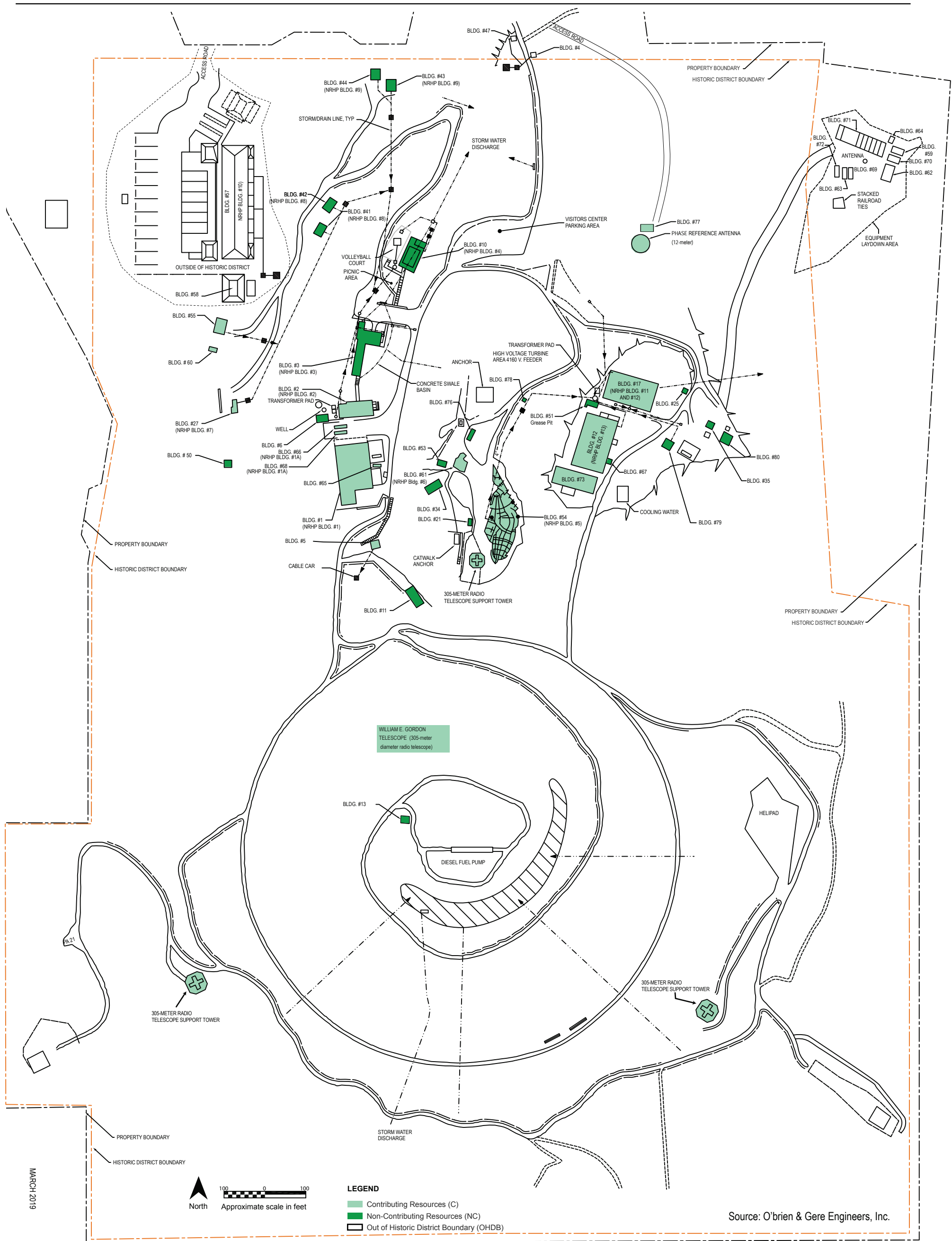


Attachment A
NAIC Historic District Map



Source: O'Brien & Gere Engineers, Inc.

BUILDING NO. DESCRIPTION

WILLIAM E. GORDON TELESCOPE AND SUPPORT TOWERS (305M diameter radio telescope) (1963) - C
 1. OPERATIONS BUILDING (1963) - C
 2. ADMINISTRATION BUILDING (1963) - C
 3. VISITING SCIENTIST QUARTERS AND CAFETERIA (1963) - NC
 4. ENTRANCE GUARD HOUSE (1963) - OHDB
 5. CABLE CAR HOUSE (1963) - C
 6. PUMP HOUSE/WATER TREATMENT BLDG. (1963) - NC
 10. SWIMMING POOL/RESTROOMS (ca. 1965) - NC
 11. LEWIS BUILDING-RIGGING LOFT (ca. 1965) - NC
 12. MAINTENANCE BUILDING (1967) - C
 13. BOWL SHACK (1963) - NC
 17. WAREHOUSE (1967) - C
 21. ANTENNA TESTING RANGE (ca. 1985) - NC
 25. PAINT STORAGE BUILDING (ca. 2010) - NC

27. OPTICAL LABS (1985/1997) - C
 34. HIGH VOLTAGE POWER SUPPLY BLDG. (1973) - NC
 35. CUMMINGS GENERATOR CONTROL BLDG. (2010) - NC
 41. WEST HILL V.S.Q. BACHELOR UNIT NO. 1 (ca. 1970s) - NC
 42. WEST HILL V.S.Q. BACHELOR UNIT NO. 2 (ca. 1970s) - NC
 43. WEST HILL V.S.Q. FAMILY UNIT NO. 1 (ca. 1970s) - NC
 44. WEST HILL V.S.Q. FAMILY UNIT NO. 2 (ca. 1970s) - NC
 47. MAIN GATE RESTROOM (1963) - OHDB
 50. INTERFERENCE MONITORING SHACK (1992) - NC
 51. GREASE PIT (n.d.) - NC
 53. EMERGENCY GENERATOR BLDG. (1993) - NC
 54. VISITOR CENTER BLDG. (2001) - C
 55. LIDAR LABORATORY BLDG. (1996) - C
 57. NORTH V.S.Q. BLDG. (2002) - OHDB
 58. NORTH V.S.Q. UTILITY BLDG. (2002) - OHDB
 59. VISITOR CENTER TRAILER (2016) - OHDB

60. ANT. RECE. TESTING BLDG. (ca. 1995) - C
 61. LEARNING CENTER (2001) - C
 62. HFF STORAGE TRAILER (2007) - OHDB
 63. IONOSONDE TRAILER (2007) - OHDB
 64. ELECTRONIC TRAILER (1990) - OHDB
 65. SHIELDED TRAILER (1983) - C
 66. ATMOSPHERIC SCIENCE TRAILER (n.d.) - C
 67. CRYOGENICS LAB TRAILER (1967) - NC
 68. SCIENTIFIC OFFICES TRAILER (n.d.) - C
 69. ELECTRONIC TRAILER (WAVEGUIDE) (2007) - OHDB
 70. COMPUTER TRAILER (2005) - OHDB
 71. ELECTRONICS CABLE TRAILER (2005) - OHDB
 72. ELECTRONIC TRAILER (CRYOGENICS) (2005) - OHDB
 73. HF TRANSMITTER BUILDING (2009) - C
 76. INSPIRATION FOR SCIENCE TRAILER (2016) - NC
 77. PHASE REFERENCE ANTENNA (12M) AND BUILDING 77 (2010) - C

78. COFFEE HUT (2002) - NC
 79. ENGINEERING OFFICE BUILDING (2010) - NC
 80. CUMMINGS DIESEL GENERATOR BUILDING (2010) - NC

Figure 1
National Astronomy and Ionosphere Center Historic District
 Arecibo Observatory, Puerto Rico

Attachment B
Table of Historic Properties in
NAIC Historic District

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Continuation Sheet**

| |
|--|
| National Astronomy and Ionosphere Center |
| Name of Property |
| Arecibo, Puerto Rico |
| County and State |
| 070000525 |
| NR Reference Number |

Table 1. NAIC Contributing Resources

| Building Number [2008 Nomination] | Resource Name | Year of Construction | Location (UTM) 19 Q |
|--------------------------------------|--|-------------------------|---------------------------------|
| N/A [N/A] | William E. Gordon Telescope and Support Towers T4, T8, and T12 (305-meter-diameter radio telescope and three support towers) | 1963 | 737295.58 m E 2029601.43 m N |
| Building 1 [Building 1] | Operations Building | 1963 (addition in 1983) | 737395.87 m E 2030000.43 m N |
| Building 2 [Building 2] | Administration Building | 1963 (addition in 1997) | 737402.22 m E 2030059.99 m N |
| Building 5* | Cable Car House | 1963 | 737414.69 m E 2029968.81 m N |
| Building 12 [Building 13] | Maintenance Building | 1967 | 737579.51 m E 2030034.27 m N |
| Building 17 [Buildings 11 and 12] | Warehouse and Business/Purchasing | 1967 | 737619.95 m E 2030067.19 m N |
| Building 27 [Building 7] | Photometry Shack and Optical Lab | 1985/1997 | 737335.67 m E 2030029.00 m N |
| Building 54 [Building 5] | Visitor Center (Fundación Angel Ramos Visitor and Educational Facility) | 2001 (addition 2015) | 737510.00 m E 2029968.58 m N |
| Building 55 | LIDAR Laboratory Building | 1996 | 737322.75 m E 2030065.49 m N |
| Building 60 | Antenna Testing Range Building | circa 1995 | 737316.53 m E 2030040.89 m N |
| Building 61 [Building 6] | Learning Center | 2001 | 737486.00 m E 2029999.00 m N |
| Building 65 | Shielded Trailer | 1983 | 737422.26 m E 2030022.46 m N |
| Buildings 66 and 68 [Building 1A] | Atmospheric Science Trailer, and Visiting Science Trailer (counted as one building) | | 737389.00 m E 2030044.00 m N |
| Building 73 | HF Transmitter Building | 2009 | 737574.41 m E 2030011.37 m N |
| Building 77 | Phase Reference Antenna (12-meter) and Building (counted as one structure) | 2010 | 737597.47 m E 2030187.28 m N |

*Shaded row indicates newly determined contributing resource.

