National Aeronautics and
Space Administration

NASA Management Office
4800 Oak Grove Drive
Pasadena, CA 91109-8099

June 15, 2020

Reply to Attn of: DA020

TO: John Mark Phillips, JPL Launch Approval Engineering Office Manager

FROM: NASA Management Office, Center NEPA Manager

SUBJECT: The National Environmental Policy Act (NEPA) Record of Environmental Consideration (REC) for the SPHEREx Mission

RECORD OF ENVIRONMENTAL CONSIDERATION

1.0 Introduction

The National Environmental Policy Act of 1969 as amended (42 U.S.C. 4321, et seq.), requires Federal agencies to consider potential environmental impacts during program and project decision-making. NASA must comply with the Council on Environmental Quality (CEO) regulations for implementing the Procedural Provisions of NEPA [40 CFR Parts 1500-1508], NASA's NEPA regulations [14 CFR, Part 1216, Subpart 1216.3], as well as NASA's NEPA policy [NPR 8580.1]. NASA has also prepared an Environmental Assessment (EA) (Ref: Environmental Assessment (Final) for Launch of NASA Routine Payloads, November 2011) to assess the environmental impacts of missions launched with spacecraft that are considered routine payloads from existing launch facilities.

Spacecraft defined as routine payloads utilize materials, quantities of materials, launch vehicles, launch sites, and operational characteristics that are consistent with normal spacecraft preparation and flight activities at Cape Canaveral Air Force Station (CCAFS), Kennedy Space Center (KSC), Vandenberg Air Force Base (VASB), among other sites. The environmental impacts of launching routine payloads from these sites falls within the range of routine, ongoing, and previously documented impacts that have been determined not to be significant.

NASA program and projects are responsible for complying with NEPA. Program authority is delegated from the Associate Administrator of the Science Mission Directorate (AA/SMD) through the SMD Astrophysics Division (APD) Director to the Explorers Program Manager within the Flight Projects Directorate at Goddard Space Flight Center (GSFC) to the NASA Management Office at JPL. The SPHEREx payload would be developed in a partnership

between the Caltech and JPL. Caltech would provide the payload optical instrument and electronics. JPL would manage the SPHEREx Project, including the contract with Ball Aerospace for the spacecraft, lead flight system test, and support launch operations. The Korea Astronomy and Space Science Institute (KASI) would provide a cryogenic ground test thermal vacuum chamber to Caltech. Caltech's Infrared Processing and Analysis Center (IPAC) would implement the science data pipeline. Public data products and analysis tools would be released through IPAC's InfraRed Science Archive (IRSA) with NASA support.

The attached supporting documents were reviewed by the Program Executive at NASA Headquarters, HQ OGC, HQ EMD NEPA Manager, and approved by the NMO Center NEPA Manager.The checklists, along with criteria defined in NASA's Routine Payload EA, were then used to evaluate whether the subject SPHEREx mission qualifies for designation as a NASA Routine Payload.

This REC serves to document NASA review and determination under NEPA for the SPHEREx mission.

2.0 Mission Description

SPHEREx would be the first all-sky near-infrared (NIR) spectral survey for inflationary cosmology, history of galaxy formation and galactic ices, creating a legacy archive of spectra ($0.75 < \lambda < 5.0$ micron (μm) with $\lambda/\Delta\lambda = 35–130$). The SPHEREx spacecraft would launch no earlier than the second quarter Fiscal Year 2024, from Kennedy Space Center (KSC), Cape Canaveral Air Force Station (CCAFS) in Florida (FL), or Vandenberg Air Force Base, California, aboard an Atlas V or Falcon 9 launch vehicle into a sun-synchronous Earth orbit.

The science instrument would maximize spectral throughput using six space-demonstrated linear-variable filter spectrometers with Hawaii-2RG arrays, and a wide-field 20-centimeter (cm) (8 inch) effective-aperture telescope. SPHEREx would observe from low Earth orbit, passively cooling the detectors and the all-aluminum telescope. The instrument would have no moving parts except for one-time deployments of the photon shields and dust cover. SPHEREx would produce four all-sky surveys in its two-year mission life, using a single, automated observing mode with successive spacecraft slews and pointed exposures. Additional information on the spacecraft and planned mission is available at https://www.jpl.nasa.gov/missions/spherex/.

