New Emergency Operations Center and Partial Repair/Alterations of Building 25

Environmental Assessment
NASA, Environmental Office

May 2021

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas

CHANGE HISTORY LOG

Revision	Date	Originator	Description of Changes
Baseline	March 2019	Baer Engineering	Initial Version
#1	October 2019	Baer Engineering	Updated document per NASA comments
#2	April 2021	JSC Planning, Integration, and Environmental Office	Updated document to include updated historical impacts from design prior to public review
#3	May 2021	JSC Planning, Integration, and Environmental Office	Updated document for final processing and included text additions from response to Texas Parks and Wildlife Department as summarized in Appendix C and comments and responses from the public review period.

Finding of No Significant Impact

Agency: NASA and the Lyndon B. Johnson Space Center (JSC)

Action: Publication of a Findings of No Significant Impact (FONSI)

Summary: Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321, et seq.), the Council on Environmental Quality (CEQ) Regulations for implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and implementing NASA policy/procedures (14 CFR 1216), based on the information presented in the DRAFT Environmental Assessment (EA) and comments received during the public comment period, the National Aeronautics and Space Administration (NASA) has made a Finding of No Significant Impact (FONSI) for the construction of a new Emergency Operations Center (EOC) and partial repair/alteration of the existing Building 25. The EA addresses the environmental impacts expected to result from the construction of proposed EOC and modifications/renovations of existing Building 25 (Fire and Operations Facility). The proposed action will result in temporary adverse impacts to environmental resources in the vicinity of the proposed construction site of the EOC and the modifications/renovations of Building 25. No long-term, significant adverse impacts to the human environment will be realized after completion of the proposed action. The proposed action will result in more efficient energy usage and a reduction in air emissions because of the sustainable design of the proposed EOC.

Date: Published in the Houston Chronicle, March 31, 2021
Address: NASA-JSC (Mail Code: JP), 2101 NASA Parkway, Houston, Texas 77058

The EA which supports this FONSI was available for public review at the Clear Lake City – Harris County Freeman Branch Public Library, 16616 Diana Lane, Houston, Texas 77062.

For Further Information: Requests for copies of the EA and FONSI, or for additional information, please contact Mr. Richard Fowler, NASA-JSC Environmental Office at the above address or by email: richard.b.fowler@nasa.gov.

Supplemental Information: NASA prepared an EA for the construction of a new EOC and the partial repair/renovations to Building 25. The EA represents an accurate and adequate analysis of the scope and level associated environmental impacts. The EA is hereby incorporated by reference into this FONSI and both were available for public and interagency review and comment.

NASA evaluated two alternatives, including the Proposed Action Alternative and the No Action Alternative. The Proposed Action Alternative includes the construction of a new EOC addition and partial repair/alterations to Building 25. Under the No Action Alternative, NASA will not take action to modify Building 25 or construct a new EOC and will result in no impacts to the environment. This alternative will not improve the infrastructure deemed necessary to meet the current and future initiatives of NASA and JSC.

NASA evaluated the potential physical, water, coastal, biological, cultural, and socioeconomic impacts of the construction of the new EOC and the partial repair/alterations to Building 25. Potential adverse impacts to cultural resources, specifically an eligible historic building JSC's eligible historic district, require Section 106 consultation with the State Historic Preservation Office (SHPO). Consultation with SHPO and other interest parties will mitigate adverse effects of the proposed action. No additional related adverse impacts were identified.

Evaluated resources include land resources, air quality, surface water, groundwater, wetlands, floodplains, coastal resources, biological resources, cultural resources, noise levels, hazardous materials, socioeconomics, and environmental justice. The proposed construction of the new EOC and modifications/renovations to Building 25 will have no long-term, significant adverse impacts on any of these resources.

Cumulative Impacts: The EA reviewed cumulative impacts that could result from the incremental impact of the proposed activities when added to other past, present, and reasonability foreseeable future actions. Development projects within this context will be consistent with the JSC Master Plan. Cumulative beneficial impacts to certain environmental resources may result from current and future development as NASA Policy Directive 8820.2C requires new construction to incorporate sustainable design features with the current recommendation to achieve, at a minimum, a Leadership in Energy and Environmental Design (LEED) Silver certification through the U.S. Green Building Council. The new EOC addition to Building 25 will be built to meet the Silver certification.

Mitigation: Standard construction best management practices (BMPs) will be implemented to reduce erosion potential during ground-disturbing activities and compliance with regulatory requirements to ensure appropriate storm water runoff control. The construction contractor will be required to develop a Storm Water Pollution Prevention Plan (SWPPP) and file a Notice of Intent with the U.S. Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ) prior to the start of construction. Areas of construction near drainage features will need to employ erosion and sedimentation controls to ensure minimal discharge of sediment to nearby ditches. Prior to demolition, the proper handling of asbestos, lead paint, and other hazardous materials and industrial solid and hazardous water will be determined and incorporated into project requirements and specification. Any hazardous waste generated during construction will be managed and disposed of in accordance with applicable local, state, and federal regulations. To minimize construction noise impacts to surrounding residential areas, construction will take place during normal business hours and equipment will meet all local, state, and federal noise regulations. To reduce potential impacts to traffic in the immediate vicinity of the proposed activities, construction vehicles and equipment will be stored on-site during project construction and appropriate signage will be posted on affected roadways. Section 106 consultation with the SHPO will mitigate potential adverse impacts to the eligible historic building and JSC's historic district. Additionally, all construction activities will be performed by qualified personnel and in accordance with the standards specified in the Occupational Safety and Health Administration regulations and JSC's Safety and Health Handbook (JPR 1700.1).

In accordance with JPR 8550.1, any SWPPP prepared must not be submitted to any regulatory agency without prior review and approval by the NASA Environmental Office. In addition, as long as the TOTAL IMPACTED AREA does not equal or exceed 5 acres, then a Notice of Intent will not be required. Even if the area does exceed 5 acres, the NOI is submitted to TCEQ (pending review/approval by the Environmental Office); EPA receives no notifications of this directly.

On the basis of the EA, NASA has determined that the physical, biological, socioeconomic, and cultural impacts associated with the construction of the new EOC and partial repair/alterations to Building 25 and related demolition activities will not individually or cumulatively have a significant impact on the quality of the human environment. Therefore, NASA has determined that an Environmental Impact Statement need not be prepared. NASA will take no final action prior to the expiration of the 30-day comment period.

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Date: 2021.05.20 16:21:21 -05'00'

Vanessa E. Wyche Date
Acting JSC Center Director

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LIST OF ACRONYMS

Acronym	Full Term
ACS	American Community Survey
ACM	Asbestos Containing Material
A/E	Architect/Engineer
AHU	Air Handling Unit
APC	Attwater Prairie Chicken
BMP	Best Management Practice
CAA	Clean Air Act
CAT	Category
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO_2	Carbon Dioxide
CoH	City of Houston
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	Decibels
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EOC	Emergency Operations Center
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FRD	Functional Requirements Document
FIRM	Flood Insurance Rate Maps
FM	Farm-to-Market
FPPA	Farmland Protection Policy Act
FPS	Fire Protection Services
GHGs	Greenhouse Gases
GLO	General Land Office
GOV	Government Owned Vehicle
HVAC	Heating, Ventilation, and Air Conditioning
IC	Incident Commander
JPR	Johnson Space Center Procedural Requirement
JSC	Johnson Space Center
LBP	Lead-based Paint
LED	Light-emitting diode

Acronym	Full Term
LEED	Leadership in Energy and Environmental Design
mph	Miles per Hour
MSGP	Multi-Sector General Permit
NAAQS	National Ambient Air Quality Standard
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NOI	Notice of Intent
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OCC	Operations Control Center
OEM	Office of Emergency Management
O_3	Ozone
OSHA	Occupational Safety and Health Administration
PEAF	Precast exposed aggregate facing
PM	Particulate Matter
POV	Privately Owned Vehicle
PSD	Protective Services Division
psf	Pounds per square foot
sf	Square Feet
SHPO	State Historic Preservation Officer
SO_2	Sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
TASA	Texas Archeological Sites Atlas
T&E	Threatened and Endangered
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollution Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USGBC	United States Green Building Council
USFWS	United States Fish and Wildlife Service
U.S.	United States
VAV	Variable Air Volume
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

1.0 PROJECT DESCRIPTION

All applicable Federal, State and industry standards, including those not referenced, constitute design criteria for this project. This scope of work presents requirements for a National Aeronautics and Space Administration (NASA) Institutional Construction of Facilities Design/Build project for an approximately 16,446 square foot (sf) Emergency Operations Center (EOC) – Category 5 (CAT 5) at Johnson Space Center (JSC), Houston, Texas. The EOC is located adjacent to existing Building 25 within Johnston Space Center. The new EOC facility will be constructed as an addition to the existing Building 25. The partial repair/alteration of Building 25, approximately 6,424 square feet, is also included under this scope of work under a separate construction option.

The EOC is bound to the north by a parking lot, east by 2nd Street, south by Avenue C, and west by a parking lot. The site is currently covered primarily with existing asphalt parking associated with existing Building This parking lot is used for privately owned vehicles. Existing utilities (water sanitary and storm sewer, natural gas, and communications) are located at or near the site as they feed the adjacent Building 25.

- The new EOC will provide a secured, hardened, and centralized location for the JSC Incident Commander (IC) and staff to operate and to coordinate with key JSC staff and community emergency responders during a disaster or an emergency event.

- The new EOC will be hardened to withstand a CAT 5 hurricane and a CAT 4 hurricane storm surge as well as being elevated out of the 500-year floodplain.

- The new EOC will consolidate the JSC Protective Services Division (PSD) assets into a singular facility, as well as optimally incorporating the Office of Emergency Management (OEM), Physical Security (Contractor), Fire Protection Services (FPS), Occupational Health, and the Operations Control Center.

- The new EOC will provide adequate and redundant communications for command and control during a disaster or an emergency incident as well as to allow for easier command and control of day-to-day operations.

Existing Building 25 requires modification, repairs, and expansion for a new EOC. The new EOC facility expansion will be hardened to withstand the winds from a CAT 5 hurricane. This expansion allows for the collocation of assets, such as the relocation of the Operations Control Center (OCC), pertinent to coordination during emergencies.

The existing Building 25 will not be required to meet CAT 5 hurricane requirements. The facility will be enhanced to improve wind and energy requirements. Exterior work will be limited to work pertaining to interior modification and the replacement of the office door and window assemblies.

The proposed location of EOC facility at JSC has been identified to act as a functional space and facility, which will consolidate PSD assets and provide the IC and staff a secure and centralized location to withstand a CAT 5 hurricane and a 100-year storm surge event in the Clear Lake region. The new facility will provide adequate and redundant communication for the command and control during disaster recovery or emergency and allow for the easier command and control of day-to-day operations.

The project includes vehicular circulation around the facility and adjacent existing parking lot for Government Owned Vehicle (GOV) parking spaces, Privately Owned Vehicle (POV) parking spaces, and walkways. The project also includes grading, support utilities and landscaping. The support utilities include water, electricity, gas, chilled water, sanitary and storm sewer, and communications/data cable and conduits.

The partial demolition and alteration of Building 25 has been designated under a separate construction option: **Bid Option 1** – Exterior and interior demolition and replacement of existing storefront system, removal of low voltage panels and associated enclosure, and the removal of existing exterior and interior walls and finishes as indicated on the demolition floor plans as identified on the Request for Proposal drawings and as identified in the sections that follow. If construction of Bid Option 1 is not awarded, a knockout panel will be required for future door assembly between the EOC and Building 25. At this time, Bid Option 1 is not being pursued, but the impacts and evaluation are included to ensure a complete project review.

Bid Option 1 Fire Alarm / Mass Notification

The existing fire alarm / mass notification will be demolished in its entirety. Provide a new fire alarm / mass notification control panel to serve Building 25. Provide new audio and visual devices. A new backbone connection from the new EOC to the Building 25 fire alarm / mass notification panel is provided in the Base Bid.

Bid Option 1 Heating, Ventilation, and Air Conditioning (HVAC)

The demolition of the existing HVAC systems serving Building 25 will be required under the Bid Option 1. Demolition of mechanical systems includes the existing air handling unit, air distribution systems and hydronic systems. Existing unit heaters in the high bay are to remain. The Contractor will notify the Contracting Officer of any suspected asbestos containing materials found during the demolition in Building 25. The Contractor will create an asbestos abatement plan in compliance with Occupational and Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) asbestos abatement requirements and regulations.

The Equipment selection for the Bid Option 1 design will use a lifecycle cost analysis to evaluate alternative systems. A variable air volume (VAV) air handling unit with hydronic cooling and heating will be considered a preferred option. Consider a dedicated outdoor air system for ventilation air and makeup air to the Laundry Room. Chilled water for the air handling unit (AHU) is to be provided by the Central Plant chilled water systems. Replace all chilled water piping systems inside the Facility. For zone reheat, this alternative uses a heat exchanger served with steam from the campus distribution system. The heat exchanger will serve heating hot water to the new AHU for pre-heat and to VAV terminal units for re-heat. The heat exchanger will also provide capacity for a new indirect water heater hot water storage tank capacity to serve the washers and new Family Restroom. All steam piping within Building 25, pressure reducing valves, condensate collection and return systems will be replaced. Existing heating system in the Building 25 High Bay will remain and be reused. The existing refrigerant within non- chilled water air conditioning systems (window units, etc.) must be properly drained by a certified technician before turn-in/disposal.

Bid Option 1 Plumbing

The demolition of all plumbing fixtures will be required under Bid Option 1. New low flow fixtures will be provided. Existing domestic water piping and sanitary sewer systems will remain and be re-used. Replace floor drains in Mechanical Room and provide new floor drain with trap primer or trap guard in the Laundry Room.

Bid Option 1 Power

The existing feeder to Building 25 will remain. Demolish service entrance equipment and all downstream equipment. Provide new, service entrance rated equipment, surge protection, and distribution equipment. Re-use existing 480/277V utility feeder. Provide dry type step down transformers and distribution panelboards as needed to provide Building 25 loads. Provide grounding per Unified Facilities Criteria and National Electric Code. No backup power is provided for Building 25.

Bid Option 1 Lighting

The existing lighting system will be removed in its entirety. Demolished fixtures (including lamps, ballasts, etc.) will be disposed as universal waste by the JSC Environmental Office. Provide light-emitting diode (LED) lighting and lighting controls.

Bid Option 1 Telecommunications

The existing telecommunications system will be removed in its entirety. Provide CAT 6A telecommunications drops, conduit, and cable trays. Route all cables to EOC telecommunications rooms on the second floor. Provide provisions (power and infrastructure) for audio visual systems in select spaces. A detailed description of the Scope of Work follows in the body of this report and is organized by technical discipline.

Demolition activities include the existing parking lot, sanitary sewer, fire water, and storm drain where the EOC will be sited. Storm drainage and runoff will be accommodated in the design of the site and the existing functions of the overall drainage system will be maintained. Protect trees that are not slated for demolition.

Site design for the EOC will include, but not be limited to: EOC and associated structures, grading and drainage, accessibility provisions, asphalt parking lot, concrete access sidewalks, LED site lighting, utility service connections and supply, landscaping, and all details necessary for construction. The project site will be designed and constructed in accordance with the criteria contained in Section 3.2.2 Site Design and Attachment A in the 2019 Corrected Final Functional Requirements Document (FRD) provided by Merrick and Company.

1.1 Description of Alternatives Evaluated in this Environmental Assessment

Two alternatives, the No Action Alternative and the Proposed Action Alternative, are fully evaluated in this Environmental Assessment (EA). Under the No Action Alternative, NASA would take no action to modify Building 25 or construct a new EOC and would result in no change in impacts to the environment. The Proposed Action Alternative includes the construction of the EOC and the partial repair/alteration of Building 25.

1.2 Summary of Impacts

1.2.1. Physical Resources

No impacts to geology, seismicity, or prime and unique farmlands are expected. Short-term impacts to approximately 35,500 square feet of soil disturbance would occur during site leveling and grading and construction of the new facility, and 16,900 square feet of area will receive fill. A Storm Water Pollution Prevention Plan (SWPPP) must be developed and a Texas Pollution Discharge Elimination System (TPDES) permit must be obtained prior to construction. The contractor would be required to implement appropriate best management practices (BMPs). Short-term impacts to air quality would occur during the

construction period. These include dust from construction and exhaust from heavy equipment. The contractor would be required to implement appropriate BMPs to minimize short-term air quality impacts. A permit will be required only if the entire impacted area (including the project site, and all associated storage/laydown yards and soil stockpiles) is greater than or equals 5 acres. Even if less than 5 acres, the SWPPP must be developed in accordance with the TPDES Construction General Permit (CGP).

1.2.2. Water Resources

No impacts to wetlands, other Waters of the U.S., or floodplains are expected. Regardless of construction depths, construction and demolition activities are not expected to impact groundwater. A SWPPP must be prepared and a TPDES permit must be obtained prior to construction. The contractor is required to implement and maintain appropriate BMPs. A permit/Notice of Intent (NOI) is required only if impacted area equals or exceeds 5 acres.

1.2.3. Coastal Resources

The new facility would be constructed within the Texas coastal zone. However, the proposed project is not intended to promote additional development within the Texas coastal zone, but to consolidate structures by demolishing seven buildings that are being replaced by one building. The proposed project is not located within a Coastal Barrier Resources System (CBRS) and is not expected to promote additional development within any adjacent CBRS.

