ENVIRONMENTAL IMPACT STATEMENT

SPACEX STARSHIP-SUPER HEAVY LAUNCH VEHICLE AT LAUNCH COMPLEX 39A

at the Kennedy Space Center, Merritt Island, Florida

Executive Summary

January 2026

Federal Aviation Administration

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Executive Summary

ES.1 Introduction

The Federal Aviation Administration (FAA) is preparing this Environmental Impact Statement (EIS) to inform and support the decision on whether to issue Space Exploration Technologies Corp. (SpaceX) a new, or modify their existing, vehicle operator license for Starship-Super Heavy at Launch Complex (LC)-39A (Figure ES-1). This EIS analyzes the potential environmental effects associated with (1) the development of infrastructure at LC-39A to support Starship-Super Heavy operations, including testing, launches and Starship and booster landings at Kennedy Space Center (KSC), and (2) the FAA's issuance to SpaceX of a new, or modification of their existing, vehicle operator license for Starship-Super Heavy operations at LC-39A and approval of related airspace closures. The FAA considers the issuance or modification of a vehicle operator license and associated airspace closures to be major Federal actions that require environmental review consistent with the National Environmental Policy Act (NEPA) of 1969, Sections (§§)4321-4336, as amended through Public Law 118–5 (June 3, 2023)[1] and FAA Order 1050.1F, Environmental Impacts: Policies and Procedures (July 16, 2015)[2].

ES.2 Background (EIS Section 1.1)

LC-39A at KSC was previously sited for Starship-Super Heavy activities through the National Aeronautics and Space Administration's (NASA's) *Final Environmental Assessment* [EA] *for the SpaceX Starship and Super Heavy Launch Vehicle at Kennedy Space Center (KSC)*[3] (referred to as "2019 NASA EA" throughout this document) and resultant Finding of No Significant Impact (FONSI). This Proposed Action incorporates that environmental analysis by reference and addresses modifications to the SpaceX concept of operations for Starship-Super Heavy. The Department of the Air Force (DAF) is also considering a proposed action to support Starship-Super Heavy at Cape Canaveral Space Force Station (CCSFS). This action is separate from the Proposed Action at LC-39A in that the CCSFS action will provide separate utility for the DAF and SpaceX within the overall Starship-Super Heavy Program. As a result, there are two separate EISs.

In September 2019, NASA completed the 2019 NASA EA to evaluate the potential environmental impacts resulting from construction and operations associated with the proposed SpaceX Starship-Super Heavy launch vehicle at LC-39A. The resulting FONSI concluded that the environmental impacts associated with the Proposed Action would not have a significant effect on the quality of the biological or physical environment.

[1] On January 20, 2025, President Trump issued Executive Order (E.O.) 14154, *Unleashing American Energy*, which revoked E.O. 11991, *Relating to Protection and Enhancement of Environmental Quality* (May 24, 1977), and instructed the Chair of the Council on Environmental Quality (CEQ) to rescind its NEPA-implementing regulations. In response, the CEQ issued an interim final rule to remove the existing implementing regulations for NEPA (90 Federal Register 10610 [February 25, 2025], effective April 11, 2025).

[2] FAA Order 1050.1G was issued on June 30, 2025, over a year after this EIS was initiated. This EIS was prepared in accordance with FAA Order 1050.1F and CEQ's NEPA Implementing Regulations Revision Phase 1, 87 Federal Register 23453 (April 20, 2022) (Phase 1 final rule).

[3] NASA, 2019. Final Environmental Assessment for the SpaceX Starship and Super Heavy Launch Vehicle at Kennedy Space Center (KSC).

Figure ES-1. Location of LC-39A

While the FAA was a cooperating agency on the 2019 NASA EA, the EA was not adopted by the FAA because SpaceX did not apply to the FAA for a commercial launch vehicle operator license at that time and the FAA had no corresponding Federal action requiring evaluation. Since the 2019 NASA EA, SpaceX has undertaken infrastructure improvements at LC-39A (e.g., construction of a launch mount) (NASA, 2019a, pp. 9-14). However, the Starship-Super Heavy concept of operations has been updated, which includes additional launch infrastructure, evolved launch vehicle design, higher launch tempo, and return to launch site (RTLS) booster recovery. In consideration of SpaceX's proposal, NASA as the lead land management agency and the FAA as the licensing agency have determined that an EIS is the appropriate level of NEPA analysis to address the potential environmental effects of Starship-Super Heavy operations at LC-39A. This Proposed Action incorporates the 2019 NASA EA analysis by reference (where appropriate) and addresses modifications to the SpaceX concept of operations for Starship-Super Heavy. SpaceX will apply for a new license or modification of their existing vehicle operator license for LC-39A that would identify a proposed launch cadence consistent with that analyzed in this EIS. Any future proposed launch cadence increases would be reevaluated by the FAA through the same process.

ES.3 Federal Agency Roles (EIS Section 1.2)

As the lead Federal agency, the FAA is responsible for analyzing the potential environmental effects of the Proposed Action. The Commercial Space Launch Act of 1984, as amended and codified at 51 United States (U.S.) Code §§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 Code of Federal Regulations (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 400–600. SpaceX would apply for a new license or modification of their existing vehicle operator license, which would authorize a licensee to conduct one or more launches or reentries using the same vehicle or family of vehicles (14 CFR §450.3(a)). The FAA is also responsible for approving airspace closures in accordance with FAA Order 7400.2P, *Procedures for Handling Airspace Matters*, to ensure public safety.

The following Federal agencies accepted the FAA's request to participate in the NEPA process as cooperating agencies due to their special expertise concerning environmental effect of rocket launch operations or jurisdiction by law over launch facility or maritime environment: NASA, the U.S. Coast Guard (USCG), the DAF, the U.S. Fish and Wildlife Service (USFWS) Merritt Island National Wildlife Refuge (MINWR), and the National Park Service (NPS) Canaveral National Seashore (CANA). An agency has "special expertise" if it has statutory responsibility, agency mission, or related program experience.

ES.4 Purpose and Need (EIS Section 1.3)

The FAA's NEPA-implementing procedures state that the purpose and need statement shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including

the Proposed Action. The FAA's authority with respect to SpaceX's license application or license modification and airspace closures is stated above in Section ES.3, *Federal Agency Roles*.

As established in the 2019 NASA EA, the purpose of Starship-Super Heavy at LC-39A is to provide greater mission capability to NASA and other SpaceX customers. SpaceX's activities would continue to fulfill the United States' expectation that increased capabilities and reduced space transportation costs will enhance exploration (including within the Artemis and Human Landing System programs), support U.S. leadership in space, and make space access more affordable. The Space Transportation section of the National Space Transportation Policy of 1994 addressed the commercial launch sector, stating that "assuring reliable and affordable access to space through U.S. space transportation capabilities is a fundamental goal of the U.S. space program."

Starship-Super Heavy at LC-39A is needed to increase operational efficiency, capabilities, and cost effectiveness of the Starship-Super Heavy Program. Satisfaction of these needs benefit government and public interests and reduces operational costs. Demand for launch services has continued to increase over the past 20 years, and the space industry growth projections indicate this will continue into the foreseeable future. By providing a reusable launch vehicle with increased lift capability that returns to its launch site, the Proposed Action would reduce the cost of launch and increase efficiency, delivering greater access to space and enabling cost-effective delivery of cargo and people to the moon and Mars. SpaceX's Proposed Action would satisfy requirements for more efficient and effective space transportation methods and continue the United States' goal of encouraging activities by the private sector to strengthen and expand U.S. space transportation infrastructure.

ES.5 Public Involvement (EIS Section 1.4)

The FAA used multiple methods of stakeholder engagement and public outreach to solicit comments and feedback regarding the proposal. The following provides a summary of public involvement throughout the NEPA process; detailed information is provided in Appendix A, *Public and Agency Involvement*, of the EIS.

Scoping

Scoping provides an opportunity for the public, Federal, state, tribal, and local governments and government agencies and other interested parties to learn about a proposed project and provide input. The FAA published the Notice of Intent to prepare an EIS in the Federal Register on May 10, 2024 (89 Federal Register 40526 Issue 92). Notices were also published in the *Orlando Sentinel*, *Florida Today*, and *Al Dia Today* to inform the public and government agencies of the EIS and announce the scoping comment period and scoping meetings. Notices were provided in English and Spanish. The scoping period lasted 45 days (May 10, 2024, through June 24, 2024). The FAA held three in-person public scoping meetings (two on June 12 and one on June 13, 2024) and one virtual public scoping meeting on June 17, 2024.

A summary of public scoping activities and comments received is provided in Section 1.4, *Public Involvement*, of the EIS, while Appendix A.1, *Public Scoping,* of the EIS provides greater detail, along with all scoping submittals received from the public and agencies.

Draft EIS Review

In accordance with NEPA and the FAA's procedures for implementing NEPA (FAA Order 1050.1F), the FAA released the Draft EIS (DEIS) for public review and comment on August 8, 2025. The DEIS was made available to the public electronically on the Federal Non-rulemaking Docket Portal (Docket Number FAA-2024-1395) and on the FAA website, and hard copies were placed in local libraries. The Executive Summary was also provided to international stakeholders potentially affected by airspace closures. The purpose of releasing the DEIS to the public was to solicit comments from the public, agencies, and other interested stakeholders regarding the content and analysis presented in the document. The FAA placed a notice in the Federal Register, made an announcement on the FAA's website, and published advertisements in local newspapers (*Orlando Sentinel*, *Florida Today*, and *Al Dia Today*) announcing the availability of the DEIS along with its public review and comment period. The FAA also provided letters and email notifications to those on a curated distribution list, announcing DEIS availability. Notices were provided in English and Spanish. The public review and comment period was open from August 8, 2025, to September 29, 2025.[4]

The FAA held four in-person public meetings (two on August 25, 2025, and two on August 27, 2025) and one virtual public meeting on September 4, 2025, to solicit comments on the DEIS. In addition to announcing the availability of the DEIS, the Federal Register, website, and newspaper announcements also provided notification of the public meetings. In addition, flyers were placed at the local libraries, and media announcements were provided to local media outlets. At the meetings, the FAA described the environmental review process, discussed the Proposed Action and alternatives, summarized the environmental analysis presented in the DEIS, and provided the public an opportunity to offer comments.

A summary of DEIS public/agency review activities and comments received is provided in Section 1.4, *Public Involvement*, of the EIS, while EIS Appendix A.2, *Draft EIS Review*, provides complete details of the DEIS public involvement process, along with substantive public/agency DEIS comments and associated responses to those comments.

ES.6 Licenses, Permits, and Approvals (EIS Section 1.5)

FAA License

Under 14 CFR Part 450, SpaceX would be required to obtain a new license or modification of their existing vehicle operator license for the Starship-Super Heavy launch vehicle at KSC's LC-39A. A vehicle operator license may authorize launch, reentry, or both. To comply with the FAA's licensing requirements, SpaceX will enter into a Letter of Agreement with appropriate air traffic control centers to accommodate flight parameters of Starship-Super Heavy. SpaceX may also enter into a Letter of Agreement with appropriate USCG Districts to safely operate the Starship-Super Heavy launch vehicle over open ocean.

Other Licenses, Permits, and Approvals

While not comprehensive, this list identifies the significant applicable environmental regulatory requirements associated with implementing the Proposed Action that are addressed in the EIS. Section 1.5.2, *Other Licenses, Permits, and Approvals*, of the EIS provides more detail regarding these

[4] The public review and comment period was initially scheduled to close on September 22, 2025; however, the FAA extended the comment period until September 29, 2025.

regulatory requirements, which are addressed in the EIS analyses of the applicable resource sections: Bald and Gold Eagle Protection Act; Clean Air Act; Endangered Species Act (ESA); Magnuson-Stevens Fishery Conservation and Management Act; Marine Mammal Protection Act; Migratory Bird Treaty Act; U.S. Department of Transportation (DOT) Act Section 4(f); Coastal Zone Management Act; National Historic Preservation Act (NHPA); Clean Water Act; Industrial Wastewater Permitting; Florida Environmental Resources Permit Program; and liquefaction plant siting and permitting.

ES.7 Proposed Action and Alternatives (EIS Chapter 2)

The FAA's Federal action is to issue a new vehicle operator license to SpaceX or modify their existing license to allow Starship-Super Heavy operations at LC-39A (see Figure ES-1) and any subsequent license modifications and renewals under 14 CFR Part 400 that are within scope of the EIS. The FAA's Federal action also includes the FAA's issuance of temporary airspace closures. LC-39A is a NASA-owned, SpaceX-leased launch site located on KSC property, approximately 3 miles (5 kilometers) east of NASA's Vehicle Assembly Building (Figure ES-2). LC-39A currently supports Falcon 9 and Falcon Heavy launches.

Following completion of the 2019 NASA EA (NASA, 2019a), SpaceX began developing a site within the perimeter of LC-39A for Starship-Super Heavy launch operations intended for future Starship-Super Heavy missions. SpaceX would continue to launch Falcon missions at LC-39A while Starship-Super Heavy is operational.

SpaceX's Proposed Action includes Starship-Super Heavy launch and landing operations (up to 44 launches and 88 landings—44 for each stage [Starship and Super Heavy] of the launch vehicle—per year) at LC-39A, to include ocean landings of Super Heavy in the Atlantic Ocean and Starship in the Atlantic, Pacific, and Indian Oceans. Starship and Super Heavy could land on floating platforms (referred to as "droneships") in the ocean. Infrastructure improvements at LC-39A are proposed to support launch and landing operations. A detailed discussion of the Proposed Action is provided in subsequent subsections.

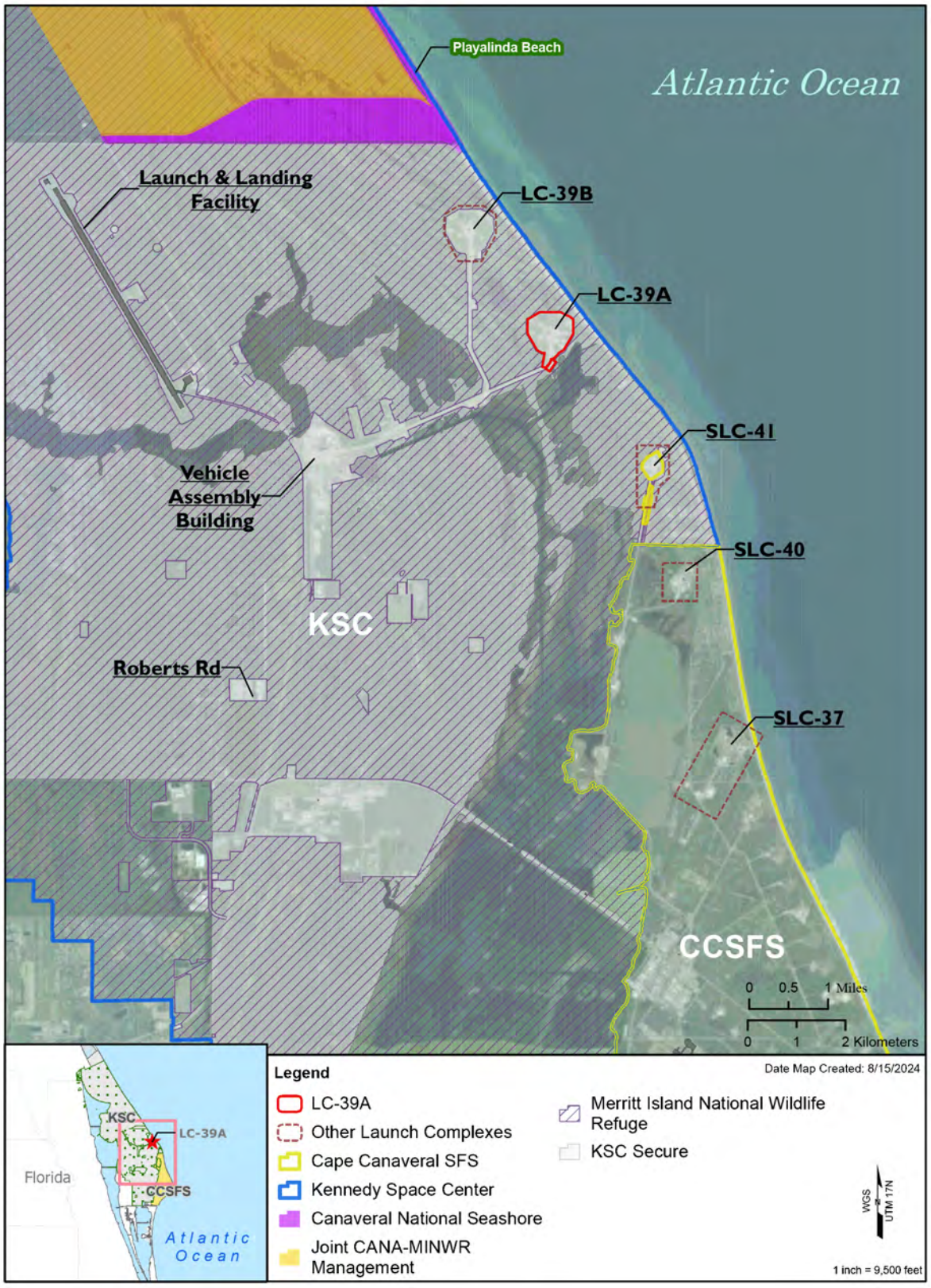


Figure ES-2. Proposed Action Location

Starship-Super Heavy is composed of two stages: Super Heavy is the first stage (or booster), and Starship is the second stage (Figure ES-3). The fully integrated Starship-Super Heavy launch vehicle is expected to be up to 492 feet (150 meters) tall depending on configuration and approximately 30 feet (9 meters) in diameter. As designed, both stages are reusable, with any potential refurbishment actions taking place at SpaceX facilities at KSC (e.g., HangarX, Roberts Road[5], LC-39A, etc.). Both stages are expected to have minimal post-flight refurbishment requirements; however, they may require periodic maintenance and upgrades (Figure ES-3).

