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April 5, 2021

Mr. Jayson Hudson
U.S. Army Corps of Engineers
Galveston District, Regulatory Branch
P.O. Box 1229
Galveston, TX 77553-1229

401 Coordinator
TCEQ, Mail Code 150
P.O. Box 13087
Austin, TX 78711-3087

Re: Permit Application Number SWG-2012-00381
Space Exploration Technologies (SpaceX)

Dear Mr. Hudson and 401 Coordinator:

Texas Parks and Wildlife Department (TPWD) has reviewed the Public Notice (PN) dated March 4, 2021 for permit number SWG-2012-00381. SpaceX proposes to amend their authorized permit for the continued development of the Boca Chica Launch Site. The project site is located in special aquatic sites adjacent to Boca Chica Bay and the Gulf of Mexico and abuts public conservation lands on State Highway 4, in Boca Chica, Cameron County, Texas.

According to the Federal Aviation Administration (FAA), SpaceX's proposed launch operations include suborbital launches and orbital launches. The Proposed Action also includes pre-flight operations (tank tests, mission rehearsals, and static fire engine tests) and construction activities associated with launch activities, including expanding the solar farm, adding infrastructure and facilities at the vertical launch area (referred to as the VLA), parking lots, a liquid natural gas pretreatment system, a liquefier, a payload processing facility, and trenching and pull-offs along State Highway 4. At the VLA, SpaceX is proposing to construct a redundant launch pad and commodities, a redundant landing pad, two integration towers, tank structural test stands, a desalination plant, additional support buildings, and a power plant.

The PN states that the continued development of the VLA includes the expansion and addition of test, orbital, and landing pads, integration towers, associated infrastructure, stormwater management features and vehicle parking. It does not appear that all of the proposed construction components have been identified in the US Army Corps of Engineers (USACE) PN and project plans.

Recommendation: USACE and Texas Commission on Environmental Quality (TCEQ) should verify that all project components within the scope of their respective evaluations have been identified on project plans and adequately described in project narratives.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
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The project site is located in a sparsely populated coastal area adjacent to the Gulf of Mexico and ecologically unique public lands owned and/or managed by TPWD and U.S. Fish and Wildlife Service (USFWS) as the Boca Chica Unit of the Lower Rio Grande Valley National Wildlife Refuge (LRGVNWR). The area is characterized by marsh and barrier island plant communities, shallow open water, algal flats, and unvegetated tidal flats. These shallows provide critical habitat to shorebirds, portions of which have been federally designated as piping plover habitat. Uplands consist of low, newly-forming sand dunes with their anchoring vegetation amidst bare sand flats. Submerged lands are fringed with black mangroves and vegetated with seagrasses. Small, ecologically unique clay hills, known as "lomas," support a diverse group of rare plants and terrestrial wildlife including the endangered ocelot and jagarundi. These conservation lands form part of the wildlife corridor which links the LRGVNWR to the Laguna Atascosa National Wildlife Refuge to the north.

According to the PN, construction of the proposed expansion to the launch area would permanently impact 10.94 acres of tidal and/or algal flats, 5.94 acres of estuarine wetlands, and 0.28 acres of non-tidal wetlands. While the proposed avoidance and minimization measures focus on the parking lot, the PN states that there may be additional opportunities to reduce wetland impacts as the site design is refined. Based on the information provided, the applicant has not adequately demonstrated that the proposed action is the least environmentally damaging practical alternative, that impacts have been avoided and minimized to the extent practicable, or that unavoidable impacts would be successfully offset through compensatory mitigation.

> **Recommendation:** The applicant should address these concerns by developing an alternatives analysis in accordance with the 404(b)1 Guidelines, considering additional opportunities to avoid and minimize impacts to the extent practicable for all aspects of the project, developing a permittee-responsible compensatory mitigation project in accordance with 33 CFR 332, including developing a permittee-responsible mitigation plan that contains all of the mitigation plan descriptions detailed in paragraphs 2 through 4 in 33 CFR 332.4(c)(2)-(4)(objectives; site selection; site protection instrument).
>
> TPWD has had a cursory-level discussion with SpaceX about the proposed impacts and SpaceX seemed amenable to our recommendation to participate in an inter-agency meeting, such as a Joint Evaluation Meeting. Such meetings have the potential to result in a better understanding of agency concerns as well as project constraints in an effort to avoid and minimize impacts where practical and to provide adequate compensation for those impacts which are unavoidable.

Project plans identify aquatic resource impacts in terms of habitat type and acreage for each major component of the proposed project but do not identify or quantify which areas of the project site are being avoided. Cross-sections provided in the project plans do not provide adequate detail to spatially visualize each component in terms of height and/or elevation. In addition, the quantities and sources of fill material required to complete each component of the revised project are not described. Without this level of detail, TPWD is unable to fully assess the potential effects of the proposed project on fish and wildlife resources.

> **Recommendation:** Proposed project plans should be revised to provide more detailed cross-sectional views, information about the sources and quantities of fill material that will be required to complete each component of the proposed project, and quantify and describe areas of the project site which are being avoided.

Sheet 8 of 8 of the project plans states that the 4:1 side slopes of the project site will be vegetated with native plant species. We are also aware of recent inquiries made with regard to vegetating the existing side slopes to address concerns for ongoing erosion at the project site.

> **Recommendation:** For recommended seed mixes and potential seed sources, please contact Mr. Russell Hooten, Wildlife Habitat Assessment Program Biologist, by email at Russell.Hooten@tpwd.texas.gov or by phone at (361) 825-3240.

TPWD has concern for significant secondary and cumulative impacts to cultural resources and fish and wildlife resources, including jurisdictional special aquatic sites, resulting from current operations at the project site. Tidal and algal flats provide important feeding and nesting habitat to shorebirds in general, and critically important feeding habitat to short-legged shorebirds, such as plovers. Snowy plover nests have been documented within the vicinity of the parking lot.

From December 9, 2020 to March 3, 2021 alone, three suborbital test flights (SN8, SN9 and SN10) resulted in anomalies/explosions with debris landing in special aquatic sites and cultural sites located on TPWD-owned property located north of the project site. Activities associated with the subsequent site investigations and the removal of hazardous and non-hazardous materials and debris have resulted in rutting, trampling, and compaction of algal flats and tidal flats as well as rutting and denuding of native coastal prairie and Tamualipan thornscrub communities from the use of all-terrain vehicles, heavy equipment, drag lines, and foot traffic. Based on these and previous anomalies, fires, and incidents which have occurred as a result of the permitted projects, TPWD has reason to believe that these secondary and cumulative impacts will increase in both frequency and magnitude as a result of the proposed project.

Recommendation: USACE and TCEQ should consider secondary effects of the proposed project on adjacent aquatic resources that would result as a consequence of the proposed action as well as the cumulative effects of past, present and foreseeable future projects in their respective evaluations of the proposed project.

By letter dated January 27, 2021 (see attachment), TPWD provided scoping comments to the FAA for the preparation of a Draft Environmental Assessment for the proposed Starship/Super Heavy Launch Operations from the Boca Chica Launch Site in Cameron County, Texas. In addition to comments and information provided herein TPWD requests that these scoping comments be considered, to the extent they are applicable, in USACE's and TCEQ's respective evaluations of the proposed action.

TPWD appreciates the opportunity to provide comments and looks forward to participating in a Joint Evaluation Meeting, interagency site visit, or similar forum to gain a better understanding of the project and to provide recommendations which, when implemented, avoid and minimize impacts to fish and wildlife resources and cultural resources. Questions can be directed to Mrs. Liana Garcia or Mr. Willy Cupit (956-350-4491) in Brownsville or Mrs. Leslie Koza (361-825-2329) in Corpus Christi.

Sincerely,

Dakus Geeslin
Chief, Science and Policy Resources Branch
Coastal Fisheries Division

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Carter P. Smith
Executive Director

January 27, 2021

Ms. Stacey M. Zee
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Ave., SW
Washington, DC 20591

RE: Scoping Comments for Draft Environmental Assessment for Space Exploration Technologies' Starship/Super Heavy Launch Operations from the Boca Chica Launch Site in Cameron County, Texas

Dear Ms. Zee:

This letter is in response to your December 22, 2020 request for scoping comments to assist the Federal Aviation Administration (FAA) to determine the scope of issues for analysis in the Draft Environmental Assessment (EA) being prepared for Space Exploration Technologies' (SpaceX) Starship/Super Heavy Launch Vehicle operations at SpaceX's Boca Chica Launch Site in Cameron County, Texas. The FAA is considering preparing a Programmatic EA for this activity.

According to Texas Parks and Wildlife Code (PWC) section 12.0011(a), Texas Parks and Wildlife Department (TPWD) is the agency with primary responsibility for protecting the state's fish and wildlife resources. Furthermore, TPWD is charged with providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources according to PWC section 12.0011(b)(3).

TPWD staff have reviewed available material regarding SpaceX's development and operations at the Boca Chica Launch Site and offers the following comments and recommendations to facilitate a comprehensive National Environmental Policy Act (NEPA) analysis for the proposed activities.