1.2.4. Biological Resources

No impact to biological resources is expected. The construction of the EOC would be on previously disturbed land with no vegetation. The demolition of the existing parking lot, sanitary sewer, fire water, and storm drain will take place where the EOC will be sited. Storm drainage and runoff will be accommodated in the design of the site and the existing functions of the overall drainage system will be maintained. Therefore, no adverse impact on biological resources is anticipated.

1.2.5. Cultural Resources/Architectural Design

The JSC main campus is an eligible National Historic District and the existing Building 25 is eligible for listing on the National Register of Historic Places (NRHP). Undertakings by NASA require Section 106 consultation and concurrence with the State Historic Preservation Office (SHPO). Modifications to the exterior of the facility will be limited in scope and will meet historic preservations guidelines and mandates that align with JSC's Architectural Design Standards. Documentation of existing exterior systems will be conducted prior to any demolition. The renovation of existing Building 25 and the new EOC addition will include a total of 22,870 gross square feet. Demolition of the exterior concrete panel system will be limited to allow connection to the new EOC. Demolition will include the following:

- Interior walls and ceilings as indicated on the demolition drawings;
- All floor finishes throughout the facility;
- Interior hollow metal or wood doors and frames as indicated on the demolition drawings; and
- Additional building items as indicated in Civil, Structural, Electrical, Mechanical and Plumbing sections of the Corrected Final FRD (Merrick 2019).

Building 25 Fire Station

Renovation work in Building 25 will primarily encompass interior renovation to meet program needs. Exterior work will only include improvements to enhance resilience against natural hazards, such as hurricane conditions, and to provide barrier-free access to the interior spaces.

Building 25 is a facility located in a National Historic District and exterior work will be limited in the rehabilitation of the facade while preserving and protecting the historic, cultural, and architectural character of the facility. Exterior alterations will be limited to the replacement of existing fenestration and doors. Field verification of existing structure will be conducted prior to construction and installation. Alterations will retain and preserve the existing design, color, texture, and materials of the items replaced. The addition of the EOC will be placed adjacent to Building 25 in order to maintain the essential form and structural integrity of the historic property. One wall of the existing high bay of the fire station will be removed to accommodate and connect the new addition. This action constitutes an adverse impact to the historic building. Known hazardous materials are contained in Building 25. The contractor will be responsible for conducting a hazardous material survey. The contractor will be responsible for hazardous material abatement in accordance with Federal, State, and JSC Procedural Requirement (JPR) 1700.1 requirements.

EOC

The EOC will be primarily a two-story facility connected to Building 25 via a new corridor through the existing high bay. The facility layout is based on gathered information from the Users during a multi-day charrette. The facility is designed to have the core emergency operations located on the second floor. Such areas include: the emergency dispatch center, emergency conference center, sensitive compartmented information facility, emergency storage rooms, kitchen/break area, offices, and restrooms. The rationale for locating these areas on the second floor was based on strategic planning, and the logic that if flooding exceeds the anticipated storm surge level, it will not jeopardize the mission critical functions that include coordinating storm recovery efforts. The first floor contains organizations that, while important to the recovery efforts, are not required on the second floor. In a hurricane event, the facility will be required to temporarily house key personnel as needed. Large meeting rooms and offices will be used to temporarily house occupants. Items needed for the ride-out efforts, such as cots, Meals Ready to Eat, and other equipment, will be stored on the second floor. The first floor of the EOC will be higher than the existing Building 25 finish floor in order to raise it above the anticipated CAT 4 storm surge. This new construction does adversely impact the eligible JSC Historic District. Consultation with SHPO is ongoing, and the required Memorandum of Agreement and a mitigation plan will address this adverse impact.

1.2.6. Socioeconomic Resources

Construction of the new EOC and partial repair/alteration of Building 25 would not adversely impact socioeconomics, minority or low-income populations, or public health and safety. Construction of the EOC and partial repair/alteration of Building 25 would create temporary jobs during the construction phase. The proposed construction site is currently an asphalt parking lot that has not been associated with any known activities involving hazardous materials. Because of the age of Building 25, asbestos-containing materials (ACM) and lead-based paint (LBP) are present. Portions of existing water, fire, and sanitary sewer lines may be asbestos pipe. The Contractor will notify the Contracting Office of any additional suspected asbestos and/or lead containing materials found during the demolition of Building 25.

Prior to demolition, NASA will determine the presence, extent, magnitude, and proper handling of on-site ACM and LBP. Hazardous materials discovered, generated, or used during construction will be handled and disposed in accordance with applicable local, state, and federal regulations. Laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, will be handled in

accordance with 40 Code of Federal Regulation (CFR) §262. There will be short-term impacts to noise levels at the project site during construction and demolition phases. Construction would take place during normal business hours and equipment would meet all local, state, and federal noise regulations.

A short-term increase in the volume of construction traffic on roadways adjacent to JSC and within the campus could cause slower traffic flow during construction activities. Construction vehicles and equipment would be stored on-site during project construction and appropriate signage would be posted on affected roadways. The appropriate signage and barriers should be in place prior to construction activities to alert pedestrians and motorists of project activities.

2.0 PURPOSE AND NEED FOR ACTION

JSC in the Clear Lake area recently went through a major hurricane event. During recovery efforts NASA identified the requirement for a centrally-located EOC at JSC, hardened to withstand a CAT 5 hurricane. JSC is proposing construction of a new EOC addition to Building 25 and partial repair/alteration of existing Building 25, as part of the recapitalization program. The recapitalization program focuses on repair by replacement and requires that new construction buildings utilize no more than 90 percent of the total area (square feet) being demolished. The new EOC would be located on the site of an existing parking lot located along Avenue C (**See attached figures**).

The EOC expansion requires a minimum Silver Certification under the Leadership in Energy and Environmental Design (LEED) v4.1. In keeping with the principles engendered by United States Green Building Council (USGBC), this design will maximize the use of sustainable materials, highly insulated building with an air/vapor barrier and will implement efficient mechanical, plumbing, and electrical equipment and systems. LEED accreditation is based on an allocation of points from a checklist of various elements including sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, design innovation, and regional priority (USGBC, 2016). Additionally, the new EOC would be designed to address federal mandates, policies and standards regarding sustainability as identified in the Corrected Final FRD (Merrick 2019).

In accordance with 44 CFR, Subpart B and Agency Implementing Procedures, Part 10.9, this EA has been prepared pursuant to Section 102 of the National Environmental Policy Act (NEPA) of 1969, as implemented by the regulations promulgated by the President's Council on Environmental Quality (CEQ [40 CFR Parts 1500-1508]). The purpose of the EA is to analyze the potential environmental impacts of the proposed project, and to determine whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact.

3.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This section describes the alternatives that were considered in addressing the purpose and need stated in Section 1 above. Two alternatives are fully evaluated in this EA: The No Action Alternative and the Proposed Action Alternative. Additional alternatives considered but not carried forward are also briefly described.

3.1 No Action Alternative

Under the No Action Alternative, NASA would not take action to partially repair/alter Building 25 or construct a new EOC. No impacts to the environment from construction would occur. However, the No Action Alternative would have negative impacts to JSC; functional spaces and the consolidation of the PSD and staff to provide a secure and centralized location to withstand a CAT 5 hurricane and 100-year storm surge event. Therefore, the No Action Alternative does meet the current or future needs of JSC.

3.2 Proposed Action Alternative

NASA proposes to partially repair/alter existing Building 25 and construct a new EOC. The new EOC facility will be constructed as an addition to the existing Building 25. The EOC is bound to the north by a parking lot, east by 2nd Street, south by Avenue C, and west by a parking lot. The site is currently covered primarily with existing asphalt parking associated with existing Building 25. The following project description is based on the Corrected Final FRD (Merrick 2019).

- The new EOC will provide a secured, hardened, and centralized location for the JSC IC and staff to operate and to coordinate with key JSC staff and community emergency responders during a disaster or an emergency event.

- The new EOC will be hardened to withstand a CAT 5 hurricane and a CAT 4 hurricane storm surge as well as being elevated out of the 500-year floodplain.

- The new EOC will consolidate the JSC PSD assets into a singular facility, as well as optimally incorporating the OEM, Physical Security (Contractor), FPS, Occupational Health, and the Operations Control Center.

- The new EOC will provide adequate and redundant communications for command and control during a disaster or an emergency incident as well as to allow for easier command and control of day-to-day operations.

Existing Building 25 requires modification, repairs, and expansion for a new EOC. The new EOC facility expansion will be hardened to withstand the winds from a CAT 5 hurricane. This expansion allows for the collocation of assets, such as the relocation of the OCC, pertinent to coordination during emergencies.

Because of the age of Building 25, ACM and LBP are present. Portions of existing water, fire, and sanitary sewer lines may be asbestos pipe. The Contractor will notify the Contracting Office of any additional suspected asbestos and/or lead containing materials found during the demolition of Building 25.

Prior to demolition, NASA will determine the presence, extent, magnitude, and proper handling of on-site ACM and LBP. Hazardous materials discovered, generated, or used during construction will be handled and disposed in accordance with applicable local, state, and federal regulations. Laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, will be handled in accordance with 40 CFR §262.

3.3 Alternatives Considered but Not Carried Forward

Under NEPA, federal agencies are required to consider reasonable alternatives to a proposed action. Two other alternatives were considered and described below.

3.3.1. Alternative 1: Harden EOC in Place

JSC considered hardening the existing EOC on the 3rd floor of Building 30, approximately 28,000 square feet of Admin wing, to be CAT 5 hurricane wind (155 miles per hour (mph)) resistant. The fireworks network essential to the EOC currently is located in both Building 30 and Building 25. In this alternative Building 30 would become the primary fireworks hub with Building 25 as a backup. This alternative was determined not to be a feasible option as Building 30's structure was designed to withstand wind speeds only up to 95mph and hardening the facility to withstand CAT 5 hurricane wind speeds would require disturbance to key ISS support communication systems, compromise the historic integrity of the building

façade, which is a National Historic Landmark, and it is fiscally unrealistic using available Harvey funds. Additionally, this alternative does not contribute to the Agency's "reduce the footprint" and affordability goals.

**Building 30 is a National Historic Landmark (also houses Mission Control), and structural upgrades needed to harden this historic facility to withstand a CAT 5 hurricane winds will impact the facility's historic integrity and associated fiscal costs are not included in the estimate.*

Structural Hardening

Frame: Building 30 has a steel moment frame structure that was originally designed for a wind speed of 95 mph. CAT 5 hurricane wind speeds of 155 mph would create much higher wind pressures than the original structure was designed to resist. Therefore, the main beams and columns in the building will require strengthening by adding cover plates to the columns and stiffening the beams. As the existing structural system is continuous throughout the building, the strengthening of the beams and columns will need to occur throughout the entire building so that un-strengthened portions of the structure do not affect the portion of the structure containing the EOC.

(*Alternatively, an independent structure could be designed to stand within the existing building footprint, but this would require demolition of the existing structure in that area and would therefore cost more than providing an independent structure outside of the existing building*).

PEAF Panels: Additionally, all the exterior precast exposed aggregate facing (PEAF) panels and the connections of the exterior precast concrete wall panels will likely need to be strengthened or new connections added to withstand CAT 5 hurricane wind loads.

Roof: The roof cladding and fastening system was not designed to withstand winds over 95 mph and will require strengthening.

Architectural Hardening

EOC Access: Utilization of the 2/3rds of the third floor of the Admin wing of Building 30 will be required to accommodate the EOC's necessary functions. A separate entrance will need to be provided into the facility for emergency personnel direct access, which will require a separate elevator system. Additionally, EOC personnel proximity to emergency vehicles would be from the third floor to the Building 30 parking lot where emergency vehicle space will need to be reserved at all times.

Interior: Additionally, the existing walls and windows will be required to be hardened to meet CAT 5 hurricane wind-resistant requirements. Renovation to the space to accommodate a complete EOC will require extensive rework to the interior layout. The Architect/Engineer (A/E) recommends removing all the interior layout space and reusing the location of the restrooms. Additional services will be required for showers and kitchen equipment. The A/E anticipates removal of hazardous materials (e.g., asbestos remediation) throughout the space.

Roof System: Upgrading of the roof cladding and fastening system will be needed to withstand over CAT 5 hurricane winds. Additionally, the roof will need to be structurally upgraded to support new HVAC equipment to support the EOC (see Mechanical Hardening below for more information).

Electrical Hardening

From an electrical standpoint, the A/E anticipates the requirement to significantly reconfigure the electrical distribution system. An exterior generator will need to be located and will prove challenging pending finding a suitable location around the exterior of the facility.

Mechanical Hardening

HVAC/Plumbing: The intent for the Mechanical Systems (HVAC/Plumbing) is to be able to function in a stand-alone manner with an emergency power source. A CAT 5 wind-resistant EOC facility cannot rely on utility services provided by the Central Plant (chilled water/steam). The A/E recommends the placement of air handling units on the roof of the EOC Facility to avoid using square footage in the building that can be used for other mission critical functions. If Building 30 is to be hardened and reused, the coordination effort will need to be considered in order to locate a new chiller that will provide air conditioning during power outages. Coordination will also be required to power chilled water pumps and heating hot water pumps. The Mechanical systems (Air Handling Units and chilled/hot water Pumps) will need an emergency power source. The existing systems are sized to serve the entire Facility and will require a larger generator due to the size of the motors (at an additional cost). The secondary pumping system for Building 30 (elevation of building pumps versus flood elevation) may make this alternative not feasible.

LEED Certification: If LEED certification is a priority in this renovation, a coordination effort that would use existing air handling units, pumps and outdated systems will likely make it a challenge to obtain enough credits on energy efficiency (LEED EAc1 points). It will also be difficult, if not impossible, to comply with LEED water savings due to the fact existing fixtures are not low-flow fixtures. These fixtures will need to be replaced. Asbestos remediation and unforeseen field conditions are also a concern in regard to cost due to the age of the facility.

Civil Hardening

Although the alternative EOC space is on an upper floor in Building 30 and is out of the 500-year floodplain and CAT 5 storm surge, the lowest floor elevation for Building 30 remains within projected CAT 3, CAT 4, and CAT 5 storm surges. As such, significant retrofit to the entire facility will be required to ensure the alternative EOC and the upper portion of the building can remain operational while the lower level of the facility succumb to hurricane storm surges.

3.3.2. Alternative 2: Repurpose and Harden Existing Building 36

JSC also considered hardening Building 36 (41,639 square feet) to be CAT 5 hurricane resistant and repurposed to house the EOC. This facility is currently on JSC's demo list. The fireworks network essential to the EOC currently is located in both Building 30 and Building 25. This alterative was determined not to be a feasible option as Building 36 is not on the fireworks network, is vastly oversized for the EOC required functions, its structure, roof cladding, and fastening system were not designed to withstand wind loads greater than 30 pounds per square foot (psf) for the first 30 feet in building height and 40 psf above 30 feet in building height as specified in the original design drawings. The expense of the structural strengthening required in Building 36, in addition to the significant resources required to route the fireworks infrastructure to this facility, renders repurposing this facility to house the EOC fiscally unrealistic using available Harvey funds. Additionally, this alterative does not contribute to the Agency's "reduce the footprint" and affordability goals.

Structural Hardening:

Frame: The existing structural system of the multi-story portion of Building 36 consists of concentrically braced steel frames supporting both gravity and wind loads. The braced frames were not designed to resist the increased wind loads, nor were the wall girts transferring the wind loads from the exterior aluminum wall panels to the structural frames. The A/E anticipates that the braced frames, the wind girts, the wall panels and the connections for all of these members will all likely need to be strengthened to resist the CAT 5 hurricane loads. The single-story portion of the building is framed with steel columns and custom steel trusses that combine to form a moment resisting frame system. It is likely that both the columns and trusses will have to be strengthened to resist CAT 5 hurricane wind loads.

PEAF Panels: All the exterior PEAF panels and the connections of the exterior precast concrete wall panels will likely need to be strengthened and/or new connections added to withstand the increased wind loads.

Roof: The roof cladding and fastening system was not designed to withstand wind loads exceeding 30 psf on the low roof and 40 psf on the high roof and both will require strengthening.

Architectural Hardening:

Interior: A complete interior renovation of Building 36's interior floor plan layout will be required to meet EOC program requirements. There is a significant amount of equipment in Building 36 that will need to be removed or modified to facilitate the new configuration of the interior spaces. Additional services will be required for showers and kitchen equipment. The first floor is within the storm surge plain and cannot be utilized for primary EOC functions. Anticipation of removal of hazardous materials throughout the space.

Roof System: Upgrading of the roof system will be needed to withstand CAT 5 hurricane winds. Additionally, the roof will need to be structurally upgraded to support new HVAC equipment need to support the EOC (see Mechanical Hardening below for more information).

Electrical Hardening:

From an electrical standpoint, there may be the requirement for significant reconfiguration of the electrical distribution system. Extending the fire alarm fiber optic and copper cabling from the head end equipment in Building 25 to Building 36 will likely be a significant cost.

Mechanical Hardening:

HVAC/Plumbing: The intent for the Mechanical Systems (HVAC/Plumbing) is to be able to function in a stand-alone manner with an emergency power source. A CAT 5 wind-resistant EOC facility cannot rely on utility services provided by the Central Plant (chilled water/steam). The A/E recommends the placement of air handling units on the roof of the EOC Facility to avoid using square footage in the building that can be used for other mission critical functions. A coordinated effort will need to be considered in order to locate a new chiller for Building 36 that can provide air- conditioning to the EOC during power outages. Per the A/E site visit observations, this alternative will require an intense demolition effort at a significant cost due to the size of systems in Building 36. Asbestos remediation and unforeseen field conditions are also a concern in regard to cost due to the age of Building 36.