Attachment C
2017 Programmatic
Agreement

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PROGRAMMATIC AGREEMENT
 AMONG
 THE NATIONAL SCIENCE FOUNDATION,
 THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND
 THE PUERTO RICO STATE HISTORIC PRESERVATION OFFICER
 REGARDING
 POTENTIAL CHANGES TO
 ARECIBO OBSERVATORY OPERATIONS
 IN THE VICINITY OF ARECIBO, PUERTO RICO

WHEREAS, the Arecibo Observatory is a federal facility owned and funded by the National Science Foundation (NSF), a federal agency. As of the date of this agreement, SRI International with Universities Space Research Association (USRA) and Universidad Metropolitana (UMET) receives funding from NSF via a Cooperative Agreement to operate and maintain the Arecibo Observatory for the benefit of research communities;

WHEREAS, the Arecibo Observatory was listed in the National Register of Historic Places (NRHP) in 2008 as the National Astronomy and Ionosphere Center (NAIC) Historic District for national significance under Criterion A because of its contribution to the history of the science of ionosphere studies and the development of radio and radar astronomy in the United States, and under Criterion C because it represents a significant work of engineering;

WHEREAS, the NRHP Registration Form describes 13 buildings and a structure, of which eight buildings and one structure have been identified as contributing resources to the NAIC Historic District based on consultation with the Puerto Rico State Historic Preservation Officer (PR SHPO) (see Attachment A for a map of the historic district and Attachment B for a list of contributing resources);

WHEREAS, NSF acknowledges that the Arecibo Observatory holds significant cultural importance to the people of Puerto Rico as a source of inspiration and pride; in addition, it is culturally and scientifically iconic, both nationally and internationally;

WHEREAS, NSF relies on formal processes within the scientific community (e.g., decadal surveys, senior-level reviews, and other advisory committees subject to the Federal Advisory Committee Act), to provide input on science priorities, and these formal reviews have repeatedly recommended divestment from Arecibo Observatory. The Portfolio Review Committee, a subcommittee of NSF Mathematical and Physical Sciences Advisory Committee composed solely of external members of the scientific community, was charged with recommending a balanced portfolio to maximize the science recommended by National Academy of Sciences surveys of the field, which are carried out every decade. To enable NSF to better address decadal survey science, the resulting Portfolio Review Committee Report (NSF AST, 2012), released in August 2012, recommended the divestment of a number of telescopes from the federal portfolio. With respect to the Arecibo Observatory, the report recommended NSF reevaluate its participation in Arecibo in consideration of the science opportunities and budget forecasts. This followed a recommendation made by the Division of Astronomical Sciences Senior Review Committee in 2006 (NSF AST, 2006), that the NAIC should seek partners to contribute personnel or financial support to the operation of Arecibo by 2011 or else these facilities should be closed. The National Academy of Sciences Mid-Decadal review (NASEM, 2016) in August 2016 reiterated these earlier recommendations. The Geospace Section of the NSF Division of Atmospheric and Geospace Sciences in the Directorate for Geosciences (GEO) was an early co-funder of Arecibo Observatory operations and now provides approximately half of the current NSF funding for Arecibo. In 2016, a subcommittee of the GEO Advisory Committee concluded its own community-based portfolio review, which recommended a significant funding reduction (NSF AGS, 2016a). This finding was reinforced by a National Academy of Sciences review in early 2017;

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WHEREAS, some members of the public have submitted additional perspectives from the scientific community that expressed support for continued operations at Arecibo Observatory;

WHEREAS, in the fall of 2015, NSF sought viable concepts of operation from the scientific community via a Dear Colleague Letter (Ulvestad and Shepson, 2015);

WHEREAS, based on the input NSF relied upon from the scientific community, NSF developed preliminary alternatives to address changes to operations from reduced NSF funding for Arecibo Observatory. The proposed changes to Arecibo Observatory operations constitute a federal undertaking subject to Section 106 (54 U.S.C. Section [§] 306108) of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 300101 *et seq.*) (NHPA) and the NHPA's implementing regulations, "Protection of Historic Properties" (Title 36 *Code of Federal Regulations* [C.F.R.] Part 800).

WHEREAS, this Programmatic Agreement (PA) has been prepared in compliance with 36 CFR 800.14(b)(1)(ii) of Section 106 of the NHPA, and technical terms related to the NHPA are included in Attachment C, "References and Definitions," along with references for citations in the PA and links to those references;

WHEREAS, NSF's preliminary alternatives were published in the *Federal Register* on May 23, 2016, as part of NSF's scoping process under the National Environmental Policy Act (42 United States Code [U.S.C.] §§ 4321, *et seq.*) (NEPA). The *Federal Register* notice also stated NSF's intention to initiate consultation under Section 106 of the NHPA and to evaluate potential effects to the Arecibo Observatory, and provided dates to specifically initiate public involvement under Section 106 per 36 CFR 800.2(d). Letters to potentially interested parties, agencies, and Puerto Rican elected officials were also sent. Notification of NSF's NEPA and Section 106 processes was also given through social media announcements, website updates on the NSF Division of Astronomical Sciences website, scientific digests and blogs, and newspaper public notices (in both English and Spanish). Public meetings were held in Arecibo and San Juan, Puerto Rico on June 7 and 8, 2016, to discuss the preliminary alternatives and NSF's compliance with both NEPA and the NHPA, seek input from the public on the preliminary alternatives, and identify consulting parties to participate in NSF's Section 106 consultation process under the NHPA. Six individuals informed NSF that they wished to participate in NSF's Section 106 consultation process as consulting parties at that time;

WHEREAS, the proposed action under NEPA review specifically includes five possible Action Alternatives for consideration: Alternative 1 – *Collaboration with Interested Parties for Continued Science-focused Operations with Reduced NSF Funding*, Alternative 2 – *Collaboration with Interested Parties for Transition to Education-focused Operations*, Alternative 3 – *Mothballing Facilities*, Alternative 4 – *Partial Demolition and Site Restoration*, and Alternative 5 – *Complete Demolition and Site Restoration*;

WHEREAS, on July 5, 2016, NSF initiated its Section 106 consultation process pursuant to the NHPA; NSF has conducted its Section 106 consultation process concurrently with, but separate from, its NEPA review process;

WHEREAS, because of the presence of the NAIC Historic District, NSF has determined, in consultation with PR SHPO and the Advisory Council on Historic Preservation (ACHP), that all five Action Alternatives, including the Preferred Alternative, have the potential to result in adverse effects on historic properties due to the potential demolition or mothballing of some components of the NAIC Historic District under all five Action Alternatives;

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WHEREAS, NSF has identified Alternative 1 as NSF's Preferred Alternative in its NEPA process and recognizes that Alternative 1 can only be implemented if a collaborator(s) comes forward with viable plans to provide additional non-NSF funding in support of their science-focused operations; because Alternative 1 has been identified as NSF's Preferred Alternative, this PA addresses potential adverse effects only from Alternative 1; if implementation of Alternative 1 is ultimately not feasible, NSF will resume Section 106 consultation focusing on Alternatives 2-5;

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WHEREAS, on September 30, 2016, NSF provided to the scientific community its intent to release a solicitation regarding future continued operations of the Arecibo Observatory via a Dear Colleague Letter (Ulvestad and Shepson, 2016);

WHEREAS, NSF, in consultation with the PR SHPO, has established that the area of potential effects (APE) (as defined at 36 C.F.R. § 800.16(d)) includes the Arecibo Observatory (see Attachment D);

WHEREAS, on October 19, 2016, NSF provided to PR SHPO a letter setting forth NSF's assessment of effects and attached the document, "Proposed Changes to Arecibo Observatory Operations: Historic Properties Assessment of Effects," which was also sent to the Consulting Parties;

WHEREAS, on November 17, 2016, NSF held a consultation meeting in San Juan, Puerto Rico, with the Consulting Parties pursuant to Section 106 of the NHPA and also invited the public. At that meeting four more individuals informed NSF that they wished to participate in NSF's Section 106 consultation process as Consulting Parties. Subsequently on June 28, 2017, an additional individual requested to be a Consulting Party. The following individuals, whose affiliations are noted in the accompanying parenthetical, are collectively referred to herein as "Consulting Parties" – Anthony van Eyken, Ph.D. (SRI International), Brett Isham, Ph.D. (Interamerican University-Bayamon), Xavier Siemens, Ph.D. (American Nanohertz Observatory for Gravitational Waves), Nicholas White, Ph.D. (Universities Space Research Association), Qihou Zhou, Ph.D. (Miami University), Ms. Luisa Zambrano-Marin (Arecibo Observatory), Daniel R. Altschuler, Ph.D. (University of Puerto Rico), Mr. Miguel Babilonia (Puerto Rican Karzo Speleological Research Foundation (FIEKP)), Carmen Pantoja, Ph.D. (University of Puerto Rico), Joan Schmelz, Ph.D. (Universities Space Research Association), and Mr. Ramon Lugo (University of Central Florida);

