National Aeronautics and
Space Administration

ENVIRONMENTAL ASSESSMENT
FOR THE CONSTRUCTION AND OPERATION OF THE RENEWABLE ENERGY SOLAR ARRAY PROJECT

JOHN C. STENNIS SPACE CENTER
HANCOCK COUNTY, MISSISSIPPI

February 2018

photo courtesy of https://en.wikipedia.org/wiki/Photovoltaic_system. Last accessed: August 2017

ENVIRONMENTAL ASSESSMENT FOR THE CONSTRUCTION AND OPERATION OF THE RENEWABLE ENERGY SOLAR ARRAY PROJECT AT JOHN C. STENNIS SPACE CENTER

Location: John C. Stennis Space Center
Hancock County, Mississippi

Lead Agency: National Aeronautics and Space Administration, John C. Stennis Space Center

Proposed Action: John C. Stennis Space Center proposes to develop two photovoltaic solar array systems for the purposes of generating renewable energy.

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Abstract: This document is an environmental assessment that examines the potential environmental impacts associated with the development of two photovoltaic solar array systems in support of federal goals related to energy independence and sustainability.

EXECUTIVE SUMMARY

The National Aeronautics and Space Administration's (NASA) John C. Stennis Space Center (SSC) is proposing to work with Mississippi Power Company (MPC), or like-entity, to develop two photovoltaic (PV) solar array systems for the purpose of generating renewable energy. The proposed action will assist NASA in meeting overall federal goals related to energy independence and sustainability as established by the Energy Policy Act of 2005 and Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*.

According to EO 13693, 30% of the electricity consumed by the federal government is to come from renewable energy sources by 2025. The EO establishes a hierarchy of practices for federal agencies to meet this target, including the installation of renewable energy sources on site. SSC has considered and evaluated the renewable energy resource potential and has identified locations suitable for development of PV solar array systems on Agency property. The purpose of this Environmental Assessment (EA) is to evaluate the potential environmental impacts associated with the development of a large-scale (13 to 25 MW) PV solar array within the SSC Buffer Zone that will be owned and operated by MPC, or like entity, as well as a one (1) megawatt (MW) PV solar array system to be located within the fee area and owned by NASA.

SSC evaluated two alternative sites located north of the fee area for the development of the large-scale PV solar array system; these alternatives were evaluated as the action alternatives in the EA. Alternative 1 evaluates impacts related to locating the PV solar array system on a 623-acre parcel located 2.0 miles from the existing substation. Alternative 2 evaluates impacts related to use of a 146-acre parcel which is located approximately 0.15 miles from a substation and has an existing utility corridor in place. SSC has identified Alternative 2 as the preferred action due to its proximity to a substation and the existing utility corridor. SSC also considered the No Action Alternative. The No Action Alternative provides the benchmark against which the proposed actions are evaluated.

The 1 MW PV solar array system is proposed for development on previously disturbed land located within the fee area near the Emergency Operations Center (EOC). An EA was developed in 2003 for the construction of the EOC, formerly referred to as the NASA First Response Facility, and a subsequent Finding of No Significant Impact (FONSI) was issued in 2004 (see Appendix A). The 1 MW PV solar array system will be located within the footprint of the 2003 EA; therefore there would be no appreciable impacts or changes beyond those previously assessed and/or as described for the No Action Alternative.

All impacts identified in this EA are considered to be minor or negligible. The most notable environmental impacts are associated with construction of the PV solar array systems and include air emissions, solid waste generation, storm water control, and vegetation disturbance. Design criteria related to the protection of natural and cultural resources and environmental compliance stipulations have been identified and are included in this EA.

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Acronyms/Abbreviations

AC	alternating current
Btu	British thermal unit
°C	degree(s) Celsius
CFR	Code of Federal Regulations
dBA	A-weighted decibel(s)
DC	direct current
EA	Environmental Assessment
EO	Executive Order
EOC	Emergency Operations Center
°F	degree(s) Fahrenheit
FONSI	Finding of No Significant Impact
ha	hectares
km	kilometer(s)
MVA	megavolt-ampere(s)
MPC	Mississippi Power Company
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act of 1969
NRHP	National Register of Historic Places
PCS	power conversion stations
PR	performance ratio
PV	Photovoltaic
SSC	Stennis Space Center
USC	United States Code

1.0 Purpose of and Need for Action

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [U.S.C.] §§ 4321-4370d), and according to the National Aeronautics and Space Administration's (NASA) Procedures for Implementing the National Environmental Policy Act (Title 14, Code of Federal Regulations [CFR], part 1216 subparts 1216.1 and 1216.3). The EA describes the purpose and need for the proposed action and evaluates the potential environmental impacts associated with the development of a large-scale photovoltaic (PV) solar array within the SSC Buffer Zone that will be owned and operated by MPC, or like entity, as well as a one (1) megawatt (MW) PV solar array system to be located within the fee area and owned by NASA. Two action alternatives and the No Action Alternative were considered.

The Energy Policy Act of 2005 (Public Law 109-58) established an energy research and development program covering: 1) energy efficiency; 2) renewable energy; 3) oil and gas; 4) coal; 5) Indian energy; 6) nuclear matters and security; 7) vehicles and motor fuels, including ethanol; 8) hydrogen; 9) electricity; 10) energy tax incentives; 11) hydropower and geothermal energy; and 12) climate change technology. In addition to providing incentives to encourage energy efficiency, research and development of renewable energy technologies, and the use of solar photovoltaic energy systems in new and existing federal buildings, the act sets forth goals for federal facilities to meet energy performance requirements and increase usage of renewable and sustainable energy sources.

Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, was signed on October 5, 2009. Building on the Energy Policy Act of 2005 and EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, EO 13514 established new targets for renewable energy usage, challenging agencies to more than double their consumption of renewable electricity.

EOs 13423 and 13514 were revoked on March 19, 2015, with the signing of EO 13693, *Planning for Federal Sustainability in the Next Decade,* which directs federal agencies to promote building energy conservation, efficiency, and management in an effort to maintain federal leadership in sustainability and greenhouse gas emission reductions. Specifically, EO 13693 requires federal agencies to ensure that where it is life-cycle cost-effective, that the percentage of the total amount of building electric energy consumed by the agency that is renewable electric energy is:

- not less than 10 percent in fiscal years 2016 and 2017;
- not less than 15 percent in fiscal years 2018 and 2019;
- not less than 20 percent in fiscal years 2020 and 2021;
- not less than 25 percent in fiscal years 2022 and 2023; and
- not less than 30 percent by fiscal year 2025 and each year thereafter.

The EO also establishes a hierarchy of practices for federal agencies to implement to meet this target, including the installation of renewable energy sources on site.

Development of the PV solar array systems will assist NASA in meeting federal goals related to renewable energy usage and generation of renewable energy on federal property, in accordance with the Energy Policy Act of 2005 and EO 13693. This environmental assessment addresses the environmental impacts associated with the proposed action.

2.0 Proposed Action and Alternatives

2.1 Description of Alternatives

According to the Energy Information Administration, Mississippi's energy consumption in 2015 was 1,133 trillion British thermal units (Btu), the 29th highest in the United States. The highest energy user by sector was industry, followed by transportation, residential users, and commerce.

Knowing the peak and average demand of a power system is critical to proper planning. The power system must be designed to serve the peak load, which is usually the busiest part of the day when the majority of the work force is present. The current SSC power system demand is approximately an average of 28.8 MW of energy continuously, and reaches daytime maximum energy usage of 36.8 MW.

SSC is proposing to work with MPC, or like entity, to develop a large-scale (13 to 25 MW) PV solar array system within the SSC Buffer Zone that will be owned and operated by MPC, or like entity, as well as a 1 MW PV solar array system to be located within the Fee Area and owned by NASA. The large-scale PV solar array system will be developed on federal property located within the SSC Buffer Zone, and leased by NASA to MPC, or like entity, as payment-in-kind for the development of the 1 MW PV solar array system. Initial construction of both solar arrays is projected to begin in 2018.

For the large-scale PV solar array system, SSC considered and evaluated the suitability of two alternative sites located north of the Fee Area within the SSC Buffer Zone - a 623 acre parcel located 2.0 miles from an existing substation and a 146 acre parcel (preferred site) located approximately 0.15 miles from a substation with an existing utility corridor in place (Figure 1). The 623 acre parcel has the same physical makeup as the 146 acre parcel, being located less than 2.0 miles apart. The flora and fauna present in the 623 acre parcel are the same as the 146 acre parcel and are described in Section 3.6, which is a complete biological resources site evaluation of the SSC Buffer Zone. The parcel was not evaluated for wetlands or cultural resources due to cost limitations. In the event that the preferred 146 acre site is not chosen, a full environmental evaluation will need to be performed before further consideration can be given to this site.

Other sites were also evaluated very early in the process, but were determined to not be viable alternatives based on distance from a substation (cost prohibited) or other planned actions already earmarked for those sites (future building site). The SSC economic development team decided that a large scale PV solar array within the SSC Fee Area would hinder future growth of the Center by using prime real estate that could be used for expansion of real estate activities. Due to this, SSC did not further pursue the development of the PV solar array within the Fee Area. The decision to develop the large-scale PV solar array system on the 146 acre parcel is

heavily influenced by its proximity to a substation, existing utility corridor, and the ability to avoid wetlands and cultural resources.

The large-scale PV solar array system will be owned and operated by MPC, or like entity, and will provide power to the commercial grid. The system will be equivalent to approximately 103 buildable acres with an estimated total capacity of up to 25 MW of installed power, the first phase of which will be approximately 13.5 MW (Figure 2). The system is expected to expand during the course of the 30-year initial lease, as the market demands. The design capacity of the PV solar array was based on the current needs of MPC. The grid layout and acreage needed were also based on recommendations from MPC. Development of the large-scale PV solar array system in conjunction with MPC, or like entity, allows NASA to receive additional energy credits for renewable energy generation on federal property and will provide NASA with increased energy security should the national grid be compromised.

SSC also considered the No Action Alternative, which addresses environmental impacts if NASA would not develop the large-scale PV solar array system. The No Action Alternative provides the benchmark against which the proposed actions are evaluated.