Civil Hardening:

Building 36 is within the 500-year floodplain and Cat 5 storm surge and will need significant interior retrofitting to create a place for the EOC to be above the flooding elevations. With interior retrofitting, new sanitary sewer and water service lines may be needed to tie restroom and other plumbing requirements to the nearest mains.

4.0 AFFECTED ENVIRONMENT

This section describes the potential resource impacts of the Proposed Action Alternative and the No- Action Alternative. Where potential impacts exist, conditions or mitigation measures to offset the impacts are detailed. A summary table is provided in Section5.0.

4.1 Physical Resources

4.1.1. Geology, Soils, and Seismicity

The land on which JSC sits is a coastal plain of deep river silt deposits known as the Beaumont Formation. During warmer periods of the Pleistocene, vast amounts of mud, sand, and clay were carried by rivers and deposited onto a broad plain that slopes gently toward the Gulf of Mexico. This plain is today's Gulf Coast and adjacent Continental Shelf of the Gulf of Mexico.

The coastal plain contains a network of non-tectonic faults. These are caused by formation mechanics including water content, pressure/overpressure, and diapirism. One hundred thirty faults (active and inactive) extend over 300 kilometers (200 miles) in Harris County. None of these faults are located within JSC's boundary. The faults damage pavement and buildings in urban areas. Underlying soils are mostly plastic clays and shales that readily convey strains to the surface. Ground movement at faults is gradual rather than episodic as with earthquakes. Until the mid-1980's, groundwater was the region's main source of potable water, and its withdrawal from underground aquifers caused widespread subsidence in the Houston area. The construction of the Southeast Water Purification Plant ended this reliance on groundwater (ERD 2019).

JSC is located on a nearly level plain of clayey and loamy prairie soils, classified as Lake Charles clay, Aris Urban Land Complex, Bernard-Urban Land Complex, Verland silty clay loam, Verland-Urban Complex, Dylan clay, Beaumont clay, and Urban Land soils. These soil series drain poorly and allow only a small amount of rainwater to permeate to the groundwater. Without modification, these soils are poor building foundations because they shrink when dry and swell when wet.

Soils have been sampled around JSC for various projects, and it has been found that the soil map is generally accurate. However, some of the samples from areas that were mapped as Lake Charles or Bernard soils look more like League clay, a recently described soil series in Jefferson County, Texas. Soils present at JSC include some characteristic of prime farmland, but urbanization and property values preclude this designation. Also, the entire Center was graded in 1961, and fill dirt was added to the soil profile in some areas. Soils located on Building 25 include Bernard-Urban Land complex (Bg), Midland-Urban Land complex (Mu), and Urban Land (Ur).

The Farmland Protection Policy Act (FPPA) states that federal agencies must "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses…" The resources protected by the FPPA include prime and unique farmland. These lands are categorized by the USDA/NRCS based on underlying soil mapping units. The proposed project site does not contain prime and unique farmlands and is in use as urban development land (research campus).

Executive Order (EO) 12699, *Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction*, establishes responsibilities regarding the seismic-related safety of buildings owned, leased, or funded by federal agencies. Under this EO, each federal agency responsible for the design and construction of a federal or federally-funded building must ensure that the building is designed and constructed in accordance with appropriate seismic design and construction standards.

No Action Alternative – Under the No Action Alternative, there would be no construction and no effect on geology or soils.

Proposed Action Alternative – Under the Proposed Action Alternative, construction activities are not expected to affect underlying geologic resources or seismicity. Construction activities would disturb approximately 35,500 square feet or 0.8 acres of previously-disturbed soils in the footprint of the proposed EOC building, existing parking lot, sanitary sewer, fire water, and storm drain where the EOC will be sited. Excavated soils will be disposed of offsite per JSC. Storm drainage and runoff will be accommodated in the design of the site and the existing functions of the overall drainage system will be maintained. The proposed project would have a minimal short-term impact on native soils.

The applicant would be required to prepare a SWPPP and obtain a TPDES permit prior to construction. Implementation of appropriate BMPs, as described in the SWPPP and required for the TPDES permit, would help minimize site runoff. BMPs would include, but not be limited to, the installation of silt fences and the revegetation of disturbed soils to minimize erosion. Excavated soils and waste materials would be managed and disposed in accordance with applicable local, state, and federal regulations. Construction contractors would obtain and comply with necessary permits and adhere to the procedures outlined in the contractual agreement with NASA JSC for handling contaminated materials. A TPDES CGP NOI is only required if the entire impacted area equals or exceeds five acres.

4.1.2. Air Quality

The Clean Air Act (CAA) requires that states adopt ambient air quality standards. These standards have been established to protect the public from potentially-harmful pollutants. Under the CAA, the U.S. EPA establishes primary and secondary air quality standards. Primary air quality standards protect the public health, including the health of "sensitive populations, such as people with asthma, children, and older adults." Secondary air quality standards protect public welfare by promoting ecosystem health and preventing decreased visibility and damage to crops and buildings.

The EPA has set national ambient air quality standards (NAAQS) for the following six criteria pollutants: ozone (O_3), particulate matter ($PM_{2.5}$, PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and lead. Greenhouse gases (GHG), water vapor, carbon dioxide, methane, nitrous oxide, and O_3 are also regulated and have been linked to global climate change.

The Texas Commission on Environmental Quality (TCEQ) has adopted EPA's NAAQS as criteria pollutants for Texas. Areas that fail to meet federal standards for ambient air quality are considered to be nonattainment areas. The General Conformity Final Rule (40 CFR Part 51) specifies criteria or requirements for conformity determinations for federal projects. The General Conformity Rule ensures that the actions taken by federal agencies in nonattainment and maintenance areas do not interfere with a state's plans to meet national standards for air quality.

Air quality is monitored for the Houston-Galveston-Brazoria region at many stations throughout the metropolitan area. The closest active air quality monitoring station to JSC is located at the Seabrook Friendship City Park (Central Air Monitoring Station 45), approximately two miles from JSC. JSC has previously modeled the dispersion of air pollutants to simulate the impact of estimated emissions on local

air quality. Concentrations of criteria pollutants (NO_x, CO, SO_2, and PM_{10}) were predicted at the JSC property line (ERD 2019). Ozone is generated by atmospheric chemical reactions of volatile organic compounds (VOCs) and oxygen. NASA modeled VOC concentrations (assumed to be all xylene for the model) and compared these concentrations to levels published by the TCEQ as relating to atmospheric ozone. The facility used the SCREEN3 model, published by the EPA, incorporating five urban air stability classes, urban dispersion, and downwash with true dimensions of JSC buildings, true distance to JSC's property line, and flat terrain (ERD 2019). Depending on the type of pollutant, both point and area source models were run. The load of each pollutant was calculated using the largest source for that category (point and area). The results of the model indicate that concentrations of criteria pollutants generated by JSC are relatively low, as compared to the national standards. Consequently, JSC does not contribute significantly to the adverse air quality issues in the Houston area. This is not likely to change under any of the proposed alternatives.

No Action Alternative – Under the No Action Alternative, there would be no construction and no effect on air quality.

Proposed Action Alternative – Under the Proposed Action Alternative a new Tier 4 backup generator will be installed for the new EOC. Tier 4 emission standards for non-road diesel engines adopted by the EPA in 2004 are intended to significantly reduce the emissions of non-road construction, agricultural, mining, and industrial equipment (EPA 2004). As a result, generator manufactures have begun incorporating Tier 4 compliant engines into many new products. The Proposed Action includes replacement of an existing back-up generator with a new, Tier 4-compliant model. While back-up generator use has minimal impact on overall air quality, this equipment upgrade will benefit the site, when the unit is needed.

Short-term impacts to air quality may occur during the construction and demolition phase of the project. Although no long-term impacts are anticipated, contractor should be prepared with dust suppression systems, such as water misting, to mitigate dust accumulation in the atmosphere.

The contribution of the project to GHG emissions could be considered an indirect impact to climate change in both directions. During the construction and demolition phases, emissions from fuel-burning internal combustion engines (e.g., heavy equipment and earthmoving machinery) could temporarily increase the levels of some criteria pollutants, including CO, NO_2, O_3, PM_{10}, and non-criteria pollutants, such as VOCs. To reduce the emission of criteria pollutants, fuel-burning equipment running times would be kept to a minimum and engines would be properly maintained. This temporary increase in emissions is not expected to impact long-term air quality or visibility in the region (ERD 2019).

The project is not expected to greatly affect the rate of climate change. While a short-term increase in GHG would occur during the construction phase, efforts to reduce and manage these emissions would be implemented, reducing carbon emissions and hence the impacts to climate change. Building 25 renovations and EOC addition would be designed to address federal mandates, policies, and standards regarding sustainability including the reduction of GHG emissions, under EO 13123 *Greening the Government Through Leadership in Efficient Energy Management* (1999), EO 13834 *Efficient Federal Operations* (2019), and NASA's *Sustainability Implementation Plan (2019)*. Long-term operation of the new building is also not expected to generate GHG. The EOC expansion requires a minimum Silver Certification under LEED v4.1. In keeping with the principles engendered by USGBC, this design will maximize the use of green materials, and will implement efficient mechanical, plumbing, and electrical equipment and systems.

4.2 Coastal Resources

The Coastal Zone Management Act (CZMA) enables coastal states, including Texas, to designate state coastal zone boundaries and develop coastal management programs to improve protection of sensitive shoreline resources and guide sustainable use of coastal areas. The Texas General Land Office (GLO) monitors and manages coastal zone actions in partnership with the federal government under the CZMA within the Texas Coastal Zone. All federally-funded projects must be consistent with the Texas Coastal Management Program.

The Coastal Barrier Resources Act (CBRA) of 1982, administered by USFWS, was enacted to protect sensitive and vulnerable barrier islands found along the U.S. Atlantic, Gulf, and Great Lakes coastlines and to discourage development in coastal areas. The CBRA established the Coastal Barrier Resources System (CBRS), which consists of undeveloped coastal barrier islands, including those in the Great Lakes. With limited exceptions, areas contained within a CBRS are ineligible for direct or indirect federal funds that might support or promote coastal development.

According to the GLO Coastal Zone Boundary shapefile, the proposed project site is located within the Texas Coastal Zone (GLO, 2019). According to USFWS Coastal Barrier Resource System Mapper, the proposed project site is located outside the CBRS zone (USFWS 2019e).

No Action Alternative – Under the No Action Alternative, no construction would occur, and there would be no impacts to coastal resources.

Proposed Action Alternative – Under the Proposed Action Alternative, the new facility would be constructed within the Texas coastal zone. However, the proposed project is not intended to promote additional development within the coastal zone. The proposed project is not located within a CBRS and is not expected to promote additional development with any adjacent CBRS.

4.3 Water Resources

4.3.1. Surface Water

The Clean Water Act (CWA), as amended in 1977, established the basic framework for regulating discharges of pollutants into the Waters of the U.S. JSC is set in a landscape with many tidal streams and estuaries of Galveston Bay. Clear Lake is at the southeast corner of the property; Mud Lake and Armand Bayou are to the northeast of the site; Cow Bayou is to the southwest; and Horsepen Bayou is north of JSC. Horsepen Bayou flows east to its confluence with Armand Bayou (previously Middle Bayou). Armand Bayou and its tributaries drain about 164.5 square kilometers (63.5 square miles) of southeast Harris County. Armand Bayou flows into the northern end of Mud Lake, part of the Clear Lake estuary, which is connected to western Galveston Bay. Cow Bayou flows into Clear Creek, which drains to Clear Lake. Galveston Bay is recognized by the EPA as an estuary of national significance and was included in the National Estuary Program in 1989 (ERD 2019).

Armand Bayou is not identified as a "scenic river" as defined by the Wild and Scenic Rivers Act, and it is not currently listed as such by the U.S. Department of the Interior. The bayou's banks support a southern mixed hardwood forest, Gulf Coast tall grass prairie, and coastal salt marsh. The bayou supports breeding and spawning of many species of waterfowl and aquatic organisms. Recreational opportunities in Bay Area Park, along Armand Bayou, and north and east of JSC, include canoeing, hiking and bird watching. The bayou is a coastal preserve in the Galveston Bay National Estuary Program (ERD 2019).

The proposed project site contains no surface water resources. Stormwater drainage lines are located under the existing parking lot at the proposed project location, traversing east/west.

No Action Alternative – Under the No Action Alternative, no construction would occur, and there would be no impacts to surface waters.

Proposed Action Alternative – The Proposed Action Alternative is located on an existing asphalt parking lot. The partial repair/alteration of Building 25 and the EOC addition would follow the Energy Independence and Security Act of 2007, which specifies requirements for the reduction of stormwater runoff. To reduce impacts to offsite surface waters, the contractor would implement appropriate BMPs, such as installing silt fences and revegetating bare soils. The contractor would also be required to prepare a SWPPP and obtain a TPDES permit prior to construction and demolition. CGP NOI required only if site size equals or exceeds 5 acres.

4.3.2. Groundwater

Groundwater is present beneath the JSC. The water table has an average depth of two to three meters (eight to eleven feet) below the ground surface. This depth fluctuates with weather and may reach the ground surface during wet periods. There is a willow confined zone below the surface aquifer. The confined zone comprises a sand layer, located approximately 18 meters (60 feet) below the surface, sandwiched between two aquitards. The upper clay layer is stiff, plastic, and impermeable. The clay under the aquifer is hard, plastic, and even less permeable than the upper clay layer. The aquifer dips to the southeast by four meters per kilometer (20 feet per mile). Its thickness ranges from six to ten meters (21 to 32 feet) with the thickest part toward the east. Groundwater moves eastward at a rate of about eight meters per year (25 feet per year).

JSC had releases of Freon 113 and trichloroethylene from a process sewer in 1987. The groundwater plume covered approximately 25 acres and was located about 20 meters (60 feet) below the Energy Systems Test Area (ESTA) in the northwest part of JSC (ERD 2019). Remediation continued until 2013, when NASA discontinued monitoring activities and the TCEQ closed the remediation case.

The Clear Lake area is located in the Gulf Coast Major Aquifer, which comprises the Jasper, Evangeline, and Chicot aquifers. Two important freshwater aquifers, the Chicot and the Evangeline, are located under the Houston area. Both aquifers comprise discontinuous sand, silt, and clay units. In southern and eastern parts of the region, the aquifers are artesian; that is, they are under pressure and tend to rise in wells. At JSC, the base of the Chicot aquifer is between 180 and 210 meters (600 and 700 feet) below the surface, and the base of the Evangeline aquifer is between 790 and 910 meters (2,600 and 3,000 feet) below the surface (ERD 2019).

Before 1975, much of the Clear Lake area drew its water from deep wells. Wells in the Clear Lake area extracted groundwater from the Alta Loma basal sand stratum of the Chicot aquifer, 140 to 210 meters (470 to 690 feet) below the surface. Houston and other cities to the north pumped large quantities of water from the underlying Evangeline aquifer. Pumping caused land subsidence. In 1975, the Harris Galveston Coastal Subsidence District began regulating groundwater users to mitigate this issue. The rate of subsidence has slowed dramatically (ERD 2019). The 2017 Annual Groundwater Report is available at https://hgsubsidence.org/wp-content/uploads/2018/08/2017_HGSD_GWR_v2.0.pdf.

No Action Alternative – Under the No Action Alternative, no construction would occur, and there would be no impacts to groundwater.

Proposed Action Alternative – Under the Proposed Action Alternative, no impacts to groundwater are expected. The proposed EOC would connect to existing water and sanitary sewer services located along Second Street. No water wells or septic systems would be installed. Groundwater is not utilized by JSC, nor is it a proposed source of water for this project. Footings for Building 25 would be installed up to a depth of 7 feet below ground surface. Excavation below ground to the depth of utilities would occur for demolition activities.

Potential sources of soil and groundwater contamination at JSC are listed as solid waste management units in JSC's application to the TCEQ for a permit to store hazardous waste. As a condition of the permit issued in 1993, JSC was required to close these units. Most of the sites listed, including the sandblasting area near the Surplus Equipment Staging Warehouse (Building 338) and the Fire Prevention Training Facility (Building 384), have been closed and certified as clean closures. In the ESTA, contaminated soil and groundwater were previously treated to remove Freon 113 and trichloroethylene by means of in-situ chemical oxidation. As discussed above, JSC received TCEQ site closure for this release in accordance with the Texas Risk Reduction Program (30 TAC §350).

In February 2014, JSC installed an innovative passive groundwater remediation system, known as a "biowall", in order to treat contaminants detected within the uppermost-saturated zone. Contaminants appear to have emanated from the concrete and artificially lined surface impoundments that collected storm water and wastewater within Building 358. These impoundments were removed in 2008. Information associated with restoration activities is available by contacting the JSC Environmental Office. A summary of current and previous restoration activities is available through the JSC Environmental Office.

No known groundwater contamination exists in the immediate area of the proposed construction site or in the proposed demolition areas. Groundwater is utilized by JSC but only as an emergency water source in the event we lose our feed from Clear Lake City Water Authority. These two wells are in the NW area of the site and should not be impacted by this activity.

