commenters also expressed a need to conduct a wetland baseline survey of the current/existing conditions (conducted prior to implementation of the Proposed Action) to serve as a basis of comparison with data collected at a later point in time so as to assess the effects of implementing the Proposed Action to implement the “no net loss” mitigation policy for wetlands, and to ensure quality wetland restoration.

Commenters raised concerns regarding potential negative effects to surrounding water resources from contamination, polluted runoff water, and increased turbidity. Commenters expressed general concerns regarding impacts to potable water, septic systems, and discharge of rainwater into the hyper-saline bay areas. Commenters also expressed concerns that the launch site is located too close to South Bay without any buffers. Several commenters noted potential substantial and unacceptable adverse impacts to aquatic resources of national importance (ARNI). Other commenters requested that stormwater runoff locations be disclosed. Multiple commenters raised questions pertaining to the adequacy of mitigation measures with regard to extreme weather events. Commenters raised concerns over pollution of the underlying water table resulting in health impacts.

Comment Response

As described in PEA Section 3.9, wetlands were delineated in the vicinity of the Boca Chica Launch Site, the current/existing conditions were documented, and the USACE issued a jurisdictional determination (see PEA Appendix H). The wetland delineation was conducted using the 1987 USACE Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain. The proposed construction is anticipated to permanently fill 17.16 acres of wetlands. Wetland impacts would be mitigated per Clean Water Act Section 404 requirements as part of the permitting process.

While the USACE is a cooperating agency on the FAA’s PEA, as described in PEA Section 1.2.2, the USACE will conduct a separate analysis for practicability of impacts to waters of the United States which will include an alternatives analysis and determination of the LEDPA pursuant to 40 CFR part 230 (Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material). The FAA anticipates the information in the PEA would support the USACE’s LEDPA decision-making process.

The USACE would ensure wetland functions of permanently filled wetlands are adequately replaced per Clean Water Act Section 404 requirements. Wetland mitigation for permanently filled wetlands would include in-kind mitigation for both mudflats and estuarine wetland impacts through creation and enhancement of wetlands within the watershed and wetland preservation.

Surface water discharges from runoff during construction and operations would be managed according to requirements of the Texas Pollutant Discharge Elimination System (TPDES). SpaceX would update its facility Construction and Industrial Stormwater Pollution Prevention Plans (SWPPPs) prior to conducting FAA-permitted or -licensed operations to maintain compliance with the TPDES permit. The SWPPPs include Best Management Practices (BMPs) to prevent indirect impacts from erosion and sedimentation to the nearby water bodies. Accordingly, SpaceX would minimize impacts associated with an increase of stormwater runoff to surface waters by implementing the BMPs.

As discussed in PEA Section 3.9, water withdrawals associated with the Proposed Action are not expected to result in any discernable impacts on adjacent property, listed species, or critical habitat. The aquifer is 850 feet deep and confined, so there is little, if any, interaction between groundwater and surface water at the VLA. Potential impacts to groundwater quality during construction include contamination from spills or leaks from construction vehicles and machinery. If such fluids were spilled on the ground, they could migrate to shallow groundwater underlying the Boca Chica Launch Site. However, SpaceX's compliance with its Spill Prevention, Control, and Countermeasures (SPCC) Plan would minimize the potential for accidental releases of polluting substances from construction equipment. The Proposed Action would have minimal impact to the groundwater quality with stormwater treatment and industrial wastewater systems that are properly designed and operated in accordance with permit conditions.

The Proposed Action is not anticipated to result in impacts to South Bay; accordingly, South Bay is not included within the study area for the Essential Fish Habitat (EFH) Assessment. Further, South Bay Coastal Preserve is not identified by the National Oceanic and Atmospheric Administration as a marine protected area. The FAA conducted EFH consultation with the National Marine Fisheries Service (NMFS) (refer to final PEA Section 3.10). NMFS provided the FAA with Conservation Recommendations, and the FAA has agreed to include those recommendations, which concludes FAA's EFH consultation obligations under the Magnuson-Stevens Fishery Conservation and Management Act.

PEA Section 3.9 addresses ARNI. As explained in the PEA, the USACE would evaluate SpaceX's proposed wetland impacts and mitigation pursuant to Clean Water Act Section 404(b)(1) Guidelines (40 CFR Part 230) and Section 404q, which require SpaceX to avoid, minimize, and mitigate impacts to aquatic resources, including ARNI. The USACE decision pursuant to 40 CFR 230 is a separate decision from the FAA's environmental finding and licensing decision. With the replacement of lost wetland functions through the Section 404 permitting and compensatory mitigation requirements, construction impacts on wetlands are not anticipated to be significant.

Regarding extreme weather events, SpaceX's planning conducted for the Boca Chica Launch Site considered the risks associated with hurricanes and floods. The site is designed in a manner to withstand adverse weather events. As stated in PEA Section 3.9, SpaceX would coordinate the proposed construction with the Cameron County floodplain administrators to obtain a development permit. In order to comply with the local floodplain zoning required for participation in the Federal Emergency Management Agency's National Flood Insurance Program (NFIP) and to obtain development permits, SpaceX would conduct a hydraulic analysis of the floodplain associated with the VLA. The hydraulic analysis would determine if the fill and construction of facilities within the floodplain would affect the base flood elevation. If the study determines that construction would not affect the base flood elevation, SpaceX would submit a "No-Rise" Determination to the county. However, if the hydraulic

study determined that the base flood elevation would be affected, SpaceX would conduct further engineering design to mitigate for the change in base flood elevation in order to comply with NFIP and Cameron County building regulations as required by the National Flood Insurance Act (42 U.S.C. Part 50). The hydraulic study would also ensure that no flood storage would be lost and that the facility is adequately designed to prevent flotation, collapse, or lateral movement of the structure due to hydrodynamic and hydrostatic loads, including the effects of buoyancy. The design engineer will certify that the design elevation will withstand the depth and velocity of 100-year flood events (hydrostatic and hydrodynamic loads), any potential increase in wind load, or any other relevant load factors. Further, numerous SpaceX launch site plans are in place to mitigate the risks associated with adverse weather events and/or unintended releases of chemicals into the environment.

SpaceX continues to update its Severe Weather Plan, which provides a response framework to be used during periods of inclement weather expected to affect the Boca Chica Launch Site.

L. Biological Resources

Commenters expressed concerns regarding the potential of the Proposed Action to impact terrestrial and aquatic wildlife (including threatened and endangered species) and critical habitat via noise, vibrations, seismic effects, and anomalies. Commenters requested the development of an EIS to analyze specific environmental impacts to biological resources and establish mitigation measures. Commenters proposed mitigation measures to offset environmental impacts, such as donating part of the company's annual profits to initiatives focused on preserving and improving the surrounding habitat and biodiversity and investment in type-for-type habitat to be set aside for impacted species. A commenter stated the noise contours used in the analysis are only appropriate for projecting impacts to the human environment, that there is no mention of the potential impacts to wildlife, and that an analysis of noise impacts should include a thorough evaluation of impacts to wildlife.