Project Description

SpaceX proposes to conduct Starship/Super Heavy launch operations from the Boca Chica Launch Site in Cameron County, Texas. Proposed launch operations would include suborbital launches, orbital launches, and pre-flight operations (e.g., tank tests, mission rehearsals, static fire engine tests). The proposed operations would require new construction activities, including expanding an existing solar farm; adding infrastructure and facilities at the vertical launch area (VLA); and constructing a liquid natural gas pretreatment system and a liquefier. SpaceX is also proposing to construct a redundant launch pad and commodities, a redundant landing pad, two integration towers, a tank structural test stand, a desalination plant, and an injection well at the VLA.

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512.389.4800
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Environmental Assessment Preparation

The FAA proposes to prepare a Draft EA that would only consider the proposed action and the no-action alternative. The Boca Chica Launch Site was initially selected as a suitable location for development based on criteria to support a launch site for Falcon 9 and Falcon Heavy vehicles. These criteria included: being at a low latitude; being able to support low-orbit and geostationary earth orbit trajectories; safety; and size (being large enough to accommodate all facilities to support Falcon 9/Falcon Heavy launches). The activities currently occurring and proposed to occur at the Boca Chica Launch Site have changed substantially from those described in the 2014 Final Environmental Impact Statement (EIS) and Record of Decision (ROD), for which the site was originally selected.

> **Recommendation:** The site selection criteria published in the 2014 Final EIS may no longer be applicable for an experimental testing facility. TPWD recommends the Draft EA include a detailed and updated Purpose and Need section and a rigorous evaluation of multiple reasonable alternatives considered for the proposed experimental testing facility. An equitable level of critical evaluation should be provided for each alternative throughout the Draft EA. The Draft EA should describe how the Boca Chica site uniquely fulfills the criteria of SpaceX's proposed use of the site as an experimental testing facility.

The 2014 ROD for SpaceX's activities at the Boca Chica Launch Site determined the project would result in unavoidable and significant direct and indirect impacts to several natural and cultural resource categories. Avoidance and minimization measures were to be implemented to reduce impacts to other resource categories including special-status species and Section 4(f) of the U.S. Department of Transportation Act (23 Code of Federal Regulations Part 774) properties. To date, several of the avoidance and minimization measures associated with the 2014 Final EIS and ROD have not been fully implemented, including: mitigating noise impacts by scheduling construction activities to occur between 8 a.m. and 5 p.m.; avoiding lateral light spread and uplighting per the Lighting Management Plan; maintaining cleared shoulders along SH 4; and observing speed limits not to exceed 25 miles per hour between the Control Center Area (CCA) and VLA. Also, to our knowledge, construction of vehicle barriers along SH 4 and monitoring of vegetation changes in piping plover critical habitat has not occurred.

The proposed action the FAA would license will require expanding the physical footprint of the Boca Chica Launch Site facilities for testing larger vehicles at an increased frequency than originally proposed for the site, for which an EIS was prepared and found impacts to be unavoidable and significant.

> **Recommendation:** TPWD recommends preparing an EIS to address the additional short-term and long-term impacts resulting from additional construction and operational tasks related to experimental testing activities that would be licensed by the FAA.

The FAA is considering preparing a Programmatic EA for this effort. It is TPWD's understanding that a Programmatic EA may be appropriate to address a broad group of related actions or to address a program, policy, plan, system, or national level proposal that may later lead to individual actions requiring a subsequent NEPA analysis. Also, the level

of analysis for a Programmatic EA may be broader and less specific than what is done for a specific project.

Comment: While a Programmatic EA may be appropriate for the activities proposed at the Boca Chica Launch Site, TPWD is concerned that the Purpose and Need, Project Description, and scope of analysis in a Programmatic EA could be defined too broadly for resource agencies to anticipate proposed future activities at the site and accurately comment or assess the potential impacts to the state's natural and cultural resources.

Recommendation: TPWD recommends a critical and comprehensive evaluation of significant environmental impacts be conducted during the development of the Draft EA. The evaluations should be informed by the best available scientific information including input from published literature and subject-matter experts; any sources should be clearly cited in the Draft EA.

To assist in the development of the Draft EA, please see the attachment titled, "Resources for Analysis of Potential Environmental Impacts of the Development of the Boca Chica Launch Site."

Development at the Control Center Area (CCA) has expanded significantly over the past two years. Much of the expansion appears to be in support of the development and construction of vehicles for which experimental licenses issued by the FAA are being sought.

Recommendation: TPWD recommends the Draft EA evaluate all facilities and infrastructure related to the development of the spacecraft or other vehicles for which the FAA licenses and experimental permits would be issued as they are connected actions.

Recommendation: TPWD recommends reviewing and addressing all comments provided in the attached TPWD letter dated July 9, 2020, provided for chapters 1 and 2 of an initial Draft EA for SpaceX's Starship/Super Heavy Launch Vehicle as they remain applicable.

Federal Regulations

Endangered Species Act

Federally-listed animal species and their habitat are protected by the Endangered Species Act (ESA) from take on any property. Take of federally-listed species can be allowed if it is incidental to an otherwise lawful activity and must be permitted in accordance with section 7 or 10 of the ESA. Federally-listed plants are not protected from take except on lands under federal or state jurisdiction or for which a federal or state nexus (i.e., permits or funding) exists. Any take of a federally-listed species or its habitat without the required take permit (or allowance) from the U.S. Fish and Wildlife Service (USFWS) is a violation of the ESA.

Portions of the proposed project (e.g., VLA construction activities) are located on tracts of land bound on three sides by land owned by TPWD and managed by the USFWS as part

of the Rio Grande Valley Wildlife Corridor, a long-standing program aimed at preserving, restoring, and managing habitat for wildlife, including threatened and endangered species. The Rio Grande Valley Wildlife Corridor initiative has been an active project of TPWD, USFWS, many private landowners, local communities, and nonprofit organizations such as Audubon, The Nature Conservancy, Valley Land Fund, and others since the 1970s. As part of the Rio Grande Valley Wildlife Corridor, large anchor tracts such as the Boca Chica tract are managed to "conserve biological material to safeguard gene pools and replenish wildlife populations throughout the corridor" (Leslie 2016).

Within or near the proposed project area, occurrences of federally-listed ocelots (*Leopardus pardalis*), piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), and Kemp's Ridley (*Lepidochelys kempii*) and green sea turtles (*Chelonia mydas*) have been documented. Additionally, for all five species of sea turtles that occur in Texas, suitable nesting habitat is available on the beach less than one-quarter mile east of the VLA. Kemp's Ridley sea turtles have consistently used Boca Chica beach for nesting; record Kemp's Ridley sea turtle nesting occurred on Boca Chica beach in 2017. It is well documented that artificial night lighting is a cause of mortality among migratory birds and hatchling sea turtles (Salmon 2006). Considering the current and expected use of artificial lighting at the VLA for operations, TPWD is concerned with the effects that skyglow (the illumination of the night sky by reflected light) may have on hatchling sea turtles. Skyglow can disorient hatchlings as they emerge on the beach, directing them into the dunes rather than toward the ocean, resulting in mortality.

Recommendations: TPWD recommends that analyses pertaining to natural resources impacts from the proposed action, such as those that may occur on threatened, endangered, and candidate species, be based on field surveys performed in collaboration with resource agencies. In the absence of, or supplementary to, field data, the best-available science should be utilized to inform mitigation needs and potential impacts to federally-listed threatened and endangered species. In particular, the USFWS and National Park Service's (NPS) Division of Sea Turtle Science and Recovery Program should be contacted for information to assist in evaluating potential impacts to nesting sea turtles and turtle hatchlings resulting from artificial night lighting and testing and launch vibrations.

TPWD continues to be concerned with the direct and indirect impacts of noise, heat, vibrations, continual nighttime lighting, emissions, and potential hazardous material spills originating from space vehicle launches, experimental testing, and routine daily activities at the CCA and VLA. The potential impacts associated with these sources should be evaluated with respect to federally-listed species and their habitat. TPWD further recommends a proactive approach regarding the avoidance and minimization of impacts to listed species. The Draft EA should clearly present the process by which these impacts are evaluated and describe mitigation measures that will be required to avoid and minimize these impacts.

TPWD recommends reviewing the lighting plan implemented at the Kennedy Space Center which was developed, in part, to avoid or minimize potential impacts to nesting sea turtles. For example, existing light pollution issues can be corrected by disconnecting and turning off lights to ensure a dark beach (NASA 2017).

The Draft EA should also evaluate the impact additional modification to the operations and landscape at the Boca Chica Launch Site will have on daily and seasonal migrations of wildlife through the area (*e.g.*, the effects of continual nighttime lighting, increases in noise and traffic on ocelot movement through the area) and whether listed species will be permanently displaced from the area. Potential impact analysis, evaluations, and conclusions related to future environmental conditions, such as habitat changes or survival of organisms, should be supported with the best available scientific data.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits direct and affirmative purposeful actions that reduce migratory birds, their eggs, or their nests, by killing or capturing, to human control, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. Additional information regarding the MBTA is available from the USFWS-Southwest Regional Office (Region 2) at (505) 248-7882.

