

Building 31 Annex Supplemental Environmental Assessment

Center Operations Directorate (JA)

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

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ABSTRACT

LEAD AGENCY	National Aeronautics and Space Administration (NASA) Lyndon B. Johnson Space Center (JSC)
PROPOSED ACTION	JSC proposed to construct a new annex to Building 31, the Planetary and Earth Sciences Laboratory, to expand the Astromaterials Research and Exploration Science Division facilities at JSC's Main Campus.
INFORMATION CONTACT	Rich Fowler, JSC NEPA Manager, (Mail Code: JP; Telephone: 281-244-0472; E-mail: richard.b.fowler@nasa.gov)
DATE	March 2021
ABSTRACT	<p>NASA policy explicitly requires each Center to develop, maintain, and implement a Master Plan for the orderly management and future development of the Center's real property assets, including land, buildings, physical resources, and infrastructure in support of mission requirements. The JSC Final Programmatic Environmental Assessment (PEA) for the JSC Master Plan (2016), as well as the Supplemental Programmatic Environmental Assessment (SPEA) for the revised 2019 JSC Master Plan, include environmental analyses of JSC's 20-year revitalization strategy for constructing new state-of-the-art installations, renovating critical infrastructure, and vacating and/or demolishing (deconstructing) non-essential installations in order to support core capabilities, meet mission requirements, and respond effectively to mission changes. JSC's Master Plan generally identifies future renovations of Building 31, as well as a proposed building annex. Moreover, the PEA and SPEA generally identify the environmental consequences associated with the proposed improvements to Building 31. The JSC Master Plan PEA and SPEA outline a tiered structure, whereas each of its individual elements (e.g., projects) will require a detailed environmental analysis. As appropriate, individual projects would be executed in the manner necessary to conform with the Master Plan and comply with NASA's implementing regulations (14 Code of Federal Regulations [CFR] 1216.3).</p> <p>Building 31 houses the Planetary and Earth Sciences Laboratory, which is run by the Astromaterials Research and Exploration Science Division. Following an alternatives analysis to expand its capabilities, NASA identified a preferred alternative which met the purpose and need for a building annex while minimizing impacts. This Supplemental Environmental Assessment (SEA) includes an environmental analysis of the construction and operation of an additional 20,000-square foot facility in order to support JSC's core capabilities, meet mission requirements, and respond effectively to mission changes. This SEA will be tiered to the JSC Master Plan SPEA where applicable and will specifically address the preferred alternatives' environmental impacts not addressed in the JSC Master Plan SPEA.</p> <p>Through the NEPA public participation process, JSC provides transparency and solicits input from stakeholders into the decision to construct the Building 31 Annex. If not adopted, JSC would not have the infrastructure improvements necessary for mission success relating to astromaterials curation. This project would be executed in the manner necessary to conform with the revised 2019 Master Plan and comply with NASA's implementing regulations (Title 14 Section 1216.3).</p>

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DRAFT FINDING OF NO SIGNIFICANT IMPACT

AGENCY	National Aeronautics and Space Administration (NASA) Lyndon B. Johnson Space Center (JSC)
ACTION	Finding of No Significant Impact
SUMMARY	<p>Based upon information presented in the Draft Supplemental Environmental Assessment (SEA) and comments received during the public comment period, NASA has made a Finding of No Significant Impact (FONSI) for the construction of an annex at Building 31 on the main JSC campus. No Environmental Impact Statement (EIS) is required. This finding is based upon the National Environmental Policy Act (NEPA) of 1969, as amended, NASA's regulations implementing the procedural provisions of NEPA (14 CFR 1216.3), and NASA Procedural Requirement 8580.1., <i>Implementing NEPA and Executive Order 12114</i>.</p> <p>The project includes adding a 20,000 square foot annex to existing Building 31, the Planetary and Earth Sciences Laboratory, with the intent to co-locate instrumentation, collections, and scientists currently spread across four separate buildings at JSC and to provide a direct connection to the existing facility to leverage current and unique multi-million dollar infrastructure investments required for astromaterial collections and research.</p>
DATE	March 2021 Comments are due to the JSC NEPA Manager by April 30, 2021.
ADDRESS	2101 NASA Parkway, Houston, TX 77058 (SEA can be reviewed at the Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX 77062.)
CONTACTS FOR FURTHER INFORMATION	Rich Fowler, JSC NEPA Manager Mail Code: JP; Telephone: 281-244-0472; E-mail: richard.b.fowler@nasa.gov Comments received during the comment period will be addressed within the Final SEA and will be considered in the decision to finalize this FONSI.
SUPPLEMENTAL INFORMATION	<p>To support the decision-making process to construct the Building 31 Annex, JSC prepared and finalized a Supplemental Environmental Assessment (SEA). The SEA represents an analysis of the associated environmental impacts of the Proposed Action.</p> <p>Under the No-Action Alternative, NASA would not construct the Building 31 Annex, and JSC would continue to operate and maintain the buildings and infrastructure currently in use. Current and future astromaterial curation efforts require specialized facilities to meet research and preservation needs, which are not fully realized in current infrastructure. With the No-Action Alternative, JSC would risk the capability of meeting human spaceflight mission requirements.</p> <p>Four alternative site locations were evaluated in the SEA, including the Proposed Action. The other alternatives were not chosen to move forward since the proposed locations impacted existing historic facades, did not provide a direct connection to the existing facility, or did not allow for connection to existing utility infrastructure.</p> <p>The SEA evaluated the environmental consequences of the proposed action and location alternatives on stormwater; groundwater; floodplains; air quality; climate change; noise; hazardous material/waste; ecosystems (e.g., vegetation; wildlife); and cultural resources.</p>

The SEA analysis also determined that the Proposed Action is not anticipated to result in impacts to land use, topography, wetlands, marine mammals and fish, transportation, and employment/income elements. Analysis tiered off the 2019 JSC Master Plan SPEA where appropriate, which identified that impacts are not anticipated for soil/geological, population, environmental justice, coastal zone management, and wild/scenic river elements. Where NASA anticipates that insignificant (minor, temporary, and primarily construction-related) impacts may occur, JSC would employ various Best Management Practices and other mitigation measures along with appropriate monitoring activities to reduce adverse impacts during construction and operation of the proposed Building 31 Annex.

The Proposed Action and site alternatives may result in minor short-term adverse impacts to air quality, climate change, stormwater, groundwater, the 500-year floodplain, vegetation, and noise resources. Site required best management practices, contract specifications, existing site and state permits, and site requirements for chemical inventories and use will ensure that these adverse impacts remain less than significant. Further, ground stabilization with vegetation will also minimize short-term construction impacts. NASA requirements for all new facilities to be at least Leadership in Energy and Environmental Design (LEED) Silver certified ensures that the Proposed Action includes energy and water efficiency design elements, diverts large percentages of construction and demolition debris from landfill, reduces transportation impacts by utilizing locally sourced materials whenever possible, implements native landscaping and pervious surfaces, and implements indoor air quality improvements, which will reduce environmental impacts from the Proposed Action as well.

Minor long-term adverse impacts are expected for air quality due to an additional emergency generator, climate change due to minor increases in chemical uses and energy/water consumption, and new processes that may generate additional wastewater. Site controls would minimize these impacts further. Also, new reflective structures may cause migratory bird-window collisions. Mitigation measures include adding design elements to reflective surfaces of the new structure to allow for more visibility to migratory bird species, reducing the chance of bird-window collisions, as well as, tree removal prior to nesting season to reduce potential impacts to nests of species protected under international treaty;

Adverse long-term and potentially cumulative impacts to cultural resources are anticipated from the Proposed Action and site alternatives since the new structure would adversely impact the JSC Historic District and the existing B31 historic integrity. As such, Section 106 State Historic Preservation Office consultation is required with development of a Memorandum of Agreement and implementation of agreed upon mitigation measures to reduce impacts to a less than significant level.