Commenters expressed concerns regarding the draft PEA's analysis of potential impacts to the piping plover critical habitat. Commenters cited a study conducted by the Coastal Bend Bays & Estuaries Program (CBBEP) in Corpus Christi, which showed a decline in the number of piping plovers in the Boca Chica area over the past three years. Commenters requested additional information to ensure that listed species are protected, a system to verify that birds have left the area during launches and landings, continued access to beaches during sea turtle nesting, and postponing launches during sea turtle nesting season.

A commenter stated that several statements in the FAA's Biological Assessment (BA) regarding the use of the area by piping plover are misleading or require consideration of additional sources. The same commenter went on to note that piping plovers wintering in the Boca Chica area are highly likely to return the following year, regardless of the suitability of habitat, and provided their own surveys indicating one of the highest concentrations of the species in its entire range.

One commenter disagreed with the BA's assertion that the red knot is a transient winter visitor to Boca Chica Beach, stating that documented occurrences of the species in the area suggest it is far more common. The commenter went on to say that their own documentation of the red knot species in the area identified 1,225 knots foraging and roosting in the flats to the north of the Launch and Landing Control Center (LLCC), which represents over a quarter of the presumed migratory and wintering population for the species in the western Gulf of Mexico.

Commenters stated that the study area is home to a diverse community of tidal flats, algal flats, mid-delta thorn forest, and mid-valley riparian woodlands that support rare, endangered, and threatened species. Commenters also stated that the Boca Chica Launch Site is adjacent to numerous parks and wildlife areas such as Boca Chica State Park, Brazos Island State Park, Las Palomas Wildlife Management Area, Boca Chica Beach, areas containing five seagrass species, and well-established stands of black mangroves. Commenters highlighted the importance of these areas for protected species such as nesting waterbirds (e.g., roseate spoonbill).

Commenters expressed concerns with the increased traffic along SH 4 and the effect this will have on bird populations (e.g., crested caracara, buzzards, kites, and hawks). Others raised concerns about possible increased roadkill (other than birds) from SpaceX employees or contractors. Commenters requested speed limits be monitored.

Commenters stated that an accident at the SpaceX facility could cause environmental impacts to numerous species and critical habitats that play an integral role in maintaining key parts of the local aquatic and terrestrial ecosystem. Several commenters expressed concern about the environmental impacts of explosions (due to anomalies) would have on nearby wildlife and habitat (including wildfires and hazardous material contamination). Several commenters stated that a previous wildfire ignited by a failed Starship prototype launch burned many acres of the NWR, and they are concerned with the possibility of more wildfires from similar anomalies.

Multiple commenters raised concerns pertaining to the importance of the Boca Chica area as a migratory corridor. Commenters suggest the PEA consider potential impacts of migratory species passing through airspace above the facility and surrounding wildlife refuge habitats.

Comment Response

Summary of Impacts and Interagency Consultation

Impacts on terrestrial and aquatic wildlife and associated habitat are discussed in PEA Section 3.10. As part of compliance with the terms and conditions listed in the USFWS's Biological Opinion (BO) issued in 2013, the University of Texas Rio Grande Valley (UTRGV), on behalf of SpaceX, has been conducting annual biological monitoring, including bird surveys, in the project area. The monitoring has not identified any *take* of species protected by the ESA and the USFWS has not reported any *take* of species to the FAA. The FAA submits SpaceX's biological monitoring reports to the USFWS annually.

During preparation of the PEA, the FAA conducted formal consultation with the USFWS pursuant to ESA Section 7. The USFWS issued a BO and concluded the Proposed Action is not likely to jeopardize the continued existence of any ESA-listed species or adversely modify designated critical habitat. In addition to the conservation measures that are part of the project, the BO contains several terms and conditions that SpaceX must implement to avoid, minimize, or mitigate effects to listed species and critical habitat. Refer to the FAA's BA and USFWS's BO (PEA Appendix D) for more information about potential effects to ESA-listed species and critical habitat.

The FAA also conducted consultation with NMFS per ESA Section 7. NMFS issued a Letter of Concurrence, which stated the Proposed Action is not expected to result in adverse effects to ESA-listed species or critical habitat under NMFS jurisdiction. The Letter of Concurrence includes mitigation

measures that SpaceX must implement to avoid adverse effects of listed species. Refer to PEA Appendix D for a copy of the Letter of Concurrence.

As explained in PEA Section 2.1, some details about some of the launch-related infrastructure (e.g., exact location and exact design) are not currently available. This is not uncommon at this stage of project planning. SpaceX has identified the general location of the proposed infrastructure (i.e., SpaceX's VLA, processing area, and production and manufacturing area) but has not completed final design and engineering such that exact locations are known. Therefore, the PEA (and associated interagency consultations) make assumptions about these unknowns using best available information and professional expertise. The BA that was sent to the USFWS as part of ESA Section 7 consultation was prepared using the best scientific and commercial data available and conservative assumptions (e.g., if launch lighting placement was in the nearest area to the beach in the VLA development footprint), and FAA's effects determinations for all ESA-listed species affected by noise and lighting in the BA were *likely to adversely affect*, which means that FAA anticipates incidental *take* to occur. Completed design and engineering that would determine exact locations of facilities and infrastructure would not change FAA's effects determinations for any species assessed in the BA; incidental take would still be expected to occur, and FAA would still conduct formal consultation with the USFWS. Refer to the USFWS BO for a description of the consultation history, which included additional coordination and consultation after the FAA submitted its draft BA to the USFWS. SpaceX is coordinating with the USFWS on its Lighting Management Plan and will continue to do so as facility design matures. In addition to the conservation measures that are part of the project, the BO contains a list of terms of conditions intended to avoid, minimize, or mitigate effects to listed species and critical habitat, including the northern aplomado falcon, Gulf Coast jaguarundi, ocelot, sea turtles, piping plover and piping plover critical habitat, and red knot and red knot proposed critical habitat.

Additional Information Provided to the FAA

The FAA appreciates CBBEP's piping plover survey report from October 2021 and the additional information on piping plover populations throughout the Boca Chica/South Bay area over the past three years. The FAA also acknowledges that the USFWS considered this report as part of the FAA's ESA Section 7 consultation with the USFWS. Since 2015, SpaceX has been conducting annual piping plover surveys around the launch site (across a 3-mile radius) as a requirement of the USFWS's 2013 BO to track the potential effects of SpaceX activities on federally listed birds. SpaceX contracted UTRGV to conduct these surveys and SWCA Environmental Consultants (SWCA) to analyze the results. These ongoing annual surveys (and methodologies developed for the surveys) are specific to the area of the SpaceX activities that have been occurring since 2015. As stated in PEA Section 3.10.4.1, and the FAA's BA, a trend analysis found little to no evidence of meaningful trends, either increasing or decreasing, in the number of birds observed through time for all four target species (Wilson's plover, snowy plover, piping plover, and red knot). To date, avian monitoring conducted by UTRGV has not shown any piping plovers or other species harmed by launch operations. In addition, the FAA has worked with the USFWS, including their avian experts, throughout the formal consultation process to address potential impacts on the piping plover and piping plover critical habitat and to ensure measures are implemented to avoid or minimize effects on the species and its habitat.