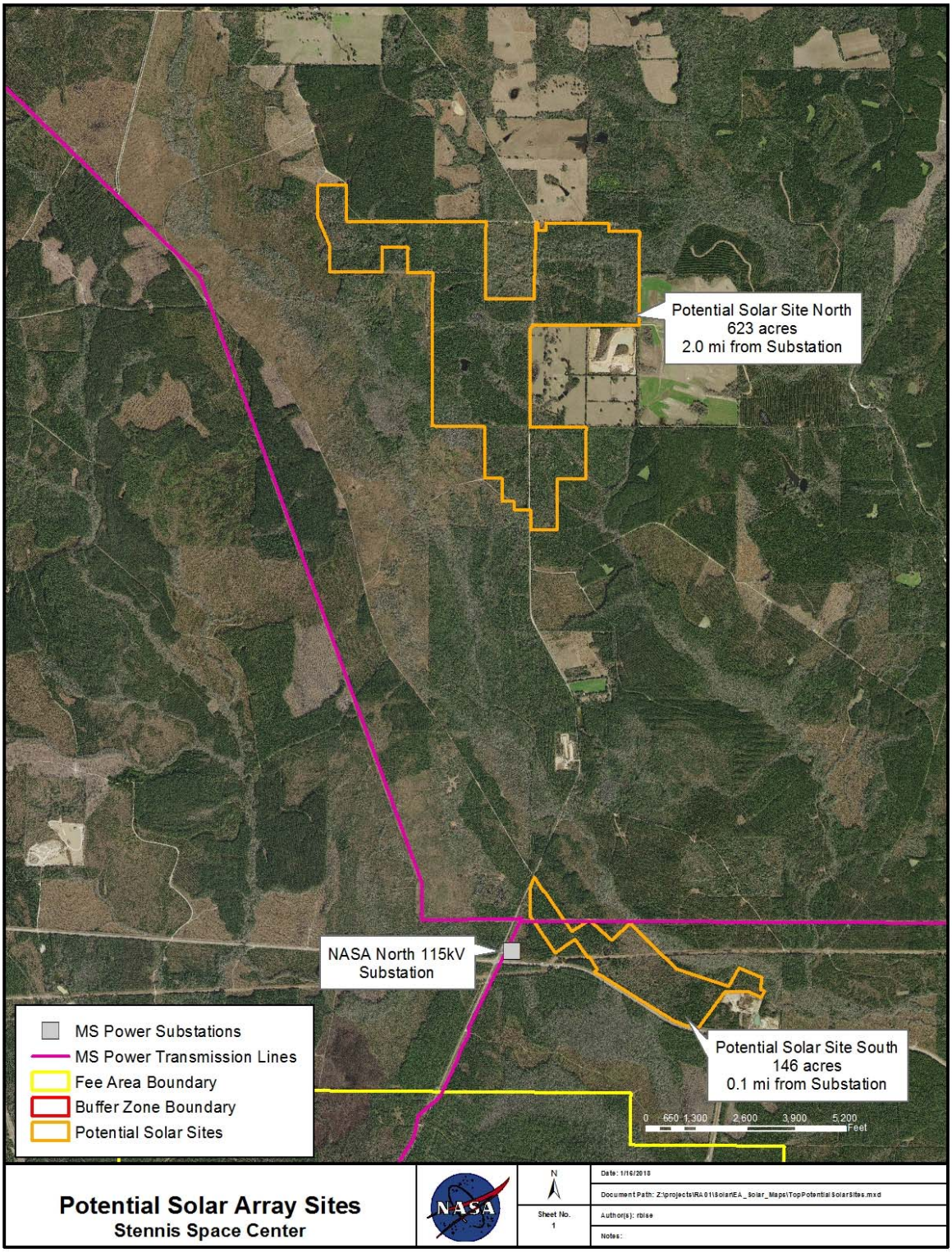

Figure 1
Alternative Potential Selection Site

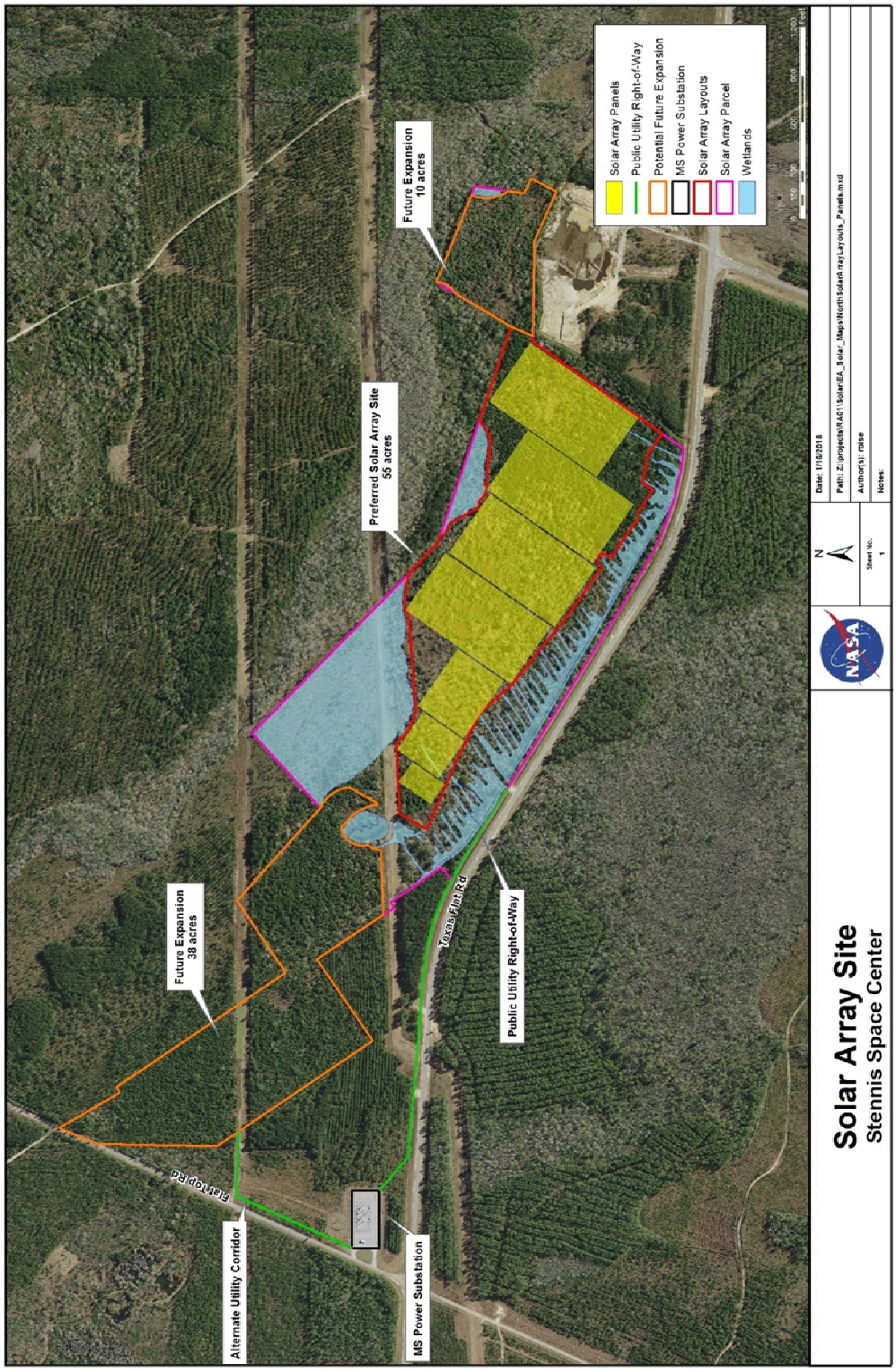

Figure 2
Location and Size of Proposed Solar Array in the SSC Buffer Zone

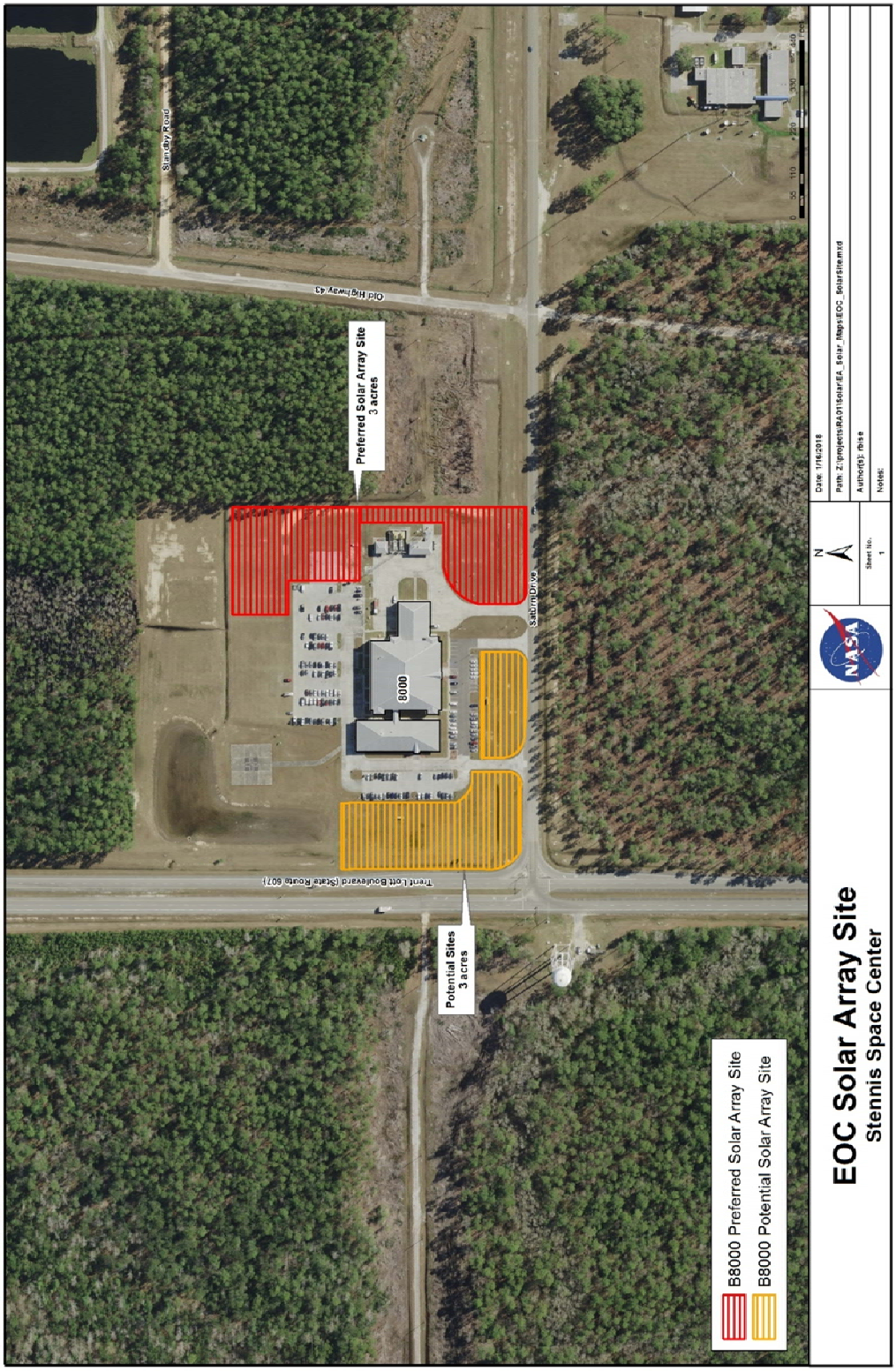

Figure 3
Location and Size of Proposed 1 MW Solar Array at the Stennis EOC

The 1 MW PV solar array system is proposed for development on a 3 to 4 acre parcel of previously disturbed land located within the Fee Area near the NASA Emergency Operations Center (EOC), as shown in Figure 3. An EA was developed in 2003 for the construction of the EOC, formerly referred to as the NASA First Response Facility, and a subsequent Finding of No Significant Impact (FONSI) was issued in 2004 (see Appendix A). The 1 MW PV solar array system will provide power to the EOC and other critical facilities at SSC. It will be comprised of solar array panels and an energy storage capacity area. This array will be very similar to the 13.5 MW array in scope just on a much smaller scale. Unlike the larger array, this array will be dedicated to SSC. This development is within the footprint of the 2003 EA; therefore there would be no appreciable impacts or changes beyond those previously assessed and/or as described for the No Action Alternative. SSC conducted a Section 106 review per the National Historic Preservation Act (NHPA) of 1966, as amended, and associated implementing regulations to ensure no cultural or historic artifacts will be adversely effected. SSC found this project will have no effect on cultural resources and the Mississippi SHPO concurred with those findings (Appendix B).