4.3.3. Waters of the U.S. Including Wetlands

Wetlands are defined in 33 CFR §328.3(b) as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. A wetland, as defined by the *1987 Corps of Engineers Wetland Delineation Manual* and updated in 1991, 1992, and 1997 must meet three mandatory criteria: the presence of hydric soils; wetland hydrology; and hydrophytic vegetation.

A jurisdictional wetland must also have a connection or nexus to interstate commerce. Connection to interstate commerce is defined as being adjacent to or abutting a traditional navigable water or a relatively permanent water. When nexus determination is vague or uncertain, the U.S. Army Corps of Engineers (USACE) will deal with jurisdictional status on a case-by-case basis. The USACE is responsible for administering and enforcing Section 404 of the Clean Water Act. Section 404 requires that anyone proposing to discharge dredged or fill material into waters of the United States, including their adjacent wetlands and other special aquatic sites, must obtain a permit granted by the USACE. The term "waters of the United States" is defined in 33 CFR §328.3. USACE has the discretion of determining on a case-by-case basis whether or not a particular water body is a water of the United States. Federal Register 41217 states that drainage ditches constructed entirely in upland areas are generally not considered to be waters of the United States (ERD 2019).

The USFWS National Wetland Inventory (NWI) online mapper of the area indicated there are no wetlands within the proposed project site (USFWS 2019a). A site visit conducted by a NEPA Environmental

Specialist on February 6, 2019, verified that there are no wetlands or other surface waters on the project site.

No Action Alternative – Under the No Action Alternative, construction of the new facility would not occur, and there would be no impacts to wetlands or other Waters of the U.S.

Proposed Action Alternative – Under the Proposed Action Alternative, no direct impacts to Waters of the U.S., including wetlands, would occur, and the project would not require permitting with the USACE.

4.3.4. Floodplains

Floodplains, the low areas adjoining rivers, streams, and inland and coastal waters, have a chance of one percent or greater for flooding in a given year (a 100-year flood). Activities in floodplains should be compatible with the natural propensity for flooding. Furthermore, structures in the floodplain may exacerbate flooding upstream or downstream. The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Maps (FIRM) for insurance ratings. The FEMA FIRM for JSC shows the majority of JSC lying outside the 500-year floodplain (**Figure 3**). However, the northeastern corner of JSC near the intersection of NASA Parkway and Space Center Boulevard and a section located along a tributary to Mud Lake in the northeastern portion of JSC are designated as lying within the 100-year and 500-year floodplains. Note that the area floodplains and associated flood insurance rate maps were substantially revised following Hurricane Harvey, which occurred in August 2017 (ERD 2019).

All applicable local, state, and federal regulations must be followed prior to conducting activities that could alter base elevations within the designated floodplain. JSC has undertaken an aggressive multi-year program to demolish and remove mission-critical buildings located within the flood-prone portions of the site, generally referred to as the "200 area", and returning the area to a more natural vegetated buffer zone. This activity is consistent with EO 13653, "Preparing the U.S. for the Impacts of Climate Change" by relocating critical mission and facility support activities out of low-lying areas that could be potentially inundated by flooding associated with heavy rains or storm surge.

EO 11988 (*Floodplain Management*) requires federal agencies to avoid direct or indirect support of development within the 100-year floodplain whenever there is a practicable alternative. FEMA uses FIRMs to identify the regulatory 100-year floodplain for the National Flood Insurance Program. Consistent with EO 11988, FIRMs were examined during the preparation of this EA. According to the FIRM, the proposed project site, including Building 25 and EOC addition, is located within Flood Zone X, which lies outside of a special flood hazard area (100-year floodplain) (FEMA 2019; Community Panel Number 48201C1090M, Revised January 6, 2017). The FIRM is presented in Figure 3.

No Action Alternative – Under the No Action Alternative, construction of the new facility would not be built, and there would be no impacts to floodplains.

Proposed Action Alternative – Under the Proposed Action Alternative, no direct impacts to floodplains would occur and there would be no impacts to floodplains.

4.4 Biological Resources

4.4.1. Wildlife

According to publications of the Texas Parks and Wildlife Department (TPWD), the Upper Texas Gulf Coast is home to many species of birds, mammals, reptiles, and amphibians. Agriculture and urban development have fragmented and degraded wildlife habitat. Homes, shops, and office buildings surround

JSC on all but its north and northeast boundaries, which abut Armand Bayou Nature Center, a 750-hectare (1,900 acre) nature preserve with undisturbed wildlife habitat. A heronry has developed in the HL&P cooling water canal. Several species utilize the heronry during nesting season, including native little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), and tricolored heron (*Egretta tricolor*), as well as non-native cattle egret (*Bubulcus ibis*). Nesting typically starts the last week of March and continues into July. Native species use of this heronry increased in number from 2015 through 2017, while non-native species use (i.e., cattle egret) declined (ERD 2019).

Bird-window collisions are a common occurrence at JSC given the center's coastal location on the central flyway. Many migratory species travel through the area on their way to and from Central Mexico in the spring and fall. JSC has been able to reduce bird-window collisions through the implementation of best management practices, such as nighttime blind closures and the installation of window films on highly reflective glass in key areas. New or replacement construction projects may also increase the potential for bird-window collisions. JSC's project review process allows project designers to incorporate mitigation measures, such as adjusting building direction, avoiding design characteristics that would funnel birds into buildings, and avoiding or restricting highly reflective materials on sides with specific directionalities having a higher risk for collision (ERD 2019).

JSC personnel monitor both the deer population and bird-window collisions. JSC personnel also provide on-call services to address employee-wildlife conflicts and assist injured wildlife. When injured wildlife is identified onsite, the affected animal is sent to a permitted Wildlife Rehabilitator, in accordance with state and federal regulations (ERD 2019).

4.4.2. Vegetation

JSC is located in the Upper Coastal Prairie Grasslands of the Gulf Prairies and Marshes biogeographic area of Texas. This region of the Gulf Coast is a nearly-level, poorly-drained prairie, dissected by streams and rivers flowing into the Gulf of Mexico. The region includes salt grass marshes surrounding bays and estuaries and tall woodlands in the river bottomlands. Specifically, JSC habitat is described as Texas Coastal Prairie, forested wetlands, and invaded grasslands. For additional information on current species found at JSC, please review the most current version of the JSC Wildlife Management Plan, available through the Facilities Management and Operations Division (ERD 2019).

4.4.3. Threatened and Endangered Species

In 2010, JSC retained a consultant who performed a study to assess the site for the presence of endangered species and potential endangered species habitat within JSC's undeveloped "natural" environment. After reviewing habitat requirements and conducting a field investigation, the investigators determined that suitable habitat existed at JSC for several of the listed species, but site reconnaissance did not find evidence of the listed species. The report is available for review by contacting the JSC Environmental Office. The Houston toad (*Bufo houstonensis*) was reportedly observed at JSC during the 1950's, but it is no longer believed to be present onsite (ERD 2019).

The Endangered Species Act (ESA) of 1973 provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Section 7 of the ESA requires federal agencies, in consultation with the United States Fish and Wildlife Service (USFWS) and/or the National Oceanic and Atmospheric Administration National Marine Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also prohibits any action that causes a "taking" of any listed species. Table 1, Threatened and Endangered

Species in Harris County, identifies state and federal threatened and endangered (T&E) species for Harris County.

Table 1: Threatened and Endangered Species in Harris County

Common Name	Scientific Name	Federal Status	State Status
TPWD			
Cajun chorus frog	*Pseudacris fouquettei*	-	-
Houston Toad	*Anaxyrus houstonensis*	LE	E
Southern Crawfish Frog	*Lithobates areolatus areolatus*	-	-
Southern dusky Salamander	*Desmognathus conanti*	-	-
Strecker's chorus frog	*Pseudacris streckeri*	-	-
Woodhouse's toad	*Anaxyrus woodhousii*	-	-
Bald Eagle	*Haliaeetus leucocephalus*	-	T
Black Rail	*Laterallus jamaicensis*	PL	-
Franklins Gull	*Leucophaeus pipixcan*	-	-
Mountain Plover	*Charadrius montanus*	-	-
Piping Plover	Charadrius melodus	LT	T
Red Knot	*Calidris canutus rufa*	LT	-
Red-cockaded Woodpecker	*Picoides borealis*	LE	E
Reddish Egret	*Egretta rufescens*	-	T
Swallow-tailed Kite	*Elanoides forficatus*	-	T
Western Burrowing Owl	*Athene cunicularia hypugaea*	-	-
White-faced Ibis	*Plegadis chihi*	-	T
White-tailed Hawk	*Buteo albicaudatus*	-	T
Whooping Crane	*Grus americana*	LE	E
Wood Stork	*Mycteria americana*	-	T
Houston Burrowing Crayfish	*Fallicambarus houstonensis*	-	-
Alligator Gar	*Atractosteus spatula*	-	-
Sabine Shiner	*Notropis sabinae*	-	-
Saltmarsh Topminnow	*Fundulus jenkinsi*	-	-
Silverband Shiner	*Notropis shumardi*	-	-
Southern Flounder	*Paralichthys lethostigma*	-	-
Western Creek Chubsucker	*Erimyzon claviformis*	-	T
American Bumble Bee	*Bombus pensylvanicus*	-	-
Bay Skipper	*Euphyes bayensis*	-	-
American Badger	*Taxidea taxus*	-	-
Big Brown Bat	*Eptesicus fuscus*	-	-
Big Free-tailed Bat	*Nyctinomops macrotis*	-	-
Eastern Red Bat	*Lasiurus borealis*	-	-
Hoary Bat	*Lasiurus cinereus*	-	-
Humpback Whale	*Megaptera novaeangliae*	LE	E
Long-tailed Weasel	*Mustela frenata*	-	-
Louisiana Black Bear	*Ursus americanus luteolus*	-	T

Common Name	Scientific Name	Federal Status	State Status
Mexican Free-tailed Bat	*Tadarida brasiliensis*	-	-
Mink	*Neovison vison*	-	-
Mountain Lion	*Puma concolor*	-	-
Plains Spotted Skunk	*Spilogale putorius interrupta*	-	-
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	-	T
Southeastern Myotis Bat	*Myotis austroriparius*	-	-
Southern Short-tailed Shrew	*Blarina carolinensis*	-	-
Swamp Rabbit	*Sylvilagus aquaticus*	-	-
Thirteen-lined Ground Squirrel	*Ictidomys tridecemlineatus*	-	-
Tricolored Bat	*Perimyotis subflavus*	-	-
Western Hog-nosed Skunk	*Conepatus leuconotus*	-	-
Louisiana Pigtoe	*Pleurobema riddellii*	-	T
Sandbank Pocketbook	*Lampsilis satura*	-	T
Alligator Snapping Turtle	*Macrochelys temminckii*	-	T
American Alligator	*Alligator mississippiensis*	-	-
Common Garter Snake	*Thamnophis sirtalis*	-	-
Eastern Box Turtle	*Terrapene carolina*	-	-
Loggerheaded Sea Turtle	*Caretta caretta*	LT	T
Slender Glass Lizard	*Ophisaurus attenuatus*	-	-
Smooth Softshell	*Apalone mutica*	-	-
Texas Diamondback Terrapin	*Malaclemys terrapin littoralis*	-	-
Texas Horned Lizard	*Phrynosoma cornutum*	-	T
Texas Tortoise	*Gopherus berlandieri*	-	T
Timber (Canebrake) Rattlesnake	*Crotalus horridus*	-	T
Western Box Turtle	*Terrapene ornata*	-	-
Western Hognose Snake	*Heterodon nasicus*	-	-
Awnless Bluestem	*Bothriochloa exaristata*	-	-
Coastal Gay-feather	*Liatris bracteata*	-	-
Corkwood	*Leitneria pilosa ssp. pilosa*	-	-
Correll's false dragon-head	*Physostegia correllii*	-	-
Giant sharpstem Umbrella-sedge	*Cyperus cephalanthus*	-	-
Goldenwave Tickseed	*Coreopsis intermedia*	-	-
Houston Daisy	*Rayjacksonia aurea*	-	-
Indianola Beakrush	*Rhynchospora indianolensis*	-	-
Oklahoma Grass Pink	*Calopogon oklahomensis*	-	-
Panicled Indigobush	*Amorpha paniculata*	-	-
Shinner's Sunflower	*Helianthus occidentalis ssp. plantagineus*	-	-
South Texas False Cudweed	*Pseudognaphalium austrotexanum*	-	-

Common Name	Scientific Name	Federal Status	State Status
Texas Ladies'-tresses	*Spiranthes brevilabris var. brevilabris*	-	-
Texas Meadow-rue	*Thalictrum texanum*	-	-
Texas Prairie Dawn	*Hymenoxys texana*	LE	E
Texas Tauschia	*Tauschia texana*	-	-
Texas Willkommia	*Willkommia texana var. texana*	-	-
Texas Windmill Grass	*Chloris texensis*	-	-
Tharp's Dropseed	*Sporobolus tharpii*	-	-
Threeflower Broomweed	*Thurovia triflora*	-	-
USFWS			
Whooping crane	*Grus americana*	E	-
Bald eagle	*Haliaeetus leucocephalus*	R	-
Red knot	*Calidris canutus rufa*	T	-
Texas prairie dawn-flower	*Hymenoxys texana*	E	-
West Indian Manatee	*Trichechus manatus*	T	-
Western Chicken Turtle	*Deirochelys reticularia ssp. miaria*	Under Review	
Sources: TPWD – Last Revision: 07/17/2019 and USFWS – Last accessed 10/24/2019; 1. Status Key: LE, LT = Federally Listed Endangered/Threatened; T = State Threatened, E = State Endangered; R = Recovery; "-" = Rare, but no regulatory listing.			

No suitable habitat for federally-protected species was observed within proposed construction and demolition areas during the site visit, conducted by a Baer Biologist on February 6, 2019. Site observations indicate that the proposed EOC site lot is confined to an existing, previously-developed parking lot and an open, manicured grassy area.

The critically endangered population of Attwater's prairie chicken (APC) (*Tympanuchus cupido attwateri*) is being restored by the Houston Zoo at a facility located within JSC. This choice of locations was made because JSC has historically contained habitat for this species. Through a Space Act Agreement, JSC licensed 1.7 acres of land to the Zoo to move their captive breeding program from the Zoo to JSC. The Zoo is fully responsible for the operation and maintenance of the program under a permit with the USFWS. The Zoo also provides staffing for the facility (ERD 2019).

According to recent estimates, there are only about 24 APCs remaining in the wild today. These populations are found only in Texas at two preserves: the Attwater Prairie Chicken National Wildlife Refuge near Eagle Lake and at the Coastal Prairie Preserve operated by the Nature Conservancy in Texas City. The main reason for the bird's decline has been the loss of the 9 million acres of prairie land that was once found in our coastal region from Texas to Louisiana. During the 1900's there were about 1 million APC's along the Texas coast. Over-predation by birds and the introduction of fire ants are other suspected causes for their decline in population (ERD 2019).

JSC's undeveloped land provides a native-like habitat with quieter surroundings and access to water and electricity for pen operations, which greatly contributed to an environment having a high potential for APC breeding program success. Records on the success of the captive breeding program since its inception are available by contacting the JSC Environmental Office (ERD 2019).

Other than APCs located in the breeding facility, no federal or state-listed threatened and endangered were observed during site reconnaissance. According to the USFWS Migratory Bird Program (USFWS, 2012c), the State of Texas is located within the Central Flyway where lands may provide resting, feeding, and breeding grounds for migratory birds, especially flocking species. The proposed project site has the potential to provide low quality, open upland resting areas for migratory birds. However, the area surrounding JSC contains preferable habitat for migratory bird roosting and feeding, specifically the Armand Bayou Nature Reserve/Armand Bayou Park to the north and the undeveloped area along Clear Creek to the south. Migratory waterfowl would likely choose to use these natural areas, rather than the developed, cleared area proposed for construction and demolition. The proposed project site provides little habitat for wildlife and no suitable habitat for federal or state-listed threatened or endangered species. No impacts to threatened and endangered species or migratory birds are expected. No trees or shrubs are expected to be removed due to the project. Existing trees inside the construction perimeter shall be protected to avoid tree loss. No shrubs are currently within the project boundaries. Small wildlife may be impacted by construction activities if the animals were to fall in trenches or excavated areas.

No Action Alternative – Under the No Action Alternative, there would be no impacts to biological resources, including federal and state-protected species.

Proposed Action Alternative – Under the Proposed Action Alternative, there would be no impact to biological resources. The construction of the EOC building would be on an existing parking lot. Onsite personnel shall inspect the construction site and proposed disturbed area for any migratory nesting species prior to the start of construction to identify any potential ground nesting sites. There is the potential for wildlife to enter into trenched or excavated areas during construction; however, per Occupational Safety and Health Administration requirements, all trenched and excavated areas shall be inspected at the start of each day until backfilled. Personnel shall also be directed to inspect for wildlife in these areas immediately prior to backfilling regardless of the time of day to ensure impacted wildlife is removed prior to additional activities as per JSC policy.

4.5 Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, (Public Law 89-665; 16 USC 470 et seq.) as amended, outlines federal policy to protect historic properties and promote historic preservation in cooperation with states, Tribal Governments, local governments, and other consulting parties. The NHPA established the NRHP and designated the SHPO as the entity responsible for administering state-level programs. The NHPA also created the Advisory Council on Historic Preservation, the federal agency responsible for overseeing the Section 106 process and providing commentary on federal activities, programs, and policies that affect historic properties.