According to SWCA's review of CBBEP's piping plover report, although the mark-resight models applied appear to be generally suitable for the data type, potential violations of some of the model assumptions

and inconsistencies in survey methods may compromise the reported confidence in the results of the report. Specifically, potential violations of the geographic closure/access restriction assumption would cause the population to be undefined and would produce biased estimates of population and survival. Due to these potential issues, a linear regression through four years of estimates may not constitute a robust or reliable evaluation of a population trend. Additionally, the inconsistent survey methods in the CBBEP study may not adequately address variable detection probability and could have resulted in overly precise confidence intervals. It is not clear whether the resulting analysis is sensitive enough to detect a difference in abundance of 50% in a short 4-year period. In April 2022, CBBEP (Newstead and Hill) also released an extended analysis incorporating additional data for the 2021 field season. The extended analysis states that the original October 2021 report missed a period in which plovers were continuing to enter the Boca Chica population, and the 2021 population mean estimate increased over the previous year. This suggests that the closure assumption was violated in the original report for the 2021 year and may have also been violated in the 2020 year. Also of note, counts of plovers may be confounded by survey frequency, which varied over the four years, with more plovers found in years with more surveys in both analyses. In both of CBBEP's reports, limited details of field methodology were provided to provide context and support for the conclusions. In the extended report, estimates of abundance and survival increased, as well as the reported precision in those estimates, across all four survey years. It is unclear why these estimates changed when the only changes described include the addition of 11 surveys to the 2021 survey year and the addition of a launch covariate. As detailed in PEA Section 3.10.5, the FAA and USFWS would ensure that SpaceX would continue contracting a qualified biologist to conduct biological monitoring, including monitoring piping plovers, Wilson's plover, and snowy plovers. Species and habitat monitoring will continue to be conducted pursuant to the USFWS's BO.

Migratory Birds

PEA Section 3.10 discusses potential impacts to migratory birds. This section includes measures that are intended to avoid, minimize, or mitigate impacts on biological resources. These measures, which including the terms and conditions identified in the USFWS's BO, would help avoid, minimize, or mitigate for any *taking* of migratory birds protected by the Migratory Bird Treaty Act (MBTA). SpaceX is responsible for MBTA compliance and thus is subject to potential enforcement actions by the U.S. Department of Interior for any violations of the law.

Sea Turtles

Regarding sea turtles, Sea Turtle, Inc. is responsible for all sea turtle nesting and stranding responses along Boca Chica and South Padre Island. According to Sea Turtle, Inc.'s public comment letter on the draft PEA, there have been no effects from SpaceX's testing and launch operation activities in 2020 and 2021, the number of patrol hours in 2021 conducted by Sea Turtle, Inc. in the Boca Chica area was the highest since 2016 when the organization standardized its process, and nesting has remained consistent over 2020 and 2021. In addition, as outlined in Sea Turtle, Inc.'s public comment letter, SpaceX has partnered with Sea Turtle, Inc. in many ways, including providing vehicles for its 2021 and 2022 patrolling seasons, closely coordinating road closures/access restrictions with the organization's activities, and committing to providing UAV footage of the nesting beach when staff are unable to access the area due to access restrictions.

Roadkill

While it is not possible to attribute increased roadkill to SpaceX employees or contractors, the FAA and SpaceX explored conservation measures to slow and reduce traffic effects. SpaceX supports the reduction in the speed limit. As stated in the PEA, SpaceX will encourage personnel to reduce speeds along SH 4 if a personal or company vehicle must be used. SpaceX has implemented a shuttle program and is offering incentives to encourage employees to use it to the fullest extent possible. SpaceX employees are mandated to obey posted speed limits in accordance with Texas law. Additionally, SpaceX has installed wildlife signs along SH 4 and has agreed to install additional signage. As noted above, the FAA completed ESA consultation with the USFWS to address effects to federally listed species and designated critical habitat, where the USFWS concluded in its BO that the Proposed Action would not jeopardize the continued existence the species. Refer to PEA Section 3.10.5 for a complete list of mitigation measures for biological resources.

Anomalies

As described in PEA Section 2.1.3.7, a Starship/Super Heavy test operation or launch could fail (referred to as anomaly). In the event of an anomaly, SpaceX would evaluate the level of response based on the situation and notify the appropriate emergency personnel and land-managing agencies according to the SpaceX Anomaly Response Plan. The FAA expects that debris would be contained within the flight hazard area established for the specific launch. SpaceX would remove debris in a manner that minimizes damage to sensitive resources in accordance with SpaceX's Anomaly Response Plan and agreements with landowners.

In addition to the spread of debris, an anomaly on the launch pad may cause a fire. SpaceX would adhere to its Fire Mitigation and Response Plan to prevent and respond to any fires. Consistent with monitoring to date and studies of the impact on wildlife from prescribed burns, the impacts of such a fire are expected to be insubstantial. Following a fire resulting from a SpaceX anomaly on July 24, 2019, at the Boca Chica Launch Site, experts at the UTRGV prepared an assessment of wildlife impacts.¹⁹ The assessment found that direct fire mortality of wildlife was low and "large motile species (e.g., vertebrates) were likely able to vacate the area at the time of the burn or survive in unburned patches." The assessment did not find any evidence of impacts to federally listed species. The assessment found direct fire mortality of a single individual coastal-plain toad (*Ollotis nebulifer*) and several blue land crabs (*Cardisoma guanhumii*) and black land crabs (*Gecarcinus quadratus*). Many crab burrows exhibited post-fire activity, showing that "it is likely that many of the crabs were able to survive the fire by retreating into subterranean burrows." The assessment concluded that direct fire mortality of wildlife was low and impacts to wildlife and habitat were not significant and "similar to those which would occur during a prescribed burn in comparable habitats." The experts explained that "[p]rescribed burns in tidal marshes and grasslands are routinely used to improve habitat for waterfowl and furbearers, control invasive species, and reduce wildfire risk." The assessment found that the majority of the burned area was not habitat for piping plover or only marginal habitat. The authors concluded that "given that new growths (grasses) have appeared within a couple of weeks of the burn, habitat suitability and ecosystem services should recover rapidly upon return of plant cover to pre-burn levels which should occur within one to

¹⁹ Hicks, D.W. and L.M. Contreras. 2019. Biological Assessment – Boca Chica Test Launch Wildfire. Post-fire Assessment Report, unpublished. August.

two growing seasons.” UTRGV is continuing to monitor vegetation changes per the requirements of the USFWS’s BO.

Endangered Species Act and Greenhouse Gas Emissions

Past rulings and guidance regarding compliance with ESA Section 7 concerning emissions of GHGs have addressed the expectations for consultation on federal actions that would result in the emission of GHGs. In December 2008, the USFWS created a final special rule (73 FR 76249; December 16, 2008) under 4(d) of the ESA that addressed the federally threatened polar bear (*Ursus maritimus*). This final rule became effective on January 15, 2009. While this ruling was written for the polar bear, the issue of whether a federal action that produces GHG emissions is a “may affect” action that requires ESA Section 7 consultation was addressed with regard to any and all species that may be impacted by climate change. The rule states there is currently no way to determine how the emissions from a specific action both influence climate change and then subsequently affect specific listed species. On October 3, 2008, the Department of Interior’s Solicitor issued a legal memorandum on the applicability of consultation requirements to proposed actions involving the emission of GHGs. That memorandum noted that the causal link cannot currently be made between emissions from a proposed action and specific effects on a listed species. Therefore, the Solicitor concluded that, given the current state of science, a proposed action that will involve the emission of GHGs cannot pass the “may affect” test for those GHGs as they relate to climate change, and is not subject to consultation on those effects under the ESA and its implementation regulations. Refer to the final rule for more information.