2.2 Photovoltaic Solar Technology Overview

Designing a utility-scale PV solar system (Figure 4) is an involved process that requires considerable technical knowledge and experience. There are many compromises that need to be made in order to achieve the optimum balance between performance and cost. This section provides an overview of currently available commercial PV technologies and highlights some of the key design considerations and methodologies for quantifying system performance.

PV cell technologies are broadly categorized as either crystalline or thin-film. Crystalline silicon (c-Si) cells provide high efficiency modules. They are sub-divided into mono-crystalline silicon (mono-c-Si) or multi-crystalline silicon (multi-c-Si). Mono-c-Si cells are generally the most efficient, but are also more costly than multi-c-Si. Thin-film cells provide a more economical alternative, but are less efficient. There are three main types of thin-film cells: Cadmium Telluride (CdTe), Copper Indium (Gallium) Di-Selenide (CIGS/CIS), and Amorphous Silicon (a-Si).

Individual PV cells are connected together in chains to form larger units known as modules or panels. Modules are either mounted on fixed-angle frames or on sun-tracking frames, which position the panels at the proper angle to the sun. Fixed-angle frames are easier to install, cost less, and require less maintenance. However, tracking systems typically generate more electricity and enable a smoother power output, particularly in areas with a high direct/diffuse irradiation ratio.

Inverters convert direct current (DC) electricity generated by the PV modules into alternating current (AC) electricity, ideally conforming to the local grid requirements. They are arranged either in string or central configurations. Central configuration inverters are considered to be more suitable for multi-MW plants. String inverters enable individual string maximum power point tracking and require less specialized maintenance skills in addition to offering more design flexibility.

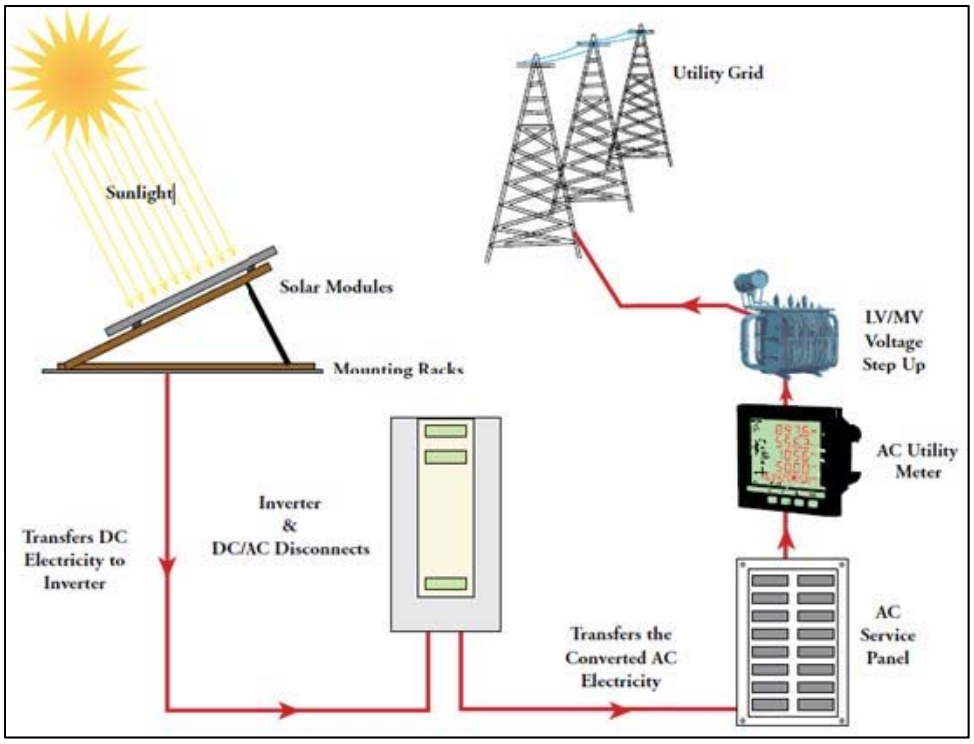

Figure 4: Overview of Solar PV Power Plant.
International Finance Corporation. Utility-Scale Solar Photovoltaic Power Plants, A Project Developer's Guide. 2015

PV modules and inverters are all subject to certification, predominantly by the International Electrotechnical Commission. New standards are currently under development for evaluating PV module components and materials.

The performance of a PV module will decrease over time due to degradation. The degradation rate depends on the environmental conditions and the technology of the module. The performance ratio (PR) of a well-designed PV power plant will typically be in the region of 77 percent to 86 percent (with an annual average PR of 82 percent), degrading over the lifetime of the plant. In general, good quality PV modules may be expected to have a useful life of 25 to 30 years.

For most large solar PV plants, reducing the levelized cost of electricity is the most important design criteria. Every aspect of the electrical system (and of the project as a whole) should be scrutinized and optimized. The potential economic gains from such an analysis are much larger than the cost of carrying it out. It is important to strike a balance between cost savings and quality. Engineering decisions should be "careful" and "informed" decisions. Otherwise, design made with a view to reduce costs in the present could lead to increased future costs and lost revenue due to high maintenance requirements and low performance.

The performance of a solar PV power plant can be optimized by reducing the system losses. Reducing the total loss increases the annual energy yield and hence the revenue, though in some

cases it may increase the cost of the plant. In addition, efforts to reduce one type of loss may conflict with efforts to reduce losses of a different type. It is the skill of the plant designer to make compromises that result in a plant with a high performance at a reasonable cost. For plant design, there are some general rules of thumb. But specifics of project locations - such as irradiation conditions, temperature, sun angles and shading - should be taken into account in order to achieve the optimum balance between annual energy yield and cost.

2.3 Photovoltaic Solar Array System Design Criteria

The final exact dimensions, structure type, layout, etc. have not yet been determined; however, general requirements for the PV solar array system include, but are not limited to the following:

- The system shall be designed and built by the vendor, and will have minimum maintenance requirements and high reliability.
- Maximum total height of the panels will be approximately 15 feet (4.6 m).
- A fence will be constructed around each of the solar array sites for protection of these resources.
- The system will avoid the disturbance of jurisdictional wetlands and flood zones.
- The system will be sized in an effort to manage the inventory of variable energy resources added to the system.
- The system will be sized for favorable economics while managing for limitations given their variability in production.

The proposed site will require clearing of all vegetation in order to ensure unobstructed views of the southern sky. In addition to land-clearing activities, the site will also need to be leveled to promote construction activities. Civil engineers will work to minimize the grading required, but it will depend on the site and racking system. The DC cables and AC cables will be placed in trenches that are typically a couple feet wide and about 3 ft. deep. The posts to support the racking system will be driven into the soil. Where feasible, existing roads will be used to access the solar array; however, any new roads that may be required to perform maintenance activities will need to be graded.

In addition, a pre-assembled power conversion station (PCS) on a steel skid will be used. There are several options for the skid and foundation. The steel skid may be set on steel piling or a concrete foundation. Figure 5 shows the DC feeders entering on the right end with the inverter modules in the middle, and the transformer on the left end, with the AC exiting.

The solar field shall consist of PV modules mounted at a fixed tilt or on rows of single-axis trackers. The rows of modules shall be electrically connected in series, in groups referred to as “strings.” Groups of strings shall feed power to a common DC combiner or string inverter. From the DC combiner, DC feeders will connect to power conversion stations. The PCSs consist of central inverters, step-up transformers, and associated electrical equipment such as recombiners and AC disconnects (if required). The PCS will additionally house supervisory control and data acquisition monitoring controls. The AC collection will consist of the wiring and associated

electrical hardware required to feed power from the PCSs to the substation. The AC collection system will primarily consist of buried power cable and the necessary connections, non-load break elbows, load break elbows, termination kits, and junction boxes/sectionalizer cabinets to connect to the substation. Figures 6 and 7 are provided as examples of similar solar arrays. If string inverters are used, then groups of string inverters will feed to a distribution panel before connecting to disconnect(s) and interconnection.

