New Life Sciences Laboratory (Building 21) Environmental Assessment

NASA, Environmental Office

Availability:

JSC & JSC contractor employees and other NASA & NASA contractor employees as required



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

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CHANGE HISTORY LOG

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LIST	OF A	CR	ONY	MS
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Acronym	Full Term
APC	Attwater Prairie Chicken
AST	Aboveground Storage Tank
bgs	Below Ground Surface
BMP	Best Management Practice
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLCWA	Clear Lake City Water Authority
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
СоН	City of Houston
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAP	Draft Analysis Package
dB	Decibels
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
GHGs	Greenhouse Gases
GLO	General Land Office
H-GAC	Houston-Galveston Area Council
HVAC	Heating, Ventilation, and Air Conditioning
JSC	Johnson Space Center
LEED	Leadership in Energy and Environmental Design
NAAQS	National Ambient Air Quality Standard
NASA	National Aeronautics and Space Administration
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act

Acronym	Full Term
NHPA	National Historic Preservation Act
PER	Preliminary Engineering Report
RCRA	Resource Conservation and Recovery Act
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Storm Water Pollution Prevention Plan
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
USFWS	United States Fish and Wildlife Service
WAFAL	Water and Food Analytical Laboratory

EXECUTIVE SUMMARY

1.1 **Project Description**

The Lyndon B. Johnson Space Center (JSC), an installation of the National Aeronautics and Space Administration (NASA), is proposing to construct a new Life Sciences Laboratory (Building 21) and demolish multiple structures as part of a recapitalization program. Building 21 would be located on the site of an existing parking lot located along Second Street and an additional parking lot is proposed to be located west of the new Building 21. Building 21 would be designed to Gold Leadership in Energy and Environmental Design (LEED) standards and would provide one modern, sustainable building facility in lieu of replacing seven (7) existing facilities in the JSC complex.

Building 37 (Life Sciences Laboratory), Building 37 adjoining storage facilities, and six structures located in the 200 Area are being proposed for demolition. Once the construction of Building 21 is complete, the laboratories and staff would relocate to the new building and the old structures would be demolished. The areas associated with structure demolition would be reverted to green space. Figures 1 and 2 illustrate the project location and area.

1.2 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 not take action to modify Building 37 or construct a new laboratory and would result in no change in impacts to the environment. The Proposed Action Alternative includes the construction of Building 21 and a new parking lot at Site A, located just west of Second Street, and the demolition of Building 37, Building 37 adjoining storage structures, and six structures in the 200 Area. The laboratories to be housed in the new Building 21 are currently located in Building 37 and other buildings on campus including Buildings 228, 229, 261, 264, 266, and 272. The project description is based on the 30 percent architectural and engineering design of Building 21 and will be finalized during the 60 to 90 percent design phase.

1.3 Summary of Impacts

1.3.1 Physical Resources

No impacts to geology, seismicity, or prime and unique farmlands are anticipated. Minor, short-term impacts to approximately 65,600 square feet of soils would occur during site leveling and grading and construction of the new facility. Approximately 120,000 square feet of buildings would be demolished and returned to grade. The Storm Water Pollution Prevention Plan (SWPPP) and Texas Pollution Discharge Elimination System (TPDES) permits must be obtained prior to construction and contractor would be required to implement appropriate best management practices (BMPs).

Minor, short-term impacts to air quality would occur during the construction period. The contractor would be required to implement appropriate BMPs to minimize short-term air quality impacts.

1.3.2 Water Resources

No impacts to wetlands, other Waters of the U.S., or floodplains are anticipated. Regardless of construction depths, construction and demolition activities are not anticipated to impact groundwater. Minor, short-term impacts to offsite surface waters may occur due to stormwater runoff transporting sediments from soils disturbed during construction and demolition and an increased amount of

impervious surfaces (new parking lot) after completion of the proposed facility. SWPPP and TPDES permits must be obtained prior to construction and contractor would be required to implement appropriate BMPs.

1.3.3 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 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 anticipated to promote additional development within any adjacent CBRS.

1.3.4 Biological Resources

No impact on biological resources is expected. The construction of the 108,000-square-foot Building 21 would be on previously disturbed land with no vegetation and the parking lot would be on a maintained lot dominated by St. Augustine grass. The demolition of Building 37, Building 37 adjoining storage facilities, and the six facilities in the 200 Area would have no adverse impact on biological resources. After demolition, the empty land would be returned to green space.

1.3.5 Cultural Resources

No impacts to cultural resources are anticipated.

1.3.6 Socioeconomic Resources

Construction of Building 21 and demolition of the existing structures would not adversely impact socioeconomics, minority or low-income populations, or public health and safety. Construction of the Building 21 and demolition of existing structures would create temporary jobs during the construction phase.

No hazardous materials or waste impacts are anticipated. The proposed construction site is currently an asphalt parking lot that has not been associated with any known activities involving hazardous materials. There are Spill Prevention, Control and Countermeasure (SPCC) regulated facilities at Building 37 for diesel fuel and coolant and in the 200 area for mineral oil. These facilities would be taken out of service and removed before the buildings are demolished. Because of the age of Building 37, asbestos and lead paint could be present.

Prior to demolition, the proper handling of asbestos and lead paint would need to be determined. Any hazardous materials discovered, generated, or used during construction would be disposed of and handled in accordance with applicable local, State, and Federal regulations. Any laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, should be handled in accordance 40 Code of Federal Regulation (CFR) Part 262.

Minor short-term impacts to noise levels would occur at the proposed 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, 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.

1.0 PURPOSE AND NEED FOR ACTION

The Lyndon B. Johnson Space Center (JSC), an installation of the National Aeronautics and Space Administration (NASA), is located in Harris County, Texas approximately 25 miles southeast of downtown Houston. The campus is situated on 1,620 acres of land donated by Rice University in 1960 for the construction of the space center. The property is almost entirely within the City of Houston (CoH) with the exception of Space Center Houston, the visitor center, which is located in extra-territorial jurisdiction of the CoH.

JSC is proposing the construction of new Life Sciences Laboratory (Building 21) and the demolition of multiple structures including Building 37, Building 37 adjacent storage areas, and six structures located in the 200 Area, as part of a 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. Building 21 would be located on the site of an existing parking lot located along Second Street. An additional parking lot is proposed west of the new Building 21. The areas associated with structure demolition would be reverted to green space. Figures 1 and 2 present the location of buildings associated with the proposed action.

