



Fire Mitigation and Response Plan

April 20, 2022

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1 PURPOSE AND SCOPE

The purpose of this policy is to establish written procedures to provide guidance on fire mitigation and response. The Fire Mitigation and Response Plan's goals are to ensure that a system is in place for the planning and implementation of emergency procedures. This plan also provides information to assure immediate response to protect life and minimize property damage.

This policy shall comply with the requirements of Occupational Safety and Health Administration's (OSHA) standard on fire prevention, 29 Code of Federal Regulations (CFR) § 1910.39.

2 APPLICATION

Space Exploration Technologies (SpaceX) in Boca Chica, South Texas is committed to minimizing the threat of fire to employees, visitors, and property. SpaceX complies with all applicable laws, regulations, codes, and good practices pertaining to fire prevention. Our separate Hazardous Materials Emergency Response Plan provides additional details regarding the procedures for responding to fires. This Fire Mitigation and Response Plan serves to reduce the risk of fires at the Boca Chica Launch Site in the following ways:

- Identifies materials that are potential fire hazards and their proper handling and storage procedures;
- Distinguishes potential ignition sources and the proper control procedures of those materials;
- Describes fire protection equipment and/or systems used to control fire hazards;
- Identifies persons responsible for maintaining the equipment and systems installed to prevent or control ignition of fires;
- Identifies persons responsible for the control and accumulation of flammable or combustible material;
- Describes good housekeeping procedures necessary to insure the control of accumulated flammable and combustible waste material and residues to avoid a fire emergency; and
- Provides training to employees with regard to fire hazards to which they may be exposed.

3 ASSIGNMENT OF RESPONSIBILITY

Fire safety is everyone's responsibility. All employees should know how to prevent and respond to incipient fires, and are responsible for adhering to company policy regarding fire emergencies. Specific roles and responsibilities are, however, assigned as described below.

3.1 Management

Management determines SpaceX Boca Chica Launch Site fire prevention and protection policies. Management will provide adequate controls to provide a safe workplace, and

will provide adequate resources and training to its employees to encourage fire prevention and the safest possible response in the event of a fire emergency.

3.2 Fire Prevention Plan (FPP) Administrator

The Environmental Health and Safety (EHS) Department acts as the Fire Prevention Plan (FPP) Administrator for SpaceX Boca Chica Launch Site, and shall maintain all records pertaining to the plan. The FPP Administrator shall also:

- Develop and administer the SpaceX fire prevention training program.
- Ensure that fire control equipment and systems are properly maintained.
- Control fuel source hazards.
- Conduct daily inspections, identifying potential fire hazards through SpaceX's 'unsafe condition' tracking system (SafetyNet).

3.3 Supervisors

Supervisors are responsible for ensuring that employees receive appropriate fire safety training, and for notifying the FPP Administrator when changes in operation increase the risk of fire. Supervisors are also responsible for enforcing SpaceX Boca Chica Launch Site fire prevention and protection policies.

3.4 Employees

All employees shall:

- Complete all required training before working without supervision.
- Conduct operations safely to limit the risk of fire.
- Report potential fire hazards to their supervisors.
- Follow fire emergency procedures.

This procedure is applicable to all employees working at Boca Chica Launch Site, Texas.

4 POTENTIAL TYPES OF HAZARDS

The following sections address the major workplace fire hazards at SpaceX Boca Chica Launch Site facilities and the procedures for controlling the hazards.

4.1 Electrical Fire Hazards

Electrical system failures and the misuse of electrical equipment are leading causes of workplace fires. Fires can result from loose ground connections, wiring with frayed insulation, or overloaded fuses, circuits, motors, or outlets. To prevent electrical fires, the following control procedures are implemented:

- Make sure that worn wires are replaced.
- Use only appropriately rated fuses.
- Never use extension cords as substitutes for wiring improvements.
- Use only approved extension cords [i.e., those with the Underwriters Laboratory (UL) or Factory Mutual (FM) label].
- Check wiring in hazardous locations where the risk of fire is especially high.

- Check electrical equipment to ensure that it is either properly grounded or double insulated.
- Ensure adequate spacing while performing maintenance.

4.2 Office Fire Hazards

Fire risks are not limited to SpaceX Boca Chica Launch Site industrial facilities. Fires in offices have become more likely because of the increased use of electrical equipment, such as computers and monitors.

To prevent office fires, the following control procedures are implemented:

- Avoid overloading circuits with office equipment.
- Avoid 'daisy-chaining' power strips.
- Turn off nonessential electrical equipment at the end of each workday.
- Keep storage areas clear of rubbish.
- Ensure that extension cords are not placed under carpets.
- Ensure that trash and paper set aside for recycling is not allowed to accumulate.
- Immediately report exposed wires or electrical outlets.

4.3 Cutting, Welding, and Open Flame Work

To prevent cutting, welding, and open flame work related fires, the following control procedures are implemented:

- All necessary hot work permits have been obtained prior to work beginning.
- Cutting and welding are done by authorized personnel in designated cutting and welding areas whenever possible.
- Adequate ventilation is provided.
- Torches, regulators, pressure-reducing valves, and manifolds are UL listed or FM approved.
- Oxygen-fuel gas systems are equipped with listed and/or approved backflow valves and pressure-relief devices.
- Cutters, welders, and helpers are wearing eye protection and protective clothing as appropriate.
- Cutting or welding is prohibited in sprinkled areas while sprinkler protection is out of service.
- Cutting or welding is prohibited in areas where explosive atmospheres of gases, vapors, or dusts could develop from residues or accumulations in confined spaces.
- Cutting or welding is prohibited on metal walls, ceilings, or roofs built of combustible sandwich type panel construction or having combustible covering.
- Confined spaces such as tanks are tested to ensure that the atmosphere is not over ten percent of the lower flammable limit before cutting or welding in or on the tank.

- Small tanks, piping, or containers that cannot be entered are cleaned, purged, and tested before cutting or welding on them begins.
- Fire watch has been established where needed.
- Grinding, cutting, and welding around open vegetation or high fire days (Red Flag) is discouraged.

4.4 Flammable and Combustible Materials

All SpaceX employees regularly evaluate the presence of combustible materials at SpaceX Boca Chica Launch Site. Certain types of substances can ignite at relatively low temperatures or pose a risk of catastrophic explosion if ignited. Such substances obviously require special care and handling.

4.4.1 Class A Combustibles.

These include common combustible materials (wood, paper, cloth, rubber, and plastics) that can act as fuel and are found in non-specialized areas such as offices.

To handle Class A combustibles safely, the following control procedures are implemented:

- Dispose of waste daily.
- Keep trash in metal-lined receptacles with tight-fitting covers (metal wastebaskets) that are emptied every day do not need to be covered).
- Keep work areas clean and free of fuel paths that could allow a fire to spread.
- Keep combustibles away from accidental ignition sources, such as hot plates, soldering irons, or other heat- or spark-producing devices.
- Store paper stock in metal cabinets.
- Store rags in metal bins with self-closing lids.
- Do not order excessive amounts of combustibles.
- Make frequent inspections to anticipate fires before they start.

Water, multi-purpose dry chemical (ABC), and halon 1211 are approved fire extinguishing agents for Class A combustibles.

4.4.2 Class B Combustibles.

These include flammable and combustible liquids (oils, greases, tars, oil-based paints, and lacquers), flammable gases, and flammable aerosols.

To handle Class B combustibles safely, the follow control procedures are implemented:

- Use only approved pumps, taking suction from the top, to dispense liquids from tanks, drums, barrels, or similar containers (or use approved self-closing valves or faucets).

- Do not dispense Class B flammable liquids into containers unless the nozzle and container are electrically interconnected by contact or by a bonding wire. Either the tank or container must be grounded.
- Store, handle, and use Class B combustibles only in approved locations where vapors are prevented from reaching ignition sources such as heating or electric equipment, open flames, or mechanical or electric sparks.
- Do not use a flammable liquid as a cleaning agent inside a building (the only exception is in a closed machine approved for cleaning with flammable liquids).
- Do not use, handle, or store Class B combustibles near exits, stairs, or any other areas normally used as exits.
- Do not weld, cut, grind, or use unsafe electrical appliances or equipment near Class B combustibles.
- Do not generate heat, allow an open flame, or smoke near Class B combustibles.
- Know the location of and how to use the nearest portable fire extinguisher rated for Class B fire.

a. Water should NOT be used to extinguish Class B fires caused by flammable liquids. Water can cause the burning liquid to spread, making the fire worse. To extinguish a fire caused by flammable liquids, exclude the air around the burning liquid.

b. The following fire-extinguishing agents are approved for Class B combustibles: carbon dioxide, multi-purpose dry chemical (ABC), halon 1301, and halon 1211. (NOTE: Halon has been determined to be an ozone-depleting substance and is no longer being manufactured. Existing systems using halon can be kept in place.)

4.5 Smoking

Smoking is prohibited inside all SpaceX buildings. Smoking is only allowed in designated (and properly identified) SMOKING AREAS. These areas have been properly evaluated and placed to not be near flammable materials or other fire risks.

5 PLAN IMPLEMENTATION

5.1 Good Housekeeping

To limit the risk of fires, employees shall take the following precautions:

- Minimize the storage of combustible materials.
- Make sure that doors, hallways, stairs, and other exit routes are kept free of obstructions.
- Dispose of combustible waste in covered, airtight, metal containers.
- Use and store flammable materials in well-ventilated areas away from ignition sources.
- Use only nonflammable cleaning products.

- Keep incompatible (i.e., chemically reactive) substances away from each other.
- Perform “hot work” (i.e., welding or working with an open flame or other ignition sources) in controlled and well-ventilated areas.
- Keep equipment in good working order (i.e., inspect electrical wiring and appliances regularly and keep motors and machine tools free of dust and grease.
- Ensure that heating units are safeguarded.
- Report all gas leaks immediately.
- Repair and clean up flammable liquid leaks immediately.
- Keep work areas free of dust, lint, sawdust, scraps, and similar material.
- Do not rely on extension cords if wiring improvements are needed, and take care not to overload circuits with multiple pieces of equipment.
- Ensure that required hot work permits are obtained.
- Turn off electrical equipment when not in use.

5.2 Maintenance

The EHS Department ensures that equipment is maintained according to manufacturers' specifications. SpaceX South Texas will also comply with requirements of the National Fire Protection Association (NFPA) codes for specific equipment. Only properly trained individuals shall perform maintenance work. The following equipment is subject to the maintenance, inspection, and testing procedures:

- Equipment installed to detect fuel leaks, control heating, and control pressurized systems;
- Portable fire extinguishers, automatic sprinkler systems, and fixed extinguishing systems;
- Detection systems for smoke, heat, or flame;
- Fire alarm systems; and
- Emergency backup systems and the equipment they support.

5.3 Fire Hazard Locations

The intent of FPP to assure that hazardous accumulations of combustible materials are controlled so that a fast developing fire, rapid spread of toxic smoke, or an explosion will not occur. Employees are to be made aware of the hazardous properties of materials in their workplaces, and the degree of hazard each poses. Following are examples of these hazards:

- **Launch Pad** – Restricted during vehicle launch operations. During normal launch operations, Methane may be present due to potential leaks in piping, pumps and tanks. During launch operations, the area shall be cleared of all personnel, vehicles, loose debris and non-essential equipment. State Highway 4 is closed to all traffic for duration of launch.

- **Stargate Building** – General hazard area containing combustible material, i.e., paper, cardboard, plastic, and construction activities.
- **Solar Farm** – General hazard area containing combustible material, batteries, solar panels, paper, cardboard, plastic.

6 FIRE MITIGATION MEASURES AT THE VERTICAL LAUNCH AREA

The following mitigation measures have been implemented at the SpaceX Boca Chica Launch Site:

- Vegetation inside the fence line near the launch pad, flare, and fuel commodity farms property has been removed to prevent any wildfire.
- Additional water cannon southwest of the Launch Pad (Figure 1).
- Additional water cannons on each side of the Landing Pad (Figure 1).
- Additional Long Reach Irrigation System along Launch Pad South fence line (Figure 1).
- Additional water fill station for wildland fire apparatus south of water farm (Figure1).

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9 PROGRAM REVIEW

An annual review of this Plan is performed by the EHS Department.

10 POINTS OF CONTACT

Organization	Name, Position	Contact Information	Responsibility
Cameron County Emergency Manager	Tom Husehen, Emergency Manager	Cell: (b) (6) Desk: (956)-547-7000	Coordinate Response
Brownsville Fire Dept.	Jarrett Sheldon, Fire Chief	Cell: (b) (6) Desk: (956)-546-3195	Coordinate Response
U.S. Coast Guard (USCG)	Sector/Air Station Corpus Christi Command Center	(361)-939-0450	Report any affect to safety of the waterway and the last known vehicle position
U.S. Fish and Wildlife	Chris Perez	24h dispatch: (956)- 784-7520 Cell: (b) (6) Desk: (956) 784-7553	Service Liaison

11 APPENDICES

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APPENDIX B: ICS 201 FORM

Blank ICS 201 Form.

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INCIDENT BRIEFING (ICS 201)

1. Incident Name:	2. Incident Number:	3. Date/Time Initiated: Date: _____ Time: _____
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4. Map/Sketch (include sketch, showing the total area of operations, the incident site/area, impacted and threatened areas, overflight results, trajectories, impacted shorelines, or other graphics depicting situational status and resource assignment):

5. Situation Summary and Health and Safety Briefing (for briefings or transfer of command): Recognize potential incident Health and Safety Hazards and develop necessary measures (remove hazard, provide personal protective equipment, warn people of the hazard) to protect responders from those hazards.

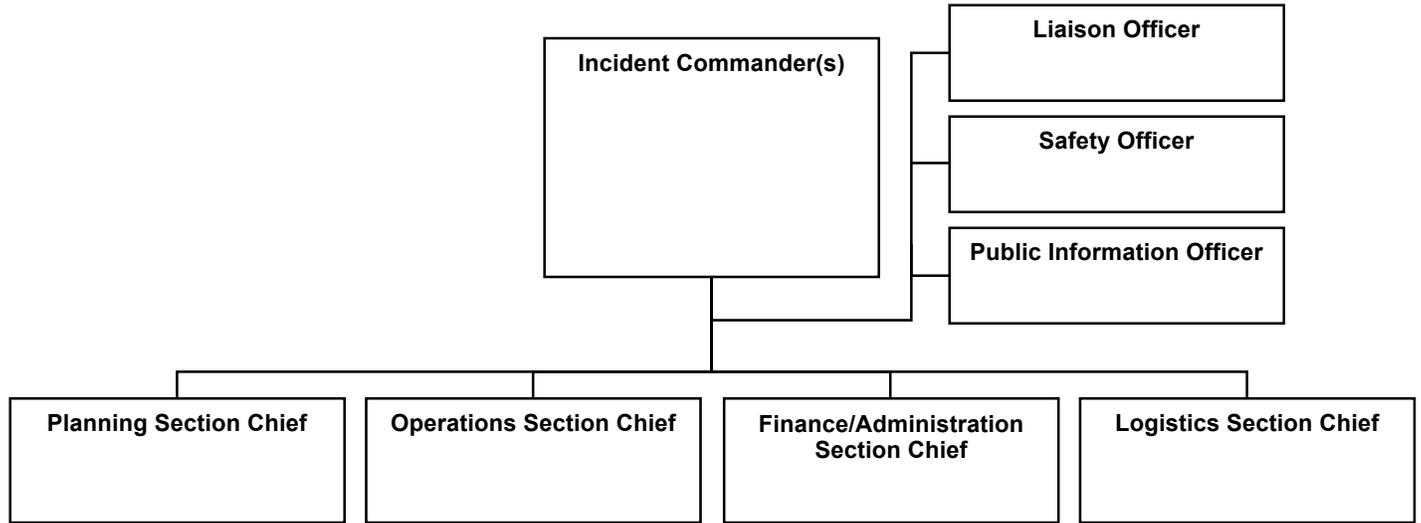
6. Prepared by: Name: _____ Position/Title: _____ Signature: _____

ICS 201, Page 1 Date/Time: _____

INCIDENT BRIEFING (ICS 201)

1. Incident Name:	2. Incident Number:	3. Date/Time Initiated: Date: _____ Time: _____
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9. Current Organization (fill in additional organization as appropriate):



6. Prepared by: Name: _____ Position/Title: _____ Signature: _____	
ICS 201, Page 3	Date/Time: _____

ICS 201 Incident Briefing

Purpose. The Incident Briefing (ICS 201) provides the Incident Commander (and the Command and General Staffs) with basic information regarding the incident situation and the resources allocated to the incident. In addition to a briefing document, the ICS 201 also serves as an initial action worksheet. It serves as a permanent record of the initial response to the incident.

Preparation. The briefing form is prepared by the Incident Commander for presentation to the incoming Incident Commander along with a more detailed oral briefing.

Distribution. Ideally, the ICS 201 is duplicated and distributed before the initial briefing of the Command and General Staffs or other responders as appropriate. The “Map/Sketch” and “Current and Planned Actions, Strategies, and Tactics” sections (pages 1–2) of the briefing form are given to the Situation Unit, while the “Current Organization” and “Resource Summary” sections (pages 3–4) are given to the Resources Unit.

Notes:

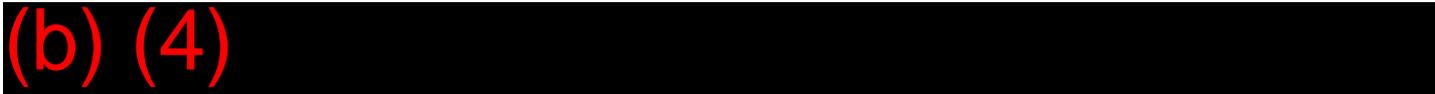
- The ICS 201 can serve as part of the initial Incident Action Plan (IAP).
- If additional pages are needed for any form page, use a blank ICS 201 and repaginate as needed.

Block Number	Block Title	Instructions
1	Incident Name	Enter the name assigned to the incident.
2	Incident Number	Enter the number assigned to the incident.
3	Date/Time Initiated <ul style="list-style-type: none"> • Date, Time 	Enter date initiated (month/day/year) and time initiated (using the 24-hour clock).
4	Map/Sketch (include sketch, showing the total area of operations, the incident site/area, impacted and threatened areas, overflight results, trajectories, impacted shorelines, or other graphics depicting situational status and resource assignment)	Show perimeter and other graphics depicting situational status, resource assignments, incident facilities, and other special information on a map/sketch or with attached maps. Utilize commonly accepted ICS map symbology. If specific geospatial reference points are needed about the incident’s location or area outside the ICS organization at the incident, that information should be submitted on the Incident Status Summary (ICS 209). North should be at the top of page unless noted otherwise.
5	Situation Summary and Health and Safety Briefing (for briefings or transfer of command): Recognize potential incident Health and Safety Hazards and develop necessary measures (remove hazard, provide personal protective equipment, warn people of the hazard) to protect responders from those hazards.	Self-explanatory.
6	Prepared by <ul style="list-style-type: none"> • Name • Position/Title • Signature • Date/Time 	Enter the name, ICS position/title, and signature of the person preparing the form. Enter date (month/day/year) and time prepared (24-hour clock).
7	Current and Planned Objectives	Enter the objectives used on the incident and note any specific problem areas.

Block Number	Block Title	Instructions
8	Current and Planned Actions, Strategies, and Tactics <ul style="list-style-type: none"> • Time • Actions 	Enter the current and planned actions, strategies, and tactics and time they may or did occur to attain the objectives. If additional pages are needed, use a blank sheet or another ICS 201 (Page 2), and adjust page numbers accordingly.
9	Current Organization (fill in additional organization as appropriate) <ul style="list-style-type: none"> • Incident Commander(s) • Liaison Officer • Safety Officer • Public Information Officer • Planning Section Chief • Operations Section Chief • Finance/Administration Section Chief • Logistics Section Chief 	<ul style="list-style-type: none"> • Enter on the organization chart the names of the individuals assigned to each position. • Modify the chart as necessary, and add any lines/spaces needed for Command Staff Assistants, Agency Representatives, and the organization of each of the General Staff Sections. • If Unified Command is being used, split the Incident Commander box. • Indicate agency for each of the Incident Commanders listed if Unified Command is being used.
10	Resource Summary	Enter the following information about the resources allocated to the incident. If additional pages are needed, use a blank sheet or another ICS 201 (Page 4), and adjust page numbers accordingly.
	<ul style="list-style-type: none"> • Resource 	Enter the number and appropriate category, kind, or type of resource ordered.
	<ul style="list-style-type: none"> • Resource Identifier 	Enter the relevant agency designator and/or resource designator (if any).
	<ul style="list-style-type: none"> • Date/Time Ordered 	Enter the date (month/day/year) and time (24-hour clock) the resource was ordered.
	<ul style="list-style-type: none"> • ETA 	Enter the estimated time of arrival (ETA) to the incident (use 24-hour clock).
	<ul style="list-style-type: none"> • Arrived 	Enter an "X" or a checkmark upon arrival to the incident.
	<ul style="list-style-type: none"> • Notes (location/assignment/status) 	Enter notes such as the assigned location of the resource and/or the actual assignment and status.



