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Chairman

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General Manager

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Accountability . Impartiality . Competence . Openness . Value

INVITATION FOR MULTI-STEP (IFB) NO.: GPA-007-18
DESCRIPTION: Renewable Energy Resource – Phase III

SPECIAL REMINDERS TO PROSPECTIVE BIDDERS

Bidders are reminded to read the Sealed Bid Solicitation and Instructions, and General Terms and Conditions attached to the IFB to ascertain that all of the following requirements checked below are submitted in the bid envelope. Bidders are required to submit one (1) original, six (6) bound copies of their bid including one completed electronic copy on one disk of the Qualitative Scoring Workbook including all addenda, if any, at the closing date and time. One completed electronic copy on another disk of the Price Proposal Workbook by the "Cut-Off Date for Receipt of Priced Proposals". Bidders are advised to keep a copy of the completed Workbooks and test the electronic copies on disks prior to submitting them to GPA.

- (XX) BID GUARANTEE – One Hundred Fifty Thousand US Dollars (\$150,000.00) May be in the form of; Reference #11 on the General Terms and Conditions
 - a. Cash, Bank Draft, Cashier's Check or Certified Check (NOTE: Cashier's Check or Certified Check Refunds will be ONLY be made out to the name of the Bidder.)
 - b. Wire Transfer to Guam Power Authority
Account No. 0601-026246, Routing No. 121405115
Bank Location: Bank of Guam, 111 Chalan Santo Papa Street, Hagatna, Guam 96910
Bank Mailing Address: P.O. Box BW Hagatna, Guam 96910
 - c. Letter of Credit or
 - d. Surety Bond – Valid only if accompanied by:
 - 1. Current Certificate of Authority issued by the Insurance Commissioner;
 - 2. Power of Attorney issued by the Surety to the Resident General Agent;
 - 3. Power of Attorney issued by two (2) major officers of the Surety to whomever is signing on their behalf.

- (XX) STATEMENT OF QUALIFICATION;
- () SAMPLES;
- () BROCHURES/DESCRIPTIVE LITERATURE; (Shall provide detailed literature on items offered.)
- (XX) AFFIDAVIT OF DISCLOSURE OF MAJOR SHAREHOLDERS
- (XX) NON-COLLUSION AFFIDAVIT;
- (XX) NO GRATUITIES OR KICKBACKS AFFIDAVIT;
- (XX) ETHICAL STANDARDS AFFIDAVIT;
- (XX) WAGE DETERMINATION AFFIDAVIT;
- (XX) RESTRICTIONS AGAINST SEX OFFENDERS AFFIDAVIT;

Note: The above Affidavits must comply with the following requirements:

- a. The affidavit must be signed within 60 days of the date the bid is due;
- b. Date of signature of the person authorized to sign the bid and the notary date must be the same.
- c. First time affidavit must be an original – If copy, indicate Bid Number/Agency where original can be obtained.

(XX) OTHER REQUIREMENTS:
A Guam Business License and/or Contractor's License with proof of Employer Identification Number (EIN) is not required in order to provide a proposal for this engagement, but is a pre-condition for entering into a contract with the Authority. Bidders MUST comply with PL 26-111 dated June 18, 2002, PL 28-165 dated January 04, 2007 and Wage Determination under the Service Contract Act (www.wdol.gov). Additionally, upon award the successful bidder must provide to GPA the most recently issued Wage Determination by the US Dept. of Labor.

The reminder must be signed and returned in the bid envelope together with the bid. Failure to comply with the above requirements will mean a disqualification and rejection of the bid.

On this _____ day of _____ 2018, I, _____, authorized representative of _____ acknowledge receipt of this special reminder to prospective bidders with the above referenced IFB.

Bidder Representative's Signature

INVITATION FOR BID

ISSUING OFFICE:

Guam Power Authority
Procurement Management Materials Supply
GPA Central Office, 1st. Floor
Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913

 11/15/17
JOHN M. BENAVENTE, P.E. DATE
General Manager

DATE ISSUED: 11/16/17 & 11/24/17 MULTI-STEP
BID INVITATION NO.: GPA-007-18

BID FOR: Renewable Energy Resource – Phase III

SPECIFICATION: See Attached

DESTINATION: See Attached

REQUIRED DELIVERY DATE: See Attached

PRE-BID CONFERENCE/SITE VISIT (NON-MANDATORY): TBD

CUT-OFF DATE FOR RECEIPT OF QUESTIONS: 4:00 P.M., Friday, January 05, 2018

INSTRUCTIONS TO BIDDERS:

INDICATE WHETHER: INDIVIDUAL PARTNERSHIP CORPORATION

INCORPORATED IN: _____

Technical Proposal (Unpriced) shall be submitted to the issuing office above no later than (Time) **4:00 P.M.**, (Date) **January 30, 2018**. Bid submitted after the time and date specified above shall be rejected. See attached General Terms and Conditions and Sealed Bid Solicitation for details.

The undersigned offers and agrees to furnish within the time specified, the articles and services at the price stated opposite the respective items listed on the schedule provided, unless otherwise specified by the bidder. In consideration to the expense of the Government in opening, tabulating, and evaluating this and other bids, and other considerations, the undersigned agrees that this bid remain firm and irrevocable ***not less than eight (8) months after the Bid Submittal Closing Date.***

NAME AND ADDRESS OF BIDDER:

SIGNATURE AND TITLE OF PERSON
AUTHORIZED TO SIGN THIS BID:

AWARD: CONTRACT NO.: _____ AMOUNT: _____ DATE: _____

ITEM NO(S). AWARDED: _____

CONTRACTING OFFICER:

JOHN M. BENAVENTE, P.E. DATE
General Manager

NAME AND ADDRESS OF CONTRACTOR:

SIGNATURE AND TITLE OF PERSON

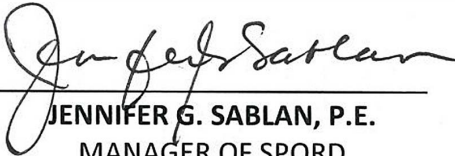
INVITATION FOR MULTI-STEP

BID NO.: GPA-007-18


RENEWABLE ENERGY RESOURCE

PHASE III





JENNIFER G. SABLAN, P.E.
MANAGER OF SPORD



JOHN J. CRUZ JR., P.E.
ASSISTANT GENERAL MANAGER OF
ENGINEERING & TECHNICAL SERVICES



JOHN M. BENAVENTE, P.E.
GENERAL MANAGER

GUAM POWER AUTHORITY
P.O. BOX 2977
HAGATNA, GUAM 96932

INVITATION FOR MULTI-STEP BID

NO.: GPA-007-18

RENEWABLE ENERGY RESOURCE

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1. Introduction

The Guam Power Authority (GPA) is inviting Renewable Resource Developers to participate in a Multi-Step Bid to provide renewable energy to serve the GPA power system. This Invitation for Multi-Step Bid (IFB) is an effort to comply with Public Law 29-62, which requires GPA to establish renewable portfolio standard goals and add additional renewable capacity with each construction of a conventional base load unit. GPA and United States Navy (Navy) have partnered in developing renewable energy resources that will aid both parties to achieve renewable goals. Navy has offered to lease properties to GPA to develop lands for installation of solar photovoltaic farms or facilities. The sites include one site in Northern Guam (South Finegayan) and four sites at Naval Base Guam.

This IFB is Phase III of GPA's effort to procure renewable energy resources. The Phase I solicitation resulted in two PPAs under NRG Energy, LLC for a combined output of 26MW using solar PV. The NRG facility is located in Dandan and was commissioned in October 2015. GPA is presently finalizing award for the Phase II solicitation.

In this Phase III acquisition, GPA intends to acquire up to 40 MW (AC) of renewable capacity with Energy Storage System. Proposed projects must meet the following established requirements:

- The Bidder's resource technology SHALL be a utility scale **Solar Photovoltaic system** with renewable integration energy storage system that will meet GPA's requirements as described in section 2.2.2 Acceptable ESS Technologies in "Volume II: Technical Qualification Proposal Requirements."
 - The primary purpose of the ESS shall be for energy shifting which is to deliver the solar produced energy at another time or period of the day.
 - The alternate function of the ESS shall be Renewable integration (RI-ESS). If and when required, i.e. GPA allows delivery directly to the grid, the RI-ESS must provide the following functions:
 - Significantly reduce the impact of intermittent ("non-firm") renewable energy generation power fluctuations on GPA's power system frequency and voltage at the point of interconnection
 - Achieve this by providing a supporting energy storage system to quickly respond to the variable renewable generation output and ameliorate the power imbalance within GPA's power grid or an assigned local micro grid.
 - Providing highly reliable fault recovery and optimizing power distribution
 - Provide a reactive capability requirement up to 0.95 lag to lead at the point of interconnection as required by GPA.
 - Demand Response Controls.
- The renewable resource will be available for commercial operation within 36 months from the contract execution.
- The technology proposed for the renewable resource will have at least 1 year of commercial operations history in a utility environment.
- The renewable resource will deliver energy directly to the existing GPA 34.5 KV transmission system.
- The renewable resource will provide energy for a term of 20 years with the option to extend two (2) additional five-year terms.
- The Bidder's renewable resource project will have a maximum export capacity of 30 MW (AC); this may be the combination of several systems at one site.

- The renewable resources shall be installed on predetermined sites GPA has leased from the U.S. Department of Navy on Guam military sites and would require successful bidders to enter into a sublease agreement with GPA subject to approval by the U.S. Department of Navy.
- The renewable resources shall conform to the Buy American Act for projects located on federal lands.
- Bidders will be required to obtain security access to sites as required by the Federal Government which may include local Rapid Gate or current required security access processing and fees.

The GPA webpage, <http://guampowerauthority.com/special/renew1.php>, also has the following information for your use:

- Public Law 29-62 (An act to promote the development of renewable energy)
- Public Law 30-66 (An act relative to permitting GPA and GWA to enter into long term contracts)
- Solar Energy Data from the Talofoto substation of the Dandan 25.65 MW solar photovoltaic farm

This bid shall be a Two Step process. Step One will establish a Qualified Bidders List (QBL) based on acceptable submitted non-price Bid information (or Technical Qualification Proposals). Step Two will evaluate the Priced Proposals from the vendors identified on the QBL and which, if any, Qualified Bidder(s) will be awarded a contract(s). Step One is the period from IFB announcement through Notification of Qualified Bidders. Step Two is the period after completion of the Technical Proposal Evaluation and notification of the QBL to the contract award date.

GPA will qualify the Bidders based on their Technical Qualification Proposals and the Qualitative Scoring Workbook. GPA will notify the Bidders selected for the QBL and will proceed with the second step of the bid process to open the sealed bid Priced Proposals of the qualified bidders. GPA will perform a comprehensive evaluation of each bid and select the Bidder(s) with the best bids based on the submitted purchase power price, minimum guarantees, and required technical data. After the selection of the winning Bidder(s), GPA will conduct system integration studies, at the selected Bidders' expense, to determine system upgrades or improvements required and the associated cost necessary for the selected renewable resource's integration into the GPA transmission system. If the selected Bidder(s) cannot proceed with the contract, GPA may elect to 1) go to the next best Bidder or 2) cancel the bid.

Table 1 indicates the anticipated milestones for the Bid process. GPA reserves the right to change the Bid process schedule at its sole discretion.

Table 1: Bid Schedule

Bid Process Milestones		From Date	To Date
Bid Announcement		11/16/17	
Vendors Submit Questions		11/16/17	1/06/18
Deadline for registration & payment of transportation fee		12/7/17	
Pre-Bid Conference & Site Visit (Meet at the GPA Main Office)		TBD	
Site Visit 1 – Naval Base Guam		TBD	
Site Visit 2 – South Finegayan Site on Route 3		TBD	
Cut-Off Date for Vendor Question Submittals		1/05/18 4:00 P.M.	
GPA Review and Answer Questions		11/16/17	1/16/18
Cut-Off Date for Receipt of Technical Proposals (Unpriced)		1/30/18 4:00 P.M.	
EVALUATION Step One:	Technical Proposal Evaluation	1/31/18	2/20/18
	Notification of Qualified Bidders	2/21/18	
EVALUATION Step Two:	Cut-Off Date for Receipt of Priced Proposals	3/13/18 2:00 P.M.	
	Opening of Priced Proposals (Public Opening)	3/13/18	
	Evaluation of Priced Proposals	3/14/18	3/27/18
	Notification of Successful Bidder(s)	3/28/18	
System Impact Study		TBD	TBD
Contract Negotiation		TBD	TBD
Contract Approval & Recommendation to Award (GPA Mgmt. & CCU)		TBD	
Public Utilities Commission Review		TBD	
Contract Signing		TBD	

1.1. Invitation for Bid (IFB) Document Organization

Invitation for Bid documents are organized into five separate volumes, as follows:

Volume I: Commercial Terms and Conditions

Volume II: Technical Qualification Requirements

Volume III: Draft Renewable Energy Purchase Agreement

Volume IV: Bid Scoring Mechanism

Volume V: Appendices

In addition, the IFB documents include two sets of electronic spreadsheets (Microsoft Excel Workbooks):

- Qualitative Scoring Workbook.xls
- Priced Proposal Workbook.xls

GPA reminds Bidders to submit the Priced Proposal in a separate sealed envelope clearly marked “Priced Proposal” for Step Two of the bid process.

1.2. GPA Overview

GPA is a public utility corporation that provides electric power service throughout the entire island of Guam. GPA, in conjunction with Private Partners, operates and maintains 9 power plants, with a total rated capacity of 428.8 MW. The Authority also has installed and maintains an estimated combined total of 182 miles of 115 kV and 34.5 kV transmission lines and an estimated 585 miles of primary distribution lines, and 30 substations. In addition, the authority owns, operates and maintains a total capacity of 18 MW for emergency generators to support 128 Guam Waterworks Authority water and sewage pump stations and sewage treatment facilities situated at various locations throughout Guam and 10 portable units.

1.2.1. Generation Overview

An overview of GPA's generation resources and transmission systems is provided in GPA's Integrated Resource Plan, which can be found at the following webpage:

http://guampowerauthority.com/gpa_authority/strategicplanning/2012IRP.php

1.2.2. Electrical System Overview

Guam Power Authority has approximately 182 miles of 115KV and 34.5KV transmission lines. There are 6 ea 115KV and 35 ea 34.5KV lines connecting 30 substations throughout the island. These Substations have 63 ea 13.8KV distribution feeders with approximately 592 miles of lines. The Guam Power Authority follows National Electrical Manufacturers Association (NEMA) ANSI C84 for delivery of power and imbalance.

The GPA Islandwide System Transmission Single Line Diagram can be found on the following webpage:

http://guampowerauthority.com/gpa_authority/engineering/gpa_engineering_system_diagrams.php

1.2.3. Guam Weather

Guam's climate is pleasantly warm year-round. The mean annual temperature is 81 degrees; generally, the range is from the low 70s to the middle 80s. The coolest and least humid months, marked by prevailing westerly tradewinds, are in December through February. Although the warmest months are from March through August, the refreshing trade winds blow steadily. The annual rainfall totals 80 to 110 inches. There are two seasons, the dry and the rainy. The dry season begins in December through June. The rainy season falls within the remaining months.

Weather	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg Fahrenheit	76	77	78	79	79	80	80	80	79	80	80	79
Avg Centigrade	24	25	26	26	26	27	27	27	26	27	27	26
rainfall inches	5.16	4.26	2.97	4.03	4.49	5.19	9.59	12.16	14.08	14.40	8.51	5.85
rel humidity %	77	76	75	74	73	76	76	81	81	80	80	78
sunshine hrs/day	11.15	11.30	11.51	12.16	12.40	12.58	13.00	12.47	12.24	12.00	11.35	11.18

1.2.4. Historical Renewable Data

Historical 10 second recorded at the Talofoto Substation of renewable energy delivered from NRG's 26MW Solar PV facility is available on the GPA renewable website for download at: <http://guampowerauthority.com/special/renew1.php>

Data is from March 2016 thru March 2017 and is the total output of the solar facility delivered to GPA.

1.3. IFB Document Media

The five-volume set of IFB documents and all Amendments to this IFB may be made available to Bidders in electronic format including:

- CD-ROM (inclusive of electronic spreadsheets);
- Downloadable files posted on the Internet (webpage or FTP site); or
- Transmittal through email.

2. Instructions to Bidders

These instructions to bidders are intended to provide guidance in the preparation of bids and do not constitute part of the bid or of the contract document.

This is a multi-step bid procurement consisting of two steps. Bidders must submit both parts of their bids: the Technical Qualification Proposal and the Priced Proposal by the Bid Submittal Closing Date indicated in Table 1: Bid Schedule. During Step One, only the submitted Technical Qualification Proposals will be evaluated. GPA will select a short-list of qualified bidders who will be eligible to submit their priced proposals.

In Step Two, the Priced Proposals based upon Technical Qualification Proposals will be considered for award. Only the Technical Qualification Proposals that are deemed acceptable, either initially or as a result of further discussions with prospective Bidders, will be considered for award during Step 2.

2.1. Correspondence

2.1.1. Language

English is the official language of Guam. As such, Bidders should submit all of their bid documents, and any accompanying documents, in English. Any bids not submitted in English will be designated as “Unacceptable” and will not qualify for the QBL.

2.1.2. Commercial and Technical Correspondence

Any prospective Bidder desiring an explanation or interpretation of the IFB, commercial terms, Technical Specifications, etc., must make a request in writing to the GPA Procurement Office at the mailing address or the email address listed below, referencing the Invitation for Multi-Step Bid No. GPA-007-18.

ATTENTION: JOHN M. BENAVENTE
GENERAL MANAGER
GUAM POWER AUTHORITY
POST OFFICE BOX 2977
HAGATNA, GUAM 96932-2977
ATTENTION: SUPPLY MANAGEMENT ADMINISTRATOR

PHONE: (671) 646-3054/55
FAX: (671) 648-3165

In addition, Bidders may also make this request by writing to the GPA PMC Procurement Officer at: jpangelinan@gpagwa.com

All inquiries must be received by GPA Procurement no later than the Cut-Off Date for Receipt of Proposals indicated in Table 1: Bid Schedule. Any oral explanations or instructions given by GPA to prospective Bidders will not be binding. GPA will promptly furnish any information given to a prospective Bidder concerning this IFB to all parties recorded by the Procurement Officer as having received the IFB. This information may be provided as an amendment to the IFB if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective Bidders.

2.2. Examination of Technical and Functional Requirements and IFB Documents

Before submitting their bid, Bidders must familiarize themselves with the nature and extent of the work, duly noting any local conditions that may affect the work to be done and the labor, materials, and equipment required.

Bidders are also required to carefully examine all IFB documents inclusive of all technical and functional requirements and to inform themselves of all conditions and requirements for the execution of the proposed work in accordance with the laws and regulations of the Territory of Guam. Ignorance on the part of Bidders of any part of the IFB documents and Technical Requirements will in no way relieve them of the obligations and responsibilities assumed under the contract.

2.3. IFB Amendment

Any amendment, modification or addendum issued by the Guam Power Authority, prior to the opening of the bids, for the purpose of changing the intent of the Technical Requirements, clarifying the meaning or changing any of the provisions of this IFB, shall be binding to the same extent as if written in the originally-issued IFB documents.

Any addendum issued will be made available to all Bidders via mail, fax, e-mail or posting to the GPA Website or FTP site. The Bidders shall acknowledge receipt of the amendment by a signature on one copy, which is to be returned to GPA at the mailing address, email address, or FAX number listed under Section 2.1.2: Commercial and Technical Correspondence.

2.4. Familiarity with Laws

Bidders shall be familiar with all U.S. Federal and local laws, ordinances, rules and regulations of Guam that in any manner affect the work. Ignorance of law on the part of the Bidders will not relieve the Bidder from responsibility.

2.5. Cost of Bidding

Bidders shall bear all costs associated with the preparation and submission of their bids. GPA will not be responsible or liable for those costs, regardless of the outcome of the IFB process.

2.6. Priced Proposals Furnished Separately without Technical Qualification Proposals

Bidders are required to submit their Priced Proposals as found in the MS EXCEL Workbook, **Priced Proposal Workbook.xls** separately from their Technical Qualification Proposals and completed **Qualitative Scoring Workbook.xls** by the Cut-Off Date for Receipt of Priced Proposals. Bidders must package Priced Proposals in a separate sealed envelope marked "Priced Proposal" and indicating the date and time of bid package submittal.

As part of the data requirements for Priced Proposals, Bidders must furnish a price for energy delivered for each year of the contract. These pricing requirements are described in more detail in Volume II: Technical Requirements

2.7. Price/Cost Data

Bidders shall provide prices/costs in U.S. Dollars

2.8. Documents Executed Outside Guam

The Power of Attorney, performance bond guarantee, and documents defining the constitution of the joint venture, consortium, company or firm, if executed outside Guam, whether required to be submitted with the bids or after the award of the contract, must be authenticated by a Notary Public or other official authorized to witness sworn statements.

2.9. Step One Procedures

The following outlines the requirements for technical (non-price) bid submittals.

2.9.1. Submission of Bids

2.9.1.1. Bid Contents

Each bid shall contain a complete and clear description of the proposed Solar PV project with energy storage, construction timelines and permitting experience, anticipated location, proposed interconnection with GPA system, operation and maintenance experience with proposed technology (as more fully discussed in Volume II: Technical Requirements). Each bid shall include the following:

- Cover and bid checklist forms defined in Appendix A;
- Responses and supporting information to the questions raised in the Qualitative Scoring Workbook;
- Completed electronic copy of the **Technical Bid Form Workbook**; and,
- Supplementary information described below.

Each bid shall be submitted in the format and quantities discussed in Section 2.9.2: Bid Submittal.

2.9.1.2. Responses and Supporting Information to Qualitative Questions

As part of their bid package, Bidders shall provide written responses and supporting information to answer each of the questions raised in the Qualitative Scoring Workbook on the tab marked Part 1- Qual Support References. The Bidders will then reference in the Qualitative Scoring Workbook, using the appropriate Section and/or page numbers, precisely where in their bid packages answers to each of the questions listed may be found.

2.9.1.3. Electronic Copies of the Bid Scoring Workbook

Bidders shall complete both the Qualitative Scoring Workbook and the Priced Proposal Workbook, **and must submit electronic copies of these two Workbooks separately from each other in clearly marked envelopes. Electronic copies should be provided on USB device. Files shall not be additionally electronically secured. Any security changes may delay evaluation.**

2.9.1.4. Supplementary Information

Bidders shall submit all the supplementary information required by the IFB documents. The supplementary information must be provided in sufficient detail and clarity to permit a complete comparison of the bids with the Technical Specifications. Volume II provides more detail on information

required for the Technical Qualification Proposals and Priced Proposals. The supplementary information included with each bid shall include the following:

1. Information requested in the Qualitative Scoring Workbook and in Volume II: Technical Qualification Requirements.

Submittal of the following supplementary information is mandatory and must be provided by the Bid Submittal Closing Date. **GPA shall automatically disqualify any bid submitted without the supplementary information listed below:**

2. A copy of the Bidder's Articles of Incorporation or other applicable forms concerning business organization (i.e. partnership, sole proprietorship, etc.) and By-Laws;
3. Affidavit of Disclosure of Major Shareholder (Appendix C);
4. Audited financial information for the last five years on Bidder's firm and all subcontractors that will be used in this contract. If they have one, Bidders must include their Dunn and Bradstreet Number or Other Major Credit Rating Agency rating, or comparable, independent verification of their credit standing.
5. Certificate of Good Standing to conduct business from the jurisdiction of their company's residence;
6. Non-collusion Affidavit (Appendix D);
7. Information regarding outstanding claims against the Bidder, if any;
8. Bid Bond (Appendix B);
9. A current Guam Business License is not required in order to provide a Bid for this engagement, but is a pre-condition for entering into a contract with the Authority. *NOTE: The successful bidder must furnish a current Guam Business License prior to contract execution;*
10. No Gratuities or Kickbacks Affidavit (Appendix J);
11. Ethical Standards Affidavit (Appendix K);
12. Declaration Re Compliance with U.S. DOL Wage Determination (Appendix L);
13. Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property (Appendix M);

2.9.2. Bid Submittal

2.9.2.1. Manual Options for Bid Submittal

Bidders may submit their bids via mail services (such as U.S. Postal Service, Federal Express or DHL) to the address provided in section 2.1.2. Bidders may also deliver bids at the GPA Procurement Office located at:

Guam Power Authority
Gloria B. Nelson Public Service Building
Procurement Office, Room No. 101
688 Route 15, Mangilao, Guam 96913

2.9.2.2. Non-repudiation Issues

GPA has structured its Manual IFB submittal procedures to ensure non-repudiation of the submitted bids. In this IFB, “non-repudiation” means strong and substantial evidence of the identity of the sender and owner of the bid and of bid’s integrity in so far as it being unaltered from its original sent state, sufficient to prevent a party from successfully denying the origin, submission or delivery of the bid and the integrity of its contents. Non-repudiation applies to both parties to this IFB transaction. It binds the sender as well as precludes the recipient from denying the exchange of information and material upon the receipt of secure acknowledgement from the recipient.

GPA and the Bidder shall manage the Manual IFB Submittal Process to address non-repudiation, security and confidentiality inclusive but not limited to the following:

- Manually executed signatures and printed media documents;
- Chain of custody receipts;
- Manual time-stamps for receipt of IFB materials;
- Machine generated Fax confirmation reports;
- Secure notification e-mail;
- Electronic Postings on the guampowerauthority.com domain;
- Physical delivery of printed material bids;
- Physically secured area storage of IFB materials.

2.9.2.3. Signature of Bidder

A duly authorized person must sign the Bidder’s bids. All names shall be typed or printed below the signature. A bid submitted by a corporation must bear the seal of the corporation, be attested to by its Secretary, and be accompanied by necessary Power-of-Attorney documentation.

Associated companies or joint ventures shall jointly designate one Power-of-Attorney person authorized to obligate all the companies of the association or joint venture. A bid submitted by a joint venture must be accompanied by the document of formation of the joint venture, duly registered and authenticated by a Notary Public, in which is defined precisely the conditions under which it will function, its period of duration, the persons authorized to represent and obligate it, the participation of the several firms forming the joint venture, the principal member of the joint venture, and address for correspondence for the joint venture. Bidders are advised that the joint venture agreement must include a clause stating that the members of the joint venture are severally and jointly bound.

All required bid documents must be submitted and received by the Procurement Office by the Bid Submittal Closing deadline.

2.9.2.4. Manual Bid Submittal Package Format and Handling

This section describes the bid package format and content required by GPA that is specific to manual submittal of bids. The Manual IFB Bid Submittal Process is characterized by a preponderance of the submitted material in tangible printed media form that is hand-delivered by an authorized agent of the Bidder to the Procurement Officer of the Guam Power Authority. Both the Bidders' agents and the GPA Procurement Officer are live human beings. In addition, both parties perform non-repudiation of the bid through the execution of manually executed signatures, seals and time stamps.

Bidders are required to submit one original and six (6) bound copies of their bid including one completed electronic copy on one disk of the Qualitative Scoring Workbook and one completed electronic copy on another disk of the Priced Proposal Workbook. The Bidders are advised to keep a copy of the completed Workbooks and test the electronic copies on disks prior to submitting them to GPA.

2.9.2.5. Marking and Packaging of Bids

As a general rule, the manually submitted Bids shall be packaged in separate sealed boxes with the following information clearly marked on the outside of the two largest sides:

- 1) "TECHNICAL QUALIFICATION PROPOSAL" OR "PRICED PROPOSAL"
- 2) "RENEWABLE RESOURCE ACQUISITION";
- 3) BIDDER'S NAME;
- 4) INVITATION FOR BID NUMBER;
- 5) CLOSING DATE and TIME (Guam Standard Time).
- 6) Addressed As follows:

ATTENTION: JOHN M. BENAVENTE
 GENERAL MANAGER, INTERIM
 GUAM POWER AUTHORITY
 POST OFFICE BOX 2977
 HAGATNA, GUAM 96932-2977

If the Bidder's submittal cannot fit within one box or if the Bidder chooses to submit more than one box, each box must be labeled as described above and with the following additional information:

- 7) Box Number Within the Set of Submitted Boxes
- 8) The Total Number of Boxes Submitted.

2.9.2.6. Receipt and Handling of Manually Submitted Bids

Upon receipt, each Bid submittal package will be time-stamped. The only acceptable evidence to establish the date and time of receipt at the GPA is the date/time stamp of the Guam Power Authority's procurement office on the wrapper or other documentary evidence of receipt maintained by GPA. Bids will be stored in a secure place until the date and time set for proposal opening.

GPA procurement personnel will stamp the outside of each package using the GPA Procurement time stamp and will officially log the date and time that each Bidder's sealed bid package is received.

2.9.3. Submittal Closing Date

The Technical Qualification Proposal Submittal Closing Date is **January 30, 2018, 4:00 P.M., Guam Standard Time**. Submitted proposals, excluding the Priced Proposals, will be opened at this time which

will initiate the proposal evaluation process. No proposals shall be accepted after the Bid Submittal Closing Date and Time.

2.9.4. Bid Changes During Bid Process

Changes may be made to the Technical Qualification Proposals(s) prior to the Bid Submittal Closing Date.

2.9.5. Evaluation of Technical Qualification Proposals

After the Bid Submittal Closing Date, GPA will evaluate the Technical Qualification Proposals and develop the QBL.

GPA will use the score from the Qualitative Scoring Workbook to evaluate the contents of bids and categorize each of the bids using one of the following designations:

- a. Acceptable—the Bidder will qualify for the QBL and its Priced Proposal may be considered
- b. Potentially Acceptable—the Bidder’s submittal has a reasonable possibility of being made acceptable; or
- c. Unacceptable—the Bidder’s submittal does not meet the requirements and will not be considered further.

The Procurement Officer shall record in writing the basis for finding an offer unacceptable and make it part of the procurement file.

The Procurement Officer may initiate Step Two if there are sufficient acceptable Technical Qualification Proposals to assure effective price competition in the second step without technical discussions. If the Procurement Officer finds that such is not the case, the Procurement Officer shall issue an amendment to this IFB or engage in technical discussions with Bidders as set forth below.

The Procurement Officer may conduct discussions with any Bidder who submits an acceptable or potentially acceptable technical Offer. During the course of such discussions, the Procurement officer shall not disclose any information derived from the Technical Qualification Proposals to any other Bidder. Once discussions are begun, any Bidder, who has not been notified that its Technical Qualification Proposal has been finally found acceptable, may submit supplemental information amending its Technical Qualification Proposal at any time. Such submission may be made at the request of the Procurement Officer or upon the Bidder’s own initiative.

2.9.5.1. Notice of Unacceptable Bid

A notice of unacceptability will be forwarded to the Bidder upon completion of the Technical Qualification Proposal evaluation and final determination of unacceptability. When the Procurement Officer determines a Bidder’s Technical Qualification Proposal to be unacceptable, such Bidder shall not be afforded an additional opportunity to supplement its offer.

2.10. Step Two Procedures.

Upon completion of Step One and the selection of qualified bidders, qualified bidders must submit their priced proposals. GPA will proceed with Step Two of the multi-step bid, which includes evaluation of the Priced Proposals and award of the contract(s).

2.10.1. Request for Priced Proposals and Performance Guarantees

Each Bidder from the QBL will be notified and GPA will open their Priced Proposals, which were submitted on compact disk in the MS EXCEL workbook titled Priced Proposal Workbook.xls. GPA will select a winning Bidder based on a comprehensive evaluation of the Priced Proposals, guarantees, and the resulting net present value of utility cost integrating each bid's Priced Proposal and generation profile as described in Volume IV: Bid Scoring Mechanism.

2.10.1.1. Bid Changes During Bid Process

Changes may be made to the Priced Proposals only prior to the Bid Submittal Closing Date.

2.10.1.2. Bid Validity

All price/cost data submitted with the Bidders' bids shall remain firm and open for acceptance for a period of **not less than eight (8) months after the Bid Submittal Closing Date**; thereafter, the Priced Proposal shall be subject to renewal by mutual agreement between the Bidder and GPA. The Bidder shall state the actual date of expiration in their Priced Proposal with their bid submittal.

2.10.2. Preliminary Examination of Priced Proposal

GPA will examine the Priced Proposal on the opening date to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Priced Proposals are generally in order.

Arithmetical errors will be rectified on the following basis. If there is discrepancy between the unit price and the total price, including any discounts, that is obtained by multiplying the unit priced and quantity, the unit price shall prevail and the total price shall be corrected. If the Bidder does not accept the correction of the error, its bid will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

2.10.3. Evaluation Criteria and Comparison of Priced Proposals

GPA will only evaluate and compare the Priced Proposals for Bidder's whose Technical Qualification Proposals were determined to be responsive to the IFB document requirements during Step One. GPA's evaluation of Priced Proposals shall compare the \$ per MWh Priced Proposals (as they apply to the expected energy production levels and Annual Minimum Quantity described in the Volume II: Technical Requirement) to GPA's cost to produce the same energy from its existing non-renewable resources. This evaluation method is explained in more detail in Volume IV: Bid Scoring Mechanism.

2.11. General Bid Guidelines and Requirements

2.11.1. Amendments to the IFB Document

GPA may elect to change the IFB documents in whole or in part. GPA shall send all Amendments to the IFB document recipients via fax and/or e-mail. In addition, GPA will make all Amendments available on the GPA Procurement Available Bids and RFPs website at http://guampowerauthority.com/gpa_authority/procurement/gpa_current_rfps.php

2.11.2. Proprietary Data

For the purposes of this IFB and submitted bids, the laws, rules and regulations of Territory of Guam concerning confidentiality shall govern. Bidders may designate those portions of the Bid that contain trade secrets or other proprietary data that are to remain confidential.

The Procurement Officer shall examine the bids to determine the validity of any request for nondisclosure of trade secrets and other proprietary data identified in writing. If the Bidder and GPA do not agree as to the disclosure of data, the Procurement Officer shall inform the Bidder in writing and in e-mail within five working days of the closing date for Bid submittal what portions of the Bid will be disclosed and that, unless the Bidder protests under the Conditions of Contract Disputes clause the information will be so disclosed. The bid shall be opened to public inspection subject to any continuing prohibition of the disclosure of confidential data.

2.11.3. Acceptance of Bids

GPA reserves the right to reject any or all bids and to waive minor errors, informalities, and discrepancies made by the Bidders if it appears in GPA's best interest to do so.

Any effort by a Bidder to influence GPA in the bid evaluation, bid comparison or contract award decisions may result in the rejection of the bid. Once GPA has arrived at a decision regarding the award of the contract, it will notify promptly the winning Bidder in writing.

2.11.4. IFB Cancellation or Delay

The Guam Power Authority reserves the right to delay award or to cancel the IFB, or to reject all bids or any individual bid in whole or in part, at any time prior to the final award. When the IFB is canceled or rejected prior to final award, notice of cancellation or rejection shall be sent to all Bidders and all bid materials will be promptly returned. The reasons for cancellation or rejection shall be made a part of the procurement file that is available for public inspection. After the Bid Submittal Closing Date, but prior to award, all bids may be rejected in whole or in part when the Procurement Officer determines that such action is in the Territory's best interest for reasons including but not limited to:

- a) The supplies and services being provided are no longer required;
- b) The IFB did not provide consideration of other factors of significance to the Territory;
- c) All otherwise acceptable bids received have clearly unreasonable price/cost data;
- d) There is reason to believe that the bids may not have been independently arrived at in open competition, may have been collusive and may have been submitted in bad faith;

Again, any individual bid may be rejected in whole or in part when in the best interest of the Territory.

2.11.5. Disqualification of Bidder

When, for any reason, collusion or other anticompetitive practices are suspected among Bidders or offerors, a notice of the relevant facts shall be transmitted to the Guam Attorney General. Bidders suspected of collusion or other anticompetitive practices may be suspended or debarred from participating in future procurement opportunities for a specified period.

2.11.6. False Statements In Bid

Bidders must provide full, accurate, and complete information as required by this IFB and its attachments. The penalty for making false statements in any bid or bid is prescribed in 18 U.S.C. 1001 and Title 9, Guam Code Annotated. Note, by use of a digital signature to sign the bid, the Bidder agrees that this act legally binds the Bidder to his bid.

2.12. Award of Contract

The contract will be awarded to the Bidder evaluated as being qualified and with the best-priced bid.

The successful Bidder will be notified in writing (letter or e-mail or fax) of the intent to award the contract, and will be required to send to GPA's offices, within ten (10) days of the date of receipt of such notice, a representative or representatives with proper Power-of-Attorney for the purpose of executing a contract with such alterations or additions thereto as may be required to adopt such contract to the circumstances of the bid.

The successful Bidder shall provide the required Performance Bond within **fourteen (14) days** of receipt of the GPA Notice of Intent to Award.

Failure on the part of the successful Bidder to provide a Performance Bond and/or to enter into a contract with GPA shall be sufficient grounds for the annulment of the award. The negotiations may then be resumed with the next most qualified Bidder.

2.13. Bid and Performance Bond Requirements

2.13.1. Bid Bond Form and Amount

A bid bond for an amount of \$ 150,000 (USD) for each submitted proposal is required and may be in the following form:

- a. Cash, Bank Draft or Certified Check made payable to the Guam Power Authority;
- b. By wire transfer to Guam Power Authority, Account No. 601-026246, Routing No. 121405115, Bank of Guam, P. O. Box BW, Hagatna, Guam 96910
- c. Letter of Credit;
- d. Surety Bond – valid if accompanied by:
 - (1) Current Certificate of Authority to do business on Guam issued by the Department of Revenue and Taxation;
 - (2) Power of Attorney issued by the Surety to the Resident General Agent

- (3) Power of Attorney issued by two (2) major officers of the Surety to whoever is signing on their behalf.

Bid Bonds, submitted as Bid Guarantee, without signatures and supporting documents are invalid and associated bids will be rejected.

If a Bidder desires to submit a bid bond with an acceptable bonding company, the Bidder must submit original copies of Appendix B.

For those Bidders not selected for award of contract, bid bonds will be refunded. For those Bidders selected for award of contract, bid bonds will be refunded once GPA has received their performance bond (see next Section 2.13.2). Any Bidder who is selected for award of contract but who is unable to fulfill the obligations of its respective bid(s) will permanently forfeit its bond(s) to GPA.

2.13.2. Performance Bond Form, Amount, and Duration

A performance bond shall be required from winning Bidders in the form as prescribed in Appendix F. For the period during construction and prior to the Commercial Operation Date of the project, the selected Bidder(s) shall provide a Development Security Bond which shall be in effect upon contract execution and until the Commercial Operation Date of the project and submission of the Contract Performance Bond. The amount of the Development security bond shall be 50% of the total projected payment for the 1st contract year based on the contractor's 1st Contract Year energy rate and the guaranteed energy production and shall be posted as a Letter of Credit or Cash.

At the beginning of the contract term, after the Commercial Operation Date, and at the beginning of each GPA Fiscal Year during which the contract is in effect, the Bidder shall provide and maintain a Contract Performance Bond performance bond in the amount equal to Cost for Minimum Annual Energy as described in the Draft Renewable Energy Purchase Agreement for that full or partial fiscal year within the term of the contract.

Upon submission of the Contract Performance Bond, the Development Security Bond can be returned. The selected bidder(s) may forfeit a portion or all of its Development Security if the selected bidder(s) fails to meet requirements as described in the Draft Renewable Energy Purchase Agreement (see Volume III).

If the Bidder is declared by GPA to be in default under the CONTRACT, GPA may exercise any or all rights and remedies it possesses under the provisions of the performance bond.

The GPA Fiscal Year begins on October 1 and ends on September 30 of the following calendar year.

2.13.3. Requirement for Performance Bond Execution by a Guam Licensed Surety Company

The Bidder shall provide a Performance Bond executed by a surety company licensed to do business on Guam.

3. Site Visits

This bid will require site visits to be conducted over two consecutive days. Site Visit #1 will be for the four (4) sites located on Naval Base Guam in Agat. Site Visit #1 requires security screening for the site visit. Bidders will be also required to be transported via bus from the Visitors Control Center to the Naval Base sites. Only bidders that have met the security clearance requirements from Navy and has a valid visitors pass will be allowed to board the bus for the site visit of these sites. Participants for the site visit are required and responsible to obtain security clearance. Note that there are restrictions to base visitor access. This includes restrictions on photography. Bidders must formally request for pictures or clarifications of the properties prior to the "Cut-Off Date for Receipt of Questions" deadline Section 1 Table 1: Bid Schedule of this document or as amended. GPA will be required to obtain these responses from Navy. Bidders must register and pay \$ **TBD** for Site Visit #1 by **TBD 12/7/17** to determine and secure transportation requirements.

Site Visit #2 of the South Finegayan site located on Route 3 in Dededo does not require security screening or coordinated transportation to the site. Participants to this Site Visit will meet GPA at the site as specified on the Bid Schedule. Additional information on the site visits will be provided during the Pre-Bid Conference.

4. Required Bid Forms

This Section describes the forms required for submission of the Bid.

The following forms in Appendices A, B, C, D, E, J, K, L and M and MS EXCEL Workbooks must be completed:

- a) Appendix A, Bid Checklists
- b) Appendix B, Bid Bond Form and Instructions Performance Bond
- c) Appendix C, Major Shareholders Disclosure Affidavit
- d) Appendix D, Non-collusion Affidavit
- e) Appendix E, Local Procurement Preference Application
- f) Appendix F, Performance Bond
- g) Appendix J, No Gratuities or Kickbacks Affidavit
- h) Appendix K, Ethical Standards Affidavit
- i) Appendix L, Declaration Re Compliance With U.S. DOL Wage Determination
- j) Appendix M, Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property
- k) Qualitative Scoring Workbook.xls
- l) Priced Proposal Workbook.xls

These Forms and Workbooks will be available in electronic format in the CD-ROM provided to Bidders and at the ftp site. Access information for the ftp site shall be provided upon registration and payment of the non-refundable fee.

In addition, Appendix Q, Site Access Security Application, is necessary to obtain required access for the Site #1 (Naval Base Guam) site visit. Each site visit participant is responsible to obtain necessary clearance prior to the scheduled Site #1 Visit. This process will not be handled by GPA.

4.1. Technical Bid Forms

The following referenced forms are contained in Appendices A, C, D, E, J, K, L and M, and shall be completed and submitted with the Bid.

4.1.1. Document Receipt Checklist

The Bidder shall complete Form A-1 by initialing the Invitation for Bid Documents received from Guam Power Authority, including the latest IFB Amendment received. This Form is an acknowledgement of receipt, review and understanding of the IFB documents.

4.1.2. Bid Submittal Checklist

The Bidder shall complete Form A-2. This Form provides an inventory of documents submitted by the Bidder in response to the Bid requirements.

4.1.3. Major Shareholders Disclosure Affidavit

Bidders shall fill out the Major Shareholders Disclosure Affidavit form in Appendix C and submit it with their bids.

4.1.4. Non-collusion Affidavit

Bidders shall fill out the Non-collusion Affidavit form in Appendix D and submit it with their bids.

4.1.5. Local Procurement Preference Application

Bidders shall fill out and sign the Local Procurement Preference Application in Appendix E and submit it with their bids.

4.1.6. No Gratuities or Kickbacks Affidavit

Bidders shall fill out and sign the No Gratuities or Kickbacks Affidavit in Appendix J and submit it with their bids.

4.1.7. Ethical Standards Affidavit

Bidders shall fill out and sign the Ethical Standards Affidavit in Appendix K and submit it with their bids.

4.1.8. Declaration Re Compliance with U.S. DOL Wage Determination

Bidders shall fill out and sign the Declaration Re Compliance with U.S. DOL Wage Determination in Appendix L and submit it with their bids.

4.1.9. Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property

Bidders shall fill out and sign the Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property Affidavit and submit it with their bids.

4.1.10. Local Procurement Preference Application

Bidders shall fill out and sign the Local Procurement Preference Application in Appendix E and submit it with their bids.

4.2. Price Bid Form

4.2.1. Fee & Evaluation Data

Bidders shall complete the Priced Proposal worksheet contained in the MS EXCEL Workbook Priced Proposal Workbook.xls and submit it in a sealed envelope which will only be opened when the Bidder has been deemed qualified through Step One of the multi-step bid process. This workbook outlines the Bidder's rate for energy delivered and the proposed plant's operating characteristics which will be used to determine total system costs.

5. Conditions of Contract

5.1. Definitions

Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof.

5.1.1. Approved

The word "Approved," when applied by ENGINEER to CONTRACTOR's drawings or documents, shall mean that the drawings or documents are satisfactory from the standpoint of interfacing with GPA-furnished components, and/or that ENGINEER has not observed any statement or feature that appears to deviate from the Specification requirements.

5.1.2. Approved As Revised

The words "Approved As Revised," when applied by ENGINEER to CONTRACTOR's drawings or documents shall mean that the drawings or documents are approved as defined above, except that the corrections shown are required for the proper interfacing with GPA-furnished components or are necessary to be in conformance with the Specification's requirements.

5.1.3. Change Order

A written instrument to CONTRACTOR signed by GPA authorizing an addition, deletion, or revision in the goods or special services, or an adjustment in the purchase order price or the delivery time, issued after the effective date of the Contract Agreement (Agreement).

5.1.4. Seller

The CONTRACTOR.

5.1.5. Day

A calendar day of twenty-four (24) hours measured from midnight to the next midnight

5.1.6. Delivery Time

The total number of days or the dates stated in the Agreement for furnishing the Goods and/or Special Services

5.1.7. Defective

An adjective which when modifying the words Goods or Special Services refers to Goods or Special Services which are unsatisfactory, faulty, deficient, do not conform to the Contract Documents, or do not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents.

5.1.8. Drawings

Drawings are all official drawings approved by the ENGINEER and showing the character and scope of the Goods to be furnished.

5.1.9. Effective Date of the Contract Agreement

The date indicated in the Purchase Agreement on which it becomes effective, or if no such date is indicated, the date by which the Purchase Contract is signed by both parties.

5.1.10. ENGINEER

Wherever the words "ENGINEER" or "ENGINEERS" appear in the CONTRACT Documents, it shall mean GPA's engineer duly appointed as "ENGINEER". GPA shall assign several ENGINEERS as required to cover specialized areas of expertise.

5.1.11. ENGINEER's Instructions

Written instructions issued by ENGINEER which clarify or interpret the CONTRACT Documents or order minor changes or alterations in the Goods or Special Services to be furnished but which do not involve a change in the Purchase Price or the Delivery Time.

5.1.12. General Manager

The General Manager is the Chief Executive Officer of the Guam Power Authority. The office and title of General Manager shall apply to any person acting in a regular or in an acting capacity as the Chief Executive Officer of the Guam Power Authority.

5.1.13. Goods

Shall refer to all energy production to be furnished by CONTRACTOR under the procurement documents.

5.1.14. Modification

A written amendment of the Purchase Agreement signed by both parties, or Change Order, or ENGINEER's Instructions.

5.1.15. OWNER

The Guam Power Authority (An autonomous instrumentality of the Government of Guam).

5.1.16. Point of Delivery

The place at which property in the goods shall pass to GPA.

5.1.17. Project

The plant, or facilities, that will generate energy required in contract

5.1.18. PURCHASER

The Guam Power Authority with whom CONTRACTOR has entered into the Contract Agreement.

5.1.19. Contract Agreement (Agreement)

The written agreement between GPA and CONTRACTOR covering the furnishing of the Goods, Special Services, and other services in connection therewith evidencing what is contemplated and agreed to between the parties including any other Contract Documents either attached to the Agreement or made a part thereof by reference therein.

5.1.20. Contract Documents

The Contract Agreement, Bonds (where required), these General Conditions, any Supplementary Conditions, the Specifications, the Drawings and any other documents specifically identified in the Contract Agreement, together with all Modifications issued after execution of the Contract Agreement.

5.1.21. Procurement Officer

The General Manager of the Guam Power Authority or the General Manager's designee.

5.1.22. CONTRACTOR

The Bidder with whom GPA has entered into the Contract Agreement.

5.1.23. SITE or Site

The SITE is the area where the Project is to be constructed or executed.

5.1.24. Territory

The Territory of Guam.

5.2. Agreement

Prior to entering into a formal agreement, GPA and CONTRACTOR shall resolve and document any differences between the CONTRACTOR's bid and the IFB documents. The Agreement between GPA and CONTRACTOR shall consist of the IFB documents, as resolved by the CONTRACTOR's final negotiated Bid and by GPA amendments, and the CONTRACTOR's bid, as adjusted by a prioritized list of documents generated during the evaluation and negotiation processes and agreed to and acknowledged in writing by both parties. These documents may consist of, but are not limited to, written answers to questions, letters, and written clarifications to the bid.

Any formal contract document shall reference GPA IFB documents and the CONTRACTOR's bid. No oral understanding or statement shall modify the Agreement. Changes to the above documents can only be made in accordance with the procedure for modifications as defined in [Section 5.14 Changes](#).

The resolved IFB documents shall take priority over and shall govern in all cases of conflict with the adjusted bid. The CONTRACTOR's contractual obligation shall be to fulfill all requirements of the IFB documents, as resolved, and to provide all features of the CONTRACTOR's bid, as adjusted.

The IFB documents are intended to be complementary, what is called for by one shall be as binding as if called for by all. If not otherwise specified in the IFB documents, these General Conditions shall apply. If, during performance of the Agreement CONTRACTOR detects a discrepancy in the IFB documents, CONTRACTOR shall so report to ENGINEER in writing at once and shall obtain a written interpretation or clarification from ENGINEER before proceeding further; however, CONTRACTOR shall not be liable to GPA for failure to report any conflict, error, or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

All materials, equipment, and services that may reasonably be inferred from the IFB documents, as being required to produce the intended result will be supplied whether or not specifically called for. When words that have a well-known technical or trade meaning are used to describe materials, equipment, or services, such words will be interpreted in accordance with such meaning. Reference to standard specifications, manuals, or codes of any technical society, organization or association, or to the code of any Governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, or code in effect on the effective date of the Agreement except as may be otherwise specifically stated in the Specification or Agreement. ENGINEER as provided in [Section 5.1.11 ENGINEER's Instructions](#) shall issue clarifications and interpretations of the IFB documents.

5.3. Indemnity

CONTRACTOR shall indemnify and hold GPA and ENGINEER harmless from any claim, liability or product liability, loss, damage, demand, cause of action or suit, expense, or fee of legal counsel arising out of or in connection with the Goods or Special Services provided by the CONTRACTOR.

5.4. Shipment, Delivery, and Acceptance of Goods

Shipment and delivery of the Goods shall be in accordance with this Paragraph except as otherwise provided or specified in the CONTRACT Documents.

All goods will be delivered at the point of delivery set forth in the Purchase Contract. CONTRACTOR shall select the means and methods of transportation. All charges necessary to effect shipment to the point of delivery, including but not limited to export packing, switching, trucking, lighter age, and special handling will be paid by CONTRACTOR.

GPA and/or ENGINEER reserve the right to inspect the Goods upon delivery for the purpose of identifying the Goods and general verification of quantities.

5.5. Accounting

For accounting purposes and for use in establishing property records, GPA may require CONTRACTOR to provide a reasonable price breakdown of the total price into separate prices applying to the individual items supplied under the Agreement.

Where the Agreement covers the reimbursement of the traveling or living expenses of the CONTRACTOR's employees or agents, the CONTRACTOR agrees to furnish complete itemization and breakdowns of such expenses when requested by GPA.

In the event of any changes to or termination of the Agreement, or the furnishing of goods or services on a labor hour or a cost reimbursable basis, CONTRACTOR shall supply information in such detail as may be reasonably required by GPA to support all applicable charges. GPA, or an independent auditor

designated by GPA, shall have the right to audit, during normal working hours, CONTRACTOR's accounts and records relating to such charges. The expense of such audit will be borne by GPA.

5.6. Waiver of Claims

The making and acceptance of final payment will constitute:

A waiver of all claims by GPA against CONTRACTOR, except claims arising from unsettled liens, claims relative to defective Goods appearing after final payment, or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; nor will final payment constitute a waiver by GPA of any rights in respect of CONTRACTOR's continuing obligations 'under the Procurement Documents; and

A waiver of all claims by CONTRACTOR against GPA other than those previously made in writing and still unsettled.

5.7. Supervision and Coordination by CONTRACTOR

CONTRACTOR shall competently and efficiently manage, supervise, and direct production of the Goods and furnishing of Special Services and coordinate all operations required to deliver the Goods and furnish any required Special Services.

CONTRACTOR shall designate, in writing to GPA, a person with authority to act on behalf of CONTRACTOR with respect to CONTRACTOR's obligations under the CONTRACT Documents, and all communications given to or received from that person will be binding on CONTRACTOR.

CONTRACTOR shall perform all such activities as an independent contractor and not as an agent of GPA. When others furnish materials and equipment for assembly by the CONTRACTOR, CONTRACTOR shall receive, unload, store, and handle it and become responsible therefore as though CONTRACTOR was furnishing such materials and/or equipment under the Agreement.

5.8. Substitutions

If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof certifying that the proposed substitute will perform adequately the function as called for by the general design, be similar and of equal substance to that specified, and be suited to the same use and capable of performing the same function as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's warranty or timely delivery of the Goods, whether or not acceptance of the substitute will require a change in any of the Contract Documents to adapt the design to the substitute and whether or not incorporation or use of the substitute in connection with the production of the Goods is subject to payment of any license fee or royalty.

All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair, and replacement service will be indicated. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense such additional data about the proposed substitute as is required by ENGINEER. GPA may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

5.9. Documentation and Drawings

The Agreement will not be deemed satisfactorily completed until all requirements have been complied with including, but not limited to, proper material documentation, final drawings and reproductions, and other requirements stated in the Contract Documents. GPA may withhold final payment hereunder, pending completion of all such requirements by the CONTRACTOR.

At the time of each submission, CONTRACTOR shall in writing call ENGINEER's attention to any deviations that the drawings or documents may have from the requirements of the Specification or Contract Documents. CONTRACTOR shall also direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals. CONTRACTOR's submission of any drawing or document bearing CONTRACTOR's approval shall constitute a representation to GPA and ENGINEER that CONTRACTOR assumes full responsibility for having determined and verified the design criteria, quantities, dimensions, installation requirements, materials, catalog numbers, and similar data and that CONTRACTOR has reviewed or coordinated each drawing or document with the requirements of the Contract Documents.

ENGINEER's review and approval of CONTRACTOR's drawings or documents will be only for conformance with the design concept of the Goods and for compliance with the information given in the Contract Documents. Such review and approval will not extend to design data reflected in drawings or documents that is peculiarly within the special expertise of CONTRACTOR or any party dealing directly with CONTRACTOR. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER when drawings or documents are marked "Approved As Revised" and shall return the required number of corrected copies.

GPA and/or ENGINEER shall have the right to reproduce any and all drawing, prints, or other data or documents received from CONTRACTOR that are considered necessary for engineering, construction, or other purposes, despite any notice to the contrary appearing on the item. When a drawing or document approval is required by the Specifications, CONTRACTOR shall not commence production of any part of the Goods affected thereby until such drawing or document has been reviewed and approved by ENGINEER.

ENGINEER's review and approval of CONTRACTOR's drawings or documents will not relieve CONTRACTOR from responsibility for any deviations from the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to such deviation at the time of submission and ENGINEER has given written concurrence and approval to the specific deviation, nor will any concurrence or approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the drawings or documents submitted.

5.10. Continuing Performance

CONTRACTOR shall continue its performance under the Agreement during all claims, disputes, or disagreements with GPA. Production of Goods will not be delayed or the timely delivery of Goods or furnishing of Special Services be prejudiced, delayed, or postponed pending resolution of any claims, disputes, or disagreements, except as CONTRACTOR and GPA may otherwise agree in writing.

5.11. Expediting

CONTRACTOR shall expedite delivery of the Goods and any related work of subcontractors. When requested or required by the Contract Documents, CONTRACTOR shall also provide GPA with an itemized schedule for engineering, outsourcing, fabrication, and shipping, which shall be followed by expediting reports including status of deliveries of materials and/or equipment purchased from subcontractors, if any, each month during its performance under the Agreement. If CONTRACTOR encounters delay in obtaining materials, or foresees any delay in its own manufacturing works, CONTRACTOR shall immediately inform GPA of such situation.

GPA and/or its designee shall be allowed reasonable access to CONTRACTOR's and its subcontractor's works for the purpose of expediting project progress. Any expediting done by GPA shall not relieve CONTRACTOR from its obligations as to the Delivery Time specified in the Agreement.

5.12. Compliance with Law

CONTRACTOR shall comply, and secure compliance by its subcontractors, with all applicable laws or regulations in connection with the Goods and services furnished hereunder. This includes the securing of any business or other licensing, certifications, or permits required.

If CONTRACTOR discovers any variance between the provisions of applicable laws and regulations and the drawings, Specifications, and other technical data furnished by the GPA, CONTRACTOR shall promptly notify GPA in writing thereof and obtain necessary changes from GPA before proceeding with the work affected thereby.

5.13. Price Adjustment

5.13.1. Price Adjustment Methods

Any adjustment in contract price within the parameters of this contract shall be made in one or more of the following ways:

- a) By agreement on a fixed price adjustment before commencement of the pertinent performance or as soon thereafter as practicable;
- b) By unit prices specified in the contract or subsequently agreed upon;
- c) By the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as specified in the contract or subsequently agreed upon;
- d) In such other manner as the parties may mutually agree; or
- e) In the absence of agreement between the parties, by a unilateral determination by the Procurement Officer of the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as computed by the Procurement

5.13.2. Submission of Cost or Pricing Data

The CONTRACTOR shall provide cost or pricing data for any price adjustments subject to the provisions of Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations in Appendix N.

5.14. Changes

5.14.1. Change Order

By a written order, at any time, and without notice to surety, the Procurement Officer may, subject to all appropriate adjustments, make changes within the general scope of this contract in any one or more of the following:

- a) Drawings, designs, or Specifications, if the supplies to be furnished are to be specially manufactured for the Territory in accordance therewith;
- b) Method of shipment or packing; or
- c) Place of delivery.

5.14.2. Time Period for Claim

Within 30 days after receipt of a written change order under [Paragraph 5.14.1 Change Order](#), unless the Procurement Officer extends such period in writing or e-mail, The CONTRACTOR shall file notice of intent to assert a claim for an adjustment. Later notification shall not bar the CONTRACTOR's claim unless the Territory is prejudiced by the delay in notification.

5.14.3. Claims Barred After Final Payment

No claim by the CONTRACTOR for an adjustment hereunder shall be allowed if notice is not given prior to final payment under this contract.

5.14.4. Other Claims Not Barred

In the absence of such a change order, nothing in this clause shall be deemed to restrict the CONTRACTOR's right to pursue a claim arising under the contract if pursued in accordance with the clause entitled, "Claims Based on the General Officer's Actions or Omissions, - Notice of Claim", or for breach of contract.

5.15. Contract Price

The Contract Price constitutes the total consideration to be paid by GPA to the CONTRACTOR for the complete delivery of the Goods, Special Services, and for performing other services in connection therewith in accordance with the Contract Documents as amended by the parties pursuant to the Agreement. Unless expressly provided otherwise in the Contract Documents, the Contract Price is not subject to escalation in respect of materials and/or labor cost or any other factor or variation in rates of exchange, and all duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR shall be at its expense without change in the Contract Price. Charges, fees, CONTRACTOR's profit, and all other expense shall be deemed to be included in the Contract Price.

5.16. Payment Milestones and Schedule

Payment milestones have been selected to clearly identify the actual status of the portion of the Work completed rather than anticipated project progress schedules. Payments will be based on actual completion of each milestone event, where applicable, and not on the scheduled completion date. When a change in the Agreement is approved, the total contract price will be altered to the new total, and the remaining milestone payments will be adjusted.

Milestones shall not be scheduled more frequently than once every month. GPA will not approve a milestone payment until all preceding milestones have been approved. GPA will make payments within thirty days from receipt and approval of the invoice for the completed milestone.

The payment milestones for monies due to the CONTRACTOR from GPA are as follows:

- Monthly invoice for Energy delivered at the contract price

The payment milestones for monies due to GPA from the CONTRACTOR are as follows:

- Penalty Payments due to liquidated damages from CONTRACTOR's failure to meet its original Commission Date.
- Penalty Payments due to CONTRACTOR's failure to meet its Guaranteed Minimum Annual Energy Production.

5.17. Force Majeure

Force Majeure referred to herein shall mean an occurrence beyond the control and without the fault or negligence of the party affected including, but not limited to, acts of God or the public enemy, expropriation or confiscation; changes in law procedures, war, rebellion, or riots; floods, unusually severe weather that could not reasonably have been anticipated; fires, explosions, epidemics, catastrophes, or other similar occurrences which are not within the control of the party affected. However, the following shall not be considered as Force Majeure:

- a) Delay caused by lack or inability to obtain raw materials, congestion at CONTRACTOR's or its subcontractor's facilities, or elsewhere; market shortages, or similar occurrences, or
- b) Delay, either on the part of the CONTRACTOR or its subcontractors, caused by shortages of supervisors or labor, inefficiency, or similar occurrences, or
- c) Sabotage, strikes, or any other concerted acts of workmen, which occur only in the facilities of the CONTRACTOR or its subcontractors.

Should the circumstances of Force Majeure continue over a period of ninety (90) days, GPA has the right, if no other understanding is reached, to terminate the whole Agreement or any part thereof in accordance with Paragraph 4.21. Any delay or failure in performing the obligations under the Contract Documents of the parties hereto shall not constitute default under the Purchase Contract or give rise to any claim for damages or loss or anticipated profits if, and to the extent, such delay or failure is caused by Force Majeure, and if a claim is made therefore.

5.17.1. Invocation of Force Majeure

The party invoking Force Majeure shall perform the following:

- a) Notify the other party as soon as reasonably possible by facsimile, e-mail, telex, cable or Messenger/courier of the nature of Force Majeure, anticipated exposure time under Force Majeure, and the extent to which the Force Majeure suspends the affected party's obligations under the CONTRACT;

- b) Consult with the other party and take all reasonable, prudent steps to minimize the losses of either party resulting from the Force Majeure;
- c) Resume the performance of its obligations as soon as possible after the Force Majeure condition ceases.

5.17.2. Delivery Time and Force Majeure

Only a Change Order may change contractual Delivery Times. The CONTRACTOR as provided in [Paragraph 5.14 Changes](#) and its sub-paragraphs shall file all claims for an extension in the Delivery Time.

The Delivery Time will be extended in an amount equal to time lost due to delays caused by Force Majeure if a claim is made therefore as provided in this Paragraph. No amendment to the Contract Price, however, shall be allowable because of Force Majeure occurrences.

Notwithstanding the foregoing, all time limits stated in the Purchase Order documents are of the essence in the agreement. The provisions of this Paragraph shall not exclude recovery for damages (including compensation for additional professional services) for delays not caused by Force Majeure.

5.18. Warranty

The CONTRACTOR'S obligation to furnish the Goods and Special Services and to perform other services in connection therewith in accordance with the Agreement is absolute, and the CONTRACTOR warrants and guarantees to GPA that all Goods will be in accordance with the Contract Documents and will be new, fit for the purpose for which they are intended, and free from any defects, including faulty design, materials, or workmanship.

The CONTRACTOR shall provide GPA with all warranties and guarantees in writing. GPA and the Bidder shall negotiate the manner in which claims against these warranties are addressed including any remedies for non-responsiveness. This may include retention of contract amounts, performance bonds, etc.

The CONTRACTOR shall be responsible for remedying all defects, without limitation, in design, materials, workmanship, operating characteristics, or performance of the Goods developing within twelve (12) months from the date on which GPA has placed the Goods in continuous service, or within twenty-four (24) months from the date of final payment, whichever date shall first occur, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or by any specific provisions of the Contract Documents.

Any part(s) supplied in replacement of the defective part(s) of the Goods or any Goods repaired pursuant to the provisions of this Paragraph shall be supplied or repaired on the same terms and conditions as provided for herein for the supply of the Goods and in particular a new warranty period shall apply. Such new warranty period shall expire on the date twelve (12) months from the date of such replacement or repair or on the expiration date of the warranty for the original Goods that were replaced or repaired, whichever is later.

In the event the CONTRACTOR furnishes special services for installation and startup, such services shall be rendered in a competent and diligent manner and in accordance with the Contract Documents, accepted industry practice and any applicable professional standards.

5.19. Tests and Inspections

GPA or its designee shall have the right to inspect or observe the production, inspection, or testing of the Goods at any time and place including the CONTRACTOR's facilities and those of its subcontractors where the Goods are being produced.

The CONTRACTOR shall conduct, at its responsibility and expense, all tests and inspections called for by the Contract Documents. In the event that witness inspection by GPA is required under the Contract Documents, the costs and expense arising therefrom shall be borne by the CONTRACTOR, including inspector's fees, transportation, hotel, and general flying expenses. In the event that CONTRACTOR's inspection is required at the site, CONTRACTOR's transportation, hotel, and general living expenses shall be borne by The CONTRACTOR.

Any inspection made by the inspector of GPA and/or its designee will be final. Such inspections or the witnessing of CONTRACTOR's test and inspection by GPA and/or its designee shall not relieve The CONTRACTOR of any of its responsibilities or liabilities under the Contract Documents, nor be interpreted in any way as implying acceptance of the Goods.

The CONTRACTOR shall repair and replace, without cost or delay, anything found defective by tests and inspections, and also to bear all costs of re-inspection.

The CONTRACTOR must carry out at its authority and expense any inspection required by statutory Authority, governmental regulation, or other similar Authority on the codes or standards.

5.20. Stop Work Order

5.20.1. Order to Stop Work

The Procurement Officer may, by written order to the CONTRACTOR, at any time, and without notice to any surety, require the CONTRACTOR to stop all or any part of the work called for by this contract. This order shall be for a specified period not exceeding ninety-days (90-days) after the order is delivered to the CONTRACTOR, unless the parties agree to any further period. Any such order shall be identified specifically as a stop work order issued pursuant to this clause. Upon receipt of such an order, the CONTRACTOR shall forthwith comply with its terms and take all reasonable steps to minimize the occurrence of costs allocable to the work covered by the order during the period of work stoppage. Before the stop work order expires, or within any further period to which the parties shall have agreed, the Procurement Officer shall either:

- a) Cancel the stop work order; or
- b) Terminate the work covered by such order, as provided in the 'Termination for Default Clause' or the 'Termination for Convenience Clause' of this contract.

5.20.2. Cancellation or Expiration of the Order

If a stop work order issued under this clause is canceled at any time during the period specified in the order, or if the period of the order or any extension thereof expires, the CONTRACTOR shall have the right to resume work. An appropriate adjustment shall be made in the delivery schedule or contract price shall be modified in writing accordingly, if:

- a) The stop work order results in an increase in the time required for, or in the CONTRACTOR's cost properly allocable to, the performance of any part of this contract; and
- b) The CONTRACTOR asserts a claim for such an adjustment within thirty (30) days after the end of the period of work stoppage; provided that, if the Procurement Officer decides that the facts justify such action, any such claim asserted may be received and acted upon at any time prior to final payment under this contract.

5.20.3. Termination of Stopped Work

If a stop work order is not canceled and the work covered by such order is terminated for default or Convenience, the reasonable costs resulting from the stop work order shall be allowed by adjustment or otherwise.

5.21. Termination for Convenience

5.21.1. Termination

The Procurement Officer may, when the interest of GPA or the Territory so require, terminate this contract in whole or in part, for the Convenience of the Territory. The Procurement Officer shall give written notice of the termination to the CONTRACTOR specifying the part of the contract terminated and when termination becomes effective. [GSA Procurement Regulations 6-101.10.] Please see APPENDIX N for a copy of GSA Procurement Regulations 6-101.10.

5.21.2. CONTRACTOR's Obligations

The CONTRACTOR shall incur no further obligations in connection with the terminated work and on the date set in the notice of termination the CONTRACTOR will stop work to the extent specified. The CONTRACTOR shall also terminate outstanding orders and subcontracts as they relate to the terminated work. The CONTRACTOR shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated work. The Procurement Officer may direct the CONTRACTOR to assign the CONTRACTOR's right, title, and interest under terminated orders or subcontracts to the GPA. The CONTRACTOR must still complete the work not terminated by the notice of termination and may incur obligations as are necessary to do so.

5.21.3. Right to Supplies

The Procurement Officer may require the CONTRACTOR to transfer title and deliver to GPA in the manner and to the extent directed by the Procurement Officer:

- a) Training material;
- b) Any completed supplies; and,
- c) Such partially completed supplies and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information and contract rights (hereinafter called "manufacturing material") as the CONTRACTOR has specifically produced or specially acquired for the performance of the terminated part of this contract.

The CONTRACTOR shall, upon direction of the Procurement Officer, protect and preserve property in the possession of the CONTRACTOR in which the Territory has an interest. If the Procurement Officer does not exercise this right, the CONTRACTOR shall use best efforts to sell such supplies and manufacturing materials in accordance with the standards of **Uniform Commercial Code of Guam (UCCG), Section 2706**. Utilization of this Section in no way implies that the Territory has breached the contract by exercise of the Termination for Convenience Clause.

5.21.4. Compensation Under Termination for Convenience

The CONTRACTOR shall perform the following for compensation under termination for convenience.

- a) The CONTRACTOR shall submit a termination claim specifying the amounts due because of the termination for Convenience together with cost or pricing data to the extent required by **Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations** bearing on such claim. If the CONTRACTOR fails to file a termination claim within one year from the effective date of termination, the Procurement Officer may pay the CONTRACTOR, if at all, an amount set in accordance with subparagraph (c) of this Paragraph. Please see APPENDIX N for a copy of **Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations**.
- b) The Procurement Officer and the CONTRACTOR may agree to a settlement provided the CONTRACTOR has filed a termination claim supported by cost or pricing data to the extent required by **Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations** and that the settlement does not exceed the total contract price plus settlement costs reduced by payments previously made by GPA, the proceeds of any sales of supplies and manufacturing materials, and the contract price of the work not terminated.
- c) Absent complete agreement under Subparagraph (b) of this Paragraph, the Procurement Officer shall pay the CONTRACTOR the following amounts, provided payments agreed to under Subparagraph (b) shall not duplicate payments under this subparagraph:
 - i. Contract prices for supplies or services accepted under the contract;
 - ii. Costs incurred in preparing to perform and performing the terminated portion of the work plus a fair and reasonable profit on such portion of the work (such profit shall not include anticipatory profit or consequential damages) less amounts paid or to be paid for accepted supplies or services; provided, however, that if it appears that the CONTRACTOR would have sustained a loss if the entire contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss;
 - iii. Costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to [Paragraph 5.21.2 Contractor's Obligations](#) of this clause. These costs must not include costs paid in accordance with other subparagraphs of this Paragraph;
 - iv. The reasonable settlement costs of the CONTRACTOR including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract for the termination and settlement of subcontracts there under, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of

property allocable to the terminated portion of this contract. The total sum to be paid to the CONTRACTOR under this Subparagraph shall not exceed the total contract price plus the reasonable settlement costs of the CONTRACTOR reduced by the amount of payments otherwise made, the proceeds of any sales of supplies and manufacturing materials under subparagraph (b) of this Paragraph, and the contract price of work not terminated.

- d) Cost claimed, agreed to, or established under subparagraph (b) and (c) of this Paragraph shall be in accordance with **Chapter 7 (Cost Principles) of the Guam Procurement Regulations. 13 GCA 2796 (UCCG)** states:

2706. SELLER's Resale Including contract for Resale

- (1) Under the conditions stated in **Section 2703** on CONTRACTOR's remedies, the CONTRACTOR may resell the goods concerned or the undelivered balance thereof. Where the resale is made in good faith and in a commercially reasonable manner the CONTRACTOR may recover the difference between the resale price and the contract price together with an incidental damages allowed under the provisions of this division (Section 2710), but less expenses saved in consequence of the buyer's breach.
- (2) Except as otherwise provided in Subsection (3) or unless otherwise agreed resale may be at public or private sale including sale by way of one or more contracts to sell or of identification to an existing contract of the CONTRACTOR. Sale may be as a unit or in parcels and at any time and place and on any terms, but every aspect of the sale including the method, manner, time, place and terms must be commercially reasonable. The resale must be reasonably identified as referring to the broken contract, but it is not necessary that the goods be in existence or that any or all of them have been identified to the contract before the breach.
- (3) Where the resale is at private sale the CONTRACTOR must give the buyer [i.e., GPA] reasonable notification of his intention to resell.
- (4) Where the resale is at public sale:
 - (1) Only identified goods can be sold except where there is a recognized market for a public sale of futures in goods of the kind; and
 - (2) It must be made at a usual place or market for public sale if one is reasonably available and except in the case of goods which are perishable or threaten to decline in value speedily the CONTRACTOR must give the buyer [i.e., GPA] reasonable notice of the time and place of the resale; and,
 - (3) If the goods are not to be within the view of those attending the sale, the notification of sale must state the place where the goods are located and provide for their reasonable inspection by prospective Bidder s; and
 - (4) The CONTRACTOR may buy.

- (5) A purchaser who buys in good faith at a resale takes the goods free of any rights of the original buyer [i.e., GPA] even though the CONTRACTOR fails to comply with one or more of this section's requirements.
- (6) The CONTRACTOR is not accountable to the buyer [i.e., GPA] for any profit made on any resale. A person in the position of a CONTRACTOR (**Section 2707**) or a buyer who has rightfully rejected or justifiably revoked acceptance must account for any excess over the amount of his security interest, as hereinafter defined (Subsection 3) of Section 2711."

5.22. Termination for Defaults

5.22.1. Default

If the CONTRACTOR refuses or fails to perform any of the provisions of this contract with such diligence as will ensure its completion within the time specified in this contract, or any extension thereof, otherwise fails to timely satisfy the contract provisions, or commits any other substantial breach of this contract, the Procurement Officer may notify the CONTRACTOR in writing of the delay or non-performance and if not corrected in ten days or any longer time specified in writing by the Procurement Officer, such officer may terminate the CONTRACTOR's right to proceed with the contract or such part of the contract as to which there has been delay or a failure to properly perform. In the event of termination in whole or in part the Procurement Officer may procure similar supplies or services in a manner and upon terms deemed appropriate by the Procurement Officer. The CONTRACTOR shall continue performance of the contract to the extent it is not terminated and shall be liable for excess cost incurred on procuring similar goods or services.

5.22.2. CONTRACTOR's Duties

Notwithstanding termination of the contract and subject to any directions from the Procurement Officer, the CONTRACTOR shall take timely, reasonable, and necessary action to protect and preserve property in the possession of the CONTRACTOR in which GPA has an interest.

5.22.3. Compensation

Payment for completed supplies delivered and accepted by the GPA shall be at the contract price. Payment for the protection and preservation of property shall be in an amount agreed upon by the CONTRACTOR and the Procurement Officer; if the parties fail to agree, the Procurement Officer shall set an amount subject to the CONTRACTOR's rights under Chapter 9 (Legal and Contractual Remedies) of the Guam Procurement Regulations. The GPA may withhold from amounts due the CONTRACTOR such sums as the Procurement Officer deems to be necessary to protect the GPA against loss because of outstanding liens or claims of former lien holders and to reimburse the PURCHASER for the excess costs incurred in procuring similar goods and services.

5.22.4. Excuse for Nonperformance or Delayed Performance

Except with respect to defaults of subcontractors, the CONTRACTOR shall not be in default by reason of any failure in performance of this contract in accordance with its terms (including any failure by the CONTRACTOR to make progress in the prosecution of the work hereunder which endangers such performance) if the CONTRACTOR has notified the Procurement Officer within fifteen (15) days after the cause of the delay and the failure arises out of causes such as: acts of God; acts of the public enemy;

act of the Territory and any other governmental entity in its sovereign restrictions; strikes or other labor disputes; freight embargoes; or unusually severe weather. If the failure to perform is caused by the failure of a subcontractor to perform or to make progress, and if such failure arises out of causes similar to those set forth above, the CONTRACTOR shall not be deemed to be in default, unless the supplies or services to be furnished by the subcontractor were reasonably obtainable from other sources in sufficient time to permit the CONTRACTOR to meet the contract requirements. Upon request of the CONTRACTOR, the Procurement Officer shall ascertain the facts and extent of such failure, and, if such officer determines that any failure to perform was occasioned by any one or more of the excusable causes, and that, but for the excusable cause, the CONTRACTOR's progress and performance would have met the terms of the contract, the delivery schedule shall be revised accordingly, subject to the rights of the GPA under the clause entitled "Termination For Convenience", Paragraph 5.21. (As used in the Paragraph of this clause the term "subcontractor" means subcontractor at any tier.)

5.22.5. Erroneous Termination for Default

If, after notice of termination of the CONTRACTOR's right to proceed under the provisions of this clause, it is determined for any reason that the CONTRACTOR was not in default under the provisions of this clause, or that the delay was excusable under the provisions of Paragraph 5.22.4 (Excuse for Nonperformance or Delayed Performance) of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for Convenience of GPA, be the same as if the notice of termination had been issued pursuant to such clause. If, in the foregoing circumstances, this contract does not contain a clause providing for termination for Convenience of GPA, the contract shall be adjusted to compensate for such termination and the contract modified accordingly subject to the CONTRACTOR's rights under Chapter 9 (Legal and Contractual Remedies) of the Guam Procurement Regulations.

5.22.6. Additional Rights and Remedies

The rights and remedies provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

5.23. Disputes

All controversies between GPA and the CONTRACTOR, which arise under, or are by virtue of, this contract and which are not resolved by mutual agreement, shall be resolved under Guam Procurement Law and the Government Claims Act.

5.24. Consequential Damages

Unless expressly provided for otherwise in this Agreement, neither party, including their agents and employees, shall be liable to the other party for consequential damages, including, but not limited to, loss of use, loss of profit and interest due to breach of contract, breach of warranty, negligence, or any other cause whatsoever, provided nothing herein shall relieve CONTRACTOR from its liability for injury to persons or property, including property of GPA, whether such liability arises in contract, including breach of warranty, or tort, including negligence.

5.25. Notices

Whenever any provision of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to

an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

5.26. Computation of Time

When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the time computation.

5.27. Language and Trade Terms

All communications, documents, and execution of services hereunder, unless otherwise designated, shall be in the English language. INCOTERMS (International Rules for the Interpretation of Trade Terms) published by the International Chamber of Commerce in 1980 and any subsequent revisions thereto shall govern interpretation of trade terms in the Contract Documents

5.28. Governing Law

The laws of Guam shall govern the validity and interpretation of these conditions, the Agreement and legal relations of the parties.

CONTRACTOR shall not transfer or assign without the prior written consent of GPA. The Draft Power Purchase Agreement in Volume III of this bid, Article Eleven, outlines requirements for assignment.

CONTRACTOR shall not sublet the Agreement in whole or in part without the prior written consent of GPA. Written consent of GPA for subletting shall not relieve CONTRACTOR of any of his obligations under the Agreement.

5.29. Non-waiver

GPA shall not consider any provisions of this Agreement waived unless GPA gives notice of such waiver in writing. Even if such notice has been given, such waiver shall not be construed as being a waiver of any other past or future right of GPA under the provisions of this Agreement, unless otherwise expressly stipulated therein. Failure of GPA to insist upon strict performance of any of the terms and conditions hereof, or failure or delay of GPA to insist upon strict performance of any of the terms and conditions hereof, or failure or delay of GPA to exercise any acts, rights, or remedies provided herein or by law shall not relieve CONTRACTOR of liability under any guarantees or of obligations under the Agreement and shall not be deemed a waiver of any right of GPA to insist upon strict fulfillment of the Agreement or of any of GPA's rights or remedies as to the Goods furnished.

5.30. Severability

If any work, phrase, clause, article, or other provision of this Agreement is or is deemed or adjudicated or otherwise found to be against public policy, void, or otherwise unenforceable, then said work, phrase, clause, article, or other provision shall be deleted or modified, in keeping with the express intent of the parties hereto as necessary to render all the remainder of this Agreement valid and enforceable. All such deletions or modifications shall be the minimum necessary to effect the foregoing.

5.31. Rights and Remedies

The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, will be in addition to, and shall not be construed in any way as a limitation of any rights and remedies available to any or all of them which are otherwise imposed or available by law or contract, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply. All representations, warranties, and guarantees made in the Contract Documents will survive final payment and termination or completion of this Agreement.

5.32. Claims based on the General Manager's Action or Omissions

If any action or omission on the part of the General Manager, or his/her designee, requiring performance changes within the scope of the contract constitutes the basis for a claim by the CONTRACTOR for additional compensation, damages, or an extension of time for completion, the CONTRACTOR shall continue with performance of the contract in compliance with the directions or orders of such officials, but by so doing, the CONTRACTOR shall not be deemed to have prejudiced any claim for additional compensation, damages, or an extension of time for completion; provided:

- (1) The CONTRACTOR shall have given written notice to the General Manager, or his/her designee:
 - i. Prior to the commencement of the work involved, if at that time the CONTRACTOR knows of the occurrence of such action or omission;
 - ii. Within thirty (30) days after the CONTRACTOR knows of the occurrence of such action or omission, if the CONTRACTOR did not have such knowledge prior to the commencement of the work; or
 - iii. Within such further time as may be allowed by the Procurement Officer in writing. This notice shall state that the CONTRACTOR regards the act or omission as a reason that may entitle the CONTRACTOR to additional compensation, damages, or an extension of time. The Procurement Officer or designee of such officer, upon receipt of such notice, may rescind such action, remedy such omission, or take such other steps as may be deemed advisable in the discretion of the Procurement Officer or designee of such officer.
- (2) The notice required by subparagraph (1) of this Paragraph describes as clearly as practicable at the time the reasons why the CONTRACTOR believes that additional compensation, damages, or an extension of time may be remedies to which the CONTRACTOR is entitled; and
- (3) The CONTRACTOR maintains and, upon request, makes available to the Procurement Officer within a reasonable time, detailed records to the extent practicable, of the claimed additional costs or basis for an extension of time in connection with such changes.

5.32.1. Limitations of Clause

Nothing herein contained shall excuse the CONTRACTOR from compliance with any rules of law precluding GPA and its officers and any CONTRACTORS from acting in collusion or bad faith in issuing or performing change orders that are clearly not within the scope of the contract.

5.33. Standard Work Schedule

Work scheduled and performed by the CONTRACTOR on GPA's premises shall conform to published GPA working hours and shall account for GPA's observed holidays.

5.34. Interference with Operation

Interference with normal operation of GPA's facilities or equipment, or that of any CONTRACTORS or subcontractors on GPA's premises, shall be avoided. The GPA's representative will determine in advance whether such interference is unavoidable and will establish the necessary procedures under which the interferences will be allowed.

5.35. Release of Information

The CONTRACTOR shall not release any information, including the contract price concerning this project or any part thereof in any form, including advertising, news releases, or professional articles, without written permission of GPA.

5.36. Liens

In the event that a lien of any nature shall at any time be filed against the hardware, firmware, or software or the CONTRACTOR's facility by any person, firm, or corporation which has supplied material or services at the request of the CONTRACTOR, and for the cost of which the CONTRACTOR is liable under the terms of the Agreement, the CONTRACTOR agrees, promptly on demand of GPA and at the CONTRACTOR's expense, to take any and all action necessary to cause any such lien to be released or discharged therefrom. The CONTRACTOR agrees to hold GPA harmless from all liens, claims, or demands in connection with the Work.

5.37. Insurance

Contractor shall not commence work under this contract until he has obtained all insurance required under this section and GPA has approved such insurance, nor shall the Contractor allow any Subcontractor to commence work on this subcontract until all similar insurance required of the Subcontractor has been so obtained and approved. He shall maintain all insurance required during the course of the work.

5.38. Contractors and Subcontractors Insurance

Prior to commencing the work, which includes construction and operation activities, contractor shall obtain and thereafter maintain during the course of the work Insurance with companies acceptable to GPA. The contractor shall not allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. The limits of insurance shall be as follows unless a higher limit is required by statute:

1. General Liability including products, completed operations and contractual coverage for this Agreement in the amount of \$1,000,000 combined limit. Owner shall be an additional insured. Grant Waiver of Subrogation in favor of GPA.
2. Auto Liability covering bodily injury and property damage in the amount of \$1,000,000 combined single limit. Owner shall be an additional insured. Grant Waiver of Subrogation in favor of GPA.

3. Excess Liability with limits of \$5,000,000 or higher. Owner shall be an additional insured. Grant Waiver of Subrogation in favor of GPA.
4. Worker's Compensation and Employer's Liability – Statutory limits. Add Waiver of Subrogation endorsement in favor of GPA
5. Builder's Risk or Installation Floater, when applicable, is to be furnished by Contractor.
6. Pollution Liability, when applicable, with limits of \$5,000,000. GPA is to be an additional insured. Grant Waiver of Subrogation in favor of GPA.
7. Property insurance with replacement cost limits for the premises, property, improvements, structures, and machinery and equipment on the Premises
8. Business Income and Extra Expense with a \$3,000,000 limit or whatever is deemed appropriate by GPA upon award.

5.38.1. Indemnification

The Contractor shall indemnify, defend and hold harmless GPA against all loss, damage, or expense (including reasonable attorney's fees incurred by GPA) arising out of the performance of the work, including injury or death to any person or persons resulting from the acts or omission of the Contractor or the Contractor's employees, servants, agents or subcontractors and from mechanics and materialism liens

5.38.2. Certificate of Insurance

Contractor shall furnish certificates of insurance and waiver of subrogation endorsement to GPA prior to commencement of work showing evidence of such coverage, including the statement to the effect that cancellation or termination of the insurance shall not be effective until at least (30) days after receipt of written notice to GPA. At all times Contractor's insurance shall be primary to any other insurance that may be carried by GPA. The statement of limits of insurance coverage shall be construed as in any way limiting the Contractor's liability under this agreement. GPA shall be an additional insured on all liability coverage and certificates of insurance shall clearly indicate such.

5.38.3. Insurance Company and Agent

All insurance policies herein required of the Contractor shall be written by a company duly authorized and licensed to do business in the State or Territory where work under this contract is being performed and be executed by some agent thereof duly licensed as an agent in said State or Territory.

5.38.4. Waiver of Subrogation

Contractor hereby releases GPA and their respective officers, employees, and agents from all loss or damage to the Premises and to the fixtures, personal property, equipment and improvements of Contractor in or on the Premises, notwithstanding that any such loss or damage may be due to or result from the negligence of GPA or their respective officers, employees or agents.

INVITATION FOR MULTI-STEP BID

NO.: GPA-007-18

RENEWABLE ENERGY RESOURCE

PHASE III



Volume II

Technical Qualification Proposal Requirements

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1. OVERVIEW

In this Invitation for Multi-Step Bid (“IFB”), GPA is seeking competitive bids for renewable energy resources to meet a portion of its overall resource needs. For selected Bidder(s), GPA will execute purchase power agreements for delivery of renewable to the 34.5 kV GPA transmission system. GPA intends to procure a total of 40 MW (AC) renewable capacity, based on proposed sites, in this Phase II acquisition that can meet the following established requirements:

1. The Bidder’s renewable resource project shall have a maximum export capacity 30 MW (AC) at the interconnection point; this may be the combination of several generation units at one site.
2. The renewable energy project must provide a dispatchable reactive capability requirement up to 0.95 lag to lead at the point of interconnection as required by GPA Power System Operators or SCADA Control Point. For example, in the course of normal operations, the renewable energy resource may be called to provide electric power range from 28.5 MW and - 9.4 MVARs through 30 MW at Unity Power Factor to 28.5 MW and 9.4 MVARs. The project shall perform at +/- 0.95 PF dynamic range up to and including the maximum MW output, and shall not reduce reactive capability near the peak real power output.
3. The renewable generation ramp limit shall be 1% of the project nameplate capacity per minute. This shall be the net ramp rate including the benefit of an energy storage system if needed.
4. The renewable energy project shall incorporate an energy storage system (ESS) that will meet GPA’s requirements as described in section 2.2.
5. The ESS must provide the following functions:
 - o The primary purpose of the ESS shall be for energy shifting which is to deliver the solar produced energy at another time or period of the day.
 - o The additional function of the ESS shall be Renewable integration (RI-ESS). If and when required, i.e. GPA allows delivery directly to the grid, the RI-ESS must provide the following functions:
 - i. Significantly reduce the impact of intermittent (“non-firm”) renewable energy generation power fluctuations on GPA’s power system frequency and voltage at the point of interconnection
 - ii. Achieve this by providing a supporting energy storage system to quickly respond to the variable renewable generation output and ameliorate the power imbalance within GPA’s power grid or an assigned local microgrid.
 - iii. Providing highly reliable fault recovery and optimizing power distribution
 - iv. Provide a dispatchable reactive capability as required by GPA Power System Control Center Dispatchers.

Persons or entities responding to this IFB are referred to herein as “Bidder(s).”

2. PRODUCT DESCRIPTION

The bids for renewable resources shall be developed based on the requirements described below and outlined in the Qualitative Scoring Workbook provided with the bid documents.

2.1. Product and Term

GPA seeks to acquire energy from renewable resource projects based on an ‘annual minimum quantity’ of energy under the terms of the Renewable Energy Purchase Agreement (See Volume III).

Projects in this acquisition phase are required to be operational and delivering renewable energy on or before 36 months from the contract award date. The term of the Renewable Energy Purchase Agreement will be 20 years. Prior to the expiration of the twenty-year contract period, GPA may extend the contract for two (2) additional five-year terms.

2.2. Technology

2.2.1. Acceptable Renewable Technologies

Only Solar Photovoltaic systems shall be proposed for this bid. Under no circumstances will energy from non-renewable resources be acceptable for delivery under the proposed agreement.

2.2.2. Acceptable ESS Technologies

Acceptable ESS technologies in this IFB include batteries, flywheels, pumped hydroelectric storages, thermal and compressed air energy storages.

2.2.2.1 ESS Technical Requirements

ESS shall have 1% ramp rate control per minute of the project nameplate renewable capacity with the guaranteed success rate for the contract period.

a. Real Power and Energy Requirements

The fully functional operating range of the ESS, with respect to energy, is defined in this specification as 0-100% State of Charge (SOC). This means that if the Bidder's proposed system is recommended or required to operate within the ESS manufacturer's stated specifications with a minimum SOC greater than 0% or a maximum charge less than 100%, then the Bidder must adjust the manufacturer's stated specifications to the fully functioning operating range of the ESS. For instance, if the manufacturer's specifications recommend operating the ESS within the range of 10-90% SOC, the total amount of available energy must be reduced by 20% to correspond to the 0-100% SOC range as defined for this IFB.

b. Reactive Power Requirements

The ESS shall have the capability to output up to the nominal real power capacity magnitude on a continuous basis. The real power order of the ESS shall take priority over the reactive power order. If the nominal real power capacity rating cannot be met, Bidders are encouraged to describe the reactive power capabilities of their proposed system and provide a reactive power capability curve. The RI-ESS must provide a dispatchable reactive capability as required by GPA Power System Control Center Dispatchers. The Reactive and Real Power Capability must be communicated to the GPA SCADA Master every two (2) seconds.

c. Response Times

The ESS shall have the ability to change its output power from 0-100% of its maximum overload rating within 200 ms. this includes positive and negative real and reactive power.

d. Ride-through and Synchronization Capabilities

The ESS shall have the ability to remain online and functional during severe disturbances. The ESS shall not lose synchronism or trip offline for disturbances that the ESS is intended to mitigate. This includes the requirement to ride through rapid rate of change of frequency events and to ride through zero or near zero voltage events with recovery as the voltage recovers. All limitations related to the ride-through and synchronism capabilities of the ESS shall be stated. The ESS must continue to conduct, and not cease to conduct for any reason when the system is operating within the ride-through settings.

Preliminary frequency and control requirements are illustrated in Table 1 below. The provided ride-through requirements are preliminary in nature. The ESS voltage and frequency trip settings should have configurable settings. If ESS is capable of riding through system disturbances beyond the limits specified in the voltage and frequency ride-through requirements, please provide an explanation of the ride-through capabilities of the ESS.

Table 1 – Voltage and Frequency Ride-through Settings

	Settings at Point of Interconnection (34.5 kV) (V is magnitude in per unit) (F is frequency in Hz) (T is time in seconds)	
	Setpoint	Trip Time
Under-voltage	$V < 0.88$	$T > 2.00$
Normal voltage	$0.88 < V < 1.10$	no trip allowed
Over-voltage	$1.10 < V < 1.20$	$T > 2.00$
Over-voltage	$1.20 < V$	$T > 0.16$
Under-frequency	$F < 57.0$	$T > 0.16$
Normal frequency	$57.0 < F < 63.0$	no trip allowed
Over-frequency	$63.0 < F$	$T > 0.16$

e. Control Functions

It is important for Bidders to describe and illustrate the control modes and methods of operation proposed. The flexibility of the ESS controls shall also be discussed and provide indication of the ease of control system changes such as adding new control modes and methods of operation.

f. SCADA/EMS/SA/AGC Communications Protocol

The ESS shall have the capability to interface with GPA's SCADA, EMS, Substation Automation (SA) and AGC systems over the latest stable release of serial and IP based DNP 3-Secure Authentication communications protocol.