Summary

Given the results of the ESA consultations, as well as the discussion of potential impacts to unlisted species and mitigation measures identified in the PEA and consultations, the FAA has concluded the Proposed Action would not result in significant impacts on biological resources.

M. Coastal Resources

Commenters suggested the Proposed Action would violate the Coastal Zone Management Act (CZMA).

Comment Response

The CZMA places obligations on both the FAA and SpaceX to ensure actions proposed within or affecting the coastal zone are consistent with the enforceable policies of the state’s approved coastal zone management program. For FAA permitting or licensing approvals, if the Proposed Action is specifically listed within an existing coastal zone management program, the FAA must ensure that the requirements of 15 CFR, Subpart D, Consistency for Activities Requiring a Federal License or Permit, are satisfied. For unlisted activities, like the Proposed Action, compliance with this subpart is also required where the responsible state agency specifically indicates to the FAA that approval for a proposed project would affect coastal zone resources and that it intends to review the approval.

On December 20, 2021, TGLO emailed SpaceX and stated TGLO will not be conducting a consistency review because the Proposed Action is not a listed activity and is not subject to review under the Texas Coastal Management Program (TCMP). However, TGLO stated that TCEQ would conduct a federal consistency review for the USACE’s modification of SpaceX’s Clean Water Act Section 404 permit (see

PEA Appendix J). SpaceX is responsible for ensuring its activities within the coastal zone comply with the policies of the TCMP (i.e., state laws) and will be conducted in a manner consistent with the TCMP.

N. Hazardous Materials, Solid Waste, and Pollution Prevention

Commenters expressed concerns regarding contamination to the adjacent environment, specifically that launch failures would result in a substantial amount of unknown and/or hazardous materials dispersed into the surrounding environment. Commenters also expressed concerns regarding potentially hazardous substances, such as rocket fuel and per- and polyfluoroalkyl substances (PFAS) related to rocket fuel flame retardant, leaking into the surrounding environment during operations; these commenters suggested mitigation measures to be performed by a third-party contractor and/or government agency to ensure proper cleanup and disposal. Commenters expressed concern regarding aboveground storage tanks being vulnerable to severe weather events such as hurricanes and/or flooding. Commenters noted concern regarding the environmental impact of expended rocket boosters. Commenters expressed concern over truck unloading operations for wastewater and hydrocarbon storage. Commenters also raised concern regarding the disclosure of ammonia storage and handling operations and Naturally Occurring Radioactive Material.

Comment Response

As described in PEA Section 3.13.4.3, SpaceX would collect, store, and dispose of hazardous materials, substances, and wastes used and generated as part of recovery operations using practices that minimize the potential for accidental releases or contact with storm or marine water and in accordance with the Anomaly Response Plan, SWPPP, and SPCC Plan. The main propellants used on the Starship and Super Heavy include liquid oxygen and liquid methane. Upon a release, these propellants would vaporize quickly. SpaceX would assemble an emergency response team that would be responsible for responding to hazards and spills from construction and launch operations. SpaceX would implement its Anomaly Response Plan to ensure that adequate and appropriate guidance, policies, and protocols regarding hazardous material incidents and associated emergency response are available to and followed by all personnel. Emergency response and clean-up procedures contained in the plan would reduce the magnitude and duration of any impacts associated with the release of hazardous materials both on and off site.

As described in PEA Section 3.13.5, SpaceX would implement numerous mitigation measures to avoid or minimize impacts related to hazardous materials, solid waste, and pollution prevention. All mitigation measures, which SpaceX would be required to implement, are enforceable, inspectable measures. SpaceX has to comply with all applicable federal, state, and local rules and regulations pertaining to the proper storage, handling, and use of hazardous materials.

Regarding severe weather events, please see the response above under Section J, *Water Resources*.

Regarding expending boosters, as stated in the PEA, SpaceX may require expending Super Heavy or Starship downrange in the Pacific Ocean or Gulf of Mexico, or for Starship only, in the Pacific Ocean, no closer than 19 miles offshore during early unmanned launches. If this occurs, SpaceX would not recover Super Heavy or Starship. SpaceX expects each stage would break up upon impact with the water's surface. SpaceX expects most of the launch vehicle would sink because it is made of steel. Lighter items (e.g., items not made of steel, such composite overwrapped pressure vessels) may float but are

expected to eventually become waterlogged and sink. If there are reports of large debris, SpaceX would coordinate with a party specialized in marine debris to survey the situation and sink or recover as necessary any large floating debris. SpaceX would coordinate with all land and water regulatory authorities as required, prior to taking action to recover debris. Refer to PEA Sections 3.9 and 3.10 for potential impacts on water resources and biological resources, respectively, from expending boosters in the ocean.

The Proposed Action does not involve the use, storage, or transport of ammonia or Naturally Occurring Radioactive Material.

O. Natural Resources and Energy Supply

Commenters expressed concern regarding the use and amount of methane as fuel and requested that SpaceX use sustainable and renewable power generation methods (e.g., wind or solar). Commenters also raised concerns regarding extended power outages to the surrounding area due to SpaceX activities and the impact this may have on first responders. Commenters suggested the need for a natural gas pipeline and potential drilling of natural gas wells in surrounding areas. Commenters also noted the lack of disclosure regarding the power plant's source of natural gas.

Comment Response

Launch vehicle propellants include LOX and LCH₄, and commodities include liquid nitrogen, water, gaseous oxygen, gaseous methane, gaseous nitrogen, helium, and hydraulic fluid. Use of these propellants in support of the Proposed Action would not adversely impact local supply, as the ability for SpaceX to supply their own propellants would reduce the demand on the local supply.

The Proposed Action includes electrical generation from alternative fuels (e.g., solar) and liquefied natural gas. Construction and operational activities under the Proposed Action are not expected to result in power outages to the surrounding area; accordingly, first responders should not be affected by SpaceX activities.

As stated in responses above, SpaceX is no longer proposing a desalination plant, natural gas pretreatment system, liquefier, or power plant. Refer to the response above under Section C, *Proposed Action*, for more information. All natural gas needed for the Proposed Action would be delivered by truck. This information was added to PEA Chapter 2 and Section 3.14. SpaceX is not proposing to install a pipeline, transport natural gas to the launch site via a pipeline, or drill wells to extract natural gas.

P. Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

Commenters stated that the FAA has not provided adequate Spanish language resources during the review process. Commenters noted that the Carrizo/Comecrudo Tribe of Texas has actively tried to protect Boca Chica for generations, which conflicts with the Proposed Action. Commenters stated that the PEA did not consider the existence of Tamaulipas settlements within the region of impact in Mexico. Commenters stated these are low-income settlements whose environment would be negatively affected by noise.