Based upon the information presented in the SEA, I have determined that the environmental impacts associated with the construction of the B31 Annex would not individually or cumulatively have a significant effect on the human environment. Therefore, issuance of a FONSI is warranted, and preparation of an EIS is unnecessary.

To be signed once finalized.

Mark Geyer
Director, Johnson Space Center

Date

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LIST OF ACRONYMS

Acronym	Full Term
ARES	Astromaterials Research and Exploration Science
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERD	Environmental Resource Document
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
HAER	Historic American Engineer Record
HPO	Historic Preservation Officer
JSC	Johnson Space Center
LEED	Leadership in Energy and Environmental Design
MS4	Municipal Separate Storm Sewer System
MSGP	Multi-Sector General Permit
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NPR	NASA Procedural Requirement
NRHP	National Register of Historic Places
PEA	Programmatic Environmental Assessment
SEA	Supplemental Environmental Assessment
SEC	Sedimentation and Erosion Control
SHPO	State Historic Preservation Officer/Office
SPEA	Supplemental Programmatic Environmental Assessment
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
TCEQ	Texas Council of Environmental Quality
TPDES	Texas Pollutant Discharge Elimination System
U.S.C.	U.S. Code
VOC	Volatile Organic Compounds

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EXECUTIVE SUMMARY

E.1 Introduction

The National Aeronautics and Space Administration (NASA) Johnson Space Center (JSC) has prepared a Supplemental Environmental Assessment (SEA) to provide transparency, encourage widespread information dissemination, and assist in the decision-making process to construct an annex to JSC's Building 31 (B31) facility for the Planetary and Earth Sciences Laboratory. The proposed 20,000 square foot annex would expand the Astromaterials Research and Exploration Science (ARES) Division capabilities at JSC's Main Campus in Houston, Texas. JSC has prepared the SEA per the National Environmental Policy Act of 1969 (NEPA), as amended; NASA's NEPA policy and procedures (14 Code of Federal Regulations [CFR] 1216.3); and NASA Procedural Requirements (NPR) as outlined in NPR 8580.1, Implementing NEPA and Executive Order 12114. The SEA considers the environmental impacts of the Proposed Action as compared to the three alternative site placements and a No-Action alternative.

A public notice will be published within local newspapers within the potentially affected areas, announced with a 30-day public comment period. In addition, JSC will contact tribal nations, local, state, and federal agencies, and other interested parties either directly or through each state's respective NEPA clearinghouse. Any comments received will be addressed in the final SEA. A draft Finding of No Significant Impact (FONSI) accompanies this SEA for review and proposed project.

E.2 Existing Facility

The existing Building 31 is bound to the north and south by parking lots, to the east by Fifth Street, and to the west by Fourth Street. There is landscaping and manicured lawns on all sides of the building except the north side. Building 31 has three wings, including B31W, B31E, and B31N. Existing utilities (water sanitary and storm sewer, natural gas, and communications) connect to the existing B31 facilities through an underground utility tunnel system that connects most of the buildings in the main JSC Mall Area.

E.3 Proposed Action Summary

The Proposed Action was identified in the 2019 revised JSC Master Plan. The JSC Master Plan includes a redevelopment strategy, implemented over 20 years that would replace aging buildings in poor condition with new, sustainable water/energy efficient buildings and infrastructure with improved working environments, better functional relationships, and reduced operating costs. The Proposed Action would support JSC's overall human space exploration mission and provide the building and infrastructure necessary to support current and future mission requirements.

The Proposed Action includes constructing approximately 20,000 square feet of cleanrooms and laboratories to support curation and research of astromaterials to support active and planned NASA and international partner missions. The project goals include the following:

1. To facilitate co-location of instrumentation, collections, and scientists currently spread across four separate buildings at JSC; and
2. To provide a direct connection to Building 31 in order to leverage current unique, multi-million-dollar infrastructure investments required for astromaterial collections.

E.3.1 Proposed Action Site Alternatives

Four site alternatives were evaluated. Site 1 Alternative is the Proposed Action. It would place the B31 Annex directly west and south of B31W wing. It would have direct connection to B31 and would allow for proposed laboratories and cleanrooms to be adjacent to existing laboratories, in part to facilitate sample transfer. The Site 2 Alternative would place the B31 Annex directly to the west of Fourth Street a short distance from the B31W wing. This alternative would not have direct connection to B31, and it would not allow for laboratories and cleanrooms to be adjacent to existing laboratories in B31. The Site 3 Alternative would place the B31 Annex along the west sides of B31E and B31N wings between the existing facilities and Second Street. This alternative would have direct connection to B31; however, this would place laboratories and cleanrooms adjacent to offices and vault space rather than connected to existing laboratories. The Site 4 Alternative would place the B31 Annex to the northwest in what currently is a parking lot perpendicular to Fourth Street a short distance from the B31W wing. This alternative would not have direct connection to B31, and it would not allow for laboratories and cleanrooms to be adjacent to existing laboratories in B31.

E.3.2 No-Action Alternative

The No-Action Alternative would maintain existing operations, installations, and infrastructure for Building 31. This alternative would maintain astromaterial research and laboratories across four buildings across the site. This would not meet project goals and would risk JSC's ability to support active and planned missions effectively. Further, JSC has a site-wide goal of developing resilient buildings, reliable infrastructure, safe and secure access, and a livable, sustainable campus as envisioned under JSC Master Plan. The No-Action Alternative would not support this site-wide goal to increase efficiency and facility effectiveness at supporting mission requirements.

E.3.3 Summary of Environmental Impacts

For each Alternative Site, NASA evaluated the short-term and long-term environmental impacts on stormwater; groundwater; wetlands; floodplains; coastal zone management; noise; air quality; greenhouse gas emissions; hazardous material uses, hazardous waste generation and pollution prevention; ecosystems (e.g., vegetation; wildlife; endangered species); land use; socioeconomic; and cultural resources.

None of the Alternatives would significantly impact stormwater, groundwater, floodplains, air quality, climate change, noise, hazardous materials and waste, vegetation, or wildlife. Although minor, temporary, and primarily construction-related impacts would occur, NASA would employ various Best Management Practices and other mitigation measures along with appropriate monitoring activities to reduce adverse impacts. The Proposed Action would result in adverse impacts to the JSC Historic District and B31 historic elements; however, Section 106 consultation with the State Historic Preservation Office (SHPO) is required to address and mitigate the adverse impacts.

Utilizing the NEPA public review process, JSC will distribute the Draft JSC Building 31 Annex SEA and preliminary finding of no significant impact to stakeholders and the public. After considering direct and indirect environmental impacts, cumulative effects, and mitigation measures necessary to ensure that no significant adverse environmental impacts are likely to occur, JSC may conclude that the environmental analysis within the SEA is sufficient and that there are no significant impacts associated with the proposed action. This determination will be provided in the Final SEA. If there are no significant impacts associated with the proposed actions, the preparation of an Environmental Impact Statement in support of the decision-making process is unnecessary.

1.0 PROJECT DESCRIPTION

The National Aeronautics and Space Administration (NASA) Johnson Space Center (JSC) has and continues to serve a hub of spaceflight activity for more than half a century. All NASA astronauts and many of their international partners trained at JSC to overcome the challenges of space. Per the JSC Strategic Plan, JSC's mission is to lead human space exploration, and to that end, JSC's goals are 1) dare to expand frontiers, 2) unite with our partners to complete bold missions, and 3) explore space to benefit humanity. Consistent with these goals, JSC recognizes the need to manage and, as necessary, upgrade installations and infrastructure to ensure the appropriate support of JSC's missions.

A significant part of those efforts includes the curation and research of Astromaterials, which mainly happens in Building 31 (B31), the Planetary and Earth Sciences Laboratory and several other buildings on the main JSC campus. The proposed project includes the construction of an Astromaterials Curation & Research Annex to the existing B31 facility to facilitate NASA and JSC's mission.