GPA requires the project control system to report each inverter failure or cessation to the GPA SCADA system. The controller will report any alarm that can lead to a system or individual converter cessation or tripping to the GPA SCADA system. The controller will report all delivered power to GPA from the PV system, curtailed power from the PV system, ESS charging power, ESS power, (real and reactive) delivered to GPA, ESS state charge.

The technology proposed for the ESS will have at least 1 year of commercial operations history in a utility environment.

Bidder shall provide Bidder's guaranteed success rate according to the size of ESS in the Qualitative Scoring Workbook. The bidder shall also describe the method of calculating and monitoring the success rate in his/her technical proposal.

2.2.3. Proven Technology

The proposed resource technology and key components must have a minimum of one (1) year of operating experience in commercial utility application. If the proposed technology is a "scale up" of an existing facility, the operational performance data for the smaller plant must be at least 1/10 the proposed plant size or larger.

2.2.4. Use of GPA Facilities

GPA has secured six sites for Solar PV development from the U.S. Department of Navy which shall be the sites for proposed renewable resource projects. The sites are listed in Table 2 below.

Table 2 - GPA-Navy Leased Sites

No	Site Reference	Location	Acres	Est. MW
1	PV (Existing 250 KW PV Site)	Naval Base Guam	31	8
2	CDF		21	5
3	WWTP (Waste Water Treatment Plant)		16	4
4	Commissary		25	6
5	S. Finegayan	Rt. 3	71	18
Total :			164	41

The draft legal descriptions and sketches which have been referenced in the GPA-Navy lease are provided in Volume III Appendix L. GPA intends to finalize these documents prior to contract award.

The use of other GPA sites or facilities (with the exception of interconnection facilities) will **NOT** be permitted in this IFB.

2.2.5. Limits on Renewable Energy Purchases

Due to the nature of the generation control system and related response characteristics of the generators on the GPA system, GPA may limit the amount of energy delivered from renewable resources to no more than 30MW (AC) at the interconnection point.

The Bidder shall complete the Energy Projection table in the Technical Bid Form providing its estimated schedule of hourly deliveries of energy for a representative period of time period sufficient for GPA to understand the variability of the expected renewable resource and the impact of total generation costs as part of the Priced Offer evaluations. These estimates must match the annual Minimum Energy Production guarantees discussed further in Section 2.3.

2.3. Project Capacity & Production

2.3.1. Minimum and Maximum Project Capacity

There is no minimum nameplate project capacity that a Bidder may offer, however the maximum export capacity shall be 30 MW. This may be the combination of several generation units at one site.

2.3.2. Annual Minimum Guaranteed Production Quantity

The Bidder will provide a guarantee for an Annual Minimum Quantity, in MWh, to be delivered to GPA's system. Subsequent failure to provide this guaranteed Annual Minimum Quantity will subject the Bidder to penalties as described in Renewable Energy Purchase Agreement. The Bidder will also provide the *expected* minimum (also in MWh) to be delivered each year of the contract period, at a 95% confidence level.

2.4. Delivery

2.4.1. Interconnection

The Bidder will deliver renewable energy to a GPA-determined interconnection point on GPA's 34.5 kV transmission system. GPA will determine the exact location after completion of a detailed interconnection study. The GPA transmission system and primary delivery points are identified in the attached map (See Appendix G). We request that the Bidders identify potential interconnection sites within their submittal.

GPA is recommending the following interconnection requirements. Note final interconnection agreement will be based on System Impact Study recommendations.

1. An underground loop system in and out of a new substation at the renewable generation facility at transmission level (34.5kV and up) connecting to an existing GPA transmission line. The rerouted transmission line, its associated breakers, and control and protection devices, etc. may require upgrade.
2. An underground transmission line connecting directly to the nearest GPA substation at transmission level (34.5kV and up) from a new substation at the renewable generation facility. The connected GPA substation will require upgrades including a new breaker, control and protection devices, and additional bus structure, etc.
3. A Fiber optic communication line between the renewable generation facility and the connected GPA substations.
4. A communication assisted protection scheme with primary and backup protection devices via a dedicated fiber optic line for the transmission line protection between the renewable generation facility and the connected GPA substations. Current differential protection is recommended.
5. GPA will need to set limits for the high/low voltage ride through, hi/low frequency ride through, VAR/power factor support and ramping rate limits based to various system studies done by our consultants and our existing system condition.

The cost of facilities to bring the Bidder's energy to GPA's point of interconnection is the responsibility of the Bidder. Bidders shall be responsible for the design, engineering and construction cost as well as construction and commissioning. All design shall require GPA review and approval and construction shall be coordinated with GPA for inspections during construction.

Bidders must include the cost for interconnection in their priced proposals as this may be negotiated with GPA during contract negotiations. Total costs, however, must still fall below GPA's avoided cost: the marginal cost for fuel as approved by the CCU and PUC.

The cost estimates in the table below are for evaluation purposes:

Transmission Cost Per Mile	
Overhead (Poles, Hardware, #927 Al Primary Lines)	\$1.24 M
Underground (Manholes, Conduits, and 1000 kcmil Al. Primary Lines)	\$2.20 M

Bidder shall provide bidder's methodology of how to measure the power and energy output at the point of interconnection including output of renewable generation plant. This is for GPA to inspect and verify bidder's energy storage system performance.

2.4.1.1 Site Interconnection Discussions

Final interconnection requirements will be based on a completed System Study for selected proposed projects. As an initial evaluation of the sites, GPA has evaluated the potential interconnection options for sites located on Naval Base Guam, Piti and on Route 3, Dededo.

The Naval Base Guam sites include the Commissary Site, Waste Water Treatment Site, Existing PV Site, and CDF site

GPA proposes all sites to be combined to a new central substation located on the CDF site as shown in Figure 2. This will be the meter point(s). One of the existing transmission lines should be intercepted and routed via the new CDF site. Thus, there will be two connection points at the CDF site. The CDF substation shall be designed using a sectionalized bus scheme.



Figure 2 – Naval Base Guam Sites Interconnection

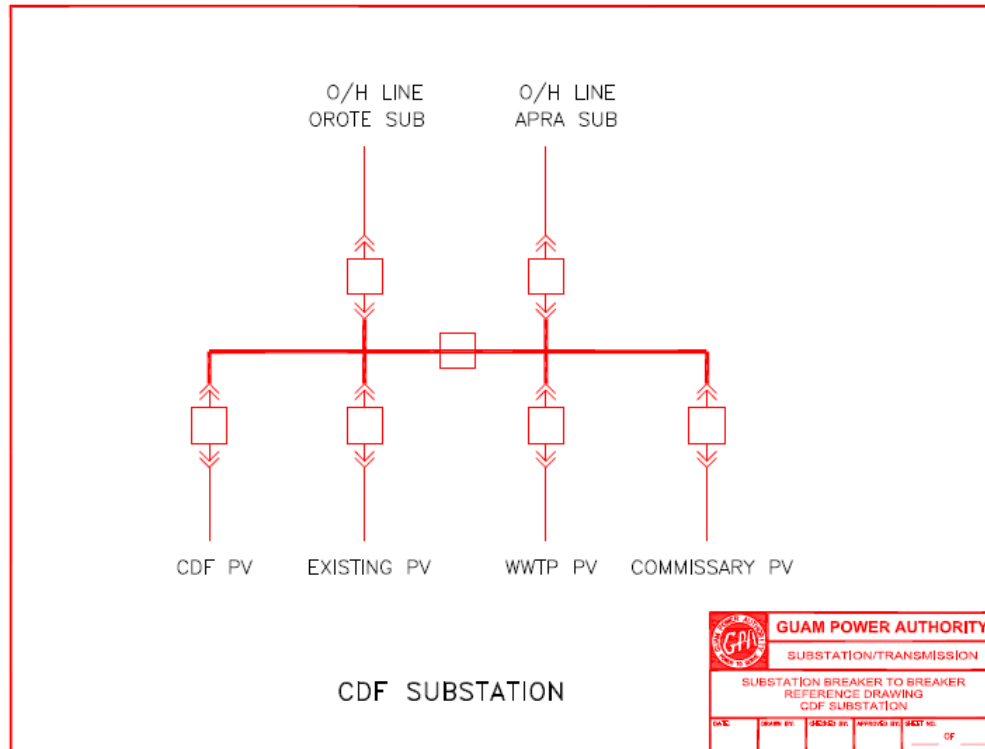


Figure 3 – Naval Base Guam New Substation

The South Finegayan Site would be considered a single project site. An existing 34.5kV overhead line runs adjacent to the property along Route 3. The Harmon Substation is the closest substation however Navy intends to build a new substation along Route 3. In addition, there is a plan to build a new underground transmission line along the existing transmission path.

Due to the construction timeline for the new North Finegayan substation, GPA proposes that a substation be built on PV site and intercept the existing overhead transmission line. The new solar substation shall utilize a sectionalized bus scheme to allow for isolating the solar site while maintaining service to Harmon and Andersen substations. Site would require a future project to transition to the new underground system once completed.



Figure 4 – South Finegayan Site Interconnection

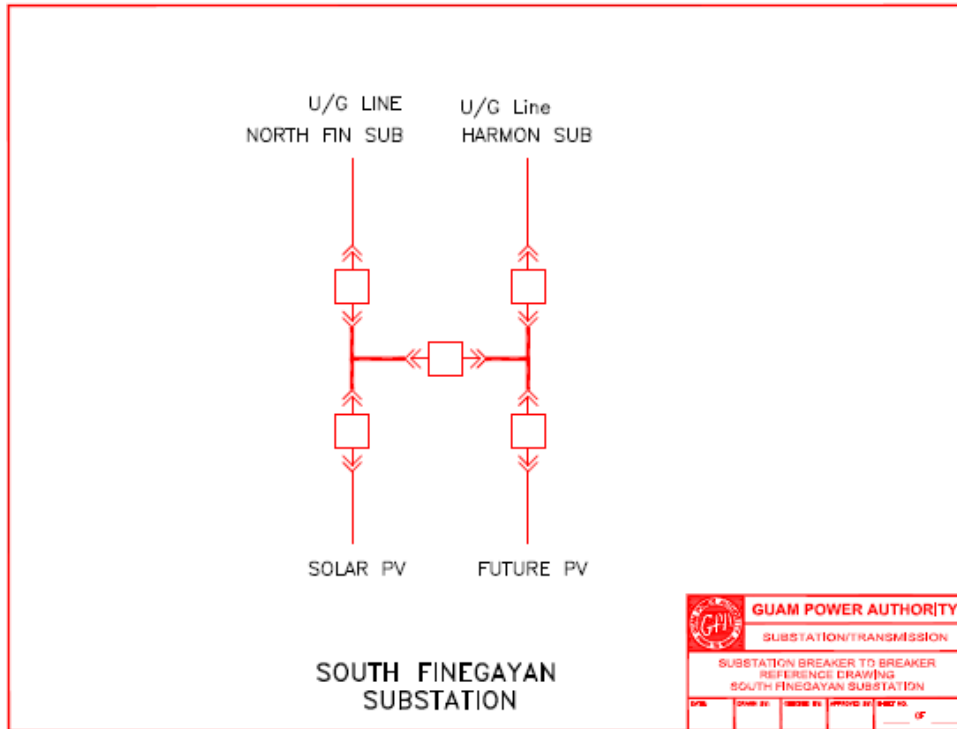


Figure 5 – South Finegayan Site Interconnection

2.4.2. GPA Interconnection Standard Specifications

GPA maintains standard specifications for interconnection equipment and communication protocols.

2.4.2.1 Transmission Line

Interconnection shall be to the 34.5 KV transmission. The following are specifications for 34.5 KV transmission lines:

Item	Specification
Overhead Lines	927 kcmil AAAC bare aluminum conductor.
Underground Lines	2 sets 1000 kcmil 133% aluminum XLPE underground cable with T-splice modular cable connectors.

In addition, Bidders are to provide 15% spare underground cable 1000 kcmil and associated modular T-splice cable connectors as GPA non-stock item materials.

2.4.2.2 Substation Hardware

The following are specifications for 34.5 kV breaker, switchgear, relays, instruments and controls, P & CT, instrument and cable.

Item	Specification
34.5 kV Breakers	Outdoor: SF6 breakers.
	Indoor: Matching existing GPA breakers.
Relays	SEL relays and meters.
PT	Dual ratio
CT	Class 400, multi-ratio.
Cable	#10 AWG for CT connection, #12 AWG for control and power, #18 AWG for SCADA communication

2.4.2.3 Substation Buildings

All new substations shall be concrete structure which meet Guam building codes.

2.4.2.3 Communication Protocol

Standard Communication Protocol with the existing and future SCADA/EMS is DNP3/DNPI. DNP3-SA version 5 serial and over TCP/IP or latest stable release implemented in concordance with the technical bulletins from www.dnp.org.

2.4.3. Substation Short Circuit Capacity Values

The following are the existing short circuit currents (base and maximum) for Orote and Harmon Substations .

Substation	Base Generation				Max Generation			
	3Ph Fault		LG Fault		3Ph Fault		LG Fault	
	SC MVA	X/R Ratio	SC MVA	X/R Ratio	SC MVA	X/R Ratio	SC MVA	X/R Ratio
Orote	470.7	7.70494	460.3	8.3632	568.6	6.38708	514.7	7.42385
Harmon	681.5	11.1796	868.7	9.44163	934.4	9.58519	1130.9	8.03686

2.4.4. System Integration Study

At the completion of the Priced Proposals evaluation and subject to the size and location of a Bidder(s) project, GPA will undertake a "System Integration Study". The purpose of this study is to determine the system impacts and upgrade requirements for integration of the selected project or projects into the GPA system. The Bidder or Bidder(s), in the event GPA selects more than one bid, will be responsible for the cost of such study. Presently the estimated cost for a single project evaluation is about **\$83,000**. If

additional modeling is required for evaluating multiple projects concurrently, additional costs may be imposed per model.

The Bidder(s) will be responsible for the costs of system upgrades, if any. If required, a separate System Integration Cost Agreement will be executed by the parties. Selected Bidders will have the opportunity to withdraw their bids upon review integration costs resulting from the GPA study.

Upon request the selected bidders will provide following information for the study:

1. Size and scope of the various types of renewable projects. This should also include any additional details that may be known about individual proposed projects, including the electrical model for the proposed interconnection, such as the distribution line description and impedances at the point of the interconnection.
2. Solar irradiance data in 2-second intervals for each solar project – time synchronized if possible.
3. Expected control characteristics of the projects – It will be critical that each project must be capable of being controlled in real time. Voltage control characteristics and frequency characteristics must be provided.
4. The developer must supply PSLF modeling information, and EMT modeling information (such as in EMTP-RV or PSCAD format) to allow for further detailed study work for the project itself, and for use on an ongoing basis for GPA system studies for other purposes. Modeling data should also include relevant modeling data for collector system/ transformers between the inverter terminals and the Point of Interconnection.

2.5. Pricing

2.5.1. Fixed Pricing for Guaranteed Energy

Bidders are required to submit fixed pricing for the guaranteed renewable energy delivered for the entire contract period.

2.5.2. Pricing for Energy Above Guaranteed Amount

All renewable energy available from the Bidder's project(s) above and beyond the guaranteed amount will be offered to GPA at the lesser of the two following prices: 1) the Bidder's guaranteed price applicable to the then current time period or 2) the effective Levelized Energy Adjustment Clause (LEAC) fuel recovery cost incurred by GPA's ratepayers. The LEAC fuel recovery cost is recalculated approximately every six months and is approved by the Guam Public Utilities Commission.

Data on the current LEAC fuel recovery costs can be found on GPA's website at:
http://www.guampowerauthority.com/gpa_authority/rates/gpa_rate_schedules.php

Details about historical filings and LEAC fuel recovery charges can be found on the PUC's website at:
<http://www.guampuc.com/main/?pg=docs&category=Guam%20Power%20Authority&subcat=LEAC>

Details of the calculation of the LEAC can be found under GPA's Rate Schedule "Z" at:

http://www.guampowerauthority.com/gpa_authority/rates/documents/ScheduleZ-61kb.pdf

For the evaluation, GPA shall use the most recent LEAC Rate approved by the PUC. An amendment shall be forwarded to all prospective bidders for the final rate.

2.5.3. Energy Purchase Price Units

The Bidder shall provide a fixed price bid in \$/MWH for the term of the proposed delivery of renewable energy for each ESS proposal options. The price bid shall include the capital and O&M components which shall be referred to should GPA exercise the capital buy-out option. All columns in the bid price worksheet must be filled. GPA will not accept bids with year-over-year (YOY) escalation rates greater than 1.0% per year.

2.5.4. Bid Expiration

All Bid terms, conditions, and pricing are binding for 8 months following the due date of the IFB.

2.6. Renewable Energy Credits and Environmental Credits:

GPA retains all environmental attributes associated with the winning Bidder's energy, including but not limited to renewable energy credits, greenhouse gas, green tags, or carbon credits, and any other emissions attributes, all as set forth in the form of Renewable Energy Purchase Agreement.

3. TECHNICAL INFORMATION

This section discusses the technical information required for the qualification process in Step One of this multi-step bid. Bidders are required to answer all questions raised in the Qualitative Scoring Workbook for Part 1 - Qualitative Scoring References and Part 2 – Technical Data provided with the bid documents.

3.1. Project Development

This category scores the likelihood that a Bidder's renewable resource project will be placed in commercial service. The evaluation criteria for this category generally address construction and development risks associated with the completion of projects that are not yet in commercial operation, and which are necessary to support bids. Plants that are already operating or are sufficiently advanced in construction may be deemed to earn the maximum possible score from this category. GPA requires bids for projects that will achieve commercial operation within 36 months after contract award.

For projects that are less advanced in construction, we will consider the following criteria for scoring:

1. Method and status of project financing
2. Level of site control by developer (full ownership, long-term lease, short-term lease, negotiating a site, searching for a site, or non-of-the above).
3. Project management/experience
4. Status of required permits, licenses and studies
5. Status of equipment supply and EPC agreements

3.2. Status of Project Financing

Bidders are required to provide responses to all questions below to demonstrate the financial viability of their project.

1. Identification of equity participants.
 - a. Who are the equity participants in the project?
2. Evidence that the project will be financed.
 - a. How will the project be financed?
 - b. Is there a written commitment from the equity participants? If so, please provide a copy with confidential information redacted if necessary.
 - c. Discuss and/or provide supporting information on any project financing guarantees.
 - d. Does the developer envision any conditions precedent to project financing other than execution of the power purchase agreement and Guam Public Utilities Commission approval of the power purchase agreement? If so, what do you expect them to be?
3. Description of the Bidder's organizational structure from a financial and legal perspective, including any general and limited partners, involvement of subsidiaries, providers of capital, and percentage interest of each party.
4. Provide a description of the financing plan for the project, including construction and term financing. The financing plan should address information contained in the pro forma, such as:
 - a. The project's projected financial structure;
 - b. Expected sources of debt and equity financing;
 - c. Estimated capital cost.
 - d. Evidence the project is financeable

In addition, the financing plan should address the financing of development costs. All bidders are required to provide this information.

5. Provide documentation illustrating the experience of the project sponsor in securing financing for projects of similar size and technology. For each project provide the following information:
 - Project name and location
 - Project type and size
 - a. Date of construction and permanent financing
6. Provide evidence that the Bidder has the financial resources and financial strength to complete and operate the project as planned.
7. Provide copies of the most recent audited financial statement for each Bidder, its parent or subsidiary company to be used in this contract. Also, list the current credit rating from Standard & Poor's and Moody's for the sponsor, affiliates, partners, and credit support provider. Unaudited financials certified by the company's chief financial officer and any Dun & Bradstreet rating are acceptable.
8. The Bidder should demonstrate its ability (and/or the ability of its credit support provider) to provide the required security, including its plan for doing so (including type of security, sources of security and a description of its credit support provider).
9. Provide a description of any current credit issues regarding the Bidder or affiliate entities raised by rating agencies, banks, or accounting firms. Credit issues includes and loan defaults or legal suits or potential suits likely to materially affect the company's finances or ability to obtain loans or other instruments in the financial markets. Bidders should address how they intend complete project acknowledging
10. Describe the implication of the federal Production Tax Credits or Investment Tax Credits (or similar incentives) on the viability of the project.
11. Provide a memorandum with supporting information demonstrating that the bid will not be subject to Variable Interest Entity treatment¹ and that GPA will not have to carry this entity on its financial statements.
12. Pro forma income and cash flow statement conforming to Generally Accepted Accounting Principles for the project for the term of the proposed Power Purchase Agreement (include revenue and cost data by major categories, debt service, depreciation expenses and other relevant information). Bidders may propose to submit their financial pro forma to a mutually agreed upon independent third party rather than to GPA. Bidders should note that this information will be required of short-listed bidders only and will be requested by GPA upon shortlist notification or after. Should GPA request pro forma financial information from the bidder, the information will only be used for project viability assessment only.
13. Bidders must disclose any litigation related to projects owned or managed by them or any of their affiliates in the United States.

3.2.1. Site Control

GPA provides the sites for this bid. GPA has entered into a lease with the Navy for use of specific properties for solar photovoltaic development. Bidders should provide GPA with some confidence in plant siting using these sites. Maps and property descriptions are provided in Volume III Appendix L. Unpriced Technical Offers shall address the following:

1. Map of the site(s), the total acreage, the interconnection point, and the relationship of the site to other local infrastructure. In addition to providing the required map, provide a site layout plan which illustrates the location of all equipment and facilities on the site.

¹ GPA is not willing to be subject to accounting treatment that results from variable interest entity ("VIE") treatment as set forth in Financial Accounting Standards Board Interpretation No. 46 (revised December 2003) ("FIN46R").

2. Identify any rights-of-way or easements that are required for access to the project or for interconnection. Describe the status of rights-of-way and easement acquisition, and describe the plan for securing the necessary rights-of-way, including the proposed timeline.
3. Describe whether the project has the capability for expansion at the proposed site. If so, describe the expansion capability possible.

3.2.2. Project Management/Experience

Bidders are required to demonstrate project experience and management capability to successfully develop and operate the project proposed. GPA is interested in a project team which has demonstrated success in projects of similar type, size and technology and can demonstrate an ability to effectively work together to bring the project to commercial operation in a timely fashion. GPA requests the following information:

1. An organizational chart for the project that lists the project participants and identifies the management structure and responsibilities.
2. Statements that list the specific experience of the firm in developing, financing, owning, and operating generating facilities, other projects of similar type, size and technology, and any evidence that the project participants have worked jointly on other projects for each of the project participants (including the Bidder, partners, and proposed contractors). (If a bidder is relying on the experience of a consultant or contractor to meet the Experience Threshold Requirement, the bidder should describe any contractual relationships between the bidder and the consultant or contractor.)
3. A management chart which lists the key personnel dedicated to this project and provides biographies of the key personnel.
4. Listing of all projects the project sponsor has successfully developed or that are currently under construction. The following information shall be included for each project:
 - a. Name of the project
 - b. Location of the project
 - c. Project type, size and technology
 - d. Commercial operation date
 - e. Capacity factor of the unit for the past three years
 - f. Availability factor of the unit for the past three years
 - g. References, including the names and current addresses and telephone numbers of individuals to contact for each reference.
5. With regard to the Seller's project team, identify and describe the entity responsible for the following:
 - a. Construction Period Lender
 - b. Operating Period Lender
 - c. Financial Advisor
 - d. Environmental Consultant
 - e. Owner's Engineer
 - f. Construction Contractor
 - g. Transmission Consultant
 - h. Legal Counsel

3.2.3. Project Schedule and Commercial Operation Date

Bidders are required to provide a complete critical path schedule for the project from the notice of selection of the project for contract negotiation to the start of commercial operations. For each project

element, list the start and end date. Bidders should ensure that the schedule provided in this section is not inconsistent with the milestone events contained in the Purchase Power Agreement.

Identify the elements on the critical path. The schedule should include, as a minimum, facility contracts, construction, siting, environmental permitting (anticipated submittal and approval), fuel supply, financing, engineering, procurement, local permits and any other requirements that could influence the project schedule, and the Commercial Operation Date. Bidders shall identify any status of permits, licenses and studies required. The project schedule should include dates for all construction and applicable reporting milestone events specified in the Purchase Power Agreement.

3.2.4. Engineering and Technology (Status of equipment supply and EPC agreements)

Bidders should provide information about the specific technology or equipment including the track record of the technology and equipment. The following information is required for these evaluation criteria:

1. A reasonable but preliminary engineering plan which includes the following information:
 - a. Name of principal engineering firm responsible for facility design
 - b. Type of generation technology
 - c. Major equipment considered or expected to be used
 - d. Equipment vendors selected/considered
 - e. History of equipment operations
 - f. Equipment procurement strategy
2. Identification of expected key equipment suppliers and information that illustrates and discusses the proposed equipment and technology, lead times for delivery to GPA, and suppliers prior experience with equipment operation in tropical island environments. This should specifically address the ability of the equipment to operate in low short-circuit conditions and extreme voltage and frequency requirements.
3. Identification of similar equipment by the same manufacturer that are presently in commercial operations including the number installed, installed capacity and estimated generation.
4. Evidence that the technology to be employed for energy production is ready for transfer to the design and construction phases.
 - a. Describe the technology to be employed for energy production.
 - b. To the developer's best knowledge, are there, or have there been any similar plants in commercial operation? If not, i) are there, or have there been, any pilot projects, and ii) please provide evidence that the technology to be employed for energy production has been proven. Such evidence may include copies of studies confirming technical feasibility.
5. Indication if the Bidder has secured its equipment for the project. If not, identify the long-lead equipment options and describe the timing for securing equipment.
6. Bidders are encouraged to provide any additional information that will further describe the proposed projects technical feasibility and applicability to development on Guam.

3.3. Physical Project Characteristics

This category captures the physical characteristic risks of the bid products. The evaluation criteria for this category generally address physical and operational risks associated with the production and delivery of power to GPA. Bidders are required to complete **Part 2 – Technical Data** in the Qualitative Scoring Workbook file (excluding any price references). The characteristics that will be considered in scoring are:

3.3.1. Operating Profile

The evaluation of operating profile shall be based on the following:

1. Conformance with Performance Standards
2. Impacts on System Operations/Stability
3. Generation Profile (see Renewable Energy Project Generation Profile data table in Part – 2 Technical Data worksheet in the Qualitative Scoring workbook)
4. Quality of Forecasting and Dispatchability
5. O&M Plan and Coordination of Maintenance- GPA is interested in projects that can demonstrate that the maintenance plan, level of funding, and mechanism for funding will ensure reliable operations during the term of the contract. Bidders shall:
 - a. Provide an operation and maintenance plan for the project that demonstrates the long term operational viability of the proposed project. The plan should include a discussion of the staffing levels proposed for the project, the expected role of the project sponsor or outside contractor, scheduling of major maintenance activity, maintenance funding levels, and the plan for testing equipment.
 - b. Indicate whether or not the project sponsor is willing to coordinate the maintenance schedule for the project with the annual maintenance schedule of GPA.
 - c. Describe the status of the project sponsor in securing any operation and maintenance agreements or contracts. Include a discussion of the sponsors plan for securing a long-term O&M contract.
 - d. Provide examples of the Bidder's experience with O&M services for other similar projects.

3.3.2. Point of delivery

Bidders must discuss interconnection with GPA system. Information required to evaluate this criteria includes the following:

1. Preliminary Single-Line Diagram(s) for the generation and interconnection facilities (see Appendix H for Unpriced Technical Offer submittal requirement details)
2. A plan map of the facilities, indicating the interconnection point to the GPA system.
3. Technical specifications and other information available for the generators included in the bid.

3.3.3. Risk

All bidders must submit a 1-2 page Risk-Assessment Plan which addresses the following items:

1. Identify project risks. (Include issues that may impact project schedule, budget, output or performance).
2. Explanation of how the risks will be avoided / minimized.
3. Propose any options that could increase the value of the project.
4. Explain the benefits of the proposed options.

3.4. Power Product Characteristics

This category scores how well the bid product matches GPA's operational needs. The evaluation criteria for this category generally address performance and supply portfolio concentration risks, along with the benefits of flexibility and optionality. The characteristics that will be considered in scoring are:

1. Guaranteed Annual Minimum Energy Production (MWH)
2. Dispatchability. This bid requires ESS for the purpose of shifting energy to a period other than when the energy is produced. Proposals with no ESS or not capable of shifting its energy to another period (i.e. during evening hours) shall be disqualified.
3. Describe unit electrical control features available such as automatic generator control, VAR control, droop control, set-point control, emergency assist capability or such other control related features.
4. Flexibility
 - a. In-service date (GPA prefers projects that reasonably propose a commercial operation within 36 months after contract award)
 - b. Willingness to accept contract provisions for flexibility to accommodate future changes to performance standards; and
 - c. Bid size
5. Contract Term.

3.5. Credit Evaluation

GPA will evaluate the creditworthiness of the Bidder. Bidders shall discuss the following that will be considered in this evaluation criteria scoring:

1. Debt and equity ratings
2. Performance assurance
3. Financial ratio analysis
4. Default risk
5. Credit concentration and liquidity effect
6. Enforceability of contractual credit terms
7. Bidder revisions to contract templates that may affect credit requirements

3.6. Environmental Permits and Impacts

The Bidder should identify environmental impacts associated with the proposed project and its plan to mitigate such impacts. Included in this section are technical environmental issues associated with air, water, solid waste, land use, noise, and other environmental issues. The following addresses specific environmental permitting considerations.

3.6.1. Permits

Bidders are shall identify all permits, licenses, and environmental assessments and/or environmental impact statements required. Specifically, the Unpriced Technical Offer should discuss the following:

1. All Federal and GUAM permits, licenses, and environmental assessments and/or environmental impact statements required to construct and operate the project and governmental agencies for issuing permits and licenses.
2. Experience with governmental agencies which will issue or approve the required permits, licenses, and environmental assessments and/or environmental impact statements. Prepare timeline to complete acquisition of permits, licenses, and environmental assessments and/or environmental impact statements.

3. Provide the anticipated timeline for seeking and receiving the required permits, licenses, and environmental assessments and/or environmental impact statements, using the execution date of the power purchase agreement as the starting point. Please include a narrative on the basis for the assumed timeline.

3.6.2. Site Environmental Assessment

This bid document contains an Environmental Assessment of the proposed sites in Appendix P. Note that the Harmon Annex, Harmon Booster, and the Tumon Tank Farm sites included in the study are not available for use or lease in this bid. Bidders shall also note the environmental restrictions in the drafted sublease provided in Volume III.

Bidders shall address each of the major environmental areas and sub-areas as presented below;

1. Site development
2. Air quality
3. Water resources
4. Ecology
5. Land use
6. Cultural resources
7. Previous site use
8. Noise level
9. Aesthetic/visual

In addition to the above, GPA requests for the following:

10. The location of the nearest residence and the nature of any buildings within 500 feet of the site.
11. Documentation identifying any potential environmental impediments to project development and the plan to mitigate the impediment

4. CONTRACT

GPA has created a draft of the Renewable Energy Purchase Agreement in Volume III of this IFB. This document includes the Interconnection Agreement and the Sublease Agreement for use of proposed properties. Bidders are required to review the document and provide comments, note any exceptions, and provide recommendations during the proposal development period as a basis for discussions during contract negotiations. This process is also a factor in the Qualitative evaluation in this multi-step bid.

The final, executable Renewable Energy Purchase Agreement shall be negotiated in good faith between the parties. Each Respondent is responsible for acquiring and/or verifying that it is in compliance with all licenses, permits, certifications, studies, reporting requirements and approvals required by federal, and Guam government laws, regulations and policies in order for it to contract for and perform in accordance with its bid.

The following highlights the contract document between GPA and the selected Bidder(s) or in this section referred to as CONTRACTOR(S).

4.1. CONTRACTOR'S Responsibilities

This section highlights the CONTRACTOR'S responsibilities.

4.1.1. System Impact Study

The CONTRACTOR is responsible for the costs of the system impact study.

4.1.2. System Upgrades for Interconnection

The CONTRACTOR is responsible for the all system impact costs, including new or upgraded facilities that are required for the project interconnection with the GPA system.

4.1.3. Interconnection Agreement

The CONTRACTOR shall complete and adhere to interconnection agreement.

4.1.4. Development Security and Post Development Security

The CONTRACTOR is required to post Credit Support only in the form of a Letter of Credit or cash referred to as "Development Security", to secure the CONTRACTOR'S obligations prior to Commercial Operation of the Facility. The CONTRACTOR will forfeit this security if failed to meet project milestones, claims force majeure, or other conditions identified in the draft contract provided in Volume III.

Upon commissioning of the new facility, the Development Security will be returned to the CONTRACTOR and the CONTRACTOR will be required to submit a Post Development Security as security for Seller's obligations following the Commercial Operation Date.

4.1.5. Performance Guarantees

The CONTRACTOR is required to meet Annual Minimum Quantities for energy delivered

4.1.6. Project Milestones

The CONTRACTOR shall submit a construction and commissioning schedule for the proposed project. The CONTRACTOR shall meet deadline for commissioning or is subject to penalties as described in the purchase power agreement.

4.1.7. Government Charges

The CONTRACTOR is responsible for all government taxes, fines or fees necessary for operation of proposed facility.

4.2. GPA Responsibilities**4.2.1. Renewable Energy Purchase**

GPA shall purchase all renewable energy produced by the CONTRACTOR.

4.2.2. Transmission

GPA is responsible for the maintenance and associated maintenance costs of all equipment and transmission lines after the CONTRACTOR delivery point.

5. PENALTIES / DAMAGE FEES

Contract performance will be evaluated annually, within 60 days of the contract anniversary, for any penalty evaluations for the pre-commissioning period and the post-commissioning period. Volume III discusses Development Security (Section 4.2), Production Default (Section 4.8), and Ramp Performance Penalty (Section 4.19)

6. REGULATORY APPROVAL

Any final negotiated term sheet or contract will be conditioned upon actions and/or approvals by Guam Public Utility Commission, satisfactory to GPA in its sole discretion.

INVITATION FOR MULTI-STEP BID

NO.: GPA-007-18

RENEWABLE ENERGY RESOURCE

PHASE III



Volume III

Draft Renewable Energy Purchase Agreement

GPA Contract No. 

**RENEWABLE ENERGY
PURCHASE AGREEMENT**

**BETWEEN
GUAM POWER AUTHORITY
AND**



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**PURCHASE AGREEMENT
BETWEEN
GUAM POWER AUTHORITY
AND
[]**

THIS RENEWABLE ENERGY PURCHASE AGREEMENT (the "Agreement"), effective as of last date set forth on the signature page hereto (the "Effective Date"), is entered into by and between and Guam Power Authority, ("GPA" or "Buyer") and [], a [] " " or "Seller"). The purpose of this Agreement is to establish the terms and conditions under which Seller shall sell and GPA shall purchase Renewable Energy and associated Renewable Energy Credits ("RECs") and Environmental Attributes, as defined herein. In this Agreement, Seller and GPA may be individually referred to as a "Party" or collectively as the "Parties."

Recitals

WHEREAS, Seller desires to sell to GPA at the Delivery Point all of the Renewable Energy and associated RECs and Environmental Attributes from the Facility and GPA desires to buy the same from the Seller at the Delivery Point.

Therefore, for good and valuable consideration, including, without limitation, the covenants and agreements of the Parties contained in this Agreement, the receipt and sufficiency of which consideration is acknowledged, the Parties agree as follows:

ARTICLE ONE: DEFINITIONS

The following definitions apply to this Agreement:

1.1 "Actual Renewable Energy" means the actual energy output of the Facility (expressed in MWhs), measured at the Delivery Point, over any Production Measurement Period. Actual Renewable Energy shall be measured by the Seller Metering Equipment, and adjusted as applicable in accordance with Section 7.4.

1.2 "Affiliate" means, with respect to any party, any other party (other than an individual) that, directly or indirectly, through one or more intermediaries, controls, or is controlled by, or is under common control with, such party. For this purpose, "control" means the direct or indirect ownership of fifty percent (50%) or more of the outstanding capital stock or other equity interests having ordinary voting power.

1.3 "Agreement" has the meaning set forth in the initial paragraph above.

1.4 "Appraisal Price" means the average of three (3) appraisals of the market value of the Facility at the end of the Delivery Period, delivered by three (3) independent appraisers qualified by experience and expertise to determine the arms length market value of the Facility and assuming that energy and Environmental Attributes produced by the Facility will be sold at fair market value prices over the remaining economic useful life of the Facility. If the Parties do not agree on the independent appraisers then they shall be determined by arbitration in accordance with Section 12.9.

1.5 "Bankrupt" means with respect to any entity, such entity (i) files a petition or otherwise commences, authorizes or acquiesces in the commencement of a proceeding or cause of action under any bankruptcy, insolvency, reorganization or similar law, including but not limited to, under Chapter 11 or Chapter 9 of the United States Bankruptcy Code and Title III of Puerto Rico Oversight, Management and Economic Stability Act, or has any such valid petition filed or commenced against it, (ii) makes an assignment or any general arrangement for the benefit of creditors, (iii) otherwise becomes bankrupt or insolvent (however evidenced), (iv) has a liquidator, administrator, receiver, trustee, conservator or similar official appointed with respect to it or any substantial portion of its property or assets, or (v) is generally unable to pay its debts as they fall due.

1.6 “Bid Security” or “Bid Bond” means the \$ _____, which is the amount of the security provided by Seller in connection with its initial bid to GPA for the Project prior to entering into the PPA.

1.7 “Business Day” means any day except a Saturday, Sunday, a Federal Reserve Bank holiday or an official Guam holiday. A Business Day shall open at 8:00 a.m. and close at 5:00 p.m. local time for the relevant Party's principal place of business. The relevant Party, in each instance unless otherwise specified, shall be the Party by whom the Notice or payment or delivery is to be received.

1.8 “Buyer” has the meaning set forth in the initial paragraph above.

1.9 “Buyout Payment” means, with respect to Seller’s election not to re-build the Facility pursuant to Section 12.2, an amount equal to: Minimum Production x the number of Contract Years (or portion thereof) remaining in the Delivery Period x the Incremental Price,

1.10 “Change Event” has the meaning set forth in Section 4.16(c).

1.11 “Claiming Party” has the meaning set forth in Section 4.11.

1.12 “Claims” means all claims or actions, threatened or filed and, whether groundless, false, fraudulent or otherwise, that directly or indirectly relate to the subject matter of an indemnity, and the resulting losses, damages, expenses, attorneys’ fees and court costs, whether incurred by settlement or otherwise.

1.13 “COD Extension” has the meaning set forth in Section 4.2(a).

1.14 “COD Extension Payment” has the meaning set forth in Section 4.2(a).

1.15 “Commercially Reasonable” or “Commercially Reasonable Efforts” means, with respect to any purchase, sale, decision, or other action made, attempted or taken by a Party, such efforts as a reasonably prudent business would undertake for the protection of its own interest under the conditions affecting such purchase, sale, decision or other action, consistent with Good Utility Practices, including, without limitation, electric system reliability and stability or other regulatory mandates relating to renewable energy portfolio requirements, the cost of such action (including whether such cost is reasonable), the amount of notice of the need to take a particular action, the duration and type of purchase or sale or other action, and the commercial environment in which such purchase, sale, decision or other action occurs. “Commercially Reasonable” or “Commercially Reasonable Efforts” shall be reviewed and determined based upon the facts and circumstances known, or which could have been known with the exercise of reasonable efforts, at the time that a sale, purchase, or other action is taken and shall not be based upon a retroactive review of what would have been optimal at such time.

1.16 “Commercial Operation” has the meaning set forth in Section 4.1.

1.17 “Commercial Operation Date” or “COD” means the date that Commercial Operation of the Project has been achieved in accordance with Section 4.1.

1.18 “Confidential Information” means all information, whether written or oral, that is disclosed or otherwise available in connection with this Agreement or the performance by either Party of any of its duties hereunder, except any information which: (i) at the time of disclosure or thereafter is generally available to the public (other than as a result of a disclosure by any Party in violation of this Agreement); (ii) was available to any Party on a non-confidential basis from a source other than the Party hereto providing the Confidential Information, provided that such source is not bound by a confidentiality agreement that protected the Confidential Information and the Party receiving such Confidential Information is aware of such confidentiality agreement; or (iii) has been independently acquired or developed by any Party without violating any of its obligations under this Agreement.

1.19 “Contract Price” means the price in U.S. Dollars (unless otherwise provided for) rounded to the nearest \$0.01, to be paid by GPA to Seller for the purchase of the Renewable Energy, as described in Appendix A.

1.20 “Contract Year” means the annual period, beginning on the Commercial Operation Date, and each annual period thereafter commencing on each anniversary of the Commercial Operation Date.

1.21 “Conventional Energy Resource” is an energy resource that is non-renewable in nature, such as natural gas, coal, oil, and uranium, or electricity that is produced with energy resources that are not Renewable Energy Resources.

1.22 “Credit Rating” means, with respect to any entity, the rating then assigned to such entity’s unsecured, senior long-term debt obligations (not supported by third party credit enhancements), or if such entity does not have a rating for its unsecured senior long-term debt obligations, then the rating then assigned to such entity as an issuer rating by S&P, Moody’s or any other rating agency agreed by the Parties.

1.23 “Daily Delay Liquidated Damages” has the meaning set forth in Section 4.2(b).

1.24 “Defaulting Party” has the meaning set forth in Section 6.1.

1.25 “Deficiency Amount” has the meaning set forth in Section 4.8.

1.26 “Delivery Period” means the period of delivery under this Agreement, commencing on the Commercial Operation Date and continuing for a Term of twenty (20) years or up to 30 years if contract extensions are applied

1.27 “Delivery Point” means the point at which the Renewable Energy will be delivered and received, as specified in Section 2.1 herein, or such other delivery point as may be agreed to by the Parties.

1.28 “Development Security” means the security required to be posted by Seller during construction of the Facility prior to Commercial Operation Date. Pursuant to Section 9.1. The Development Security shall be 50% of the total projected payment for the 1st Contract Year based on the Seller’s 1st Contract Year Contract Price and the Guaranteed Output for the first Contract Year. The amount of the Development Security is set out in Section 2.1.

1.29 “Early Termination Date” has the meaning set forth in Section 6.2.

1.30 “Effective Date” means the date first set forth above.

1.31 “Eligible Renewable Energy Resources” are applications of the following defined technologies that displace Conventional Energy Resources that could otherwise be used to provide electricity to GPA’s customers: biogas electricity generator, biomass electricity generator, fuel cells that use only renewable fuels, geothermal generator, hybrid wind and solar electric generator, landfill gas generator, solar electricity resources, wind generator and such other generally accepted Renewable Energy Resources.

1.32 “Emergency” means any abnormal interconnection or system condition (including, without limitation, equipment or transmission limitations and constraints caused by thermal limits, stability, voltage, or loop flows) that Buyer determines in accordance with Good Utility Practices: (a) requires automatic or immediate manual operation to prevent or limit loss of Buyer’s system or generation supply; (b) could adversely affect the reliability of the Buyer system or generation supply; (c) could adversely affect the reliability of any interconnected electric system; or (d) could otherwise pose a threat to public safety.

1.33 “Energy Storage System” shall mean the energy storage system described in Appendix C that is integrated with the Project as part of the Facility.

1.34 “Environmental Attributes” means environmental characteristics that are attributable to Renewable Energy or the Project, including credits; credits towards achieving local, national or international renewable portfolio standards; green tags; Renewable Energy Credits; greenhouse gas or emissions reductions, credits, offsets, allowances or benefits; actual SO₂, NO_x, CO₂, CO, Carbon, VOC, PM₁₀, mercury, and other emissions avoided; and any and all other green energy or other environmental benefits associated with the generation of Renewable

Energy (regardless of how any present or future law or regulation attributes or allocates such characteristics). Such Environmental Attributes shall be expressed in kWh or, as applicable in the case of emissions credits, in tonne equivalent or other allowance measurement. Environmental Attributes do not include Tax Benefits, or any energy, capacity, reliability, or other power attributes used by Seller to provide electricity services.

1.35 “EPC Contractor” means the contractor(s) under the engineering, procurement and construction contract for the Project.

1.36 “Event of Default” has the meaning set forth in Section 6.1.

1.37 “Excused Hours” means the hours in the applicable Production Measurement Period in which (i) Seller or Buyer has declared Force Majeure, (ii) Seller has initiated a Dispatch Down (as defined in Appendix K), or (iii) Seller’s delivery to GPA of Renewable Energy is adversely affected as a result of failure by GPA to perform its obligations under this Agreement or the Interconnection Agreement, provided, however, if the Project is not able to generate Renewable Energy during any hour of a Production Measurement Period due solely to Seller’s failure to establish and maintain the “Voltage and Frequency Ride-Through Settings” set forth in Appendix C (“Voltage and Frequency Ride-Through Settings”), such hours shall not constitute Excused Hours.

1.38 “Facility” means all of the following: the Project, as defined in Section 2.1 of this Agreement, the purpose of which is to produce Renewable Energy including Seller’s Interconnection Facilities and Energy Storage System and all equipment and other tangible assets, land rights and contract rights owned by Seller and reasonably necessary for the construction, operation, and maintenance of the Project.

1.39 “Facility Capacity” has the meaning set forth in Section 2.1.

1.40 “Facility Test” has the meaning set forth in Section 4.1 (e).

1.41 “Facility Debt” means the obligations of Seller or its Affiliates to any direct or indirect Facility lender pursuant to the Financing Documents, including without limitation, principal of, premium and interest on indebtedness, fees, expenses or penalties, amounts due upon acceleration, prepayment or restructuring, swap or interest rate hedging breakage costs and any claims or interest due with respect to any of the foregoing. Facility Debt does not include trade debt or obligations incurred in the ordinary course of business.

1.42 “FERC” means the Federal Energy Regulatory Commission or any successor government agency.

1.43 “Financing Arrangement Deadline” has the meaning set forth in Section 4.3.

1.44 “Financing Arrangement Provision Date” has the meaning set forth in Section 4.3.

1.45 “Financing Documents” means the loan and credit agreements, notes, bonds, indentures, security agreements, lease financing agreements, mortgages, deeds of trust, interest rate exchanges, swap agreements and other documents relating to the development, bridge, construction and/or permanent debt financing for the Facility (including any portfolio debt financing of which the Facility is included), including any credit enhancement, credit support, working capital financing, or refinancing documents, and any and all amendments, modifications, or supplements to the foregoing that may be entered into from time to time at the discretion of Seller and/or its Affiliates in connection with development, construction, ownership, leasing, operation or maintenance of the Facility.

1.46 “Forced Outage” means the shutdown or unavailability of the Facility, or a portion thereof other than as a Planned Outage, for reasons including, but not limited to, unanticipated equipment breakdown, human error, or Emergency conditions. A Forced Outage shall not include any Outage that may be deferred consistent with Good Utility Practices and without causing safety risk damage to equipment or additional costs.

1.47 “Forced Outage Notice” has the meaning set forth in Section 4.12(b).

1.48 “Force Majeure” means an event or circumstance which prevents one Party from performing its obligations under this Transaction, which event or circumstance was not anticipated as of the date the Transaction was agreed to, which is not within the reasonable control of, or the result of the negligence of, the Claiming Party, and which, by the exercise of due diligence, the Claiming Party is unable to overcome or avoid or cause to be avoided. So long as the requirements of the preceding sentence are met, a “Force Majeure” event may include, but shall not be limited to, flood, drought, military ordinances or archaeological discoveries at the Project site, change in applicable law or interpretation or application thereof, failure or delay by any Governmental Authority in issuing any required permit, earthquake, storm, fire, lightning, epidemic, war, terrorism or riot. Notwithstanding the foregoing, Force Majeure shall not be based on (i) the loss of Buyer's markets; (ii) Buyer's inability economically to use or resell the Renewable Energy purchased hereunder; (iii) the loss or failure of Seller's supply, including materials or equipment, unless such loss or failure is caused by a Force Majeure event; (iv) the delay in or inability of Seller to obtain financing or economic hardship of any kind unless such delay or inability is caused by a Force Majeure Event; or (v) Seller's ability to sell the Renewable Energy at a price greater than the Contract Price or Buyer's ability to purchase the Renewable Energy at a price less than the Contract Price; or (vi) strike or other labor dispute (other than strikes at a national, Guam or regional level). Neither Party may raise a claim of Force Majeure based in whole or in part on curtailment by a transmission provider unless such curtailment is due to "force majeure" or "uncontrollable force" or a similar term as defined under the transmission provider's tariff.

1.49 “Force Majeure Extension” has the meaning set forth in Section 4.2(c).

1.50 “Good Utility Practices” means any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result consistent with good business practices, economy, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method or act to the exclusion of all others, but rather to be generally accepted and consistently adhered to acceptable practices, methods, or acts.

1.51 “Governmental Authority” means any federal, territorial or local government body; any governmental, quasi-governmental, regulatory or administrative agency, commission, body or other authority exercising or entitled to exercise any administrative, executive, judicial, legislative, policy, regulatory or taxing authority or power; or any court or governmental tribunal.

1.52 “Governmental Charges” has the meaning set forth in Section 10.2.

1.53 “GPA” has the meaning set forth in the initial paragraph above.

1.54 “GPA Delay” means any delay by GPA in performing an obligation under this Agreement or under the Interconnection Agreement which results in a delay to Seller achieving COD.

1.55 “Guaranteed Output” has the meaning given in Section 4.8.

1.56 “Incremental Price” means, at the time of its calculation, the LEAC Rate minus the Contract Price, provided, however, if the LEAC Rate is less than the Contract Price then the Incremental Price shall be deemed to be zero. Sample calculations of the Incremental Price are shown in Schedule III to Appendix K.

1.57 “Independent Engineer” shall mean one of the engineering firms set forth in Appendix D hereto, and any other independent engineer or engineering firm, nationally recognized in the United States and having knowledge and expertise in the United States generation industry (including specifically the design and construction of utility scale solar photovoltaic power projects), and which is mutually agreed to by the Parties.

1.58 “Interconnection Agreement” means the agreement for interconnection service relating to the Facility between GPA and Seller, executed and delivered as of the Effective Date in the form attached hereto as Appendix J.

1.59 "Interest Rate" means, for any date, the lesser of (a) the per annum rate of interest equal to the prime lending rate as may from time to time be published in The Wall Street Journal under "Money Rates" on such day (or if not published on such day on the most recent preceding day on which published), plus two percent (2%) and (b) the maximum rate permitted by applicable law.

1.60 "kWh" means kilowatt hour.

1.61 "LEAC Rate" means the "Fuel Recovery Charge" (expressed in US\$/MWh) as set forth in GPA's most recent approved tariff in effect as of any date of determination of the LEAC Rate under this Agreement.

1.62 "Letter(s) of Credit" means one or more irrevocable, transferable standby letters of credit issued by a U.S. commercial bank or a foreign bank with a U.S. branch with such bank having a Credit Rating of at least A- from S&P or A3 from Moody's, in substantially the form set forth in Appendix F hereto; provided, however that such form may be modified by the issuing bank as long as such modifications are acceptable to the beneficiary in its reasonable discretion. Costs of a Letter of Credit shall be borne by the applicant for such Letter of Credit.

1.63 "Merger Event" means, with respect to a Party, that such Party consolidates or amalgamates with, or merges into or with, or transfers substantially all of its assets to another entity and (i) the resulting entity fails to assume all of the obligations of such Party hereunder or (ii) the benefits of any credit support provided pursuant to this Agreement fail to extend to the performance by such resulting, surviving or transferee entity of its obligations hereunder and such benefits are not replaced with equivalent credit support or (iii) the resulting entity's Credit Rating upon the occurrence of the Merger Event is lower than that of such Party immediately prior to such action and is not supplemented by credit support such that the resulting entity's credit is equal to or better than the predecessor entity.

1.64 "Minimum Production" has the meaning set forth in Section 4.8.

1.65 "Month" means a calendar Month. The term "Monthly" shall have a meaning correlative to a Month.

1.66 "Moody's" means Moody's Investor Services, Inc. or its successor.

1.67 "MW" or "MWh" means megawatt or megawatt hour, in each case rounded to the nearest whole MW or MWh.

1.68 "NAR" means the North American Renewables Registry.

1.69 "NAR Operating Procedures" means any and all guidelines, procedures, requirements and obligations established by the NAR, including the terms of use, operating procedures, and fee schedules, as such may be amended from time to time.

1.70 "Non-Defaulting Party" has the meaning set forth in Section 6.

1.71 "Notice" has the meaning set forth in Section 12.7.

1.72 "Notice to Proceed" means the written notice provided by Seller to the EPC Contractor to begin full (and not limited) procurement and construction activity at the Project site.

1.73 "Outage" means the period during which the Facility or a portion thereof is out of service.

1.74 "Outside Commercial Operation Date" has the meaning set forth in Section 4.2(b).

1.75 "Party" and "Parties" has the meaning set forth in the initial paragraph above.

1.76 “Planned Outage” means any Outage that is not a Forced Outage, and refers to the shutdown or unavailability of the Facility or a portion thereof for inspection or maintenance in accordance with an advance schedule.

1.77 “Production Measurement Period” has the meaning set forth in Section 4.8.

1.78 “Project” has the meaning set forth in Section 2.1.

1.79 “QRE” means the Qualified Reporting Entity as such term is defined in the NAR Operating Procedures.

1.80 “Quantity” means the actual quantity of Renewable Energy sold by Seller and purchased by and delivered to GPA pursuant to this Agreement. The Quantity shall be measured based on the metered data from the Seller Metering Equipment at the Delivery Point.

1.81 “Renewable Energy” means energy derived from a Renewable Energy Resource.

1.82 “Renewable Energy Credit” (“REC”) means the unit created to track kWh derived from an Eligible Renewable Energy Resources or kWh equivalent of Conventional Energy Resources displaced by Renewable Energy Resources.

1.83 “Renewable Energy Resource” means an energy resource that is replaced rapidly by a natural, ongoing process and that is not nuclear or fossil fuel.

1.84 “Replacement Price” means the price at which GPA, acting in a commercially reasonable manner, purchases electricity in place of Renewable Energy.

1.85 “S&P” means the Standard & Poor's Rating Group (a division of McGraw-Hill, Inc.) or its successor.

1.86 “SCADA” means “supervisory control and data acquisition” and shall refer to that category of software application program that can be used to gather data from the Facility remotely in real time in order to monitor Facility equipment and conditions.

1.87 “Schedule,” “Scheduled” or “Scheduling” means the actions of Seller, Buyer and/or their designated representatives, of notifying, requesting and confirming to each other the quantity and type of Renewable Energy to be delivered on any given day or days during the Delivery Period at a specified Delivery Point.

1.88 “Scheduled Commercial Operation Date” has the meaning set forth in Section 4.2(a).

1.89 “Seller” has the meaning set forth in the initial paragraph above.

1.90 “Seller Failure” has the meaning set forth in Section 5.1.

1.91 “Seller Failure Damages” has the meaning set forth in Section 5.1.

1.92 “Seller’s Interconnection Facilities” means Seller’s equipment as specified in the Interconnection Agreement.

1.93 “Seller Metering Equipment” means all metering equipment and data processing equipment used to measure the Quantity delivered to the Delivery Point.

1.94 “Shortfall Damages” has the meaning set forth in Section 4.8.

1.95 “Study” means the Renewable IFB System Impact Study (insert date & study contractor).

1.96 “Tax Benefits” means Renewable Energy related tax credits or other benefits, including those established under Section 45 and Section 48 of the Internal Revenue Code, as amended, or any similar or successor provision of the Internal Revenue Code.

1.97 “Term” has the meaning set forth in Section 12.1.

1.98 “Termination Damages” has the meaning set forth in Section 4.4.

1.99 “Test Energy” means non-firm Renewable Energy generated by the Facility prior to the Commercial Operation Date, subject to immediate interruption, fluctuations or reduction/increase with no prior Notice, due to unit performance.

1.100 “Transaction” means the transaction relating to the purchase or sale of Renewable Energy and Environmental Attributes as contemplated in this Agreement.

1.101 “Unit Contingent” means that the Renewable Energy is intended to be supplied from the Facility as it is produced.

1.102 “Weather Hours” means the total hours in any Production Measurement Period, as applicable, in which the Facility is derated as a result of cumulative weather conditions which are outside historical average conditions for any applicable Month during the Production Measurement Period in which the deration occurs, calculated in accordance with Appendix K.

ARTICLE TWO: COMMERCIAL TERMS2.1 Commercial Terms.

The following commercial terms apply to the Transaction that is the subject of this Agreement, each as more fully described herein:

Buyer: GPA	Seller:
Project: _____	
Delivery Point:	
Guaranteed Annual Production (MWhs): As set forth in the fifth column of <u>Appendix A</u>	Estimated Annual Production (Minimum Production): (MWhs): As Set forth in the third column of Appendix A
	Facility Capacity (MWs):
Delivery Period: 20 Contract Years with option of two(2) five-year extensions	Contract Price (\$/MWh): <u>See Appendix A</u>
Renewable Energy Type: Unit Contingent (solar) and associated RECs	Development Security: \$ _____
Day(s) of week: Monday through Sunday, including holidays	Hours: Hour Ending 0100 – Hour Ending 2400, Monday through Sunday Chamorro Standard Time (CHST), Guam time
Commercial Operation Date:	
Test Energy: Seller agrees to sell and Buyer agrees to purchase all Test Energy from the Facility. The price of such Test Energy shall be the current LEAC Rate. Test Energy shall be delivered in accordance with the Scheduling provisions contained herein. Both Parties agree that Seller will use Commercially Reasonable Efforts to pre-schedule the Test Energy, but Buyer shall nonetheless be obligated to accept all Test Energy up to _____ MW per hour of Test Energy. Seller shall provide to Buyer all RECs and other Environmental Attributes associated with the Test Energy produced by the Facility in accordance with <u>Section 4.16</u> .	

ARTICLE THREE: REPRESENTATIONS AND WARRANTIES

3.1 Mutual Representations and Warranties.

On the Effective Date of this Agreement, each Party represents and warrants to the other Party that:

- (a) It is duly organized, validly existing and in good standing under the laws of the jurisdiction of its formation;
- (b) It has all regulatory authorizations necessary for it to legally perform its obligations under this Agreement (other than permits or regulatory authorizations to be obtained by Seller for the construction, operation or maintenance of the Facility, which Seller reasonably anticipates it will be able to obtain in due course);
- (c) The execution, delivery and performance of this Agreement are within its powers, have been duly authorized by all necessary action and do not violate any of the terms and conditions in its governing documents, any contracts to which it is a party or any law, rule, regulation, order or the like applicable to it, and the Agreement constitutes its legally valid and binding obligation enforceable against it in accordance with its terms, subject to any equitable defenses.
- (d) It is not Bankrupt and there are no proceedings pending or being contemplated by it or, to its knowledge, threatened against it which would result in it being or becoming Bankrupt;
- (e) There is not pending or, to its knowledge, threatened against it or any of its Affiliates any legal proceedings that could materially adversely affect its ability to perform its obligations under this Agreement;
- (f) No Event of Default or potential Event of Default with respect to it has occurred and is continuing and no such event or circumstance would occur as a result of its entering into or performing its obligations under this Agreement; and
- (g) It is acting for its own account, has made its own independent decision to enter into this Agreement and as to whether this Agreement is appropriate or proper for it based upon its own judgment, is not relying upon the advice or recommendations of the other Party in so doing, and is capable of assessing the merits of and understanding, and understands and accepts, the terms, conditions and risks of this Agreement;

3.2 Seller Representations and Warranties.

Seller affirmatively represents and warrants to GPA that:

- (a) On the Effective Date of this Agreement, or in due course as required in accordance with the Scheduled Commercial Operation Date, Seller has (or reasonably expects to have in due course), good defensible title, or valid and effective leasehold rights in the case of leased property, to the Facility, free and clear of all liens, charges, claims, pledges, security interests, equities and encumbrances of any nature whatsoever other than the lien of current taxes not delinquent, liens, charges, claims, pledges, security, interests, equities and encumbrances relating to Facility Debt as provided for herein, or that are permitted by the Facility Debt, or that in the aggregate do not materially detract from or interfere with the ability of Seller to deliver the Quantity of the Renewable Energy;
- (b) All acts necessary to the valid execution, delivery and performance of this Agreement by Seller have or will be taken and performed as required under Seller's ordinances, operating agreement, or other regulations including, but not limited to (i) the valid authority of the person executing this Agreement to bind Seller and (ii) the Term of this

Agreement does not extend beyond any limitation applicable to Seller imposed by relevant governing documents and applicable law; and

- (c) Seller will have at the time of sale, title to and ownership of the RECs and Environmental Attributes sold hereunder.

3.3 GPA Representations and Warranties.

GPA represents and warrants that the board of directors of GPA has made all certifications required by the Guam Public Utilities Commission and the Guam legislature in order for GPA to execute this Agreement.

ARTICLE FOUR: PERFORMANCE REQUIREMENTS

4.1 Commercial Operation.

Seller shall achieve Commercial Operation of the Project no later than the Scheduled Commercial Operation Date, except to the extent such date is extended pursuant to Section 4.2, in which case Commercial Operation shall occur on or prior to the Outside Commercial Operation Date. Commercial Operation shall be achieved as of the date on which Seller certifies to Buyer in writing that each of the following conditions precedent has been satisfied or waived in writing by the Parties, as applicable ("Commercial Operation"):

- (a) Seller shall have obtained all governmental and regulatory authorizations, including any applicable permits, required for the construction, ownership, operation and maintenance of the Project and for the sale of the Renewable Energy therefrom (except for any permits or authorizations typically obtained after Commercial Operation and that Seller reasonably believes will be obtained in due course);
- (b) Seller and Buyer shall have entered into the Interconnection Agreement;
- (c) Seller shall have established SCADA information and real time data feed to enable GPA to view parameters or data points that relate to Facility availability, Renewable Energy data and other actual resource data for the Facility;
- (d) Seller shall be capable of delivering the Renewable Energy from the Facility to GPA at the Delivery Point.
- (e) Seller shall perform at its cost a capacity test in accordance with the protocol outlined in Appendix I to determine the capacity of the Facility ("Facility Test"). GPA shall receive the entire Renewable Energy from the Facility during such test as contemplated in Section 2.1. Renewable Energy deliveries during testing shall be measured at the Delivery Point.

GPA shall use all available Commercially Reasonable Efforts to assist Seller in achieving the Scheduled Commercial Operation Date. Seller shall present to GPA a certificate executed by its duly executed officer, and by an Independent Engineer as to items (d) and (e), verifying that each of the foregoing conditions has been satisfied or waived in writing by the Parties and Commercial Operation shall be deemed to have occurred upon the delivery of such certificate to GPA unless GPA objects to such certificate on the grounds that the condition has not been satisfied within ten (10) Business Days of delivery thereof and such objections are either agreed by Seller or resolved in favor of GPA pursuant to Section 12.9 hereof. Upon any acceptance or deemed acceptance of Seller's certificate by GPA, all conditions, set forth above shall no longer be a condition precedent to Commercial Operation of the Project. If the Commercial Operation Date does not occur on or before the Outside Commercial Operation Date, as such date may be extended in accordance with Section 4.2 herein; either Party shall have the right to terminate the Agreement upon written Notice to the other Party. In the event of such termination by either Party, GPA shall be entitled to Termination Damages set forth in Section 4.4; provided, however, that in accordance with Section 4.2(c), GPA shall not be entitled to such Termination Damages if the Outside Commercial Operation Date is not achieved due to a Force Majeure event or a GPA Delay.

4.2 Extension of Commercial Operation Date.

- (a) Planned Extension. The Parties agree that the Commercial Operation Date is expected to occur on or before [] ("Scheduled Commercial Operation Date"). Seller may elect to extend the Commercial Operation Date beyond the Scheduled Commercial Operation Date (the "COD Extension") by paying GPA for such extension (the "COD Extension Payment"). The COD Extension Payment shall be in the amount of fifty percent (50%) of the daily Shortfall Damages (based on ninety percent (90%) of the Minimum Production for the first Contract Year) per day for each day (or portion thereof) after but not including the date of the COD Extension until, but not including, the date on

which the Project actually achieves Commercial Operation. To extend the Commercial Operation Date, Seller must, as early as reasonably possible, but in no event later than fourteen (14) days prior to the first day of the proposed extension, provide GPA with Notice of its election to extend the Commercial Operation Date along with an estimate of the duration of the extension. The COD Extension Payment is in addition to and not to be considered part of the Development Security, and shall be paid to GPA in arrears on a monthly basis after delivery of the Notice hereunder. Seller's request to extend the Commercial Operation Date shall not be valid unless proper Notice and payment are timely received by GPA. No Event of Default shall be deemed to have occurred with respect to Seller's extension as provided herein, and GPA shall not have the right to terminate the Agreement or to receive Termination Damages with respect to such extension so long as Seller has provided the Notice, estimation and payment as provided in this Section 4.2(a). Seller may further extend the Commercial Operation Date beyond the original COD Extension, subject to the foregoing Notice, estimation and payment terms applicable to the original COD Extension.

Seller shall be entitled to a prompt refund, without interest, of any portion of the COD Extension Payment held by GPA which exceeds the amount required to cover the number of days by which the Commercial Operation Date was actually extended. In no event may Seller extend the Commercial Operation Date by more than six (6) months through the payment of the COD Extension Payment, except as provided in Section 4.2(b). In the event that the Project does not achieve Commercial Operation on or before the expiration of any COD Extension period as provided herein, either Party shall have the right to terminate the Agreement upon written Notice to the other, subject to any further extension rights pursuant to Sections 4.2(b) or (c) below. In the event of such termination by either Party in accordance with this provision, GPA shall be entitled to Termination Damages as set forth in Section 4.4 as its sole and exclusive remedy, subject to Section 4.2(c).

- (b) Unplanned Extension/Additional Planned Extension. In the event that (i) the Project does not achieve Commercial Operation by the Scheduled Commercial Operation Date and Seller fails to provide sufficient Notice and/or payment in order to extend the Commercial Operation Date as provided in Section 4.2(a), or (ii) the Commercial Operation Date shall not have occurred within the six (6) months extension period provided under Section 4.2(a), then Seller may still extend the Commercial Operation Date by paying GPA damages ("Daily Delay Liquidated Damages"). The Daily Delay Liquidated Damages shall be in the amount of one hundred percent (100%) of the Shortfall Damages (based on ninety percent (90%) of the Minimum Production for the first Contract Year) per day for each day (or portion thereof) after but not including the earlier of the dates set forth in sub-clauses (i) or (ii) above, or until, but not including, the date on which the Project actually achieves Commercial Operation, and shall be payable on a monthly basis in arrears within ten (10) Business Days following receipt of an invoice from GPA for any such Daily Delay Liquidated Damages. No Event of Default shall be deemed to have occurred with respect to Seller's extension as provided herein and GPA shall not have the right to terminate the Agreement with respect to such extension or to receive Termination Damages so long as Seller has extended the Commercial Operation Date and pays the Daily Delay Liquidated Damages as provided in this Section 4.2(b).

In the event that the Project does not achieve Commercial Operation on or before twelve (12) months from the Scheduled Commercial Operation Date (as extended pursuant to this Agreement, the "Outside Commercial Operation Date"), then either Party shall have the right to terminate the Agreement upon written Notice to the other, subject to any further extension rights pursuant to Section 4.2(c) below. In the event of such termination by either Party in accordance with this provision, GPA shall be entitled to Termination Damages as set forth in Section 4.4 as its sole and exclusive remedy, subject to Section 4.2(c).

- (c) Force Majeure and GPA Delay Extension. The Scheduled Commercial Operation Date and the Outside Commercial Operation Date shall also be extended, without payment or other penalty, on a day-for-day basis for each day of delay caused by reason of Force Majeure (a “Force Majeure Extension”) or by reason of GPA Delay. Any Force Majeure Extension or GPA Delay shall also extend the period of any planned or unplanned extensions pursuant to Sections 4.2(a) or (b) on a day-for-day basis for each day during the Force Majeure Extension or GPA Delay, and Seller shall not be required to pay any COD Extension Payments or Daily Delay Liquidated Damages, as applicable, for any days during the Force Majeure Extension or GPA Delay. Notwithstanding any other provision in this Agreement, if, due solely to a Force Majeure event, the Project does not achieve Commercial Operation on or before the Outside Commercial Operation Date, then the Parties by mutual agreement may terminate this Agreement without penalty or further obligation to either Party, and after one hundred and eighty (180) days following the Outside Commercial Operation Date, either Party may unilaterally terminate this Agreement without penalty or further obligation to either Party. For the sake of clarity,
- (i) in the event of any such termination, GPA shall not be entitled to Termination Damages, and (ii) Seller shall be entitled to any remedies available under Section 6.3 in the case of delays caused by GPA Delays, including reimbursement for (i) the cost of network upgrades and interconnection costs incurred by Seller, (ii) costs incurred under construction, equipment and other contracts entered into in connection with the development and construction of the Facility, and (iii) Seller’s costs and expenses in connection with the Facility and its performance under this Agreement.

4.3 Financing Arrangement Deadline.

Seller shall make Commercially Reasonable Efforts to (i) secure a third party financing sufficient for the successful completion of the Project as soon as practicable, and (ii) procure a binding credit agreement for such financing be executed no later than one (1) year after the Effective Date (the “Financing Arrangement Deadline”) unless extended by written agreement of the Parties. Seller shall provide GPA with a copy of the executed credit agreement within three (3) Business Days after the execution of such credit agreement (the date on which GPA receives such copy is hereinafter referred to as the “Financing Arrangement Provision Date”).

In the event that Seller fails to procure the execution of a binding credit agreement by the Financing Arrangement Deadline, GPA may terminate the Agreement and shall be entitled to Termination Damages set forth in Section 4.4 as its sole and exclusive remedy unless such Financing Arrangement Deadline is extended under other provisions of this Agreement, including Section 4.11.

4.4 Termination Damages.

Prior to the Commercial Operation Date, Seller may terminate this Agreement at any time for its convenience. GPA shall be entitled to termination damages, payable solely from the Bid Security or the Development Security established in Section 9.1 (as applicable) (“Termination Damages”), in the amounts set forth in the table below, if: (a) subject to the last sentence of this Section 4.4, Seller terminates the Agreement prior to the Commercial Operation Date for any reason other than: (i) a Force Majeure event (ii) a GPA Delay, or (iii) an Event of Default by GPA; and/or (b) GPA terminates the Agreement as a result of Seller failing to achieve the Commercial Operation Date on or prior to the Scheduled Commercial Operation Date, as the same may have been extended pursuant to Section 4.2, and subject to Section 4.2. The Termination Damages are designed to help compensate GPA for, among other things, transactions that it did not consummate because it relied on this Agreement with Seller, and GPA’s potential failure to meet its applicable renewable energy portfolio requirements and do not constitute a penalty payment. Accordingly, Seller shall pay to GPA, in cash or from the Development Security, Termination Damages in the following amounts, based upon when the termination occurs:

Up to Financing Arrangement Provision
Date

Up to Six (6) months after Financing
Arrangement Provision Date

100% of the Bid Security	Twelve (12) months after Financing Arrangement Provision Date forward: 75% of Development Security
50% of the Development Security	
Twelve (12) months after Financing Arrangement Provision Date from Six (6) months after Financing Provision Date	100% of Development Security

No later than five (5) Business Days after the Financing Arrangement Provision Date, GPA shall return the Bid Security to Seller, to the extent GPA has not validly claimed the Bid Security in respect of Termination Damages on or prior to _____. Notwithstanding the foregoing, in the event that Seller terminates this Agreement for any reason prior to the posting date for the Development Security as set forth in Section 9.1 herein, then Seller shall owe GPA no Termination Damages and such termination shall be without penalty to Seller.

4.5 Seller's and Buyer's Obligations.

Subject to Appendix H, Seller shall sell and deliver, or cause to be delivered, and GPA shall purchase and receive, or cause to be received, all Renewable Energy generated by the Facility, at the Delivery Point, and GPA shall pay Seller the Contract Price for such Quantity of Renewable Energy as measured by the Seller Metering Equipment at the Delivery Point; provided that for quantities of Renewable Energy in excess of 105% of the Estimated Annual Production, as shown in the third column of Appendix A, which are not make-up quantities for delivery deficiencies in prior Production Measurement Periods pursuant to Section 4.8, the price payable by GPA shall be the lower of the Contract Price and the LEAC Rate. For Seller's failure to deliver Renewable Energy as required hereunder, GPA's remedies shall be as set forth in Section 4.8. For GPA's failure to purchase and receive Renewable Energy as required hereunder, if Seller's damages are less than \$10,000 then Seller's remedies shall be as set forth in Appendix K. For damages in excess of that amount, Seller shall in addition have all other remedies available at law or in equity. Seller shall be responsible for any costs or charges imposed on or associated with the Renewable Energy or its delivery up to the Delivery Point. GPA shall be responsible for any costs or charges imposed on or associated with Renewable Energy or its receipt at and from the Delivery Point. Title to and risk of loss of Renewable Energy from the Facility delivered to the Delivery Point shall transfer to GPA at the Delivery Point. Seller warrants that it will deliver to Buyer Renewable Energy free and clear of all liens, security interests, claims and encumbrances or any interest therein or thereto by any person arising prior to the Delivery Point. Notwithstanding the foregoing Seller's obligation to supply and sell, and GPA's obligation to accept and purchase, Renewable Energy shall be limited to such Renewable Energy that is actually deliverable from the Facility to the Delivery Point during such period.

4.6 Operation of Facility.

Seller shall operate and maintain the Facility in accordance with Good Utility Practices.

4.7 [Reserved].

4.8 Minimum Production.

The Facility is expected to produce a minimum number of MWhs of Renewable Energy in each one (1) Contract Year period as set forth in the third column of Appendix A (such annual MWh production is the "Minimum Production"). Seller during the Delivery Period shall (i) during each such Contract Year period, deliver to GPA at least ninety percent (90%) of the Minimum Production (which calculated amounts are set forth in the fourth column of Appendix A), and for any consecutive five (5) Contract Years during the Delivery Period, deliver to GPA at least one hundred percent (100%) of the aggregate Minimum Production (which calculated amounts are set forth in Appendix A) during such period (any such time period a "Production Measurement Period" and each such guaranteed amount of delivered Renewable Energy during any Production Measurement Period, the "Guaranteed

Output”). Any shortfall of Renewable Energy deliveries to Buyer from the applicable Guaranteed Output during a Production Measurement Period shall be deemed a “Deficiency Amount”.

GPA shall be entitled to receive damages for any Deficiency Amount (“Shortfall Damages”) which are not due to Excused Hours or Weather Hours (except, in the case of Weather Hours, as set forth below). GPA shall calculate such Shortfall Damages as follows (and in accordance with the example set forth in Schedule III to Appendix K):

$$\text{Shortfall Damages} = \text{Deficiency Amount} \times \text{Incremental Price.}$$

For purposes of clarity, if Actual Renewable Energy for any given Production Measurement Period is less than the Guaranteed Output for that period (even if due to Excused Hours or Weather Hours), there shall be a “shortfall”, and Seller shall be entitled to deliver to GPA energy in that amount in subsequent Performance Measurement Periods, and this Agreement may be extended as necessary for a period of up to six (6) months in order to provide Seller with the opportunity to deliver Renewable Energy to Buyer up to the amount of the Deficiency Amount that would not otherwise be eligible for sale to Buyer under this Agreement. There shall be no Shortfall Damages owing to GPA for any Performance Measurement Period unless such Actual Renewable Energy is less than the Guaranteed Output amount for that Performance Measurement Period, and such shortfall is not due to Excused Hours or Weather Hours (except, in the case of Weather Hours, as set forth below).

In the event Shortfall Damages are due for a Production Measurement Period of five (5) rolling Contract Years, then such Shortfall Damages shall be reduced by the amount of any Shortfall Damages previously paid for any Contract Year during such five (5) year Production Measurement Period. Seller’s payment of Shortfall Damages shall be Seller’s sole liability and obligation, and GPA’s sole right and remedy, with respect to Seller’s failure to deliver the Guaranteed Output during any Production Measurement Period.

To the extent any Deficiency Amount is due to Weather Hours, Seller’s sole liability and GPA’s sole remedy shall be to deliver thereafter Renewable Energy equal to such Deficiency Amount attributable to Weather Hours, calculated in accordance with Appendix K (which includes a sample calculation for a hypothetical Production Measurement Period). If any portion of a Deficiency Amount due to Weather Hours is not made up in the five (5) Contract Years beginning in the first Contract Year following the Performance Measurement Period in which the Weather Hours Deficiency Amount occurred. The Contract Price for such Renewable Energy shall be the Contract Price in effect in the Contract Year of delivery. Deficiency Amount due to weather shall not be penalized.

Seller shall be entitled to sell, and GPA shall purchase, quantities of Renewable Energy for which Shortfall Damages are paid hereunder (the “Make-up Renewable Energy”), during any remaining Production Measurement Period during the Delivery Period. The price for the Make-up Renewable Energy shall be the Contract Price in effect at time of the supply of such Make-up Renewable Energy. During any Contract Year, all Renewable Energy delivered by Seller to GPA in excess of the Guaranteed Output shall be credited against makeup of any outstanding Deficiency Amounts, with oldest Deficiency Amounts made up first.

To the extent any Deficiency Amount is due to Excused Hours, Seller shall be excused from any liability with respect thereto.

4.9 Facility Testing.

In addition to the Facility Test referenced in Section 4.1(e), the capacity of the Facility shall be tested during each Contract Year during the Delivery Period (the “Annual Facility Test”). Seller shall notify GPA of the specific date on which it intends to conduct the Annual Facility Test at least ten (10) Business Days in advance and shall permit GPA to be present at such test. GPA shall have the right to receive copies of the results of the Annual Facility Test, which shall be conducted in accordance with the protocol set forth in Appendix I. Any dispute regarding the results of the Annual Facility Test shall be resolved as set forth in Section 12.9 of this Agreement. GPA shall receive, in accordance with Section 4.5, the entire Renewable Energy from the Facility during any Annual Facility Test or re-test. Renewable Energy deliveries during testing shall be measured at the Delivery Point.

4.10 Scheduling.

Seller agrees to supply at the Delivery Point all Renewable Energy produced by the Project, net of Renewable Energy self-generated and consumed at the Facility and net of any generation losses prior to the Delivery Point, up to the Facility Capacity, in accordance with the scheduling and coordination procedures set out in Appendix H. GPA agrees to take at the Delivery Point all Renewable Energy tendered by Seller in accordance with the foregoing sentence.

The Schedules and estimates provided pursuant to Appendix H shall be made by Seller in good faith and based on information available to it at such time, but in no event shall such Schedules be binding on Seller nor shall Seller be liable for any inaccuracies in such Schedules.

4.11 Force Majeure.

To the extent either Party is prevented by Force Majeure from carrying out, in whole or part, its obligations under this Transaction and such Party (the "Claiming Party") gives Notice and details of the Force Majeure to the other Party promptly upon the occurrence of the Force Majeure event, then the Claiming Party shall be excused from the performance of its obligations with respect to such Transaction (other than the obligation to make payments then due or becoming due hereunder). The Claiming Party shall exercise Commercially Reasonable Efforts to remedy the Force Majeure with all reasonable dispatch. The non-Claiming Party shall not be required to perform or resume performance of its corresponding obligations to the Claiming Party (other than the obligation to make payments then due or becoming due hereunder) until the Claiming Party resumes its performance. If the Force Majeure event extends for three hundred and sixty-five (365) days, either Party may terminate this Agreement without further obligation by either Party, except as to costs and liabilities incurred prior to the termination date and obligations under the Agreement which survive termination by nature of the obligation.

4.12 Facility Outages and Maintenance Scheduling.

- (a) Planned Outages. Seller shall provide written Notice to GPA prior to conducting any Planned Outages of the Facility. Within ninety (90) days prior to the Commercial Operation Date, as the same may be extended in accordance with the provisions of Section 4.2, and on or before the first day of each subsequent Contract Year, Seller shall provide GPA with a schedule of such proposed Planned Outages in accordance with Appendix H. The proposed Planned Outages schedule shall be submitted electronically to GPA, using a reasonably acceptable format provided by GPA. Such format is subject to change from time-to-time during the Term of this Agreement by agreement of the Parties, but will generally describe the nature of the Outage, the expected duration, and any other pertinent information that will assist GPA in planning for the decreased output and/or availability of the Facility as a result of the Outage.

GPA shall promptly review Seller's proposed schedule and may request modifications within thirty (30) days of GPA's receipt of such schedule. Changes to the schedule may be requested by either Party and each Party shall make Commercially Reasonable Efforts to accommodate such changes, provided further that Seller shall have no obligation to agree to GPA's proposed modifications or revisions to any Planned Outage schedule.

- (b) Forced Outages. In the event of any Forced Outage, Seller shall promptly notify GPA of the same. Seller shall as quickly as practicable notify GPA verbally and shall then, within twenty-four (24) hours thereafter, provide written Notice to GPA of the Forced Outage (the "Forced Outage Notice"). The Forced Outage Notice shall be submitted electronically to GPA, using a reasonably acceptable format provided by GPA. Such format is subject to change from time-to-time during the Term of this Agreement by agreement of the Parties, but will generally describe the nature of the Outage, the expected duration, and any other pertinent information that will assist GPA in planning for the decreased output and/or availability of the Facility as a result of the Outage. Seller shall return the Facility to service as soon as possible, consistent with Good Utility Practices, after the Forced Outage ceases to exist.

- (c) GPA Parts Inventory. To the extent GPA maintains an inventory of parts or components that are used or useful in the Facility and provided it can prudently do so under its own ordinary course operating practices and restrictions, GPA shall cooperate with Seller in a Commercially Reasonable manner by making such parts or components available to Seller at its request during the period of time Seller is obtaining replacement parts or components for the Facility in order to maximize output of Renewable Energy. If Seller obtains a replacement part or component from GPA, it shall at GPA's option either replace such part or component with the new part or component ordered by Seller or return the borrowed part or component to GPA at such time as Seller obtains the replacement. Seller shall bear the installation, transportation and labor charges relating to GPA's replacement parts or components, and if the parts or components are returned to GPA then Seller shall reimburse GPA for any damage to such parts or components while in Seller's possession.

4.13 Operating Status Reports.

From the Effective Date of this Agreement, through the date of Commercial Operation, Seller shall provide GPA with Monthly reports regarding material data pertaining to the operation of the Facility. The operations data is generally identified as performance, Outage, and risk data and shall be sent electronically to GPA using a reasonably acceptable format provided by GPA. The operations data report format may be modified by agreement of the Parties from time-to-time during the Term of this Agreement.

4.14 Resource Quality Reporting: Forecasting.

Seller shall provide to GPA at its request copies of non-proprietary resource quality data in Seller's possession that could reasonably be expected to affect, in any material manner, the operation and/or productivity of the Facility, whether produced, compiled or otherwise generated by Seller or any third party in a Commercially Reasonable manner, so that GPA can evaluate the expected performance of the Facility. Seller shall provide such data as it is produced or otherwise made available to Seller. Upon Commercial Operation of the Facility, to the extent generated or procured by Seller, Seller shall also provide to GPA Monthly and day-ahead forecasting information for the Facility. Such information shall be in a format agreed to by the Parties and include, among other things: Seller's forecasts for the performance of the Facility based on Facility specifications, weather-based forecasting, and weather-related studies. Such information, which will be used by GPA solely for evaluation, Scheduling, and other purposes related to this Agreement, shall be provided as available. In no event shall the data and/or information provided to GPA pursuant to this Section 4.14 be binding upon Seller, nor shall Seller be liable for any penalties, charges or other damages based on the inaccuracy of such data or information.

4.15 Permit Violations.

Seller shall at all times during the Term of this Agreement maintain and comply in all material respects with all applicable permits for the development, ownership and maintenance of the Facility.

4.16 Delivery of RECs and Environmental Attributes.

- (a) Use of North American Renewables Registry. At least ten (10) days prior to COD, Seller shall transfer to GPA the authority to create, own and transfer all Environmental Attributes associated with the Renewable Energy produced by the Facility, by executing and delivering the form entitled "Generator Owner's Designation of Responsible Party" published by NAR, wherein Seller shall designate GPA as the "responsible party" for all matters relating to the creation, ownership, and transfer of RECs and Environmental Attributes from the Facility. Thereafter, GPA shall be responsible for all obligations relating to creating and transferring RECs and Environmental Attributes from the Facility and Seller shall have no further obligations or liabilities with respect thereto, provided, however, that Seller shall reimburse to GPA its costs of creating and maintaining the NAR account and NAR's fees charged to transfer the RECs and Environmental Attributes, up to an aggregate maximum amount of \$5,000 per annum. In the event this

Agreement is terminated or suspended for any reason, the Parties agree to each consent to the termination of such designation in accordance with NAR procedures.

- (b) GPA Registration as a QRE. GPA shall be the QRE for the Facility as required by NAR and shall comply with any and all NAR Operating Procedures relating to the registration and operation as a QRE and the reporting of generation data from the Facility to NAR. As the QRE, each month upon receipt of an invoice and associated interval metering data from Seller in accordance with Section 7.5 herein, GPA shall report such data to NAR within three (3) Business Days following receipt of such data. The Parties shall cooperate to ensure that the Seller Metering Equipment and the resulting interval metering data meet the NAR requirements for metering equipment and generation data.
- (c) Change Event. During the Term, in the event that (i) the NAR Operating Procedures are amended or changed such that it becomes impossible for the Parties to utilize NAR as the REC tracking method and/or for GPA to continue as “responsible party” for purposes of creating, owning and transferring RECs and Environmental Attributes attributable to the Facility; (ii) the fees or charges imposed by NAR on either Seller or GPA to utilize the NAR REC tracking system are materially increased such that use of the NAR REC tracking system becomes uneconomic or infeasible; or (iii) the NAR REC tracking system is eliminated (each one individually, a “Change Event”), then the Parties shall promptly negotiate in good faith to reform the terms of this Agreement in order to give effect to the original intention of the Parties to the extent reasonable under the circumstances, including utilizing an alternative method for transferring RECs to GPA, but in no case shall Seller’s cost with respect thereto exceed \$5,000 per annum.

4.17 Allowable GPA Curtailment Interim Period

[Subject to Final System Impact Study this section may be required]

For any day during the contract term prior to _____, GPA will be allowed to curtail the Seller’s Output due to low loads which may impact stable operations of the GPA electric grid system. GPA will not be required to pay for any curtailments during this period. This will be defined in the Interconnection Agreement.

4.18 Energy Shifting

Seller shall be required to use ESS for the purpose of delivering solar produced energy at a different period of time than its production period. Delivered energy shall be at a firm output with a 1% ramp minimum output. GPA shall receive all of the stored renewable before the next solar production period.

4.19 Ramp Rate Control Performance.

During the Delivery Period, Seller shall cause the Energy Storage System to comply with the performance guarantees for ramp rate control set forth on Appendix C (the “Ramp Rate Control Performance Guarantees”). If the Energy Storage System fails to meet the Ramp Rate Control Performance Guarantees over the time periods set forth in Appendix C, GPA may provide written notice to Seller of the failure to meet the Ramp Rate Control Performance Guarantees and a request for Seller to take steps needed for the Energy Storage System to meet the Ramp Rate Control Performance Guarantees. In response to such a notice, Seller shall, within two (2) weeks from the date of such notice, provide GPA with a written remedial action plan that provides a detailed description of Seller’s course of action and plan to meet the Ramp Rate Control Performance Guarantees and shall take steps to implement such remedial action within six (6) months of the date of such action plan; provided, however, GPA shall not be entitled to such a remedial action plan if the failure to achieve the Ramp Rate Control Performance Guarantees is due to a Force Majeure event, GPA Delay or an Event of Default by GPA. Seller’s sole obligation with respect to any deficiency in the Ramp Rate Control Performance Guarantees is to follow its remedial action plan.

If ramp rate is greater than 3 MW/minute seller shall reduce plant output until ramp rate is less than 2 MW/minute. If system issues remain, GPA reserves the right to restrict Seller’s plant output until seller restores

operation with a ramp rate less than 2 MW/minute. The Interconnection Agreement shall define conditions for Seller's plant reduction and implementation of GPA's restrictions.

ARTICLE FIVE: SELLER FAILURE**5.1 Seller Failure.**

In the event Seller fails to deliver to GPA any Quantity of Renewable Energy to which GPA is entitled in accordance with the terms of this Agreement and instead sells such Quantity of Renewable Energy to which GPA is entitled to a third party in violation of this Agreement (“Seller Failure”), then Seller shall pay to GPA the “Seller Failure Damages,” which shall mean the positive difference, if any, between the Replacement Price and the Contract Price for the period of such Seller failure, times such Quantity of Renewable Energy. GPA shall calculate the Seller Failure Damages and shall provide to Seller an invoice for such amount, including a written statement explaining in reasonable detail the calculation of such amount. Seller shall pay the Seller Failure Damages not later than ten (10) days following its receipt of such an invoice from GPA. If the Replacement Price is less than the Contract Price, then the Seller Failure Damages are deemed to be zero. The Seller Failure Damages represent the sole and exclusive remedy for Seller’s failure as described herein, except as provided in Section 6.1(h).

ARTICLE SIX: EVENTS OF DEFAULT; REMEDIES

6.1 Events of Default.

An “Event of Default” shall mean, with respect to a Party (a “Defaulting Party”), the occurrence of any of the following:

- (a) The failure to make, when due, any payment required pursuant to this Agreement if such failure is not remedied within three (3) Business Days after written Notice;
- (b) Any representation or warranty made by such Party herein is false or misleading in any material respect when made or when deemed made or repeated, if such failure is not remedied within thirty (30) Business Days after written Notice, or such longer time, not to exceed ninety (90) Business Days, as is reasonably required to remedy such failure, provided the Defaulting Party is employing Commercially Reasonable Efforts to achieve the remedy;
- (c) The failure to perform any material covenant or obligation set forth in this Agreement (except to the extent constituting a separate Event of Default and except for such Party’s obligations to deliver or receive the Renewable Energy, the remedies for which are provided in Article Five) if such failure is not remedied within thirty (30) Business Days after written Notice, or such longer time, not to exceed ninety (90) Business Days, as is reasonably required to remedy such failure, provided the Defaulting Party is employing Commercially Reasonable Efforts to achieve the remedy;
- (d) Such Party becomes Bankrupt (or if the Bankruptcy is involuntary, the failure of such Party to achieve dismissal of the Bankruptcy within ninety (90) days);
- (e) A Merger Event occurs with respect to such Party;
- (f) If during the Term of this Agreement there have occurred three (3) or more Seller Failures as that term is used in Section 5.1;
- (g) With respect to Seller, a material permit violation occurs and such violation is not remedied within thirty (30) Business Days after Notice by either GPA or the relevant permitting authority, or such longer time, as is reasonably required to remedy such failure, provided the Defaulting Party is employing Commercially Reasonable Efforts to achieve the remedy; and
- (h) With respect to Seller, failure to maintain the Development Security and failure to reinstate the same within thirty (30) Business Days after Seller’s receipt of written Notice thereof from GPA.

6.2 Declaration of an Early Termination Date.

If an Event of Default with respect to a Defaulting Party shall have occurred on or after the Commercial Operation Date and be continuing, the other Party (the “Non-Defaulting Party”) shall have the right but not the obligation to: (i) designate a day, no earlier than the day such Notice is effective and no later than twenty (20) days after such Notice is effective, as an early termination date (“Early Termination Date”) to accelerate all amounts owing between the Parties and to liquidate and terminate this Agreement between the Parties; (ii) withhold any payments due to the Defaulting Party under this Agreement as setoff against termination costs and liabilities as determined herein (and until such amounts are determined); and (iii) suspend its performance under this Agreement.

6.3 Suspension of Performance and Other Remedies.

Except as otherwise expressly provided in this Agreement, if an Event of Default shall have occurred and be continuing, the Non-Defaulting Party, upon written Notice to the Defaulting Party, shall have the right (i) to suspend performance under this Agreement; and (ii) to the extent an Event of Default shall have occurred and be continuing to exercise any remedy available at law or in equity including any specific remedies set forth in this Agreement; provided, however, that any damages shall include only the direct actual damages incurred by the Non- Defaulting Party as provided in Section 8.1, and Seller's aggregate total liability hereunder shall not exceed the amounts set forth in Section 4.4 prior to the Commercial Operation Date.

ARTICLE SEVEN: PAYMENT AND NETTING

7.1 Billing Period.

Unless otherwise specifically agreed upon by the Parties, the calendar Month shall be the standard period for all payments under this Agreement. No later than the tenth (10th) day after the end of each Month, each Party will render to the other Party an invoice (in the case of Seller, such invoice being rendered in accordance with Section 7.5) for the payment obligations of the non-invoicing Party, if any, incurred hereunder during the preceding Month.