WHEREAS, on January 25, 2017, NSF released a solicitation requesting proposals to manage and operate the Arecibo Observatory in a reduced funding environment (NSF, 2017); this solicitation, including review of any proposals received, proceeded in parallel with, and separate from, NSF's Section 106 consultation process;

WHEREAS, NSF provided updates to the scientific community on divestment of Arecibo Observatory via a Dear Colleague Letter in April, 2017 (Gaume and Ulvestad, 2017);

WHEREAS, the majority of Consulting Parties and members of the public who submitted comments during the Section 106 and NEPA processes described the cultural and scientific importance of Arecibo Observatory and emphasized a strong preference for continued science-focused operations, which is consistent with Alternative 1, NSF's Preferred Alternative;

WHEREAS, under Alternative 1, any new collaborator(s) must retain the following contributing resources: the 305-meter Reflector (including the Support Towers), NRHP Building #1 (Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2nd level)), NRHP Building #5 (Visitors Center), NRHP Building #6 (Learning Center), NRHP Building #7 (Atmospheric and Optical Labs), and NRHP Building #13 (Machine Shop). The following contributing resources may be retained or demolished depending on the needs of any collaborator(s): NRHP Building #1A (Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2nd level); and Safety/Security Office, PC Network Office, Visiting Scientists Offices), NRHP Building #2 (1st floor: Scientific Services, Human Resources, TV/Conference Room; 2nd floor: Director and Administration, Library, Mail Room; 3rd floor: Palomar Room, Scientific Staff Offices; 4th floor: Scientific Staff Offices), and NRHP Buildings #11 and #12 (Warehouse and Business/Purchasing) (see Attachment E);

WHEREAS, under Alternative 1, an additional 17 buildings that have not been designated as either contributing or non-contributing, and are therefore considered to be unevaluated, may be retained or demolished depending on the needs of any collaborator(s) (see Attachment E);

WHEREAS, under Alternative 1, NSF may retain or transfer ownership, depending, in part, on the needs of any new collaborator(s);

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WHEREAS, NSF has consulted with PR SHPO and the ACHP and determined that, under Alternative 1, adverse effects to historic properties would result if contributing resources of the NAIC Historic District were demolished, as this would be a permanent removal of historic fabric, or if ownership was transferred from NSF to a nonfederal entity, as the federal consultation process under Section 106 would no longer be applicable to future actions by such a new owner;

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1)(i)(C), NSF has provided the ACHP the required documentation and invited it to participate in this PA; the ACHP notified NSF that it would participate in the consultation via a letter dated May 30, 2017;

WHEREAS, NSF has consulted with PR SHPO, the ACHP, and Consulting Parties on ways to avoid, minimize, and/or mitigate the adverse effects that the proposed undertaking could have on historic properties pursuant to the regulations implementing Section 106 of the NHPA, 36 C.F.R. Part 800;

WHEREAS, NSF provided the public an opportunity to express their views on resolving potential adverse effects during a telephonic consultation meeting on June 21, 2017, a public meeting on July 6, 2017, a 30-day public comment period on a draft PA commencing on June 23, 2017, and a telephonic consultation meeting on July 13, 2017; a revised draft PA, incorporating comments made during the July 6, 2017 and July 13 consultation meetings and comments received during the public comment period, was prepared and distributed to the Consulting Parties and the public on August 17, 2017 for review and comment; notification for public involvement opportunities was provided via email to potentially interested parties, updates to the NSF Division of Astronomical Sciences website, and notices in *El Nuevo Dia* newspaper on June 28, 2017, and *El Norte* newspaper on July 6, 2017; the draft PA was emailed to the Consulting Parties and other interested members of the public, posted to the AST website, and provided (hard copies) to the following libraries: Biblioteca Electrónica Pública Municipal Nicolás Nadal Barreto and the Archivo General y Biblioteca Nacional de Puerto Rico;

WHEREAS, NSF has determined, in consultation with PR SHPO and the ACHP, that circumstances are present (undetermined result of the solicitation and uncertainty regarding the specific needs of any new collaborator) that warrant the development of a PA, in accordance with 36 C.F.R. § 800.14(b)(1)ii), is appropriate;

WHEREAS, during the review of the final draft of this PA, Hurricanes Irma (September 6, 2017) and Maria (September 20, 2017) struck the Commonwealth of Puerto Rico resulting in catastrophic damage, including the loss of electrical power and telecommunications. Some damage to the Arecibo Observatory was sustained during Hurricane Maria. Because, as of October 11, 2017, 80% of the island did not have access to consistent and reliable communications, NSF was unable to communicate with the Consulting Parties located in Puerto Rico; therefore, NSF consulted with the ACHP to determine next steps for finalizing this PA.

WHEREAS, in accordance with an October 6, 2017 notification from the ACHP to Federal Preservation Officers regarding post-hurricane Section 106 consultations and related matters, the ACHP concluded and communicated to NSF that it would increase its involvement to facilitate the finalization of this PA;

WHEREAS, to keep the Consulting Parties informed and to communicate the process for implementing the stipulations in this PA, NSF has committed to provide the Consulting Parties with a final copy of this PA for their records;

WHEREAS, PR SHPO, the ACHP, and the Consulting Parties participated in the development of this PA; PR SHPO and ACHP are signatories herein; despite the logistical challenges resulting from Hurricanes Irma and Maria, the Consulting Parties have been asked, if available, to execute this PA as Concurring Parties;

WHEREAS, because the Director of the Arecibo Observatory, Francisco Córdova, oversees the operations and administration of the Arecibo Observatory and because he has actively participated in NSF's Section 106

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consultation process, NSF invites Director Francisco Córdova to sign this PA as an Invited Signatory to demonstrate his awareness of the terms of this PA;

WHEREAS, if provided supplemental appropriations for hurricane relief and if feasible, NSF intends to fund the repairs of the Arecibo Observatory to its pre-hurricane condition; and

NOW, THEREFORE, NSF, PR SHPO, and the ACHP agree that NSF will ensure that, if Alternative 1 (*Collaboration with Interested Parties for Continued Science-focused Operations with Reduced NSF Funding*) is selected, the following Stipulations are implemented to address adverse effects of the proposed undertaking on historic properties under Alternative 1 and agree that these Stipulations will govern the undertaking and all of its parts,

STIPULATIONS

NSF will ensure that the following measures are carried out:

The following Stipulations address adverse effects to historic properties associated with implementation of Alternative 1 under the following two scenarios: a) NSF retains ownership of Arecibo Observatory with reduced NSF funding (Stipulation I.A., below); and b) NSF transfers ownership of Arecibo Observatory to a non-federal entity (Stipulation I.B., below).

I. Preservation Provisions

A. **NSF Retains Ownership of Arecibo Observatory.** In the event NSF retains ownership of Arecibo Observatory and a new collaborator(s) begins operations at and management of Arecibo Observatory with reduced NSF funding, the following provisions shall apply:

1. **Avoidance of Adverse Effects.** NSF will make every effort to avoid adverse effects on contributing buildings by encouraging any collaborator(s) to use as many contributing buildings as practicable, provided that such use facilitates science-focused operations. If the collaborator(s) recommends demolition, NSF will consider mothballing in accordance with Preservation Brief 31: *Mothballing Historic Buildings*, issued by the U.S. Department of the Interior, National Park Service, for possible future use prior to demolition.
2. **Support of National Historic Landmark Nomination.** If PR SHPO nominates Arecibo Observatory as a National Historic Landmark, a designation that it currently does not have, NSF will support that nomination, subject to the consent of the collaborator(s).
3. **Survey.** NSF will conduct a survey of the NAIC Historic District to evaluate the eligibility of any buildings or structures that were not previously surveyed during preparation of the 2008 NRHP nomination, and also those built between 2008 and 2015. NSF will invite PR SHPO staff to participate in the survey. If additional contributing resources are identified, NSF, in consultation with PR SHPO, will prepare and submit an updated NRHP nomination form to include them in the NAIC Historic District.
4. **Preparation of a NAIC Historic District Preservation and Management Plan.** NSF, in consultation with the ACHP, PR SHPO, and the collaborator(s), will prepare a NAIC Historic District Preservation and Management Plan, consistent with the results of the survey completed in Stipulation I.A.3. and with *The*

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Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings (2017), as appropriate. The plan will define roles for NSF, as the federal owner of the historic district, and for the collaborator(s) as operator of the historic property. NSF will implement applicable measures of the plan, as appropriate (see also Stipulation 1.A.8.b. for collaborator(s) implementation).