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APPENDIX F: SMOKE DETECTORS

This site layout identifies where smoke detectors are throughout the site

Site layout is under development



APPENDIX : EVACUATION ROUTES

This consists of all evacuation routes

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APPENDIX H: STAR STATE ARMOR SYSTEM

The content of the schematic of the fire alarm system at Star state is in .

This schematic is under development



SpaceX Texas Launch Site Construction Storm Water Pollution Prevention Plan

Revision 14

December 2021

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1.0 Purpose

This Storm Water Pollution Prevention Plan (SWPPP) was prepared to comply with Texas Pollutant Discharge Elimination System (TPDES) permit as defined in the Construction General Permit TXR 150000 Part III Section F. The purpose of this SWPPP is to:

1. Describe and ensure the implementation of practices that will be used to reduce the pollutants in storm water discharges associated with construction activity at the construction site and assure compliance with the terms and conditions of the Permit;
2. Identify potential pollutants that are reasonably expected to affect the quality of storm water discharges from the construction site, including off-site material storage areas, overburden and stockpiles of dirt, borrow areas, equipment staging areas, vehicle repair areas, fueling areas, etc., used solely by the permitted project;
3. Identify non-storm water discharges and eliminate unauthorized non-storm water discharges, illicit connections, and dumping; and
4. Outline an inspection and maintenance program to determine the effectiveness of site best management practices (BMPs).

Implementation of the components of this SWPPP is required as a condition of compliance with the General Permit, a copy of which is attached in Appendix D. The Texas Commission on Environmental Quality (TCEQ) has been granted authority to administer the TPDES program and is therefore the regulatory authority overseeing the implementation of this SWPPP.

2.0 General Requirements

2.1 Availability

The SWPPP shall remain on-site at all times during business hours and readily available for review by State, Federal, local or other agencies having authority upon request. These include the City of Brownsville, Cameron County, Texas Commission on Environmental Quality (TCEQ), and the U.S. Environmental Protection Agency (EPA), SpaceX representatives, and all operating personnel for the duration of the project. If the site is inactive or does not have an on-site location to store the plan, a notice must be posted describing the location of the SWPPP.

2.2 Approved State and Local Plans

This SWPPP was prepared to comply with TPDES permit as defined in the Construction General Permit TXR 150000 Part III Section F. Currently, there are no erosion and sediment or storm water permits issued by the City of Brownsville, or Cameron County, Texas for this site.

2.3 Deadlines

The SWPPP provides for compliance with the terms and schedule of the General Permit beginning with the initiation of construction activities and following through to the completion of construction activities and final stabilization. A Notice of Intent (NOI) is required to be submitted to the TCEQ at least seven (7) days prior to commencing construction activities, or prior to commencing construction activities if an electronic NOI is submitted. An NOI can be submitted electronically through the State of Texas Environmental Electronic Reporting System (STEERS) at the following web address: <https://www3.tceq.texas.gov/steers/index.cfm>. The Notice of Termination (NOT) addressed in Section 2.5 of this plan can also be submitted through the STEERS.

2.4 SWPPP Updates

The SWPPP will be amended whenever there is a change in design, construction, operation or maintenance of the construction site that has a significant effect on the potential for the discharge of pollutants to surface waters and that has not been addressed in the normal implementation of the SWPPP. The SWPPP will also be updated if there are changing site conditions based on updated plans and specifications, new operators, new areas of responsibility, and/or changes in BMPs. In the event a State, Federal, local or other agency, or the BMP inspector notifies the Permittee that this SWPPP does not meet one or more of the provisions of the General Permit, within a period of seven days, the Permittee will make the required changes to the SWPPP or individual BMPs.

The SWPPP will also be updated and the U.S. Fish and Wildlife Service (USFWS) notified if there are any changes in the Plan/project that may affect listed species or critical habitat. These changes include:

1. Construction sequencing, including clearing and re-vegetation.
2. Project end date.

3. Any changes to coordinated area of disturbance/vegetation removal.
4. Changes to planned construction related storm water outfalls (addition or removal).
5. Construction related lighting modifications.
6. Any major changes to construction laydown/staging areas.

2.5 Guidance

Large Construction Activities (>5 disturbed acres):

1. Develop a SWPPP and implement prior to commencing construction activities;
2. Maintain with the SWPPP a copy of the General Permit, completed maintenance and inspection forms, and all records of compliance;
3. Primary operators must submit an NOI at least seven (7) days prior to commencing construction activities, or if utilizing electronic submittal, prior to commencing construction activities. A copy of the NOI along with the acknowledgement certificate can be found in Appendix A. If an additional primary operator is added after the initial NOI is submitted, the new primary operator must submit an NOI at least seven (7) days before assuming operational control, or if utilizing electronic NOI submittal, prior to assuming operational control. If the primary operator changes after the initial NOI is submitted, the new primary operator must submit a paper NOI or an electronic NOI at least ten (10) days before assuming operational control;
4. All primary operators must also post a copy of the signed NOI at the construction site in a location where it is readily available for viewing by the general public and local, state, and federal authorities prior to commencing construction activities, and must maintain the NOI in that location until completion of the construction activity;
5. All operators of large construction activities must post a site notice in accordance with Part III.D.2. of this permit. The site notice must be located where it is safely and readily available for viewing by the general public and local, state, and federal authorities prior to commencing construction, and must be maintained in that location until completion of the construction activity (for linear construction activities, e.g. pipeline or highway, the site notice must be placed in a publicly accessible location near where construction is actively underway; notice for these linear sites may be relocated, as necessary, along the length of the project, and the notice must be safely and readily available for viewing by the general public and local, state, and federal authorities); (Appendix B)
6. All primary operators must provide a copy of the signed NOI to the operator of any municipal separate storm sewer system (MS4) receiving the discharge and to any secondary operator, at least seven (7) days prior to commencing construction activities, and must list in the SWPPP the names and addresses of all MS4 operators receiving a copy. NOTE: this site does not discharge to a MS4;
7. All persons meeting the definition of “secondary operator” in Part I of this permit are hereby notified that they are regulated under this General Permit, but are not required to submit an NOI, provided that another operator(s) at the site has submitted an NOI, or is required to submit an NOI and the secondary operator has provided notification to the operator(s) of the need to obtain coverage (with records of notification available upon request). Any secondary operator notified under this provision may alternatively

- submit an NOI under this General Permit, may seek coverage under an alternative TPDES individual permit, or may seek coverage under an alternative TPDES general permit if available;
8. Submit a Notice of Change (NOC) if any information submitted on the NOI changes or is inaccurate. An NOC must be submitted to TCEQ at least 14 days before the change occurs, or within 14 days of discovering the inaccuracy. See Part II Section E.6 in the permit for the list of eligible changes;
 9. Submit the NOT to TCEQ, and a copy of the NOT provided to the operator of any MS4 receiving the discharge, within 30 days after any of the following:
 - a. Final stabilization has been achieved on all portions of the site that are the responsibility of the permittee;
 - b. A transfer of operational control has occurred; or
 - c. The operator has obtained alternative authorization under an individual TPDES permit or alternative TPDES general permit;
 10. Maintain the following records for a period of 3 years:
 - a. A copy of the SWPPP;
 - b. All reports and actions required by this permit, including a copy of the construction site notice;
 - c. All data used to complete the NOI, if an NOI is required for coverage under this general permit; and
 - d. All records of submittal of forms submitted to the operator of any MS4 receiving the discharge and to the secondary operator of a large construction site, if applicable; and
 11. NOI forms, NOT forms, NOC letters, and Construction Site Notices that require a signature must be signed according to 30 TAC § 305.44.

3.0 Site Information

3.1 Project Limits

The SpaceX Boca Chica Launch Site is located directly adjacent to the eastern terminus of State Highway 4 (Boca Chica Boulevard) and to Boca Chica State Park and Lower Rio Grande Valley National Wildlife Refuge lands. It is located immediately south of Brazos State Park, approximately 5 miles south of Port Isabel and South Padre Island, approximately 18 miles east of Brownsville, and approximately 3 miles north of the U.S./Mexico border on the Gulf Coast of Texas (Figure 3-1).

Project Latitude: 25°59'49.33"N

Project Longitude: -97°09'17.34"W



Figure 3-1 Location of the Vertical Launch Area and Launch and Landing Control Center

3.2 Site Preparation

Soil surcharging, layering of dirt on dirt, will be used to compact the lower layer of soil to allow for a more conducive foundation. Materials such as gravel or topsoil will be obtained from

existing developed or previously used sources, not from undisturbed areas adjacent to the property. Sites will be cleared of vegetation and graded. Fill material will be clean and of such composition that will not adversely affect the biological, chemical or physical properties of adjacent water.

3.3 Project Description

SpaceX plans to construct facilities, structures, and utility connections in order to support the development of the new launch vehicle called the Starship/Super Heavy.

The SpaceX Boca Chica Launch Site consists of the vertical launch area (VLA), which includes two test pads, a landing pad, and launch pad. The vertical launch area is under construction, including addition of commodities and infrastructure. Further development of the vertical launch area would result in expansion of the site's footprint to SpaceX's property boundary, excluding the dune buffer zone, which is 1,000 feet from the mean high tide line. SpaceX is proposing additional construction at the VLA, including expanding the solar farm near the LLCC, adding infrastructure and facilities at the VLA, parking lots, a liquid natural gas pretreatment system, a liquefier, a payload processing facility, and trenching and pull-offs along SH 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, additional support buildings, and a power plant. SpaceX also plans to expand the solar farm, which will power both the production area and the pad.

3.3.1. Launch and Landing Control

The launch and landing control (LLC) is located near approximately 2 miles west of the vertical launch area and north of Boca Chica Boulevard (Figure 3-2). The two-story control center building, formally known as Stargate, is used for command and control of the launch vehicle, and ground systems during launch and test operations. The control center building consists primarily of several large rooms for control consoles, conference rooms, and support rooms. In addition, the facility houses office areas for site personnel.

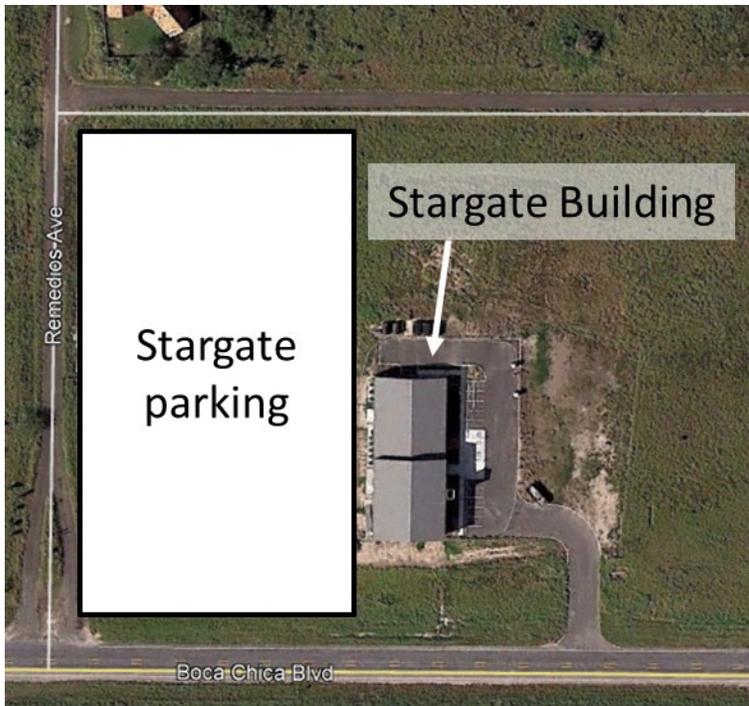


Figure 3-2 Launch and Landing Control

3.3.2. Solar Farm Area

The solar farm area is located west of the LLC, and is approximately 5.4 acres in size (Figure 3-3). The solar farm area consists of solar arrays and batteries for power storage. The solar farm area will be expanded to approximately 7 acres.



Solar Array

The solar array encompasses approximately 2.5 acres, with each solar panel being approximately five feet tall. This area has been stabilized with vegetation.

Ground Tracking Station Antennas

SpaceX has two satellite dishes. Each satellite dish is approximately 41 feet tall, with approximately 900 square-foot pads. They are used to receive data from launch vehicles during flight and to communicate commands to the launch vehicles if needed. The antennas would be located on the north side of Parcel 2, in the middle of the property.

3.3.3. Vertical Launch Area

Infrastructure at the vertical launch area (Figure 3-4) includes:

- Orbital and suborbital launch pads
- Propellant handling storage areas
- Roads, parking areas, fencing, security, lighting, and utilities
- Landing Pad

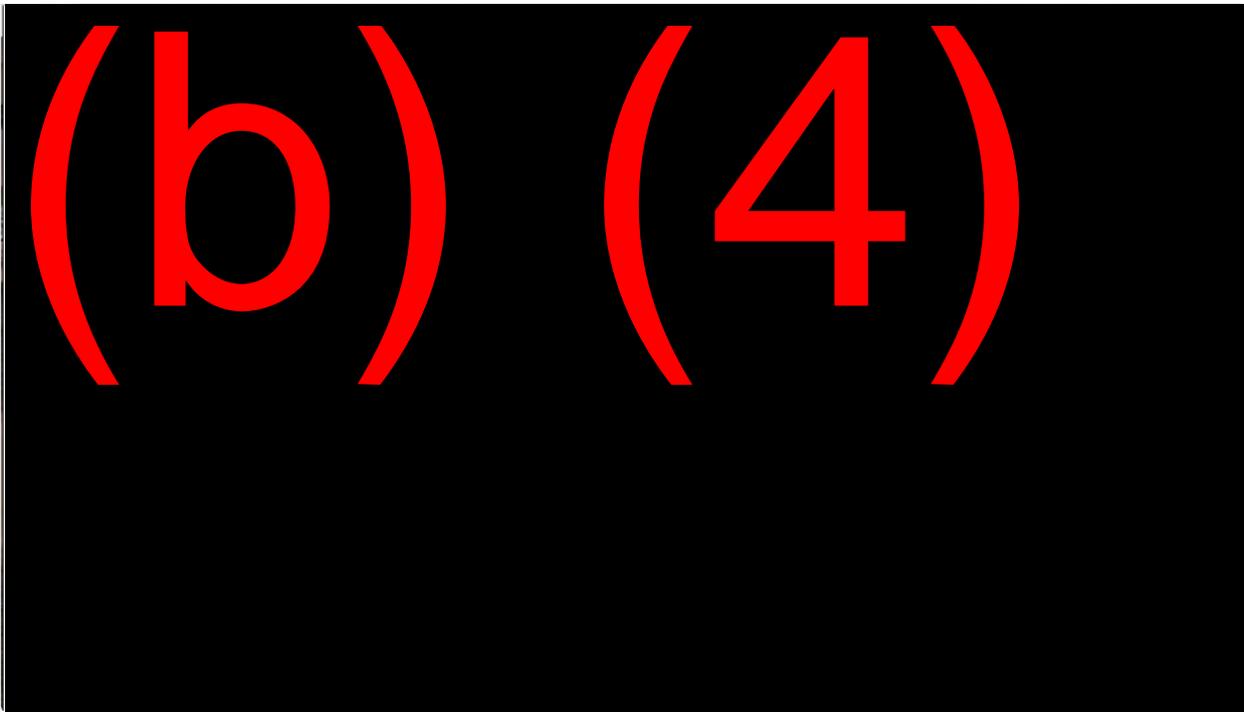


Figure 3-4 Layout of the Vertical Launch Area

3.3.4. Propellant Storage and Handling Areas

The propellant storage areas will include storage and handling equipment for the propellants and gases that fuel the launch vehicle. There are three primary areas: liquid oxygen (LOX) area, methane area, and nitrogen area. Each area will include storage tanks or vessels, including their supports and containment area where required; fluid pumps; gas vaporizers; and other components necessary to control flow to the launch vehicle. In addition, each area will include a concrete or asphalt parking area for delivery trucks for refill of the storage tanks.

3.3.5. Access Roads and Infrastructure

Roads and utilities will be required to provide access, power, and septic to the facilities within the launch area. Roads will be constructed of concrete or asphalt, depending on the planned use. The perimeter access road will be dirt/gravel. Throughout the area, there will be exterior lighting, security fences, and gates built. During launches, deluge water will be sprayed over the launch pad for cooling and sound and vibration suppression.

3.4 Sequence of Construction

Schedule for sequence of construction is TBD factoring in timelines and start date and other activity considerations.

3.5 Drainage Patterns and Receiving Waters

There are no surface waters (non-wetland surface waters) within the boundary or footprint of the manufacturing area, LLC, or the vertical launch area. The location of the launch site is within South Laguna Madre watershed, which is within the Bahia-Grande Brownsville Ship Channel watershed, a 363-square mile subwatershed to the Southwestern Texas Coastal Basin¹. South Bay is an inland bay along the Gulf of Mexico located within the Laguna Madre hypersaline lagoon system and is the southernmost bay in Texas (TPWD 2012b). South Bay is separated from the Gulf of Mexico by Brazos Island. On the northern boundary of South Bay is an inlet where water flows freely from South Bay into the Brownsville Shipping Channel, which connects the Port of Brownsville to the Gulf of Mexico. On the southern end of South Bay, approximately 0.5 mile north of the vertical launch area, is Boca Chica Bay where Boca Chica State Park is located. Boca Chica Bay, located approximately 0.03 mile from the vertical launch area, is a subdelta of the Rio Grande.

The vertical launch area topology is essentially flat and low-lying. The pad elevations will be approximately 5-15 feet and slope all around, creating natural drainage away from the center of the pads. The control center and manufacturing area topology is similar to the launch area, generally flat. As with the vertical launch area, facilities in these areas will be built above ground level, creating natural drainage away from the facilities. Storm waters and other drainage will be diverted generally to the north of the area.

Runoff from both areas will not be to a MS4. South Bay water quality results were last posted in August 2018, and although they indicated the presence of fecal coliform, these levels were below EPA standards¹. To the east of the vertical launch area is the Gulf of Mexico. Waters of the Gulf of Mexico have been deemed impaired waters by EPA. Causes of impairment include the presence of mercury in fish tissue (TCEQ 2011a). Water quality is regularly sampled at Boca Chica State Park Station #3, which is located near where State Highway 4 meets the Gulf of Mexico. The results of the last sampling event conducted in August 2018 indicated that Enterococcus bacteria were below maximum concentration in August 2018². Enterococcus is the Federal standard for water quality at public salt water beaches.

¹ EPA. 2012. Designated Sole Source Aquifers in EPA Region VI.

² EPA. 2018. <http://www.epa.gov/region6/water/swp/ssa/maps.htm>.

The Rio Grande is located approximately 2 miles south of the launch site and is located outside of the watershed. Portions of the Rio Grande are designated a wild and scenic river. However, these portions are located over 400 miles away from the launch site. In addition, as per the Nationwide River Inventory (NRI), no rivers or river segments within Cameron County are currently listed.

3.6 Description of Vegetation

The uplands located within the vertical launch area are largely comprised of sporadically vegetated sand dunes in the eastern portion of the property and moderately to densely vegetated uplands in the western portion of the property. Additional upland islands are located in the unvegetated salt flats. The wetlands on-site are comprised of scrub shrub and emergent wetlands, both of which are categorized as high marsh areas, and unvegetated salt flats. Additionally, three small unvegetated depressional features were identified in the northwestern portion of the site. Upland vegetation is typified by Texas pricklypear (*Opuntia engelmannii*), honey mesquite (*Prosopis glandulosa*), little bluestem (*Schizachyrium scoparium*), gush bluestem (*Andropogon glomeratus*), giant reed (*Arundo donax*), cuman ragweed (*Ambrosia cumanensis*), and golden tickseed (*Coreopsis tinctoria*). Wetland vegetation is primarily comprised of saltgrass (*Distichlis spicata*), shoregrass (*Monanathocloe littoralis*), glasswort, shoreline seapurslane, sea ox-eye, and gulf cordgrass (*Spartina spartinae*). Other species observed include black mangrove and turtleweed. Vegetation in the sand dunes includes beach croton, sea purslane, and beach morning glory.