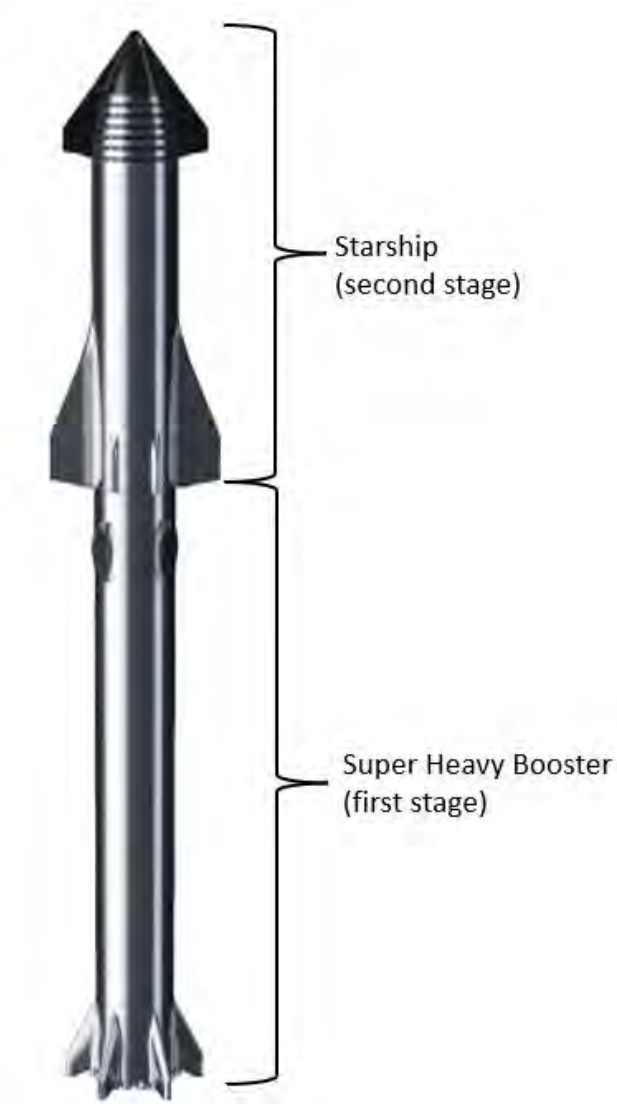


Figure ES-3. Starship-Super Heavy Launch Vehicle Design

ES.7.1 Proposed Action (EIS Section 2.1)

Starship-Super Heavy Operations (EIS Section 2.1.3)

Pre-Launch Operations

Preflight operations could include ground testing activities, tanks testing, spin-prime tests, mission rehearsals (i.e., dry and wet dress rehearsals), and static fire engine tests. A dry dress rehearsal simulates launch day conditions where a full launch countdown is conducted but the vehicle is not fueled. A wet dress rehearsal is like a dry dress rehearsal, but the vehicle is fueled. This test allows the launch team to practice timelines and procedures used for launch, and to identify potential issues. The goal of these operations is to verify that all vehicle and ground systems are functioning properly, as well as to verify that all procedures are properly written.

Static Fire Testing

Prior to launch operations, SpaceX could conduct static fire engine tests of both Starship and Super Heavy (Starship static fire tests would be conducted before integration with Super Heavy). The goal of a static fire engine test is to verify engine control and performance. During a static fire engine test, the launch

[5] Both HangarX and the Roberts Road facility support SpaceX's payload fairing processes; current improvements underway (which are not part of this Proposed Action) would support Starship development plus integration and support of future Starship missions at KSC (NASA, 2024).

vehicle engines are ignited for a short duration, generating noise and a heat plume, then shut down. SpaceX estimates that Starship and the Super Heavy booster would each conduct one static fire engine test per launch, respectively (i.e., 44 total static fire tests per stage for a total of 88 per year). SpaceX may also reduce the cadence of the static fires of the Starship or Super Heavy vehicles, not requiring a static fire of each engine test per launch operation. Static fires would be up to 15 seconds in duration and would only be conducted during the daytime. Airspace closures are not required for static fire testing. For booster static fires, an access-restricted area[6] could extend into the ocean. SpaceX would surveil the area prior to commencing propellant loading and delay the operation if a vessel was actively inside or heading toward the access-restricted area during the operation. For static fires, access-restricted areas are cleared and roadblocks established around 2 hours prior to the test and dropped after propellant is offloaded, approximately 1 hour. Cleared areas and roadblocks therefore last about 3 hours per static fire event.

Airspace Coordination/Closures

All launch and reentry operations would comply with necessary notification requirements, including issuance of Notices to Airmen (NOTAMs), as defined in agreements required for a vehicle operator license issued by the FAA. A NOTAM provides notice of unanticipated or temporary future closures to components of, or hazards in, the National Airspace System (FAA Order 7930.2U, *Notice to Airmen (NOTAM)*). The FAA issues a NOTAM at least 48 hours prior to a launch or reentry activity in the airspace to notify pilots and other interested parties of temporary conditions. NOTAMs are similarly used by foreign Air Navigation Service Providers to provide notice of temporary airspace closures in their airspace. Advance notice via NOTAMs and the identification of Aircraft Hazard Areas (AHAs)[7] assist pilots in scheduling around any temporary disruption of flight activities in the area of operation.

The location and size of airspace closures for commercial space operations also vary with each mission type and are influenced by multiple factors, including prior flight history. The size of airspace closures can grow or shrink as reliability is either decreased or increased with results and analysis from each launch. The FAA worked with SpaceX to develop notional launch and reentry trajectories and associated AHAs for this EIS. These AHAs define the temporarily closed airspace that would be established and published through a NOTAM prior to the launch/reentry.

Launches and Super Heavy Reentries

Starship-Super Heavy launches and Super Heavy booster reentries[8] would impact air routes extending eastward from the launch site over portions of the Atlantic Ocean, covering approximately 1,600 nautical miles (3,000 kilometers). AHAs may necessitate the closure of dozens of coastal and deep-water oceanic airways over the Atlantic Ocean, requiring substantial aircraft rerouting to avoid the AHAs. The northernmost and southernmost launch and Super Heavy booster reentry trajectory could impact the airspace of Canada and the Bahamas, respectively. The Bahamas would be expected to close its airspace

[6] The access restricted area is the safety zone associated with the potential for an anomaly on the launch pad. Within the access restricted area, no personnel are allowed. The closure area represents a bounding case, using the highest possible fuel volume as well as the highest possible liquid oxygen (LOX)/methane yield.

[7] Hazard areas are any region of land, sea, or air that must be surveyed, publicized, controlled, or evacuated to control the risk to the public. It includes regions of land, sea, and air potentially exposed to hazardous debris generated during normal flight events and all reasonably foreseeable failure modes.

[8] Super Heavy booster landings at the launch site are included in the launch AHAs and are assumed to occur within approximately 10 minutes of a Starship-Super Heavy launch.

up to 6,000 feet (1,829 meters), and the FAA would close the airspace above that level. See Figure ES-4 for a depiction of the range of notional launch and Super Heavy landing trajectories and associated AHAs.

Starship Reentries

Starship reentries would impact air routes extending westward from KSC LC-39A over portions of the Pacific Ocean, Central America, Gulf of America, Caribbean Sea, Florida Peninsula, and Atlantic Ocean. AHAs may necessitate the closure of dozens of coastal and deep-water oceanic airways over the Pacific Ocean, Gulf of America, Caribbean Sea, and Atlantic Ocean, requiring significant aircraft rerouting to avoid the AHAs. Multiple airports may require departure stops due to the overlying AHA. See Figure ES-5 for a depiction of the notional range of Starship reentry AHAs.

Maritime Coordination

All launch and reentry operations would comply with necessary notification requirements, including issuance of a Notice to Mariners (NOTMAR), as defined in agreements required for a vehicle operator license issued by the FAA. 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 restrict vessel movement; rather, the NOTMAR disseminates relative information regarding maritime activity and temporary hazards within a defined area to ensure public awareness and safety during the proposed operations.

The USCG publishes NOTMARs through multiple media platforms, to include Local NOTMAR, Broadcast NOTMAR, and Navigational Telex, as needed, to inform the maritime community of temporary changes in condition, Limited Access Areas, Regulated Navigation Areas, and hazards on navigable waterways. Notices in international areas are published by the National Geospatial Intelligence Agency. Advance notice via a NOTMAR and the identification of SHAs would assist mariners in voyage planning and scheduling around any temporary operation.

All landing operations would comply with necessary notification requirements, including issuance of NOTMARs by the USCG, as defined in agreements required for a vehicle operator license issued by the FAA. The USCG maintains authority to establish and enforce Limited Access Areas and Regulated Navigation Areas as needed to support public health and safety during these events. A NOTMAR provides a notification regarding a temporary hazard and any additional safety measures within a defined area (an SHA) to ensure public safety during proposed operations.

Launches (up to 44 per year) and landings (a total of 88, up to 44 per vehicle, per year) would be of short duration, and scheduled in advance to minimize interruption to ship traffic.

Land-Side Coordination

Static fire tests, launches, and landings (both booster and Starship) would require land-based access restrictions. Figure ES-6 provides a graphical representation of notional access-restricted areas. Any required CANA or MINWR closures would be coordinated between SpaceX and the respective agency, the NPS and the USFWS, as appropriate. CANA and MINWR closures might also occur due to the volume of visitor traffic, because launch activity on KSC has historically attracted people to the area including MINWR and CANA, enhancing the visitor experience and public enjoyment. Such closures are coordinated between KSC Security Police, Spaceport Integration and Services, the USFWS, and the NPS by monitoring to ensure parking lot thresholds are not exceeded and roadways allow for emergency egress for any form of emergency associated with large crowds.

Figure ES-4. Range of Notional Launch and Super Heavy Landing Trajectories and Associated AHAs

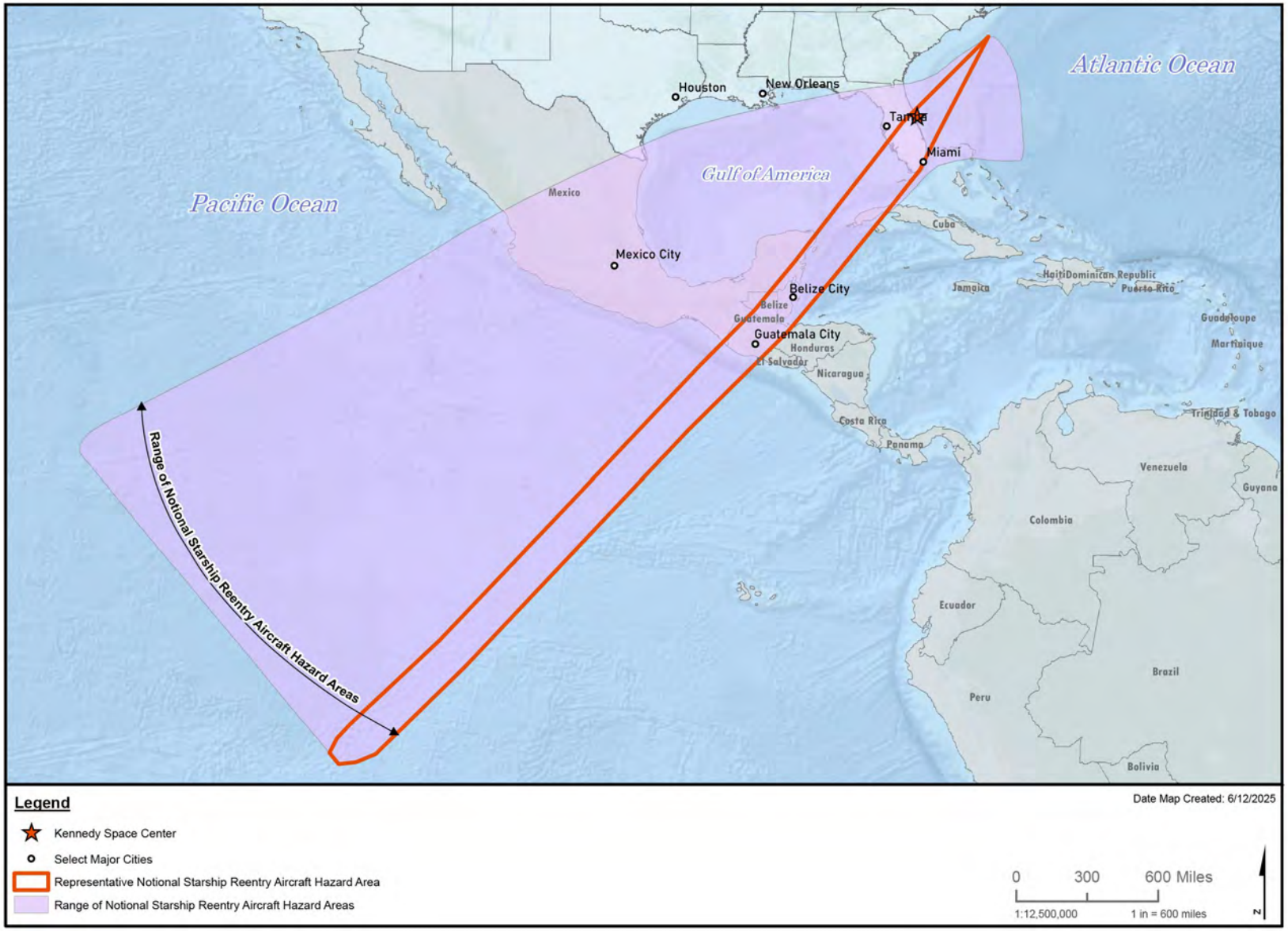


Figure ES-5. Notional Range of Starship Reentry AHAs

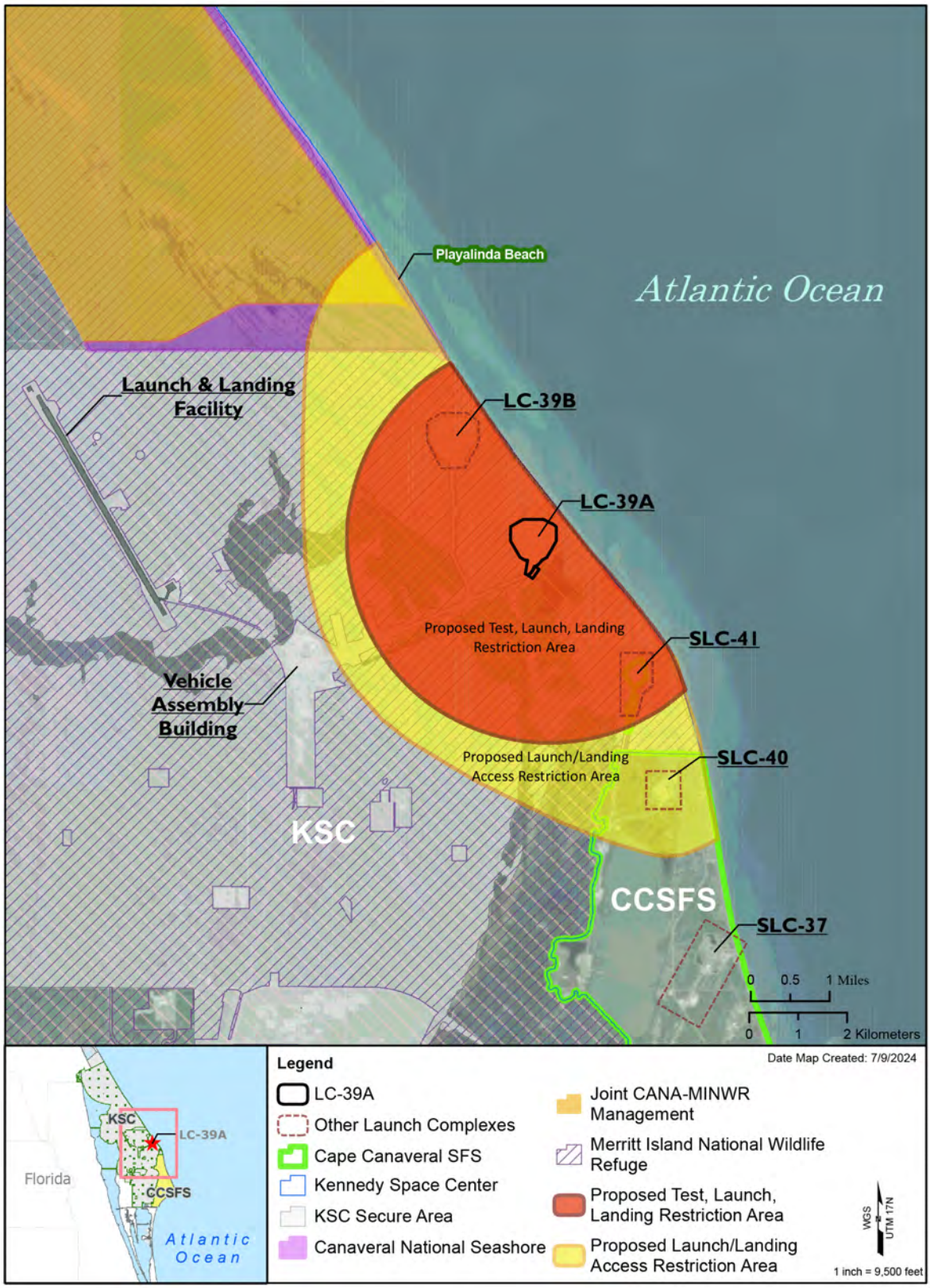


Figure ES-6. Potential Notional Access Restriction Areas For Pre-Launch, Launch, and Landing Activities