5. **Required Documentation Prior to Demolition of any Building/Structure Listed on Attachment E.** If the collaborator(s) identifies a building(s) or structure(s) listed on Attachment E that is no longer needed to support science-focused operations and recommends demolition, NSF will first consider mothballing for possible future use. In the case that demolition is to occur, NSF will ensure that the appropriate documentation is prepared prior to any NSF-approved demolition as follows:
 - a. For those buildings/structures identified as contributing to the NAIC Historic District (including any newly identified contributing resources resulting from the survey described in Stipulation I.A.3., above), NSF will ensure that any such contributing resources are documented in accordance with National Park Service (NPS) Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) standards prior to demolition, unless PR SHPO recommends against such HABS/HAER documentation.
 - b. For those buildings/structures that are identified as non-contributing to the NAIC Historic District (as updated by the survey conducted pursuant to Stipulation I.A.3., above), no additional documentation will be required.
6. **Process Required Prior to Demolition of any Building/Structure Not Listed on Attachment E.** If the collaborator(s) identifies a building(s) or structure(s) not listed on Attachment E that is no longer needed to support science-focused operations and recommends demolition, NSF will conduct, as appropriate, a new Section 106 consultation prior to any NSF-approved demolition.
7. **New Construction.** If the collaborator(s) identifies new construction or other changes needed to the NAIC Historic District, NSF will conduct, as appropriate, a new Section 106 consultation prior to any NSF-approved new construction or modifications.
8. **Preservation Provisions.** NSF will require that any collaborator(s) adhere to the following preservation provisions:
 - a. **Training.** Key facility staff of the collaborator(s) will attend historic preservation awareness training to encourage awareness of the historic and cultural significance of Arecibo Observatory and to minimize the potential for adverse effects to historic properties. Such training, which will be provided by NSF via a qualified historic preservation professional who is familiar with and knowledgeable about the Arecibo Observatory and its importance to Puerto Rico and the local community, will occur within 180 days (or as soon as practicable thereafter) of the commencement of operations by the collaborator(s). The training will address applicable elements of the

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NAIC Historic District Preservation and Management Plan described in Stipulation I.A.4. NSF will provide PR SHPO an opportunity to comment on the content of such training.

- b. **NAIC Historic District Preservation and Management Plan.** The collaborator(s) will incorporate, where practicable, appropriate elements of the NAIC Historic District Preservation and Management Plan (see Stipulation 1.A.3) into the management and operations of Arecibo Observatory in a manner that does not interfere with the ability of the collaborator(s) to conduct science-focused operations at Arecibo Observatory.
 - c. **Public Access.** The collaborator(s) will allow reasonable public access to the Arecibo Observatory site provided that such access does not unduly interfere with the collaborator's use of the property for science-focused operations and is consistent with health, safety, and security guidelines.
- B. **NSF Transfers Ownership of Arecibo Observatory.** In the event NSF issues an award to a collaborator to operate and manage Arecibo Observatory with reduced NSF funding, and that award includes provisions reflecting the collaborator's intent to seek a transfer of ownership of Arecibo Observatory from NSF to the collaborator, the following provisions shall apply:
1. **Survey.** Prior to the transfer, NSF will conduct a survey of the NAIC Historic District to evaluate the eligibility of any buildings or structures that were not previously surveyed during preparation of the 2008 NRHP nomination, and also those built between 2008 and 2015. NSF will invite PR SHPO staff to participate in the survey. If additional contributing resources are identified, NSF, in consultation with PR SHPO, will prepare and submit an updated NRHP nomination form to include them in the NAIC Historic District. This provision shall not apply, however, if a survey has already been conducted pursuant to Stipulation I.A.3.
 2. **Required Documentation.** Prior to transfer, or as soon as practicable thereafter, NSF will ensure that all contributing resources (including those identified in the survey conducted pursuant to Stipulation I.B.2., above) are documented in accordance with NPS HABS/HAER standards unless PR SHPO recommends against such HABS/HAER documentation.
 3. **Training.** NSF will ensure that the key facility staff of any new owner will receive an initial, one-time historic preservation awareness training to encourage awareness of the historic and cultural significance of Arecibo Observatory and to minimize the potential for adverse effects to historic properties. Such training, which will be funded by NSF, will be administered by a qualified historic preservation professional who is familiar with and knowledgeable about the Arecibo Observatory and its importance to Puerto Rico and the local community, and will occur within 180 days (or as soon as practicable thereafter) of the transfer. NSF will provide PR SHPO an opportunity to comment on the content of such training.
 4. **Consultation on Preservation Principles and Management Strategies for the**

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new Collaborator(s). Within nine months of selection of a new collaborator(s), NSF will consult with the ACHP, PR SHPO, and the new collaborator(s) to discuss the development and implementation of future preservation principles and management strategies that permit continued science-focused operations at Arecibo Observatory while preserving its historic integrity.

- 5. **Public Access.** NSF will encourage the collaborator(s) to allow reasonable public access to the Arecibo Observatory site provided that such access does not unduly interfere with the collaborator's use of the property for science-focused operations and is consistent with health, safety, and security guidelines.
- 6. **NSF-Funded Program for the Visually- and Hearing-Impaired.** Within one year of the transfer of Arecibo Observatory to a new owner, NSF will fund the development and installation of a program for the visually- and hearing-impaired in the Arecibo Observatory Visitor's Center. The purpose of this program is to help convey the cultural and scientific significance of Arecibo Observatory to a broader audience. The cost for the program will not exceed \$50,000. Signatories to this PA will have a 30-day period to review a written draft of the proposed program and its components, and NSF will consider any comments received before developing and installing the final program.

C. Documentation of Actions Demonstrating Compliance with this PA

So long as NSF remains the owner of Arecibo Observatory and provided this PA remains in effect, NSF will submit updates every six months, beginning with six months following the effective date of this PA, regarding the progress of compliance with this PA to PR SHPO and the ACHP. If PR SHPO has any concerns regarding the implementation of this PA, Section VII. Dispute Resolution, herein, may be used to address those concerns.

II. DELAYED TRANSFER OF OWNERSHIP

In the event NSF issues an award to a collaborator(s) to manage and operate Arecibo Observatory, and plans to transfer ownership of Arecibo Observatory to the collaborator(s) (a non-federal entity), only Stipulation I.B., above, shall apply, notwithstanding any limited temporal delay.

III. ALTERNATIVE 1 is selected by NSF in its Record of Decision and Implementation is not feasible

If Alternative 1 is selected by NSF in its Record of Decision and implementation is not feasible, NSF will notify PR SHPO, the ACHP, and Consulting Parties and will resume Section 106 consultation on Alternatives 2-5 and seek to amend this PA.

IV. UNANTICIPATED EFFECTS

If unanticipated effects on historic properties occur during implementation of the undertaking under Stipulation I.A., NSF will, in compliance with 36 C.F.R. § 800.13(b)(3), determine actions that it can take to resolve potential adverse effects and notify via phone and email PR SHPO and other Consulting Parties, as appropriate, within 48 hours of NSF's awareness of the effects. The notification will describe the eligibility of the property and proposed actions to resolve any adverse effects. PR SHPO and other Consulting Parties will respond with any comments within 48 hours of the notification by phone or email. NSF will take into account the Consulting Parties' recommendations regarding NRHP eligibility and proposed actions, and then carry out appropriate actions. NSF will provide PR SHPO and other Consulting Parties, as appropriate, with a report of the actions when they are completed. This Stipulation (Stipulation IV.) shall not apply if NSF is no longer the owner of Arecibo Observatory.

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V. POST-AGREEMENT DISCOVERIES

If NSF continues to own Arecibo Observatory and it is managed by a collaborator(s), all unanticipated discoveries of historic properties and human or burial remains within the APE revealed during any activity associated with implementation of the proposed undertaking under Stipulation I.A., the proposed undertaking will be addressed in the following manner:

- A. The contractor/collaborator(s) carrying out any such demolition will promptly notify NSF, who will notify PR SHPO of the discovery.
- B. If NSF determines, in consultation with PR SHPO, that the discovery is eligible for listing in the NRHP, NSF will initiate consultation with the Consulting Parties to draft a plan with measures that will avoid, minimize, and/or mitigate adverse effects. If agreement is reached regarding such a plan, NSF will implement the plan. If the discovery is made during demolition activities (if any), demolition in the affected area must cease until the discovery process in this Stipulation has been concluded either through a finding that the property is not eligible for listing in the NRHP or through finalization of the plan referenced herein.
- C. If the Consulting Parties cannot reach agreement regarding the development of a treatment or mitigation plan, then the matter will be referred to the ACHP for guidance. NSF will address the ACHP's guidance in reaching a final decision regarding implementation of the plan.
- D. If any previously unidentified human or burial remains are discovered during implementation of the undertaking, the contractor/collaborator(s) will immediately cease any demolition work and adhere to applicable state and federal laws regarding the treatment of human or burial remains.

VI. REPORTING

- A. To keep the public and Consulting Parties apprised of the status of the implementation of the Stipulations in this PA, NSF will maintain a status report on the NSF Division of Astronomical Sciences website with relevant information.
- B. Meetings or conference calls regarding the undertaking and/or implementation of the Stipulations in this PA may be requested at any time by the Signatories for the duration of this PA.
- C. If Arecibo Observatory is transferred out of NSF ownership, the terms of this Stipulation shall not apply after transfer.