NASA prepared this Supplemental Environmental Assessment (SEA) to identify and evaluate the environmental consequences of constructing the B31 Annex (i.e., the Proposed Action). NASA has prepared this SEA per the requirements of the National Environmental Policy Act of 1969, as amended (NEPA) (42 United States Code (U.S.C.) 4321 et. seq.), NASA's implementing regulations (14 CFR 1216.3), and NASA Procedural Requirements 8580.1A, *Implementing the NEPA and Executive Order 12114*. To the extent practicable, NASA has followed the guidelines published by the Council on Environmental Quality (CEQ) pertaining to preparation and use of Programmatic Environmental Assessments, dated December 18, 2014, and the guidelines of the NASA NEPA Desk Guide. Consistent with JSC strategic goals, JSC is utilizing the NEPA administrative process to engage stakeholders and the public in this decision-making process.

1.1 Location Descriptions

The JSC Main Campus is located in Harris County, Texas, in the City of Houston on 650 hectares (1,620 acres), approximately 40 kilometers (26 miles) southeast of downtown Houston and three kilometers (two miles) northeast of Webster. The area is geographically characterized by the bodies of water in and around it, including Clear Lake (to the east and southeast), Mud Lake (to the northeast), Clear Creek (to the south), and Galveston Bay (to the east). A mix of residential, commercial, and institutional land uses surround JSC Main Campus. To the north is the Armand Bayou Nature Center.

Built in 1966, B31 is a two-floor facility that covers approximately 72,000 square feet of curation facilities, laboratories, clean rooms, offices, and a highbay with loading dock. Figure 1 shows the location of B31 in comparison to the rest of the JSC campus. Currently, B31 has three wings that includes B31N, which houses the Lunar Sample Collection Vault, B31E, which houses offices, labs, and sample curation cleanrooms, and B31W, which houses the highbay and associated loading area and labs. Figures 2 and 3 show the existing layout of the three wings. The north and west wings do not have any windows; however, the east wing has a traditional façade seen in the majority of buildings in the JSC main Mall Area.

Figure 1. Site Map



Figure 2. Existing Building 31 Aerial



NEPA (42 U.S.C. §4321 et seq.) and the CEQ regulations implementing NEPA (40 CFR parts 1500 – 1508) direct Federal agencies to fully understand and consider the environmental consequences of proposed projects during decision-making. NASA’s regulations for NEPA compliance are described in 14 CFR §1216.3 and NASA Procedural Requirements (NPR) 8580.1. The regulations specify that NASA must complete the NEPA process prior to proceeding with taking a proposed action with the potential to affect the environment. Under these regulations, NASA must use a systematic, interdisciplinary process that includes public involvement to evaluate the potential impacts of its activities on the environment.

The Environmental Assessment (EA) is a concise public document that serves to provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). An EA includes a brief discussion of the purpose and need for the proposed action, a range of reasonable alternatives to the proposed action, environmental impacts analysis of the proposed action and its alternatives, and a listing of preparers. NASA must prepare an EIS when significant environmental impacts are anticipated and cannot otherwise be avoided.

A Programmatic EA was completed as part of the 2016 JSC Master Plan process, and a Supplemental Programmatic EA was completed as part of the 2019 update to the JSC Master Plan, which included the Proposed Action. A Programmatic EA is an EA that can covers broader agency actions, such as rulemaking or establishing a policy, program, or plan, as well as when decisions are based on subsequent tiered-NEPA review. This SEA for the specific Building 31 Annex Project tiers off the 2019 Master Plan Supplemental Programmatic EA.

The NEPA process includes notifying the general public, interested parties and stakeholders, and relevant agencies about the project. This SEA will be publicized via public notice in area newspapers in the Houston, Texas. The SEA will be available in the local library, to various federal, state, and local agencies for review), and through direct communication via the JSC mailing list. For all NEPA-related actions, JSC maintains a mailing list of other federal, state, and local agencies, as well as interested parties who have

requested notification of pending actions. NASA Headquarters also contacted potentially affected tribal nations directly per established protocols.

2.0 PURPOSE AND NEED

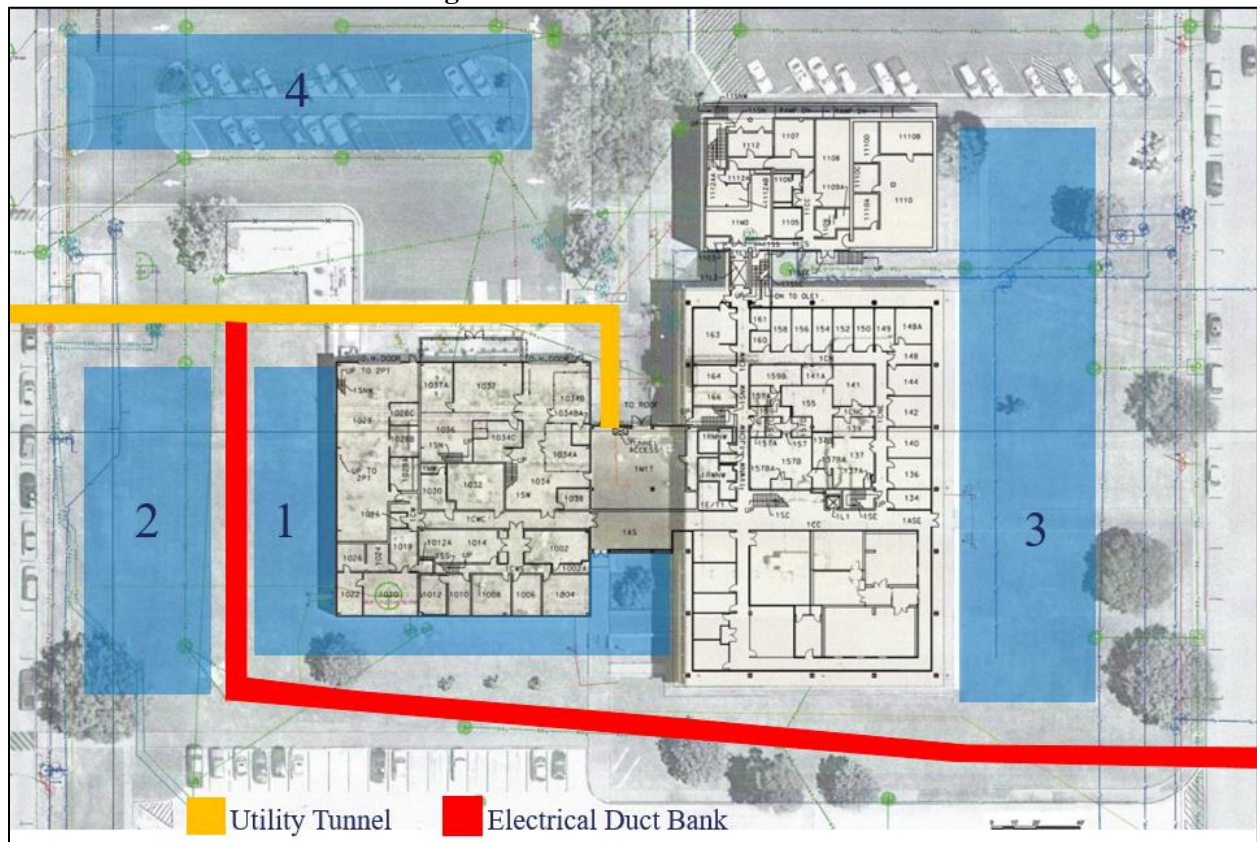
The JSC Master Plan addresses land use planning and facility modifications supporting JSC's missions. The overall goals of the Master Plan are to further human spaceflight by developing resilient buildings, reliable infrastructure, safe and secure access, and a livable campus. The Master Plan is needed to implement JSC's vision for a sustainable capability to develop, operate, and integrate human exploration activities involving commercial, academic, international, and U.S. Government partners. The Master Plan provides guidelines to support redevelopment of JSC's real property assets that incorporates JSC's guiding principles, development constraints, and embraces the concepts and constraints associated with energy and water conservation, renewable energy, climate change resilience, floodplain management, and protection of NASA's rich historical and cultural assets while ensuring the appropriate level of sensitivity for protection of human health and the environment. Rehabilitation and annexation of B31 was identified in the revised 2019 JSC Master Plan.