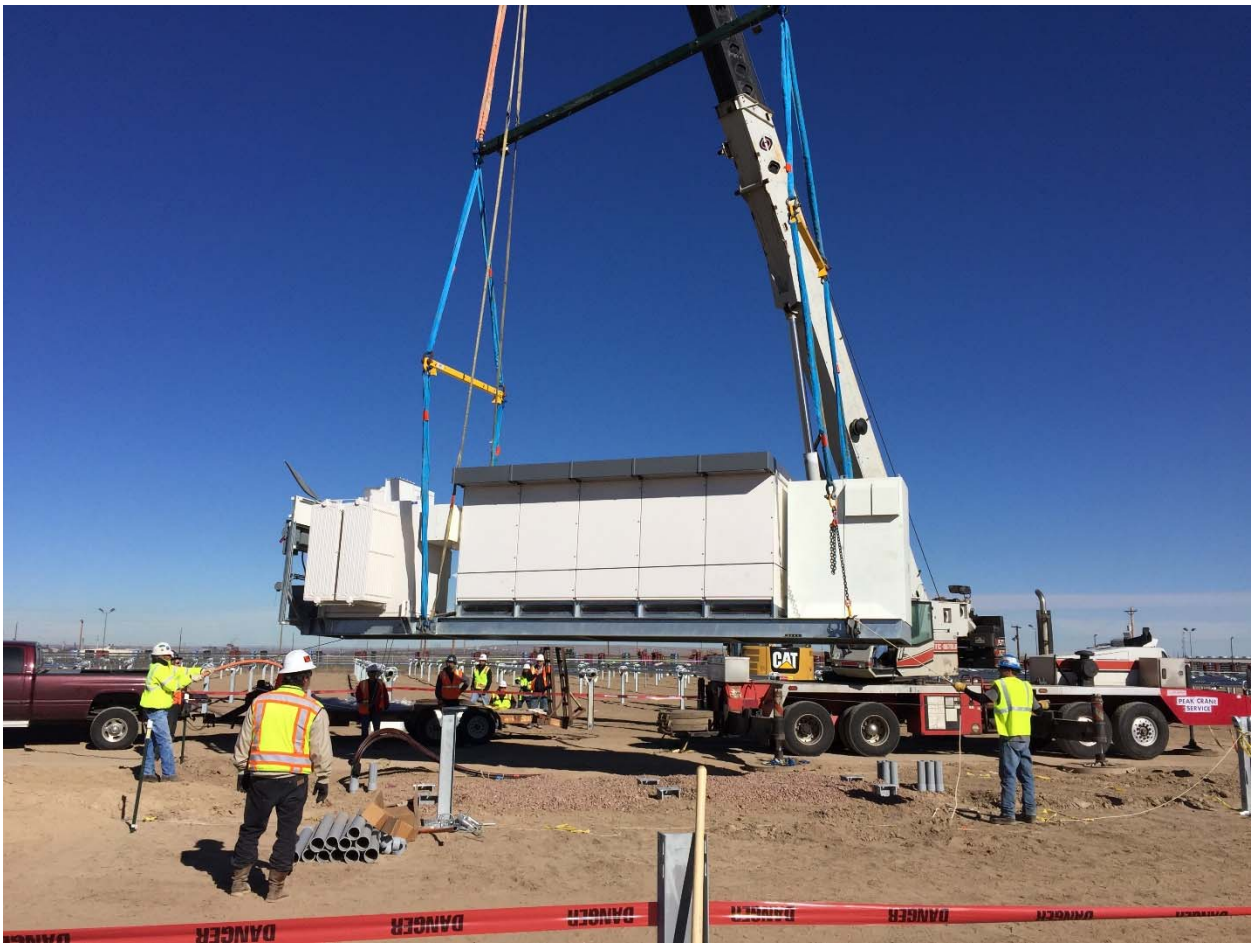

Figure 5
Pre-Assembled Power Conversion Station on a Steel Skid

https://en.wikipedia.org/wiki/Photovoltaic_system Last accessed: August 2017

Figure 6
Tucson Electric Power Company Ground Array (4.6 MW on 44 acres [0.18 km²])

https://en.wikipedia.org/wiki/Photovoltaic_system Last accessed: August 2017

Figure 7
Sarnia Solar Project in Ontario, Canada (80 MW on 950 acres [3.84 km²])

3.0 Existing Environment and Environmental Consequences of Alternatives

SSC is located near the Gulf of Mexico in western Hancock County, Mississippi, approximately 55 miles northeast of New Orleans, Louisiana and approximately 30 miles west of Biloxi/Gulfport, Mississippi (Figure 8). The facility is situated 30.38 north latitude (30º 22' 48") and 89.60 west longitude (89º 36' 0") at its center point. In May 1962, the Federal Government acquired approximately 13,800 acres which constitute the SSC Fee Area, or confines within the gates of SSC. Within this area, NASA along with numerous federal and state agencies have constructed administrative, research, remote sensing, and propulsion testing facilities.

Rocket testing operations necessitated development of a buffer zone for safety and acoustic considerations. A perpetual restrictive easement on 125,001 acres was acquired, which extends 6 miles in all directions of the SSC Fee Area (Figure 9). The majority of the SSC Buffer Zone is located in Hancock County, Mississippi, although portions extend into Pearl River County, Mississippi and St. Tammany Parish, Louisiana. The region is bounded on the east and west by the Pearl River and Jourdan River watersheds, respectively. At present, the government owns 6,808 acres of the SSC Buffer Zone with the remainder being held by individuals, corporations, or state government. Provisions of the restrictive easement prohibit maintenance or construction of dwellings and other buildings suitable for human habitation. Predominant land use in the buffer zone includes sand and gravel mining, timber production, and recreational pursuits such as hunting and fishing. Several communities are situated just outside the SSC Buffer Zone including Pearlington, Waveland, Bay St. Louis, Kiln, and Picayune, Mississippi as well as Slidell and Pearl River, Louisiana.

There are approximately 7 miles of canals inside the SSC Fee Area available to transport material within its boundaries. The SSC canal system links to the East Pearl River through a canal lock system. The East Pearl River links SSC to the national waterway transportation system. It is 21 miles from the main canal to the Gulf Intracoastal Waterway. The canal system provides a means of transporting large rocket engine stages, propellants, and other heavy equipment and materials to the facility.

(NASA. *Environmental Resources Document –SCWI-8500-0026-ENV*. NASA SSC: 2016)

The 1 MW solar array is proposed for development within the footprint of the 2003 EA developed for the construction of the EOC, and the subsequent FONSI issued in 2004 (Appendix A). Therefore there would be no appreciable impacts or changes beyond those previously assessed and/or as described for the No Action Alternative.

The following sections detail potential environmental impacts associated with the development of the large scale PV solar array system at the proposed site (identified as Alternative 2) and the No Action Alternative.