VII. DISPUTE RESOLUTION

A. Signatories

In the event one of the Signatories objects to the manner in which any term of this PA is implemented, the following dispute resolution process will be followed:

- 1. The objecting Signatory will notify all other Signatories to this PA, in writing, of the objection or disagreement, request written comments on the objection or disagreement within ten (10) business days following receipt of such notification, and then proceed to consult with the Signatories to resolve the objection. If at any time during consultation, NSF determines that the objection or disagreement cannot be resolved through consultation, NSF will forward all documentation relevant to the dispute to PR SHPO, or if the objection is raised by PR SHPO, NSF will forward all documentation relevant to the dispute to the ACHP. Within 30 days after receipt of all pertinent documentation, PR SHPO or, as appropriate, the ACHP, will provide NSF with comments and recommendations, which NSF will take into account in reaching a final decision regarding the dispute. Any comment provided by PR SHPO or, as

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appropriate, the ACHP, will be understood to pertain only to the subject of the dispute. All other actions under this PA that are not the subject of the dispute will remain unchanged.

2. Unless all Signatories agree that the dispute warrants a cessation of work, neither NSF nor its collaborator(s) will be required to cease work on the proposed undertaking while the dispute is being reviewed.

B. Continued Participation by the Public and Concurring Parties

At any time during the Implementation of the Stipulations set forth in this PA, any member of the public, including any Consulting Party who has decided not to sign this PA as a Concurring Party, and any Concurring Party may continue to participate in the Section 106 consultation process as follows:

1. Any member of the public may raise an objection to NSF pertaining to the treatment of an historic property associated with Implementation of the proposed undertaking, provided that title to Arecibo Observatory is retained by NSF. In the event such an objection is raised, NSF will consult with PR SHPO regarding the objection, and following such consultation, will provide the objecting member of the public with a decision on the objection.
2. Any Concurring Party may raise an objection to NSF and PR SHPO pertaining to the treatment of an historic property associated with Implementation of the proposed undertaking. In the event such an objection is raised by a Concurring Party, NSF and PR SHPO will consult regarding how to resolve the objection. If NSF and PR SHPO are unable to resolve the objection, they will consult with the ACHP. NSF will consider any recommendation on the objection provided by the ACHP before making a final decision on the matter. NSF will communicate such a final decision to the objecting Concurring Party and PR SHPO.

If an objection is made pursuant to either Stipulation VII.B.1. or VII.B.2., NSF, in consultation with PR SHPO, will determine whether the objection warrants a cessation of work (if any) on the proposed undertaking while the objection is being reviewed.

- C. This Stipulation (Stipulation VII.) shall not apply if NSF is no longer the owner of Arecibo Observatory.

VIII. PROFESSIONAL QUALIFICATIONS

All work carried out pursuant to this PA will be developed and/or implemented by or under the direct supervision of a person or persons meeting or exceeding the minimum professional qualifications, appropriate to the affected resource(s), listed in the *Secretary of the Interior's Professional Qualification Standards* (36 CFR Part 61, Appendix A) and amended in 1992.

IX. PRINCIPLES AND STANDARDS

The Signatories agree that the surveys referred to in Stipulations I.A.3. and I.B.1. will be conducted in a manner consistent with the principles and standards contained in the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68), *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (1983, as amended), *Recommended Approach for Consultation on Recovery of Significant Information from Archaeological Sites* (ACHP, May 18, 1999, 64 FR 27085-27087), and any Puerto Rico guidelines, as appropriate.

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X. ELECTRONIC COPIES

NSF will provide PR SHPO, the ACHP, and each Consulting Party with one legible, full-color, electronic copy of the fully executed PA and its Attachments no more than 30 days after execution. If the electronic copy is too large to send via email, NSF will provide each Consulting Party with a copy of the executed PA via a CD.

XI. AMENDMENT

Any Signatory may request that this PA be amended by informing NSF in writing of the reason for the request and the proposed amendment language. After receiving the request, NSF will notify all Consulting Parties of the proposed amendment and consult to reach agreement. The amendment will be effective on the date a copy signed by all the Signatories and Invited Signatories is filed by NSF with the ACHP.

XII. EXPIRATION

If NSF retains ownership of Arecibo Observatory, this PA will expire ten years from the Effective Date of this PA as defined in Stipulation XV., herein. If ownership of Arecibo Observatory is transferred to a non-federal entity, upon completion of the terms in Stipulation I.B., this PA shall expire. Prior to such expiration date, NSF may consult with PR SHPO and the ACHP to reconsider the terms of this PA and amend it in accordance with Stipulation XI. If unresolved issues remain within two years of the expiration date of this PA, NSF will, at that time, consult with PR SHPO and the ACHP regarding the progress of implementation of this PA and consider the appropriateness of developing a subsequent agreement or amendment to the PA.

XIII. COMPLIANCE WITH APPLICABLE LAW AND ANTI-DEFICIENCY ACT PROVISION

This PA will be carried out consistent with all applicable federal and state laws. No provision of this PA will be implemented in a manner that would violate the Anti-Deficiency Act. NSF shall make reasonable and good faith efforts to secure the necessary funds to implement this PA in its entirety. All obligations on the part of NSF will be subject to the availability and allocation of appropriated funds for such purposes. Nothing in this PA may be construed to obligate NSF to any current or future expenditure of resources in advance of the availability of appropriations. Should NSF be unable to fulfill the terms of this PA due to funding constraints or priorities, NSF will immediately notify and consult with PR SHPO and the ACHP to determine whether to amend or terminate this PA pending the availability of resources.

XIV. TERMINATION

If any Signatory to this PA determines that the terms of this PA will not or cannot be carried out, that Signatory will immediately consult with the other Signatories to develop an amendment to this PA pursuant to Section XI., above. If this PA is not amended following that consultation, then it may be terminated by any Signatory through written notice to the other Signatories. Within 30 days following any such termination and prior to work continuing on the undertaking, NSF will notify PR SHPO and the ACHP whether it will initiate consultation to execute a new PA under 36 C.F.R. § 800.14(b)(1)(ii) or request and consider the comments of the ACHP under 36 C.F.R. § 800.7 and proceed accordingly.

XV. EFFECTIVE DATE

This PA will be executed in counterparts, with a separate page for each Signatory, and NSF will ensure that each Signatory is provided with a fully executed copy. This PA will become effective upon obtaining the signatures of NSF, PR SHPO, and the ACHP.

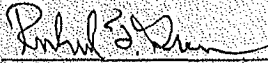
Execution of this PA by NSF, PR SHPO, and the ACHP evidences that NSF has taken into account the effects of this proposed undertaking on historic properties, and has afforded the ACHP an opportunity to comment on the proposed undertaking.

SIGNATORY PAGE

**PROGRAMMATIC AGREEMENT
AMONG
THE NATIONAL SCIENCE FOUNDATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND
THE PUERTO RICO STATE HISTORIC PRESERVATION OFFICER
REGARDING
POTENTIAL CHANGES TO
ARECIBO OBSERVATORY OPERATIONS
IN THE VICINITY OF ARECIBO, PUERTO RICO**

Signatory:

National Science Foundation



Richard F. Green, Ph.D., Division Director, Astronomical Sciences

Date 15 Nov, 2017

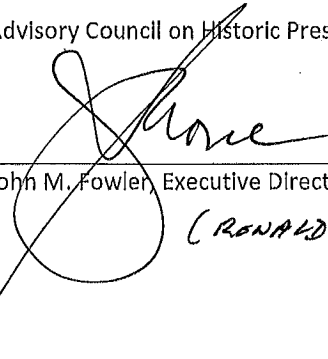


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Signatory:

Advisory Council on Historic Preservation



John M. Fowler, Executive Director
(RONALD D. ANZALONE, ACTG.)

Date

11/15/2017

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SIGNATORY PAGE

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IN THE VICINITY OF ARECIBO, PUERTO RICO

Signatory:

Puerto Rico State Historic Preservation Office



Carlos Rubio Cancela, Executive Director

Date

November 14, 2017



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INVITED SIGNATORY PAGE
PROGRAMMATIC AGREEMENT
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IN THE VICINITY OF ARECIBO, PUERTO RICO

Invited Signatory:

Arecibo Observatory



Francisco Córdova, Director

Date

11/13/17



CONCURRING PARTY SIGNATURE PAGE

PROGRAMMATIC AGREEMENT
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IN THE VICINITY OF ARECIBO, PUERTO RICO

Concurring Party:

SRI International

Anthony van Eyken, Ph.D.

Date _____

CONCURRING PARTY SIGNATURE PAGE

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Concurring Party:

Interamerican University-Bayamon

Brett Isham, Ph.D.

Date

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Concurring Party:

Miami University

Date

Qihou Zhou, Ph.D.

CONCURRING PARTY SIGNATURE PAGE

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Concurring Party:

Universities Space Research Association

Date

Nicholas White, Ph.D.

CONCURRING PARTY SIGNATURE PAGE

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Concurring Party:

American Nanohertz Observatory for Gravitational Waves

Xavier Siemens, Ph.D.

Date _____

CONCURRING PARTY SIGNATURE PAGE

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Concurring Party:

Ms. Luisa Zambrano-Marín

Date _____

CONCURRING PARTY SIGNATURE PAGE

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Concurring Party:

Carmen Pantoja, Ph.D.

Date _____

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Concurring Party:

Puerto Rican Karzo Speleological Research Foundation (FIEKP)

Mr. Miguel Babilonia

Date _____

CONCURRING PARTY SIGNATURE PAGE

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Concurring Party:

Universities Space Research Association

Joan Schmelz, Ph.D.