An Astromaterials Research and Exploration Science (ARES) facility assessment was completed in Fiscal Year 2017 that evaluated the division's capabilities, and it recommended an annex to Building 31 in order to meet the necessary laboratory needs in the 2020s. Laboratory space is needed to support JSC's core planetary science and curation capability. Over the next decade, JSC must plan for an unprecedented increase of new astromaterial collections for curation, analysis, preliminary examination, and allocation to the scientific community from sample return missions. The number, diversity, and complexity of these new NASA astromaterials collections rival the breadth and number of NASA's existing collections, which were accumulated over the previous 5 decades combined (across all of NASA's history). These new types of samples present challenges (e.g., organic cleanliness, cold and volatile-rich sample preservation, restricted Earth return), and meeting those challenges require dedicated space to meet Level 1 mission requirements and maximize the scientific return from the irreplaceable samples. Each laboratory will have unique requirements as far as cleanliness (e.g., International Organization for Standardization class 5, 6 and 7 space requirements), pressurization, vibration, temperature, humidity, lighting and permitted materials. Laboratory space is the primary need, but some office and conference space are required. Laboratories are required to support JSC's Agency role in the curation and research of astromaterials samples. A direct connection to the existing B31 would be preferred in order to leverage the unique, multi-million-dollar infrastructure investments required for the Astromaterials collections.

3.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This SEA considered four Alternative Sites and a No-Action alternative: 1) Site 1 Alternative (Proposed Action); 2) Site 2 Alternative; 3) Site 3 Alternative; 4) Site 4 Alternative; and 5) No-Action. Figure 4 provides locations for the site alternatives.

Figure 4. Annex Site Alternatives



3.1 Proposed Action Site 1 Alternative

The Site 1 Alternative would place the B31 Annex directly west and south of B31W wing. It would have direct connection to B31 and would allow for proposed laboratories and cleanrooms to be adjacent to existing laboratories, in part to facilitate sample transfer. The Astromaterials samples cannot be transported outdoors. The direct connection would allow for shared amenities to serve both the existing B31W and the Annex, including shared labs and resources, bathrooms, conference rooms, break room, etc. The construction of a new front door and lobby area would be utilized to better represent ARES as a state-of-the-art International Research Destination and provide display opportunities. Furthermore, the existing B31W was not originally intended for laboratories. The rehabilitation associated with the Annex construction will improve the environmental conditions for the laboratories due to the heat load on the building.

Site 1 Alternative would allow connections to existing infrastructure, including a utility tunnel, Electrical Duct Bank, and liquid nitrogen tank. Because the B31 West wing does not have windows, annexing the building would not eliminate any windows or block existing views. The preliminary floor plans for the first and second floors are shown on Figure 5 and Figure 6 respectively. The first floor will primarily be laboratories, whereas the second floor will primarily be office and conference space.

The Site 1 Alternative is the Proposed Action, as it meets the project's Purpose and Needs, as it allows for consolidated support for active and planned mission.

Figure 5. Preliminary First Floor Plan

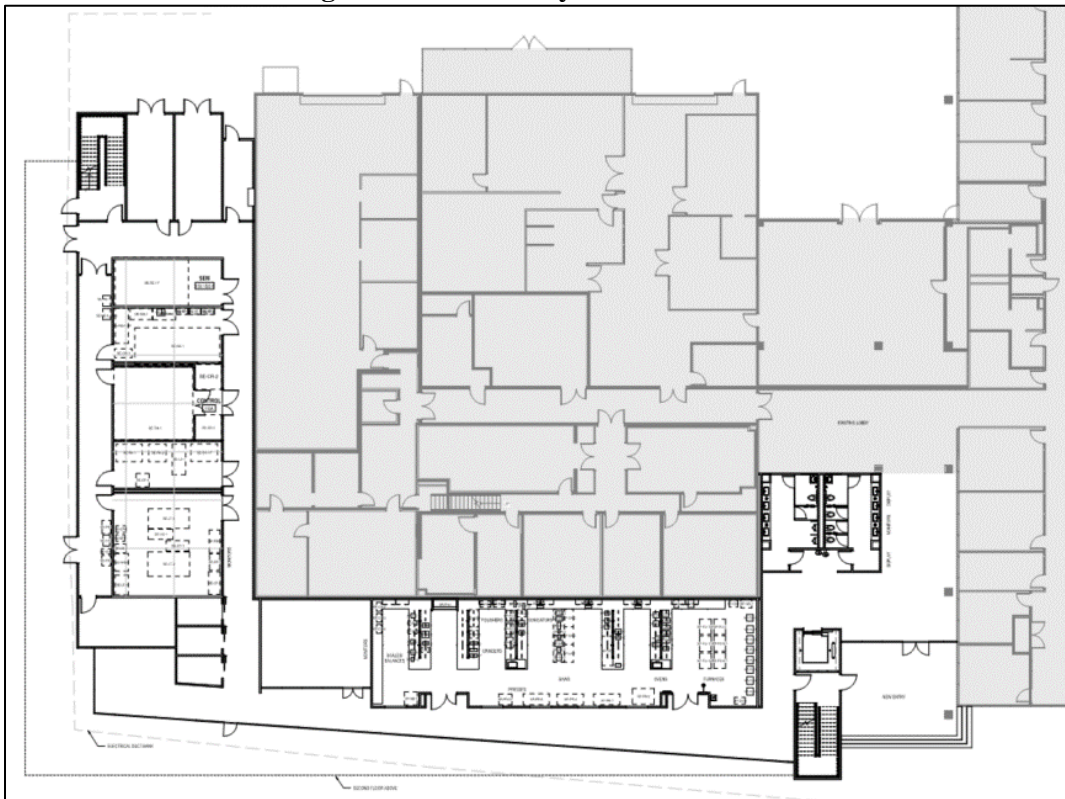
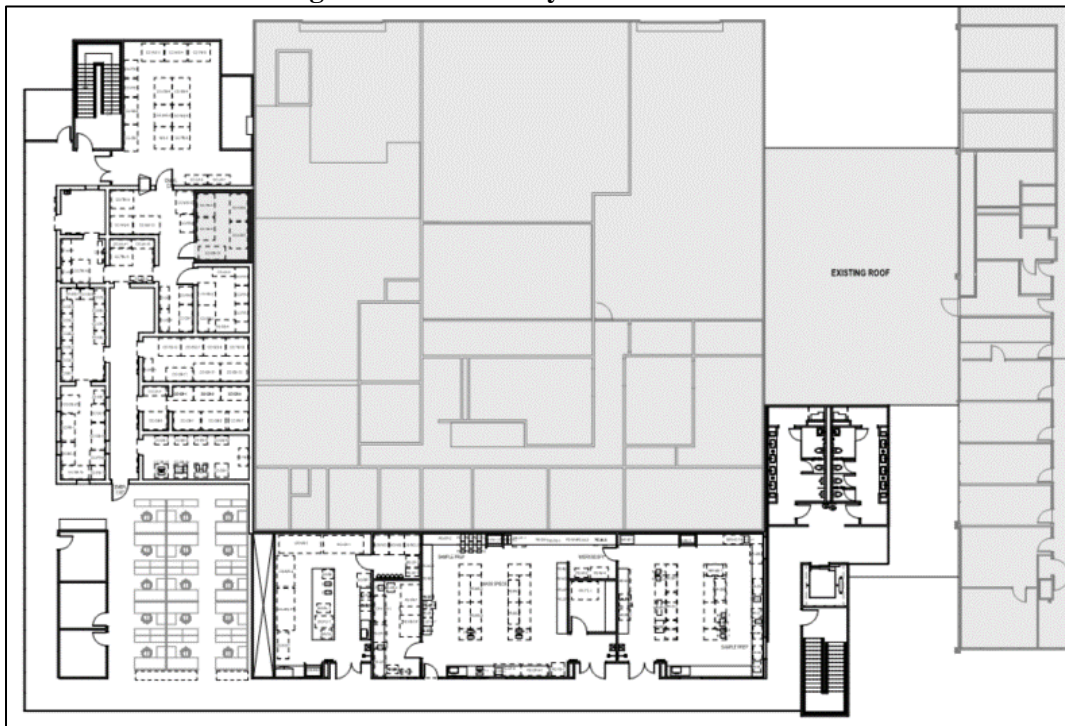