Section 106 of the NHPA and its implementing regulations (36 CFR 800) outline the procedures for federal agencies to follow to take into account the effect of their actions on historic properties. The Section 106 process applies to any federal undertaking that has the potential to affect historic properties, defined in the NHPA as those properties (archaeological sites, standing structures, or other historic resources) that are listed in or eligible for listing in the NRHP. Although buildings and archaeological sites are most readily recognizable as historic properties, a diverse range of resources are listed in the NRHP, including roads, landscapes, and vehicles. Under Section 106, federal agencies are responsible for identifying historic properties within the Area of Potential Effects for an undertaking, assessing the effects of the undertaking on those historic properties, if present, and considering ways to avoid, minimize, and mitigate any adverse effects of its undertaking on historic properties. It is the primary regulatory framework that is used in the NEPA process to determine impacts on cultural resources.

A review of the Texas Archeological Sites Atlas (TASA) indicates that the JSC campus and adjacent undeveloped lands were the subject of an archeological survey conducted in 2013. The TASA also indicates that a portion of the adjacent Armand Bayou Archeological District extends into the JSC campus, but clearly does not occur within the construction and demolition area of the proposed action alternative. Consultation with the JSC Historic Resources Specialist identified that the JSC campus is eligible for inclusion on the NRHP as a National Historic District.

No Action Alternative – Under the No Action Alternative, no construction or demolition would occur, and no historic properties would be affected.

Proposed Action Alternative – The proposed action is will adversely impact eligible historic resources and the JSC Historic District. SHPO Section 106 consultation is ongoing. A mitigation plan has been submitted to SHPO and is awaiting concurrence. Historic recordation is ongoing to document the historic elements of the structure prior to construction. These efforts reduce adverse impacts to the historic components to a less than significant level.

4.6 Socioeconomics

4.6.1. Socioeconomic Resources

JSC is located in the Bay area, which is bounded by Interstate 45 to the west, Farm-to-Market (FM) 2351 Clear Lake City Boulevard to the north, Galveston Bay to the east, and FM 518 to the south. The region covers 650 square kilometers (250 square miles) and includes parts of two counties and ten cities. JSC is the largest employer of the Bay area. The Clear Lake area is demographically different from the Houston area because of JSC.

Growth in the Bay Area slowed in the first part of the 1980s due to the oil industry recession, but less so than in other parts of the Houston area (ERD 2019). By 1987, with federal commitment to the International Space Station and renewed growth in the oil industry, the Clear Lake area population has grown at an increasing rate. The Bay Area has grown from approximately 446,000 people (2000 Census) to 528,000 people (2010 Census), which is an annual rate of approximately 7,500 persons per year. The 2018 population is estimated to be 602,000. Most of the growth is in the planned communities of the Bay Area (part of the City of Houston (CoH)), League City, Webster, and Seabrook. According to 2010 census data, the demographics of the area include approximately 70% white, 7.5% black, 5.5% Asian, and the balance of other or mixed races. Those identifying themselves as Hispanic account for approximately 40% of the total population. The median household income is approximately $62,000, and the average family income is approximately $87,000. The median age is approximately 34 years of age. The unemployment rate is less than 7.1%, and less than 15% of working adults have less than a high school education. Approximately 25% of working adults in the area have a college or post-college advanced degree (ERD 2019).

Houston's economic base, while changed since 1980, remains distinct as compared to that of other major cities in the United States (ERD 2019). The Houston economy experienced a sharp decline in the early 1980s but has been expanding in recent years as it relies more on technology and service industries and less on oil refining and exploration. According to the Bay Area Economic Partnership, the area in and around JSC has its economic base in five major industries: 1) aerospace development; 2) specialty chemical production; 3) healthcare and life sciences; 4) maritime activities; and 5) tourism and recreation. Aerospace, centered on JSC, brings millions of dollars in NASA contracts to the area every year. Most of the major aerospace and space technology companies have offices in the area (ERD 2019).

According to the Fiscal Year 2017 JSC Economic Impact Report, of JSC's estimated annual budget of $4.43 billion, $1.877 billion provides salaries for 10,450 onsite civil service and contractor personnel in

Texas, in addition to indirectly funding additional jobs throughout Texas and New Mexico (ERD 2019). Specialty chemical production has grown in the Bay Area. The area is one of the largest petrochemicals and energy production and manufacturing support centers in the nation. The Bay Area supports chemical manufacturing resources, technology, and expertise to maintain stable growth for the industry. The Bayport Industrial Complex, east of JSC, is among the nation's largest privately developed industrial parks, with 70 companies employing nearly 15,000 workers. It has an annual economic impact of over $6 billion in the Clear Lake and Houston region (ERD 2019).

The healthcare and life sciences industries are growing in the Bay Area. The Bay Area and Houston metro area have over 160 biotechnology companies and academic partnerships for healthcare, including over 75 exemplary-ranked hospitals, health clinics, and research facilities. Biotechnological research occurs in agricultural, biomedical, oncology, environmental, genomics, medical devises and nanotechnology fields (ERD 2019).

Maritime activities include maritime transportation, recreational boating, commercial fishing and other sea-based businesses, environmental/coastal protection, and maritime education. According to the Texas Ports Association, 564.7 million tons of cargo and 112,100 jobs are a direct result of maritime cargo activities in Texas, which brings in approximately $22.6 billion in economic activity to Texas. Three ports support the regional economy, including the Port of Houston, the Port of Texas City, and the Port of Galveston. The Bay Area also houses the nation's third largest marina with over 7,000 recreational boat slips. Recreational opportunities include over 4 million visitors each year (ERD 2019).

Clear Lake, a natural estuary, has safe harbors for pleasure craft and direct access to Galveston Bay and the Gulf of Mexico. Tourism is the fastest growing industry in the Clear Lake area. Currently, about one million tourists visit JSC each year. In 1992, Space Center Houston, designed by the Disney organization, opened as JSC's visitor center. Space Center Houston has drawn over 15 million visitors since 1993, resulting in approximately $73 million annually to the local economy and 925 jobs (ERD 2019). The Clear Lake Chamber of Commerce and member organizations actively promote Space Center Houston as a tourist destination, and local businesses, such as hotels and restaurants, reap the benefits of these visitors to the area (ERD 2019).

According to the U.S. Census Bureau (USCB) American Community Survey (ACS) 2017 5-year Estimates, the total population of JSC Census Tract is 5,003 (Census Tract 3413.01). The population over the age of 16 participating in the work force is 3,111 citizens (USCB 2016).

No Action Alternative – Under the No Action Alternative, no impacts to socioeconomic resources would occur.

Proposed Action Alternative – No adverse socioeconomic impacts are expected under the Proposed Action Alternative. No displacements or community impacts are expected since the proposed project would be constructed in an existing parking lot. Once the EOC is complete and all of the employees have been relocated, the demolition would commence. Construction of the EOC and partial repair/alteration of Building 25 would create temporary jobs during the construction. Because of the age of Building 25, ACM and LBP are present. Portions of existing water, fire, and sanitary sewer lines may be asbestos pipe. Prior to demolition, NASA will determine the presence, extent, magnitude, and proper handling of on-site ACM and LBP. Hazardous materials discovered, generated, or used during construction will be handled and disposed in accordance with applicable local, state, and federal regulations. Laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, will be handled in accordance with 40 CFR §262.

4.6.2. Environmental Justice

EO 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Socioeconomic and demographic data for the project area were reviewed to determine if a disproportionate number of minority or low-income persons have the potential to be adversely affected by the proposed project. The information presented in Table 2, Socioeconomic Summary, was gathered from the USCB 2010 Census and the 2013-2017 ACS for evaluation.

Table 2: Socioeconomic Summary

	JSC (Census Tract 3413.01)	Harris County	State of Texas
Total Population (2017)	5,003	4,525,519	27,419,612
Annual median household income	$34,303	$57,791	$57,051
Population below poverty level	31.1%	16.8%	16.0%
Minorities[1]	28.0%	27.3%	18.24%
Hispanic or Latino	16.8%	42.21%	39.0%
1. Racial Minority = Black or African American alone, American Indian and Alaskan Native alone, Asian alone, Native Hawaiian and Other Pacific Islander alone, Some Other Race alone, Two or More Races. Source: USCB, 2013-2017 American Community Survey			

Minorities represented 28.0 percent, 27.3 percent, and 18.24 percent, respectively, of the populations of JSC, Harris County, and the State of Texas populations. Table 3, Summary of Racial Composition, shows the specific racial composition of JSC, Harris County, and the State of Texas.

Table 3: Summary of Racial Composition

Ethnicity	JSC (Census Tract 3413.01)	Harris County	State of Texas
White	55.2%	31.0%	42.8%
Hispanic or Latino	16.8%	42.21%	39.0%
Black or African American	8.3%	18.6%	11.7%
American Indian or Alaska Native	1.2%	0.2%	0.2%
Asian	10.0%	6.8%	4.5%
Native Hawaiian or Other Pacific Islander	0.0%	0.1%	0.1%
Some other race	2.1%	0.2%	0.14%
Two or more races	6.4%	1.4%	1.6%
Source: USCB ACS 2013-2017 5-year Estimates			

Site observations indicate that the demographics of the residential communities adjacent to the proposed project site are consistent with those found throughout the area.

No Action Alternative – Under the No Action Alternative, construction of the new facility would not occur, and there would be no disproportionate impacts on minority or low-income populations.

Proposed Action Alternative – The Proposed Action Alternative would be constructed within the developed JSC campus and would not result in the acquisition of additional land or displacement of people or businesses. Additionally, no impacts associated with the demolition activities are expected to low-income or minority populations. There would be no disproportionately high or adverse impact on minority or low-income portions of the population.

4.6.3. Solid Waste and Hazardous Materials

Solid waste is any waste material, including liquids, solids, and contained gases that are discarded or are managed prior to being discarded. Industrial solid waste is waste associated with activities at an industrial facility. JSC is considered an industrial facility for the purposes of this definition. Hazardous waste is solid waste that is flammable, corrosive, reactive, toxic, or listed by the EPA. JSC generates and stores large quantities of industrial solid and hazardous wastes and is registered by the TCEQ. According to NASA, JSC hazardous waste is not accumulated or managed at JSC for more than ninety (90) days, and JSC is not required to have a storage permit issued by the TCEQ (ERD 2019).

JSC has established procedures to minimize the production of hazardous waste, control its handling, and avoid environmental pollution. The five-year Pollution Prevention Plan, submitted to the TCEQ in December 2018, targets specific wastes and waste sources for reduction, which includes laboratory wastes. Metal finishing in the Technical Services Facility (Building 9) generates spent concentrated baths and rinse water. The dilute rinse water wastes transferred to 55-gallon drums for offsite disposal when the solutions are spent or become contaminated. Waste solvents and oils are generated by maintenance activities, such as painting, compressor cleaning, and degreasing. These wastes are managed at the Hazardous Waste 90-day Accumulation Facility (Building 358) until they are removed for disposal. Other hazardous and universal wastes include sludge from oil-water separators, wastewater containing hazardous organic compounds, lab packs, plating filter cakes, contaminated filter media, used batteries, and contaminated rags. Hazardous wastes may also be generated from spill cleanup activities and contamination removal (ERD 2019).

JSC accumulates only non-hazardous rinse water within the accumulation tank at the Technical Services Facility in Building 9; the six hazardous waste (previously permitted) tanks were formally "clean-closed" and removed in November 2008. The Hazardous Waste 90-day Accumulation Facility (Building 358) is the central storage site for hazardous waste. Waste is generated at various points around JSC and is transferred to this building to be prepared for shipment to disposal sites. Transport vehicles take the wastes to federal/state and JSC approved/audited hazardous waste disposal operations (ERD 2019).

Extensive BMPs and controls for petroleum products are contained in the Integrated Contingency Plan. The elimination or reduction of potential pollutants exposed to rainfall and runoff are covered in a SWPPP as part of the TPDES General Permit (Permit No. TXR05K587). TPDES Multi-Sector General Permit (MSGP) TXR05K587 expired in 2011 and was reissued in 2011 under the MSGP renewal as TXR05AZ55, which was replaced in 2013 with a No Exposure Exclusion under the MSGP as TXRNEAA42. JSC maintains currently maintains MSGP compliance under this No Exposure Exclusion, and no longer maintains a SWPPP. However, JSC is also a Phase II Small MS4 (TXR040214) since 2008. BMPs for minimizing potential pollutants exposed to rainfall and runoff are covered in the Storm Water Management Program as part of the TPDES General Permit (TXR040214).

No Action Alternative – Under the No Action Alternative, no construction would occur, and there would be no impacts to or from hazardous materials or waste.

Proposed Action Alternative – Under the Proposed Action Alternative, hazardous materials or waste impacts are expected to be minimal (demolition and construction debris, asbestos abatement, lead paint containing materials). The proposed construction site is currently an asphalt parking lot that has not been associated with known activities or past uses that involved the generation, storage, or disposal of hazardous materials. There are no records of spills having occurred. Because of the age of Building 25, ACM and LBP are present. Prior to demolition, the presence, extent, concentration, and proper handling of these materials would need to be determined. A building survey is also required for building demolition. Any hazardous materials discovered, generated, or used during construction, including asbestos and lead paint containing materials, would be handled and disposed in accordance with applicable local, state, and federal regulations. Laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, should be handled in accordance 40 CFR §262.

4.6.4. Noise

The CoH has noise ordinances (Code of Ordinances, Chapter 30) that generally prohibit noises that annoy, disturb, or endanger persons within the limits of the city. The Federal Aviation Administration prohibits civil aircraft from operating above the speed of sound (14 CFR §91). An aircraft may generate a sonic boom within the United States only if its operator obtains prior authorization, subject to conditions and limits. The U.S. Air Force also limits the operation of supersonic military aircraft over major U.S. population centers (Air Force Regulation 55-354) (ERD 2019).

Noise is generally defined as unwanted sound. Sound is most commonly measured in decibels (dB) on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. The Day-Night Average Sound Level (DNL) is an average measure of sound. The DNL descriptor is accepted by federal agencies as a standard for estimating sound impacts and establishing guidelines for compatible land uses. EPA guidelines, and those of many other federal agencies, state that outdoor sound levels in excess of 55 dB DNL are "normally unacceptable" for noise-sensitive land uses such as residences, schools, or hospitals (ERD 2019).

There are six main noise sources at JSC. Three of these sources are utilities: 1) Central Heating and Cooling Plant (Building 24N), cooling tower, and CHP; 2) Auxiliary Chiller Facility (Building 28) and cooling tower; and 3) Emergency Power Building (Building 48) (ERD 2019). The other sources are the Vibration and Acoustic Test Facility in Building 13 and the Propulsion Test Facility in Building 353. Sensitive receptors to Center noise include the Child Care Facility (Building 210); the Gilruth Recreation Facility (Building 207); the Space Center Houston Visitor's Center; and homes, stores, and offices surrounding JSC. The CHP (Building 24N) on Second Street southwest of Avenue B has boilers, compressors, chillers, and natural gas turbines that generate noise levels inside the building up to 95 A-weighted decibels (dBA). The Child Care Facility (Building 210), 600 meters (2,000 feet) away, is the closest sensitive receptor. It is estimated that a 36-dBA-noise from this source will reach the facility. The nearest noise receptor outside JSC is a store 1,100 meters (3,700 feet) to the southeast, across NASA Parkway, where the noise from this source is estimated to be 29 dBA.

The Auxiliary Chiller Facility (Building 28), east of the Central Mall near the HL&P canal, generates noise at its cooling tower. In 1995, noise levels in the building were measured at levels from 88.3-101 dBA with the highest reading (101) coming from behind chiller #1 (CH-28-1). The closest outside receptor is a house 500 meters (1,500 feet) to the southeast. The Emergency Power Building (Building 48) adjacent to Mission Control Center (Building 30) in the Central Mall contains seven diesel engines for power backup to critical areas and is not a constant noise source. When three of the seven diesel engines are operating, the internal noise level inside the work area is as high as 124 dBA. The closest external receptor is a store 800 meters (2,600 feet) southeast of the building and outside JSC. It has been estimated that 62 dBA of noise from this source will reach the closest sensitive receptor (ERD 2019).

The Vibration and Acoustic Test Facility in Building 13 is southeast of the intersection of Second Street and Avenue B. The building houses an acoustical chamber that subjects test materials to up to 165 dBA. Acoustic tests are conducted no more than once per day for one to two minutes. The nearest receptor is an offsite gas station located approximately 420 meters (1,380 feet) southeast of the southeast corner of Building 13. Noise from this source is estimated at less than 63 dBA at the facility during tests. The Propulsion Test Facility (Building 353) is in the northern part of the ESTA. It is equipped with a steam ejection system to produce vacuum during routine test procedures. Noise is generated from an exhaust port mounted on a tower 30 meters (100 feet) above the ground. Noise at 98 C-weighted decibels (dBC) is generated two meters (six feet) from the exhaust and 84 to 86 dBC on the ground below the exhaust. The nearest receptor is the Child Care Facility (Building 211), which is 750 meters (2,500 feet) southeast of the building; it receives about 43 dBC when the steam ejectors are operating. The closest receptor outside JSC is a house 1,100 meters (3,600 feet) to the west. The noise level that reaches this house is estimated at 38 dBC (ERD 2019).