The LLC is comprised of upland vegetation dominated by little bluestem, honey mesquite, cuman ragweed, and yucca (*Yucca treculeana*).

3.7 Description of Soils

Based on the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) web soil survey (NRCS 2012a), the soils underlying the vertical launch area are comprised of Galveston fine sand, hummocky (90 percent Galveston); Mustang fine sand, saline (90 percent Mustang); Mustang fine sand (95 percent Mustang); and Coastal beach (100 percent). The Galveston fine sand is in the taxonomic class mixed, hyperthermic Typic Udipsamments. Mustang fine sand is in the taxonomic class siliceous, hyperthermic Typic Psammaquents. The LLC is underlain by Galveston fine sand, hummocky, which is classified as partially hydric soils. All of the soils on-site have very high wind erosion potential. Conversely, all of the soils on-site have very low water erosion potential (NRCS 2012a).

3.8 Non –Storm Water Discharges

The General Permit prohibits discharging anything other than storm water and authorized non-storm water discharges to Waters of the State or an MS4. Authorized non-storm water discharges include:

Offsite discharges are prohibited except as follows:

- 1) Discharges from firefighting activities and/or uncontaminated fire hydrant flushings.

- 2) Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).
- 3) Uncontaminated water used to control dust.
- 4) Plain water originating from potable water sources.
- 5) Uncontaminated groundwater, spring water, or accumulated storm water.
- 6) Uncontaminated air conditioning condensate.
- 7) Lawn watering and similar irrigation drainage.

Non-storm water discharges are not anticipated during construction activities; however, BMPs have been identified in this SWPPP to control spills, leaks, and to prevent illicit connections and discharges during the project (see Section 4.0).

3.9 Threatened and Endangered Species

The Federal Aviation Administration (FAA) prepared a Biological Assessment (BA) in 2013 and based on the analysis presented in the BA, the FAA determined that the Proposed Action (construction and operations) *may affect, is likely to adversely affect* the piping plover and its critical habitat, red knot, northern aplomado falcon, Gulf Coast jaguarundi, ocelot, and Kemp's ridley, hawksbill, leatherback, loggerhead, and green sea turtles. The FAA has determined that the Proposed Action *may affect, is not likely to adversely affect* the West Indian manatee. In accordance with ESA Section 7, formal consultation was conducted between the USFWS and the FAA in 2013. Consultation with the USFWS was completed with their issuance of a Biological and Conference Opinion (BCO) on December 18, 2013. The BCO concurred with the findings of the BA analysis and concluded no jeopardy to any species and no adverse modification to designated piping plover critical habitat from construction and operations. Special conservation measures have been developed for the project and are presented in **Section 4.0**.

In 2017, the FAA re-initiated consultation with the USFWS on January 26, 2017 to assess potential effects on ESA-listed species as a result of installing a security fence and road at the launch area. After learning of SpaceX's proposed changes to the LLC site design, the FAA expanded the consultation with USFWS to include these changes. The FAA concluded no take of species beyond that issued in the BO was anticipated from SpaceX's proposed modifications to the LLC and launch area.

In 2021, the FAA prepared a Biological Assessment for the Programmatic Environmental Assessment for the Starship/Super Heavy launch vehicle program. The FAA the FAA determined that the Proposed Action (construction and operations) *may affect, is likely to adversely affect* the piping plover and its critical habitat, red knot, northern aplomado falcon, Gulf Coast jaguarundi, ocelot, and Kemp's ridley, hawksbill, leatherback, loggerhead, and green sea turtles. The FAA has determined that the Proposed Action *may affect, is not likely to adversely affect* the West Indian manatee and the Eastern black rail. Formal consultation with the USFWS is ongoing, and updates to special conservation measures will be reflected in future versions of this document.

3.10 Historical, Architectural, Archaeological, and Cultural Resources

Construction of the facilities would not physically impact any historic property listed or eligible for the National Register of Historic Places. No significant archaeological resources were found during the surveys of the vertical launch area, LLC, or solar farm area. The 2014 Section 106 Programmatic Agreement (PA) includes stipulations on the process for avoiding, minimizing, and mitigating adverse effects on historic properties. Section 106 consultation with applicable agencies is ongoing for the Starship/Super Heavy launch vehicle program; a new PA is currently under development.

3.11 Potential Pollution Sources

Potential sources of sediment to storm water runoff:

- 1) Clearing and grubbing operations
- 2) Grading and site excavation operations
- 3) Vehicle tracking
- 4) Topsoil stripping and stockpiling
- 5) Landscaping operations
- 6) Potential pollutants and sources, other than sediment, to storm water runoff
- 7) Combined Staging Area—small fueling activities, minor equipment maintenance, sanitary facilities, and hazardous waste storage
- 8) Materials Storage Area—general building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
- 9) Construction Activity—paving, curb/gutter installation, concrete pouring/mortar/stucco, and building construction
- 10) Concrete Washout Areas

Potential construction site pollutants include:

Material	Pollutants
Concrete	Limestone, sand
Asphalt	Petroleum
Glue, adhesives	Polymers, epoxies
Paints	Metal oxides, solvent, carbonate, arsenic
Wood preservatives	Solvent, petroleum distillates, arsenic, copper, chromium
Hydraulic oil/fluids	Mineral oil
Gasoline	Benzene, ethyl benzene, toluene, xylene, Methyl Tertiary Butyl Ether (MTBE)
Diesel fuel	Petroleum distillate, oil & grease, naphthalene, xylenes
Antifreeze/coolant	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)
Sanitary toilets	Bacteria, parasites, and viruses
Site trash	Plastic, paper

4.0 Best Management Practices

BMPs have been selected to control potential pollutants on-site. General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs are to reduce sediments from construction activities. [Sediment and Erosion Control Drawings are TBD and will be complete during final site design] The type of BMPs will be selected for good housekeeping, sediment control, storm water management, spill prevention and biological resources. Control measures must be properly installed and maintained according to the manufacturer's or designer's specifications.

In lieu of detaining for the 25-year storm, permanent storm water quality best management practices (BMPs) could be implemented to address concerns of sediment and pollutants in the runoff. While the process of detaining stormwater for a period of time would allow for the settlement of sediment and some particulates out of the stormwater before discharging into the bay, this could be achieved more efficiently with water quality BMPs (best management practices), designed to treat the "first flush" of stormwater before discharging into the bay. These BMPs can include Sedimentation/Filtration Ponds, Biofiltration Ponds, Extended Detention Basins, Wet Ponds, Retention/Irrigation Systems, Rain Gardens, Constructed Wetlands, Vegetative Filter Strips, Grassy Swales, Permeable Concrete, as well as engineered systems from various vendors. BMP selection and design will be dependent on site conditions and drainage patterns. Some of these BMPs may be used by themselves and some may be used in tandem with other BMPs

4.1 Good Housekeeping

Good housekeeping practices are the primary means by which construction-related pollutants will be controlled at this site. These practices include properly managing construction materials and wastes so they do not come into contact with storm waste. The following good housekeeping BMPs will be in place:

- 1) No solid materials shall be discharged to surface waters or buried on site. All solid non-hazardous waste material including disposable materials will be collected in containers or closed dumpsters. The collection containers will be emptied periodically and the collected material hauled to a landfill permitted by State and/or appropriate local municipality to accept the waste for disposal.
- 2) To ensure off-site vehicle tracking of sediments and the generation of dust is minimized, the paved areas adjacent to the entrances and exits will be cleaned to remove any excess mud, dirt, or other material tracked from the site. All trucks hauling materials from the construction site will be covered with a tarpaulin.
- 3) Construction material waste collection points will not be located in any wetland, water body or stream bed.
- 4) Concrete truck water discharges on the site will be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow.
- 5) Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete

curing compounds, and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products.

- 6) Dumpsters will be equipped with lids (predator-proof) and kept closed at all times except when adding or removing trash.
- 7) Trash must be removed regularly to help prevent attracting predators or blowing debris into sensitive areas.
- 8) Dumpsters will be constructed and positioned in such a way as to reduce the risk of the dumpster tipping over.
- 9) Exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, and sanitary waste to precipitation will be minimized. These items will be stored under cover if possible.

4.2 Sediment Controls

Sediment controls are structural measures intended to complement and enhance the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. Sediment control BMPs include:

- 1) Install fiber rolls or silt fence along the site perimeter as shown on the erosion control drawings (no planting within piping plover critical habitat).
- 2) Vehicles, heavy equipment, and general construction traffic shall use the designated entrances/exits to prevent sediment tracking onto paved areas and to minimize ground disturbance. Limit construction traffic to the stabilized entrance/exits only.
- 3) Verification that silt fences are in proper condition prior to all rainfall events.

4.3 Erosion Controls

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in storm water runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles and many have the secondary effect of increasing water infiltration. Erosion control BMPs include:

- 1) Schedule construction activities to reduce the amount of soil exposed at one time. Perform mass grading during the dry season.
- 2) SpaceX will provide effective soil cover for inactive areas and all finished slopes, open space, utility backfill, and completed lots
- 3) The amount of exposed soil will be minimized to the greatest extent practical during construction.
- 4) The disturbance of slopes and dunes will be avoided/minimized to the greatest extent practical.
- 5) Native topsoil at the site will be preserved, unless infeasible.
- 6) Soil compaction in post-construction pervious areas will be minimized.

4.4 Spill Prevention

The following are the management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.

1. All spills must be cleaned and disposed properly and reported to the Engineer. Please refer to Section 3.10 of the facility Spill Prevention, Control and Countermeasures (SPCC) Plan for detailed spill response instructions. Report any release at or above the reportable quantity during a 24-hour period to the National Response Center at 1-800-424-8802. An effort will be made to store only enough products required to do the job.
2. All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and if possible, under a roof or other enclosure.
3. Products will be kept in their original containers with the original manufacturer's label.
4. Substances will not be mixed with one another unless recommended by the manufacturer.
5. Whenever possible, all of a product will be used up before disposing of the container.
6. Manufacturer's recommendations for proper use and disposal will be followed.
7. Designated areas for equipment maintenance and repair (control of oil, grease and fuel spills).
8. Dumpsters will be equipped with lids (predator-proof) and kept closed at all times except when adding or removing trash.
9. Trash must be removed regularly to help prevent attracting predators or blowing debris into sensitive areas.
10. Dumpsters will be constructed and positioned in such a way as to reduce the risk of the dumpster tipping over.
11. Protected storage area for chemicals, paints, solvents, fertilizers and other potentially toxic materials.
12. Adequately maintained sanitary facilities.
13. Proper control of raw materials stored onsite (for example, sand, aggregate and cement used in the manufacture of concrete or stockpiles of topsoil).
14. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4.5 Biological Resources

The 2014 USFWS BCO specified non-discretionary Reasonable and Prudent Measures that are necessary to minimize impacts to listed species (i.e., amount or extent of incidental take) and critical habitat. The BCO also specified discretionary Conservation Recommendations that are intended to avoid or minimize adverse effects of a proposed action on listed species and critical habitat. The FAA commits to implementing the Reasonable and Prudent Measures and the Terms and Conditions outlined in the BCO to minimize potential impacts on ESA-listed species and critical habitat. The FAA is currently in consultation with USFWS, which will result in the

development of updated Reasonable and Prudent Measures and Terms and Conditions, which will be incorporated in future updates of this document after the completion of consultation.

FAA/SpaceX has agreed on Reasonable and Prudent Measures to avoid and minimize impacts to the ocelot, jaguarundi, aplomado falcon, piping plover, red knot, and sea turtles. Of those measures, the following measures are relevant to storm water management:

1. Submit a detailed Storm water Monitoring Plan.
2. In conjunction with final design, an SWPPP will be prepared. The SWPPP will include BMPs for erosion and sedimentation controls, including techniques to diffuse and slow the velocity of stormwater to reduce potential impacts (e.g., soil loss and sedimentation) to water quality during construction. All construction activities with the potential of impacting water quality due to potential runoff from the site will be conducted in accordance with SWPPP requirements.
3. Uncontaminated rainwater will be allowed to drain or pumped out of containment structures only following visual inspection to determine the absence of evidence of a spill or leak of oil and/or visible seen on the surface of the water. If a spill has occurred within the last 48 hours preceding a rain event, Space X will conduct analytical sampling of the waters before releasing.
4. To the maximum extent practicable the following would be followed:
 - a. The perimeter of all areas to be disturbed during construction or maintenance activities would be clearly demarcated using flagging or temporary construction fence, and no disturbance outside that perimeter would be authorized (in particular tidal flats and dunes). All access routes into and out of the proposed disturbance area would be flagged, and no construction travel outside those boundaries would be authorized. When available, areas already disturbed by past activities or those that would be used later in the construction period shall be used for staging, parking, and equipment storage.
 - b. Roads would be designed and located where roadbed erosion into special-status species habitat is avoided or minimized and the potential for entrapment of surface flows within the roadbed due to grading would also be avoided or minimized.
 - c. Drip pans underneath equipment, containment zones used when refueling vehicles or equipment, and other measures would be implemented.
 - d. Non-hazardous waste materials, litter, and other discarded materials, such as construction waste, would be contained within secured containers until removed from the construction site. All trash containers would have secured closures to prevent animal foraging.
5. Prior to entry and exit into unpaved areas of the project, SpaceX would ensure heavy equipment would traverse over construction shaker or rumble plates or rock bed to remove any sediment and dirt and prevent importation of non-native plant species. The equipment would be inspected to ensure that hydraulic fittings are tight, hydraulic hoses are in good condition (and replaced if damaged), and there are no petroleum leaks.

6. SpaceX will designate an FCR that will be present during the beginning of the construction period to provide all construction personnel and SpaceX employees with an environmental worker-education briefing that will include, but not be limited to, the following:
 - a. Information regarding federally and State-listed species with the potential to occur in the area, impacts that may occur, conservation measures being implemented, their responsibilities under the ESA, and avoidance and reporting procedures.
 - b. Measures to prevent wildfires, including restricting smoking to areas clear of vegetation, ensuring no fires of any kind are ignited and equipping vehicles with spark arrestors and fire extinguishers.
 - c. Requirements for safe handling and disposal of hazardous wastes will be implemented.

5.0 Inspection and Maintenance

5.1 Inspection

A qualified person or persons will be designated to perform required inspections. This person must be knowledgeable of the General Permit, familiar with the construction site, and knowledgeable of this SWPPP. The following inspections will be conducted:

1. Disturbed areas and areas used for storage of materials that are exposed to precipitation will be inspected for evidence of, or the potential for, pollutants entering the drainage system.
2. Erosion and sediment control measures identified in the plan will be observed to ensure that they are operating correctly.
3. Where discharge locations or points are accessible, they will be inspected to ascertain where erosion control measures are effective in preventing significant impacts to receiving waters.
4. Locations where vehicles enter or exit the disturbed areas of site will be inspected for evidence of offsite sediment tracking.
5. Inspections are intended to identify areas where the pollutant control measures at the site are ineffective and are allowing, or could potentially allow, pollutants to enter surface waters. Receiving water will be inspected to ascertain whether control measures are effective in preventing significant impacts. Locations where vehicles enter or exit the site will be inspected for evidence of offsite sediment tracking.
 - a) The inspection will be conducted by the responsible person at least once every fourteen (14) calendar days and within twenty-four (24) hours of the end of a storm event of 0.5 inch or greater.

As an alternative to the above described inspection schedule, the SWPPP may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, the inspection must occur on a specifically defined day, regardless of whether or not there has been a rainfall event since the previous inspection.

- b) Based on the results of the inspection, if revisions to the SWPPP are needed they will be made no later than seven (7) calendar days following the inspection.

5.2 Maintenance

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than seven calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall

be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainage ways shall have priority followed by protecting storm sewer inlets.

Inspection and Maintenance forms are located in **Appendix C**.

6.0 Final Stabilization

When construction is complete, all construction materials and temporary BMPs will be removed from the site. Final stabilization will primarily consist of impervious concrete and asphalt and the planting of native plants.

Drainage on the LLC will remain essentially the same as before construction with storm water being conveyed off-site to the north. Final stabilization will be achieved prior to submitting the NOT. After the entire site is stabilized, any sediment that has accumulated will be removed and hauled off-site for disposal.

Storm Water Management for the facility would be assumed under the facility's Operation SWPPP.

7.0 Management Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Title _____

Signature _____ Date _____

DATE OF TEST (m/d/yr.)	OUTFALL NO. DIRECTLY OBSERVED DURING TEST	METHOD USED TO TEST OR EVALUATE DISCHARGE	DESCRIBE RESULTS FROM TEST FOR NON- STORM WATER DISCHARGE	IDENTIFY POTENTIAL SIGNIFICANT SOURCES	NAME OF PERSON WHO CONDUCTED THE TEST OR EVALUATION
CERTIFICATION					
I certify under penalty of law that the outfall(s) covered by this Storm Water Pollution Prevention Plan have been tested or evaluated for presence of non-storm water discharges, and that all non-storm water discharges from the outfall are limited to those identified in Section II.A.3 of the TPDES General Permit No. TXR150000.					
Signature				Date Signed	

Appendix A – Notice of Intent



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Texas Pollutant Discharge Elimination System
Stormwater Construction General Permit

The Notice of Intent (NOD) for the facility listed below was received on July 16, 2018. The intent to discharge stormwater associated with construction activity under the terms and conditions imposed by the Texas Pollutant Discharge Elimination System (TPDES) stormwater construction general permit TXR150000 is acknowledged. Your facility's TPDES construction stormwater general permit authorization number is:

TXR15962P

Coverage Effective: July 16, 2018

TCEQ's stormwater construction general permit requires certain stormwater pollution prevention and control measures, possible monitoring and reporting, and periodic inspections. Among the conditions and requirements of this permit, you must have prepared and implemented a stormwater pollution prevention plan (SWP3) that is tailored to your construction site. As a facility authorized to discharge under the stormwater construction general permit, all terms and conditions must be complied with to maintain coverage and avoid possible penalties.

Project/Site Information:

RN107697088
SpaceX Texas Launch Site
1 Rocket Rd
Brownsville, TX 78521
Cameron County

Operator:

CN602867657
Space Exploration Technologies Corp.
1 Rocket Rd
Brownsville, TX 78521

This permit expires on March 05, 2023, unless otherwise amended. If you have any questions related to processing, you may contact the Stormwater Processing Center by email at swpermit@tceq.texas.gov or by telephone at (512) 239-3700. For technical issues, you may contact the stormwater technical staff by email at swgp@tceq.texas.gov or by telephone at (512) 239-4671. Also, you may obtain information on the TCEQ web site at <http://www.tceq.texas.gov/goto/wq-dpa>. A copy of this document should be kept with your SWP3.