Figure 6. Preliminary Second Floor Plan



3.2 Proposed Action Site 2 Alternative

The Site 2 Alternative would place the B31 Annex directly to the west of Fourth Street a short distance from the B31W wing. This alternative would not have direct connection to B31, and it would not allow for laboratories and cleanrooms to be adjacent to existing laboratories in B31. However, this location would allow direct connection to utility infrastructure via the tunnel system and would not impact the existing B31 structure. The Site 2 Alternative was not carried further because it would not meet project goals and allow for consolidated support for active and planned missions.

3.3 Proposed Action Site 3 Alternative

The Site 3 Alternative would place the B31 Annex along the west sides of B31E and B31N wings between the existing facilities and Second Street. This alternative would have direct connection to B31; however, this would place laboratories and cleanrooms adjacent to offices and vault space rather than connected to existing laboratories. Further, this option would not allow connection to existing tunnel infrastructure and would block windows and historic facades. The Site 3 Alternative was not carried further because it would not meet project goals and allow for consolidated support for active and planned missions.

3.4 Proposed Action Site 4 Alternative

The Site 4 Alternative would place the B31 Annex to the northwest in what currently is a parking lot perpendicular to Fourth Street a short distance from the B31W wing. This alternative would not have direct connection to B31, and it would not allow for laboratories and cleanrooms to be adjacent to existing laboratories in B31. Further, this location would not allow for connection to existing utility infrastructure. However, this location would avoid impacts to the existing B31 structure. The Site 4 Alternative was not carried further because it would not meet project goals and allow for consolidated support for active and planned missions.

3.5 No-Action Alternative

The No-Action Alternative would maintain existing operations, installations, and infrastructure for Building 31. This alternative would maintain astromaterial research and laboratories across four buildings across the site. This would not meet project goals and would risk JSC's ability to support active and planned missions effectively. Further, JSC has a site-wide goal of developing resilient buildings, reliable infrastructure, safe and secure access, and a livable, sustainable campus as envisioned under JSC Master Plan. The No-Action Alternative was not carried further because it would not support this site-wide goal to increase efficiency and facility effectiveness at supporting mission requirements.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The affected environment includes those environmental resources potentially impacted by the construction of the B31 Annex. JSC's Environmental Resource Document (ERD) contains information on site-wide environmental resources. Required by NPR 8580.1, *Implementing NEPA and Executive Order 12114*, the JSC ERD provides a detailed and comprehensive baseline of environmental conditions onsite. NASA's NEPA Program promotes incorporating ERDs by reference in order to streamline NEPA documentation.

For each environmental resource area, an impact assessment is provided for construction activities associated with the various phases of the Proposed Action, which includes new construction and necessary modifications to the existing B31 structure. Impacts are defined in general terms and are qualified as adverse or beneficial and as short-term or long-term. For the purposes of this SEA, beneficial impacts would improve resources/conditions and adverse impacts would deplete or negatively alter resources/conditions. In terms of duration, short-term impacts are generally considered those impacts that would have temporary effects. Long-term impacts are generally considered those impacts that would result in permanent effects.

4.1 Resources Eliminated from Further Analysis

Per 40 CFR Parts 1500 through 1508 allow identified non-significant issues to be discussed to the extent that it is clear why additional study is not warranted. The 2019 Master Plan Supplemental Programmatic EA evaluated and determined that the following resources are unlikely to be impacted by the adoption of the 2019 Master Plan, which includes the Building 31 Annex project. As such, the following topics were not evaluated further:

- A. Soils and Geology;
- B. Population;
- C. Environmental Justice;
- D. Coastal Zone Management; and
- E. Wild and Scenic Rivers.

Additional topics assessed that do not warrant further examination in this SEA include land use, topography, wetlands, threatened/endangered species, marine mammals and fish, transportation, and employment and income. A summary of all resources assessed, their presence in this document for further evaluation, and the rationale for eliminating a resource from detailed study are provided in Table 1.

Table 1. Summary of Resource Assessment			
Resources		Analyzed in Detail in SEA?	If Yes, EA Section If No, Rational for Elimination
Physical Environment	Land Use	No	No changes in land use are anticipated with the Proposed Action.
	Soils	No	Proposed structure to be on previously disturbed soil and previously developed areas; common soil impacts (e.g., erosion and compaction) are mitigated using Best Management Practices.
	Topography	No	Topography would not change.
	Coastal Zone	No	No Wild and Scenic Rivers or coastal resource areas that the Texas General Land Office reviews would be impacted.
	Stormwater	Yes	Section 4.3.1
	Groundwater	Yes	Section 4.3.2
	Wetlands	No	The Proposed Action and Alternatives are not near the six wetlands identified at JSC in the 2018 Wetlands Survey.
	Floodplains	Yes	Section 4.3.3
	Air Quality	Yes	Section 4.2.1
	Climate change	Yes	Section 4.2.2
	Noise	Yes	Section 4.6.2
	Hazardous Materials/Waste	Yes	Section 4.6.1
Biological Environment	Vegetation	Yes	Section 4.4.1
	Terrestrial Wildlife and Migratory Birds	Yes	Section 4.4.2
	Threatened and Endangered Species	No	Site reconnaissance to date has not indicated any evidence of any listed species within any habitat type at JSC.
	Marine Mammals/Fish	No	No water work is proposed.
Social and Economic Environment	Transportation	No	Minor traffic increases and some parking lot space closures are anticipated due to short-term, construction activities.
	Cultural Resources	Yes	Section 4.5
	Environmental Justice	No	Impacts from the Proposed Action are not likely to disproportionately impact any community surrounding JSC.
	Population	No	No new employment opportunities or changes in the local population are anticipated.
	Employment and Income	No	Minor, short-term beneficial impacts during construction are anticipated due to the creation of short-term jobs.

4.2 Physical Resources

4.2.1 Air Quality

JSC is located in an area that is in non-attainment for ground-level ozone. While JSC does not contribute significantly to the adverse air quality issues in the Houston-Galveston area, JSC still participates in the Construction activities are expected to cause short-term adverse impacts to air quality. Local impacts to air quality from construction activities would likely include fossil-fuel use for construction equipment, use of materials containing Volatile Organic Compounds (VOCs), and fugitive dust emissions from soil disturbance and demolition. Fossil-fuel use for construction equipment would produce emissions of carbon monoxide, nitrogen oxides, sulfur dioxide, VOCs, particulate matter, and hazardous air pollutants. VOCs and hazardous air pollutants emissions could also occur at construction sites from the use of paving materials, paints, thinners, solvents, and other materials.

As part of the required Sedimentation and Erosion Control plan for the project, JSC requires the best management practices and mitigation measures to limit construction emissions, including watering disturbed areas, maintaining and covering soil piles, scheduling staging area siting to minimize fugitive dust, covering truck beds when hauling debris, and keeping construction equipment properly tuned.