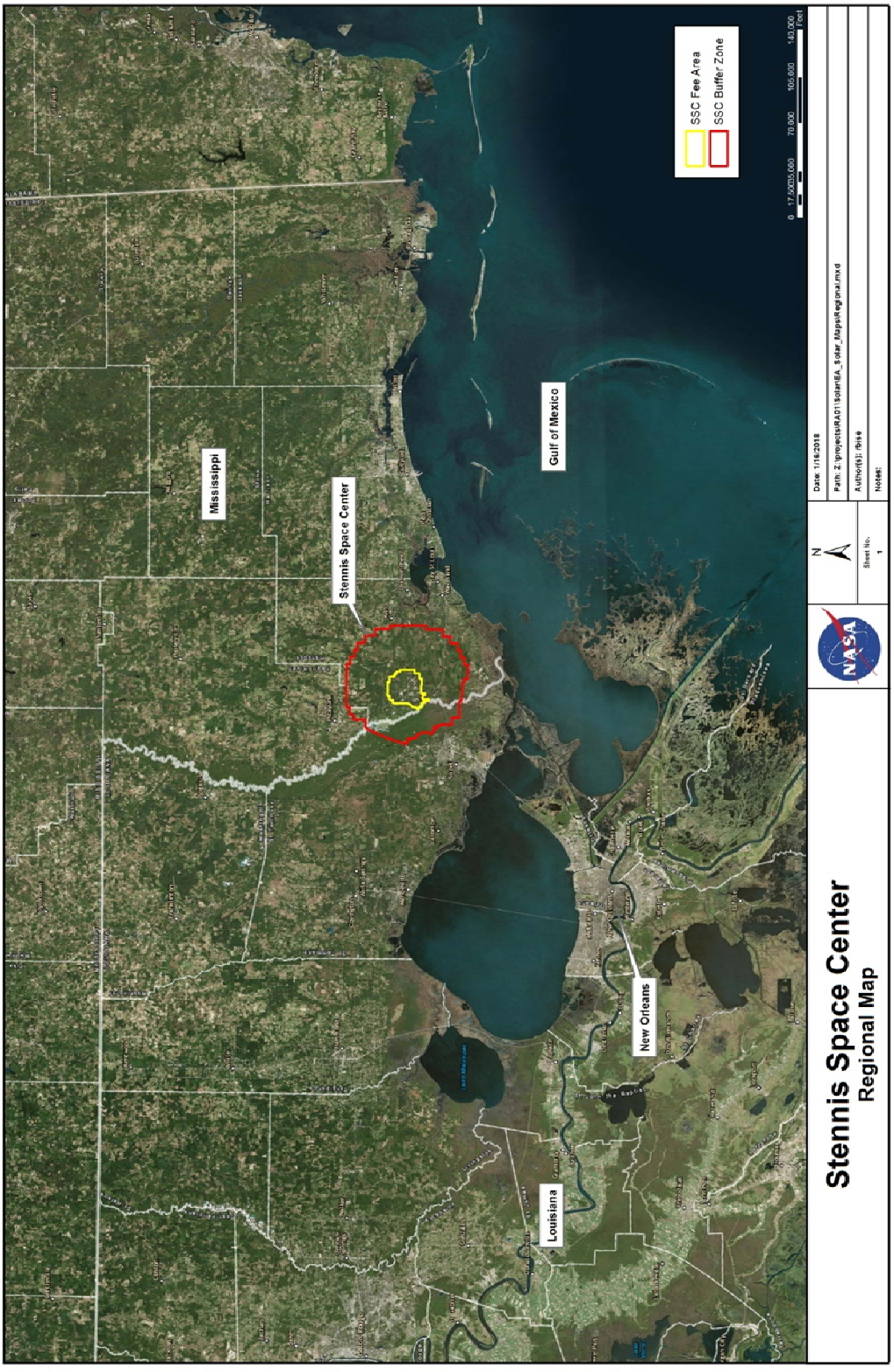

Figure 8
Regional Location of Stennis Space Center

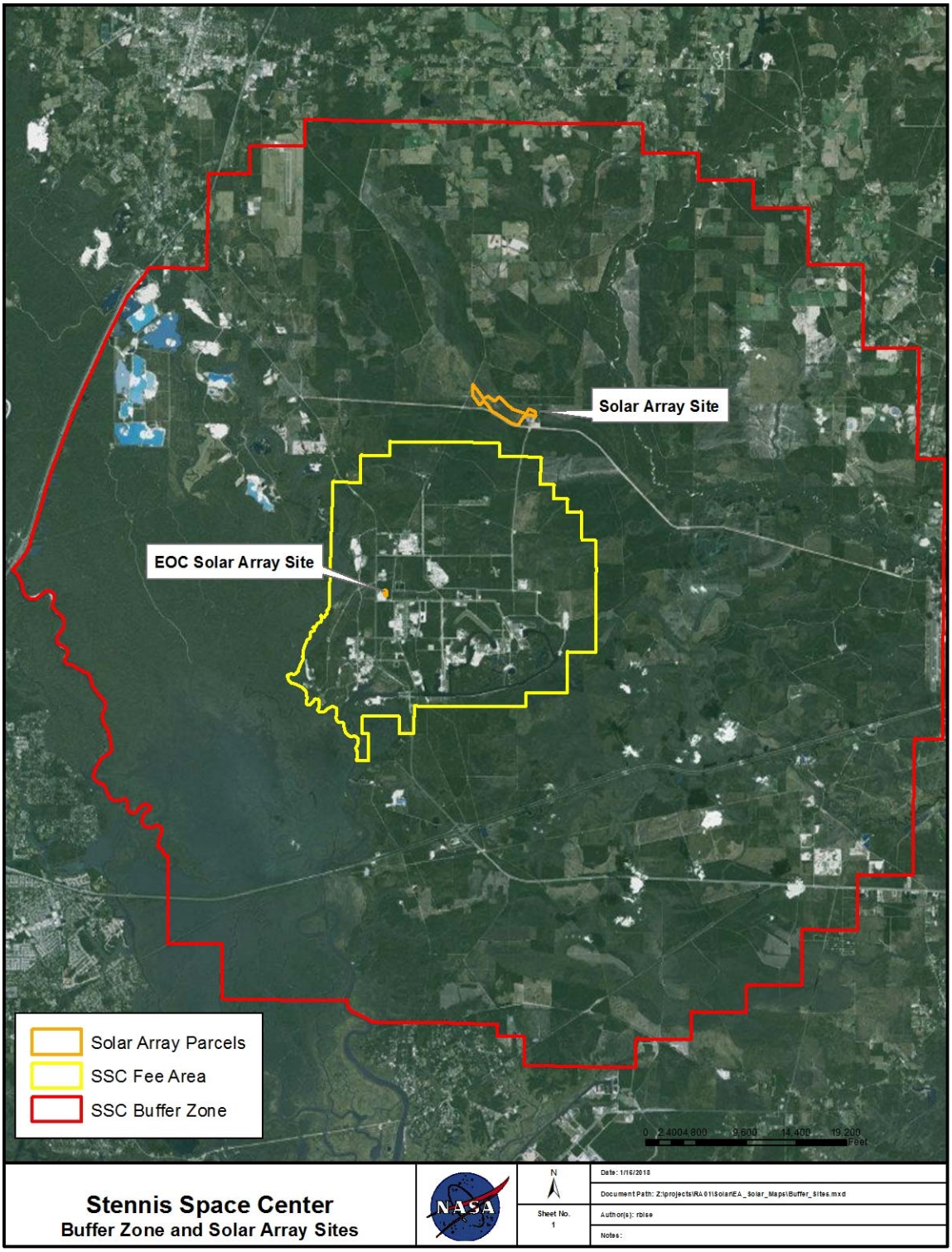

Figure 9
Stennis Space Center – Buffer Zone

3.1 Land Use

Affected Environment

The proposed site for the large scale PV solar array system is a 146 acre parcel located north of the Fee Area in the SSC Buffer Zone, in Hancock County, Mississippi. Specifically, the proposed site is north of the Fee Area boundary on the Dead Tiger Creek 7.5' USGS quadrangle, in Township 7 South, Range 16 West, Sections 15, 22, and 23 (Figure 2). The proposed site consists primarily of planted pine, and is bordered on the south by Texas Flat Road and on the west by Flat Top Road.

(Sarah E. Price. Phase I Cultural Resources Survey 71, Solar Array, Stennis Space Center, Hancock Co., MS Wiregrass Project No. 2017.01)

Environmental Consequences

No cultural resources were found during the Phase I survey previously conducted by Wiregrass Archaeological Consulting. Threatened and endangered species are not likely to be disturbed based on a two year study conducted by Mississippi State University. Delineated wetlands (Figure 10) shall be avoided during all site preparation activities. The proposed activities would result in no significant impact to land use at SSC.

There are no environmental impacts associated with the No Action Alternative.

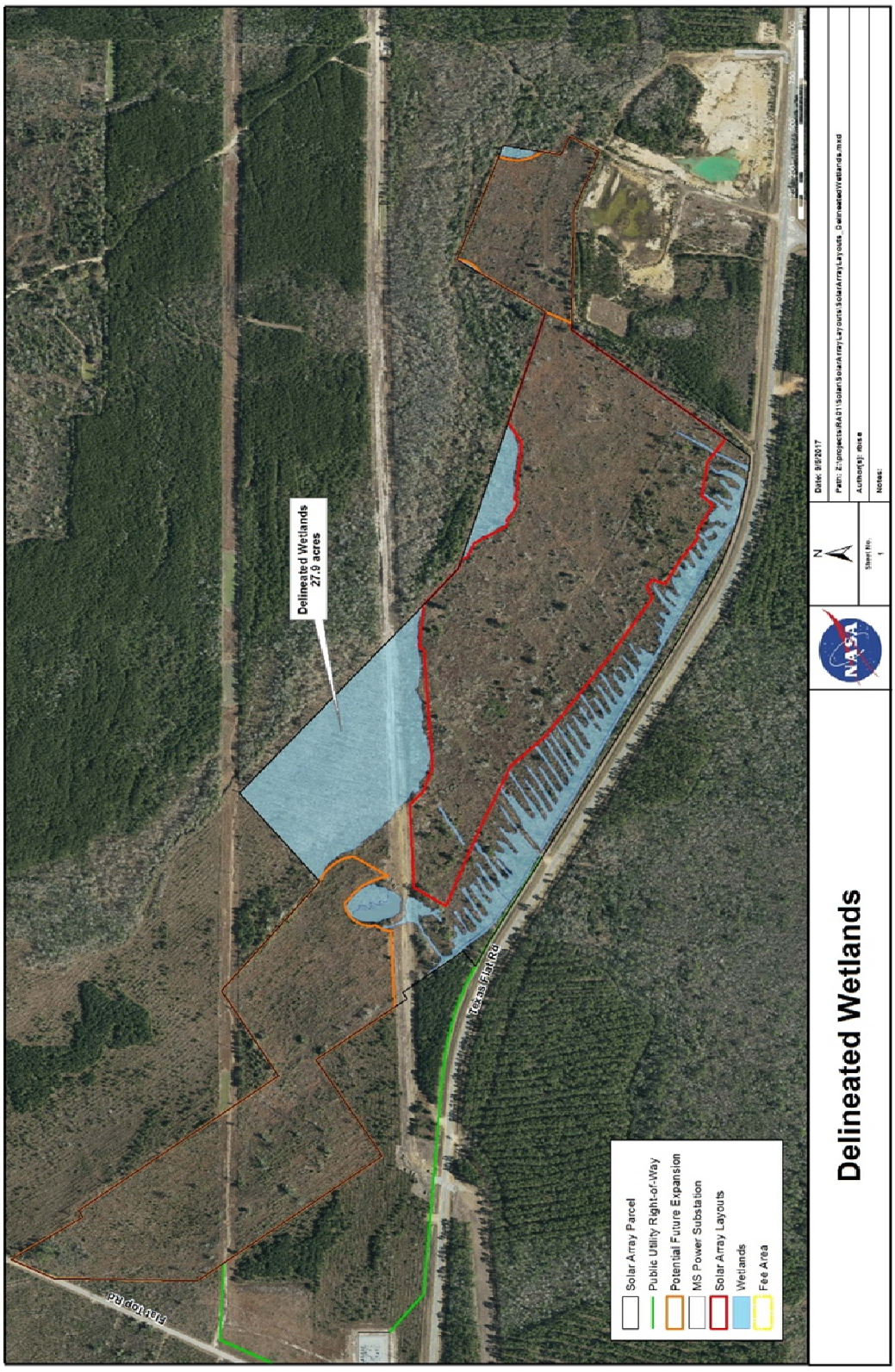

Figure 10
Delineated Wetlands

3.2 Geology and Soils

Affected Environment

Elevations within the proposed site range between 31 to 35 feet above mean sea level, based on Light Detection and Ranging (LiDAR) data. The proposed site lies on a terrace above Dead Tiger Creek to the north, and unlike much of the surrounding area, there is a definitive drop down into the creek bed. The proposed site lies wholly within Pliocene-age deposits of the Citronelle formation. This formation occupies the highest elevations in the interior portion of Hancock County, and is composed of gravel and sandstones with thin deposits of silt or clay. The Citronelle soils are red sand and white clay, and Citronelle formation gravels are often found in association as a residuum deposit of mixed lithology that originates in the Midwestern states. The deposit is heavily eroded in many places, and the underlying Hattiesburg formation is often exposed as a thin, ferruginous cemented sandstone.

(Sarah E. Price. Phase I Cultural Resources Survey 71, Solar Array, Stennis Space Center, Hancock Co., MS Wiregrass Project No. 2017.01)

Environmental Consequences

There will be some soil disturbance at the proposed site due to construction of the solar array within the 146 acre footprint. Overall the soil and soil quality will not be significantly impacted as a result of the proposed activity and the associated construction of such within the designated area, based on LiDAR data. A large construction storm water permit shall be obtained prior to commencement of construction activities. In addition, a Storm Water Pollution Prevention Plan shall be developed and implemented to address good engineering and best management practices as necessary to mitigate soil erosion and storm water runoff. Therefore, no significant impact to topography or soils is anticipated as a result of the proposed activity.

There are no environmental impacts associated with the No Action Alternative.

3.3 Climate

Affected Environment

Local

The climate at Stennis Space Center and its surrounding region is classified as humid subtropical. Average temperatures in the area range from around 49°F in January to about 82°F in July. Annual precipitation is about 64 inches and precipitation is relatively evenly distributed throughout the year. Local weather hazards that affect the Center include hurricanes and thunderstorms. Several hurricanes affected Stennis operations in recent history, including Betsy in 1965, Camille in 1969, and Katrina in 2005.

(NASA. *Adapting Now to a Changing Climate – Stennis Space Center)*

State

Mississippi is located in the humid subtropical climate region, characterized by temperate winters; long, hot summers; and rainfall that is fairly evenly distributed through the year. However, the state is subject to periods of both drought and flood, and the climate rarely seems to bring "average" conditions. More typical would be an expectation of "feast or famine" with regard to weather events as the climate delivers energy and moisture in subtropical latitudes between a large landmass to the north and the Gulf of Mexico to the south.

Prevailing southerly winds provide moisture for high humidity and potential discomfort from May through September. Locally violent and destructive thunderstorms are a threat on an average of about 60 days each year. Eight hurricanes have struck Mississippi's coast since 1895, and tornadoes are a particular danger, especially during the spring season.

Normal mean annual temperatures range from 62°F in the north to 68°F along the coast. Low temperatures have dropped to 16F below zero while high temperatures exceed 90°F over 100 days each year. Temperatures routinely exceed 100°F at many places in the state each year and drop to zero or lower an average of once in five years in the state. Freezing temperatures reach the Gulf Coast almost every winter. Annual rainfall ranges from about 50 to 65 inches across the state from north to south with occasional instances of measurable snow and/or sleet.

In summary, Mississippi has a climate characterized by absence of severe cold in winter and extreme heat in summer. The ground rarely freezes and outdoor activities are generally planned year-round. Cold spells are usually of short duration and the growing season is long. Rainfall is plentiful, but so are dry spells and sunshine.

(Mississippi State University. Department of Geosciences. *Mississippi Climate)*

Environmental Consequences

The proposed action is not expected to adversely impact the climate at SSC or the surrounding area. Instead, the proposed action will reduce the need for electricity generated in part by the use of fossil fuels, thereby reducing the overall climate impacts associated with emissions of greenhouse gases.

The No Action Alternative would not affect the climate at SSC or the surrounding area.

3.4 Air Quality

Affected Environment

The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. NAAQS have been established for six criteria pollutants, including carbon monoxide (CO), lead (Pb), ground-level ozone (O_3), nitrogen dioxide (NO_2), particulate matter (PM), and sulfur dioxide (SO_2). The federal primary and secondary ambient air quality standards

as promulgated in 40 CFR Part 50 have been adopted by the Mississippi Department of Environmental Quality, and are incorporated by reference in Title 11 Part 2 of the Mississippi Administrative Code.