Building 37, constructed in 1967, was designed to support specialized NASA projects and currently houses the vast majority of the associated life sciences research activities. Over time, adaptations have been made to the building as project needs change, technological advances are made, and budgets allow. Operationally, the building lacks a layout to support efficient use of laboratory space, offices, conference areas and break rooms. The facility infrastructure is outdated, specifically the heating, ventilation, and air conditioning (HVAC) system and building insulation, leading to increased costs of operation. In addition to these inconveniences, there are multiple code violations including mechanical, electrical, and plumbing and the facility does not meet all Federal Americans with Disabilities Act (ADA) statutes. Based on the existing conditions of the structure, Building 37 is being replaced due to the overall poor condition of the building and its infrastructure, and its general inability to provide the necessary work stations and laboratories to support NASA's mission without significant and costly rehabilitation and repairs.

The six buildings in the 200 Area are generally metal structures ranging in size from 500 to 10,000 square feet. The laboratories and supporting facilities in these buildings would relocate to Building 21, providing improved integration for research and testing.

Building 21 would be designed to Gold Leadership in Energy and Environmental Design (LEED) standards and would provide one modern, sustainable building facility in lieu of multiple facilities on the JSC complex. The new facility would provide modern laboratories capable of supporting advanced laboratory equipment and processes. Demolition of the seven structures referenced above would result in at least a 10 percent reduction in conditioned office space and laboratories at JSC, and therefore expected to reduce energy consumption through a more efficient use of space and elimination of older energy-inefficient structures.

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, 2012). Additionally, Building 21 would be designed to address Federal mandates, policies and standards regarding sustainability as identified in the 2011 *Design Analysis Package (DAP) 90-Percent Preliminary Engineering Report (PER) Submittal*.

In accordance with 44 CFR, Subpart B and Agency Implementing Procedures, Part 10.9, this Environmental Assessment (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 (EIS) or a Finding of No Significant Impact (FONSI).

2.0 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.

2.1 No Action Alternative

Under the No Action Alternative, NASA would not take action to modify Building 37, remove the 200 buildings, or construct a new laboratory. No impacts to the environment from construction would occur. However, the No Action Alternative would have negative impacts to JSC; existing laboratories would remain inefficient and obsolete facilities. Therefore, the No Action Alternative does meet the current or future needs of JSC.

2.2 Proposed Action Alternative

NASA proposes to construct a new Life Sciences Laboratory Facility at the Johnson Space Center located at Site A, identified on Figure 3 from the 60-Percent Design Analysis Package (HDR, 2011a). Site A is located just west of Second Street and provides close proximity to Buildings 17, 30 and 45 that are visited frequently by the doctors, researchers, and other staff to be located in the Building 21. The following project description is based on the 30 percent architectural and engineering design of Building 21 and will be finalized during the 60 to 90 percent design phase.

Site A was selected as the Proposed Action Alternative from four alternate sites based on several key factors. These factors include proximity to Buildings 17, 30 and 45; availability and proximity to utilities; ease of pedestrian and vehicular access to the facility; potential for future growth to the west; ability to shift the building's orientation to true north for sustainability; and least disruptive location during construction (HDR, 2011b).

Building 21 would be situated on the north edge of existing parking lot B-5 and along the south edge of parking lot B-4, Figure 4. Building 21 would include approximately 108,000 square feet if usable space and be 60-feet tall, with two stories and a mechanical penthouse. The foundation would be constructed with footings and drilled piers, drilled to a depth of no more than 80-feet below ground surface (bgs). The first floor finished floor elevation would be at 21-feet North American Vertical Datum of 1988 (NAVD 88). The new building would serve as a single replacement building, with two wings connected on two levels by an office and lobby block (HDR, 2011c). The laboratories to be housed in Building 21 are currently located in Building 37 and other buildings on campus including Buildings 228, 229, 261, 264, 266, and 272.

The north wing would consist of one main floor with high bay ceilings. The north wing would house only dry laboratories, including the Anthropometry and Biomechanics Facility, Bone and Muscle, Cardiovascular Laboratory, Exercise Physiology and Countermeasures and the Neurosciences Laboratory. Additionally, the north wing would house a machine shop, receiving area, and controlled access storage. Typical equipment to be used in the north wing includes compressed gas tanks (oxygen, carbon dioxide), cameras, laser scanners, bone density scanner, infrared cameras, and an extravehicular activity chamber.

The south wing would house the wet laboratories and would consist of two stories with a penthouse above the second floor. The labs on the first floor would include environmental physiology, immunology, microbiology laboratory, core laboratories, pharmacotherapeutics, radiation, and space cell biology. The labs on the second floor would include the clinical laboratory, animal care facility, toxicology laboratory, water and food analytical laboratory (WAFAL), environmental health, and nutrition. The labs housed in the south wing are rated at Biosafety Level 2 (BSL-2) or less. BSL-2 is suitable for work involving agents that pose moderate hazards to personnel and the environment. It differs from BSL-1 in three ways: laboratory personnel have specific training in handling pathogenic agents and are supervised by scientists competent in handling infectious agents and associated procedures; access to the laboratory is restricted when work is being conducted; and all procedures in which infectious aerosols or splashes may be created are conducted in BSCs or other physical containment equipment (USDHHS, 2009). Typical equipment and materials to be used in the south wing include specialty gases, liquid nitrogen, electron microscope, biological samples, and rats and mice.

A large freezer would be located in the penthouse. Gases piped into the laboratories are to be stored outside of Building 21, in a secure, designated area west of the north wing. Flammable and chemical material would be isolated in yellow cases.

Additional parking would be required since the proposed Building 21 site is located within an existing parking lot and the amount of available parking would be reduced. An additional parking lot is proposed to be constructed west of the existing B-4 and B-5 parking lots and would contain approximately 1,350 parking spaces (HRD, 2010a).

Once Building 21 construction is complete and all of the occupants have been relocated to their new facilities, the demolition of the seven structures would begin. Table 1-1 summarizes the buildings to be demolished and their current uses. The gross area of the buildings to be demolished totals approximately 120,000 square feet.

Table 1-1 Buildings to be Demolished				
Building Name	Building Use	Gross Area (Square feet)		
37	Life Sciences Laboratory	82,915		
37A, 37AA, and 37J	Building 37 adjoining structures	3,921		
228	Environmental Hygiene Lab	4,130		
229	Environmental Support Facility	5,000		
261	Planetary and Earth Sciences Laboratory, Annex A	9,386		
264	Storage Building No. 3	480		
266	Medical Data Support Facility	4,051		
272	Space and Life Sciences Laboratory	3,989		
Source: ERT, 2008; NASA, 2012a				

Building 37 is located on approximately 6.3 acres in the northeast part of JSC campus (HDR, 2010). Building 37 was constructed in 1967 and currently houses wet laboratories and includes adjoining storage structures. The building is three stories tall and also has a single story basement located underground at an approximate depth of six stories. The basement is no longer in use, but was designed to be a "null room" – void of any background radiation. The basement walls are covered with steel plates lined with lead bricks. The building also contains asbestos pipe insulation and vinyl asbestos floor tiles. Asbestos abatement procedures would be handled by the contractor selected for demolition services, but abatement would adhere to the JSC guidelines that would be included in the contractual agreement (Section 01 22 00.00 80, Special Requirements, of JSC Submaster, Unified Facilities Guide Specifications, April 2011) between NASA and the contractor. Demolition of the seven structures would comply with guidelines outlined in Section 02 41 00.00 80 (Demolition) and Section 01 74 19.00 80 (Construction and Demolition Waste Management).