Issued Date: July 16, 2018

Stephani Bergesen Penland

FOR THE COMMISSION

Appendix B – Construction Site Notice



LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Stormwater Program
TPDES GENERAL PERMIT TXR150000

“PRIMARY OPERATOR” NOTICE

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of stormwater runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. Additional information regarding the TCEQ stormwater permit program may be found on the internet at:

<https://www.tceq.texas.gov/permitting/stormwater/construction>

Site-Specific TPDES Authorization Number:	(b) (4)
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Stormwater Pollution Prevention Plan:	

Appendix C – Inspection and Maintenance Forms

General Information			
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Describe present phase of construction			
Type of Inspection: <input type="checkbox"/> Regular <input type="checkbox"/> Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Weather at time of this inspection? <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other: _____ Temperature: _____			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: _____			

	Erosion and Sediment Control BMPs	Frequency	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are disturbed areas not actively being worked for a period exceeding 14 days in good condition (no weeds, pests) and properly vegetated?	Weekly and After Storms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are dust control trucks properly maintained, including the mobile pressure-type distributor?	Monthly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are silt fences adequately installed (perpendicular to direction of runoff) and maintained (sediment buildup less than 1/3 fence height?)	Weekly and After Storms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are hay bay dikes anchored and embedded properly?	Weekly and After Storms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are the filter rock dams functioning properly (sediments are not clogging the voids of crushed stone)?	Weekly and After Storms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	Erosion and Sediment Control BMPs	Frequency	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
6	Are construction exits functioning properly (preventing sediment tracking offsite)?	Weekly and After Storms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Are drainage ditches functioning properly (no ponding, no signs of erosion, no accumulating sediments)?	Weekly and After Storms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	Other BMPs				
8	Are laydown areas free of debris and/or trash?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Are materials stored outside (construction material and equipment) free of oil?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials positioned on wood cribbing blocks that are in good condition?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are Safety Data Sheets up to date and stored in an accessible location?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

12	Are construction materials (e.g., paints, thinners, etc.) properly labeled?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13	Are tanks and drums in good condition (properly labeled, free of corrosion, etc.)?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14	Are tank areas free of stressed vegetation?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15	Is there evidence of leaks and spills around tank areas?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16	Are emergency contact signs posted in tank loading areas?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17	Are spill response kits replenished?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18	Are containers placed within containment areas?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19	Are secondary containment areas free of leaks and spills?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20	Are containers in good condition (no corrosion or bulging)?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

21	Is there evidence of concrete trucks being washed outside the designated area?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
22	Are the non-hazardous waste dumpsters in good condition?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
23	Is there evidence of waste mixing in the non-hazardous waste dumpsters?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
24	Are the areas surrounding the dumpsters free of debris or trash?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
25	Are the hazardous waste drums in the hazardous waste storage area (HWSA) in good condition?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
26	Are the HWSA drums properly labeled? Is the contact information posted and current?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
27	Is the contact information in the HWSA posted and current?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

28	Does the HWSA have drums that have been stored for more than 180 days?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
29	Is the client aware that drums are past due for disposal?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
30	Is the secondary containment area free of leaks and spills?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
31	Are the ditches adjacent to the blasting and painting operations free of paint chips, blast material and grit waste?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
32	Are there full bags of spent water cutting grit at Machine Shop Accumulation Area	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
33	Is the storm water runoff tested prior to discharge?	Weekly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
34	Is the General Site Plan accurate?	Quarterly	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Print name and title:

Signature: _____

Date: _____



SpaceX Boca Chica Launch Site

Spill Prevention, Control, and Countermeasures (SPCC) Plan

Revision 10

December 2021

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1.0 Introduction

This Spill Prevention, Control, and Countermeasures (SPCC) Plan is required by the U.S. Environmental Protection Agency (EPA) regulations contained in Title 40, Code of Federal Regulations, Part 112 (40 CFR 112) – Oil Pollution Prevention. A facility is subject to these regulations if the total aboveground storage capacity of oil and oil products exceeds 1,320 gallons; or if the underground storage capacity exceeds 42,000 gallons; and if, because of its location, the facility could reasonably be expected to discharge oil into navigable waters of the United States. Containers with a capacity of less than 55 gallons of oil or oil products are exempted from the requirements under the Oil Pollution Prevention regulations.

“Oil” is defined in 40 CFR 112.2 as “oil of any kind or in any form, including, but not limited to: fats, oils, or greases from animals, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels; and, other oils and greases, including petroleum, fuel oil, sludge, synthetic oils, mineral oils, oil refuse, or oil mixed with wastes other than dredged spoil.” This definition includes many transformer oils, hydraulic oils, and other oils.

This SPCC Plan is not required to be filed with the EPA, but a copy must be maintained on-site for review by the EPA. Should the facility discharge more than 1,000 gallons of oil in a single discharge, or discharge more than 42 gallons of oil in each of two discharges occurring within any 12-month period, the facility must submit the following information to the EPA Regional Administrator within 60 days:

- facility name and location;
- facility owner or operator names;
- facility maximum storage or handling capacity and normal daily oil throughput;
- an adequate description of the facility, including maps, flow diagrams, and topographical maps, as necessary;
- the cause(s) of the discharges, including a failure analysis of the system or subsystem where the failure occurred;
- the corrective actions and/or countermeasures taken (e.g., equipment repairs or replacement);
- any other prevention measures taken or contemplated to minimize the possibility of recurrence; and
- other reasonable information as request.

The EPA Regional Administrator will review this information and may require this facility to amend this SPCC Plan if it does not meet the regulations or if an amendment is necessary to prevent and contain oil discharges from the facility.

Certification

The Facility has a total aboveground oil storage capacity less than 10,000 gallons and has had no discharges and is considered to be a Qualified Facility by the EPA. According to the EPA, a Qualified Facility can prepare a self-certified Plan in lieu of a PE-certified Plan. If the total aboveground oil storage capacity increases above 10,000 gallons, this Plan will be certified by a Professional Engineer.

SpaceX hereby certifies this Plan is in accordance with all applicable requirements 40 CFR Part 112.

Plan Location and Review

1.1 Plan Location

In accordance with 40 CFR 112.3(e), a complete copy of this SPCC Plan is maintained at the facility in the control center building. The building is attended whenever the facility is operating, i.e., 7 days per week.

1.2 Plan Review

This SPCC Plan must be reviewed, updated, amended, and/or recertified under various circumstances, as follows:

1. A change(s) at the facility materially affects the potential of oil discharge.
2. Five years have elapsed since the plan was last reviewed.
3. Technical and non-technical amendments have been made to the plan.

Details regarding each of these circumstances, including the time frame for making such changes and the identification of those which require recertification are discussed below.

In accordance with 40 CFR §112.5(a), this plan is required to be updated and amended whenever a change occurs in the facility design, construction, operation, or maintenance that materially affects its potential for the discharge of oil. The plan shall be amended within six months of any such change. Examples of changes requiring plan amendment follow:

- The commissioning or decommissioning of containers
- The replacement, reconstruction, or movement of containers
- The reconstruction, replacement, or installation of piping systems
- Construction or demolition that might alter secondary containment structures
- Changes in products or services
- A revision in standard operating or maintenance procedures at the facility

Additionally, pursuant to 40 CFR §112.5(b), a review and evaluation of this SPCC Plan is conducted at least once every five years. As a result of this review and evaluation, SpaceX will amend the SPCC Plan within six months of the review to include more effective prevention and control technology if (1) such technology will significantly reduce the likelihood of a spill event from the facility, and (2) such technology has been field-proven at the time of review. The amendments shall be implemented as soon as possible, but no later than six months following preparation of the amended SPCC Plan.

1.3 Conformance with Applicable State and Local Requirements

40 CFR §112.7(a)(1): Include a discussion of your facility's conformance with the requirements listed in this part.

40 CFR §112.7(j): In addition to the minimal prevention standards listed under this section, include in your Plan a complete discussion of conformance with the applicable requirements and other effective discharge prevention and containment procedures listed in this part or any applicable more stringent State rules, regulations, and guidelines.

The facility will comply with the requirements set forth in 40 CFR Part 112. An SPCC Plan Checklist identifying all applicable requirements under this Part and where the required information is located within the SPCC Plan is presented in Section 2.0, SPCC Cross Reference Table.

Management Approval

Space Exploration Technologies Corp. (SpaceX) is committed to the prevention of discharges of oil to navigable waters and the environment, and maintains the highest standards for spill prevention control and countermeasures through regular review, updating, and implementation of this SPCC Plan for the SpaceX facility. This SPCC Plan is fully approved by the management of SpaceX, and the necessary resources have been committed to fully implement the Plan as described herein.

Authorized Facility Representative: _____

Title: _____

Signature: _____

2.0 SPCC Cross Reference Table

Provision	Plan Section	Section #	Page #
112.3(e)	Location of SPCC Plan	1.0	V
112.5	Plan Review	1.0	V
112.7(a)(1)	Conformance with Applicable State and Local	1.0	Vi
112.7	Management Approval	1.0	VII
112.7	Cross-Reference with SPCC Rule	2.0	8
112.7(a)(3)	General Facility Information	3.1/3.2/3.3	10
112.7(a)(3)(i)	Oil Storage	3.5	13
112.7(a)(3)(iii)	Secondary Containment and Spill Prevention Procedures	3.6	13
112.7(a)(3)(iv)	Spill Control Equipment	3.7	13
112.7(a)(3)(vi)	Emergency Contacts	3.9	14
112.7(a)(4)	Discharge Notification	3.10.1	15
112.7(a)(5)	Discharge Response	3.10.2	16
112.7(b)	Potential Discharge Volumes a and direction of flow	3.11	18
112.7(c)	Containment and Diversionary structures	3.11	19
112.7(d)	Practicability of Secondary Containment	3.11	20
112.7(e)	Inspections and Record Keeping	3.12	20
112.7(f)	Personnel, Training and Discharge Prevention Procedures	3.13	22
112.7(g)	Site Security	3.14	23
112.7(h)	Tank Truck Loading/Unloading	3.15	24
112.7(i)	Brittle Fracture Evaluation	3.15	24
112.7 (k)	Qualified Oil Filled Equipment	3.16	24
112.8(b)	Facility Drainage Controls	4.1	26
112.8(c)(1)	Construction	4.1.1	27
112.8(c)(3)	Drainage of Diked Areas	4.1.2	28
112.8(c)(4)	Corrosion Protection	4.1.2	28
112.8(c)(5)	Partially Buried and Bunkered Storage Tanks	4.1.3	28
112.8(c)(6)	Inspection	4.1.4	29
112.8(c)(7)	Heating Coils	4.1.5	29
112.8(c)(8)	Overfill Protection	4.1.5	30
112.8(c)(9)	Effluent Treatment	4.1.5	30
112.8(c)(10)	Visible Discharges	4.1.6	30
112.8(c)(11)	Mobile and Portable Containers	4.1.7	30
112.8(d)	Transfer Operations, Pumping and In-Plant Processes	4.1.7	30
112.20(e)	Certification of Substantial Harm Determination	Appendix C	

3.0 Site Specific Information

3.1 Facility Owner and Operator

Space Exploration Technologies
1 Rocket Rd, Brownsville, Texas
Cameron County

3.2 Facility Description

SpaceX owns and operates a private launch site on privately owned property at 1 Rocket Rd, in Cameron County, Texas. The facility consists of three operational areas, the vertical launch area, launch and landing control (LLC), and the solar farm (Appendix B).

Vertical Launch Area

Facility and infrastructure at the vertical launch area includes the following:

- Launch pads
- Test stands
- Landing pads
- Commodity storage and handling areas
- Workshop and office area
- Roads, parking areas, fencing, security, lighting, and utilities

The launch pad consists of a rectangular pervious compacted area and at height of approximately 15 ft and a footprint of approximately 34,000 ft². A smaller concrete structure, approximately 1,000 ft² is located on the launch pad and is used for the launch vehicle hop tests. An additional pad approximately 50,625 ft² to the east is landing operations.

Launch and Landing Control

The LLC is located immediately adjacent to Boca Chica Village, approximately 2 miles west of the proposed vertical launch area and north of Boca Chica Boulevard.

The two-story control center building, formally known as Stargate, is used for command and control of the launch vehicle, and ground systems during launch and test operations. The control center building consists primarily of several large rooms for control consoles, conference rooms, and support rooms. In addition, the facility houses office areas for site personnel.

Solar Farm Area

The solar farm area is located west of the LLC, and is approximately 5.4 acres in size. The solar farm area consists of solar arrays and batteries for power storage. The solar farm area will be expanded to approximately 7 acres.

3.3 Facility Operations

40 CFR §112.7(a)(3): Describe the physical layout of the facility and include a facility diagram, which must mark the location and contents of each container. The facility diagram must also include completely buried tanks that are otherwise exempted from the requirements of this part under §112.1(d)(4). The facility diagram must include transfer stations and connecting pipes.

Launch and test activities start with transport of the vehicle from the command and control center to the vertical launch area. Once at the launch pad, pre-launch checkout and processing of the Launch Vehicle occurs. Pre-launch processing takes approximately 5 to 30 days to complete. Test activities can include system checkouts, propellant loading, static fires, and test hops. Test operations are closely monitored by the command team from the LLC, using a variety of instrumentation, remote control, and video.

SpaceX launch vehicles use liquid oxygen (LOX) and liquid methane (CH₄) for propellants.

To conduct a test operation, the CH₄ and LOX are pressure fed and also pumped from storage tanks to the launch vehicle tanks. High-pressure gaseous helium (He) from on-board storage tanks is used to pressure feed the LOX and CH₄ from the vehicle tanks to the engines. During the static fire and hops, both LOX and CH₄ are mostly consumed. After operations, any remaining propellants are pressure fed from the vehicle back to ground storage tanks and re-used, or are off-gassed from the vehicle. During the launch, deluge water may be sprayed over the launch pad for cooling and sound and vibration suppression.

Mapping and diagrams showing the physical layout of the facility are included in Appendix B.

3.4 Drainage Pathways and Distance to Navigable Waters

There are no surface waters (non-wetland surface waters) within the boundary or footprint of the LLC or the vertical launch area. The location of the vertical launch and LLC are within South Laguna Madre watershed, which is within the Bahia-Grande Brownsville Ship Channel watershed, a 363-square mile subwatershed to the Southwestern Texas Coastal Basin. South Bay is an inland bay along the Gulf of Mexico located within the Laguna Madre hypersaline lagoon system and is the southernmost bay in Texas. South Bay is separated from the Gulf of Mexico by Brazos Island. On the northern boundary of South Bay is an inlet where water flows freely from South Bay into the Brownsville Shipping Channel, which connects the Port of Brownsville to the Gulf of Mexico. On the southern end of South Bay, approximately 0.5 mile north of the proposed vertical launch area, is Boca Chica Bay where Boca Chica State Park is located. Boca Chica Bay, located approximately 0.03 mile from the vertical launch area, is a subdelta of the Rio Grande.

The vertical launch area topology is essentially flat and low-lying. Facilities were built above ground level by approximately 5-15 feet, creating natural drainage away from the facilities. Drainage flows to the north, and the State Highway 4 gutter carries the flow to the west. There

are four culverts at the end of the highway gutter that outfall on the northwest of the pad, and two culverts that outfall to the south of the pad.

The LLC topology is similar to the vertical launch area, generally flat. As with the vertical launch area, facilities in the control center area are above ground level, creating natural drainage away from the facilities. Storm waters and other drainage flows away from the facilities and infiltrates through pervious areas or is collected in the swales of State Highway 4. There are no receiving bodies near this area.

Runoff from the both areas will not be to a Municipal Separate Storm Sewer System (MS4). Discharge from the vertical launch area will be into jurisdictional wetlands that contribute to the Rio Grande and un-vegetated salt flats associated with the Gulf of Mexico. SpaceX would manage surface water discharges from runoff during construction and operations according to the requirements of the Texas Pollutant Discharge Elimination System.

3.5 Oil Storage

40 CFR 112.7(a)(3)(i) requires a discussion of the type of oil in each fixed container and its storage capacity. For mobile or portable containers, either provide the type of oil and storage capacity for each container or provide an estimate of the potential number of mobile or portable containers, the types of oil, and anticipated storage capacities.

Oil and oil products are not stored in containers unless the container material and construction are compatible with the material stored and the conditions of storage. Appendix A, Table 1 - Storage and Potential Spill Predictions shows the storage capacity, contents, and location of the oil storage containers at the facility.

3.6 Secondary Containment

3.6.1 Bulk Storage Containers

40 CFR §112.7(a)(3)(iii): Address discharge or drainage controls such as secondary containment around containers and other structures, equipment, and procedures for control of a discharge.
40 CFR §112.8(c)(2): Construct all bulk storage tank installations (except mobile refuelers) so that you provide a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. You must ensure that diked areas are sufficiently impervious to contain discharged oil. Dikes, containment curbs, and pits are commonly employed for this purpose. You may also use an alternative system consisting of a drainage trench enclosure that must be arranged so that any discharge will terminate and be safely confined in a facility catchment basin or holding pond.

Table 1 (Appendix A) addresses the secondary containment provided for each bulk oil storage tank. In general, all of the bulk oil storage tanks, with the exception of several drums and the fuel tank on the diesel generator, are located outside in containment areas. All fuel/oil storage containment areas have sufficient capacity to contain the volume of the largest tank plus some rainfall input. See Section 3.10 for spill response procedures.

3.7 Spill Prevention Procedures

40 CFR §112.7(a)(3)(iii): Describe discharge or drainage controls such as secondary containment around containers and other structures, equipment, and procedures for the control of a discharge.

Please refer to Table 1 (Appendix A) for secondary containment and Section 3.12 for a description of required inspections. Section 3.10 addresses spill response procedures, and Section 3.8 addresses spill response and control equipment.

3.8 Spill Control Equipment

40 CFR §112.7(a)(3)(iv): Countermeasures for discharge discovery, response, and cleanup (both the facility's capability and those that might be required of a contractor).

Spill control equipment is available on site for use by facility, contractor, or emergency personnel. Table 3 (Appendix A) includes an inventory of spill control equipment for the facility which includes the equipment type, approximate quantity, and location.

40 CFR §112.7(a)(3)(v): Methods of disposal of recovered materials in accordance with applicable legal requirements.

All recovered material in liquid and solid form will be characterized for proper disposal and disposed of in accordance with applicable federal, state, and local regulations.

3.9 Emergency Contacts

40 CFR §112.7(a)(3)(vi): Contact list and phone numbers for the facility response coordinator, National Response Center, cleanup contractors with whom you have an agreement for response, and all appropriate federal, state, and local agencies who must be contacted in case of a discharge as described in §112.1(b).

Reporting a spill to the proper facility personnel is of utmost importance so that further action/reporting can be initiated. In case of a fire, spill, or other emergency related to a potential release of oil or oil products, use existing radios and/or cell phones to contact the SPCC Coordinator (EHS Manager) or the designee.

For internal reporting, contact the SPCC Coordinator. If the SPCC Coordinator is not available, report the incident to one of the designees. The facility's emergency contact list is provided in Table 2 (Appendix A).

After being notified, the SPCC Coordinator (or designee) will report the incident to the outside agencies if warranted. If a spill is reportable, the National Response Center and the Texas Commission on Environmental Quality (TCEQ) will be contacted immediately. The outside agency contact information is presented in Table 2 (Appendix A).

3.10 Spill Response Procedures

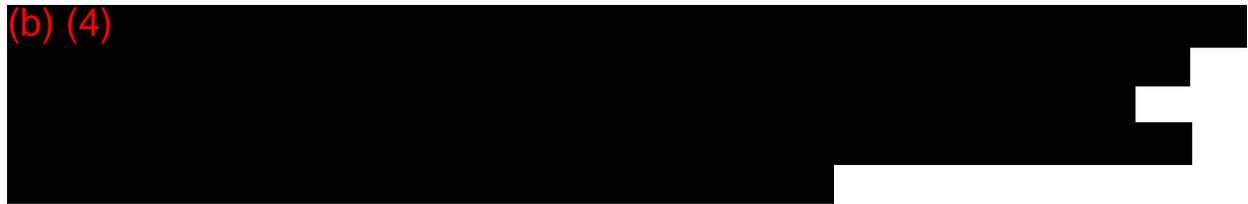
Procedures have been implemented to minimize the likelihood of spills and to respond quickly to spills, should they occur. This section presents the facility's emergency contact list, the spill response procedures to be followed during a spill event, and the descriptions of the types and locations of spill response equipment available at the facility for use during a spill event response.

The spill response procedures described herein serve to address spills of oil and oil-containing materials only. It is important to note that such spills may also be subject to additional local, state, and federal release reporting requirements under various regulations, which are beyond the scope of this plan. Such regulations include, but are not necessarily limited to, the Superfund Amendment and Reauthorization Act (SARA), Section 304; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and the Resource Conservation and Recovery Act (RCRA). Consequently, the SPCC Coordinator (EHS Manager) or his/her designee will be responsible for identifying any other applicable release reporting requirements, as well as any applicable cleanup requirements.

3.10.1 Notification and Reporting Procedures

40 CFR §112.7(a)(4): Unless you have submitted a response plan under §112.20, provide information and procedures in your Plan to enable a person reporting a discharge as described in §112.1(b) to relate information on the exact address or location and phone number of the facility; the date and time of the discharge, the type of material discharged; estimates of the total quantity discharged; estimates of the quantity discharged as described in §112.1(b); the source of the discharge; a description of affected media; the cause of the discharge; any damages or injuries caused by the discharge; actions being used to stop, remove, and mitigate the effects of the discharge; whether an evacuation may be needed; and, the names of individuals and/or organizations who have also been contacted.

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3.10.2 Spill Response, Containment, Cleanup

40 CFR §112.7(a)(5): Unless you have submitted a response plan under §112.20, organize portions of the Plan describing procedures you will use when a discharge occurs in a way that will make them readily usable in an emergency, and include appropriate supporting material as appendices.

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3.10.4 Release Containment Procedures

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3.10.5 Spill Cleanup Procedures

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3.11 Potential Discharge Volumes and Direction of Flow

40 CFR §112.7(b): Where experience indicates a reasonable potential for equipment failure (such as loading or unloading equipment, tank overflow, rupture, or leakage or any other equipment known to be a source of a discharge), include a prediction of the direction, rate of flow, and total quantity of oil which could be discharged from the facility as a result of each type of major equipment failure.