Review of aerial photography and the Ecological Mapping Systems of Texas (EMST), indicate that the project area is among wind tidal flats, deep sand grasslands, sea ox-eye daisy flats, and salty prairie. Areas surrounding the project area are managed or preserved as high-quality wildlife habitat that provide foraging, loafing, and nesting sites for birds. Additionally, the project area occurs in the middle of the Central Flyway Migration Corridor through which millions of birds pass during spring and fall migration. More than 250 bird species have been documented within the Boca Chica Village and Boca Chica Beach areas in recent years. The mud and sand flats surrounding the proposed construction areas are used by numerous shorebirds, including the federally-listed piping plover and rufa red knot, during the winter.

Recommendations: The Draft EA should address direct impacts that expanded infrastructure construction may have on birds. Impacts from noise, heat, vibration, permanent artificial lightning at night, emissions, anomaly debris and debris removal, and hazardous material spills should be evaluated. To minimize potential impacts to birds, TPWD recommends locating proposed infrastructure expansion or new structures in previously disturbed areas.

Additionally, TPWD recommends any vegetation clearing or trampling necessary to accommodate construction be scheduled to occur outside of the March 15 - September 15 migratory bird nesting season. If vegetation clearing must be scheduled to occur during the nesting season, TPWD recommends the vegetation to be impacted should be surveyed for active nests by a qualified biologist. Nest surveys should be conducted no more than five days prior to the scheduled clearing or disturbance to ensure recently constructed nests are identified. If active nests are observed during surveys, TPWD recommends a 150-foot buffer remain around the nests until the young have fledged or the nest is abandoned.

Two integration towers would be constructed as part of the proposed project. The information provided did not include specific information regarding the proposed towers.

The potential exists for birds to be attracted to towers as perching sites and to collide with towers or elevated structures, especially those with associated guy wires lines.

Recommendations: TPWD recommends towers be self-supporting monopoles to eliminate the need for guy wires and minimize perching opportunities for birds in areas that may place birds in imminent danger, whenever possible. All permanent structures or substrates within the proposed development areas should be designed to avoid and/or minimize potential bird impacts. TPWD recommends towers be less than 199-feet in height to eliminate the need for FAA required pilot warning and obstruction lighting which can be a bird attractant.

Preliminary shorebird monitoring conducted by the Coastal Bend Bays and Estuaries Program (CBBEP) indicates that activities attributed to SpaceX (i.e., increased vehicle traffic, construction noise, concussive force) may be a major contributor to an observed reduction in snowy and Wilson's plover nesting at Boca Chica (CBBEP 2020).

Recommendations: The Draft EA should address bird use in the area, especially for shorebirds and wading birds that are known to utilize the habitat within and adjacent to the project areas and migrate daily across the area between roosting and foraging sites. Grassland birds may also utilize available suitable habitat for nesting. The Draft EA should address proposed plans to avoid and or minimize potential impact to nesting and wintering birds. Specifically, the Draft EA should include a detailed discussion of the effects of a permanently-lit facility with upward directed lights in construction areas on bird use.

TPWD recommends SpaceX fund a long-term avian monitoring project to evaluate impacts to birds and their habitat due to construction, operations, anomalies, and debris removal following anomalies. Due to continuous construction and testing, surveys should be conducted at regular intervals (e.g., quarterly) and immediately after unexpected events that discharge material (i.e., solid debris, liquid spills, gaseous emissions), particularly if discharges affect adjacent properties.

Clean Water Act

The Clean Water Act (CWA) provides for the federal protection and regulation of surface water quality. The CWA regulates point and nonpoint sources of water pollution, including dredge and fill activities in waters of the U.S.

The proposed action occurs in the clay loma and wind tidal flats of the Lower Rio Grande Valley in an area known as Boca Chica. In Texas, these expansive sand and algal flats are concentrated within the Laguna Madre system, which in combination with the Laguna Madre of Tamaulipas, Mexico, represents one of six coastal hypersaline lagoon systems worldwide. In the Lower Rio Grande Valley, the clay loma and wind tidal flats represent one of the eleven unique biotic communities that comprise the Matamoran District of the Tamualipan Biotic Province.

Rare clay dunes, called lomas, dot the flat landscape, and the terrain is also engulfed with shallow bay waters of the South Bay Coastal Preserve which supports seagrass meadows and oysters with fringes of salt marsh and mangroves. These aquatic habitats, along with

the dune, ridge, and swale topography of upland coastal prairie and Tamaulipan thornscrub, serve as migration corridors, as well as feeding, breeding, nesting, roosting, and denning habitat for rare, threatened, and endangered species. Sand and algal flats are essential to shorebirds in general and critical to species with relatively short legs and bills, like plovers, that are physically limited to shallow water habitats. Other tidal flat features utilized by shorebirds include washovers that cut through the coastal dunes and provide a shallow tidal connection with the Gulf of Mexico. When exposed, the sand and algal flats support the dietary requirements of migratory species, such as the state- and federally-listed threatened piping plover and rufa red knot, and provide nesting habitat to resident plovers, stilts, and terns. When inundated, these shallow water features provide forage habitat for finfish, crustaceans, larger shorebirds, and wading birds. Accordingly, critical habitat has been federally designated for wintering piping plover (Unit TX-1) within the vicinity of the project site.

Proposed expansion at the VLA, including a parking and storage area north of State Highway (SH) 4, may result in additional wetland impacts.

Recommendations: Because no successful tidal flat restoration or establishment projects have been documented in Texas, TPWD considers these habitats to be difficult to replace. Consequently, impacts to functions and values of tidal flats should be avoided and minimized to the extent possible.

The Draft EA should address all direct, indirect, and cumulative impacts to the functions and values of aquatic habitats for fish and wildlife resources and include mitigation measures that will be required to avoid, minimize, and potentially compensate for those impacts. TPWD recommends continuing coordination with the U.S. Army Corps of Engineers regarding potential wetland impacts.

Due to the experimental nature of the proposed activity, environmental effects to all aquatic habitats should be evaluated using the worst case scenario for the initial impact of, and subsequent removal of, debris resulting from anomalies associated with all activities which may be authorized under the jurisdiction of FAA.

State Regulations

Parks and Wildlife Code Chapter 64 - Birds

State law prohibits any take or possession of nongame birds, including their eggs and nests. Laws and regulations pertaining to state-protection of nongame birds are contained in PWC chapter 64. Specifically, PWC section 64.002 provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. PWC section 64.003, regarding destroying nests or eggs, provides that no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl.

It is important to note that 88 species of birds have been identified as Species of Greatest Conservation Need (SGCN) within Texas' Gulf Coast Marshes and Prairies Ecoregion. Fifty-eight of those species (or 65 percent) have been documented within the immediate Boca Chica area in recent years.

Recommendation: Please review the *Federal Regulations: Migratory Bird Treaty Act* section above for recommendations as they are applicable for compliance to PWC chapter 64.

Recommendation: Following testing anomalies, biologists participating in the long-term avian monitoring project recommended above and TPWD staff, should have access to TPWD property immediately after it is declared safe to enter the area to assess for habitat impacts and direct mortalities.

Parks and Wildlife Code Chapter 68 - Endangered Species

PWC section 68.015 regulates state-listed threatened and endangered animal species. The capture, trap, take, or killing (incidental or otherwise) of state-listed threatened and endangered animal species is unlawful unless expressly authorized under a permit issued by the USFWS or TPWD. A copy of TPWD Protection of State-Listed Species Guidelines, which includes a list of penalties for take of species, can be found online at the TPWD Wildlife Habitat Assessment Program website at: https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/habitat_assessment/media/tpwd_statelisted_species.pdf. While the document provides general guidelines, it is the responsibility of the project applicant to determine whether the project would adversely affect a state-listed species and comply with all statues and provisions of law. For purposes of relocation, surveys, monitoring, and research, state-listed species may only be handled by persons with the appropriate authorization obtained through the TPWD Wildlife Permits Program. For more information on this authorization, please contact the TPWD Wildlife Permits Office by phone at (512) 389-4647.

Recommendation: TPWD recommends that evaluations pertaining to natural resources impacts, such as those that may occur to state-listed threatened and endangered species, be based on field surveys performed in collaboration with resource agencies. In the absence of, or in supplement to, field data, the best available science should be utilized to inform mitigation needs and potential impacts to state-listed species.

Due to the diversity of habitat types available in the general Boca Chica project area, suitable habitat for several state-listed species occurs in, and adjacent to, the proposed project area. TPWD has concerns regarding the physical and behavioral barriers that may be created with additional development of the area, potential changes in the project's mission, and increased traffic along SH 4. These activities will further fragment and disturb suitable habitat for state-listed species. Specifically, TPWD is concerned with direct impacts to the Texas horned lizard (*Phrynosoma cornutum*) and Texas tortoise (*Gopherus berlandieri*) and indirect impacts to numerous other state-listed species on the adjacent managed lands.

The proposed action would include constructing an injection well, five gas wells, utility lines along SH 4, gas pipelines, and potentially buried interconnection lines at the solar farm. Trenching and excavation pose entrapment risks to wildlife including state-listed species that occur in the area.