Extra temporary workspaces would be required in some locations to accommodate lay down areas, equipment storage, etc. These workspaces would be located on already disturbed land, such as parking lots.

2.3 Alternatives Considered but Not Carried Forward

Under NEPA, Federal agencies are required to consider reasonable alternatives to a proposed action. Three other sites were considered as alternative locations within the main campus of JSC; additionally the remodel of Building 37 was considered. These alternatives are briefly described below.

Site B is located on the east side of Second Street between Buildings 17 and 45. Site B was eliminated because of space constraints, lack of well-defined outdoor space, and inability to orient the building true north.

Site C is located on the east side of Second Street, north of Buildings 46 and 47. Site C was eliminated because it has limited expansion potential, small outdoor space, and further from the preferred adjacencies than Sites A and B.

Site D is located between Fourth Street and Fifth Street, north of Building 29. Although this site has good expansion potential and a large outdoor space, the site was eliminated because it is located further from a utility tunnel and the preferred adjacencies (HDR, 2010).

The rehabilitation and remodel of Building 37 was considered and a site investigation was conducted in October 2010 by the HDR Design Analysis team to evaluate the conditions of the building. The investigation identified numerous code deficiencies, life safety issues, and inefficient configuration and use of space that would be overly expensive to correct (HDR, 2010).

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3.0 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 Section 3.7.

3.1 Physical Resources

3.1.1 Geology, Soils, and Seismicity

JSC is located on the Beaumont formation, a coastal plain of deep river silt deposits. This formation originated in the Pleistocene era via mass river transport of mud, silt and clays to the area. These deposits formed a gently sloped surface leading to the Gulf of Mexico, known as the Gulf Coast and Gulf of Mexico Continental Shelf. The historical heavy use of groundwater in the Houston area resulted in mass subsidence. The Southeast Water Purification Plant provided the means to utilize surface water sources to provide potable water in the area.

Soils located on the JSC facility include Lake Charles clay, Bernard clay loam, Midland silty clay loam, and Beaumont clay. These soils absorb only a small amount of water during rainfall events, drain poorly and provide poor building foundations without modification.

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. Some soil types present on JSC are indicative of prime farmland soils, however farmland does not include land that is already in or committed to urban development (ERT, 2008). 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.

The Texas gulf coastal region is located along the Gulf-margin Normal Faults, a fault belt with strikingly low historical seismicity; the stress field and seismogenic potential of the underlying crust are unknown; and, therefore, the ability of the fault belt to generate significant seismic ruptures that could cause damaging ground motion is unclear (Wheeler, 1998). According to the USGS National Seismic Hazard Maps, the Texas Gulf Coast, including the proposed project area, is located in the lowest hazard probability area for seismicity (USGS, 2008).

There are multiple faults located beneath this coastal plain; however, none are located beneath the JSC. It is notable that the underlying soils are clays and shales, which easily convey stress from sub surface movement to the surface (ERT, 2008).

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

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, construction activities would not be deep enough to impact underlying geologic resources or seismicity. However; construction activities would disturb approximately 65,600 square feet of previously disturbed soils in the footprint of the proposed building, additional area for the construction of a parking lot containing approximately 1,350 parking spaces (HDR, 2010), and 120,000 square feet for the demolition of seven structures. The proposed project would have a minimal short-term impact on native soils. NASA initiated consultation with USDA on October 23, 2012. No response has been received to date.

The applicant would be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) and obtain a Texas Pollution Discharge Elimination System (TPDES) permit prior to construction. Implementation of appropriate Best Management Practices (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 soil and waste materials would be managed and disposed of 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.

3.1.2 Air Quality

The Clean Air Act (CAA) requires that States adopt ambient air quality standards. The standards have been established to protect the public from potentially harmful amounts of pollutants. Under the CAA, the U.S. Environmental Protection Agency (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 (O₃), particulate matter ($PM_{2.5}$, PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (Pb). Greenhouse gasses (GHG), water vapor, carbon dioxide, methane, nitrous oxide, and O₃ 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 in nonattainment. 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 air quality monitoring stations are located at Clear Lake High School (CAMS 572) and at the Seabrook Friendship City Park (CAMS 45) (ERT, 2008). TCEQ and EPA consider Harris County a marginal/severe area for O_3 (TCEQ, 2012a). In 2008, Houston was reclassified as a severe nonattainment area for ozone (8-hour standard) (TCEQ, 2012b).

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

<u>Proposed Action Alternative</u> – With the Proposed Action Alternative, no long-term impacts to air quality would occur; the proposed Building 21 would not emit any 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 a minor indirect impact to climate change.

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 of the criteria pollutants, including CO, NO₂, O₃, PM₁₀, and non-criteria pollutants such as volatile organic compounds. 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.

The project is not anticipated to greatly impact 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 21 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 13514 *Federal Leadership in Environmental, Energy and Economic Performance* (2009), and NASA's 2010 *Strategic Sustainability Performance Plan* (HDR, 2011b). Long-term operation of the new building is also not anticipated to generate GHG. NASA initiated consultation with EPA on October 23, 2012. No response has been received to date.

3.2 Water Resources

3.2.1 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.

The proposed project site contains no surface water resources, but JSC is located in an area with many tidal streams and estuaries of Galveston Bay. Clear Lake is located southeast of JSC; Mud Lake and Armand Bayou are northeast; Cow Bayou is southwest; and Horsepen Bayou is north of JSC. Horsepen Bayou flows east to its confluence with Armand 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 (ERT, 2008).

At the proposed project location, stormwater drainage lines are located under the existing parking lot, traversing east/west, and under Second Street, traversing north/south. The east/west 72-inch drainage line flows into an existing storm channel located approximately 1,300 feet from Second Street.

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

<u>Proposed Action Alternative</u> – The Proposed Action Alternative is located on an existing asphalt parking lot and maintained grass lot. During construction of the Building 21 and parking lot, minor short-term impacts to offsite surface waters may occur due to stormwater runoff transporting sediments from soils disturbed during construction and an increased amount of impervious surfaces after completion of the proposed project. The design of Building 21 would follow the Energy Independence and Security Act (EISA) of 2007, PL 110-140 which specifies requirements for the reduction of stormwater runoff. During demolition of Building 37, Building 37 adjoining storage facilities and the six facilities in the 200 Area, minor short-term impacts to offsite surface waters may occur due to stormwater runoff transporting sediments from soils disturbed during demolition. After the completion of demolition, the areas

associated with structure demolition would be reverted to green space, therefore decreasing the amount of impervious surfaces within JSC.