7.2 Timeliness of Payment.

Unless otherwise agreed by the Parties, all invoices under this Agreement shall be due and payable in accordance with each Party's invoice instructions on or before the later of the _____ (the) day of each Month, or if later the tenth (10th) day after receipt of the invoice or, if such day is not a Business Day, then on the next Business Day. Each Party will make payments by electronic funds transfer, or by other mutually agreeable method(s), to the account designated by the other Party. Any amounts not paid by the due date will be deemed delinquent and will accrue interest at the Interest Rate, such interest to be calculated from and including the due date to but excluding the date the delinquent amount is paid in full.

7.3 Disputes and Adjustments of Invoices.

A Party may, in good faith, dispute the correctness of any invoice or any adjustment to an invoice, rendered under this Agreement or adjust any invoice for any arithmetic or computational error within twelve (12) Months of the date the invoice, or adjustment to an invoice, was rendered. In the event an invoice or portion thereof, or any other claim or adjustment arising hereunder, is disputed, payment of the undisputed portion of the invoice shall be required to be made when due, with Notice of the objection given to the other Party. Any invoice dispute or invoice adjustment shall be in writing and shall state the basis for the dispute or adjustment. Except as otherwise provided in this Agreement, payment of the disputed amount shall not be required until the dispute is resolved. Upon resolution of the dispute, any required payment shall be made within two (2) Business Days of such resolution along with interest accrued at the Interest Rate from and including the due date to but excluding the date paid. Inadvertent overpayments shall be returned upon request or deducted by the Party receiving such overpayment from subsequent payments, with interest accrued at the Interest Rate from and including the date of such overpayment to but excluding the date repaid or deducted by the Party receiving such overpayment. Any dispute with respect to an invoice is waived unless the other Party is notified in accordance with this Section 7.3 within twelve (12) Months after the invoice is rendered or any specific adjustment to the invoice is made. If an invoice is not rendered within twelve (12) Months after the close of the Month during which performance of a Transaction occurred, the right to payment for such performance is waived.

7.4 Metering and Other Facilities.

Seller shall be responsible, at its sole expense, for providing the Seller Metering Equipment in accordance with Good Utility Practices. In accordance with the terms of the Interconnection Agreement, the Seller may elect to have GPA provide Seller with the Seller Metering Equipment; provided, however, the cost of such meters shall be borne solely by Seller at no cost to GPA. Seller shall be solely responsible for operating, maintaining, and repairing the Seller Metering Equipment at its own expense throughout the Term of this Agreement. Seller shall inspect and test the Seller Metering Equipment upon its installation and at least once every year at Seller's expense. Seller shall give GPA reasonable advance Notice of any test, and promptly provide GPA with the results of any such test. GPA may observe the test and conduct its own tests, at GPA's expense, to verify Seller's procedures and results. GPA shall give Seller reasonable advance Notice of any such test, and may observe the tests. GPA shall provide Seller with the results of any test by GPA promptly upon receipt of the results. Access by GPA for any such testing shall be in compliance with Section 12.4.

Upon an inaccurate read of the Seller Metering Equipment or if Seller knows of any inaccuracy or material defect in Seller Metering Equipment, Seller shall notify GPA in writing within forty-eight (48) hours of such defect. Seller shall be solely responsible for adjusting, repairing, replacing or recalibrating such metering device as near as practicable to a condition of zero (-0-) error, and for paying any expenses associated with such adjustment, repair,

replacement or recalibration. If a metering device fails to register or is found upon testing to be inaccurate, an adjustment will be made correcting all measurements by the inaccurate or defective metering device in the following manner:

- (a) In the event that an adjustment factor cannot be reliably calculated, the Parties shall use the measurements from GPA-owned meters if they are installed, fully operational and calibrated in accordance with Good Utility Practices. If for any reason the measurements cannot be obtained from GPA-owned meters, the Parties shall use data from Seller's computer monitoring system to determine the relevant measurements. If Seller's computer monitoring system is found to be inaccurate by more than two (2) percent, the Parties shall estimate the amount of the necessary adjustment using the site meteorological information for the period of the inaccuracy based upon deliveries of Renewable Energy delivered to GPA at the Delivery Point from the Facility during periods of similar operating conditions when the Seller Metering Equipment was registering accurately. The adjustment will be made for the period during which inaccurate measurements were made.
- (b) If the Parties cannot agree on the actual period during which the inaccurate measurements were made, the period during which the measurements are to be adjusted will be the shorter of: (1) the last one-half of the period from the last previous test of the metering device to the test that found the metering device to be defective or inaccurate; or (2) the one hundred and eighty 180-day period immediately preceding the test that found the metering device to be defective or inaccurate.
- (c) Upon determination of corrected measurements, the required payment adjustment shall be made according to the procedures set forth in Section 7.3.

DISCUSS SYSTEM IMPACT REQUIREMENTS HERE – Interconnection and Network Upgrades

7.5 Invoices.

Seller shall maintain and read the Seller Metering Equipment for measuring the Renewable Energy delivered hereunder. For review purposes, Seller shall furnish GPA with a written invoice reflecting the Contract Price; interval data from the Seller Metering Equipment used to calculate that invoice; and any other charges due, within ten (10) Business Days after Seller reads the Seller Metering Equipment. Such invoices may be furnished to GPA by facsimile transmission or by such other method as the Parties agree.

ARTICLE EIGHT: LIMITATIONS**8.1 Limitation of Remedies, Liability and Damages.**

EXCEPT AS SET FORTH HEREIN, THERE ARE NO WARRANTIES BY EITHER PARTY UNDER THIS AGREEMENT, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY AND ALL IMPLIED WARRANTIES ARE DISCLAIMED. THE PARTIES CONFIRM THAT THE EXPRESS REMEDIES AND MEASURES OF DAMAGES PROVIDED IN THIS AGREEMENT SATISFY THE ESSENTIAL PURPOSES HEREOF. FOR BREACH OF ANY PROVISION FOR WHICH AN EXPRESS REMEDY OR MEASURE OF DAMAGES IS PROVIDED HEREIN, SUCH EXPRESS REMEDY OR MEASURE OF DAMAGES SHALL BE THE SOLE AND EXCLUSIVE REMEDY AND THE OBLIGOR'S LIABILITY SHALL BE LIMITED AS SET FORTH IN SUCH PROVISION AND ALL OTHER REMEDIES OR DAMAGES AT LAW OR IN EQUITY ARE WAIVED. IF NO REMEDY OR MEASURE OF DAMAGES IS EXPRESSLY PROVIDED HEREIN OR IN A TRANSACTION, THE OBLIGOR'S LIABILITY SHALL BE LIMITED TO DIRECT ACTUAL DAMAGES ONLY, SUCH DIRECT ACTUAL DAMAGES SHALL BE THE SOLE AND EXCLUSIVE REMEDY AND ALL OTHER REMEDIES OR DAMAGES AT LAW OR IN EQUITY ARE WAIVED. UNLESS EXPRESSLY HEREIN PROVIDED, NEITHER PARTY SHALL BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, PUNITIVE, EXEMPLARY OR INDIRECT DAMAGES, LOST PROFITS OR OTHER BUSINESS INTERRUPTION DAMAGES, BY STATUTE, IN TORT OR CONTRACT, UNDER ANY INDEMNITY PROVISION OR OTHERWISE. IT IS THE INTENT OF THE PARTIES THAT THE LIMITATIONS HEREIN IMPOSED ON REMEDIES AND THE MEASURE OF DAMAGES BE WITHOUT REGARD TO THE CAUSE OR CAUSES RELATED THERETO, INCLUDING THE NEGLIGENCE OF ANY PARTY, WHETHER SUCH NEGLIGENCE BE SOLE, JOINT OR CONCURRENT, OR ACTIVE OR PASSIVE. TO THE EXTENT ANY DAMAGES REQUIRED TO BE PAID HEREUNDER ARE LIQUIDATED, THE PARTIES ACKNOWLEDGE THAT THE DAMAGES ARE DIFFICULT OR IMPOSSIBLE TO DETERMINE, OR OTHERWISE OBTAINING AN ADEQUATE REMEDY IS INCONVENIENT AND THE DAMAGES CALCULATED HEREUNDER CONSTITUTE A REASONABLE APPROXIMATION OF THE HARM OR LOSS.

Notwithstanding the foregoing, if GPA is the Defaulting Party, the Parties agree that the actual damages recoverable to Seller hereunder on account of an Event of Default by GPA shall include loss of Tax Benefits on a grossed up after tax basis, using the highest applicable United States marginal personal income tax rate.

Any assets transferred to GPA as required by the Interconnection Agreement shall require a one year warranty on all construction work and extension of any manufacturer warranties from the transfer of such assets.

ARTICLE NINE: CREDIT AND COLLATERAL REQUIREMENTS

9.1 Development Security.

In order to secure Seller's obligations prior to Commercial Operation of the Facility, Seller shall post a Letter of Credit or cash in the amount of \$_____ (the "Development Security"). The Development Security shall be held by GPA as security for Seller's obligations prior to the Commercial Operation Date under the Agreement. To the extent permitted under Section 4.4, GPA may draw on the Development Security at any time prior to the Commercial Operation Date, but only in the amounts and according to the schedule set forth in Section 4.4. Seller shall post the Development Security in accordance with the following terms and conditions:

- (a) Seller shall post the Development Security within ten (10) Business Days from the date when a binding credit agreement is executed pursuant to Section 4.3 but no later than the Financing Arrangement Deadline.
- (b) If the Development Security is posted as a Letter of Credit, it shall be in substantially the form attached hereto as Appendix F, respectively with such changes thereto as may be approved by Buyer and Seller in their reasonable discretion.
- (c) Any Development Security posted in cash shall bear simple interest at a rate equal to the Interest Rate. The calculation and payment of any such interest shall be made in accordance with the procedure specified in Section 9.3 of this Agreement.

9.2 Forfeiture of Development Security.

In the event that the Commercial Operation Date does not occur on or before the Scheduled Commercial Operation Date, as extended pursuant to the terms of this Agreement, and to the extent Seller does not remit any COD Extension Payment or Daily Delay Liquidated Damages payment when due pursuant to Section 4.2, then GPA shall be entitled to proceed against the Development Security in accordance with the terms thereof, to the extent of the amount(s) due and owing from time to time under Section 4.2. If the Development Security is exhausted up to the limits in Section 4.4 and further payments are due, then GPA shall be entitled to terminate this Agreement as its sole and exclusive remedy if Seller otherwise refuses to pay the amount due, and Seller shall have no further liability for damages hereunder. Seller acknowledges and agrees that forfeiture of all or a portion of the Development Security, as provided herein, represents reasonable compensation to GPA for, among other things, transactions that it did not consummate because it relied on this Agreement with Seller, and GPA's potential failure to meet its applicable renewable energy portfolio requirements as a result of Seller's failure to achieve Commercial Operation by the Scheduled Commercial Operation Date. Notwithstanding the foregoing, if Seller terminates this Agreement prior to the Commercial Operation Date for the sole purpose of selling the Renewable Energy to a third party, GPA shall be entitled to both the Development Security and any other remedies available at law or in equity to the extent that GPA's actual damages exceed the value of the Development Security.

9.3 Return of Development Security.

Concurrently with the achievement of the Commercial Operation Date or the earlier termination of the Agreement pursuant to Section 4.2, GPA shall return to Seller any remaining portion of the Development Security still held by GPA and to which GPA has no claim pursuant to the terms of this Agreement. If the Development Security was posted as a Letter of Credit, GPA shall return the Letter of Credit to Seller and Seller shall be entitled to immediately cancel such Letter of Credit. If the Development Security was posted in cash, GPA shall return to Seller the balance of the Development Security, together with daily interest at the Interest Rate, from and including the date that the Development Security was posted until, but not including, the date on which the Development Security is returned by GPA.

9.4 Performance Security.

In order to secure Seller's obligations after Commercial Operation of the Facility and during the Delivery Period hereunder, Seller hereby agrees to post security in one of the forms contemplated below, each of which is deemed acceptable by GPA (the "Performance Security"):

- (a) A Letter of Credit or cash in the amount of \$_____; or
- (b) A Payment and Performance Bond in the amount of \$_____; or
- (c) A subordinated lien on all real and personal property constituting the Project, to be effective as of the Commercial Operation Date (the "GPA Lien") and Seller agrees to take such action as is reasonably required in order to perfect GPA's security interest in, and lien on, such collateral and any and all proceeds resulting therefrom; provided, that concurrently with the grant of the such lien, GPA shall enter into such subordination, inter-creditor and other agreements with the senior financing parties pursuant to which GPA shall agree that their rights and remedies pursuant to their lien shall be subordinated in all respects to the senior first lien held by or the financing parties.

The Performance Security shall be held by GPA as security for Seller's obligations after the Commercial Operation Date and during the Delivery Period, but GPA may draw on the Performance Security at any time only in full the amounts actually due and (b) payable by Seller remaining liable to GPA pursuant to this Agreement. Seller may (i) post the Performance Security by posting a combination or one or more of the above acceptable forms of credit support in an aggregate amount of \$_____, and (ii) at any time elect to substitute any form of one or more of the above acceptable forms of credit support for any existing Performance Security in which case GPA shall return the replaced Performance Security and reasonably cooperate with Seller in the exchange or cancellation of such credit support.

Seller shall post the Performance Security in accordance with the following terms and conditions:

- (a) Seller shall post the Development Security within ten (10) business days following the Commercial Operation Date.
- (b) If the Performance Security is posted as a Letter of Credit, it shall be in substantially the form attached hereto as Appendix [F-1].
- (c) If the Performance Security is posted as a Payment and Performance Bond, it shall be in substantially the form attached hereto as Appendix [F-2].
- (d) Any Performance Security posted in cash shall bear simple interest at a rate equal to the Interest Rate. The calculation and payment of any such interest shall be made in accordance with the procedure specified in Section 9.5 of this Agreement.

9.5 Return of Performance Security.

At the end of the Term or upon the termination of this Agreement following the settlement and payment of any damages owed as a result of such termination, GPA shall return to Seller any remaining portion of the Performance Security still held by GPA and to which GPA has no claim pursuant to the terms of this Agreement. If the Performance Security was posted as a Letter of Credit or a Payment and Performance Bond, then GPA shall return the Letter of Credit or Payment and Performance Bond to Seller and Seller shall be entitled to immediately cancel such Letter of Credit or Payment and Performance Bond. If the Performance Security was posted in cash, GPA shall return to Seller the balance of the Performance Security, together with daily interest at the Interest Rate,

from and including the date that the Performance Security was posted until, but not including, the date on which the Performance Security is returned by GPA.

ARTICLE TEN: GOVERNMENTAL CHARGES**10.1 Cooperation.**

Each Party shall use Commercially Reasonable Efforts to implement the provisions of and to administer this Agreement in accordance with the intent of the Parties to minimize all taxes, so long as neither Party is materially adversely affected by such efforts.

10.2 Governmental Charges.

Seller shall pay or cause to be paid all taxes imposed by any Government Authority ("Governmental Charges") on or with respect to the Renewable Energy, Environmental Attributes or this Agreement arising prior to the Delivery Point. GPA shall pay or cause to be paid all Governmental Charges on or with respect to the Renewable Energy, Environmental Attributes, or this Agreement at and from the Delivery Point. All other tax or income taxes on the sale of the Renewable Energy by Seller hereunder and are, therefore, the responsibility of the Seller). In the event Seller is required by law or regulation to remit or pay Governmental Charges, which are GPA's responsibility hereunder, GPA shall promptly reimburse Seller for such Governmental Charges. If GPA is required by law or regulation to remit or pay Governmental Charges which are Seller's responsibility hereunder, GPA may deduct the amount of any such Governmental Charges from the sums due to Seller under Article Seven of this Agreement. Nothing shall obligate or cause a Party to pay or be liable to pay any Governmental Charges for which it is exempt under the law.

ARTICLE ELEVEN: ASSIGNMENT**11.1 Buyer Assignment.**

Buyer may not assign this Agreement or assign or delegate its rights and obligations under this Agreement, in whole or in part, without Seller's consent, not to be unreasonably withheld.

11.2 Seller Assignment.

Seller may perform any of the following, without the consent of the Buyer (1) transfer, pledge, encumber, or assign this Agreement or the accounts, revenues, or proceeds hereof, in connection with any financing or other financial arrangements for the Facility, (2) transfer or assign this Agreement to any of its Affiliates in connection with a transfer of the Facility to such Affiliate, (3) transfer or assign this Agreement to any person or entity succeeding to all or substantially all of the assets of such Party; provided, that Seller provides Buyer prior notice of any such transfer or assignment and, with respect to any transfer to an Affiliate of Seller, (A) the creditworthiness of such Affiliate is equal to or superior to the creditworthiness of Seller as of the Effective Date and (B) such Affiliate enters into an assignment and assumption agreement, in form and substance reasonably satisfactory to Buyer, pursuant to which Affiliate assumes all of Seller's obligations hereunder and otherwise agrees to be bound by the terms of this Agreement. Seller agrees that it will provide written notice to Buyer of any assignment of this Agreement by Seller within five (5) Business Days of the date of such assignment.

Except as stated above, neither this Agreement nor any of the rights, interests and obligations hereunder shall be assigned by Seller without the prior written consent of Buyer, which consent shall not be unreasonably withheld. Any assignment of this Agreement in violation of the foregoing shall be, at the option of Buyer, void.

11.3 Liability After Assignment.

A Party's assignment or transfer of rights or obligations pursuant to this Article 11 shall relieve said Party from any liability and financial responsibility for the performance thereof arising after any such transfer or assignment.

11.4 Transfers of Ownership.

Subject to any rights of first offer or refusal under this Agreement, during the Term, Seller shall not sell, transfer, assign or otherwise dispose of its interest in the Facility to any third-party absent (1) a transfer of this Agreement to such third-party and (2) Seller entering into an assignment and assumption agreement for this Agreement, in form and substance reasonably satisfactory to Buyer, with such third-party.

11.5 Successors and Assigns.

This Agreement and all of the provisions hereof are binding upon, and inure to the benefit of, the Parties and their respective successors and permitted assigns.

11.6 Collateral Assignment by Seller.

In the event that Seller pursuant to Section 11.2 (1) transfers, pledges, encumbers or collaterally assigns this Agreement to Seller's lenders, Seller shall provide written notice to Buyer of such transfer, pledge, encumbrance or assignment, including the address of Seller's lenders. In connection with any financing or refinancing of the Facility, including tax equity financing, Buyer at Seller's request shall negotiate in good faith with Seller and Seller's lenders and financing parties to agree upon reasonable direct agreements, estoppels, opinions and other customary documentation to support the financing(s) with respect to this Agreement, which shall be in form and substance reasonably agreed to by Buyer, Seller and Seller's financing parties. The direct agreement shall include (but not be limited to) provisions substantially as follows:

- (a) The Parties shall not amend or modify this Agreement in any material respect without the prior written consent of the Seller's financing parties;

- (b) Prior to exercising its right to terminate this Agreement as a result of an Event of Default by Seller, Buyer shall give notice of such Event of Default by Seller to the administrative agent of Seller's lenders of Seller's financing parties, which Buyer has been provided written notice of; and
- (c) Seller's lenders or financing parties shall have the right, but not the obligation, to cure an Event of Default on behalf of Seller in accordance with the provisions of this Agreement, provided that Seller's lenders or financing parties shall be provided an additional forty-five (45) days, from the end of the cure periods provided pursuant to Section 6.1, to effect a cure of such Event of Default.

ARTICLE TWELVE: MISCELLANEOUS

12.1 Term of Agreement.

The Term of this Agreement shall commence on the Effective Date and shall remain in effect for the duration of the Delivery Period, as set forth in Section 2.1, unless earlier terminated by either Party in accordance with this Agreement herein (the "Term"); provided, however, that such termination shall not affect or excuse the performance of either Party under any provision of this Agreement that by its terms survives any such termination.

12.2 Insurance.

At all times during the Term of this Agreement, Seller shall maintain at its own expense insurance policies for the Facility and its tangible assets in such amounts and against such risks and losses as are consistent with Good Utility Practices and those policies listed below. Such insurance policies shall be maintained only with insurers rated at least A- VII by MVI Best or comparable ratings agency.

- Commercial General Liability with limits of \$1,000,000 including products, completed operations, and contractual for this Agreement. GPA shall be an additional insured. Seller shall grant a waiver of subrogation in favor of GPA.
- Commercial Auto Liability in the amount of \$1,000,000 combined single limit for bodily injury and property damage. GPA shall be an additional insured. Seller shall grant a waiver of subrogation in favor of GPA.
- Excess Liability with limits of \$5,000,000. GPA shall be an additional insured. Seller shall grant a waiver of subrogation in favor of GPA.
- Workers Compensation and Employers Liability with statutory limits and \$1,000,000/\$1,000,000/\$1,000,000 respectively. Seller shall add a waiver of subrogation endorsement in favor of GPA.
- Pollution Liability, when applicable, with limits for \$5,000,000. GPA is to be an additional insured. Seller shall grant a waiver of Subrogation in favor of GPA.
- Builder's Risk or Installation Floater, when applicable, is to be furnished by Contractor.
- Property insurance that will keep the premises, property, improvements, structures, and machinery and equipment on the premises insured, at a minimum, against with an all risk property policy for full replacement value as determined from time to time. Such insurance shall be issued by financially responsible insurers duly authorized to do business in Guam, and shall contain the standard form of waiver of subrogation. Nothing contained herein shall be construed as creating any liability or responsibility on the part of GPA for the adequacy of insurance coverage on the premises. As to any insurable risks of loss or damage to the premises not required to be insured hereunder, Seller shall bear the cost of the same. Seller shall be deemed to be self-insured as to the deductible or co-insurance amount applicable to such insurance coverage and shall pay any deductible or co-insurance amount applicable in the event of such loss or damage.

At all times after achieving COD, Seller may discontinue or otherwise cancel each of the aforementioned policies, except the following insurance policies, which shall be maintained with the limits set forth below:

- Commercial General Liability with limits of \$1,000,000.00 including products, completed operations, and contractual for this Agreement. GPA shall be an additional insured. Seller shall grant a waiver of subrogation in favor of GPA.

- Excess Liability with limits of \$3,000,000.00. GPA shall be an additional insured. Seller shall grant a waiver of subrogation in favor of GPA.
- Property insurance that will keep the premises, property, improvements, structures, and machinery and equipment on the premises insured, at a minimum, against with an all risk property policy for full replacement value as determined from time to time. Such insurance shall be issued by any financially responsible insurer duly authorized to do business in Guam, and shall contain the standard form of waiver of subrogation. Nothing contained herein shall be construed as creating any liability or responsibility on the part of GPA for the adequacy of insurance coverage on the premises. As to any insurable risks of loss or damage to the premises not required to be insured hereunder, Seller shall bear the cost of the same. Seller shall be deemed to be self-insured as to the deductible or co- insurance amount applicable to such insurance coverage and shall pay any deductible or co-insurance amount applicable in the event of such loss or damage.
- Seller is also required to carry Business Interruption and Extra Expense insurance in the amount of \$1,000,000.00.

If the Facility is lost or damaged due to a casualty, Seller shall re-build the Facility promptly and in a commercially reasonable manner; provided, however, (i) if the time to re-build the Facility would result in less than five (5) years remaining in the Delivery Period then (A) Seller shall have the option in lieu of re-building the Facility to pay to GPA the Buyout Payment and terminate this Agreement with no further costs or penalties, or (B) if Seller nevertheless elects to re-build the Facility, then GPA shall reimburse Seller for any deductibles payable by Seller under its property insurance (not to exceed \$500,000), and (ii) regardless of when the casualty event occurs, if Seller re-builds the Facility, then the Delivery Period shall be extended for the greater of one (1) year or two (2) times the length of the interruption of the sale of Renewable Energy (pro-rated based on the Minimum Production for partial interruptions) after the end of the Term, and the Contract Price shall be the price in effect, without escalation, at the end of the Term.

Within ten (10) Business Days after receipt of a request for the same from GPA, Seller shall deliver to GPA a certificate of insurance for any or all policies maintained in accordance with this Section 12.2, which certificate shall include at least the following information: (i) the name of the insurance company, policy number and expiration date; and (ii) the coverage and limits on coverage, including the amount of deductibles or self-insured retentions.

Seller shall furnish certificates of insurance and waiver of subrogation endorsements to GPA prior to commencement of construction of the Facility showing evidence of such coverage, including the statement to the effect that cancellation or termination of the insurance shall not be effective until at least [thirty (30)] days after receipt of written Notice to GPA. At all times Seller's insurance shall be primary and non-contributory to any other insurance that may be carried by GPA. The statement of limits of insurance coverage shall not be construed as in any way limiting the Seller's liability under this Agreement. GPA shall be an additional insured on all liability coverage and certificates of insurance shall clearly indicate such.

12.3 Indemnity.

To the extent permitted by law, each Party shall indemnify, defend and hold harmless the other Party from and against any Claims arising from or out of any event, circumstance, act or incident first occurring or existing during the period when control and title to the Renewable Energy and Environmental Attributes is vested in such Party, unless a Claim is due to such Party's willful misconduct or gross negligence. To the extent permitted by law, each Party shall indemnify, defend and hold harmless the other Party against any Governmental Charges for which such Party is responsible under Article Ten. Notwithstanding anything to the contrary contained in this Agreement, no individual representative of either Party shall have any personal liability to the other Party as a result of the breach of any representation, warranty, covenant or agreement contained herein.

12.4 Site Access and Inspection of Records.

Seller shall provide GPA with reasonable access to the Facility site for purposes of review and inspection during regular business hours within a reasonable time after a request for the same is made by GPA to Seller. During such reviews and inspections, GPA representatives shall be permitted to review such records relating to the Facility and reasonably related to the performance of this Agreement, including Facility maintenance and operations logs. GPA shall have access to the Facility site for the limited purposes described herein, but Seller shall at all times remain responsible and liable for the control and operation of the Facility and the Facility site. GPA representatives shall follow Seller's safety procedures when accessing the Facility site and shall conduct themselves in a manner that will not interfere with the operation of the Facility. Seller will provide GPA with information about such safety procedures to enable GPA to comply with this requirement.

12.5 Audit.

Subject to Section 7.3, each Party has the right, at its sole expense and during normal working hours, to examine copies of the records of the other Party to the extent reasonably necessary to verify the accuracy of any statement, charge or computation made pursuant to this Agreement.

12.6 Confidentiality.

The Parties will make Commercially Reasonable Efforts to safeguard Confidential Information against disclosure by employing the same means to protect such Confidential Information as that Party uses to protect its own non-public, confidential or proprietary information, and otherwise in accordance with the provisions of this Section 12.6. Specifically, no receiving Party shall itself, or permit its employees, consultants and/or agents to disclose to any person, corporation or other entity the Confidential Information without the prior written consent of the Party providing the Confidential Information, except a receiving Party may distribute the Confidential Information to its and its Affiliates' board members, officers, employees, agents, consultants, actual or potential investors, actual or potential purchasers, Facility lenders, and others who have a need for such Confidential Information in connection with the Transaction.

The Parties acknowledge, however, that a Party may need to disclose the Confidential Information in connection with its regulatory filings or to otherwise satisfy its governmental and regulatory requirements. In the event that a Party intends to disclose any of the Confidential Information to its regulatory authorities including, but not limited to, the Guam Public Utilities Commission, the FERC, or any employee, staff member, consultant, and/or agent of the foregoing, it shall give the other Party prompt prior written Notice of its intention so that the other Party may seek a protective order or other appropriate remedy. In addition, each Party specifically agrees not to use the other Party's name in connection with this Agreement or the Facility in any press releases, public meetings or hearings, or other public communications, including any release to any newswire service, without the express written consent of the other Party. The Parties anticipate that at some future time it may be in the best interests of one or both of them to disclose Confidential Information to the media and the Parties anticipate entering into a subsequent agreement that will govern the terms of such disclosure. The Parties expressly agree, however, that unless and until such subsequent agreement is executed between the Parties, the terms of this Agreement shall be binding with respect to such disclosure.

In the event that any Party receiving the Confidential Information becomes legally compelled (by deposition, interrogatory, request for documents, subpoena, civil investigative demand or similar process) to disclose any of the Confidential Information, the legally compelled Party shall give the other Party providing the Confidential Information prompt prior written Notice of such requirement so that the providing Party may seek a protective order or other appropriate remedy and/or waive compliance with the terms of this Agreement. In the event that such protective order or other remedy is not obtained, the providing Party waives compliance with the terms hereof to the extent of the required disclosure.

Each Party acknowledges that the unauthorized disclosure of any Confidential Information may cause irreparable harm and significant injury that may be difficult to ascertain. Each Party therefore agrees that specific performance or injunctive relief, in addition to other legal and equitable relief, are appropriate remedies for any actual or threatened violation or breach of this Agreement, **although neither Party shall be entitled to any special, consequential, indirect or punitive damages as a result of a breach of this Agreement, whether a claim is based in contract, tort or otherwise.** The Parties agree that the respondent in any action for an injunction, specific performance decree or similar relief shall not allege or assert that the initiating Party has an adequate remedy at law

in respect to the relief sought in the proceeding, nor shall the respondent seek the posting of a bond by the Party initiating the action. Under no circumstances will either Party's directors, management, employees, agents or consultants be individually liable for any damages resulting from the disclosure of Confidential Information in violation of the terms of this Agreement.

12.7 Notices.

All notices, requests, statements or payments ("Notices") shall be made as specified on Appendix B attached hereto and incorporated herein by reference. Notices (other than with respect to Scheduling) shall, unless otherwise specified herein, be in writing and may be delivered by hand delivery, United States mail, overnight courier service or facsimile. Notice by facsimile or hand delivery shall be effective at the close of business on the day actually received, if received during business hours on a Business Day, and otherwise shall be effective at the close of business on the next Business Day. Notice by overnight United States mail or courier shall be effective on the next Business Day after it was sent. Notices relating to Facility operations and Scheduling, as required pursuant to Appendix H, may be given electronically and shall be deemed effective upon receipt; otherwise, electronic notices shall not be effective unless affirmatively acknowledged in writing (including by reply e-mail) by the receiving Party. A Party may change its addresses by providing Notice of same in accordance herewith.

12.8 Purchase Option.

- (a) Transfer During the Delivery Period. In the event that Seller desires to sell the Facility during the Delivery Period, Seller shall provide prior written Notice of the same to GPA, and agrees to engage in discussions with GPA for the purchase of the Facility by GPA during the exclusivity period described in this Section with GPA if GPA desires to purchase the Facility. Within ninety (90) days following Seller's Notice to GPA of its intent to sell the Facility, GPA may deliver to Seller an indicative purchase price at which it would be willing to purchase the Facility. If GPA does not deliver the indicative purchase price within ninety (90) days of receipt of the Notice, then Seller shall be free to transfer the Facility under any terms and conditions at any time thereafter. If GPA delivers the indicative purchase price within ninety (90) days of receipt of the Notice, then the Parties shall negotiate exclusively for a period of up to sixty (60) days after GPA delivers the indicative purchase price. If no binding agreement is entered into by the Parties during such sixty (60)-day period then Seller shall be free to transfer the Facility to any person on transactions terms, including price, that are better for Seller than GPA's indicative offer, and neither Party shall have any further liability or obligation to the other Party in connection with such sale or as a result of the terminated negotiations. If Seller does not transfer the Facility on such basis within one (1) year following the end of the sixty (60)-day exclusive negotiation period, then the procedure in this paragraph shall apply to any subsequent sale of the Facility during the Term of this Agreement.
- (b) Extension of Delivery Period and Facility Purchase at End of Delivery Period. GPA and Seller may agree to extend the Term of this Agreement on a year-to-year basis up to five (5) years in the aggregate, in which case the Contract Price and terms shall be mutually agreeable to GPA and the Seller. At least one hundred and eighty (180) days prior to the end of the Delivery Period, GPA may provide Notice to Seller that it elects to purchase the Facility at the end of the Delivery Period at a purchase price equal to the higher of (i) 100% of the Appraised Price of the Facility at the end of the Delivery Period and (ii) the sum of (x) the amount necessary to repay any Facility Debt (including any swap or interest rate hedging breakage costs related thereto) in full plus (y) the amount which when applied pursuant to the governing documents for the Seller or any relevant subsidiary or upstream holding company through which the tax equity invests in the Facility is sufficient to repay any Facility Debt, including back-leverage financing and including any swap or interest rate hedging breakage costs related thereto, and for the tax equity investors to recover (to the extent not previously recovered) the higher of (1) their investment balance together with their targeted return or (2) the amount necessary to avoid a loss under US GAAP. If GPA fails to send such Notice of purchase then this

Agreement shall terminate in accordance with the terms hereof. If GPA provides such a Notice of the purchase, Seller and GPA shall exercise Commercially Reasonable Efforts to consummate the purchase within thirty (30) days of the end of the Delivery Period, and at the end of such time period the purchase option shall expire. The documentation for the sale shall be mutually agreeable to the Parties. Any such sale will be on an "as is" basis, without the giving of any representations or warranties, except as to (i) each party's organization, power and authority; (ii) good standing; (iii) Seller's ownership of the Facility to be sold in such sale, and the existing liens and encumbrances thereon; (iii) the instrument(s) conveying the Facility to GPA constitutes the legal, valid, and binding obligation of Seller, enforceable against Seller, in accordance with its terms; (iv) such conveyance will not violate any contract or legal requirement applicable to Seller; and (v) subject to applicable regulatory approvals, no consents, approvals, or filings are required to be obtained or made by Seller to convey the Facility to GPA other than those that have previously been obtained or made and are in full force and effect as of the date of the conveyance.

12.9 Alternative Dispute Resolution.

All disputes arising under this Agreement are subject to the provisions of this Section 12.9.

- (c) Mediation. In the event of any dispute or Claim between the Parties arising out of or relating to this Agreement, or the breach thereof, and if the dispute or Claim cannot be settled through negotiation, the Parties agree first to try in good faith to settle the dispute by mediation administered by the American Arbitration Association under its Commercial Mediation Procedures before resorting to arbitration in accordance with Section 12.9(b) hereof; provided, however, that, during the pendency of any such mediation, (1) neither Party shall do anything to alter the status quo, and (2) either Party shall be entitled to seek interim, conservatory or provisional relief from any court or tribunal of competent jurisdiction in order to protect its rights. In the event of any dispute or Claim between the Parties arising out of or relating to this Agreement, or the breach thereof, consistent with the previous sentence, either Party may submit the matter to mediation in accordance with the Commercial Mediation Procedures of the American Arbitration Association. Within fourteen (14) days of such submission, the Parties shall attempt in good faith to mutually agree on the appointment of a mediator. If no such agreement is reached within fourteen (14) days of the submission of the dispute to mediation, then, unless otherwise agreed by the Parties, the American Arbitration Association shall appoint the mediator as promptly as possible in accordance with its Commercial Mediation Procedures or other rules it has adopted for this purpose. The Parties and the mediator shall schedule and complete the mediation within sixty (60) days from the date that the mediator is appointed. In the event that the mediation is not completed by such time, either Party shall be entitled to terminate the mediation and pursue arbitration of any outstanding dispute or Claim in accordance with subsection (b) of this Section 12.9.
- (d) Arbitration. Subject to Section 12.9(a), any disputes or Claims between the Parties and/or their respective representatives arising out of or relating to this Agreement, or the breach thereof, shall be submitted to binding arbitration, whether such disputes or Claims are in contract, tort or otherwise. The arbitration shall be conducted in accordance with the Federal Arbitration Act (9 U.S.C. Section 1, *et seq.*) and the then prevailing Commercial Arbitration Rules of the American Arbitration Association. The validity, construction, and interpretation of this Agreement to arbitrate and all procedural aspects of the arbitration conducted pursuant hereto shall be decided by the arbitrator(s). Submission shall be made upon the request of either Party. Within twenty (20) calendar days of the receipt by the respondent of service of the Notice of arbitration, the Parties shall select one (1) arbitrator by mutual consent. If the Parties are unable to agree upon a single arbitrator, there shall be three (3) arbitrators. Specifically, in the event the Parties cannot agree upon a single arbitrator, both the claimant and the respondent shall appoint one (1) arbitrator within ten (10) calendar days after written Notice by either Party that three (3) arbitrators shall be necessary. The two (2) arbitrators so appointed shall then select the third arbitrator within twenty (20) calendar days, who shall be the chairperson, of the tribunal. The chairperson shall be a

person who has over eight (8) years of experience in energy-related transactions, and none of the arbitrators shall have been previously employed by either Party or have any direct interest in either Party or the subject matter of the arbitration, unless such conflict is expressly acknowledged and waived in writing by both Parties. It is agreed that the seat of the arbitration shall be Honolulu, Hawaii and that the arbitration proceeding shall be conducted in Honolulu, Hawaii, or another neutral location mutually agreed to by the Parties, however, the seat of the arbitration shall remain Honolulu, Hawaii. It is further agreed that the arbitrator(s) shall have no authority to award consequential, treble, exemplary, or punitive damages of any type or kind regardless of whether such damages may be available under any law or right, with the Parties hereby affirmatively waiving their rights, if any, to recover or claim such damages. The compensation and any costs and expenses of the arbitrators shall be borne equally by the Parties. Any arbitration proceedings, decision or award rendered hereunder and the validity, effect and interpretation of this arbitration provision shall be governed by the Federal Arbitration Act. The award shall be final and binding on the Parties and judgment upon any award may be entered in any court of competent jurisdiction. The Parties agree that all information exchanged as a result of any proceeding as described herein shall be deemed Confidential Information.

- (e) Judicial Relief. Either Party may petition a court of appropriate jurisdiction, as described in Section 12.11, for non-monetary interim or provisional relief relating to any dispute or claim of breach arising out of or relating to this Agreement in order to prevent undue hardship relating to any such claimed breach pending the appointment of an arbitration panel as described in this Section 12.9.

12.10 Governing Law.

THIS AGREEMENT AND THE RIGHTS AND DUTIES OF THE PARTIES HEREUNDER SHALL BE GOVERNED BY AND CONSTRUED, ENFORCED AND PERFORMED IN ACCORDANCE WITH THE LAWS OF GUAM, WITHOUT REGARD TO PRINCIPLES OF CONFLICTS OF LAW.

12.11 Jurisdiction and Costs.

Subject to and without prejudice to the mandatory arbitration provision set out in Section 12.9 hereof, each Party hereby consents to the exclusive jurisdiction of the United States federal courts sitting in Guam for any action or proceeding to enforce the foregoing agreement to arbitrate, or ancillary to such arbitration proceedings, or to confirm or set aside any award rendered in such proceeding. Both Parties waive any right to trial by jury in any such action. described in this Section 12.11. In the event such judicial proceedings are instituted by either Party, the prevailing Party shall be entitled to award of its costs and reasonable attorneys' fees incurred in connection with such proceedings.

12.12 Financial Accounting Standards.

Under the latest interpretations of the Financial Accounting Standards Board's Interpretation No. 46(R) (FIN No. 46(R)), "Consolidation of Variable Interest Entities," GPA may be required to consolidate a seller's entity for which GPA has entered into a long-term power purchase agreement. Seller agrees to provide all information needed and in Seller's possession in order for GPA to determine whether or not Seller or any special purpose entity which owns the Seller's Facility must be consolidated by GPA under FIN No. 46(R) upon request from GPA. If it is determined that GPA needs to consolidate Seller or such special purpose entity, Seller agrees to provide all information in its possession that is needed to comply with the consolidation requirements of FIN 46(R) in a timely manner every calendar quarter during the Term upon request from GPA. If GPA is required to consolidate Seller or the special purpose entity that owns the Seller's Facility in its financial statements, Seller agrees to provide access to any needed records in its possession and personnel, as requested by GPA, so GPA's independent auditor, Deloitte & Touche LLP, can conduct financial statement audits in accordance with generally accepted auditing standards, as well as internal control audits in accordance with Section 404 of the Sarbanes-Oxley Act of 2002.

12.13 Forward Contract.

The Parties intend that in any relevant proceedings, each be regarded as a forward contract merchant in respect of this Agreement and that the Transaction and this Agreement be a forwards contract for purposes of the United States Bankruptcy Code, 11 U.S.C. §§ 101 et seq., as amended from time to time, and the Puerto Rico Oversight, Management and Economic Stability Act, including Title III thereof.

12.14 General.

No delay of a Party in the exercise of, or the failure to exercise, any rights under this Agreement shall operate as a waiver of such rights, a waiver of any other rights under this Agreement or a release of the other Party from any of its obligations under this Agreement. Any provision declared or rendered unlawful by any applicable court of law or regulatory agency or deemed unlawful because of a statutory change will not otherwise affect the remaining lawful obligations that arise under this Agreement; and provided, further, that if such an event occurs, the Parties shall use their Commercially Reasonable Efforts to reform this Agreement in order to give effect to the original intention of the Parties. The term “including” when used in this Agreement shall be by way of example only and shall not be considered in any way to be in limitation. The headings used herein are for convenience and reference purposes only. The indemnity provisions of this Agreement shall survive the termination of this Agreement for the period of the applicable statute of limitations. The audit provisions of this Agreement shall survive the termination of this Agreement for a period of twelve (12) Months. This Agreement shall be binding on each Party’s successors and permitted assigns.

12.15 Entire Agreement; Amendment.

This Agreement, together with any appendices, schedules, and any written supplements hereto constitutes the entire agreement between the Parties relating to the subject matter hereof. This Agreement shall be considered for all purposes as prepared through the joint efforts of the Parties and shall not be construed against one Party or the other as a result of the preparation, substitution, submission or other event of negotiation, drafting or execution hereof. Except to the extent herein provided for, no amendment or modification to this Agreement shall be enforceable unless reduced to writing and executed by both Parties.

12.16 Appendices.

The following Appendices are included in this Agreement for all purposes:

<u>Appendix A</u>	Contract Price and Minimum Production
<u>Appendix B</u>	Notice Addresses
<u>Appendix C</u>	Energy Storage System and Performance Criteria
<u>Appendix D</u>	Independent Engineers
<u>Appendix E</u>	Permits
<u>Appendix F</u>	Form of Letter of Credit
<u>Appendix G</u>	Calculation of Curtailed Amount Due to DispatchDown
<u>Appendix H</u>	Scheduling and Coordination
<u>Appendix I</u>	Base Conditions and Facility Test Protocol
<u>Appendix J</u>	Interconnection Agreement
<u>Appendix K</u>	Calculation of Weather Hours Deration

12.17 Special Provisions.

It is the policy of GPA not to discriminate on the basis of age, race, sex, color, national origin, or disability in its hiring and employment practices, or in admission to, access to, or operation of its programs, services, and activities. With regard to all aspects of this Agreement, Seller certifies and warrants it will comply with this policy. No person shall be excluded from participation in, be denied benefits of, be discriminated against in the admission or access to, or be discriminated against in treatment or employment in GPA's contracted programs or activities, on the grounds of such person's handicap or disability, age, race, color, religion, sex, national origin, or any other classification protected by federal or Guam law; nor shall any person be excluded from participation in, be denied benefits of, or be otherwise subjected to discrimination in performance of contracts with GPA or in the employment practices of GPA's contractors. Accordingly, all persons entering into contracts with GPA shall, upon request, be required to show proof of such nondiscrimination and to post notices of non-discrimination in conspicuous places that are available to all employees and applicants.

Seller hereby represents that Seller has not been retained or retained any persons to solicit or secure a contract from GPA upon an agreement or understanding for a contingent commission, percentage, or brokerage fee, except for retention of bona fide employees or bona fide established commercial selling agencies for the purpose of securing business. Breach of the provisions of this section is, in addition to a breach of this Agreement, a breach of ethical standards, which may result in civil or criminal sanction, debarment or suspension from being a contractor or subcontractor under any other contract with GPA and any Government Authority.

It shall be a breach of ethical standards for any person to offer, give or agree to give any employee or former employee, or for any employee or former employee to solicit, demand, accept or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation of any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy or other particular matter, pertaining to any program requirement of a contract or subcontract or to any solicitation or proposal therefor. It shall be breach of ethical standards for any payment, gratuity or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or a person associated therewith, as an inducement for the award of a subcontractor or order. Breach of the provisions of this paragraph is, in addition to a breach of this Agreement, a breach of ethical standards, which may result in civil or criminal sanction, debarment or suspension from being a contractor or subcontractor under any other contract with GPA and any Governmental Authority.

Seller warrants that no person providing services on behalf of Seller or in its employment who has been convicted of a sex offense under the provisions of Chapter 25 of Title 9 of the Guam Code Annotated, or convicted of an offense defined in Article 2 of Chapter 28 of Title 9 of the Guam Code Annotated regardless of the jurisdiction in which the conviction was obtained, shall provide services on behalf of Seller relative to this Agreement. If any person employed by Seller and providing services under this Agreement is convicted subsequent to the date of this Agreement, then Seller warrants that it will notify GPA of the conviction within twenty-four hours of being made aware of the conviction, and will immediately remove such convicted person from providing services under this Agreement. If Seller is found to be in violation of any of the provisions of this paragraph, then GPA shall give Notice to Seller to take corrective action. Seller shall take corrective action within twenty-four hours of Notice from GPA, and Seller shall notify GPA when action has been taken. If Seller fails to take corrective steps within twenty-four hours of Notice from GPA, then GPA in its sole discretion may suspend this Agreement temporarily upon prior written Notice to Seller until the individual in question is removed from service to GPA.

12.18 Waiver of Immunity.

To the extent that GPA may in any jurisdiction claim for itself or its assets or revenues immunity from suit, execution, attachment (whether in aid of execution, before judgment or otherwise) or other legal process, and to the extent that in any such jurisdiction there may be attributed to GPA or its assets or revenues such immunity (whether or not claimed), GPA agrees not to claim and irrevocably waives such immunity to the full extent permitted by the laws of such jurisdiction.

IN WITNESS THEREOF, the Parties hereto made and executed this Agreement, signed by their duly authorized officers or individuals, as of the dates listed below.

**GUAM POWER AUTHORITY
GPA or Buyer**

(abbreviation if any) or **Seller**

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Date: _____

Date: _____

[Signature Page to Renewable Energy Purchase Agreement]

ARTICLE ONE: APPENDICES

**CONTRACT PRICE, MINIMUM PRODUCTION
AND GUARANTEED OUTPUT**

Contract Year	Annual Contract Price (\$/MWh)	Estimated Annual Production (MWh) (= Minimum Production)	90 % of Minimum Production (MWh)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTICE ADDRESSES

ENERGY STORAGE SYSTEM AND PERFORMANCE CRITERIA

As part of the Facility, Seller shall install the Energy Storage System for the purpose of (i) meeting GPA's ramp rate control requirements set forth in Section 4.19 and this Appendix C, and (ii) meeting GPA's energy shifting requirements set forth in Sections 4.17 and 4.18. The Energy Storage System shall meet performance criteria set out in this Appendix C.

1.1 The Energy Storage System shall be comprised of:

___MW/___MWh Energy Storage System which will have the capability to control the Facility's ramping rate under 1% of the Facility Capacity (i.e. ___kW) per minute. The control period [for the ramping rate] will be no more than 1 second and the Energy Storage System's performance will be verified as set out in this Appendix C below (detailed ramping control algorithm will be finalized through discussions between GPA and Seller after the final design of the Energy Storage System is put in place but no later than one (1) month before the commissioning test of the Facility will start). The Energy Storage System may be dedicated to meet GPA's requirements for energy shifting as described in Sections 4.17 and 4.18.

1.2 Voltage and Frequency Ride-through

The Facility shall meet the voltage and frequency ride-through requirements shown in Table 1 below. Voltage and frequency measurements in the table are to be taken at the Delivery Point.

Table 1 – Voltage and Frequency Ride-through Settings

	Settings at Point of Interconnection (34.5 kV) (V is magnitude in per unit) (F is frequency in Hz) (T is time in seconds)	
	Setpoint	Trip Time
Under-voltage	$V < 0.88$	$T > 2.00$
Normal voltage	$0.88 < V < 1.10$	no trip allowed
Over-voltage	$1.10 < V < 1.20$	$T > 2.00$
Over-voltage	$1.20 < V$	$T > 0.16$
Under-frequency	$F < 57.0$	$T > 0.16$
Normal frequency	$57.0 < F < 63.0$	no trip allowed
Over-frequency	$63.0 < F$	$T > 0.16$

1.3 Ramp Rate Control Performance

1.3.1 Energy Storage System will control the ramping rate under 1% of the Facility Capacity (i.e. ___kW) per minute and the control period [for the ramping rate] will be no more than 1 second. Detailed ramping control algorithm will be finalized through discussions between GPA and Seller after the final design of the Energy Storage System is put in place but no later than one (1) month before the commissioning test of the Facility will start. Notwithstanding the foregoing, Seller will not be required to adhere to the ramp rate control requirement specified in this Appendix C during any day when the Energy Storage System is used for energy shifting purposes as described in Sections 4.17 and 4.18.

1.3.2 Evaluation of Performance Verification

- (a) During the Delivery Period, on an annual basis, Seller shall carry out the evaluation process for the performance verification of the Energy Storage System, including power test and 1% ramp-rate control test in the presence of GPA, once every year with annual data storage in the Facility database and GPA SCADA. [Note: specify what is to be measured and equation below.]

$$\sum_{t-\Delta t}^t \frac{PV_i(x)}{\Delta t} - \sum_{t-2\Delta t}^{t-\Delta t} \frac{PV_i(x)}{\Delta t} > P_{ramp}$$

Where:

- $\Delta t = 60$ seconds
- $PV_i(x)$: PV generation at time t
- $i = 1,2,3, \dots, 60$ seconds
- P_{ramp} : active power considering ramp rate limit per 1min window

- (b) Ramp Rate Control shall be based on a plus or minus (\pm) 1% of rated power of MW plant (“Measured Value”). Ramp Rate Control Failure means a plus or minus (\pm) 2% of Measured Value.

1.3.3 Ramp Control Penalty

Penalty will apply to failure to meet the 1% ramp per minute rate for both under and over power. Ramp-Control must be controlled within 1 second. The failure percentage is as below:

- Failure Percentage (FP) = (E1 – E2)

Symbol	Item	Unit	Remarks
E1	Guaranteed value of Succeed Ramp-Rate	%	Proposal (offer) shown in table below
E2	Output of Ramp Rate Controlled	%	1% ramping requirement with 2% measurement error

If FP is greater than 0 (zero), then Penalty shall be calculated as follow:

- Under Power Failure Penalty = (AF_U)*(C_U)*(FP_U)
- Over Power Failure Penalty= (AF_O)*(C_O)*(FP_O)

Symbol	Item	Value	Unit
C_U	Nominal Ramp Down Cost	1.96	\$/min/MW
C_O	Nominal Ramp Up Cost	0.49	\$/min/MW

The penalty is calculated only for the portion exceeding the guaranteed value.

Where:

- Failure Power of Under Power (FP_U) = |Ramp Rate Required Power – CP|[MW]
- Failure Power of Over Power (FP_O) = |CP – Ramp Rate Required Power|[MW]
- Controlled Power (CP) = 1 minute Average Power of 1% Ramp Rate Controlled by 1second
- Acceleration Factor of Under Power (AF_U) = 0.5
- Acceleration Factor of Over Power (AF_O) = 0.5

The penalty shall be paid to GPA in arrears at the end of each Contract Year.

Contract Year	1% Ramp Rate Guaranteed Success Rate (%)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

APPENDIX D

INDEPENDENT ENGINEER

PERMITS

FORM OF LETTER OF CREDIT

(Provided is sample which may be replaced by Bank / Financial Institution Form)

(Bank or Financial Institution)

_____, 201_

Irrevocable Standby Letter of Credit No. _____

Beneficiary:

Guam Power Authority

P.O. Box 2977

Guam 96932-2977

Attn:

Applicant:

Dear _____:

We hereby establish for the account of (*Company Name*) (“Applicant”) our irrevocable standby letter of credit in your favor for an amount of USD \$[_____] ([_____] United States Dollars). Applicant has advised us that this letter of credit is issued in connection with the Renewable Energy Purchase Agreement, dated as of _____, 2017, by and between the Applicant, and Guam Power Authority (the “Beneficiary”). This letter of credit shall become effective immediately on the date hereof and shall expire on _____ [the date that is XX days after the date first set forth above] (such date, or such later date(s) as determined by Applicant in accordance with the next succeeding sentence, the “Expiration Date”). The Expiration Date can be extended on one or more occasions by written notice to us from the Applicant, provided that such written notice is received at least 10 days prior to the Expiration Date. This letter of credit is subject to the following:

1. Funds under this letter of credit shall be made available to Beneficiary against its draft drawn on us in the form of Annex 1 hereto, accompanied by (a) a certificate in the form of Annex 2 hereto, appropriately completed and signed by an authorized officer of Beneficiary, dated the date of presentation, and (b) the original of the letter of credit (the “Accompanying Documents”) and presented at our office located at (*Bank/Financial Institution Address*) attention _____. (or at any other office which may be designated by us by written notice delivered to you). A presentation under this letter of credit may be made only on a day, and during hours, in which such office is open for business (a “Business Day”). If we receive your draft and the Accompanying Documents at such office on any Business Day, all in strict conformity with the terms and conditions of this letter of credit, we will honor the same by making payment in accordance with your payment instructions on the third succeeding Business Day after presentation.

2. This letter of credit shall terminate upon the earliest to occur of (i) our receipt of a notice in the form of Annex 3 hereto signed by an authorized officer of Beneficiary, accompanied by this letter of credit for cancellation, or (ii) our close of business at our aforesaid office on the Expiration Date, or if the Expiration Date is not a Business Day, then on the succeeding Business Day. This letter of credit shall be surrendered to us by you upon the earlier of presentation or expiration.

3. This letter of credit is issued and subject to the International Standby Practices 1998 (ISP98) International Chamber of Commerce Publication No. 590, and as to matters not addressed by ISP98, shall be governed by and construed in accordance with the laws of the State of New York and application of U.S. Federal Law.

4. This letter of credit sets forth in full our undertaking, and such undertaking shall not in any way be modified, amended, amplified or limited by reference to any document, instrument or agreement referred to herein, except for Annexes 1, 2 and 3 hereto and the notices referred to herein; and any such reference shall not be deemed to incorporate herein by reference any document, instrument or agreement except as otherwise provided in this paragraph 4.

5. Communications with respect to this letter of credit shall be in writing and shall be addressed to us at the address referred to in paragraph 1 above, and shall specifically refer to this letter of credit no.

_____.

Very truly yours,

Authorized signature
(*Bank or Financial Institution*)

under LETTER OF CREDIT No. _____

To:

(Bank or Financial Institution)

(Bank/Financial Institution Address)

Attn: _____

[Month, Day , Year]

On Sight

Pay to Guam Power Authority U.S. \$_____ [not to exceed amount available to be drawn]

Wire to:

Bank's Name: Bank of Guam

Bank's Location: 111 Chalan Santo Papa St., Hagatna, Guam 96910

Bank's Mailing Address: P.O. Box BW, Hagatna, Guam 96932

Account Name: Guam Power Authority Revenue Fund Account

Acct. No.: (to be provided)

Routing No.: (to be provided)

For value received and charge to account of Letter of Credit No. _____ of (Company Name)

GUAM POWER AUTHORITY

By: _____

Name: _____

Title: _____

Drawing under Letter of Credit No. _____

Date: _____

To: _____
(*Bank or Financial Institution*)
(*Bank/Financial Institution Address*)
Attn: _____

The undersigned, a duly authorized officer of the Guam Power Authority, ("Beneficiary"), hereby certifies on behalf of Beneficiary to (*Bank or Financial Institution*) and to (*Company Name*) (the "Applicant") with reference to irrevocable standby Letter of Credit No. _____ (The "Letter of Credit") issued for the account of (*Company Name*) ("Applicant"), that:

- 1) pursuant to the Renewable Energy Purchase Agreement, dated as of _____, 201 , by and between Applicant and Beneficiary and as of the date hereof, Beneficiary is entitled to draw under the Letter of Credit;
- 2) by presenting this certificate and the accompanying sight draft, Beneficiary is requesting that payment in the amount of \$ _____, as specified on said draft, be made under the Letter of Credit by wire transfer or deposit of funds into the account specified on said draft;and
- 3) the amount specified on the sight draft accompanying this certificate does not exceed the remaining amount to which Beneficiary is entitled to draft under said Renewable Energy Purchase Agreement.

In witness whereof, Beneficiary has caused this certificate to be duly executed and delivered by its duly authorized officer as of the date and year written below.

Date: _____

GUAM POWER AUTHORITY

By: _____
Name: _____
Title: _____

Re: Letter of Credit No. _____ issued for the account of (Company Name)

Ladies and Gentlemen:

We refer to your above-mentioned irrevocable standby Letter of Credit (the "Letter of Credit"). The undersigned hereby surrenders the Letter of Credit to you for cancellation as of the date hereof. No payment is demanded of you under this Letter of Credit in connection with this surrender.

Very truly yours,

GUAM POWER AUTHORITY

By: _____

Name: _____

Title: _____

CALCULATION OF CURTAILED AMOUNT DUE TO GPA DISPATCH DOWN

Buyer shall pay Seller, on the date payment would otherwise be due in respect of the day in which any curtailment is initiated by GPA for reasons other than Force Majeure or Seller Event of Default (“Dispatch Down”), an amount equal to the Contract Price times the amount of Renewable Energy that Seller could reasonably have delivered to Buyer but for such Dispatch Down, pursuant to the limitations provided in Appendix H, Section 1.2, which allow GPA to curtail energy delivered from Seller 2% of the Guaranteed Output in each Contract Year. The determination of the curtailed amount associated with any Dispatch Down shall be calculated as follows:

1) Identification of weather conditions for the period of Dispatch Down

For any period the Facility was Dispatched Down, Seller shall document the Weather Data associated therewith. (“Weather Data” means solar irradiation, wind speed, and ambient temperatures.)

2) Curtailed amount calculation

- a. Seller shall use PVSyst energy simulation software or other software as agreed by the Parties to generate hypothetical generation amounts for the Dispatch Down period (curtailed amount MWh) by utilizing the Weather Data.
- b. In addition to “Annual Facility Test” (as described in Section 4.9 of this Agreement), GPA shall be entitled to check the accuracy of the equipments associated with the Weather Data once in each Contract Year as agreed with Seller.

SCHEDULING AND COORDINATION PROCEDURES

The Parties acknowledge that as of the Effective Date GPA has not yet established protocols for scheduling (firm or intermittent) power to permit solar energy generating projects to participate in GPA's scheduling process. As soon as practicable, in consultation with Seller (and after taking into account and accommodating Seller's reasonable comments), GPA shall establish such protocols. As soon as practicable after such protocols have been established, become effective and been provided to Seller, but not more than ninety (90) days thereafter, Seller shall use commercially reasonable efforts to cause the Project to become certified as an available resource, including negotiating and executing documents to become an available resource in Guam. Following certification and whenever applicable, Seller shall use commercially reasonable efforts to comply with all additional reasonable protocols issued by GPA relating to available resources during the Delivery Period, and GPA shall consult with Seller (and take into account and accommodate Seller's reasonable comments) in connection with the preparation of any such additional protocols. Seller shall not be required to incur additional costs to comply with such future protocols or to become an available resource under future requirements to be established by GPA.

1.1 General

- (a) Notices. Seller shall submit to GPA notices and updates required under this Agreement regarding the Project's status, including, but not limited to, outage requests, Forced Outages and Forced Outage reports. If a web based system is not available, Seller shall promptly submit such information to GPA (in order of preference) telephonically, by electronic mail, or facsimile transmission to the personnel designated to receive such information. **Need to include PSCC requirements for Hourly Reports, Daily Production Reports, etc.**
- (b) GPA Settlements. GPA shall be responsible for all settlement functions within GPA related to the Project.
- (c) Resource Data Template. Seller shall provide the data to the GPA that is required for GPA's resource data template (or successor data system) for the Project consistent with this Agreement. Neither Party shall change the template for such data without the other Party's prior written consent.
- (d) Annual Delivery Schedules. No later than forty-five (45) days before (A) the first day of the first Contract Year and (B) the beginning of each calendar year for every subsequent Contract Year during the Delivery Period, Seller shall provide a non-binding forecast of each month's average-day expected Actual Renewable Energy for the following calendar year.
- (e) Monthly Delivery Schedules. Ten (10) Business Days before the beginning of each month during the Delivery Period, Seller shall provide a non-binding forecast of each day's average expected Actual Renewable Energy for the following month ("Monthly Delivery Forecast").
- (f) Daily Delivery Schedules. By 5:30 AM Guam Prevailing Time on the Business Day immediately preceding the date of delivery, Seller shall provide GPA with a non-binding forecast of the Project's available energy (a "Day-Ahead Forecast"). A Day-Ahead Forecast provided in a day prior to any non-Business Day(s) shall include Schedules for the immediate day, each succeeding non-Business Day and the next Business Day. Each Day-Ahead Forecast shall clearly identify, for each hour, Seller's estimate of the Project's available energy. Seller may not change such Schedule past the deadlines provided in this section except in the event of a Forced Outage or Schedule change imposed by GPA, in which case Seller shall promptly provide GPA

with a copy of any and all updates to such Schedule indicating changes from the then-current Schedule. These notices and changes to the Schedules shall be sent to GPA's on-duty scheduling coordinator. If Seller fails to provide GPA with a Day-Ahead Forecast as required herein, then for such unscheduled delivery period only GPA shall rely on the delivery Schedule provided in the Monthly Delivery Forecast or GPA's best estimate based on information reasonably available to GPA and Seller shall be liable for Scheduling and delivery based on such Monthly Delivery Forecast or GPA's best estimate.

- (g) Hourly Delivery Schedules. Notwithstanding anything to the contrary herein, in the event Seller makes a change to its Schedule on the actual date of delivery for any reason, including Forced Outages (other than a scheduling change imposed by GPA), that results in a change to its deliveries (whether in part or in whole), Seller shall notify GPA immediately by calling GPA's on-duty scheduling coordinator. Seller shall notify GPA of Forced Outages in accordance with this Agreement. Seller shall keep GPA reasonably informed of any developments that are reasonably expected to affect either the duration of the outage or the availability of the Project during or after the end of the outage.

1.2 Dispatch Down/Curtailment.

- (a) GPA shall have the right to order Seller to curtail deliveries of Renewable Energy from the Project to the Delivery Point pursuant to a Notice of a Dispatch Down (as defined in Appendix K) delivered to Seller, provided that the value attributable to any Renewable Energy in an aggregated quantity of more than 2% of the Guaranteed Output for any Contract Year which is not delivered during such curtailment periods, whether for transmission unavailability, operational dispatch or pre-set ramping parameters or otherwise, shall be reimbursed to Seller as provided below.
- (b) Seller shall have the right in its discretion to make up any curtailed quantities, as calculated in accordance with Appendix G, of Renewable Energy as a result of a Dispatch Down ("Dispatch Down Makeup Production"), for which it is not reimbursed pursuant to this Appendix H, in the first and any subsequent Contract Year in which at least the Minimum Production is delivered and to extend the Term to the extent necessary, but not to exceed six (6) months, to make up any curtailed quantities. The Contract Price for the Contract Year in which the make-up occurs shall apply to Dispatch Down Makeup Production. Production in excess of Guaranteed Output for any Contract Year as set forth in the fifth column of Appendix A will first be applied to any previous years' Deficiency Amounts, then to Dispatch Down Makeup Production, then treated under this Agreement as production in excess of Guaranteed Output.
- (c) GPA shall provide to Seller all technical information necessary to justify and support each Dispatch Down. Seller agrees to reduce the Project's Renewable Energy as set forth in such a Notice of Dispatch Down that meets the requirements set forth herein.
- (d) For each MWh of Renewable Energy from the Facility curtailed by GPA in Contract period prior to January 1, 2022. GPA shall pay Seller, on the date payment would otherwise be due in respect of the month in which any such curtailment occurred in excess of low load curtailment requirements discussed in section 4.17 and to be defined in the Interconnection Agreement, an amount equal to the product of the Contract Price times the amount of Renewable Energy that Seller could reasonably have delivered to GPA but for such curtailment ("Lost Revenue"). For each MWh of Renewable Energy from the Facility curtailed by GPA until the end of this

Agreement, GPA shall pay Seller, on the date payment would otherwise be due in respect of the month in which any such curtailment occurred, an amount equal to the product of the Contract Price times the amount of Renewable Energy that Seller could reasonably have delivered to GPA but for such curtailment (“Lost Revenue”); provided that no Lost Revenue shall be due and payable from GPA to Seller for curtailments of up to 2% of the Guaranteed Output.

- (e) For purposes of clarification, no curtailment by GPA, as a result of a warranted failure of or defect in the interconnection facilities transferred by Seller to GPA pursuant to the Interconnection Agreement, during the one-year warranty term thereof, shall count against the % curtailment threshold set forth above. During the one-year warranty term of the interconnection facilities transferred, any curtailment by GPA which results from such failure of or defect in the interconnection facilities transferred will not be eligible for reimbursement by GPA to Seller as Lost Revenue payments, or Dispatch Down Makeup Production in future Contract Years.

1.3 Outage Notification.

- (a) Planned Outages. Seller shall schedule Planned Outages in accordance with Good Utility Practices and with the prior written consent of GPA, which consent may not be unreasonably withheld, conditioned or delayed. Nonetheless, the Parties acknowledge that in all circumstances, Good Utility Practices shall dictate when Planned Outages should occur. Seller shall notify GPA of Seller’s proposed Planned Outage schedule for the Project for the following calendar year by submitting a written Planned Outage schedule no later than October 1st of each year during the Delivery Period. The Planned Outage schedule is subject to GPA’s concurrence, which concurrence may not be unreasonably withheld, conditioned or delayed. GPA shall promptly respond with its approval or with reasonable modifications to the Planned Outage schedule and Seller shall use its commercially reasonable efforts in accordance with Good Utility Practices to accommodate GPA’s requested modifications. Notwithstanding the submission of the Planned Outage schedule described above, Seller shall also submit a completed form of outage notification to GPA no later than fourteen (14) days prior to each Planned Outage and reasonably appropriate outage information or requests to GPA. Seller shall contact GPA with any requested changes to the Planned Outage schedule if Seller believes the Project must be shut down to conduct maintenance that cannot be delayed until the next scheduled Planned Outage consistent with Good Utility Practices. Seller shall not change its Planned Outage schedule without GPA’s concurrence, not to be unreasonably withheld, conditioned or delayed.
- (b) Forced Outages. Within two hours of any Forced Outage Seller shall submit a completed form of outage notification to GPA in accordance with the instructions shown on the agreed form and shall submit outage information to GPA. Seller shall not substitute Renewable Energy from any other source for the output of the Project during a Forced Outage.
- (c) Coordination with GPA. GPA shall cooperate with Seller in arranging and coordinating all Project outages.

1.4 Operations Logs and Access Rights.

- (a) Operations Logs. Seller shall maintain a log of all material operations and maintenance information on a daily basis. Such log shall include, but not be limited to, information on power production, efficiency, availability, maintenance performed, outages, results of inspections, manufacturer recommended services, replacements, and control settings or adjustments of equipment and protective devices. Seller shall

maintain this information for at least two (2) years and shall provide this information electronically to GPA within five days of GPA's request.

- (b) Access Rights. GPA, its authorized agents, employees and inspectors shall have the right of ingress to and egress from the Project during normal business hours upon reasonable advance notice and for any purposes reasonably connected with this Agreement and in accordance with Section 12.4 and the other applicable requirements of this Agreement.

APPENDIX I

BASE CONDITIONS AND FACILITY TEST PROTOCOL **[GPA and Seller shall complete a mutually agreed process for commissioning and performance testing prior to COD and to any curtailment claims]**

1. Notice of Test plan to GPA
2. Test Plan
The test equation between real PV plant output and PVSyst is below:
$$PV_Output = (PV_Diff)(PVSyst_Output)$$
 - (1) Collect the weather data
 - (2) Base on collected data, generate the PVSyst
 - (3) Compare the PVSyst and real plant output
 - (4) Update the PV_Diff parameter
3. This PV_Diff Parameter shall be used for identification.
4. Status data of main equipment such as ESS PCS, Battery PV inverters (ex: On/Off status) shall be collected by SCADA and _____ provide those data.
5. Detail testing plan and period for all the equipment including the procedure above shall be discussed and agreed with both parties at least before a month of COD and the parties shall execute the test.

APPENDIX J
INTERCONNECTION AGREEMENT
(TO BE PROVIDED UPON ITS EXECUTION)

CALCULATION OF WEATHER HOURS

For each applicable period, Seller shall calculate (1) the expected production of the Facility using the historical Weather Data from “WeatherBank PGUM_2004-PRES_solar data” provided in bid Amendment 2 (the “Expected Historical Production”) and (2) the expected production of the Facility using the actual Weather Data (the “Expected Actual Production”). Seller then obtain the quotient, rounded to the fourth decimal place (the “Production Factor”), equal to the Expected Actual Production divided by the Expected Historical Production. If the Production Factor is greater than one (1), then no Weather Hours shall be deemed to have occurred. However, if the Production Factor is less than one (1), then Weather Hours shall be deemed to have occurred. The portion of any Deficiency Amount (as defined in the Agreement) attributable to such Weather Hours shall be the difference equal to (A) the aggregate Minimum Production amount for that period minus (B) the product of (x) the Production Factor and (y) the aggregate Minimum Production amount for that period. The Deficiency Amount due to weather shall not be penalized.

The Deficiency Amount due to weather shall be audited annually by an independent auditor to be selected and the cost shared by both parties.

SUBLEASE

**GUAM POWER AUTHORITY
SUBLEASE**

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**SUBLEASE AGREEMENT
BETWEEN
GUAM POWER AUTHORITY
AND**

This SUBLEASE, is made and executed this ____ day of _____ 2017, by and between GUAM POWER AUTHORITY, (hereinafter referred to as “GPA”), a public corporation and autonomous instrumentality of the Government of Guam, and (COMPANY) (hereinafter referred to _____), a private corporation, duly organized and existing under the laws of _____, duly registered to do business in Guam, with its local address at _____. (GPA and _____ may sometimes jointly be referred to as the “Parties”.)

R E C I T A L S

WHEREAS, GPA is a tenant under the Lease Agreement between The United States of America, acting by and through the Secretary of the Navy (hereinafter referred to as “Navy”) under Contract No. N62742-16-RP-00009 and **executed** on September 12, 2012, (hereinafter referred to as the “**Master Lease**”), pursuant to which Navy leased to GPA certain real and personal property for the purpose of developing properties for solar photovoltaic systems to produce renewable energy for the Guam Power Authority. A copy of the Master Lease is attached hereto and incorporated herein by this reference as Exhibit “A”; and

WHEREAS, GPA, through its solicitation process (**ENTER BID NO**) has entered into a Power Purchase Agreement with (COMPANY) on (Insert PPA Date) (hereinafter referred to the “PPA”) for renewable energy from and installed capacity of _____ MW grid interconnected solar photovoltaics system (“Solar PV Project”); and

WHEREAS, GPA desires to sublease certain real property located at _____ to (COMPANY) and (COMPANY) desires to accept such sublease upon and subject to terms and conditions set forth herein for the purposes of implementing the PPA.

NOW THEREFORE, in consideration of the mutual agreements herein contained and other good and valuable consideration, receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

ARTICLE 1 SUBLEASE

GPA subleases to (COMPANY) on the terms and conditions in this Sublease Agreement the premises set forth in Exhibit “B”, attached hereto and incorporated herein by this reference.

As used in this Sublease Agreement, the term “premises” refers to the real property described in **Exhibit “B”** and to any personal property and improvements located on said real property on the effective date of this Sublease Agreement.

ARTICLE 2 TERM

The term of this Sublease Agreement (the “term”) will commence on _____ (the “Commencement Date”) and end (Insert Contract Term including Construction Period) (____) years

from said Commencement Date (“Termination Date”), unless terminated sooner in accordance with the provisions of this Sublease Agreement. The lease period shall not extend past April 30, 2054.

ARTICLE 3 DELIVERY OF POSSESSION

Possession of the premises will be delivered to (COMPANY) on the Commencement Date. If GPA, for any reason whatsoever, cannot deliver possession of the premise to (COMPANY) on the Commencement Date, this Sublease Agreement shall not be void or voidable, nor shall GPA be liable to (COMPANY) for any loss or damage resulting from any delay in delivery.

ARTICLE 4: RENT

(COMPANY) will pay to GPA as rent, with deduction, setoff, notice, or demand, the annual sum of _____ (U.S Dollars).

ARTICLE 5 USE OF PREMISES

The premises will be used and occupied by (COMPANY) only for the purpose of its planning, development, construction, testing, operation, repair, and maintenance of the Solar PV Project and all things reasonable incidental to the foregoing.

ARTICLE 6 CONDITION OF PREMISES

(COMPANY) has inspected, and accepts the condition and state of the premises. (COMPANY) acknowledges that no representations, statements, or warranties, express or implied, have been made by or on behalf of GPA in respect to the condition of the premises, including all facilities located thereon, or whether the intended use or occupation may be made of them, and that GPA shall in no event whatsoever be liable for any latent defects in or on the premises.

In the event this Sublease is terminated and the Parties have not agreed to enter into a new sublease, (COMPANY) shall return the subleased Premises to GPA in the same condition in which it was received, reasonable wear and tear, damage by insurable events, and Acts of God accepted.

An Environmental Condition of Property (ECP) is provided in Attachment C of the Master Lease. The ECP sets forth the existing environmental conditions of the Leased Premises as represented by a survey conducted by the Navy and sets forth the basis for the Navy’s determination that the Leased Premises are suitable for leasing.

ARTICLE 7 OWNERSHIP OF IMPROVEMENTS

All improvements erected or placed on the premises after the Commencement Date by and on behalf of (COMPANY) are and shall be the property of (COMPANY) during the term hereof, subject to the terms and condition of this Sublease Agreement. Upon the expiration or termination of the Sublease Agreement, all such improvements shall become the property of GPA for the duration of the Master Lease.

ARTICLE 8 ALTERATIONS

(COMPANY) will not make, or cause to be made any alterations, improvements, additions and changes in or to the premises without the prior written consent of GPA and prior written consent of Navy. In particular, (COMPANY) shall comply with all requirements as provided in Section 4.2, Section 7.2 and Section 8 of the Master Lease and as specified here:

(COMPANY) shall not undertake any activity that may affect a historic or archeological property, including excavation, construction, alteration, or repairs of the Leased Premises, without the prior approval of Government and compliance with section 106 of the National Historic Preservation Act (16 U.S.C. § 470), and the Archeological Resources Protection Act of 1979 (16 U.S.C. §470aa). Buried cultural materials may be present on the Leased Premises. If those materials are encountered, (COMPANY) shall stop work immediately and notify GPA and Navy. GPA has been advised by Navy of no knowledge of any historical or archeological property on the Leased Premises; in the event that it becomes aware of any, GPA or Navy will immediately notify Sublessee.

Unexploded Ordnance and other Munitions and Explosives of Concern (UXO) may be present at this site. Unless otherwise explicitly stated in this paragraph, (COMPANY) shall not conduct or permit any contractor(s) to conduct any subsurface excavation, digging, drilling or other disturbance of the surface at any time without the prior written approval of the Navy. Any excavation, digging, drilling, or other disturbance of the surface shall be done in compliance with all applicable Federal, state, and local laws and regulations and with Department of Defense and Department of the Navy safety policies, including those pertaining to explosives safety. (COMPANY) acknowledges that land underlying and adjacent to the Leased Premises may contain UXO. If, after receipt of written approval by the Navy, (COMPANY) undertakes any subsurface excavation, digging, drilling, or other disturbance of the surface, it shall immediately halt work and notify the Navy of any buried debris, or foreign, potentially hazardous material encountered during this work.

ARTICLE 9 ENTRY / ACCESS

GPA reserves the right to enter premises to inspect the premises or the performance by (COMPANY) of the terms and conditions of this Sublease Agreement, Master Lease and the PPA.

In addition, as prescribed in the Master lease and at all reasonable times throughout the term of this Sublease, the Navy shall be allowed access to the Leased Premises for any purpose upon reasonable notice to Lessee or sublessee. The Navy normally will give Lessee or any sublessee 24-hour's prior notice of its intention to enter the Leased Premises, unless it reasonably determines the entry is an emergency required for safety, health, environmental, operations or security purposes, in which event no notice shall be required. Any claims by Lessee or sublessee against the Navy for damages arising from such entry shall be governed by the Federal Tort Claims Act. Nothing in this Lease shall be deemed to prejudice the rights of Lessee or any sublessee under any contract, other agreement or law including, but not limited to the Federal Tort Claims Act. All necessary keys to the buildings and Leased Premises occupied by Lessee or any sublessee shall be made available to the Navy upon request.

(COMPANY), their employees, vendors, and invitees will be granted reasonable access to the Leased Premises under this Sublease. As a condition, (COMPANY), and their employees, vendors, and invitees, agree to adhere to all base rules and regulations regarding installation security, ingress, egress, safety and sanitation that may be prescribed from time to time by the Commander/Commanding Officer. (COMPANY) and their employees, vendors, and business invitees, shall coordinate parking with the appropriate office of the installation. (COMPANY) and its invitees and contractors agree to absorb all costs, including time and expense, associated with gaining access to the installation under the RAPIDGATE or similar program. (COMPANY) shall also agree to absorb the direct cost associated with gaining access under RAPIDGATE or similar program for GPA employees related to operation and maintenance of the on base Solar PV Project.

Installation Security. The Leased Premises is located on a secure Department of Navy installation and sublessee(s) are required to comply with all applicable security rules, regulations, and procedures issued by the installation Commander/Commanding Officer. All employees of (COMPANY) that are required by the installation to do so, shall obtain appropriate clearance from the installation

("Clearance") to access the Leased Premises. Failure to obtain the required Clearance shall result in denial of access to the Leased Premises of (COMPANY) employees. (COMPANY) agree(s) to hold harmless Government from any liability of any nature for financial or other losses incurred by (COMPANY) by reason of (COMPANY) employees failure to obtain Clearance for access to the Leased Premises. The prior sentence shall survive the termination of this Lease.

ARTICLE 10 ASSIGNMENT AND SUBLETTING

(COMPANY) shall neither transfer, assign, nor sublet this Sublease or any interest in it, or any property on the Leased Premises, or grant any interest, privilege, or license whatsoever in connection with this Sublease without the prior written consent of GPA and the prior written consent of Navy.

ARTICLE 11 COMPLIANCE WITH LAW - WASTE AND NUISANCE PROHIBITED

During the term of this Sublease Agreement, (COMPANY) shall, at the expense of (COMPANY), observe and comply with all present and future laws and regulations of all federal, territorial and other governmental authorities affecting the premises, the equipment and any improvements by (COMPANY) in and on the premises, or any part of the premises, and of all governmental departments, agencies, bureaus and officials.

(COMPANY) shall not commit, or suffer to be committed, any waste on the premises, or any nuisance.

ARTICLE 12 ABANDONMENT OF PREMISES

(COMPANY) shall not vacate or abandon the premises at any time during the term of this Sublease Agreement. If (COMPANY) abandon, vacates, or surrenders the premises or is dispossessed by process of law, or otherwise, any personal property belonging to (COMPANY) and left on the premises shall be deemed to be abandoned.

ARTICLE 13 SUBLEASE SUBJECT TO MASTER LEASE

(COMPANY) hereby acknowledges that GPA is now leasing the property described in Exhibit "B" from the Navy under the terms of the Master Lease. This Sublease Agreement is subject to all terms, provisions, covenants and conditions contained in the Master Lease. (COMPANY) agrees to assume and be bound by the same responsibilities, rights, privileges, and duties that GPA has to Navy with respect to the premises or its operations, and (COMPANY) shall fully indemnify GPA against any responsibility or liability that GPA may incur by virtue of (COMPANY) use or occupancy of the premises or its operation allowed under this Sublease Agreement. (COMPANY) will not directly or indirectly do any act or permit any condition or thing to occur which would violate any of the provisions or constitute a default under the Master Lease. (COMPANY) will execute and deliver any documents, papers, or other instruments that may be necessary or required to permit the due performance and compliance with all of the terms, covenants, and provisions of the Master Lease.

(COMPANY) shall have the right at any time, at the expense of GPA, to take any action required of GPA under the Master Lease that GPA fails to perform in a timely manner and that may be necessary to prevent a default under the terms of the Master Lease.

If the Master Lease terminates as a result of default or breach by GPA or (COMPANY) under this Sublease Agreement or the Master Lease, the defaulting party will be liable to the non-defaulting party for the damage suffered as a result of the termination.

In the event that a conflict exists between the applicable terms, provisions, covenants and conditions of the Master Lease and this Sublease Agreement, the applicable terms, provisions, covenants and conditions of the Master Lease will control. In the event of a conflict between the terms and conditions of this Sublease Agreement, the PPA between GPA and (COMPANY), the terms and conditions of this Sublease Agreement will control. GPA and (COMPANY) understand and agree that the Navy has not approved, consented or agreed to the terms of the PPA and is not bound thereby.

ARTICLE 14 NO MODIFICATION OF MASTER LEASE

Nothing contained in this Sublease Agreement shall be construed to modify any of the provisions of the Master Lease or to waive any rights that Navy may have or hereafter have against GPA by reason of the Master Lease.

ARTICLE 15 LIABILITY FOR LIENS ON SUBLEASED PREMISES

(COMPANY) shall not permit any lien, charge, or encumbrance to be filed against the title of Navy or GPA with respect to the premises or any buildings or improvements on the premises including, but not limited to, by reason of work, labor, services or materials supplied to (COMPANY) or anyone holding the premises or any part of the premises by, through or under (COMPANY). As to any and all alterations, additions, improvements, repairs and work installed or performed by (COMPANY) on the premises, or labor performed or material furnished in connection therewith, neither GPA nor the premises shall be under any circumstances be liable for the payment of any expense incurred or for the value of any work done or material furnished, but rather, all alterations, additions, improvements, and repairs, and labor and material, shall be made, furnished, and performed at the expense of (COMPANY). (COMPANY) shall be solely responsible to contractors, laborers, and material suppliers furnishing and performing the labor and material.

If any lien, charge, or order for the payment of money shall hereafter be file against the title or other estate of Navy or GPA in premises or any buildings or improvements on the premises, or against Navy or GPA, whether or not the lien, charge, or order is valid or enforceable, (COMPANY) shall, at the expense of (COMPANY) cause the lien to be cancelled and discharged of record or bonded within thirty (30) days after the notice to (COMPANY) of the filing of such item.

ARTICLE 16 REPAIRS, UTILITIES AND TAXES TO BE LIBAIBLITY OF (COMPANY)

(COMPANY) shall maintain, or cause to be maintained, the premises in reasonable order and condition in light of the use of the premises and the condition of the premises immediately prior to the Commencement Date.

(COMPANY), shall, at all times during the term of this Sublease Agreement, at the expense of (COMPANY), keep and maintain in thorough repair and good, safe, and substantial order and condition, having regard to normal wear and tear, all buildings and improvements, and all building service equipment, on the land portion of the premises at the commencement of the term hereof and thereafter erected on the premises, or forming part of the premises, and promptly make all necessary repairs, both inside and outside, structural and non-structural, extraordinary and ordinary, whether or not the repairs were necessitated by wear, tear, obsolescence, or defects, latent or otherwise.

(COMPANY) shall use reasonable precaution to prevent waste, damage, or injury, and shall at the expense of (COMPANY), keep, replace, and maintain in thorough repair, good order, and safe condition, and free from rubbish, and other obstructions or encumbrances, the areas in front of and adjacent to the premises.

GPA shall in no event be required to make any alterations, additions, improvements, replacements, renewals or repairs of any kind, nature, or description, whatsoever during the term of this Sublease Agreement, nor shall GPA be required to furnish (COMPANY) any utilities or services of any kind whatsoever during the term.

(COMPANY) shall be responsible for obtaining utilities and services for the Leased Premises. In the event that (COMPANY) shall request and Government shall furnish (COMPANY) with any utilities and services maintained by Government, (COMPANY) shall pay Government the agreed charges as additional rent under this Sublease. Those charges and the method of payment shall be determined by Government or the appropriate supplier of the service, in accordance with applicable laws and regulations, on the basis that Government or the appropriate supplier may establish, and may include a requirement for the installation of adequate connecting and metering equipment at the sole cost and expense of (COMPANY). It is expressly agreed and understood that Government in no way warrants the continued maintenance or adequacy of any utilities or services furnished by it to the Leased Premises. (COMPANY) shall have the right, subject to Article 8, to install utilities, or make improvements to existing utilities on the Leased Premises, including but without limitation, the installation of emergency power generators, that may be necessary for the operation of (COMPANY) equipment.

(COMPANY) shall pay to the proper authority when and as the same become due and payable all taxes, assessments, and similar charges that, at any time during the term of this Sublease may be imposed on the Leased Premises. 10 U.S.C. § 2667(f) contains the consent of Congress to the taxation of (COMPANY)'s interest in the Leased Premises, whether or not the Leased Premises are in an area of exclusive Federal jurisdiction. Should Congress consent to taxation of Government's interest in the Leased Premises, this Sublease will be renegotiated.

ARTICLE 17 LIABILITY ON DESTRUCTION OF PREMISES

If, during the term of this Sublease Agreement, buildings, improvements, or the building service equipment in and on the premises at the commencement of the term or thereafter erected on or in the premises shall be destroyed or damaged in whole or in part by fire or other cause, (COMPANY) shall give to GPA and Navy under the Master Lease, notice thereof. (COMPANY) shall, at the expense of (COMPANY), promptly repair, replace, and rebuild the destroyed premises, at least to the extent of the value and as nearly as possible to the character of the building and improvements and the building service equipment on the premises at the commencement of the term and thereafter erected on the premises. In no event shall GPA be called on to repair, replace, or rebuild any buildings, improvements, or equipment, or to pay any of the expenses thereof.

ARTICLE 18 LIABILITY FOR INJURY OR DAMAGE UNDER SUBLEASE AGREEMENT

(COMPANY) is and shall be in exclusive control and possession of the premises as provided in this Sublease Agreement, and in no event shall GPA or Navy be liable for any injury or damage to any property or to any person happening on or about the premises, or for any injury or damage to the premises, nor to any property of (COMPANY), or of any other person contained in or on the premises.

The provisions of this Sublease Agreement permitting GPA to enter and inspect the premises are made for the purpose of enabling GPA to be informed as to whether (COMPANY) is complying with the terms and conditions of this Sublease Agreement, the Master Lease and the PPA and to do the acts that (COMPANY) fails to do.

ARTICLE 19 LIABILITY FOR INSURANCE FOR SUBLEASE

During the term of this Sublease Agreement, (COMPANY), at the expense of (COMPANY), shall be responsible to ensure that there is effective insurance covering (COMPANY)'s use of the premises and operations allowed under this Sublease Agreement, as provided for in Section 16 of the Master Lease.

ARTICLE 20 ENVIRONMENTAL PROTECTION

20.1. Compliance with Law. (COMPANY) shall comply, at its sole cost and expense, with the Federal, state, and local laws, regulations, and standards that are or may become applicable to (COMPANY)'s activities on the Leased Premises. (COMPANY) shall be financially responsible for environmental contamination of the Leased premises which occurs during the term of this Sublease Agreement, except to the extent that (COMPANY) can prove that the Navy actually and directly caused the contamination by operations of the Navy.

20.2. Permits. (COMPANY) shall be solely responsible for obtaining at its cost and expense any environmental permits required for its operations under this Sublease, independent of any existing permits.

20.3. Indemnification. (COMPANY) shall, to the extent permitted under applicable law, indemnify and hold harmless GPA and the Navy from, and defend GPA and/or the Navy against, any damages, costs, expenses, liabilities, fines, or penalties resulting from releases, discharges, emissions, spills, storage, treatment, disposal, or any other acts or omissions by (COMPANY), its officers, agents, employees, or contractors, or licensees, or the invitees of any of them, giving rise to GPA and/or the Navy liability, civil or criminal, or responsibility under Federal, state, or local environmental laws. This Paragraph shall survive the termination of this Sublease, and (COMPANY)'s obligations under this Paragraph shall apply whenever GPA and/or the Navy incurs costs or liabilities for (COMPANY)'s actions of the types described in this Paragraph 20.

20.4. Inspection. The Navy's rights under this Sublease specifically include the right for the Navy officials to inspect upon reasonable notice the Leased Premises for compliance with environmental, safety, and occupational health laws and regulations, whether or not the Navy is responsible for enforcing them. Those inspections may be made without prejudice to the right of duly constituted enforcement officials to make them. The Navy normally will give (COMPANY) twenty-four (24) hours prior notice of its intention to enter the Leased Premises unless it determines the entry is required for safety, environmental, operations, or security purposes. Any claims by (COMPANY) or sub (COMPANY) against the Navy for damages arising from such entry shall be governed by the Federal Tort Claims Act.

20.5. Asbestos. Except as provided in Paragraph 20.6, the Navy is not responsible for any abatement, removal, or containment of asbestos. If (COMPANY) intends to make any Improvements that require the abatement, removal, or containment of asbestos, an appropriate asbestos management plan must be incorporated in the alterations plan to be submitted to the Commander/Commanding Officer under Paragraph 8. The asbestos management plan will identify the proposed disposal site for the asbestos.

20.6. Abatement of Asbestos. the Navy shall be responsible for the removal or containment of asbestos or asbestos-containing material (collectively, "ACM") existing in the Leased Premises on the term beginning date as identified in the ECP attached to this Sublease when that ACM is damaged or deteriorated to the extent that, through normal use, it is a source of airborne fibers in quantities that pose a threat to human health ("damaged or deteriorated ACM"). The Navy agrees to abate all that existing damaged or deteriorated ACM as stated in this Paragraph 20.6. The Navy may choose the most economical means of abating damaged or deteriorated ACM, which may include removal or containment, or a combination of removal and containment. The foregoing the Navy obligation does not apply to

ACM that is not damaged or deteriorated at the time (COMPANY) takes possession of the Leased Premises and that may become damaged or deteriorated by (COMPANY)'s activities. ACM that during the period of this Sublease becomes damaged or deteriorated through the passage of time, or as a consequence of (COMPANY)'s activities under this Sublease, including but not limited to any emergency, shall be abated by (COMPANY) at its sole cost and expense. Notwithstanding Paragraph 20.5, in an emergency, (COMPANY) shall notify the Navy as soon as practicable of its emergency ACM responses. (COMPANY) shall be responsible for monitoring the condition of existing ACM on the Leased Premises for deterioration or damage and accomplishing repairs pursuant to this Sublease.

20.7. Environmental Liability of (COMPANY). Notwithstanding any other provision of this Sublease, (COMPANY) does not assume any liability or responsibility for environmental impacts and damage caused by the Navy's use of toxic or hazardous wastes, substances, or materials on any portion of the installation, including the Leased Premises. (COMPANY) has no obligation under this Sublease to undertake the defense of any claim or action, whether in existence now or brought in the future, solely arising out of the use or release of any toxic or hazardous wastes, substances, or materials on or from any part of the installation, including the Leased Premises, which occurred prior to the first day of (COMPANY)'s occupation or use of each portion of, or any building, facility, or other improvement on, the Leased Premises under any instrument entered into between the Parties. Further, (COMPANY) has no obligation under this Sublease to undertake environmental response, remediation, or cleanup relating to that use or release.

20.7.1. For the purposes of this Paragraph, "defense" or "environmental response, remediation, or cleanup" include liability and responsibility for the costs of damage, penalties, legal, and investigative services relating to such use or release. "Occupation or use" shall mean any activity or presence (including preparation and construction) in or upon such portion of, or such building, facility, or other improvement on, the Leased Premises.

20.7.2. This Paragraph 20.7 does not relieve (COMPANY) of any obligation or liability it might have or acquire with regard to third parties or regulatory authorities by operation of law.

20.7.3. This Paragraph 20.7 shall survive the expiration or termination of this Sublease.

20.8. No Liability for Interference. (COMPANY) expressly acknowledges that it fully understands that some or all of the response actions to be undertaken with regard to the Federal Facilities Agreement (FFA), if applicable, or the ERP, may impact (COMPANY)'s quiet use and enjoyment of the Leased Premises. An FFA WAS NOT signed for the Leased Premises. (COMPANY) agrees that notwithstanding any other provision of this Sublease, the Navy assumes no liability to (COMPANY) should implementation of the FFA, if applicable, or the ERP, or other hazardous waste cleanup requirements, whether imposed by law, regulatory agencies, or the Navy or the Department of Defense, interfere with (COMPANY)'s use of the Leased Premises. (COMPANY) shall have no claim against The United States or any of its officers, agents, employees, or contractors on account of any interference, whether due to entry, performance of remedial or removal actions, or exercise of any right with regard to the FFA, if applicable, or the ERP, or under this Sublease or otherwise.

20.9. Response or Remedial Actions. (COMPANY) agrees to comply with the provisions of any health or safety plan in effect under the ERP or any hazardous substance remediation or response agreement with environmental regulatory authorities during the course of any of the above described response or remedial actions. Any inspection, survey, investigation, or other response or remedial action will, to the extent practicable, be coordinated with representatives designated by (COMPANY). Any claims by (COMPANY) or sub (COMPANY) against the Navy for damages arising from such actions shall be governed by the Federal Tort Claims Act.