Recommendation: TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. If covering trenches or excavated areas is not feasible, escape ramps fashioned from soil or boards should be installed at an angle of less than 45 degrees (1:1) in trenches and excavated areas that will allow wildlife to climb out on their own.

Some reptiles, including the Texas tortoise, use hard-packed surfaces, such as asphalt, to thermoregulate, and they will occasionally seek shade by crawling under parked vehicles. Near the VLA, SpaceX employees customarily park along the north side of SH 4 between the asphalt and TPWD property, where tortoises, snakes, and other reptiles may occur.

Recommendation: Before driving passenger vehicles or construction equipment that have been parked at project sites, vehicle operators should check underneath the vehicles to ensure no tortoises or other wildlife are present. If a tortoise is located in any area associated with the project site, it should only be relocated if it is found to be in imminent danger. Individuals that must be relocated should be transported to the closest suitable habitat outside of the proposed disturbance area, but preferably within a one-mile radius of where the individual was collected. Additional information regarding Texas tortoise best management practices is available on TPWD's Wildlife Habitat Assessment Program website (https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/habitat_assessment/tools.phtml).

The 2014 Final EIS indicated that SpaceX would have an average of approximately 30 employees on site. Currently, several hundred employees and contractors travel to the Boca Chica Launch Site and between the CCA and VLA throughout the day and night, resulting in an increase in traffic along SH 4. TPWD continues to be concerned that the increase in traffic has resulted and will continue to result in an increase in wildlife-vehicle collisions (WVC; roadkill). Roadkill observations have been documented along SH 4 and include state-listed and SGCN species including Texas tortoise, Texas indigo snake, snowy plover, and Harris' hawk.

Recommendation: The Draft EA should evaluate potential impacts to state-listed species resulting from increased traffic on SH 4 and from parking in unimproved areas adjacent to land managed for wildlife.

The Texas tortoise is particularly susceptible to mortality from vehicle collisions due to its slow gait and the tendency to withdraw into its shell when startled (e.g., by oncoming traffic) rather than fleeing.

Recommendation: Due to the high potential for encountering wildlife along SH 4, TPWD recommends SpaceX employees and contractors receive environmental awareness training to be able to identify and avoid impacts to state-listed species encountered along SH 4. Conservation actions to alleviate traffic impacts should include consideration of measures to ensure the safe passage of wildlife over SH 4 such as limiting the volume of traffic through van pooling to the project area and the construction of culverts that facilitate wildlife movement under the roadway.

Parks and Wildlife Code Chapter 26 - Protection of Public Parks and Recreational Lands

PWC chapter 26 provides that a department, agency, political subdivision, county, or municipality of this state may not approve any project that requires the use or taking of public land (designated and used prior to the project as a park, public recreation area, scientific area, wildlife refuge, or historic site) unless it holds a public hearing and determines that there is "no feasible and prudent alternative to the use or taking of such land," and the project "includes all reasonable planning to minimize harm to the land…resulting from the use or taking." Chapter 26 requirements must also be met by the Texas Parks and Wildlife Commission (Commission) before it can grant an easement to cross TPWD property. The Commission is not obligated to grant approval for an easement. If an easement is granted, a fee and mitigation for possible adverse impacts would be required.

Land-use priorities for the Lower Rio Grande Valley National Wildlife Refuge (LRGVNWR) in the Boca Chica area (including state-owned, federally managed land) include endangered species protection, migratory bird habitat, marine turtle nesting, and storm surge protection. The area also supports a wide variety of compatible public uses associated with the beach and South Bay, including fishing, kayaking, and bird watching. Aside from proposed future activities, the degree of impacts that the current SpaceX activities have on these priority land uses has not been thoroughly evaluated. Impacts to the purposes of these adjacent properties would be expected to continue or increase with the proposed expansion of activities at the Boca Chica Launch Site.

Recommendation: The Draft EA should include a detailed analysis of the impacts of restricting access and use of public land and the loss of recreational value due to proposed activities. Additionally, the Draft EA should include an access plan that will address the frequency and timing of closures, mitigation for loss of recreational, scientific, and research access due to SpaceX activities, and clearly define remedies when SpaceX exceeds thresholds or does not comply with the access plan. Between all affected landowners, a mutually agreed-upon method for implementing and calculating what constitutes "closure hours" should also be resolved.

General Comments

Many of the Boca Chica area's tangible benefits to present and future generations of Texans will continue to be impacted by the implementation of expanded infrastructure and continuous experimental testing at the Boca Chica Launch Site. Potential impacts may be compounded by the failure to completely execute or comply with the Special Conservation Measures and management plans previously developed and associated with the 2014 Final EIS and ROD.

Recommendations: TPWD recommends the Draft EA thoroughly assess existing conditions of the properties within or adjacent to SpaceX's proposed project area, particularly the VLA, and provide a thorough analysis into the reasonably foreseeable future of the ability for those adjacent lands to continue to retain the unique environmental conditions and outdoor recreational opportunities. The Draft EA should propose appropriate mitigation that provides a net benefit to offset impacts to public access and use and the management of fish, wildlife and plants.

TPWD recommends that conclusions related to future environmental conditions, such as ecosystem services expected from the post-construction environment, be supported with the best available scientific data.

Recommendation: TPWD recommends socioeconomic impacts be considered in the Draft EA including the potential economic impact from the loss of public access to and outdoor recreational opportunities at Boca Chica beach and other public land.

Currently, the process for closing SH 4, adjacent private and public lands, and Boca Chica beach does not allow adequate planning by the public or landowners and their authorized users. Closure notifications continue to be provided either the same day or as little as one to four days prior to closures, and notification of closure extensions have occurred after the extension period has begun. Also, revocation of closures occur well into the authorized closure window after landowners and the general public may have abandoned their plans for the day. Also of concern to TPWD are the closures on federal and state holidays when the general public are more likely to want access to public recreation areas like Boca Chica beach. These short-notice closures can impact TPWD and its partners' abilities to conduct day-to-day activities and fulfill each entities mission to provide outdoor recreational opportunities to the public, conduct and collect scientific research and imperiled species monitoring data, and to protect and preserve the state's natural resources. For example, in January 2021, TPWD received notification from the Coastal Bend Bays and Estuaries Program that it would be discontinuing its shorebird research and monitoring project in the Boca Chica and South Bay area due to the "magnitude and frequency of the closures and the last minute (and after-the-fact) notices."

Recommendation: TPWD recommends the process for issuing closure notices for activities to be authorized by the FAA's licenses and experimental permits be revised with input from all affected stakeholders.

Information previously provided to TPWD indicated water from an existing well would be used for sound and fire suppression during tests. The information also referenced a potential retention pond to be located adjacent to the launch mount.

Recommendations: For the most part, the area around the VLA consists of unvegetated flats. TPWD is concerned that water discharged for sound and fire suppression or as vapor released during testing, could result in vegetation shifts into unvegetated areas. Vegetation in and around the VLA should be monitored over time to assess any changes, and the Draft EA should include measures and processes to address the influences that water releases may have on the surrounding habitats.

Although retention ponds do not perform the same ecological functions as streams or wetlands, because they are designed to retain water, they may attract wildlife, particularly birds. Due to the potentially dangerous conditions for wildlife found within the VLA, the use of wildlife deterrents or exclusion practices around the retention pond should be evaluated in the Draft EA.

The project would include a liquified natural gas (LNG) pretreatment system and a liquefier. The specific LNG pretreatment method was not described.

Recommendation: The Draft EA should provide a detailed description and evaluation of the proposed LNG pretreatment method and liquefaction process. The impacts of potential emissions resulting from the process and the proposed safety measures that would be implemented should also be described.

The Draft EA should also evaluate the cumulative impacts of these emissions. The evaluation should include anticipated air quality impacts and describe the mitigative measures that would be implemented to minimize those impacts to the region's air quality.

The existing solar farm would be expanded near the CCA.

Recommendations: To reduce ground disturbance in the solar farm, TPWD recommends housing cables in above-ground cable trays rather than burying them in trenches. Utilizing above ground housing methods can reduce fugitive dust emissions, reduce use of water to suppress fugitive dust, minimize equipment emissions, preserve cultural resources, and minimize potential wildlife entrapment (Sinha et al. 2018).

To further mitigate potential impacts associated with the solar farm expansion, TPWD recommends incorporating beneficial practice guidelines for solar facilities that enhance biodiversity such as reseeding the area with native flora and allowing it to grow under solar panels to provide wildlife habitat and reduce dust. Fencing around the solar farm should be designed to be wildlife-friendly, allowing smaller species to pass through while excluding larger ones from becoming trapped within the solar farm.

TPWD also recommends incorporating avian safety features for all energized components within the solar farm (APLIC 2012).

The proposed project would also include tanks of natural gas, liquid methane, liquid nitrogen, liquid oxygen, and liquid argon, most of which would be located at the VLA and may be susceptible to catastrophic damage during hurricanes or other storm events.

Recommendation: TPWD is concerned with the potential of significant contamination of very sensitive natural resources in the event of a catastrophic event (*i.e.*, hurricane). The Draft EA should thoroughly address fuel storage and clean up procedures in the event of a catastrophic event.