Date _____

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Concurring Party:

University of Central Florida

Mr. Ramon Lugo

Date _____

CONCURRING PARTY SIGNATURE PAGE

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Concurring Party:

University of Puerto Rico

Daniel R. Altschuler, Ph.D.

Date _____

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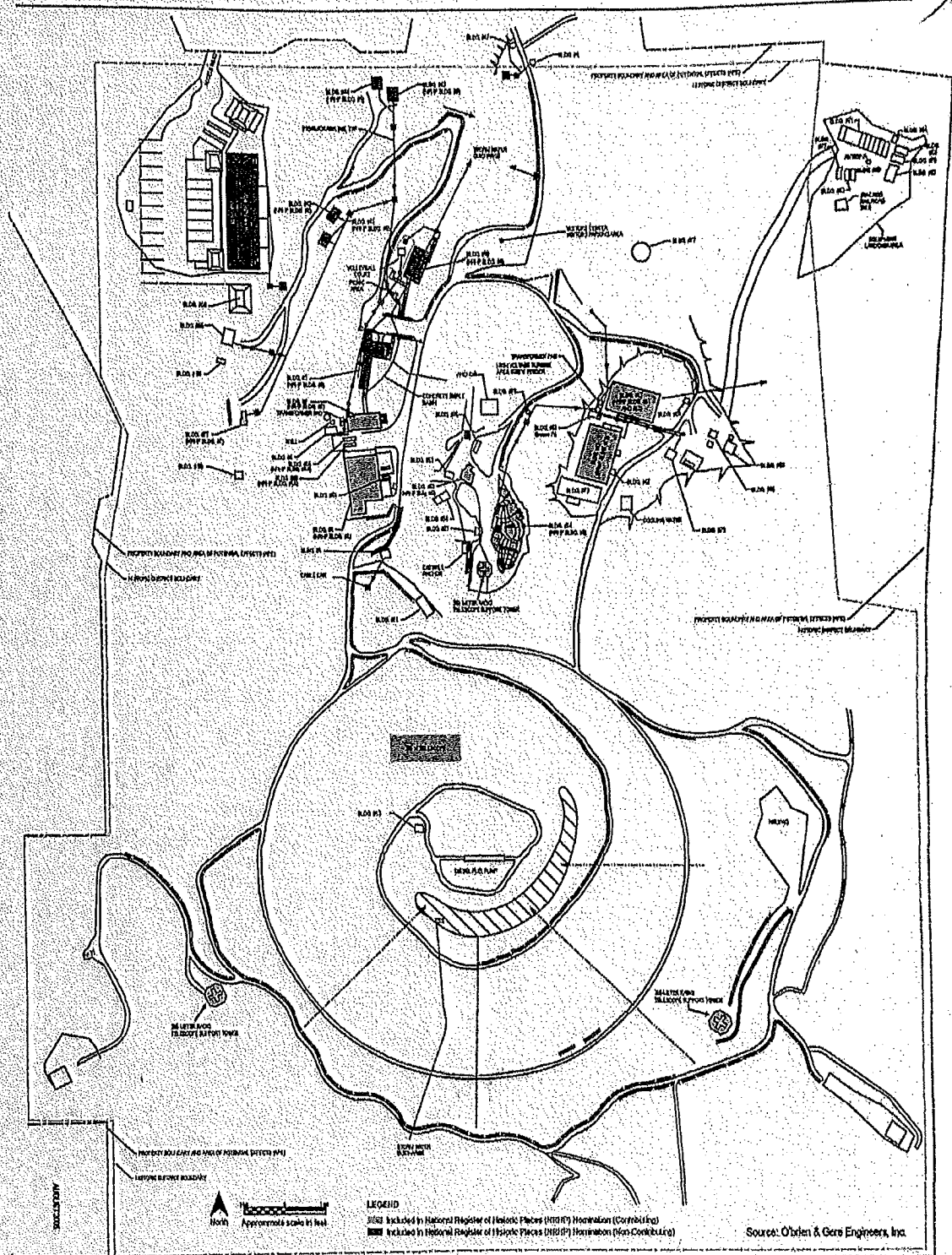
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Attachment A
NAIC Historic District Map

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| BUILDING NO. | DESCRIPTION |
|--------------|---|
| 1 | OPERATIONS BUILDING (RRP BLDG #1) (1963) |
| 2 | ADMINISTRATION BUILDING (RRP BLDG #2) (1963) |
| 3 | VISITOR SCIENTIST QUARTERS AND CAFETERIA (RRP BLDG #3) (1963) |
| 4 | ENTRANCE GUARD HOUSE (1963) |
| 5 | CABLE CAR HOUSE (1963) |
| 6 | PUMP HOUSE WATER TREATMENT BLDG (1963) |
| 10 | EVAPORATION POOL RESTROOMS (RRP BLDG #10) (1964) |
| 11 | LEWIS BUNKER ROOMING (OFF. BLDG) (1964) |
| 12 | MAINTENANCE SHOP (RRP BLDG #12) (1964) |
| 13 | DOVA SHACK (1963) |
| 17 | WAREHOUSE (RRP BLDG #17) (1967) |
| 21 | AUTOMATIC TESTING RANGE |
| 27 | PART STORAGE BUILDING (1964) |
| 34 | OPTICAL LABS (RRP BLDG #34) (1965/1967) |
| 34 | HIGH VOLTAGE POWER SUPPLY BLDG (1977) |
| 35 | CUMMINGS GENERATOR CONTROL BLDG (2016) |
| 41 | WEST HILL V.S.O. BACHELOR UNIT 1 (RRP BLDG #41) (1960) |
| 42 | WEST HILL V.S.O. BACHELOR UNIT 2 (RRP BLDG #42) (1960) |
| 43 | WEST HILL V.S.O. FAMILY UNIT 1 (RRP BLDG #43) (1960) |
| 44 | WEST HILL V.S.O. FAMILY UNIT 2 (RRP BLDG #44) (1960) |
| 47 | MAIN GATE RESTROOM (1963) |
| 50 | INTERIOR LUNCH CATERING SHACK |
| 51 | GREASE PIT |
| 53 | EMERGENCY GENERATOR BLDG |
| 54 | VISITOR CENTER BLDG (RRP BLDG #54) (1967) |
| 55 | LABORATORY BLDG (1966) |
| 56 | NORTH V.S.O. BLDG (VOLUME #1) (2002) |
| 56 | NORTH V.S.O. UTILITY BLDG (2002) |
| 59 | VISITOR CENTER TRAILER |
| 59 | AIR RECL. TENTED BLDG (1966) |
| 61 | LEARNING CENTER (RRP BLDG #61) (2001) |
| 62 | REF STORAGE TRAILER |
| 63 | EXHIBITION TRAILER |
| 64 | ELECTRICAL TRAILER |
| 65 | SHEDDED TRAILER (1983) |
| 66 | ATMOSPHERIC SCIENCE TRAILER (RRP BLDG #11) |
| 67 | COSMOLOGICAL LAB TRAILER (1977) |
| 68 | SCIENTIFIC OFFICES TRAILER (RRP BLDG #1) |
| 69 | ELECTRICAL TRAILER (AMVEGLOD) |
| 70 | COMPUTER TRAILER |
| 71 | ELECTRONIC GUIDE TRAILER |
| 72 | ELECTRICAL TRAILER (COSMOLOGICAL) |
| 73 | RF TRANSMITTER BUILDING (2005) |
| 74 | REPERATION FOR SCIENCE TRAILER (2004) |
| 77 | PHASE REFERENCE ANTENNA (1974) (2019) |
| 78 | COFFEE HUT (2004) |
| 79 | ENGINEERING OFFICE BLDG (2004) |
| 80 | CUMMINGS DIESEL GENERATOR (1966) (2019) |

Source: O'Brien & Gere Engineers, Inc.

Architectural Resources and
 Historic Properties within the APE
 Arecibo Observatory
 Puerto Rico

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Attachment B
Table of Historic Properties in
NAIC Historic District

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Contributing Resources to the National Astronomy and Ionosphere Center Historic District

| Structure/Building Number | Building Name | Year of Construction |
|---|---|---|
| National Register of Historic Places designation (NRHP)*: N/A | 305-meter Reflector | 1963 |
| Arecibo Observatory designation (AO): N/A | 305-meter Radio Telescope and Support Towers | |
| NRHP: Buildings #1 and #1A | Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2 nd level); and Safety/Security Office, PC Network Office, Visiting Scientists Offices | 1963 (addition in 1983) Year of construction for trailers unknown. |
| AO: Building #1 (and Trailers #66 and #68) | Operations Building (with Atmospheric Science Traller and Scientific Offices Traller) | |
| NRHP: Building #2 | 1st floor: Scientific Services, Human Resources, TV/Conference Room; 2 nd floor: Director and Administration, Library, Mail Room; 3 rd floor: Palomar Room, Scientific Staff Offices; 4 th floor: Scientific Staff Offices | 1963 |
| AO: Building #2 | Administration Building | |
| NRHP: Building #5 | Visitors Center | |
| AO: Building #54 | Visitor Center Building (Fundación Angel Ramos Visitor and Educational Facility) | 1997 (addition 2015) |
| NRHP: Building #6 | Learning Center | 2001 |
| AO: Building #61 | Learning Center | |
| NRHP: Building #7 | Atmospheric and Optical Labs | 1985/1997 |
| AO: Building #27 | Optical Labs | |
| NRHP: Buildings #11 and #12 | Warehouse and Business/Purchasing | 1967 |
| AO: Building #17 | Warehouse | |
| NRHP: Building #13 | Machine Shop | 1967 |
| AO: Building #12 | Maintenance Shops | |

* The National Register of Historic Places Registration Form, which was completed in 2007, provides building numbers and names that do not always correspond to the current Arecibo Observatory facility designations. For this reason, the current NRHP Registration Form building designations are provided along with the Arecibo Observatory designations that are provided in Attachment A. Also note that the Registration Form does not indicate which of the 13 described buildings/structures are contributing resources to the NAIC Historic District. The above 8 buildings/structures were identified as contributing resources based on correspondence with the Puerto Rico SHPO on May 20, 2016.