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.

3.2.2 Groundwater

The Gulf Coast Aquifer forms a wide belt along the Gulf of Mexico from Florida to Mexico. In Texas, the aquifer provides water to all or parts of 54 counties and extends from the Rio Grande northeastward to the Louisiana-Texas border. Municipal and irrigation uses account for 90 percent of the total withdrawals from the aquifer. The Greater Houston metropolitan area is the largest municipal user, where well yields average about 1,600 gallons/minute (TWDB, 2012b).

The Gulf Coast Aquifer System is divided into four units, each of which can be generally correlated to different sedimentary formations (from deepest to shallowest): the Chatahoula, Jasper, Evangeline, and Chicot aquifers (TWDB, 2012a, 2012b). The Chicot and the Evangeline aquifers are located under the Houston area and are comprised of discontinuous sand, silt and clay.

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. The groundwater table fluctuates, but is typically found two to three meters (8 to 11 feet) bgs (ERT, 2008). According to the underground injection well permit, shallow groundwater depths range between 10 and 15 feet bgs.

JSC purchases water from the Clear Lake City Water Authority (CLCWA), which provides water from the San Jacinto and Trinity Rivers. JSC does maintain two water wells for contingency and emergency use only (ERT, 2008).

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

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, no impacts to groundwater are anticipated. The proposed Building 21 would connect to existing water and sanitary sewer services located along Second Street; no water well 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 21 would be installed up to a depth of 80 feet bgs. Excavation below ground to the depth of utilities would occur for demolition activities.

No known groundwater contamination exists in the immediate area of the proposed construction site or in the proposed demolition areas, Building 37 and the 200 Area. A known VOC groundwater plume was located approximately 2,300 feet north of the proposed Building 21 site within the shallow groundwater zone in the Surface Impoundment Area (Building 358). Treatment of groundwater contamination in this area was completed in 2011.

3.2.3 Waters of the U.S. Including Wetlands

The U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into Waters of the U.S., including wetlands, pursuant to Section 404 of the CWA. Additionally, EO 11990

(*Protection of Wetlands*) requires Federal agencies to avoid, to the extent possible, adverse impacts to wetlands. Drainage ditches constructed in uplands are not considered Waters of the U.S.

The U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) map of the area indicated there are no wetlands within the proposed project site (USFWS 2012a). A site visit conducted by a NEPA Environmental Specialist on October 2, 2012, verified that there are no wetlands or other surface waters on the project site.

<u>No Action Alternative</u> – 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.

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, no direct impacts to Waters of the U.S., including wetlands, would occur. Therefore, the project would not require permitting with the USACE. NASA initiated consultation with the USACE on October 23, 2012. No response has been received to date.

3.2.4 Floodplains

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. The Federal Emergency Management Agency (FEMA) uses Flood Insurance Rate Maps (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 21 and buildings to be demolished, is located within Flood Zone X which lies outside of a special flood hazard area (100-year floodplain) (FEMA 2007; Community Panel Number 48201C1080L, Revised June 18, 2007). The FIRM is included in Figure 5. A portion of Building 37 and all of the buildings in the 200 Area to be demolished are located within the 500-year floodplain, as shown on Figure 2.

<u>No Action Alternative</u> – Under the No Action Alternative, construction of the new facility would not occur and there would be no impacts to floodplains.

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, no direct impacts to floodplains would occur. Therefore, the project would not affect any Harris County Flood Control District infrastructure. NASA initiated consultation with FEMA on October 23, 2012. No response has been received to date.

3.3 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 (TCMP).

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 Map, the proposed project site is located within the Texas Coastal Zone (GLO, 2012). According to USFWS CBRS maps, the proposed project site is located outside the CBRA zone. The nearest CBRS unit (TX-04P) is located south of Texas City, Texas approximately 20 miles south of the proposed project site (USFWS, 2012b).

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

<u>Proposed Action Alternative</u> – 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, but consolidate structures by demolishing seven buildings that are being replaced by a single building. The proposed project is not located within a CBRS and is not anticipated to promote additional development with any adjacent CBRS.

3.4 Biological Resources

Wildlife

Mammals that may be found at JSC include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), nine-banded armadillo (*Dasypus novemcinctus*), nutria (*Myocastor coypus*), eastern cottontail (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*), and various bats, rats, and mice.

Birds using uplands include red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), barred owl (*Strix varia*), Eastern screech owl (*Otus asio*), common crow (*Corvus brachyrhynchos*), killdeer (*Charadrius vociferus*), eastern meadowlark (*Sturnella magna*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida* asiatica), loggerhead shrike (*Lanius ludovicianus*), mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), blue jay (*Cyanocitta cristata*), cardinal (*Cardinalis cardinalis*), common grackle (*Quiscalus quiscula*), rock dove or pigeon (*Columba livia*), starling (*Sturnus vulgaris*), and various sparrow species. Birds using JSC's waters include egrets and herons (e.g., *Casmerodius albus, Ardea herodias, Nycticorax violacea, Nycticorax nycticorax*), mottled ducks (*Anas fulvigula*), and belted kingfisher (*Megaceryle alcyon*). Ospreys (*Pandion haliaetus*) have also been sighted near JSC and are reported to nest in coastal areas of the region.

Reptiles and amphibians including alligators, snakes, turtles, lizards, and skinks occur throughout the site, although infrequently due to the development of the area (ERT, 2008).

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 slowly drained plain, that includes salt grass marshes surrounding bays and estuaries and tall woodlands in the river bottomlands (ERT, 2008).

Saint Augustine (*Stenotaphrum secundatum*) and Bermuda grass (*Cynodon dactylon*) are the dominant turf grasses. Most open grassland in the undeveloped areas and around some buildings, are mowed twice per year; although some of the more developed areas are mowed more frequently (ERT, 2008).

In 2005, JSC initiated a Sustainable Landscape Project with a Lady Bird Johnson Wildflower Center grant to assess the effectiveness of using regionally appropriate native plants to reduce landscape maintenance costs while enhancing biological diversity and wildlife habitat (ERT, 2008). Wildflowers and native grasses, planted in designated areas within JSC, cover approximately 10 acres (NASA, 2011b).

Threatened and Endangered Species

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 USFWS and/or the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA/NMFS), 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 3-1 identifies the federally threatened and endangered (T&E) species for Harris County and the Texas Parks and Wildlife Department (TPWD) state-listed threatened and endangered species for Harris County.