Construction of the Proposed Action, as well as the Site 3 Alternative, may impact existing structures with asbestos-containing materials. An asbestos survey will be completed to determine if impacted walls have asbestos-containing materials. If so, then these materials will be abated with any required notifications under National Emission Standards for Hazardous Air Pollutants (NESHAP) made as required. Resulting asbestos-containing waste will be contained and disposed of as required in a permitted landfill.

As stated in the JSC Master Plan EIS, JSC operates under a Federal Clean Air Act (CAA) Title V operating permit. Currently, JSC Main Campus is classified as a major source for stationary onsite emission sources, which include turbines, boilers, heating, ventilation and air conditioning systems, generators, painting processes, ventilation exhausts from research laboratories, and test equipment. Current B31 operations and operations that would be consolidated in the new B31 Annex are currently covered under the existing Title V permit. Air impacts from the B31 Annex construction include new laboratories with chemical usage that would contribute to fugitive emissions, as well as the need for a new dedicated emergency generator for the facility. However, impacts from new laboratory vents and chemical uses would be minimal since these operations are already occurring onsite, but with the new annex would be located in one location. The new emergency generator would be permitted as per regulatory requirements, and impacts associated with the generator would be due to operational testing and occasional use rather than continuous operation. As such, impacts for operation of the new B31 Annex would be less than significant regardless of location alternative.

4.2.2 Greenhouse Gas Emissions and Climate Change

The Proposed Action could have a short-term adverse, localized impact to greenhouse gas (GHG) emissions at all the installations. Construction, demolition, and renovation activities would likely include fossil-fuel use from heavy equipment, which would produce GHG emissions. JSC requires construction equipment to be properly tuned to limit emissions that would contribute to temporary construction impacts.

NASA requires construction and new facilities to comply with federal and state requirements, as well as Guiding Principles for Sustainable New Construction and Major Renovations and Leadership in Energy and Environmental Design (LEED) Silver certification requirements at a minimum. These elements include sustainable design requirements, such as increasing energy and water efficiency, which also reduces the short-term and long-term impacts from new facility construction. The new Annex is required to be 30

percent more energy efficient than a conventional building of the same size using traditional materials and practices to meet LEED requirements, and the project includes commissioning requirements to ensure that the finished facility performs as required. NASA also requires designated construction and furnishing materials to contain recycled or biobased content, to utilize energy and water efficiency fixtures and products, non-ozone depleting and low greenhouse gas emitting refrigerants, and less toxic chemical alternatives. These design elements reduce the generation of indirect greenhouse gas emissions relating to facility operations. The contribution of the Proposed Project and site alternatives to GHG emissions could be considered a minor indirect impact to climate change.

The Proposed Action and Site Alternative 3 both add on to the existing B31 structure, which replaces older, less efficient exterior walls to energy efficient exterior structures with daylighting, which reduce the energy demand of the existing structure. Site Alternatives 2 and 4 are separate structures, so the existing facility would not increase efficiency with these options. The No Project Alternative would not contribute to additional greenhouse gas emissions; however, current operations that are spread out over the Center would not benefit from increased operational efficiency if the project was not implemented.

4.3 Water Resources

4.3.1 Stormwater

JSC Main Campus is set in a landscape with many tidal streams and estuaries of Galveston Bay and is within the Clear Creek and Armand Bayou watershed. Clear Lake is at the southeast corner; Mud Lake and Armand Bayou are northeast; Cow Bayou is southwest; and Horsepen Bayou is north of JSC Main Campus. Galveston Bay is recognized by the U.S. Environmental Protection Agency as an estuary of national significance and was included in the National Estuary Program in 1989.

JSC has applied for and received a site-specific Municipal Separate Storm Sewer System (MS4 permit; Permit Number TXR040214). State law requires that storm water be discharged separately from sanitary wastewater. In conjunction with the MS4 permit, JSC Main Campus has developed a Storm Water Management Plan (SWMP) under the National Pollution Discharge Elimination System (NPDES), which is issued under the Texas Pollutant Discharge Elimination System (TPDES), to reduce adverse impacts to water quality and aquatic habitat by instituting controls on storm water discharge. Storm water is drained from JSC Main Campus by underground conduits and ditches. The Proposed Action would be located in Drainage Area 13, which discharges to Horsepen Bayou. Horsepen Bayou is listed as impaired waterways by the Texas Commission on Environmental Quality (TCEQ).

In conjunction with the MS4 permit, JSC Main Campus' SWMP includes an education program and implementation of Best Management Practices (BMPs) for discharges to the storm water system, including sedimentation and erosion control during construction and maintenance activities involving disturbance of soil (e.g., dig permits).

JSC Main Campus currently discharges storm water associated with industrial activities under the TPDES Multi-Sector General Permit (MSGP). Under this MSGP, JSC Main Campus maintains coverage under a No Exposure Exclusion (Permit Number TXRNEAA42). Under this No Exposure Exclusion, JSC maintains many practices and measures to prevent pollutant discharges to the environment from materials and processes associated with its industrial activities, which applies to some B31 activities.

JSC Main Campus utilizes equipment and procedures to minimize or eliminate the potential of a spill or release to reach navigable waters. JSC maintains and implements an Integrated Spill Prevention Control and Countermeasure Plan and Hazardous Waste Contingency Plan.

The Proposed Action could cause short-term, adverse impacts to surface water due to the operation of heavy equipment, disturbance of soils during construction and demolition activities at JSC Main Campus, EF, and SCTF. No construction, demolition, renovation activities are planned to take place within any waterways. JSC would employ environmental mitigation measures, as necessary, to limit these impacts. Environmental mitigation measures consist of the following: 1) obtaining a JSC-specific dig permit; 2) developing a Sedimentation and Erosion Control (SEC) Plan; 3) employ BMPs using silt fences, hay bales, and similar measures to prevent contaminated runoff from entering water bodies; and 4) re-vegetate disturbed soils to provide stability and runoff filtration after construction activities are complete. The Proposed Action and associated staging and laydown yard are likely to cause an acre or more of impacted area. The TPDES permit requires staging and laydown areas to be included in the calculated total impacted area regardless of whether it is stabilized (e.g., an existing parking lot). Therefore, a site-specific storm water pollution prevention plan (SWPPP) will be necessary. However, the adjacent parking lot, which is stabilized, can be used as part of the staging area to minimize ground disturbance impacts, and this can be noted in the SWPPP to reduce the level of calculated ground disturbance. The SEC plan and SWPPP will contain BMPs to minimize storm water impacts from potential pollutants during construction. During construction, required dig permit inspections ensure that BMPs are implemented effectively.

The Proposed Action and site alternatives would include the instillation of concrete sidewalks. Concrete washouts are required for concrete work and would be present during construction activities. Discharge of high pH concrete wash water or rinse water onto the ground or into any stormwater feature is prohibited; excess wet concrete not used would be managed in the washout and not dumped onto the ground.

Any new systems or equipment that consumes water and/or generates wastewater is required to complete JSC Form 1109, Sanitary Sewer Discharge Approval Request, for review and approval prior to discharging any wastewater to sanitary sewer to ensure compliance with applicable regulations and permits. Any wastewater not approved for discharge will be collected and disposed of through the Industrial Solid Waste program.

The Proposed Action and the site alternatives would be constructed to achieve at least LEED Silver certification. LEED certification encourages the use of innovative measures to reduce storm water runoff, including installation of collection systems and installation of enhanced infiltration measures (e.g., low impact development).