3.0 Compliance Documentation and Conclusion

The SPHEREx mission has been reviewed in accordance with the NASA Routine Payload (NRP) criteria established in the "Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles," (NRP EA) dated November 2011 and Finding of No Significant Impact (FONS!) dated November 22, 2011. The SPHEREx mission will not carry any pathogenic organisms or radioisotopes, a Class 3b or 4 laser, exceed any of the NRP EA Envelope Payload Characteristics (EPCs), or return samples to Earth or its vicinity.

The completed JPL facility checklist confirms that design and construction of the spacecraft is not expected to require any facility construction activity and will be covered by existing

environmental permits and environmental management system plans and commitments. The SPHEREx mission launch vehicle will be either an Atlas V or Falcon, and launch site either KSC, CCAFS, or VAFB. These candidate launch vehicle/launch site combinations fall within the scope of the EA.

Based upon the analyses, NASA has determined that the SPHEREx mission fits within the EPCs described by the 2011 NRP EA Checklist and therefore, qualifies as a Routine Payload. Any impacts from the mission are anticipated to be minor and transient.

The program is responsible for reviewing any significant changes in the scope of the payload or activities conducted as part of SPHEREx to ensure the project continues to fall within the NASA Routine Payload criteria. If an aspect of the mission falls outside the scope of this REC, additional environmental review and/or documentation will be completed.

Steven Slaten

3 Enclosures:
1. Environmental Evaluation and Request for Categorization of the SPHEREx Mission as a NASA Routine Payload
2. NASA Routine Payload Environmental Assessment Checklist
3. JPL Facility Environmental Evaluation Checklist - SPHEREx

Approval:

6-15-2020

Date

Steve Slaten
NMO-JPL Center NEPA Manager

May 20, 2020

Environmental Evaluation and Request for Categorization of the Spectro-Photometer for the History of the Universe, Epoch of Reionization, and Ices Explorer (SPHEREx) Mission as a NASA Routine Payload

The proposed SPHEREx mission has been reviewed in accordance with the Routine Payload criteria established by the "*Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles*," and Finding of No Significant Impact (FONSI) dated November 2011 (2011 NRP EA). This review indicates that the SPHEREx spacecraft fits within the envelope payload characteristics described by the 2011 NRP EA checklist. Therefore, it is requested that NASA designate the SPHEREx mission as a NASA Routine Payload. Supporting documentation and NASA Routine Payload Checklist are attached for your review.

Signed:

E-SIGNED by Mark Phillips
on 2020-05-21 16:53:52 GMT

J. Mark Phillips, Manager
Launch Approval Engineering
Office

Date

Signed:

E-SIGNED by Allen Farrington
on 2020-05-21 17:16:08 GMT

Allen Farrington, Manager
SPHEREx Project

Date

Description of Proposed Mission:

SPHEREx would be the first all-sky near-infrared (NIR) spectral survey for inflationary cosmology, history of galaxy formation and galactic ices, creating a legacy archive of spectra (0.75 < lambda (λ) < 5.0 micron (μm) with λ/Δλ = 35–130). The SPHEREx spacecraft would launch no earlier than the second quarter Fiscal Year 2024, from Kennedy Space Center (KSC), Cape Canaveral Air Force Station (CCAFS) in Florida (FL), or Vandenberg Air Force Base, California, aboard an Atlas V or Falcon 9 launch vehicle (EELV) into a sun-synchronous Earth orbit.

Program authority is delegated from the Associate Administrator of the Science Mission Directorate (AA/SMD) through the SMD Astrophysics Division (APD) Director to the Explorers Program Manager within the Flight Projects Directorate at Goddard Space Flight Center (GSFC) to the California Institute of Technology/Jet Propulsion Laboratory (Caltech/JPL). The SPHEREx payload would be developed in a partnership between the Caltech and JPL. Caltech would provide the payload optical instrument and electronics. JPL would manage the SPHEREx Project, including the contract with Ball Aerospace for the spacecraft, lead flight system test, and support launch operations. The Korea Astronomy and Space Science Institute (KASI) would provide a cryogenic ground test thermal vacuum chamber to Caltech. Caltech's Infrared Processing and Analysis Center (IPAC) would implement the science data pipeline. Public data products and analysis tools would be released through IPAC's InfraRed Science Archive (IRSA) with NASA support.