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Attachment C References and Definitions

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PA References:

Gaume, Ralph A. and James S. Ulvestad. 2017. National Science Foundation NSF 17-079 Dear Colleague Letter: MPS-AST Facility Divestment Activity. April 27. <https://www.nsf.gov/pubs/2017/nsf17079/nsf17079.isp>

National Academies of Sciences, Engineering, and Medicine (NAEM). 2016. *New Worlds, New Horizons: A Midterm Assessment*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/23560>

National Science Foundation (NSF) Directorate for Mathematical & Physical Sciences Division of Astronomical Sciences and Directorate for Geosciences Division of Atmospheric and Geospace Sciences. 2017. Program Solicitation NSF 17-538 Management and Operations of the Arecibo Observatory. January 25. <https://www.nsf.gov/pubs/2017/nsf17538/nsf17538.htm>

National Science Foundation (NSF) Division of Astronomical Sciences (AST). 2006. *From the Ground Up: Balancing the NSF Astronomy Program* (Senior Review Committee Report). Prepared by the Senior Review Committee. October 22. https://www.nsf.gov/mps/ast/seniorreview/sr_report_mpsac_updated_12-1-06.pdf

National Science Foundation (NSF) Division of Astronomical Sciences (AST). 2012. *Advancing Astronomy in the Coming Decade: Opportunities and Challenges* (Portfolio Review Committee Report). Prepared by the Portfolio Review Committee. August 14. https://www.nsf.gov/mps/ast/portfolioreview/reports/ast_portfolio_review_report.pdf

National Science Foundation (NSF) Division of Atmospheric and Geospace Science (AGS). 2016. *Investments in Critical Capabilities for Geospace Science 2016 to 2025 - A Portfolio Review of the Geospace Section of the Division of Atmospheric and Geospace Science*. Prepared by the Portfolio Review Committee: Daniel N. Baker, Jorge Chau, Christina Cohen, Sarah Gibson, Joseph Huba, Mona Kessel, Delores Knipp, Louis Lanzerotti, William Lotko (Chair), Patricia Reiff, Alan Rodger, Joshua Semeter (GEO/Advisory Committee Liaison), Howard Singer. April 14. <https://www.nsf.gov/geo/adgeo/geospace-review/geospace-portfolio-review-final-rpt-2016.pdf>

Ulvestad, James S. and Paul B. Shepson. 2015. National Science Foundation NSF 16-005 Dear Colleague Letter: Concepts for Future Operation of the Arecibo Observatory. October 26. <https://www.nsf.gov/pubs/2016/nsf16005/nsf16005.pdf>

Ulvestad, James S. and Paul B. Shepson. 2016. National Science Foundation NSF 16-144 Dear Colleague Letter: Intent to Release a Solicitation Regarding Future Continued Operations of the Arecibo Observatory. September 30. <https://www.nsf.gov/pubs/2016/nsf16144/nsf16144.isp>

PA Definitions:

Adverse Effect: a change to the characteristics that qualify a historic property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(a)).

Area of Potential Effects (APE): the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)). It is important to understand that the effects

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pertain to the effects on physical historic properties (eligible for or listed in the National Register of Historic Places [NRHP]) in a specific area.

Concurring Party: Any consulting party that has been invited by the federal agency (NSF) to concur in the PA. Concurring parties have the same rights with regard to seeking amendment or termination of the PA as other signatories. The refusal of any party invited to concur in the PA does not invalidate the document (36 CFR 800.16(d)).

Consultation: the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process (36 CFR 800.16(f)).

Consulting Party: Section 106 term that refers to organizations and/or individuals with a demonstrated interest in the undertaking due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties. The participation of consulting parties is subject to approval by the federal agency (in this case, NSF). Consulting parties are actively informed of and able to participate in the Section 106 process, including consultation meetings. The views of consulting parties are actively sought by NSF during the Section 106 consultation process. (36 CFR 800.2(c)(5))

Effect: an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP (36 CFR 800.16(i)).

Historic Property: Any resource, such as a building, structure, or historic district, included in or eligible for inclusion in the NRHP, maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria (36 CFR 800.16(l)).

Invited Signatory: Any party that is assigned a responsibility under the PA and is invited by the federal agency (NSF) to sign the PA. Any invited signatory that signs the PA has the same rights with regard to seeking amendment or termination of the PA as other signatories. The refusal of any party invited to become a signatory to a PA does not invalidate the document (36 CFR 800.6(c)(2)).

Signatory: Signatories include the federal agency (NSF), PR SHPO, and ACHP, and they have the sole authority to execute, amend, or terminate the PA (36 CFR 800.6(c)(1)).

Programmatic Agreement (PA): A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program or complex undertaking. For this undertaking, a PA is used to document the ways in which adverse effects are addressed because the result of the 2017 solicitation for new collaborators is undetermined and the needs of any new collaborator(s) are unknown (36 CFR 800.14(b)).

Undertaking: A project, activity, or program funded in whole or in part by a federal agency (36 CFR 800.16(y)).

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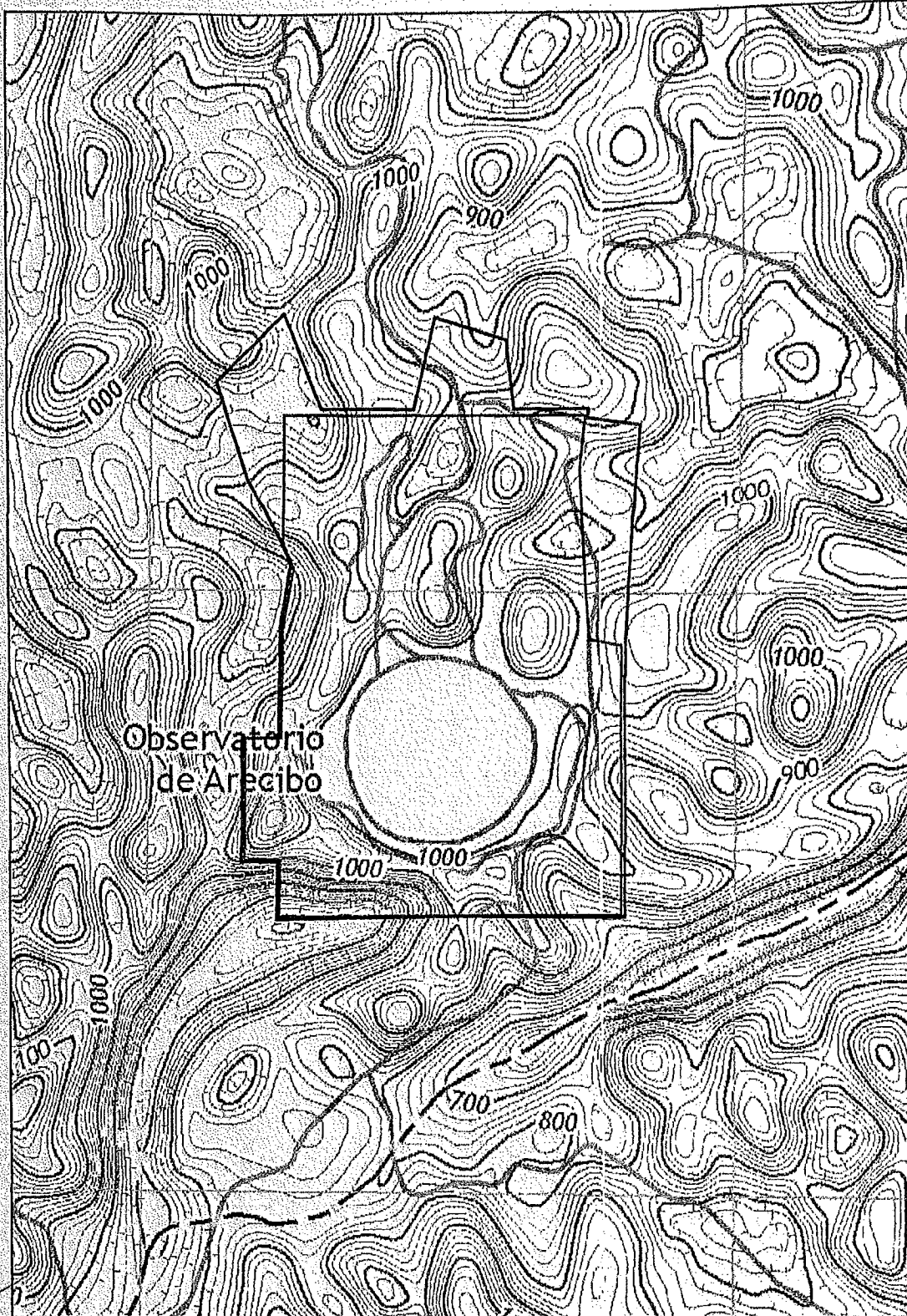
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Attachment D
Area of Potential Effects