20.10. Storage of Hazardous Wastes. (COMPANY) must comply with all applicable Federal, state, and local laws, regulations, and other requirements relating to occupational safety and health, the handling and storage of hazardous materials, and the proper generation, handling, accumulation, treatment, storage, disposal, and transportation of hazardous wastes. (COMPANY) shall not treat, store, transport, or dispose of hazardous waste unless (COMPANY) is in possession of any required permit issued to it under the Resource Conservation and Recovery Act, as amended (RCRA). (COMPANY) shall not treat, store, transport, or dispose of any hazardous waste under, pursuant to, or in reliance upon any permit issued to the Navy. (COMPANY) shall be liable for the cost of proper disposal of any hazardous waste generated by its approved sub (COMPANY) s in the event of failure of the sub (COMPANY) s to dispose properly of those wastes.

20.11. Environmental Records. (COMPANY) must maintain and make available to the Navy all records, inspection logs, and manifests that track the generation, handling, storage, treatment, and disposal of hazardous waste relevant to the Leased Premises, as well as all other environmental records required to be maintained by (COMPANY) in connection with its use and activities on the Leased Premises by applicable laws and requirements. the Navy reserves the right to inspect the Leased Premises and (COMPANY)'s records for compliance with Federal, state, local laws, regulations, and other requirements relating to the generation, handling, storage, treatment, and disposal of hazardous waste, as well as to the discharge or release of hazardous substances. Violations will be reported by the Navy to appropriate regulatory agencies, as required by applicable law. (COMPANY) shall be liable for the payment of any fines and penalties that may accrue as a result of the actions of (COMPANY).

20.12. Spill Plans. If hazardous waste, fuel, chemicals, or other regulated hazardous substances will be present on the Leased Premises, (COMPANY) shall prepare a completed and approved plan prior to commencement of operations on the Leased Premises for responding to hazardous waste, fuel, and other chemical spills. The plan shall comply with all applicable requirements and shall be updated from time to time as may be required to comply with changes in site conditions or applicable requirements, and where required, shall be approved by all agencies having regulatory jurisdiction over the plan. The plan shall be independent of Navy spill prevention and response plans. (COMPANY) shall not rely on use of the installation's personnel or equipment in execution of its plan. (COMPANY) shall file a copy of the approved plan and approved amendments thereto with the Commander/Commanding Officer within fifteen (15) days of approval. Notwithstanding the foregoing, should the Navy provide any personnel or equipment, whether for initial fire response or spill containment or otherwise on request of (COMPANY), or because (COMPANY) was not, in the sole opinion of the Navy, conducting timely cleanup actions as required of (COMPANY) under applicable laws and regulations, (COMPANY) agrees to reimburse the Navy for its costs in accordance with all applicable laws and regulations.

20.13. RCRA Compliance. (COMPANY) shall comply with the hazardous waste permit requirements under the RCRA or its state equivalent and any other applicable hazardous waste laws, rules, and regulations pertaining to (COMPANY)'s use or activities on the Leased Premises. (COMPANY) must provide at its own expense hazardous waste storage facilities that comply with all laws and regulations that it may need for storage. The Navy hazardous waste storage facilities will not be available to (COMPANY). Any violation of the requirements of this Paragraph shall be deemed a material breach of this Sublease.

20.14. Accumulation Points. Navy accumulation points for hazardous and other wastes shall not be used by (COMPANY), and (COMPANY) shall not permit its hazardous waste to be commingled with hazardous waste of the Navy.

20.15. Discharge of Fill. (COMPANY) shall not discharge, or allow the discharge of, any dredged or fill material into any waters or wetlands on the Leased Premises except in compliance with the express written consent of the Commander/Commanding Officer.

20.16. Pesticides. Prior to the storage, mixing, or application of any pesticide, as that term is defined under the Federal Insecticide, Fungicide, and Rodenticide Act, (COMPANY) shall prepare a plan for storage, mixing, and application of pesticides (Pesticide Management Plan). The Pesticide Management Plan shall be sufficient to meet all applicable Federal, state, and local pesticide requirements. (COMPANY) shall store, mix, and apply all pesticides within the Leased Premises only in strict compliance with the Pesticide Management Plan. The pesticides will only be applied by a licensed applicator.

20.17. National Pollutant Discharge Elimination System (NPDES) Permit. (COMPANY) shall comply with all requirements of the Federal Water Pollution Control Act, as amended, the NPDES, and any applicable State or local requirements. If (COMPANY) discharges wastewater to a publicly owned treatment works, (COMPANY) must submit an application for its discharge prior to the start of this Sublease. (COMPANY) shall be responsible for meeting all applicable wastewater discharge permit standards. (COMPANY) shall not discharge wastewater under the authority of any NPDES permit, pretreatment permit, or any other permit issued to the installation. (COMPANY) shall make no use of any septic tank installed on the installation without the prior written consent of the Navy.

20.18. Radioactive Materials. (COMPANY) must notify the Navy of its intent to possess, store, or use any licensed or licensable source or byproduct materials, as those terms are defined under the Atomic Energy Act, as amended, and its implementing regulations; of (COMPANY)'s intent to possess, use, or store radium; and of (COMPANY)'s intent to possess or use any equipment producing ionizing radiation and subject to specific licensing requirements or other individual regulations, at least sixty (60) days prior to the entry of such materials or equipment upon the installation. Upon notification, the Navy may impose requirements, including prohibition of possession, use, or storage that are deemed necessary to adequately protect health and the human environment. Thereafter, (COMPANY) must notify the Navy of the presence of all licensed or licensable source or byproduct materials, of the presence of all radium, and of the presence of all equipment producing ionizing radiation and subject to specific licensing requirements or other individual regulation; provided, however, that (COMPANY) need not make either of the above notifications to the Navy with regard to source and byproduct material that is exempt from regulation under the Atomic Energy Act. (COMPANY) shall not, under any circumstances, use, own, possess, or allow the presence of special nuclear material on the Leased Premises.

20.19. Improvements and Environmental Cleanup. (COMPANY) further agrees that it shall give the Navy prior written notice accompanied by a detailed written description of all proposals for any Improvements that may impede or impair any activities under the ERP, or the FFA if applicable, or that will be undertaken in certain areas of the Leased Premises identified as "Areas of Special Notice" on **Attachment E**. These Areas of Special Notice consist of either "Operable Units" (as defined in the National Contingency Plan) or other areas of concern because of the potential for environmental contamination and include buffer areas as shown on **Attachment E**. The notice and accompanying written description of those proposals shall be delivered to the Navy sixty (60) days in advance of the commencement of any Improvements. In addition, Improvements shall not commence until (COMPANY) has complied with the provisions of Paragraph 8. The detailed written description must include the effect that planned Improvements may have on site soil and groundwater conditions and the cleanup efforts contemplated under the ERP and the FFA, if applicable. Notwithstanding the preceding three sentences, (COMPANY) shall be under no obligation to give advance written notice of any Improvements that will be undertaken totally within any structure located on the Leased Premises, provided that the work will not impede or impair any activities under the ERP or the FFA, if applicable. However, any work below the floor of any structure within any Area of Special Notice that will involve excavating in and/or disturbing concrete flooring, soil and/or groundwater, or will impede or impair any activities under the ERP or the FFA, if applicable, will be subject to the sixty (60) day notice requirement imposed by this Paragraph 20.19.

20.20. FFA A Federal Facility Agreement does not exist for this Leased Premises. The Navy acknowledges that the installation has been identified as a National Priorities List Site under CERCLA. (COMPANY) acknowledges that the Navy has delivered to it a copy of the FFA entered into by EPA, the state, and the Navy, and will deliver to (COMPANY) a copy of any amendments to it. (COMPANY) agrees that should any conflict arise between the terms of such agreement as it presently exists or may be amended (“FFA,” “Interagency Agreement” or “IAG”) and the provisions of this Sublease, the terms of the FFA will take precedence. (COMPANY) further agrees that notwithstanding any other provision of this Lease, the Navy assumes no liability to (COMPANY) should implementation of the FFA interfere with (COMPANY)’s use of the Leased Premises. (COMPANY) shall have no claim on account of any interference against The United States or any of its officers, agents, employees, or contractors, other than for abatement of Rent.

20.21. Environmental Access. the Navy, EPA, and the state and their respective officers, agents, employees, contractors, and subcontractors have the right, upon reasonable notice to (COMPANY) to enter upon the Leased Premises for the purposes enumerated in this subparagraph, and for other purposes consistent with any provision of the FFA, if applicable:

20.21.1. To conduct investigations and surveys, including, where necessary, drilling, soil and water sampling, test pitting, testing soil borings, and other activities related to the ERP or the FFA, if applicable;

20.21.2. To inspect field activities of the Navy and its contractors and subcontractors in implementing the ERP or the FFA, if applicable. When the (COMPANY) has notice of an EPA or State Regulatory visit or inspection, the (COMPANY) shall notify the Navy as soon as practical;

20.21.3. To conduct any test or survey required by the EPA or the state relating to the implementation of the FFA, if applicable, or environmental conditions at the Leased Premises or to verify any data submitted to the EPA or state by the Navy relating to those conditions;

20.21.4. To conduct, operate, maintain, or undertake any other response or remedial action as required or necessary under the ERP or the FFA, if applicable, including, but not limited to, monitoring wells, pumping wells, and treatment facilities.

20.21.5. To monitor any environmental restrictive use covenants and the effectiveness of any other land use or institutional control established by the Navy on the Leased Premises, either by itself, by its contractor, by any public entity, including the state, or by a private entity registered in the state to monitor environmental covenants.

ARTICLE 21 INDEMNIFICATION

GPA and the Navy shall not be liable for any loss, injury, death, or damage to persons or property that at any time may be suffered or sustained by (COMPANY) or by any person whatsoever may at any time be using or occupying or visiting the premises or be in, on or about the premises, whether the loss, injury, death, or damage shall be caused by or in any way result from or arise out of any act, omission, or negligence of (COMPANY) or of any occupation, visitor, or user of any portion of the premises, or shall result from or be caused by any other matter or thing whether of the same kind as or of a different kind than the matters of things above set forth. (COMPANY) shall indemnify and hold harmless GPA and the Navy against any and all claims, liabilities, losses, or damage whatsoever on account of any such loss, injury, death, or damage. (COMPANY) waives all claims against GPA and the Navy for damages to the buildings and improvements that are now on or hereafter placed or build on the premises and to the property of (COMPANY) in, on, or about the premises, and for injuries to persons or property in or about

the premises, from any cause arising at any time. As to (COMPANY)'s obligations to GPA, the two preceding sentences shall not apply to loss, injury, death, or damage arising by reason of the gross negligence or misconduct of GPA, its agents, or employees.

ARTICLE 22 PROHIBITION OF VOLUNTARY ASSIGNMENT – EFFECT OF BANKRUPTCY OR INSOLVENCY

Neither this Sublease Agreement nor the premises nor any interest of GPA under this Sublease Agreement in the premises or in the building of improvements of the premises shall be subject to involuntary assignment, transfer, sale, or to assignment, transfer or sale by operation of law in any manner whatsoever; any attempt at involuntary assignment, transfer, or sale shall be void and of no effect.

Without limiting the generality of the provisions of the preceding paragraph of this Article 21, (COMPANY) agrees that in the event any proceedings under the Bankruptcy Act or any amendment to the act is commenced by or against (COMPANY), (and, if against (COMPANY), the proceeding shall not be dismissed before either an adjudication in bankruptcy or the confirmation of composition, arrangement, or plan or reorganization), or in the event (COMPANY) is adjudged insolvent or makes an assignment for the benefits of its creditors, or if a receiver is appointed in any proceeding or action to which (COMPANY) is a party, with authority to take possession or control of the premises or the business conducted on the premises by (COMPANY), and such receiver is not discharged within a period of thirty (30) days after his or her appointment, any such event of any involuntary assignment prohibited by the provisions of the preceding paragraph of this Article 21 shall be deemed to constitute a breach of this Sublease Agreement by (COMPANY) and shall, at the election of GPA, without notice or entry or other action of the GPA terminate this Sublease Agreement and also all rights of (COMPANY) under this Sublease Agreement in and to the premises and also all rights of any and all persons claiming under (COMPANY).

ARTICLE 23 DEFAULT AND REMEDIES ON DEFAULT

23.1. Default. This Sublease Agreement is entered into on the condition that (COMPANY) shall perform all the terms and conditions set forth herein to be performed by (COMPANY), and the failure of (COMPANY) to perform said terms and conditions shall constitute a default under this Sublease Agreement. GPA may, at its option and without limiting GPA in the exercise of any other right or remedy it may have on account of a default or breach by (COMPANY), exercise the rights and remedies specified in Section 23.02. if:

- (a) (COMPANY) defaults in the payment of any money agreed to be paid by (COMPANY) to GPA for rent or for any other purpose under this Sublease Agreement, and if such default continues for ten (10) days after written notice to (COMPANY) by GPA;
- (b) The premises is used for an unlawful purpose;
- (c) The premises are left vacant, unoccupied, or deserted for a period of thirty (30) days or more, unless caused by circumstances beyond the reasonable control of (COMPANY);
- (d) (COMPANY) defaults in the performance of any other of its agreements, conditions or covenants under this Sublease Agreement and such default continues for thirty (30) days after written notice to (COMPANY) by GPA.

23.2. Remedies. On any breach, default, or abandonment by (COMPANY), GPA may exercise any of the following rights after the periods of time stated in Section 23.01:

- (a) Immediately reenter and, at GPA's election, remove all persons and property from the premises, store the personal property in a public warehouse or elsewhere at the cost of, for the account of, and at the risk of (COMPANY). In the event of any such reentry by GPA, GPA may make any repairs, additions, or improvements in, to or upon the premises which may be necessary or

convenient. In such instance, the Sublease Agreement will be terminated, and GPA will be entitled to recover all damages allowable under law or this Sublease Agreement.

- (b) Collect by suit or otherwise each installment of rent or other sum as it becomes due hereunder, or enforce, by suit or otherwise, any other term or provision hereof on the part of (COMPANY) required to be kept or performed, it being specifically agreed that all unpaid installments of rent other sums shall bear interest at the highest legal rate from the due date thereof until paid.
- (c) Terminate this Sublease Agreement, in which event (COMPANY) agrees to immediately surrender possession of the premises and any improvements thereon, and to pay GPA, in addition to any other remedy GPA may have, all damages GPA may incur by reason of (COMPANY)'s defaults, including the cost of recovering the premises.

23.3. No Waiver of Default. GPA's failure to take advantage of any default or breach of covenant on the part of (COMPANY) shall not be, or be construed as, a waiver thereof, nor shall any custom or practice which may arise between the parties in the course of administering this Sublease Agreement be construed to waive or to lessen the right of GPA to insist upon the performance by (COMPANY) of any term, covenant, or condition hereof, or to exercise any rights given on account of any such default. A waiver of a particular breach, or default, shall not be deemed to be a waiver of the same or any other subsequent breach or default. The acceptance of rent hereunder shall not be, or be construed to be, a waiver or any term, covenant, or condition of this Sublease Agreement.

23.4. (COMPANY)'s Waiver of Statute of Limitations. (COMPANY) does further waive the benefit of any statute of limitations to which it might be entitled.

23.5. Remedies Cumulative. The rights, powers, elections, and remedies of GPA contained in this Sublease Agreement shall be construed as cumulative and no one of them is or shall be considered exclusive of the other or exclusive of any rights or remedies allowed by law, and the exercise of one or more rights, powers, elections, or remedies shall not impair GPA's right to exercise any other.

ARTICLE 24 TERMINATION OF SUBLEASE AGREEMENT ON EXPIRATION OR TERMINATION OF MASTER LEASE

This Sublease Agreement is subject to the terms and conditions of the Master Lease between GPA and Navy, and this Sublease Agreement shall terminate automatically on the termination, cancellation, expiration or surrender of the Master Lease between GPA and Navy.

ARTICLE 25 TERMINATION OF SUBLEASE AGREEMENT UPON MUTAL AGREEMENT

This Sublease Agreement may be terminated upon the written mutual agreement of GPA and (COMPANY), with notice provided to the Navy of such termination.

ARTICLE 26 SURRENDER OF PREMISES

Upon the voluntary or other termination of this Sublease Agreement or any early termination of the term from whatever cause, (COMPANY) shall peaceably and quietly surrender and deliver up to GPA the premises, including all buildings, alterations, rebuilding, replacements, and changes, additions, and improvements, constructed, erected, added, or placed on the premises by (COMPANY), with all building service equipment in or appurtenant to the premises, in as good condition, repair, and as clean as at the commencement of the term, and as any new buildings, structures, replacements, additions, or improvements constructed, erected, added, or placed on the premises by (COMPANY) were when completed, with ordinary wear and tear excepted.

ARTICLE 27 NOTICES

All notices and demands that may be required or permitted by either party to the other will be in writing. All notices and demands shall be sent by telefax or mail, postage prepaid, addressed to (with a copy to the Navy to the addresses listed in Section of the Master Lease):

To: *(Post Office Address)*
 GUAM POWER AUTHORITY
 General Manager
 P.O. Box 2977
 Hagatna, Guam 96932

Or

(Physical Address)
 GUAM POWER AUTHORITY
 General Manager
 Gloria B. Nelson Public Service
 Bldg. 688, Route 15-Suite 100
 Mangilao, Guam 96913-6203

To: **(COMPANY Address)**

ARTICLE 28 PARTIES BOUND

The covenants, agreements, terms, provisions and conditions contained in this Sublease Agreement shall apply to and bind the successors, executors, administrators, and assigns parties.

ARTICLE 29 RELATIONSHIP OF PARTIES

Nothing contained in this Sublease Agreement shall be deemed or construed by the parties or by any third person to create the relationship of principal and agent or of partnership or of joint venture or of any association between GPA and **(COMPANY)**, provided that any actions or inactions of **(COMPANY)** may be attributed by the Navy to GPA and GPA shall be responsible therefore, in accordance with the terms of the Master Lease.

ARTICLE 30 DISPUTE RESOLUTION

30.1. Disputes. The parties hereto agree that in the event that there is any dispute or difference between them arising out of or in connection with this Sublease Agreement or in the interpretation of any of the provisions hereof or the breach, termination or validity of this Sublease Agreement, the chief executives of GPA and **(COMPANY)** shall meet together within five (5) days of one party notifying the other party of any dispute in an effort to resolve such dispute by discussion between them. Any joint decision of such chief executives shall be binding upon the parties hereto.

30.2. Guam Procurement Law and Government Claims Act. Where any dispute is not resolved as provided for in the preceding Article 30.01, such dispute shall be resolved pursuant to the Guam Procurement Law (5 GCA Section 5001 et. seq.) and the Government Claims Act (5 GCA Section 6101 et. seq.).

30.3. Continuing Obligations. During the pendency of any dispute hereunder, the parties shall continue to perform their obligations hereunder.

ARTICLE 31 GOVERNING LAW

This Sublease Agreement will be governed by and construed in accordance with the laws of the Territory Guam and the applicable laws of the United States of America.

ARTICLE 32 NO WAIVER

The failure of either party to this Sublease Agreement to insist on the performance of any of its terms and conditions, or the waiver of any breach of any of the terms and conditions of this Sublease Agreement, shall not be construed as thereafter waiving any such terms and conditions, but they shall continue and remain in full force and effect as if no such forbearance or waiver had occurred.

ARTICLE 33 ATTORNEYS' FEE

If either party commences an action against the other in connection with this Sublease Agreement, the prevailing party will be entitled to recover costs of suit and reasonable attorneys' fees.

ARTICLE 34 EFFECT OF PARTIAL INVALIDITY

The invalidity of any part of this Sublease Agreement will not and shall not be deemed to affect the validity of any other part. In the event that any provision of this Sublease Agreement is held to be invalid, the parties agree that the remaining provisions shall be deemed to be in full force and effect as if they had been executed by both parties subsequent to the expungement of the invalid provision.

ARTICLE 35 ENTIRE AGREEMENT

This Sublease Agreement sets forth all the agreements between GPA and (COMPANY) concerning the premises, and there are no agreements, either oral or written, other than as set forth in the Sublease Agreement.

ARTICLE 36 MODIFICATION OF SUBLEASE AGREEMENT

Any modification of this Sublease Agreement or additional obligation assumed by either party in connection with this Sublease Agreement shall be binding only if evidenced by a document in writing signed by each party or an authorized representative of each party and approved by the Navy.

ARTICLE 37 COUNTERPARTS

This Sublease Agreement may be executed in any number of counterparts, each which shall be deemed to be an original, but all of which together shall constitute but one and the same instrument.

ARTICLE 38 FURTHER ASSURANCES

The parties agree to execute whatever papers and documents and assurances may be necessary to effectuate the terms of this Sublease Agreement and take such further action required by law or as GPA or (COMPANY) may from time to time reasonably request in order to carry out more effectively the intent and purpose of this Sublease Agreement and to establish and protect the rights and remedies created in favor of GPA or (COMPANY).

ARTICLE 39 PARAGRAPH HEADINGS

The titles to the paragraphs of this Sublease Agreement are solely for the convenience of the parties and shall not be used to explain, modify, simply, or aid in the interpretation of the provisions of this Sublease Agreement.

ARTICLE 40 CONSENT BY NAVY

The Sublease Agreement will have no effect unless consented to in writing by the Navy.

[Signature Page Follows]

IN WITNESS WHEREOF, the Parties hereto have caused this Sublease Agreement to be executed on the dates provided below to be effective as of the day and year first above written.

WITNESS:

GUAM POWER AUTHORITY

By: _____
D. GRAHAM BOTHA
GPA LEGAL COUNSEL
GUAM POWER AUTHORITY

By: _____
JOHN M. BENAVENTE, P.E.
GENERAL MANAGER
GUAM POWER AUTHORITY

Date: _____

Date: _____

APPROVED BY THE CONSOLIDATED COMMISSION ON UTILITIES:

By: _____
JOSEPH T. DUENAS
CHAIRMAN

Date: _____

CONSOLIDATED COMMISSION ON UTILITIES

WITNESS:

(COMPANY)

By: _____
WITNESS NAME
Title
Division
Company

By: _____
LESSEE SIGNATORY
Title
Division
Company

Date: _____

Date: _____

MASTER LEASE

(to be provided)

PREMISES
Property Maps & Descriptions
(to be provided)

INVITATION FOR MULTI-STEP BID

NO.: GPA-007-18

RENEWABLE ENERGY RESOURCE

PHASE III



Volume IV

Bid Scoring Mechanism

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1 Introduction

1.1 Overview

GPA will use the Bid Scoring Procedures described in this volume of the Invitation for Bid (IFB) to qualify Bidders for the participation in the final bid stage. The Bid Scoring Procedures provide the Bidders the opportunity to highlight their qualifications to bid in terms of their resources, experience in developing renewable resources, financial conditions and creditworthiness qualifications, risk exposure, pricing structure, and ability to comply with bidding “Threshold Requirements”.

The IFB bid evaluation shall be based on such specifications and based on the relative ranking of each Bidder’s qualifications, financial information, and the structure of their bid.

1.2 Bid Scoring Worksheets

Bidders shall complete the following worksheets in the **Qualitative Scoring Workbook.xls** for Step 1 of this multi-step IFB.

- **Part 1- Qual Support References**
- **Part 2 – Technical Data**

Bidders shall complete the **Priced Proposal** worksheet in the **Priced Proposal Workbook.xls** for Step 2 of this multi-step IFB.

2 Step 1 - Qualitative Bid Scoring

The qualitative bid scoring is designed to assess the quality of the Bidder’s resources, experience, credit worthiness, maturity of resource technology, and control of proposed site. Each GPA evaluator shall score each Bidder separately under a point system to determine the acceptability of each bid. The majority of the determinations of GPA evaluators shall prevail in the decision to Qualify or not Qualify a Bidder for Step 2.

2.1 Technical Qualification Proposal Qualitative Bid Scoring Procedure

The instructions for filling out the Qualitative Scoring Workbook are listed in the **Workbook Instructions** tab in the Workbook. The Bidder must complete all entries in the **Part 1- Qual Support References** and **Part 2 – Technical Data** tabs of the Workbook.

GPA may elect to have up to seven (7) evaluators for this IFB. Evaluators will be employees of GPA.

Each GPA evaluator will score Bidders' responses in the "**Part 1- Qual Support References**" and the "**Part 2 – Technical Data**" Worksheet Tabs using the following steps in filling out the "**Qual Eval Scoresheet**" tab:

- Review each Bidder's response to each line item;
- Assign a relative score to each Bidder's response to each line item;
- Determine each Bidder's weighted average raw score using pre-specified weights for each question.

The maximum Total Qualitative Score is **1,865 points**

Each GPA evaluator will analyze the contents of the bids and categorize the bids as:

- a. Acceptable—those Technical Qualification Proposals receiving a score at or above 80% of the total possible score of 1,865 points (those receiving 1,492 points).
- b. Potentially Acceptable—those Technical Qualification Proposals receiving a score of less than 80% but at least 70% of the total possible score of 1,865 points (those receiving at least 1,306 points)
- c. Unacceptable—those Technical Qualification Proposals receiving a score of less than 70% of the total possible score of 1,865 points (those receiving less than 1,306 points)

A rating of Potentially Acceptable means the GPA evaluator has determined this Bidder has a reasonable possibility of making its submittal acceptable. A percent score of less than 70% indicates that a GPA evaluator has determined that the Bidder has not supplied sufficient evidence of qualifications and should not be allowed to participate in Step 2.

After each GPA evaluator has completed the evaluation of Technical Qualification Proposals, GPA shall complete the Table 1 below. The Procurement Officer will enter for each GPA evaluator and Bidder one and only one of the following in the appropriate table cell below:

- Acceptable
- Potentially Acceptable
- Unacceptable

Table 1. Final Evaluation of Bidder Qualification

	BIDDER 1	BIDDER 2	BIDDER 3	BIDDER 4	BIDDER 5	BIDDER 6
TECHNOLOGY:						
EVALUATOR						
1						
2						
3						
4						
5						
Majority Result:						

If the majority of the GPA evaluators rate the Bidder as Acceptable, that Bidder is determined to be Qualified and will be allowed to participate in Step 2.

The Procurement Officer may initiate Step Two if there are sufficient acceptable Technical Qualification Proposals to assure effective price competition in the second phase without technical discussions. Sufficient acceptable Technical Qualification Proposals shall include variety of resource technologies in order to meet GPA's generation diversification goals.

If the Procurement Officer finds that such is not the case, the Procurement Officer shall issue an amendment to this Invitation for Bid or engage in technical discussions with Bidders who are rated by a majority of the GPA evaluators as Acceptable or Potentially Acceptable. During the course of such discussions, the Procurement officer shall not disclose any information derived from one Technical Qualification Proposals to any other Bidders. Once discussions are begun, any Bidder who has not been notified that it's Offer has been finally found acceptable, may submit supplemental information amending its Technical Offer at any time. Such submission may be made at the request of the Procurement Officer or upon the Bidder's own initiative.

Bidders who are rated by the majority of the GPA evaluators as Unacceptable are determined to be not qualified and will not be allowed to participate in Step 2.

The Procurement Officer shall record in writing the basis for finding a Bidder Not Qualified and make it part of the procurement file.

22 Qualitative Scoring

Table 2 identifies the factors that will determine which of the Bidders meet the qualifications to participate in Step 2, Price Evaluation, in this multi-step bid. Evaluators will score each bid by criteria category sub-factors listed in this table. The Evaluator scores will be summed by category and weighted to produce a weighted score. The weighted scores will be totaled to produce a total score which will be the final score used to determine "Acceptable", "Potentially Acceptable", and "Unacceptable" bids as defined in previous section.

Descriptions of the scoring criteria sub-factors can be found in Volume II.

Table 2 - Qualitative Scoring

Invitation for Bid: GPA-007-18 Renewable Resource Acquisition for the Guam Power Authority PART 3 - QUAL EVAL SCORESHEET					
Bidder's Name:					Date:
Bidder's No.: <<< BIDDER'S BID NO >>>					
EVALUATION FACTORS	Raw Score Weight	MAX Possible Score	Maximum Weighted Possible Score	BID EVALUTION	
				RAW SCORE	WEIGHTED SCORE
A. PROJECT DEVELOPMENT	20	26	520	0	
A1. Method and status of project financing (3)		3			
A2. Level of site control by developer (6)		6			
A3. Project team experience (5)		5			
A4. Project Schedule & Commercial Operation Date (4)		4			
A5. Status of equipment supply and EPC agreements (3)		3			
A6. Bidder concurrence to the draft Purchase Power Agreement (5)		5			
B. PHYSICAL PROJECT CHARACTERISTICS	20	20	400	0	
B1. Operating Profile (5)		5			
B2. Point of delivery (5)		5			
B3. Risk that the resource will not perform as expected (5)		5			
B4. Project life and extension options. (5)		5			
C. POWER PRODUCT CHARACTERISTICS	25	12	300	0	
C1. Guaranteed Annual MWH (3)		3			
C2. Dispatchability (3) - Proposals not capable of energy shifting total daily solar generated energy shall be disqualified.		3			
C3. Product flexibility (3)		3			
C4. Contract Term (3)		3			
D. CREDIT EVALUATION	20	21	420	0	
D1. Debt and equity ratings (3)		3			
D2. Performance assurance (3)		3			
D3. Financial ratio analysis (3)		3			
D4. Default risk (3)		3			
D5. Credit concentration and liquidity effect (3)		3			
D6. Enforceability of contractual credit terms (3)		3			
D7. Bidder revisions to contract templates that may affect credit requirements (3)		3			
E. Environmental Permits and Impacts	15	15	225	0	
E1. Permits (5)		5			
E2. Site Environmental Assessment (10)		10			
TOTALS	100	94	1865	0	
EVALUATION RATING:					
ACCEPTABLE - Scores Greater Than or Equal to:					1492
POTENTIALLY ACCEPTABLE - Less than Acceptable but Greater Than or Equal to:					1306
UNACCEPTABLE - Scores are less than:					1306

3 Step 2 — Priced Proposal Evaluation

The price evaluation will be based on the total net cost to the utility of integrating a bidder's proposed project onto the utility's grid and purchasing the renewable energy from the bidder at the bidder's proposed price. Bids will be compared to each other based on the methodology and cost components described below.

The cost analysis will include an evaluation of the utility's fuel and O&M cost savings expected to be realized by contracting with each Bidder's project against the utility cost projected in GPA's 2013 Integrated Resource Plan using the Ventyx/ABB Strategist Software. GPA will award the contract(s) to the Bidder(s) whose bid yields the lowest Net Present Value Utility Costs that equals or is lower than GPA's projected net present value utility cost in the Integrated Resource Plan, while also meeting GPA's fuel diversification goals.

At this stage of the evaluation process, the components of the total cost of power to the utility for each bid will include the cost of the energy to be purchased as a product of the bid price and the Contract Energy based on the generation profile submitted by the bidder.

GPA will accept bids from intermittent resources that offer Annual Fixed Pricing (in \$/MWh) for the term of the contract. GPA will not accept bids with year-over-year (YOY) escalation rates greater than 1.0% per year.

Table 3. Priced Proposal Evaluation

	BIDDER 1	BIDDER 2	BIDDER 3	BIDDER 4	BIDDER 5	BIDDER 6
TECHNOLOGY:						
Net Present Value – Contract Costs						

GPA will select the bids based on the lowest net present value costs results.

The basis of the cost analysis will be the process used in developing GPA's Integrated Resource Plan. GPA's Integrated Resource Plan includes assumptions such as GPA Generator performance and efficiencies (Heat Rate, Availability, etc.), Fuel Forecasts, Load Forecasts, and GPA Generator Fixed and Variable Operating Costs.

Renewable bids compete with GPA operating cost for Generation (all power plants) including but not limited to variable O&M and fuel costs using the Ventyx/ABB Strategist software application. The evaluation compares the difference in total system costs between the case without Phase III Renewable Energy Bids and with Bidder proposed costs and energy guarantees singly and in combination. To meet the avoided cost standard, the Bidder's proposed costs and operational guarantees must result in an equal or lower total system cost when included in the GPA generation mix than the GPA system without the proposed renewable energy system.

The charts below show GPA’s Marginal Electric Cost for its current operation.

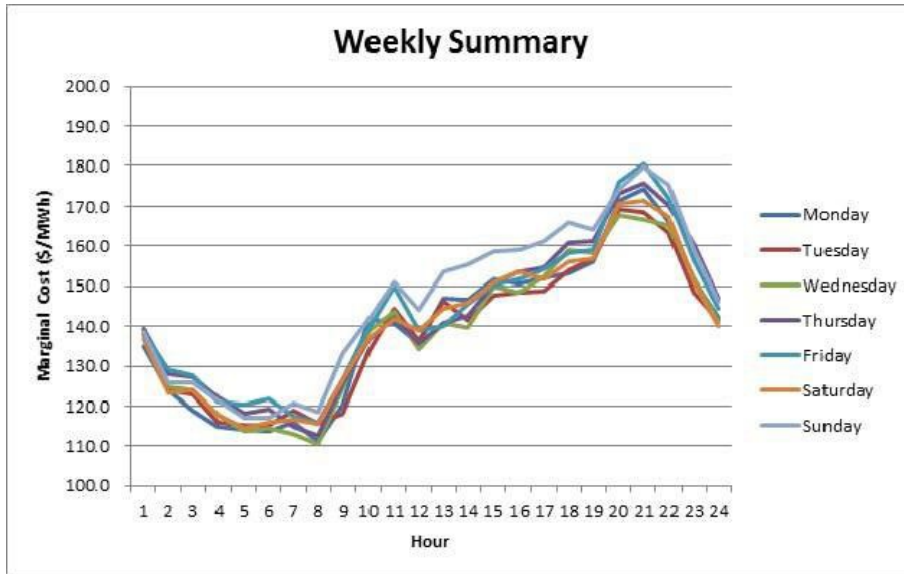


Figure 3 Weekly Marginal Electric Costs Assuming Cabras Unit 3 is Online

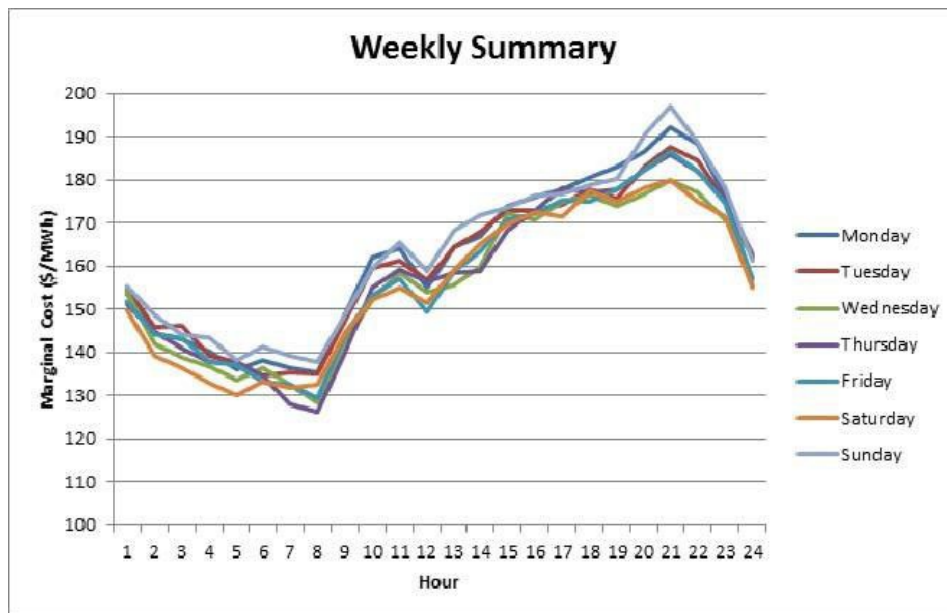


Figure 4 Weekly Marginal Electric Costs Assuming Cabras Unit 3 is Offline

Historical LEAC rates are also provided in Appendix O of the bid documents.

INVITATION FOR MULTI-STEP BID

NO.: GPA – 007 - 18

RENEWABLE ENERGY RESOURCE

PHASE III



Volume V

Appendices

APPENDIX A

Proposal Checklists

DOCUMENT RECEIPT CHECKLIST

Document Title	Proponent Initial
Volume I Commercial Terms and Conditions	_____
Volume II Technical Qualification Requirements	_____
Volume III Purchase Power Agreement (Draft)	_____
Volume IV Proposal Scoring Mechanism	_____
Volume V Appendices	_____
APPENDIX A – Proposal Checklist	_____
APPENDIX B – Bid Bond Form and Instructions	_____
APPENDIX C – Major Shareholders Disclosure Affidavit	_____
APPENDIX D – Non-Collusion Affidavit	_____
APPENDIX E – Local Procurement Preference Application	_____
APPENDIX F – Performance Bond	_____
APPENDIX G – Electrical System Drawings	_____
APPENDIX H – Required Interconnection Technical Information	_____
APPENDIX I – Not Used	_____
APPENDIX J – No Gratuities or Kickbacks Affidavit	_____
APPENDIX K – Ethical Standards Affidavit	_____
APPENDIX L – Declaration Re Compliance with U.S. DOL Wage Determination	_____
APPENDIX M – Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property	_____
APPENDIX N – Section 3-403 (Cost or Pricing Data) of the Guam Procurement Regulations	_____
APPENDIX O – Historical LEAC – Fuel Recovery Rates	_____
APPENDIX P – Environmental Assessment for PV Systems (2015)	_____
APPENDIX Q – Site Access Security Application	_____
Qualitative Scoring Workbook.xls	_____
Priced Proposal Workbook.xls	_____
Contiguous Amendment Notifications From Amendment No. 1 through _____	_____
Others:	_____

TECHNICAL PROPOSAL SUBMITTAL CHECKLIST

	ITEM	QUANTITY (ORIGINALS)¹	QUANTITY (COPIES)¹	GPA INITIAL
1	Technical Qualification Proposal	_____	_____	_____
2	Written Responses and Supporting Information to the Questions Raised in the Qualitative Scoring Workbook	_____	_____	_____
3	Electronic Copy of the Completed Qualitative Scoring Workbook (Reference Worksheet)	_____	_____	_____
4	Completion of data input into Technical Proposal Form	_____	_____	_____
5	Electronic Copy of the Completed Price Technical Proposal Workbook	_____	_____	_____
6	Supplementary Information:	_____	_____	_____
6.1	Articles of Incorporation and By-Laws ²	_____	_____	_____
6.2	Affidavit of Disclosure of Major Shareholders (Appendix D) ²	_____	_____	_____
6.3	Audited Financial Information on Bidder and Sub-Contractors	_____	_____	_____
6.4	Certificate of Good Standing ²	_____	_____	_____
6.5	Non-collusion Affidavit (Appendix E) ²	_____	_____	_____
6.6	Client References	_____	_____	_____
6.7	Bid Bond ²	_____	_____	_____
6.8	Local Procurement Preference Application	_____	_____	_____
6.9	No Gratuities or Kickbacks Affidavit	_____	_____	_____
6.10	Ethical Standards Affidavit	_____	_____	_____
6.11	Declaration Re Compliance with US DOL Wage Determination	_____	_____	_____
6.12	Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property	_____	_____	_____

¹Quantities supplied for each item must comply with minimums established in Volume I of the Invitation for Bid documents.

²Proposal is subject to automatic disqualification if this article is not provided.

APPENDIX B

Bid Bond Form and Instructions



GUAM POWER AUTHORITY

ATURIDÁT ILEKTRESEDÁT GUAHAN
P.O.BOX 2977 • AGANA, GUAM U.S.A. 96932-2977

BID BOND

NO.: _____

KNOW ALL MEN BY THESE PRESENTS that _____, as

Principal Hereinafter called the Principal, and (Bonding Company), _

a duly admitted insurer under the laws of the Territory of Guam, as Surety, hereinafter called the Surety are Held firmly bound unto the Territory of Guam for the sum of

_____ Dollars (\$

_____), for Payment of which sum will and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for (identify project by number and brief description)

NOW, THEREFORE, if the Territory of Guam shall accept the bid of the Principal and the Principal shall enter into a Contract with the Territory of Guam in accordance with the terms of such bid, and give such bond or bonds as my be specified in bidding or Contract documents with good and sufficient surety for the faithful performance of such Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Territory of Guam the difference not to exceed the penalty hereof between the amounts specified in said bid and such larger amount for which the Territory of Guam may in good faith contract with another party to perform work covered by said bid or an appropriate liquidated amount as specified in the Invitation for Bids then this obligation shall be null and void, otherwise to remain full force and effect.

Signed and sealed this _____ day of _____ 2018.

(PRINCIPAL) (SEAL)

(WITNESS)

(TITLE)

(MAJOR OFFICER OF SURETY)

(TITLE)

(TITLE)

(RESIDENT GENERAL AGENT)

SEE INSTRUCTIONS FOR SUPPORTING DOCUMENTS REQUIRED.

INSTRUCTION TO PROVIDERS:

NOTICE to all Insurance and Bonding Institutions:

The Bond requires the signatures of the Vendor, two (2) major Officers of the Surety and Resident General Agent, if the Surety is a foreign or alien surety.

When the form is submitted to the Guam Power Authority, it should be accompanied with copies of the following:

1. Current Certificate of Authority to do business on Guam issued by the Department of Revenue and Taxation.
2. Power of Attorney issued by the Surety to the Resident General Agent.
3. Power of Attorney issued by two (2) major officers of the Surety to whoever is signing on their behalf.

Bonds, submitted as Bid Guarantee, without signatures and supporting documents are invalid and Bids will be rejected.

APPENDIX C

Major Shareholders Disclosure Affidavit



GUAM POWER AUTHORITY
ATURIDAT ILEKTRESEDAT GUAHAN
P O BOX 2977, AGANA, GUAM 96932-2977

SPECIAL PROVISION
FOR
MAJOR SHAREHOLDERS DISCLOSURE AFFIDAVIT

All Bidders/Offerors are required to submit a current affidavit as required below. Failure to do so will mean disqualification and rejection of the bid/rfp.

5 GCA §5233 (Title 5, Section 5233) states:

"Section 5233 Disclosure of Major Shareholders. As a condition of submitting a bid or offer, any partnership, sole proprietorship or corporation doing business with the government of Guam shall submit an affidavit executed under oath that lists the name and address of any person who has held more than ten percent (10%) of the outstanding interest or shares in said partnership, sole proprietorship or corporation at any time during the twelve (12) month period immediately preceding submission of a bid, or, that it is a not for profit organization that qualifies for tax exemption under the Internal Revenue Code of the United States or the Business Privilege Tax law of Guam, Title 12, Guam Code Annotated, Section 26203©. With the exception of not for profit organizations, the affidavit shall contain the number of shares or the percentage of all assets of such partnership, sole proprietorship or corporation which have held by each such person during the twelve (12) month period. In addition, the affidavit shall contain the name and address of any person who has received or is entitled to receive a commission, gratuity or other compensation for procuring or assisting in obtaining business related to the bid or offer and shall also contain the amounts of any such commission, gratuity or other compensation. The affidavit shall be open and available to the public for inspection and copying."

- 1. If the affidavit is a copy, indicate the BID/RFP number and where it is filed.**
- 2. Affidavits must be signed within 60 days of the date the bids or proposals are due.**

MAJOR SHAREHOLDERS OF DISCLOSURE AFFIDAVIT

TERRITORY OF GUAM)
)
 HAGATNA, GUAM)

I, undersign, _____,
 (partner or officer of the company of, etc.)
 being first duly sworn, deposes and says:

1. That the person who have held more than ten percent (10%) of the company's shares during the past twelve (12) months are as follows:

<u>Name</u>	<u>Address</u>	<u>Percentage of Shares Held</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total number of shares		_____

2. Persons who have received or are entitled a commission, gratuity or other compensation for procuring or assisting in obtaining business related to the bid/rfp for which this Affidavit is submitted are as follows:

<u>Name</u>	<u>Address</u>	<u>Amount of Commission Gratuity or other Compensation</u>
_____	_____	_____
_____	_____	_____

Further, affiant sayeth naught.

Date:

 Signature of individual if bidder/offeror is a sole Proprietorship; Partner, if the bidder/offeror is a Partnership Officer, if the bidder/offeror is a corporation.

Subscribe and sworn to before me this _____ day of _____,

20 _____.

Notary Public _____

In and for the Territory of Guam

My Commission expires _____.

APPENDIX D

Non-Collusion Affidavit

NON-COLLUSION AFFIDAVIT

Guam)
)ss:
Hagatna)

I, _____ first being duly sworn, depose and say:
(Name of Declarant)

1. That I am the _____ of _____.
(Title) (Name of Bidding/RFP Company)
2. That in making the foregoing proposal or bid, that such proposal or bid is Genuine and not collusive or shame, that said bidder/offeror has not colluded, Conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham or to refrain from bidding or submitting a proposal and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid of affiant or any other bidder, or to secure any overhead, project or cost element of said bid price, or of that of any bidder, or to secure any advantage against the GUAM POWER AUTHORITY or any person interested in the proposed contract; and
3. That all statements in said proposal or bid are true.
4. This affidavit is made in compliance with Guam Administrative Rules and Regulations §§3126(b).

(Declarant)

SUBSCRIBED AND SWORN to me before this _____ day of _____ 2018.

)Seal(

Notary Public

SPECIAL PROVISIONS

All offerors are required to submit a current affidavit; failure to do so will mean disqualification and rejection of the proposal.

APPENDIX E

**Local Procurement Preference
Application**

Edward J.B. Calvo
Governor

Telephone Nos. (671) 648-3054/55 Fax: 648-3165

Raymond S. Tenorio
Lieutenant Governor

Accountability · Impartiality · Competence · Openness · Value

LOCAL PROCUREMENT PREFERENCE APPLICATION

Based on the law stipulated below, please place a checkmark or an "X" on the block indicating the item that applies to your business:

5GCA, Chapter 5, Section 5008, "Policy in Favor of Local Procurement" of the Guam Procurement Law states:

All procurement of supplies and services shall be made from among businesses licensed to do business on Guam and that maintains an office or other facility on Guam, whenever a business that is willing to be a contractor is:

- () (a) A licensed bonafide manufacturing business that adds at least twenty-five percent (25%) of the value of an item, not to include administrative overhead, suing workers who are U.S. Citizens or lawfully admitted permanent residents or nationals of the United States, or persons who are lawfully admitted to the United States to work, based on their former citizenship in the Trust Territory for the Pacific Islands; or
- () (b) A business that regularly carries an inventory for regular immediate sale of at least fifty percent (50%) of the items of supplies to be procured; or
- () (c) A business that has a bonafide retail or wholesale business location that regularly carries an inventory on Guam of a value of at least one half of the value of the bid or One Hundred Fifty Thousand Dollars (\$150,000.0) whichever is less, of supplies and items of a similar nature to those being sought; or
- () *(d) A service actually in business, doing a substantial business on Guam, and hiring at least 95% U.S. Citizens, lawfully admitted permanent residents or national of the Unites States, or persons who lawfully admitted to the United States to work, based on their citizenship in any of the nation's previously comprising the Trust Territory of the Pacific Islands.

- Bidders indicating qualification under (d) may be considered QUALIFIED for the Local Procurement Preference only if the Government's requirement is for service. Service is defined Pursuant to 5 GCA Government Operations Subparagraph 5030 entitled DEFINITIONS under Chapter 5 of the Guam Procurement Law.

1. I _____, representative for _____, have read the requirements of the law cited above and do hereby qualify and elect to be given the LOCAL PROCUREMENT PREFERENCE for Bid No.: GPA _____.
By filling in this information and placing my signature below, I understand that the Guam Power Authority will review this application and provide me with a determination whether or not the 15% preference will be applied to this bid.

2. I _____, representative for _____, have read the requirements of the law cited above, and do not wish to apply for the Local Procurement Preference for Bid No.: GPA _____.

Bidder Representative Signature

Date

APPENDIX F

Performance Bond

PERFORMANCE BOND NUMBER: _____

KNOW ALL MEN BY THESE PRESENTS that _____,
 as Principal, hereinafter called **CONTRACTOR**, and _____,
 a corporation hereinafter called **SURETY**, are held and firmly bound unto the **GUAM
 POWER AUTHORITY** as Obligee, in the amount of _____
 Dollars (\$ _____), an amount negotiated for the first partial **GUAM POWER
 AUTHORITY** fiscal year within the term of the **CONTRACT**, for the payment whereof
CONTRACTOR and **SURETY** bind themselves, their heirs, executors, administrators,
 successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, **CONTRACTOR** has by written agreement dated _____,
 2009, entered into a **PURCHASE POWER AGREEMENT** with the **GUAM POWER
 AUTHORITY** through midnight of _____,
 _____, in accordance with forms and
 specifications prepared by the **GUAM POWER AUTHORITY** which **CONTRACT** is by
 reference made a part hereof, and is hereinafter referred to as the "**CONTRACT**".

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if
CONTRACTOR shall promptly and faithfully perform said **CONTRACT** then this obligation
 shall be null and void; otherwise it shall remain in full force and effect. The **SURETY** hereby
 waives notice of any alteration or extension provided the same is within the scope of the
CONTRACT. Whenever **CONTRACTOR** shall be and is declared by the **GUAM POWER
 AUTHORITY** to be in default under the **CONTRACT**, **GUAM POWER AUTHORITY**
 having performed its obligation thereunder, the **SURETY** may promptly remedy the default or
 shall promptly:

- (1) Complete the **CONTRACT** in accordance with its terms and conditions;
 or,
 - (2) Obtain a bid or bids for completing the **CONTRACT** in accordance with its
 terms and conditions and upon determination by the **GUAM POWER
 AUTHORITY** and the **SURETY** jointly of the lowest responsive,
 responsible **BIDDER**, arrange for a **CONTRACT** between such **BIDDER**
 and the **GUAM POWER AUTHORITY** and make available as work
 progresses (even though there should be a default or a succession of defaults
 under the **CONTRACT** or **CONTRACTS** of completion arranged under
 this paragraph) sufficient funds to pay the cost of completion less the balance
 of the **CONTRACT** price; but not exceeding, including other costs and
 damages for which the **SURETY** may be liable hereunder, the amount set
 forth in the first paragraph hereof.
-

The term "balance of the **CONTRACT** price", as used in this paragraph shall mean the total amount payable by the **GUAM POWER AUTHORITY** to **CONTRACTOR** under the **CONTRACT** for the current fiscal year and any amendments thereto, less the amount properly paid by the **GUAM POWER AUTHORITY** to **CONTRACTOR** for that partial or full fiscal year.

The term fiscal year shall mean the time between October 1 in the calendar year to September 30 of the next calendar year.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the **GUAM POWER AUTHORITY** or successors of the **GUAM POWER AUTHORITY**.

Signed and sealed this _____ day of _____, 20_____.

(Principal) (Seal)

(Witness) _____
(Bonding Company)

(Title) _____
(Title)

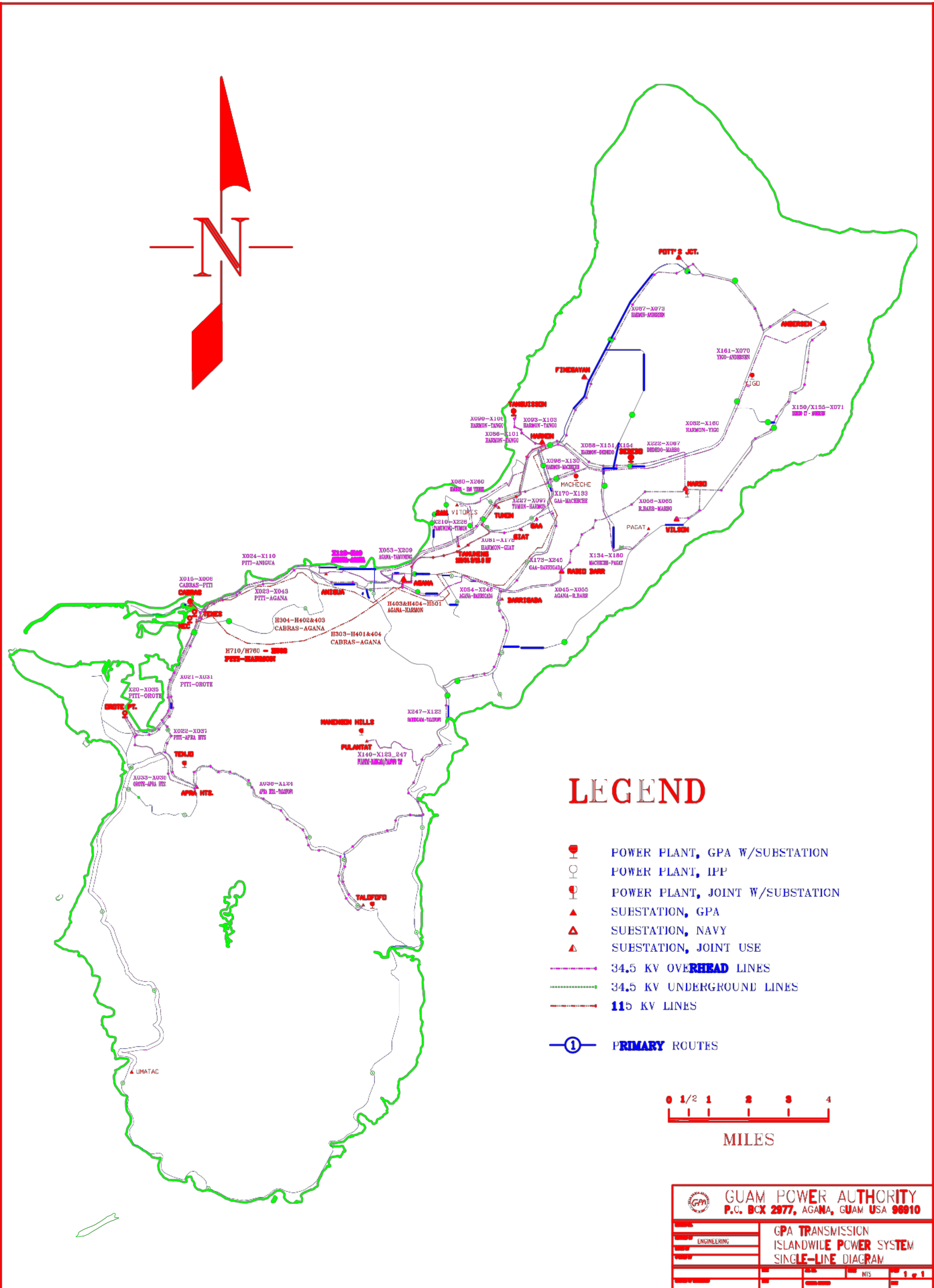
By: _____

(Witness) (Attorney-In-Fact)



APPENDIX G

Electrical System Drawings



LEGEND

- POWER PLANT, GPA W/SUBSTATION
- POWER PLANT, IPP
- POWER PLANT, JOINT W/SUBSTATION
- SUBSTATION, GPA
- SUBSTATION, NAVY
- SUBSTATION, JOINT USE
- 34.5 KV OVERHEAD LINES
- 34.5 KV UNDERGROUND LINES
- 115 KV LINES
- PRIMARY ROUTES



GUAM POWER AUTHORITY P.O. BOX 2977, AGANA, GUAM USA 96910	
ENGINEERING _____ _____ _____	GPA TRANSMISSION ISLANDWIDE POWER SYSTEM SINGLE-LINE DIAGRAM _____ _____
NTS 1.1	

APPENDIX H

Required Interconnection Technical Information

Bidders are required to provide the following information in describing or detailing proposed project's interconnection with GPA grid.

1. Provide preliminary Single-Line Diagram(s) for the generation and interconnection facilities. The Single-line diagram(s) should include:
 - a. **Transformers** - For main and generator step up transformer(s), show:
 - i. Transformer voltage and MVA ratings.
 - ii. Transformer impedance(s).
 - Transformer winding connections and grounding. If neutrals are grounded through impedance, show the impedance value.
 - b. **Breakers** - For the Breakers include:
 - i. The voltage, continuous current and interrupting capability ratings.
 - ii. The trip speed (time to open)
 - c. The protective relaying and metering for the generators, buses, and all other main substation equipment.
 - d. For the potential transformers, indicate the type, quantity, ratio, and accuracy rating.
 - e. For the current transformers, indicate the type, quantity, ratio, and accuracy rating, and thermal rating factor.
 - f. Auxiliary power devices (e.g. capacitors, reactors, storage systems, etc.) and their rating(s); additional inquiries may be made to obtain technical data for these devices.
 - g. The generator(s) voltage, impedances, and MVA ratings.
 - h. The generator grounding method. If the generator is not solidly grounded, provide the grounding method details and equipment ratings.
 2. Provide a plan map of the facilities and indicate the interconnection point to the GPA system.
 3. Provide the technical specifications and other information available for the generators included in the proposal.
-

(Not Used)

No Gratuities or Kickbacks Affidavit

NO GRATUITIES OR KICKBACKS AFFIDAVIT

AFFIDAVIT

(Offeror)

TERRITORY OF GUAM)

HAGATNA, GUAM)

SS:

_____, being first duly sworn, deposes and says:

As the duly authorized representative of the Offeror, that neither I nor of the Offeror's officers, representatives, agents, subcontractors, or employees has or have offered, given or agreed to give any government of Guam employee or former employee, any payment, gift, kickback, gratuity or offer of employment in connection with Offeror's proposal.

Signature of Individual if Proposer is a Sole
Proprietorship; Partner, if the Proposer is a
Partnership;
Officer, if the Proposer is a Corporation

SUBSCRIBED AND SWORN to before me this day of _____, 2018.

Notary Public
In and for the Territory of Guam
My Commission Expires:

APPENDIX K

Ethical Standards Affidavit

ETHICAL STANDARDS AFFIDAVIT

AFFIDAVIT

(Proposer)

TERRITORY OF GUAM)

HAGATNA, GUAM

)
)

SS:

_____, being first duly sworn, deposes and

says: That I am (the Sole Proprietor, a Partner or Officer of the Offeror)

That Offeror making the foregoing Proposal, that neither he or nor of the Offeror's officers, representatives, agents, subcontractors, or employees of the Offeror have knowingly influenced any government of Guam employee to breach any of the ethical standards set forth in 5 GCA Chapter 5 Article 11, and promises that neither he nor any officer, representative, agent, subcontractor, or employee of Offeror will knowingly influence

any government of Guam employee to breach any ethical standard set for in 5 GCA Chapter 5 Article 11.

Signature of Individual if Proposer is a Sole
Proprietorship; Partner, if the Proposer is a
Partnership;
Officer, if the Proposer is a Corporation

SUBSCRIBED AND SWORN to before me this day of _____, 2018.

Notary Public
In and for the Territory of Guam
My Commission Expires:

APPENDIX L

**Declaration Re Compliance with US DOL
Wage Determination**

DECLARATION RE-COMPLIANCE WITH U.S. DOL WAGE DETERMINATION

Procurement No.: _____

Name of Offeror Company: _____

_____ hereby certifies under penalty of perjury:

(1) That I am _____ (the offeror, a partner of the offeror, an officer of the offeror) making the bid or proposal in the foregoing identified procurement;

(2) That I have read and understand the provisions of 5 GCA § 5801 and § 5802 which read:

§ 5801. Wage Determination Established.

In such cases where the government of Guam enters into contractual arrangements with a sole proprietorship, a partnership or a corporation ("contractor") for the provision of a service to the government of Guam, and in such cases where the contractor employs a person(s) whose purpose, in whole or in part, is the direct delivery of service contracted by the government of Guam, then the contractor shall pay such employee(s) in accordance with the Wage Determination for Guam and the Northern Mariana Islands issued and promulgated by the U.S. Department of Labor for such labor as is employed in the direct delivery of contract deliverables to the government of Guam.

The Wage Determination most recently issued by the U.S. Department of Labor at the time a contract is awarded to a contractor by the government of Guam shall be used to determine wages, which shall be paid to employees pursuant to this Article. Should any contract contain a renewal clause, then at the time of renewal adjustments, there shall be made stipulations contained in that contract for applying the Wage Determination, as required by this Article, so that the Wage Determination promulgated by the U.S. Department of Labor on a date most recent to the renewal date shall apply.

§ 5802. Benefits.

In addition to the Wage Determination detailed in this Article, any contract to which this Article applies shall also contain provisions mandating health and similar benefits for employees covered by this Article, such benefits having a minimum value as detailed in the Wage Determination issued and promulgated by the U.S. Department of Labor, and shall contain provisions guaranteeing a minimum of ten (10) paid holidays per annum per employee.

(3) That the offeror is in full compliance with 5 GCA § 5801 and § 5802, as may be applicable to the procurement referenced herein;

Signature of Individual if Proposer is a Sole Proprietorship;

Partner, if the Proposer is a Partnership;

Officer, if the Proposer is a Corporation

SUBSCRIBED AND SWORN to before me this ____ day of _____, 2018.

Notary Public
In and for the Territory of Guam
My Commission Expires:

APPENDIX M

**Restriction against Sex Offenders
Employed by Service Providers to
Government of Guam from Working on
Government of Guam Property**

SPECIAL PROVISIONS

Restriction Against Sex Offenders Employed by Service Providers to Government of Guam from Working on Government of Guam Property

GCA 5 §5253 Restriction Against Contractors Employing Convicted Sex Offenders from Working at Government of Guam Venues:

- (a) No person convicted of a sex offense under the provisions of Chapter 25 of Title 9 Guam Code Annotated, or an offense as defined in Article 2 of Chapter 28, Title 9 GCA in Guam, or an offense in any jurisdiction which includes, at a minimum, all of the elements of said offenses, or who is listed on the Sex Offender Registry, and who is employed by a business contracted to perform services for an agency or instrumentality of the government of Guam, shall work for his employer on the property of the Government of Guam other than public highway.
- (b) All contracts for services to agencies listed herein shall include the following provisions: (1) warranties that no person providing services on behalf of the contractor has been convicted of a sex offense under the provisions of Chapter 25 of Title 9 GCA or an offense as defined in Article 2 of Chapter 28, Title 9 GCA, or an offense in another jurisdiction with, at a minimum, the same elements as such offenses, or who is listed on the Sex Offender Registry; and (2) that if any person providing services on behalf of the contractor is convicted of a sex offense under the provisions of Chapter 25 of Title 9 GCA or an offense as defined in Article 2 of Chapter 28, Title 9 GCA or an offense in another jurisdiction with, at a minimum, the same elements as such offenses, or who is listed on the Sex Offender Registry, that such person will be immediately removed from working at said agency and that the administrator of said agency be informed of such within twenty-four (24) hours of such conviction.
- (c) Duties of the General Services Agency or Procurement Administrators. All contracts, bids, or Requests for Proposals shall state all the conditions in § 5253(b).
- (d) Any contractor found in violation of § 5253(b), after notice from the contracting authority of such violation, shall, within twenty-four (24) hours, take corrective action and shall report such action to the contracting authority. Failure to take corrective action within the stipulated period may result in the temporary suspension of the contract at the discretion of the contracting authority.

SOURCE: *Added by P.L. 28-024:2 (Apr. 21, 2005). Amended by P.L. 28-098:2 (Feb. 7, 2006).*

Signature of Bidder Date

Proposer, if an individual;
Partner, if a partnership;
Officer, if a corporation.

Subscribed and sworn before me this _____ day of _____, 2018.

Notary Public

APPENDIX N

Procurement Regulations

(excerpts from 1984 GSA Procurement Regulations)

3-403 Cost or Pricing Data

6-101.09 Liquidated Damages

GSA Procurement Regulations

3-401.05 WRITTEN DETERMINATION OF NONRESPONSIBILITY REQUIRED.

If a bidder or offeror who otherwise would have been awarded a contract is found nonresponsible, a written determination of nonresponsibility setting forth the basis of the finding shall be prepared by the Chief Procurement Officer, the Director of Public Works, or the head of a Purchasing Agency. A copy of the determination shall be sent promptly to the nonresponsible bidder or offeror. The final determination shall be made part of the procurement file.

3-402 PREQUALIFICATION OF SUPPLIERS.

Prospective suppliers may be prequalified for particular types of supplies, services, and construction. Solicitation mailing lists of potential contractors shall include, but shall not be limited to, such prequalified suppliers.

3-402.01 PREQUALIFICATION.**3-402.01.1 GENERAL.**

Prospective contractors may be prequalified for bidder lists, but distribution of the solicitation shall not be limited to prequalified contractors, nor may a prospective contractor be denied award of a contract simply because such contractor was not prequalified. The fact that a prospective contractor has been prequalified does not necessarily represent a finding of responsibility.

3-402.01.2 QUALIFIED PRODUCTS LISTS.

This Section is not applicable to qualified products lists which are treated in Section 4-202.02.2 (Procedures for the Development of Specifications, Special Additional Procedures) of Chapter 4 (Specifications) of these Regulations.

3-403 COST OR PRICING DATA.**3-403.01 SCOPE OF REGULATION ON COST OR PRICING DATA.**

This Section sets forth the pricing policies which are applicable to contracts of any type and any price adjustments thereunder when cost or pricing data are required to be submitted. The provisions of this Section requiring submission of cost or pricing data do not apply to a contract let by competitive sealed bidding (including multi-step bidding) or small purchases. However, cost or pricing data may be required under a contract let by competitive sealed bidding when price adjustments are subsequently made in such a contract and, to this extent, those provisions would apply. See Section 3-403.02 (Requirement for Cost or Pricing Data) for when the contractor may be required to submit cost or pricing data.

GSA Procurement Regulations

3-403.02 REQUIREMENT FOR COST OR PRICING DATA.**3-403.02.1 SUBMISSION OF COST OR PRICING DATA.**

Except as provided in Subsection 3-403.02.2 of this Section, cost or pricing data is required to be submitted in support of a proposal when:

- (a) any contract expected to exceed \$100,000 is to be awarded by competitive sealed proposals, by sole source procurement, by competitive selection, or under Chapter 5 of the Guam Procurement Act, (Architect-Engineer and Land Surveying Services).
- (b) adjusting the price of any contract, including a contract awarded by competitive sealed bidding, whether or not cost or pricing data were required in connection with the initial pricing of the contract, if the adjustment involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed \$100,000. (For example, the requirement applies to a \$30,000 net modification resulting from a reduction of \$70,000 and an increase of \$40,000 when the reduction and increase are related.) However, this requirement shall not apply when unrelated and separately priced adjustments for which cost or pricing data would not be required if considered separately are consolidated for administrative convenience. The price shall also be adjusted to reflect non-payment by the contractor of any taxes which would have been paid were it not for the exclusion provided by Section 19543.1016 (Gross Receipts Tax) as added by Section 26 of the Guam Procurement Act; or
- (c) the Procurement Officer makes a written determination that the circumstances warrant requiring submission of cost or pricing data provided, however, cost or pricing data shall not be required where the contract award is made pursuant to competitive sealed bidding. However, generally cost or pricing data should not be required where the contract or modification is less than \$25,000. Moreover, when less than complete cost analysis (for example, analysis of only specific factors) will provide a reasonable pricing result on awards under \$100,000 without the submission of complete cost or pricing data, the Procurement Officer shall request only that data considered adequate to support the limited extent of the cost analysis needed and need not require certification.

GSA Procurement Regulations

3-403.02.2 EXCEPTIONS

Cost and pricing data need not be submitted or certified:

- (a) where the contract price is based on:
 - (i) adequate price competition;
 - (ii) established catalogue prices or market prices; except as provided by Section 3-403.03.3(c); or
 - (iii) prices set by law or regulation; or
- (b) when the Chief Procurement Officer, the Director of Public Works, or the head of a Purchasing Agency determines in writing to waive the applicable requirement for submission of cost or pricing data under Subsection 3-403.02.1(a), (b), or (c) of this Section in a particular pricing action and the reasons for such waiver are stated in the determination. A copy of such determination shall be kept in the contract file and made available to the public upon request.

If, after cost or pricing data were initially requested and received, it is determined that adequate price competition does exist, the data need not be certified.

3-403.03 MEANING OF TERMS 'ADEQUATE PRICE COMPETITION', 'ESTABLISHED CATALOGUE PRICES OR MARKET PRICES', AND 'PRICES SET BY LAW OR REGULATION'.

3-403.03.1 APPLICATION.

As used in the exceptions set forth in Section 3-403.02.2 (Requirement for Cost or Pricing Data, Exceptions) the terms 'adequate price competition', 'established catalogue prices or market prices', and 'prices set by law or regulations' shall be construed in accordance with the following definitions.

3-403.03.2 ADEQUATE PRICE COMPETITION.

Price competition exists if competitive sealed proposals are solicited and at least two responsible offerors independently compete for a contract to be awarded to the responsible offeror submitting the lowest evaluated price by submitting priced offers (or best and final offers) meeting the requirements of the solicitation. If the foregoing conditions are met, price competition shall be presumed to be "adequate" unless the Procurement Officer determines in writing that such competition is not adequate.

3-403.03.3 ESTABLISHED CATALOGUE PRICES OR MARKET PRICES.

(a) See §6958(b) (Definitions, Established Catalogue Price of the Guam Procurement Act), for the definition of established catalogue price. (This definition is quoted in Section 1-106.24 of these Regulations).

GSA Procurement Regulations

(b) 'Established Market Price' means a current price, established in the usual and ordinary course of trade between buyers and sellers, which can be substantiated from sources which are independent of the manufacturer or supplier and may be an indication of the reasonableness of price.

(c) If, despite the existence of an established catalogue price or market price, and after consultation with the prospective contractors, the Procurement Officer considers that such price is not reasonable, cost or pricing data may be requested. Where the reasonableness of the price can be assured by a request for cost or pricing data limited to data pertaining to the differences in the item or services being procured and those listed in the catalogue or market, requests should be so limited.

3-403.03.4 PRICES SET BY LAW OR REGULATION.

The price of a supply or service is set by law or regulation if some governmental body establishes the price that the offeror or contractor may charge the territory and other customers.

3-403.04 SUBMISSION OF COST OR PRICING DATA AND CERTIFICATION.

3-403.04.1 TIME AND MANNER.

When a cost or pricing data are required, they shall be submitted to the Procurement Officer prior to beginning price negotiations at any reasonable time and in any reasonable manner prescribed by the Procurement Officer. When the Procurement Officer requires the offeror or contractor to submit cost or pricing data in support of any proposal, such data shall either be actually submitted or specifically identified in writing.

3-403.04.2 OBLIGATION TO KEEP DATA CURRENT.

The offeror or contractor is required to keep such submission current until the negotiations are completed.

3-403.04.3 TIME FOR CERTIFICATION.

The offeror or contractor shall certify as soon as practicable after agreement is reached on price that, to the best of his knowledge and belief, the cost or pricing data submitted are accurate, complete, and current as of a mutually determined date prior to reaching an agreement. Certification shall be made using the certificate set forth in Section 3-403.05 (Certificate of Current Cost or Pricing Data) of these Regulations.

3-403.04.4 REFUSAL TO SUBMIT DATA.

A refusal by the offeror to supply the required data shall be referred to the Chief Procurement Officer, the Director of

GSA Procurement Regulations

Public Works, or the head of a Purchasing Agency, whose duty shall be to determine in writing whether to disqualify the noncomplying offeror, to defer award pending further investigation, or to enter into the contract. A refusal by a contractor to submit the required data to support a price adjustment shall be referred to the Chief Procurement Officer, the Director of Public Works, or the head of a Purchasing Agency who shall determine in writing whether to further investigate the price adjustment, not to allow any price adjustment, or to set the amount of the price adjustment, subject to the contractor's rights under Chapter 9 (Legal and Contractual Remedies) of these Regulations.

3-403.05 CERTIFICATE OF CURRENT COST OR PRICING DATA.

3-403.05.1 FORM OF CERTIFICATE.

When cost or pricing data must be certified, a certificate substantially as set forth below shall be included in the contract file along with any award documentation required under these Regulations. The offeror or contractor shall be required to submit the certificate as soon as practicable after agreement is reached on the contract price or adjustment.

CERTIFICATE OF CURRENT COST OR PRICING

This is to certify that, to the best of my knowledge and belief, cost or pricing data as defined in Section 3-101.01 of the Guam Procurement Regulations submitted, either actually or by specific identification in writing (See Section 3-403.04) to the Procurement Officer in support of¹, are accurate, complete, and current as of (date)(month)(year).....²

This certification includes the cost or pricing data supporting any advance agreement(s) between the offeror and the territory which are part of the proposal.

FIRM.....

NAME.....

TITLE.....

DATE OF EXECUTION.....³

(End of Certificate)

¹Describe the proposal, quotation, request for price adjustment or other submission involved, giving appropriate identifying number (e.g., RFP No. _____).

GSA Procurement Regulations

contractor's rights under Chapter 9 (Legal and Contractual Remedies) of the Guam Procurement Regulations.

(6) *Additional Rights and Remedies.* The rights and remedies provided in this clause are in addition to any other rights and remedies provided by law or under this contract."

6-101.09 LIQUIDATED DAMAGES CLAUSE.

6-101.09.1 WITH TERMINATION FOR DEFAULT CLAUSE.

The following clause is authorized for use in supply or service contracts when it is difficult to determine with reasonable accuracy the amount of damage to the territory due to delays caused by late contractor performance or nonperformance and the contract contains the termination for default clause set forth in Section 6-101.08 of this Chapter.

"LIQUIDATED DAMAGES

When the Contractor is given notice of delay or nonperformance as specified in Paragraph (1) (Default) of the Termination for Default Clause of this contract and fails to cure in the time specified, the contractor shall be liable for damages for delay in the amount of one-fourth of one-percent (1%) of outstanding order per calendar day from date set for cure until either the territory reasonably obtains similar supplies or services if the contractor is terminated for default, or until the contractor provides the supplies or services if the contractor is not terminated for default. To the extent that the contractor's delay or nonperformance is excused under Paragraph (4) (Excuse for Nonperformance or Delayed Performance) of the Termination for Default Clause of this contract, liquidated damages shall not be due the territory. The contractor remains liable for damages caused other than by delay."

6-101.09.2 IN OTHER SITUATIONS.

If the contract will not have a termination for Default Clause or the liquidated damages are to be assessed for reasons other than delay, the Chief Procurement Officer or the head of a Purchasing Agency may approve the use of any appropriate liquidated damages clause.

6-101.10 TERMINATION FOR CONVENIENCE CLAUSE.

"TERMINATION FOR CONVENIENCE

(1) *Termination.* The Procurement Officer may, when the interest of the territory so require, terminate this contract in whole or in part, for the convenience of the territory. The Procurement Officer shall give written notice of the termination to the contractor specifying the part of the contract terminated and when termination becomes effective.

GSA Procurement Regulations

²The effective date shall be a mutually determined date prior to, but as close to the date when price negotiations were concluded and the contract price was agreed to as possible. The responsibility of the offeror or contractor is not limited by the personal knowledge of the offeror's or contractor's negotiator if the offeror or contractor had information reasonably available at the time of agreement, showing that the negotiated price is not based on accurate, complete, and current data.

³This date should be as soon after the date when the price negotiations were concluded and the contract price was agreed to as practical.

3-403.05.2 REPRESENTATION AS TO ACCURACY OF COST OR PRICING DATA.

Although the certificate pertains to "cost or pricing data", it is not to be construed as a representation as to the accuracy of the offeror's or contractor's judgment on the estimated portion of future costs or projections. It does, however, constitute a representation as to the accuracy of the data upon which the offeror's or contractor's judgment is based. A Certificate of Current Cost or Pricing Data shall not substitute for examination and analysis of the offeror's or contractor's proposal.

3-403.05.3 INCLUSION OF NOTICE AND CONTRACT CLAUSE.

Whenever it is anticipated that a Certificate of Current Cost or Pricing Data may be required, notice of this requirement shall be included in the solicitation. If such a certificate is required, the contract shall include a clause giving the territory a contract right to a reduction in the price as provided in Section 3-403.06 (Defective Cost or Pricing Data).

3-403.05.4 EXERCISE OF OPTION.

The exercise of an option at the price established in the initial negotiation in which certified cost or pricing data were used does not require recertification or further submission of data.

3-403.06 DEFECTIVE COST OR PRICING DATA.

3-403.06.1 OVERSTATED COST OR PRICING DATA.

If certified cost or pricing data are subsequently found to have been inaccurate, incomplete, or noncurrent as of the date stated in the certificate, the territory is entitled to an adjustment of the contract price, including profit or fee or any exclusion of taxes (Gross Receipts Tax) pursuant to Section 19543.1016 as added by Section 26 of the Guam Procurement Act, to exclude any significant sum by which the price, including profit or fee or any exclusion of taxes (Gross Receipts Tax) pursuant to Section 19543.1016 as added by

GSA Procurement Regulations

Section 26 of the Guam Procurement Act was increased because of the defective data. Judgmental errors made in good faith concerning the estimated portions of future costs or projections do not constitute defective data. It is presumed that overstated cost or pricing data increased the contract price in the amount of the defect plus related overhead and profit or fee. Therefore, unless there is a clear indication that the defective data were not used or relied upon, the price should be reduced in such amount. In establishing that the defective data caused an increase in the contract price, the Procurement Officer is not expected to reconstruct the negotiation by speculating as to what would have been the mental attitudes of the negotiating parties if the correct data had been submitted at the time of agreement on price.

3-403.06.2 OFF-SETTING UNDERSTATED COST OR PRICING DATA.

In determining the amount of a downward adjustment, the contractor shall be entitled to an off-setting adjustment for any understated cost or pricing data submitted in support of price negotiations for the same pricing action up to the amount of the territory's claim for overstated cost or pricing data arising out of the same pricing action.

3-403.06.3 DISPUTE.

If the contractor and the Procurement Officer cannot agree as to the existence of defective cost or pricing data or amount of adjustment due to defective cost or pricing data, the Procurement Officer shall set an amount in accordance with Subsections 3-403.06.1 and 3-403.06.2 of this Section and the contractor may appeal this decision as a contract controversy under Chapter 9 (Legal and Contractual Remedies) of these Regulations.

3-403.07 PRICE ANALYSIS TECHNIQUES.

Price analysis is used to determine if a price is reasonable and acceptable. It involves an evaluation of the prices for the same or similar items, services, or construction. Examples of price analysis criteria include, but are not limited to:

- (a) price submissions of prospective bidders or offerors in the current procurement;
- (b) prior price quotations and contract prices charged by the bidder, offeror, or contractor;
- (c) prices published in catalogues or price lists;
- (d) prices available on the open market; and
- (e) in-house estimates of cost.

In making such analysis, consideration must be given to any differing terms and conditions.

GSA Procurement Regulations

3-403.08 COST ANALYSIS TECHNIQUES.

Cost analysis includes the appropriate verification of cost or pricing data, and the use of this data to evaluate:

- (a) specific elements of costs;
- (b) the necessity for certain costs;
- (c) the reasonableness of amounts estimated for the necessary costs;
- (d) the reasonableness of allowances for contingencies;
- (e) the basis used for allocation of indirect costs;
- (f) the appropriateness of allocations of particular indirect costs to the proposed contract; and
- (g) the reasonableness of the total cost or price.

3-403.09 EVALUATIONS OF COST OR PRICING DATA.

Evaluations of cost or pricing data should include comparisons of costs and prices of an offeror's cost estimates with those of other offerors and any independent territorial price and cost estimates. They shall also include consideration of whether such costs are reasonable and allocable under the pertinent provisions of Chapter 7 (Cost Principles) of these Regulations.

3-501 TYPES OF CONTRACTS.**3-501.01 SCOPE OF SECTION.**

This Section contains descriptions of types of contracts and limitations as to when they should be utilized by the territory in its procurement.

3-501.02 PROHIBITION OF COST-PLUS-A-PERCENTAGE-OF-COST CONTRACTING.

Except for a cost-plus-a-percentage-of-cost contract, which is prohibited by Section 6952 (Types of Contract) of the Guam Procurement Act, the use of any type of contract is permissible.

3-501.03 POLICY REGARDING SELECTION OF CONTRACT TYPES.**3-501.03.1 GENERAL.**

The selection of an appropriate contract type depends on factors such as the nature of supplies, services, or construction to be procured, the uncertainties which may be involved in contract performance, and the extent to which the territory or the contractor is to assume the risk of the cost of performance of the contract. Contract types differ in the degree of responsibility assumed by the contractor.

The objective when selecting a contract type is to obtain the best value in needed supplies, services, or construction in the time required and at the lowest cost or price to the territory.

APPENDIX O

Historical LEAC – Fuel Recovery Rates

Historical Levelized Adjustment Clause - Fuel Recovery Rate
(Secondary)

EFFECTIVE DATES		FUEL RECOVERY RATE (per Kwh)
From	To	
4/20/2006	1/31/2007	0.098589
2/1/2007	7/31/2007	0.108893
8/13/2007	2/29/2008	0.123957
3/1/2008	5/31/2008	0.150467
6/1/2008	10/2/2008	0.170440
10/3/2008	11/30/2008	0.187750
12/1/2008	1/31/2009	0.171050
2/1/2009	4/30/2009	0.157630
5/1/2009	7/31/2009	0.136450
8/1/2009	1/31/2010	0.129670
2/1/2010	7/31/2010	0.150460
8/1/2010	1/31/2011	0.124650
2/1/2011	7/31/2011	0.161530
8/1/2011	1/31/2012	0.192220
2/1/2012	3/31/2012	0.191980
4/1/2012	7/31/2012	0.192310
8/1/2012	1/31/2013	0.186834
2/1/2013	7/31/2013	0.209271
8/1/2013	1/31/2014	0.182054
2/1/2014	7/31/2014	0.172986
8/1/2014	1/31/2015	0.176441
2/1/2015	7/31/2015	0.102054
8/1/2015	1/31/2016	0.104871
2/1/2016	7/31/2016	0.086613

APPENDIX P

**Environmental Assessment for PV Systems
(2015)**

Environmental Assessment for Photovoltaic Systems



Commander, Joint Region Marianas
Guam

September 2015



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**Environmental Assessment
for Photovoltaic Systems**

Commander, Joint Region Marianas, Guam

Prepared for:

Commander, Joint Region Marianas

Prepared By:

Naval Facilities Engineering Command Pacific

September 2015

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COVER SHEET

Proposed Action: Approximately 192 acres of Department of Defense (DoD) land on Guam would be leased to the Guam Power Authority for use to build and operate eight photovoltaic (PV) systems that have a combined energy potential of approximately 43.8 megawatts (MW).

Type of Document: Environmental Assessment (EA)

Lead Agency: U.S. Department of the Navy
Commander, Joint Region Marianas

For Further Information: ATTN: ENV Planning and Conservation
NAVFAC Marianas
Nimitz Hill, Guam 96540

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 codified in Title 42 of the United States Code (U.S.C.), Section (§) 4321 et seq.; Council on Environmental Quality (CEQ) procedures for implementing NEPA codified in Title 40 of the Code of Federal Regulations (CFR), Parts 1500-1508; DoN regulations for implementing NEPA (32 CFR §775), and Office of the Chief of Naval Operations M-5090.1, titled *Environmental Readiness Program Manual* (January 10, 2014).

The proposed action would involve the use of 192 acres of DoD land to produce up to 43.8 MW of direct current solar-generated energy. Commander, Joint Region Marianas would lease the Guam Power Authority four PV sites in Northern Guam (South Finegayan, former Tumon Tank Farm, Harmon Booster Station, and Harmon Annex) and four PV sites at Naval Base Guam. The land underlying the PV sites would be leased for up to 37 years after which time the leases may be renewed or the facilities could be decommissioned.

The proposed action would provide clean, renewable energy and would help decrease energy costs, reduce dependency on fossil fuel, and increase energy independence. The proposed action is not expected to have an adverse effect upon air quality; noise; topography and soils; water resources; biological resources; cultural resources; visual resources; land use; roadways; electrical and water utilities; or socioeconomic conditions. DoN concluded a Coastal Zone Management Act consultation process with the Guam Bureau of Statistics and Plans (Guam BSP). DoN informed Guam BSP of its determination that the Proposed Action would not have reasonably foreseeable direct or indirect effects on any use or resource within Guam's coastal zone and did not receive a response within the required 60-day review period. In accordance with federal and Guam regulations, Guam BSP's concurrence with DoN's determination was therefore assumed. The Guam Historic Preservation Office (GHPO) was also consulted as part of the National Historic Preservation Act Section 106 process. The Section 106 consultation began with a May 6, 2015 letter from DoN to GHPO documenting DoN's finding of "no historic properties affected." The letter stated that in accordance with 36CFR 800.5(c)(1), DoN would assume no objections to the determination of effect and eligibility if no response was received within 30 days of receipt of the letter (letter was received by GHPO on May 7, 2015). The DoN received a response from the GHPO dated June 5, 2015 on July 1, 2015 (well after the 30-day deadline) indicating it could not concur with DoN's determination of effect and requested a 15-day extension of the review period. On July 29, 2015, DoN received GHPO comments by letter dated July 24, 2015. DoN responded with a letter dated August 13, 2015 notifying GHPO of its decision to proceed with the undertaking because of the urgency of the proposed action and lack of timely review comments.

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Acronyms, Abbreviations, and Symbols

°	degrees
'	minutes
#	number
%	percent
§	Section
AAFB	Andersen Air Force Base
AD	<i>anno Domini</i> (after date)
AC	alternating current
AMSL	above mean sea level
Approx.	approximately
BCS	battery container system
BESS	battery energy storage system
BSP	Guam Bureau of Statistics and Plans
C&D	Construction and Demolition
CDF	Confined Disposal Facility
CFR	Code of Federal Regulations
CNMI	Commonwealth of the Northern Mariana Islands
CJRM	Commander, Joint Region Marianas
CONUS	Continental United States
CZMA	Coastal Zone Management Act of 1972
DAF	Department of the Air Force
DC	direct current
DoD	Department of Defense
DoN	Department of the Navy
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPAct	Environmental Policy Act of 2005
ESA	Endangered Species Act of 1973
ESS	Explosive Safety Submission
FAA	Federal Aviation Agency
ft.	feet/foot
FY	fiscal year
GHG	greenhouse gas
GHPO	Guam Historic Preservation Office
GovGuam	Government of Guam
GPA	Guam Power Authority
GTA	GTA Teleguam
GW	gigawatt
GWA	Guam Waterworks Authority
kW	kilowatt
LUC	Land Use Controls
LEED	Leadership in Energy and Environmental Design
MCVB	Marianas Cable Vision Broadband
mph	miles per hour

MW	megawatt
NAAQS	National Ambient Air Quality Standards
NBG	Naval Base Guam
NAVFAC	Naval Facilities Engineering Command
NAVFACINST	NAVFAC Instruction
NEX	Navy Exchange
NHPA	National Historic Preservation Act of 1966
NMS	Naval Munitions Site
No.	Number
Nos.	Numbers
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OPNAV	Office of the Chief of Naval Operations
POC	point of connection
PV	photovoltaic
REPO	Renewable Energy Program Office
ROW	right(s)-of-way
Rte	Route
SECNAV	Secretary of the Navy
SCADA	supervisory control and data acquisition
SEIS	Supplemental Environmental Impact Statement
SGHAT	Solar Glare Hazard Analysis Tool
U.S.	United States
U.S.C.	United States Code
UXO	Unexploded Ordnance
WWII	World War II
WWTP	wastewater treatment plant

Chapter 1 Purpose and Need for the Proposed Action

1.1 Introduction

The U.S. Department of the Navy (DoN) has prepared this Environmental Assessment (EA) to evaluate the potential environmental effects of the construction, operation, and decommissioning of ground-mounted photovoltaic (PV) systems on the island of Guam.

To facilitate the development of the PV systems, the Commander, Joint Region Marianas (CJRM) would lease approximately 192 acres of U.S. Department of Defense (DoD) land to the Guam Power Authority (GPA), the local electrical utility company. GPA would then select a renewable energy contractor(s) to build and operate the solar PV systems which are expected to generate approximately 43.8 megawatts (MW) of direct current (DC) electrical power and would feed into GPA's electrical grid for public and military use. The land underlying the PV sites would be leased for up to 37 years after which time the leases may be renewed or the facilities could be decommissioned.

This EA has been developed in accordance with the National Environmental Policy Act (NEPA) of 1969 codified in Title 42 of the United States Code (U.S.C.), Section (§) 4321 et seq.; Council on Environmental Quality (CEQ) procedures for implementing NEPA codified in Title 40 of the Code of Federal Regulations (CFR), Parts 1500-1508; Department of Defense (DoD) Directive 6050.1(D), titled *Environmental Effects in the United States of DoD Actions* (July 30, 1979); DoD Instruction 4715.9, titled *Environmental Planning and Analysis* (May 3, 1996); DoN procedures for implementing NEPA (32 CFR §775), and Office of the Chief of Naval Operations (OPNAV) M-5090.1, titled *Environmental Readiness Program Manual* (January 10, 2014).

The DoN is the lead agency for the proposed action, and CJRM is the action proponent.

1.2 Background

The DoN's energy strategy is centered on energy security, energy efficiency, and sustainability while remaining the pre-eminent maritime power.

- Energy efficiency increases mission effectiveness. Efficiency improvements minimize operational risks while saving time, money, and lives.
- Energy security is critical to mission success. Energy security safeguards our energy infrastructure and shields the DoN from a volatile energy supply.
- Sustainable energy efforts protect mission capabilities. Investment in environmentally responsible technologies afloat and ashore reduces greenhouse gas (GHG) emissions and lessens dependence on fossil fuels (DoN, not dated).

In October 2009, the Secretary of the Navy (SECNAV) established renewable energy goals for the DoN's shore-based installations to meet in 2015. These goals include:

1. The DoN will produce or procure at least 50% of the total quantity of electric energy consumed by shore-based facilities and activities each fiscal year (FY) from alternative energy sources;
2. 50% of DoN installations will be net zero (i.e., over the course of a FY, an installation matches or exceeds the electrical energy it consumes ashore with electrical energy generated from alternative energy sources) (DoN 2011).

The DoN's goals and energy strategy are in sync with renewable energy policies being developed throughout the federal government and contained in the following executive order and statutes:

- Executive Order (EO) 13693, "Planning for Sustainability in the Next Decade" (March 2015): The goal of this EO is to maintain federal leadership in sustainability and GHG emission reduction. Beginning in FY 2016, federal agencies must promote building energy conservation, efficiency, and management with each agency reducing their building energy intensity by 2.5% annually through the end of fiscal year 2025, relative to the agency's baseline building energy use in fiscal year 2015. The agencies must also meet specified goals to ensure that total electric and thermal energy use comes from renewable electric energy and alternative energy.
- Energy Policy Act of 2005 (EPAAct) (42 U.S.C. 15852): Section 203 of the EPAAct requires that the federal government consume not less than 7.5% of its electricity from renewable sources after FY 2013.
- Title 10 U.S.C. 2911(e): This statute requires the submission of an energy performance master plan and performance goals, including the goal to produce or procure 25% of the total quantity of energy consumed within its facilities from renewable sources by 2025 and each FY thereafter.

In December 2013, President Obama signed a Presidential Memorandum entitled "Federal Leadership on Energy Management" that requires that 20% of the total amount of electric energy consumed by federal agencies be from renewable sources by facilities by FY 2020 and each FY thereafter, an amount that represents a more aggressive goal than under EPAAct or 10 U.S.C. 2911(e). The memorandum also establishes interim goals of 10% in 2015, 15% by 2016, and 17.5% by 2018. The memorandum states that the renewable energy consumption target be achieved by: 1) installing agency-funded renewable energy on-site at federal facilities, or 2) contracting for energy that includes the installation of a renewable energy project on-site at a federal facility. The memorandum implements the goal outlined by President Obama in the June 2013 Climate Action Plan. As part of this effort, agencies are instructed "to consider opportunities to the extent economically feasible and technically practical, to install or contract for energy installed on current or formerly contaminated lands, landfills, and mine sites." The DoD is currently working with the CEQ, the U.S. Office of Management and Budget, and the Department of Energy (DoE) to provide guidance on the 20% renewable energy goal under the Presidential Memorandum (DoD 2014).

In support of EPAAct and 10 U.S.C. 2911(e) renewable energy goals, SECNAV created the 1 gigawatt (GW) Initiative—named for the amount of renewable energy generation capacity to be deployed in 2015 (DoN 2012), either on or near DoN installations. This goal was initially stated in the President's 2012 State of the Union Address and is consistent with SECNAV's 2009 alternative energy goal and the 2013 Presidential Memorandum.

With the 1 GW Initiative, the DoN took a more aggressive approach to implement cost-effective and mission-compatible projects at its shore facilities. To achieve 1 GW of renewable energy generation capacity in 2015, the DoN recognized the need to develop opportunities for large-scale projects that would be attractive to local commercial utilities. The DoN established the Renewable Energy Program Office (REPO) specifically to work with local commercial utilities to use private-sector funds to construct renewable energy facilities on DoN land. The DoN established three Regional Program Offices to implement the projects at shore facilities across the country and abroad; Guam projects are being administered by the Naval Facilities Engineering Command (NAVFAC) Pacific's Program Office.