JSC's noise sources do not exceed typical conversation levels of 65 dBA at receptors outside JSC. The Child Care Facility (Building B211) receives up to 73 dBA discontinuously from noise sources; this noise level could occasionally disturb its activities. JSC evaluates and controls noise in work areas so that it will not cause loss of hearing or physical impairment. Refer to JPR 1700.1, the JSC Safety & Health Handbook, regarding occupational hearing conservation measures and requirements. JSC has no records of complaints from offsite receptors associated with noise associated with onsite testing activities (ERD 2019).

No Action Alternative – Under the No Action Alternative, no construction would occur, and there would be no impacts to noise levels.

Proposed Action Alternative – Under the Proposed Action Alternative, short-term increases in noise levels are expected during the construction and demolition period. To mitigate noise impacts to nearby noise-sensitive receptors, construction activities would take place during normal business hours.

Equipment and machinery installed at the proposed project site would meet all local, state, and federal noise regulations.

The APC breeding facility is located to the northwest of Building 25. Research is limited on the effects of noise on birds and wildlife, although one study was completed in 2007 on the effects of highway noise on birds. The study determined that bird communication was predicted to be “at risk” when the noise spectrum is 20 dB at a distance of approximately 755 feet, “difficult” when the noise spectrum is 25 dB at a distance of approximately 755 feet, and “impossible” when the noise spectrum is 30 dB at a distance of approximately 755 feet (March, 2011). Although construction noise would exceed 30 dB at times, the distance between the proposed building site and the APC breeding facility is significant, and no long-term impacts are expected.

4.6.5. Transportation

JSC is a secure facility with gates on Space Center Boulevard to the east and north and Saturn Lane to the west. Building 25 is located within JSC on Second Street. Transportation to JSC for most employees is by private auto. JSC has gates on NASA Parkway to the south, Space Center Boulevard to the east and north, and Saturn Lane to the west. Traffic on NASA Parkway is generally crowded during the morning and afternoon rush hours. The road was widened in 1997, and construction was completed in 2008, creating a Webster bypass to facilitate the east-west movement of vehicles along NASA Parkway toward the Gulf Freeway (Interstate Highway (IH) 45) (ERD 2019).

Autos and trucks reach the Clear Lake area on State Highway 3, State Highway 146, and IH 45. NASA Parkway connects these roads with the main gate to JSC. The Metropolitan Transit Authority of Harris County provides Park and Ride bus service between Clear Lake City and downtown Houston on a staggered schedule. A transit stop is located just outside the main gate on Saturn Boulevard. Railroads run parallel to State Highway 3 and State Highway 146. The Southern Pacific provides freight rail service to Seabrook, and the Missouri-Kansas-Texas Railroad serves Webster. JSC does not have any direct rail service (ERD 2019).

No Action Alternative – Under the No Action Alternative, there would be no construction, and no impacts to transportation would occur.

Proposed Action Alternative – Under the Proposed Action Alternative, there would be no long-term impact to the existing roadway network. Because the function of the proposed building would be consistent with the existing use, no additional traffic is expected, although traffic may become more concentrated along Second Street.

There would be a temporary increase in construction traffic on roadways leading into JSC, as well as increased traffic within the campus. This slight increase in traffic could potentially result in slower traffic flow during construction. Although road closures on campus are not expected, appropriate signage would be posted on affected roadways and construction vehicles and equipment would be stored on site during project construction to mitigate potential delays.

4.6.6. Public Health and Safety

EO 13045 (*Protection of Children*) requires federal agencies to make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children. Safety and security issues considered in this EA include the health and safety of area residents, the public-at-large, and the protection of personnel involved in the activities related to the construction of the proposed project.

No Action Alternative – Under the No Action Alternative, construction of the new facility would not occur, and there would be no impacts to public health and safety.

Proposed Action Alternative – Under the Proposed Action Alternative, construction activities could present safety risks to those performing the activities but impacts to public health and safety are not expected. To minimize risks, qualified personnel trained in the proper use of equipment, including appropriate safety precautions, would perform construction activities. Activities would be conducted in a safe manner, in accordance with the standards specified in the OSHA regulations and procedures and health and safety requirements contained within JSC 1700.1 (JSC Safety and Health Handbook.). The appropriate signage and barriers would be in place prior to construction activities to alert pedestrians and motorists of project activities. The construction contractor would be responsible for utility locates and adhering to the Texas One-Call Law.

5.0 SUMMARY

Table 4, Summary of Impacts, summarizes the potential impacts of the Proposed Action Alternative and conditions or mitigation measures to offset those impacts.

Table 4: Summary of Impacts

Affected Environment	Impacts	Mitigation
Geology, Soils, and Seismicity	Construction activities are not expected to affect underlying geologic resources or seismicity. Construction activities would disturb approximately 35,500 square feet of previously-disturbed soils in the footprint of the proposed EOC building, existing parking lot, sanitary sewer, fire water, and storm drain where the EOC will be sited. The proposed project would have a minimal short-term impact on native soils. No impacts to prime and unique farmlands would occur.	The applicant would be required to prepare a SWPPP and obtain a TPDES permit prior to construction. Implementation of appropriate BMPs, as described in the SWPPP and required for the TPDES permit, would help minimize site runoff. BMPs would include the installation of silt fences and the revegetation of disturbed soils to minimize erosion. Excavated soils and waste materials would be managed and disposed in accordance with applicable local, state, and federal regulations. Construction contractors would obtain and comply with necessary permits and adhere to the procedures outlined in the contractual agreement with NASA JSC for handling contaminated materials. A TPDES CGP NOI is only required if the entire impacted area equals or exceeds five acres.
Air Quality	No long-term impacts to air quality would occur. The proposed Building 25 renovations and addition of the EOC building, would not emit criteria air pollutants. Short-term impacts to air quality may occur during the construction and demolition phase of the project. The contribution of the project to GHG emissions could be considered an indirect impact to climate change in both directions.	During the construction and demolition phases, emissions from fuel-burning internal combustion engines (e.g., heavy equipment and earthmoving machinery) could temporarily increase the levels of some criteria pollutants, including CO, NO_2, O_3, PM_{10}, and non-criteria pollutants, such as VOCs. To reduce the emission of criteria pollutants, fuel-burning equipment running times would be kept to a minimum, and engines would be properly maintained. This temporary increase in emissions is not expected to impact long-term air quality or visibility in the region (ERD 2019).
Surface Water	The design of Building 25 and the EOC addition would follow the Energy Independence and Security Act of 2007, which specifies requirements for the reduction of stormwater runoff.	To reduce impacts to offsite surface waters, the contractor would implement appropriate BMPs, such as installing silt fences and revegetating bare soils. The contractor would also be required to prepare a SWPPP and obtain a TPDES permit prior to construction and demolition. A TPDES CGP NOI is only required if the entire impacted area equals or exceeds five acres.
Groundwater	No impacts to groundwater are expected.	None.
Waters of the U.S. including Wetlands	No direct impacts to Waters of the U.S., including wetlands, would occur and the project would not require permitting with the USACE.	Appropriate BMPs would be implemented to minimize soil erosion and reduce sediment transport to offsite surface waters and wetlands.
Floodplains	No direct impacts to floodplains would occur and there would be no impacts to floodplains.	None.

Affected Environment	Impacts	Mitigation
Coastal Resources	The new facility would be constructed within the Texas coastal zone. However, the proposed project is not intended to promote additional development within the coastal zone. The proposed project is not located within a CBRS and is not expected to promote additional development with any adjacent CBRS.	None.
Biological Resources	No impact to biological resources. The construction of the EOC building would be on an existing parking lot. The proposed project site provides little habitat for wildlife andno suitable habitat for federal or state-listed threatened or endangered species. No impacts to threatened and endangered species or migratory birds are expected. Trenching and excavation may potentially impact wildlife during construction.	Prior to the start of construction activities, personnel shall inspect the construction site and staging areas for any nesting birds. Personnel shall inspect open trenches and excavations prior to backfilling and daily prior to work starting to identify any safety issues or wildlife concerns. All wildlife concerns shall be reported to the JSC Wildlife Biologist for resolution prior to the start of work.
Cultural Resources	Adverse impacts to the eligible historic resource and the eligible JSC Historic District will occur.	SHPO Section 106 consultation and historic recordation and photographs reduce adverse impacts to a less than significant level. A mitigation plan has been submitted to SHPO for concurrence.
Socioeconomics	No adverse socioeconomic impacts are expected under the Proposed Action Alternative. No displacements or community impacts are expected since the proposed project would be constructed in an existing parking lot. Once the EOC is complete and all of the employees and laboratories have been relocated, the demolition would commence. Construction of the EOC and demolition of existing structures would create temporary jobs during the construction and demolition phases.	None.
Environmental Justice	The proposed project would be constructed within the developed JSC campus and would not result in the acquisition of additional land or displacement of people or businesses. Additionally, no impacts associated with the demolition activities are expected to low-income or minority populations. There would be no disproportionately high or adverse impact on minority or low-income portions of the population.	None.

Affected Environment	Impacts	Mitigation
Solid Waste and Hazardous Materials	No hazardous materials or waste impacts are expected. The proposed construction site is currently an asphalt parking lot that has not been associated with known activities or past uses that involved the generation, storage, or disposal of hazardous materials. There are no records of spills having occurred.	Prior to demolition, the presence, extent, concentration, and proper handling of these materials would need to be determined. Any hazardous materials discovered, generated, or used during construction, including ACM and LBP, would be handled and disposed in accordance with applicable local, state, and federal regulations. Laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, should be handled in accordance 40 CFR §262.
Noise	Short-term increases in noise levels are expected during the construction and demolition period.	To mitigate noise impacts to nearby noise-sensitive receptors, construction activities would take place during normal business hours. Equipment and machinery installed at the proposed project site would meet all local, state, and federal noise regulations.
Transportation	No long-term impact to the existing roadway network would occur. Because the function of the proposed building would be consistent with the existing use, no additional traffic is expected, although traffic may become more concentrated along Second Street.	There would be a temporary increase in construction traffic on roadways leading into JSC, as well as increased traffic within the campus. This slight increase in traffic could potentially result in slower traffic flow during construction. Although road closures on campus are not expected, appropriate signage would be posted on affected roadways and construction vehicles and equipment would be stored on site during project construction to mitigate potential delays.
Public Health and Safety	Construction activities could present safety risks to those performing the activities, but impacts to public health and safety are not expected.	To minimize risks, qualified personnel trained in the proper use of equipment, including appropriate safety precautions, would perform construction activities. Activities would be conducted in a safe manner, in accordance with the standards specified in the OSHA regulations and procedures and health and safety requirements contained within JSC 1700.1 (JSC Safety and Health Handbook.). The appropriate signage and barriers would be in place prior to construction activities to alert pedestrians and motorists of project activities. The construction contractor would be responsible for utility locates and adhering to the Texas One-Call Law.

6.0 CUMULATIVE IMPACTS

According to CEQ regulations, cumulative impacts represent the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7)." In accordance with NEPA and to the extent reasonable and practical, this EA considered the combined effect of the Proposed Action Alternative and other actions occurring or proposed in the vicinity of the proposed project site. The proposed construction and demolition activities are part of NASA's repair by replacement program, which is part of JSC's vision for growth through consolidation. Future growth at JSC would be constructed to reduce the footprint of structures and reduce impacts to floodplains, while constructing sustainable, modern facilities. As a result of this vision, JSC anticipates a reduction in energy consumption through a more efficient use of space and elimination of older, energy-inefficient structures.

Construction or demolition of other projects may occur simultaneously with the Proposed Action Alternative. The activities may have a cumulative temporary impact on noise due to use of heavy equipment and air quality in the area by increasing criteria pollutants during construction activities. Construction of the proposed EOC and demolition of associated structures would incur additional short-term impacts to soils, air quality, surface water, noise, and transportation. Impacts to these resources would remain consistent with those defined for the Proposed Action Alternative analysis.

7.0 MITIGATION

In general, the proposed design and construction methods were chosen to avoid and/or minimize impacts to natural resources, reducing the need for mitigation. To minimize the environmental impacts during construction and demolition activities, NASA incorporates environmental requirements into all construction specifications. NASA's construction contractors must comply with permit conditions in addition to NASA contractual requirements. BMPs meeting or exceeding applicable federal, state, and local environmental protection and erosion control specifications and practices are required during construction.

Mitigation measures that are resource-specific would be addressed below once all agency correspondence has been received. Adjustments to these measures due to site-specific conditions may be necessary and would be decided on a case-by-case basis by NASA, construction contractors, and applicable agencies if necessary.

8.0 AGENCIES AND PERSONS CONSULTED

NASA is the lead federal agency for conducting the NEPA compliance process for the proposed construction of the new EOC. It is the goal of the lead agency to expedite the preparation and review of NEPA documents and to be responsive to the needs of the community and the purpose and need of the proposed action while meeting the intent of NEPA and complying with all NEPA provisions. NASA provided notification to the public on the availability of the Draft EA through publication of a Notice of Availability for the Draft EA in local newspapers informing the public of NASA's decision to proceed with the project. The Draft EA was made available for public review at the Freeman Public Library (16616 Diana Lane, Houston, TX 77062). NASA conducted a 30-day public comment period commencing on the initial date of publication of the public notice. In accordance with applicable local, state, and federal regulations, the applicant would be responsible for acquiring any necessary permits prior to commencing construction at the proposed project site. As of the date of this report, no consultation has been initiated.

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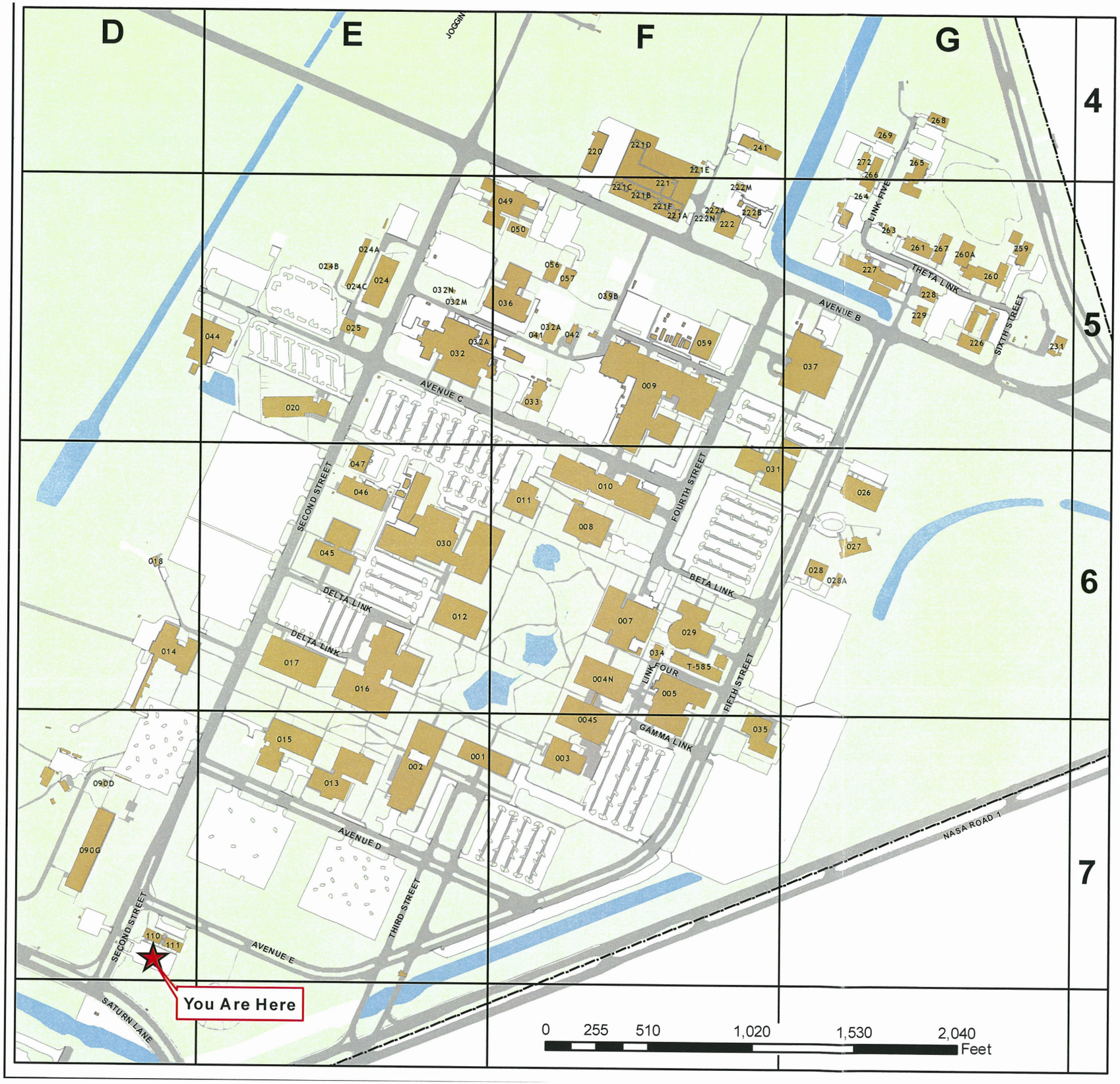
Appendices