Statement of Purpose and Need:

NASA published a new Strategic Plan in 2018, which includes four strategic themes: Discover, explore, develop, and enable. These themes correspond to NASA's missions of scientific discovery of the Earth, of other worlds, and of the cosmos as a whole; missions of exploration in our solar system with humans and robotic probes that expand the frontiers of human experience; and missions of development that advance new technologies in aeronautics and space systems that allow American industry to create and expand a nascent space marketplace to serve the needs of space exploration, both here on Earth and in near-Earth environments. In addition, the Agency has a number of activities in support areas that enable our missions.

NASA's Strategic Goal 1 is to expand human knowledge though new scientific discoveries. Under Strategic Objective 1.1: Understand the Sun, Earth, Solar System, and Universe, NASA would conduct scientific studies of the Earth and Sun from space, return data and samples from other bodies in the solar system, peer out into the vast reaches of the universe, and play a catalyzing role in lunar robotic exploration by supporting innovative approaches to advancing science. These efforts are guided by National priorities and recommendations from the National Academies' decadal surveys and implemented through a balanced portfolio of programs. Missions for NASA's Discovery program lie outside the bounds of a decadal strategic plan, so the most recent decadal study report, *Visions and Voyages for Planetary Science in the Decade 2013-2022*, makes no recommendations on specific Discovery flight missions. However, the committee emphasized that the Discovery program has made important and fundamental contributions to planetary exploration and can continue to do so in the coming decade.

NASA's Science Mission Directorate (SMD) conducts scientific exploration enabled by the use of space observatories and space probes that view the Earth from space, observe and visit other bodies in the solar system, and peer out into our Galaxy and beyond. The Space Science program portfolio comprises the following areas: flight mission development, research, applications development, and technology development. These areas are responsible for conducting and sponsoring research, collecting and disseminating new observations, developing new technologies and predictive capabilities, and demonstrating innovative and practical uses of the program's data and results for societal benefit. In addition, NASA develops partnerships with other national and international organizations to enhance economic security and environmental stewardship to benefit society.

The science goals of the SMD Astrophysics Division are to understand the universe and our place in it, investigate the very moment of creation of the universe to learn the full history of stars and galaxies, discover how planetary systems form and how environments hospitable for life develop, and to search for the signature of life on other worlds.

The SPHEREx mission would address all of the science goals in NASA's APD: probe the origin and destiny of our Universe; explore whether planets around other stars could harbor life; and explore the origin and evolution of galaxies. The single instrument would be designed to maximize spectral throughput and efficiency, and would be extremely simple. Spectra would be produced by sequentially scanning 4 space-demonstrated linear-variable filters over the sky. The detectors and telescope would be passively cooled using the thermal methods demonstrated by Planck, Spitzer and Wide-field Infrared Survey Explorer (WISE). The instrument would have no moving parts except for one-time deployments of the thermal shields and aperture cover. The SPHEREx mission would:

- Probe the origin of the Universe by improving constraints on inflationary non-Gaussianity through a large-volume galaxy redshift survey.
- Investigate the origin of water and biogenic molecules from interstellar ices in the early phases of planetary system formation.
- Chart the origin and history of galaxy formation, from light produced by the first galaxies that ended the cosmic dark ages to the present day.
- Provide a rich public spectral archive for diverse investigations ranging from X-ray astronomy to exoplanet characterization.

The following science objectives would support the above goals:

1. Test models of inflation by mapping the 3-dimensional (3D) distribution of galaxies to measure or constrain the amplitude of primordial non-Gaussian.
2. Investigate the connection between ice in interstellar clouds and planet-forming disks by measuring the composition and abundance of ices in an unbiased and diverse sample of Galactic clouds and disks.
3. Measure large-scale infrared extragalactic background light anisotropy, and constrain the history of its light production.
4. Provide an all-sky infrared spectral survey for diverse applications across astronomy.

The science instrument would maximize spectral throughput using six space-demonstrated linear-variable filter spectrometers with Hawaii-2RG arrays, and a wide-field 20-centimeter (cm) (8 inch) effective-aperture telescope. SPHEREx would observe from low Earth orbit, passively cooling the detectors and the all-aluminum telescope. The instrument would have no moving parts except for one-time deployments of the photon shields and dust cover. SPHEREx would produce four all-sky surveys in its 2-year mission life, using a single, automated observing mode with successive spacecraft slews and pointed exposures.