1.3 Purpose and Need

The purpose of the proposed action is to reduce energy costs and fuel oil dependency, and increase the energy security, operational capability, strategic flexibility and resource availability at DoN installations through the development of renewable energy generating assets on Guam. The proposed action is required to meet the renewable energy standards put forth by the 1 GW Initiative, EAct, 10 U.S.C. 2911(e), the 2013 presidential memorandum, and SECNAV, to include the requirement to produce 50% of the DoN's shore-based energy requirements from alternative sources.

1.4 Project Locations

CJRM encompasses approximately 22,537 acres of land and water on the island of Guam, and includes significant land holdings at U.S. Naval Base Guam (NBG), Naval Munitions Site, Nimitz Hill, NBG Transmitter Station Barrigada, NBG Transmitter Station Finegayan, Andersen Air Force Base (AAFB), Andersen South, Andersen Communications Annex Barrigada, and other outlying areas (DoN, November 2010). U.S. Naval Base Guam joined with AAFB to become CJRM in 2009, combining the 2 bases into a single joint installation to support both DoN and Department of the Air Force (DAF) missions in the Pacific. CJRM serves as the home base for the Air Force's 36th Wing, Submarine Squadron 15, and dozens of Pacific Command, U.S. Pacific Fleet, and Seventh Fleet units. In addition, CJRM hosts a number of tenant commands that support the DoN, DAF, and other missions in the Pacific Region.

The solar PV systems are proposed at eight locations on CJRM properties including four sites in Northern Guam and four sites in Southern Guam at NBG (Figure 1-1). The locations, land areas, and energy potential for each of the proposed sites is shown in Table 1-1.

Table 1-1: PV Site Locations, Land Areas, and Energy Potential

<i>Site Location</i>	<i>Village (Installation)</i>	<i>Approximate Land Area</i>	<i>Energy Potential* (MW DC)</i>
Northern Guam			
South Finegayan	Dededo	71 acres	16.2
Harmon Annex	Tamuning	4 acres	0.9
Harmon Booster Station	Tamuning	4 acres	0.9
Former Tumon Tank Farm	Tamuning	20 acres	4.5
Southern Guam			
Wastewater Treatment Plant (WWTP) Site	Santa Rita (NBG)	16 acres	3.7
Existing 250kW PV Site	Santa Rita (NBG)	31 acres	7.1
Confined Disposal Facility (CDF) Site	Santa Rita (NBG)	21 acres	4.7
Commissary Site	Santa Rita (NBG)	25 acres	5.6
Total	-----	192 acres	43.8

*Energy Potential based on GPA-provided output estimates (GPA 2014). Total Energy Potential is slightly larger than the sum of each individual site due to rounding.



Regional Location Map
Environmental Assessment for PV Systems
Commander, Joint Region Marianas

Figure 1-1

1.5 Scope of the EA

This EA evaluates the reasonably foreseeable potential environmental effects of the DoN's plan to lease land for the construction, operation, and decommissioning of potential solar PV systems and associated battery energy storage system (BESS) facilities.

Resource areas that could be potentially affected by the Proposed Action include the following.

- Air Quality
- Topography and Soils
- Biological Resources
- Visual Resources
- Utilities
- Socio Economic Conditions
- Noise
- Water Resources
- Cultural Resources
- Glint and Glare
- Land Use Compatibility

1.6 Agency Coordination and Permit Requirements

As part of the NEPA compliance process, the DoN has engaged in coordination, consultation, and permitting with regulatory agencies to ensure that all applicable laws, rules, regulations, and policies have been satisfied with respect to the proposed action. Potential permits, approvals, and consultation requirements for the project include but are not limited to those listed in Table 1-2

Table 1-2: List of Potential Permits, Approvals, and Required Consultations

<i>Oversight Agency</i>	<i>Permit, Approval, or Consultation</i>
Guam Historic Preservation Officer (GHPO)	Section 106 consultation for properties listed or eligible for the National Register of Historic Places (NRHP) pursuant to the National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665; 16 U.S.C. §470 et seq.); 36 CFR 800 (Protection of Historic Properties)
Guam Environmental Protection Agency	National Pollutant Discharge Elimination System (NPDES) Permit for construction-related stormwater discharge for land disturbance equal or greater than 1-acre pursuant to the Clean Water Act of 1972 (33 U.S.C. 121 et seq.)
Guam Bureau of Statistics and Plans (BSP)	Negative Determination of effects to Guam's defined coastal zone per CFR Part 930 §930.35, and pursuant to the Coastal Zone Management Act (CZMA) of 1972 (as amended) (16 U.S.C. §1451 et seq.)

1.7 Public Participation

In accordance with DoD and DoN policies and instructions for implementing NEPA, comments from the public were solicited for the Draft EA. Copies of the Draft EA were provided to public libraries on Guam and the Draft EA was made available over the Internet.

A notice of availability of the Draft EA was published in the Pacific Daily News on May 8, 9, and 10, 2015. The public comment period was open from May 8, 2015 to May 27, 2015. The proposed action and Draft EA were also featured in four local news articles, including a Pacific Daily News story during the public comment period on May 11, 2015. Two comments were received during the Draft EA comment period, and are provided in Appendix D.

The first comment was submitted by a PV contractor to express their interest in responding to a future request for proposals for the proposed action.

The second comment was submitted by the Government of Guam's Office of the Special Assistant to the Governor for the Guam Military Buildup, and it requested that at least two of the proposed action sites (South Finegayan and Tumon Tank Farm) be removed from consideration (Appendix D). The comment cited a February 7, 2011 letter from the Under Secretary of the Navy to the Governor of Guam that refers to the DoD's initiative to better utilize the lands it currently has and return underutilized land to the Government of Guam (referred to as the "four pillars" letter).

After fully considering the comment, DoN determined that the proposed action supported its stated initiatives on Guam, and decided to move forward with the eight proposed action sites, including the South Finegayan and Tumon Tank Farm sites. A discussion of the points raised in the comment letter and reasoning behind DoN's decision is provided below.

DoN strives to support projects that benefit Guam. The proposed action would provide clean, renewable energy, help decrease energy costs, reduce dependency on fossil fuel, and increase Guam's energy independence. All the proposed action sites are critical to this implementing this strategy.

DoN is pursuing renewable energy generation to improve its energy security, operational capability, strategic flexibility and resource availability. In an era of fluctuation and uncertainty in energy markets and resource availability due to global and regional geopolitical instability, as well as natural and manmade disasters, DoN must examine every means possible to conserve and diversify resources while simultaneously meeting the energy requirements of its forces, both ashore and afloat. SECNAV has made deploying renewable energy projects on DoN lands a high priority to support the DoN's mission. Renewable energy projects on DoN lands such as the proposed action are a critical component of DoN's strategy to achieve energy security.

The proposed action is independent of the U.S. Marine Corps relocation to Guam and supports existing energy security and mission needs of NBG and AAFB. The proposed action is consistent with DoN's "four pillars" letter that guides the relocation effort in the following ways:

1. It supports the "One Guam" initiative. The DoN and GPA are discussing a collaborative effort to provide clean and affordable energy to Guam residents. In this model, DoN is hosting renewable energy projects and the energy is delivered into the GPA electric distribution system for the benefit of all residents on Guam. This type of model leverages third party financing to invest in new infrastructure on Guam for the benefit of the community. Successful projects could reduce pollution, lessen Guam's dependency on imported fuel, and possibly promote new renewable energy job opportunities for residents.
2. It supports the "Green Guam" initiative. The proposed renewable energy projects inherently demonstrate the DoN's commitment to develop sustainable and renewable energy projects on Guam. Additionally the DoN is working closely with GPA to secure third party funding for these "green" projects.
3. It has no effect on the third pillar (unimpeded access to the Pagat Village and Pagat Cave historical sites).

4. It would better utilize DoN's existing land holdings to improve energy security on the island for the shared benefit of DoN and the community. All sites are located within the existing DoD footprint and no acquisition of additional property is required. Because DoN shares power consumption with the local Guam community and buys its power from GPA, implementation of the proposed action increases the availability of a renewable power resource and regional energy security for DoN and the greater Guam community, while improving DoN's operational capability and strategic flexibility.

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Chapter 2 Proposed Action and Alternatives

The DoN established REPO to spearhead its efforts to secure 1 GW of renewable energy generation capacity in 2015. With support from NAVFAC Pacific and GPA, REPO conducted a survey of suitable sites on DoD installations and lands on Guam for the development of renewable energy facilities and identified eight potential PV sites that possess the necessary site characteristics for solar PV development.

2.1 Proposed Action

2.1.1 Overview of the Proposed Action

To facilitate the development of the PV systems, the Commander, Joint Region Marianas (CJRM) would lease approximately 192 acres of DoD land to GPA, the local electrical utility company. GPA would then select a renewable energy contractor(s) to build and operate the solar PV systems which are expected to generate approximately 43.8 MW of DC electrical power and would feed into GPA's electrical grid for public and military use. The land underlying the PV sites would be leased for up to 37 years after which time the leases may be renewed or the facilities could be decommissioned.

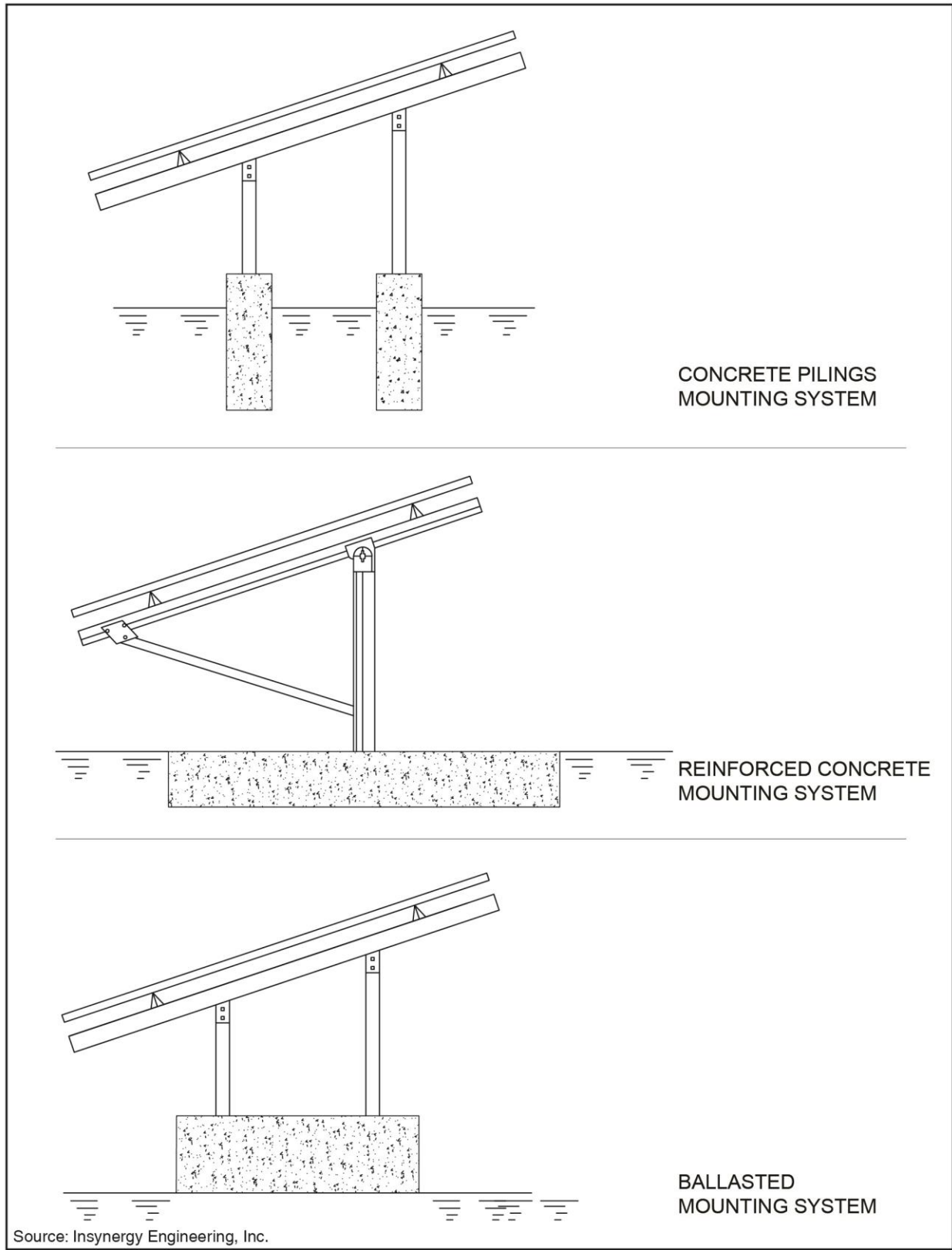
2.1.2 Solar PV Technology

Solar PV panels utilize a packaged assembly of solar cells to harness solar energy (photons) from the sun and generate electricity. The panels generate DC electricity, which is converted to alternating current (AC) electricity for transmission on the electrical grid and ultimate end-use in AC form. The conversion from DC to AC occurs at inverters mounted on concrete pads that are strategically located throughout the PV array. Each inverter would have its own medium voltage transformer, and the medium voltage power output from each of these inverter/transformer blocks (approx. 10 feet square by 10 feet high) would be carried through electrical cables to the PV system's substation. Each PV system may include some type of BESS facility to provide dispatchable energy to balance fluctuations in energy generation caused by weather, seasons, and nighttime darkness. The BESS is typically located near the PV system's substation. The substation and a transmission line extending to the nearest point of connection (POC), would transfer the power generated by the PV system to the electrical grid.

2.1.3 Description of the Proposed Action

The proposed action involves the construction of solar PV systems at various locations on Guam. A description of the PV system's components and operations is provided below, followed by a review of each of the eight proposed sites.

Glass-cased PV panels would be used for the PV array. The panels would be darkly colored to minimize light reflection and would each be approximately 3.5 feet wide and 5 feet long. The PV panels would be attached to metal racking structures before being placed upon a mounting system. Generally, the mounting systems are installed in the ground; however, a ballasted system would be utilized where ground disturbance is a concern. The type of racking structure (stationary versus adjustable) would be determined by GPA's PV contractor(s) during the project's final engineering design. A stationary racking structure is one in which the PV panels are attached to a fixed assembly which locks the tilt and orientation of the panels.



Source: Insynergy Engineering, Inc.

Ground Mount PV Foundation Types

Figure 2-1

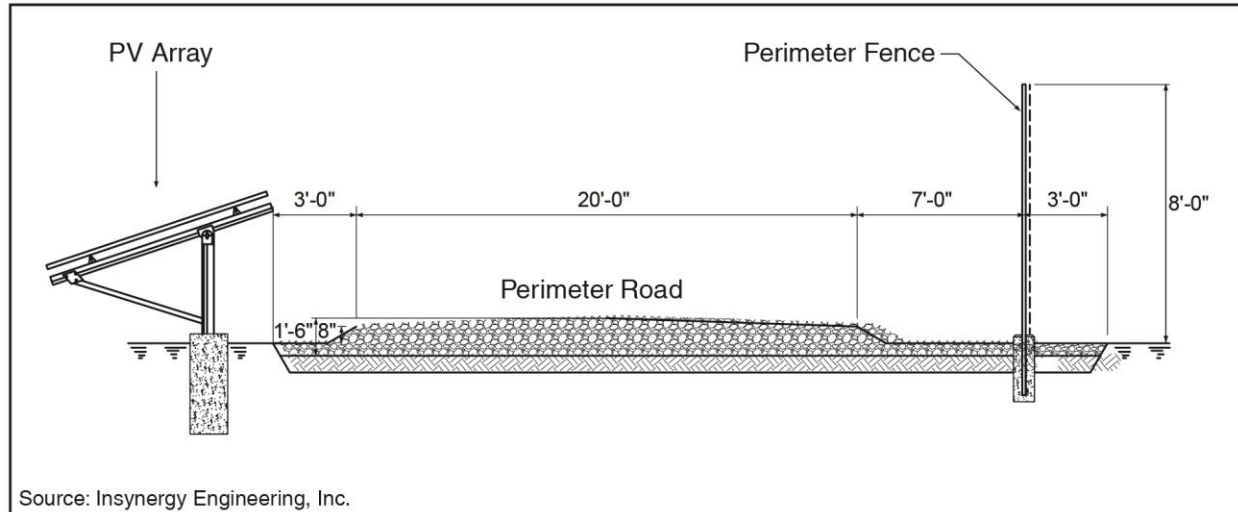
The optimal exposure for a stationary racking structure in Guam is a tilt of 13.5 degrees (°) and an orientation pointing due south. However, the PV contractor(s) may adjust the tilt and orientation of the PV array, to better accommodate the shape and topography of each site. The actual tilt and orientation of the panels would be established during final engineering design. An adjustable racking structure is one in which the panels are attached to a solar tracking assembly which allows the panels to follow the path of the sun throughout the day in a vertical and/or horizontal direction – which increases the efficiency of the system but also increases cost. The installed top edge height of the ground-mounted PV panels (regardless of the racking structure) is projected to be approximately 4 feet from ground level to the top edge of the panel.

Mounting systems constructed of concrete pilings, poured reinforced concrete, or concrete ballasted systems would be used to support the racking structures (Figure 2-1). The racking structures would be designed to comply with all applicable wind load criteria. Where possible, the racking structures would adapt to ground contours to minimize site work and ground disturbance. The racking systems would also be designed to facilitate the efficient placement, replacement, maintenance, and cleaning of the PV panels.

Electrical cabling would be used to connect the individual PV modules and the larger electrical system. Where practical, cabling would be placed in trays above ground. In the event cable routing requires underground installation, cables (in conduits) would be buried directly in excavations of minimal cross section with a required depth per DoD Unified Facility Criteria and the National Electrical Code 70 (typically 36 inches below grade). The conduit would then be covered with backfill and tamped to the appropriate level of compaction. Where conduit would cross under on-site service roads, concrete encasement would be used around conduits for mechanical protection against vehicular traffic.

The construction of several electrical system components would require concrete slab foundations. The inverter/transformer stations located throughout the PV array would be pad mounted on concrete foundations and their placement would be determined during final engineering design. These stations are generally sized at 1.0 MW, therefore there would be approximately 1 station for every 1 MW of PV energy development proposed at each site. Additionally, each substation complex would be located as close as practicable to the nearest POC to minimize transmission line length. Each substation complex would include its own transformers as well as, switchgear, a BESS facility, and a maintenance building, all of which would require concrete foundations. Prefabricated buildings would likely be used to house some of this equipment (i.e., maintenance building and BESS facility). In addition to providing storage space for equipment, the maintenance building will contain a supervisory control and data acquisition (SCADA) system which will be used to remotely monitor and operate the PV system, therefore, no full-time personnel would be required at each PV site.

The PV sites would be contained within an 8-foot-high perimeter fence to restrict access and ensure security. Outdoor lighting would also be provided for security purposes and shall be fully shielded, utilize light-emitting diodes, and comply with International Dark-Sky Association standards. PV arrays would occupy most of the space within the fenced enclosure. A perimeter maintenance road would be located directly inside of the security fence, and would generally be 20 feet wide (Figure 2-2). Access roads within the array would typically be 10 feet wide. All site roads would be constructed per final design but likely would consist of a gravel or similar base that would be trucked on site.



PV Site Typical Perimeter Road Detail

Figure 2-2

2.1.4 Site Preparation and Construction Activities

The island of Guam was a World War II battleground and unexploded ordnance (UXO) can still be found today. Potential adverse effects from UXO are not expected and are capable of being avoided or minimized through the use of BMPs. Site preparation and construction activities for the proposed action would comply with all applicable UXO regulatory requirements and protocols.

During site preparation, surface vegetation in the areas to be developed would be cleared and grubbed (i.e., roots and stumps extracted), and the ground would be excavated and compacted where load-bearing foundations are proposed. Ground disturbance during construction would include site grading to establish positive drainage control, installation of the PV racking system and mounting systems, trenching for underground electrical cables, installation of overhead transmission line poles, foundation work for electrical equipment and site buildings, and miscellaneous civil works (i.e., perimeter fencing post holes and access roads). BMPs for soil erosion and sedimentation control would be implemented in accordance with project-specific drainage and erosion control plans which would comply with applicable NPDES requirements for construction-related activities. In addition, BMPs will be implemented, and retention basins or dry wells will be utilized as necessary, to ensure that stormwater runoff is retained on site and allowed to percolate into the ground or be discharged at a rate that would not exceed pre-development runoff or adversely affect adjacent and downstream properties.

During construction, materials would be transported to the project sites by truck, where they would be stored, assembled (as necessary), and moved into place. Temporary construction laydown areas for materials, equipment, and parking would be provided on each site or on adjacent DoD Property. Prior to construction, site boundaries or limits of disturbance would be surveyed and staked to identify areas where construction activities would occur. Dust barriers would be erected around active construction areas to minimize the effects of fugitive dust on adjacent land uses in the area.

2.1.5 PV Substations and Interconnections

The PV substation located at each solar PV site is where power is transformed to match the specification for interconnection with the electrical grid. An electrical transmission line would be installed either overhead or underground (based on final engineering design) to connect the PV system substation to the electrical grid. In cases where the proposed connection lines would require a new ROW within DoD property, the width of the ROW would be determined by GPA. The ROW would likely be cleared of vegetation and may be graded to provide maintenance access. Final siting of utility lines would be subject to review by CJRM and GPA personnel prior to construction.

2.1.6 Operation and Maintenance

The solar PV systems would require minimal maintenance. Cleaning with hand tools or spray washing the surfaces of the PV panels with water would be undertaken periodically to remove accumulated dust and dirt. Connections to DAF and DoN systems will be made to provide water for fire protection for the BESS and substation complex at each of the PV sites. Water trucks would also be used for cleaning purposes.

Periodic maintenance of the PV system's electrical equipment would involve checking the equipment and testing the connections, replacing air filters in the inverters, and sampling the oil in the transformers. Maintenance for the BESS facility would involve checking the batteries and electrical equipment and testing the connections.

Surface vegetation lying beneath, and adjacent to the panels, would be regularly trimmed to ensure that grass, plants, and weeds do not overhang or cast shadows upon the panels. As warranted, herbicides would be used for vegetation control in accordance with applicable government regulations and manufacturer's guidelines. Maintenance roads would be maintained as needed to ensure that vehicular access and mobility are maintained.

2.1.7 Lease Agreement

The land underlying each solar PV site would be leased to for up to 37 years including renewal options. After the expiration of the lease, the lease may be renewed or the facility could be decommissioned. In accordance with 10 U.S.C. §2667, the leases shall provide for consideration (rent) to be paid in an amount not less than the fair market value of the leasehold interest, either in cash or in kind.

Although the proposed action addresses the known impacts of the federal lease action, details regarding the specific method of consideration to be employed, to include the design, construction, management and maintenance of any potential in-kind consideration projects or efforts, have not been developed at this time. Therefore, these projects may be subject to further site-specific planning, environmental planning, and engineering analysis as necessary.

2.1.8 Removal of Equipment

If decommissioning is required, a plan would be prepared to decommission the PV system and supporting infrastructure. The plan would be prepared in accordance with DoN requirements and would ensure that the closure of these sites would be conducted in accordance with conditions established in the lease agreement.

In general, the decommissioning process would involve compliance with mutually agreed upon conditions for the removal of structures, restoration of topsoil, and the re-vegetation of the sites. Best management practices (BMPs) would be used during the decommissioning phase to control soil erosion, sedimentation, and stormwater runoff.

2.1.9 PV System Site Screening Criteria

Several important criteria must be considered when identifying and evaluating potential sites for PV system development. These factors include, but are not limited to: (1) land area; (2) topography, (3) proximity to public access or roadways; (4) proximity to transmission lines or substations; and (5) land use compatibility (including technical feasibility). Working with GPA, REPO utilized these criteria to guide their site assessment process. After completing this screening process, REPO is proposing the development of solar PV systems at eight sites on the island of Guam described below.

2.1.10 Proposed PV System Sites

Naval Base Guam

Four PV systems are proposed for NBG (Figure 2-3). NBG encompasses the entire Orote Peninsula along Apra Harbor's southern shoreline. The extent of GPA's electrical grid at NBG consists of three 34.5 kV transmission lines, which run to their Orote Substation. The distribution level electrical grid at NBG is owned by the DoN. The proposed PV Systems at NBG consist of the sites described below and shown in the accompanying figures.

- **WWTP site.** This approximately 16-acre site is relatively flat with vegetation composed of disturbed, secondary forest community interspersed with areas of open canopy. The site is bordered to the west by Marine Corps Drive and to the southeast by a wastewater treatment plant. It is located in the vicinity of both the existing 250kW PV site and the CDF site along Marine Corps Drive. The proposed PV system substation would be located in the south corner of the site. A proposed transmission line would link the WWTP site with the existing 250kW PV site and connect to GPA's existing electrical grid (Figure 2-3).
- **Existing 250kW PV site.** This approximately 31-acre expansion site is relatively flat with an uphill slope towards the south end, and is covered with mostly scrub vegetation. It surrounds an existing 250kW PV solar facility, and is located in the vicinity of both WWTP site and the CDF site along Marine Corps Drive. The proposed PV system substation would be located in the eastern corner of the site along Marine Corps Drive. A proposed transmission line would connect this substation to GPA's existing electrical grid (Figure 2-3).
- **CDF site.** This approximately 21-acre site contains pockets of relatively flat terrain, but a pronounced ridge runs through much of the site. It is undeveloped and with vegetation composed of disturbed, secondary forest community interspersed with areas of open canopy. Various military facilities lie to the south of the site. Marine Corps Drive borders the site on the southwest and Sumay Drive borders on the east. The proposed PV system substation would be located at the east end of the site with access provided from Sumay Drive, and a proposed transmission line would connect the substation to GPA's existing electrical grid (Figure 2-3).

- *Commissary site.* This approximately 25-acre site consists of two separate parcels that are both relatively flat with vegetation composed of disturbed scrub forest. The site is bordered to the south by Shoreline Drive and is bisected by an unnamed local access Road. The proposed PV system substation would be located in the cleared area along the northern border of the site with access provided off of the unnamed road and a proposed transmission line would connect the substation to GPA's existing electrical grid (Figure 2-4).

Northern Guam

Four (4) PV systems are proposed for DoD properties in Northern Guam. Of these systems, three are located in the Tamuning District, and one is located in the Dededo District. Each of these sites is described below and shown in the accompanying figures.

- *Harmon Annex.* This approximately 4-acre site is relatively flat and encompasses GPA's existing Harmon electrical substation. The site is located in the Tamuning District along Marine Corps Drive to the east of the proposed PV system sites at the Harmon Booster Station and former Tumon Tank Farm. The proposed PV system would include a small PV array and/or BESS system located in the cleared grassy area around the existing substation and within the boundary fence. A proposed transmission line would connect the proposed PV substation to GPA's existing electrical grid. Access to the site would be provided by an existing driveway off of Marine Corps Drive (Figure 2-5).
- *Harmon Booster Station.* This approximately 4-acre site is relatively flat and its vegetation is characterized by a disturbed scrub community. It is bordered to the south by Marine Corps Drive, and surrounds an existing booster station for Guam's water distribution system. The proposed PV system substation would be located to the east of the existing booster station along Marine Corps Drive, and a proposed transmission line would connect the substation to GPA's existing electrical grid. (Figure 2-5).
- *Former Tumon Tank Farm.* This site encompasses approximately 20 acres and is the largest of the three Tamuning District sites located along Marine Corps Drive. An unmaintained access road loops through the site and connects to Marine Corps Drive at both the northeast and southeast corners of the site. While the road area is relatively flat and clear, the adjacent terrain consists of slight hills and ridges. Vegetation is composed of a disturbed, secondary scrub community interspersed with areas of open grassland. The proposed PV system substation would be located at the northeast corner of the site, and a proposed transmission line would connect the substation to GPA's existing electrical grid (Figure 2-5).
- *South Finegayan.* At approximately 71 acres, this site represents the largest of the proposed PV systems. The site consists of relatively flat and gently sloping terrain, and consists of a maintained grassy field. It is located in the Dededo District adjacent to the former Royal Palms Navy family housing area along Route 3. The proposed PV system substation would be located near the corner of Control Tree Drive and Route 3. A proposed transmission line would connect the substation to GPA's existing electrical grid (Figure 2-6).

2.2 Alternatives Considered but Dismissed

As indicated in its *Strategy for Renewable Energy* (DoN, October 2012), the Navy will consider all sources of renewable energy to attain its goal of procuring 1 GW of renewable energy capacity in 2015. Renewable energy can be described as energy that comes from sources which are naturally replenished on a human timescale such as sunlight, wind, geothermal heat, and ocean waves, tides, and currents. Because some renewable energy technologies may be appropriate for some locations, while others may not be well suited, each DoN installation and region must prepare an energy plan to evaluate which technology is most appropriate and cost-effective for their particular area. Given Guam's remote location and its dependence on fossil fuels, it was imperative that the DoN find an appropriate, long-term renewable energy source that would be efficient, dependable, and cost-effective. The following renewable energy technologies were considered by the DoN, but were subsequently dismissed from further consideration for development within the 2015 time frame set for the 1 GW goal.

2.2.1 Wind Energy

Wind-based power generation is a mature technology that uses airflows to run wind turbines and drive electrical generators. As the wind speed rises, power output increases up to the maximum capacity of the turbine. Wind turbines are usually developed in areas with strong, steady winds. Wind is an intermittent energy source. The manufacturing and installation of wind turbines requires significant upfront investments in both time and cost. Additionally, the lands underlying the PV sites are not optimal locations for large-scale wind turbine facilities. In light of the foregoing, the wind energy alternative was dismissed from consideration.

2.2.2 Geothermal Energy

Geothermal energy is generated by natural heat stored in the Earth. The temperature difference between the Earth's core and its surface drives a continuous conductive process where molten rock (magma) inside the Earth heats rock and water to produce geothermal heat. The heat produced by a geothermal source is to generate electric power via heat exchangers and turbines. Where available, geothermal sources would produce full-time baseload power unlike the intermittent energy provided by solar and wind. In April 2010, a team from the National Renewable Energy Laboratory and the U.S. Navy's Geothermal Program Office in China Lake, California, conducted a reconnaissance assessment of the geothermal potential for the island of Guam (Baring Gould, et al. 2011). Their assessment found potential signs of geothermal activity that indicated further investigation would be warranted, but utility scale geothermal energy production does not represent a feasible alternative at this time.

2.2.3 Ocean Energy

Sometimes referred to as marine energy, this renewable energy source is created by ocean waves and currents. The global movement of ocean water creates a vast store of kinetic energy which can be harnessed to generate electric power. Ocean energy conversion is a fledgling technology. The DoN recently selected a private developer to test its wave-to-energy technology in Kaneohe Bay, Oahu, Hawaii for at least 12 months beginning in the second half of 2016. Because it is a budding technology, the environmental effects and long-term performance of ocean energy projects have yet to be determined. High development costs coupled with the need for suitable site characteristics for a commercial-grade facility must also be considered. In light of the foregoing, ocean energy was dismissed as a feasible energy source at this time.

2.2.4 Alternative PV Sites

The proposed PV sites were screened from a larger pool of potential sites identified by REPO. With GPA's assistance, REPO was able to identify and objectively evaluate all of the potential sites based on criteria that included: (1) land area; (2) topography, (3) proximity to public access or roadways; (4) proximity to transmission lines or substations; and (5) land use compatibility (including technical feasibility). Some of the potential sites scored well on a portion of these criteria, but were eventually dismissed because of significant challenges associated with one or more criteria. For example, the Andersen and Orote landfills did not meet criteria (5) due to technical concerns with penetration of the existing landfill caps and therefore were dismissed from further consideration. The site assessment criteria used to identify and evaluate potential PV sites is shown in Table 2-1.

Table 2-1: Site Assessment Criteria

Category	1 Point	5 Points	10 Points
Land Size (acreage)	1 to 10 acres	11 to 49 acres	50 acres or more
Topography (degree of slope)	More than 10%	10% or less	Flat
Distance from Public Access or Roadways	5 miles or more	0.5 to 5 miles	Within 0.5 mile
Distance from Transmission Lines or Nearest Substation	5 or more miles	0.5 to 5 miles	Within 0.5 mile
Compatibility of Property for PV System Use	---	No	Yes

As a result of the screening process, the DoN determined that the eight sites included in the proposed action represent the most feasible approach to contribute towards its goal of 1 GW of renewable energy capacity in 2015 and help the DoN produce 50% of its shore-based energy requirements from alternative energy sources.

2.3 No Action Alternative

In accordance with NEPA and CEQ regulations, the No Action Alternative and any associated potential impacts, must be taken into account and evaluated.

Under the No Action Alternative, the development and use of the solar PV systems on Guam would not occur on DoD lands and near-term federal goals for renewable energy generation and use would not occur. The No Action Alternative does not address the DoN's strategy for renewable energy nor would it meet the purpose and need of the proposed action as described in Section 1.2 and Section 1.3 of this document.

Although the No Action Alternative does not address the DoN's purpose and need, the inclusion of this Alternative is prescribed by CEQ regulations and is brought forward and analyzed in this EA. The No Action Alternative also serves as a baseline against which the impacts of the proposed action can be measured and evaluated.

2.4 Summary of Potential Impacts to Resource Areas

The effect the Proposed Action and No Action alternatives will have on various facets of the natural and man-made environment is summarized in Table 2-2. Potential impacts associated with the construction and operational phase are covered separately when warranted.

Table 2-2: Summary of Potential Impacts to Resource Areas

Resource	Proposed Action	No Action
Air Quality	<p><u>Construction</u>: Temporary effects from fugitive dust and soil erosion. Best management practices (BMPs) including dust fences, water wagons and/or sprinklers would be used to control fugitive dust emissions during construction. Slight increase in GHG emissions due to use of construction equipment, machinery and vehicles.</p> <p><u>Operations</u>: Vehicular emissions from occasional trips to the PV sites for system maintenance will have a minimal, temporary effect. Decrease in GHG emissions during operations due to reduction of fossil fuel used to produce electricity.</p>	No reduction in fossil fuel use and GHG emissions would be realized under this alternative.
Noise	<p><u>Construction</u>: Temporary increase in ambient noise from equipment, machinery and vehicles would be minimized by complying with local regulatory requirements for noise control.</p> <p><u>Operations</u>: Minimal noise from cooling fans and transformers.</p>	No impact.
Topography and Soils	<p><u>Construction</u>: Temporary effects from fugitive dust and soil erosion and sedimentation will be avoided or minimized through BMPs to control dust emissions (see air quality discussion above) and compliance with NPDES permit conditions regarding construction-period erosion and sedimentation control.</p> <p><u>Operations</u>: No significant impact.</p>	No impact.
Water Resources	<p>Hydrology</p> <p><u>Construction</u>: Hazardous materials (coolants, fluids, oils) from equipment, machinery, and vehicles would be managed in accordance with applicable regulations and maintenance practices to minimize the potential for release.</p> <p><u>Operations</u>: There are no water resources located within or in proximity of the proposed PV sites.</p> <p>Drainage</p> <p><u>Construction</u>: Introduction of impervious surfaces will alter existing drainage conditions and could increase stormwater runoff potential. BMPs will be implemented to capture and retain stormwater on site and allow it to infiltrate into the soil or to be discharged at a rate that would not exceed the predevelopment hydrology to adjacent surface waters.</p> <p><u>Operations</u>: No significant drainage impact.</p>	No impact. No impact.

Resource	Proposed Action	No Action
Biological Resources	<p><u>Construction</u>: No listed or proposed species were located at the proposed sites nor are any sites located within a critical habitat.</p> <p><u>Operations</u>: Shaded areas below the PV panels could shelter feral animals. Orientation and spacing of panels would minimize the potential for birds to mistake them for a body of water. Permanent outdoor lighting would be fully shielded, use light-emitting diodes, and comply with International Dark-Sky Association standards to minimize the potential for seabird fallout or disorientation.</p>	No impact.
Cultural Resources	<p><u>Construction</u>: Archaeological inventory-level surveys and subsurface testing of the PV sites did not locate any cultural deposits or materials that are eligible for listing on the NRHP. No historic properties would be affected by the project.</p> <p><u>Operations</u>: No historic properties would be affected by the project.</p>	No impact.
Visual Resources	<p><u>Construction</u>: The construction equipment would be visible from adjacent roads and properties; however, this impact is consistent with standard construction activities and would cease upon completion of the PV installation.</p> <p><u>Operations</u>: Due to their location and distance, the PV systems would not have any effect on views from scenic vantage points. The PV systems at NBG would have no effect on public view planes or the local landscape since their location on DoD property restricts public access and therefore limits their visibility.</p>	No impact.
Glint and Glare	<p><u>Construction and Operations</u>: Aircraft and adjacent properties could be affected by sunlight reflecting off the PV panels (glint and glare). Glare hazard analyses determined that none of the PV sites will have adverse glare impacts to Won Pat International Airport and that the South Finegayan site potential glare impact will be avoided by not orienting PV panels to the southeast.</p>	No impact.

Resource	Proposed Action	No Action
Roadways and Utilities (continued)	<p>Electrical Power <u>Construction:</u> Temporary construction-related impacts for the connection of new transmission lines would be short-term, cease upon completion of the construction activities, and would not adversely affect overall service delivery.</p> <p><u>Operations:</u> Decrease fossil fuel dependency through the increase in renewable energy generation and meet the renewable energy goals set forth by SECNAV and the federal government.</p> <p>Telecommunications <u>Construction:</u> Temporary construction-related impacts for the connection of new telecommunications lines would be short-term, cease upon completion of the construction activities, and would not adversely affect overall service delivery.</p> <p><u>Operations:</u> No significant impact.</p> <p>Solid Waste Disposal <u>Construction:</u> Surface vegetation will be removed in areas where the PV arrays, equipment pads, substation complex, and maintenance/access roads will be built. The removed vegetation will be deposited in authorized green waste repositories</p> <p><u>Operations:</u> No significant impact.</p>	<p>No reduction in fossil fuel dependency for electrical power generation.</p> <p>No impact.</p> <p>No impact.</p>
Socioeconomic Conditions	<p><u>Construction:</u> Construction-related employment and spending will benefit the economy.</p> <p><u>Operations:</u> Wages and the purchase of goods and services for PV system operations and maintenance will benefit the economy.</p>	No impact.

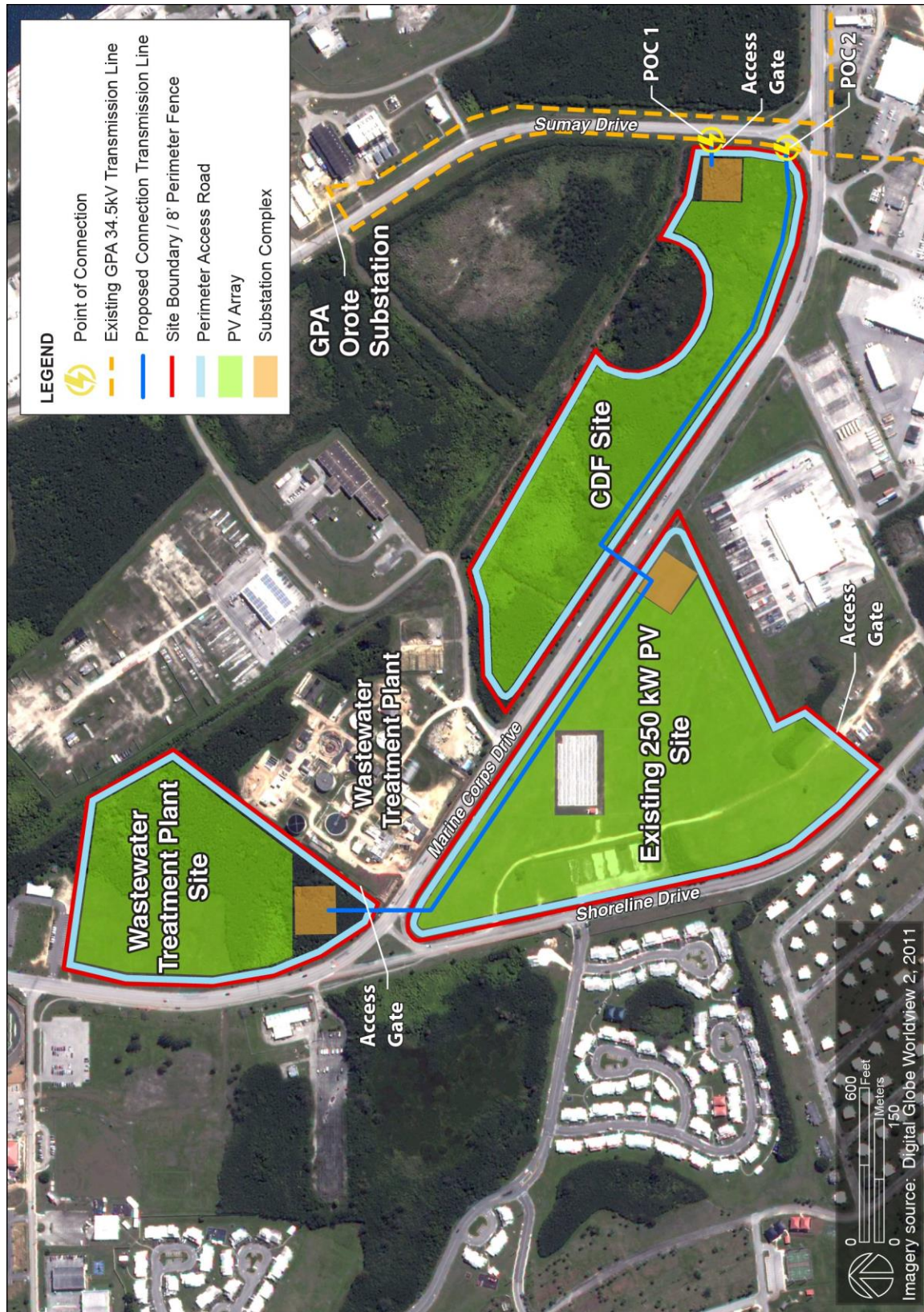


Figure 2-3

Wastewater Treatment Plant, Existing 250 kW PV, and CDF Project Sites Map

Environmental Assessment for PV Systems
Commander, Joint Region Marianas



Figure 2-4

Commissary Project Site Map
Environmental Assessment for PV Systems
Commander, Joint Region Marianas

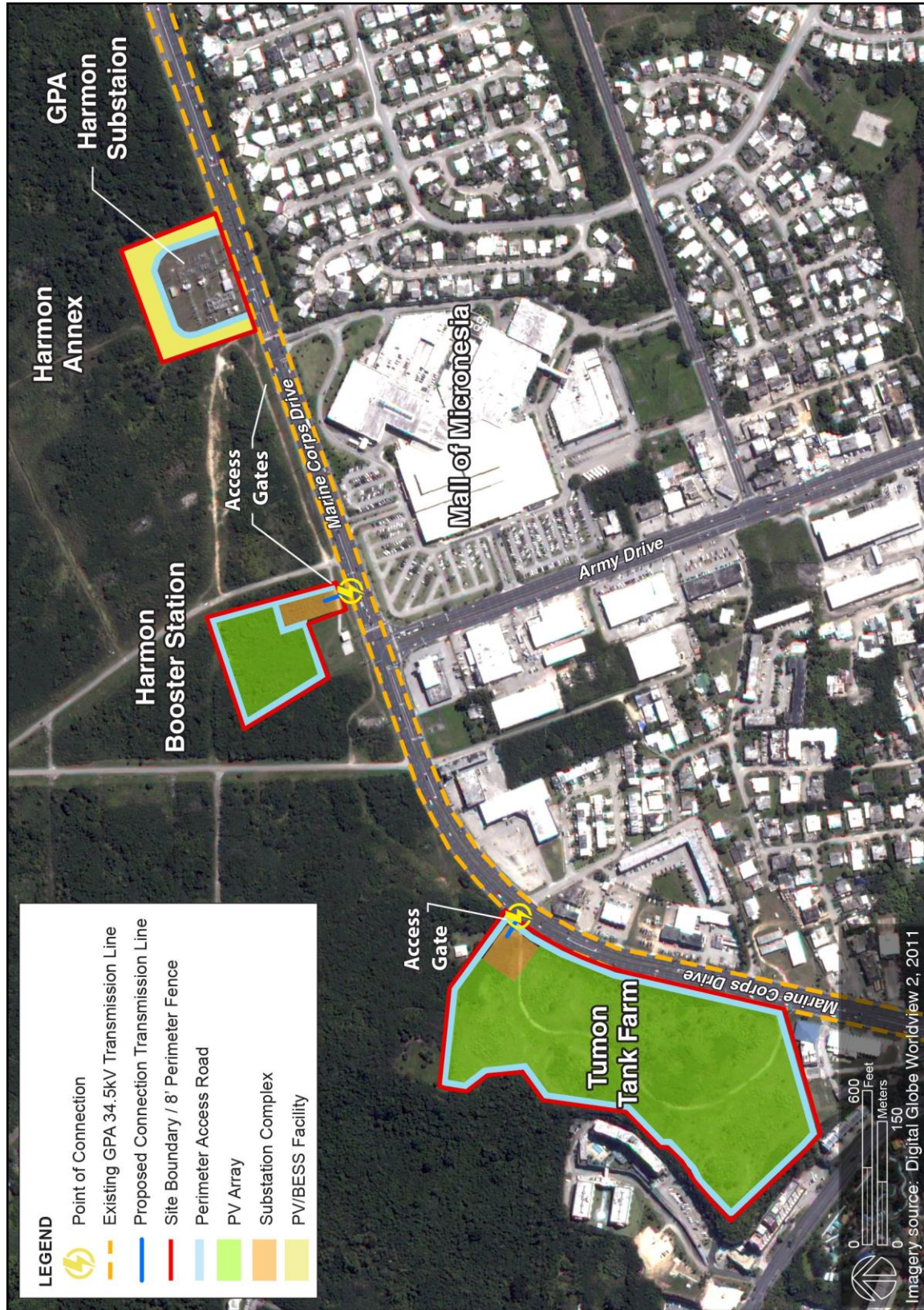


Figure 2-5

Tumor Tank Farm, Harmon Booster Station, and Harmon Annex Project Site Maps

Environmental Assessment for PV Systems
Commander, Joint Region Marianas

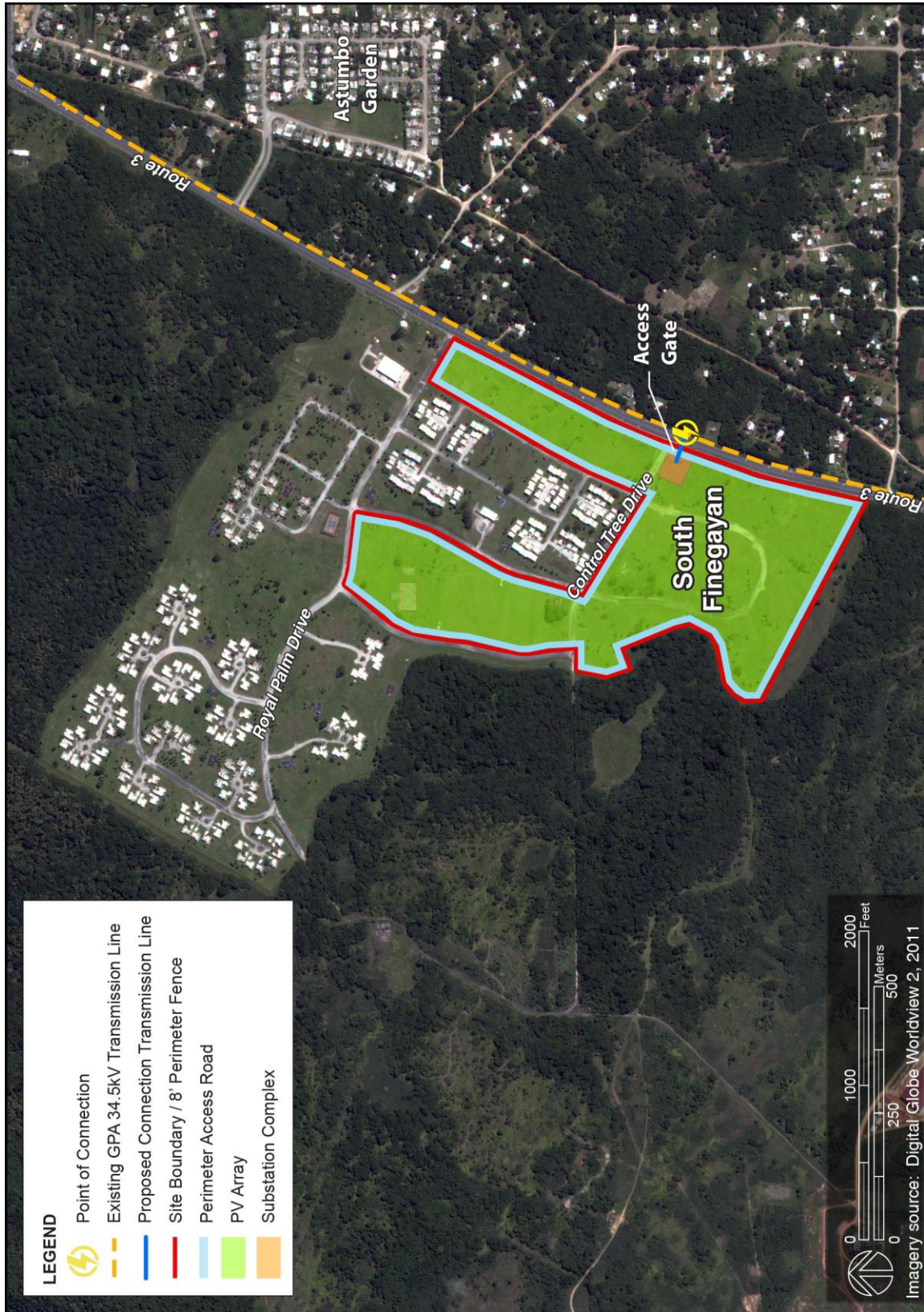


Figure 2-6

South Finegayan Project Site Map
Environmental Assessment for PV Systems
Commander, Joint Region Marianas

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Chapter 3 Affected Environment and Environmental Consequences

This chapter describes the existing environmental setting and establishes baseline conditions for the environmental resources with the potential to be directly or indirectly affected by the proposed action. This chapter also evaluates potential environmental consequences of the proposed action including the potential direct, indirect, short-term, long-term, and cumulative impacts on relevant environmental resources. This chapter is organized by resource topic (e.g., air quality, noise, geology and soils, etc.). The discussion under each topic begins with an overview of existing conditions related to that topic. Where appropriate, the discussion encompasses a larger environmental setting (e.g., the island of Guam). In other cases the focus is more regional (e.g., Northern Guam, Southern Guam, NBG) or applies to a particular site (e.g., South Finegayan site).

In accordance with CEQ guidance 40 CFR 1501.7(3), only resources/areas that have the potential to be affected are discussed in this EA. Therefore, the following resources/areas will not be evaluated.

Climate. Guam's tropical climate is pleasantly warm throughout the year. Temperatures range between 74° and 92° Fahrenheit with a mean annual temperature of 83°. Average annual rainfall is 85 to 100 inches with average humidity at 72% to 86%. As noted by the government of Guam (GovGuam), the island of Guam has two seasons: a rainy season from June through November and a dry season from December through May (GovGuam 2014). Due to its location in the Western Pacific, Guam has the highest risk of being hit by a typhoon or hurricane of any state or territory in the United States, and it is susceptible to being hit by the world's largest and most intense tropical cyclones (Guard et al., 1999). The PV systems will not have a significant effect on the local or regional climate of Guam.

Flood Hazard Areas. The PV systems will not be built in areas that are subject to 1% annual chance coastal or inland flooding nor will they affect flood hazard parameters or increase flood hazard potential.

Marine Resources. The proposed action will not involve any work in the shoreline area or within the nearshore marine environment.

Public Health and Safety. The proposed action does not pose a risk to public health and safety. Access to the PV sites will be restricted and security fencing and lighting have been incorporated into the design of the project.

Public Services. The PV sites will be unmanned facilities and would not increase the service area limits for police or fire protection nor would it generate a demand for health, educational, or recreational services or facilities.

Transportation. The proposed action will not directly affect air or ocean transportation facilities. Most of the materials to be used for the project would be imported by sea. However, the volume of cargo passing through these facilities amounts to a fraction of their capacity and is well within their capabilities. Roadway traffic is covered below in Section 3.11 (Roadways and Utilities).

Wastewater. The proposed action will not require any wastewater connections. The PV systems will be unmanned facilities without restrooms and would not generate wastewater flows.

Wetlands. The PV systems will be constructed in upland, dry areas. The sites do not intersect with any wetlands identified by the 2013 Wetland Mapping Final Report in Support of the Guam and Commonwealth of the Northern Marianas Military Relocation Supplemental Environmental Impact Statement (SEIS), and the proposed action will not affect any wetlands in the vicinity of the project sites.

Resources that could be potentially affected by the proposed action include: air quality; noise; topography and soils; water resources; biological resources; cultural resources; visual resources; land use; roadways; potable water, electrical, telecommunications, and solid waste disposal systems; and socioeconomic conditions. Potential effects from glint and glare and hazardous materials and UXO are also discussed in this EA.

Due to similarities in their affected environments, the PV sites proposed in Northern Guam and at NBG have been grouped together and evaluated as such since the sites are located in built-up areas with similar affected environments. Where additional details are warranted, site-specific discussions of affected resource areas and potential impacts are provided by location.

3.1 Air Quality

3.1.1 Affected Environment

Guam has a landmass that is 30 miles long and 4 to 8 miles wide. It is approximately 212 square miles and is the largest and southernmost of the Mariana Islands. Guam is situated between Hawaii and the Philippines at 13°28 minutes (') north latitude and 144°44' east longitude. Located in the Western Pacific, Guam serves as the gateway to Micronesia and a crossroad to Asia (GovGuam 2014).

Trade winds from the east dominate the wind pattern on Guam during the drier months. Trade wind speeds are typically less than 10 miles per hour (mph), but are variable in late summer. An average of three tropical storms (40 to 75 mph wind speeds) or typhoons (greater than 75 mph) have passed within 180 nautical miles of Guam each year between 1945 and 2004 (DoN 2014). Typhoon Vongfong was the most recent storm, passing through the Mariana Islands in October 2014.

The island of Guam is designated a National Ambient Air Quality (NAAQS) attainment area, with the exception of areas surrounding the Tanguisson Power Plant in Northern Guam and the Piti Power Plant in Southern Guam which are considered by the Environmental Protection Agency (EPA) as non-attainment areas for sulfur dioxide. The non-attainment area extends 2.2 miles from the center of each plant. None of the proposed PV sites are located within these non-attainment areas (DoN 2014).

3.1.2 Potential Impacts

The PV sites are within attainment areas that currently meet NAAQS for criteria pollutants and, therefore, would not be subject to the Clean Air Act's General Conformity Rule (DoN 2014).

Emissions from heavy equipment (e.g., bulldozers, excavators, dump trucks, etc.) will temporarily affect ambient air quality during the construction phase. In addition, ground disturbing activities such as site clearing; grading for the mounting systems for the PV arrays, substation complex, and maintenance roads; and trenching for fence posts, utility poles, and underground utility lines would temporarily generate fugitive dust. To minimize the effects of fugitive dust during construction, dust suppression methods using water trucks would be implemented in accordance with all applicable regulatory requirements.

A slight increase in GHG emissions is anticipated during construction. This increase would be attributed primarily to diesel-powered equipment and trucks, along with fossil fuel-powered delivery trucks and vehicles of workers and visitors commuting to and from the project sites. However, the short-term increase in GHG emissions during construction would be compensated by the generation of electricity from solar energy once the PV systems are in operation.

During the operational period, none of the PV system components emit air pollutants of any kind. Some emissions will result from vehicles to and from the PV sites for periodic maintenance but these effects would involve relatively short distances and brief periods of time. The proposed action would provide long-term beneficial effects on air quality and GHG emissions, since the use of fossil fuels would be reduced. The use of PV systems to generate electricity reduces dependence on fossil fuels that emit GHG (See Section 3.13 for a discussion of the cumulative effects of GHG and climate change).

No adverse impacts are anticipated during the decommissioning process. Dust from the removal of structures and improvements, and emissions from vehicles and equipment used to perform this work will be temporary in duration. The same BMPs as used during the construction period will be implemented during decommissioning to control fugitive dust.

No Action Alternative. No impacts to air quality would occur because no construction activities would take place and existing site conditions would continue to be maintained. However, the beneficial impacts associated with the proposed action's long-term reduction in fossil fuel use and GHG emissions would not be realized under the No Action Alternative.

3.2 Noise

3.2.1 Affected Environment

The level of ambient noise is an important indicator of environmental quality. Noise from vehicle traffic, aircraft flights, industrial land uses, and construction activities can impact ambient noise levels based on their proximity to noise-sensitive receptors (e.g., occupied structures). Chronically high noise levels can impact personal health and quality of life in an area.

The PV sites in Northern Guam are located in urbanized settings with ambient noise levels that correspond to this type of environment. The Harmon Annex, Harmon Booster Station, and Tumon Tank Farm sites lie along Route 1 which is bordered by high-density residential, commercial, and light industrial development, while the South Finegayan site along Route 3 is proximate to single-family housing. Ambient noise levels at NBG are typical of most established naval stations with waterfront operations located largely along the shoreline, adjacent areas used for ship berthing and mission support activities, and housing and individual/family support functions located inland from the waterfront. At NBG, the Harbor View and South Tupalao family housing areas are located across the street (Shoreline Drive) from the existing 250kW PV site.

The NBG sites are located along the major collector roads serving the installation and are exposed to regular vehicle noise. With the exception of the Harbor View and South Tupalao family housing areas at NBG, approximately 160 feet away from the existing 250kW PV site at the closest point, there are no other noise-sensitive receptors in the vicinity of the proposed PV sites.

Noise in the vicinity of the PV sites is primarily attributable to vehicles along adjacent roadways or aircraft operations.

3.2.2 Potential Impacts

Construction period noise would temporarily affect the occupants in the vicinity of the PV sites. Noise from construction vehicles, machinery, equipment, and power tools would be the dominant source of construction noise. Measures to minimize noise include the use of sound-dampening devices (e.g., baffles, mufflers) and properly maintaining all equipment, vehicles, and machinery. The PV contractor(s) would be responsible for compliance with all applicable regulatory requirements for noise control. To minimize noise impacts, construction activities will be limited to normal daylight hours in residential areas.

During the operational period, the proposed action is not expected to result in adverse noise impacts. The PV system components will make little or no sound except for noise from cooling fans in the inverters and a low hum from transformers mounted on each equipment pad. Vehicles used for periodic maintenance activities will generate noise on a limited, temporary basis. Given the primarily urbanized settings of the project sites, the noise sources would generally be consistent with existing ambient noise levels.

No long-term adverse impacts are anticipated during the decommissioning process. Noise from the removal of structures and improvements, and emissions from vehicles and equipment used to perform this work will be temporary in duration. The same BMPs as during the construction period will be implemented during decommissioning to minimize work-related noise.

No Action Alternative. No impacts to ambient noise levels would occur because no construction activities would take place and existing site conditions would continue to be maintained.

3.3 Topography and Soils

3.3.1 Affected Environment

Guam is the largest and southernmost island in the Mariana Islands archipelago, which is located in the western Pacific Ocean at approximately 13°25' north latitude and 144° 45' east longitude. It is approximately 30 miles long and varies between 4 and 8 miles wide. The volcanic archipelago resulted from subduction of the Pacific Tectonic Plate beneath the Philippine Tectonic Plate at the Mariana trench, which is east of Guam. Two (2) separate emergent mountains fused to form the Island of Guam. Volcanic hills that rise to 1,334 feet above mean sea level (AMSL) form Southern Guam, while the central and northern sections of the island consist of a limestone plateau reaching a height of 600 feet AMSL. This high plateau creates steep cliffs dropping down to a narrow coastal shelf (Joint Region Marianas 2012).

The soils of Guam are derived from the two types of parent material, volcanic and coralline limestone. The volcanic material forms poorly drained, acidic, lateritic soils. The limestone forms thin (only a few inches thick) basic soils. Mixing of the two sources results in a clay formation that is found chiefly in the central and some southern parts of the island. Heavy black soils accumulate in valley bottoms along streams and in estuarial swamps in the southern part of the island (Young, 1988).

The project parcels in the northern part of the island (South Finegayan, Harmon Annex, and former Tumon Tank Farm) overlie the main Marianas Limestone Formation and the related Barrigada Limestone Formation. Those on the Orote Peninsula of the Navy Main Base, which extends into the ocean off the western coast of the south part of the island, are located on a plateau of an upraised reef of the Marianas Limestone.

The proposed PV sites generally consist of relatively flat and gently sloping terrain, with the exception of the following sites:

Former Tumon Tank Farm. A relatively flat access road loops through the site, but the land surrounding the roadway consists of slight hills and ridges that rise up to 10 feet higher than the roadway surface.

CDF site. The site contains pockets of relatively flat terrain, but a pronounced ridge runs along the southern boundary of the site. The terrain reaches a high point of approximately 70 feet AMSL along the southern boundary (Marine Corps Drive), and drops down to an elevation of around 10 feet AMSL along the northern boundary.

3.3.2 Potential Impacts

No significant impacts to topography and soils would occur at any of the proposed PV sites. Site preparation would involve selective grubbing, grading, and vegetation removal in areas where the mounting systems for the PV arrays, substation complex, and maintenance roads would be located. Earthwork for maintenance roads, fence posts, utility poles, and underground utility lines is expected to be minimal. Cut and fill quantities will be balanced on site to make use of excavated earth although not all of this material may be suitable for structural fill. As necessary, the PV contractor(s) may need to import appropriate fill material (e.g., gravel, rock, sand) to create a strong and stable foundation for PV system components.

Ground-altering construction activities will comply with all applicable regulatory requirements. A NPDES Permit for general coverage would be obtained from the Guam EPA for the discharge of stormwater associated with construction activities such as grubbing and grading. To the extent possible, earthwork will be balanced to maintain existing drainage patterns and bare ground shall be hydro mulched or planted with ground cover to minimize erosion and runoff. If necessary, water trucks or temporary irrigation systems would be utilized to facilitate plant growth. Green waste from the site clearing process will be transported to a composting facility and excavated earth from site work shall be retained on site or disposed of in accordance with all applicable regulations. The PV contractor(s) will be responsible for implementing BMPs to control soil erosion and sedimentation during construction activities.

During the operational period, the PV systems are not expected to have an adverse impact upon topography and soils. The PV systems would operate passively with no active components which would disturb topography or soils. Periodic maintenance to clean and maintain the area around the PV panels would involve the use of small vehicles along established roads. These activities would be limited in

duration and would not result in any additional soil compaction beyond the initial construction phase. No adverse impacts are anticipated during the decommissioning process. Dust from the removal of structures and improvements, and emissions from vehicles and equipment used to perform this work will be temporary in duration. The same BMPs as used during the construction period will be implemented during decommissioning to control soil erosion, sedimentation, and stormwater runoff.

No Action Alternative. No impacts to topography and soils would occur because no construction activities would take place and existing site conditions would continue to be maintained.

3.4 Water Resources

3.4.1 Affected Environment

Hydrology. The hydrology of Northern and Southern Guam is quite varied with the distribution of fresh water largely controlled by local geology and topography. Guam is limited in freshwater resources and its freshwater environments are comparatively small, fragile, and extremely important (WERIWP/IREI 2014).

The northern part of the island is a limestone plateau with virtually no streams or rivers. Rocks in Northern Guam are water permeable and soluble, and the rain percolates into the ground instead of flowing on the surface. Driven by gravity, the water moves underground through air-filled fractures, voids, and conduits, and enlarges and connects them by dissolution. When the water reaches sea level, it accumulates and forms a groundwater body known as the freshwater lens. This lens-shaped body floats on top of the underlying seawater, which also easily moves through limestone. The “lens” is thickest in the island's interior and thinnest along its perimeter. The body of fresh water is known as the Northern Guam Lens Aquifer (NGLA) and is the primary source of drinking water on Guam. The NGLA is recharged by rainfall and discharges water to the surrounding ocean through springs along the coast (WERIWP/IREI 2014).

Fresh water from the NGLA is pumped upwards by production wells to provide approximately 80% of Guam’s population with potable drinking water. In 1978, the EPA designated the NGLA as a Sole Source Aquifer, which means an aquifer which is the "sole or principal drinking water source for the area."(WERIWP/IREI 2014).

Naval Base Guam is located on the Orote Peninsula which is a raised limestone plateau. The peninsula lies approximately four miles south of the southern extent of the NGLA. It consists of primarily porous coralline limestone and disturbed or created land, and there is no named aquifer system under the peninsula (INRMP 2012).

Drainage. Drainage characteristics in Northern Guam are reflective of local geological and topographic conditions. The limestone plateau underlying Northern Guam and the Orote Peninsula cannot support long-term surface water flow. Instead of collecting on the surface, rainwater is conveyed underground through subsurface voids in the rock caused by dissolution which ultimately forms a complex underground drainage system. The replacement of surface drainage by underground drainage is one of the defining features of karst topography and why karst areas usually lack surface streams. (WERIWP/IREI 2014).

3.4.2 Potential Impacts

Hydrology. There are no water resources located within or in proximity of the proposed PV sites. During the construction phase, water will be dispensed by water trucks or temporary irrigation systems to control fugitive dust and wet down any exposed ground. No significant impacts to groundwater are expected.

During the operational period, PV system operations will not require significant water use nor would it affect groundwater withdrawals. The PV systems would be unmanned facilities and would not generate a regular demand for water use. The PV systems will require minimal maintenance which would involve periodically washing the PV panels with water to remove accumulated dust and dirt. Water would also be required to provide fire protection for the substation complex. To provide water for PV system maintenance and fire suppression, connection to a water line within the adjacent roadway ROW is proposed.

The proposed PV systems would not impact groundwater resources as they would have a negligible effect on groundwater. While some hazardous materials are contained within equipment like the inverters, transformers, and BESS, they are housed in closed, properly-maintained systems (see Section 2.12). During construction, BMPs such as proper storage of hazardous materials and immediate cleanup of any leaks or spills will be implemented to prevent contamination of groundwater resources.

Drainage. Section 438 of the Energy Independence and Security Act of 2007 established strict stormwater runoff requirements for federal development and redevelopment projects. The provision requires that "The sponsor of any development or redevelopment project involving a federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow." The proposed action will comply with these and all other applicable regulatory requirements for stormwater management.

The proposed action is not expected to have an adverse effect on drainage. Construction of the PV systems would alter existing drainage and groundwater recharge conditions through the introduction of impervious surfaces. However, the increase in runoff, and subsequent decrease in groundwater recharge for each PV site is expected to be minimal as the impervious surfaces would be limited to the mounting systems for the PV arrays, equipment pads, and substation complex. These impervious surfaces represent a relatively small area when compared to the overall land area of each site. BMPs will be implemented, and retention basins or dry wells will be utilized as necessary, to ensure that stormwater runoff is retained on site and allowed to percolate into the ground or be discharged at a rate that would not exceed predevelopment runoff or adversely affect adjacent and downstream properties. An NPDES Permit for stormwater discharge associated with construction activities will be obtained where site work (grubbing, grading) is 1-acre or more.

During the operational period, the PV systems will require minimal maintenance which would involve periodically washing the PV panels with water to remove accumulated dust and dirt. These activities would be limited in duration and would not involve any discharges that have the potential to affect surface or groundwater quality.

No adverse impacts are anticipated during the decommissioning process which will be limited in duration. BMPs will be implemented during decommissioning to ensure that the removal of structures and improvements does not impact surface and groundwater.

No Action Alternative. No impacts to water resources would occur because no construction activities would take place and existing site conditions would continue to be maintained.

3.5 Biological Resources

3.5.1 Affected Environment

Many of the animals found on Guam today were brought there intentionally by humans. Pigs and chickens were brought in for food, while carabao (water buffalo) was brought to help farmers. Domesticated dogs and cats were brought in as pets; some of them escaped and now live in the wild. Animals native to Guam include the Mariana fruit bat, the flightless Guam rail, and the Mariana crow. Other wildlife such as rats, snakes, and lizards were brought in accidentally through cargo shipments. Some of these introduced species have become pests and either eat or compete with native species. For example, the Brown tree snake has destroyed many of Guam's native birds and lizards since it appeared in the 1940s. Because it has no natural predators, the snakes multiplied, spread throughout the island, and ate most of Guam's native birds. The Mariana fruit bat, Guam rail, and Mariana crow are extirpated from Guam, but these species are present on the island of Rota (Bess Press 2006).

Biological resource surveys at the proposed action sites were undertaken between October 2014 and December 2014 to document potential impacts that the proposed action could have on Endangered Species Act (ESA)-listed species and proposed species; Guam-listed endangered species; and wetlands (SWCA Environmental Consultants 2015).

The existing vegetation structure at each of the proposed PV sites is summarized below.

South Finegayan. Onsite vegetation consists of open, grassy parkland interspersed with palm trees and other tree species. No ESA-listed or proposed species were observed during the surveys.

Harmon Annex. Onsite vegetation is composed of a disturbed secondary forest containing various tree species. Understory vegetation is dominated by a dense ground cover of native ferns. Various herbaceous weed species occupy open disturbed vehicle trails and forest edges. No ESA-listed or proposed species were observed during the surveys.

Harmon Booster Station. Onsite vegetation is composed of a disturbed scrub community consisting of various tree species and herbaceous weeds at gaps and sunlight edges. Understory vegetation is dominated by a dense ground cover of native ferns. Herbaceous weeds vegetate gaps and sunlight edge niches. No-ESA listed or proposed species were observed during the surveys.

Former Tumon Tank Farm. Onsite vegetation is composed of disturbed, secondary scrub community consisting of various tree species interspersed with areas of open grassland. Understory vegetation consists of an array of grasses and herbaceous weeds. No ESA-listed or proposed species were observed during the surveys.

WWTP Site. Onsite vegetation is composed of a disturbed, secondary forest community consisting of various tree species interspersed with areas of open canopy containing the invasive vine (*Antigonon leptopus*). Understory vegetation is dominated by a dense ground cover of native ferns. The invasive vines *Antigonon leptopus* and *Mikania scandens* occupy canopy gaps and forest edges. Herbaceous weeds vegetate small forest gaps and sunlight edge niches. No ESA-listed or proposed species were observed during the surveys.

Existing 250kW PV Expansion Site. Onsite vegetation mostly consists of uncut grassy areas and low-lying shrubs interspersed with occasional palm trees and stands of tangen-tangan (*Leucaena leucocephala*), an invasive tree species. No ESA-listed or proposed species were observed during the surveys.

CDF Site. Onsite vegetation is composed of disturbed, secondary forest community interspersed with areas of open canopy containing the invasive vine (*Antigonon leptopus*). Understory vegetation is dominated by a dense ground cover of native ferns. Herbaceous weeds vegetate forest gaps and sunlight edge niches. No ESA-listed or proposed species were observed during the surveys.

Commissary site. Onsite vegetation is composed of a disturbed scrub forest containing various tree species. Understory vegetation is dominated by a dense ground cover of native ferns. Herbaceous weeds vegetate surrounding sunlight edge niches. No ESA-listed or proposed species were observed during the surveys.

A summary of the biological resources encompassed by the surveys follows below.

Birds. Eight (8) bird species are ESA listed or Guam listed as threatened or endangered. These birds include the Nightingale reed warbler, Guam swiftlet, Mariana crow, Mariana moorhen, Guam Micronesian kingfisher, Micronesian megapode, Guam rail, and Brindled white-eye. The Nightingale reed warbler, Micronesian megapode, and Brindled white-eye are extirpated from Guam. The Guam rail was released on the island of Rota where there is now a wild population, and the Guam Micronesian kingfisher occurs only in captivity. A discussion of the three remaining avian species follows.

- **Mariana Crow (*Corvus kubaryi*).** The Guam and federally-endangered crow was once found throughout native limestone forests on Guam. However, its population has been severely impacted by the introduction of the Brown tree snake (*Boiga irregularis*). Infertility, predation by rats (*Rattus spp.*) and monitor lizards (*Varanus indicus*), and displacement by drongos (*Dicrurus macroercus*) have also contributed to their decline. A recovery plan was drafted by the U.S. Fish and Wildlife Service in 1990 and crow habitat has been protected by the Guam National Wildlife Refuge since 1992. Despite these recovery efforts the Mariana crow is not present on Guam, nor is it present at any of the proposed sites.
- **Mariana Common Moorhen (*Gallinula chloropus guami*).** The Guam and federally-endangered moorhen is also protected by the Migratory Bird Treaty Act (MBTA) and is found primarily in freshwater wetlands and occasionally in brackish wetlands. Habitat loss, water pollution, and predation by Brown tree snakes, feral pigs, and introduced fish have impacted its population. The moorhen is not likely to be present at any of the proposed sites.

- Guam Swiftlet (*Aerodramus vanikorensis bartschi*). The Guam and federally-endangered swiftlet lives in a variety of habitats including cave dwellings, savanna, and ravine forests. The swiftlet has historically been found throughout Guam, however, habitat destruction, pesticides, and predation by the Brown tree snake have impacted its population. Since 1992, only caves in southern Guam are known to have had swiftlet populations. The swiftlet is not likely to be present at any of the proposed sites.

Mammals. Two (2) mammals, the Little Mariana fruit bat (*Pteropus tokudae*) and the Mariana fruit bat (*Pteropus m. mariannus*) are federally-listed species. The little fruit bat is believed to be extinct. The Mariana fruit bat, which is Guam listed as endangered and federally listed as threatened, is known to forage and roost in native limestone and ravine forests. The population of the Mariana fruit bat is threatened by illegal hunting, predation by the Brown tree snake, and habitat loss. Critical habitat has been designated for the Mariana fruit bat in the fee-title lands of the Guam National Wildlife Refuge. However, none of the proposed sites are located within the Guam National Wildlife Refuge.

Reptiles. Seven (7) skink and gecko species are listed as endangered on Guam and are candidates for federal listing. These species include the Snake-eyed skink (*Cryptoblepharus poecilopleurus*), Tide-pool skink (*Emoia cyanura*), Azure-tailed skink (*Emoia cyanura*), Slevin's skink (*Emoia slevini*), Moth skink (*Lipinia noctua*), Pacific slender-footed gecko (*Nactus pelagicus*), and Micronesian gecko (*Perochirus ateles*). Skink and gecko species have been impacted by the introduction of the Brown tree snake; however competition from introduced species, feral cats, flat worms, habitat loss, and wild fires have also caused their populations to decline. Of the seven species listed, the Snake eye skink, Pacific slender footed skink, moth skink, and Azure-tailed skink are believed to be extirpated from the wild. The remaining reptile species are discussed below.

- Micronesian Gecko. Little information is available about the Micronesian gecko; however, it is believed to be present in limestone forest and beach strands. The Harmon Annex and Harmon Booster Station sites contain potential habitat for these species; however no occurrences or indicators of their presence, were identified during field surveys.
- Slevin's Skink. This species is found on the forest floor, in old fields, and low on tree trunks. Because little is known about the ecology of this skink, further study is warranted. Slevin's skink is known only from the Mariana Islands and was last recorded on Guam in 1945 before the introduction of the Brown tree snake. The skink has been detected on Cocos Island, off the southwest coast of Guam, and is present on the northern islands in the CNMI (IUCN 2015).
- Tide-Pool Skink. Tide-pool skinks are found in intertidal strands and are therefore unlikely to be found at any of the proposed PV sites.

Insects. Two (2) butterfly species, the Mariana eight-spot butterfly (*Hypolimnna octocula mariannensis*) and the Mariana wandering butterfly (*Vagrans eqistina*) are proposed species for federal listing as endangered. Habitat loss for host plants, *Procris pendunculata* and predation of caterpillars by ichneumonid wasp (*Ichneumon sarcitorius*) have impacted the Mariana eight-spot butterfly. No host plants for the Mariana eight spot butterfly were observed at any of the proposed sites.

Mollusks. Three (3) mollusk species are Guam listed as endangered and are proposed species for federal listing. These species include the Guam tree snail (*Partula radiolata*), the humped head tree snail, and the fragile tree snails. All tree snails species have been observed on host plants; however, habitat conditions include cool, shaded forests with high humidity. Populations of all three snails have been impacted by human activity as well as predation by flat worms (*Platydemus manokwari*), and the giant African snail (*Achitina fulica*). None of the three tree snail species were observed during comprehensive surveys of host plants at the PV sites.

Plants. Hayun lagu (*Serianthes nelsonii*) is a federally-listed endangered species that grows in limestone forests at elevations ranging from 400 to 575 feet. The primary threats to this tree are lack of regeneration caused by feral ungulates, insect damage, and typhoons. There is one mature Hayun lagu and one sapling at AAFB and 31 saplings at the Guam National Wildlife Refuge. None of these trees are located within any of the proposed project sites.

The following 14 species are candidates for federal listing as threatened or endangered species: *Bulbophyllum guamense*, *Cycas micronesica*, *Dendrobium guamense*, *Eugenia bryani*, *Hedyotis megalantha*, *Heririera longipetiolata*, *Maesa walkeri*, *Nervilia jacksoniae*, *Phyllanthus saffordi*, *Psychtria malaspinae*, *Solanum guamense*, *Tabernae montana rotensis*, *Tinospora homosepala*, *Tuberolabium guamense*. Threats to these plant species vary and include fires, typhoons, climate change, habitat loss, direct destruction, urban development, agricultural activities, non-native plants and animals, predation by non-native invertebrates, and failure to regenerate due to seedling loss. None of the ESA listed or candidate plant species were identified during surveys at the proposed sites.

3.5.2 Potential Impacts

No ESA or Guam listed or proposed species were observed at the surveyed sites during field work for the biological resources surveys. In addition, none of the sites are located within critical habitat, and none of the sites falls within the limits of the Guam National Wildlife Refuge. The findings and conclusions of the biological resource surveys and effects analysis are summarized below.

Birds and Mammals. Critical habitat at the Guam National Wildlife Refuge includes 22,821 acres of land which offer protection to the Mariana crow and the Mariana fruit bat. None of the proposed sites is located within this critical habitat. The Mariana crow is not present on Guam, and the Mariana fruit bat is not likely to be present at any of the proposed sites. As such, the proposed action would have no effect on the Mariana fruit bat. No Mariana common moorhen were observed during the surveys. Because the proposed sites do not include wetland habitats which would attract the moorhen, the proposed action is expected to have no effect upon this species.

Reptiles. The total potential land disturbance for the Harmon Annex and Harmon Booster Station sites totals 8 acres. These 2 sites may be potential habitat for the Micronesian gecko; however, none were observed during reptile surveys therefore, it is not likely that the proposed sites are occupied by these species. The proposed action will have no effect on the Micronesian gecko.

Insects. The Harmon Annex and Harmon Booster Station sites may be suitable habitat for the Mariana eight-spot butterfly and Mariana wandering butterfly; however, no host plants for the Mariana eight-spot butterfly were observed at any of the sites which makes it unlikely that they are occupied by the species. The proposed action will have no effect on the Mariana eight-spot butterfly or the Mariana wandering butterfly.

Mollusks. Host plants for tree snail species were abundant at all proposed sites, however the tree snail species require complex canopy structures with overstory, understory, and layers in between to maintain an environment with high humidity. Generally, disturbed forests do not become re-vegetated with the canopy structure needed for these species to survive. No tree snails were observed on host plants and it is not likely that tree snails occupy these forests. The proposed action will have no effect on tree snails.

Plants. None of the ESA-listed or candidate plant species were identified at any of the proposed sites. It is not likely that the proposed action will adversely affect any of the surveyed plant species.

The proposed action would not have a significant impact upon biological resources during the construction phase. Clearing of vegetation and potential habitat conversion would occur under the proposed action at the Harmon Booster Station, Tumon Tank Farm, CDF, Wastewater Treatment Plant, and Commissary Sites. However, all of these sites have been previously disturbed, and are dominated by introduced and herbaceous species. Localized impacts to species residing in these vegetative areas would occur, but the long-term impact would not be significant and no population level impacts would occur.

Should nests of any MBTA species (e.g., Mariana common moorhen) be found in areas where PV arrays are planned, the installation of equipment at that location will be delayed until after the nest fledges or naturally fails on its own accord. To ensure that all parties are aware of this procedure, a coordination meeting with the PV contractor(s), construction workers, and resource specialist shall be held for instructional purposes prior to the start of construction.

During the operational period, the proposed action will have no effect on ESA-listed and proposed species.

There are no known federally-listed threatened or endangered species or important habitat that would be affected by the proposed action. As necessary, skirting would be placed around the PV arrays to prevent the shaded area underneath the panels from becoming a habitat for feral animals.

None of the PV arrays are located in areas where large numbers water birds are known to congregate. It is possible, however, that birds could mistake the PV arrays for a body of water ("lake effect") instead of a solid surface and strike the panels when attempting to land on them. Because the PV panels have an anti-reflective coating and will be placed at an angle instead of a horizontal position, the potential of birds mistaking it for a body of water would be minimized. The design of PV systems will not include any guy wires that would create a strike hazard to birds, and barbed wire will not be used in the fences to minimize the potential for bird strike hazards and subsequent harm to avian species.

Any migratory birds that may pass through or use the PV sites for foraging or loafing could be displaced by the installation of the PV arrays. This would not have an adverse effect on these species since they would relocate to adjacent areas with suitable habitat.

To minimize the potential of seabird fallout or disorientation, permanent outdoor lighting shall be fully shielded, utilize light-emitting diodes, and comply with International Dark-Sky Association standards.

The decommissioning of the PV systems is not expected to result in any adverse impacts. BMPs such as those utilized during the construction and operational phases will be implemented as necessary.

No Action Alternative. No impacts to biological resources would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.6 Cultural Resources

3.6.1 Affected Environment

In October and November 2014, an archaeological inventory survey and subsurface testing was conducted at the proposed action sites by Leppard, et al. (2015), to document existing conditions and the potential for impacts the proposed action could have on cultural resources, including NRHP-eligible sites. Prior to this field work, archival research was completed to assist in identifying cultural resources at the proposed action sites (Leppard et al. 2015). None of the features documented during the archaeological inventory surveys and subsurface testing meet the criteria to be eligible for the NRHP, and no other types of cultural resources were identified at the project sites through archival research. A historical summary and presentation of efforts to identify cultural resources are described in this section. Much of this summary has been drawn from the Leppard et al. 2015 report.

Archaeological data indicates that the main Mariana Islands were settled about 1,500 years Before Christ, although some paleo-environmental and archaeological evidence suggests that initial settlement of Guam and Saipan may have occurred 300 to 900 years earlier (Athens and Ward 2004).

Archaeological, biological, and linguistic evidence all point to Southeast Asia, and most strongly to the Philippine Islands, as the place of origin of the first Mariana islanders.

The early settlement period of the Mariana Islands is labeled as the Pre-Latte Period and spans the time from initial settlement to *Anno Domini* (AD) 1000. The basic settlement pattern is one of small population groups living along sandy coastlines. Subsistence practices included ocean resources (e.g., shellfish, reef fish) and agricultural crops that could be easily grown and were highly stress resistant (e.g., coconuts, breadfruit, taro). Occasional forays into the interior of the island were made to obtain resources (e.g., birds, fruit bats) that were not available near the coast. Caves and rock overhangs were used for shelter.

The Latte Period (AD 1000-1521) came next and is distinguished by the presence of latte stone structures and a notable change in pottery technology. Latte are large upright limestone pillars topped by a semi-hemispherical capstone. Latte sets served as foundations for homes and storage structures and were also associated with burials. The deceased were buried beneath latte sets within the area demarcated by the pillars or surrounding homes, as well as in non-habitation areas. Latte sites typically consist of clusters containing up to 18 individual structures and are common along the coastline of the major Mariana Islands. Inland latte sites are found in productive agricultural areas and in upland areas of southern Guam near streams and lakes. During the Latte Period, the population increased and settlement areas expanded beyond the coastal environments.

The late Latte Phase covers the period from Ferdinand Magellan's landing on Guam in 1521 until the beginning of full Spanish colonization in 1668. In 1565, Miguel Lopez de Legazpi became the first person to make a round-trip between the Americas and the western Pacific. On his westward trip from Mexico, he landed on Guam and claimed the Mariana Islands for Spain. In the following years, Spanish contact with the Marianas remained limited, with no major changes to Chamorro culture and society except for the introduction of iron tools and Spanish galleons stopping at Guam for provisions during their annual voyages to Manila to exchange silver from Mexico for silks, porcelains, and other luxury goods from

China (via the Philippines). A major consequence of contact with the Spanish galleons was the introduction of European and Asian diseases which the Chamorro were very aware of and referred to it as the “sickness of the ships”.

During the late Latte period, settlements existed at the foot of each stream and river valley, as well as inland areas suitable for cultivation. The population of the Marianas was perhaps 40,000 at this time, with at least 20,000 people living on Guam. The economy of the islands was subsistence-based and dependent on fishing, gardening, and gathering.

In 1668, Spanish (Jesuit) missionaries arrived on Guam to convert the Chamorro to Christianity. Jesuit attempts to change Chamorro culture led to conflict and eventual violence. By the end of the 17th century, Chamorro society was radically changed. The impact the Spanish had on the island’s people and ecosystem was devastating. New diseases, to which the Chamorro had no in-built immunity, reduced the estimated pre-Contact population of 20,000-40,000 to just 1,800 in 1690 and to less than 1,600 within a 25 year span.

The Spanish established a rigid hierarchical system in which Hagatna was the center of religious and political power. Umatac, with its excellent harbor and freshwater source, had the status of a village with a special charter. The remaining population was concentrated in four parish villages (Pago, Inarajan, Merizo, Agat) which were under the control of the Spanish missionaries and military. The island’s subsistence economy was transformed to one of trade with islanders raising crops and livestock to provision the Spanish galleons and ships bringing in clothing and other items from the outside world. The introduction of large animals (e.g., cattle, carabao, pigs, goats, deer) and the clearing of forests for pasture land also impacted the environment and Chamorro culture. Along with clustering the native population in parish villages, free-roaming animals contributed to the neglect and abandonment of traditional Chamorro gardens. The Chamorro’s specialized knowledge of deep-sea fishing and long-distance navigation diminished, as “virgin soil” epidemics (e.g., introduced diseases) killed many traditional knowledge holders before their skills that were accumulated over many generations could be passed on and shared.

The greatest influence the Spanish had on Guam’s culture was through the Catholic Church, which has been the center of village activity since the 17th century. Today, every village has its own patron saint whose feast day is celebrated with an elaborate fiesta to which the entire island is invited (Guampedia 2015). As part of their policy of *reduccion* (i.e., forced cultural change), Spanish missionaries forced islanders to wear European-style clothing. The Spanish also established schools where students received lessons in Christian doctrine, reading, writing, arithmetic, penmanship, Spanish grammar, geography, history, and etiquette. By 1887, approximately 35% of the population had received primary instruction in the local schools and 11% had learned to read and write (Guam-Online 2015). Spanish architectural influence can still be seen on Guam as various buildings, bridges, forts, and churches that were built during their occupation still remain. For example, the San Antonio Bridge was constructed in the 1800s to span the Hagatna River while the Taliafak Bridge was built along the old Spanish Coastal Road between Hagatna and Umatac. The Plaza de Espana in Hagatna was the location of the Governor’s Mansion during the Spanish occupation. Most of the palace was destroyed during WWII but three structures still remain standing: the three-arch gate, the back porch, and the Chocolate House. The Dulce Nombre de Maria (Sweet Name of Mary) Cathedral-Basilica was built in Hagatna in 1669 but was destroyed during WWII. A new church was constructed on the same site in the 1950s. Located in the Umatac area, and restored in 1995, Fort Nuestra Senora de la Soledad was one of the last forts build in the 19th century to support the Spanish galleon trade (Guam-Online, March 2015).

Early in the 19th century, Spanish trade in the Pacific ceased as Spain's colonies in the New World gained their independence. The administration and financial support for the Marianas was transferred to the Philippines which had strengthened their connection with the islands in the late 1700s. The easing of Spanish policy in the 1770s led to an increased number of foreign ships stopping at Guam. As a result, subsidies to Guam were reduced and the population was allowed to trade freely. This liberalization resulted in three decades of trade with the Pacific whaling fleet, which resupplied 30 British ships at Guam every year between 1823 and 1853. By the late 1840s, the American fleet became dominant and ports in Hawaii, Pohnpei, and Kosrae replaced Guam as a stop for provisions. Despite the efforts of various governors, the agricultural economy of Guam changed little and all but a very few of Guam's inhabitants were still engaged in a strictly subsistence economy. The rice and corn harvests remained low because of extensive crops damage caused by rats. Wild cotton and indigo were occasionally harvested but never became financially successful. Except for livestock and sweet potatoes that were raised to supply ships, only coffee and cacao were grown in quantities for export. Although trade had been loosened in the 1770s, it was still firmly under the control of the Spanish governor and the very few wealthy individuals that he favored. If any islanders were producing crops and livestock to provision the Galleons, it was done so on the basis of taxes that were collected by the governor. Guam's population increased during the 19th century, but occasional epidemics still resulted in high mortality. According to official census records, the population increased from 4,158 in 1800 to 8,775 to the mid-1800s. A virulent smallpox epidemic in 1855-1856 reduced the population to 5,241. In 1886, the population climbed to 8,176.

During the Spanish-American War, the U.S. Navy cruiser *Charleston* sailed into Apra Harbor in June 1898. Without any ammunition, the Spanish surrendered, and the Americans took control of the island. Spain ceded Guam to the United States at the end of the war and the Navy became responsible for the administration of the island. Guam remained under American control for the next 40 years. During this time, the island served as a fueling station for ships traveling from the U.S. to Asia; as the site of the trans-Pacific cable station; the base of a strategic naval radio station; and a landing place for the Pan American Airlines trans-Pacific Clipper service between San Francisco and Hong Kong.

On December 8, 1941, Japanese planes attacked Guam a few hours after attacking Pearl Harbor. Japanese forces landed on Guam two days later, and for two years, the Japanese Navy controlled Guam. During this time, the Japanese attempted to acculturate the native population, conscripted them into forced labor, and eventually forced them into internment camps. In July 1944, the United States began an intensive bombardment of Guam that lasted 13 days. On July 21st, U.S. Marines landed on Asan Beach with the U.S. Army following the next day. Fierce fighting ensued and by and by August 10th all organized resistance ended.

The recapture of Guam was followed by a massive build-up of American forces to support air attacks on Japan and prepare for an invasion of the country. New facilities were also constructed on the island and included a major port and ship repair facility at Apra Harbor, three airfields, a hospital, and multiple fuel storage facilities. After the war, many of these facilities continued to be used, and additional facilities were added in response to military needs during the Cold War, Korean War, and Vietnam War.

During the post-war period, Guam fell under U.S. Navy administration for a few years. In 1949, a civilian government was established, and in 1950 Guam was made a U.S. territory. Hagatna was rebuilt after almost being completely destroyed during WWII. Since the 1960s, tourism, particularly from Japan and other Asian countries, has become the mainstay of the Guam economy, with resort development centered around Tumon Bay on the Guam's west coast. The American military presence on the island has also remained significant.

The eight PV sites encompass 192 acres and constitute the area of potential effect for the proposed action. Four (4) of the PV sites are located in Northern Guam, while four of the sites lie within NGB. The locations and areas of these sites are shown in Table 1-1 and Figures 2-3 through 2-6. Inventory (pedestrian) surveys were conducted with parallel transect lines spaced between 6 to 50 feet apart, depending on the density of vegetation and ground visibility. Stratigraphic test pit (STP) locations for subsurface testing were selected according to a hierarchical sampling strategy. Excavation of the STPs proceeded by strata using arbitrary 4-inch levels within layers (Leppard et al. 2015).

A summary of investigations to identify cultural resources in each of the proposed PV sites is presented below.

South Finegayan. Leppard et al. (2015) completed a surface survey and subsurface investigations on a 290-acre parcel at this location; however, only 71 acres of the surveyed area are currently being carried forward for a potential PV system. Given its prior use as a housing area, the site has been subject to extensive surface and shallow subsurface disturbance. Leppard et al. (2015) did not document any archaeological sites within the proposed PV site, although a displaced Chamorro pot sherd was collected from a fill deposit in one of the stratigraphic test pits. A concrete platform that may be a component of Site 66-08-2317, a post-WWII military complex, was recorded beyond the boundaries of the proposed PV system; however, Site 66-08-2317 was previously determined to lack sufficient integrity for NRHP eligibility (Welch 2010).

There have been several other recent systematic archaeological studies in the vicinity of the South Finegayan housing complex but outside the footprint of the proposed PV system (Reinman 1967; Olmo et al. 2000; Welch 2010). The most proximate study is Welch (2010), which undertook intensive pedestrian survey on the adjacent GLUP 77 Parcel and Naval Computer and Telecommunications Station (NCTS) Finegayan, also referred to as Finegayan North and identified several sites within a 0.6-mile radius of the South Finegayan site: a latte site (Site 66-08-0141); a historical military installation (Site 66-08-2317); a Japanese military complex (Site 66-08-2316); Latte Period, Spanish Period, and military sites 66-08-2311–2316), a military complex (Site 66-08-2318), and two well installation sites. Olmo et al. (2000) recorded the Hila'an Complex to the west of the South Finegayan site, below the limestone escarpment. This complex includes at least 19 latte sets and the Hila'an cave (Reinman 1967).