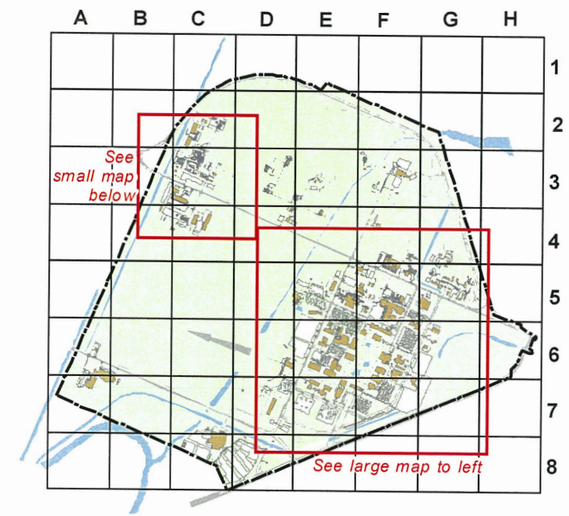
Appendix A: Attachments

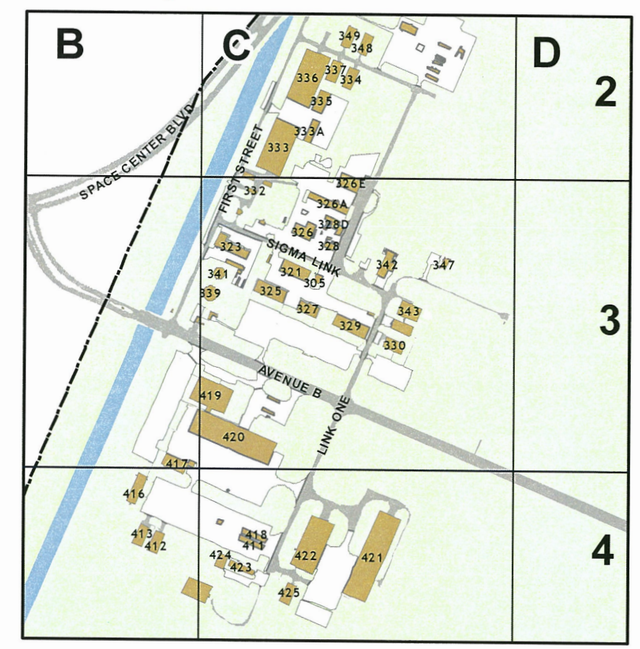
Attachment: 1

Johnson Space Center

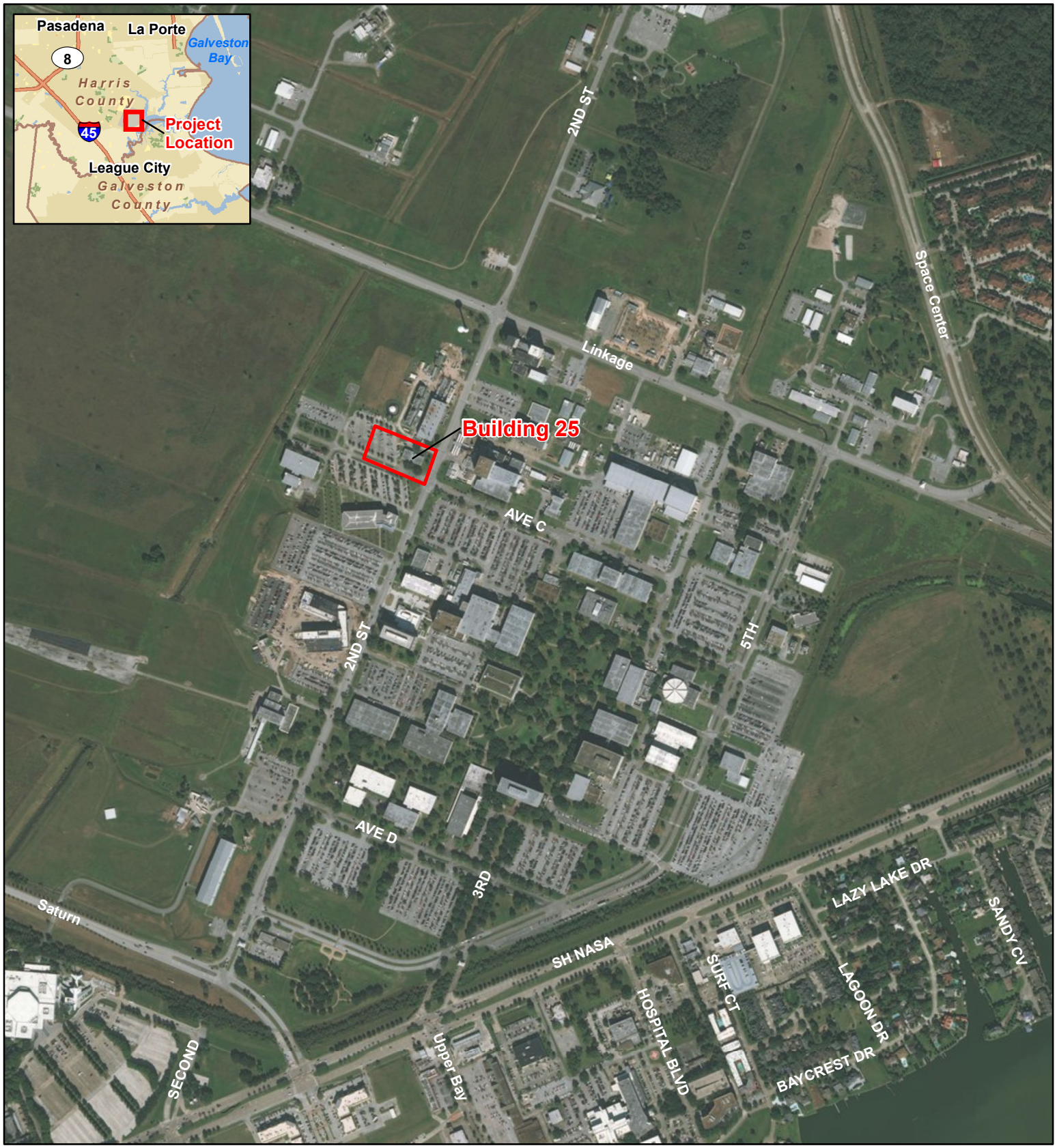
Building Locator







July 2011



Project Location

N
W E
S

Feet

0 400 800

Baer Project No. 182054.01
Date: March 21, 2019

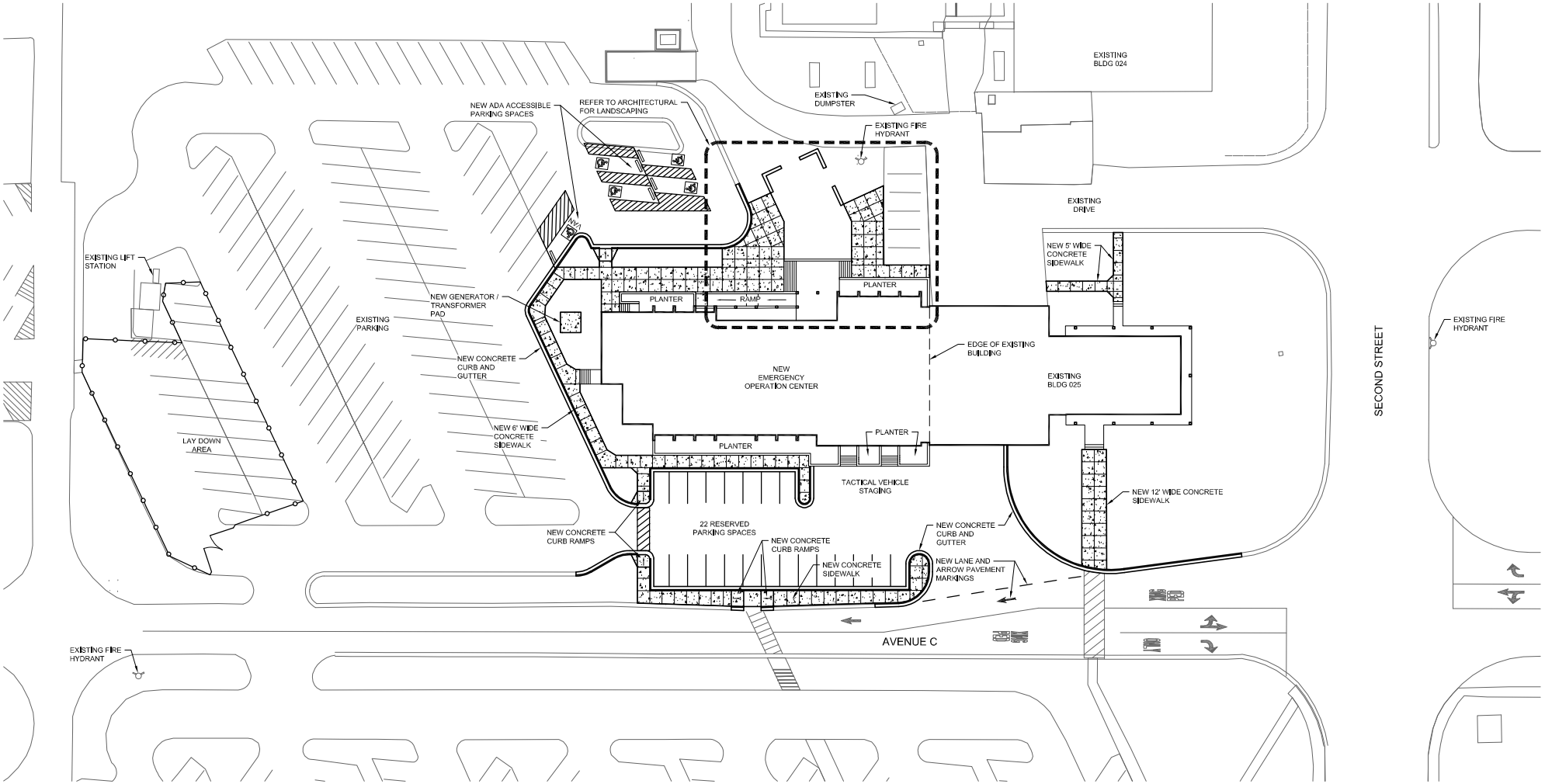
TBPE Firm No. F-3181 TBPG Firm No. 50030

Base Map: ESRI World Imagery

Attachment 2
Project Location

Fire Operations Facility
(Building 25)
Environmental Assessment

Baer Engineering
and Environmental Consulting, Inc.



SUBMITTAL - NFC

1 SITE PLAN
1" = 20'

20 10 0 20 40

TRUE NORTH
PLAN NORTH
23°10'43"
N

PARKING TOTALS

114	EXISTING POV SPACES
22	NEW RESERVED SPACES
4	NEW ACCESSIBLE SPACES
1	NEW VAN ACCESSIBLE SPACE
141	TOTAL SPACES

Attachment 3

REVISION	DATE

SIGNATURES		DATE
DR:	E. CHAVEZ	11/30/18
CH:	J. HOLLAND	11/30/18
DES:	F. PODUSKA	11/30/18
APPR:	Approver	
REV:		
DISCP:		
PE:		
APPR:		

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS
BUILDING:
SITE PLAN

PROJECT NO.
PROJECT ID WAO
CODE IDENT. NO. 52FR7
SHEET NO. OF 77
DWG. NO. C-101

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator, Zone 15. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Houston-Galveston Area Council and was revised and enhanced by Harris County.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

The AE Zone category has been divided by a **Limit of Moderate Wave Action (LiMWA)**. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LiMWA (or between the shoreline and the LiMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

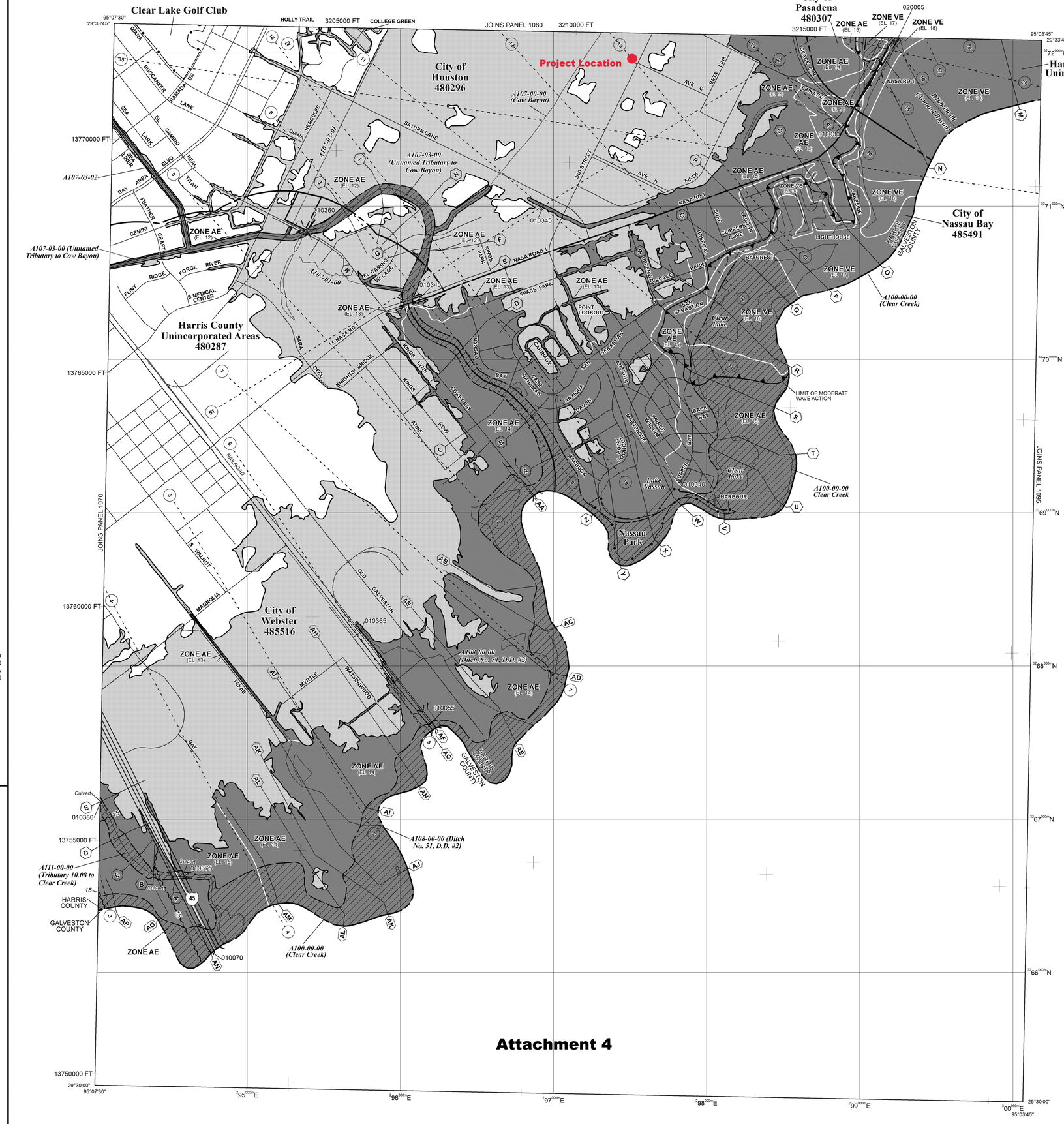
Contact the **FEMA Map Information eXchange** at 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Information eXchange may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/national-flood-insurance-program.

Vertical Datum Adjustment due to subsidence is the 2001 adjustment.

Benchmarks shown on this map were provided by either Harris County or the National Geodetic Survey. To obtain elevation, description, and location information for benchmarks provided by Harris County, please contact the Permits Office of the Engineering Department at 713-274-3900 or visit their website at http://www.eng.hctx.net/permits. For information regarding the benchmarks provided by National Geodetic Survey, please see note above.

Some bridges and other structures shown on the detailed studied streams are not labeled. See corresponding flood profile for appropriate names.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
	Limit of Moderate Wave Action
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section Line
23 - - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
3 76 000m N	1000-meter Universal Transverse Mercator grid values, zone 15N
600000 FT	5000-foot grid values: Texas State Plane coordinate system, South Central zone (FIPSZONE 4204), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 28, 1990

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 30, 1992
November 6, 1996
April 20, 2000
June 18, 2007
January 6, 2017

FOR REASON OF REVISION
SEE NOTICE TO FLOOD INSURANCE STUDY USERS IN THE FIS REPORT

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1090M

FIRM
FLOOD INSURANCE RATE MAP

HARRIS COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 1090 OF 1150
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HARRIS COUNTY	480287	1090	M
HOUSTON, CITY OF	480296	1090	M
NASSAU BAY, CITY OF	485491	1090	M
PASADENA, CITY OF	480307	1090	M
WEBSTER, CITY OF	485516	1090	M

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48201C1090M

MAP REVISED
JANUARY 6, 2017

Federal Emergency Management Agency

Appendix B:
Photolog

Photograph #1: Existing Fire Operations Facility (Building 25) facing west.

Photograph #2: Existing Building 25 exterior facing northwest.

Photograph #3: View of existing parking lot along Avenue C. Photographer is facing west.

Photograph #4: View of existing Building 25 parking lot facing the Central Heating and Cooling Plant (Building 24). Photographer is facing north.

Photograph #5: View of existing Building 25 driveway with the Central Heating and Cooling Plant (Building 24) on the right. Photographer is facing west.

Photograph #6: View of existing Building 25 parking lot. Photographer is facing west.

Photograph #7: View of existing Building 25 facing Second Street. Photographer is facing

Photograph #8: View of existing Building 25 parking lot. Photographer is facing north.