Access-restricted areas are cleared and any necessary roadblocks are established around 3 hours prior to launch/landing and dropped after the event concludes. In the event of a scrub, cleared areas and roadblocks remain until propellant is offloaded, with the duration variable depending on the percentage of propellant loaded; however, the maximum duration would be about 1 hour. Not all attempts load propellant before scrubbing and roadblocks are often dropped early.

The restricted areas shown are estimated and provide only a representative depiction; exact restricted areas would be determined prior to pre-launch activities and launch/landing. For planning purposes to support this EIS, SpaceX and NASA used conservative assumptions to develop these restricted areas. Ultimately, each restricted area is mission specific and will be determined by Range Safety and the FAA through the FAA license or license modification process.

After receiving license or license modification materials, the FAA will determine the appropriate restricted areas to protect public safety and compare those areas to the assumptions provided in the EIS. The FAA would address any discrepancies or gaps, if found, in the environmental analysis.

Static fire tests would result in restricted access to areas not currently accessible to the public and would last approximately 3 hours each time; these would mostly affect land management and mission-related activities on MINWR and KSC. Restricted access associated with launches and landings would be expanded to also affect the northern portion of CCSFS, which would include Space Launch Complex (SLC)-41 (leased to United Launch Alliance) and SLC-40, and publicly accessible areas in the southern portion of MINWR and CANA that includes Playalinda Beach. Restricted areas in areas accessible to the public would be closed to the public during the identified operations due to safety concerns. All closures, whether dictated by public safety concerns (i.e., the Range or the FAA require the closure) or by the NPS due to visitor volumes exceeding capacity, would be temporary.

While restricted access requirements are limited to the duration that the access-restricted area is in effect (i.e., between 3 and 3.5 hours), the actual duration of a closure associated with publicly accessible areas may be longer due to logistical aspects. Based on information provided by the NPS, duration of closures for portions of CANA and Playalinda Beach is affected by the time of day/night that the test or launch occurs. Due to logistics of closures (e.g., NPS personnel clearing the park of visitors, etc.), midday (or later) launches or tests could result in the need to close portions of the park for the entire day; tests or launches occurring very early in the morning may result in the park being closed for a portion of the day.

Based on information provided by the NPS, it is estimated that there could be between 33 and 44 (using the most conservative estimate) full-day closures and up to 33 half-day closures, which equates to up to 60.5 total “closure days” per year (44 full days + 33 half-days = 60.5 “full days”). Launch scrubs and weather delays could affect the length and/or number of closures; however, the extent of these occurrences cannot be quantified at this time. Table ES-1 provides a summary of pre-launch and closure-related activities and notional closure times/durations. As mentioned previously, it is anticipated that, similar to other launch vehicles like Falcon, associated closure areas would reduce in size and duration as the program matures, more data is available, and the reliability of the vehicle improves.

Table ES-1. Summary of Pre-Launch Starship/Super Heavy and Pre-Reentry of Starship Closure-Related Activities

Action	Purpose	Start Time	End Time[1]
Establish check points and take down check points	Set up for launch and remove after launch. Commence monitoring of traffic flow.	T[2] – 6 to 12 hours	T + 5 to 30 minutes
Establish hard access control checkpoints	Restrict public access to access-restricted area and limit access within the USCG LAA (same for static fire).	T – 3 hours	T + 5 to 30 minutes
USCG/other waterborne law enforcement on station	USCG and/or other local waterborne law enforcement sweep areas and restrict/limit (LAA) boating access (same for static fire).	T – 3 hours	T + 5 to 30 minutes
Security sweeps	Security sweeps responsible areas (e.g., beach, roads near launch site, rivers and creeks). Verify by video, UAV, or ATV as needed.	T – 2 hours	T – 1 hour 40 minutes
Trajectory sweeps	Verify with radar sweep.	T – 1 hour	T – 40 minutes
Close airspace	In accordance with agreed procedure, FAA Air Traffic Control closes appropriate commercial airspace. Airspace closures potentially affecting Special Use Airspace would be coordinated with the appropriate using agency (e.g., CCSFS, Patrick Space Force Base).	T – 15 minutes	T + 5 to 30 minutes
		Approximate minimum 40-minute, and up to 2-hour closure for launches. Approximate minimum 40-minute, and up to 1-hour closure for Starship reentries.	
Estimated Restricted Access Time per Static Fire Engine Test (88/year) and Wet Dress Rehearsal (44/year) within access-restricted area and LAA (up to approximately 13,550 feet/2.6 miles [4.2 kilometers] from the center of LC-39A)		Approximately 3 hours	
Estimated Total Annual Restricted Access Time within access-restricted area and LAA for Static Fire Engine Tests and Wet Dress Rehearsals		Approximately 396 hours	
Estimated Closure and Limited Access Time per Launch/Booster Landing (44/year) or Starship Landing (44/year) within the access-restricted area/LAA (up to approximately 22,965 feet/4.4 miles [7 kilometers] from the center of LC-39A). Note: Booster landings would not be considered an "additional event" for closure length determinations.		Up to 3.5 hours	
Estimated Total Annual Closure and Limited Access Time for Launches/Booster Landings and Starship Landings within the access-restricted area/LAA (50% between 7:00 a.m. and 10:00 p.m. and 50% between 10:00 p.m. and 7:00 a.m.)		Approximately 308 hours	
Estimated Total Annual Closure and Limited Access Time within access-restricted area and LAA (44 launches/booster landings + 44 Starship landings + 88 static fire engine tests + 44 wet dress rehearsals)		Approximately 704 hours	

Notes: % = percent; ATV = all-terrain vehicle; CCSFS = Cape Canaveral Space Force Station; FAA = Federal Aviation Administration; LAA = Limited Access Area; LC = Launch Complex; UAV = unmanned aerial vehicle; USCG = United States Coast Guard.

[1] Does not apply to static fire or wet dress—all times assume nominal launch/landing sequence.

[2] "T" implies the anticipated time of engine firing, with start and end times measured before (minus x hours or minutes) or after (plus x hours or minutes).

Launch Operations

Starship-Super Heavy would launch from LC-39A up to 44 times per year and could occur at any time of day or night; for purposes of noise analysis, it is assumed that 22 launches would occur during the day (7:00 a.m. to 10:00 p.m.) and 22 launches would occur at night (10:00 p.m. to 7:00 a.m.). During a launch, ignition of the Super Heavy booster Raptor engines would generate a heat plume. The plume would appear clear and consist of water vapor, carbon dioxide (CO_2), carbon monoxide, hydrogen, methane, nitrogen oxides (NO_x), and oxygen. The heat plumes and increased temperatures in this area would be temporary and would only occur during engine ignition and dissipate within minutes. A flame diverter or similar infrastructure (e.g., a water-cooled diverter) would be constructed to reduce potential effects due to the plume (a diverter can direct the plume upward, away from the ground). Launches would result in noise and vibration, and nighttime launches would require lighting.

Super Heavy and Starship Landing Operations

SpaceX plans to land the reusable Super Heavy and Starship back on land at LC-39A or on floating platforms in the ocean. As SpaceX continues to develop the capability to perform an RTLS landing of Super Heavy and the Starship, some vehicles may not be reused and instead may be expended in the ocean in the following three conditions depending on the stage of development of the program:

1. Hard water landing at terminal velocity and break up on impact, resulting in an explosive event at the surface of the water
2. Soft water landing and tip over and sink or explode on impact at the surface of the water[9]
3. In-flight breakup—breakup during reentry, resulting in debris falling into the ocean (up to 25 times per year of each vehicle stage)

Of the above scenarios, SpaceX anticipates no more than 20 explosive events at the surface of the water (Scenario Number 1) for each vehicle for the life of the program. These three scenarios are only anticipated to occur within the first 5-6 years of the program.

For Super Heavy ocean landings, Super Heavy would land on a droneship or be expended in the Atlantic Ocean (Figure ES-7). Starship could land on a droneship (floating platform) or be expended in any of the following landing areas shown in Figure ES-8, Figure ES-9, and Figure ES-10. The landing area in the Pacific Ocean is outside the U.S. Exclusive Economic Zone. The droneship operations and specifications were assessed in the 2025 National Marine Fisheries Service consultations (NMFS, 2025a; NMFS, 2025b). Additionally, a Starship nearshore contingency landing zone is located in the Atlantic Ocean, beginning 1 nautical mile (2 kilometers) or more from the coast and covering a distance of up to 50 miles (80 kilometers) north of KSC LC-39A and up to 50 miles (80 kilometers) south of CCSFS SLC-37 (Figure ES-7). Landings that occur downrange on a floating platform would continue to be delivered by barge to the Port Canaveral and transported the remaining distance to the launch site through the Turn Basin and then over established roadways.

[9] A soft water landing is when the launch vehicle intentionally slows its speed to land in the water.

Figure ES-7. Starship and Super Heavy Atlantic Ocean Landing Areas and Notional Range of Starship RTLS Headings