JPL Facility Requirements:

The SPHEREx Project has coordinated with the JPL Environmental Affairs Program Office (EAPO) to ensure Project activities at JPL are within the limits and requirements described by JPL facility permits and environmental documentation. SPHEREx is currently in the Formulation Phase (Phase B). A Systems Safety Engineer has been assigned to SPHEREx and would be responsible for performing required system safety surveys. Changes to Project facility needs or requirements would be coordinated with the EAPO to ensure compliance with all pertinent permits and environmental documentation. The proposed task, conducted according to the JPL standard safety processes and procedures in place, would not pose a substantial threat to worker health and safety.

Evaluation Checklist for Applicability of the NASA Routine Payload Environmental Assessment (NRP EA)

PROJECT NAME: SPHEREx Mission **LAUNCH DATE:** NET 2nd Qrtr FY 2024

PROJECT CONTACT: Allen Farrington **PHONE:** 818-653-2284 **E-MAIL:** allen.h.farrington@nasa.gov

PROPOSED ACTION DESCRIPTION: The SPHEREx mission would launch a single spacecaft no earlier than 2nd Qrtr FY 2024, from Kennedy Space Center (KSC), Cape Canaveral Air Force Station (CCAFS) in Florida (FL), or Vandenberg Air Force Base, California, aboard an Atlas V or Falcon 9 launch vehicle (EELV) into a sun-synchronous Earth orbit.

Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.	YES	NO
A. Sample Return:		
Would the candidate mission return a sample from an extraterrestrial body?	☐	☑
Comment:		
B.		
Would the candidate spacecraft carry radioactive materials in quantities that produce an A2 mission multiple value of 10 or more?	☐	☑
Comment:		
C. Launch Site and Launch Vehicles:		
1. Would the candidate spacecraft be launched on a vehicle and launch site combination other than those listed in Table 1 of this checklist?	☐	☑
2. Would launch of the proposed mission exceed the approved or permitted annual launch rate for the particular launch vehicle or launch site?	☐	☑
Comment:		
D.		
Would the candidate mission require the construction of any new facilities or substantial modification of existing facilities? (If YES, provide a brief description below of the construction or modification required, including whether ground disturbance and/or excavation would occur)	☐	☑
Comment:		
E. Health and Safety:		
1. Would the candidate spacecraft utilize batteries, ordnance, hazardous propellant, radiofrequency transmitter power, or other subsystem components in quantities or levels exceeding the Envelope Payload Characteristics (EPCs) in Table 2 of this checklist?	☐	☑
2. Would the expected risk of human casualty from spacecraft planned orbital reentry exceed the criteria specified by NASA Standard 8719.14?	☐	☑
3. Would the candidate spacecraft utilize any potentially hazardous material as part of a flight system whose type or amount precludes acquisition of the necessary permits prior to its use or is not included within the definition of the Envelope Payload Characteristics (EPCs)?	☐	☑
4. Would the candidate mission, under nominal conditions, release material other than propulsion system exhaust or inert gases into the Earth's atmosphere or space?	☐	☑
5. Are there changes in the preparation, launch or operation of the candidate spacecraft from the standard practices described in Chapter 3 of the *Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles* dated November 2011?	☐	☑
6. Would the candidate spacecraft utilize an Earth-pointing laser system that does not meet the requirements for safe operation (ANSI Z136.1-2007 and ANSI Z136.6-2005)?	☐	☑

Evaluation Checklist for Applicability of the NASA Routine Payload Environmental Assessment (NRP EA)

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PROJECT CONTACT: Allen Farrington **PHONE:** 818-653-2284 **E-MAIL:** allen.h.farrington@nasa.gov

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Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.	YES	NO
7. Would the candidate spacecraft contain, by design (e.g., a scientific payload) pathogenic microorganisms (including bacteria, protozoa, and viruses) which can produce disease or toxins hazardous to human health or the environment beyond Biosafety Level 1 (BSL 1)[1]?	☐	☑
Comment:		
F. Other Environmental Issues:		
1. Would the candidate spacecraft have the potential for substantial effects on the environment outside the United States?	☐	☑
2. Would launch and operation of the candidate spacecraft have the potential to create substantial public controversy related to environmental issues?	☐	☑
3. Would any aspect of the candidate spacecraft that is not addressed by the Envelope Payload Characteristics (EPCs) have the potential for substantial effects on the environment (i.e., previously unused materials, configurations or material not included in the checklist)?	☐	☑
Comment:		
G. Applicability of the NASA Routine Payload Environmental Assessment (NRP EA):		

Pending approval by NASA, the NASA Routine Payload Environmental Assessment (NRP EA) ☑ does ☐ does not provide adequate coverage for the proposed action as currently described.