Commenters questioned the number of jobs that would be created by SpaceX, and the number of jobs that would be offered to current residents as opposed to hires from outside the region. Commenters also expressed concern about rising home prices, impacts on residents of Boca Chica Village, and new residents from outside of the local community displacing existing residents. Commenters are also concerned about temporarily closing Brownsville Ship Channel/South Bay and the negative impacts on the local shrimping and fishing industry. Commenters raised concerns regarding effects on birding, recreational fishing, and ecotourism industry in the Rio Grande Valley. Other commenters noted the economic benefit of the Proposed Action to the local economy regarding increased jobs and tourism that could support the local communities. Commenters also expressed support regarding the Science, Technology, Engineering, and Math educational opportunities for the local communities.

Commenters stated that the area is an environmental justice community. Commenters stated closures of SH 4 and Boca Chica Beach would result in disproportionate adverse impacts to low-income indigenous populations who have relied on waters for economic and familial subsistence for generations.

Comment Response

Regarding Spanish translations, see response below under Section T, *Public Equity/Access*.

As noted in the response in Section H, *Cultural Resources*, the FAA has reached out to the Carrizo/Comecrudo Tribe of Texas. The FAA has not received a response from the tribe.

Regarding the workforce, as described in PEA Section 3.15.4.1, SpaceX anticipates personnel supporting the Proposed Action would reach up to 450 full-time workers. All 450 full-time SpaceX employees/contractors would represent under 1 percent of the 159,725 total study area housing units listed in the 2018 census. This minimal increase would not significantly change the housing purchase or rental markets.

The FAA does not expect adverse economic impacts to maritime commerce and local fishermen from temporarily restricting access to the Brownsville Ship Channel. As stated in PEA Section 2.1.3.5, a Notice to Mariners (NOTMAR) would be issued for prior to each launch and reentry operation. A NOTMAR provides a notification regarding a temporary hazard within a defined area (a Ship Hazard Area [SHA]) to ensure public safety during proposed operations. A NOTMAR itself does not alter or close shipping lanes; rather, the NOTMAR provides a notification regarding a temporary hazard within a defined area to ensure public safety during the proposed operations. Advanced notice via NOTMAR and identification of SHAs would assist mariners in scheduling around any temporary disruption of shipping activities in the area of operation. The Proposed Action would not require shipping lanes to be altered or closed. Launches and reentries would be infrequent, of short duration, and scheduled in advance to minimize interruption to ship traffic. Accordingly, the Proposed Action should not negatively impact the flow of maritime commerce in the Port area.

While the percentages of minority and low-income populations are substantially higher in Cameron and Willacy counties than in the state of Texas as a whole, the Proposed Action would not have the potential to lead to a disproportionately high and adverse impact on an environmental justice population from impacts in other environmental impact categories or impacts on the physical or natural environment

that affect an environmental justice population. Impacts from the proposed project would not be unique or significant to an environmental justice population.

Regarding access restrictions, SpaceX has worked and continues to work with the state and federal landowners and land-managing agencies for the purpose of improving planning and communication regarding access restrictions. The Texas Natural Resources Code Section 61.132 permits TGLO and Cameron County to enter into an MOA under the terms of which Boca Chica Beach may be closed temporarily for space launches. The MOA between Cameron County and TGLO delineates the circumstances under which the County is authorized to close the beach and beach access points for the limited purpose of protecting public health and safety during spaceflight activities. SpaceX and Cameron County also have an agreement that further establishes how access restrictions are to be issued. Access restrictions that occur as part of the Proposed Action (i.e., those that are related to FAA-licensed or permitted activity) would be temporary.

PEA Section 3.8 was updated to reflect that SpaceX has agreed to implement mitigation measures to reduce the impact of temporary access restrictions. In addition, as stated in the MOA between SpaceX and TPWD, the agencies will continue to receive updates from SpaceX immediately when the temporary access restrictions go into place, end, and are canceled. These measures help ensure the public and agencies have accurate information regarding planned temporary restrictions and can plan activities accordingly.

As explained in the PEA, Cameron County maintains free public beach access at several areas within Cameron County, including Boca Chica Beach, Access Point Number Four (4) (East and West), Access Point Number Five (5) West, and Access Point Number Three (3) and Six (6). Additionally, the city of South Padre Island provides free access to the beach and parking at several locations along Gulf Boulevard.

As noted in Section 3.1 of the PEA, because of the proximity of the VLA to the U.S./Mexico border, the FAA considered the potential for transboundary impacts and consulted the Mexican government through the State Department. The FAA did not receive any comments from the Mexican government regarding the environmental review.

The FAA and SpaceX have not received any complaints or claims of structural damage resulting from SpaceX activities at the Boca Chica Launch Site. As described in PEA Section 3.5, structural damage is not expected in Brownsville or other parts of Cameron County, but if it did occur, it is expected to be minor. Per FAA regulations and the Commercial Space Launch Act, SpaceX is required to carry insurance to cover claims by third parties that result from licensed activities, including any structural damage. The FAA requires that SpaceX carry insurance in the amount of the “Maximum Probable Loss,” which is determined on a launch-by-launch basis by the FAA and is up to \$500,000,000 per launch. In the event that structural damage results from noise-induced vibrations or sonic booms, any such claims of damage would be subject to the insurance policy terms and process specified by the Commercial Space Launch Act and the FAA regulations.

Q. Violations of Law

In addition to addressing special-purpose laws identified above (e.g., CZMA, ESA, MBTA, Section 4(f) of the Department of Transportation Act, Clean Water Act, etc.), commenters suggested the Proposed

Action would violate laws, including the National Wildlife Refuge System Improvement Act of 1997, MBTA, and Texas Open Beaches Act. Some commenters expressed concern that FAA or SpaceX may be violating NEPA due to SpaceX starting construction of one of the proposed integration towers prior to completing the NEPA process. Comments stated the FAA failed to take a “hard look” at the potential environmental impacts.

Comment Response

National Wildlife Refuge System Improvement Act of 1997

The access restrictions are measures that will close roads and entrances to an area that includes, among other areas, the Lower Rio Grande Valley NWR, in order to protect public safety, and are not directed intentionally at the NWR. See PEA Section 2.1.3.5 for additional measures related to better predicting access restrictions.

As explained in PEA Section 1.5, the Finding of No Significant Impact / Record of Decision will require that if a license is issued, SpaceX will be required to obtain a Special Use Permit on an emergency basis from the USFWS in the event of an anomaly that creates debris on NWR fee-owned or managed lands if SpaceX should need to enter for clean-up activities.

Migratory Bird Treaty Act

PEA Section 3.10 discusses potential impacts to migratory birds. This section includes measures that are intended to avoid, minimize, or mitigate impacts on biological resources. These measures, which including the terms and conditions identified in the USFWS’s BO, would help avoid, minimize, or mitigate for any *taking* of migratory birds protected by the MBTA. SpaceX is responsible for MBTA compliance and thus is subject to potential enforcement actions by the U.S. Department of Interior for any violations of the law.