Because of the project's location among grasslands susceptible to fire, and due to the accidental fires that burned approximately 140 acres of TPWD property on July 25, 2019 and in August 2019 during SpaceX test launches, TPWD continues to be concerned about the potential impacts of unintentional fires resulting from launch failures and other SpaceX operations on the sensitive natural resources on adjacent properties. For example, the only known population of an SGCN insect (the Boca Chica flea beetle [*Chaetocnema rileyi*]), occurs along the back of the primary and secondary dunes at Boca Chica in association with the marsh fimbry (*Fimbristylis castanea*), a plant occurring in marshes. If accidental fires escape into areas behind the dunes, the only known population of this species may be permanently lost.

Recommendation: The Draft EA should either incorporate SpaceX's Fire Plan that was developed in 2019 or develop a new Fire Contingency Plan to address potential wildfires and their impacts to natural resources.

Similarly, the project is located among sensitive wind tidal flats that have been negatively impacted by falling debris and subsequent retrieval following explosions of SpaceX rockets during testing anomalies in November 2019, February 2020, and December 2020.

Recommendation: TPWD recommends that the Draft EA contain a contingency plan for testing anomalies that may discharge debris onto adjacent properties. The plan should include retrieval practices that would avoid impacts to sensitive habitats, immediate habitat assessment protocols, post-incident monitoring, and proposed mitigation for unavoidable impacts.

Noise modeling in previous environmental evaluations was based on launching Falcon 9 and Falcon Heavy vehicles.

Recommendation: TPWD recommends the Draft EA evaluate noise and vibration impacts, including sonic booms, based on current and anticipated engines that will be launched or tested at the Boca Chica Launch Site. As a potential mitigation option, TPWD recommends SpaceX provide funding for research that will alleviate the paucity of data that analyzes the short, long, and cumulative impacts of noise and vibrations on the region's wildlife, in particular nesting sea turtles.

TPWD continues to be concerned with the wildlife impacts created by continuous noise and lighting associated with the project area. Research indicates that light pollution, including direct glare, increased illumination, and unexpected fluctuations in lighting from sources such as skyglow, lighted buildings and towers, security lights, and lights on vehicles and construction equipment can disrupt ecosystems and alter organisms' behavior and physiology.

Recommendations: Due to the well-documented deleterious effects of artificial night lighting on wildlife, including at other spacecraft launching facilities (NASA 2017), TPWD recommends nighttime construction and testing, particularly at the VLA be discontinued, severely limited, or modified to meet accepted standards in order to minimize potential impact to animals and preserve the ecological integrity of the adjacent managed lands.

The 2019 Launch Facility Design and Lighting Management Plan no longer accurately reflects the operational environment of the Boca Chica Launch Site. TPWD recommends developing a new Lighting Management Plan that eliminates or minimizes site lighting from being directed toward the beach or into land managed for wildlife.

The information provided did not include plans for proposed post-construction landscaping for erosion control or for aesthetics.

Recommendations: For soil stabilization and/or revegetation of disturbed areas within the proposed project areas, TPWD recommends erosion and seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species. Because the mesh found in many erosion control blankets or mats poses an entanglement hazard to wildlife, TPWD recommends the use of no-till drilling, hydromulching, and/or hydroseeding due to a reduced risk to wildlife. If erosion control blankets or mats were to be used, the product should either contain no netting or contain loosely woven, natural-fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic mesh matting and hydromulch that includes plastics should be avoided.

TPWD recommends the exclusive use of a mixture of regionally adapted native grasses, forbs, and pollinator species for post-construction revegetation efforts and landscaping. If needed, TPWD can provide technical guidance on appropriate plant species for the project area.

Historic Properties

The 2015 Memorandum of Agreement (MOA) among the FAA, the Texas State Historic Preservation Officer (SHPO), the NPS, the Advisory Council on Historic Preservation, SpaceX, the USFWS, and TPWD, as well as the 2019 SpaceX Vibration Monitoring Plan (Revision 10) (VMP), define measures to be taken in order to account for adverse effects on historic properties caused by SpaceX. However, many of those measures have not been sufficiently executed to date, including the Historical Context Report, Vibration Monitoring Reports on the most recent launch events, Replication of Missing Marker Elements, Additional Security, Interpretive Signage, and Educational Website.

Also, additional potential for direct adverse effects associated with SpaceX operations, including damage caused by debris/explosions, vehicular and foot traffic, and wildfires, has become apparent over recent years.

Recommendation: Based on the information provided, those same measures already defined in the MOA and VMP are likely to be appropriate for the additional operations being proposed assuming they are updated to account for any new adverse effects. It is recommended that in addition to updating those measures, the causes for the lack in execution of the measures to date be addressed and corrected prior to approval of the operations being proposed. It is also recommended that the additional potential for the direct adverse effects described above be addressed as well.

Indirect Impacts to Natural Resources

Based on information previously provided to TPWD, proposed infrastructure at the VLA would be located immediately adjacent to TPWD property; a parking and storage area along SH 4 would be bound on three sides by TPWD property, and newly proposed expansion at the CCA would be immediately adjacent to TPWD property along Eichorn Boulevard. As stated in previous environmental reviews of SpaceX activities at Boca Chica, TPWD continues to be concerned that the impacts of suborbital and orbital launches and continual testing will significantly reduce the natural resource conservation value of some or all of the state-owned property at Boca Chica.

In addition to the direct loss of habitat resulting from the infrastructure expansion, new construction and experimental testing, TPWD is concerned that the quality and natural resource value of the surrounding properties will also be diminished. Cumulatively, infrastructure expansion, new construction, and the increased closure hours necessary to support the new project mission corresponds to an increase in potential direct and indirect impacts to and disturbance of wildlife and wildlife habitat on adjacent properties through additional loss of habitat, increased traffic, noise, vibration, emissions, and night time lighting. TPWD has concerns regarding impacts associated with unexpected anomalies (e.g., explosions) including fires, scattered debris, and activities related to the response to these incidents (i.e., debris retrieval through sensitive habitats) on the integrity of TPWD property and the wildlife and plants TPWD is responsible for protecting and conserving.

Recommendations: TPWD recommends evaluating the potential direct, indirect, and cumulative impacts to fish, wildlife, and plant resources on state property that may be affected by continual construction activity and launching or experimental testing of space vehicles. Specifically, the Draft EA should describe the expected impacts (e.g., noise, heat, vibration, fuel emissions) on vegetation and wildlife. For expected impacts for which no data exists to assist in predicting their significance (i.e., vibrations to sea turtle nests, noise on ocelot movement), TPWD recommends SpaceX propose and conduct research to help predict and minimize those impacts. The Draft EA should specifically address the occurrence, frequency, quantity, extent, and fate of debris on TPWD property and that may result from activities which directly involve or support the testing and launching of experimental and established spacecraft.

TPWD appreciates the opportunity to provide comments and recommendations during the development of the Draft EA for the proposed activity. Regarding future commenting opportunities, TPWD respectfully requests that at least 45 days are provided for review and response to this complex project. If you have any questions regarding TPWD's input on this NEPA scoping opportunity, please contact Mr. Russell Hooten, Wildlife Habitat Assessment Program Biologist, by email at Russell.Hooten@tpwd.texas.gov or by phone at (361) 825-3240. Thank you.

Sincerely,

Clayton Wolf
Chief Operating Officer

CW:RH:cb

Attachments

cc: Mr. Carter Smith
Mr. John Silovsky
Mr. Robin Riechers
Mr. Rodney Franklin
Mr. Russell Hooten

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University of Texas-Rio Grande Valley, Coastal Studies Lab Research

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Commercial Launch Site Pre-Construction Species Monitoring Survey. PIs: David Hicks, Karl Berg, and Heather Alexander.
This is the first phase of a consortium project involving three UTB/TSC faculty to conduct pre-launch site construction baseline surveys of avian, sea turtle, and vegetation of the Boca Chica SpaceX facility.

Evaluation of Beach Management Practices. PI: David Hicks
This is a collaborative effort between UTB/TSC and the town of South Padre Island. The objective of this partnership is to experimentally assess the beach management practices adopted by the City of South Padre Island (e.g., beach grooming, nourishment, dune restoration, etc.).

Coastal Impact Assistance Program - Baseline Study for Oil Spill Planning. PI: T. Whelan
Under contract with Cameron County, CSL researchers are conducting a hydrographic survey at critical locations in the Laguna Madre to predict where an oil or chemical spill would travel if it entered the Laguna Madre through the Brazos-Santiago Pass from the Gulf of Mexico.

Modeled Inflow Validation & Nutrient Loading Estimation in Two Subwatersheds of the Lower Laguna Madre. H. DeYoe, PI
This project is a collaborative project that will assess through field monitoring and rainfall-runoff modeling the input of nutrient loading from two major ungaged subwatersheds into the Lower Laguna Madre (LLM).