Additional considerations, if any:

Individual Completing Checklist: Janis Graham

Launch Approval Engineer, SPHEREx

Date of Completion: 3/23/2020

Concurred by NMO NEPA Manager:

Date: 5/6/2020

[1] The use of biological agents on payloads is limited to materials with a safety rating of "Biosafety Level 1." This classification includes defined and characterized strains of viable microorgani[illegible]ersonnel working with Biosafety Level 1 agents follow standard microbiological pra[illegible]g, or smoking in the laboratory, and required hand-washing after working with agents or leaving a lab where agents are stored. Personal protective equipment such as gloves and eye protection is also recommended when working with biological agents.

Data Tables from NASA "Final Environmental Assessment For Launch Of Nasa Routine Payloads On Expendable Launch Vehicles", November 2011

Table 1. Launch Vehicles and Launch Sites

Launch Vehicle and Launch Vehicle Family	Space Launch Complexes and Pads				
	Eastern Range (CCAFS)	Western Range (VAFB)	USAKA/RTS	WFF	KLC
Athena I, IIc, III[a]	LC-46	CA Spaceport (SLC-8)	N/A	Pad 0	LP-1
Atlas V Family	LC-41	SLC-3	N/A	N/A	N/A
Delta II Family	LC-17	SLC-2	N/A	N/A	N/A
Delta IV Family	LC-37	SLC-6	N/A	N/A	N/A
Falcon 1/1e	LC-36	SLC-4W	Omelek Island	Pad 0	LP-3[b]
Falcon 9	LC-40	SLC-4E	Omelek	Pad 0	LP-3[b]
Minotaur I	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur II-III	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur IV	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur V	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Pegasus XL	CCAFS skidstrip, KSC SLF	VAFB Airfield	Kwajalein Island	WFF Airfield	N/A
Taurus	LC-46 and/or LC-20	SLC-576E	N/A	Pad 0	LP-1
Taurus II/Antares[c]	NA	NA	N/A	Pad 0	LP-3[b]
Any other launch vehicle/launch site combination for which NASA has completed or cooperated on the NEPA Compliance					

[1] Athena III and LP-3 are currently under design

[b] While not explicitly listed in this table, the Minotaur IV includes all configurations of this launch vehicle, including the Minotaur IV+, which is a Minotaur IV with a Star 48V 4th stage.

[c] The Taurus II LV was renamed Antares after publication of the *Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles* in November 2011.

Key: CA=California; CCAFS=Cape Canaveral Air Force Station; KSC=Kennedy Space Center; LC=Launch Complex; LP=Launch Pad; MARS=Mid-Atlantic Regional Spaceport; SLC=Space Launch Complex; SLF=Shuttle Landing Facility; USAKA/RTS=United States Army Kwajalein Atoll/Reagan Test Site; VAFB=Vandenberg Air Force Base; WFF=Wallops Flight Facility.

Table 2. Summary of Envelope Payload Characteristics (EPCs) by Spacecraft Subsystems

Structure	• Unlimited: aluminum, beryllium, carbon resin composites, magnesium, titanium, and other materials unless specified as limited.
Propulsion[a]	• Liquid propellant(s); 3,200 kg (7,055 lb) combined hydrazine, monomethylhydrazine and/or nitrogen tetroxide. • Solid Rocket Motor (SRM) propellant; 3,000 kg (6,614 lb) Ammonium Perchlorate (AP)- based solid propellant (examples of SRM propellant that might be on a spacecraft are a Star-48 kick stage, descent engines, an extra-terrestrial ascent vehicle, etc.)
Communications	• Various 10-100 Watt (RF) transmitters
Power	• Unlimited Solar cells; 5 kilowatt-Hour (kW-hr) Nickel-Hydrogen (NiH_2) or Lithium ion • (Li-ion) battery, 300 Ampere-hour (A-hr) Lithium-Thionyl Chloride (LiSOCl), or 150 A-hr Hydrogen, Nickel-Cadmium (NiCd), or Nickel-hydrogen (Ni-H_2) battery.
Science Instruments	• 10 kilowatt radar • American National Standards Institute safe use of lasers (see Section 4.1.2.1, Final Environmental Assess endable Launch Vehicles, November 2011)
Other	• U. S. Department of Transportation (DoT) Class 1.4 Electro-Explosive Devices (EEDs) for mechanical systems deployment • Radioactive materials in quantities that produce an A2 mission multiple value of less than 10 • Propulsion system exhaust and inert gas venting • Sample returns are considered outside of the scope of this environmental assessment

[1] Propellant limits are subject to range safety requirements.