Texas Open Beaches Act

As explained in the PEA, as of May 24, 2013, Texas House Bill 2623 was signed by Texas Governor Rick Perry to amend the Texas Natural Resources Code Chapter 61 (Sec. 61.132) to allow for the TGLO and/or the Cameron County Commissioners Court to temporarily restrict access to public beaches for space flight activities, including launches. The 2013 MOA between TGLO and Cameron County provides Cameron County with the authority to protect public safety and ensure that landowners and residents are absent from their property in the Safety Zone determined by the FAA flight safety analysis. As described above, access to public land and beaches would be temporarily and intermittently limited during FAA-licensed or permitted activity. At all other times, public land and beaches would remain open.

NEPA

A “hard look” at potential impacts does not necessitate a “worst-case scenario” analysis. See Section B for more information on how impacts were analyzed. Regarding the integration tower, as explained in the PEA, the FAA has informed SpaceX that any actions SpaceX takes to construct integration towers at the launch site, or any other action in furtherance of the Starship/Super Heavy launch vehicle program, will not prejudice any FAA environmental or licensing decisions. This means that the FAA does not have the authority to prevent an applicant from constructing infrastructure on private property, but its

presence will not impact the FAA’s environmental or licensing decisions. For the purpose of the impact analysis, the PEA assumes the integration towers do not exist at the launch site.

R. Transboundary Impacts

Commenters expressed concerns regarding possible international incidents with Mexico as a result of launch anomalies (e.g., damage to foreign land, infrastructure, violating international airspace). Commenters also noted the project’s proximity to Mexico and questioned if the United States and Mexico have reached and/or formalized an operational agreement or understanding.

Comment Response

As described in PEA Section 3.1, NEPA requires that federal agencies include analysis of potential transboundary effects extending across the border and affecting another country’s environment. Because of the proximity of the launch site to the U.S./Mexico border, the FAA considered the potential for the project to impact parts of Mexico and consulted with the Mexican government through the State Department. The PEA discusses transboundary impacts in Section 3.5 and Section 3.6, because the Proposed Action is expected to generate noise that can be heard in Mexico and create visual effects that extend across the U.S./Mexico border. The FAA did not receive any comments from the Mexican government regarding the environmental review.²⁰

As stated in PEA Section 2.1.3.5, SpaceX would coordinate with the Secretariat of Communications and Transportation–Mexico if any airspace, land, or water closures in Mexico were required. This coordination ensures open communication between the United States and Mexico regarding launch operations.

S. Access Restrictions

Commenters stated that SpaceX has not provided public notice of upcoming closures (road, beach, shipping channel, and NWR closures) in a timely manner. Commenters expressed support for mitigation to address concerns about restricted access. Commenters expressed they would like to maintain access to the state parks and beach. Commenters are concerned SpaceX does not have the authority to authorize public road closures. Multiple commenters raised concern over the number of actual closures already taking place as a result of current operations. Commenters raised a concern over the project setting a precedent allowing a nonuser of waterways the ability to shut down a major U.S. port and economically vital waterway. Commenters raised concern over access restrictions for local property owners and questioned if local residents would be impacted by access restrictions. Commenters also questioned what specific areas, roads, beach, airspace would experience access restrictions during the nominal and anomaly-related access restrictions.

Comment Response

The FAA understands the challenges and issues created by SpaceX’s access restrictions in the Boca Chica area. SpaceX has worked and continues to work with the state and federal landowners and land-managing agencies for the purpose of improving planning and communication regarding access

²⁰ The FAA met with the Mexican State of Tamaulipas in October 2021. Secretary Gilberto Estrella, Secretary of Urban Development and Environment for the State of Tamaulipas, contacted the Mexican Federal environmental office. The FAA provided information on the public hearings to Secretary Estrella.

restrictions. As stated above, the Texas Natural Resources Code Section 61.132 permits TGLO and Cameron County to enter into an MOA under the terms of which Boca Chica Beach may be closed temporarily for space launches. The MOA between Cameron County and TGLO delineates the circumstances under which the County is authorized to close the beach and beach access points for the limited purpose of protecting public health and safety during spaceflight activities. At all other times, public land and beaches would remain open.

Licensed-related access restrictions would be intermittent, temporary, and short, subject to advance-notice requirements, planned to avoid times of high visitation, and conducted to minimize disruption for agencies that own or manage the properties. PEA Section 3.8 was updated to reflect that SpaceX has agreed to implement mitigation measures to reduce the impact of temporary access restrictions.

As described in PEA Section 2.1.3.5, SpaceX will perform the following notifications prior to a planned closure/access restriction and in accordance with SpaceX's Closure Notification Plan:

1. Provide a forecast of planned closures/access restriction one to two weeks in advance of the closure/access restriction on the County's website and/or send via email to the agency distribution list. Information about the proposed closure/access restriction would be available on Cameron County's website. The Cameron County judge issues a public notice of a Cameron County order to temporarily close Boca Chica Beach and SH 4 anywhere from a few hours to a few days after receiving SpaceX's request to close restrict access.
2. Send closure/access restriction notifications to the regulatory and public land-managing agencies as plans finalize (48 hours prior to the closure). The agencies would continue to receive updates immediately when the closures/access restrictions go into place and when the closures/access restrictions end, as well as cancellations of requested closures/access restrictions. SpaceX personnel at the LLCC would send these notifications to ensure the most up-to-date information is distributed.
3. Send real time status and updates on closures/access restrictions through a text message alert service. Subscribers can text "BEACH" TO 1-877-591-2152 to receive updates.

Additionally, SpaceX will implement the following measures to limit access restrictions:

1. No SH 4 access restrictions on the following holidays: Memorial Day, Labor Day, July 4th, MLK Day, Presidents' Day, Texas Independence Day, Cesar Chavez Day, Emancipation Day in Texas (also referred to as Juneteenth), Veteran's Day, Good Friday, Easter, Father's Day, Mother's Day, Thanksgiving Day, Christmas Day, New Year's Day ("Holidays").
 - a. Where any of the Holidays falls annually on a Monday or Friday, no Weekend Access Restrictions, as defined in #4 below, shall be permitted.
 - b. Where any of the Holidays does not fall annually on a Monday or Friday, but falls on a Monday or Friday in a particular year, no Weekend Access Restrictions, as defined in #4 below, shall be permitted for that year.
 - c. For Thanksgiving, no access restrictions shall be permitted from Thanksgiving Day through the Sunday immediately following Thanksgiving.
2. Except as provided in #4 below, from Memorial Day to Labor Day (the times of greatest visitor beach uses and enjoyment), no Weekend Access Restrictions from Friday at 6:00 a.m. through Sunday. Road access restrictions for any SpaceX activities would occur from Monday through

Friday at 6:00 a.m. This predictive schedule ensures the public access to all open areas of the NWR (e.g., Boca Chica Beach) from Friday at 6:00 a.m. through Sunday from Memorial Day through Labor Day.