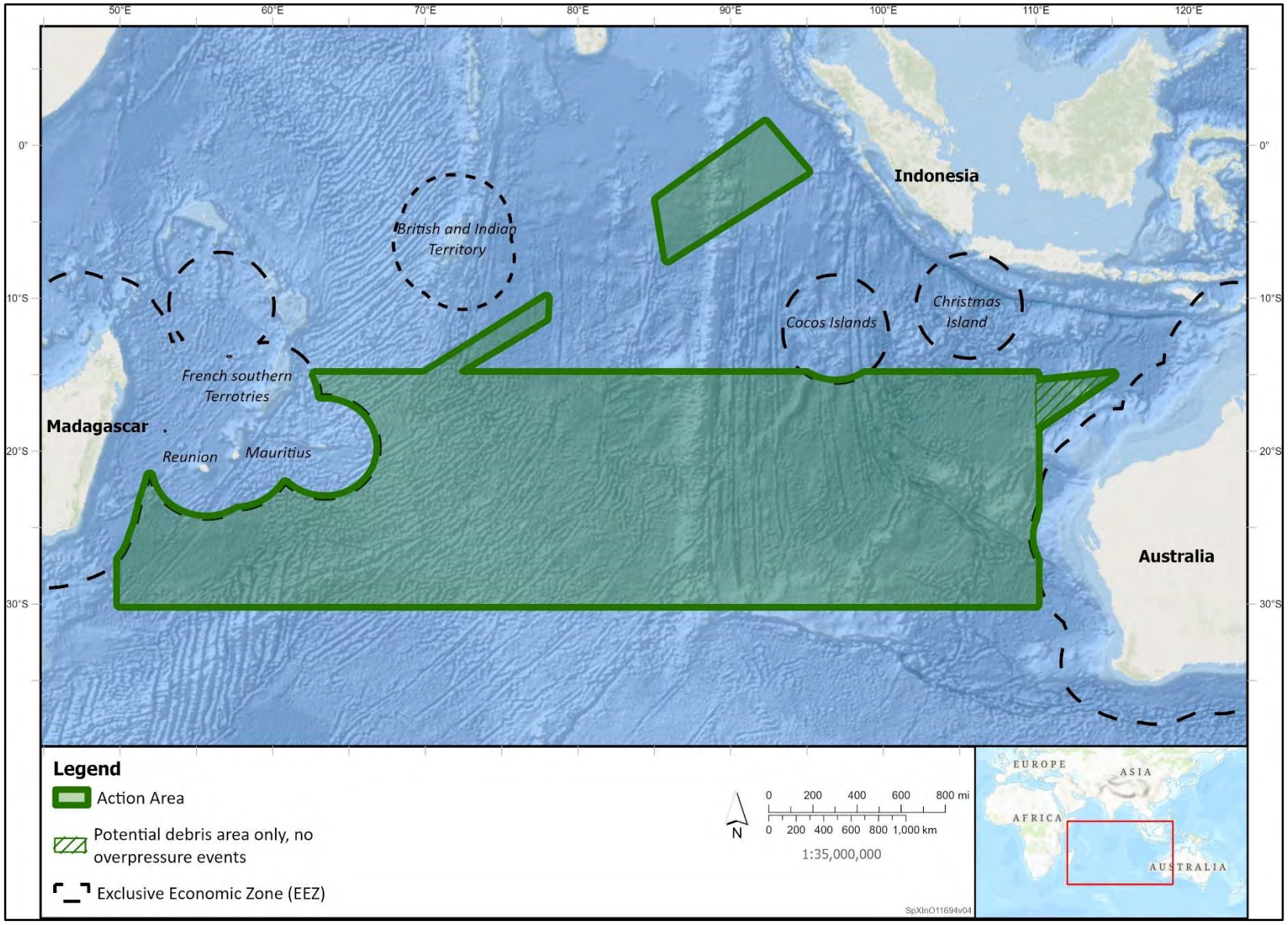


Figure ES-8. Indian Ocean Starship Landing Area

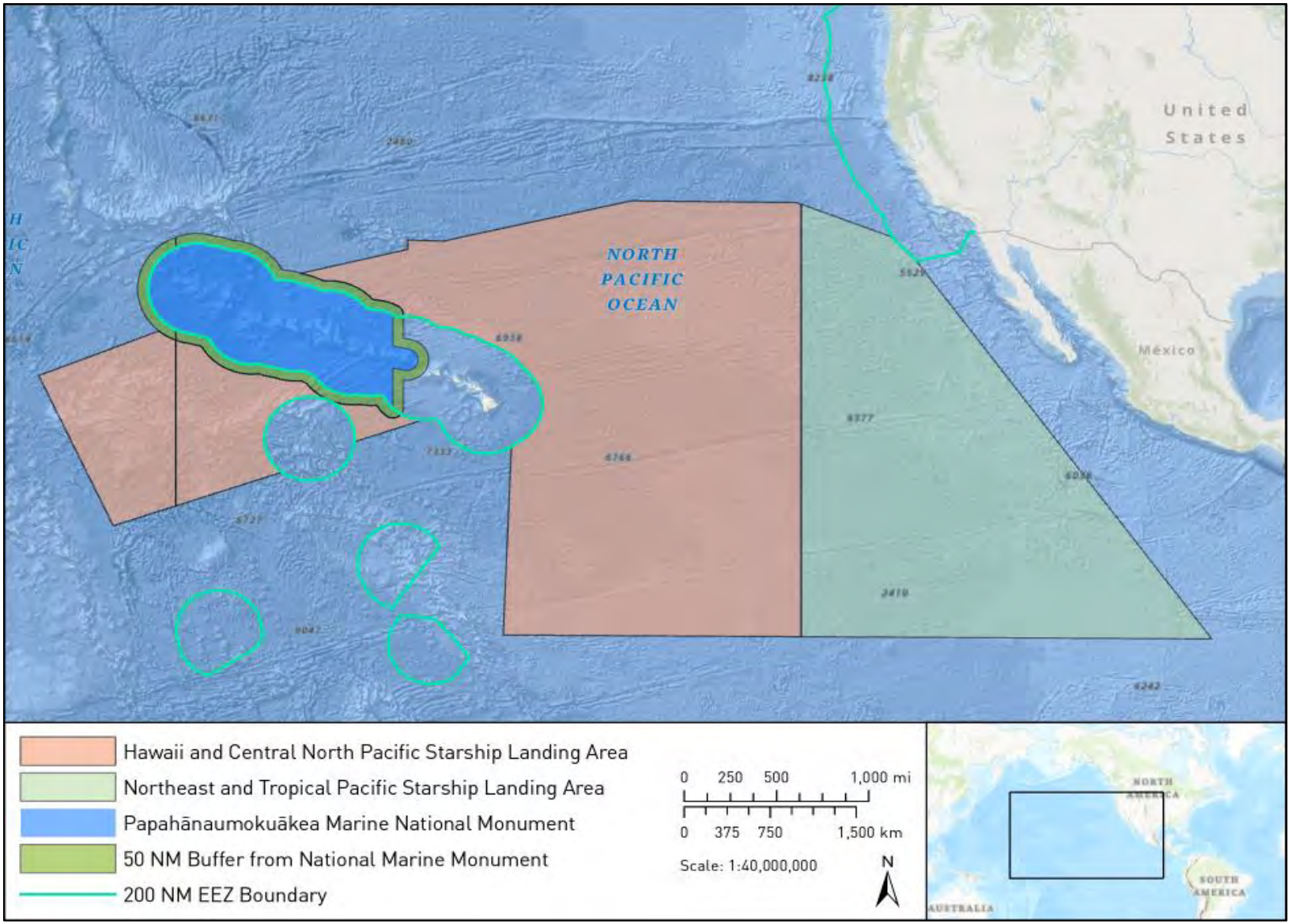


Figure ES-9. North Pacific Starship Landing Area (Hawaii and Central North Pacific Landing Area and Northeast and Tropical Pacific Ocean Landing Area)

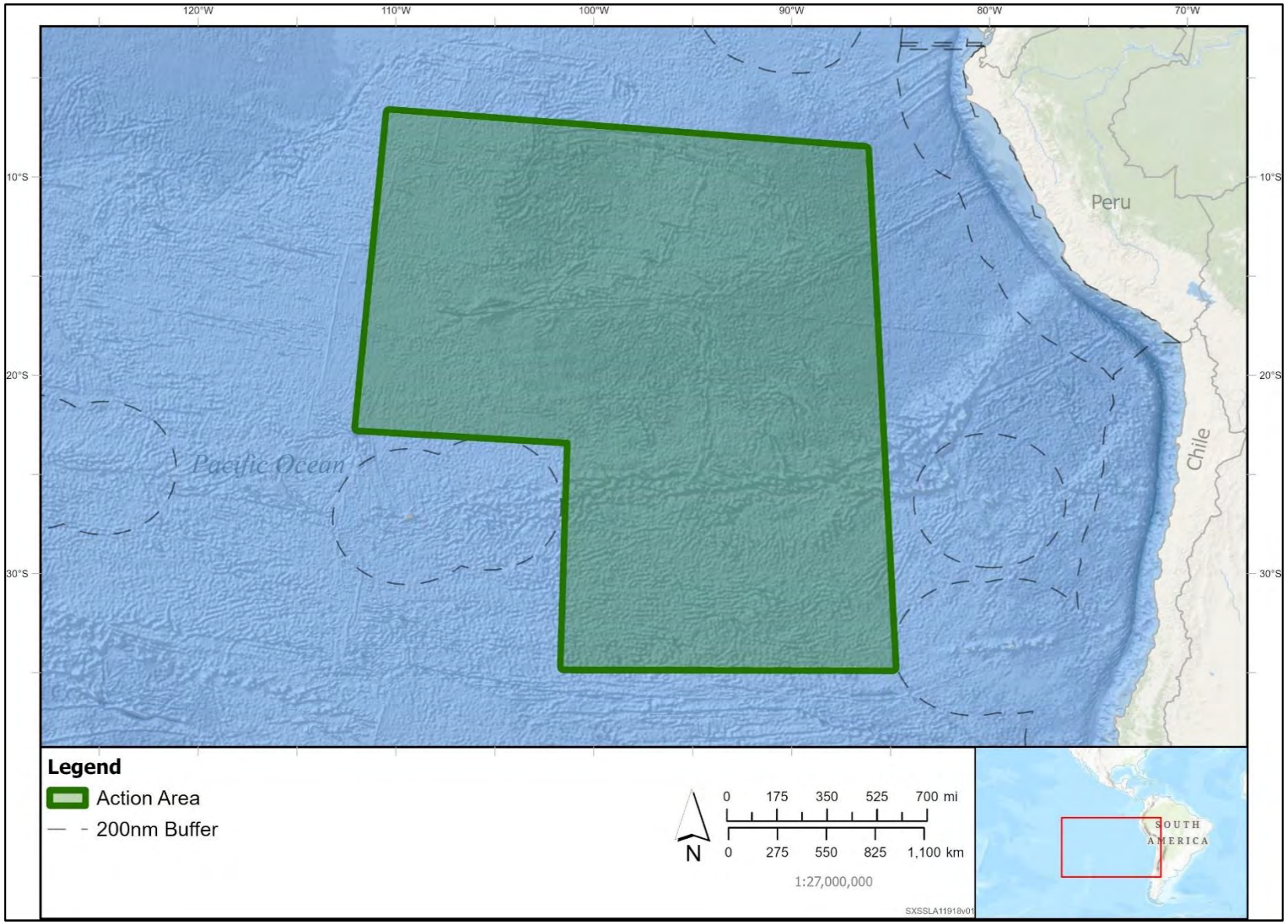


Figure ES-10. Southeast Pacific Starship Landing Area

Trajectories

Starship-Super Heavy launch and RTLS trajectories would be specific to each particular mission. Flight trajectories vary based on mission specifics such as desired payload orbit. Starship-Super Heavy launch azimuths would range from 40 degrees to 115 degrees, from a reference of due north at 0 degrees and due east at 90 degrees (see Figure ES-4); RTLS trajectories would be the same for the Super Heavy booster. RTLS trajectories for Starship would likely be in a range from the southwest/northwest eastward toward LC-39A; reentry trajectories and landing headings are shown in Figure ES-5 and Figure ES-7, respectively. Restricted airspace parameters would need to be modified for Starship-Super Heavy operations based on individual launch and RTLS trajectories.

Anomalies

A Starship-Super Heavy operation could result in a deviation from what is expected (referred to as an anomaly). An anomaly on the launch pad could cause a fire on the launch pad and/or an explosion onsite or elsewhere that spreads debris. While anomalies are unexpected, as part of evaluating a vehicle operator license, the FAA evaluates SpaceX's debris analysis to ensure the hazard area is of sufficient size to ensure public safety. 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 requirements in a site-specific anomaly [or emergency] response plan.

LC-39A Infrastructure (EIS Section 2.1.4)

A conceptual plan of proposed infrastructure improvements at LC-39A are shown in Figure ES-11 and described in the following sections. The figure shows facilities that were previously approved for construction (and currently under development) under the 2019 NASA EA, as well as those associated with this Proposed Action. It is estimated that remaining construction would last up to 2 years. Table ES-2 provides a summary of the proposed infrastructure.

Table ES-2. Proposed Starship-Super Heavy Infrastructure Summary

Facility	Approximate Square Footage	Previously Approved (2019 EA)	Newly Proposed (2025 EIS)
Propellant Generation			
Liquid Oxygen Farm	65,454	x	
Methane Farm	78,876	x	
Vaporization Farm	9,650	x	
Liquid Nitrogen Farm	13,342	x	
Air Separation Unit	222,071		x
Liquefaction Plant	17,246		x
General Infrastructure			
Water Farm	17,955	x	
Catch Tower	5,992		x
Deluge Pond	121,963		x
Ponds	68,799	x	
Launch Mount	36,568	x	
Landing Zone	72,672	x	
Integration Tower	6,184	x	
MegaPacks	34,979		x
Power Hub	28,998		x
Total	**800,647**		

Notes: EA = Environmental Assessment; EIS = Environmental Impact Statement.

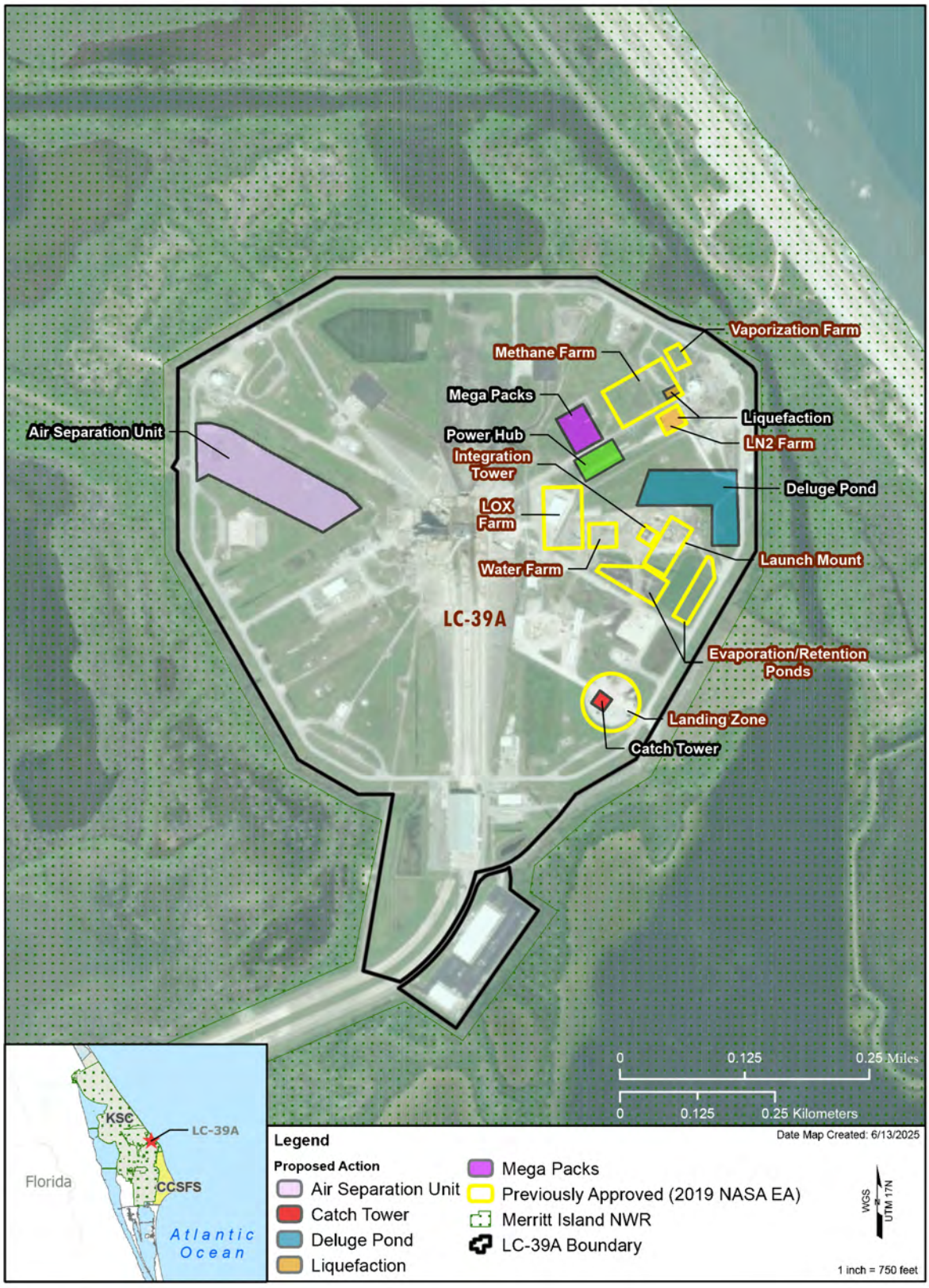


Figure ES-11. Proposed LC-39A Infrastructure

Propellant Generation

The Starship-Super Heavy Raptor engines are powered by liquid oxygen (LOX) and liquid methane (LCH_4). SpaceX is proposing to construct onsite facilities for propellant generation and propellant storage, and storage tanks for LOX and LCH_4 are under construction as approved under the 2019 NASA EA.

Propellant generation facilities would be operated using natural gas and/or existing electrical power lines and "MegaPacks" (a large-scale rechargeable lithium-ion battery stationary energy storage product that can store up to 3.9 megawatt (MW)-hours of electricity). The current concept of operations is that, until the liquefaction plant and air separation unit (ASU) are constructed (this is due to the extensive lead time necessary for final design, construction, and onboarding of these facilities), commodities would be trucked to LC-39A to generate propellant. For the purposes of a "maximum use" analysis in this EIS, current estimates of the number of trucks per launch for commodities include 270 for LOX, 80 for liquid nitrogen (LN_2), and 90 for LCH_4. At 44 launches per year, this equates to a total of 19,356 trucks per year. During a 12-hour period for operations occurring 365 days per year, this approximates to 53 trucks per day (or 4 to 5 trucks per hour).

SpaceX would process natural gas brought to the site for propellant generation. A natural gas pretreatment system would remove impurities such as mercury, sulfur, water, CO_2, and hydrocarbons heavier than methane from the natural gas to produce a stream of higher purity gaseous methane; impurities would be captured through a filtration system and managed according to KSC solid and hazardous waste requirements. Surplus natural gas would be used for process work, power generation, or would boil off like a natural gas line venting. The natural gas pretreatment system would include a small amine treating unit for CO_2 removal, a scrub column to remove heavy hydrocarbons that would be up to 100 feet (30 meters) tall and 10 feet (3 meters) in diameter, and four to six smaller vessels approximately 6 feet (2 meters) in diameter and up to 30 feet (9 meters) tall.

As part of the liquefaction process, SpaceX proposes to construct a methane liquefier to supercool pretreated natural gas into a liquid state for storage and transportation to the launch vehicle. The natural gas pretreatment and liquefier together would be comprised of several structures each up to 65 feet (20 meters) tall. The methane liquefier would be cooled by a typical evaporative cooling tower requiring up to 30 cubic meters per hour (approximately 8,000 gallons [30,000 liters] per hour) of water (acquired through existing water pipelines) and producing up to 3 cubic meters per hour (approximately 800 gallons [3,000 liters] per hour) of wastewater, which would be captured by evaporation/retention ponds as identified in Figure ES-11.

SpaceX proposes to construct an ASU within the LC-39A fence line to generate LN_2 and LOX to support launch activities. An ASU dehumidifies, liquefies, and separates air into its major components (oxygen and nitrogen). The liquid would then be transferred via pipeline to storage tanks at LC-39A. The ASU would be cooled by a typical evaporative cooling tower requiring approximately 75 cubic meters per hour (approximately 20,000 gallons [75,700 liters] per hour) of water and producing approximately 7 cubic meters per hour (approximately 2,000 gallons [7,600 liters] per hour) of wastewater. Water/wastewater would be managed in the same way as identified for the evaporative cooling tower as discussed previously. The ASU would be up to approximately 180 feet (55 meters) tall with supporting infrastructure up to approximately 60 feet (18 meters) tall. An onsite ASU reduces the need to transport nitrogen and oxygen to LC-39A from offsite via trucks as discussed previously.