Photograph #7: View of existing Building 25 facing Second Street. Photographer is facing

Photograph #10: View of existing Building 25 parking lot. Photographer is facing west.

Photograph #11: View of existing parking lot behind Building 25 Photographer is facing east.

Photograph #12: View of existing Building 25 Photographer is facing southeast.

Appendix C: Public Review Comments and Responses

COMMENT 1

TEXAS PARKS & WILDLIFE

Life's better outside.®

Commissioners

S. Reed Morian
Chairman
Houston

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Fort Worth

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Lee M. Bass
Chairman-Emeritus
Fort Worth

T. Dan Friedkin
Chairman-Emeritus
Houston

Carter P. Smith
Executive Director

April 23, 2021

Mr. Richard Fowler, NEPA Manager
National Aeronautics and Space Administration
Johnson Space Center
2101 NASA Parkway
Houston, Texas 77058-3696

RE: Draft Johnson Space Center Emergency Operations Center B25 Project Environmental Assessment; Harris County, Texas

Dear Mr. Fowler:

Texas Parks and Wildlife Department (TPWD) has received and reviewed the submitted documentation regarding the above-referenced project.

Project Description

The National Aeronautics and Space Administration (NASA) Johnson Space Center (JSC) facility provided a courtesy notification regarding the availability of the JSC New Emergency Operations Center (EOC) and Partial Repair/Alternations of Building 25 Environmental Assessment (EA) for review. This EA satisfies the requirements of the National Environmental Policy Act (NEPA) and identifies the requirements for a NASA Institutional Construction of Facilities Design/Build project for an approximately 16,446-square foot EOC at JSC in Houston, Texas. The EOC is located adjacent to an existing Building within JSC.

TPWD, as the state agency with primary responsibility for protecting the state's fish and wildlife resources and in accordance with the authority granted by Texas Parks and Wildlife Code (PWC) section 12.0011, hereby provides the following recommendations to minimize the adverse impacts to the state's fish and wildlife resources in the construction of the proposed project. Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, PWC section 12.0011. For tracking purposes, please refer to TPWD project number 46400 in any return correspondence regarding this project.

Construction Recommendations

General Construction Recommendations

Recommendation: TPWD recommends avoiding or minimizing any clearing of native trees and shrubs.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.

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

Recommendation: TPWD recommends the NASA JSC avoid utilizing invasive species in seed mixes or plantings for revegetation or soil stabilization purposes. More information and resources regarding revegetation and restoration with native plants may be found at TPWD's Wildlife Habitat Assessment Program: Planning Tools and Best Management Practices webpage.

Recommendation: If trenching or other excavation is involved in the project, TPWD recommends that contractors keep trenching/excavation and backfilling crews close together to minimize the amount of trenches/excavation areas left open at any given time during construction. TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. Trenches left open for more than two daylight hours should be inspected for the presence of trapped wildlife prior to backfilling. If trenches/excavation areas cannot be backfilled the day of initial excavation, then escape ramps should be installed at least every 90 meters. Escape ramps can be short lateral trenches or wooden planks sloping to the surface at an angle less than 45 degrees (1:1).

Federal Law: Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits direct and affirmative purposeful action that reduce migratory birds, their eggs, or their nests, by killing or capturing, to human control, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. The U.S. Fish and Wildlife Service (USFWS) Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

Within the project area, potential impacts to migratory birds may occur during site preparation and grading activities through the disturbance of existing vegetation and bare ground that may harbor active bird nests, including nests that may occur in grass, shrubs and trees and on bare ground

Recommendation: TPWD recommends any clearing be scheduled outside of the general bird nesting season of March 15th to September 15th; however, if clearing must occur during nesting season, nest surveys should be conducted prior to clearing. If nests are observed during surveys, a vegetation buffer area of no less than 150-feet

in diameter should remain around the nest until all young have fledged. Likewise, active nests on or within the existing building should not be disturbed.

State Law: Parks and Wildlife Code – Chapter 64, Birds

PWC section 64.002, regarding protection of nongame birds, provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. PWC section 64.003, regarding destroying nests or eggs, provides that no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl.

Recommendation: Please review the *Federal Law: Migratory Bird Treaty Act* section above for recommendations as they are also applicable for Chapter 64 of PWC compliance.

Natural Spaces and Quality of Life, Monarch and Pollinator Conservation

TPWD encourages landowners to restore habitat for wildlife on their properties, as a way to contribute to wildlife conservation where they live, work, and play. These small conservation sites, when co-located with facilities such as residences, libraries or schools, afford important opportunities not only for wildlife conservation but for promoting human well-being. On-site habitats such as "pocket prairies" or small wetlands offer residents and other citizens sites for pleasant outdoor excursions. Children who learn and play outdoors experience better health, better performance in school, higher self-esteem, and myriad other benefits. TPWD has collaborated with Independent School Districts to achieve common goals that benefit students, teachers, the community, and wildlife; there is opportunity to obtain similar benefits for JSC personnel through the current EOC B25 project.

Additionally, there is widespread concern regarding the decline of monarch butterflies (*Danaus plexippus*) and other native insect pollinator species due to reductions in native floral resources. To support pollinators and migrating monarchs, TPWD encourages the establishment of native wildflower habitats on private and public lands. Establishing wildflower habitats in new developments can contribute to pollinator conservation. Greenspaces surrounding development can provide habitat for a diverse community of pollinators, providing forage for food and breeding or nesting opportunities. By acting as refugia for pollinators in otherwise inhospitable landscapes, this habitat can contribute to the maintenance of healthy ecosystems and provision of ecological services such as crop pollination services. Recent publications on conserving pollinators in Texas can be found at the TPWD Wildlife Habitat Assessment Program: Planning Tools and Best Management Practices webpage.

Recommendation: TPWD encourages the NASA JSC to consider incorporating "wildscape" features (e.g., pocket prairies, pollinator gardens) into the plans and design for the proposed development. Online resources are available on the TPWD Wildscapes program webpage. For technical guidance related to wildscape features contact TPWD Urban biologists Mr. Kelly Norrid (Kelly.Norrid@tpwd.texas.gov or 281-456-7029) or Ms. Diana Foss (Diana.Foss@tpwd.texas.gov or 281-456-7029).

Recommendation: To contribute to pollinator conservation efforts, TPWD encourages the NASA JSC to consider incorporating pollinator habitat into the landscaping plans for any proposed development. Pollinator habitats can be designed to provide aesthetic benefits to residents and visitors. Species appropriate for the project area can be found by accessing the Lady Bird Johnson Wildflower Center, working with TPWD biologists to develop an appropriate list of species, or utilizing resources found at the Xerces Society's Guidelines webpage.

Recommendation: TPWD advises against planting the non-native milkweed species black swallow-wort (*Cynanchum louiseae*) and pale swallow-wort (*C. rossicum*). Monarch butterflies will lay eggs on these plant species, but the larvae are unable to feed and complete their life cycle. Additionally, these plant species can be highly invasive. Additionally, TPWD advises against planting the non-native tropical milkweed (*Asclepias curassavica*), a popular commercial nursery milkweed that can persist year-round in southern states. The year-round persistence of tropical milkweed fosters greater transmission of the protozoan *Ophryocystis elektroscirrha* (OE), increasing the likelihood that monarchs become infected with the debilitating parasite.

Thank you for considering project impacts to Texas' fish and wildlife resources. If you have any questions, please contact me at Rachel.Lange@tpwd.texas.gov or (979) 732-4213.

Sincerely,

Rachel Lange
Wildlife Habitat Assessment Program
Wildlife Division

RAL/46400

RESPONSES TO COMMENT 1

JSC appreciates and acknowledges the comments provided by the Texas Parks and Wildlife Department (TPWD). NASA is committed to complying fully with all applicable requirements associated with managing natural resources, and JSC recognizes the associated obligations for the stewardship of these resources.

In response to the comments relating to general construction recommendations, JSC does not include removal of any existing trees for the implementation of the B25 EOC project, and there are no shrubs in the area that would be impacted by the project. The existing trees inside the construction boundary will be protected and maintained during construction. The new construction will be placed on what is currently a parking lot, a small strip of landscaped turf, and sidewalk that runs along the side of the existing structure. Due to the requirement for the new structure to be built up to avoid impacts from any future floodwaters, the structure will have sloping lawns that level out to the existing grade once complete. The design calls for sod to be placed up to the building façade, which is how the existing and eligible historic building currently is landscaped. Please note that since the existing structure is eligible for the National Register of Historic Places and inside the eligible JSC Historic District, the landscaping of the new addition is required to be consistent with the historical elements of the existing structure. To stabilize soil on the incline up to the new structure, the project will be using pegged sod to ensure vegetation stays in place. As such, the project meets the recommendations of the TPWD to not remove native trees or shrubs, not utilize plastic mesh erosion control blankets or mats, and avoid invasive species in seed mixes or plantings used for stabilization.

In response to the recommendations relating to trenching and other excavation activities that may be required by the project, the project's Geological report and resulting mitigation requirements express the same requirement to ensure trenching and excavation is completed and backfilled as quickly as possible and requires daily inspections prior to work to meet Occupational Safety and Health Administration requirements. Checking for wildlife impacts during these daily inspections is a reasonable expectation and text has been added to the EA to ensure that TPWD recommendation is included in the project implementation. Further, an 8-foot fence surrounding the construction site should deter most wildlife from entering the construction area. Construction personnel will also be informed of the need to inspect trenches and excavation for any wildlife prior to backfilling. Per JSC policy, wildlife conflicts and injuries are to be reported to the onsite Wildlife Biologist for timely resolution, which will ensure that any wildlife situation that occurs can be quickly resolved to allow work to continue and trenches and excavation to be closed as quickly as possible.

In response to the clearing recommendation for compliance with the Federal Migratory Bird Treaty Act and Parks and Wildlife Code (PWC) 64.002, this project is to be constructed on an existing paved parking lot with only a small strip of turf along the side of the existing building to be disturbed or removed. The well trafficked nature of this paved parking lot and small turf area and frequent mowing would not be conducive to nesting ground bird species. There are no shrubs in the vicinity that are expected to be impacted, and the existing trees nearby are to remain in place. As such, it is not expected that the project would impact nesting migratory bird species. Further, 280 yards to the northwest of the project location is over 700 acres of Texas Coastal Prairie that would be more suitable and preferable for migratory birds nesting activities. However, JSC personnel shall conduct a walkthrough of the construction site and staging areas to identify and address any ground nesting areas prior to construction.

In response to the Natural Spaces, Quality of Life, and Monarch and Pollinator Conservation recommendations, JSC recognizes the TPWD's efforts to encourage wildlife habitat and restoration practices, and fully supports these initiatives. JSC currently has over 700 acres of Texas Coastal Prairie, forested areas, and small wetlands that provide habitat for local and migratory species that occur onsite. JSC continues to maintain and restore these habitat for both plant and wildlife species, working with local partners, such as the Houston Zoo, the nearby Armand Bayou Nature Center, Master Naturalists, and Katy Prairie Conservancy to encourage conservation and provide education for employees, participant groups, and local school children. Further, Houston Zoo staff planted a pollinator garden on JSC property in 2018 as part of the Pollinators

Pathways program, linking pollinator gardens for monarchs and other pollinator species through various properties throughout the local area, including the nearby 200-acre Exploration Green greenspaces. In addition to the 2011 partnership with the Lady Bird Johnson Wildflower Center to seed approximately 10 acres of JSC property with wildflowers and prairie grasses, JSC also has installed several native gardens in landscaped beds throughout the Mall Area of the JSC Campus and encourages the use of native, deer-resistant plant species in the landscaped beds throughout the site.

As mentioned previously, the B25 EOC project does not allow for gardens along the building's exterior due to the angle of the incline required for flood impact prevention during emergency situations and the historic landscaping of the existing structure. Sod is planned for the permeable surfaces around the new structure to match the existing structure's façade. If landscaped beds were to become an option in future, JSC promotes the use of native plant species throughout the site. The plant list provided in the JSC Landscape Standards do not include the black swallow-wort, pale swallow-wort, or non-native tropical milkweed mentioned in the TPWD comments, and these species have been provided to the onsite Grounds contract, who maintains the landscaped areas throughout the site, as species to avoid to the greatest extent possible.

The following text (in italics) has been added to the EA in light of the comments above.

Section 4.4.1, Wildlife, on page 30, first paragraph:

Other than APCs located in the breeding facility, no federal or state-listed threatened and endangered were observed during site reconnaissance. According to the USFWS Migratory Bird Program (USFWS, 2012c), the State of Texas is located within the Central Flyway where lands may provide resting, feeding, and breeding grounds for migratory birds, especially flocking species. The proposed project site has the potential to provide low quality, open upland resting areas for migratory birds. However, the area surrounding JSC contains preferable habitat for migratory bird roosting and feeding, specifically the Armand Bayou Nature Reserve/Armand Bayou Park to the north and the undeveloped area along Clear Creek to the south. Migratory waterfowl would likely choose to use these natural areas, rather than the developed, cleared area proposed for construction and demolition. The proposed project site provides little habitat for wildlife and no suitable habitat for federal or state-listed threatened or endangered species. No impacts to threatened and endangered species or migratory birds are expected. *No trees or shrubs are expected to be removed due to the project. Existing trees inside the construction perimeter shall be protected to avoid tree loss. No shrubs are currently within the project boundaries. Small wildlife may be impacted by construction activities if the animals were to fall in trenches or excavated areas.*

<u>No Action Alternative</u> – Under the No Action Alternative, there would be no impacts to biological resources, including federal and state-protected species.

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, there would be *minimal* impact to biological resources. The construction of the EOC building would be on an existing parking lot. *Onsite personnel shall inspect the construction site and proposed disturbed area for any migratory nesting species prior to the start of construction to identify any potential ground nesting sites. There is the potential for wildlife to enter into trenched or excavated areas during construction; however, per Occupational Safety and Health Administration requirements, all trenched and excavated areas shall be inspected at the start of each day until backfilled. Personnel shall also be directed to inspect for wildlife in these areas immediately prior to backfilling regardless of the time of day to ensure impacted wildlife is removed prior to additional activities as per JSC policy.*

Section 5.0, Summary, Table 4 Summary of Impacts, on page 39, second row:

Affected Environment	Impacts	Mitigation
Biological Resources	No impact to biological resources. The construction of the EOC building would be on an existing parking lot. The proposed project site provides little habitat for wildlife andno suitable habitat for federal or state-listed threatened or endangered species. No impacts to threatened and endangered species or migratory birds are expected. *Trenching and excavation may potentially impact wildlife during construction.*	*Prior to the start of construction activities, personnel shall inspect the construction site and staging areas for any nesting birds. Personnel shall inspect open trenches and excavations prior to backfilling and daily prior to work starting to identify any safety issues or wildlife concerns. All wildlife concerns shall be reported to the JSC Wildlife Biologist for resolution prior to the start of work.*

COMMENT 2

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Bobby Janecka, *Commissioner*
Toby Baker, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 28, 2021

Richard Fowler
Manager
NASA
2101 NASA Parkway
Houston, Texas 77058

Via: E-mail

Re: TCEQ NEPA Request #2021-045. Construction of facilities for the Johnson Space Center and New Emergency Operations Center. Harris County.

Dear Mr. Fowler,

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers the following comments:

In accordance with the general conformity regulations in 40 CFR Part 93, this proposed action was reviewed for air quality impact. The proposed action is located in Harris County, which is designated nonattainment for the ozone National Ambient Air Quality Standards (NAAQS) with a classification of serious for the 2008 eight-hour ozone NAAQS and a classification of marginal for the 2015 eight-hour ozone NAAQS. General conformity requirements apply for federal actions in Harris County according to the higher, serious classification.

Volatile organic compounds (VOC) and nitrogen oxides (NO_X) are precursor pollutants that lead to the formation of ozone. A general conformity demonstration may be required when the total projected direct and indirect VOC or NO_X emissions from an applicable action are equal to or exceed the *de minimis* emissions level, which is 50 tons per year (tpy) for ozone NAAQS serious nonattainment areas. Based on the information provided to the TCEQ, the emissions from this proposed action are expected to be below the general conformity *de minimis* threshold and are not anticipated to impact the state implementation plan.

We do not anticipate significant long term environmental impacts from this project as long as construction and waste disposal activities are completed in accordance with applicable local, state, and federal permits, statutes, and regulations. We agree with a finding of no significant impact and have no objection to the release of funds for this project. We recommend that the applicant take necessary steps to ensure that best management practices are used to control runoff from construction sites to prevent detrimental impact to surface and ground water.

Any debris or waste disposal should be at an appropriately authorized disposal facility.

Thank you for the opportunity to review this project. If you have any questions, please contact the agency NEPA coordinator at (512) 239-0010 or NEPA@tceq.texas.gov

Sincerely,

Ryan Vise,
Division Director
External Relations

P.O. Box 13087 • Austin, Texas 78711-3087 • 512-239-1000 • tceq.texas.gov

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RESPONSES TO COMMENT 2

Thank you for your concurrence that the B25 EOC construction is expected to be below the general conformity de minimis threshold. JSC will install and operate the equipment in accordance with all regulatory emission control requirements. Further, construction and waste disposal activities shall meet all applicable permits, statues, and regulations, including those for disposal at an authorized disposal facility. JSC follows TCEQ Texas Pollutant Discharge Elimination System Construction General Permit requirements for minimizing stormwater pollution, including the implementation of appropriate best management practices to effectively control runoff from the construction site.