4.3.2 Groundwater

Groundwater is found in soil strata under JSC Main Campus. The groundwater table is usually found about two to three meters (eight to eleven feet) below the ground surface. The water table fluctuates with weather and may reach the ground surface during wet periods. Several strata of soil contain silty and sandy zones; these zones may contain perched groundwater. The uppermost groundwater aquifer under JSC Main Campus is a confined sand layer approximately 18 meters (60 feet) below the surface. A clay barrier layer at a depth of 26 meters (85 feet) contains this artesian aquifer. The upper clay layer is stiff, plastic, and impermeable. The clay under the aquifer is hard, very plastic, and even less permeable than the upper clay layer.

Two important freshwater aquifers, the Chicot and the Evangeline, are located under the Houston area. Both aquifers are comprised of discontinuous sand, silt, and clay. 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 Main Campus, 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.

JSC Main Campus does not routinely use groundwater for potable water; JSC Main Campus purchases approximately 300,000,000 gallons of potable water each year from the Clear Lake City Water Authority. Two water wells (Wells No. 2 and 4) are maintained at JSC Main Campus for contingency and emergency use only, neither of which are in the proximity of the Proposed Action sites. JSC operates a potable water treatment system that is regulated by the State.

The Proposed Action and site alternatives may cause short-term impacts to surficial groundwater due to the operation of heavy equipment, disturbance of soils, and the potential for unintentional release (spills) of oil or hazardous materials during construction and demolition activities, since groundwater recharge would occur in lieu of runoff. However, JSC has processes and procedures in place to address, contain, and cleanup spill impacts through onsite Spill Response Team with support from offsite entities and subcontractors, including local fire departments and hazardous material cleanup services. BMPs employed for storm water impact minimization would also reduce the chance of impacts to groundwater.

Groundwater is not used to meet potable water needs. Increases in potable water needs for the Proposed Action and site alternatives would be minimal; however, an ultrapure water system will be necessary to support facility research activities. Impacts from the B31 Annex to groundwater are expected to be minor and less than significant during construction and during facility operations.

4.3.3 Floodplains

The northeastern corner of JSC Main Campus near the intersection of NASA Parkway and Space Center Boulevard and a section located along a tributary to Mud Lake are within the 100-year floodplain according to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map. Extending further into the campus, a large portion of JSC Main Campus eastern and northern portions of its campus are located within the 500-year floodplain. As shown in Figure 7, Building 31 is located in the 500-year floodplain.

Floodplains are defined by Executive Order 11988 as "...the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year." The flood level that has a one percent chance of occurring each year is the base or 100-year flood, and the area flooded by such an event is the base or 100-year floodplain.

All Federal actions must avoid modifying or developing floodplains if practical alternatives exist. In addition, critical actions (defined as "...any activity for which even a slight chance of flooding would be too great" by the Water Resources Council) must avoid modifying or developing the floodplain having a 0.2 percent chance of occurring each year (the 500-year floodplain). The Executive Order does not prohibit actions or critical actions within a floodplain, but it requires consideration of alternatives before the action is taken.

The Proposed Action is located within the 500-year floodplain. The Proposed Action is an annex to an existing building that includes specialized labs and operations for the study and curation of astromaterials. Locations outside of the 500-year floodplain would be too far removed from the existing Building 31 to be considered practical since the main campus of JSC is almost entirely in the 500-year floodplain except for a few areas that are already developed. Additional sites were considered for the project, but all were within the 500-year floodplain.

The Proposed Action could cause short-term adverse impacts to floodplains. All applicable local, state, and federal regulations must be followed prior to conducting activities that could alter base elevations within the designated floodplain. NASA JSC would ensure that the Proposed Action complies with Executive Order 11988 and 14 CFR 1216.2 (NASA regulations on Floodplain and Wetland Management).

With the Proposed Action and site alternatives, no increases in flood elevations for neighboring communities are anticipated with this project.

The Proposed Action would include new construction that would be built to LEED Silver certification standards and would include structural designs that incorporate climate change resilience features, in order to preclude any adverse effects from flooding and hurricane force winds.

Figure 7. FEMA Floodplain Maps



Source: FEMA's National Flood Hazard Layer Viewer, as of April 2020, available at: <https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd>.

4.4 Biotic Resources

4.4.1 Vegetation

The Proposed Action and Alternative locations are comprised of structural facilities, cultivated turf, ornamental shrubs, and trees. The location in question is not adjacent to undisturbed habitat, wooded areas onsite, or wetlands that could be impacted by construction. Nearby drainage ditches are mowed and maintained to allow for adequate water flow.

The Proposed Action and Alternatives could cause short-term adverse impacts to vegetation at the JSC Main Campus. Construction and demolition activities, including material staging, are likely to adversely impact vegetation around the existing structure. Further, the construction of the new Building 31 Annex would convert landscaped and turfed areas to new permanent structures, which would reduce greenspace and pervious surfaces. However, the project is required by NASA policy to meet LEED Silver Standards, which includes requirements to utilize pervious surfaces and native vegetation wherever possible. The temporary nature of construction activity impacts, staging materials on hardened surfaces, and the requirement to replace turf and utilize native plants would reduce impacts to a less than significant level. Further, the use of native plants in landscaped areas around the new structure would reduce irrigation needs

and increase plant resiliency to climate variations and disease. Long-term adverse impacts to vegetation would occur in areas currently vegetated that would be converted to building or infrastructure.

Non-native and invasive species could become established on disrupted soils common during construction activities. To minimize impacts associated with invasive species, JSC would ensure that any disruption of soils and existing vegetation would be sodded with turf to match adjacent areas, reseeded with a native seed mix, or allowed to re-vegetate with native plants. The project SWPPP requires stabilization of disturbed soil after construction activities are finalized, and project specifications require contractors to minimize tracking sediments, soil, or vegetation by vehicles on site, which will minimize the likelihood of vehicles tracking in and/or dispersing existing invasive plant materials during construction.

4.4.2 Wildlife

The location of the Proposed Action and Alternatives is developed with routine traffic and activities that discourage wildlife during business hours. As discussed in the 2019 Master Plan SPEA, animals, such as deer, raccoon, nutria, small mammals, migratory and non-migratory birds, and various reptiles frequent the site in mostly the undisturbed areas across the Center.

There is an active heronry near the Pecan Grove on the south side of JSC, which provides nesting areas for several different species of herons, egrets, and other similar species of birds. The 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. The heronry unlikely to be disturbed by construction activities or operational activities at the site of the Proposed Action and site alternatives given the distance from the site to the heronry location.

The Proposed Action Alternatives would require some tree removal, which provides nesting habitat for various species, including those protected under the Migratory Bird Treaty Act. Construction activities during nesting season would adversely impact any migratory species or wildlife species in the trees expected to be removed. JSC will remove trees in the impacted area prior to spring nesting seasons to reduce these impacts to a less than significant level. This would allow these species to find suitable nesting sites elsewhere and avoid “takes” of any protected species during construction periods. In the event that construction activities encountered any bird nesting activity, work would be stopped and JSC environmental staff would contact the local US Fish and Wildlife Office, Texas Parks and Wildlife Department, or the National Marine Fisheries Services, as appropriate to develop additional measures to mitigate action-related losses of fish and wildlife resources.

The Proposed Action and Alternatives could have a short-term adverse impact on wildlife. The ingress and egress of equipment and personnel during construction could adversely affect wildlife resources close to the activities due to increased human presence, removal of habitat, and increased noise. Potential impacts would be short-term and could include displacement or mortality of individual wildlife.

To avoid long-term negative impacts to migratory bird populations, the Proposed Action and alternatives design integrates design features, such as window coverings or fritted glass, to make highly reflective windows more visible to birds to avoid bird-window collisions. This will reduce impacts to migratory birds that travel across the Gulf of Mexico during biennial migration routes.

4.5 Cultural Resources

The National Register of Historic Places (NRHP) has a listed district, the Armand Bayou Archaeological District, that overlaps the northernmost part of JSC (near Building 207). The Proposed Action and site alternatives are not located near the Archaeological District, so impacts to archaeological resources are not anticipated.