SSC is considered to be in a rural area, and is expected to remain as such due to NASA's restrictive easement surrounding the facility. The ambient air quality for Hancock County, where the proposed project is located, currently meets all air quality standards and is considered to be in attainment.

(NASA. *Environmental Resources Document –SCWI-8500-0026-ENV*. NASA SSC: 2016)

Environmental Consequences

Use of ground vehicles as well as construction activities are expected to result in minimal, short-term air emissions. To minimize dust during these activities, dust control measures such as water trucks or dust suppressants shall be employed. Should the project require the use of portable generators, the resultant air emissions may be subject to federal and/or state regulations, including notification requirements and/or restrictions on use. The construction contractor is responsible for complying with all applicable federal, state, and local air quality regulations.

No air emissions are associated with the No Action Alternative.

3.5 Energy

Affected Environment

All 115 kilovolt (kV) electric transmission resources terminating at SSC are owned and operated by MPC, a subsidiary of The Southern Company. Four MPC 115 kV transmission lines are available to SSC at all times and are supervised via network monitoring and control by MPC in Gulfport, MS. Two lines arrive together at the southern edge of SSC from the southwest and from the southeast. Two lines arrive together at the northern edge of SSC from the northwest and from the northeast. All of these transmission resources are connected together at the 115 kV level by an MPC transmission line that bisects SSC. This bisecting resource represents capacity far beyond SSC requirements and is a critical electric load distribution element in the multi-state Southern Company system. Direct connection to these disparate sources and to this critical connecting pathway ensure increased service reliability for SSC.

Locally, electricity is conditioned and made available to SSC from three MPC owned and operated 115 kV / 13.8 kV substations. These are located geographically at SSC to accommodate existing and anticipated electric loads. These facilities are supervised around the clock by MPC and represent a 110 megavolt-ampere (MVA) capacity with 100% redundancy at two of three substations.

Locally, site-wide distribution of electricity is accomplished at a voltage rating of 13.8 kV via fifteen interconnected electrical circuits owned and operated by the government. As a result of investment over time and repairs to the system after Hurricane Katrina, supporting structures, conductors and underground facilities are robust in capacity and condition. Connectivity between

the three MPC substations at SSC has been established via this system to enhance reliability and to allow the reallocation of electric load between substations as necessary.

On-site electrical generation takes place at SSC in multiple ways. This is most common at the individual facility level and rated at 480 volts. However, the SSC 13.8 kV distribution system is connected to a concentration of 13.8 kV electric generating capacity, 6 MVA, from a single facility. This capacity is available exclusively to enhance the reliability of electric service in support of SSC's primary role: testing and flight certification of rocket engines and rocket engine components.

While the A and B Test Stands and the High Pressure Gas Facility (HPGF) routinely receive power from a commercial provider, the generator systems can take over this role exclusive of commercial power during engine tests and as needed during bad weather events. Manually operated electrical connections are available, in the event of the loss of commercial power.

(NASA. *Facility Master Plan, John C. Stennis Space Center*. NASA SSC: MS, 2015)

Environmental Consequences

It is anticipated that SSC shall continue to consume the same amount of energy it currently uses; however the solar arrays will provide a source of renewable energy without fossil fuel emissions.

The No Action Alternative would result in no change in the existing energy sources and/or consumption.

3.6 Biological Resources

Affected Environment

Property Location and Description

SSC is located in Hancock County, in southwestern Mississippi, east of the Pearl River and just north of Interstate 10 at 30°22'10" north latitude and 89°36'80" west longitude. SSC is comprised of approximately 6,462 ha of land. Approximately 3,823 ha of this land are designated controlled access areas and house testing facilities, laboratories, offices, and other operational facilities. The other 2,639 hectares (ha) are primarily forested land scattered within the large acoustical easement area that surrounds the Center's test facility. Beginning a decade ago, SSC managers have developed and maintained wetland mitigation banks to offset cumulative impacts of construction activities at the SSC. Current management requires the creation of replacement wetlands when Center operations must fill or clear natural wetland areas.

Major Habitat Types

At least four major types of plant associations provide habitat for native flora and fauna, including pine forests, bottomland hardwoods, pitcher plant wetlands, and savannahs marshes. Additionally, riparian habitats, bayheads, wetlands, rivers, and streams are present and provide

habitat diversity across the landscape. Pine forest communities at the SSC are composed mainly of slash pine (Pinus elliottii). Bottomland hardwood forests occur on low-lying areas near rivers and streams (floodplains). As a result, bottomland hardwood forests can experience intermittent to nearly continuous flooding. The plant communities in these forests can function under water or in saturated soil conditions. Tree species in these forests on SSC lands include but are not limited to the following: baldcypress (Taxodium distichum), red, Durand, white, willow, and water oaks (Quercus spp.); yellow poplar (Liriodendron tulipifera), Tupelo gum (Nyssa aquatica), sugarberry (Celtis laevigaeta), red maple (Acer rubrum), sweet bay and magnolias (Magnolia spp.), red bay (Persea borbonia), sweetgum (Liquidambar styraciflua). Savannahs and marshes are dominated by grasses, sedges, and rushes which may be interspersed with forbs and legumes. A protect mitigation pitcher plant wetland exist within the Fee Area and this area is dominated by sedges, pitcher plants (Sarracenia spp.) and other insectivorous plants, and rare forbs, such as orchids (Family Orchidaceae).

Species group (protected species)	**Survey Method**	**Method description and survey periods**
Amphibians		
Anurans - Frogs/Toads	Anuran call counts	Auditory surveys at dusk during February – April
Reptiles		
American Alligator, Map Turtles, Gopher Tortoises, Black Pine Snake	Evaluation of habitat; basking surveys; quadrat transects surveyed on sandy well drained soil types for tortoise burrows	Condition of lotic habitats will be evaluated for map turtles and if suitable habitat is found, basking surveys will be conducted. Upland habitats of sandy substrates will be searched for the presence of tortoise burrows and burrows will be classified according to activity status.
Other Aquatic Vertebrates and Invertebrates		
Fishes, larval amphibians, aquatic invertebrates, such as freshwater mussels and crayfish	Sweep netting Substrate sieving	Sweep netting in selected wetlands and watersheds to detect and identify aquatic fauna in April-May; Inspection of sand/gravel substrates of lotic habitats to detect mussels in April – May. Consultation with USFWS and Natural Heritage Program biologists on voucher specimens and photographic images.
Birds		
Passerines and woodpeckers	Observation and auditory Surveys	Surveys along established transects in open canopy pine forests or grass dominated, old field habitats, riparian forests and wetlands
Raptors, waterbirds and wading birds	Call counts, wetland surveys, and auditory and visual observations	Surveys conducted during winter, early spring, and spring summer months . Repeated inspections of wetland sites during spring and summer.
Mammals		
Louisiana Black Bear (*Ursus americanus luteolus*)	Sign identification; Consultation with state agency biologists and known locations of black bears near SSC.	During all other faunal and floral surveys, mammal sign (tracks, feces, scent mounds, burrows, feeding sign, and lodges or dens) will be recorded and listed within the habitat of detection.

Bats	Inspection of Potential Roost Sites and Anabat auditory surveys	Visual inspection of abandoned buildings, large bridge and culvert systems, and roost trees with special emphasis on mature, large diameter trees with cavity chambers. Anabat surveys in alluvial and upland forest areas
State-listed Plants	Transect Surveys within Potential Habitat	$\geq$ 90% coverage of selected forested, savanna, and wetland habitats potentially supporting state or federally listed plants from March – September.

Table 1: Survey methods for detection of state and/or federally listed flora and fauna at John C. Stennis Space Center, Mississippi in September 2014 – April 2016.

Common Name	Scientific Name	Federal Status and Act
Plants		
Louisiana quillwort	*Isoetes louisianensis*	Endangered Endangered Species Act
Mollusks		
Inflated Heelsplitter Mussel	*Potamilus iriflatus*	Threatened Endangered Species Act
Fish		
Gulf sturgeon	*Acipenser oxyrhynchus desotoi*	Threatened, critical habitat Endangered Species Act
Reptiles		
Gopher tortoise	*Gopherus polyphemus*	Threatened Endangered Species Act
Ringed map turtle	*Gratemys oculifera*	Threatened Endangered Species Act
Black pine snake	*Pituophis melanoleucus lodgingi*	Threatened, Endangered Species Act
Birds		
Bald Eagle	*Haliaeetus leucocephalus*	Bald and Golden Eagle Protection Act
Piping Plover	*Charadrius melodus*	Threatened, critical habitat Endangered Species Act
Mammals		
Louisiana black bear	*Ursus americanus luteolus*	Threatened with de-listing advanced in spring 2016 Endangered Species Act
Northern long-eared bat	*Myotis septentrionalis*	Threatened, Endangered Species Act

Table 2: Federally listed or protected plants and animals that potentially could occur on John C. Stennis Space Center, Picayune, Mississippi in 2014 – 2016
List provided by U.S. D. I. Fish and Wildlife Service, Jackson, MS.

Environmental Consequences

Construction and maintenance activities would create vegetation disturbances. The proposed project area would disturb approximately 103 acres of planted pine and dense undergrowth vegetation. The construction activities would take place within established areas of human activity that have been heavily modified in the last 70+ years based on LiDAR data. Overall, there would be no long-term significant impacts to the site's vegetation.

Fauna may be affected by construction activities, and operation and maintenance activities of the solar array. Noise from sources, such as vehicles, heavy machinery, and general human activities, related to construction and operation and maintenance activities would lead to species-specific faunal reactions. Factors influencing faunal responses may be time and length of the noise, seasonality, time of day, stress and physiological effects, life history, naturally occurring and background noise, and habituation (Larkin, 1996 and Brown, 2001). Most small mammals would avoid excessive noise by retreating into burrows while larger species of mammals and birds would temporarily vacate the area. Reproductive activities of some small mammals and birds may be temporarily disrupted by noise and the presence of humans while other animals may become increasingly habituated and display little modification in behavior with ongoing exposure. No threatened or endangered floral or faunal species occur in the proposed areas. Overall, due to the noise being isolated to the actual construction of the solar array, there would be no long-term significant impacts to the site's faunal species.

The No Action Alternative would result in no change to the existing floral and faunal populations at SSC and the surrounding area.

3.7 Cultural Resources

Affected Environment

Several federal laws require this assessment, including Sections 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and associated implementing regulations (36 CFR, Part 800); the National Environmental Policy Act (NEPA); and reporting standards outlined in the Mississippi Department of Archives and History (MDAH) Guidelines for Archaeological Investigation and Reports in Mississippi (Sims 2001), hereinafter referred to as MDAH Survey Guidelines.

Two archaeological sites, 22HA787 and 22HA788, and one isolated find were located and documented as a result of this Phase I Cultural Resources Assessment of the proposed Stennis Solar Array project tract (Figure 11). It is expected that historical remains might be encountered, based on available historical maps and aerial images. The two archaeological sites are the remains of historical structures, which were well documented at the time of acquisition by NASA.