Shorebirds at Boca Chica. PI: David Hicks
Since 2015, UTRGV has been conducting ecological monitoring of a threatened shorebird community in the Delta of the Rio Grande and Gulf of Mexico shoreline.
https://www.utrgv.edu/avianecology/research/shorebirds-at-boca-chica/index.htm

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July 9, 2020

Ms. Stacey M. Zee
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Ave., SW
Washington, DC 20591

RE: Review of Chapters 1 and 2 of Draft Environmental Assessment for SpaceX Starship/Super Heavy Launch Vehicle at SpaceX Texas Launch Site, Cameron County, Texas

Dear Ms. Zee:

This letter is in response to your June 5, 2020, email request for review of the first two chapters of the Draft Environmental Assessment (EA) for SpaceX Starship/Super Heavy Launch Vehicle at SpaceX Texas Launch Site in Cameron County, Texas.

The Federal Aviation Administration (FAA) Office of Commercial Space Transportation is preparing an EA to evaluate the potential environmental impacts of activities associated with issuing experimental permits and launch licenses to SpaceX for Starship/Super Heavy launch operations at the Texas Launch Site.

Texas Parks and Wildlife Department (TPWD) staff has reviewed the material provided and offers comments and recommendations on the attached SpaceX Boca Chica Comment form provided by the FAA. TPWD appreciates the opportunity to provide comments and recommendations during the development of the EA for the proposed activity. If you have any questions regarding TPWD's input on the EA review, please contact Russell Hooten, Wildlife Division at (361) 825-3240, or Russell.Hooten@tpwd.texas.gov. Thank you.

Sincerely,

Clayton Wolf
Chief Operating Officer

CW:RH:jn

Enclosures

cc: Mr. Robin Riechers
Mr. Rodney Franklin
Ms. Colette Barron Bradsby
Mr. Russell Hooten

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800

www.tpwd.texas.gov

Comment Response Matrix **SpaceX Boca Chica Sections 1 and 2 – Administrative Draft Cooperating Agency Review (June 2020)**						
#	**Location**		**Type of Comment**	**Reviewer Initials**	**Comment**	**Response / Concurrence**
	Page*	**Section**	**S, A**			
1	8	1.1, line 4	S	KK	Other FAA EA's begin by stating that, "The Federal Aviation Administration (FAA) Office of Commercial Space Transportation (AST) proposes to issue an experimental permit to Space Exploration Technologies Corporation (SpaceX) to..." Why does the current Draft EA to state "SpaceX proposes to..." since the action being analyzed during this NEPA process is the federal action?	
2	8	1.1, line 6	S	KK/RH	Per CFR §437.9, FAA issued experimental permits authorize an unlimited number of launches. In this location, TPWD recommends that the experimental permit(s) need to be limited in scope and breadth.	
3	8	1.1, line 14	S	KK	It is confusing to reference, "activites associated with the Proposed Action" when the Proposed Action is not described, even in summary terms, until Chapter 2.	
4	8	1.1, line 15	S	KK	The term "Texas Launch Site" should identify the specific location as Boca Chica Texas Launch Site.	
5	8	1.1, line 22	S	KK	Is it correct to say that the 2014 EIS analyzed the consequences of issuing SpaceX launch licenses **and/or** experimental permits? If TPWD understands correctly, an experimental permit authorizes unlimited launches. Please explain if an experimental permit as well as a launch license will be issued for the currently proposed activities at the Boca Chica site, and why both authorizations would be necessary for the site.	
6	8	1.1, line 24, 25	S	KK	These lines state, "The analysis in the 2014 EIS included construction and operation of the launch site." TPWD disagrees with this statement. Much of the construction which has occurred and is occurring was not adequately analyzed since it diverges substantially from what was originally proposed in the 2014 EIS. TPWD has concerns with the segmenting of the current project from the proposed project rather than evaluating potential impacts from all SpaceX FAA-permitted activities as one single and complete action. The NEPA analysis	

Comment Response Matrix SpaceX Boca Chica Sections 1 and 2 -- Administrative Draft Cooperating Agency Review (June 2020)						
#	Location		Type of Comment	Reviewer Initials	Comment	Response / Concurrence
	Page*	Section	S, A			
					needs to include all the construction, past, present, and planned, and all the subsequent operations and activities.	
7	8	1.1, line 29	S	KK	This line states, "Each Written Re-evaluation concluded that SpaceX's modifications 1) conformed to the prior environmental documentation..." TPWD does not agree with this conclusion. TPWD expressed concerns during the Written Reevaluation comment periods about what was perceived as actions not covered under the 2014 EIS analysis.	
8	8	1.1, line 34	S	KK	This line states that, "SpaceX has decided to use the Texas Launch Site as a site to..." Since an alternatives analysis has not yet been completed, this should be re-phrased to read, "SpaceX proposes to use the Boca Chica Texas Launch Site..."	
9	9	1.3.1, line 26	S	KK	This line states, "The purpose of FAA's Proposed Action is to ..." The Proposed Action, which is to issue experimental permits and launch licenses to SpaceX that would allow Starship/Super Heavy launches from the Texas Launch Site, is not stated until Section 2.1. It would be helpful if it was stated earlier in the document.	
10	9	1.2.#	S	RH	TPWD recommends the EA include a description in this section of the roles and contributions of participating or coordinating agencies, such as state agencies like TPWD and THC, in the NEPA process, including the preparation of the EA.	
11	10	1.3.2 line 3	S	KK/RH	Please remove the section for SpaceX's Purpose and Need. The Purpose and Need identified in NEPA documents are typically only from the perspective of the lead federal agency (CEQ Regulations §1502.13 for an EIS; §1508.9(b) for an EA).	
12	10	1.3.2 line 4	S	KK	This line states, "The purpose of SpaceX's proposal is to..." This document is discussing the purpose of the federal action, not the Purpose and Need of SpaceX, as the section heading suggested. Can this be clarified?	

Comment Response Matrix **SpaceX Boca Chica Sections 1 and 2 – Administrative Draft Cooperating Agency Review (June 2020)**						
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	Page*	**Section**	**S, A**			
13	10	1.3.2 line 11	S	KK/RH	TPWD suggests changing this line from, "SpaceX's proposal is needed to increase operational capabilities ..." to "the actions decribed in SpaceX's proposal are needed..." to clarify why the Action is needed, not SpaceX's proposal.	
14	10	1.4 line 24	S	LZ	The Public Involvement section does not describe the NEPA public involvement process. This reads more like a Federal Register notice for a public comment period. TPWD recommends that FAA revise this section to describe the public involvement process typically afforded the general public during the NEPA process.	
15	12	2.1.1.	S	JR/RH	The description in this section does not adequately describe the location of the project site. While TPWD anticipates that subsequent sections will offer more robust descriptions of the land uses and natural and cultural resources within the vicinity of the project site, it would be reasonable for this section to at least briefly describe the location's proximity to public lands that are managed to preserve unique natural resources. TPWD recommends changing: "The area is in a sparsely populated coastal area adjacent to the Gulf of Mexico, characterized by sand and mud flats" to something such as, "The area is in a sparsely populated coastal area adjacent to the Gulf of Mexico and ecologically unique public lands owned by Texas Parks and Wildlife Department and the Lower Rio Grande Valley National Wildlife Refuge. The area is characterized by marsh and barrier island plant communities, shallow open water, algal flats, and unvegetated tidal flats. Uplands consist of low, newly-forming sand dunes with their anchoring vegetation amidst bare sand flats. The open water areas are fringed with black mangroves and vegetated with seagrasses. Small, ecologically unique clay hills, known as "lomas", support a diverse group of rare plants and terrestrial wildlife including the endangered ocelot and jagarundi."	

Comment Response Matrix SpaceX Boca Chica Sections 1 and 2 – Administrative Draft Cooperating Agency Review (June 2020)						
#	Location		Type of Comment	Reviewer Initials	Comment	Response / Concurrence
	Page*	Section	S, A			
					Subsequent sections should discuss the diverse terrestrial and aquatic habitats at the site that provide valuable feeding, roosting, and nesting habitats for resident and migratory shorebirds, wading birds, waterfowl, and other avian species including several other federal and state listed threatened and endangered species such as northern aplomado falcon, piping plover, reddish egret, snowy plover, sooty tern, and Texas botteri's sparrow. The area also serves as a major winter ground for endangered peregrine falcons and piping plovers and a large variety of shorebirds, gulls, and terns winter here in large numbers.	
16	12	2.1, line 3	S	KK	As indicated above, this is the first time the Proposed Action is stated. TPWD recommends that it be stated earlier in the document.	
17	12	2.1, line 4	S	KK	See comments #2 and #5 above regarding the unlimited nature of Experimental Permits.	
18	12	2.1, line 7	S	KK	"...SpaceX is proposing to conduct up to eight launches per year. Annual operations would also include suborbital flight tests (Section 2.1.3.2) and/or orbital launches (Section 2.1.3.3). The Proposed Action also includes the connected actions of static fire engine tests, landings, expansion of the VLA and solar farm, and additional construction of infrastructure." Would activities covered under the experimental permit be unlimited, and if so what would those activities include?	
19	12	2.1, line 16	S	KK	The Vertical Launch Area (VLA) is approximately 3.6 km north and the launch and landing control center (LLCC) is approximately 2.1 km north of the U.S./Mexico border.	
20	12	2.1.1, lines 19 & 20	S	KK	This line should clarify that it provides the only access to the public Boca Chica Beach and TPWD's 1054-acre Boca Chica Tract.	
21	14	2.1.2, line 9	S	KK	Would refurbishment of reusable stages occur only at SpaceX facilities at Boca Chica?	