Table 3-1 Threatened and Endangered Species in Harris County				
Common NameScientific NameFederalStateStatusStateStateState				
Houston Toad	Anaxyrus houstonensis	LE	Е	
American Peregrine Falcon	Falco peregrinus anatum	DL	Т	
Arctic Peregrine Falcon	Falco peregrinus tundrius	DL	-	
Bald Eagle	Haliaeetus leucocephalus	DL	Т	
Black Rail	Laterallus jamaicensis	-	-	
Brown Pelican	Pelecanus occidentalis	DL	Е	
Henslow's Sparrow	Ammodramus henslowii	-	-	
Mountain Plover	Charadrius montanus	-	-	
Peregrine Falcon	Falco peregrinus	DL	Т	
Red-cockaded Woodpecker	Picoides borealis	LE	Е	
Snowy Plover	Charadrius alexandrinus	-	-	
Southeastern Snowy Plover	Charadrius alexandrinus tenuirostris	-	-	
Sprague's Pipit	Anthus spragueii	С	-	
White-faced Ibis	Plegadis chihi	-	Т	
White-tailed Hawk	Buteo albicaudatus	-	Т	
Whooping Crane	Grus americana	LE	Е	
Wood Stork	Mycteria americana	-	Т	
American Eel	Anguilla rostrata	-	-	
Creek Chubsucker	Erimyzon oblongus	-	Т	
Smalltooth sawfish	Pristis pectinata	LE	Е	
Louisiana black bear	Ursus americanus luteolus	LT	Т	

Table 3-1				
Threatened and Endangered Species in Harris County				
Common Name	Scientific Name	Federal Status	State Status	
Plains Spotted Skunk	Spilogale putorius interrupta	-	-	
Rafinesque's big-eared bat	Corynorhinus rafinesquii	-	Т	
Red wolf	Canis rufus	LE	Е	
Southeastern Myotis Bat	Myotis austroriparius	-	-	
Little Spectaclecase	Villosa lienosa	-	-	
Louisiana pigtoe	Pleurobema riddellii	-	Т	
Sandbank pocketbook	Lampsilis satura	-	Т	
Texas pigtoe	Fusconaia askewi	-	Т	
Wabash pigtoe	Fusconaia flava	-	-	
Alligator snapping turtle	Macrochelys temminckii	-	Т	
Green Sea Turtle	Chelonia mydas	LT	Т	
Gulf Saltmarsh Snake	Nerodia clarkii	-	-	
Kemp's Ridley Sea Turtle	Lepidochelys kempii	LE	Е	
Leatherback Sea Turtle	Dermochelys coriacea	LE	Е	
Loggerhead Sea Turtle	Caretta caretta	LT	Т	
Smooth Green Snake	Liochlorophis vernalis	-	Т	
Texas horned lizard	Phrynosoma cornutum	-	Т	
Timber/Canebrake rattlesnake	Crotalus horridus	-	Т	
Coastal Gay-feather	Liatris bracteata	-	_	
Giant Sharpstem Umbrella-sedge	Cyperus cephalanthus	-	_	
Houston Daisy	Rayjacksonia aurea	-	_	
Texas Meadow-rue	Thalictrum texanum	-	-	
Texas Prairie Dawn	Hymenoxys texana	LE	Е	
Texas Windmill-grass	Chloris texensis	-	-	
Threeflower Broomweed	Thurovia triflora	-	-	
 Sources: TPWD 2012 and USFWS 2012c; 1. Status Key: LE, LT = Federally Listed Endangered/Threatened; T = State Threatened, E = State Endangered; DL = Federally Delisted; "-" = Rare, but no regulatory listing 				

No critical habitat for threatened or endangered species is located at JSC (USFWS, 2012e). The Houston toad (*Bufo houstonensis*) was reportedly observed at JSC during the 1950's, but it is no longer believed to be present (ERT, 2008). No suitable habitat for any federally protected species was observed within proposed construction and demolition areas during the site visit, conducted by a URS Biologist on October 2, 2012. Site observations indicate that the proposed Building 21 site and additional parking lot is confined to an existing, previously developed parking lot and an open, manicured grassy area.

Since 2005, there is a Houston Zoo affiliated Attwater Prairie Chicken (*Tympanuchus cupido*) (APC) breeding program located at JSC, approximately 4,000 feet northwest from the proposed Building 21. The open expanse of JSC's undeveloped land provides a native-like habitat with quieter surroundings, a low predation threat and access to water and electricity for pen operations, which greatly contribute to an environment having a high potential for APC breeding program success. The program has been deemed successful, which has released an increasing number of birds into the wild (103 birds in 2005, to 150 in 2006, and to 196 in 2007) (ERT, 2008).

Other than APCs located in the breeding facility, no federally or state-listed threatened and endangered were observed during site reconnaissance.

According to the USFWS Migratory Bird Program (USFWS, 2012d), 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.

<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 no impact to biological resources. The construction of the 108,000-square-foot building would be on previously disturbed land with no vegetation and the parking lot would be on a maintained lot dominated by St. Augustine grass. The demolition of Building 37, Building 37 adjoining storage facilities, and the six facilities in the 200 Area would have no adverse impact on biological resources. After demolition, the empty land would be returned to green space.

The proposed project site provides little habitat for wildlife and no suitable habitat for any federally or state-listed threatened or endangered species. No impacts to threatened and endangered species or migratory birds are anticipated. NASA initiated consultation with USFWS and the USFWS Migratory Bird Office on October 23, 2012. No response has been received to date.

3.5 Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, (Public Law {P.L.). 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 National Register of Historic Places (NRHP) and designated the State Historic Preservation Office (SHPO) as the entity responsible for administering State-level programs. The NHPA also created the Advisory Council on Historic Preservation (ACHP), 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 ant 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 (APE) 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.

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

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, no impacts to archeological or cultural resources are anticipated. NASA will initiate consultation with SHPO for the proposed action.

3.6 Socioeconomic Resources

3.6.1 Socioeconomics

JSC is located in the Bay area, which is bounded by Interstate 45 to the west, 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. The area's economic base has four major industries: aerospace, petrochemical, tourism and recreation (ERT, 2008).

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. 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 375,000 people in 1998 to 425,000 people in 2008, which is an annual increase of approximately 5,000 persons per year. The population is estimated to reach 550,000 by 2020 (ERT, 2008).

According to the U.S. Census Bureau (USCB) 2010 demographic profiles, the total population of JSC Census Tract is 4,864 (Census Tract 3413.01). The population over the age of 16 participating in the work force is 4,251 citizens (USCB, 2010).

<u>No Action Alternative</u> – Under the No Action Alternative, no impacts to socioeconomic resources would occur.

<u>Proposed Action Alternative</u> – No adverse socioeconomic impacts are anticipated under the Proposed Action Alternative. No displacements or community impacts are anticipated since the proposed project would be constructed in an existing parking lot. Once Building 21 is complete and all of the employees and laboratories have been relocated, the demolition of seven structures would commence. Construction of the Building 21 and demolition of existing structures would create temporary jobs during the construction and demolition phases.

3.6.2 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 3-2 was gathered from the USCB 2010 Census and the 2006-2010 American Community Survey for evaluation.