Note: *Types of failures to consider include tank (aboveground and underground) overflow, rupture or leakage, pipe failure, wastewater treatment plant failure, and spills during transfer operations at the rack and/or dock or tank truck parking area. The direction a spill would flow can be predicted by drainage patterns, the location of storm or sewer drains, and secondary containment; these predictions should be performed or verified by a Professional Engineer. The rate of flow will depend on the size and location of the failure and the equipment involved. The total quantity of oil that could be discharged from the facility should be based upon a worst-case situation and the time it would take to respond to a spill (e.g., shutting off a pump or closing a valve).*

Table 1 (Appendix A) presents the expected volume, discharge rate, general flow direction in the event of a release, and the provided secondary containment for different parts of the facility where oil or other hazardous fluids are stored, used, transferred, or handled. Secondary containment structures are essentially bathtubs made of impermeable materials such as concrete or plastic, located under and around storage tanks. In cases where tanks stand alone, there is a containment structure for each tank. Containment size depends on the amount

stored – containment must be at least 110% of the largest tank in the containment area, so they are specific to each area and tank.

40 CFR §112.7(c): Provide appropriate containment and/or diversionary structures or equipment to prevent a discharge as described in §112.1(b), except as provided in paragraph (k) of this section for qualified oil-filled operational equipment. The entire containment system, including walls and floor, must be capable of containing oil and must be constructed so that discharge from a primary containment system, such as a tank or pipe, will not escape the containment system before cleanup occurs. At a minimum, you must use one of the following prevention systems or its equivalent:

(1) For onshore facilities:

- (i) Dikes, berms, or retaining walls sufficiently impervious to contain oil*
- (ii) Curbing*
- (iii) Culverts, gutters, or other drainage systems*
- (iv) Weirs, booms, or other barriers*
- (v) Spill diversion ponds*
- (vi) Retention ponds*
- (vii) Sorbent material*

No railcar loading or unloading of oil takes place at the facility. All loading/unloading of oil is accomplished by drum or tank truck. When practical, secondary containment systems or structures will be available at the facility for loading/unloading operations. Fueling areas where large amounts or frequent fueling events are planned will include structures and/or equipment designed to contain any spills. An example of an area that might not have containment is a one-time transfer location that transfers a small amount of fluid, for example, refueling of a portable generator in a temporary location. In these situations, drip pans and other spill kit materials will be on site to handle any spilled materials. If secondary containment is not present, site geography is such that a spill or leak during loading/unloading would be retained in the immediate area on concrete or asphalt areas for immediate cleanup. Otherwise, a spill would flow towards the storm water retention ponds and would not result in a discharge of oil to waters of the United States. [Extent of asphalt, perimeter concrete curbing etc. is TBD].

3.11.1 Non-Qualified Oil-Filled Equipment Containment

40 CFR §112.7(c): Provide appropriate containment and/or diversionary structures or equipment to prevent a discharge as described in §112.1(b), except as provided in paragraph (k) of this section for qualified oil-filled operational equipment. The entire containment system, including walls and floor, must be capable of containing oil and must be constructed so that discharge from a primary containment system, such as a tank or pipe, will not escape the containment system before cleanup occurs. At a minimum, you must use one of the following prevention systems or its equivalent:

(1) For onshore facilities:

- (i) Dikes, berms, or retaining walls sufficiently impervious to contain oil*
- (ii) Curbing*
- (iii) Culverts, gutters, or other drainage systems*
- (iv) Weirs, booms, or other barriers*
- (v) Spill diversion ponds*
- (vi) Retention ponds*
- (vii) Sorbent material*

Table 1 (Appendix A) summarizes the spill prevention and control measures in-place to minimize the potential for equipment failure at tanks and drum storage. Oil-filled operational equipment is also presented in Table 1. The tank on the cart has a capacity of 55 gallons and is double-walled.

3.11.2 Exemptions to Secondary Containment/Diversionary Structures

40 CFR §112.7(d): Provided your Plan is certified by a licensed Professional Engineer under §112.3(d), or, in the case of a qualified facility that meets the criteria in §112.3(g), the relevant sections of your Plan are certified by a licensed Professional Engineer under §112.6(d), if you determine that the installation of any of the structures or pieces of equipment listed in paragraphs (c)[related to appropriate containment and diversionary equipment] and (h)(1)[related to loading rack secondary containment] of this section, and §§112.8(c)(2) [related to bulk storage secondary containment], 112.8(c)(11) [related to secondary containment for mobile storage], 112.9(c)(2) [related to onshore oil production facilities], 112.10(c) [related to onshore oil drilling and workover facilities], 112.12(c)(2) [related to animal fat, fish and vegetable oils], and 112.12(c)(11) [related to animal fat, fish and vegetable oils] to prevent a discharge as described in §112.1(b) from any onshore or offshore facility is not practicable, you must clearly explain in your Plan why such measures are not practicable; for bulk storage containers, conduct both periodic integrity testing of the containers and periodic integrity and leak testing of the valves and piping; and, unless you have submitted a response plan under §112.20, provide in your Plan the following:

- 1. An oil spill contingency plan following the provisions of part 109 of this chapter.*
- 2. A written commitment of manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful.*

All methods of secondary containment proposed in this SPCC Plan have been deemed practicable; therefore, this requirement is not applicable.

3.12 Inspections/Record Keeping

40 CFR §112.7(e): Inspections, tests, and records. Conduct inspections and tests required by this part in accordance with written procedures that you or the certifying engineer develop for the facility. You must keep these written procedures and a record of the inspections and tests, signed by the appropriate supervisor or inspector, with the SPCC Plan for a period of three years. Records of inspections and tests kept under usual and customary business practices will suffice for purposes of this paragraph.

Inspections will be conducted to minimize the chances of oil spills and also to minimize the chances of spill control and countermeasure failure in the event of an oil spill. This subsection explains the scope and schedule of inspections conducted as part of the SPCC Plan. A facility inspection checklist is included in Appendix D.

Inspections at SpaceX will be performed by the SPCC Coordinator (EHS Manager) or a designee. The inspection records will be maintained as part of the facility’s operations records for three years. Copies of the inspection records must be kept with a copy of the SPCC Plan or with the EHS Manager.

3.12.1 Detailed Inspections

The SPCC Coordinator (EHS Manager) or a designee will inspect for malfunctions, deterioration, operator errors, leaks, damage, discharge, or corrosion of SPCC-regulated valves, pumps, tanks, piping, oil handling storage and handling equipment, and spill prevention equipment. These items will be checked to minimize the possibility of spills of oil and hazardous substances. The inspections will be conducted not less than once per quarter and often enough to identify problems in time to correct them before a spill occurs.

Inspections will need to be conducted more often for some equipment and areas than for others. A list of equipment and areas where detailed inspections may be necessary, along with recommended inspection schedules, is given below. Copies of the facility inspection forms are included in Appendix D.

3.12.2 Inspection Schedule and Details

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3.12.3 Inspection Records

Inspections will be documented and a written record of inspection, signed by an appropriate supervisor or the SPCC Coordinator (EHS Manager), will be made a part of the SPCC Plan. Inspections will be recorded on form located in Appendix D and will be maintained in the SPCC files for a minimum of three years.

3.13 Personnel Training

40 CFR §112.7(f): Personnel, training, and discharge prevention procedures. (1) At a minimum, train oil-handling personnel in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; applicable pollution control laws, rules, and regulations; general facility operations; and, the contents of the facility SPCC Plan.

40 CFR §112.7(f): (2) Designate a person at each applicable facility who is accountable for discharge prevention and who reports to facility management.

40 CFR §112.7(f): (3) Schedule and conduct discharge prevention briefings for your oil-handling personnel at least once a year to make sure that they adequately understand the SPCC Plan for that facility. Such briefings must highlight and describe known discharges as described in §112.1(b) or failures, malfunctioning components, and any recently developed precautionary measures.

In accordance with 40 CFR §112.7(f)(2), the SPCC Coordinator (EHS Manager) is designated as the person ultimately responsible for spill prevention at the facility. All SpaceX employees are, however, individually responsible for control of oil in the performance of their job functions. To this end, facility personnel who are reasonably expected to come into contact with or handle oil are required to receive initial spill prevention training as well as annual spill prevention briefings. The initial training will consist of in-house classroom and/or hands-on training, and will cover the following topics:

1. The operation and maintenance of equipment to prevent discharges
2. Discharge procedure protocols
3. Applicable pollution control laws, rules, and regulations
4. General facility operations
5. The contents of this plan

Annual spill prevention briefings are conducted for oil-handling personnel. This refresher training is done to make sure that oil-handling personnel have an adequate understanding of this plan. Any known discharges that occurred during the previous year will be discussed during these scheduled briefings. The discussion will include the mode of failure, the malfunctioning components, and the corrective actions taken. In addition, the training will include a discussion of any recently developed precautionary measures. Training records are maintained by the SPCC Coordinator (EHS Manager).

3.14 Site Security

40 CFR §112.7(g): Security (excluding oil production facilities). (1) Fully fence each facility handling, processing, or storing oil, and lock and/or guard entrance gates when the facility is not in production or is unattended.

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40 CFR §112.7(g): (2) Ensure that the master flow and drain valves and any other valves permitting direct outward flow of the container's contents to the surface have adequate security measures so that they remain in the closed position when in non-operating or non-standby status.

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40 CFR §112.7(g): (3) Lock the starter control on each oil pump in the "off" position and locate it at a site accessible only to authorized personnel when the pump is in a non-operating or non-standby status.

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40 CFR §112.7(g): (4) Securely cap or blank-flange the loading/unloading connections of oil pipelines or facility piping when not in service or when in standby service for an extended time. This security practice also applies to piping that is emptied of liquid content either by draining or by inert gas pressure.

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40 CFR §112.7(g): (5) Provide facility lighting commensurate with the type and location of the facility that will assist in the

- (i) discovery of discharges occurring during hours of darkness, both by operating personnel, if present, and by nonoperating personnel (the general public, local police, etc.); and
- (ii) prevention of discharges occurring through acts of vandalism.

Facility lighting is adequate for employee safety and spill detection during the hours of darkness. (b) (4)

3.15 Tank Car and Truck Loading/Unloading Operations

40 CFR §112.7(h): Facility tank car and tank truck loading/unloading rack (excluding offshore facilities). (1) Where loading/unloading area drainage does not flow into a catchment basin or treatment facility designed to handle discharges, use a quick drainage system for tank car or tank truck loading and unloading areas. You must design containment systems to hold at least the maximum capacity of any single compartment of a tank car or tank truck loaded or unloaded at the facility.

40 CFR §112.7(h): (2) Provide an interlocked warning light or physical barrier system, warning signs, wheel chocks, or vehicle break interlock system in loading/unloading areas to prevent vehicles from departing before complete disconnection of flexible or fixed oil transfer lines.

40 CFR §112.7(h): (3) Prior to filling and departure of any tank car or tank truck, closely inspect for discharges the lowermost drain and all outlets of such vehicles, and if necessary, ensure that they are tightened, adjusted, or replaced to prevent liquid discharge while in transit

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in order to prevent spills during tank truck loading/unloading operations, the facility requires all drivers to adhere to standard operating procedures when loading or unloading oil or fuel which include DOT regulations 49 CFR 177. Standard procedures include measures to prevent departure prior to hose disconnection and truck inspections to prevent spills in transit. In addition, SpaceX requires an employee to be present during all fuel loading/unloading operations.

40 CFR §112.7(i): If a field-constructed aboveground container undergoes a repair, alteration, reconstruction, or a change in service that might affect the risk of a discharge or failure due to brittle fracture or other catastrophe, or has discharged oil or failed due to brittle fracture failure or other catastrophe, evaluate the container for risk of discharge or failure due to brittle fracture or other catastrophe, and as necessary, take appropriate action.

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3.16 Qualified Oil-filled Operational Equipment

40 CFR § 112.7(k) Qualified Oil-filled Operational Equipment. The owner or operator of a facility with oil-filled operational equipment that meets the qualification criteria in paragraph (k)(1) of this

sub- section may choose to implement for this qualified oil-filled operational equipment the alternate requirements as described in paragraph (k)(2) of this sub- section in lieu of general secondary containment required in paragraph (c) of this section.

(1) Qualification Criteria—Reportable Discharge History: The owner or operator of a facility that has had no single discharge as described in § 112.1(b) from any oil-filled operational equipment exceeding 1,000 U.S. gallons or no two discharges as described in § 112.1(b) from any oil-filled operational equipment each exceeding 42 U.S. gallons within any twelve month period in the three years prior to the SPCC Plan certification date, or since becoming subject to this part if the facility has been in operation for less than three years (other than oil discharges as described in § 112.1(b) that are the result of natural disasters, acts of war or terrorism); and

(2) Alternative Requirements to General Secondary Containment. If secondary containment is not provided for qualified oil-filled operational equipment pursuant to paragraph (c) of this section, the owner or operator of a facility with qualified oil-filled operational equipment must:

(i) Establish and document the facility procedures for inspections or a monitoring program to detect equipment failure and/or a discharge; and

(ii) Unless you have submitted a response plan under § 112.20, provide in your Plan the following:

(A) An oil spill contingency plan following the provisions of part 109 of this chapter.

(B) A written commitment of manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful.

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4.0 Spill Prevention

4.1 Facility Drainage Controls

40 CFR §112.8(b)(1): The facility must restrain drainage from diked storage areas by valves to prevent discharge into the drainage system or facility effluent treatment system, except where facility systems are designed to control such discharge. You may empty diked areas by pumping or ejectors; however, you must manually activate these pumps or ejectors and must inspect the condition of the accumulation before starting, to ensure no oil will be discharged.

40 CFR §112.8(b)(2): The facility must use valves of manual, open-and-closed design, for the drainage of diked areas. You must not use flapper-type drain valves to drain diked areas. If your facility drainage drains directly into a watercourse and not into an on-site wastewater treatment plant, you must inspect and may drain uncontaminated retained storm water.

Secondary containment structures are equipped with manual open-and-closed type valves to prevent a discharge from entering the facility drainage system. Containment areas are inspected periodically to detect leaks, spills, and rainwater accumulation. The valves on the containment areas will remain closed at all times unless uncontaminated rainwater is being drained from the containment area. Drainage events are recorded in the log included in Appendix E to this SPCC Plan.

40 CFR §112.8(b)(3): The facility must design facility drainage systems from undiked areas with a potential for a discharge (such as where piping is located outside containment walls or where tank trucks discharges may occur outside the loading area) to flow into ponds, lagoons, or catchment basins designed to retain oil or return it to the facility. You must not locate catchment basins in areas subject to periodic flooding.

40 CFR §112.8(b)(4): If facility drainage is not engineered as in paragraph (b)(3) of this section, equip the final discharge of ditches inside the facility with a diversion system that would, in the event of an uncontrolled discharge, retain oil in the facility.

Drainage where spills outside of containment could occur will either flow along created channels leading to containment areas. Discharge offsite to low areas including tidal flats from the containment occurs after inspection.

40 CFR §112.8(b)(5): Where drainage waters are treated in more than one treatment unit and such treatment is continuous, and pump transfer is needed, provide two "lift" pumps and permanently install at least one of the pumps. Whatever techniques you use, you must engineer facility drainage systems to prevent a discharge as described in §112.1(b) in case there is an equipment failure or human error at the facility.

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In the event of a spill or contaminated rainwater, including a spill that leads to the retention pond, a contractor will clean up and dispose of the waste.

4.1.1 Tank System Operations

40 CFR §112.8(c)(1): Do not use a container for the storage of oil unless its material and construction are compatible with the material stored and the conditions of storage, such as pressure and temperature.

40 CFR §112.8(c)(8): Engineer or update each container installation in accordance with good engineering practice to avoid discharges. You must provide at least one of the following devices:

- (i) High liquid level alarms with an audible or visual signal at a constantly attended operation or surveillance station. In smaller facilities an audible air vent may suffice.
- (ii) High liquid level pump cutoff devices set to stop flow at a predetermined container content level.
- (iii) Direct audible or code signal communication between the container gauger and the pumping station.
- (iv) A fast response system for determining the liquid level of each bulk storage container such as digital computers, telepulse, or direct vision gauges. If you use this alternative, a person must be present to monitor gauges and the overall filling of bulk storage containers.
- (v) You must regularly test liquid level sensing devices to ensure proper operation.

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4.1.2 Drainage of Diked Areas

40 CFR §112.8(c)(3): Do not allow drainage of uncontaminated rainwater from the diked area into the storm drain or discharge of an effluent into an open watercourse, lake, or pond, bypassing the facility treatment system unless you: (i) normally keep the bypass valve sealed closed, (ii) inspect the retained rainwater to ensure that its presence will not cause a discharge described in §112.1(b), (iii) open the bypass valve and reseal it following drainage under responsible supervision, and (iv) keep adequate records of such events, for example, any records required under permits issued in accordance with §122.41(j)(2) and §122.41(m)(3).

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4.1.3 Additional Bulk Storage Preventative Measures for Buried Tanks

40 CFR §112.8(c)(4): Protect completely buried metallic storage tanks installed on or after January 10, 1974 from corrosion by coating or cathodic protection compatible with local soil conditions. You must regularly leak test such completely buried metallic storage tanks.

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40 CFR §112.8(c)(5): Do not use partially buried or bunkered metallic tanks for the storage of oil, unless you protect the buried section of the tank from corrosion. You must protect partially buried and bunkered tanks from corrosion by coating or cathodic protection compatible with local soil conditions.

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4.1.4 Inspection/Integrity Testing

40 CFR §112.8(c)(6): Test each aboveground container for integrity on a regular schedule, and whenever you make material repairs. The frequency and type of testing must take into account container size and design (such as floating roof, skid mounted, elevated, or partially buried). You must combine visual inspection with another testing technique such as hydrostatic testing, radiographic testing, ultrasonic testing, acoustic emissions testing, or another system of nondestructive shell testing. You must keep comparison records and you must also inspect the container's supports and foundations. In addition, you must frequently inspect the outside of the container for signs of deterioration, discharges, or accumulation of oil inside diked areas. Records of inspections and tests kept under usual and customary business practices will suffice for purposes of this paragraph.

Note: Since electrical, operating, and manufacturing equipment are not bulk storage containers, this requirement is not applicable to those devices and equipment.

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4.1.5 Heating Coil

40 CFR §112.8(c)(7): Control leakage through defective internal heating coils by monitoring the steam return and exhaust lines for contamination from internal heating coils that discharge into an open watercourse, or pass the steam return or exhaust lines through a settling tank, skimmer, or other separation or retention system.

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40 CFR §112.8(c)(9): Observe effluent treatment facilities frequently enough to detect possible system upsets that could cause a discharge as described in §112.1.

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4.1.6 Visible Discharges

40 CFR §112.8(c)(10): Promptly correct visible discharges which result in a loss of oil from the container, including but not limited to seams, gaskets, piping, pumps, valves, rivets, and bolts. You must promptly remove accumulations of oil in diked areas.

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¹ Tank Inspection, Repair, Alteration, and Reconstruction, API Standard 653, 3rd ed., December 2001.

² Standard for Inspection of Aboveground Tanks, STI SP001-03, 3rd edition, Steel Tank Institute: July 2005.

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4.1.7 Mobile Oil Storage

40 CFR §112.8(c)(11): Position or locate mobile or portable oil storage containers to prevent a discharge as described in §112.1(b). Except for mobile refuelers, you must furnish a secondary means of containment, such as a dike or catchment basin, sufficient to contain the capacity of the largest single compartment or container with sufficient freeboard to contain precipitation.

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40 CFR §112.8(d): Facility transfer operations, pumping, and facility process. (1) Provide buried piping that is installed or replaced on or after August 16, 2002, with a protective wrapping and coating. You must also cathodically protect such buried piping installations or otherwise satisfy the corrosion protection standards for piping in part 280 of this chapter or a state program approved under part 281 of this chapter. If a section of buried line is exposed for any reason, you must carefully inspect it for deterioration. If you find corrosion damage, you must undertake additional examination and corrective action as indicated by the magnitude of the damage.

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40 CFR §112.8(d): (2) Cap or blank-flange the terminal connection at the transfer point and mark it as to origin when piping is not in service or is in standby service for an extended time.

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40 CFR §112.8(d): (3) Properly design pipe supports to minimize abrasion and corrosion and allow for expansion and contraction.