JSC has a delineated, eligible historic district for listed and eligible sites of historic significance. Consultation with the Texas State Historic Preservation Office (SHPO) is required for all actions that would impact the listed and eligible structures at these facilities, including new construction, renovations of existing facilities, and demolition of existing structures. This consultation and resulting Memorandum of Agreement determines required mitigation measures that are necessary to preserve any historical knowledge at this site and address any adverse impacts from the Proposed Action. The JSC HPO evaluates proposed designs for impacts to historic resources, coordinates with designers to reduce impacts to those resources, and coordinates with SHPO to determine required mitigation measures to reduce adverse historical impacts.

Section 106 consultation with SHPO is ongoing for the Proposed Action, and SHPO has concurred that B31 and B31N are eligible for the NHRP under “Criterion A (space exploration and significant historic events), Criterion B (historically significant individuals associated with the building), and Criterion C (engineering, i.e. historic materials characteristic of a type, period, or method of construction).” Buildings 31 and 31N are also identified as contributing elements to the eligible JSC Historic District.

The Proposed Action and site alternatives will have short-term and long-term adverse impacts on cultural resources, both to the integrity of the historic district and the B31 facility itself, due to construction activities and the changes to the building’s facade. Direct physical impacts to the B31 façade will occur with the addition of a connected structure wrapping around and covering the original facility high bay. Further the added structure will impact the JSC historic district.

Not only will the B31 exterior be impacted with the proposed addition, the contributing elements inside the B31 lobby will be impacted with the addition. At a minimum, the project will be required to conduct a Historic American Engineering Record (HAER) to document the historic elements of the B31 facility. Section 106 SHPO consultation and subsequent Memorandum of Agreement will identify mitigation to address adverse historical impacts. SHPO consultation is ongoing.

All four site alternatives in Figure 4 above will impact the historic district. Site 2 and 4 Alternatives will not impact historic elements of B31 structure since they are detached from the main structures; however, these alternatives would not connect to the existing tunnel infrastructure and not provide connectivity needed for the astromaterials curation and associated laboratories. Site 1 and Site 3 Alternatives, which includes the Proposed Action, would both adversely impact the B31 façade since both alternatives would impact and cover historic architecture and cover the facades consistent with the historic district.

4.6 Socioeconomic Resources

4.6.1 Hazardous Materials, Waste, and Pollution Prevention

Because of the existing structure’s age, the Proposed Action and Site Alternative 3 may have impacts to asbestos-containing material or lead-based paint in the existing B31 structure that are likely to be present during construction. Disturbed materials during construction activities will be appropriately abated, contained, and disposed of in accordance with all applicable regulatory requirements. The Proposed Action and Site Alternative 3 would allow the proposed structures to be tied into the existing utility tunnels and

infrastructure of the existing B31. Site Alternatives 2 and 4 would require new connections for utilities, which may impact asbestos-containing transite pipe, which would need to be contained and disposed of in accordance with regulatory requirements. Construction debris would cause negative, short-term impacts to local landfills; however, both NASA and LEED requirements include recycling and waste diversion goals. Construction projects are required to divert at least 50 percent of nonhazardous construction debris from landfill, and with the LEED requirements, the project is expected to exceed the 50 percent diversion rate. Construction projects at JSC typically divert around 75 to 98 percent from landfill, and the Proposed Action and Site Alternatives are expected to fall within this range as well.

JSC is considered a Large Quantity Generator of hazardous waste, and the Center also generates regulated non-hazardous waste that must meet applicable federal and state requirements for management, handling, transportation, and disposal. Given the laboratory functions of the existing B31 facility, hazardous and other regulated wastes are generated currently at this facility. In 2019, B31 generated 665 pounds of hazardous waste, 332 pounds of Universal Waste, and 353 pounds of non-hazardous, regulated waste. Non-hazardous waste and recyclables associated with general office use are also generated at the existing B31 facility. The Proposed Action and site alternatives would increase the waste generated at this location; however, since most of the anticipated operations are a consolidation of activities from across the existing site, impacts relating to waste generation are considered minor.

JSC restricts the use of certain chemicals onsite to avoid high hazardous situations. To waive the restrictions, Environmental and Occupational Health reviews the circumstances surrounding the request and evaluates any necessary mitigation measures or constraints to allow the chemical to be brought onsite. An inventory of toxic substances and hazardous materials by building is performed annually by JSC through the Occupational Health Office. Operations at the B31 Annex would be required to adhere to this requirement for chemicals brought onsite.

Several types of wastewater are generated at JSC. These include laboratory wastewater. New connections to sanitary sewer lines from laboratory processes are evaluated on a case by case basis to ensure compliance with discharge limits allowed for wastewater. If wastewater is not allowed to be discharged through the sanitary sewer system, the disposal through the Industrial Solid Waste program would be necessary to meet regulatory requirements.

4.6.2 Noise

The Proposed Action and Alternatives are not located around any sensitive noise receptors, nor are they located in the vicinity of any significant noise sources. Short-term noise impacts from construction activities are likely to occur. Construction activities would typically result in temporary noise increases from use of construction equipment and the increased sound associated with work crews/personnel and demolition, construction, renovation, and hauling activities. However, activities would occur during business hours and comply with local noise ordinances and State and Federal standards and guidelines. Noise from construction activities would not impact offsite facilities, and operational activities are not anticipated to include operations with constant or repetitive noise hazards.

A short-term, minor 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.

5.0 CUMULATIVE EFFECTS AND MITIGATION MEASURES

5.1 Cumulative Effects

The CEQ regulations require that all Federal agencies include an analysis of potential cumulative effects within their environmental analyses. Cumulative effects result from the incremental effect of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. This includes those that may be "individually minor but collectively significant actions taking place over time."

As part of JSC's Master Plan Revitalization Strategy, multiple buildings in the 200 area are being demolished in order to reduce the Center's footprint and replace inefficient, dated structures with more efficient infrastructure that better meets Center needs to support NASA mission. The structures marked for demolition would also remove structures in the 100-year floodplain. This project is slated to continue through Spring 2022. If the Proposed Action construction were to overlap this timeframe, there may be temporary cumulative impacts on noise and air quality from heavy equipment, which would increase criteria pollutants during construction activities. Impacts to these resources would remain minor and consistent with those defined for the Proposed Action.

The 2019 revised Master Plan includes the B31 Annex construction in addition to the overall reduction in footprint of the JSC installations and includes the removal of buildings from floodplains, the continuation of construction and renovation to achieve LEED certification, and the integration of architectural controls to ensure new structures are less impacted by extreme weather events. These actions will limit and further reduce direct impacts on the environment. Based upon the abovementioned, JSC has concluded that no significant cumulative effects will occur associated with the construction of the B31 Annex.

5.2 Mitigation Measures

NASA is committed to conforming to all applicable federal and state regulations, Executive Orders, and management policies and directives. This commitment includes complying with regulatory agency permits and associated permit conditions, such as implementing applicable Best Management Practices (BMPs) to prevent pollution and incorporating environmental requirements into all construction specifications. Construction contractors for this project are required to comply with permit conditions and NASA contractual requirements, including BMPs that are required during construction activities to mitigate and reduce impacts. 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 required, JSC will commit an appropriate level of resources to perform monitoring and inspections to ensure conformity and will undertake corrective and preventive actions should any non-conformity issues arise. Adjustments to any mitigation 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.

6.0 LIST OF REFERENCES, PREPARERS, AND REVIEWERS

6.1 References

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6.2 Preparers and Reviewers

Organizations listed below contributed to the preparation and review of this document by writing portions of the text, contributing background, and supporting information, or providing technical review/comments on the SEA.

- A. Straughan Environmental, Inc.
- B. NASA-HQ NEPA Manager
- C. NASA-JSC Facilities Management and Operations Division
- D. NASA-JSC Planning, Integration, and Environmental Office
- E. NASA-JSC Historic Preservation Officer