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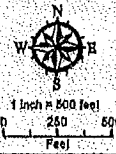
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-  Property Boundary and Area of Potential Effects (APE)
-  Historic District Boundary

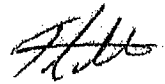


Cultural Resources Area of Potential Effects
 Arecibo Observatory
 Puerto Rico

USGS Topographic Quads Bayaney NE (2013) and
 Utuado NW (2013)

ATTACHMENT D

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Attachment E

Buildings and structures that may be retained or demolished based on the needs of any collaborator(s) under Alternative 1- *Collaboration with Interested Parties for Continued Science-focused Operations*



BFG

Att

Buildings and structures that may be retained or demolished based on the needs of any collaborator(s) under Alternative 1, Collaboration with Interested Parties for Continued Science-focused Operations

| Structure/Building Number | Building Name | Year of Construction, if known |
|---|---|---|
| National Register of Historic Places designation (NRHP)*: #1A | Visitors Offices, Electronics/Digital Lab, Control Room/Operators Office, Facilities/Maintenance (2 nd level); and Safety/Security Office, PC Network Office, Visiting Scientists Offices | 1963 (addition in 1983) Year of construction for trailers unknown. |
| Arecibo Observatory designation (AO): Trailers #66 and #68 | Atmospheric Science Trailer and Scientific Offices Trailer | |
| NRHP: Building #2 | 1st floor: Scientific Services, Human Resources, TV/Conference Room; 2 nd floor: Director and Administration, Library, Mail Room; 3 rd floor: Palomar Room, Scientific Staff Offices; 4 th floor: Scientific Staff Offices | 1963 |
| AO: Building #2 | Administration Building | |
| NRHP: Buildings #11 and #12 | Warehouse and Business/Purchasing | 1967 |
| AO: Building #17 | Warehouse | |
| NRHP: #4 | Recreation Area | |
| AO: #10 | Swimming Pool/Restrooms (with additional recreation areas) | mid 1960s |
| NRHP: #8 (B1-B2) | VSO Bachelor Units (B1-B2) | 1990s |
| AO: #41 | West Hill V.S.O. Bachelor Unit 1 | |
| NRHP: #8 (B3-B4) | VSO Bachelor Units (B3-B4) | 1990s |
| AO: #42 | West Hill V.S.O. Bachelor Unit 2 | |
| NRHP: #9 (F1) | VSO Family Units F1 | 1990s |
| AO: #43 | West Hill V.S.O. Family Unit 1 | |
| NRHP: #9 (F2) | VSO Family Units F2 | 1990s |
| AO: #44 | West Hill V.S.O. Family Unit 2 | |
| NRHP: N/A | N/A | |
| AO: #11 | Lewis Building-Rigging Loft | mid 1960s |
| NRHP: N/A | N/A | |
| AO: #13 | Bowl Shack | 1963 |
| NRHP: N/A | N/A | |
| AO: #21 | Antenna Testing Range | |
| NRHP: N/A | N/A | |
| AO: #25 | Paint Storage Building | 2010 |
| NRHP: N/A | N/A | |
| AO: #34 | High Voltage Power Supply Building | 1973 |




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| | | |
|-----------|------------------------------------|------------|
| NRHP: N/A | N/A | Late 1990s |
| AO: #60 | Antenna Receiving Testing Building | |
| NRHP: N/A | N/A | 1983 |
| AO: #65 | Shielded Trailer | |
| NRHP: N/A | N/A | 2000s |
| AO: #73 | HF Transmitter Building | |
| NRHP: N/A | N/A | 2000s |
| AO: #78 | Coffee Hut | |
| NRHP: N/A | N/A | |
| AO: #62 | HFF Storage Trailer | |
| NRHP: N/A | N/A | |
| AO: #71 | Electronics Cable Trailer | |
| NRHP: N/A | N/A | |
| AO: #64 | Electronic Trailer | |
| NRHP: N/A | N/A | |
| AO: #59 | Visitor Center Trailer | |
| NRHP: N/A | N/A | |
| AO: #70 | Computer Trailer | |
| NRHP: N/A | N/A | |
| AO: #63 | Ionosonde Trailer | |
| NRHP: N/A | N/A | |
| AO: #69 | Electronic Trailer (Waveguide) | |
| NRHP: N/A | N/A | |
| AO: #72 | Electronic Trailer (Cryogenics) | |

Key:

-  **Contributing Resources:** described in the National Register of Historic Places Registration Form, which was completed in 2007, and identified as contributing to the NAIC Historic District Historic District based on correspondence with the Puerto Rico SHPO on May 20, 2016.
-  **Non-Contributing Resources:** described in the National Register of Historic Places Registration Form, which was completed in 2007, and identified as non-contributing to the NAIC Historic District Historic District based on correspondence with the Puerto Rico SHPO on May 20, 2016.
-  **Unevaluated:** buildings/structures not designated as contributing or non-contributing resources and considered to be unevaluated at this time.

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** The National Register of Historic Places Registration Form provides building numbers and names that do not always correspond to the current Arecibo Observatory facility designations. For this reason, the current NRHP Registration Form building designations are provided along with the Arecibo Observatory designations that are provided in Attachment A.*

Attachment D

References and Definitions

PA References:

Jacobs Engineering, Inc. 2018. Arecibo Observatory Historic Property Survey Report. Prepared for the National Science Foundation.

Jacobs Engineering, Inc. 2020. Preservation Principles and Management Plan, Arecibo Observatory, Puerto Rico. Prepared for the National Science Foundation.

https://www.nsf.gov/mps/ast/env_impact_reviews/arecibo/section106/NSF_Arecibo_PPM-Plan_Final.pdf

Jones, Sean L. and William E. Easterling. 2021. National Science Foundation NSF 21-055 Dear Colleague Letter: Intent to support a Workshop to Explore Novel Ideas for Future Scientific, Educational, and cultural Activities with the Arecibo Observatory. March 10.

www.nsf.gov/pubs/2021/nsf21055/nsf21055.jsp

National Science Foundation (NSF). 2017. Programmatic Agreement between National Science Foundation, the Advisory Council on Historic Preservation, and the Puerto Rico State Historic Preservation Officer. November 13.

www.nsf.gov/mps/ast/env_impact_reviews/arecibo/section106/arecibo_section106.jsp

Santos, Juan Llanes. 2007. National Astronomy and Ionosphere Center (Arecibo Observatory). National Register of Historic Places Continuation Sheet. Prepared by the Puerto Rico State Historic Preservation Office for the U.S. Department of the Interior, National Park Service. March 20.

Wobig, Jessica R. 2019. Amendment to the National Astronomy and Ionosphere Center Historic District. National Register of Historic Places Continuation Sheet (National Register Registration Form Addendum). National Register Reference Number 070000525. Prepared for Caroline M. Blanco, Federal Preservation Officer, National Science Foundation.

www.nsf.gov/mps/ast/env_impact_reviews/arecibo/section106/PR_Arecibo_County_NAIC_Historic_District_form.pdf

PA Definitions:

Adverse Effect: a change to the characteristics that qualify a historic property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(a)).

Area of Potential Effects (APE): the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)). It is important to understand that the effects pertain to the effects on physical historic properties (eligible for or listed in the National Register of Historic Places [NRHP]) in a specific area.

Concurring Party: Any consulting party that has been invited by the federal agency (NSF) to concur in the PA. Concurring parties have the same rights with regard to seeking amendment or termination of the PA as other signatories. The refusal of any party invited to concur in the PA does not invalidate the document (36 CFR 800.16(d)).

Consultation: the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process (36 CFR 800.16(f)).

Consulting Party: Section 106 term that refers to organizations and/or individuals with a demonstrated interest in the undertaking due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties. The participation of consulting parties is subject to approval by the federal agency (in this case, NSF).

Consulting parties are actively informed of and able to participate in the Section 106 process, including consultation meetings. The views of consulting parties are actively sought by NSF during the Section 106 consultation process. (36 CFR 800.2(c)(5))

Effect: an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP (36 CFR 800.16(i)).

Historic Property: Any resource, such as a building, structure, or historic district, included in or eligible for inclusion in the NRHP, maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria (36 CFR 800.16(l)).

Intensive Building Survey: defined by the National Park Service as a precise evaluation of all potential historic properties in a defined survey area (NPS, 1985). This type of survey includes research and field evaluations of potential historic properties to determine whether the resources meet the definition of a historic property according to the NHPA.

Signatory: Signatories include the federal agency (NSF), PR SHPO, and ACHP, and they have the sole authority to execute, amend, or terminate the PA (36 CFR 800.6(c)(1)).

Programmatic Agreement (PA): A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program or complex undertaking. For this undertaking, a PA is used to document the ways in which adverse effects are addressed because the result of the 2017 solicitation for new collaborators is undetermined and the needs of any new collaborator(s) are unknown (36 CFR 800.14(b)).

Undertaking: A project, activity, or program funded in whole or in part by a federal agency (36 CFR 800.16(y)).