Harmon Annex, Harmon Booster Station, and former Tumon Tank Farm. These three proposed PV sites are located in close proximity to each other (Figure 2-5) and therefore considered collectively for identification of cultural resources. Leppard et al. (2015) did not identify any archaeological resources on the Harmon Annex or the Tumon Tank Farm. One concrete pad (Feature 005) was identified at the Harmon Booster Station; however, this feature lacks integrity characteristics and is not considered significant under any NRHP criteria.

Prior to Leppard et al. (2015), limited systematic archaeological work has been undertaken at the Harmon Annex site with no reported findings of significance (DeFant 2008). No previous systematic archaeological work has been undertaken on the Harmon Booster Station and Tumon Tank Farm sites. Additional studies have occurred within 0.6-mile of the proposed PV sites; however, the immediate context for pre-Contact (and immediately post-Contact) archaeological resources is a large and contiguous Latte Period settlement which does not extend to the karst plateau on which the proposed PV systems are situated. None of the Annex infrastructure to the North was found to be eligible for the NRHP (Schilz et al. 1996: Table 1). Burtchard (1991) reported an absence of archaeological material to the immediate northwest of the proposed PV systems. On the karst plateau to the south, outside the project areas, two Japanese fortifications have been identified (Site 66-01-2132 and Site 66-04-1182, Bulgrin 2006).

WWTP Site. A previous pedestrian survey by Hunter-Anderson and Moore (2002) included the WWTP site as part of a larger survey parcel and no archaeological sites were identified within the boundary of the proposed PV system. Leppard et al. (2015) completed subsurface investigations on the proposed PV location and did not identify any archaeological resources.

Existing 250kW PV Site. The expansion area for this existing PV site has not been subject to previous archaeological investigations; therefore, Leppard et al. (2015) represents the first systematic investigation of this location. No archaeological resources were identified during the pedestrian survey and subsurface investigation.

The surrounding area has been previously investigated (Hunter-Anderson and Moore 2002; Carucci 1993; Craib and Yoklavich 1996; and Lauter-Reinman 1998) and Craib and Yoklavich (1996) recorded two historic Quonset huts (Map Nos 294 and 295) adjoining the west side of the Expansion site area. They also recorded additional Quonset huts (Map Nos 297-300) and post-WWII sports fields (Map Nos 179 and 220), which Lauter-Reinman (1998) added to Map Nos 178 and 320, farther from the project area. Hunter-Anderson and Moore (2002) recorded 11 post-WWII Sites to the northeast (Sites C-6 to C-16; two of these sites had prehistoric components, one consisting of an artifact scatter of pottery, lithic flakes, and marine shell (Sites C-11) and one a rock shelter (Site C- 12) in which pottery sherds and marine shell were found in a test unit. Carucci (1993) documented the remnants of multiple concrete structure (Sites TN-3 to TN-7). Carucci (1993) recorded multiple Japanese defensive positions (Sites 66-02-1129, 1301, and 1306 to 1310), Camp Bright (Site 66-02-1300), caves (Site 66-02-1312), and various post-WWII structure/remnants (Sites TN-2, 9, 10, 22-25). Tipalao Marsh (Site 66-03-1827) and Tuparao Village (Site 66-02-1311) were documented in the area.

CDF Site. A previous survey by Hunter-Anderson and Moore (2002) included the CDF Disposal Area and identified five archaeological sites within the proposed PV boundary. These included one pre-Contact site, a rock shelter containing pottery sherds and marine shell. The prehistoric deposits had been extensively disturbed by WWII use and landfilling, and pre-Contact and historical period materials were found mixed together. One late Pre-Latte sherd and several probable Latte Period sherds were recovered (Hunter-Anderson and Moore 2002:52, 99; Welch et al. 2009:78). Because of the extensive disturbance, the DoN has determined the site to be ineligible for the NRHP.

The other four sites are all WWII or post-WWII US military sites (Hunter-Anderson and Moore 2002, Volume 2): a WWII and post war limestone quarry; a complex of post-war military structures, consisting of a main concrete slab, smaller slabs, and associated sidewalks; a post-war military structure, consisting of a T-shaped concrete slab; and two adjacent post-war concrete slabs. None of these sites were determined to be eligible for the NRHP. Leppard et al. (2015) completed subsurface investigations on the proposed CDF area and did not identify any archaeological resources.

A fifth site, Site 66-03-1856, is located adjacent to the proposed CDF site and contains a series of post-WWII structures that belonged to Guam Dredging Contractors, who held a contract to dredge Apra harbor from 1946-1950. Site 66-03-1856 was determined eligible for the NRHP (Hunter-Anderson and Moore 2002). Leppard et al. (2015) confirmed the site's integrity and a 30 meter (m) buffer will be maintained between the site and the proposed PV system.

Commissary Site. Portions of the Commissary site have been subject to previous investigations by Carucci (1993) and Craib and Yoklavich (1996); however, Leppard et al. (2015) is the first investigation of the western portion of the proposed PV site. Carucci (1993) documented multiple concrete pads (Site TN-8) in the southern component, and Craib and Yoklavich (1996) plotted the northeastern half of what may have been Orote Village (Map No 267) within this parcel. However, a subsequent study by Dixon et al. (2011) investigated the area directly adjacent to the commissary site between Shoreline Drive and Dadi Beach. Their investigation found that if the Orote Village Site had extended beyond Dadi Beach, it had been disturbed by later earthmoving associated with Camp Bright and no intact resources would occur (Dixon et al. 2011). Numerous other nearby sites have been identified; however, they are all outside the disturbance footprint of the proposed PV system and would therefore not be affected by the project.

Leppard et al. (2015) did not identify any archaeological sites within the parcel during the pedestrian survey or subsurface testing. Specifically, the subsurface investigations conducted by Leppard et al. (2015) evaluated the extent of the previously identified concrete pads by Carucci (1993) and the proposed Orote Village area suggested by Craib and Yoklavich (1996). Their investigation did not identify any archaeological findings and primarily encountered sandy fill with some graded limestone, very shallow topsoil, and push berm evidence suggesting anthropogenic degradation. This disturbance is further evidenced by the presence of Shoreline Drive bisecting the proposed Orote Village boundary as defined in the 1996 study, and confirms the findings of Dixon et al. that the area has been previously disturbed. In summary, Leppard et al. (2015) determined the disturbance was such that no material deriving from the Orote Village remains within the boundary of the proposed Commissary Site.

Summary. Previous investigations for the proposed PV sites did not document any historic features eligible for the NRHP within the proposed site boundaries. Except for the concrete pad (Feature 005) that was located on the Harmon Substation site, no other previously unrecorded archaeological sites or features were documented on any of the proposed PV sites during recent investigations by Leppard et al. (2015). Feature 005 lacks integrity and is not considered eligible for listing on the NRHP. In addition, Leppard et al. (2015) did not locate any architectural resources within the proposed PV sites that are eligible for listing on the NRHP.

Table 3-1 lists the archaeological resources that were identified on the proposed PV sites.

Table 3-1: Archaeological Resources Identified on the Proposed PV Sites

<i>Proposed PV Site</i>	<i>Archaeological Resources Identified</i>	<i>NRHP Eligibility</i>
South Finegayan	No findings	Not Applicable
Harmon Booster Station	Feature 005 by Leppard et al. (2015)	Ineligible
Harmon Annex	No findings	Not Applicable
Former Tumon Tank Farm	No findings	Not Applicable
WWTP Site	No findings	Not Applicable
250kW PV Site	No findings	Not Applicable
CDF Site	Features C-6, C-8, C-12, C-13, and C-14 by Hunter-Anderson and Moore (2002)	Ineligible
Commissary Site	Craib and Yoklavich (1996) plotted the northeastern half of what may have been an Orote Village within this area. Subsequent investigation found that if the Orote Village Site had extended beyond Dadi Beach, it had been disturbed by later earthmoving associated with Camp Bright and no intact resources would occur (Dixon et al. 2011 & Leppard et al. 2015).	Not Applicable

None of the sites and features documented during previous and recent surveys on the proposed PV sites are properties that are eligible for listing on the NRHP, the nation's official list of properties that recognizes those that are significant in American history, architecture, archaeology, engineering, and culture.

3.6.2 Potential Impacts

The archaeological inventory surveys and subsurface testing at the proposed PV sites did not locate any cultural resources that meet the criteria for inclusion in the NRHP. The likelihood of such resources being present within these sites remains small since surface observations and the results of subsurface testing documented significant 20th century land alterations at all of the sites. As such, the meager cultural materials resulting from the archaeological investigations supports an assessment that the potential for future historic properties and cultural deposits to be discovered at the proposed PV sites is low.

The Section 106 Consultation Process was conducted with the GHPO and other interested parties (Section 106 consultation correspondence is provided in Appendix A). The Section 106 consultation began with a May 6, 2015 letter from DoN to GHPO documenting DoN's finding of "no historic properties affected." The letter stated that in accordance with 36CFR 800.5(c)(1), DoN would assume no objections to the determination of effect and eligibility if no response was received within 30 days of receipt of the letter (letter was received by GHPO on May 7, 2015). The DoN received a response from the GHPO dated June 5, 2015 on July 1, 2015 (well after the 30-day deadline) indicating it could not concur with DoN's determination of effect and requested a 15-day extension of the review period. On July 29, 2015, DoN received GHPO comments by letter dated July 24, 2015. DoN responded with a letter dated August 13, 2015 notifying GHPO of its decision to proceed with the undertaking because of the urgency of the proposed action and lack of timely review comments.

Because none of the features documented during the archaeological inventory surveys and subsurface testing meet the significance and integrity criteria to be eligible for the NRHP, and since no other types of cultural resources were identified at the project sites through archival research, the proposed action is not expected to negatively impact cultural resources.

No Action Alternative. No impacts to cultural resources would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.7 Visual Resources

3.7.1 Affected Environment

Guam's natural beauty and historical landmarks provide points of scenic interest. Latte, pillars which served as foundations for the thatched huts of the Chamorros, can be found in parks and remote areas of the jungle. The remnants of Spanish buildings such as the Plaza De Espana, and stone bridges may be seen in Hagatna, Guam's capital. In other locations throughout the island, the Spanish influence is clearly visible in the architectural design of homes and villages in Southern Guam (GovGuam 2014).

Well-known scenic vantage points on Guam include Two Lovers Point located along the coastline at the north end of Tumon Bay in the village Tamuning, and the Asan Bay Overlook located along Route 6 and approximately 1.6 miles east of Piti in the village of Asan-Maina. PV sites in Tamuning include the former Tumon Tank Farm, Harmon Annex, and Harmon Booster Station. These sites are located from 1.2 to 1.3 miles southeast of Two Lovers Point. There are no PV sites in Asan-Maina; the closest PV location is the CDF site at NBG which lies approximately 4.6 miles southwest of the Asan Bay Overlook.

The urban character of the areas adjoining the PV sites in Northern Guam and at NBG is briefly described below.

Northern Guam. The PV sites in Northern Guam are located in highly urbanized settings. The Harmon Annex, Harmon Booster Station, and Tumon Tank Farm sites lie along Route 1 which is bordered by high-density residential, commercial, and light industrial development. The South Finegayan site along Route 3 is bordered by large-scale residential development to the east (across Route 3); forest stands to the south-southwest; and the vacant South Finegayan military housing complex to the north-northwest.

NBG. The installation has a land use pattern that is typical of most established naval stations. Industrial-type waterfront operations are largely along the shoreline, areas adjacent to ship berths are primarily used for mission or related support activities, and individual/family support functions are generally located inland from the waterfront.

All of the PV sites are covered with varying degrees of trees and/or scrub vegetation. The WWTP and CDF sites lie in an area bounded by Route 1 (Marine Corps Drive), Sumay Drive, and an unnamed local access road. Facilities within this area are industrial in nature and include the WWTP, a vehicle storage area, a conforming storage complex, an operations vehicle garage, a recycling warehouse, and various smaller buildings. The existing 250kW PV site is triangular shaped and bounded by Route 1, Shoreline Drive, and a general warehouse facility. Family housing areas lie to the west of the site. The Commissary site consists of two parcels that are bisected by an unnamed local access road. Shoreline Drive borders both parcels on the south and Exchange Road borders the larger parcel on the east. The existing Commissary and Transportation Equipment Maintenance Shop lie to the north of the large and small lots, respectively.

3.7.2 Potential Impacts

Because of their locations, distance, and topography the proposed PV systems would not affect views from scenic vantage points such as Two Lovers Point and the Asan Bay Overlook. The Harmon Booster Station, Tumon Tank Farm, and Harmon Annex sites are located just over a mile south east of Two Lovers Point, but topographic features shield the proposed sites from the viewpoint. The PV systems at NBG are located over 4.5 miles east of the Asan Bay Overlook, and would be partially shielded from the overlook by vegetation and topographic features.

The PV systems at NBG will not have an adverse effect on public view planes or the local landscape since their location on DoD property restricts public access and therefore limits their visibility. The PV systems proposed at NBG are not expected to have an adverse impact on the visual character of the installation. However, due to their large footprint and locations, the PV systems would be visible from public roadways and areas adjacent to the sites.

The PV panels have a relatively low profile (approx. 4 feet above grade) and comprise the vast majority of equipment to be installed on the site. When panels are installed on a level site, only the panels closest to the viewer would be visible. When they are installed on a sloping site, a greater number of panels would be visible from the roadway or adjacent areas. Regardless of any intervening onsite vegetation and the low-lying appearance of the PV arrays, the sheer number of panels would create a new visual presence where previously only trees and scrub vegetation existed.

Perimeter/security fencing (8 feet) would be set back from the roadway rights-of-way to minimize streetscape impacts. Pad-mounted inverter/transformer blocks (approx. 10 feet square by 10 feet high) would be distributed throughout the PV arrays. Based upon final engineering design, any new transmission lines for the PV systems would be installed either overhead or underground along existing roadways. Typically, any new overhead transmission lines would be suspended on approximately 40-foot tall utility poles spaced at about 200-foot intervals. Any new overhead transmission lines are not expected to result in any adverse visual effects since their appearance would blend in and be consistent with those of pre-existing transmission lines in the area.

The substation complex, outdoor light poles (30 feet), and any overhead utility poles and transmission lines would be more visible than the PV panels and pad-mounted inverter/transformers. All permanent outdoor lighting would be fully shielded and downward directed to be compliant with the International Dark Sky Association standards. Along roadways and adjacent areas beyond the limits of DoD property, visual barriers will screen the PV sites from view. The visual barriers may consist of new or existing landscape features (trees, shrubs), manmade structures (fences) or natural features (topography).

During the operational period, the visual barriers would screen the PV panels and most of the improvements from view so they would not be prominent in views from public roadways and adjacent areas.

The decommissioning process would remove all proposed action structures and improvements, and will not have an adverse effect on visual resources.

No Action Alternative. No impacts to visual resources would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.8 Glint and Glare

PV systems introduce the possibility of light being reflected off the surface of the PV panels, into the eyes of individuals. As noted by the Federal Aviation Agency (FAA), this condition is commonly referred to as glint and glare, and can cause disorientation and a brief loss of vision also known as flash blindness (FAA, November 2010). However, solar PV systems employ glass panels that are designed to maximize light absorption and minimize reflection. The panels are constructed with dark, light-absorbing materials and covered with an anti-reflective coating which reflect as little as 2% of the incoming sunlight depending on the angle of the sun (FAA, November 2010). PV systems do not generally pose a glint and glare risk for the general public as individuals must view the panels from elevation to gain the angle of reflection needed to experience glare impacts. However, there is the potential for glint and glare to impact air traffic, specifically pilots and air traffic controllers.

3.8.1 Affected Environment

The island of Guam is currently served by two active airports, including Andersen Airfield at AAFB and the Antonio B. Won Pat International Airport (Won Pat). Andersen Airfield is located on AAFB which encompasses approximately 17,000 acres at the northern end of Guam. AAFB serves as the home base for the Air Force's 36th Wing, and supports CJRM missions in the Pacific Region. The airfield itself comprises approximately 1,750 acres on the east side of the installation. It consists of two parallel runways aligned in an east northeast/west southwest orientation. The northern runway is identified as runway 06L/24R, and the southern runway is identified as runway 06R/24L.

Won Pat is the civilian airport that serves the island of Guam. It is located in the Tamuning Village approximately 3 miles east from Guam's capital city of Hagatna and approximately 1 mile south from the main tourist center at Tumon Bay. It consists of two parallel runways aligned in an east northeast/ west southwest orientation. Similar to Andersen Airfield, the northern runway is identified as runway 06L/24R, and the southern runway is identified as runway 06R/24L.

The proposed PV sites at NBG are located approximately 10 and 20 miles south west from Won Pat and Andersen Airfield respectively. The proposed PV sites in Northern Guam are generally located in between the two airports. The Tumon Tank Farm site is the closest site to Won Pat, located approximately 1.5 miles due north. South Finegayan is the closest site to Andersen Airfield, located approximately 5.3 miles to the southeast. Currently the proposed PV sites consist of undeveloped vegetative land, and do not create glint or glare effects for aircraft or residents in the surrounding area.

3.8.2 Potential Impacts

In order to assess the potential for glint and glare effects from proposed PV systems near airports, the Sandia National Laboratories has developed the Solar Glare Hazard Analysis Tool (SGHAT). This tool determines when and where solar glare can occur throughout the year from a proposed PV system as viewed from user-specified observation points (e.g., flight tracks) (SGHAT User Manual 2014). The tool accounts for PV system configurations (e.g., tilt, orientation, height, etc.) to determine the potential glare impacts.

In October 2013, the FAA released an interim policy for solar energy system projects on federally obligated airports. Under this policy, the FAA specifies that glint and glare impacts to airport facilities must be limited to "no potential" for glint glare impacts at air traffic control towers, and "no potential" for glare or "low potential for after image" along the final approach path for any existing or planned

landing threshold (FAA 2013). The FAA also identified the SGHAT as the acceptable tool to be used to determine glare impacts and requires that it be used to demonstrate compliance with the standards for measuring ocular impact for any solar energy proposed at a federally obligated airport.

Although the proposed action does not involve a solar energy system for a federally obligated airport, SGHAT was used to assess potential glare hazard analysis associated with the proposed action. The glare analysis was conducted for all applicable runways at Won Pat and Andersen Airfield. Also, the PV contractor(s) will be selecting the final layout and panel orientation of the proposed PV system, so the analysis incorporated a range of panel orientation from southeast (150°) to due south (180°) and southwest (210°). An orientation of due south would provide for the greatest panel efficiency, however, orienting slightly to the east or west may allow the panel layout to best fit the shape of a site.

The SGHAT analysis confirmed that none of the proposed PV sites will cause significant glare impacts to Won Pat. Specifically, none of the proposed sites were shown to cause any glare impacts to the ATCT at Won Pat, and only the Tumon Tank Farm site was found to cause “low potential for after image” glare to Won Pat runways. For Andersen Airfield, only the South Finegayan site was found to have the potential to cause glare impacts. This site is discussed below.

South Finegayan. The SGHAT analysis confirmed that a panel orientation of due south or southwest at the South Finegayan PV site will cause no glare impacts to Andersen Airfield. However, if the panels were oriented to the southeast, they do have the potential to cause “low potential for after image” glare to the air traffic control tower and both flight tracks. Under FAA policy, this level of glare is acceptable for the flight tracks, but it is unacceptable for the air traffic control tower. Therefore, in order to avoid glare impacts to the Andersen Airfield site, the South Finegayan site should not be oriented toward the southeast and the shape of the proposed South Finegayan PV site lends itself to a south southwest orientation.

The SGHAT analysis shows that potential impacts from glint and glare will not be significant and are within the approved standards set forth by the FAA. For those that have the potential to cause glare impacts, measures can be taken through the orientation of the panels to avoid any significant glare impacts.

The decommissioning of the PV systems will remove any potential effects from glint and glare.

No Action Alternative. No impacts from glint and glare would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.9 Hazardous Materials and UXO

3.9.1 Affected Environment

Hazardous Materials. Most of the proposed PV sites are covered with varying degrees of trees and/or scrub vegetation. As shown in Table 3-2, a few of the PV sites, in whole or in part, were utilized for hazardous material storage or solid waste disposal in the past and are subject to specific Land Use Controls (LUC) for the affected area in order to be utilized.

Table 3-2: Past Use of PV Sites for Solid Waste Disposal and Hazardous Materials Storage

<i>PV Site</i>	<i>Previous Use</i>	<i>Present Use or Status</i>	<i>Effect on PV Systems</i>
South Finegayan	Majority of site used for Navy family housing. A 9.5-acre Construction Battalion (CB) Landfill site used for construction shop waste from 1944 to 1957 when it was closed.	The housing has been abandoned and is pending demolition. LUC are in place for the former CB Landfill site.	No adverse effect. Former CB Landfill site located in forested area, approx. 300 ft. from nearest PV array. PV arrays to be placed in previously graded and open areas of the former housing site.
Tumon Tank Farm	Fuel storage site	Site is unoccupied.	No adverse effect. No unacceptable risks to public health or welfare or the environment were identified at Sites 44 or 46 (Tumon Tank Farm) (DoN, November 2009).
Existing 250kW PV Site	From the 1960s to the 1980s, a small part of the site was used for temporary storage. Stored materials included electrical transformers containing PCBs, which were no longer accepted after 1985.	Remedial action and studies were subsequently undertaken. Samples were also collected and no traces of arsenic and PCBs were detected	No adverse effect. Guam EPA granted conditional closure in October 2004 which require, among other stipulations, Institutional Controls for the PCB contaminated soil beneath the concrete caps (DoN, October 2014).

UXO. The island of Guam was a World War II battleground with air, land, and naval combat occurring almost everywhere military operations took place. Due to the large number of residual, UXO there is a significant likelihood of encountering UXO on DoD land. The UXO Likelihood Map for Guam identifies all DoD properties on Guam as having a low, moderate, or high probability of encountering UXO. This map shows that the PV sites have a moderate likelihood of an encounter.

DoD policy calls for an Explosive Safety Submission (ESS) whenever ground-disturbing activities such as excavation, soil boring, or soil sampling occur on DoD land that have a moderate to high likelihood of encountering UXO. The ESS covers explosives safety, as well as environmental and human health and safety risks posed by UXO. The ESS also sets forth procedures to follow when personnel must enter unmaintained lands that have a moderate to high likelihood of encountering UXO.

3.9.2 Potential Impacts

Hazardous Materials. The proposed action may require the removal and disposal of hazardous materials or waste that may be undetected and present in the soils underlying the sites. If the existence of hazardous materials or waste is suspected, the PV contractor(s) will ensure that an Environmental Site Assessment is conducted prior to construction to determine the presence or absence of any hazardous materials or waste on the site. Should any such materials or waste be identified in the ESA, they will be contained, removed, and disposed of by qualified personnel in accordance with applicable DoD requirements. The affected area would undergo remedial cleanup prior to any further use of the area.

During the construction phase, the PV contractor(s) shall be responsible for ensuring that temporary, secondary containment measures are employed, to ensure that any accidental releases of hazardous substances (e.g., anti-freeze, petroleum, oils, lubricants) are prevented or limited in scope. Portable catch basins, portable containment berms, and other similar measures would be used for refueling equipment. The PV contractor(s) would ensure that spill kits are kept on site to ensure that response and cleanup actions are promptly undertaken should a spill occur. All construction workers will be trained on spill prevention and notification measures in accordance with DoD pollution control requirements to reduce the potential for accidental spills.

With a few exceptions, the equipment associated with PV systems do not pose a threat of hazardous waste. However, coolant used in inverters, mineral oil used in transformers, and substances (e.g., anti-freeze, petroleum, oils, lubricants) used by construction vehicles are considered hazardous substances. Both the inverters and transformers utilize closed systems, and the hazardous materials could only be spilled if there was physical damage to the equipment.

Additionally, the batteries used in the BESS will contain hazardous substances. Lead-acid, sodium sulfur, and lithium-ion batteries represent the more robust technologies available, however, the specific battery technology used for the proposed system would be decided during the project design process. Batteries are typically housed entirely within a battery container system (BCS), and multiple BCS would be located within the BESS main building. The BCS will include the container, battery enclosures, control system, internal wiring, cooling system, fire suppression system, battery rack system and interfaces for battery management system. Fire risk presents the main safety concern with respect to BESS.

In response to the growing demand for energy storage systems, including BESS, the DOE has recently released, December 2014, an Energy Storage Safety Strategic Plan. In the plan they outline two basic sets of controls that should be used to minimize the risk of fires at BESS facilities. Engineered controls provide the first step in ensuring the safety of a BESS and include designing the system to the highest possible level of safety. Administrative controls includes the implementation of emergency preparedness plans and the appropriate facility signage, processes, and procedures (DOE 2014).

During the design, construction, and operation of the PV system, including the BESS, the PV contractor(s) will be required to implement both engineering and administrative controls to minimize the risk of hazardous substance release.

No adverse impacts are anticipated during the decommissioning process. Appropriate measures will be implemented during decommissioning to control any hazardous materials or waste, including the proper disposal or recycling of batteries.

UXO. Because all of the proposed PV sites are identified as having either a moderate or high likelihood of encountering UXO, all ground disturbing activities will utilize BMPs and comply with applicable UXO regulatory requirements and protocols. For example, this would include compliance with ESS standards which currently include surface and subsurface survey and clearance by a certified UXO contractor who would conduct a visual and below ground survey of the area. Since the survey only indicates the possible presence of UXO, any anomalies will require further investigation by the UXO contractor. As necessary, the UXO contractor would remain on site to monitor all ground-disturbing construction activities.

In the event a possible UXO object is encountered during construction or anytime thereafter, its location would be noted and anyone in the area must retreat. After reporting the finding to authorities, military Explosive Ordnance Disposal (EOD) personnel would classify the object and determine disposal requirements. Typical UXO render safe procedure calls for recovering the UXO object and moving it offsite for disposal. However, if the UXO object is unstable, the object may need to be disposed of in place.

No adverse impacts are anticipated during the decommissioning process. Appropriate BMPs and ESS screening will be implemented during decommissioning should any hazardous materials or UXO be encountered.

No Action Alternative. Because no construction activities would take place and existing site conditions would continue to be maintained, there would be no impacts to hazardous materials or wastes.

3.10 Land Use Compatibility

3.10.1 Affected Environment

The island of Guam is approximately 212 square miles in size (135,680 acres) and is divided into 19 municipalities which are commonly called villages.

North and Central Guam, which has an urban character and western-style development, is predicted to absorb much of Guam's future growth. The southern portion of the island contains large expanses of undeveloped land and has a more traditional culture and lifestyle. DOD land holdings on Guam occupy 36,276 acres with approximately 17,370 acres under CJRM control. DoD is planning to relocate approximately 5,000 Marines and 1,300 dependents to Guam in connection with the realignment of U.S. military personnel based in Okinawa (DoN, April 2014). The time frame for the relocation is contingent upon the completion of the federal environmental review process and the release of federal construction funds to accommodate the move. A Draft SEIS was completed in 2014 and a Final SEIS and Record of Decision are anticipated in 2015.

Because much of this future growth is expected to occur in North and Central Guam, the government of Guam, with the participation of an interagency working group, prepared the "North and Central Guam Land Use Plan" (GovGuam, September 2009). The Plan established a vision and created goals and policies to guide future growth and development in North and Central Guam and maintain the island's quality of life. Although the Plan was initially limited to North and Central Guam, its vision, goals, and policies are intended to have island-wide application as island's remaining villages would be included in a later planning phase (GovGuam, September 2009). The Plan also includes a range of land use categories for Guam that are not intended to be used as zoning designations but are meant to establish a land use pattern that is consistent with the goals and policies of the Plan. The Plan includes a "Federal Land" category which includes "all properties owned and managed by the federal government for military and other uses." All of the proposed PV sites are designated "Federal Land" with the exception of the Tumon Tank Farm site which is designated "Residential," the Harmon Annex site which is designated "Industrial" and Harmon Booster Station site which is partially designated "Industrial" and partially "Commercial".

The current zoning code for Guam regulates land uses, heights, setbacks, lot coverage, parking, and signage. The zoning code establishes various zones including: (1) Rural, (2) Residential, (3) Commercial, (4) Automobile Parking, (5) Light Industrial, (6) Heavy Industrial, (7) Limited Commercial, (8) Hotel-Resort, (9) School, and (10) Public Facility (GovGuam, September 2009). Since local zoning does not regulate federal lands, the DoD lands on Guam are not zoned.

The four PV sites in Northern Guam are located in two villages: Dededo and Tamuning. A summary description of these villages and the land uses in the vicinity of each of the PV sites follows below.

Dededo. The island's second largest and most populous village occupies 30 square miles in northwestern Guam. As with other northern villages, Dededo is located on Guam's limestone plateau. The main sections of Dededo lie along Route 1 (Marine Corps Drive), Guam's principal roadway. This village, which is a major residential and commercial center, is home to the Micronesia Mall, the largest shopping mall in Micronesia (GovGuam 2014).

- **South Finegayan.** Residential areas (Astumbo Garden, Lower Astumbo) lie approximately 800 feet to the east of the site. Astumbo Elementary School and Astumbo Middle School lie approximately 0.7 mile east of the site, while Finegayan Elementary School lies 1.4 miles to the northeast.

Tamuning. This village encompasses the areas of Tamuning, Tumon, and Harmon. The main geographic features of this region are the low plateau of Oka Point which divides Tumon and Hagatna Bays, and the area around Tumon Bay which is enclosed by high cliffs leading to relatively flat areas in Upper Tumon and Harmon. Tumon, with its beautiful white sand beaches and protected waters, has become the focal point of Guam's visitor industry, while Tamuning has become a major commercial and residential area. Harmon, the site of a post-World War II airfield, is now an industrial park (GovGuam 2014). The three proposed action sites below all front on the island's major commercial arterial, Marine Corps Drive.

- **Harmon Annex.** The Micronesia Mall and areas of large-scale residential development lie immediately south of the site. Lands to the immediate north, east, and west of the site are basically undeveloped and covered with trees and scrub vegetation. The Guam Regional Medical Center (under construction) lies approximately 0.2 miles to the east of the site, while lands to the southwest are industrial in nature.
- **Harmon Booster Station.** At its closest point, the Harmon Annex lies 0.2 miles northeast of the site. The Micronesia Mall and business/industrial-type development lie immediately south of the site. Lands to the north, east, and west of the site are basically undeveloped and mostly covered with trees and scrub vegetation.
- **Former Tumon Tank Farm.** Business/ industrial-type development lie immediately east of the site. Land uses to the west and south of the site appear to be tourist oriented. Lands to the north of the site are basically undeveloped and mostly covered with trees and scrub vegetation.

The four PV systems proposed at NBG are located in the village of Santa Rita. A summary description of this village and the land uses in the vicinity of each of the PV sites follows below.

Santa Rita. Excluding NBG, Naval Munitions Site (NMS), and military housing areas, this is one of Guam's smallest villages. Most of the village's activities revolve around Our Lady of Guadalupe Church, as well as the baseball field, Mayor's Office, and new Senior Citizen's Center. Located within the NMS, the Fena Reservoir was initially intended for Navy use but now serves as the main drinking water source for most of Southern Guam. In 2007, the Santa Rita Springs Booster Pump underwent a \$1.5 million upgrade to support the growing demand for water (GovGuam 2014).

NBG is located on the south side of Apra Harbor along the island's west coast. Approximately 4,300 acres in size, NBG provides waterfront, berthing, munition, and other logistical services to support various fleet units and operational forces. A summary description of the existing land uses in the vicinity of each of the proposed PV sites follows below.

- WWTP site. The WWTP site and following two sites front on Marine Corps Drive, NBG's main collector road. The existing wastewater treatment plant borders the site to the south. Various military facilities and small pockets of undeveloped land are located in the surrounding area.
- Existing 250kW PV site. The Harbor View and South Tipalao family housing areas lie west of and across the street (Shoreline Drive) from the site. Undeveloped land and the existing WWTP lie to the north and east of the site. Various military facilities and small pockets of undeveloped lands lie to the south of the site.
- CDF site. The existing 250kW PV solar facility lies to the west of the site. Undeveloped lands lie to the east of the site and various military facilities lie to the south.
- Commissary site. This site consists of two parcels that are bisected by unnamed local access road. Shoreline Drive borders both parcels on the south and Exchange Road borders the larger parcel on the east. The existing Commissary and Transportation Equipment Maintenance Shop respectively border the large and small lots on the north. An 18-acre area in the eastern portion of the larger parcel is currently being considered as a potential disaster debris management area. Should this be implemented, this portion of the PV site will be reduced accordingly.

3.10.2 Potential Impacts

The use of DoD land for the proposed PV systems would temporally preclude the use of the property for other uses. While this would foreclose the use of this land for other purposes during the operational life of the PV systems, the proposed action will have a positive overall effect on Guam's environment and energy production since it would provide clean, renewable energy and lessen the demand for energy produced from non-renewable sources.

The proposed action will not have an adverse effect on surrounding land use during the construction phase. BMPs and appropriate mitigation measures will be implemented during construction in accordance with all applicable regulatory requirements to minimize construction-related impacts to the surrounding area.

During the operational period, the operation and maintenance of the PV systems are not expected to impact surrounding land uses. The PV systems represent a benign, productive use of DoD land that is compatible with surrounding land uses in the area, as well as future land use plans. In addition to addressing SECNAV's goals for renewable energy production, the proposed use of DoD land for the PV

systems will provide positive effects which will accrue to the island community by producing clean, renewable solar energy; reducing the island's dependence on imported foreign oil; and improving the overall quality of life for island residents.

The proposed PV sites are generally compatible with the future land uses proposed in the "North and Central Guam Land Use Plan," as most DoD properties continue to be identified as federal lands. However, the proposed PV site at the former Tumon Tank Farm is identified in the plan as a future residential land use, which conflicts at least in the short to mid-term with the proposed use of the site for a PV system (the area could ultimately become residential in the long term). The Harmon Annex site is identified as a future industrial land use, and the Harmon Booster Station site is partially identified as future industrial and future commercial land use. The industrial designation is consistent with the proposed action, but the proposed PV system conflicts in the short to medium term with the commercial designation for the portion of the Harmon Booster Station site. However, in the long term, it could still support commercial use.

There are slight discrepancies between the proposed PV sites and the future land uses identified for the Tumon Tank Farm and Harmon Booster Station sites. However, these discrepancies would only exist during the short to medium term (up to 37 years), and this potential conflict would be outweighed by the proposed action's beneficial impacts to Guam's environment and renewable energy production. In general, proposed action is consistent with the following goals and policies of the "North and South Guam Land Use Plan."

- Goal LU 2. Promote sustainable community development.
- Policy LU 5. Promote environmental sustainability through a variety of measures. Examples of possible measures include green building design, green spaces in urban areas, green infrastructure, greenway and conservation land networks, transit-oriented development, improved networks for walking and wheeling, site design to promote renewable energy use, and other measures.
- Goal LU 3. Promote and protect the long-term health, character, and identity of the village communities.
- Policy LU 10. Provide for incremental growth in already developed areas to take advantage of existing investments in transportation and utility systems and to reduce impacts on the Northern Aquifer. In providing for infill growth, assure the adequacy of water, roads, and other public services.

The decommissioning process is not expected to have an adverse effect on land use because decommissioning would involve the removal of all applicable structures and improvements, the sites are expected to revert to their pre-development, open space condition.

No Action Alternative. No impacts to land use would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.11 Roadways and Utilities

3.11.1 Affected Environment

Utilities are basic services that are provided to the general public and include roadways, potable water, electrical power, telecommunications, and wastewater and solid waste disposal. These utilities largely lie within or utilize Guam's roadway ROW. Some DoD installations on Guam have utilities located along local and installation roadways and whose service areas extend off base. The proposed action will require connections to existing water, electrical and telecommunications lines within the roadway ROW.

As previously noted, the proposed action will not require any wastewater connections. The PV systems will be unmanned facilities without restrooms and would not generate any wastewater flows. As such, this section does not include a discussion on wastewater. A summary description of the utilities that are discussed in this section follows below.

Roadways. There are approximately 155 miles of federal-aid highways on Guam with 860 miles of other roadways. The primary circulation route, Route (Rte) 1 or Marine Corps Drive, is a 4-lane highway extending from Apra Harbor through the capitol Hagatna to AAFB in the north. Route 16 is a 4-lane roadway which diverts from Marine Corps Drive at Hagatna, loops to Barrigada and reconnects to Marine Corps Drive near Dededo. Route 3, another 4-lane road, branches from Marine Corps Drive in Dededo north towards Finegayan. Past Finegayan, Route 3 transitions to Route 9 along the southern boundary of AAFB. Route 15 is the coastal access road to the back gate of AAFB (DoN, November 2010).

The proximity of the proposed PV sites to the closest roadways in the vicinity, their site access points, and the utility service connections to be made for each of the sites are shown in Table 3-3.

Table 3-3: PV Sites, Nearest Roads, Site Access Points, and Utility Connections

<i>PV Site</i>	<i>Nearest Roadway(s)</i>	<i>Proximity to Site</i>	<i>Site Access</i>	<i>Utility Service Connections</i>	<i>Water Service Provider</i>
South Finegayan Site	Rte 3	Adjacent	Control Tree Drive (off Rte 3)	E, W, T	DoN
Harmon Booster Station Site	Rte 1	Adjacent	Frontage Road (off Rte 1)	E, W, T	DAF
Harmon Annex Site	Rte 1	Adjacent	Frontage Road (off Rte 1)	E, W, T	DAF
Tumon Tank Farm Site	Rte 1	Adjacent	Loop Road (off Rte 1)	E, W, T	DAF
WWTP Site	Route 1	Adjacent	Rte 1	E, W, T	DoN
Existing 250kW PV Site	Rte 1, Shoreline Drive	Adjacent	Rte 1	E, W, T	DoN
CDF Site	Rte 1, Sumay Drive	Adjacent	Rte 1	E, W, T	DoN
Commissary Site	Unnamed Road, Shoreline Drive	Adjacent	Unnamed Road	E, W, T	DoN

Key: E (electrical); W (water); T (telecommunications)

Potable Water. There are 3 separate domestic drinking water systems on Guam: 1 serves the civilian population and is owned and operated by the Guam Waterworks Authority (GWA), while 2 serve the military on Guam and are owned and operated by DoD. These water systems include

production wells, surface impoundments, springs, transmission lines, water treatment facilities, pump stations, storage tanks, and distribution lines. Groundwater wells fed by the NGLA supply most of the drinking water in north and central Guam, while springs and impounded surface water (i.e., reservoirs) provides most of the potable water for south Guam (DoN April 2014). As of this time, GWA provides water service to more than 41,000 customers throughout Guam (GWA 2014).

The DoN's system is island-wide and serves NBG, South Finegayan, and various DoN lands. Fena Water Treatment Plant is the primary source for this system which conveys water to storage tanks in different service zones and then transfers it to other DoD land across Guam (DoN, July 2010). Andersen Northwest Field and Andersen South are the primary water sources for the DAF system which supplies AAFB and their other lands. The system includes an off-base water supply; disinfection, storage, and transmission system; and an on-base water distribution system. Water for AAFB is provided by seven off-base production wells which draw water from the NGLA (DoN, July 2010).

Electrical Power. GPA provides all the electricity used on Guam by both civilians and the military (DoN, April 2014). GPA has 663 miles of transmission and distribution lines and 29 substations, as well as two steam power plants, one slow speed diesel plant, four medium speed diesel plants, and five combustion turbine plants. All GPA power generation units provide energy to an electrical grid which is interconnected throughout Guam. This interconnection allows power to be conveyed over a wide geographical area and not just a limited area. In conjunction with Independent Power Producers (IPP) – Pruvient Energy Guam, Marianas Energy Company, and Taiwan Electrical and Mechanical Engineers Services – GPA produces approximately 550MW of available and emergency (standby) power.

As of this time, GPA provides electrical service to more than 44,000 customers throughout Guam (GPA 2014). DoD owns and operates substations and distribution lines serving many of their installations. In the event of local or island-wide power outages, DoD has dedicated standby generators to maintain power to important DoD facilities (DoN April 2014).

GPA, IPPs, and DoD generate power for the regions where the proposed PV sites are located. Concrete poles with overhead conductors and wood cross arms are used to convey power at most locations while the primary service voltage is supplied by pole-mounted transformers provided with lightning surge arresters to protect downstream equipment. GPA utilizes crude oil to generate power and provides a full range of electrical services to its customers (DoN July 2010).

The proximity of the proposed PV sites to the nearest points of connections and substations in the vicinity of the sites are shown in Table 3-4.

Table 3-4: PV Sites, Distance to POC, and Electrical Grid Connection

<i>Region</i>	<i>PV Sites</i>	<i>POC Location</i>	<i>Approx. Distance to PV Substation</i>
Northern Guam	South Finegayan Site	Rte 3	80 ft.
	Harmon Booster Station Site	Rte 1	150 ft.
	Harmon Annex Site	Rte 1	150 ft.
	Tumon Tank Farm Site	Rte 1	200 ft.
NBG	WWTP Site	Sumay Drive	3,900 ft.
	Existing 250 kW/250kW PV Site	Sumay Drive	2,000 ft.
	CDF Site	Sumay Drive	50 ft.
	Commissary Site	Unnamed Road	50 ft.

Telecommunications. The two main providers of telecommunication services (i.e., telephone, television, and fiber optics) on Guam are GTA Teleguam (GTA) and Marianas Cable Vision Broadband (MCVB). GTA is headquartered in Tamuning and provides telephone, mobile, internet, and television service to Guam's residents (GTA 2014). MCVB is headquartered in Dededo and specializes in cable television, telephone, and broadband internet service providers. In addition to serving the Northern Mariana Islands, MCVB serves Guam and the military installations on the island (DOCOMO Pacific Guam 2014). Most of the transmission of telephone and television lines throughout Guam is through overhead transmission lines. Portions of the telephone and television lines and all of the fiber optic lines are buried underground. Main transmission and distribution lines are aligned along all of the existing major roadways in northern Guam (DoN, July 2010).

Solid Waste Disposal. In August 2011, the unlined municipal landfill (Ordot Dump) was closed and the new Layon Landfill at Dandan officially opened. The new landfill is owned by the Guam Solid Waste Authority and operated by Herzog Environmental, Inc. This modern, high-tech landfill handles non-hazardous municipal solid waste and was built with an engineered liner and a leachate collection and removal system. With a capacity in excess of 15.8 million cubic yards, the Layon Landfill is expected to serve Guam for more than 30 years (GovGuam 2014).

The NBG Landfill is an unlined facility occupying 60 acres in the southeastern part of the base and has been in use since 1965 (DoN July 2010). The landfill receives waste that is not accepted at the Layon Landfill such as green waste, wood waste, construction and demolition (C&D) waste, asbestos, and dried sewage sludge. The DoN does not plan to close the municipal solid waste area of the NBG Landfill (DoN April 2014).

3.11.2 Potential Impacts

During the construction phase, the proposed action will involve the use of roadways and solid waste disposal, as well as connections to electrical, water, and telecommunications lines along adjacent or nearby roadways. BMPs will be implemented for the installation of water, electrical, and telecommunication lines to control soil erosion and surface runoff during construction activities within the roadway ROW.

Roadways. The proposed action will require the use of local and installation roadways to transport construction materials; provide construction and maintenance workers with access to and from the PV sites; and haul green waste and construction waste materials away for disposal. The proposed action will also require connections to electrical, water, and telecommunications lines within the roadway ROW.

To minimize traffic-related impacts during construction, appropriate traffic management measures will be implemented to control material deliveries and work. Construction vehicles, equipment, and materials may be stored and secured onsite to minimize vehicle movement. The PV contractor(s) would ensure that construction vehicles do not impede traffic along local roadways and would obtain the necessary approval to transport any oversized and/or overweight material on Guam's highways. At NBG, current DoD standoff distance protocols would be implemented during construction to ensure that force protection capabilities continue to be maintained.

The operation and maintenance of the PV systems will require periodic maintenance trips to each site to clean the PV panels, trim overgrown vegetation, and check the PV panels and equipment. Since the PV systems are unmanned facilities, they will not generate any additional vehicle trips or involve any activities that could potentially affect traffic.

Potable Water. Potable water from the DAF and DoN systems will be used for fire protection for the BESS and substation complex at each of the PV sites. The layout and installation of the new water lines will be coordinated with the appropriate potable water provider (DoN, DAF or GovGuam) to ensure that all applicable design and operational criteria are addressed. Construction drawings will be prepared during final engineering design and submitted to the water service provider for review and approval prior to the commencement of construction. During the operational period, the operation and maintenance of the PV systems will not have an adverse effect on potable water systems.

Electrical Power. The layout and installation of the new electrical lines and equipment required to service the proposed PV systems will be coordinated with the appropriate electrical power provider (GPA, DoN) to ensure that all applicable design and operational criteria are addressed. Construction drawings will be prepared during final engineering design and submitted to the electrical power provider for review and approval prior to the commencement of construction.

During the operational period, the PV systems will have a positive overall effect on Guam's environment and energy use since it would help reduce the amount of fuel oil that is burned for power generation and reduce the island's dependence on foreign oil and fossil fuels. In addition to providing end users with clean, renewable energy, the proposed action would also lessen the demand for energy produced from non-renewable sources and meet the renewable energy goals established by SECNAV and the federal government.

Telecommunications. To monitor and control the PV systems using SCADA, the proposed action will require connections to existing GTA or MCVB telecommunications lines (overhead or underground) along adjacent or nearby roadway rights-of-way. New telecommunications lines required to service the proposed PV systems will be installed overhead or underground in accordance with GTA or MCVB requirements. The layout and installation of the new lines will be coordinated with the telecommunications provider (GTA or MCVB) to ensure that all applicable design and operational criteria are addressed. Construction drawings will be prepared during final engineering design and submitted to the telecommunications provider for review and approval prior to the commencement of construction.

During the operational period, the operation and maintenance of the PV systems will not have an adverse effect on GTA or MCVB's telecommunications systems.

Solid Waste Disposal. During the construction phase, the disposal of green waste and construction waste materials will be the responsibility of the PV contractor(s) who would likely use a commercial waste hauler to transport any non-hazardous municipal solid waste to a Hauler Transfer Station. Cleared vegetation, including brush and tree limbs, will be hauled to a green waste facility for disposal and mulching. If feasible, tree branches could be mulched in place and used to control ground vegetation. Similarly, construction waste materials would be hauled to a construction and demolition C&D waste disposal facility. For example, a commercial disposal facility such as Primo's Northern Hardfill in Yigo accepts green and C&D waste materials for disposal (GSWA 2014).

During the operational period, solid waste generated by the operation and maintenance of the PV systems would be expected to be very minimal and will be the responsibility of the PV contractor(s) who would utilize a commercial waste disposal service.

The decommissioning of the PV systems is not expected to result in any adverse impacts. For roadways, traffic management measures will be implemented to ensure that local roadways and traffic are not impacted during this process. Solid waste disposal will be the responsibility of the contractor(s) who would hire a commercial waste service to transport the waste to an appropriate disposal facility. For potable water, electrical power, and telecommunications, BMPs will be implemented to control soil erosion, sedimentation, and stormwater runoff. The PV contractor(s) will be responsible for ensuring that water, power, and telecommunications services to others are not disrupted and that other utility lines in the roadway ROW are not disturbed.

No Action Alternative. No impacts to roadways, potable water, electrical power, telecommunications, and solid waste disposal would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.12 Socioeconomic Conditions

3.12.1 Affected Environment

Guam experienced a lengthy period of investment-driven growth through the 1980's and early 1990's which saw the private sector overtaking the public sector in economic importance. Employment data provided by the Guam Department of Labor shows there were 61,930 jobs in March 2011, a slight decline from 62,200 jobs the previous year. By employer, 74.42% of the jobs were provided by the private sector, 6.36% by the Federal Government, and 19.22% by GovGuam. By economic sector, 27.76% of the employed individuals were in Services (including 8.85% in Hotel and Other Lodging Accommodations), 18.44% were in Retail Trade; 10.27% were in Construction; 7.14% were in Transport and Public Utilities; 4.28% in Financial, Insurance and Real Estate, 3.39% in Wholesale Trade, 2.71% in Manufacturing and 0.44% in Agriculture. By gender, employees were 56% male, 44% female. Guam's unemployment rate was 13.3% in March 2011. The number of unemployed increased from 6,510 persons (9.3%) in September 2009 to 9,970 persons (13.3%) in March 2011 (GovGuam 2011).

According to the Guam Bureau of Labor Statistics, Guam's average household income for calendar year 2010, was \$49,263, an increase of \$3,477 or 7.1% from \$45,786 in 2008. Per capita income for 2010 was \$12,864, a decrease of \$225 or 1.7% from calendar year 2008 (GovGuam 2011). Economic estimates for Guam show that real Gross Domestic Product increased 1.7% to \$3.9 billion in 2009. Guam's tourism industry is the island's single largest economic sector and generates approximately 60% of Guam's annual business revenue. This economic activity generated \$378 million in local wages and 10,412 full- and part-time jobs. About 90% of all Guam's visitors are from Asia, with the balance made up of visitors from the U.S., neighboring Pacific islands, and other areas. Visitors from Japan comprise the largest share of Guam's market mix with close to 80% of all arrivals to Guam. Guam's market share in 2010 was 5.4% of the Japanese tourist market, a total of 16.6 million outbound travelers (GovGuam 2011).

Guam has a large U.S. military presence, which includes DoN and DAF bases and lands that encompass nearly 27% of the island's land mass. DoD plans to relocate 5,000 Marines and 1,300 dependents from Okinawa to Guam at an estimated cost of \$10.27 billion. It is estimated that up to 20,000 temporary workers may be needed to support the relocation, and approximately 6,000 civilian workers may be added to the island's population after the relocation is complete. Major funding for the buildup effort is being contributed by DoD, U.S. Department of Agriculture and the Government of Japan. Defense spending on Guam is about \$700-800 million a year, with 6,500 active duty personnel and approximately 7,000 dependents. There were 3,600 federal civilian employees and federal taxes returned to Guam were \$45 million (GovGuam 2011).

According to U.S. Census data for 2010, Guam's population was 159,358 and is projected to increase to 168,323 in 2020. For those of one race, the Chamorro is the largest ethnic group on Guam at 59,381 or approximately 37% of the population. Filipinos at 41,944, account for 26% of the population, followed by Caucasians at 11,321 with 7%. The remaining population is composed of Asian Americans at 51,381, African Americans at 1,540, Hispanics at 1,201, those of other ethnic origins at 404, and those of two more ethnic origins at 14,929 (GovGuam 2012).

Most of the island's population lives in Northern Guam and is most dense in the north and central regions. Villages that comprise the northern half of the island are home to 80% of Guam's overall population. The four most populous municipalities - Dededo, Yigo, Tamuning, and Mangilao - are all in Northern Guam (WERIWP/IREI 2014). According to 2010 census data, the average population density in the Northern Guam municipalities is 716 people per square kilometer. For comparison, population density in Southern Guam municipalities is 113 people per square kilometer (WERIWP/IREI 2014).

3.12.2 Potential Impacts

The proposed action is not expected to result in any adverse socioeconomic impacts because it will not alter population and demographic characteristics nor would it result in inconsistent population growth or have any disproportionate impacts upon housing and employment markets. Construction-related employment would have a positive impact on the local economy due to spending by those employed in construction jobs and businesses providing goods and services to the construction industry. Construction-related spending would also benefit businesses in other commercial sectors (e.g., stores, restaurants), while construction-related tax revenues would benefit the local economy. During the operational period, the PV systems would continue contributing to the local economy through periodic maintenance work and the purchase of goods and services for the operation and maintenance of the PV systems.

No adverse impacts are anticipated during the decommissioning of the PV systems. The decommissioning work will provide employment opportunities and contribute to the local economy through direct and indirect spending.

No Action Alternative. No impacts to socioeconomic conditions would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.13 Cumulative Impacts

Cumulative impacts on environmental resources are the result of two or more individual impacts that, when considered together, compound or increase the overall impact of a particular action. Cumulative impacts can arise from the individual effects of a single action or from the combined effects of past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor actions that collectively amount to significant impacts over time.

The proposed and potential future PV systems are part of a world-wide shift toward renewable energy sources. This growth is attributable to rising fossil fuel costs, an awareness of fossil fuel dependency and energy independence, and energy efficient improvements in PV technology (i.e., improved energy density), as well as federal renewable energy policies and the availability of federal tax credits.

Guam is somewhat unique from the continental U.S. (CONUS) due to its geographic location and heavy reliance on fossil fuel. Guam is also different from CONUS in that it cannot benefit from redundant and oftentimes competitive electrical grids, accessibility to natural gas, and availability of other types of fuel (e.g., coal, hydro, large scale geothermal, etc.).

In addition to recent renewable energy projects, Table 3-5 lists past, present, and reasonably foreseeable future projects on Guam (organized by proponent).

Table 3-5: Construction Projects Considered in the Cumulative Impact Analysis

<i>Proponent</i>	<i>Project Name</i>	<i>Description</i>	<i>Status</i>
Guam Power Authority	2013 Integrated Resource Plan Recommendations	Work with EPA on resolving Clean Air Act non-attainment issues. Construct a new 60-120MW LNG Power Plant in Harmon area – and retire a number of older technology Power Plants. Increase electrical production to support the pending DoD buildup and its economic consequences Procure an additional 40MW of renewable energy Investigate potential for geothermal, ocean thermal energy conversion and sea water air conditioning technologies Institute rules for net metering	Various
	Energy Storage Systems (ESS)	40MW Battery ESS at Hagatna Substation	Feasibility
	Dandan project	26MW PV Farm and Windfarm in Dandan	Under construction
	Pole Hardening	harden power poles to make them more wind resistant	Programmed
	Lateral Conversion of Power Lines to Underground Lines	convert overhead lines to underground lines	Programmed
	Redesign Orote substation and include transformer connections to existing diesel power plant (NBG)	Prioritized for funding and construction	Under construction
	NBG Substation Transformer Upgrades	GPA to undertake transformer upgrades	Prioritized for funding and construction

Proponent	Project Name	Description	Status
Guam Housing and Urban Renewal Authority	Lada Estates	Affordable, low-income 240-unit housing built in Dededo	Completed
Guam Healthcare Development, Inc.	Guam Regional Medical Center	Guam Regional Medical Center (private 130-bed hospital) in Dededo	2015
Guam Economic Development Authority	Hotel Occupancy Tax Revenue Bond Projects (\$90M)	New museum and cultural center and other Hagatna improvements New Farmer's Co-op in Dededo Other cultural and recreational improvements around the island	Funded; some projects underway
Guam Solid Waste Authority	Layon Landfill	A new integrated municipal solid waste landfill was built at Dandan	Completed
University of Guam, Center for Island Sustainability	Yigo Research Farm	Wind turbines and roof and ground mount PV projects	Completed
GIA Authority	Terminal improvements	The airport's grounds, main terminal, industrial park, airfield, and south ramp are being upgraded	Ongoing
Private Sector	Hemlani Apartments at Tumon	300-unit apartment complex was built behind the Acanta Mall	Completed
	Bayview Luxury Hotel at Tumon	28-story, 400-room hotel	Complete
	Tumon Amusement Park	Amusement park providing rides, food, and beverages	Completed
USAF	AAFB Infrastructure Construction	Construction, alteration, repair, and maintenance of the airfield's asphalt concrete roads and parking areas	Undetermined
DoN Island wide	Guam and Commonwealth of the Northern Mariana Islands (CNMI) Relocation	Relocation of 5,000 Marines and 1,300 dependents from Okinawa to Guam	Pending completion of NEPA process and release of federal funds
	Future PV projects (14.3MW)	Potts Junction; 19ac, 3MW Nimitz Hill; 6 ac, 1.6MW GLUP 77; 61ac, 9.7MW	Potential future sites
DoN NBG	North Tupalao Family Housing	Infrastructure improvements	Completed
	NEX Mini-mart and Gas Station	Infrastructure improvements	Completed

3.13.1 Air Quality and Climate

A significant focus of GPA's long range plan is to retire aging power plants burning heavy residual fuel (considered the source of the two non-attainment areas around the Tanguisson and Cabras power plants) and replacing that generating capacity with a cleaner burning new Power Plant in the Harmon area -- and supplementing that with renewable energy sources including ongoing and planned PV and wind farms and future OTEC, SWCA and geothermal projects. From a cumulative perspective, the proposed action will assist GovGuam improve air quality and conformance with the federal Clean Air Act and move the territory towards greater energy security and reliability.

Renewable energy technologies, by definition, replace fossil-fuel generated power. These technologies require fossil fuels to support the manufacture, transport, construction and servicing of the equipment, but during the operational period, the technologies generate clean power. According to researchers at the Brookhaven National Laboratory, regardless of the specific technology, PV systems generate significantly fewer harmful air emissions (at least 89% less per kW) than conventional fossil fuel fired technologies (Good Company 2014).

Though individual projects are unlikely to have significant impacts on global climate change, they collectively may have cumulative effects when their individual GHG emissions are combined over time. The proposed and potential future PV systems would generate GHG emissions in the manufacture, assembly, transport, and installation of the PV systems and energy transmission networks. However, most of the GHG emissions associated with the proposed and potential future PV systems would be temporary in nature. Once they are installed, the operation of these PV systems is not expected to generate levels of GHGs that would significantly impact global, regional or local climate conditions when considered together with other local or regional projects (operations and maintenance activities will involve the use of fossil-fueled vehicles and equipment).

By offsetting the future demand for fossil fuel-based energy production, the development of PV systems have the potential to ultimately contribute to the reduction of regional and overall GHG emissions. The development of PV systems represent an important step towards reaching federal and DoD renewable energy goals that, from a cumulative impact perspective, represent a modest, positive impact on the environment in conjunction with other past, present, and reasonably foreseeable future actions.

Global sea levels are expected to rise over the coming century due to the effects of projected climate change. Islands and coastal areas are especially vulnerable since the sea level around Guam is expected to rise by 24 to 31 inches by the end of this century (Oak Ridge National Laboratory 2014). The proposed and potential future PV systems would be located well above the projected sea level rise and would therefore not be affected.

3.13.2 Topography and Soils

The proposed action, combined with past, present and foreseeable projects has the potential to alter topography and cause soil erosion which can have vast effects on the ecosystem. In gross terms, the proposed 192 acres of PV farms represents less than 0.2% of Guam's land mass. The economics of PV farms require compact, relatively flat sites to keep site development costs at a minimum— so extensive grading and land alteration is not a factor in this type of development. The proposed action sites will follow best practice erosion and sediment control plans to minimize potential for airborne dust, soil erosion and stormwater runoff. Therefore, the proposed action will not significantly contribute to a cumulative effect to topography and soils.

In regards to the past, present, and reasonably foreseeable projects listed in Table 3-4. The vast majority of these projects and their cumulative effects were thoroughly addressed in the Guam and CNMI Military Relocation SEIS in 2012. This analysis identified that these large scale development projects do have the potential to adversely affect topography and soils. However, all of the DoD projects will be required to comply with all DoD BMPs and regulations to mitigate potential impacts. Similarly, the non-DoD projects would be required to implement erosion control plans to mitigate potential impacts as required by GovGuam (DoN, April 2014). Accordingly, the proposed action, combined with past present, and reasonably foreseeable projects would not cause a significant cumulative impact on topography and soils.

3.13.3 Water Resources

The proposed action could impact surface and groundwater resources by altering site drainage and groundwater recharge. However, federal renewable energy systems are required to maintain pre-development onsite hydrology to the maximum extent possible. The proposed action will meet this requirement, and therefore will not contribute to a cumulative effect on groundwater recharge or stormwater quality. The proposed action is not a water intensive land use. They will draw water from the DAF and DoN water systems, but only for fire protection and periodic cleaning/maintenance. Therefore, the proposed action will not significantly contribute to a cumulative effect on groundwater resources or hydrology.

In regards to the past, present, and reasonably foreseeable projects listed in Table 3-4. The vast majority of these projects and their cumulative effects were thoroughly addressed in the Guam and CNMI Military Relocation SEIS in 2012. This analysis identified that by implementing large scale construction projects, increasing impervious surfaces, and increasing the demand for potable water, the projects have the potential to adversely affect water resources. However, all construction projects will be required to comply with stormwater management best practices, and low impact development measures would be used, in compliance with local and federal regulations, to minimize the potential impacts to water resources (DoN, April 2014). As such, the proposed action, combined with past present, and reasonably foreseeable projects would not cause a significant cumulative impact on water resources.

3.13.4 Biological Resources

As noted, the proposed PV sites are generally located on previously disturbed properties without significant biological resources and would not present a significant direct or indirect adverse effect on biological resources. The proposed action in combination with past, present, and reasonably foreseeable projects would result in further cumulative reduction in available habitat; however, as described above, the proposed PV projects are generally located on previously disturbed areas with low potential for biological resources. Therefore, the proposed action's contribution to the cumulative effects on available habitat would be minimal.

Additionally, the proposed action would have no effect on species listed or eligible for listing under the Endangered Species Act; therefore, there would be no potential for cumulative impacts.

3.13.5 Cultural Resources

The volume of development and DoD projects on Guam have the potential to have cumulative impacts on cultural resources; however, the review processes required under NHPA Section 106 incorporate broad consideration of effects to historic properties. These review processes help to create a mitigative filter that substantially reduces the potential for cumulative impacts. Additionally, no historic properties would be affected by the proposed action. Therefore, the proposed action, in conjunction with past, present, and reasonably foreseeable future actions does not have the potential to contribute to a cumulative impact on Guam's cultural resources.

3.13.6 Visual Resources and Land Use Compatibility

The proposed action, in combination with past, present, and reasonably foreseeable future projects could impact visual resources especially by changing Guam's open space landscapes. The proposed PV sites are located either on DoD installations or in urbanized areas along Guam's main highways and represent less than 0.2% of the total land area. Their proposed development does not pose a significant impact to Guam's open space or visual resources. From a cumulative perspective, the proposed action represents one part of a significant number of federal and GovGuam initiatives to improve energy security and reliability, and to address existing deficiencies and accommodate projected economic growth. Simply put, Guam's transition towards increased energy self-reliance will require open space to be used for the production of renewable energy. This transition will require tradeoffs to determine proper siting for renewable energy projects, and the type of technology that would be best suited. Locating renewable energy facilities near existing GPA transmission lines is a key economic feasibility factor, and these transmission lines typically run along the major roads, increasing the visibility of these facilities. While the open space landscape and associated visual resources on Guam will change as foreseeable growth occurs, the effect of the proposed action (because the acreage is relatively small and largely restricted to previously developed sites), will play a small and insignificant role.

The proposed PV systems are considered an interim land use (i.e., not permanent), on federal land, and compatible with surrounding land uses. Regardless, the proposed PV sites are generally consistent with GovGuam's land use plan which is very supportive of sustainable community development, including promotion of renewable energy. While land use patterns on Guam will change as foreseeable growth occurs, the effect of the proposed action will play a small and insignificant role.

3.13.7 Hazardous Materials and Waste

The proposed action, in combination with past, present, and reasonably foreseeable future projects could generate or otherwise involve hazardous materials and waste. From a cumulative perspective, the use of hazardous chemicals in the manufacture of PV panels poses a potential biological impact. Improper disposal of the panels at the end of their useful life presents an environmental, health, and safety concern (a number of PV panel manufacturers have recycling programs). Extracting raw materials such as crystalline silica to manufacture the panels, can also pose a similar hazard. The proposed and potential future PV systems will not require the extraction of materials or manufacture of panels on Guam.

Potential biological effects during the operational phase would be minimal and limited to rare and infrequent events. With effective regulation, enforcement, and vigilance any danger to workers, the public, and the environment can be minimized. The benefits of PV systems tend to far outweigh risks especially when compared to conventional fossil fuel technologies (Good Company 2014).

3.13.8 Socioeconomic Conditions

The proposed action, in combination with past, present, and reasonably foreseeable future projects show the ongoing investment in infrastructure and development that has the potential to impact Guam's socioeconomic conditions. In itself, the pending relocation of 5,000 Marines and 1,300 dependents to Guam has the potential to create significant economic development and population growth. Guam's focus on transitioning towards renewable sources for energy production also has the potential to influence socioeconomic conditions.

Continued growth in the renewable energy industry, including the proposed PV systems, would result in continued job growth and increased disposable income due to attendant energy savings. Overall, the proposed PV systems, in conjunction with other past, present, and reasonably foreseeable future actions, would have a beneficial cumulative effect on Guam's economy.

3.13.9 Cumulative Impacts Summary

The construction, operation, and decommissioning of the proposed PV systems in combination with past, present, and reasonably foreseeable future projects are not expected to result in any significant cumulative impacts upon air quality; noise; topography and soils; water resources; biological resources; cultural resources; visual resources; land use; electrical and water utilities; and socioeconomic conditions. Potential adverse effects from glint and glare and hazardous materials and UXO are not expected and are capable of being avoided or minimized through the use of BMPs and compliance with applicable regulatory requirements and protocols. During the operational period, beneficial cumulative effects upon air quality would be realized as more renewable energy projects are developed on Guam.

No Action Alternative. No adverse cumulative impacts to the natural or manmade environment in the area around the proposed and potential future PV systems would occur because the PV systems would not be built and existing site conditions would continue to be maintained.

3.14 Relationship between Short-Term Use and Long-Term Productivity

This section lists the trade-offs between short-term and long-term gains and losses due to the proposed action. "Short-term" refers to the construction period; "long-term" refers to the post-construction (operation and potential decommissioning) period.

The proposed action would have the following short- and long-term gains and losses:

Short-term

- Short-term construction period impacts on air quality, noise, traffic, and stormwater runoff.
- Short-term economic benefits associated with the employment created by construction contracts.

Long-term

- Long-term improvements in energy security and reduction of fossil fuel use.

The proposed action would have the long-term benefit of producing approximately 43.8 MW DC of clean, renewable energy for the island of Guam. Additional long-term benefits include increasing the energy security, operational capability, strategic flexibility and resource availability for DoD installations and lands on Guam through the development of renewable-energy on Guam. In addition, the proposed action would also help meet the renewable energy standards set forth by the federal government and SECNAV's 1 GW Initiative and goal to produce 50% of the DoN's shore-based energy requirements from alternative sources.

The minimal short-term construction period impacts associated with the proposed action are more than justified by the potential long-term benefits that will be realized through improvements to energy security and reduction of fossil fuel use.

No Action Alternative. Under this scenario, the PV systems would not be built and existing site conditions would continue to be maintained.

3.15 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable resource commitments are defined as the use of non-renewable resources and the effects the use of these resources have on future generations. Irreversible effects result from the use or destruction of a specific resource, such as fossil fuels or minerals that cannot be replaced within a reasonable period. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the proposed action, such as a significant archaeological site.

Irreversible resources that would be consumed by the proposed action include energy needed to manufacture the PV system components (e.g., PV panels, cables, batteries, and inverters); transport the components from the manufacturer to the PV sites; and operate the construction equipment to install the PV systems. Other irreversible resource commitments include materials needed to manufacture the PV components. Construction and operation of the PV arrays and the placement of associated electrical equipment and cables would be an irretrievable commitment of various resources, such as labor, capital, energy, and land, by the PV contractor(s). Use of the land for the PV systems is not an irreversible or irretrievable resource commitment because the systems can be removed at the end of the lease period.

No Action Alternative. There would be no irreversible and irretrievable resource commitments. However, DoD installations and lands on Guam would continue to use non-renewable energy and, during the operational period, would consume a greater amount of irreversible resources by using energy produced by fossil fuels.

3.16 Compliance with Executive Orders

3.16.1 Executive Order 12898, Environmental Justice in Minority Populations and Income Populations.

Executive Order 12898 (February 11, 1994), and SECNAV's Notice 5090 (May 27, 1994) requires the DoN to identify and address the potential for disproportionately high and adverse human health and environmental effects of their actions on minority and low-income populations. Because the PV systems will be located on DoD property with controlled access, exposure and risk to the general public would be limited. In addition, since the proposed action is not expected to have an adverse effect upon environmental resources, it would not create any environmental health or safety risks that would disproportionately affect minorities or disadvantaged populations. The construction and operation of the PV systems would not disrupt the structure or cohesion of the community since the proposed action would occur on DoD land. The proposed action could potentially provide benefits to minority and low-income populations by providing employment opportunities for the local workforce.

As such, no adverse environmental justice impacts are anticipated because there would be no significant changes in land use or aesthetics and there would be no disproportionate human health or environmental impacts to low income or minority populations.

Under the No Action Alternative, no construction activities would take place and existing site conditions would continue to be maintained.

3.16.2 Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

Executive Order 13045 (April 21, 1997) and its policies, programs, activities, and standards requires federal agencies to make it a high priority to identify and address disproportionate risks to children that result from environmental health or safety risks. During construction, access to each PV site would be restricted to authorized personnel. Temporary fences and other access control measures would be utilized to prevent accidental entry by children or other individuals who reside or work on or near military installations or DoD land. Noise generated by construction activities near residential areas would have a short term effect on children due to their limited duration during daylight hours. Safety precautions employed during construction to minimize construction noise, would not be hazardous to the safety and health of children. After their completion, the PV systems would be screened from children living in nearby homes by fences and locked gates to prevent accidental entry and exposure to electrocution or other safety and health hazards. No long-term adverse impacts on children living near the PV sites are anticipated.

Under the No Action Alternative, no construction activities would take place and existing site conditions would continue to be maintained.

3.16.3 Executive Order 13693, Planning for Federal Sustainability in the Next Decade

EO 13693 revokes EO 13423, “Federal Leadership in Environmental, Energy, and Economic Performance” (October 5, 2009) and EO 13423, “Strengthening Federal Environmental, Energy, and Transportation Management” (January 23, 2007). The goal of EO 13693 (March 19, 2015) is to maintain federal leadership in sustainability and GHG emission reductions. Beginning in FY 2016, federal agencies, where life-cycle cost effective, must promote building energy conservation, efficiency, and management by reducing the agency’s building energy intensity by 2.5% annually through the end of fiscal year 2025, relative to the agency's baseline building energy use in fiscal year 2015. The agencies must also meet specified goals to ensure that total electric and thermal energy use comes from renewable electric energy and alternative energy.

In accordance with NAVFACINST 9830.1, current DoN policy is for new construction to meet Leadership in Energy and Environmental (LEED) certification levels set forth by the U.S. Green Building Council (USGBC). As such, the proposed action will be guided by LEED standards and directives to employ efficient and environmentally-sensitive sustainable design standards and minimize energy use and water consumption during PV system operations.

Under the No Action Alternative, no construction activities would take place and existing site conditions would continue to be maintained.

3.17 Coastal Zone Management Act

The proposed action would be located entirely on DoD property that by definition is excluded from Guam’s coastal zone per 15 CFR 923, §923.33(a), and would not result in spillover effects extending into Guam’s coastal zone per 15 CFR §923(b).

The DoN initiated the CZMA consultation process via letter to the Guam BSP received 7 May 2015 documenting its “negative determination” that the Proposed Action would not have reasonably foreseeable direct or indirect effects on any use or resource within Guam’s coastal zone (Appendix B). The DoN did not receive a response from BSP within the 60-day review period. In accordance with 15 CFR Part 930 and the “Procedures Guide for Achieving Federal Consistency with the Guam Coastal Management Program” (Guam BSP 2011), Guam BSP concurrence with the DoN determination is assumed.

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Welch, "Archaeological Surveys and Cultural Resources Studies Conducted in 2007 on the Island of Guam in Support of the Joint Guam Build-Up Environmental Impact Statement." 2010.

Appendix A

NHPA Section 106

Consultation Correspondence

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND MARIANAS
PSC 455, BOX 195
FPO AP 96540-2937

5090
Ser OPS/2015-002
06 May 15

Ms. Lynda Bordallo Aguon
State Historic Preservation Officer
Department of Parks & Recreation
490 Chalan Palayso
Agana Heights, Guam 96910

**SUBJ: INSTALLATION AND OPERATION OF PHOTOVOLTAIC SYSTEMS AT EIGHT
SITES ON GUAM**

Dear Ms. Lynda Bordallo Aguon,

The Naval Facilities Engineering Command (NAVFAC) requests your review of a proposed development of eight renewable energy generation assets, via solar photovoltaic (PV) systems, at Naval Base Guam (NBG). Pursuant to Section 106 of the National Historic Preservation Act (NHPA), we have reviewed the proposed project scope and determined proposed development of each asset is an undertaking as defined in 36 CFR 800.16(y). Concurrently, the DoN is requesting a 30-day review of the attached 2014 draft report by Leppard et al. (Enclosure 1), Letter for Archaeological Feature and Site Re-Location and Assessment at the CDF Area in Support of Navy Renewable Energy Projects on Guam (Enclosure 2), and consulting on the eligibility of properties for inclusion in the National Register of Historic Places (NRHP).

The proposed project has undergone multiple scope updates during development. As a result, Leppard et. al. (2014) surveyed three (3) additional locations (two at Andersen Air Force Base [AAFB]; one on NBG) beyond those for which a Determination of Effect under Section 106 of the NHPA has been made. Additionally, Leppard et. al.'s surveyed boundary of the South Finegayan Housing area exceeds the revised PV project area for which a Determination of Effect was made. To facilitate the multiple, concurrent reviews requested in this letter, the following table identifies the sites surveyed for eligibility in Leppard et. al. (2014) and the proposed sites for which concurrence with Determinations of Effect for the construction and operation of PV is requested.

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Table 1. Summary of Requested Actions

Site Name	Review requested in Leppard et. al., 2014	Concurrence with PV Determination of Effect requested
Andersen AFB Landfill/Utility Corridor	Yes	No
Andersen AFB South Lot "A"	Yes	No
South Finegayan Housing	Yes	Yes*
Orote Landfill	Yes	No
NBG Existing 250 kW PV Site	Yes	Yes
Commissary Site	Yes	Yes
Harmon Annex	Yes	Yes
Harmon Booster Station	Yes	Yes
Tumon Tank Farm	Yes	Yes
Wastewater Treatment Plant	Yes	Yes
Confined Disposal Facility	Yes	Yes

*Surveyed area (Leppard et. al., 2014) exceeds the proposed boundary of the PV site

Project Description: This project proposes to lease up to 192 acres of DoD land, at 8 separate locations, to Guam Power Authority (GPA) to construct and operate solar photovoltaic (PV) systems producing solar-generated energy for transmission to the GPA electrical grid. Specifically, GPA would select a renewable energy contractor to develop eight (8) PV sites: South Finegayan Housing, NBG existing 250 kilowatt PV site, Commissary Site, Harmon Annex, Harmon Booster Station, Tumon Tank Farm, Wastewater Treatment Plant area, and the Confined Disposal Facility (CDF) Site (see enclosures 3 and 4). It should be noted that the potential exists for the Harmon Annex and Booster Station sites to also be used for Battery Energy Storage Systems (BESS).

The land underlying the PV sites would be leased for up to 37 years after which time the leases may be renewed or the facilities could be decommissioned. In accordance with 10 U.S.C. §2667, the leases shall provide for consideration (rent) to be paid in an amount not less than the fair market value of the leasehold interest, either in cash or in kind. Although the proposed action addresses the known impacts of the federal lease action, details regarding the specific method of consideration to be employed, to include the design, construction, management and maintenance of any potential in-kind consideration projects or efforts, have not been developed at this time. Once the specific considerations are identified, a new review process under Section 106 of the NHPA will be completed to determine if these considerations would have the potential to affect cultural resources; therefore, determinations of effect for these considerations are not addressed in this letter.

The purpose of the proposed action is to reduce energy costs and fuel oil dependency, and increase the energy security, operational capability, strategic flexibility and resource availability

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of DoN installations through the development of renewable energy generating assets on Guam. The proposed action is required to meet the renewable energy standards put forth by the 1 GW Initiative, EPLA, 10 U.S.C. 2911(e), the 2013 presidential memorandum, and SECNAV, to include the requirement to produce 50 percent of DoN's shore-based energy requirements from alternative sources.

Solar PV panels utilize a packaged assembly of solar cells to harness solar energy (photons) from the sun and generate electricity. The system includes inverters, mounted on concrete pads located throughout the PV array, with its own medium voltage transformer which transmits the power to the PV system's on-site substation. Each PV system may include some type of BESS to balance fluctuations in energy generation caused by weather, seasons, and nighttime darkness. The BESS is located onsite near the PV system's substation. If the two Harmon sites are pursued for BESS without on-site PV, the configuration and components would be comparable. Once all the electricity is collected, the power is transferred via a transmission line to the nearest point of connection (POC) to the GPA utility grid.

The PV panels would be approximately 3.5 foot wide and 5 foot long glass-encased, darkly colored to minimize light reflection. The PV panels would be attached to metal racking structures on foundations. The type of racking structure (stationary versus adjustable) would be determined by the PV contractor during the project's final engineering design. See enclosure (5) for examples of the types of racking structures being considered for this project. During site preparation, surface vegetation would be cleared and grubbed, and where load-bearing foundations are proposed, the ground would be excavated and compacted. Ground disturbance would include the installation of the PV racking system on foundations or piers, trenching for underground electrical cables or installation of transmission line poles, power centers with inverters, substations, foundation work for electrical equipment, site buildings, and miscellaneous civil works (i.e., perimeter fencing post holes, typically 4 foot deep, to support a 8-foot high chain link fence enclosure and gates). A new perimeter road and smaller access roads would be constructed to access the solar array in order to maintain the elevated and sloped photovoltaic panels.

Area of Potential Effect: The proposed undertakings include the construction and operation of eight (8) PV systems wholly within current DoD property on Guam, encompassing a total of 192 acres. These eight individual project areas constitute the Areas of Potential Effect (APEs) for this undertaking and are depicted on the maps in enclosure (4).

Identification of Historic Properties: The proposed project includes construction of eight independent PV systems. However, as described above, the project originally included 11 sites as surveyed by Leppard et. al. (2014), of which three are no longer being considered. The following discussion provides the results of the 11 sites surveyed by Leppard et. al. (2014), including the 8 proposed PV sites; a recommendation of eligibility for any potential archaeological resources identified by Leppard et. al. (2014); and a summary of the previous surveys/investigations.

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Andersen AFB Landfill and Utility Corridor

This site is no longer under consideration for construction of a PV system.

Systematic archaeological investigation in the vicinity of the AAFB Landfill and Utility Corridor has been limited and current knowledge of historic resources in the area is correspondingly underdeveloped. Leppard et. al. (2014) is the sole investigation of the utility corridor and no archaeological resources were documented during survey and subsurface testing. Subsurface testing occurred only within the utility corridor, as the project site is an existing landfill and subsurface investigations were not warranted.

Andersen South Lot "A"

This site is no longer under consideration for construction of a PV system.

Leppard et. al. (2014) is the first systematic archaeological work undertaken on the Andersen South Lot "A" Site. Two post-WWII features were recorded within the proposed PV site – a bottle dump and the remnants of a metal container. As archaeological sites, neither feature is considered eligible for listing on the NRHP.

South Finegayan Housing

Leppard et. al. (2014) completed a surface survey and subsurface investigations on a 290-acre parcel at this location; however, only 71 acres of the surveyed area are currently being carried forward for a potential PV system. Given its prior use as a housing area, the site has been subject to extensive surface and shallow subsurface disturbance. Leppard et. al. (2014) did not document any archaeological sites within the proposed PV site.

One traditional Chamorro bodysherd (severely abraded) from a coarseware pottery vessel was recovered with no surviving surface treatment. This sherd was located between 0-2 cm below the surfaces and was the only deposit encountered in the unit when it was closed at 60 cm below the surface. The sherd was located within a clay loam fill with occasional small plastic inclusions indicating the sherd had been redeposited from its original position, and is not representative of cultural activity within the immediate vicinity. Excavation continued with the entirety of the deposit sieved with a 1/8-inch screen, but no further cultural material was encountered.

Orote Landfill

This site is no longer under consideration for construction of a PV system.

This site has not been subject to previous archaeological investigation. Leppard et. al. (2014) did not identify any archaeological resources during the pedestrian survey and, as the site is a capped landfill, did not complete any subsurface investigations. However, the northern corner of the Landfill intrudes into the boundary for Orote Airfield (Site 66-03-1066), which was listed on the NRHP in 1975.

NBG Existing 250 kW PV Site Expansion

The expansion area for this existing PV site has not been subject to previous archaeological investigations; therefore, Leppard et. al. (2014) represents the first systematic investigation of

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this location. No archaeological sites were identified during the pedestrian survey and subsurface investigation.

Commissary Site

Portions of the Commissary site have been subject to previous investigations by Carucci (1993), Craib and Yoklavich (1996), and Dixon, Walker, and Carson (2011); however, Leppard et. al. (2014) is the first investigation of the western portion of the proposed PV site. Carucci (1993) documented multiple concrete pads (Site TN-8) in the southern component, and Craib and Yoklavich (1996) plotted the northeastern half of what may have been Orote Village (Map No 267) within this parcel. A subsequent study (Dixon, Walker, and Carson, 2011) evaluated the area between Shoreline Drive and Dadi Beach, determining that the construction and subsequent demolition of Camp Bright had disturbed the surface and subsurface sediments such that no intact archaeology remained in the areas immediately adjacent to the project location. Camp Bright extended from Shoreline Drive into the proposed PV Commissary Site; therefore, it is unlikely that intact remnants of the Orote Village extend into this area

Leppard et. al. (2014) did not identify any archaeological sites within the parcel during the pedestrian survey or subsurface testing. Specifically, the subsurface investigations conducted by Leppard et. al. (2014) evaluated the extent of the previously identified concrete pads by Carucci (1993) and the proposed Orote Village area suggested by Craib and Yoklavich (1996). Their investigation did not identify any archaeological findings and primarily encountered sandy fill with some graded limestone, very shallow topsoil, and push berm evidence suggesting anthropogenic degradation. This disturbance is further evidenced by the presence of Shoreline Drive bisecting the proposed Orote Village boundary as defined in the 1996 study. In summary, Leppard et. al. (2014) determined the disturbance was such that no material deriving from the Orote Village remains within the boundary of the proposed Commissary Site. The Navy recommends the boundary of the potential Orote Village, as described by Craib and Yoklavich, be revised to only include the Dadi beach area.

Harmon Annex, Harmon Booster Station, and Tumon Tank Farm

These three sites are located in close proximity to each other (see enclosures 3 and 4) and therefore considered collectively for identification of historic properties. Leppard et. al. (2014) did not identify any archaeological resources on the Harmon Annex or the Tumon Tank Farm. One concrete pad was identified at the Harmon Booster Station; however, this feature lacks integrity characteristics and is not considered significant under any NRHP criteria.

Prior to Leppard et. al. (2014), limited systematic archaeological work has been undertaken at the Harmon Annex site with no reported findings of significance (DeFant 2008). No previous systematic archaeological work has been undertaken on the Harmon Booster Station and Tumon Tank Farm sites.

Waste Water Treatment Plant (WWTP)

A previous pedestrian survey by Hunter-Anderson and Moore (2002) included the Waste Water Treatment Plant as part of a larger survey parcel and no archaeological sites were identified

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within the boundary of the proposed PV system. Leppard et. al. (2014) completed subsurface investigations on the proposed PV location and did not identify any archaeological resources.

CDF Site

A previous survey by Hunter-Anderson and Moore (2002) included the CDF Disposal Area and identified six archaeological sites within the proposed PV boundary. These included one pre-Contact site, a rockshelter containing pottery sherds and marine shell. The prehistoric deposits had been extensively disturbed by WWII use and landfilling, and pre-Contact and historical period materials were found mixed together. One late Pre-Latte sherd and several probable Latte Period sherds were recovered (Hunter-Anderson and Moore 2002:52, 99; Welch et al. 2009:78). Because of the extensive disturbance, this site was not recommended as eligible for the NRHP.

The other five sites are all WWII or post-WWII US military sites (Hunter-Anderson and Moore 2002, Volume 2): a WWII and post war limestone quarry; a complex of post-war military structures, consisting of a main concrete slab, smaller slabs, and associated sidewalks; a post-war military structure, consisting of a T-shaped concrete slab; and two adjacent post-war concrete slabs. None of these sites were determined to be eligible for the NRHP. Site 66-03-1856, immediately north of the proposed PV site, contains a series of post-WWII structures that belonged to Guam Dredging Contractors, who held a contract to dredge the harbor from 1946-1950. The remains consist of concrete slabs, steps, and decorative concrete and rock walls on an artificially terraced slope. Site 66-03-1856 was determined eligible for the NRHP.

Leppard et. al. (2014) completed subsurface investigations on the proposed CDF area and did not identify any archaeological resources. Additionally, Leppard et. al. re-surveyed Site 66-03-1856 and verified that it still retained the integrity and characteristics for eligibility for the NRHP. To avoid the potential for adverse effects to this site, a 30-meter buffer from the proposed undertaking was placed around Site 66-03-1856.

Summary

Leppard et. al. (2014) documented four mid- to late-20th century features within the APE—a bottle dump, remains of a large metal container, and two concrete pads. The bottle dump and remnants of a metal container were recorded within Andersen South Lot “A”, and concrete pads were documented within the Harmon Booster Station and South Finegayan parcels. In addition, a single displaced Chamorro pot sherd was recovered from a fill deposit at the South Finegayan parcel. The Navy has determined that none of these features, as archaeological sites, are eligible for listing on the NRHP. In addition, Leppard et. al. (2014) did not locate any architectural resources within the proposed PV sites that are recommended as eligible for listing on the NRHP.

Determination of Effect: As indicated above, eight of the eleven areas surveyed in Leppard et. al. (2014) for the construction and operation of PV systems are considered undertakings. For these eight sites Leppard et. al. (2014) documented two mid- to late-20th century concrete pads. The concrete pads were documented within the Harmon Booster Station and South Finegayan parcels. The Navy has determined these sites are not eligible for the NRHP and requests concurrence with that determination. In addition, Leppard et. al. (2014) did not identify any

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architectural resources on the proposed PV sites as eligible for listing on the NRHP and requests concurrence that the Orote Village boundary does not extend onto the Commissary parcel. Leppard et. al. (2014) confirmed the previous investigations at the post-WWII Guam Dredging Contractor complex (Site 66-03-1856) as eligible for the NRHP and the proposed undertaking includes a 30 m buffer between Site 66-03-1856 and the proposed CDF APE.

Based on the factors discussed above, the Navy has made a finding of “no historic properties affected” for the eight (8) undertakings and requests your concurrence. In accordance with 36 CFR 800.5(c)(1), if we receive no response from your office within 30 days of receipt of this letter, the Navy will assume no objections to the determination of effect and eligibility. Should you have any questions, our point of contact is Mr. Lon Bulgrin NAVFAC Marianas, who can be reached by phone at (671) 339-2093, or by e-mail at Lon.Bulgrin@fe.navy.mil.

Sincerely,



MARK BONSAVAGE
 Environmental Business Line Coordinator
 By Direction of the Commanding Officer

- Enclosures: (1) Leppard, T., D. Welch, and T. M. Rieth. 2014. *Archaeological Inventory Survey and Subsurface Testing at Multiple Locations in Support of Navy Renewable Energy Projects on Guam*. Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc. Honolulu.
 (2) Letter for Archaeological Feature and Site Re-Location and Assessment at the CDF Area in Support of Navy Renewable Energy Projects on Guam
 (3) Location Map
 (4) Site Maps
 (5) Typical Detail, PV Racking Structures

References:

1. Bulgrin, Lon. 2006. *Subsurface Testing and Documentation for Site No. 66-01-2132, a Japanese World War II Cave, Tamuning, Guam*. Prepared for United Seas Overseas Investment Company. Manuscript on file, International Archaeological Research Institute, Inc., Honolulu.
2. Carucci, James. 1993. *The Archaeology of Orote Peninsula: Phase I and II Archaeological Inventory Survey of Areas Proposed for Projects to Accommodate Relocation of Navy Activities from the Philippines to Guam, Mariana Islands*. With contributions by H. David Tuggle, D. Colt Denfeld, J. Stephen Athens, Jerome V. Ward, and Stephen K. Wickler, and with the assistance of Jolie Liston, Richard K. Olmo, and

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- Wendy L. Goodman. Prepared for Belt Collins and Associates. International Archaeological Research Institute, Inc., Honolulu.
3. Craib, John L., and Ann K. Yoklavich. 1996. *Cultural Resources Management Overview Survey, US Naval Activities, Guam Waterfront Annex, Mariana Islands, Territory of Guam*. Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Ogden Environmental and Energy Services Co., Inc., Honolulu.
 4. DeFant, David G. 2008. Early Human Burials from the Naton Beach Site, Tumon Bay, Island of Guam, Mariana Islands. *Journal of Island and Coastal Archaeology* 3:149-153.
 5. Dixon, Boyd, Sam Walker, and Mike Carson. 2011. *Cultural Resources Investigations conducted in the Territory of Guam supporting the Joint Guam Build-up Environmental Impact Statement: Final Archaeological Surveys on Guam 2008-2009 at Air Force Barrigada, Proposed Live Fire Training Range, Andersen South, and Naval Base Guam*. Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. TEC, Inc. and Richard Flores Taitano Micronesia Area Research Center, University of Guam.
 6. Hunter-Anderson, Rosalind L., and Darlene R. Moore. 2002. *Phase I and Phase II Archaeological Survey at Waterfront Annex and Ordnance Annex, Territory of Guam. Volume I: Narrative*. With contributions by Judith R. Amesbury, Shawn K. Collins, Deborah M. Pearsall, Michael W. Kaschko, Gail M. Murakami, Craig E. Skinner, Jerome V. Ward, and Eleanor F. Wells. Prepared for International Archaeological Research Institute, Inc. and Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i.
 7. Kaschko, Michael W., and David J. Welch. 2002. *Cultural Resources Assessment for Marine Forces Pacific, Andersen South Training Area, Andersen Air Force Base, Mariana Islands, Guam*. Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc., Honolulu.
 8. Lauter-Reinman, Gloria. 1998. *Cultural Resources Management Plan for the Apra Harbor Naval Complex, Guam*. Prepared for Department of the Navy, Pacific Division, Naval Facilities Engineering Command. Ogden Environmental and Energy Services Co., Inc., Honolulu.
 9. Moore, Darlene R. 2002. *Guam's Prehistoric Pottery and Its Chronological Sequence*. Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Micronesia Archaeological Research Services, Guam, under contract to International Archaeological Research Institute, Inc., Honolulu.
 10. Olmo, Richard K., Tina Mangieri, David J. Welch, and Thomas S. Dye. 2000. *Phase II Archaeological Survey and Detailed Recording at Commander, US Forces Marianas (COMNAVMARIANSA) Communication Annex (formerly Naval Computer and*

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06 May 15

Telecommunications Are Master Station, Western Pacific), Territory of Guam, Mariana Islands. Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc., Honolulu.

11. Reinman, Fred M. 1967. *Notes on an Archaeological Survey of Guam, Marianas Islands, 1965-66, Preliminary Report, National Science Foundation Grant 65-662.* Unpublished ms. on file, Department of Anthropology, Field Museum of Natural History, Chicago.
12. Schilz, Allan, J., Richard L. Carrico, Ann K. Yoklavich, and John L. Craib. 1996. *Cultural Resource Management Plan, Andersen Air Force Base, Mariana Islands, Territory of Guam.* Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Ogden Environmental and Energy Services Co., Inc., Honolulu.
13. Welch, David J. (Ed.) 2010. *Archaeological Survey and Cultural Resource Studies Conducted in 2007 on the Island of Guam in Support of the Join Guam Build-Up Environmental Impact Statement.* 2 volumes Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc., Honolulu.