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40 CFR §112.8(d): (4) Regularly inspect aboveground valves, piping, and appurtenances. During the inspection you must assess the general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces. You must also conduct integrity and leak testing of buried piping at the time of installation, modification, construction, relocation, or replacement.

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40 CFR §112.8(d): (5) Warn vehicles entering the facility to be sure that no vehicle will endanger aboveground piping or other oil transfer operations.

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Appendix A:-Tables

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Appendix B: Facility Mapping

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Appendix D: Facility Inspection Reports

Monthly Facility Inspection Report and Checklist

Date: _____ Time: _____ Inspector: _____ Inspector's signature: _____	X = Satisfactory NA = Not applicable R = Repair or adjustment repair C = See comments under Remarks/Recommendations
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Drainage: <input type="checkbox"/> No noticeable oil sheen on runoff <input type="checkbox"/> Containment area drainage valves closed and locked <input type="checkbox"/> No visible oil sheen in the containment areas <input type="checkbox"/> No standing water in containment areas
ASTs: <input type="checkbox"/> Tank surface checked for signs of leakage <input type="checkbox"/> Tank condition and coating good (no rusting, corrosion, or pitting) <input type="checkbox"/> Bolts, rivets, or seams not damaged <input type="checkbox"/> Tank supports not damaged or deteriorated <input type="checkbox"/> Level gauges and alarms working properly <input type="checkbox"/> Vents not obstructed <input type="checkbox"/> Valves, flanges, and gaskets free of leaks <input type="checkbox"/> Containment walls intact <input type="checkbox"/> Presence of water/contamination in the containment area
Drums and Containers: <input type="checkbox"/> Surface checked for signs of leakage <input type="checkbox"/> Condition good (no rusting, corrosion, or pitting) <input type="checkbox"/> Drums elevated and no evidence of leaks from bottom <input type="checkbox"/> Covers secured/fill openings not obstructed <input type="checkbox"/> Containment areas intact <input type="checkbox"/> Drums located in or on containment <input type="checkbox"/> Presence of water/contamination in the containment area <input type="checkbox"/> No leaks at valves, flanges, or other fittings, if applicable
Pipelines: <input type="checkbox"/> No signs of corrosion damage to pipelines or supports <input type="checkbox"/> No leaks at valves, flanges, or other fittings
Truck Loading/Unloading Area: <input type="checkbox"/> No standing water in loading/unloading area <input type="checkbox"/> Warning signs posted <input type="checkbox"/> No leaks in hoses <input type="checkbox"/> Connections capped and blank-flanged, where applicable <input type="checkbox"/> Fill line one-way valve is operating properly and is securely in the closed position when not in use
Security & Spill Kits: <input type="checkbox"/> Fence and gates intact <input type="checkbox"/> Locks on gates <input type="checkbox"/> Spill kits are present in designated locations and contents are maintained <input type="checkbox"/> Lighting working properly

Include Remarks/Recommendations on Back of Page

Appendix E: Discharge Reporting Form

Drainage Discharge Report Form

Containment area:
Operator's name:
Date and time water discharge from the containment area started:
Date and time water discharge from the containment area stopped:
Approximate volume _____ discharged to _____
Appearance of water prior to pumping or discharging: Color Sheen Odor Foam
NOTE: Only unimpacted, visually clean water will be discharged to the environment. Water impacted by oil products will be contained and properly disposed as oily wastewater.
Signature of operator:

Appendix F: Training Records

[TBD]



Access Restriction Notification Plan

Revised: December 9, 2021

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Anomaly Response Plan for Boca Chica Launch Site

Revised: April 20, 2022

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Introduction

SpaceX operates at the Boca Chica launch site in Cameron County, TX. In 2019, SpaceX developed the Starship technology, a reusable suborbital launch vehicle. SpaceX is currently testing Starship and Super Heavy prototypes at the launch site. This involves static fire engine tests and a series of suborbital launches at the vertical launch area (VLA) from just a few inches above ground level (AGL) to up to 30 kilometers (18 miles) AGL. SpaceX is also proposing to conduct static fire engine tests and suborbital and orbital launches of the Starship/Super Heavy launch vehicle.

This Anomaly Response Plan outlines the security and safety steps SpaceX will implement in the event of an anomaly or mishap during space flight operations.

Stakeholders

Below is a list of primary SpaceX personnel and government agencies that may be engaged during launch activities and following any anomaly or mishap. Points of contact are summarized in Table 1.

1. SpaceX
 - a. Flight Control I: team has responsibility to ensure activities proceed in a disciplined, safe manner as well as direct immediate emergency and safing actions following a mishap
 - b. Security
 - c. Environmental Health & Safety (EHS)
 - d. Operations Support Coordinator (OSC)
2. Federal Aviation Administration (FAA)
3. Cameron County Sheriff's Office (CCSO)
4. U.S. Customs and Border Protection (CBP)
5. U.S. Coast Guard (USCG)
6. U.S. Fish & Wildlife (USFWS)
7. Texas Department of Transportation (TxDOT)
8. Texas Department of Public Safety (DPS)
9. Texas Parks and Wildlife Department (TPWD)
10. Brownsville Navigation District (BND)
11. US Army Corp of Engineers (USACE)
12. Texas Historical Commission (THC)
13. National Park Service (NPS)
14. Texas General Land Office (TGLO)

I. Closure and Clearing Operations

Tanks tests, wet dress rehearsals, static fire engine tests, and launches (suborbital and orbital) would require restricting public access in the vicinity of the launch pad and securing land and water areas as part of public safety requirements. The areas on land that would be closed to public access is referred to as the closure area (Figure 1). The closure area includes an area of Boca Chica Beach, ranging from the Brownsville Shipping Channel south to the U.S./Mexico border. The Brownsville Shipping Channel would be temporarily restricted during orbital launches and some suborbital launches, but not restricted

during tank tests, wet dress rehearsals, or static fire engine tests. SpaceX would coordinate these closures in accordance with the SpaceX Security Plan.

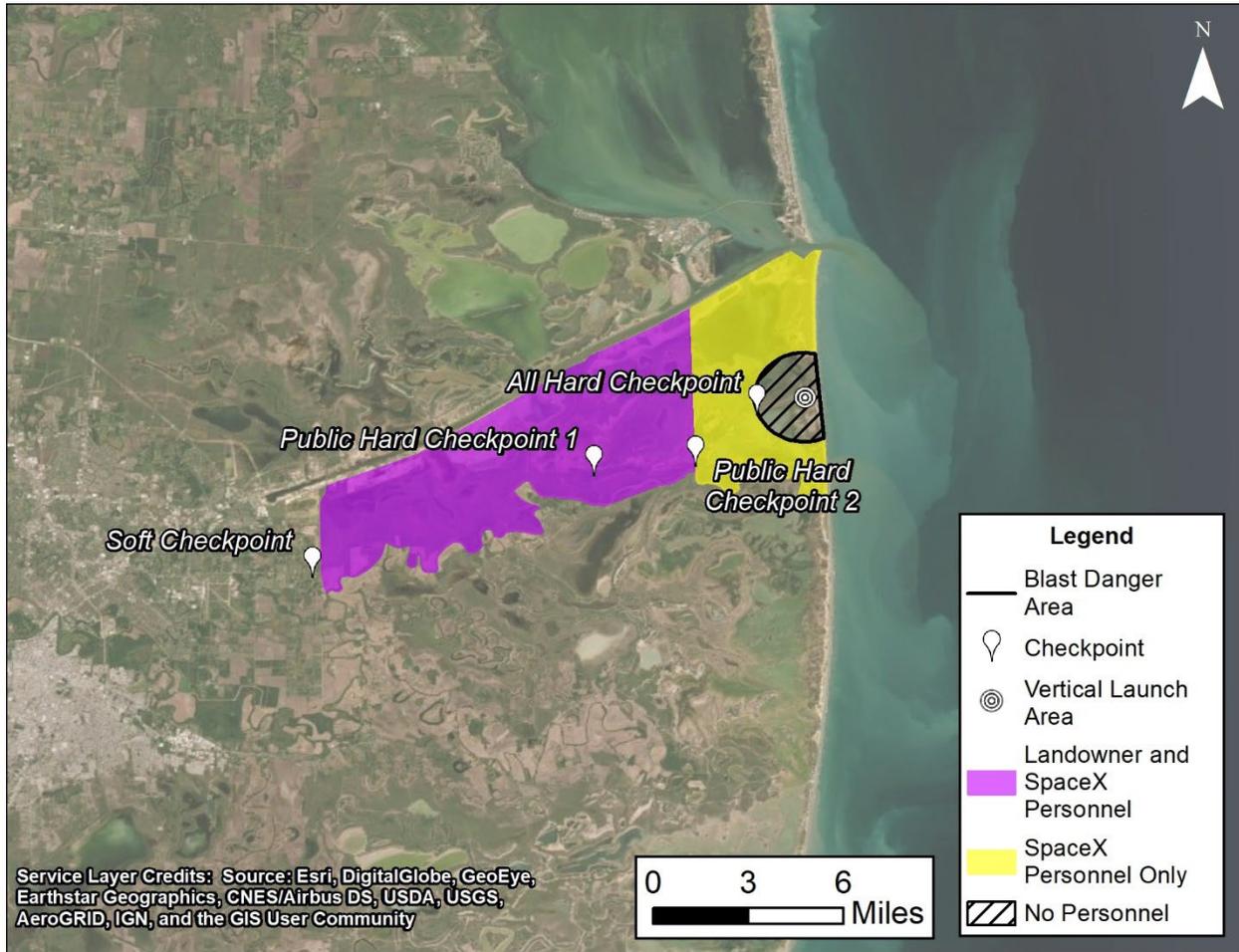


Figure 1 Locations of Hard and Soft Checkpoints

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II. Anomalies

A Starship/Super Heavy test operation or launch could fail (referred to as an anomaly or mishap). An anomaly on the launch pad could cause a fire on the launch pad and/or an explosion that spreads debris. While anomalies are not licensed activities, as part of evaluating a launch license or permit application, the FAA evaluates SpaceX's debris analysis to ensure the hazard area is of sufficient size to ensure public safety.

The SN11 anomaly, which occurred during landing operations at the VLA, created the largest debris field to-date, and although debris spread outside the launch pad, it was contained to a 700-acre area adjacent to the launch pad, specifically, Boca Chica State Park and Brazos Island State Park. Therefore, the FAA expects debris from an anomaly at the VLA during launch or landing operations to be contained to this 700-acre area of potential affect (APE) (Debris APE). An anomaly on the launch pad during testing operations is expected to be contained to a smaller APE, either because the test does not involve explosive commodities, or because it is static (i.e., no impact from velocity of the vehicle).

In the event of an anomaly, SpaceX will evaluate the level of response based on the situation and notify the appropriate emergency personnel and land-managing agencies. Immediately following an anomaly, SpaceX may be required to continue to restrict public access in the vicinity of the VLA to address any impacts and ensure public safety. SpaceX will request an extension of the access restriction from Cameron County. The access restriction will be released when the area is deemed safe for the public by SpaceX and Cameron County. This determination by SpaceX and Cameron County would be made with input provided by public land-managing agencies (i.e., TPWD, TGLO, and USFWS).

SpaceX estimates up to 300 hours of access restrictions per year could be needed to address things such as ensuring public safety and debris removal on public land. The anomaly hours go beyond the 500 nominal operational closure hours. The hour count for nominal operations will stop when the launch operation is complete and the area is deemed safe for SpaceX or emergency personnel to enter. The anomaly-response hour count will start at that point to address debris removal and last until the area is deemed safe for the public and the access restriction is released.

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accordance with the Hazardous Materials Emergency Response Plan and the regulatory agencies. Flight Control I or delegate will determine a plan for communicating safety state of pad to SpaceX personnel and regulatory agencies, including road and beach closure releases.

Cleanup of Debris

A limited number of Red Team (typically four) will enter debris field first. They will survey the area, photograph the site, and locate hazardous components. Hazardous components may include the battery, the flight termination system, debris with stored energy, including components with valves and pressurized systems.

Following the initial evaluation of the area, SpaceX will coordinate with TPWD, THC, NPS, TGLO, and USFWS prior to any attempt of cleanup, in order to minimize damage to the refuge lands and sensitive historic, biological, and geological resources. The method of debris cleanup will be assessed on a case-by-case basis and will be approved by TPWD, USFWS and TGLO. Conditions that would be assessed include location and size of the debris, weather, condition of the soil, number of support staff, etc.

Cleanup of debris on State Highway 4 will be the first priority, followed by Refuge or TPWD lands, and then SpaceX property. SpaceX will consult with TPWD and USFWS prior to any activity that may impact sensitive wildlife habitat and refuge lands during cleanup. SpaceX will enter on foot as much as possible and coordinate the use of vehicles with applicable landowners or land-managing agencies to minimize impacts. SpaceX will perform an initial assessment of the debris to geotag and pick up debris by hand and carry out on foot. If SpaceX cannot remove debris by hand, SpaceX will coordinate the use of equipment or vehicles with applicable landowners or public land-managing agencies. SpaceX will not use motorized vehicles on the tidal flats and will stay within established paths. Once removal is complete, restoration and monitoring efforts with respect to disturbed areas such as lomas and tidal flats, will be coordinated with TPWD, TGLO, and USFWS.

In the case an animal is killed or injured, the EHS lead will contact USFWS and TPWD. If the killed or injured animal is a protected species, the EHS lead will coordinate with the SpaceX Environmental Specialists to report the take to the FAA, and the FAA will lead agency coordination on the incident.

SpaceX will continue sending closure notifications to the regulatory and public land-managing agencies as plans finalize (typically 24–48 hours prior to the closure). The agencies will continue to receive updates immediately when the closures go into place and when the closures end, as well as cancellations of requested closures. SpaceX personnel at the LLCC will send these notifications to ensure the most up-to-date information is distributed. Notices will also be sent in real time status and updates on closures through a text message alert service. Subscribers can text “BEACH” TO 1-877-591-2152 to receive updates.

In the event that a historic property is damaged, the EHS lead will coordinate with the SpaceX Environmental Specialists to report the damage to the FAA. SpaceX will retain a qualified professional archaeologist or architectural historian to document the damage in a report, which will be provided to the Texas Historical Commission. SpaceX will coordinate with THC and other relevant agencies to determine a reasonable course of action. This action could include hiring a qualified professional to make recommendations for repairs to the historic property or other appropriate mitigation identified in consultation with THC. Any proposed measures to repair historic properties will be subject to the review process described in the Stipulation III of the Programmatic Agreement between the FAA, THC, SpaceX,

USFWS, TPWD and NPS. Historic properties in the vicinity of the launch pad include the 1846 Cypress Pilings, the 1865 Palmetto Pilings, and the 1936 Palmetto Pilings Centennial Marker, which are eligible for listing on the National Register of Historic Places.

In the event of unanticipated discoveries of human remains and/or other cultural resources during debris clean up, SpaceX will adhere to the procedures of the SpaceX Unanticipated Discoveries Plan.

Any restoration required from after the removal of debris would be coordinated with USWFS and TPWD.

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Boca Chica Launch Site Security Plan

Date: April 20, 2022
Version: 4.8 - EA

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Introduction

The SpaceX Security Team provides security to the Boca Chica Launch Site during routine operations and in support of vehicle operations. The Boca Chica Launch Site is a dynamic environment that incorporates multiple layers of security with a significant emphasis on interagency coordination and cooperation. SpaceX will follow this plan to ensure that there are not any unauthorized persons, vessels, trains, aircraft, or other vehicles within the safety clear zones. The plan includes conducting “safety sweeps” by security personnel as needed for each launch, as well as roadblocks, surveillance activities, and other security checkpoints as appropriate. Safety sweeps will utilize various methods, as appropriate that may include, but are not limited to: video surveillance; motion detection; and human patrol assets.

Stakeholders

Below is a list of primary SpaceX stakeholders and external agencies that may be engaged during Boca Chica launch activities.

1. SpaceX
 - a. Flight Control
 - b. Security
 - c. Environmental Health & Safety (EHS)
 - d. Operations Support Coordinator (OSC)
 - e. Red Team
2. Federal Aviation Administration (FAA)
3. Cameron County Sheriff's Office (CCSO)
4. U.S. Customs and Border Protection (CBP)
5. U.S. Coast Guard
6. U.S. Fish & Wildlife Service
7. Texas Department of Transportation
8. Texas Department of Public Safety
9. Texas Parks and Wildlife
10. Brownsville Navigation District
11. Texas Historical Commission

Clearing Operations

Safety clear zones will be established for each launch and test, when necessary, to contain the adverse effects of launch and test operations involving a hazard. The purpose of these zones is to protect public health and safety and the safety of property. The zones are sized to prevent a launch anomaly from harming those outside the safety clear zones, including SpaceX's, state, and federal property, and they typically extend downrange along the flight trajectory for a certain distance.

This temporary access restriction and clearing plan describes the procedures for land and water access restriction areas that will restrict public access on the day of launch operations along State Highway 4, on Boca Chica Beach, and offshore.

Tank tests, wet dress rehearsals, static fire engine tests, and launches (suborbital and orbital) will require restricting public access in the vicinity of the Vertical Launch Area (VLA) and securing land and water as part of public safety requirements. The areas on land that will be closed to the public access are referred to as the access restriction area. The access restriction area includes an area of Boca

Chica Beach, ranging from the Brownsville Shipping Channel south to the U.S./Mexico border.

A total of 500 hours of nominal access restrictions per year will be required for FAA-licensed activities. SpaceX will use reasonable efforts to avoid performing launch operations on weekends to the extent orbital mechanics and/or other operational issues do not conflict with or otherwise prevent such efforts. In addition, SpaceX would avoid performing launch operations on the following holidays: Memorial Day, Labor Day, July 4th, Martin Luther King Day, Presidents' Day, Texas Independence Day, Cesar Chavez Day, Emancipation Day in Texas (also referred to as Juneteenth), Veteran's Day, Good Friday, Easter, Father's Day, Mother's Day, Thanksgiving Day, Christmas Eve, Christmas Day, New Year's Eve and New Year's Day ("Holidays").

If an agency needs access to an area within a planned access restriction, the agency is encouraged to contact SpaceX directly to find the best opportunity to access the area and avoid any conflict in operations.

Pad

As necessary, SpaceX's Flight Control, EHS lead, and Security lead will conduct pad clearing operations. This team will clear the pad and its supporting structures to ensure that there are no personnel on site. Once the pad is clear, the gate will be locked.

Maritime

The Brownsville Ship Channel to the north of the launch site separates the area from Port Isabel and South Padre Island. The channel is approximately 7 km north of the launch site. This is not a populated area; there are no permanent residences or commercial structures in the area between the launch site and the channel. The Rio Grande River is located about 4 km to the south of the launch site. As necessary, to inform the maritime public of potential hazards associated with testing and launches on the waterways, the U.S. Coast Guard (USCG) will issue any of the following: a Local Notice to Mariners, a Broadcast Notice to Mariners, and/or Marine Safety Information Bulletins. SpaceX will provide information to the USCG for either of the Local Notice to Mariners and/or the Marine Safety Information Bulletins. Additionally, for flight operations, Cameron County Sheriff's Office (CCSO) will control access to the South Bay.

Boca Chica State Park Beach

As necessary, CCSO will close Boca Chica State Park Beach and assist SpaceX Security in clearing the beach from Highway 4 south to the Rio Grande river and north to the marine channel. The CCSO will also close the beach access points. U.S. Customs and Border Protection (CBP) may assist the county in clearing the beach and communicating the results to the SpaceX OSC.

Boca Chica Village

Boca Chica Village (the Village) is the nearest population center to the launch site, just over 1.24 miles west of the launch location. Boca Chica Village consists of private homes, SpaceX housing, and is near the SpaceX production and manufacturing areas.

Overpressure Mitigation

As necessary, to mitigate the risk of injury to the Village residents due to overpressure, Cameron County will exercise its authority to protect the public and direct residents to go outside their properties. Cameron County will provide warnings to residents by distributing a written notice in English and Spanish to

residents in the Village. Cameron County will alert residents when the launch operation giving rise to the overpressure risk is imminent by sounding a police siren in the Village.

Evacuating Boca Chica Village

As necessary, CCSO will aid in evacuation of the Village to the fullest extent of their authority in accordance with the applicable law. That operation should take place approximately T-6 hours prior to the planned space flight activity, and in coordination with other clearing procedures. Activity in the Village will be monitored until the clear has been verified, and then continually throughout the duration of the window.