Wastewater generated by the ASU and stormwater would be treated onsite via evaporation and retention ponds. Any residuals may be treated onsite, hauled off, or conveyed in a wastewater system that has capacity. Onsite treatment could include, but is not limited to, methods such as membrane aerated biofilm reactors or other processes. Reclaimed wastewater could then be discharged onsite via a stormwater pond, exfiltration trenches, infiltration basins, Class V group 6 drainage wells, percolation/evaporation ponds, or industrial evaporators or used for irrigation purposes or some other permitted method. If discharge would occur, SpaceX would acquire all necessary permits from the St. Johns River Water Management District and/or the Florida Department of Environmental Protection (FDEP). Utility work within LC-39A would occur to provide power and water to the system, with any new utility lines placed underground. As mentioned previously, up to 12 MegaPacks would be installed to support 24 MW/48 MW hours of power generation. Existing commodity tanks would be used where practicable and a 10,000-gallon (40,000-liter) aboveground storage tank would be constructed to store LN_2 for system purges. Propellant generation infrastructure location is shown in Figure ES-11**.**

Stormwater Evaporation/Retention and Deluge Ponds

SpaceX proposes to construct additional stormwater evaporation/retention and deluge ponds, if needed, to manage water associated with deluge and stormwater within LC-39A. Preliminary pond locations are shown in Figure ES-11. In general, the deluge system would apply a large amount of water to rapidly cool and create a barrier between the steel plate of the launch mount and rocket exhaust that will help to absorb sound energy and heat produced by the rocket engines and would allow the steel plate to be reused. It is expected that approximately 92 percent of the water would be vaporized by the heat of the rocket engines (FAA, 2023). Water delivery to the site would be by truck or pipeline, as previously described, and stored in tanks.

The deluge and diverter system and associated operational parameters are still in the design phase, and specific details are currently unknown. The deluge system would be activated during each ignition event on the orbital launch pad, including engine ignition tests and launches, and during landings. Each launch is associated with an estimated two static fire engine tests (one each for Starship and Super Heavy). Therefore, the deluge system may operate up to 220 times per year (88 static fires, 44 launches, and 44 landings each for Starship and Super Heavy).

The deluge system would be activated immediately prior to an engine ignition or landing event, allowing water to flow from the storage tanks, through the piping network, to the spray nozzles at the launch pad. Five seconds prior to ignition/landing, water would begin discharging. Most of this pre-ignition water would be captured by the containment structures. SpaceX estimates that up to 50 million gallons (190 million liters) of water per year would be utilized for launch/landing deluge operations at the site (approximately 137,000 gallons [519,000 liters] per day). SpaceX plans to reuse deluge water that is retained onsite (i.e., not evaporated). In the event SpaceX is unable to reuse the deluge water, it may be hauled offsite, discharged, or land applied. Prior to any discharge or land application, SpaceX would apply for any applicable FDEP permits. All ponds would be lined to prevent percolation of contaminants into the groundwater and would be maintained and monitored by SpaceX. Berms would be built around the ponds to eliminate additional stormwater/rainwater inflow/outflow. No deluge water would enter the Banana River or adjacent waterbodies or wetlands.

During engine ignition of the Starship-Super Heavy, the surface of the pad flame diverter could experience a small amount of ablation (erosion of steel from the metal surface resulting from heat and force, considered common on metal launch infrastructure). The ablated steel would quickly recondense near the launch mount when exposed to the deluge water. The metal components of the steel could remain localized to the launch pad, captured in the deluge water and retained onsite, or dispersed in vapor. SpaceX would implement sampling protocols in accordance with an amended Multi-Sector General Permit for industrial stormwater from FDEP and would remove water containing contaminants that exceed the water quality criteria and haul it to an approved industrial stormwater treatment facility. SpaceX would pump all other water not within permitting standards back to the water storage tanks for the deluge system.

Launch Vehicle Transport and Refurbishment

Fabrication, assembly, delivery, and integration of components would occur at existing SpaceX facilities located on KSC and CCSFS (NASA, 2019a, p. 12). Most manufacturing would occur at the SpaceX facility in Boca Chica, Texas. Starship or Super Heavy components would be delivered over roadways on a mobile transporter like the transports performed for Falcon. Large vehicle components would be transported by barge from the Port of Brownsville, Texas, utilizing the KSC Turn Basin to the Vehicle Assembly Building location, then via Crawlerway to LC-39A (Figure ES-12). These are the same locations and processes utilized for current large vehicle transport (i.e., Falcon) and that were used during the Shuttle Program.

No improvements to transportation routes are anticipated at this time. Future transportation improvements to support SpaceX and other KSC operations that are not covered under the scope of this EIS would require additional NEPA review. Transport of Starship-Super Heavy and related components to and across KSC would generally occur as transport of rocket components currently does at KSC. This could include transport via barge or overland from SpaceX production sites, including Boca Chica, Texas, and Hawthorne, California. Any potential refurbishment actions would take place at SpaceX's facilities at KSC. Starship-Super Heavy would be transported to and from LC-39A to a SpaceX facility via SpaceX transporter over KSC roadways. At this time no improvements to KSC infrastructure outside those previously identified for LC-39A are proposed. Current and potential future improvements to KSC infrastructure that would support general SpaceX and other KSC operations were previously analyzed and approved under NEPA (NASA, 2020; NASA, 2024).

Launch Site Selection (EIS Section 2.1.6)

SpaceX's purpose and need was established in the 2019 NASA EA (NASA, 2019b) and is identified in this EIS at Section 1.3, *Purpose and Need*. FAA Order 1050.1F Section 7-1.1(e) defines "reasonable alternatives" as those that meet the purpose and need for the proposed action. Through an alternative screening process based on Starship-Super Heavy requirements and the purpose and need, the 2019 EA established LC-39A as the approved location for Starship-Super Heavy operations, and infrastructure development based on NASA's 2019 FONSI is already underway. LC-39A provides time-critical mission capability to NASA and commercial pursuits via the Starship-Super Heavy. In addition to existing launch infrastructure, LC-39A provides launch site diversity for Starship-Super Heavy to meet the purpose and need for near-term lunar exploration under the NASA Artemis and Human Landing System programs. Given the above, no other launch sites were considered for this Proposed Action.

Figure ES-12. Starship-Super Heavy Transport Routes

ES.7.2 No Action Alternative (EIS Section 2.2)

Under the No Action Alternative, the FAA would not issue a new license to SpaceX or modify their existing vehicle operator license for Starship-Super Heavy operations at LC-39A and would not close any associated airspace. SpaceX would not launch Starship-Super Heavy from LC-39A. NASA would not develop, implement, or approve agreements with SpaceX associated with Starship-Super Heavy operations at LC-39A. The No Action Alternative would not meet the purpose and need. The No Action Alternative includes reasonably foreseeable actions that would still occur regardless of the Proposed Action, such as planned launch activity at both KSC and CCSFS. No Action analyses therefore focus on reasonably foreseeable actions within each respective resource study area. Projects are identified as reasonably foreseeable if they are in published planning documents, are in the process of NEPA evaluation, or have completed NEPA evaluation but the project has not yet been implemented.

Reasonably foreseeable actions are actions that may affect projected effects of a proposal and are not remote or speculative. An action may be reasonably foreseeable even in the absence of a specific proposal. Actions not grounded in publicly available planning documents, projected development trends, or regional or local plans would typically be considered remote and speculative and are not considered. In addition, actions may be considered improbable or remote even though they have been mentioned in planning documents (e.g., general statements about future growth opportunities and unrefined lists of potential projects). This includes planned future operations and aggregate rocket noise levels from all approved actions that have completed their environmental review. Section 2.2, *No Action Alternative*, of the EIS provides greater detail on the activities included in the No Action analysis.

ES.7.3 Alternatives Considered but Eliminated from Further Analysis (EIS Section 2.3)

As discussed previously, through an alternative screening process based on Starship-Super Heavy requirements and the purpose and need, the 2019 EA established LC-39A as the approved location for Starship-Super Heavy operations; SLC-40 within CCSFS and SLC-4 within Vandenberg Space Force Base were considered as alternatives but were not carried forward (NASA, 2019a). Currently, infrastructure development in support of Starship-Super Heavy at LC-39A based on NASA's 2019 FONSI is already underway. As a result, because LC-39A is already the approved location for Starship-Super Heavy operations alternative locations are not considered within the context of this EIS.

ES.8 Summary of Environmental Consequences

Effects analyses in the EIS found no substantive or significant effects to the following resources under the Proposed Action and No Action alternatives: *Visual Effects* (EIS Section 3.6); *Water Resources* (EIS Section 3.9); *Coastal Resources* (EIS Section 3.10); *Climate* (EIS Section 3.12); *Hazardous Materials, Solid Waste, and Pollution Prevention* (EIS Section 3.13); *Natural Resources and Energy Supply* (EIS Section 3.14); *Farmlands* (EIS Section 3.15); and *Health and Safety* (EIS Section 3.18). As a result, these are not discussed further in this Executive Summary—more detail on these resource area analyses and associated best management practices (BMPs), mitigations, and monitoring actions can be found in the respective EIS sections.

ES.8.1 Noise and Noise-Compatible Land Use (EIS Section 3.2)

Proposed Action

Increased supersonic noise levels would result in significant noise effects based on criteria in FAA Order 1050.1F Desk Reference, Section 11.5.4.2, *Noise Prediction Modeling*, and other effect criteria described in Section 3.2.1, *Definition of Resource and Regulatory Setting*. Interruptions of activities in nearby communities during the 44 proposed annual Starship-Super Heavy launch and 88 landing events per year would be relatively brief. At representative locations outside KSC/CCSFS, outdoor noise levels would exceed 97 maximum A-weighted decibels (dB). The likelihood of people exposed to these noise levels being awakened indoors would be as high 82 percent during late-night operations, which would make up approximately half of total annual events at sensitive locations outside KSC/CCSFS. Noise levels would remain below 65 A-weighted dB day-night average sound level (DNL) at all locations outside the boundaries of KSC/CCSFS under the Proposed Action (Figure ES-13); all land uses would remain compatible in accordance with guidelines at 14 CFR Part 150 with propulsion noise levels. Sonic boom noise levels would exceed 60 dB C-weighted DNL (CDNL), a level at which noise-sensitive land uses are not considered compatible, in 28,595 acres (11,572 hectares) of off-KSC/CCSFS land (Figure ES-14). Propulsion noise levels would remain below hearing conservation criteria at all locations outside of KSC/CCSFS boundaries. Sonic booms exceeding 4 pounds per square foot (psf) in portions of Merritt Island would be relatively infrequent, and sonic boom noise energy would be primarily at frequencies that do not interact strongly with hearing mechanisms (Figure ES-15 and Figure ES-16). People in known high-noise areas on KSC would be provided hearing protection where appropriate, and the risk of hearing damage would remain minimal. Mitigations described in Section 3.2.5, *Best Management Practices (BMPs), Mitigation, and Monitoring*, would reduce effects somewhat, but significant effects associated with the Proposed Action are unavoidable. Details regarding associated BMPs, mitigations, and monitoring actions can be found in EIS Section 3.2.5.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. Depending on the launch vehicle and location of launch/landing areas around KSC and CCSFS, the local area would continue to experience noise-related effects associated with activity interference, sleep disturbance, and in areas near launch sites minor structural damage to older and less robust structures (depending on the launch vehicle).

ES.8.2 Land Use (EIS Section 3.3)

Proposed Action

Under the Proposed Action, land use designations at KSC would remain unchanged. Construction and operations at LC-39A would occur within areas previously approved for construction (and currently under development) as described in the NASA 2019 EA (NASA, 2019a). The Proposed Action would be consistent with the current land uses at and in the vicinity of KSC and would continue to function to support space transportation operations and associated support requirements.

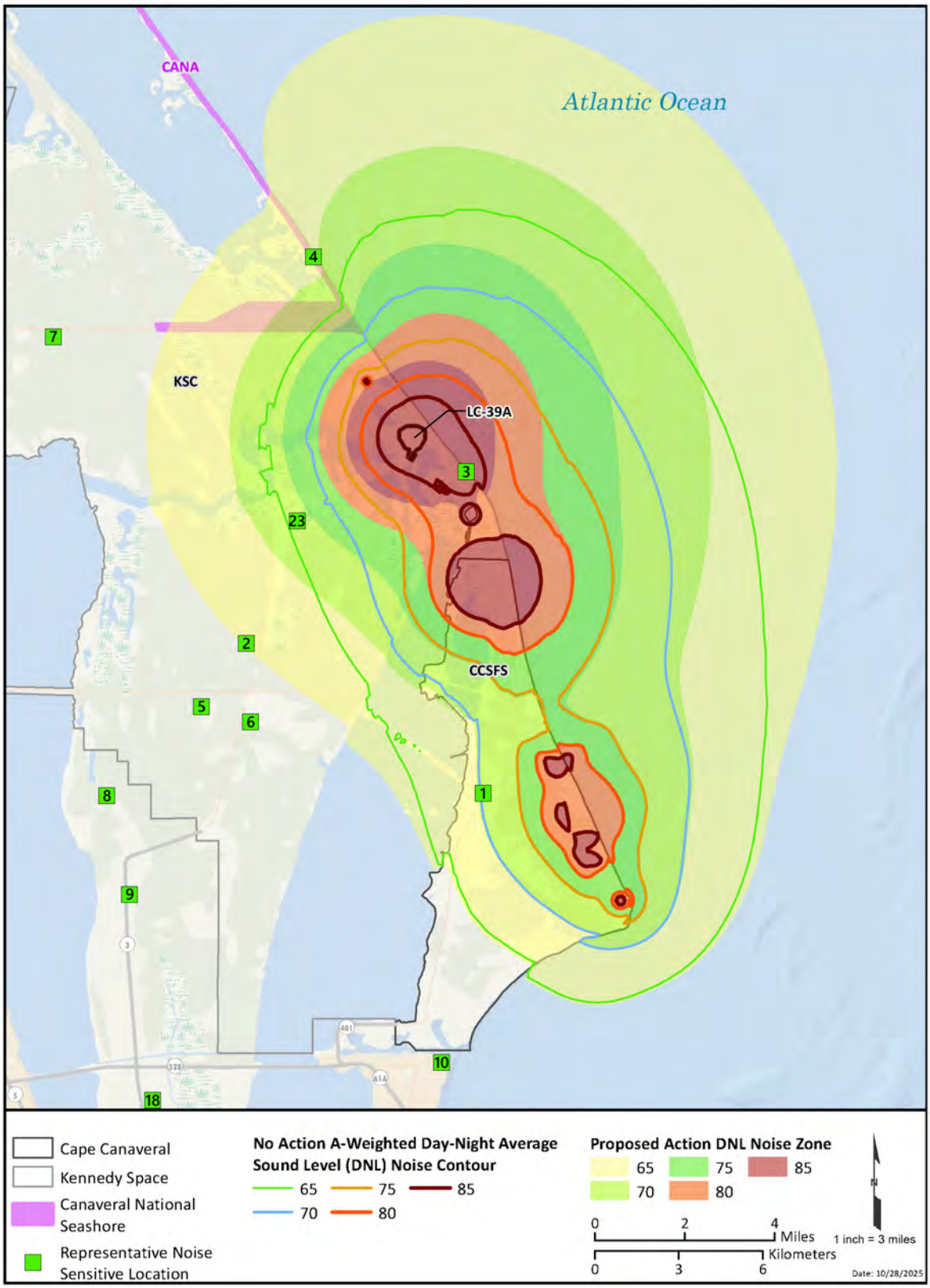
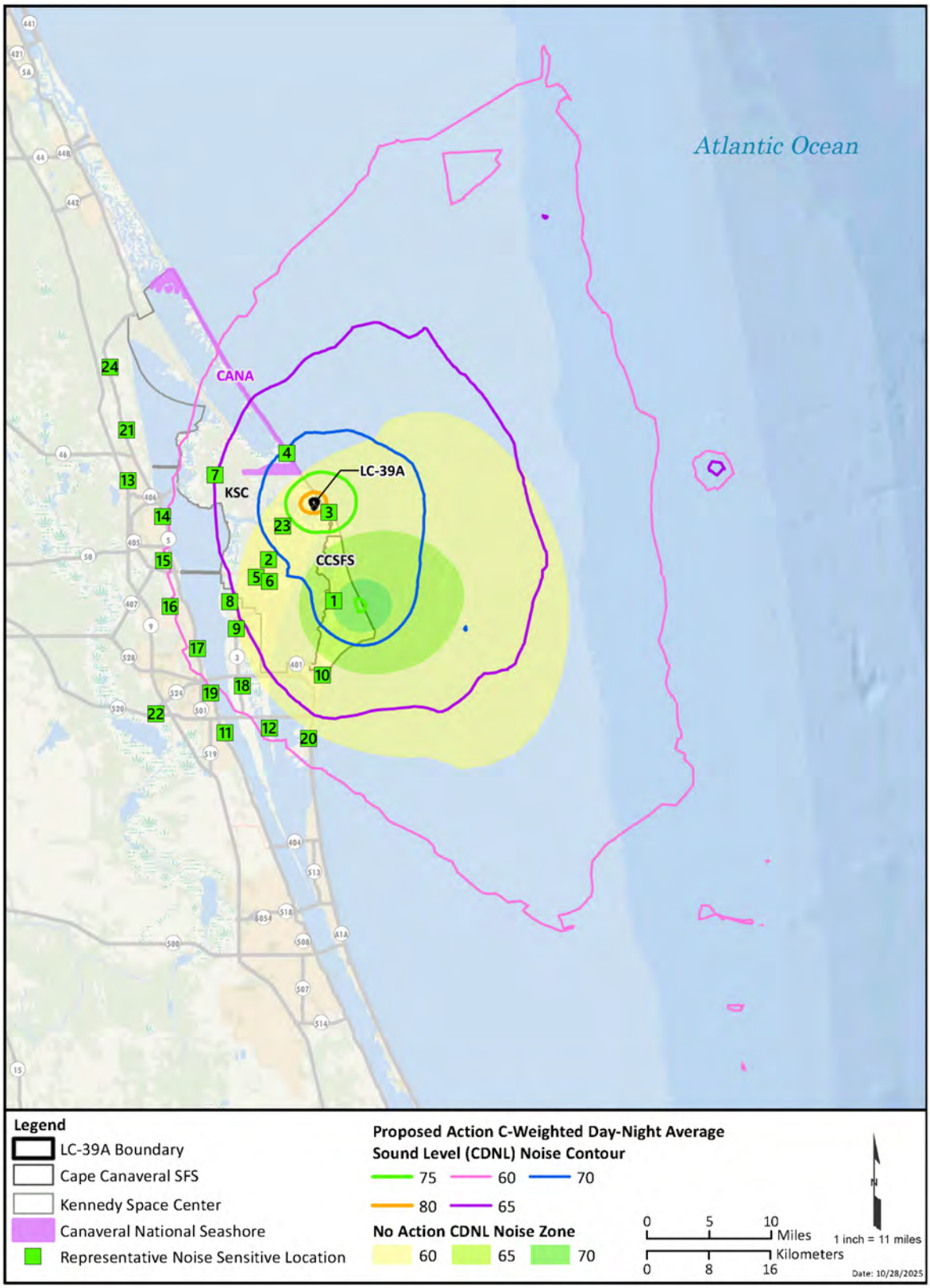