Table 3-2					
Socioeconomic Summary					
JSC					
	(Census Tract 3413.01)	Harris County	State of Texas		
Total Population (2010)	4,864	4,092,459	25,145,561		
Annual median household income	\$45,076	\$51,444	\$48,286		
Population below poverty level	13.7%	16.8%	16.8%		
Minorities ¹	42.3%	67.0%	54.7%		
Hispanic (may be of any race)	16.4%	40.8%	37.6%		
Over 65	12.9%	8.2%	10.2%		
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, and Hispanic or Latino.					

Source: Houston-Galveston Area Council, U.S. Census Bureau, 2006-2010 American Community Survey

Minorities represented 42.3 percent, 67.0 percent, and 54.7 percent, respectively, of the populations of JSC, Harris County, and the State of Texas populations. Table 3-3 shows the specific racial composition of JSC, Harris County, and the State of Texas.

Table 3-3 Summary of Racial Composition						
Ethnicity	JSC (Census Tract 3413.01)	Harris County	State of Texas			
White	57.69%	32.98%	45.3%			
Hispanic or Latino	16.39%	40.84%	37.6%			
Black or African American	7.63%	18.43%	11.8%			
American Indian or Native Alaskan	0.53%	0.20%	0.7%			
Asian	15.34%	6.11%	3.8%			
Native Hawaiian or Other Pacific Islander	0.04%	0.06%	0.1%			
Other 2.38% 1.39% 0.7%						
Source: U.S. Census Bureau, 2010 Census						

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

<u>No Action Alternative</u> – 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.

<u>Proposed Action Alternative</u> –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 any population or businesses. Additionally, no impacts associated with the demolition activities are anticipated to low-income or minority populations. There would be no disproportionately high or adverse impact on minority or low-income portions of the population.

3.6.3 Hazardous Materials

Hazardous substances are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health and the environment. Industry, hospitals, research facilities, and the government primarily generate hazardous substances. Improper management and disposal of hazardous substances can lead to pollution of groundwater or other drinking water supplies, and the contamination of surface water and soil. The primary Federal regulations for the management and disposal of hazardous substances are the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA).

Given the nature and diversity of operations taking place at the JSC, specifically aeronautical and medical research, hazardous materials are handled at the facility. Based on TCEQ records, the facility is regulated for air emissions, industrial and hazardous waste, petroleum storage tanks, pollution prevention, stormwater, and underground injection. Facility operations include the transportation, storage, transfer, and use of oil regulated by Title 40, CFR Part 112, Oil Pollution Prevention (40 CFR §112) published in the Federal Register on November 13, 2009. Fuels, including diesel fuel, gasoline and ethanol, are used to power ground vehicles, equipment, boilers, and emergency generators. These fuels are stored in above ground bulk tanks ranging in size from 100 gallons to 100,000 gallons. All fuel handling activities are conducted by authorized personnel trained in spill prevention and response procedures. Oil and grease are used as lubricants in ground vehicles and equipment. All oil and grease, with the exception of the 900-gallon JSC-64897 aboveground storage tank (AST) at Building 48, is stored in 55-gallon drums or smaller containers. A Class V Injection Well is located approximately 2,300 feet north of the site and is designed to stimulate biodegradation and inhibit migration of a volatile organic compound plume. The underground injection control permit with the TCEQ is listed as being active; however, according to JSC remediation was completed in 2011.

Extensive BMPs and controls for petroleum products are contained in the facility Spill Prevention, Control, and Countermeasure (SPCC) 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). The SWPPP lists two major classes of hazardous waste; petroleum products and scrap materials. Scrap materials, especially metals, are stored in containers or covered to prevent contact with storm water. All other wastes are characterized according to a waste characterization plan and disposed of properly.

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

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, no hazardous materials or waste impacts are anticipated. The proposed construction site is currently an asphalt parking lot that has not been associated with any known activities or past uses that involved the generation, storage, or disposal of hazardous materials. There are no records of spills having occurred. There are SPCC regulated facilities at Building 37 for diesel fuel and coolant and in the 200 area for mineral oil. These facilities would be taken out of service and removed before demolition of the buildings. Because of the age of Building 37, asbestos and lead paint could be present. Prior to demolition, the proper handling of these materials would

need to be determined. Any hazardous materials discovered, generated, or used during construction, including asbestos and lead paint containing materials, would be handled and disposed of in accordance with applicable local, State, and Federal regulations. Any laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, should be handled in accordance 40 CFR Part 262.

3.6.4 Noise

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.

There are six main noise sources at JSC. Three of these sources are utilities: Central Heating and Cooling Plant (Building 24) and cooling tower, Auxiliary Chiller Facility (Building 28) and cooling tower, and Emergency Power Building (Building 48). The other sources are the Vibration and Acoustic Test Facility (Building 49), the Atmospheric Re-entry Materials and Structures Evaluation Facility (Building 222), and the Propulsion Test Facility (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 Center; and homes, stores and offices outside JSC (ERT, 2008).

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

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, minor short-term increases in noise levels are anticipated 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 approximately 3,500 feet west of the proposed Building 21. 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 anticipated.

3.6.5 Transportation

JSC is a secure facility with gates on Space Center Boulevard to the east and north and Saturn Lane to the west. The proposed Building 21 would be located within JSC on Second Street.

Traffic conditions on NASA Parkway are typically congested during the morning and evening peak periods. Vehicles reach the Clear Lake area via State Highway 3, State Highway 146 or Interstate 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, and operates a shuttle to JSC.

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 (ERT, 2008).

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

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, there would be no significant long-term impact to the existing roadway network. Because the function of the proposed building would be consistent with the buildings being demolished, no significant additional traffic is anticipated although traffic may become more concentrated along Second Street.

There would be a minor 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 anticipated, appropriate signage would be posted on affected roadways and construction vehicles and equipment would be stored on site during project construction to mitigate against any potential delays.

3.6.6 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.

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

<u>Proposed Action Alternative</u> – Under the Proposed Action Alternative, construction activities could present safety risks to those performing the activities; however, no impacts to public health and safety are anticipated. To minimize risks, qualified personnel trained in the proper use of equipment, including all appropriate safety precautions, would perform all construction activities. Additionally, all activities would be conducted in a safe manner in accordance with the standards specified in the Occupational Safety and Health Administration (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 adhering to the Texas One-Call Law.