Checkpoint Operations

As necessary, SpaceX will operate Hard and Soft Checkpoints to limit access to the launch site and ensure the integrity of permissioned access.

- A soft checkpoint located at the intersection of Oklahoma Avenue and SH 4, just east of Brownsville. Government personnel, SpaceX personnel, emergency personnel, and anyone with property beyond this soft checkpoint could pass, but the general public will be denied access.
- The second checkpoint (referred to as “public hard checkpoint 1”) will be located at the intersection of Massey Way and SH 4. Only SpaceX personnel, government personnel, emergency personnel involved in SpaceX operations, and anyone with property beyond this checkpoint will be able to pass this checkpoint.
- The third checkpoint (referred to as “public hard checkpoint 2”) will be located at the intersection of SH 4 and Richardson Avenue. Only SpaceX personnel and FAA launch support personnel will be able to pass this checkpoint.
- The final checkpoint (referred to as “all hard checkpoint”) will be located just west of the LLCC. No one will be able to pass this checkpoint

CCSO and SpaceX Security will establish these checkpoints. CCSO will exercise its authority to limit access. CBP may participate in these operations at its discretion. When the Soft Checkpoint is in effect for flight, access will be restricted to SpaceX essential personnel, landowners who reside past the checkpoint and outside of the flight caution area, and CCSO Hard Checkpoint support. SpaceX will provide credentials for persons who will pass through the Soft Checkpoint. No members of the public will enter the safety clear zone during launch operations.

Range Coordination

As necessary, SpaceX will establish a safety clear zone during pre-flight, launch and post-flight operations to protect public health and safety and the safety of property during Starship operations. SpaceX will ensure the integrity of the safety clear zone with Hard and Soft Checkpoints as defined in this plan.

The Range team will consist of SpaceX Security and other local, state, and federal partners with responsibility to clear areas for public safety. Range stakeholders will report clear activities, concerns, and incident response to the OSC. Range coordination activities will begin when the Soft Checkpoint is established and conclude when all checkpoint operations close. SpaceX, along with Refuge employees if permitted, will ensure bollards and cable barrier secure and gaps are closed to reduce public vehicle traffic onto TPWD/USFWS property upon direction from TPWD and/or USFWS. SpaceX will coordinate closely with the Service’s Federal Wildlife Officer, through the Refuge Dispatch at (956) 784-7520. The Officer will be in charge of maintaining security throughout the neighboring National Wildlife Refuge, including land leased to Service.

Emergency Response Support

In the event of a Launch Incident, Launch Accident, or Mishap, SpaceX security, in close coordination with CCSO, will maintain all checkpoints until deemed safe to return inside the safety clear areas. As necessary, SpaceX may request first responders be available to help mitigate brush fires outside of the clear areas or respond to medical emergencies. In general, first responders will remain outside of the debris field until the Red Team sweeps the debris field to safe the area.



DRAFT

SpaceX Boca Chica Launch Site Lighting Management Plan

April 20, 2022

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1.0 Introduction

1.1 Overview

This Lighting Management Plan (Plan) describes the exterior lighting for the Space Exploration Technologies Corp. (SpaceX) Boca Chica Launch Site, located near Brownsville, TX (Figure 1-1). This Plan also provides site-specific guidelines for the installation and operation of night lighting.



Figure 1. Location of the Vertical Launch Area and Launch and Landing Control

1.2 Site Description

The Boca Chica Launch Site consists of three areas, the Vertical Launch Area (VLA), the solar farm, and the Launch and Landing Control (LLCC). The LLCC includes one building known as Stargate. Adjacent to the LLCC is the SpaceX private manufacturing and production area.¹ The solar farm consists of an

¹ The manufacturing and production area supports SpaceX operations that are outside of the Federal Aviation Administration's (FAA's) jurisdiction; accordingly, activity in this area is outside the scope of the FAA's environmental review process and subsequent special purpose law consultations.

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approximately 2.5-acre area roughly 1.7 miles west of the VLA. The VLA is approximately 16.5 acres and includes:

- One test pad, one redundant test pad, a launch pad and a landing pad.
- Propellant storage and handling areas.
- Roads, parking areas, fencing, security, lighting, and utilities.

2.0 Lighting Design

The lighting design objective is to minimize, or where possible, eliminate site lighting seen from the beach, vegetated dunes, and from the Palmito Ranch Battlefield National Historic Landmark (NHL). To accomplish this, lighting will primarily consist of directional lights, oriented downward, and where possible, away from the beach. Exterior lights used expressly for safety or security purposes are limited to the minimum number and configuration required to achieve their functional roles. Up lighting and side lighting will only be used in the event that a safety or mission critical operational need arises – use will be temporary. Extendible pole lights will be reduced to as minimal a height as operationally allowed.

Independent research has shown that different types of lighting affect sea turtle orientation to varying degrees. Low-pressure sodium (LPS) lighting has historically been a best practice, having the least impact with nearly monochromatic amber lighting of 589-590 nanometers. Mitigation of existing high intensity discharge (HID) exterior lighting, consisting of white light, which contains the greatest percentage of blue and green wavelengths is ongoing. Lighting with a more yellow appearance, such as high pressure sodium (HPS) contains a smaller percentage of light at the blue and green end of the visible light spectrum, and can still cause disorientations.

The most effective method of reducing incidental take relating to lighting disorientations is to eliminate light sources. A total elimination of exterior lighting at Starbase is not possible due to safety, security and mission critical operational requirements. SpaceX will perform its internal best management practices to reduce lighting.

Low pressure sodium or amber LED lighting will be used as operational constraints allow. To minimize ground reflection, flat or non-reflective coatings will be used where possible. Details of lighting design in each area of the launch site are identified below. When possible (e.g., when safety or security is not compromised), timers and/or motion sensors will be used to limit lighting. The Occupational Safety and Health Administration (OSHA) requires the workplace to be illuminated when workers are present. This also includes access ways. When workers are present at the VLA or the LLC, task lighting will be used to illuminate the work areas. These lights will be directed downward, where possible, to minimize visibility from the beach, vegetated dunes, and NHL. When workers are not present, the task lighting will be turned off. On-site security is required to prevent unauthorized access to information, including information protected by International Traffic in Arms Regulations (ITAR) or SpaceX or customer-owned information. Security processes that mitigate these threats include restricting access to facilities to authorized personnel only and ensuring network systems are secure. In addition to protecting information, it is important for employee and public safety to prevent accidental or deliberate theft, vandalism, or other damage to the facility, equipment, and to personnel. Security ensures no one is harmed by test activities or daily operational activities. To protect the VLA, SpaceX security limits access to site grounds using perimeter fences, monitoring equipment, and security patrols. SpaceX security works closely with local law enforcement personnel in protecting the facilities and handling any emergent issues. Lighting is required to monitor the perimeter fence lines, entrances, and exits. This

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lighting will be on during all nighttime hours to ensure security.

The proposed approach to lighting design is included throughout the facility descriptions presented in this Plan.

2.1 Operational Guidelines

Launch or pre-launch operations may occur at night, during which lighting will be required on the pad deck areas. SpaceX would conduct construction activities during normal working hours to the greatest extent possible; however, due to late arrival of construction supplies, launch critical work, or other unexpected events, there may continue to be construction during nighttime hours. Additionally, primary roads, parking areas, building entrance lighting, and the primary gated entrance to each area could be illuminated during nighttime hours. In some cases, some site lighting may be motion controlled or be able to be adjusted to security needs.

Should there be the need for additional, local temporary exterior lighting to support construction activities or emergencies, the following requirements will be adhered to:

- Whenever possible, lights will be placed in such a way that they do not shine directly towards the beach or vegetated dunes or unnecessarily illuminate large objects visible from the Palmito Ranch Battlefield, or the beach or vegetated dunes (during the sea turtle nesting season). Additionally, up-lighting will be minimized to the maximum extent possible.
- Lighting will be extinguished upon completion of work in an illuminated area.
- The size, type, and number of exterior lights will be minimized and will be restricted to low pressure sodium, when practicable, during turtle nesting season.
- Fixtures will be shielded or screened whenever practical.
- A qualified biologist will conduct lighting inspections before nesting season and biweekly during the nesting-hatching season (March 15th to October 1st).

2.2 Compliance Verification

SpaceX will have responsibility for ensuring compliance of these procedures by site personnel, including all contractors and subcontractors. The following monitoring and enforcement actions will be taken, and the persons responsible for the misuse of lights will be notified.

- All SpaceX personnel and contractors will receive training regarding sea turtles and the importance of minimizing light impacts to the beach, the vegetated dunes, and the NHL.
- SpaceX site management will issue annual notices to all complex personnel prior to sea turtle nesting season (March 15 to October 1) for continued awareness.
- To comply with the terms and conditions of the BO, SpaceX will perform a lighting inspection on the beach in front of the VLA. The inspection will include the number, type, and locations of lights visible from the beach. A set of daytime and nighttime lighting inspections will be done before nesting season. If lighting at the VLA, Stargate, or the solar area changes, this Plan will be updated and additional light monitoring will be completed to reduce or eliminate light seen from the beach.
 - SpaceX will conduct evening inspections between 9:00 PM and 5:00 AM biweekly during sea turtle nesting season.

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- Data from lighting monitoring and unannounced inspections, as well as any compliance issues and remedies, will be summarized in the annual Monitoring Report.
- SpaceX will address deviations with the Service on a timely manner to implement corrective actions.

2.3 Parking and Roadway Lighting

Parking and roadway lighting consists of lighting used for parking areas, roadways, and driveways to provide lighting for driving and transit between facilities.

2.4 Egress Lighting

Egress lighting is present in facilities to provide illumination of walkways used in the exit of employees during low-visibility hours.

2.5 Facility Operations Task Lighting

Facility Operations Task Lighting is utilized for mission critical operations in support of launch. Lighting may consist of Pad Deck visibility lighting and commodity farm visibility lighting. Operational tasks shall be coordinated with the SpaceX Site Director or designee to determine the appropriate lighting needed per operation.

2.6 Security Lighting

Security Lighting consists of constant illumination at guard shacks, vehicle spotlights used during launch operations, and perimeter fencing lighting.

3.0 Area Inventories

3.1 Key to Lighting Maps

Key

- FSP Pro Series Sparta Sports Light Gen1 White LED 850W Spotlight
- OLWX1 White LED Wall Luminaire 40W
- DSXW1 White LED Full Cut-Off Wall Light 40W
- LOVUS ST60-039 Solar Light 60W

3.2 Locations and Lighting Maps

3.2.1 Launch and Landing Control

The LLCC consists of Stargate and the adjacent parking lot. Lighting at the Stargate building consists of two white LED shielded spotlights mounted about 10 feet high, controlled by photocell, and operating

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dusk to dawn. Additional lighting at the Stargate building consists of 21 white LED full cut-off wall mounted lights (OLWX1) mounted about 10 feet high, controlled by photocell, and operating dusk to dawn.

Figure 2 Lighting at Launch and Landing Control



The parking lot at the LLCC includes 30 downward facing solar LED streetlight fixtures to provide low lighting. These lights are controlled by photocell, mounted about 8 feet high, and operate from dusk until dawn. These lights are sensor activated, when not activated they are very dim, and become brighter with motion activation.

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Figure 3 Lighting and Launch and Landing Control Parking Lot



LOVUS 600LM
Solar LED Street
Light- Motion
Sensor and Light
Control

3.2.2 Solar Farm

The solar farm consists of solar arrays and batteries for power storage. Lighting at the solar farm area consists of eight white LED (DSXW1) full cut-off wall lights, mounted about 10 feet high, controlled by photocell, operating from dusk to dawn.

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Figure 4 Lighting at the Solar Farm

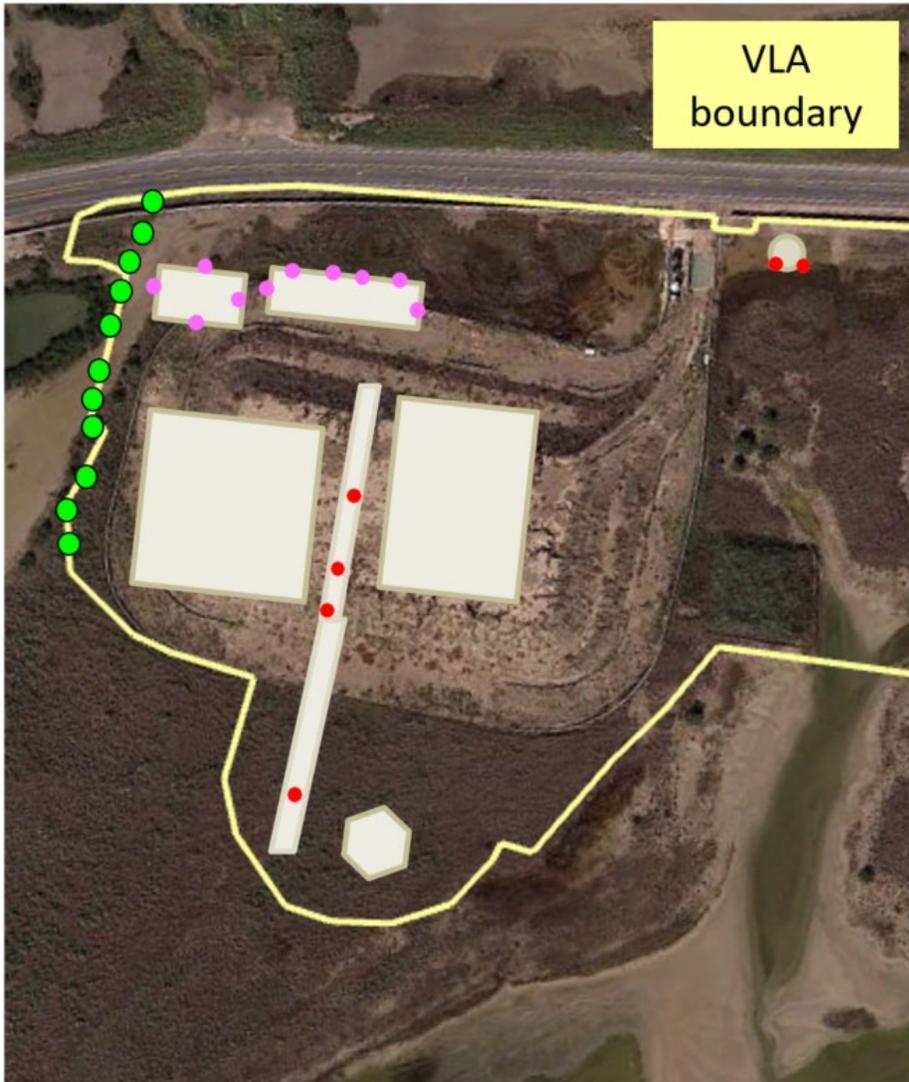


3.2.3 Vertical Launch Area

The VLA consists of the landing pad, the suborbital area, and the orbital area. There is no lighting at the landing pad. Lighting at the suborbital area includes 10 white LED (DSXW1) full cut-off wall lights, mounted about 10 feet high, controlled by photocell, operating from dusk to dawn. There are also four white shielded LED spotlights mounted about 30 feet high on the suborbital berm, controlled by photocell, and operating dusk to dawn.

Along the western edge of the suborbital area, there are 11 downward facing solar LED streetlight fixtures to provide low lighting. These lights are controlled by photocell, mounted about 8 feet high, and operate from dusk until dawn. These lights are sensor activated, when not activated they are very dim, and become brighter with motion activation.

Figure 5 Lighting at the Vertical Launch Area Suborbital Area



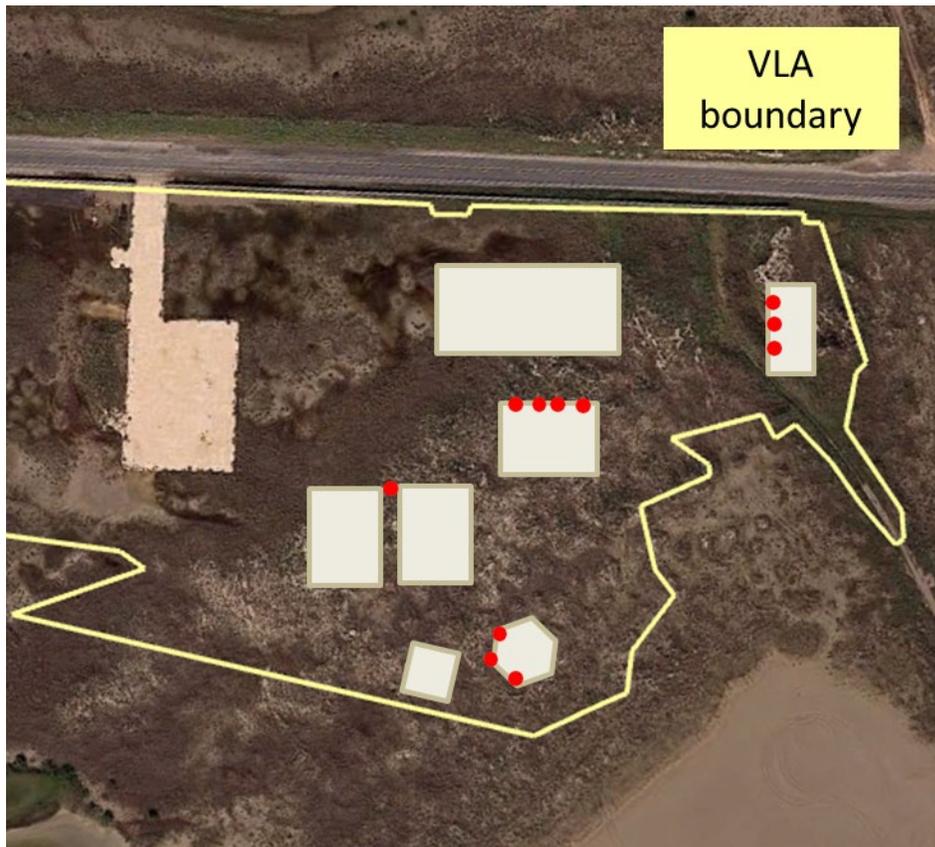
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Lighting at the orbital pad consists of 11 white LED shielded spotlights mounted between 10- 50 feet high, controlled by photocell, and operating dusk to dawn.

Figure 6 Lighting at the Vertical Launch Area Orbital Area



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4.0 Lighting Matrix and Cut Sheets

Launch and Landing Control

Fixture ID	Symbol	Location	Lamp Type	Shield?	Power	Housing Style	Mount Height	Hours of Operation	Control Method
FSP		Parking	White LED	Y	850W	spotlight	10'	Dusk to Dawn	Photocell
OLWX1		Building Exterior	White LED	N	40W	Full Cut-Off Wall Light	10'	Dusk to Dawn	Photocell
Solar		Parking	White LED	N	60W	Street Light	8'	Dusk to Dawn	Motion Activated

Solar Farm

Fixture ID	Symbol	Location	Lamp Type	Shield?	Power	Housing Style	Mount Height	Hours of Operation	Control Method
DSXW1		Building Exterior	White LED	N	40W	Full Cut-Off Wall Light	10'	Dusk to Dawn	Photocell

Suborbital Area of Vertical Launch Area

Fixture ID	Symbol	Location	Lamp Type	Shield?	Power	Housing Style	Mount Height	Hours of Operation	Control Method
DSXW1		Building Exterior	White LED	N	40W	Full Cut-Off Wall Light	10'	Dusk to Dawn	Photocell
FSP		Berm and Starhopper	White LED	Y	850W	Spotlight	20'-30'	Dusk to Dawn	Photocell
Solar		Western fence line	White LED	N	60W	Street Light	8'	Dusk to Dawn	Motion Activated

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Orbital Area of Vertical Launch Area

Fixture ID	Symbol	Location	Lamp Type	Shield?	Power	Housing Style	Mount Height	Hours of Operation	Control Method
FSP		Top of columns, bunkers, and seawans	White LED	Y	850W	Spotlight	10'-50'	Dusk to Dawn	Photocell



SpaceX Boca Chica Launch Site Biological Monitoring Plan

**April 22, 2022
Revised: May 10, 2022**

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(b) (4)



SpaceX Boca Chica Launch

Site Roadway Closure

Traffic Control Plan

November 7, 2013

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November 7, 2013

Dr. Steve Davis
Space Exploration Technologies (SpaceX)
1030 15th Street NW Suite 220E
Washington, DC, 20005-1503

Mr. Juan Bosquez Jr., P.E.
San Benito Area Engineer
Texas Department of Transportation
P.O. Box 1041
San Benito, TX 78586

RE: SpaceX Roadway Closure Traffic Control Plan

Dear Mr. Bosquez:

Space Exploration Technologies Corp. (SpaceX) has proposed to construct and operate a private launch site in order to accommodate up to 12 (twelve) launches per year. The proposed private launch site will be located at the eastern terminus of State Highway (SH) 4 off the Gulf of Mexico and is needed to provide SpaceX with an exclusive launch facility that would allow the company to meet tight launch windows.