Site 22HA787 is a historical site, the remains of a mid-twentieth century historical farming occupation. Aside from a few surficial artifacts, and the remnants of a chicken coop, there is no subsurface deposit to this site. Although there are some historical records, and the detailed

description from the acquisition appraisal, this site lacks attributes that meet the National Register of Historic Places (NRHP) criteria for eligibility.

Site 22HA788, also a mid-twentieth century historical occupation is slightly different than 22HA787, in that remains of three structures were found, as well as subsurface recovery of artifacts. Although there are at least two known owners of the parcel, records indicate neither resided in either of the two houses.

Isolated Find #1, four two-inch wire nails were recovered from a shovel test in the southeastern portion of the project tract. Although four artifacts are generally enough to designate a site, the fact that only nails were recovered from a single shovel test does not provide enough data tie these artifacts to an actual occupation or activity. Historical records do not indicate any structures in this portion of the project tract. This may be an activity area associated with the occupants of Tract 1910, but no direct connection can be made. No further work at this isolated find is recommended.

(Sarah E. Price. Phase I Cultural Resources Survey 71, Solar Array, Stennis Space Center, Hancock Co., MS Wiregrass Project No. 2017.01)

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) requires federal agencies to consult with appropriate Native American tribes prior to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony. There are 4 identified Native American tribes that have an interest in the project area. There are no known traditional cultural properties within the project area, however as part of the consultation process for this EA, interested federally-recognized Native American tribes were contacted and asked to provide comments on the project (Appendix B). The Choctaw Nation of Oklahoma responded on September 19, 2017 saying that they were not aware of any Choctaw historic sites within the immediate project area and that they concur with a finding of "No Historic Properties Affected" for this project (Appendix B). The Jena Band of Choctaw Indians responded on February 8, 2018 saying that they concur with the determination of no effect to present Cultural Properties (Appendix B).

No other Native American tribes provided comment(s).

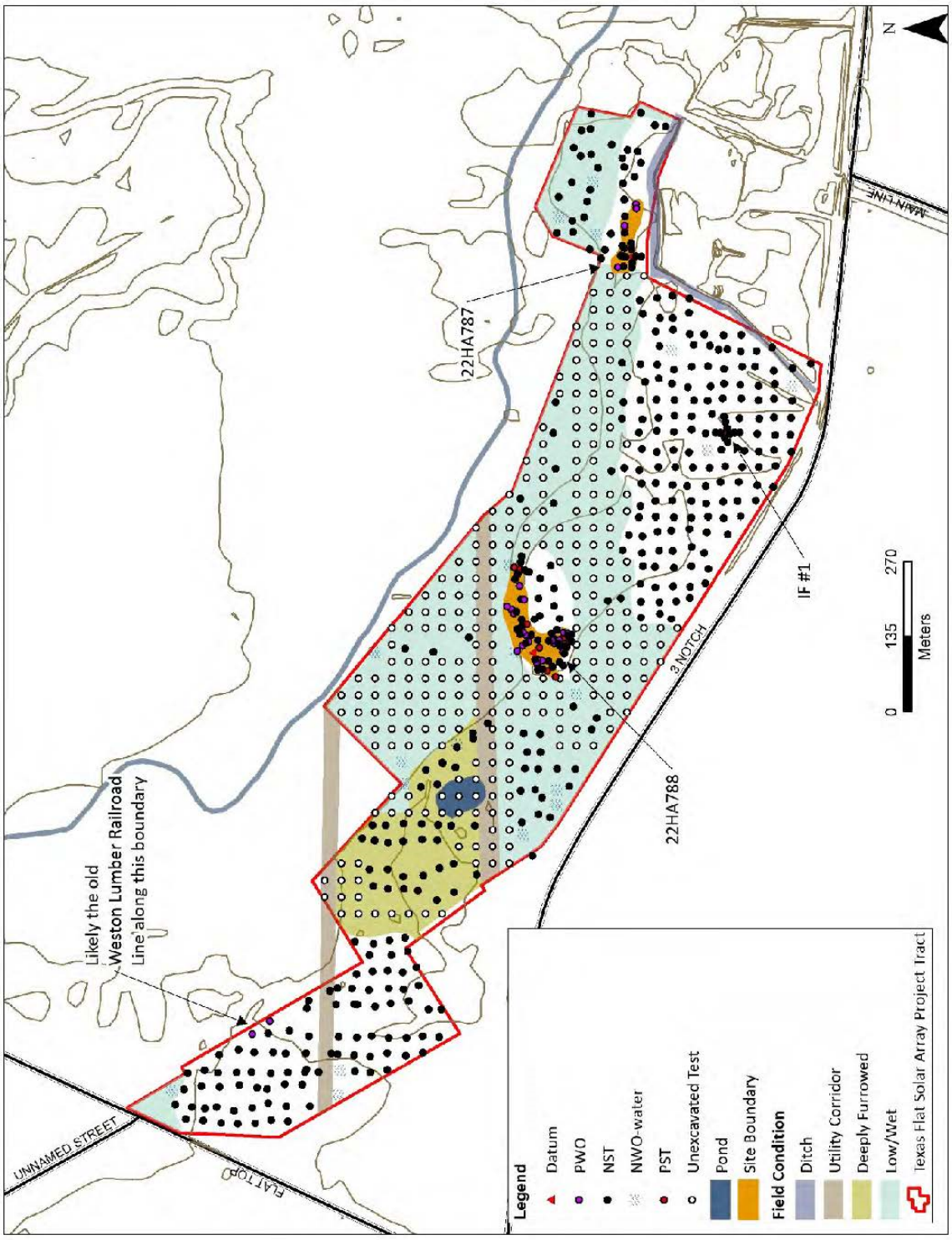

Figure 11
Phase I Cultural Resources Survey

Environmental Consequences

Two historic archaeological sites and one isolated find were identified within the proposed project area; none of these are eligible for listing on the NRHP. The SHPO concurred with SSCs determination of "No historic properties affected" on June 8, 2017 (Appendix B).

The proposed project is not expected to significantly impact the site's cultural resources. In the event archaeological features or human remains are found during construction at the proposed project site(s), NASA will follow the procedures outlined in their Integrated Cultural Resources Management Plan, Section 5.6.3, SOP #3: Inadvertent Discovery of Archaeological Deposits. Additionally, the contractor shall immediately cease all activities and notify the Stennis Historic Preservation Officer (SHPO). The SHPO will contact the MDAH Historic Preservation Division.

The No Action Alternative would result in no change to the existing cultural resources at SSC.

3.8 Noise

Affected Environment

Construction activities will generate noise; however, the level of noise is expected to have minimal impact to the environment. NASA's occupational exposure limit for noise is the equivalent of 85 A-weighted decibels (dBA), 8-hour dBA time-weighted average (TWA) exposure using a 3 decibel exchange rate. In the event noise levels associated with the proposed project exceed the NASA exposure limit, a combination of engineering and administrative controls, and hearing protection devices shall be used to control, reduce, or eliminate those exposures.

(NASA. *Environmental Resources Document –SCWI-8500-0026-ENV*. NASA SSC: 2016)

Environmental Consequences

Noise will be generated during the construction phase. For the safety of workers, proper protective equipment shall be utilized per the Occupational Safety and Health Administration and NASA requirements. The proposed solar array will have no significant impact on existing conditions.

The No Action Alternative would result in no change to the existing environment at SSC.

3.9 Socioeconomics and Environmental Justice

Affected Environment

Socioeconomics consists of the basic attributes and resources associated with the human environment especially in regard to population, economic activity, and environmental justice. The socioeconomic region of impact for the proposed action includes the areas surrounding SSC.

In accordance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, NASA considers environmental justice issues during program and project planning consistent with the SSC *Environmental Justice Implementation Plan* (NASA, 2017). Any disproportionately high and adverse effects of proposed programs at SSC on minority or low-income populations would be identified and action would be taken to resolve public concern.

The data used in this document is from the U.S. Census block-groups, which allows for an appropriate level of disaggregation. Six measures are employed: median household income, per capita income, percentage black, percentage persons of color, percentage female, and percentage persons under 18 years of age (children). These measures serve as indicators to identify vulnerable population groups that may be affected by activities at SSC. Portions of Hancock and Pearl River Counties and St. Tammany Parish are depicted in the mapping in this document. The largest populations within Hancock County are in Diamondhead, Waveland, and Bay St. Louis. Most of the SSC Buffer Zone land area is defined as a functional wetland, and comprises a major portion of the focus area in Hancock County. As a result, opportunities for development are minimal and population densities are low, except as noted previously. St. Tammany Parish occupies the western portion of the focus area with the northwestern tip lying in Pearl River County. The major urban area in St. Tammany Parish is Slidell, Louisiana, with the small community of Pearl River to the north. The town of Picayune, Mississippi occupies most of the Pearl River County portion of the study area. Population and income information for the project study area are shown in Table 3.

County or Parish	Total Population	% White	% Black	Male	Female	Per Capita Income
Hancock	45,136	87.34%	8.70%	49.03%	50.97%	$23,138
Pearl River	55,293	84.40%	13.33%	49.21%	50.79%	$20,010
St. Tammany	239,814	83.73%	11.73%	48.63%	51.37%	$30,304

Table 3. 2010 - 2014 Study Area Statistics by County or Parish

Environmental Consequences

Because of the size of the SSC Buffer Zone surrounding the Fee Area, there are no environmental justice concerns associated with this project.

Although minority and low-income populations are believed to exist within the proposed action's region of influence, under the proposed action, there would be no significant impact on, nor a potential for, disproportionately high and adverse effects on minority and low-income populations. The No Action Alternative would have no impact to the region's socioeconomics.

3.10 Pollution Prevention

EO 13693 expands upon the requirements established in EO 13423, which required Federal agencies to conduct environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically, fiscally sound, integrated, continuously improving, efficient, and sustainable manner.

Environmental Consequences

SSC has an Environmental Management System in place to identify all environmental aspects of operations and to select objectives and targets to minimize impact to the environment. SSC prevents pollution by recycling and reusing materials whenever possible, purchasing environmentally preferable products, minimizing the use of hazardous materials, and conserving water as well as other strategies delineated in the SSC *Pollution Prevention Plan* (NASA, 2016)

The No Action Alternative would not change current pollution prevention activities.

3.11 Cumulative Impacts

Cumulative impacts are those environmental impacts that result from the incremental effects of the proposed action when compounded by other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Environmental Consequences

A potential problem that occurs with PV modules is glare, or intense light reflecting off the modules. To reduce this effect, all modules will have an anti-reflective coating which will reduce glare and help with light absorption. The remote location of the solar array also reduces the potential impact of glare to neighboring properties.

The SSC solar energy project will have minimal implications in regards to noise and pollution prevention. Overall air emissions for the region are expected to improve upon implementation. Land use, climate, biological resources, cultural resources, and socioeconomics will not be effected.