3.7 Summary

Table 3-4								
Summary of Impacts								
Affected Environment	Impacts	Mitigation						
Geology, Soils, and Seismicity	No impacts to geology or seismicity are anticipated. Minor, short-term impacts to approximately 65,600 square feet of soils would occur during site leveling and grading and construction of the new facility. Additional soils would be disturbed for the construction of a parking lot. Approximately 120,000 square feet of buildings would be demolished and returned to grade. No impacts to prime and unique farmlands would occur.	SWPPP and TPDES permits must be obtained prior to construction. The construction contractor would be required to implement appropriate BMPs, including installation of silt fences and revegetation of disturbed soils to minimize erosion. Excavated soil and waste materials would be managed and disposed of in accordance with applicable local, State, and Federal regulations. If contaminated materials are discovered during the construction activities, work would cease until appropriate procedures and permits can be implemented.						
Air Quality	Minor, short-term impacts to air quality would occur during the construction period.	Construction contractors would be required to water down construction areas when necessary, fuel-burning equipment running times would be kept to a minimum, and engines would be properly maintained.						
Surface Water	Minor, short-term impacts to offsite surface waters may occur due to stormwater runoff transporting sediments from soils disturbed during construction and demolition and an increased amount of impervious surfaces (new parking lot) after completion of the proposed facility.	The applicant would be required to obtain a SWPPP and a TPDES permit for the project. Appropriate BMPs, including installing silt fences and revegetating bare soils, would minimize runoff.						
Groundwater	No impacts to groundwater are anticipated.	None						
Waters of the U.S. including Wetlands	No impacts to wetlands or other Waters of the U.S. are anticipated.	Appropriate BMPs would be implemented to minimize soil erosion and reduce sediment transport to offsite surface waters and wetland areas.						
Floodplains	No impacts to the floodplain	None						

Table 3-4 summarizes the potential impacts of the Proposed Action Alternative and conditions or mitigation measures to offset those impacts.

Table 3-4 Summary of Impacts						
Affected Environment	Impacts	Mitigation				
Coastal Resources	are anticipated. The structure would be elevated to a finished floor elevation of 21-feet, out of both the 100- and 500-year floodplains to allow for full functionality during flooding events. Because the building would be constructed on previously paved land, no appreciable increase in flood velocities or elevations upstream or downstream of the proposed project site is anticipated. 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. Based on a review of Coastal Coordination Council General Concurrence #5, NASA has determined that the Proposed Action Alternative is deemed consistent with the goals and policies of the Texas Coastal Management Program and consistency review procedures as implemented by the GLO.	None				

	Table 3-4 Summary of Impacts						
Affected Environment	Impacts	Mitigation					
Biological Resources	No impact on biological resources is anticipated. The construction of the 108,000- square-foot building would be on previously disturbed land with no vegetation and the parking lot would be on a maintained lot dominated by St. Augustine grass. The demolition of Building 37, Building 37 adjoining storage facilities, and the six facilities in the 200 Area would have no adverse impact on biological resources. After demolition, the empty land would be returned to green space.	None					
Cultural Resources	No impacts to cultural resources are anticipated.	None					
Socioeconomics	No adverse socioeconomic impacts are anticipated. Temporary jobs would be created during site construction and a few permanent jobs for facility operations may be created.	None					
Environmental Justice	No disproportionately high or adverse effect on minority or low-income populations is anticipated.	None					

Table 3-4									
Summary of Impacts									
Affected Environment	Impacts	Mitigation							
Hazardous Materials	No hazardous materials or waste impacts are anticipated. The proposed construction site is currently an asphalt parking lot that has not been associated with any known activities involving hazardous materials. There are SPCC regulated facilities at Building 37 for diesel fuel and coolant and in the 200 area for mineral oil. These facilities would be taken out of service and removed before structure demolition. Because of the age of Building 37, asbestos and lead paint could be present.	Prior to demolition, the proper handling of asbestos and lead paint would need to be determined. Any hazardous materials discovered, generated, or used during construction would be disposed of and handled in accordance with applicable local, State, and Federal regulations. Any laboratory wastes that could be considered hazardous, such as biological hazardous waste or chemicals, should be handled in accordance 40 CFR Part 262.							
Noise	Minor short-term impacts to noise levels would occur at the proposed project site during the construction and demolitions phases.	Construction would take place during normal business hours and equipment would meet all local, State, and Federal noise regulations.							
Transportation	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.							
Public Health and Safety	No impacts to public health and safety are anticipated.	Qualified personnel would perform all construction activities in accordance with the standards specified in OSHA regulations and JSC 1700.1; 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 adhering to the Texas One-Call Law.							

4.0 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.

Additionally, Building 21 would be designed to address Federal mandates, policies and standards regarding sustainability as identified in the 2011 *Draft Analysis Package (DAP) 90-Percent Preliminary Engineering Report (PER) Submittal.*

Construction or demolition of other projects is not anticipated to occur simultaneously with the Proposed Action Alternative. If other activities were to occur at the same time, 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 Building 21 and demolition of associated structures would incur additional minor, short-term impacts to soils, air quality, surface water, noise, and transportation. Impacts to these resources would remain minor and consistent with those defined for the Proposed Action Alternative analysis.

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5.0 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. The proposed site for Building 21 was selected because of its proximity to neighboring buildings, availability of utilities, ease of pedestrian and vehicular access, space for future growth, ability to orient the building to true north, and because it provides the least disruptive location. 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. Additionally, NASA would encourage the use of BMPs during construction and is required to meet or exceed applicable Federal, State, and local environmental protection and erosion control specifications and practices.

Consultation letters were submitted to Federal agencies requesting agency review and comments on the Proposed Action Alternative. An example of the letters sent and all responses are included in Appendix C. 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.

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6.0 AGENCIES AND PERSONS CONSULTED

NASA is the lead Federal agency for conducting the NEPA compliance process for the proposed construction of the new Life Sciences Laboratory (Building 21) and the demolition of multiple buildings including Building 37. 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 will provide additional notification to the public on the availability of the Draft EA through publication of a Notice of Availability for the Draft EA in *The Citizen* informing the public of NASA's decision to proceed with the project. The full text of the Draft EA will be linked to a secure ftp site. The Draft EA will also be made available for public review at JSC's onsite Industry Outreach Center and the Freeman Public Library (16616 Diana Lane, Houston, TX 77062). NASA will conduct a 30-day public comment period commencing on the initial date of publication of the public notice.

NASA conducted coordination with the following Federal agencies.

- 1. USDA
- 2. EPA
- 3. USACE
- 4. National Park Service
- 5. USFWS
- 6. USFWS Migratory Bird Division

Communication with agencies received to date is included in Appendix C.

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.

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7.0 LIST OF PREPARERS

7.1 Document Preparers

Brian Mehok, CFM Senior Environmental Specialist Houston, Texas

Stephanie Guillot, PE Environmental Specialist Houston, Texas

Amy Vargas Environmental Specialist Houston, Texas

Danny Symes GIS Specialist Houston, Texas

7.2 Government Contributors

David Hickens NASA Environmental Office Houston, Texas

Charlie Webster NASA Environmental Office Houston, Texas

Sandra Tetley NASA Historic Preservation Officer Houston, Texas

John Herrmann, PE NASA ESSC/ERT Houston, Texas

Christal Banks NASA ESSC/ERT Houston, Texas This page intentionally left blank.