To support these launches, Space X would like to request from the Texas Department of Transportation (TxDOT) a “Revolving” Letter approval for the closure of SH 4 during launch and other hazardous operations. The approval shall have the following stipulations.

1. The “Revolving” Letter approval would be valid for a span of 1 (one) year; however, it would automatically renew annually unless revoked in writing by TxDOT, with a 60 day notice of termination.
2. SpaceX shall only close SH 4 for launch and other hazardous operations as determined by SpaceX in consultation, when necessary, with Cameron County and the Texas General Land Office.
3. The SH 4 roadway closure shall be in accordance to the attached Traffic Control plan, the Texas Manual on Uniform Traffic Control Devices, and all pertinent TxDOT Standards.
 - a. A Hard Checkpoint will be provided as shown in the Traffic Control Plan. The Hard Checkpoint will be a “no pass” area determined by the hazard area. No one without SpaceX clearance would be permitted to pass by this hard checkpoint during launch and other hazardous operations.
 - b. A Soft Checkpoint will be provided as shown in the Traffic Control Plan. The Soft Checkpoint will be the area where Government personnel, SpaceX personnel, emergency personnel, and anyone with property

Mr. Juan Bosquez Jr., P.E.

November 7, 2013

Page 2

beyond this soft checkpoint could be granted admittance, but the general public would be denied access.

- c. These checkpoints shall be consistent with the findings in the Environmental Impact Statement.
4. SpaceX shall alert the TxDOT Brownsville Maintenance Office of all roadway closures at least 48 hours in advance.
5. A changeable message sign advising the traveling public of the roadway closure shall be set up 7 days in advance of any closures unless special approval is provided by TxDOT for shorter notice times.
6. Roadway closures will typically be for 6 hours with some instances lasting up to 15 hours maximum.
7. During all road closures, SpaceX, at its own expense, shall provide a private traffic management company or the local law enforcement agents to enforce the roadway closure.

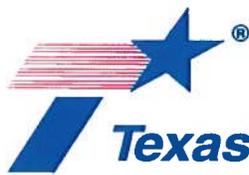
If you have any questions or need additional information, please feel free to contact me. I look forward to hearing from you.

Sincerely,

A handwritten signature in black ink, appearing to read 'Steve Davis', with a large, sweeping horizontal stroke underneath.

Steve Davis
Director of Advanced Projects

Enclosure



125 EAST 11TH STREET | AUSTIN, TEXAS 78701-2483 | (512) 463-8700 | WWW.TXDOT.GOV
1350 E. HIGHWAY 77 | P.O. BOX 1041 | SAN BENITO, TEXAS 78586 | (956)399-5102

December 9, 2013

Pete Sepulveda, Jr.
County Administrator
Cameron County
1100 E. Monroe, Suite 256
Brownsville, Texas 78520

RE: SpaceX Roadway Closure Traffic Control Plan

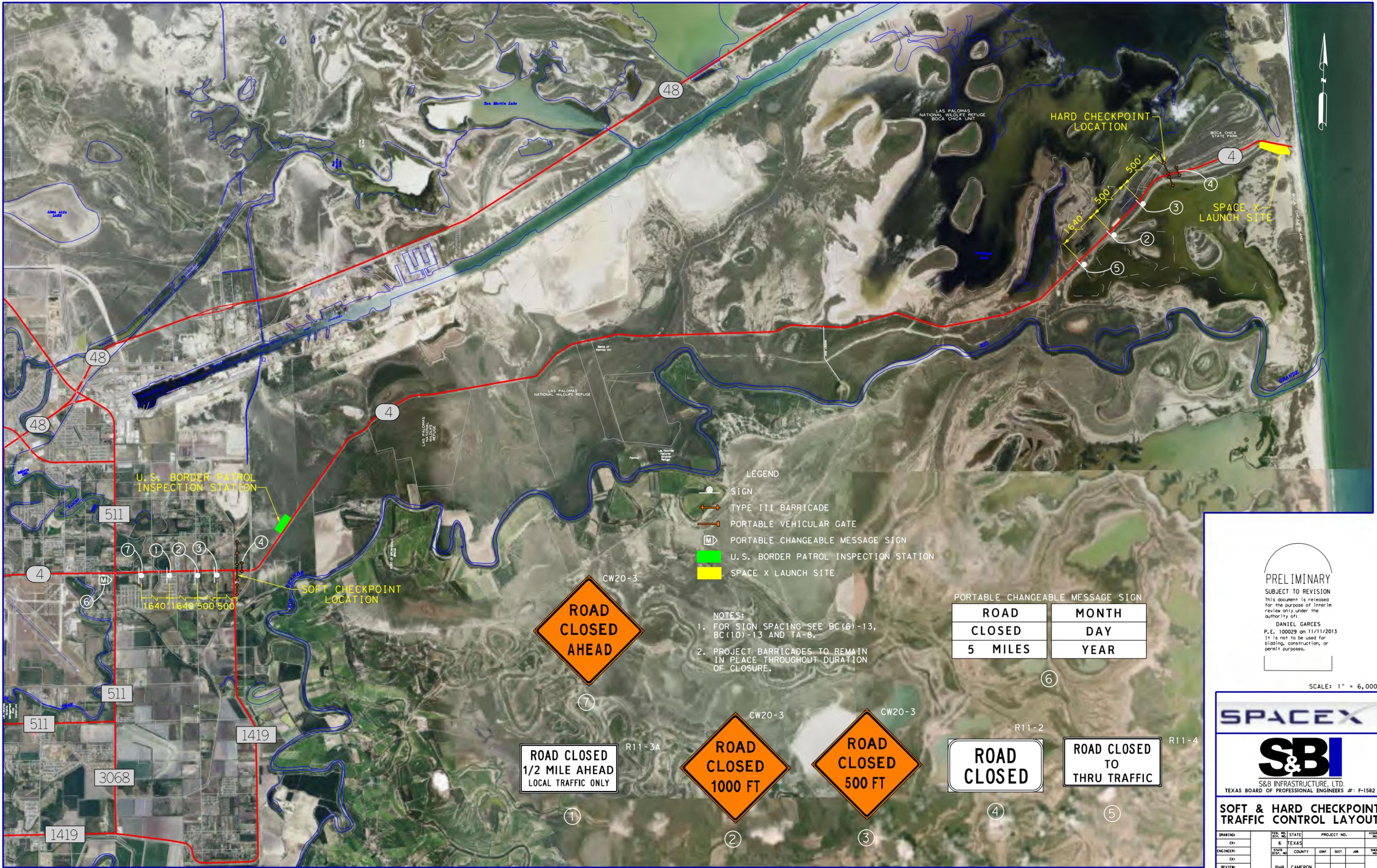
Dear Mr. Sepulveda,

This letter serves notification that the traffic control plan submitted by Space Exploration Technologies (Space X) on November 20, 2013 for review has been approved. This approval will allow Cameron County to perform road closures on SH 4 as per the submitted traffic control plan and standards. The Texas Department of Transportation will reserve the right to request changes to the traffic control plan as necessary to ensure the safety of the traveling public.

Sincerely,

Toribio Garza, P.E.
Pharr District Engineer
Texas Department of Transportation

Cc: Dr. Steve Davis
San Benito Area Office



- LEGEND**
- SIGN
 - TYPE III BARRICADE
 - PORTABLE VEHICULAR GATE
 - PORTABLE CHANGEABLE MESSAGE SIGN
 - U.S. BORDER PATROL INSPECTION STATION
 - SPACE X LAUNCH SITE

- NOTES:**
1. FOR SIGN SPACING SEE BC (6) -13, BC(10) -13 AND TA-8.
 2. PROJECT BARRICADES TO REMAIN IN PLACE THROUGHOUT DURATION OF CLOSURE.

PORTABLE CHANGEABLE MESSAGE SIGN

ROAD	MONTH
CLOSED	DAY
5 MILES	YEAR

PRELIMINARY
 SUBJECT TO REVISION
 This document is released for the purpose of Interim review only under the authority of:
 DANIEL GARCES
 P.E. 100029 on 11/11/2013
 It is not to be used for bidding, construction, or permit purposes.

SCALE: 1" = 6,000'

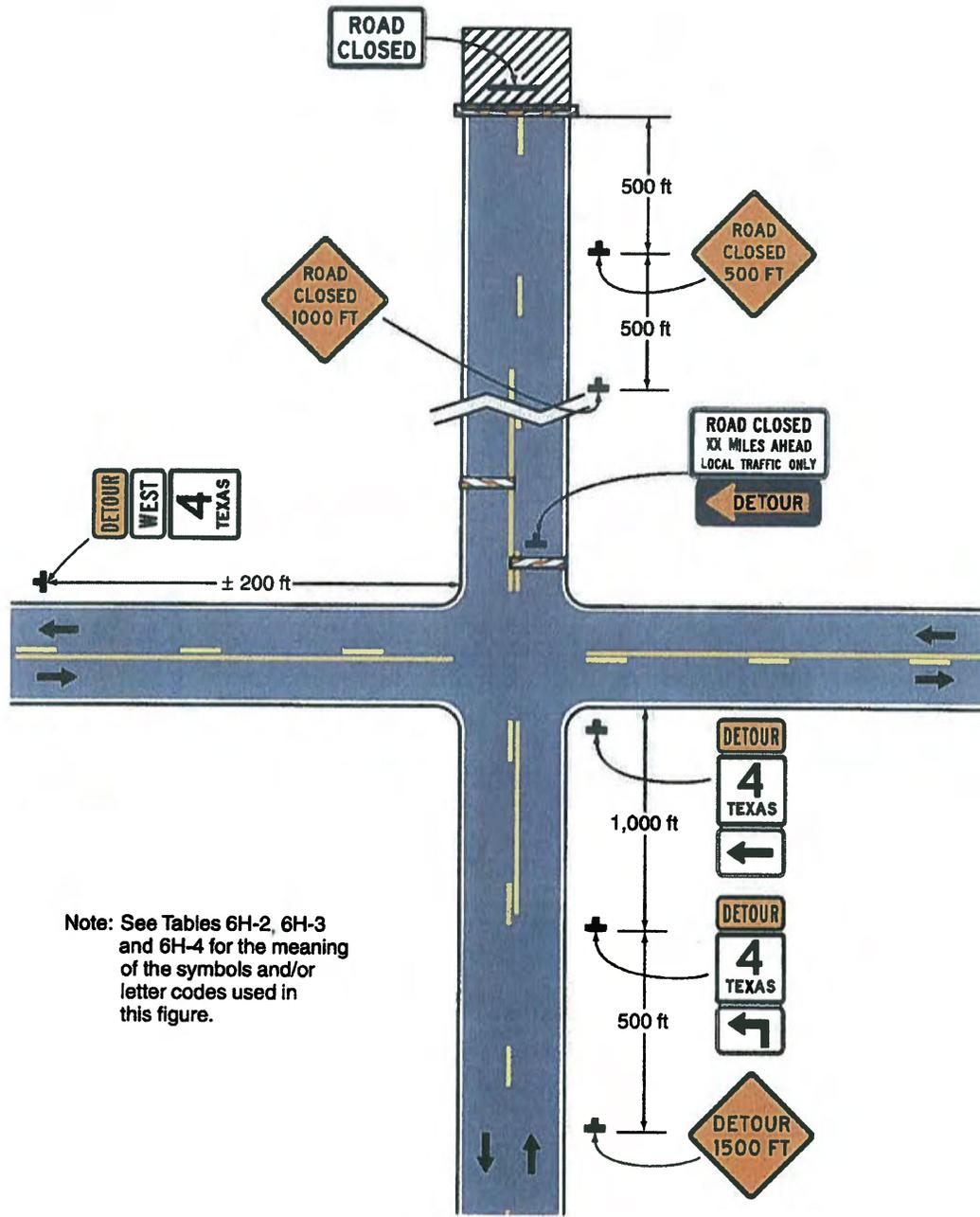
SPACEX

S&B
 S&B INFRASTRUCTURE, LTD.
 TEXAS BOARD OF PROFESSIONAL ENGINEERS # F-1582

SOFT & HARD CHECKPOINT TRAFFIC CONTROL LAYOUT

DRAWING:	FEED NO.:	STATE:	PROJECT NO.:	HIGHWAY NO.:
CR:	6	TEXAS		
ENGINEER:	SCALE:	COUNTY:	CONT:	SECT:
CR:				
REVIEWER:	PHR:	CAMERON:		
CR:				

Figure 6H-8. Road Closure with an Off-Site Detour (TA-8)



Note: See Tables 6H-2, 6H-3 and 6H-4 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 8

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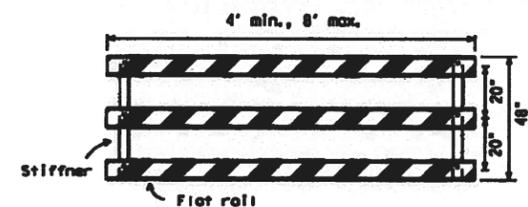
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCO) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



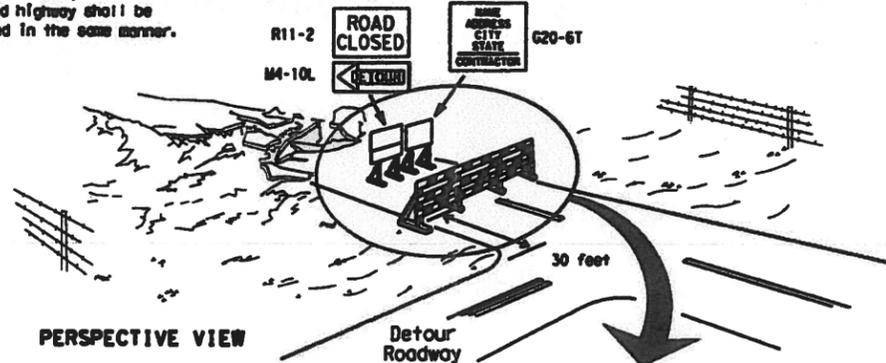
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

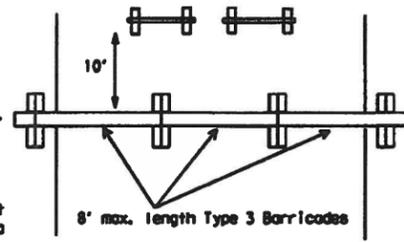
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

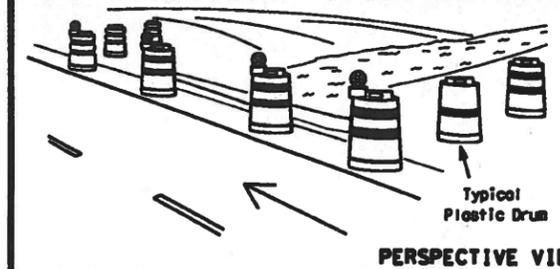
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

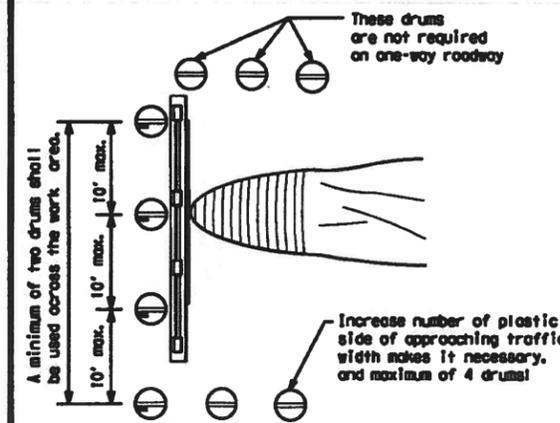


PLAN VIEW

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

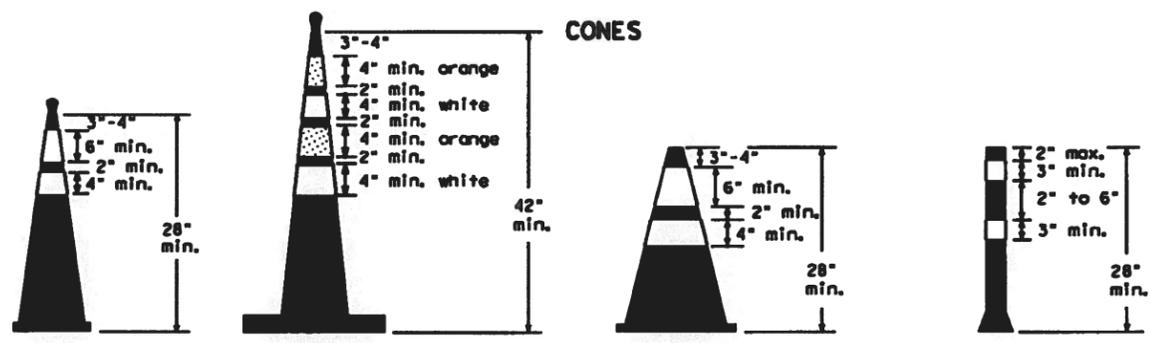


PLAN VIEW

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



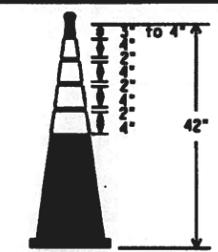
Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

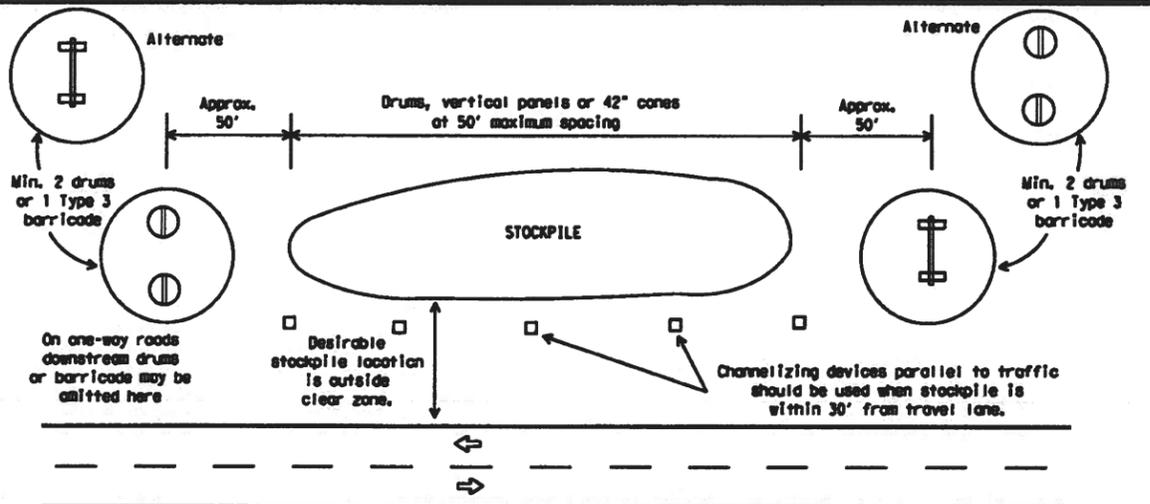
SHEET 10 OF 12

Texas Department of Transportation
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-13

FILE: bc-13.dgn	DATE: TxDOT	DATE: TxDOT	DATE: TxDOT	DATE: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
9-07	REVISIONS		DIST	COUNTY
7-13				SHEET NO.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined in BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.

DATE: FILE:

WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TAJTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MINR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDN
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXX Feet	XXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FRWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLRS
High Occupancy	HOV	Tuesday	TUES
Vehicle	VEH	Time Minutes	TIME MIN
Highway	Hwy	Upper Level	UPR LEVEL
Hour(s)	HR, HRS	Vehicles (s)	VEH, VEHs
Information	INFO	Warning	WARN
It Is	ITS	Wednesday	WED
Junction	JCT	Weight Limit	WT LIMIT
Left	LFT	West	W
Left Lane	LFT LN	Westbound	(route) W
Lane Closed	LN CLOSED	West Payment	WEST PMNT
Lower Level	LRW LEVEL	Will Not	WONT
Maintenance	MAINT		

Roadway designation = IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXXX TO XXXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

**** Advance Notice List**

TUE-FRI XX AM-X PM
APR XX-XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM-XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (C820-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

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