Key: kg=kilograms; lb=pounds.

Facility Environmental Evaluation Checklist

This checklist is to be completed by the EAPO in coordination with the JPL program/project manager who proposes on-site activities. This checklist will become part of the environmental impact assessment. No work is to be conducted until this form and any environmental impact assessment has been completed and approved by NASA.

Title of Proposed Action:	**EAPO ID#**
SPHEREx	**20EIA56**

Description of Proposed Action:

The proposed SPHEREx mission would be an all-sky near-infrared spectral survey satellite designed to address all three science goals in NASA's astrophysics division: probe the origin and destiny of our Universe; explore whether planets around other stars could harbor life; and explore the origin and evolution of galaxies. The telescope would be a 20-centimeter (cm) (8-inch) wide-field all-aluminum design. The detectors and telescope would be passively cooled using the thermal methods demonstrated by Planck, Spitzer and WISE. The instrument would have no moving parts except for 1-time deployments of the thermal shields and aperture cover. The survey would be based on a single observing mode, repeated over multiple orbits by a succession of spacecraft pointings.

Start Date and Duration: Aug 1, 2017	**Today's Date:** Mar 25, 2020
Name of Prog/Project Manager: Allen Farrington	**Phone:** (818) 393-5260
Facility Location: ☑ JPL Oak Grove ☐ GDSCC ☐ TMF	**Proposed Action Bldg/Room:** TBD

Environmental Impacts *(Check appropriate box and provide sufficient details for assessment. Explain any "Yes" and "Maybe" responses in the Assessment field on page 3.)*	**Yes**	**No**	**May be**
A. **Geologic**			
1. Would the proposed action induce erosion (Water/Wind) either on- or off-site?	☐	☑	☐
2. Would the proposed action affect surface stability?	☐	☑	☐
3. Would the proposed action affect agricultural lands?	☐	☑	☐
B. **Water**	**Yes**	**No**	**May be**
1. Would the proposed action affect a natural body of water?	☐	☑	☐
2. Would the proposed action alter storm water flow?	☐	☑	☐
3. Would the proposed action result in a >10% change of facility potable water use (>250GPM)?	☐	☑	☐
4. Would the proposed action impact chemical quality (pH, dissolved solids, organics, etc.) of wastewater or stormwater?	☐	☑	☐
5. Would the proposed action impact physical quality (temperature, suspended solids, etc.) of wastewater or stormwater?	☐	☑	☐
6. Would the proposed action require a modification to the existing stormwater permit?	☐	☑	☐
7. Would the proposed action require a modification to the existing industrial wastewater permit?	☐	☑	☐
C. **Air**	**Yes**	**No**	**May be**
1. Would the proposed action generate objectionable odors?	☐	☑	☐
2. Would the proposed action release toxic substances?	☐	☑	☐
3. Would the proposed action release particulates?	☐	☑	☐
4. Would the proposed action be classified as either a New Source Emission or a major modification to an existing source (SCAQMD Regulation XIII)?	☐	☑	☐
D. **Natural Resources**	**Yes**	**No**	**May be**
1. Would the proposed action affect an undisturbed natural area?	☐	☑	☐
2. Would the proposed action affect game animals and fish?	☐	☑	☐