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22	16	2.1.3.1, line 5	S	KK	Would road closures that may be necessary for transporting Starship or Super Heavy components to SpaceX facilities count towards the total of access closures for the area? If road closures are necessary for this activity, TPWD recommends that these closures should be counted toward the total closure time allowed and scheduled to avoid occurring on holidays/weekends.	
23	16	2.1.3.1, line 28	S	KK	The estimated amount of liquid methane (LCH4) that will be flared per month/year should be provided. Is this monitored, and if so, how?	
24	16	2.1.3.1, lines 20-21	S	KK	Do the numbers of proposed tests represent the total anticipated, beginning with 60 static fire engine tests per year? Does public access to the beach have to be closed for each static fire engine test? As demonstrated during the past year, testing does not usually happen on schedule and, more often than not, has to be rescheduled. The proposed total of 60 static fire engine tests should be multipled by a factor of at least 2 or 3 to determine the number of closures and does not include proposed launches. TPWD has concerns about prolonged and frequent closures to the beach and surrounding public lands and recommends that the FAA establish a more robust and transparent closure process that tracks the number of, length of, and reason for each closure, provides reasonable notification of closures, and provides a threshold trigger of alternate procedures when SpaceX approaches their closure hours minimum. An example schedule should be prepared that shows an "as planned scenario", and one that is more in line with our recent experiences of multiple closures for a single test.	
25	16	2.1.3.1, line 22-23	S	JR	This section states that there may be occasions when a static fire engine test is "unsuccessful" and that in those "rare circumstances" when the full duration is not achieved, another attempt would be made.	

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					The EA should define the terms "successful static fire engine test" and "unsuccessful static fire engine test". All potential direct and indirect environmental effects associated with both successful and unsuccessful static fire engine tests should be fully described and evaluated. The term "rare" should be quantified in order to fully evaluate the anticipated environmental impacts associated with both successful and unsuccessful tests. The number of additional static fire test attempts should be quantified and included in the maximum total number of static fire tests that would be conducted annually.	
26	16	2.1.3.1, line 27	S	JR	The EA should define what is meant by "off-nominal operation" when residual LCH4 may be released into the atmosphere.	
27	16	2.1.3.2, lines 29+	S	KK	The header only identifies Suborbital Flight Tests but describes both suborbital flight tests and tanking tests. TPWD recommends that it would be clearer for each activity to have its own heading followed by descriptions of the activities.	
28	16	2.1.3.2; line 32	S	LG	The process of how the liquids within the tanks will be disposed of after the tanking tests are completed should be described.	
29	16	2.1.3.2, line 35, 36	S	KK	Can the phrases "likely be higher" and "high altitudes" be made more specific?	
30	16	2.1.3.2, line 35, 36	S	KK	This line states, "...conduct up to 20 Starship suborbital flights."	

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					Is this per year? And will closures be required? Is this in addition to 60 static fire engine tests per year?	
31	16	2.1.3.2, line 37,38	S	JR	This section states that as flight tests become "successful", SpaceX would then lower the number of suborbital flights to a minimum of approximately 5. Please define what is meant by "successful" and what would be considered "unsuccessful". How many "unsuccessful" suborbital flights are anticipated before the desired success rate is achieved? What are the potential environmental effects of both successful and unsuccessful suborbital flight tests?	
32	16	2.1.3.3, line 40	S	KK	Are the number of annual launches based on noise modeling? TPWD would like to review the noise modeling and know what the maximum and average decibel levels are for launches as well as experimental testing activities. Who will conduct the assessment of the impacts to wildlife and how will this be done?	
33	17	2.1.3.3, line 1 ff	S	JR	This section describes the maximum number of proposed orbital launches. The EA should clarify the frequency of orbital launches.	
34	17	2.1.3.3; line 6	A	LG	The "Y" orbital launches placeholder is confusing and inconsistant since it has been stated in Section 2.1 and previously in this section, 2.1.3.3, that there would be a maximum of 8 orbital launches. Please clarify this information.	
35	17	2.1.3.3, line 7	S	KK	Is the rocket exhaust plume expected to impact TPWD land immediately adjacent to SpaceX property? What is the estimated radius at which the rocket exhaust plume would affect these surroundings?	

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36	17	2.1.3.3; line 8	S	LG	What are the characteristics of the "surrounding areas" around the launch pad? They should be described.	
37	17	2.1.3.3, line 9 ff	S	JR	This section describes the potential use and disposal of water at the launch site. The EA should evaluate the effects of water retention and/or disposal on fish and wildlife resources at the project site. Specifically, these activities have the potential to result in habitat conversions (e.g., salt marsh to freshwater marsh or tidal flats to emergent marsh).	
38	17	2.1.3.3, line 11	S	KK	Regarding stormwater/wastewater issues addressed in this section, TPWD recommends the TCEQ be provided an opportunity to provide input and comment on this issue.	
39	17	2.1.3.3, line 11	S	KK	TPWD has noted vegetation changes at and adjacent to the site from runoff and water from fire fighting, and TPWD does not know about contamination from site water runoff. TPWD recommends that treatment or retention of stormwater or wastewater should be required and water would be contained in retention basins adjacent to the launch mount on SpaceX property.	
40	17	2.1.3.3, line 23	S	KK	Is the well referenced on line 23 an existing well or a proposed well?	
41	17	2.1.3.3; lines 24-35	S	LG	How downrange and VLA landings compare with respect to potential environmental effects should be discussed as well as how the use of one over the other is determined.	
42	17	2.1.3.3, line 25 ff	S	JR	This section describes landing Super Heavy down range "off the coast" or at the VLA. Additional information about landing "off the coast" should be provided since this activity has not been previously described for this project site and may be a connected action.	

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43	17	2.1.3.3; line 35, 42	A	LG	The maximum of "Y" Super Heavy and Starship landings is not consistent with what has already been stated will be a maximum of 8 orbital launches. Clarification is needed on why these paragraphs continue to state an unknown maximum number of launches and landings.	
44	17	2.1.3.3, line 32	S	KK	Delivery via road from the Port of Brownsville to the VLA is at least 20 miles without new road construction. Does the FAA and SpaceX anticipate that road expansion or construction to accommodate vehicle deliveries to the VLA?	
45	17	2.1.3.3, line 37	S	KK	The term "safing" should be defined in the EA.	
46	17	2.1.3.3, line 38	S	KK	The effects of sonic booms on wildlife should be discussed and supported by recent studies. How many times per year are sonic booms proposed to occur? Would it be a maximum of 8 times?	
47	18	2.1.3.3, line 2 ff	S	JR	This section describes the potential to recycle LCH4 back into methane tanks at the VLA or send it to the flare as technology and design develops. Please clarify if the research and development of technology to recycle methane or send it to a flare would be conducted at the project site. Will these activities and associated environmental effects be evaluated in the EA?	
48	18	2.1.3.4, line 29-30	S	JR	This section states that the Brownsville Shipping Channel would not be effected by a closure. Since the 2014 FEIS, TPWD notes that three LNG terminals have been licensed along the Brownsville Shipping Channel and a large natural gas pipeline has been constructed within 6 miles or less of the VLA.	

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					It is our understanding that, based on a third-party independent evaluation, FERC determined that activities described for each of the LNG projects would not result in adverse effects with respect to FAA-authorized activities. FAA should address these changes to the regional landscape and evaluate potential environmental effects that may result from proposed activities including "unsuccessful tests" and "off-nominal operations" in proximity to natural gas facilities located onsite, offsite, and offshore (e.g., LNG carriers, wells, etc.).	
49	18	2.1.3.4, line 34 ff	S	JR	This section states that SpaceX would notify the Cameron County Commissioners Court of the proposed operation date, the expected closure times, and back-up closure dates and times. This section does not specify how much notice the public will be given prior to beach closures, including the use or revocation of back-up dates. In addition, SpaceX states that proposed activities would require no more than 500 hours of closure per year. The EA should clearly explain how closures will be calculated and how those closures will be evaluated with respect to adverse effects on public access to public lands. The EA should evaluate the difference between "actual closure times" and "effective closure times". For example, if a beach closure is planned for 8 hours on Monday with Tuesday and Wednesday as back-up dates, and a reasonable person was planning a day trip to Boca Chica, that person would not likely plan the trip for Monday. They would also be less likely to plan the trip for Tuesday or Wednesday because the	