Figure ES-13. Proposed and No Action Day-Night Average Sound Level (DNL)



Sources: (FGDL, 2017; FGDL, 2018; FGDL, 2023a; FGDL, 2023b)

Figure ES-14. Proposed and No Action C-Weighted Day-Night Average Sound Level (CDNL)

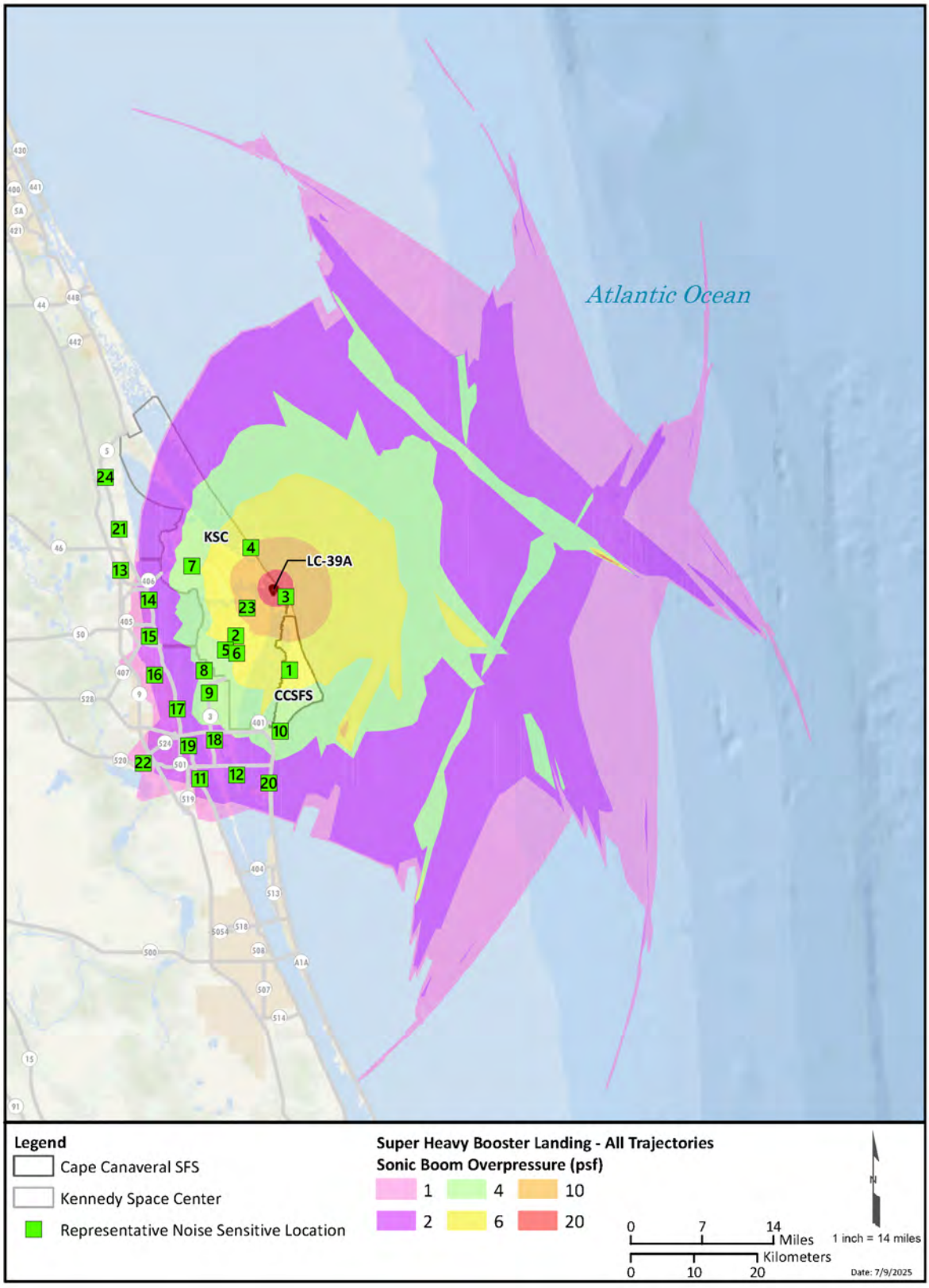


Figure ES-15. Super Heavy Booster Landing Sonic Boom Overpressure (psf)

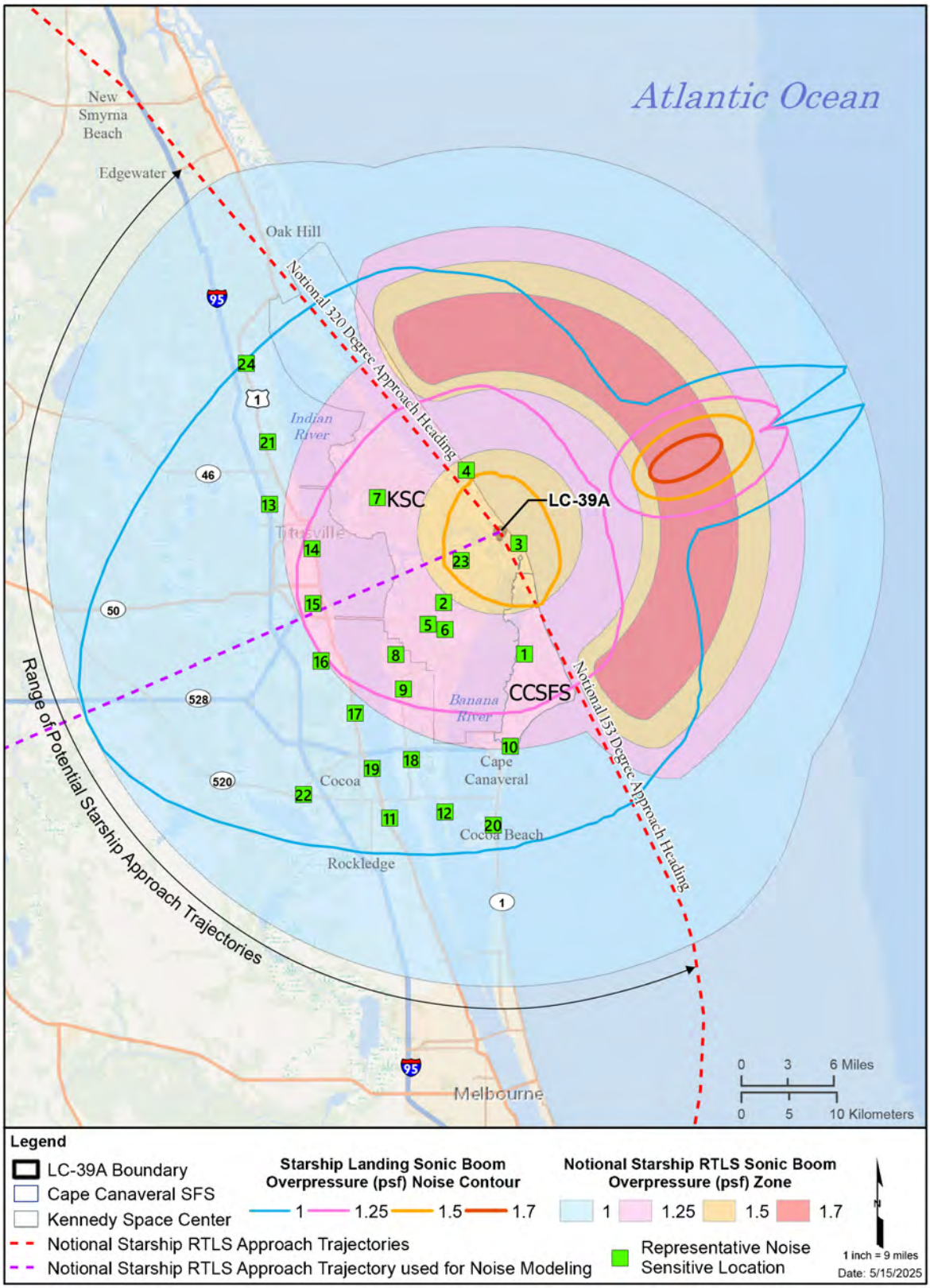


Figure ES-16. Notional Starship RTLS Sonic Boom Overpressure (psf) Zone

Impaired use (i.e., "Constructive Use") of recreation areas such as parks, trails, water access, golf courses, campgrounds, and wildlife/waterfowl refuges due to the Proposed Action is discussed in EIS Section 3.7, *Department of Transportation Act, Section 4(f)*. In general, effects to recreational land use in the surrounding study area would occur due to increased noise events/public exposure, as well as increased access restrictions, closures, and the associated changes to USFWS and NPS staff management priorities altered by launches. However, the FAA has not determined a constructive use of these areas and does not consider these effects significant, as the noise and closure events would be temporary and would not permanently preclude the viability or use of the areas, as shown by their current exposure to frequent launch-related noise from both KSC and CCSFS. Land uses would not be affected to the extent that public health or safety was threatened. Additionally, it is not anticipated that fire management program activities would significantly change in the area surrounding KSC due to continued enforcement of the Memorandum of Understanding for Prescribed Burning (SLD 45, USFWS, and KSC, 2025). Before any closures are enacted, the closure activities must be reviewed and approved by the NPS Director and the Assistant Secretary for Fish and Wildlife and Parks under Secretarial Order 3426. This will be coordinated between the FAA, SpaceX, and the Department of the Interior.

Noise-compatible land use outside of KSC and CCSFS would remain compatible with guidelines published at 14 CFR Part 150, except for those areas exposed to sonic booms exceeding 60 dB CDNL (Figure ES-15 and Figure ES-16). In these areas projected noise levels from sonic booms would exceed levels at which noise-sensitive land uses are not considered compatible (see EIS Section 3.2.4, *Noise and Noise-Compatible Land Use, Environmental Consequences*). Details regarding associated BMPs, mitigations and monitoring actions can be found in EIS Section 3.3.5.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. Depending on the launch vehicle and location of launch/landing areas around KSC and CCSFS, the local area would continue to experience land use-related effects associated with increased access restrictions, closures, and the associated changes to USFWS and NPS staff management priorities altered by launches.

ES.8.3 Socioeconomics and Children's Environmental Health and Safety Risks (EIS Section 3.4)[10]

Proposed Action

Based on the analysis provided in EIS Section 3.4.4.2, *Proposed Action*, and consideration for the Proposed Action to affect factors outlined in EIS Section 3.4.4, *Environmental Consequences*, significant effects to socioeconomic resources would not be anticipated because there would not be a large change in personnel that would induce substantial economic growth, disrupt or divide the physical arrangement of

[10] FAA Order 1050.1F includes environmental justice as a component of this impact category. On January 20, 2025, President Trump issued E.O. 14148, *Initial Rescissions of Harmful Executive Orders and Actions*, rescinding E.O. 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All* (2023). E.O. 14096 supplemented E.O. 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), establishing a government-wide mandate to advance environmental justice. As a result, the FAA no longer evaluates environmental justice as a part of its NEPA reviews. Thus, this EIS does not include any discussion of environmental justice, and environmental justice will not be considered by the FAA in its decision-making.

an established community, cause extensive relocation of residents and community businesses, substantially reduce the levels of service of roads, or produce a substantial change in the community tax base. However, construction and operational activities would have positive and short-term direct, indirect, and induced employment and income effects. These effects would last for the duration of the construction activities and/or during the up to 220 static fire, launch, and landing events.

KSC is a multiuser spaceport and facilitates space launch operators, including major companies such as Blue Origin, Boeing, Lockheed Martin, SpaceX, Sierra Space, and United Launch Alliance. Starship-Super Heavy operations may require closure of areas that affect other launch service providers at the spaceport. The FAA expects range managers to coordinate launch activities amongst launch service providers to minimize potential conflicts. The area and duration of range clearance are largely based on the launch trajectory and operations. During each launch, the FAA coordinates with other Federal agencies, spaceport personnel, regional air traffic controllers, U.S. military aviation units, and other launch providers and airspace users to clear the affected areas. Estimating the economic impact that the Proposed Action may have on airspace and maritime activities is challenging and is unlikely to produce reasonable and defensible estimates. Any estimate of the economic impact to airspace and maritime users resulting from space launch or reentry activity is sensitive to the timing of prelaunch notification as well as the timing and duration of the closure, which itself may be further impacted by any off-nominal launch-related events. The economic impacts would vary significantly based on aircraft/vessel type, operational flexibility, alternative routing options, scheduling constraints, and any buffers within these operational scenarios. Depending on the timing and duration of the launch and reentry windows, there could be commercial flight cancellations or diversions. There would be no change in the number of operational personnel or taxes to commercial airlines. There would be changes in expenditures due to the delays and associated airline income, but there would be no change expected to economic activity, personal income, employment, population, sustenance, public services, and/or social conditions.

Shipping lanes would not be altered or closed under the Proposed Action. Launches and reentries would occur 88 times per year and be scheduled in advance to minimize interruption to ship traffic (Starship-Super Heavy launches and Super Heavy booster returns are considered one event due to short time period between launch and return).

As described in Section 2.1.3.1, *Starship-Super Heavy Operations, Pre-Launch*, potential effects to airspace and maritime activities would be minimized due to implementation of numerous protocols and procedures, compliance with necessary notification requirements (e.g., NOTAMs and NOTMARs), and coordination activities between SpaceX, the DAF, the FAA, and the USCG.

Launches/booster landings and reentries would occur 88 times per year and be scheduled in advance to minimize interruption to commercial and recreational participants that may be affected by temporary closures or restricted access to certain areas. The NPS could experience a range of annual fee loss due to closures potentially between $239,000 and $423,000, which equates to a potential annual average revenue loss of between approximately 13 percent and 24 percent. This would adversely affect the NPS's ability to fund projects, staff, and maintain the park; the NPS may consider this a significant adverse effect to their operations. Persons that are unable to visit the park due to closures would experience a loss of net economic value associated with a park visit. A robust notification and awareness system would serve to reduce this potential.

SpaceX is required to carry insurance to cover claims by third parties that result from licensed activities, including structural damage; claims would be subject to the insurance policy terms and Commercial Space Launch Act.