Copy to:
NAVFAC MAR PWD (L. Bulgrin)
Anderson AFB EV (W. Arnold)
NAVFAC PAC EV21 (C. Chang)

Enclosure 1: Archaeological Inventory Survey and Subsurface Testing at Multiple Locations in Support of Navy Renewable Energy Projects on Guam

Per National Historic Preservation Act Section 304 this enclosure is not provided

Enclosure 2: Letter for Archaeological Feature and Site Re-Location and Assessment at the CDF Area in Support of Navy Renewable Energy Projects on Guam

Per National Historic Preservation Act Section 304 this enclosure is not provided

Enclosure 3: Site Overview Map



Enclosure 4: Location Maps

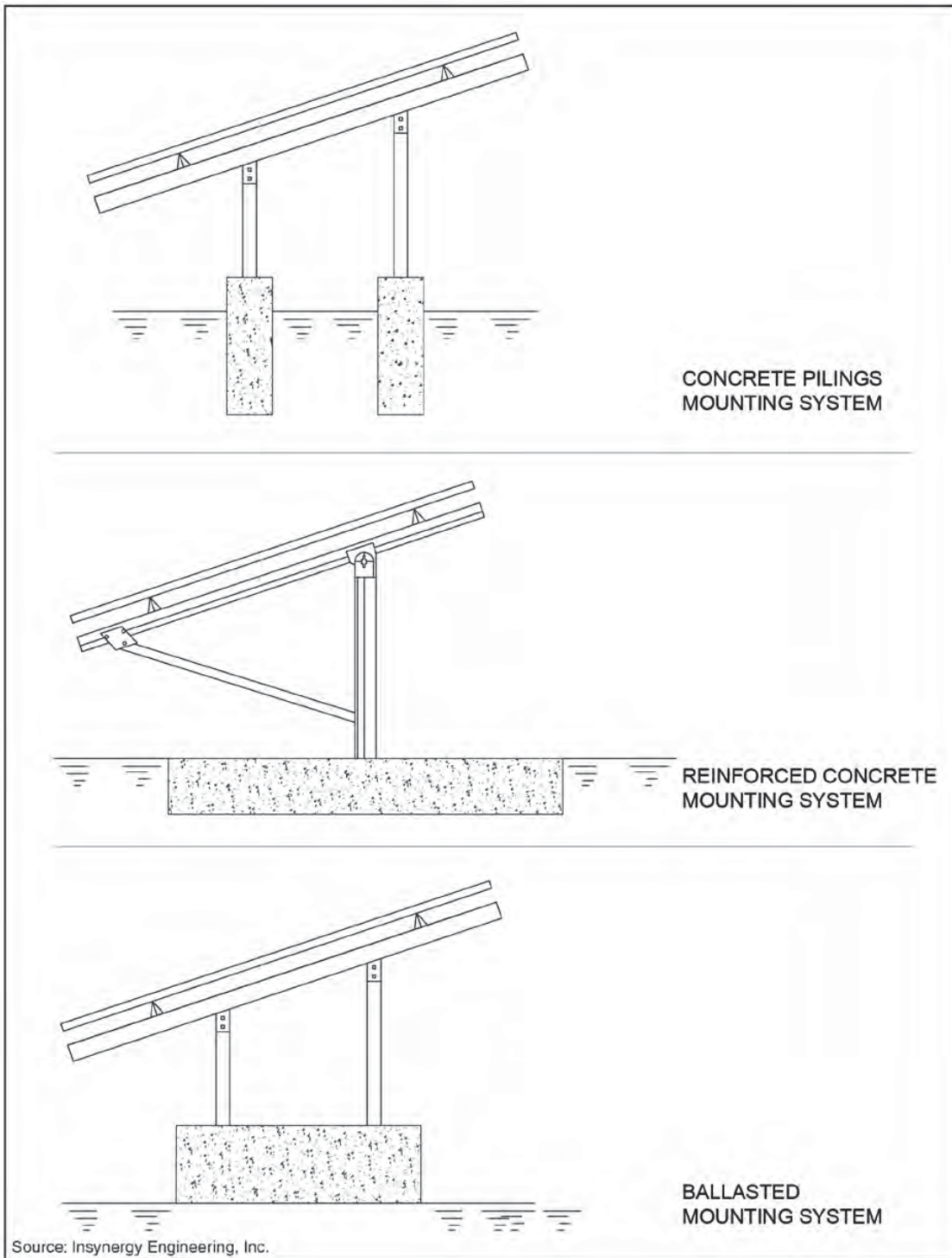








Enclosure 5. Racking Structures





Eddie B. Calvo
Governor

Ray Tenorio
Lt. Governor

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Government of Guam

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Raymond F.Y. Blas
Director

William N. Reyes
Deputy Director

In reply refer to:
RC2015-0626

June 5, 2015

Mark Bonsavage
Department of Navy
Environmental Business Line Coordinator
Naval Facilities Engineering Command Marinas
PSC 455, Box 195
FPO AP 96540-2937

Subject: NHPA Section 106 Review
Installation and Operation of Photovoltaic Systems at Eight Sites on Guam


Dear Mr. Bonsavage,

We cannot concur with your determination of effect on the subject eight sites at this time. The determinations are based on the *Draft Archaeological Inventory Survey and Subsurface Testing at Multiple Locations in Support of Navy Renewable Energy Projects on Guam* report, which has not been reviewed, nor were we aware of the studies being conducted. In light of this, we are requesting an additional fifteen days to complete our review.

Enclosure 5 does not provide the depths of the pilings or mounting systems for the racking structures, please provide this information.

Should you have any questions, please contact our office.

Sincerely,


Raymond F.Y. Blas
Director


Lynda Bordallo Aguon
State Historic Preservation Officer



Eddie B. Calvo
Governor

Ray Tenorio
Li. Governor

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Raymond F.Y. Blas
Director

William N. Reyes
Deputy Director

In reply refer to:
RC2015-0626

July 24, 2015

Mark Bonsavage
Department of Navy
Environmental Business Line Coordinator
Naval Facilities Engineering Command Marinas
PSC 455, Box 195
FPO AP 96540-2937

Subject: NHPA Section 106 Review
Installation and Operation of Photovoltaic Systems at Eight Sites on Guam and
Review of: Draft Archaeological Inventory Survey and Subsurface Testing at
Multiple Locations in Support of Navy Renewable Energy Projects on Guam.

Dear Mr. Bonsavage:

We've reviewed the subject draft archaeological inventory survey report and reconsidered the NHPA Section 106 Review and have the following comments:

Summary Overview

Overall the report needs to be reevaluated as the Interpretation section presents "A" Horizon's with depths of 50 cm. The areas of potential effect (APE) do not have nor do the photos indicate an "A" Horizon of this depth. "A" Horizons, although they can be buried contain partially decomposed organic matter. A centimeter scale needs to be added to the side of the soil profiles. The report does not represent the presence or absence of historic properties in general. Why is this? Shovel test pits (Stps) did not cover the landscape but were clustered to identify anomalies. Stps placed throughout the landform provide good information on the presence or absence of soil development, soil disturbance and historic properties. We also found that the research conducted was not consistent with the recommendations set forth in the previous studies within the APEs.

The use of Co. as an abbreviation for Contractor is wrong. Please correct with either Contr. or Cr.

The overall Munitions of Explosive Concern (MEC) and/or Material Potentially Presenting an Explosive Hazard (MPPEH) and anomaly avoidance techniques conflicts with identifying buried horizons, or artifacts that indicate historic presence on properties. Such micro-avoidance of anomalies negates implementation of battlefield archaeological methods. These may be appropriate. Take for example Andersen South Lot "A" Site that contains a decaying metal container frame,

which was most likely the source of the ferrous metal signals found throughout the south western section of the lot. These anomalies prevented further investigation of the area.

Finally, the layout of the report is incompatible for reviewing. Once an APE is presented, it should be brought to a conclusion without having to skip ahead 80 pages to view the results. Therefore we highly recommend that you change the format of the document, where the method is laid out in the beginning for the entire project. The description of an APE, should be directly followed by the results of the testing, followed by the opinion surmised from the interpretation. Any change in methodology can be placed at the beginning of the new APE section. This allows a reader and the client the opportunity to not read a repeated cut and pasting of the same paragraphs throughout the document. At the end, a conclusion and discussion section should follow which should indicate any short falls within the study.

More specific comments are found below addressing the draft report, followed by opinions on each of the eight Section 106 renewable energy projects.

Abstract, Page iii: There is a discrepancy in the number of acres presented. The 11 non-continuous parcels are approximately 487.9 acres; however, the second paragraph total is 516.5 acres. The second paragraph indicates 13 parcels rather than 11 parcels, and mentions the Dandan Renewable Energy Project, which is not included in this report. The third paragraph mentions “a single traditional Chamorro pot sherd”, however, there are different types and time sequences for the Chamorro pottery. Please change the word “traditional” and replace it with an appropriate pottery description Latte, Pre-Latte (Unai), or Huyong.

Initial Settlement, Page 6: The common settlement dates for the Mariana Islands have been unchanged since Spoehr’s work in 1949-50, long before Carson and Kurashina 2012 or Carson et al. 2014. This is common knowledge and need not be cited especially from a recent context. It should have been one of the minor revisions made in Cochrane’s work. The Mochom site is not “alternatively” known as the Huchunao site, Reinman only states that the area is noted on the 1968 USGS map as Huchunao. This may be a fluke as the 1913-14 map and others maps consistently indicate the area as Mochom. Remember that there is a need to check what you summarize as others may not have the facts correct.

Page 7, the mtDNA study points to mainly Indonesia (Wallacea) populations coming through the Philippines, not strongly from the Philippine Islands. On Page 9, the dates given for the Matapang Beach Park are off as the range given by Bath is 2650-2130 not 2404-2135.

Page 22, Previous Archaeological Investigations: PN-14 was given GHPI number 66-08-2558 back in 2012, please remember to check with our office when doing background research.

Page 25, Andersen South Lot “A” Site: The background research does not indicate the GHPI number 66-04-1098 War Dog Cemetery established in 1944, nor does it account for the three or four buildings and possible well shown on the 1954 map. The road traversing the area should also be considered in the evaluation.

Page 29, South Finegayan Site: In reviewing the Welch 2010 documents on GHPI number 66-08-2316 there is no photographic documentation of the site to back up the claims of non-eligibility. Please provide us some photographic evidence of the site. Latte Park GHPI number 66-08-0141 needs to be considered in the assessment. The report does not mention or cite Birkedal and McCarty’s 1972 *Preliminary Report on the NCS Latte Site, South Finegayan, GU* for the Department of the Navy in the assessment of the parcel. This report indicates that there is a pump

house and midden deposits outside of the footprint of Latte Park; these also need to be included in the assessment.

Page 39, Figure 6: The map indicates there are three sites numbered GHPI 66-03-1889, however, there is only one GHPI number 66-03-1889, the other two sites are mislabeled. Please correct this error. The number 862 indicated on the map does not correspond to any site number in our data base. In checking our records we believe your 862 is GHPI number 66-03-1998, please check your data and consult with our office on the GHPI numbers.

The area for the expansion of the current 250 kW Photovoltaic Filed NBG Site needs to be further tested in the northwest section of the APE. The depositional sequence of this area was not completely identified.

Page 55, Previous Archaeological Investigations: The citation for DeFant 2013 is not found in the Reference section. DeFant's work in 2014 leaves out one important map, the 1954 Engineer, HQ, AFFE, by the 64th Engineer Battalion, which can be found at Micronesian Archaeological Resource Center (G 9415 1954. A4 c.4). The 1954 map shows several buildings and a road located on the property, these should be mentioned in the background history. Recently, structures shown on the 1954 map in the area were found to exist on the landscape and to also be significant.

Page 82, Anticipated Results: As previously noted the Low-Potential maps provided by Welch 2010 based on the 2008 Programmatic Agreement do not offer any justification for such determinations. The information was based mainly on pedestrian survey and since Orote Peninsula was landscaped by the Seabee's after the retaking of Guam the current terrain may be unreliable for the identification of historic properties. This was unfortunately revealed with the destruction of a Japanese defensive site bulldozed in the construction for the new gym. The defensive position was made up of numerous 55 gallon drums set in a ravine that was buried shortly after the battle for Orote. This type of destruction walks the fine line of "anticipatory demolition of historic properties", especially after numerous war dead were found in close proximity to the defensive position and the driver should have been made aware of his surroundings when excavating.

Page 82, Previous Archaeological Investigations: MARS' work in 2002 clearly states that C-8 (MapNO 720) may be part of GHPI number 66-03-1856, which is eligible for listing on the National Register of Historic Places. Therefore, C-8 needs to be investigated to see if it is part of that site. Two buildings appear on the 1954 map directly where GHPI number 66-03-1856 and C-8 are located. C-6 also may be part of this complex as the 1954 map indicates that there are three buildings located here (see attachment 1). Since no detailed research has been conducted on the Guam Dredging Contractor the other building in the area may be part of the Guam Dredging Contractor and should not be discounted until such research had been conducted. A GHPI data form needs to be filled out and submitted to our office once the research is completed for review by our office.

Page 91, Subsurface Testing: Not initially screening the excavated soil is not an efficient and effective way of doing an archaeological test, unless it is a known fill or disturbed deposit.

Pages 91-96: The Survey Methods section describes the areas of survey being limited to a 4 meter swath around the AAFB and Orote Landfills. However, Feature 003 is approximately 40 meters outside the boundary of the AAFB landfill. Are the Survey Methods stated wrongly in the size of the swath around the landfill? Please explain. A historic road that also transected the site should have been mentioned in the background research.

Pages 99-104, Andersen South Lot "A" Site: The random sampling does not appear to be random at all, nor does it present a representative sampling of the parcel. It is hard to believe that the UXO/EOD technician could not find an appropriate place to drop shovel test pits (Stps) in the western section of this parcel. The historic background of the parcel should have focused on the events of August 5 and 6, 1944. Why was this not done? This area was occupied by the 77th Infantry Division during the night of August 5. Neither background research, nor the survey thoroughly examined the areas as a possible defensive position for the 77th Infantry. The 1954 map shows one building on the lot, along with a pond and a quarry feature. The limestone quarry needs to be considered an archaeological site even though it may or may not be significant. A GHPI data form needs to be filled out and submitted to our office. This site is noted on the 1954 map, was it there in 1944 and was it utilized for defensive purposes in 1944? Also, there is no mention of the War Dog Cemetery, GHPI number 66-04-1098 or any testing of that area, which is considered one of the prominent areas on the lot. Therefore we cannot concur with the findings at this time.

Pages 107-120, South Finegayan Site, Surface Survey: If the pottery sherd cannot be assigned to either the Latte or Pre-Latte, then please state this. The random sampling is clustered in areas, where these Stps should have been distributed throughout the parcel to provide a better assessment of the property. GHPI number 66-08-0141 and the two midden deposits near the site have to be included in an assessment of the parcel because the transfer of the property from a residential to a photovoltaic system will adversely impact it. More testing is needed along the southwestern border between the housing and the edge of the APE.

Page 125, Expansion of Current 250 kW Site: The statement that "More extensive excavation may clarify the nature of the depositional sequence;" indicates that though no cultural bearing deposits were found, further testing may indeed find cultural deposits. If further testing is not possible then the north western section of the APE needs to be avoided in consultation with our office.

Page 132-137, NBG Commissary Area Site: In reviewing this portion of the document, we found the methodology to be flawed, since the subsoil or bedrock was never reached in the testing, the presence or absence of a site cannot be determined. The testing only indicates the presence of fill over the area and one cannot definitively say that some portions of Orote Village do not remain under the fill. A backhoe trench or two would have easily identified if the site was present or not. The extremely dense vegetation should have provoked tighter transect intervals.

Pages 143-149, Harmon Booster Station Site: Feature 005 is a feature within a site. We have assigned GHPI number 66-04-2805 to the site. The site is possible noted on the 1954 map. Please fill out a GHPI data form and submit it to our office.

Although the draft report should have been presented long before the Section 106 determination these comments should provide the information needed to achieve an affective outcome to these projects in the future. Though we have reviewed the draft report for all 11 project areas presented, we are only providing opinions on eight projects as requested. Therefore we will not offer an opinion on Andersen AFB Landfill and Utility Corridor, Andersen South Lot "A" and Orote Landfill as these areas are no longer under consideration for development.

Concerning the Section 106 determination Enclosure 5, Racking Structures; the drawings do not present the depth of the concrete pilings or the mounting system to be placed in the ground. There are no plans for the substation complex or the transmission lines either, this information will need to be presented to our office when resubmitting certain Section 106 determinations that were not concurred upon. Since the transmission lines for the projects run outside the projects' APE, these transmission lines have to be considered as part of any directly connecting project. Therefore, if the

transmission line connects directly to a project that was not concurred upon then the transmission line is not concurred upon, since they were not separated out.

Specific opinions on the eight sites presented:

South Finegayan Housing: We concur with the determination of “*no historic properties affected*” on the APE presented in Enclosure 4.

NBG Existing 250 kW PV Site Expansion: The draft report statement “More extensive excavation may clarify the nature of the depositional sequence;” (p.122) indicates that although no cultural bearing deposits were found that further testing may indeed produce cultural deposits. The deposits described in Stp 14 needs to be defined. Buried features from WWII have been discovered under Orote Peninsula’s manicured landscape. If these deposits turn out to be cultural then a GHPI data form will need to be filled out. Therefore we cannot concur with “*no historic properties affect*” at this point in time.

NBG Commissary Site: Areas within this APE are noted by Carucci and Tuggle 1992, “which warrant mitigation in the form of further study” (p. 31). The aspect that fill has covered part of the section does not provide enough evidence that the Orote Village Site does not exist below the fill. The work conducted near TN-8 did not produce the results noted by those of Carucci and Tuggle 1992, nor does the methodology of 10 meter transect interval in “extremely dense” vegetation provide for good identification of historic properties. Transect intervals should have been reduced to 5 meters in areas of “extremely dense” vegetation. There would be no expectation of finding sites in fill, therefore we do not concur with the determination that “*no historic properties affected*” at this time. Once excavations have been conducted below the fill and the area in and around TN-8 has been cleared and tested for the site previously recorded, then we can consider what mitigation would be acceptable for the site. A GHPI data form will need to be filled out for the site once it has been defined.

Harmon Annex: We concur with “*no historic properties affected*” for the Harmon Annex Site.

Harmon Booster Station: We have issued a GHPI number 66-08-2316 for the site found at the Harmon Booster Station, the site needs to be recorded and a GHPI data form filled out. The site is on 1954 maps however, we believe we can agree that the site has lost integrity and therefore we believe we can concur with the “*no historic properties affected*” determination contingent on site recordation and a data form submitted to our office.

Tumon Tank Farm: We concur with “*no historic properties affected*” for the Tumon Tank Farm. However, we ask that caution be used in the northern section of the property where a buried “A” Horizon was found.

Waste Water Treatment Plant (WWTP): The testing methodology was flawed. Stps 1 and 2 indicate that there are fill levels down to 50 cm, the testing stopped short of identifying what is below the fill. Therefore, we cannot concur with “*no historic properties affected*” at this time. However, if this area can be tested below the fill this may resolve our concerns. Our recent meeting with the Japanese Ministry of Health, Labor and Welfare on the subject of Japanese mass burials and the finding of buried defensive positions has raised some concerns for Orote Peninsula.

CDF Site: We cannot concur with the “*no historic properties affected*” for the CDF Site at this time.

As noted above in the review of the draft report, there is no discussion or documentation of the relationship between the Guam Dredging Contractor GHPI number 66-03-1856 and temporary site

C-8 noted in Hunter-Anderson and Moore's 2002 report. These areas need to be fully researched, cleaned, documented and mapped before any decision can be considered on the size of the complex and their possible association. This can also be said for C-6 as three building are apparent on the landscape on the 1954 map. These buildings may all be part of the Guam Dredging Contractor GHPI number 66-03-1856 and enclosure 2 did not answer these questions (see Attachment 1).

Please provide corrections for the preliminary draft report. The scope of work for the projects perhaps restricted archaeological inventory survey causing short coming in the data submitted. Hopefully in the future, we can work closer on these projects to make sure they are in line with the previous archaeological studies and concerns of our office.

Should you have any questions please contact our office.

Sincerely,



Raymond F.Y. Blas
Director



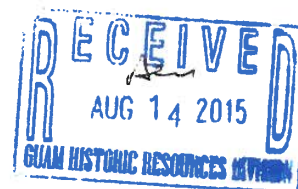
Lynda Bordallo Aguon
State Historic Preservation Officer



DEPARTMENT OF THE NAVY
 NAVAL FACILITIES ENGINEERING COMMAND MARIANAS
 PSC 455, BOX 195
 FPO AP 96540-2937

5090
 Ser OPS/2015-003
 13 August 2015

Ms. Lynda Bordallo Aguon, State Historic Preservation Officer
 Guam Historic Resources Division
 State Historic Preservation Office (SHPO)
 Department of Parks and Recreation
 490 Chalan Palayso
 Agaña Heights, Guam 96910



Dear Ms. Bordallo Aguon:

SUBJECT: Installation and Operation of Photovoltaic Systems at Eight Sites on Guam and Review of Draft Archaeological Inventory Survey and Subsurface Testing at Multiple Locations in Support of Navy Renewable Energy Projects on Guam - RC2015-0626

The Section 106 consultation for RC2015-0626, *Installation and Operation of Photovoltaic Systems at Eight Sites on Guam and Review of: Draft Archaeological Inventory Survey and Subsurface Testing at Multiple Locations in Support of Navy Renewable Energy Projects on Guam*, began with a letter dated 6 May 2015 which was received by your office 7 May 2015 (Enclosure 1). We received a response from your office, dated 5 June 2015, on 1 July 2015 (Enclosure 2). Your response requested a fifteen (15) day extension of the review period. We received comments for RC2015-0626, dated 24 July 2015, on 29 July 2015 (Enclosure 3).

As noted when we initiated consultation on this project, the timeline for review is critical. For this reason, when we did not receive correspondence from your office within the extended review period, we were forced to act on our determination of No Historic Properties Affected, which we are confident is correct. We will work with our contractor for the cultural resources investigation and request that they attempt to address your comments on the draft report.

The U.S. Navy is committed to protecting historic properties in conformance with the National Historic Preservation Act and to our continuing relationship with your office. Should you have any questions or require additional information concerning this project, please contact our representative Mr. Kevin Brindock at (671)-349-4836 or Kevin.Brindock@fe.navy.mil.

Sincerely,

MARK BONSAVAGE
 Environmental Business Line Coordinator
 By Direction of the Commanding Officer

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Ser OPS/2015-003
13 August 2015

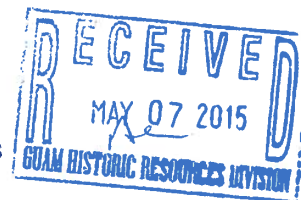
Enclosures: (1) RC2015-0626 Consultation
(2) RC2015-0626 Extension Request
(3) RC2015-0626 SHPO Comments

Copy to:
NAVFAC MAR PWD (L. Bulgrin)
Andersen AFB EV (D. Lujan)
NAVFAC PAC EV21 (C. Chang)

Enclosure 1. RC2015-0626



DEPARTMENT OF THE NAVY
 NAVAL FACILITIES ENGINEERING COMMAND MARIANAS
 PSC 455, BOX 195
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5090
 Ser OPS/2015-002
 06 May 15

Ms. Lynda Bordallo Aguon
 State Historic Preservation Officer
 Department of Parks & Recreation
 490 Chalan Palayso
 Agana Heights, Guam 96910

SUBJ: INSTALLATION AND OPERATION OF PHOTOVOLTAIC SYSTEMS AT EIGHT
 SITES ON GUAM

Dear Ms. Lynda Bordallo Aguon,

The Naval Facilities Engineering Command (NAVFAC) requests your review of a proposed development of eight renewable energy generation assets, via solar photovoltaic (PV) systems, at Naval Base Guam (NBG). Pursuant to Section 106 of the National Historic Preservation Act (NHPA), we have reviewed the proposed project scope and determined proposed development of each asset is an undertaking as defined in 36 CFR 800.16(y). Concurrently, the DoN is requesting a 30-day review of the attached 2014 draft report by Leppard et al. (Enclosure 1), Letter for Archaeological Feature and Site Re-Location and Assessment at the CDF Area in Support of Navy Renewable Energy Projects on Guam (Enclosure 2), and consulting on the eligibility of properties for inclusion in the National Register of Historic Places (NRHP).

The proposed project has undergone multiple scope updates during development. As a result, Leppard et. al. (2014) surveyed three (3) additional locations (two at Andersen Air Force Base [AAFB]; one on NBG) beyond those for which a Determination of Effect under Section 106 of the NHPA has been made. Additionally, Leppard et. al.'s surveyed boundary of the South Finegayan Housing area exceeds the revised PV project area for which a Determination of Effect was made. To facilitate the multiple, concurrent reviews requested in this letter, the following table identifies the sites surveyed for eligibility in Leppard et. al. (2014) and the proposed sites for which concurrence with Determinations of Effect for the construction and operation of PV is requested.

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Table 1. Summary of Requested Actions

Site Name	Review requested in Leppard et. al., 2014	Concurrence with PV Determination of Effect requested
Andersen AFB Landfill/Utility Corridor	Yes	No
Andersen AFB South Lot "A"	Yes	No
South Finegayan Housing	Yes	Yes*
Orote Landfill	Yes	No
NBG Existing 250 kW PV Site	Yes	Yes
Commissary Site	Yes	Yes
Harmon Annex	Yes	Yes
Harmon Booster Station	Yes	Yes
Tumon Tank Farm	Yes	Yes
Wastewater Treatment Plant	Yes	Yes
Confined Disposal Facility	Yes	Yes

*Surveyed area (Leppard et. al., 2014) exceeds the proposed boundary of the PV site

Project Description: This project proposes to lease up to 192 acres of DoD land, at 8 separate locations, to Guam Power Authority (GPA) to construct and operate solar photovoltaic (PV) systems producing solar-generated energy for transmission to the GPA electrical grid. Specifically, GPA would select a renewable energy contractor to develop eight (8) PV sites: South Finegayan Housing, NBG existing 250 kilowatt PV site, Commissary Site, Harmon Annex, Harmon Booster Station, Tumon Tank Farm, Wastewater Treatment Plant area, and the Confined Disposal Facility (CDF) Site (see enclosures 3 and 4). It should be noted that the potential exists for the Harmon Annex and Booster Station sites to also be used for Battery Energy Storage Systems (BESS).

The land underlying the PV sites would be leased for up to 37 years after which time the leases may be renewed or the facilities could be decommissioned. In accordance with 10 U.S.C. §2667, the leases shall provide for consideration (rent) to be paid in an amount not less than the fair market value of the leasehold interest, either in cash or in kind. Although the proposed action addresses the known impacts of the federal lease action, details regarding the specific method of consideration to be employed, to include the design, construction, management and maintenance of any potential in-kind consideration projects or efforts, have not been developed at this time. Once the specific considerations are identified, a new review process under Section 106 of the NHPA will be completed to determine if these considerations would have the potential to affect cultural resources; therefore, determinations of effect for these considerations are not addressed in this letter.

The purpose of the proposed action is to reduce energy costs and fuel oil dependency, and increase the energy security, operational capability, strategic flexibility and resource availability

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of DoN installations through the development of renewable energy generating assets on Guam. The proposed action is required to meet the renewable energy standards put forth by the 1 GW Initiative, EPLA, 10 U.S.C. 2911(e), the 2013 presidential memorandum, and SECNAV, to include the requirement to produce 50 percent of DoN's shore-based energy requirements from alternative sources.

Solar PV panels utilize a packaged assembly of solar cells to harness solar energy (photons) from the sun and generate electricity. The system includes inverters, mounted on concrete pads located throughout the PV array, with its own medium voltage transformer which transmits the power to the PV system's on-site substation. Each PV system may include some type of BESS to balance fluctuations in energy generation caused by weather, seasons, and nighttime darkness. The BESS is located onsite near the PV system's substation. If the two Harmon sites are pursued for BESS without on-site PV, the configuration and components would be comparable. Once all the electricity is collected, the power is transferred via a transmission line to the nearest point of connection (POC) to the GPA utility grid.

The PV panels would be approximately 3.5 foot wide and 5 foot long glass-encased, darkly colored to minimize light reflection. The PV panels would be attached to metal racking structures on foundations. The type of racking structure (stationary versus adjustable) would be determined by the PV contractor during the project's final engineering design. See enclosure (5) for examples of the types of racking structures being considered for this project. During site preparation, surface vegetation would be cleared and grubbed, and where load-bearing foundations are proposed, the ground would be excavated and compacted. Ground disturbance would include the installation of the PV racking system on foundations or piers, trenching for underground electrical cables or installation of transmission line poles, power centers with inverters, substations, foundation work for electrical equipment, site buildings, and miscellaneous civil works (i.e., perimeter fencing post holes, typically 4 foot deep, to support a 8-foot high chain link fence enclosure and gates). A new perimeter road and smaller access roads would be constructed to access the solar array in order to maintain the elevated and sloped photovoltaic panels.

Area of Potential Effect: The proposed undertakings include the construction and operation of eight (8) PV systems wholly within current DoD property on Guam, encompassing a total of 192 acres. These eight individual project areas constitute the Areas of Potential Effect (APEs) for this undertaking and are depicted on the maps in enclosure (4).

Identification of Historic Properties: The proposed project includes construction of eight independent PV systems. However, as described above, the project originally included 11 sites as surveyed by Leppard et. al. (2014), of which three are no longer being considered. The following discussion provides the results of the 11 sites surveyed by Leppard et. al. (2014), including the 8 proposed PV sites; a recommendation of eligibility for any potential archaeological resources identified by Leppard et. al. (2014); and a summary of the previous surveys/investigations.

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Andersen AFB Landfill and Utility Corridor

This site is no longer under consideration for construction of a PV system.

Systematic archaeological investigation in the vicinity of the AAFB Landfill and Utility Corridor has been limited and current knowledge of historic resources in the area is correspondingly underdeveloped. Leppard et. al. (2014) is the sole investigation of the utility corridor and no archaeological resources were documented during survey and subsurface testing. Subsurface testing occurred only within the utility corridor, as the project site is an existing landfill and subsurface investigations were not warranted.

Andersen South Lot "A"

This site is no longer under consideration for construction of a PV system.

Leppard et. al. (2014) is the first systematic archaeological work undertaken on the Andersen South Lot "A" Site. Two post-WWII features were recorded within the proposed PV site – a bottle dump and the remnants of a metal container. As archaeological sites, neither feature is considered eligible for listing on the NRHP.

South Finegayan Housing

Leppard et. al. (2014) completed a surface survey and subsurface investigations on a 290-acre parcel at this location; however, only 71 acres of the surveyed area are currently being carried forward for a potential PV system. Given its prior use as a housing area, the site has been subject to extensive surface and shallow subsurface disturbance. Leppard et. al. (2014) did not document any archaeological sites within the proposed PV site.

One traditional Chamorro bodysherd (severely abraded) from a coarseware pottery vessel was recovered with no surviving surface treatment. This sherd was located between 0-2 cm below the surfaces and was the only deposit encountered in the unit when it was closed at 60 cm below the surface. The sherd was located within a clay loam fill with occasional small plastic inclusions indicating the sherd had been redeposited from its original position, and is not representative of cultural activity within the immediate vicinity. Excavation continued with the entirety of the deposit sieved with a 1/8-inch screen, but no further cultural material was encountered.

Orote Landfill

This site is no longer under consideration for construction of a PV system.

This site has not been subject to previous archaeological investigation. Leppard et. al. (2014) did not identify any archaeological resources during the pedestrian survey and, as the site is a capped landfill, did not complete any subsurface investigations. However, the northern corner of the Landfill intrudes into the boundary for Orote Airfield (Site 66-03-1066), which was listed on the NRHP in 1975.

NBG Existing 250 kW PV Site Expansion

The expansion area for this existing PV site has not been subject to previous archaeological investigations; therefore, Leppard et. al. (2014) represents the first systematic investigation of

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this location. No archaeological sites were identified during the pedestrian survey and subsurface investigation.

Commissary Site

Portions of the Commissary site have been subject to previous investigations by Carucci (1993), Craib and Yoklavich (1996), and Dixon, Walker, and Carson (2011); however, Leppard et. al. (2014) is the first investigation of the western portion of the proposed PV site. Carucci (1993) documented multiple concrete pads (Site TN-8) in the southern component, and Craib and Yoklavich (1996) plotted the northeastern half of what may have been Orote Village (Map No 267) within this parcel. A subsequent study (Dixon, Walker, and Carson, 2011) evaluated the area between Shoreline Drive and Dadi Beach, determining that the construction and subsequent demolition of Camp Bright had disturbed the surface and subsurface sediments such that no intact archaeology remained in the areas immediately adjacent to the project location. Camp Bright extended from Shoreline Drive into the proposed PV Commissary Site; therefore, it is unlikely that intact remnants of the Orote Village extend into this area

Leppard et. al. (2014) did not identify any archaeological sites within the parcel during the pedestrian survey or subsurface testing. Specifically, the subsurface investigations conducted by Leppard et. al. (2014) evaluated the extent of the previously identified concrete pads by Carucci (1993) and the proposed Orote Village area suggested by Craib and Yoklavich (1996). Their investigation did not identify any archaeological findings and primarily encountered sandy fill with some graded limestone, very shallow topsoil, and push berm evidence suggesting anthropogenic degradation. This disturbance is further evidenced by the presence of Shoreline Drive bisecting the proposed Orote Village boundary as defined in the 1996 study. In summary, Leppard et. al. (2014) determined the disturbance was such that no material deriving from the Orote Village remains within the boundary of the proposed Commissary Site. The Navy recommends the boundary of the potential Orote Village, as described by Craib and Yoklavich, be revised to only include the Dadi beach area.

Harmon Annex, Harmon Booster Station, and Tumon Tank Farm

These three sites are located in close proximity to each other (see enclosures 3 and 4) and therefore considered collectively for identification of historic properties. Leppard et. al. (2014) did not identify any archaeological resources on the Harmon Annex or the Tumon Tank Farm. One concrete pad was identified at the Harmon Booster Station; however, this feature lacks integrity characteristics and is not considered significant under any NRHP criteria.

Prior to Leppard et. al. (2014), limited systematic archaeological work has been undertaken at the Harmon Annex site with no reported findings of significance (DeFant 2008). No previous systematic archaeological work has been undertaken on the Harmon Booster Station and Tumon Tank Farm sites.

Waste Water Treatment Plant (WWTP)

A previous pedestrian survey by Hunter-Anderson and Moore (2002) included the Waste Water Treatment Plant as part of a larger survey parcel and no archaeological sites were identified

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within the boundary of the proposed PV system. Leppard et. al. (2014) completed subsurface investigations on the proposed PV location and did not identify any archaeological resources.

CDF Site

A previous survey by Hunter-Anderson and Moore (2002) included the CDF Disposal Area and identified six archaeological sites within the proposed PV boundary. These included one pre-Contact site, a rockshelter containing pottery sherds and marine shell. The prehistoric deposits had been extensively disturbed by WWII use and landfilling, and pre-Contact and historical period materials were found mixed together. One late Pre-Latte sherd and several probable Latte Period sherds were recovered (Hunter-Anderson and Moore 2002:52, 99; Welch et al. 2009:78). Because of the extensive disturbance, this site was not recommended as eligible for the NRHP.

The other five sites are all WWII or post-WWII US military sites (Hunter-Anderson and Moore 2002, Volume 2): a WWII and post war limestone quarry; a complex of post-war military structures, consisting of a main concrete slab, smaller slabs, and associated sidewalks; a post-war military structure, consisting of a T-shaped concrete slab; and two adjacent post-war concrete slabs. None of these sites were determined to be eligible for the NRHP. Site 66-03-1856, immediately north of the proposed PV site, contains a series of post-WWII structures that belonged to Guam Dredging Contractors, who held a contract to dredge the harbor from 1946-1950. The remains consist of concrete slabs, steps, and decorative concrete and rock walls on an artificially terraced slope. Site 66-03-1856 was determined eligible for the NRHP.

Leppard et. al. (2014) completed subsurface investigations on the proposed CDF area and did not identify any archaeological resources. Additionally, Leppard et. al. re-surveyed Site 66-03-1856 and verified that it still retained the integrity and characteristics for eligibility for the NRHP. To avoid the potential for adverse effects to this site, a 30-meter buffer from the proposed undertaking was placed around Site 66-03-1856.

Summary

Leppard et. al. (2014) documented four mid- to late-20th century features within the APE—a bottle dump, remains of a large metal container, and two concrete pads. The bottle dump and remnants of a metal container were recorded within Andersen South Lot “A”, and concrete pads were documented within the Harmon Booster Station and South Finegayan parcels. In addition, a single displaced Chamorro pot sherd was recovered from a fill deposit at the South Finegayan parcel. The Navy has determined that none of these features, as archaeological sites, are eligible for listing on the NRHP. In addition, Leppard et. al. (2014) did not locate any architectural resources within the proposed PV sites that are recommended as eligible for listing on the NRHP.

Determination of Effect: As indicated above, eight of the eleven areas surveyed in Leppard et. al. (2014) for the construction and operation of PV systems are considered undertakings. For these eight sites Leppard et. al. (2014) documented two mid- to late-20th century concrete pads. The concrete pads were documented within the Harmon Booster Station and South Finegayan parcels. The Navy has determined these sites are not eligible for the NRHP and requests concurrence with that determination. In addition, Leppard et. al. (2014) did not identify any

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architectural resources on the proposed PV sites as eligible for listing on the NRHP and requests concurrence that the Orote Village boundary does not extend onto the Commissary parcel. Leppard et. al. (2014) confirmed the previous investigations at the post-WWII Guam Dredging Contractor complex (Site 66-03-1856) as eligible for the NRHP and the proposed undertaking includes a 30 m buffer between Site 66-03-1856 and the proposed CDF APE.

Based on the factors discussed above, the Navy has made a finding of “no historic properties affected” for the eight (8) undertakings and requests your concurrence. In accordance with 36 CFR 800.5(c)(1), if we receive no response from your office within 30 days of receipt of this letter, the Navy will assume no objections to the determination of effect and eligibility. Should you have any questions, our point of contact is Mr. Lon Bulgrin NAVFAC Marianas, who can be reached by phone at (671) 339-2093, or by e-mail at Lon.Bulgrin@fe.navy.mil.

Sincerely,



MARK BONSAVAGE
 Environmental Business Line Coordinator
 By Direction of the Commanding Officer

- Enclosures: (1) Leppard, T., D. Welch, and T. M. Rieth. 2014. *Archaeological Inventory Survey and Subsurface Testing at Multiple Locations in Support of Navy Renewable Energy Projects on Guam*. Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc. Honolulu.
- (2) Letter for Archaeological Feature and Site Re-Location and Assessment at the CDF Area in Support of Navy Renewable Energy Projects on Guam
- (3) Location Map
- (4) Site Maps
- (5) Typical Detail, PV Racking Structures

References:

1. Bulgrin, Lon. 2006. *Subsurface Testing and Documentation for Site No. 66-01-2132, a Japanese World War II Cave, Tamuning, Guam*. Prepared for United Seas Overseas Investment Company. Manuscript on file, International Archaeological Research Institute, Inc., Honolulu.
2. Carucci, James. 1993. *The Archaeology of Orote Peninsula: Phase I and II Archaeological Inventory Survey of Areas Proposed for Projects to Accommodate Relocation of Navy Activities from the Philippines to Guam, Mariana Islands*. With contributions by H. David Tuggle, D. Colt Denfeld, J. Stephen Athens, Jerome V. Ward, and Stephen K. Wickler, and with the assistance of Jolie Liston, Richard K. Olmo, and

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- Wendy L. Goodman. Prepared for Belt Collins and Associates. International Archaeological Research Institute, Inc., Honolulu.
3. Craib, John L., and Ann K. Yoklavich. 1996. *Cultural Resources Management Overview Survey, US Naval Activities, Guam Waterfront Annex, Mariana Islands, Territory of Guam*. Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Ogden Environmental and Energy Services Co., Inc., Honolulu.
 4. DeFant, David G. 2008. Early Human Burials from the Naton Beach Site, Tumon Bay, Island of Guam, Mariana Islands. *Journal of Island and Coastal Archaeology* 3:149-153.
 5. Dixon, Boyd, Sam Walker, and Mike Carson. 2011. *Cultural Resources Investigations conducted in the Territory of Guam supporting the Joint Guam Build-up Environmental Impact Statement: Final Archaeological Surveys on Guam 2008-2009 at Air Force Barrigada, Proposed Live Fire Training Range, Andersen South, and Naval Base Guam*. Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. TEC, Inc. and Richard Flores Taitano Micronesia Area Research Center, University of Guam.
 6. Hunter-Anderson, Rosalind L., and Darlene R. Moore. 2002. *Phase I and Phase II Archaeological Survey at Waterfront Annex and Ordnance Annex, Territory of Guam. Volume I: Narrative*. With contributions by Judith R. Amesbury, Shawn K. Collins, Deborah M. Pearsall, Michael W. Kaschko, Gail M. Murakami, Craig E. Skinner, Jerome V. Ward, and Eleanor F. Wells. Prepared for International Archaeological Research Institute, Inc. and Department of the Navy, Pacific Division, Naval Facilities Engineering
 7. Kaschko, Michael W., and David J. Welch. 2002. *Cultural Resources Assessment for Marine Forces Pacific, Andersen South Training Area, Andersen Air Force Base, Mariana Islands, Guam*. Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc., Honolulu.
 8. Lauter-Reinman, Gloria. 1998. *Cultural Resources Management Plan for the Apra Harbor Naval Complex, Guam*. Prepared for Department of the Navy, Pacific Division, Naval Facilities Engineering Command. Ogden Environmental and Energy Services Co., Inc., Honolulu.
 9. Moore, Darlene R. 2002. *Guam's Prehistoric Pottery and Its Chronological Sequence*. Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Micronesia Archaeological Research Services, Guam, under contract to International Archaeological Research Institute, Inc., Honolulu.
 10. Olmo, Richard K., Tina Mangieri, David J. Welch, and Thomas S. Dye. 2000. *Phase II Archaeological Survey and Detailed Recording at Commander, US Forces Marianas (COMNAVMARIANSA) Communication Annex (formerly Naval Computer and*

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Telecommunications Are Master Station, Western Pacific), Territory of Guam, Mariana Islands. Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc., Honolulu.

11. Reinman, Fred M. 1967. *Notes on an Archaeological Survey of Guam, Marianas Islands, 1965-66, Preliminary Report, National Science Foundation Grant 65-662.* Unpublished ms. on file, Department of Anthropology, Field Museum of Natural History, Chicago.
12. Schilz, Allan, J., Richard L. Carrico, Ann K. Yoklavich, and John L. Craib. 1996. *Cultural Resource Management Plan, Andersen Air Force Base, Mariana Islands, Territory of Guam.* Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Ogden Environmental and Energy Services Co., Inc., Honolulu.
13. Welch, David J. (Ed.) 2010. *Archaeological Survey and Cultural Resource Studies Conducted in 2007 on the Island of Guam in Support of the Join Guam Build-Up Environmental Impact Statement.* 2 volumes Prepared for the Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. International Archaeological Research Institute, Inc., Honolulu.

Copy to:
NAVFAC MAR PWD (L. Bulgrin)
Anderson AFB EV (W. Arnold)
NAVFAC PAC EV21 (C. Chang)

Enclosure 2. RC2015-0626 Extension



Eddie B. Calvo
Governor

Ray Tenorio
Lt. Governor

Department of Parks and Recreation

Government of Guam

490 Chalan Palasyo

Agana Heights, Guam 96910

Director's Office: (671) 475-6296/7

Facsimile: (671) 477-0997

Parks Division: (671) 475-6288/9

Guam Historic Resources Division: (671) 475-6294/5

Facsimile: (671) 477-2822



Raymond F.Y. Blas
Director

William N. Reyes
Deputy Director

In reply refer to:
RC2015-0626

June 5, 2015

Mark Bonsavage
Department of Navy
Environmental Business Line Coordinator
Naval Facilities Engineering Command Marinas
PSC 455, Box 195
FPO AP 96540-2937

Subject: NHPA Section 106 Review
Installation and Operation of Photovoltaic Systems at Eight Sites on Guam


Dear Mr. Bonsavage,


We cannot concur with your determination of effect on the subject eight sites at this time. The determinations are based on the *Draft Archaeological Inventory Survey and Subsurface Testing at Multiple Locations in Support of Navy Renewable Energy Projects on Guam* report, which has not been reviewed, nor were we aware of the studies being conducted. In light of this, we are requesting an additional fifteen days to complete our review.

Enclosure 5 does not provide the depths of the pilings or mounting systems for the racking structures, please provide this information.

Should you have any questions, please contact our office.

Sincerely,


Raymond F.Y. Blas
Director


Lynda Bordallo Aguon
State Historic Preservation Officer

Enclosure 3. RC2015-0626 SHPO



Eddie B. Calvo
Governor

Ray Tenorio
Li. Governor

Department of Parks and Recreation
Government of Guam
490 Chalan Palasyo
Agana Heights, Guam 96910
Director's Office: (671) 475-6296/7
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Parks Division: (671) 475-6288/9
Guam Historic Resources Division: (671) 475-6294/5
Facsimile: (671) 477-2822



Raymond F.Y. Blas
Director

William N. Reyes
Deputy Director

In reply refer to:
RC2015-0626

July 24, 2015

Mark Bonsavage
Department of Navy
Environmental Business Line Coordinator
Naval Facilities Engineering Command Marinas
PSC 455, Box 195
FPO AP 96540-2937

Subject: NHPA Section 106 Review
Installation and Operation of Photovoltaic Systems at Eight Sites on Guam and
Review of: Draft Archaeological Inventory Survey and Subsurface Testing at
Multiple Locations in Support of Navy Renewable Energy Projects on Guam.

Dear Mr. Bonsavage:

We've reviewed the subject draft archaeological inventory survey report and reconsidered the NHPA Section 106 Review and have the following comments:

Summary Overview

Overall the report needs to be reevaluated as the Interpretation section presents "A" Horizon's with depths of 50 cm. The areas of potential effect (APE) do not have nor do the photos indicate an "A" Horizon of this depth. "A" Horizons, although they can be buried contain partially decomposed organic matter. A centimeter scale needs to be added to the side of the soil profiles. The report does not represent the presence or absence of historic properties in general. Why is this? Shovel test pits (Stps) did not cover the landscape but were clustered to identify anomalies. Stps placed throughout the landform provide good information on the presence or absence of soil development, soil disturbance and historic properties. We also found that the research conducted was not consistent with the recommendations set forth in the previous studies within the APEs.

The use of Co. as an abbreviation for Contractor is wrong. Please correct with either Contr. or Cr.

The overall Munitions of Explosive Concern (MEC) and/or Material Potentially Presenting an Explosive Hazard (MPPEH) and anomaly avoidance techniques conflicts with identifying buried horizons, or artifacts that indicate historic presence on properties. Such micro-avoidance of anomalies negates implementation of battlefield archaeological methods. These may be appropriate. Take for example Andersen South Lot "A" Site that contains a decaying metal container frame,

which was most likely the source of the ferrous metal signals found throughout the south western section of the lot. These anomalies prevented further investigation of the area.

Finally, the layout of the report is incompatible for reviewing. Once an APE is presented, it should be brought to a conclusion without having to skip ahead 80 pages to view the results. Therefore we highly recommend that you change the format of the document, where the method is laid out in the beginning for the entire project. The description of an APE, should be directly followed by the results of the testing, followed by the opinion surmised from the interpretation. Any change in methodology can be placed at the beginning of the new APE section. This allows a reader and the client the opportunity to not read a repeated cut and pasting of the same paragraphs throughout the document. At the end, a conclusion and discussion section should follow which should indicate any short falls within the study.

More specific comments are found below addressing the draft report, followed by opinions on each of the eight Section 106 renewable energy projects.

Abstract, Page iii: There is a discrepancy in the number of acres presented. The 11 non-continuous parcels are approximately 487.9 acres; however, the second paragraph total is 516.5 acres. The second paragraph indicates 13 parcels rather than 11 parcels, and mentions the Dandan Renewable Energy Project, which is not included in this report. The third paragraph mentions “a single traditional Chamorro pot sherd”, however, there are different types and time sequences for the Chamorro pottery. Please change the word “traditional” and replace it with an appropriate pottery description Latte, Pre-Latte (Unai), or Huyong.

Initial Settlement, Page 6: The common settlement dates for the Mariana Islands have been unchanged since Spohr’s work in 1949-50, long before Carson and Kurashina 2012 or Carson et al. 2014. This is common knowledge and need not be cited especially from a recent context. It should have been one of the minor revisions made in Cochrane’s work. The Mochom site is not “alternatively” known as the Huchunao site, Reinman only states that the area is noted on the 1968 USGS map as Huchunao. This may be a fluke as the 1913-14 map and others maps consistently indicate the area as Mochom. Remember that there is a need to check what you summarize as others may not have the facts correct.

Page 7, the mtDNA study points to mainly Indonesia (Wallacea) populations coming through the Philippines, not strongly from the Philippine Islands. On Page 9, the dates given for the Matapang Beach Park are off as the range given by Bath is 2650-2130 not 2404-2135.

Page 22, Previous Archaeological Investigations: PN-14 was given GHPI number 66-08-2558 back in 2012, please remember to check with our office when doing background research.

Page 25, Andersen South Lot “A” Site: The background research does not indicate the GHPI number 66-04-1098 War Dog Cemetery established in 1944, nor does it account for the three or four buildings and possible well shown on the 1954 map. The road traversing the area should also be considered in the evaluation.

Page 29, South Finegayan Site: In reviewing the Welch 2010 documents on GHPI number 66-08-2316 there is no photographic documentation of the site to back up the claims of non-eligibility. Please provide us some photographic evidence of the site. Latte Park GHPI number 66-08-0141 needs to be considered in the assessment. The report does not mention or cite Birkedal and McCarty’s 1972 *Preliminary Report on the NCS Latte Site, South Finegayan, GU* for the Department of the Navy in the assessment of the parcel. This report indicates that there is a pump

house and midden deposits outside of the footprint of Latte Park; these also need to be included in the assessment.

Page 39, Figure 6: The map indicates there are three sites numbered GHPI 66-03-1889, however, there is only one GHPI number 66-03-1889, the other two sites are mislabeled. Please correct this error. The number 862 indicated on the map does not correspond to any site number in our data base. In checking our records we believe your 862 is GHPI number 66-03-1998, please check your data and consult with our office on the GHPI numbers.

The area for the expansion of the current 250 kW Photovoltaic Filed NBG Site needs to be further tested in the northwest section of the APE. The depositional sequence of this area was not completely identified.

Page 55, Previous Archaeological Investigations: The citation for DeFant 2013 is not found in the Reference section. DeFant's work in 2014 leaves out one important map, the 1954 Engineer, HQ, AFFE, by the 64th Engineer Battalion, which can be found at Micronesian Archaeological Resource Center (G 9415 1954. A4 c.4). The 1954 map shows several buildings and a road located on the property, these should be mentioned in the background history. Recently, structures shown on the 1954 map in the area were found to exist on the landscape and to also be significant.

Page 82, Anticipated Results: As previously noted the Low-Potential maps provided by Welch 2010 based on the 2008 Programmatic Agreement do not offer any justification for such determinations. The information was based mainly on pedestrian survey and since Orote Peninsula was landscaped by the Seabee's after the retaking of Guam the current terrain may be unreliable for the identification of historic properties. This was unfortunately revealed with the destruction of a Japanese defensive site bulldozed in the construction for the new gym. The defensive position was made up of numerous 55 gallon drums set in a ravine that was buried shortly after the battle for Orote. This type of destruction walks the fine line of "anticipatory demolition of historic properties", especially after numerous war dead were found in close proximity to the defensive position and the driver should have been made aware of his surroundings when excavating.

Page 82, Previous Archaeological Investigations: MARS' work in 2002 clearly states that C-8 (MapNO 720) may be part of GHPI number 66-03-1856, which is eligible for listing on the National Register of Historic Places. Therefore, C-8 needs to be investigated to see if it is part of that site. Two buildings appear on the 1954 map directly where GHPI number 66-03-1856 and C-8 are located. C-6 also may be part of this complex as the 1954 map indicates that there are three buildings located here (see attachment 1). Since no detailed research has been conducted on the Guam Dredging Contractor the other building in the area may be part of the Guam Dredging Contractor and should not be discounted until such research had been conducted. A GHPI data form needs to be filled out and submitted to our office once the research is completed for review by our office.

Page 91, Subsurface Testing: Not initially screening the excavated soil is not an efficient and effective way of doing an archaeological test, unless it is a known fill or disturbed deposit.

Pages 91-96: The Survey Methods section describes the areas of survey being limited to a 4 meter swath around the AAFB and Orote Landfills. However, Feature 003 is approximately 40 meters outside the boundary of the AAFB landfill. Are the Survey Methods stated wrongly in the size of the swath around the landfill? Please explain. A historic road that also transected the site should have been mentioned in the background research.

Pages 99-104, Andersen South Lot "A" Site: The random sampling does not appear to be random at all, nor does it present a representative sampling of the parcel. It is hard to believe that the UXO/EOD technician could not find an appropriate place to drop shovel test pits (Stps) in the western section of this parcel. The historic background of the parcel should have focused on the events of August 5 and 6, 1944. Why was this not done? This area was occupied by the 77th Infantry Division during the night of August 5. Neither background research, nor the survey thoroughly examined the areas as a possible defensive position for the 77th Infantry. The 1954 map shows one building on the lot, along with a pond and a quarry feature. The limestone quarry needs to be considered an archaeological site even though it may or may not be significant. A GHPI data form needs to be filled out and submitted to our office. This site is noted on the 1954 map, was it there in 1944 and was it utilized for defensive purposes in 1944? Also, there is no mention of the War Dog Cemetery, GHPI number 66-04-1098 or any testing of that area, which is considered one of the prominent areas on the lot. Therefore we cannot concur with the findings at this time.

Pages 107-120, South Finegayan Site, Surface Survey: If the pottery sherd cannot be assigned to either the Latte or Pre-Latte, then please state this. The random sampling is clustered in areas, where these Stps should have been distributed throughout the parcel to provide a better assessment of the property. GHPI number 66-08-0141 and the two midden deposits near the site have to be included in an assessment of the parcel because the transfer of the property from a residential to a photovoltaic system will adversely impact it. More testing is needed along the southwestern border between the housing and the edge of the APE.

Page 125, Expansion of Current 250 kW Site: The statement that "More extensive excavation may clarify the nature of the depositional sequence;" indicates that though no cultural bearing deposits were found, further testing may indeed find cultural deposits. If further testing is not possible then the north western section of the APE needs to be avoided in consultation with our office.

Page 132-137, NBG Commissary Area Site: In reviewing this portion of the document, we found the methodology to be flawed, since the subsoil or bedrock was never reached in the testing, the presence or absence of a site cannot be determined. The testing only indicates the presence of fill over the area and one cannot definitively say that some portions of Orote Village do not remain under the fill. A backhoe trench or two would have easily identified if the site was present or not. The extremely dense vegetation should have provoked tighter transect intervals.

Pages 143-149, Harmon Booster Station Site: Feature 005 is a feature within a site. We have assigned GHPI number 66-04-2805 to the site. The site is possible noted on the 1954 map. Please fill out a GHPI data form and submit it to our office.

Although the draft report should have been presented long before the Section 106 determination these comments should provide the information needed to achieve an affective outcome to these projects in the future. Though we have reviewed the draft report for all 11 project areas presented, we are only providing opinions on eight projects as requested. Therefore we will not offer an opinion on Andersen AFB Landfill and Utility Corridor, Andersen South Lot "A" and Orote Landfill as these areas are no longer under consideration for development.

Concerning the Section 106 determination Enclosure 5, Racking Structures; the drawings do not present the depth of the concrete pilings or the mounting system to be placed in the ground. There are no plans for the substation complex or the transmission lines either, this information will need to be presented to our office when resubmitting certain Section 106 determinations that were not concurred upon. Since the transmission lines for the projects run outside the projects' APE, these transmission lines have to be considered as part of any directly connecting project. Therefore, if the

transmission line connects directly to a project that was not concurred upon then the transmission line is not concurred upon, since they were not separated out.

Specific opinions on the eight sites presented:

South Finegayan Housing: We concur with the determination of “*no historic properties affected*” on the APE presented in Enclosure 4.

NBG Existing 250 kW PV Site Expansion: The draft report statement “More extensive excavation may clarify the nature of the depositional sequence;” (p.122) indicates that although no cultural bearing deposits were found that further testing may indeed produce cultural deposits. The deposits described in Stp 14 needs to be defined. Buried features from WWII have been discovered under Orote Peninsula’s manicured landscape. If these deposits turn out to be cultural then a GHPI data form will need to be filled out. Therefore we cannot concur with “*no historic properties affect*” at this point in time.

NBG Commissary Site: Areas within this APE are noted by Carucci and Tuggle 1992, “which warrant mitigation in the form of further study” (p. 31). The aspect that fill has covered part of the section does not provide enough evidence that the Orote Village Site does not exist below the fill. The work conducted near TN-8 did not produce the results noted by those of Carucci and Tuggle 1992, nor does the methodology of 10 meter transect interval in “extremely dense” vegetation provide for good identification of historic properties. Transect intervals should have been reduced to 5 meters in areas of “extremely dense” vegetation. There would be no expectation of finding sites in fill, therefore we do not concur with the determination that “*no historic properties affected*” at this time. Once excavations have been conducted below the fill and the area in and around TN-8 has been cleared and tested for the site previously recorded, then we can consider what mitigation would be acceptable for the site. A GHPI data form will need to be filled out for the site once it has been defined.

Harmon Annex: We concur with “*no historic properties affected*” for the Harmon Annex Site.

Harmon Booster Station: We have issued a GHPI number 66-08-2316 for the site found at the Harmon Booster Station, the site needs to be recorded and a GHPI data form filled out. The site is on 1954 maps however, we believe we can agree that the site has lost integrity and therefore we believe we can concur with the “*no historic properties affected*” determination contingent on site recordation and a data form submitted to our office.

Tumon Tank Farm: We concur with “*no historic properties affected*” for the Tumon Tank Farm. However, we ask that caution be used in the northern section of the property where a buried “A” Horizon was found.

Waste Water Treatment Plant (WWTP): The testing methodology was flawed. Stps 1 and 2 indicate that there are fill levels down to 50 cm, the testing stopped short of identifying what is below the fill. Therefore, we cannot concur with “*no historic properties affected*” at this time. However, if this area can be tested below the fill this may resolve our concerns. Our recent meeting with the Japanese Ministry of Health, Labor and Welfare on the subject of Japanese mass burials and the finding of buried defensive positions has raised some concerns for Orote Peninsula.

CDF Site: We cannot concur with the “*no historic properties affected*” for the CDF Site at this time.

As noted above in the review of the draft report, there is no discussion or documentation of the relationship between the Guam Dredging Contractor GHPI number 66-03-1856 and temporary site

C-8 noted in Hunter-Anderson and Moore's 2002 report. These areas need to be fully researched, cleaned, documented and mapped before any decision can be considered on the size of the complex and their possible association. This can also be said for C-6 as three buildings are apparent on the landscape on the 1954 map. These buildings may all be part of the Guam Dredging Contractor GHPI number 66-03-1856 and enclosure 2 did not answer these questions (see Attachment 1).

Please provide corrections for the preliminary draft report. The scope of work for the projects perhaps restricted archaeological inventory survey causing short coming in the data submitted. Hopefully in the future, we can work closer on these projects to make sure they are in line with the previous archaeological studies and concerns of our office.

Should you have any questions please contact our office.

Sincerely,



Raymond F.Y. Blas
Director



Lynda Bordallo Aguon
State Historic Preservation Officer

Appendix B

CZMA Correspondence

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND MARIANAS
PSC 455, BOX 195
FPO AP 96540-2937

5090
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06 May 15

Ms. Lorilee T. Crisotomo
Director
Bureau of Statistics and Plans
P.O. Box 2950
Hagatna, Guam 96932

Subject: NEGATIVE DETERMINATION FOR THE PROPOSED INSTALLATION AND
OPERATION OF PHOTOVOLTAIC SYSTEMS AT EIGHT SITES ON GUAM

Dear Ms. Crisostomo,

The Navy proposes a federal agency activity at eight (8) sites located on federally-owned lands. The Navy determined that the proposed federal activity is a development project outside of Guam's defined coastal zone. This letter provides documentation that the Navy has determined that the proposed activity would not have foreseeable coastal effects to Guam's defined coastal zone per 15 CFR 930, §930.35.

The Navy proposes to lease up to 192 acres of DoD land, on eight separate sites, to Guam Power Authority (GPA) to construct and operate solar photovoltaic (PV) systems producing up to 43.8 MW (direct current [DC]) of solar-generated energy for transmission to the GPA electrical grid. Specifically, GPA would then select a renewable energy contractor to develop eight (8) PV sites: South Finegayan, the existing 250 kilowatt PV site, Commissary Site, Harmon Annex, Harmon Booster Station, Tumon Tank Farm, Wastewater Treatment Plant area, and the Confined Disposal Facility (CDF) Site (see enclosures 1 and 2). It should be noted that the potential exists for the Harmon Annex and Booster Station sites to also be used for Battery Energy Storage Systems (BESS).

The land underlying the PV sites would be leased for 37 years after which time the lease may be renewed or the facilities would be decommissioned. As a statutory requirement of the lease agreement, the Navy will receive in-kind consideration for the leased property. It is intended that this consideration will address the energy security at Naval Base Guam and Andersen Air Force Base through surveys, studies, repair, replacement, or upgrades (or a combination thereof) of the existing electrical distribution systems; distribution system controls to provide the installations with direct access to the renewable generation asset; or other energy conservation measures and maintenance to existing infrastructure at the installations. While the specific scope of the in-kind consideration will be determined through lease negotiation, it is anticipated that these activities would occur within the existing infrastructure or distribution system footprints

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such that no new potential for impact to the Guam Coastal Zone are anticipated. Once the specific considerations are identified, a new review process will be completed to determine if these considerations would have the potential to affect the Guam Coastal Zone.

The purpose of the proposed action is to reduce energy costs and fuel oil dependency, and increase the energy security, operational capability, strategic flexibility and resource availability of DoN installations through the development of renewable energy generating assets on Guam. The proposed action is required to meet the renewable energy standards put forth by the 1 GW Initiative, EPAAct, 10 U.S.C. 2911(e), the 2013 presidential memorandum, and SECNAV, to include the requirement to produce 50 percent of DoN's shore-based energy requirements from alternative sources.

Solar PV panels utilize a packaged assembly of solar cells to harness solar energy (photons) from the sun and generate electricity. The system includes inverters, mounted on concrete pads located throughout the PV array, with its own medium voltage transformer which transmits the power to the PV system's on-site substation. Each PV system may include some type of battery energy storage system (BESS) to balance fluctuations in energy generation caused by weather, seasons, and nighttime darkness. The BESS is located onsite near the PV system's substation. If the two Harmon sites are pursued for BESS without on-site PV, the configuration and components would be comparable. Once all the electricity is collected, the power is transferred via a transmission line to the nearest point of connection (POC) to the GPA utility grid.

The PV panels would be approximately 3.5 foot wide and 5 foot long glass-encased, darkly colored to minimize light reflection. The PV panels would be attached to metal racking structures on foundations. The type of racking structure (stationary versus adjustable) would be determined by the PV contractor during the project's final engineering design. See enclosure (3) for examples of the types of racking structures being considered for this project. During site preparation, surface vegetation would be cleared and grubbed, and where load-bearing foundations are proposed, the ground would be excavated and compacted. Ground disturbance would include the installation of the PV racking system on foundations or piers, trenching for underground electrical cables or installation of transmission line poles, power centers with inverters, substations, foundation work for electrical equipment, site buildings, and miscellaneous civil works (i.e., perimeter fencing post holes, typically 4' deep, to support a 8-foot high chain link fence enclosure and gates.) A new perimeter road and smaller access roads would be constructed to access the solar array in order to maintain the elevated and sloped photovoltaic panels.

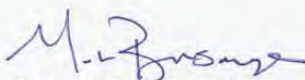
The Navy is preparing an Environmental Assessment and has completed an "effects" test per 15 CFR Part 930 §930.33(a)(1). The Navy assessed reasonably foreseeable direct and indirect effects on Guam's coastal use or resources, reviewed relevant management program enforceable policies, and determined that the project does not have foreseeable coastal effects to Guam's defined coastal zone per 15 CFR 930, §930.35. This notification of negative determination is based on:

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1. The proposed federal activity is located entirely within federal property that by definition is excluded from Guam's coastal zone per 15 CFR 923, §923.33(a), and would not result in spillover effects extending into Guam's coastal zone per 15 CFR 923, §923(b).
2. For the four (4) projects in Southern Guam (see Enclosure 1), the nearest coastal zone is located approximately 3,000 ft (914 m) southeast of the nearest proposed federal activities (Commissary Site). For the four (4) projects in Northern Guam (see Enclosure 1), the nearest coastal zone is immediately adjacent to the proposed sites as these locations share boundaries with non-federal property, which are part of the Coastal Zone per 15 CFR 930, §930.35. However, none of the proposed activities at these locations would spill-over to the adjacent parcels. See Enclosure (2).
3. The proposed federal development is consistent with existing land uses as military mission support.
4. The use of Best Management Practices, such as use of silt containment devices during construction; development of a contingency plan to control and contain spills; daily inspections of equipment for cleanliness and leaks; and implementation of dust suppression measures on all temporary roadways and dump trucks.
5. The proposed activities are similar to previous Navy activities that have been determined to have no coastal effects.

If no response is received from your office within 60 days, the Navy shall presume concurrence with the negative determination per 16 CFR §930.35(c). If you have questions or require additional information about the proposed project, please contact the Kevin Brindock by e-mail at kevin.brindock@fe.navy.mil.

Sincerely,

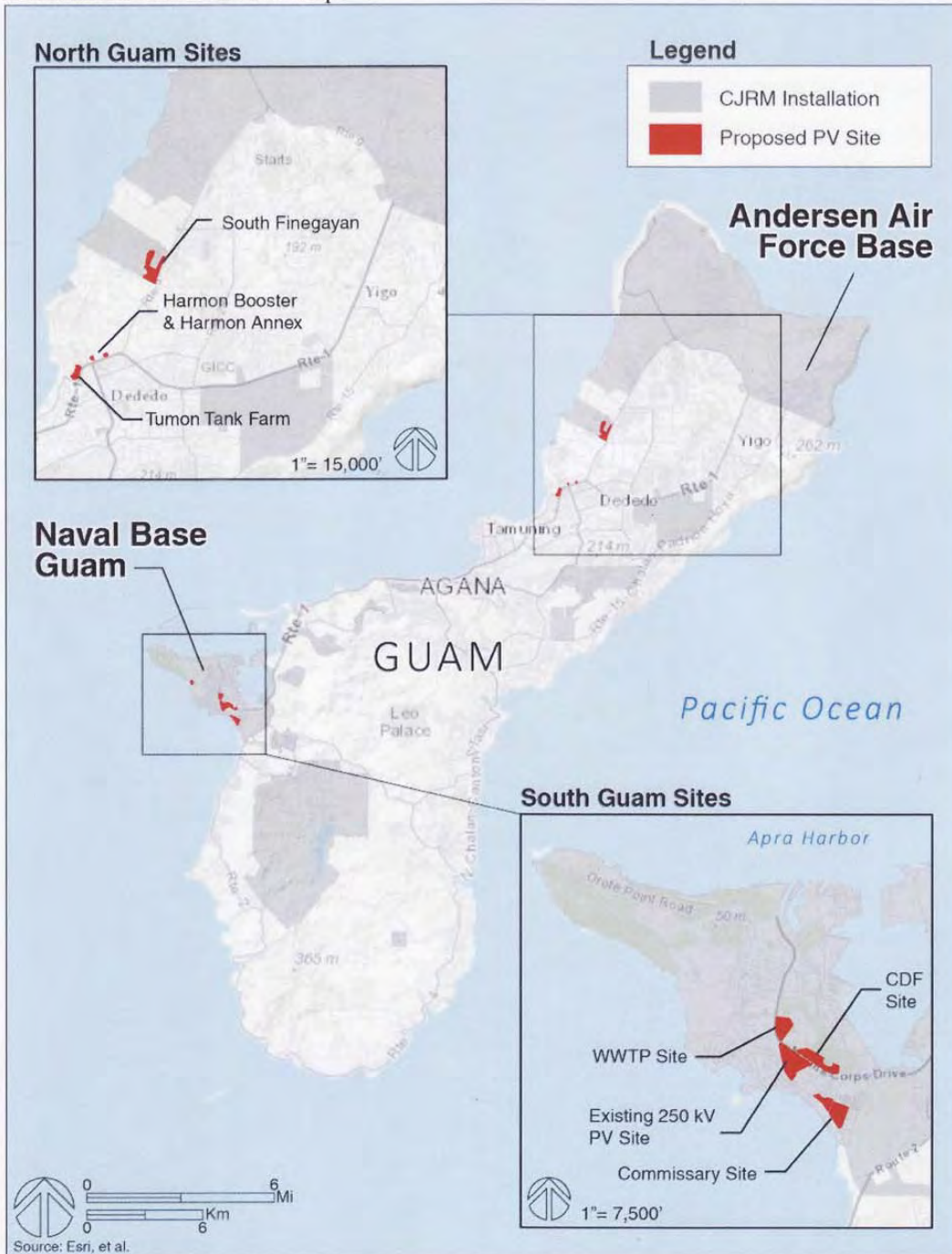


MARK BONSAVAGE
Environmental Business Line Coordinator
By Direction of the Commanding Officer

Enclosures: (1) Site Overview Map
(2) Location Maps
(3) Racking Structures

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Enclosure 1: Site Overview Map



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Enclosure 2: Location Maps



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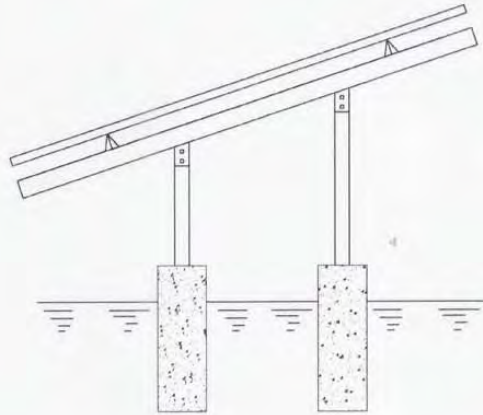


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Ser OPS/2015-001
06 May 15

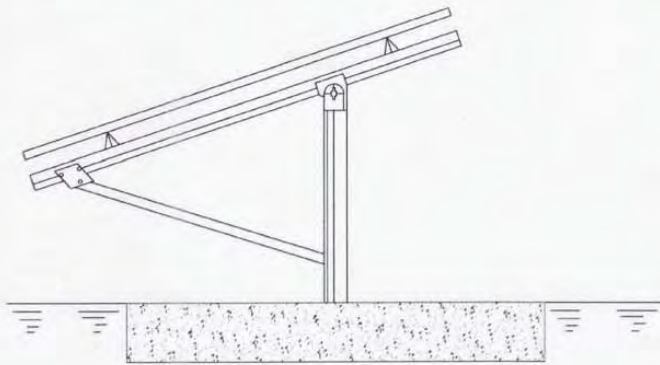


5090
Ser OPS/2015-001
06 May 15

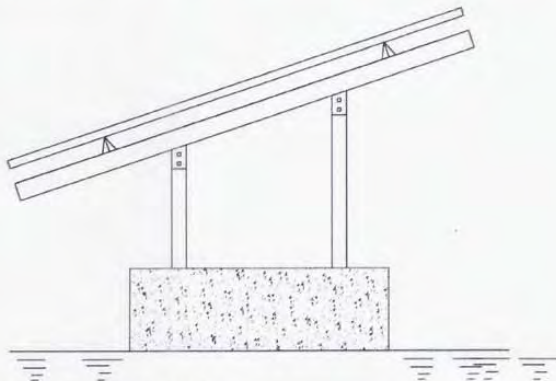
Enclosure 3. Racking Structures



CONCRETE PILINGS
MOUNTING SYSTEM



REINFORCED CONCRETE
MOUNTING SYSTEM



BALLASTED
MOUNTING SYSTEM

Source: Insynergy Engineering, Inc.

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Appendix C

SGHAT Glint and Glare Analysis

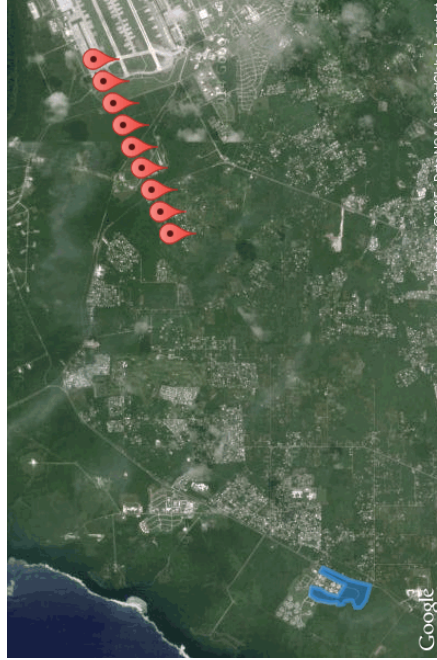
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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 14, 2015, 3:40 p.m.

Flight path: AAFB 6L

Glare found



Analysis & PV array parameters

Analysis name	AAFB. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	66.2
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

21	13.5454172738	144.834018946	352.49	4.0	356.49
----	---------------	---------------	--------	-----	--------

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84
8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2

Flight Path Observation Points

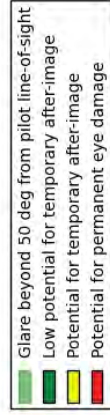
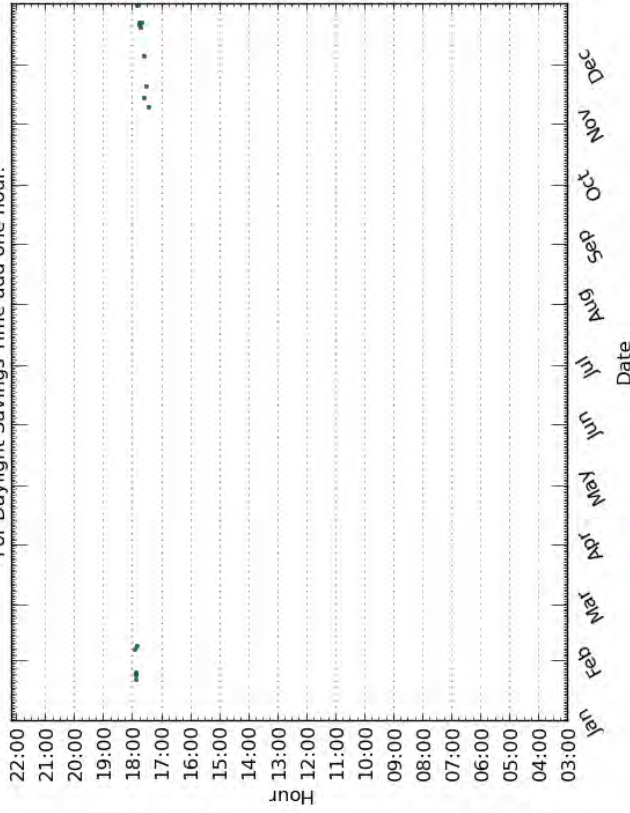
	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.5803670034	144.915637225	530.11	50.0	Yes
1/4 mi	13.5789086942	144.912231715	526.63	122.64	Yes
1/2 mi	13.577450385	144.908826204	490.92	227.55	Yes
3/4 mi	13.5759920758	144.905420694	505.34	282.29	Yes
1 mi	13.5745337666	144.902015184	523.62	333.19	Yes
1 1/4 mi	13.5730754574	144.898609674	550.42	375.58	Yes
1 1/2 mi	13.5716171481	144.895204163	596.06	399.11	Yes
1 3/4 mi	13.5701588389	144.891798653	599.62	464.74	Yes
2 mi	13.5687005297	144.888393143	584.03	549.51	Yes

Glare occurrence plots

All times are in standard time. For Daylight Savings Time add one hour.

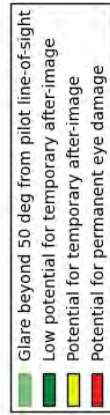
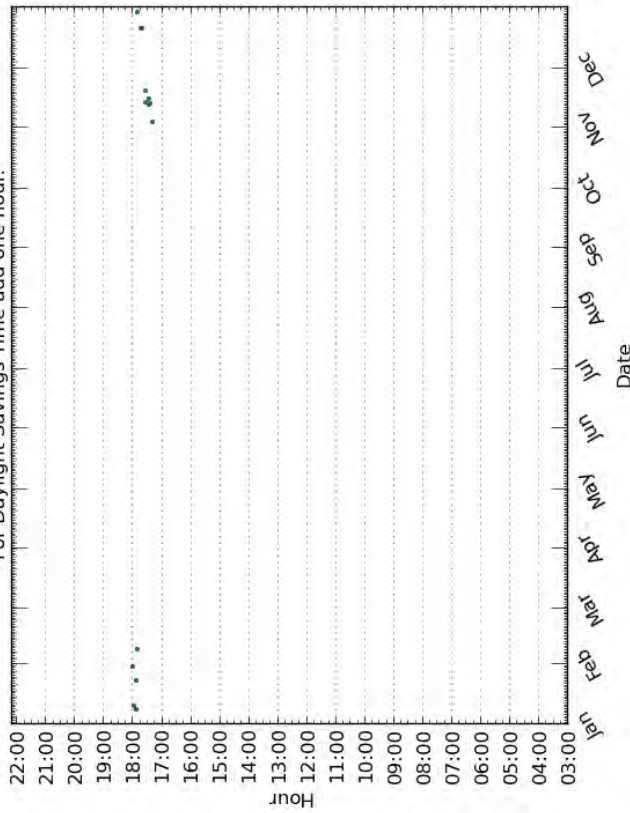
1/4 mi

1--minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.



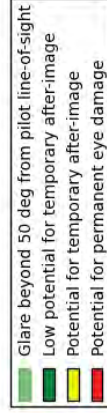
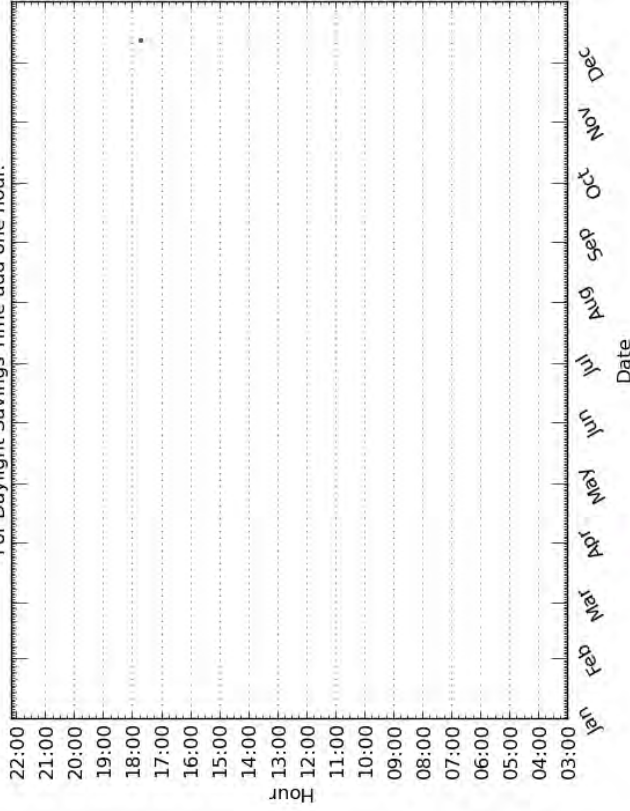
Threshold

1--minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.



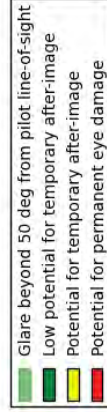
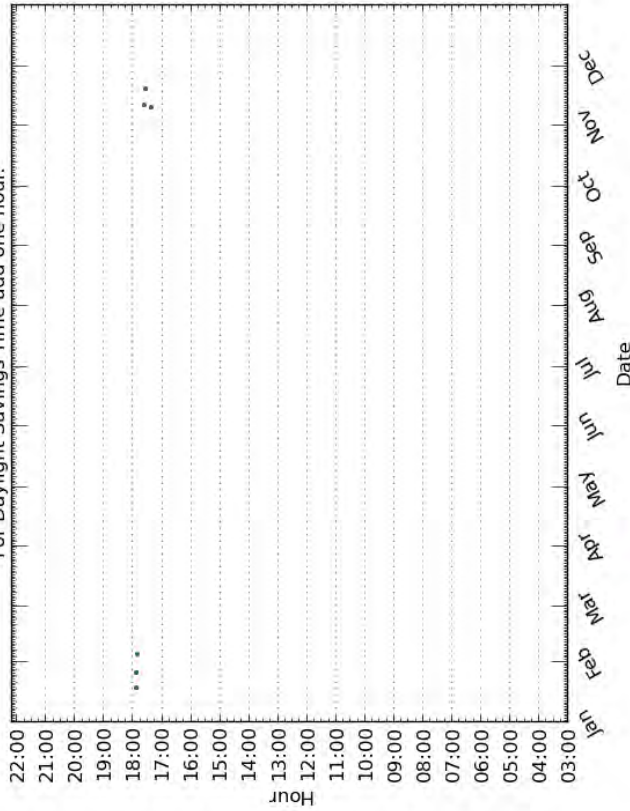
3/4 mi

1-minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.



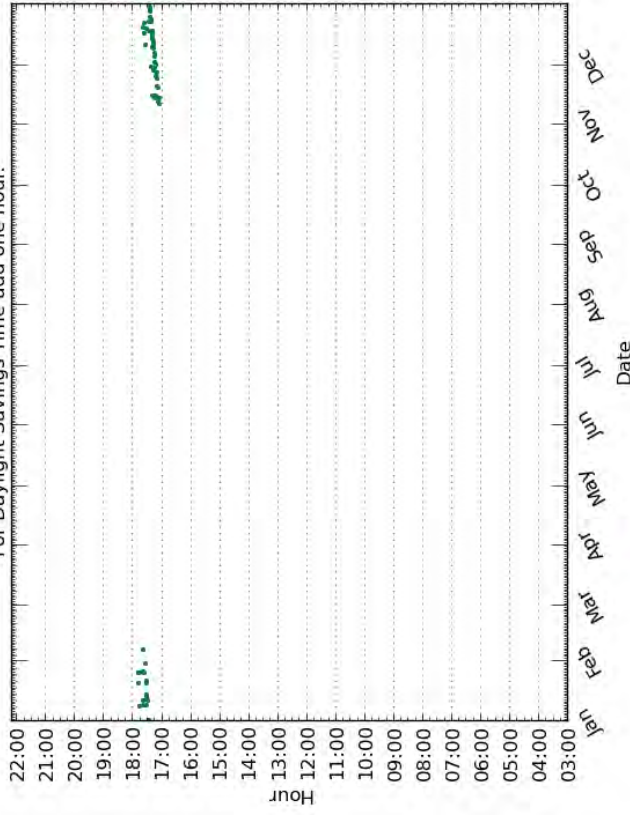
1/2 mi

1-minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.



1 1/4 mi

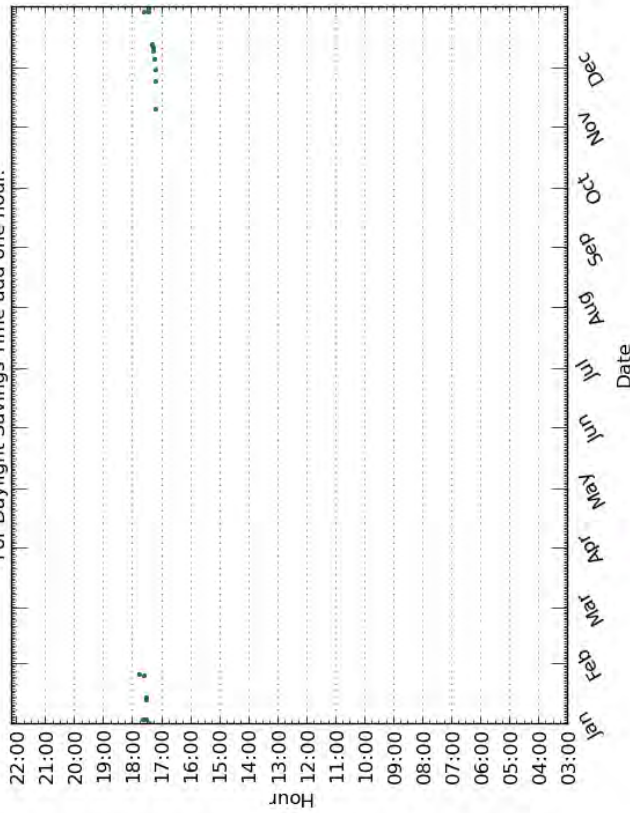
1--minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.



- Glare beyond 50 deg from pilot line-of-sight
- Low potential for temporary after-image
- Potential for temporary after-image
- Potential for permanent eye damage

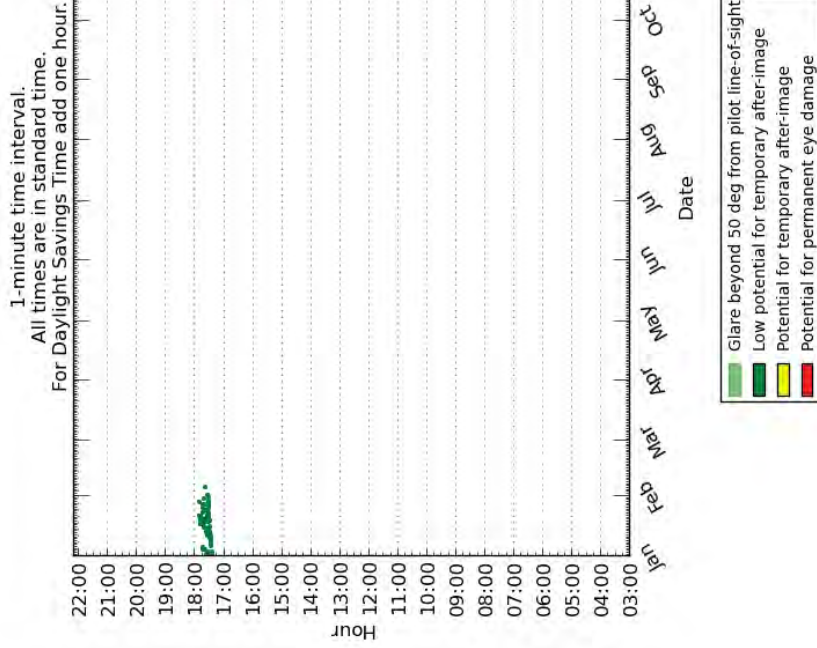
1 mi

1--minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.

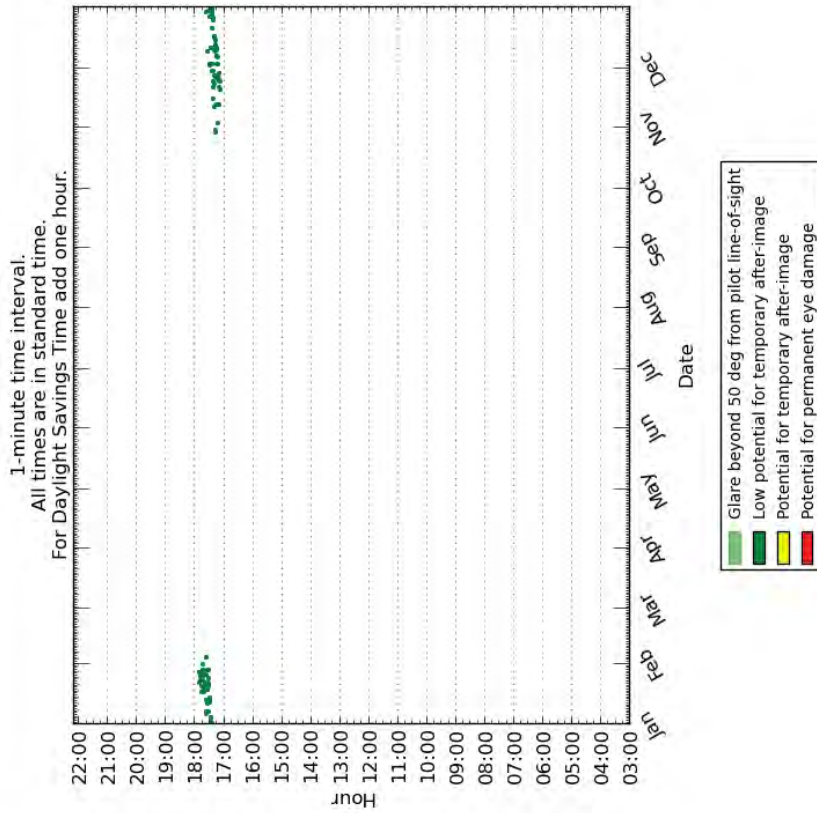


- Glare beyond 50 deg from pilot line-of-sight
- Low potential for temporary after-image
- Potential for temporary after-image
- Potential for permanent eye damage

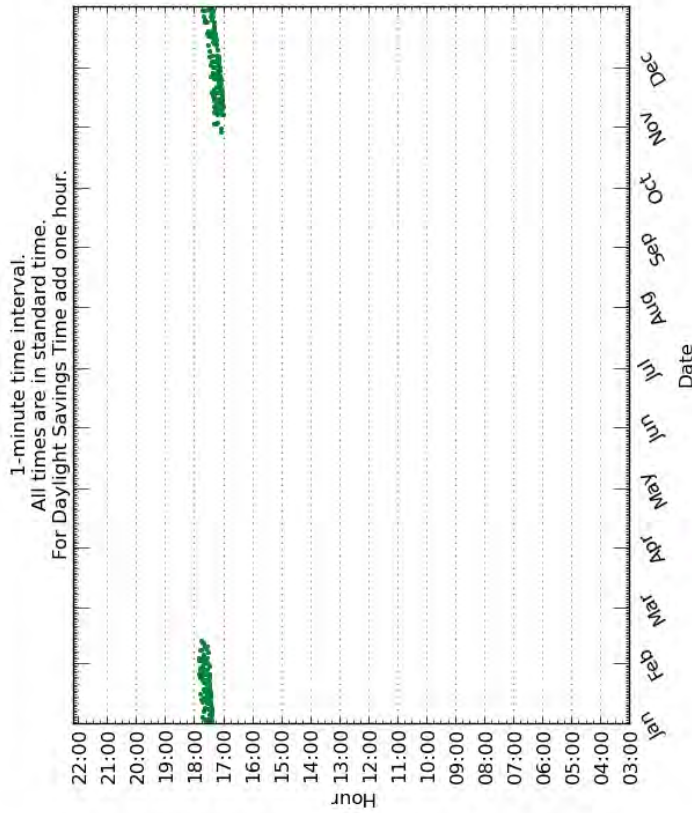
1 3/4 mi



1 1/2 mi



2 mi



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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 14, 2015, 3:40 p.m.

Flight path: AAFB 6R

Glare found

Print



Analysis & PV array parameters

Analysis name	AAFB. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	66.2
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84
8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2

21	13.5454172738	144.834018946	352.49	4.0	356,49
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Flight Path Observation Points

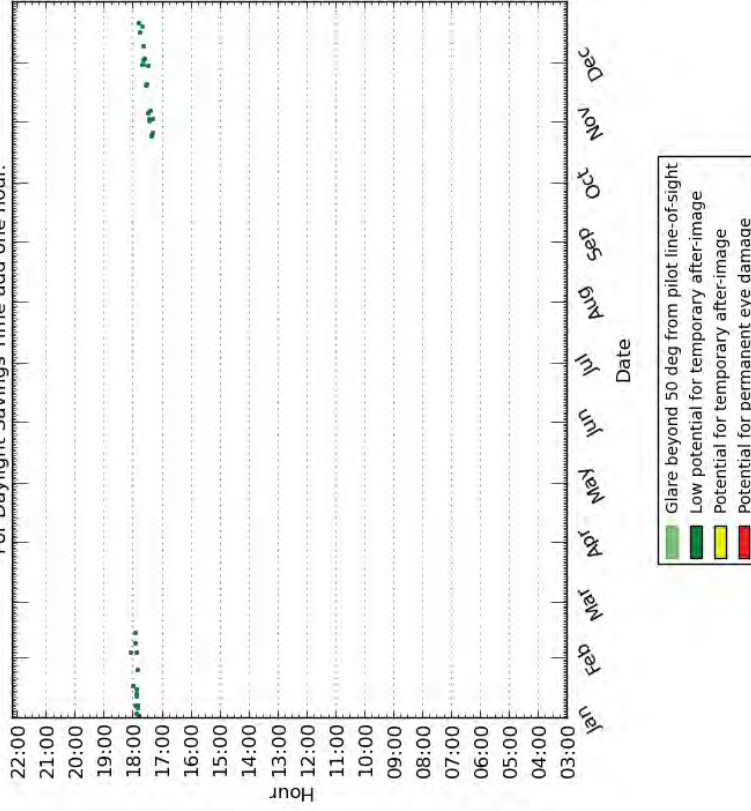
	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.5753298037	144.916500896	547.63	50.0	Yes
1/4 mi	13.5738714945	144.913095458	559.89	106.92	Yes
1/2 mi	13.5724131853	144.90969002	523.25	212.75	Yes
3/4 mi	13.5709548761	144.906284582	501.74	303.43	Yes
1 mi	13.5694965669	144.902879144	580.27	294.07	Yes
1 1/4 mi	13.5680382577	144.899473706	599.31	344.22	Yes
1 1/2 mi	13.5665799485	144.896068268	588.27	424.43	Yes
1 3/4 mi	13.5651216393	144.89266283	615.54	466.35	Yes
2 mi	13.5636633301	144.889257392	586.71	564.35	Yes

Glare occurrence plots

All times are in standard time. For Daylight Savings Time add one hour.