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					beach is not guaranteed to be open. In this scenario, the beach would be "effectively closed" all day Monday, all day Tuesday and all day Wednesday.	
50	18	2.1.3.3, lines 2 & 3	S	KK	This line references recycling LCH4 back into methane tanks. It is unclear if LCH4 and methane are used interchangeably. Is liquid methane being returned to tanks in a gaseous state?	
51	18	2.1.3.3; line 2-4	S	LG	What will determine the method of disposal of residual methane (recycle vs. release)? What is the estimated amount of residual methane released by the flares and what are the permit requirements?	
52	18	2.1.3.3, line 4	S	KK	An estimate of how much liquid oxygen (LOX) and LCH4 will be released should be provided; estimates should be separated into releases from everyday activities, tests, launches and landings, and any other sources.	
53	18	2.1.3.3, line 7	S	KK	In the event that a vehicle would be expended into the ocean, the fate/impacts of that action should be addressed and evaluated (e.g., describe the fate of the fuel) including potential short-term and long-term environmental hazards.	
54	18	2.1.3.3, line 14	S	KK	Regarding the night-time activities described in this section, an indepth analysis of potential impacts to rare and endangered nesting sea turtle adults and hatchling sea turtles should be included in the appropriate section of the EA.	
55	18	2.1.3.3, line 21-24	S	KK	This section states that, "SpaceX is currently constrained by limits in technology and production, resulting in the proposed launch cadence. In the future, SpaceX may propose to increase the launch rate of Starship/Super Heavy to support growth in the program. Proposed modifications to the launch program would be assessed at that time in a new NEPA document." This proposed activity would occur at a facility surrounded by publicly owned land managed for wildlife. Due to its location among areas of sensitive	

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					resources and the lack of additional property for SpaceX expansion, growth of the Starship/Super Heavy at the current location may result in significant negative impacts to adjacent properties. The anticipated activities for which a new NEPA document would be required should be addressed in a Cumulative Impacts analysis.	
56	18	2.1.3.4, lines 31-33	S	KK/WC	The operational closure notices are described in this section as, "Approximately two weeks in advance of an operation requiring a closure, SpaceX would notify..." This is not how the process is currently carried out. Two weeks notice is not often given. None of the notices since April 2020 have had a two week advance notice. The longest advance was 10 days and most were 0 to 5 days. If two weeks notice is not possible, the written process should reflect what is actually possible and likely to happen.	
57	19	2.1.3.4, lines 6 & 7	S	KK	These lines state, "SpaceX has committed to work with the USFWS to fund additional resources or personnel necessary to enforce the closures required for launch operations." Working with the USFWS to provide funds for additional resources was proposed previously and has still not occurred. Because it is critical to the process of conserving natural resources while also meeting SpaceX's objectives, the EA should include assurances that SpaceX and the FAA ensure this commitment is fulfilled.	
58	19	2.1.3.4, lines 16 &17	S	KK	These lines state, "SpaceX would not exceed 500 hours of closure per year." The term "closure" needs to be defined. Currently, closures far exceed what was included in the 2014 EIS. Closure should include times that were advertised as closed, but ended up not being closed.	
59	19	2.1.3.4; line 18	S	LG	A breakdown of time (a minimum, maximum, and average hours) needed for each type of operation (i.e. wet dress rehearsal, static fire engine test, etc.)	

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					should be provided. This information would benefit limiting closures of Boca Chica beach.	
60	19	2.1.3.4; line 20	S	LG	The EA should describe how hours of closure will be monitored/logged and by whom, and describe if that information will be available to the public. Will the 500 hours of closure include hours spent on incompleted planned flight activities as well as hours reserved for alternate dates? Are updates to those notifications provided to the public when the use of the listed alternate dates are not needed, therefore making beach access available to the public?	
61	19	2.1.3.4, lines 19-21	S	KK	"The total number of closures and closure hours for wet dress rehearsals, static fire engine tests, tanks tests, suborbital tests, and actual launches would require approximately 500 hours of closure per year." Considering the problems agency staff have had calculating closures, please estimate how many days with interruptions to access that this represents, and share with us the current SpaceX methodology for calculating this.	
62	19	2.1.3.4 Lines 24,25	S	WC	The EA proposes to increase the closure hours from 180 to 500 hours per year. Since 1 April 2020 the beach has been closed 51 days according to www.cameroncounty.us/space-x/. It appears that the number of closure hours has already exceeded 180 hours. An increase to 500 hours is excessive and should be unnecessary.	
63	20	2.1.4	S	LG	The total footprint of proposed expansion and any additional, potential impacts to wetlands and aquatic resources should be provided. The total acres for each habitat type affected and a breakdown for each of the proposed projects, should be assessed and quantified. The total acres for each habitat type and a breakdown of each should also be included in mitigation plans. The EA should	

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					specify whether any of the new construction proposed would be outside the Space X property boundary.	
64	22	Figure 2-5	A	LG	The long, rectangular, blue area in figure abutting the air separation unit is not labeled. Nor are the two gray trapezoid-like areas attached to the redundant starship test pad and existing landing pad.	
65	20	2.1.4, line 4	S	KK	Solar farm expansion should be explained in detail. Solar farms should be located away from refuges and public lands, especially areas with large populations of birds. Special coatings should be used to prevent the panels from looking like water. Other beneficial management practices (BMPs) for solar installations are available and should be included and implemented to limit impacts on wildlife, particularly birds.	
66	24	2.1.4; line 6	S	JR/LG	The EA should specify how the soil from drill activities will de disposed of. The EA should also evaluate adverse environmental effects that may result from "unsuccessful tests" or "off-nominal operations" within the vicinity of the natural gas wells, power plants, and associated infrastructure.	
67	24	2.1.4, line 2 ff	S	KK	If drilling is proposed to go under any land other than SpaceX's, the additional review and applicable regulations should be addressed and followed. No activities, materials, or soil disposal would be allowed on TPWD land without prior consent.	
68	24	2.1.4, line 12	S	KK	Any potential emissions/flares from the natural gas wells should be addressed and included with the discussion of other emmissions/flares, if applicable.	
69	24	2.1.4, line 16	S	KK	The acreage for the desalination plant and five natural gas wells and separation units should be provided. Is the liability policy for clean up at the site $3M per	

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					the FAA permit? Are there assurances that if cleanup is needed the funds do not have to come from public funds?	
70	24	2.1.4, line 24	S	RH/KK	Figure 2.5 (Page 22) indicates that a parking area would be located on the north side of Highway 4, on a loma, outside of the SpaceX property boundary. TPWD recommends the EA clarify the locations of parking areas; they should not be located along the side of the highway. TPWD recommends coordinating with TxDOT to establish a reasonable speed limit to minimize wildlife-vehicle collisons along this section of Highway 4.	
71	24	2.1.4; line 25	S	LG	In addition to providing a footprint of the proposed parking lot expansion, the proposed material used to construct it should be described. TPWD recommends investigating the use of permeable materials to construct the parking areas.	
72	24	2.1.4; line 27-29	S	LG/KK	Please provide the exact number of proposed power plants (1 or 2) so an adequate evaluation of impacts to wetlands can be conducted since each site is proposed to be up to 5.5 acres in size.	
73	24	2.1.4, line 30	S	KK	Please provide the anticipated emissions from the proposed power plants.	
74	24	2.1.4; line 34	S	LG	The statement of, "Some structures would be up to 45 m" needs to be more definitive and detailed and less conceptual to properly and accurately determine impacts to fish and wildlife resources. This comment applies to all plans and projects proposed in the EA.	
75	24	2.1.4, line 41	S	KK	During preparation of the EA, it should be determined if TxDOThas authority in the ROW along Highway 4.	
76	25	2.1.4, line 4	S	KK	See comment #65; the solar farm expansion impacts on wildlife should be researched further.	

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77	26	2.3	S	LG	A table should be provided quantifiying the impacts (acres) to each wetland type for each of the alternative sites to support why the Texas Launch Site meets the criteria of having the minimum environmental disturbance.	
78	26	2.3, line 15	A	KK	Should the word "compromise" be "comprise" in this sentence?	
79	26	2.3, line 17	S	KK	Alternative sites were eliminated from further consideration because they do not support landing a space vehicle. The infrastructure at the Boca Chica site also does not support landing a space vehicle, which is why the site is currently undergoing additional construction. The EA needs to better demonstrate how the impacts at Boca Chica would be less than those at other more developed locations and how the existing infrastructure and size of the facilities at Boca Chica are more suitable than those at SLC-40, located at the Space Launch Complex within Cape Canaveral Air Force Station.	
80	26	2.3, line 20	S	KK	The EA should describe the analysis that led to the conclusion that impacts at a new site would be greater than those at Boca Chica, a site located adjacent to public lands containing rare and unique ecosystems. Due to the current redevelopment of the Boca Chica site to accommodate the Starship/Super Heavy, the current activities at Boca Chica essentially constitute constructing a new site for Starship/Super Heavy operations that would result in extensive environmental impacts.	
81	27	App.A	S	KK	Very few of the references listed are actually cited in the first two chapters of the EA. Will they be used in subsequent sections? Some references listed are currently outdated and should be revised with more current data/references (e.g., the 2009 referenced sea turtle report contains data from 2008. The most current data should be used).	

To add additional rows, place cursor in the bottom right cell and hit << Tab>>.
Comment Types: S= Substantive; A=Administrative (See definitions below)
* Page number refers to the pdf page number not document page number

DEFINITIONS

Substantive – Comments identifying an item in the document that appears to be, or is potentially, incorrect, misleading, or confusing.
Administrative – Comments identifying minor inconsistencies between different sections or errors in typography and grammar.

Reviewer: Please provide your initials