Implementation of Occupational Safety and Health Administration regulations, other recognized standards, applicable NASA regulations or instructions, and SpaceX internal procedures associated with existing launches and landings minimize potential environmental health and safety risks to the general public, including children. These regulations would continue under the Proposed Action. As stated in EIS Section 3.11.6, *Air Quality, Summary*, the FAA anticipates that launching and landing activities would result in NO_x emissions above indicator thresholds and would be considered potentially significant unless localized air-dispersion modeling could demonstrate that the emissions would not cause or contribute substantially to a projected air quality violation of an ambient air quality standard. Significant levels of NO_x emissions could result in a disproportionate health and safety risk to children; however, adverse effects are not anticipated because children's exposure to high concentrations is unlikely. Details regarding associated BMPs, mitigations, and monitoring actions can be found in EIS Section 3.4.5.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. Depending on the launch vehicle and location of launch/landing areas around KSC and CCSFS, the local area would continue to experience induced socioeconomic effects associated with increased access restrictions, closures, noise, air quality, and health and safety similar to those described under the Proposed Acton.

ES.8.4 Historical, Architectural, Archaeological, and Cultural Resources (EIS Section 3.5.3)

Proposed Action

Based on the information provided in EIS Section 3.5.3, *Existing Conditions*, and EIS Section 3.5.4, *Environmental Consequences*, while effects to historical, architectural, archaeological, and cultural resources are possible, significant impacts to these resources are unlikely because of the infrequency of damage to these kinds of resources when exposed to sonic boom overpressure events and vibratory effects expected within the Area of Potential Effects as the result of the Proposed Action. However, poorly maintained structures or previously damaged structures may be more susceptible to damage. The long-term effects of repeated sonic boom overpressure events on subsurface archaeological sites, if any, are poorly understood. Any effects potentially resulting from such events have not been systematically documented in the past.

NASA, as the lead agency for NHPA consultation and in coordination with the FAA, intends to continue NHPA Section 106 consultation with the State Historic Preservation Officer, federally recognized tribes, and other consulting parties as per an executed Programmatic Agreement pursuant to 36 CFR §800.14(b). The Programmatic Agreement includes ongoing consultation and monitoring efforts and mitigation strategies to resolve any potential adverse effects resulting from the Proposed Action. Details regarding associated BMPs, mitigations, and monitoring actions can be found in EIS Section 3.5.5 and EIS Appendix B.3.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-

Super Heavy were to be implemented at CCSFS. While effects to historical, architectural, archaeological, and cultural resources resulting from reasonably foreseeable actions are possible, significant impacts to these resources are unlikely because of the infrequency of damage to these kinds of resources when exposed to sonic boom overpressure events and vibratory effects expected within the Area of Potential Effects. However, poorly maintained structures or previously damaged structures may be more susceptible to damage from repeated exposure to auditory and sonic boom overpressure events.

ES.8.5 Department of Transportation Act, Section 4(f) (EIS Section 3.7)

Proposed Action

Based on the information provided in EIS Section 3.6.3, *Visual Effects*, *Existing Conditions*, and EIS Section 3.7.4, *Environmental Consequences*, there will be no use of Section 4(f) resources resulting from the Proposed Action or No Action Alternative. There are 392 Section 4(f) resources in the proposed project area. DOT Section 4(f) resources evaluated are shown in Figure ES-17 and Figure ES-18. The FAA determined that the MINWR and CANA are subject to the Joint Development Exemption of 23 CFR §774.11(i) and thus not subject to Section 4(f) evaluation. The FAA determined the proposed project does not require the permanent incorporation or temporary occupancy of Section 4(f) resources. Additionally, the FAA determined and detailed in the Section 4(f) Use Determination Report located in Appendix B.4, *Department of Transportation Act Section 4(f) Consultation*, of the EIS, that the proposed project does not significantly impair historic sites, public parks and recreation areas, or wildlife and waterfowl refuges; thus, the project would not use Section 4(f) resources. The FAA notified officials with jurisdiction regarding its DOT Section 4(f) determinations, and no officials responded with any related issues or nonconcurrences. Details regarding associated BMPs, mitigations and monitoring actions can be found in EIS Section 3.7.5.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. NASA and CCSFS actions that do not require FAA licenses are not subject to DOT Section 4(f) requirements. Any future actions requiring FAA licensing actions would necessarily address this issue.

ES.8.6 Biological Resources (EIS Section 3.8)

Proposed Action/No Action

Figure ES-19 shows the area evaluated for potential effect from the Proposed Action. Table ES-3 provides a summary of the significance determinations for biological resources under the Proposed Action and the No Action Alternative, which are based on the information provided in EIS Section 3.8.3, *Existing Conditions*, and EIS Section 3.8.4, *Environmental Consequences*. Under the No Action Alternative, Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. As described in the 2020 Falcon EA (FAA, 2020) and associated ESA consultation, under the No Action Alternative SpaceX would continue to conduct Falcon operations at LC-39A and at ocean landing areas, and effects on terrestrial, estuarine, and marine habitats and species would remain below significant levels. For the Proposed Action, NASA has completed ESA Section 7 consultation with the USFWS.