3. Would the proposed action affect threatened or endangered species?	☐	✓	☐
4. Would the proposed action affect nesting birds?	☐	✓	☐
5. Would the proposed action affect a critical habitat?	☐	✓	☐
6. Would the proposed action affect protected trees (e.g.: oak)?	☐	✓	☐
E. Land Use	**Yes**	**No**	**May be**
1. Would the proposed action affect floodplains/wetlands?	☐	✓	☐
2. Would the proposed action affect off-site land use?	☐	✓	☐
3. Would the proposed action affect on-site land use?	☐	✓	☐
4. Would the proposed action affect aesthetics?	☐	✓	☐
F. Cultural Resources	**Yes**	**No**	**May be**
1. Would the proposed action affect NRHP-Listed Properties?	☐	✓	☐
2. Would the proposed action affect properties eligible or potentially eligible for the NRHP?	☐	✓	☐
3. Would the proposed action affect known historic landmarks?	☐	✓	☐
4. Would the proposed action affect known and/or potential archeological areas?	☐	✓	☐
G. Socio-Economic/Environmental Justice	**Yes**	**No**	**May be**
1. Would the proposed action affect regional employment?	☐	✓	☐
2. Would the proposed action disproportionally affect low income or minority populations?	☐	✓	☐
H. Noise	**Yes**	**No**	**May be**
1. Would the proposed action expose people to severe noise levels (>80dBA)?	☐	✓	☐
2. Would the proposed action increase existing community noise contours?	☐	✓	☐
I. Health and Safety	**Yes**	**No**	**May be**
1. Would the proposed action generate ionizing or non-ionizing radiation?	☐	✓	☐
2. Would the proposed action use pesticides, insecticides, herbicides, fungicides, or rodenticides?	☐	✓	☐
3. Would the proposed action require entry into a confined space?	☐	✓	☐
4. Would the proposed action include the use, acquisition, or storage of toxic or hazardous substances?	☐	☐	✓
5. Would the proposed action generate medical, hazardous, toxic, or radiological waste?	☐	☐	✓
J. CERCLA	**Yes**	**No**	**May be**
1. Would the proposed action affect existing CERCLA infrastructure (e.g.: wells)?	☐	✓	☐
2. Would the proposed action be located in an area of known future CERCLA activity?	☐	✓	☐
3. Would the proposed action result in exposure or disturbance of contaminated soil or groundwater?	☐	✓	☐
K. Activity/Systems	**Yes**	**No**	**May be**
1. Would the proposed action reduce parking?	☐	✓	☐
2. Would the proposed action affect access to utility or infrastructure support systems?	☐	✓	☐
3. Would the proposed action affect roadway transportation systems?	☐	✓	☐
4. Would the proposed action increase hazards to motor vehicles or pedestrians?	☐	✓	☐
5. Would the proposed action require the acquisition or storage of solid waste storage containers?	☐	✓	☐

Assessment:

I. Health and Safety #4 and #5 - The SHEREx project is currently in phase B. Any on-site integration and test (I&T) wouldn't take place until sometime in the fall of 2020, at the earliest. As is typical during I&T, hazardous substances would be used and hazardous waste would likely be generated. JPL has established processes and procedures in place to comply with the associated health and safety requirements. In addition, a Systems Safety Engineer has been assigned to the SPHEREx project and they would be responsible for performing the required systems safety surveys.

Signature of Program/Project Manager: [signature] Date: 3/24/20

Environmental Analysis Determination

Title of Proposed Action: SPHEREx

Description of Proposed Action:

The proposed SPHEREx mission would be an all-sky near-infrared spectral survey satellite designed to address all three science goals in NASA's astrophysics division: probe the origin and destiny of our Universe; explore whether planets around other stars could harbor life; and explore the origin and evolution of galaxies. The telescope would be a 20-centimeter (cm) (8-inch) wide-field all-aluminum design. The detectors and telescope would be passively cooled using the thermal methods demonstrated by Planck, Spitzer and WISE. The instrument would have no moving parts except for 1-time deployments of the thermal shields and aperture cover. The survey would be based on a single observing mode, repeated over multiple orbits by a succession of spacecraft pointings.

It has been determined that the above action (choose one):

☑	Qualifies for one or more Categorical Exclusions pursuant to 14 CFR 1216.304(d) and the current NASA Policy Requirement (NPR) which suggests no need for an Environmental Assessment (EA) or Environmental Impact Statement (EIS). List applicable Categorical Exclusion(s): (3)(i) Research, development, and testing in compliance with all applicable Federal, Federally recognized Indian tribe, State, and/or local law or requirements and Executive Orders.
☐	Is exempt from NEPA requirements under the provisions of the (cite superseding law):
☐	Is adequately covered in the following Environmental Assessment (EA) or Environmental Impact Statement (EIS): and dated:
☐	Has no environmental impact as indicated by the result of an existing environmental checklist or analysis (attach checklist or analysis).

Prepared by: Faustino Chirino (JPL EAPO) **Signature:** Faustino Chirino **Date:** Mar 26, 2020

Approved by: Steve Slaten (Environmental and Facilities Manager, NASA Management Office, JPL) **Signature:** [signature] **Date:** 3/30/2020