3. Except as provided in #4 below, from the day after Labor Day to the day before Memorial Day (throughout the winter months), no Weekend Access Restrictions on Saturday or Sunday.
4. When a SpaceX activity requires at least one road access Restriction between Fridays at 6:00 a.m. and Sundays from Memorial Day to Labor Day, or on weekends from the day after Labor Day to the day before Memorial Day, it is considered a “Weekend Access Restriction.”
 - a. SpaceX may request a Weekend Access Restriction up to five times per calendar year.
5. For any SH 4 road access restriction, SpaceX will request, at least 48 hours prior to the start of the access restriction period, that the Cameron County Commissioners Court implement the access restriction. This notice requirement is intended to give the public a minimum 48-hour notice to reduce impacts to the recreational users. Any requested Weekend Access Restriction shall count toward the total five annual Weekend Access Restrictions unless cancellation of the Weekend Access Restriction is publicized more than 24 hours prior to the start of the requested access restriction period.
6. Exception to the above is for activities deemed to be anomalies per FAA regulations.

See Figure 2-4 of the PEA for the figure depicting the access restriction areas and checkpoints.

Refer to the response above under Section A, *Role of the Federal Aviation Administration*, for additional information regarding the FAA’s role.

Much of SpaceX’s current testing operations do not require an FAA license or permit. For purposes of the PEA, as stated in PEA Section 2.1.3.5, the FAA defines an operational access restriction as follows:

An access restriction begins when local law enforcement, under the direction of an order from the Cameron County Commissioners Court, shuts down SH 4 and Boca Chica Beach to support the FAA-permitted or FAA-licensed activity, which may include a tank test, wet dress rehearsal, static fire engine test, or launch. An access restriction ends when the operation is completed, and local law enforcement opens SH 4 and Boca Chica Beach.

Access restrictions that are planned but not implemented (e.g., Cameron County revokes the access restriction) do not meet the FAA’s definition of an access restriction.

Based on this definition of an operational access restriction, SpaceX has estimated it may need up to 500 hours per year of access restriction to conduct nominal launch operations and up to an additional 300 hours per year of access restriction in case of anomalies. The anomaly response hours would only be used in the case of an anomaly requiring road access restrictions and would not be used in nominal instances. SpaceX would provide the notifications required in SpaceX’s Access Restriction Notification Plan in order to ensure that the public, federal and state agencies, and any additional stakeholders receive notice of planned road access restrictions. The area restricted during anomaly-response

activities is anticipated to be much smaller than the area restricted for nominal operations (i.e., it would be limited to the area containing the launch vehicle and debris). Temporary access restrictions that are planned but not implemented (e.g., Cameron County revokes the closure/access restriction) do not meet the FAA's definition of a temporary access restriction for the environmental review. For an operation requiring a temporary access restriction, SpaceX would coordinate with Cameron County under the authority granted in the 2013 MOA between the TGLO and Cameron County.

Temporary access restrictions would not prevent USFWS staff or their contractors, partners, or guests from completing habitat or species management activities. SpaceX has provided funding to USFWS for the purpose of hiring an employee to assist with coordination between USFWS and SpaceX. To further reduce impacts on USFWS's access, SpaceX will maintain a roster/badge system to identify staff, contractors, partners, and guests of USFWS and other agencies. On days with planned access restrictions, personnel so identified by USFWS will have access to state and federal lands in the vicinity at all times except for a reasonable period associated with ignition events or tests that could pose a safety risk, and when conditions may otherwise be unsafe.

As noted in responses above, the Proposed Action would not require shipping lanes to be altered or closed. Launches and reentries would be infrequent, of short duration, and scheduled in advance to minimize interruptions to ship traffic.

T. Anomalies

Several commenters suggested that the PEA include an assessment of potential human injuries, deaths, and property damages should there be a rocket anomaly within various distances of the launch pad. Some commenters raised concerns over the size of debris fields from possible future anomalies. Other commenters stated concerns over explosions during tank tests. Commenters suggested an increased use of hi-lift drones, helicopter operations, specialized transport and recovery vehicles, and specially trained personnel on all debris recovery operations within the protected properties. Commenters expressed the need for an updated Launch Failure Analysis (Safety Review), Failure Modes and Effects Analysis, and Emergency Response Plan.

Comment Response

As part of evaluating a license or permit, the FAA conducts a safety review in accordance with FAA regulations to ensure public safety. Refer to the response above under Section F, *Noise and Noise-Compatible Land Use*, for information about SpaceX's requirement to carry insurance to cover claims by third parties.

As described in Section 3.8.3.3 of the draft PEA, a Starship/Super Heavy test operation or launch could result in a deviation from what is expected (referred to as an anomaly), which could include an explosion on the launch pad, spreading debris and triggering anomaly-response activities such as debris removal and cleanup.

SpaceX's SN11 anomaly, which occurred during landing operations at the VLA, created the largest debris field to-date, and although debris spread outside the launch pad, it was contained within an area adjacent to the launch pad. Therefore, the FAA expects debris from an anomaly at the VLA during launch or landing operations to be contained to the approximate 700-acre area evaluated in the PEA. An anomaly on the launch pad during testing operations is expected to be contained to a smaller area,

either because the test does not involve explosive commodities, or because it is static (i.e., no impact from velocity of the vehicle). An anomaly during a tank test operation could result in an explosion of debris, but it might not. For example, an anomaly could result in buckling of the tank only. If the test did result in an explosion of debris, the probability of debris spreading outside the launch pad boundary is low because this type of test does not involve mixing of explosive commodities.

In addition to the spread of debris, an anomaly on the launch pad may cause a fire. SpaceX would adhere to its Fire Mitigation and Response Plan to prevent and respond to any fires. Consistent with monitoring to date and studies of the impact on wildlife from prescribed burns, the impacts of such a fire are expected to be insubstantial (see response above under Section K, *Biological Resources*).

SpaceX executed an MOA with TPWD, which owns and manages the land within the debris study area, to address potential debris impacts and removal and restoration activities (see PEA Appendix K for a copy of the MOA). SpaceX has committed to adhering to the post-response site restoration and impact mitigation protocols identified in the MOA. This mitigation measure is reflected in the final PEA, and SpaceX must comply with this measure. SpaceX has specifically agreed to restore damaged algal flat and loma habitats to pre-anomaly conditions and to include monitoring protocols in its restoration plan and to apply any learned methodologies to restoration of habitats following any future impacts. SpaceX will use a subject matter expert recommended by TPWD to assist in this restoration. As described in the PEA, restoration areas with respect to algal flats include grooming of tracks with the use of hand tools and ambient soils to prevent further impacts, removing fill, establishing the proper slope within the tidal range, and inoculating the soils with a mixture of the dominant algal species. Restoration measures regarding any adverse impacts to landforms include monitoring disturbed areas for spread of non-native vegetation and removal upon discovery, spreading seeds found locally from preferred grass species, and regrading disturbed land to its pre-existing condition. Alternative restoration approaches may be considered as determined by TPWD and agreed to by SpaceX.

Pursuant to the MOA, if an anomaly occurred:

- SpaceX would enter the property on foot as much as possible and pick up debris by hand and would attempt to remove all debris by hand and carry it out on foot.
- SpaceX would notify TPWD, TGLO, and/or any other landowner per the procedure outlined in SpaceX's Anomaly Response Plan.
- Debris removal would occur by a by means that will result in the least amount of impact as by TPWD and agreed to by SpaceX.
- The timing of debris removal will be determined by TPWD to minimize the potential impacts as much as possible and may be based upon soil conditions, presence of rare or sensitive species, or other natural resources or operational concerns.
- Debris is to be removed as expeditiously as is practical.
- Protocols for debris removal include the following: (1) prohibit dragging or winching of debris; (2) no vehicles or equipment on the property without the express written consent of TPWD or USFWS; (3) large pieces of debris are to be accessed on foot and dismantled or cut up using tools carried on foot (except as otherwise approved in accordance with (2)); (4) tarps or liners are to be placed under areas where cutting occurs to limit shavings and particulates from contaminating the ground and any such shavings or particulates are to be disposed of off-site;

and (5) except in an emergency, retrieval of debris from the property should take place only during daylight hours.