8.0 **REFERENCES**

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APPENDIX A FIGURES

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Proposed	Buildina	21	Location

10550 Richmond, Suite 155 Houston, TX 77042 Tel: 713.914.6699 Fax: 713.789.8404		NASA Building	\mathbf{A}		Proposed Building 21 Location						
	///	Wetlands	0	300	Feet 600	Drawn By:	DS	Date: 11/5/2012	Project No.: 25015181	Figure: 1	



Feet 1,600

Wetlands

0

400

800

Proposed Construction

Project Location Map						
Drawn By: DS	Date: 11/5/2012	Project No.: 25015181	Figure:			
во	11/0/2012	20010101	<u> </u>			







Source: FEMA, Flood Insurance Rate Map, Harris County, Texas. Community Panel No. No. 48201C1080L. Revised November 18, 2007.

	NASA Johnson Space Center			FIRM	
PROJECT	^{CT} Building 21 Environmental Assessment			TIDC	FIGURE
DATE	10/22/2012	SCALE As shown		URS	5

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APPENDIX B Photograph Log

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APPENDIX C AGENCY COORDINATION

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Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058-3696



OCT 2 3 2012

Reply to Attn of : JE-12-050

Federal Emergency Management Agency, Region 6 800 North Loop 288 Denton, Texas 76201-3698

Subject: Preliminary Coordination and Scoping for the Building 21 Environmental Assessment

NASA JSC is hereby providing notification of our intent to prepare an Environmental Assessment (EA) per the requirements of the National Environmental Policy Act (NEPA), and as described within 14 CFR 1216.4. A description of the proposed action is described within the Attachment to this letter. We anticipate preparing the EA and having it available for public notice and interagency review in the late November or early December 2012 timeframe. No specific action is required on your part, as this notification is being provided for information purposes only.

By providing early notification during the early stages of the EA scoping and preparation process, JSC is providing you with the opportunity to provide any input you deem appropriate, in terms of environmental requirements, constraints, mitigations, or other issues that might apply to the proposed action that you wish to have considered within the EA.

If you have any questions concerning this notification, please contact me at (281) 483-3120 or by email at <u>david.hickens-1@nasa.gov</u>.

Sincerely,

David Hickens Lead, Environmental Office

1Enclosure

Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058-3696



Reply to Attn of : JE-12-050

OCT 2 3 2012

Regional Environmental Review Coordinator U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202-2733

Subject: Preliminary Coordination and Scoping for the Building 21 Environmental Assessment

NASA JSC is hereby providing notification of our intent to prepare an Environmental Assessment (EA) per the requirements of the National Environmental Policy Act (NEPA), and as described within 14 CFR 1216.4. A description of the proposed action is described within the Attachment to this letter. We anticipate preparing the EA and having it available for public notice and interagency review in the late November or early December 2012 timeframe. No specific action is required on your part, as this notification is being provided for information purposes only.

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Sincerely,

Ďavid Hickens ⁷ Lead, Environmental Office

1Enclosure

Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058-3696



OCT 2 3 2012

Reply to Attn of : JE-12-050

National Park Service, IMDE-PE P.O. Box 25287 Denver, Colorado 80225

Subject: Preliminary Coordination and Scoping for the Building 21 Environmental Assessment

NASA JSC is hereby providing notification of our intent to prepare an Environmental Assessment (EA) per the requirements of the National Environmental Policy Act (NEPA), and as described within 14 CFR 1216.4. A description of the proposed action is described within the Attachment to this letter. We anticipate preparing the EA and having it available for public notice and interagency review in the late November or early December 2012 timeframe. No specific action is required on your part, as this notification is being provided for information purposes only.

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Sincerely, chanz

David Hickens Lead, Environmental Office

1Enclosure

JE-12-050

Reply to Attn of :

Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058-3696



OCT 2 3 2012

Migratory Bird Office U.S. Fish & Wildlife Service P.O. Box 1306 Albuquerque, NM 87103-1306

Subject: Preliminary Coordination and Scoping for the Building 21 Environmental Assessment

NASA JSC is hereby providing notification of our intent to prepare an Environmental Assessment (EA) per the requirements of the National Environmental Policy Act (NEPA), and as described within 14 CFR 1216.4. A description of the proposed action is described within the Attachment to this letter. We anticipate preparing the EA and having it available for public notice and interagency review in the late November or early December 2012 timeframe. No specific action is required on your part, as this notification is being provided for information purposes only.

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Sincerely, Men

David Hickens / Lead, Environmental Office

1Enclosure

Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058-3696



OCT 2 3 2012

JE-12-050 Reply to Attn of :

> U.S. Fish and Wildlife Service **Division of Ecological Services** 17629 El Camino Real, Suite 211 Houston, Texas 77058

Preliminary Coordination and Scoping for the Building 21 Environmental Subject: Assessment

NASA JSC is hereby providing notification of our intent to prepare an Environmental Assessment (EA) per the requirements of the National Environmental Policy Act (NEPA), and as described within 14 CFR 1216.4. A description of the proposed action is described within the Attachment to this letter. We anticipate preparing the EA and having it available for public notice and interagency review in the late November or early December 2012 timeframe. No specific action is required on your part, as this notification is being provided for information purposes only.

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Sincerely,

David Hickens Lead, Environmental Office

1Enclosure

Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058-3696



OCT 2 3 2012

Reply to Attn of : JE-12-050

U.S. Department of Agriculture, Natural Resource Conservation Service 101 South Main Temple, Texas 76501-7682

Subject: Preliminary Coordination and Scoping for the Building 21 Environmental Assessment

NASA JSC is hereby providing notification of our intent to prepare an Environmental Assessment (EA) per the requirements of the National Environmental Policy Act (NEPA), and as described within 14 CFR 1216.4. A description of the proposed action is described within the Attachment to this letter. We anticipate preparing the EA and having it available for public notice and interagency review in the late November or early December 2012 timeframe. No specific action is required on your part, as this notification is being provided for information purposes only.

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Sincerely,

David Hickens Lead, Environmental Office

1Enclosure

Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058-3696



Reply to Attn of : JE-12-050

OCT 2 3 2012

U.S. Army Corps of Engineers P.O. Box 1229 Galveston, Texas 77553-1229

Subject: Preliminary Coordination and Scoping for the Building 21 Environmental Assessment

NASA JSC is hereby providing notification of our intent to prepare an Environmental Assessment (EA) per the requirements of the National Environmental Policy Act (NEPA), and as described within 14 CFR 1216.4. A description of the proposed action is described within the Attachment to this letter. We anticipate preparing the EA and having it available for public notice and interagency review in the late November or early December 2012 timeframe. No specific action is required on your part, as this notification is being provided for information purposes only.

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Sincerely, ielan

David Hickens Lead, Environmental Office

1Enclosure

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