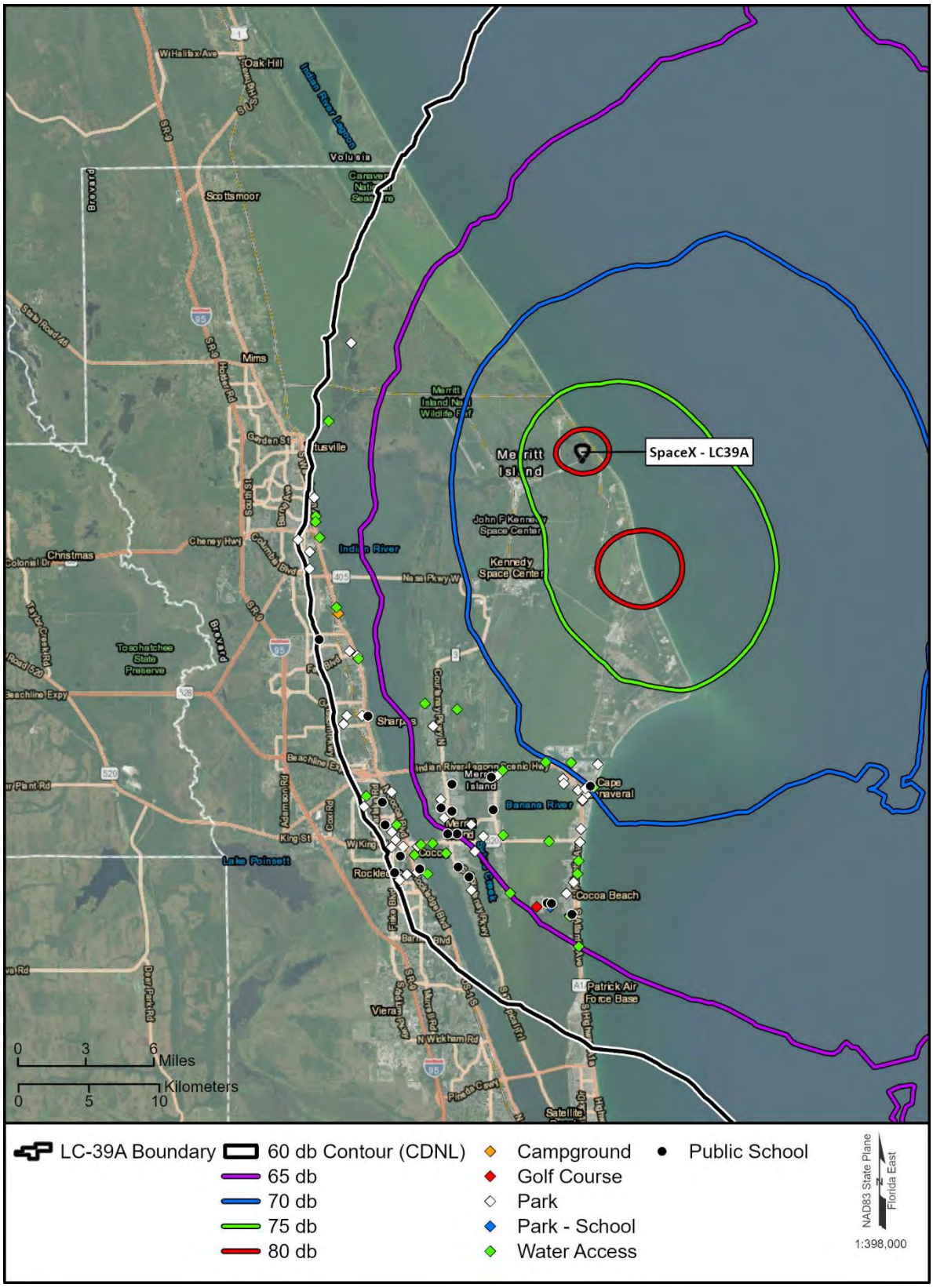


Figure ES-17. Public Parks and Recreation Areas

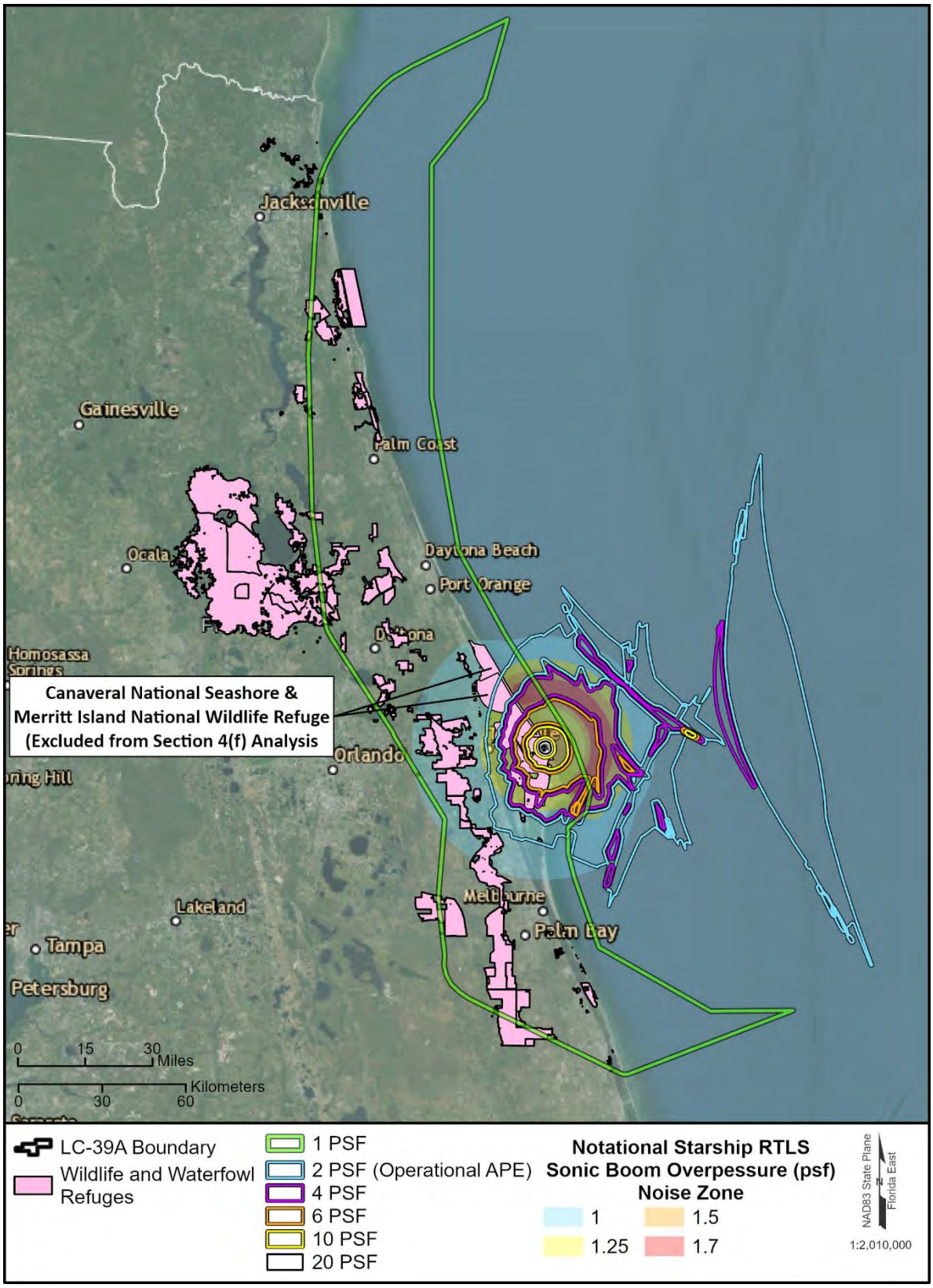


Figure ES-18. Wildlife and Waterfowl Refuges

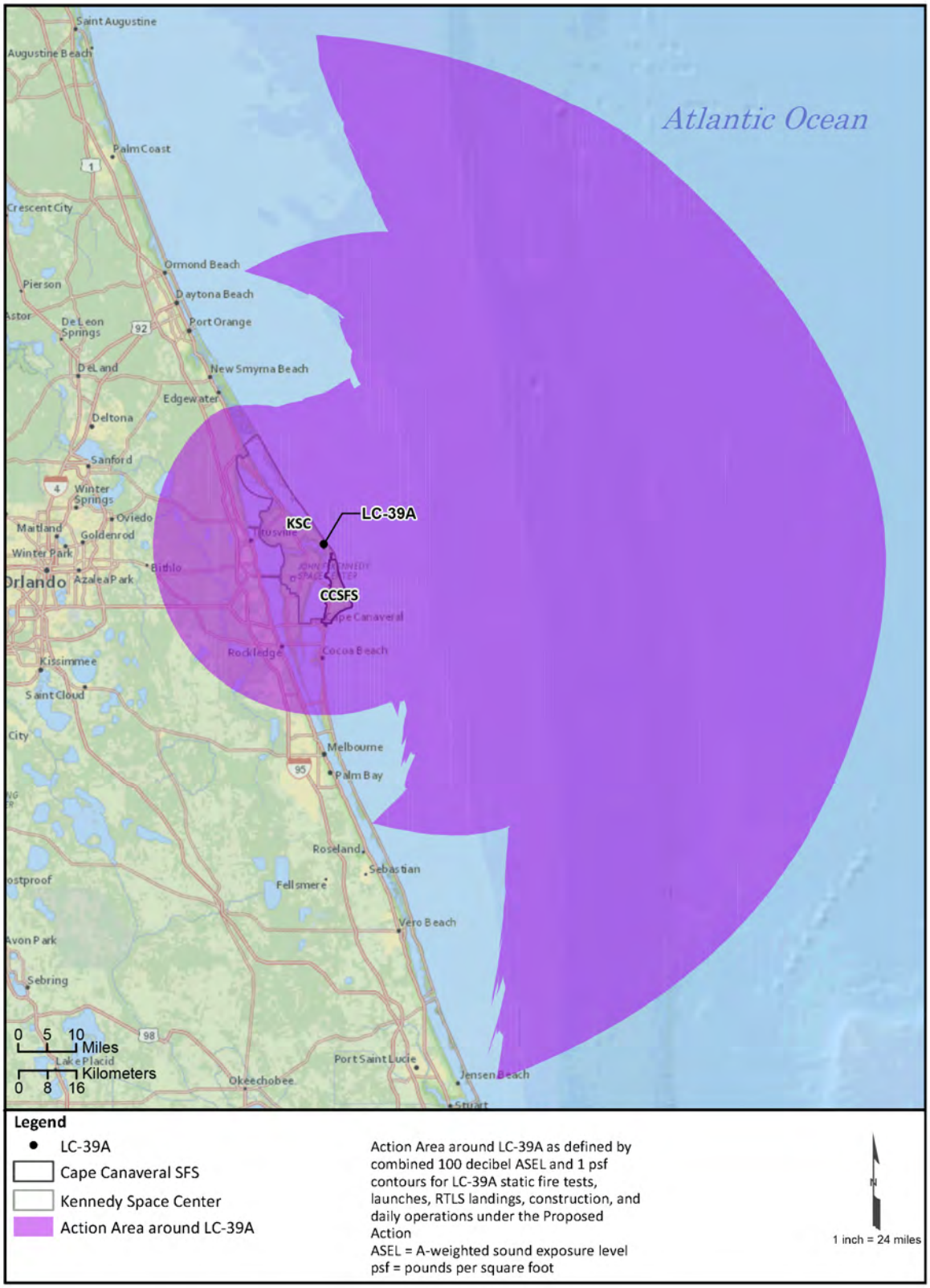


Figure ES-19. Biological Resources Study Area Around LC-39A

Table ES-3. Significance Determinations for Biological Resources

Resource	Proposed Action	No Action Alternative
Terrestrial and Estuarine Wildlife and Habitats	Terrestrial and estuarine wildlife may alter behaviors or suffer injury or death, and their habitats may be degraded or destroyed by noise and visual disturbance, vibrations, sonic booms, strikes and collisions, artificial lighting, vapor plumes, hazardous materials, invasive species, and restricted access associated with construction and Starship-Super Heavy operations. The magnitude, frequency, and extent of exposures to such effects would increase under the Proposed Action compared to the No Action Alternative. However, effects would still be less than significant because the Proposed Action would not result in any species extirpations, substantial habitat effects, or adverse population-level effects.	Terrestrial and estuarine wildlife may alter behaviors, or suffer injury or death, and their habitats may be degraded or destroyed by noise and visual disturbance, vibrations, sonic booms (from landings at other sites), strikes and collisions, artificial lighting, vapor plumes, hazardous materials, invasive species, and restricted access associated with Falcon operations. However, effects would be less than significant because the No Action Alternative would not result in any species extirpations, substantial habitat effects, or adverse population-level effects.
Marine Wildlife and Habitats	Marine wildlife may alter behaviors, or suffer injury or death, and their habitats may be degraded by noise and visual disturbance, sonic booms, strikes and collisions, artificial lighting, hazardous materials, and restricted access associated with Starship-Super Heavy launches, expended boosters and landings, and vessel operations. The magnitude, frequency, and extent of exposures to such effects would increase under the Proposed Action compared to the No Action Alternative. However, effects would still be less than significant because the Proposed Action would not result in any species extirpations, substantial habitat effects, or adverse population-level effects.	Marine wildlife may alter behaviors, or suffer injury or death, and their habitats may be degraded by Falcon noise and visual disturbance, sonic booms, strikes and collisions, entanglement in and ingestion of parachutes and parafoils, hazardous materials, and restricted access associated with expended boosters and landings, and vessel operations. However, effects would be less than significant because the No Action Alternative would not result in any species extirpations, substantial habitat effects, or adverse population-level effects.
Federally Protected Species	Federally protected species in the launch and ocean landing study areas could be affected by the same stressors identified for terrestrial, estuarine, and marine wildlife. The magnitude, frequency, and extent of exposures to such effects would increase under the Proposed Action compared to the No Action Alternative. However, the effects would still be less than significant because the Proposed Action would not be likely to jeopardize the continued existence of a federally listed threatened or endangered species.	Federally protected species in the Falcon launch and ocean landing areas could be affected by the same stressors identified for terrestrial, estuarine, and marine wildlife. However, the effects would be less than significant because the ongoing actions would not be likely to jeopardize the continued existence of a federally listed threatened or endangered species.
Critical Habitat	Critical habitat in the launch and ocean landing study areas could be affected by the same stressors identified for terrestrial, estuarine, and marine habitats. The magnitude, frequency, and extent of exposures to such effects would increase under the Proposed Action compared to the No Action Alternative, but effects to critical habitat would still be less than significant because	Critical habitat in Falcon launch and ocean landing areas could be affected by the same stressors identified for terrestrial, estuarine, and marine habitats, but effects would be less than significant because the ongoing actions would not likely result in the destruction

Table ES-3. Significance Determinations for Biological Resources

Resource	Proposed Action	No Action Alternative
	the Proposed Action would not likely result in the destruction or adverse modification of federally designated critical habitat.	or adverse modification of federally designated critical habitat.
Essential Fish Habitat	EFH could be affected by hazardous materials and debris strikes from Starship-Super Heavy construction and operations. The magnitude, frequency, and extent of exposures to such effects would increase under the Proposed Action compared to the No Action Alternative. However, effects would still be less than significant because there would be no adverse effects on estuarine EFH or water column or soft substrate EFH in the Atlantic Ocean landing area, and the potential to adversely affect hard bottom and deep-water corals in the Atlantic Ocean landing area would be decreased by their limited distribution in the overall study area, relatively low number and dispersed location of expended items, and number of debris items that would burn up in the atmosphere.	EFH in estuarine and marine waters could be affected by hazardous materials and debris strikes from Falcon operations, but effects would be less than significant because the effects would not measurably reduce the quantity or quality of EFH.
State-Listed Species	State-listed species in the launch and ocean landing study areas could be affected by the same stressors identified for terrestrial, estuarine, and marine wildlife. The magnitude, frequency, and extent of exposures to such effects would increase under the Proposed Action compared to the No Action Alternative. However, the effects would still be less than significant because the Proposed Action would not result in any species extirpations or adverse population-level effects.	State-listed species in the Falcon launch and ocean landing areas could be affected by the same stressors identified for terrestrial, estuarine, and marine wildlife. However, the effects would be less than significant because the No Action Alternative would not result in any species extirpations or adverse population-level effects.
Migratory Birds and Bald Eagles	Migratory birds and bald eagles in the launch and (for migratory birds) ocean landing study areas could be affected by the same stressors identified for terrestrial, estuarine, and marine wildlife. The magnitude, frequency, and extent of exposures to such effects would increase under the Proposed Action compared to the No Action Alternative. However, the effects would still be less than significant because the Proposed Action would not result in any species extirpations or adverse population-level effects.	Migratory birds and bald eagles in the launch and (for migratory birds) ocean landing areas could be affected by the same stressors identified for terrestrial, estuarine, and marine wildlife. However, the effects would be less than significant because the No Action Alternative would not result in any species extirpations or adverse population-level effects.

Note: EFH = essential fish habitat.

The FAA has completed consultation with the National Marine Fisheries Service for the ESA, Marine Mammal Protection Act, and essential fish habitat. These consultations include various requirements, monitoring efforts, and mitigation strategies to minimize potential adverse effects to listed species, critical habitat, and other protected resources resulting from the Proposed Action. Details regarding associated BMPs, mitigations, and monitoring actions can be found in EIS Section 3.8.5.

ES.8.7 Air Quality (EIS Section 3.11)

Proposed Action

Based on the analysis provided in EIS Section 3.11.4.2.1, *Construction*, and EIS Section 3.11.4.2.2, *Operation*, effects to air quality would be insignificant for all criteria pollutants except NO_X. Emissions from construction activities would be minor and temporary, lasting only the duration of the construction phase. These emissions would remain well below insignificance indicator thresholds established for NEPA analysis and would not contribute to an exceedance of any National Ambient Air Quality Standards. Emissions sources during construction would be mobile and intermittent and pollutant emissions would not be large enough in a localized area to cause any exceedance of an ambient air quality standard. For operational activities, emissions of all criteria pollutants except NO_X are anticipated to remain below insignificance thresholds. However, total NO_X emissions—including both construction (11.11 tons per year) and operational (374.55 tons per year) sources—are estimated at 385.66 tons per year, exceeding the insignificance indicator threshold of 250 by approximately 54 percent. This level of NO_X emissions represents 4.35 percent of the National Emissions Inventory total for Brevard County, which is 8,867.99 tons per year.

Additionally, the ground-level effect of launch vehicle emissions released above the atmospheric mixing layer would be negligible due to the inability of released pollutants to penetrate the mixing layer and mix downward to ground level. The FAA anticipates that launch and landing activities would result in NO_x emissions above indicator thresholds and would be considered potentially significant unless localized air-dispersion modeling could demonstrate that the emissions would not cause or contribute substantially to a projected air quality violation of an ambient air quality standard.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. As a result, implementation of the No Action Alternative would result in increased launch and development-related emissions within the region, the scope of which would be dependent on the number of launches and types of vehicles, and size of development projects. Development project emission would be considered short-term and temporary. However, as launch licenses are approved or adjusted over time, air emissions analyses would be conducted by the FAA, NASA, or the DAF in associated NEPA documentation to identify any potentially significant effects. Details regarding associated BMPs, mitigations, and monitoring actions can be found in EIS Section 3.11.5.

ES.8.8 Transportation (EIS Section 3.16)

Proposed Action

While there could be temporary road closure and traffic effects associated with heavy and slow-moving construction vehicles at KSC and on the local roads, these effects would be temporary and typical for the local transportation system within and around an active spaceport. Therefore, the FAA does not anticipate significant effects to transportation systems during construction activities under the Proposed Action with construction workers representing only a 0.02 percent increase in the number of employees and vehicles accessing LC-39A.

During operations, the number of employees could increase along with associated vehicle traffic; therefore, commuter traffic could increase under the Proposed Action compared to the No Action Alternative. These increases would be small compared to the number of employees located at KSC. Increases in the number of launches under the Proposed Action, however, would change the frequency of transport of rocket components, payloads, and commodities over roadways in and around KSC and CCSFS. In addition, more launches would result in more frequent road closures. As an active spaceport, road closures would be expected. Visitors driving to KSC and surrounding areas to view launches would continue to generate traffic effects. It is unknown if more frequent launches would generate less tourist interest, but high-profile launches and reentries would likely still attract viewer interest and associated traffic congestion. Roadways are operating at an acceptable level of service and current and planned improvement projects would result in better traffic flow. As a result, while traffic effects could occur due to more frequent road closures and launches, the FAA does not expect these effects to significantly affect current level of service.

Shipping lanes would not be altered or closed under the Proposed Action. With proper coordination and scheduling, the Proposed Action would not significantly affect vessel traffic. Launches and reentries would occur 88 times per year and be scheduled in advance to minimize interruption to ship traffic (Starship-Super Heavy launches and Super Heavy booster returns are considered one event due to short time period between launch and return).

The integration of Starship launches, booster landings, and reentries into the National Airspace System would significantly impact air traffic. The FAA would need to implement ground stops, manage miles-in-trail (distance between aircraft) for spacing and volume control, and reroute aircraft around the AHAs. These operations would particularly affect international flights, which may face delays due to fuel constraints or extended reroute times. The launch and Super Heavy booster landing AHA could also affect airways within the flight regions of Canada and the Bahamas. Starship reentry and landings may require ground stops for volume control at multiple Core 30 airports in Florida, as well as numerous other international, regional, and general aviation airports. Starship reentry AHAs could also affect airways within the flight regions of Mexico, El Salvador, Belize, Guatemala, Honduras, and Cuba. The average expected flight delay for launches is approximately 40 minutes, potentially extending up to 2 hours, while delays for reentries are also around 40 minutes, with a maximum of up to an hour. General aviation operations would be similarly impacted by launches, booster landings, and reentry landing AHAs; however, general aviation operations typically have more flexibility for flight planning than commercial flights, due to the nature of connecting commercial flights.

The FAA would manage such operations in a way that minimizes disruption to existing aviation operations and ensures safety for all airspace users. Successful integration requires close collaboration between space operators, the FAA, commercial airlines, general aviation, and defense stakeholders. Key factors contributing to feasibility include enhanced real-time communication systems and well-defined scheduling and deconfliction procedures. Although temporary airspace closures may impact other stakeholders, mitigation strategies such as pre-coordinated reroutes, dynamic scheduling, and time-based traffic flow management could reduce operational burdens. Details regarding associated BMPs, mitigations, and monitoring actions can be found in EIS Section 3.16.5.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. Local roadways and transportation corridors would continue to be affected by current traffic conditions and ongoing and planned roadway improvements. In addition, the Florida DOT has a Spaceport Office that developed and administers the Spaceport Improvement Program. The goal of the program is to improve aerospace transportation facilities. The program embraces Florida leading the growth and development of the aerospace industry. The Spaceport Improvement Program is designed to stimulate private sector investment and commercial spaceport development and acknowledges the importance of quality of life for Floridians continuing as a direct result of infrastructure improvements[11]. Vessel traffic is also projected to increase when considering the reasonably foreseeable actions along with NASA, other commercial space providers, and Port Canaveral goals.

ES.8.9 Utilities and Infrastructure (EIS Section 3.17)

Proposed Action

There could be potential minor short-term effects during construction of the utility improvement projects, but those would likely be short-term and not significant. During operations, the Proposed Action would result in greater utility demands compared to the No Action Alternative; however, the Proposed Action includes construction projects to support the increased demand. Water use associated with Proposed Action operations at LC-39A would require approximately 297 million gallons (1.1 billion liters) per year; given the context of the City of Cocoa, this is a small percentage of current annual use and capacity. SpaceX would construct onsite bulk storage for water and commodities and would reuse or recycle as appropriate. Based on the analysis of potential effects presented above, the FAA does not anticipate significant effects to utilities and infrastructure distribution systems and service capacity from implementation of the Proposed Action. Details regarding associated BMPs, mitigations, and monitoring actions can be found in EIS Section 3.17.5.

No Action Alternative

Starship-Super Heavy would not launch from LC-39A. Launch activities currently occur on KSC and CCSFS, and this would continue, likely increasing over time based on current launch cadence projections and if Starship-Super Heavy were to be implemented at CCSFS. Reasonably foreseeable actions would all require an increase in utilities including drinking and industrial water use, domestic and industrial wastewater collection and treatment, emergency response, and communications enhancements. However, each project is analyzed separately to determine utility loads and typically includes infrastructure improvements to ensure that existing infrastructure availability and capacity would not be negatively affected. As an example, the EIS for Starship-Super-Heavy operations at SLC-37 on CCSFS estimates approximately 105 million gallons (397 million liters) per year of potable water use (USSF, 2025). As a result, the FAA anticipates that the No Action Alternative, with consideration of new, more efficient

[11] FDOT, 2023. Spaceport Improvement Program Project Handbook 2023-2024.

utilities with an increased capacity would not pose significant adverse effects on utilities and infrastructure.

ES.9 Other Environmental Considerations[12]

Unavoidable Adverse Effects (EIS Section 4.1)

For the Proposed Action analysis identified unavoidable adverse effects associated with soil disturbance, air quality, water quality, and biological resources within and adjacent to LC-39A from development activities (ground disturbance). However, these adverse effects have been shown to not be significant based on the context (already developed site) and intensity (short-term and temporary) of these activities; furthermore, implementation of BMPs and permitting requirements for ground-disturbance activities would further minimize these effects. Unavoidable adverse effects from operational activities have been identified across multiple resource areas (e.g., land use and access restrictions, effects to biological resources), some of which have been identified as potentially significant (noise and air quality in particular). While some of these effects could be minimized through implementation of mitigations, or by reducing the scope of the Proposed Action, these effects are inherent to the Proposed Action and cannot be avoided (i.e., a rocket inherently produces noise and air emissions).

Irreversible and Irretrievable Commitment of Resources (EIS Section 4.2)

Implementing the Proposed Action requires a commitment of natural, physical, human, and fiscal resources. In all these categories, irreversible and irretrievable commitments of resources would occur, with these commitments similar in nature across the Proposed Action and No Action (given ongoing and reasonably foreseeable actions). However, these resources should generally be in sufficient supply during the Proposed Action; therefore, their commitment would not have an adverse effect on the resources' local, regional, or national continued or future availability.

Short-Term Uses and Long-Term Productivity (EIS Section 4.3)

Under the Proposed Action the only "short-term" uses would be associated with construction activities, given that the Proposed Action involves long-term use of LC-39A to support Starship-Super Heavy operations. Development of LC-39A would involve temporary, short-term effects associated with ground disturbance and vehicle air emissions, which would be minimized by implementation of best practices and permitting requirements identified in each respective section and would end once construction is complete. Therefore, there would be no effects associated with short-term uses (i.e., development activities) that would adversely affect maintenance and enhancement of the long-term productivity of KSC or the study area.

[12] FAA Order 1050.1F provides for an evaluation of cumulative impacts. The term cumulative effects (impacts) was defined in CEQ's NEPA-implementing regulations in 40 CFR §1508(i)(3) (2024). However, on February 25, 2025, the CEQ published an interim final rule to remove these regulations in accordance with E.O. 14154, *Unleashing American Energy*. See 90 Federal Register 10610 (February 25, 2025). The rule became effective on April 11, 2025. On February 19, 2025, the CEQ issued a memorandum titled *Implementation of the National Environmental Policy Act* that provided guidance to Federal agencies on how to implement NEPA. The memo provides, "Federal agencies should analyze the reasonably foreseeable effects of the proposed action consistent with section 102 of NEPA, which does not employ the term "cumulative effects;" NEPA instead requires consideration of "reasonably foreseeable" effects, regardless of whether or not those effects might be characterized as "cumulative." Based on the CEQ memo and on the U.S. Supreme Court's recent decision in *Seven County Infrastructure Coalition v. Eagle County, Colorado*, 145 S. Ct. 1497 (2025), this EIS does not include a discussion of cumulative impacts, and cumulative impacts will not be considered by the FAA in its decision-making. Reasonably foreseeable effects are discussed within each resource area.

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