In addition, SpaceX must obtain a Special Use Permit on an emergency basis from USFWS as applicable, prior to clean-up activities for any anomaly on NWR fee-owned or managed lands.

The FAA understands, recognizes, and appreciates the ecological value of the sensitive habitat in the vicinity of the proposed project. Detailed planning for mitigation and monitoring has been incorporated into the NEPA process and special purpose law consultations. As noted above, PEA Chapter 3 contains many mitigation measures that SpaceX must implement to avoid, minimize, or mitigate environmental impacts. Many of these mitigation measures were established as part of interagency consultations. Additional mitigation will be imposed upon SpaceX as part of the USACE's review of SpaceX's Clean Water Act Section 404 permit application.

U. Public Equity/Access

Commenters were not satisfied with the level of public notice provided to minorities, non-English speakers, the elderly, and those with disabilities. Commenters expressed concern that there was inadequate public equity engagement compliant with Title VI of the Civil Rights Act of 1964 with the Spanish speaking community. Commenters expressed concern with the level of communication between SpaceX operations and the surrounding population. Commenters suggest SpaceX share operation information on a regular basis to improve public awareness.

Comment Response

The FAA used multiple methods of stakeholder engagement and public outreach to solicit comments and feedback regarding SpaceX's proposal. As outlined below, the FAA conducted a public scoping process, including a public scoping comment period, and published the draft PEA for public review and comment.

On November 23, 2020, the FAA sent an email (in English) to interested parties notifying them that the FAA was in the beginning stages of conducting an environmental review for SpaceX's Starship/Super Heavy proposal. The list of interested parties was developed from individuals and entities that participated in the environmental review process for the 2014 EIS for SpaceX at Boca Chica, TX. On December 22, 2020, the FAA sent an email (in English) to interested parties (including anyone that signed up to receive project updates after the November 23, 2020 announcement) stating that the agency was holding a public scoping period to determine the scope of issues for analysis in the draft PEA. The email provided an overview of the proposed project, indicated that the FAA would be considering the preparation of a programmatic EA, and explained the FAA's environmental review process. The scoping comment period was open through January 22, 2021. On March 16, 2021, the FAA sent an email (in English) providing notification of the availability of the FAA's scoping report.

On September 17, 2021, the FAA published on its website²¹ the draft PEA for public review and comment. In addition to posting the draft PEA, the FAA provided a Summary of the draft PEA in English and Spanish. Hardcopies of the draft PEA and Summary (English and Spanish) were available for public

²¹ See: https://www.faa.gov/space/stakeholder_engagement/spacex_starship/.

review at the following locations, which were chosen by FAA in consultation with Cameron County officials:

- Brownsville Public Library, Main Branch located at 2600 Central Blvd, Brownsville, TX 78520
- Brownsville Public Library, Southmost Branch located at 4320 Southmost Road, Brownsville, TX 78521
- The Dancy Building County Judge Office located at 1100 E Monroe St Suite 218, Brownsville, TX 78520

On the same day, the FAA sent an email (in English) announcing the availability of the draft PEA on the FAA's project website, notice of a public comment period and request for comments, and notice of two virtual public hearings (originally planned for October 6, 2021, and October 7, 2021). The FAA also posted updates on its Facebook, Instagram, and Twitter accounts (social media accounts) announcing the release of the draft PEA and the public hearings.

On September 30, 2021, the FAA sent an email (in English) noting that the public review period was being extended to November 1, 2021, and the public hearings were rescheduled to October 18, 2021, and October 20, 2021. The FAA also provided these updates via its social media accounts.

On October 15, 2021, the FAA sent an email in English and Spanish providing information on how to register for the public hearings. The FAA also provided SpaceX with flyers in both English and Spanish, and SpaceX posted the flyers at the following locations:

- Main utility pole at each entrance of Boca Chica Village
- Residences in Boca Chica Village
- Main Public Library Public Bulletin Board
- Southmost Library Public Bulletin Board
- Texas Southmost College International Technology, Education, and Commerce Center

On October 16 and 18, 2021, the dates of the public hearings, the FAA posted in English on its social media accounts on how to register for the public hearings.

A licensed Spanish translator participated in the two virtual public hearings. Public hearing participants could self-select English or Spanish audio "rooms" when signing into the hearing. The hearing facilitator and FAA made announcements in English and Spanish that there was a translator in the Spanish audio "room" to translate the meeting and assist Spanish speakers with any questions or comments. The FAA provided a pre-recorded PowerPoint presentation in English and Spanish (the text of the slides was in English, but the audio of the recording was in Spanish). A court reporter recorded both public hearings and prepared transcripts of the proceedings in English. A Spanish transcript was prepared for the comment provided in Spanish in the October 16 public hearing. The FAA could not conduct in-person public hearings due to the COVID-19 pandemic.

On October 25, 2021, the FAA posted the presentations on its project website. On the same day, the FAA sent an email in English and Spanish noting the availability of the presentations on the project website. The FAA posted 1) English slides with English script text and 2) Spanish slides with Spanish script text.

On November 15, 2021, the FAA posted the court reporter's transcripts of the two public hearings on its website in English. The FAA also posted a transcript of the verbal comments that were given in Spanish during the hearings on the project website. On the same day, the FAA sent an email in English and Spanish noting these project updates.

All subsequent email notifications regarding timeframe for the final PEA December 2021 and February 2022 and website publication of comments received on the draft PEA in February 2022 were sent in both English and Spanish. The FAA will continue providing Spanish translations of vital project-related documents and information, and oral interpretation services for public meetings, or as requested in the future.

As stated in the PEA, operations at the VLA might not be considered desirable for the limited residential areas along SH 4 and could result in lowered property values for residential use. Property values are dynamic and influenced by a combination of factors, including market conditions, neighborhood characteristics, and individual real property characteristics (e.g., the age of the property, its size, and amenities). The degree to which a particular factor may affect property values is influenced by many other factors that fluctuate widely with time and market conditions. No definitive federal standards exist for quantifying the impact of launches and launch complexes, nor are there previous studies conducted for similar launch facilities. Given the dynamic nature of the real estate market and the varying degree to which any combination of factors may affect the value of a particular property, it would not be possible to quantify how the Proposed Action may affect nearby property values.

SpaceX anticipates personnel supporting the Proposed Action would reach up to 450 full-time workers. The potential in-migration of 450 people to the study area, less than 0.1 percent of the existing population, would not be expected to strain the capacity or affect the quality of emergency response, medical, or public education services.

PEA Section 3.8 was updated to reflect that SpaceX has agreed to implement mitigation measures to reduce the impact of temporary access restrictions.