4.0 Mitigation and Monitoring

To minimize potential environmental impacts associated with the proposed action as identified in the preceding analysis, the following mitigations shall be implemented during the course of the proposed project, at the discretion of SSC. These mitigations are central to the determination of no significant impact. Any unexpected adverse impacts to the environment will require additional mitigation measures.

4.1 Land Use

Actions will be taken to ensure a minimal amount of land disturbance during the course of the proposed project. In addition, existing roads, utilities, and resources shall be used, where feasible.

4.2 Air

Air emissions, including dust, will be generated from construction activities and vehicle traffic. To minimize dust during these activities, dust control measures such as water trucks or dust suppressants shall be used. All air emission sources shall be operated in accordance with the applicable federal, state, and local regulations.

4.3 Biological Resources

If any species listed in Section 3.6 is found following the completion of this EA, SSC will evaluate and determine the need for additional mitigation.

4.4 Cultural Resources

In the event archaeological features or human remains are found during construction at the proposed project site(s), NASA will follow the procedures outlined in their Integrated Cultural Resources Management Plan, Section 5.6.3, SOP #3: Inadvertent Discovery of Archaeological Deposits. Additionally, the contractor shall immediately cease all activities and notify the Stennis Historic Preservation Officer (SHPO). The SHPO will contact the MDAH Historic Preservation Division.

4.5 Noise

In the event noise levels associated with the proposed project exceed the NASA exposure limit, a combination of engineering and administrative controls, and hearing protection devices shall be used to control, reduce, or eliminate those exposures.

5.0 Preparers, Contributors, and Contacts

Agencies and Individuals Consulted

The Southern Company (Chris Snow)
- Section 2.2 & 2.3

NASA White Sands Test Facility (Amanda Skarsgard)
- Document structuring and design

NASA Stennis Space Center – Environmental and Health Services (Katrina Wright)
- Section 3.8

NASA Stennis Space Center – SSC Center Sustainability Officer (Ronald G. Magee)
- Section 1.0 & 2.0

NASA Stennis Space Center – SSC Energy Manager (Missy Ferguson)
- Section 3.5

NASA Headquarters – Federal Preservation Officer (Rebecca Klein) and NEPA Manager (Tina Norwood)
- Document review

List of Preparer(s)

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Appendix A

FONSI – EA for NASA EOC

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTICE 03-SSC-01

National Environmental Policy Act; Finding of No Significant Impact; NASA First Response Facility

AGENCY: National Aeronautics and Space Administration (NASA)

ACTION: Finding of No Significant Impact

SUMMARY: Pursuant to the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 et seq.), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and NASA's policy and procedures (14 CFR Subpart 1216.3), NASA has made a Finding of No Significant Impact (FONSI) with respect to the proposed construction and operation of the NASA First Response Facility. The Facility would be used for consolidation of the John C. Stennis Space Center (SSC) fire department, medical clinic, security operations, emergency operations and the energy management and control center. This new facility is needed in order to co-locate emergency response units and facilitate emergency communications and planning.

DATE: Comments in response to this notice must be received in writing by NASA no later than February 25, 2004.

ADDRESSES: Comments should be addressed to Anne H. Peek, NASA Environmental Officer, Code RA02, Building 1100, Stennis Space Center, MS 39529-6000. The Environmental Assessment (EA) for the NASA First Response Facility that supports this FONSI may be reviewed at:

Maury Oceanographic Library, Building 1003, Stennis Space Center, MS 39529

Hancock County Library, Highway 90, Bay St. Louis, MS 39520

Margaret Reed Crosby Library, Picayune, MS 39466

St. Tammany Parish Library, Slidell, LA 70458

NASA Headquarters, Library, 300 E Street SW, Washington, DC 20546

A limited number of copies of the EA are available by contacting Anne H. Peek, NASA Environmental Officer, at the address and/or telephone number herein indicated.

FOR FURTHER INFORMATION CONTACT:

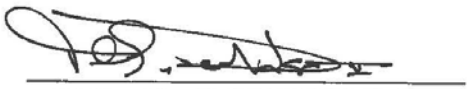
Anne H. Peek, NASA Environmental Officer, Code RA02, Building 1100, Stennis Space Center, MS 39529-6000; Telephone (228) 688-2004

SUPPLEMENTARY INFORMATION: NASA has determined that the EA for the construction and operation of the NASA First Response Facility represents an accurate and adequate analysis of the scope and level of associated environmental impacts. The EA is incorporated by reference in this FONSI.

NASA plans to construct a 4,082 square meter (43,940 square foot) First Response Facility at the John C. Stennis Space Center on the northeast corner of Saturn Drive and Trent Lott Boulevard. The facility would be used for consolidation of the SSC fire department, medical clinic, security operations, emergency operations and the energy management and control center. This new facility is needed in order to co-locate emergency response units and facilitate emergency communications and planning. Alternatives considered early in the planning process were (1) to refurbish existing used spaces and (2) to locate the First Response Facility at a more eastern site than the proposed location. The "No Action Alternative" provides the benchmark against which the proposed action is evaluated.

Environmental impacts for this project include air emissions, wetlands disturbance, solid waste generation and storm water control. This project would require a Mississippi Department of Environmental Quality storm water permit for construction, a wetlands disturbance authorization from the U.S. Army Corps of Engineers – Vicksburg District, and a revision to the SSC Title V Permit to Operate Air Emissions Equipment. Other aspects that require consideration are energy conservation, water conservation, native plant landscaping, and the purchase of materials under comprehensive procurement guidelines for using materials with recycled content.

This project would not alter the architecture or historic attributes of the facility and would not affect the property from a cultural resource standpoint. The proposed project site would not be located in floodplains. No threatened or endangered species or critical habitats will be affected by the project. No other matters of potential environmental concern have been identified. On the basis of the EA and underlying reference documents, NASA has determined that the environmental impacts associated with this project will not individually or cumulatively have a significant effect on the quality of the environment; therefore, an environmental impact statement is not required.



T. Q. Donaldson V, RDML USN (Ret)
Director

15 Jan 04
Date

Appendix B

Cultural Resources – SHPO Concurrence Letters &
Tribal Consultation

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY

MDAH

HISTORIC PRESERVATION DIVISION
P. O. BOX 571
Jackson, MS 39205-0571
Phone 601-576-6940 Fax 601-576-6955
Website: mdah.ms.gov

June 8, 2017

Mr. David Lorance
NASA
John C. Stennis Space Center
Stennis Space Center, Mississippi 39529-6000

RE: Phase I Cultural Resources Assessment of the Proposed Stennis Solar Array Tract in the John C. Stennis Space Center Buffer Zone, (USACE) MDAH Project Log #06-002-17, Report #17-0161, Hancock County

Dear Mr. Lorance:

We have reviewed the May, 2017, cultural resources survey report by Sarah E. Price, Principal Investigator, with Wiregrass Archaeological Consulting, received on June 1, 2017, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After review, we concur that site 22HA787 is ineligible for listing in the National Register of Historic Places. We also concur that site 22HA788 is of unknown eligibility and that no other cultural resources will be affected by the project. Therefore, we have no objections with the proposed undertaking.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide a copy of this letter to Ms. Price. If you need further information, please let us know.

Sincerely,

Hal Bell

Hal Bell
Review and Compliance Officer

FOR: Katie Blount
State Historic Preservation Officer

SHPO Concurrence with the Phase I review of the Solar Array Tract.

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY

MDAH

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February 15, 2018

Mr. David K. Lorance
National Aeronautics and Space Administration
John C. Stennis Space Center
Stennis Space Center, Mississippi 39529-6000

RE: Proposed 1 megawatt solar array within the John C. Stennis Space Center Fee Area at the Stennis Emergency Operations Center, (NASA) MDAH Project Log #01-133-18, Hancock County

Dear Mr. Lorance:

We have reviewed your request for a cultural resources assessment, received on January 29, 2018, for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, it is our determination that no cultural resources are likely to be affected. Therefore, we have no objection with the proposed undertaking.

Should there be additional work in connection with the project, or any changes in the scope of work, please let us know in order that we may provide you with appropriate comments in compliance with the above referenced regulations.

If you have any questions, please do not hesitate to contact us at (601) 576-6940.

Sincerely,

Hal Bell

Hal Bell
Review and Compliance Officer

FOR: Katie Blount
State Historic Preservation Officer

SHPO Concurrence with the Phase I review of the 1 MW Solar Array at the Stennis EOC.

The following Native American tribes received an inquiry request via official email announcing the EA and soliciting comments during the scoping period. The inquiries were sent on August 23, 2017 and January 16, 2018. The Choctaw Nation of Oklahoma and Jena Band of Choctaw Indians provided comment(s).

The Choctaw Nation of Oklahoma
Attn: Ian Thompson PhD RPA., THPO
P.O. Box 1210
Durant, OK 74702-0210

Jena Band of Choctaw Indians
Attn: Alina Shively, THPO
P.O. Box 14
Jena, LA 71342

Mississippi Band of Choctaw Indians
Attn: The Honorable Phyliss J. Anderson, Chief
101 Industrial Road
Philadelphia, MS 39350

Tunica-Biloxi Indian Tribe
Attn: The Honorable Earl J. Barbry, Sr., Tribal Chairman
P.O. Box 1589
Marksville, LA 71351

The following is the concurrence response from the Choctaw Nation of Oklahoma THPO, Dr. Ian Thompson.

The Choctaw Nation of Oklahoma thanks NASA for consulting with about on the above-referenced undertaking. This project is located within Choctaw Nation's Area of Historic Interest. Native American archaeological materials located in or around the project area may potentially be culturally affiliated with the Choctaw Nation of Oklahoma.

The Choctaw Nation Historic Preservation Department is not aware of any Choctaw historic sites within the immediate project area. Choctaw Nation would concur with a finding of "No Historic Properties Affected" for this project. In the unexpected event that human remains or intact archaeological deposits are encountered, we ask that ground-disturbing activities are halted immediately and that our office is contacted as quickly as possible.

Thank you,

Ian Thompson PhD, RPA
Tribal Historic Preservation Officer,
Senior Director
Historic Preservation Dept,
Wheelock Academy,
Tuskahoma Capitol Museum.
Choctaw Nation of Oklahoma
PO Drawer 1210
Durant, OK 74701
1-800-522-6170 ext. 2216
www.choctawnationculture.com

The following is the concurrence response from the Jena Band of Choctaw Indians THPO, Alina J. Shively.

Mr. Murrah:

Regarding the above-mentioned project, the Jena Band of Choctaw Indians' THPO hereby concurs with the determination of No Effect to present Cultural Properties. Should any inadvertent discoveries or unanticipated impacts occur, please contact all Tribes with interest in this area. Thank you.

Sincerely,

Alina J. Shively
Jena Band of Choctaw Indians
Tribal Historic Preservation Officer
P.O. Box 14
Jena, LA 71342
(318) 992-1205
ashively@jenachoctaw.org

Appendix C

Public Comment