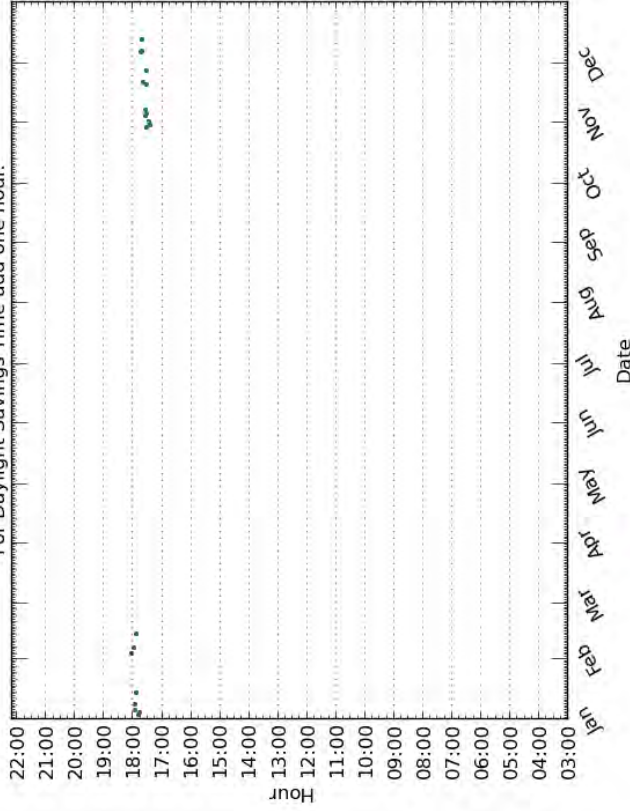
Threshold

1-minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.



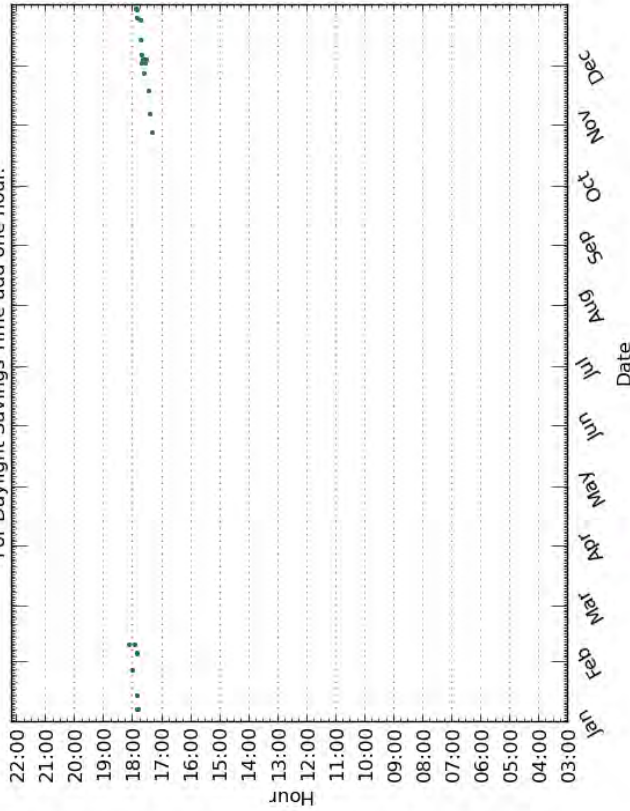
1/2 mi

1--minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.

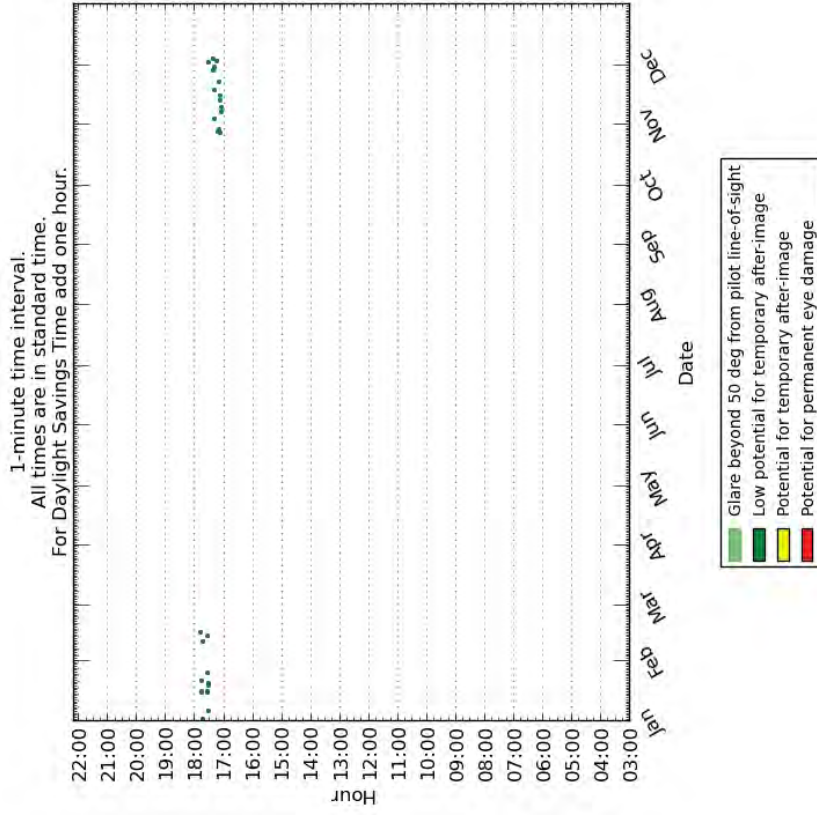


1/4 mi

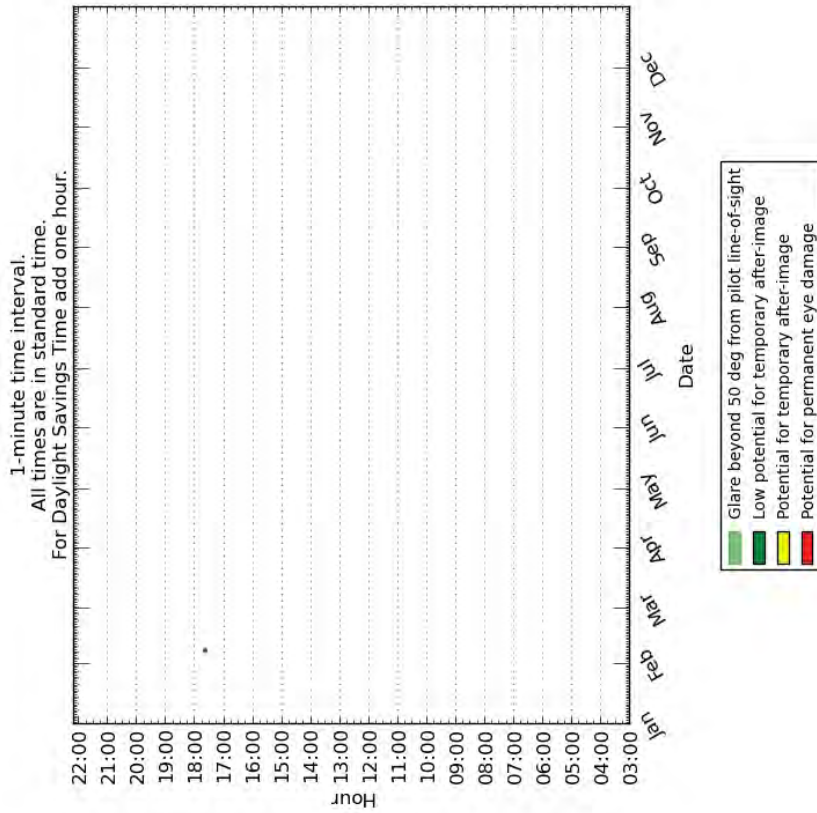
1--minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.



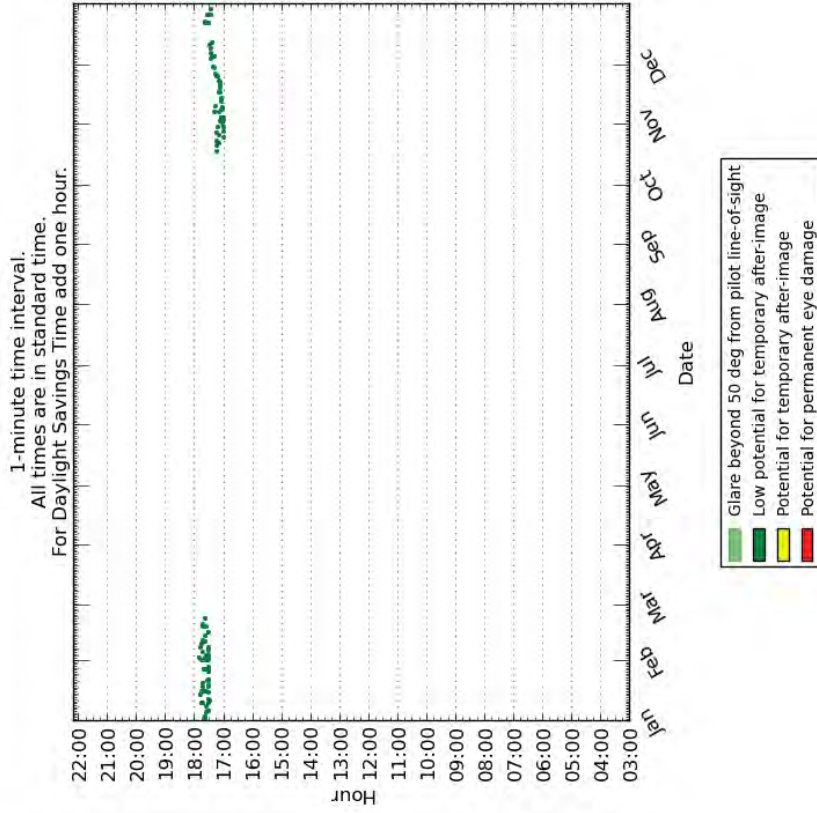
1 mi



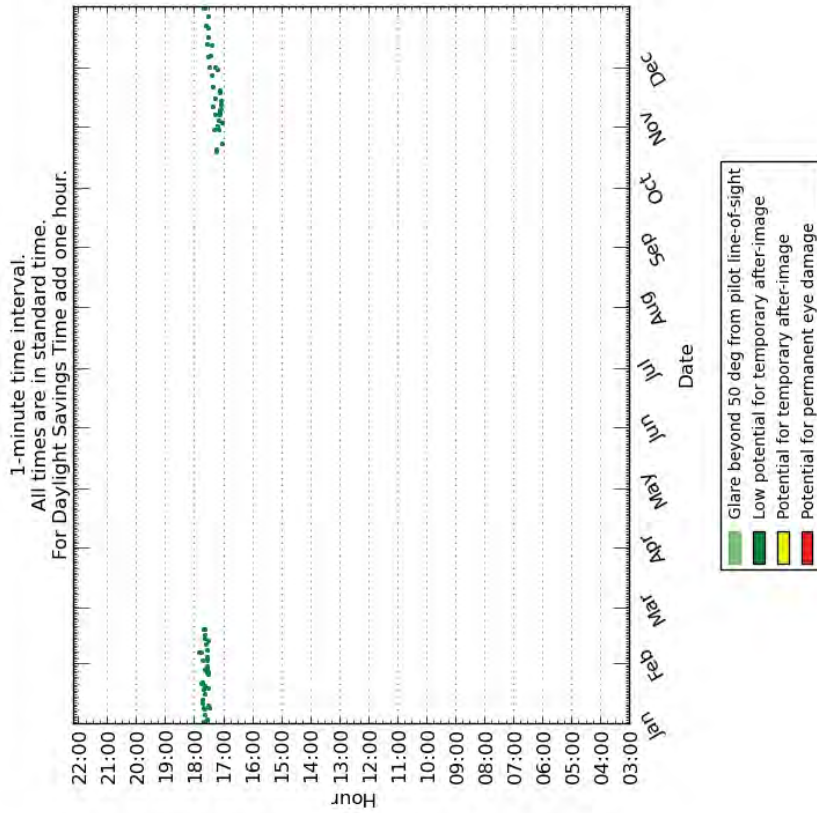
3/4 mi



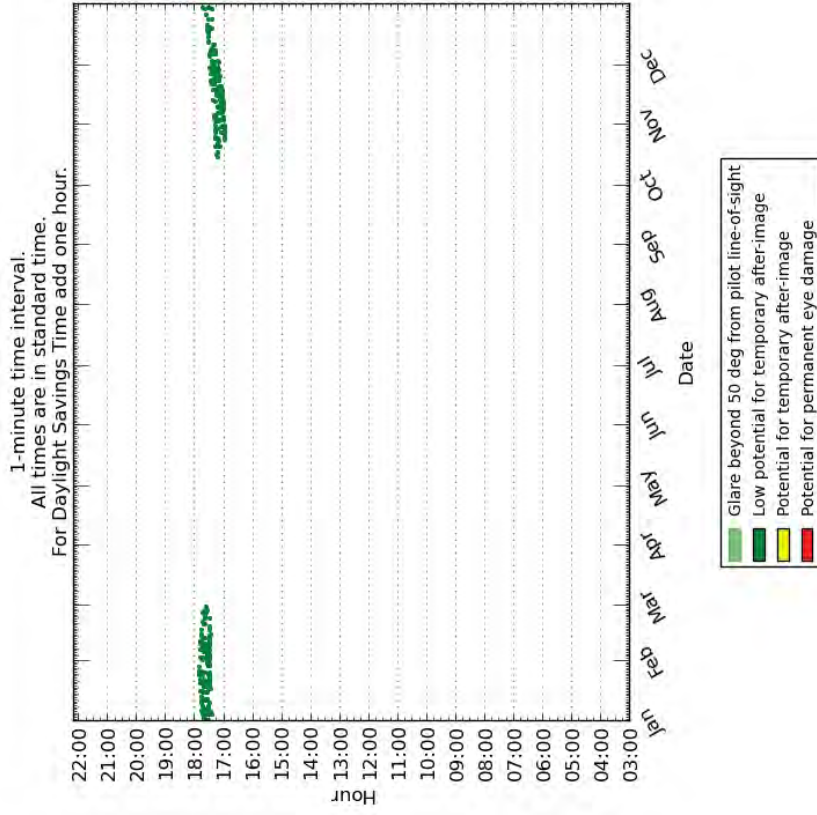
1 1/2 mi



1 1/4 mi

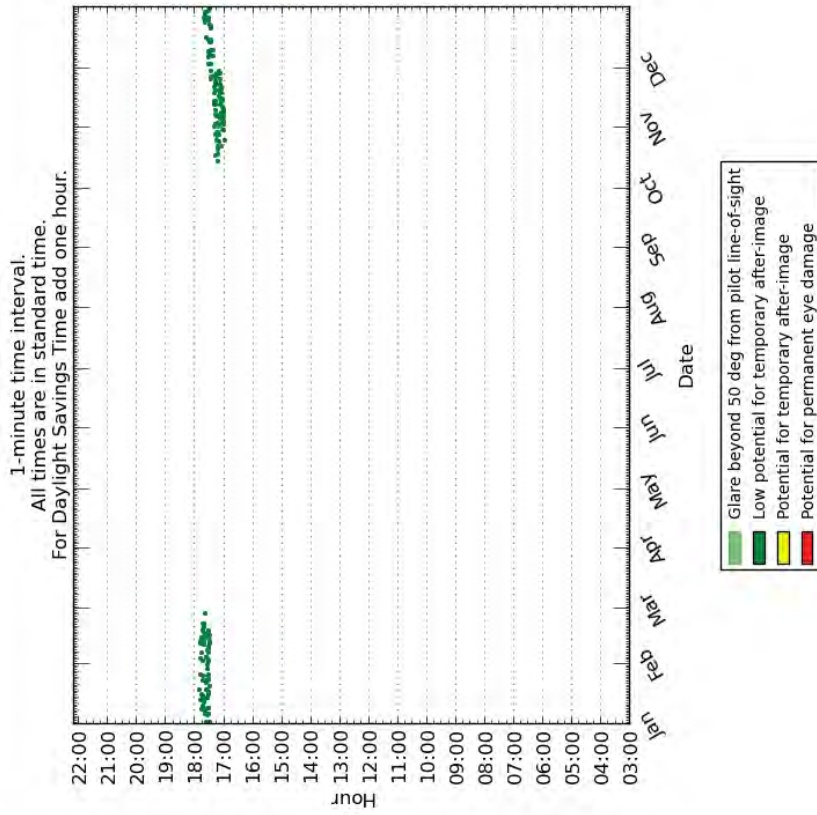


2 mi



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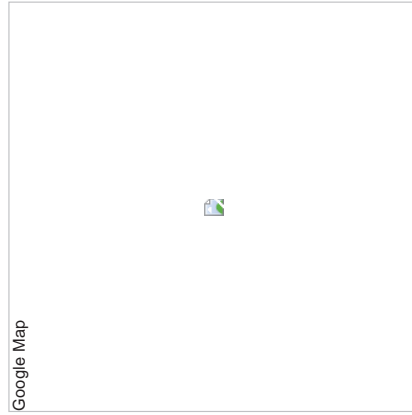
1 3/4 mi



Solar Glare Hazard Analysis Report

Generated Jan. 14, 2015, 3:39 p.m.

Glare found



Inputs

Analysis name	AAFB. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	150.0

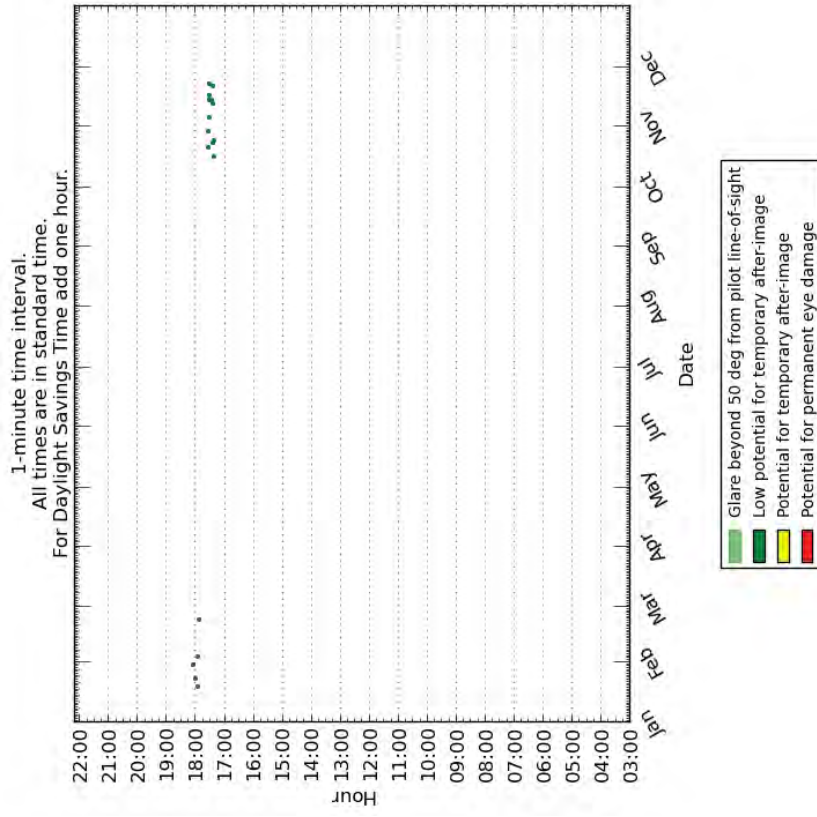
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mirad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mirad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84

8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.548337704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2
21	13.5454172738	144.834018946	352.49	4.0	356.49



1-minute time interval.
All times are in standard time.
For Daylight Savings Time add one hour.

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
Air Traffic Control Tower	13.5753428401	144.930805117	543.21	168.0

Glare Occurrence Plot

All times are in standard time. For Daylight Savings Time add one hour.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 14, 2015, 3:17 p.m.

Flight path: AAFB 6R

No glare found



Analysis & PV array parameters

Analysis name	AAFB. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	66.2
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

21	13.5454172738	144.834018946	352.49	4.0	356.49
----	---------------	---------------	--------	-----	--------

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
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8	13.5512790914	144.83296752	344.32	4.0	348.32
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11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.5753298037	144.916500896	547.63	50.0	No
1/4 mi	13.5739714945	144.913095458	559.89	106.92	No
1/2 mi	13.5724131853	144.90969002	523.25	212.75	No
3/4 mi	13.5709548761	144.906284582	501.74	303.43	No
1 mi	13.5694965669	144.902879144	580.27	294.07	No
1 1/4 mi	13.5680382577	144.899473706	599.31	344.22	No
1 1/2 mi	13.5665799485	144.896068268	588.27	424.43	No
1 3/4 mi	13.5651216393	144.89266283	615.54	466.35	No
2 mi	13.5636633301	144.889257392	586.71	564.35	No

No glare found.

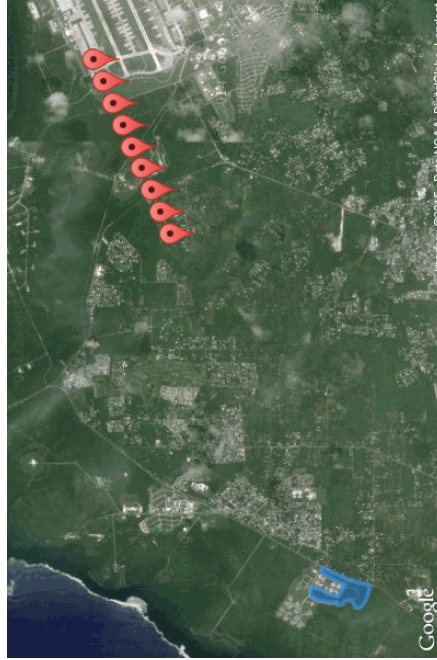
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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 14, 2015, 3:17 p.m.

Flight path: AAFB 6L

No glare found



Analysis & PV array parameters

Analysis name	AAFB. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	66.2
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

21	13.5454172738	144.834018946	352.49	4.0	356.49
----	---------------	---------------	--------	-----	--------

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84
8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.5803670034	144.915637225	530.11	50.0	No
1/4 mi	13.5789086942	144.912231715	526.63	122.64	No
1/2 mi	13.577450385	144.908826204	490.92	227.55	No
3/4 mi	13.5759920758	144.905420694	505.34	282.29	No
1 mi	13.5745337666	144.902015184	523.62	333.19	No
1 1/4 mi	13.5730754574	144.898609674	550.42	375.58	No
1 1/2 mi	13.5716171481	144.895204163	596.06	399.11	No
1 3/4 mi	13.5701588389	144.891798653	599.62	464.74	No
2 mi	13.5687005297	144.888393143	584.03	549.51	No

No glare found.

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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 14, 2015, 3:17 p.m.

Flight path: AAFB 6R

No glare found



Analysis & PV array parameters

Analysis name	AAFB. . south. finegayan
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	66.2
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

21	13.5454172738	144.834018946	352.49	4.0	356.49
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PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84
8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.5753298037	144.916500896	547.63	50.0	No
1/4 mi	13.5739714945	144.913095458	559.89	106.92	No
1/2 mi	13.5724131853	144.90969002	523.25	212.75	No
3/4 mi	13.5709548761	144.906284582	501.74	303.43	No
1 mi	13.5694965669	144.902879144	580.27	294.07	No
1 1/4 mi	13.5680382577	144.899473706	599.31	344.22	No
1 1/2 mi	13.5665799485	144.896068268	588.27	424.43	No
1 3/4 mi	13.5651216393	144.89266283	615.54	466.35	No
2 mi	13.5636633301	144.889257392	586.71	564.35	No

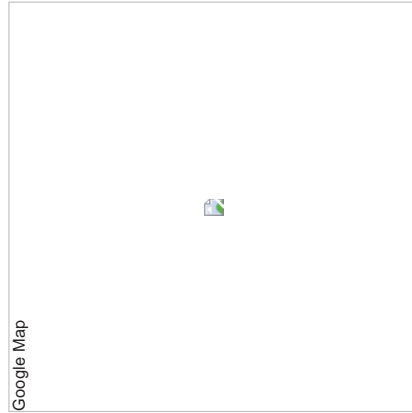
No glare found.

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Solar Glare Hazard Analysis Report

Generated Jan. 14, 2015, 3:16 p.m.

No glare found



Inputs

Analysis name	AAFB. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	180.0

Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mirad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mirad)	10.0

PV array vertices

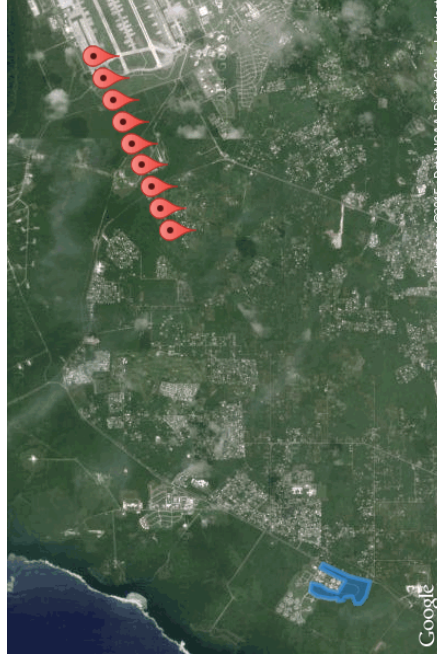
id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 14, 2015, 4:04 p.m.

Flight path: AAFB 6L

No glare found



8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2
21	13.5454172738	144.834018946	352.49	4.0	356.49

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
Air Traffic Control Tower	13.5753428401	144.930805117	543.21	168.0

No glare found.

Analysis & PV array parameters

Analysis name	AAFB. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	66.2
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84
8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2

21	13.5454172738	144.834018946	352.49	4.0	356.49
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Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.5803670034	144.915637225	530.11	50.0	No
1/4 mi	13.5789086942	144.912231715	526.63	122.64	No
1/2 mi	13.577450385	144.908826204	490.92	227.55	No
3/4 mi	13.5759920758	144.905420694	505.34	282.29	No
1 mi	13.5745337666	144.902015184	523.62	333.19	No
1 1/4 mi	13.5730754574	144.898609674	550.42	375.58	No
1 1/2 mi	13.5716171481	144.895204163	596.06	399.11	No
1 3/4 mi	13.5701588389	144.891798653	599.62	464.74	No
2 mi	13.5687005297	144.888393143	584.03	549.51	No

No glare found.

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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 14, 2015, 4:05 p.m.

Flight path: AAFB 6R

No glare found



Analysis & PV array parameters

Analysis name	AAFB. . south. finegayan
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	66.2
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84
8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2

21	13.5454172738	144.834018946	352.49	4.0	356.49
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Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.5753298037	144.916500896	547.63	50.0	No
1/4 mi	13.5738714945	144.913095458	559.89	106.92	No
1/2 mi	13.5724131853	144.90969002	523.25	212.75	No
3/4 mi	13.5709548761	144.906284582	501.74	303.43	No
1 mi	13.5694965669	144.902879144	580.27	294.07	No
1 1/4 mi	13.5680382577	144.899473706	599.31	344.22	No
1 1/2 mi	13.5665799485	144.896068268	588.27	424.43	No
1 3/4 mi	13.5651216393	144.89266283	615.54	466.35	No
2 mi	13.5636633301	144.889257392	586.71	564.35	No

No glare found.

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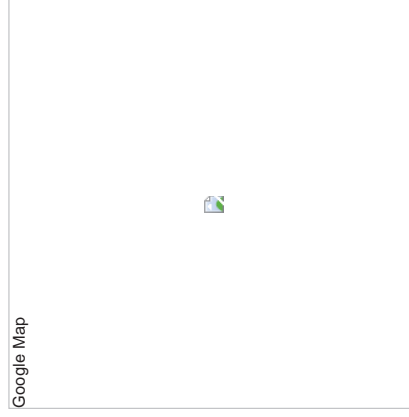
Solar Glare Hazard Analysis Report

Generated Jan. 14, 2015, 4:04 p.m.

No glare found



Google Map



Inputs

Analysis name	AAF.B. south. finegayan
PV array axis tracking	none
Orientation of array (deg)	210.0

Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC
Timezone offset	10.0
Subtended angle of sun (mirad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mirad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5495476799	144.836035967	372.43	4.0	376.43
2	13.5499231678	144.835349321	366.07	4.0	370.07
3	13.5476285102	144.834018946	344.38	4.0	348.38
4	13.5461682621	144.833289385	347.06	4.0	351.06
5	13.547232158	144.831508398	333.74	4.0	337.74
6	13.5487341207	144.831851721	331.03	4.0	335.03
7	13.5499023073	144.832645655	340.84	4.0	344.84

8	13.5512790914	144.83296752	344.32	4.0	348.32
9	13.5514876943	144.831701517	330.1	4.0	334.1
10	13.5504655381	144.830950499	331.52	4.0	335.52
11	13.5483377704	144.830521345	331.53	4.0	335.53
12	13.5473364613	144.830585718	327.88	4.0	331.88
13	13.54729474	144.830156565	332.37	4.0	336.37
14	13.5463768695	144.830263853	315.4	4.0	319.4
15	13.5462517051	144.830735922	314.8	4.0	318.8
16	13.5450626397	144.830886126	314.89	4.0	318.89
17	13.5446037006	144.829705954	319.6	4.0	323.6
18	13.5437692635	144.829770327	320.02	4.0	324.02
19	13.5429556846	144.83084321	330.42	4.0	334.42
20	13.5423298528	144.833225012	337.2	4.0	341.2
21	13.5454172738	144.834018946	352.49	4.0	356.49

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
Air Traffic Control Tower	13.5753428401	144.930805117	543.21	168.0

No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:44 p.m.

Flight path: 24L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.52335541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.81444689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.821223278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	362.27	542.11	No

No glare found.

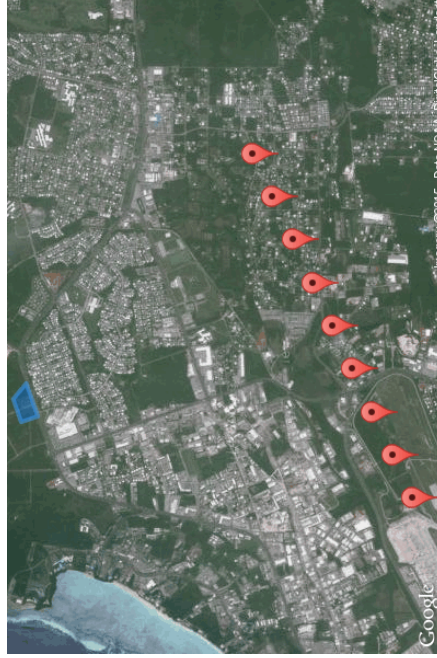
Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:44 p.m.

Flight path: 24R

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.5235541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.822173394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

No glare found.

Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 2:43 p.m.

No glare found



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.5235541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Observation Points

Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95
			300.0

No glare found.

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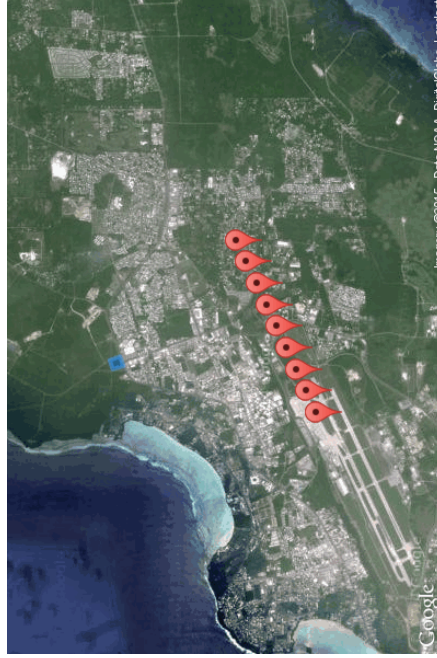
Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:57 p.m.

Flight path: 24L

No glare found

 Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.821223278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	352.27	542.11	No

No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:56 p.m.

Flight path: 24R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.52335541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

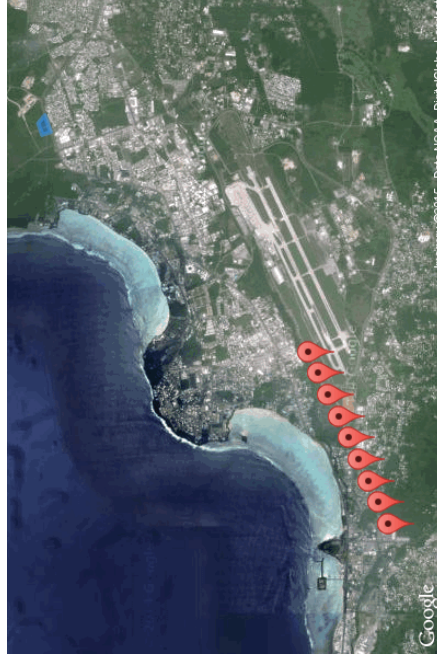
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:40 p.m.

Flight path: 6L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.5235541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4789245692	144.784057438	237.77	50.0	No
1/4 mi	13.4773939063	144.780687216	208.62	148.32	No
1/2 mi	13.4758632434	144.777316993	205.16	220.97	No
3/4 mi	13.4743325805	144.773946771	175.68	319.62	No
1 mi	13.4728019176	144.770576548	140.53	423.94	No
1 1/4 mi	13.4712712546	144.767206326	74.93	558.73	No
1 1/2 mi	13.4697405917	144.763836103	10.39	692.45	No
1 3/4 mi	13.4682099288	144.760465881	13.44	758.59	No
2 mi	13.4666792659	144.757095659	12.01	829.19	No

No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:40 p.m.

Flight path: 6R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.52335541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4771639403	144.78486076	229.31	50.0	No
1/4 mi	13.4756332774	144.781490562	215.91	132.57	No
1/2 mi	13.4741026145	144.778120365	195.79	221.88	No
3/4 mi	13.4725719516	144.774750167	147.31	339.53	No
1 mi	13.4710412887	144.771379969	112.33	443.69	No
1 1/4 mi	13.4695106257	144.768009772	15.76	609.44	No
1 1/2 mi	13.4679799628	144.764639574	31.29	663.09	No
1 3/4 mi	13.4664492999	144.761269376	9.82	753.74	No
2 mi	13.464918637	144.757899179	15.99	816.74	No

No glare found.

Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 2:55 p.m.

No glare found

 Print



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material	Smooth glass without ARC
Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.5235541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Observation Points

Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95
			300.0

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 5:06 p.m.

Flight path: 24L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.5235541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.821223278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	352.27	542.11	No

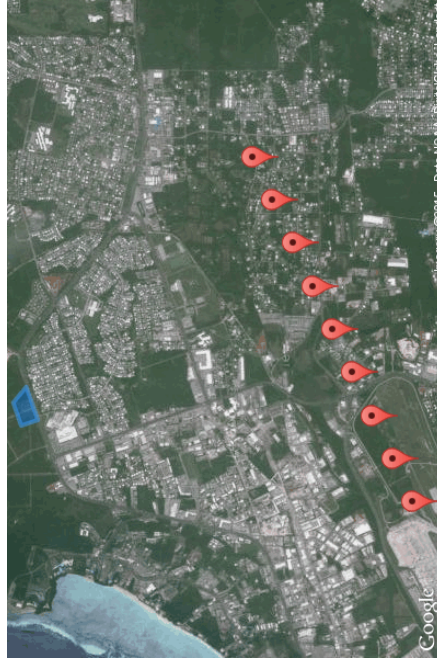
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 5:06 p.m.

Flight path: 24R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.52335541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

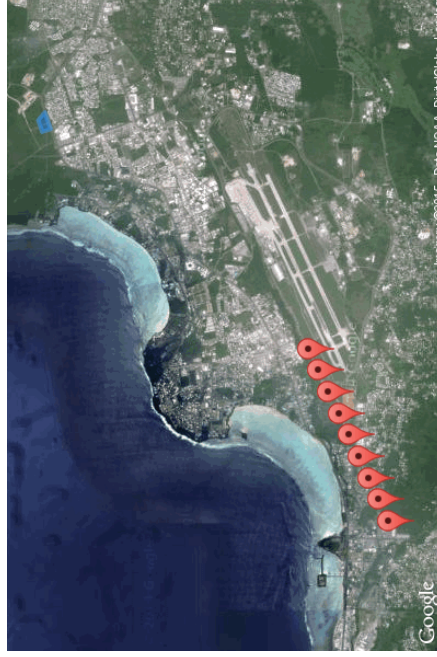
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:18 p.m.

Flight path: 6L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.5235541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4789245692	144.784057438	237.77	50.0	No
1/4 mi	13.4773939063	144.780687216	208.62	148.32	No
1/2 mi	13.4758632434	144.777316993	205.16	220.97	No
3/4 mi	13.4743325805	144.773946771	175.68	319.62	No
1 mi	13.4728019176	144.770576548	140.53	423.94	No
1 1/4 mi	13.4712712546	144.767206326	74.93	558.73	No
1 1/2 mi	13.4697405917	144.763836103	10.39	692.45	No
1 3/4 mi	13.4682099288	144.760465881	13.44	758.59	No
2 mi	13.4666792659	144.757095659	12.01	829.19	No

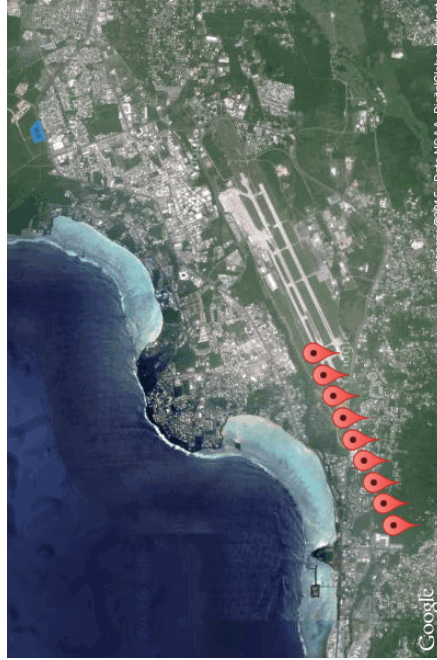
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:18 p.m.

Flight path: 6R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.52335541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4771639403	144.78486076	229.31	50.0	No
1/4 mi	13.4756332774	144.781490562	215.91	132.57	No
1/2 mi	13.4741026145	144.778120365	195.79	221.88	No
3/4 mi	13.4725719516	144.774750167	147.31	339.53	No
1 mi	13.4710412887	144.771379969	112.33	443.69	No
1 1/4 mi	13.4695106257	144.768009772	15.76	609.44	No
1 1/2 mi	13.4679799628	144.764639574	31.29	663.09	No
1 3/4 mi	13.4664492999	144.761269376	9.82	753.74	No
2 mi	13.464918637	144.757899179	15.99	816.74	No

No glare found.

Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 5:05 p.m.

No glare found

Print



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

No glare found.

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PV surface material Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5222815024	144.818387032	260.54	4.0	264.54
2	13.5235541326	144.817947149	269.06	4.0	273.06
3	13.5241591511	144.819749594	257.4	4.0	261.4
4	13.5231681717	144.82098341	267.14	4.0	271.14

Observation Points

Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95
			300.0

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:45 p.m.

Flight path: 24L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.81444689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.821223278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997456752	144.834732035	362.27	542.11	No

No glare found.

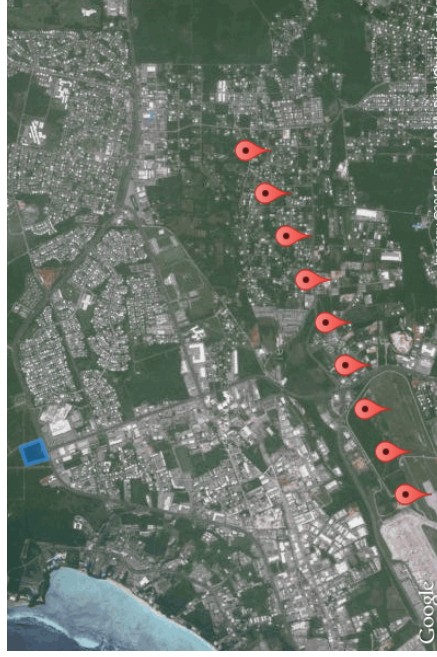
Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:45 p.m.

Flight path: 24R

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.822173394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

No glare found.

Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 2:44 p.m.

No glare found



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.8116316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Observation Points

Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
13.478828061	144.79699105	241.95	300.0

No glare found.

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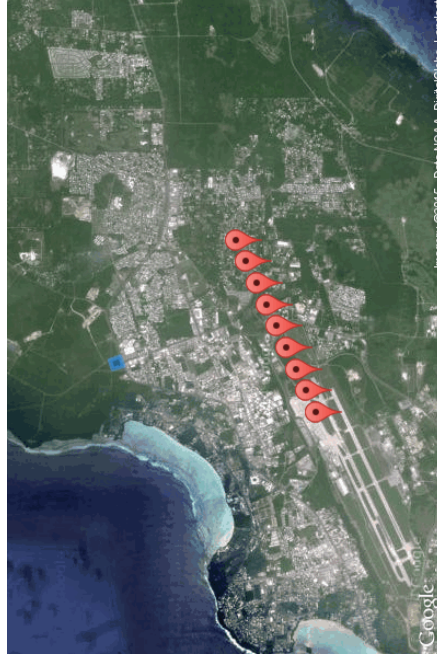
Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 7:11 p.m.

Flight path: 2

No glare found

 Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.821223278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	352.27	542.11	No

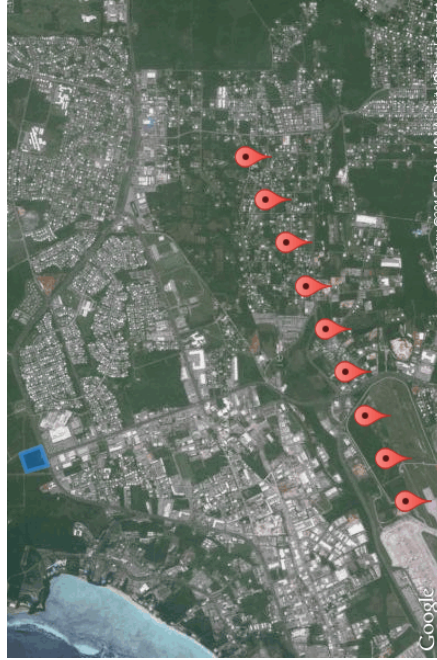
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:57 p.m.

Flight path: 24R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

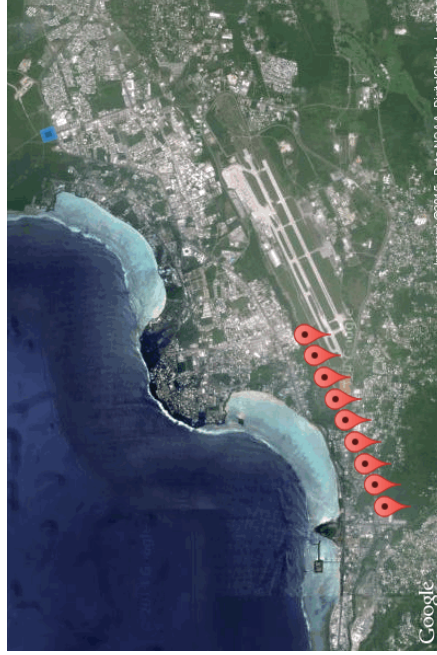
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:41 p.m.

Flight path: 6L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4789245692	144.784057438	237.77	50.0	No
1/4 mi	13.4773939063	144.780687216	208.62	148.32	No
1/2 mi	13.4758632434	144.777316993	205.16	220.97	No
3/4 mi	13.4743325805	144.773946771	175.68	319.62	No
1 mi	13.4728019176	144.770576548	140.53	423.94	No
1 1/4 mi	13.4712712546	144.767206326	74.93	558.73	No
1 1/2 mi	13.4697405917	144.763836103	10.39	692.45	No
1 3/4 mi	13.4682099288	144.760465881	13.44	758.59	No
2 mi	13.4666792659	144.757095659	12.01	829.19	No

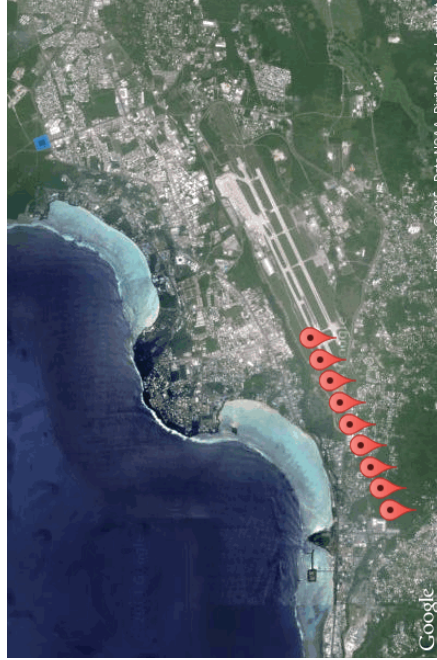
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:41 p.m.

Flight path: 6R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4771639403	144.78486076	229.31	50.0	No
1/4 mi	13.4756332774	144.781490562	215.91	132.57	No
1/2 mi	13.4741026145	144.778120365	195.79	221.88	No
3/4 mi	13.4725719516	144.774750167	147.31	339.53	No
1 mi	13.4710412887	144.771379969	112.33	443.69	No
1 1/4 mi	13.4695106257	144.768009772	15.76	609.44	No
1 1/2 mi	13.4679799628	144.764639574	31.29	663.09	No
1 3/4 mi	13.4664492999	144.761269376	9.82	753.74	No
2 mi	13.464918637	144.757899179	15.99	816.74	No

No glare found.

Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 2:56 p.m.

No glare found



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

No glare found.

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PV surface material Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Observation Points

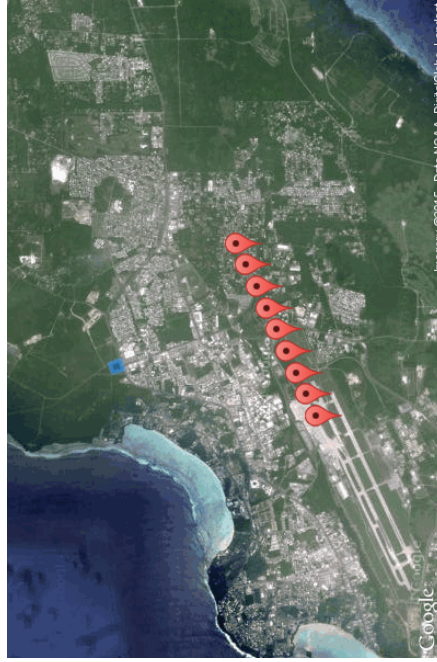
Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95
			300.0

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 5:07 p.m.

Flight path: 24L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.81444689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.821223278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	362.27	542.11	No

No glare found.

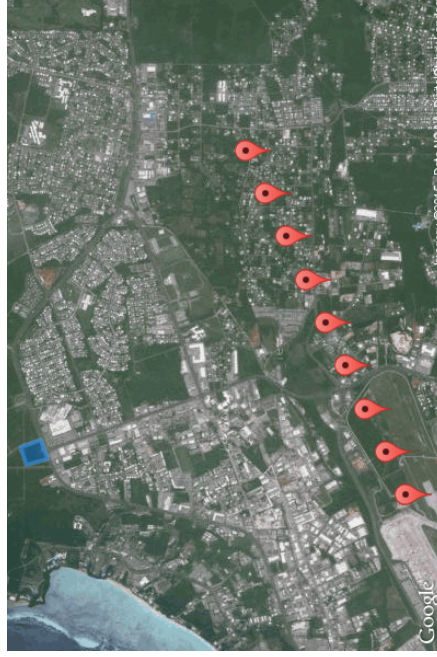
Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 5:07 p.m.

Flight path: 24R

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.822173394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

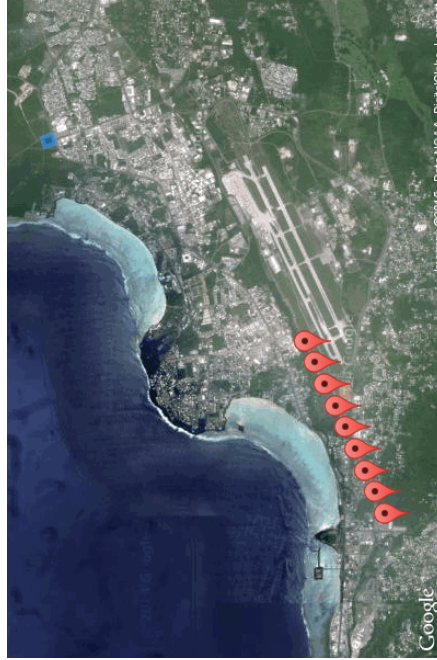
No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:19 p.m.

Flight path: 6L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4789245692	144.784057438	237.77	50.0	No
1/4 mi	13.4773939063	144.780687216	208.62	148.32	No
1/2 mi	13.4756632434	144.777316993	205.16	220.97	No
3/4 mi	13.4743325805	144.773946771	175.68	319.62	No
1 mi	13.4728019176	144.770576548	140.53	423.94	No
1 1/4 mi	13.4712712546	144.767206326	74.93	558.73	No
1 1/2 mi	13.4697405917	144.763836103	10.39	692.45	No
1 3/4 mi	13.4682099288	144.760465881	13.44	758.59	No
2 mi	13.4666792659	144.757095659	12.01	829.19	No

No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:19 p.m.

Flight path: 6R

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	0.0
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4771639403	144.78486076	229.31	50.0	No
1/4 mi	13.4756332774	144.781490562	215.91	132.57	No
1/2 mi	13.4741026145	144.778120365	195.79	221.88	No
3/4 mi	13.4725719516	144.774750167	147.31	339.53	No
1 mi	13.4710412887	144.771379969	112.33	443.69	No
1 1/4 mi	13.4695106257	144.768009772	15.76	609.44	No
1 1/2 mi	13.4679799628	144.764639574	31.29	663.09	No
1 3/4 mi	13.4664492999	144.761269376	9.82	753.74	No
2 mi	13.464918637	144.757899179	15.99	816.74	No

No glare found.

Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 5:06 p.m.

No glare found



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5215513017	144.816316366	260.58	4.0	264.58
2	13.5210192969	144.814825058	258.85	4.0	262.85
3	13.5226570333	144.81434226	258.11	4.0	262.11
4	13.5231160147	144.81572628	270.0	4.0	274.0

Observation Points

Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
13.478828061	144.79699105	241.95	300.0

No glare found.

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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 8:59 p.m.

Flight path: 24L

No glare found

 Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.83422794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45
11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.5443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.82123278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	352.27	542.11	No

No glare found.

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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 8:58 p.m.

Flight path: 24R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.83422794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45
11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.5443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

No glare found.

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Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 8:58 p.m.

No glare found



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
11	13.5436858197	144.829759598	320.72	4.0
12	13.54443533698	144.829545021	317.34	4.0
13	13.5448331702	144.830231667	313.44	4.0
14	13.5454172738	144.83093977	311.36	4.0
15	13.5462517051	144.830703735	314.68	4.0
16	13.5466063375	144.830338955	316.97	4.0
17	13.5485255154	144.830510616	331.58	4.0
18	13.5504655381	144.830918312	331.74	4.0

Observation Points

Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95
			300.0

No glare found.

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PV surface material	Smooth glass without ARC
Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.834222794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 7:11 p.m.

Flight path: 24L

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.821223278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	352.27	542.11	No

No glare found.

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PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.834222794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45
11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.5443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 7:10 p.m.

Flight path: 24R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

No glare found.

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PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.834222794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45
11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.5443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 7:09 p.m.

No glare found



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.834222794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45

11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.5443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95	300.0

No glare found.

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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 9:14 p.m.

Flight path: 24L

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.83422794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45
11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.5443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.82123278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No
2 mi	13.4997436752	144.834732035	352.27	542.11	No

No glare found.

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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 9:13 p.m.

Flight path: 24R

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.83422794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45
11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.5443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No
2 mi	13.5038849378	144.839053359	283.63	625.32	No

No glare found.

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Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 9:13 p.m.

No glare found



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material	Smooth glass without ARC
Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.551466834	144.831669331	330.22	4.0	334.22
2	13.5512790914	144.832892418	343.26	4.0	347.26
3	13.5500066094	144.832634926	340.8	4.0	344.8
4	13.547232158	144.831433296	331.56	4.0	335.56
5	13.5462517051	144.833278656	347.23	4.0	351.23
6	13.549985749	144.835252762	364.84	4.0	368.84
7	13.5495268194	144.836046696	372.43	4.0	376.43
8	13.5458553506	144.834222794	355.16	4.0	359.16
9	13.5422255473	144.833192825	336.65	4.0	340.65
10	13.5430182677	144.830725193	329.45	4.0	333.45

11	13.5436858197	144.829759598	320.72	4.0	324.72
12	13.54443533698	144.829545021	317.34	4.0	321.34
13	13.5448331702	144.830231667	313.44	4.0	317.44
14	13.5454172738	144.83093977	311.36	4.0	315.36
15	13.5462517051	144.830703735	314.68	4.0	318.68
16	13.5466063375	144.830338955	316.97	4.0	320.97
17	13.5485255154	144.830510616	331.58	4.0	335.58
18	13.5504655381	144.830918312	331.74	4.0	335.74

Observation Points

Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95
			300.0

No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:19 p.m.

Flight path: 2

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

No glare found.

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2 mi	13.4997436752	144.834732035	352.27	542.11	No
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Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare ?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.82123278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 13, 2015, 2:19 p.m.

Flight path: 1

Glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Glare occurrence plots

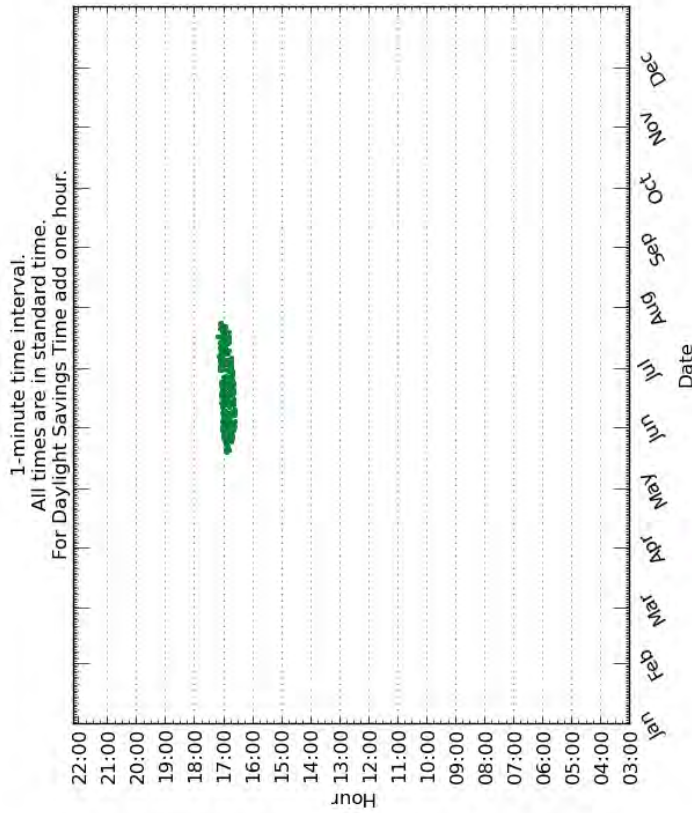
All times are in standard time. For Daylight Savings Time add one hour.

2 mi	13.5038849378	144.839053359	283.63	625.32	Yes
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Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare ?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No

2 mi



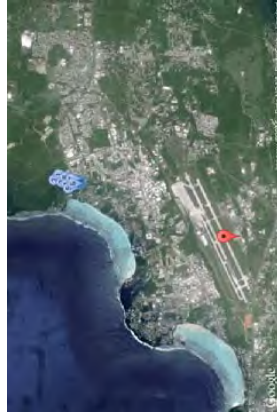
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Solar Glare Hazard Analysis Report

Generated Jan. 13, 2015, 2:18 p.m.

No glare found

Print



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	150.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.478828061	144.79699105	241.95	300.0

No glare found.

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PV surface material

	Smooth glass without ARC
Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.809095886	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 7:08 p.m.

Flight path: 2

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

No glare found.

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2 mi	13.4997436752	144.834732035	352.27	542.11	No
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Flight Path Observation Points

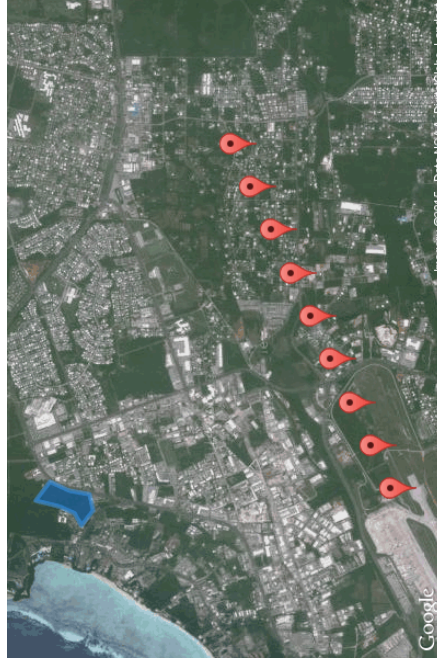
	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare ?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.82123278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 7:08 p.m.

Flight path: 1

Glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Flight Path Observation Points

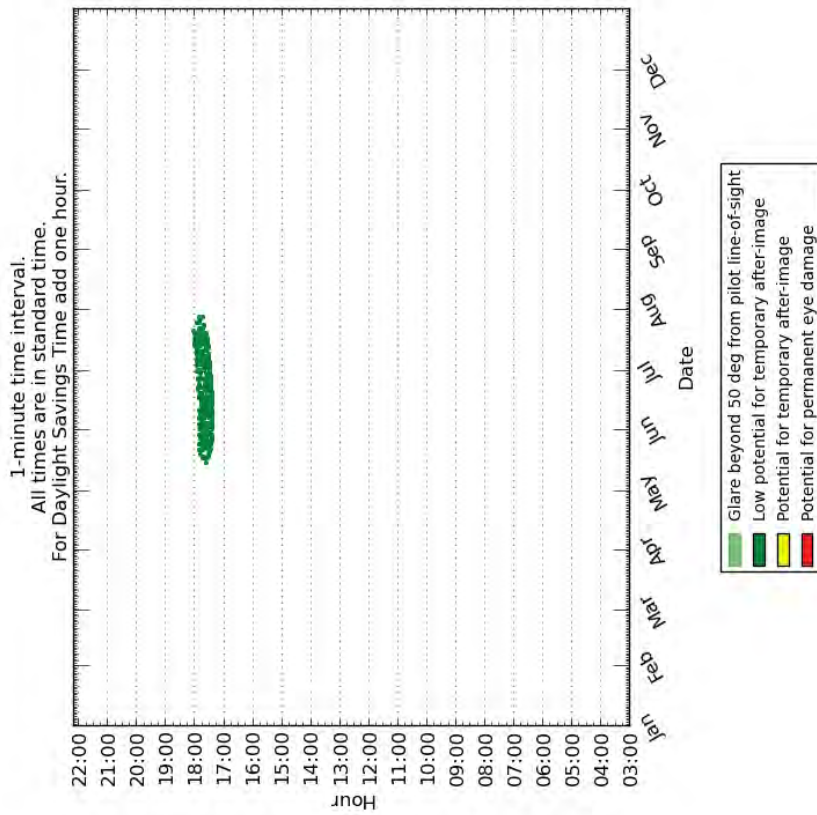
	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare ?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No

2 mi 13.5038849378 144.839053359 283.63 625.32 Yes

Glare occurrence plots

All times are in standard time. For Daylight Savings Time add one hour.

2 mi



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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 5:45 p.m.

Flight path: 6L

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4789245692	144.784057438	237.77	50.0	No
1/4 mi	13.4773939063	144.780687216	208.62	148.32	No
1/2 mi	13.4758632434	144.777316993	205.16	220.97	No
3/4 mi	13.4743325805	144.773946771	175.68	319.62	No
1 mi	13.4728019176	144.770576548	140.53	423.94	No
1 1/4 mi	13.4712712546	144.767206326	74.93	558.73	No
1 1/2 mi	13.4697405917	144.763836103	10.39	692.45	No
1 3/4 mi	13.4682099288	144.760465881	13.44	758.59	No

2 mi	13.4666792659	144.757095659	12.01	829.19	No
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No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 5:46 p.m.

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Flight path: 6R

No glare found

 Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4771639403	144.78486076	229.31	50.0	No
1/4 mi	13.4756332774	144.781490562	215.91	132.57	No
1/2 mi	13.4741026145	144.778120365	195.79	221.88	No
3/4 mi	13.4725719516	144.774750167	147.31	339.53	No
1 mi	13.4710412887	144.771379969	112.33	443.69	No
1 1/4 mi	13.4695106257	144.768009772	15.76	609.44	No
1 1/2 mi	13.4679799628	144.764639574	31.29	663.09	No
1 3/4 mi	13.4664492999	144.761269376	9.82	753.74	No

2 mi	13.464918637	144.757899179	15.99	816.74	No
------	--------------	---------------	-------	--------	----

No glare found.

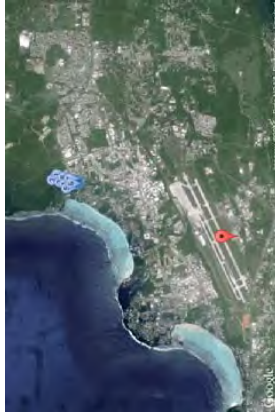
©1997-2014 Sandia Corporation

Solar Glare Hazard Analysis Report

Generated Jan. 9, 2015, 5:45 p.m.

No glare found

 Print



Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	180.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material

Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.809095886	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.4788306694	144.796989709	241.95	300.0

No glare found.

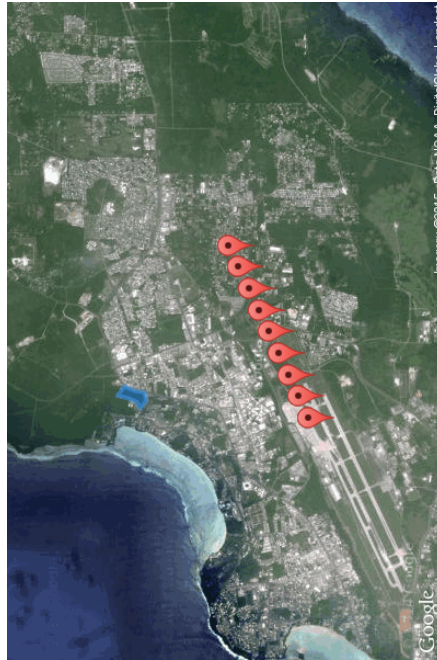
©1997-2014 Sandia Corporation

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 7:56 p.m.

Flight path: 2

No glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m^2)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.19
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

No glare found.

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2 mi	13.4997436752	144.834732035	352.27	542.11	No
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Flight Path Observation Points

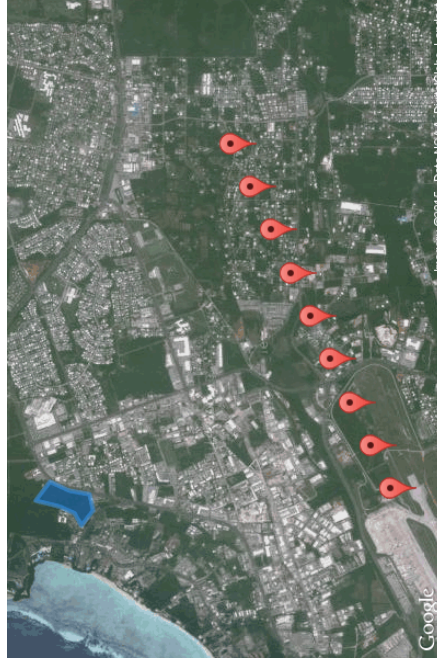
	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare ?
Threshold	13.4876127569	144.807714522	290.95	50.0	No
1/4 mi	13.4891291217	144.811091711	298.85	111.27	No
1/2 mi	13.4906454865	144.8144689	334.43	144.88	No
3/4 mi	13.4921618513	144.817846089	364.49	183.99	No
1 mi	13.493678216	144.82123278	390.74	226.92	No
1 1/4 mi	13.4951945808	144.824600468	350.32	336.52	No
1 1/2 mi	13.4967109456	144.827977657	415.45	340.57	No
1 3/4 mi	13.4982273104	144.831354846	425.23	399.98	No

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 7:56 p.m.

Flight path: 1

Glare found



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	245.14
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Glare occurrence plots

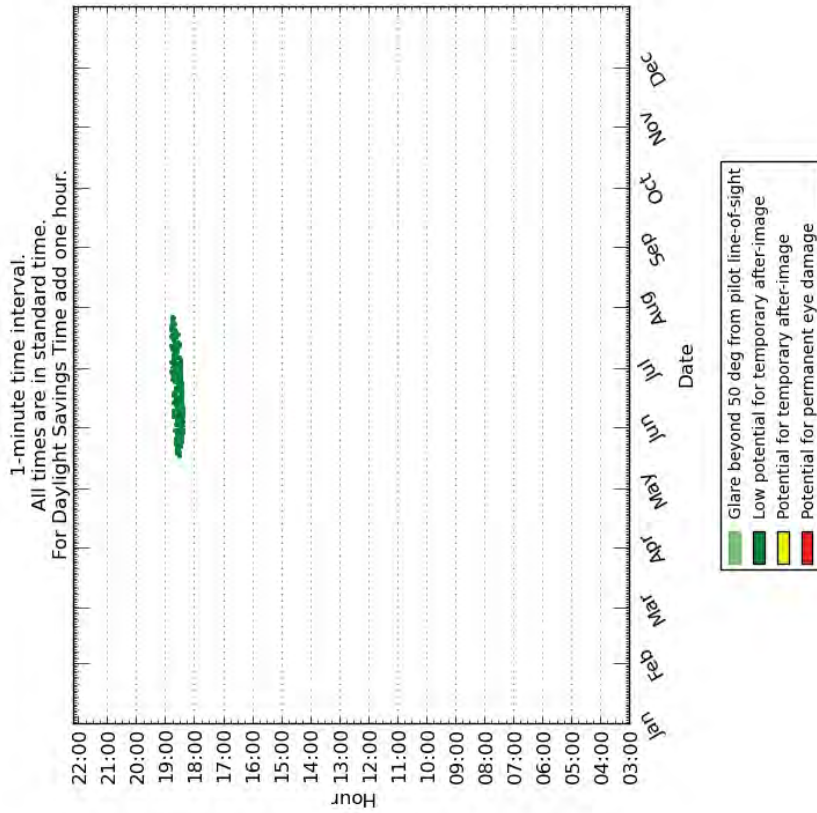
All times are in standard time. For Daylight Savings Time add one hour.

2 mi	13.5038849378	144.839053359	283.63	625.32	Yes
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Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare ?
Threshold	13.491731124	144.812046289	305.52	50.0	No
1/4 mi	13.4932503507	144.815422173	337.87	86.82	No
1/2 mi	13.4947695774	144.818798057	374.97	118.91	No
3/4 mi	13.4962888041	144.82217394	373.89	189.17	No
1 mi	13.4978080309	144.825549824	380.28	251.95	No
1 1/4 mi	13.4993272576	144.828925708	351.47	349.94	No
1 1/2 mi	13.5008464843	144.832301591	268.52	502.06	No
1 3/4 mi	13.5023657111	144.835677475	271.35	568.43	No

2 mi



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Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:16 p.m.

Flight path: 6L

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4789245692	144.784057438	237.77	50.0	No
1/4 mi	13.4773939063	144.780687216	208.62	148.32	No
1/2 mi	13.4758632434	144.777316993	205.16	220.97	No
3/4 mi	13.4743325805	144.773946771	175.68	319.62	No
1 mi	13.4728019176	144.770576548	140.53	423.94	No
1 1/4 mi	13.4712712546	144.767206326	74.93	558.73	No
1 1/2 mi	13.4697405917	144.763836103	10.39	692.45	No
1 3/4 mi	13.4682099288	144.760465881	13.44	758.59	No

2 mi	13.4666792659	144.757095659	12.01	829.19	No
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No glare found.

Solar Glare Hazard Analysis Flight Path Report

Generated Jan. 9, 2015, 6:17 p.m.

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Flight path: 6R

No glare found

Print



Analysis & PV array parameters

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True
PV surface material	Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

Flight path parameters

Direction (deg)	64.94
Glide slope (deg)	3.0
Consider pilot visibility from cockpit	False

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.80909586	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Flight Path Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)	Glare?
Threshold	13.4771639403	144.78486076	229.31	50.0	No
1/4 mi	13.4756332774	144.781490562	215.91	132.57	No
1/2 mi	13.4741026145	144.778120365	195.79	221.88	No
3/4 mi	13.4725719516	144.774750167	147.31	339.53	No
1 mi	13.4710412887	144.771379969	112.33	443.69	No
1 1/4 mi	13.4695106257	144.768009772	15.76	609.44	No
1 1/2 mi	13.4679799628	144.764639574	31.29	663.09	No
1 3/4 mi	13.4664492999	144.761269376	9.82	753.74	No

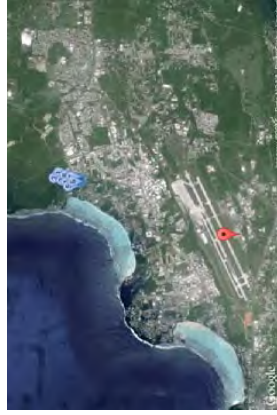
2 mi	13.464918637	144.757899179	15.99	816.74	No
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No glare found.

Solar Glare Hazard Analysis Report

Generated Jan. 9, 2015, 6:16 p.m.

No glare found



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Inputs

Analysis name	Won Pot
PV array axis tracking	none
Orientation of array (deg)	210.0
Tilt of solar panels (deg)	13.5
Rated power (kW)	0.0
Vary reflectivity	True

PV surface material

Smooth glass without ARC

Timezone offset	10.0
Subtended angle of sun (mrad)	9.3
Peak DNI (W/m ²)	1000.0
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002
Eye focal length (m)	0.017
Time interval (min)	1
Slope error (mrad)	10.0

PV array vertices

id	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Height of panels above ground (ft)	Total elevation (ft)
1	13.5196944955	144.812529087	239.79	4.0	243.79
2	13.5207793728	144.811048508	257.77	4.0	261.77
3	13.51898515	144.810597897	221.59	4.0	225.59
4	13.5178168117	144.810061455	229.67	4.0	233.67
5	13.5172952302	144.809095886	187.01	4.0	191.01
6	13.5163981074	144.810279031	217.15	4.0	221.15
7	13.5166693309	144.811544034	227.5	4.0	231.5
8	13.5182236444	144.811823984	230.36	4.0	234.36

Observation Points

	Latitude (deg)	Longitude (deg)	Ground Elevation (ft)	Eye-level height above ground (ft)
1	13.4788306694	144.796989709	241.95	300.0

No glare found.

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Appendix D

Public Comment and Correspondence

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From: Mark Calvo [mailto:mark.calvo@guam.gov]

Sent: Wednesday, May 27, 2015 10:04 AM

To: NFPAC-Receive

Subject: Comment on Draft Environmental Assessment (EA) for Photovoltaic (PV) Systems, Guam

Recommendation: Department of the Navy remove the consideration of at least two Northern Guam sites listed in the current Proposed Action for PV Systems Guam (South Finegayan and the former Tumon Tank Farm).

Rationale: The consideration of these two sites undermines the stated intent of DoD to better utilize the lands it currently has and return underutilized land to the Government of Guam. Attached for your consideration is a copy of a letter from Under Secretary of the Navy to the Governor of Guam dated 7 February 2011. It refers to an agreement with "four pillars" to be used to guide DoD's approach to the military buildup on Guam.

--

Respectfully,

Mark G. Calvo

Director, Guam Military Buildup Office

Special Assistant to the Governor of Guam

Tel: 671-472-8931 / Cell: 671-686-1429 / Fax: 671-472-7549



THE UNDER SECRETARY OF THE NAVY
WASHINGTON, D.C. 20350-1000

February 7, 2011

The Honorable Eddie Baza Calvo
Governor of Guam
P.O. Box 2950
Hagatna, GU 96932

Dear Governor Calvo:

I want to thank you for the frank, informative discussions we had in Guam during my last visit. I would like to reiterate the four pillars which will guide DoD's approach to the military buildup.

First, through our "One Guam" initiative, the Department is committed to improving the quality of life for the people of Guam and the military personnel who will call Guam home. We have secured, and will continue to seek, funding for infrastructure upgrades directly and indirectly associated with the military buildup, and will continue to advocate for federal investment in Guam's other socio-economic needs.

Second, through our "Green Guam" initiative, the Department is committed to developing the most energy efficient infrastructure possible and supporting Guam's efforts to develop sustainable and renewable energy projects. We will work hard to achieve "net zero" energy usage for our installations on Guam. Moreover, we will work closely with relevant Guam utilities, Guam agencies, and federal agencies to secure necessary funding for "green" projects.

Third, the Department is committed to providing 24 hours/seven days a week unimpeded access to the Pagat Village and Pagat Cave historical sites. We will adjust our proposed plans outlined in the final Environmental Impact Statement to continue unfettered access to these important historical and cultural locations.

Fourth, we will pursue a "Net Negative" strategy for DoD-owned land on Guam. The Department is committed to having a smaller DoD footprint on Guam after the military build-up than we currently hold. We will better utilize the lands we currently have and return underutilized land to the Government of Guam.

I believe that these initiatives take into account many of the concerns expressed by the people of Guam and will provide a solid foundation for resolving many of the outstanding issues related to the build-up. With these commitments, I am hopeful that we can resolve the issues we are facing and bring about a Guam build-up that benefits both the people of Guam and our military personnel. I look forward to continuing this dialogue during your visit to Washington, D.C.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert O. Work", with a long horizontal line extending to the right.

Robert O. Work

APPENDIX Q

Site Access Security Application

The following has been provided by Navy for some guidance to base access. Site security access is required for the Naval Base Guam sites. Site visit participants are required and responsible for obtaining the required security access for the site visit.

The Naval Base Guam Visitor Control Center (VCC) has indicated that the approval for visitor passes takes approximately 3-5 business days. The VCC will notify the 'company' who submitted the application when the approval is ready. Those requesting a pass must also be prepared to supply two forms of accepted identification on the day.

Also, depending on the duration of the project/visit, VCC may either issue a DBIDS paper pass or a credential. Normally, credentials are issued when the access is required for more than one year. This may be something to consider upon or near contract award.

Additionally, for your information, NCACS (Rapidgate) IDs have been transitioning to the DBIDS credential. If you hold a NCACS/Rapidgate you will need to have made the change before August 15, 2017 in order to continue base access.

Please note that Foreign Nationals do require in-person biometrics and therefore the lead time for pass/ID is longer (requirement for foreign national to go to VCC in-person prior to the site visit date).

The Naval Base Guam VCC is located outside the main Naval Base front gate and open Monday, Tuesday, Thursday & Friday 6:30 a.m. to 4:30 p.m and Wednesday, 7:00 a.m. to 3:00 p.m. For more information please call 339-1280 or 339-1380.

The following is a sample of the required application form.

DEPARTMENT OF THE NAVY LOCAL POPULATION ID CARD/BASE ACCESS PASS REGISTRATION

PRIVACY ACT STATEMENT:

AUTHORITY: 10 U.S.C. 5013 Secretary of the Navy; 10 U.S.C. 5041 Headquarters Marine Corps; OPNAVINST 5530.14E Navy Physical Security; Marine Corps Order 5530.14A, Marine Corps Physical Security Program Manual; and E.O. 9397 (SSN), as amended, SORN **NM5592-2**.
PURPOSE(S): To control physical access to Department of Defense (DoD), Department of the Navy (DON) or U.S. Marine Corps (USMC) installations/units controlled information, installations, facilities or areas over which DoD/DON or U.S. Marine Corps has security responsibilities by identifying or verifying an individual through the use of biometric databases and associated data processing/information services for designated populations for purposes of protecting U.S./Coalition/US government/national security areas of responsibility and information; to issue badges, replace lost badges, and retrieve passes upon separation to maintain visitor statistics; collect information to adjudicate access to facility; and track the entry/exit times of personnel.
ROUTINE USE(S): To designate contractors, Federal agencies, and foreign governments for the purpose of granting Navy officials access to their facility.
DISCLOSURE: Providing registration information is voluntary. Failure to provide requested information may result in denial of access to benefits, privileges and DoD installations facilities and buildings.

IDENTITY PROOFING AND APPLICANT INFORMATION

1. LAST NAME:	2. FIRST NAME:	3. MIDDLE NAME:	4. NAME SUFFIX:
			O Jr. D Sr. 1 011 0 111 D IV

5. HISPANIC OR LATINO (Check one):	DYES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	6. RACE (Check one or more):	D WHITE <input type="checkbox"/> D AFRICAN AMERICAN OR BLACK <input type="checkbox"/> D ASIAN <input type="checkbox"/> D AMERICAN INDIAN OR ALASKA NATIVE <input type="checkbox"/> D NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER <input type="checkbox"/>
------------------------------------	--	------------------------------	---

7. GENDER (Check one):	MALE <input type="checkbox"/> FEMALE <input checked="" type="checkbox"/>	8. DATE OF BIRTH:	9. CITY OF BIRTH:	10. STATE OF BIRTH:	11. BIRTH COUNTRY:
------------------------	--	-------------------	-------------------	---------------------	--------------------

12. US CITIZEN (Check):	DYES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	13. DUAL CITIZENSHIP: DYES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	CITIZENSHIP IF OTHER THAN US (Country):
-------------------------	--	--	---

U.S. Citizen Minimum Documentation Required:
 By Birth - Social Security No and/or State ID/Drivers License.
 Naturalized - Certification Number, Petition Number, Date, Place and Court, United States passport number, Social Security No and/or State ID/Drivers License.
 Derived - Parent's certification number, Social Security No and/or State ID/Drivers License.

Alien Minimum Documentation Required:
 Registration Number, Expiration date, Date of entry, Port of entry.

14. IDENTITY SOURCE DOCUMENTS PRESENTED:	15. DOCUMENT NUMBER:	16. ISSUED BY STATE/COURT:	17. ISSUED BY COUNTRY:	18. ISSUED:	19. EXPIRES:
<input checked="" type="checkbox"/> Social Security No.			United States		
<input type="checkbox"/> State ID/Drivers License			United States		
<input type="checkbox"/> Passport No.					
<input checked="" type="checkbox"/> Certification Number and Petition Number					
<input checked="" type="checkbox"/> Derived - Parent's Certification Number:			United States		
<input checked="" type="checkbox"/> Alien Registration No.			United States		

Date of Entry:	Port of Entry:
----------------	----------------

OTHER APPROVED IDENTITY SOURCE DOCUMENTS:

<input checked="" type="checkbox"/>					
<input checked="" type="checkbox"/>					

20. WEIGHT (Pounds):	21. HEIGHT (Inches):	22. HAIR COLOR (Check one):	23. EYE COLOR (Check one):
		<input checked="" type="checkbox"/> Blond <input checked="" type="checkbox"/> Brown <input type="checkbox"/> Black <input type="checkbox"/> Gray <input type="checkbox"/> Red <input type="checkbox"/> White <input type="checkbox"/> Silver <input type="checkbox"/> Auburn <input type="checkbox"/> Bald	<input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Green <input type="checkbox"/> Blue <input type="checkbox"/> Hazel <input type="checkbox"/> Black <input type="checkbox"/> Gray <input type="checkbox"/> Violet <input type="checkbox"/> Unknown

24. HOME ADDRESS (Include city, state, zip code):	HOME PHONE (Include Area Code):
L: ;: t l A:; t :; 1-u N:; ut-; NAM t :	SPONSOR PHONE (Include Area Code):

EMPLOYMENT ACTIVITY INFORMATION

LO. t: MI- LUJ: t: H NAMc ANU- " - " !... _ _ _ (Include city/state/Zip code):	t: MI- LU y: t: H 1- H UN t: (Include Area Code):
LI. :; ui- "" V: t: u K NAMt. ANU AUUKt. SS (Include city/state/Zip code):	SUPERVISOR PHONE (Include Area Code):

28. Check the applicable box for WORK HOURS box or check the OTHER box and enter the work hours, then check the applicable for WORKDAYS

WORK HOURS: Oosoo-1aoo 0 0800-1700 OorHER

WORKDAYS: OsN OM Or Ow OTH OF Osr

PRIOR FELONY CONVICTIONS

29. Have you ever been convicted of a Felony? DYES ONO --- Initial

REQUIREMENT TO RETURN LOCAL POPULATION ID CARD

30. I understand that I am required to return my Local Population Identification Card to the Base Pass Office when it expires or if my employment is terminated for any reason. (initial)

AUTHORIZATION AND RELEASE AND CERTIFICATION

3.1. I hereby authorize the DOD/DON and other authorized Federal agencies to obtain any information required from the Federal government and/or state agencies, including but not limited to, the Federal Bureau of Investigation(FBI), the Defense Security Service (OSS), the U.S. Department of Homeland Security (OHS).

I have been notified of DON right to perform minimal vetting and fitness determination as a condition of access to DON installation/facilities. I understand that I may request a record identifier; the source of the record and that I may obtain records from the State Law Enforcement Office as may be available to me under the law. I also understand that this information will be treated as privileged and confidential information.

I release any individual, including records custodians, any component of the U.S. Government or the individual State Criminal History Repository supplying information, from all liability for damages that may result on account of compliance, or any attempts to comply with this authorization. This release is binding, now and in the future, on my heirs, assigns, associates, and personal representative(s) of any nature. Copies of this authorization that show my signature are as valid as the original release signed by me.

FALSE STATEMENTS ARE PUNISHABLE BY LAW AND COULD RESULT IN FINES AND/OR IMPRISONMENT UP TO FIVE YEARS.

BEFORE SIGNING THIS FORM, REVIEW IT CAREFULLY TO MAKE SURE YOU HAVE ANSWERED ALL QUESTIONS FULLY AND CORRECTLY.

I DECLARE UNDER PENALTY OF PERJURY THAT THE STATEMENTS MADE BY ME ON THIS FORM ARE TRUE, COMPLETE AND CORRECT

DATE _____ SIGNATURE _____

FINAL DETERMINATION ON YOUR ACCESS: The Base Commanding Officer has final authority for determination on granting physical access to DON controlled installations/facilities under his/her jurisdiction.

BELOW COMPLETED BY BASE REGISTRAR PERSON CONDUCTING IDENTITY PROOFING and NCIC CHECK

32. INFORMATION VERIFIED BY:	33. ENTERED IN C/S SYSTEM BY:	34. PASS ISSUE DATE:	35. PASS EXPIRATION DATE:
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36. NCIC CHECK PERFORMED BY:	37. RESULTS OF NCIC CHECK: 0 NO RECORDS 0 RECORD IDENTIFIER RECORD NUMBER:	38. RESULTS OF LOCAL RECORDS CHECK: 0 NO RECORDS 0 RECORD IDENTIFIER RECORD NUMBER:
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Office of Under Secretary of Defense Directive-Type Memorandum (DTM) 09-012, "Interim Policy Guidance for DoD Physical Access Control," December 8, 2009. DTM 09-012 requires that DoD installation government representatives query the National Crime Information Center (NCIC) and Terrorist Screening Database to vet the claimed identity and to determine the fitness of non-federal government and non-DoD-issued card holders (i.e. visitors) who are requesting unescorted access to a DoD installation. The minimum criteria to determine the fitness of a visitor is: 1) not on a terrorist watch list; 2) not on an DoD installation debarment list; and 3) not on a FBI National Criminal Information Center (NCIC) felony wants and warrants list. Additionally, SECNAV Memo, Policy for Sex Offender Tracking and Assignment and Access Restrictions within the Department of the Navy, of 7 Oct 08 and OPNAVINST 1752.3 established the Navy's policy on sex offenders, requiring Region Commanders (REGCOMs) and Installation Commanding Officers (COs) to prohibit sex offender access to DoN facilities and Navy owned, leased or PPV housing. This form describes the authority and purpose to collect and share the required information; and identifies the applicant/visitor and sponsor; and authorizes the DoD to perform the minimum vetting and fitness determination criteria. A favorable response on the vetting and fitness determination is required to receive access to DOD-controlled installation/facilities.

Instruction for completing the Local Population Access Registration Form

INSTRUCTIONS : Please complete all information in black ink (printed) or by typing. By voluntarily providing your Personal Information, you agree to the following terms and restrictions:

RESTRICTIONS: Local Population Identification Card/Base Access Pass may only be used by person to whom they are issued and for the specific business/purpose issued. Applicants are reminded that soliciting (i.e. door-to-door sales) is prohibited on the base, and that such activity is grounds for cancellation of the Pass. Additionally, such action may result in debarment from the base and legal action. The Base Commanding Officer has discretion over specifying the period of validity for any Local Population ID Cards/Base Access Passes that are issued under his/her jurisdiction. Review the Privacy Statement that is printed at the top of the form

<p>Block 1: Enter the Last Name. Block 2: Enter the First Name. Block 3: Enter the Middle Name. Block 4: If applicable, check the box for Name Suffix. Block 5: Check the applicable box for Hispanic or Latino. Block 6: Check the applicable box for Race. Block 7: Check the applicable box for Gender. Block 8: Enter Date of Birth. Block 9: Enter City of Birth. Block 10: Enter state of Birth. Block 11: Enter County of Birth. Block 12: Check the applicable box for US Citizenship. Block 13: If not a US Citizen, enter the name of the Country of Origin. Block 14: Two forms of identity source documents from the list of acceptable documents listed below must be presented to the base registrar with this completed form. Check the box for the type of documents that will be presented for identity proofing. If the document type is not listed, use the two rows under Other Approved Identity Source Documents to enter the type or document(s) that you will present. Block 15: Enter the Document Number located on the Identity Proofing Source document that was checked in Block 14. Block 16: Enter the state that issued the Identity Source Document. Block 17: Enter the Country that issued the Identity Source Document</p>	<p>Block 18: Enter the Date that the Identity Source Document was issued. Block 19: Enter the Date that the Identity Source Document Will expire. Block 20: Enter Weight in pounds. Block 21: Enter Height in inches. Block 22: Check the applicable box for Hair Color. Block 23: Check the applicable box for Eye Color. Block 24: Enter Home Address including City, state, Zip Code, and Home Telephone Number. Block 25: Enter Name of Registrant's Base Sponsor and Base Sponsor's Telephone Number. Block 26: Enter Employer Name and address including City, State, Zip Code, and Employer's Telephone Number. Block 27: Enter Supervisor's Name including City, State, Zip Code, and Supervisor's Telephone Number. Block 28: Check the applicable box for Work Hours box or check the OTHER box and enter the work hours, then check applicable boxes for Work Days. Block 28: Check the applicable answer if you have been convicted of Felony and enter initials. Block 29: Check the applicable box for felony conviction. Block 30: Enter initials to accept terms for returning Local Population Identification Card. Block 31: Sign and date the form to attest that the foregoing information is true and complete to best of your knowledge</p>
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LIST OF ACCEPTABLE DOCUMENTS - All documents must not be expired.
 Must present one selection from List A or a combination of one selection from List B and one selection from List C.

List A - Documents that Establish Identity and Employment Authorization	OR	List B - Documents that Establish Identity	AND	List C - Documents that Establish Employment Authorization
<ol style="list-style-type: none"> U.S. Passport or U.S. Passport Card. Permanent Resident Card or Alien Registration Receipt Card (Form I-551). Foreign passport that contains a temporary 1-551 stamp or temporary 1-551 printed notation on a machine-readable immigrant visa. Employment Authorization Document that contains a photograph (Form I-766). For a nonimmigrant alien authorized to work for a specific employer because of his or her status: <ol style="list-style-type: none"> Foreign Passport; and Form I-94 or Form I-94A that has the following: <ol style="list-style-type: none"> The same name as the passport; and An endorsement of the alien's nonimmigrant status as long as that period of endorsement has not yet expired and the proposed employment is not in conflict with any restrictions or limitations identified on form. Passport from the Federal states of Micronesia (FSM) or the Republic of the Marshall Islands (RM) with Form I-94 or Form I-94A indicating nonimmigrant admission under the Compact of Free Association Between the United States and FSM or RM. 		<ol style="list-style-type: none"> Driver's license or ID card issued by a state or outlying possession of the United States provided it contains a photograph or information such as name, date of birth, gender, height, eye color, and address. ID card issued by federal, state or local government agencies or entities provided it contains a photograph or information such as name, date of birth, gender, height, eye color, and address. School ID card with a photograph Voter's registration card. U.S. Military card or draft record. Military dependent's ID card. U.S. Coast Guard Merchant Mariner Card. Native American tribal document. Driver's license issued by a Canadian government authority. <p>For persons under age 18 who are unable to present a document listed above:</p> <ol style="list-style-type: none"> School record or report card. Clinic, doctor, or hospital record. Day-care or nursery school record. 		<ol style="list-style-type: none"> A Social Security Account Number card, unless the card includes one of the following restrictions: <ol style="list-style-type: none"> NOT VALID FOR EMPLOYMENT VALID FOR WORK ONLY WITH INS AUTHORIZATION. VALID FOR WORK ONLY WITH OHS AUTHORIZATION. Certification of Birth Abroad issued by the Department of State (Form FS-545). Certification of Birth issued by the Department of State (Form DS-1360). Original or certified copy of birth certificate issued by a State, county, municipal authority or territory of the United States bearing an official seal. Native American tribal document. U.S. Citizen ID Card (Form I-197). Identification Card for Use of Resident Citizen in the United States (Form I-179). Employment authorization document issued by the Department of Homeland Security.

The remainder of the form will be completed by the Base Registrar Person conducting Identity Proofing process and NCIC check.

AGENCY DISCLOSURE STATEMENT:

The public reporting burden for this collection of information is estimated to average 10 minutes per response including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Services Directorate, Information Management Division, 4800 Mark Center Drive, East Tower, Suite 02G09, Alexandria, VA 22350-3100 OMB 0703-0061. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN COMPLETED FORM TO THE ABOVE ADDRESS.
 Completed form should be submitted to the Base P.; gis tr...1r

Invitation for Bid: GPA-007-18
Re-Bid Renewable Resource Acquisition for the Guam Power Authority
QUALITATIVE SCORING WORKBOOK INSTRUCTIONS

Bidders should enter their name in highlighted cell, this will title the other sheets in the workbook with the Bidder's name.

Bidder should enter a unique bid no. (1,2,3....) in the highlighted cell if submitting more than one bid.

<<< BIDDER'S BID NO >>>

Overview:

Bidders are required to complete Task 1 and Task 2 described below. GPA staff will complete Tasks 3 and 4. Bidders must fill in the worksheets titled "**Part 1- Qual Support References**" and "**Part 2 - Technical Data**" and return an electronic copy of this entire workbook with their IFB submittals. GPA will review each Bidder's submittal of Task 1 to ensure that the referenced pages/sections given by the Bidder in the worksheet truly support compliance with the Technical Requirements. The Bidders have been given the Task 1 worksheet to facilitate the bid evaluation. In addition, GPA has requested for specific technical information that must be provided as described in Task 2. For the Bidders' reference, there is a copy of the scoring sheet used to qualify/disqualify the Unpriced Technical Offers on the worksheet titled "Part 3 - Qual Eval Scoresheet." The Bidders may use this sheet as a tool to assess the strength of their submittals. However, GPA evaluators will fill this information in for each bid received and only the GPA evaluators' scorings will count.

Task 1: Complete the worksheet titled "Part 1-Qual Support References
Each Bidder Must Complete Task 1.

Step Directions

- 1 Go to the "Part 1 - Qual Support References" worksheet.
- 2 In Column E, labeled "Bid Reference," cite the volume, chapter, section, page number, etc. of the Bidder's submittal where the information supporting compliance for the given Checklist Item can be found. Give locational references as specifically as possible. Leave the reference cell blank if the bid does not contain adequate supporting information for the given Checklist Item.

Task 2: Complete the worksheet titled "Part 2 - Technical Data"
Each Bidder Must Complete Task 2.

Step Directions

- 1 Go to the "Part 2 - Technical Data" worksheet.
This width of this sheet (columns B to Q) can be viewed completely by setting zoom to 84%
- 2 Fill in the yellow highlighted cells in this worksheet with the information requested. Additional instructions are provided below. If any of the items are not applicable, mark "N/A".

No: Technical Data Request:

1. **Provide the name of the company bidding.**
2. **Provide Bidder contact information.**
3. **Provide the name of the renewable energy project.**
4. **Assign a bid number to the bid form.** If a Bidder is submitting two alternative bids for the same project, the bid number would be 1 for the first and 2 for the second. Alternative bids might be submitted for different CODs, project sizes, etc.
5. **Select the renewable energy technology being utilized by the project.** If the technology is not listed in the selection list enter the technology on the space provided directly to the right of the selection box.
6. **Provide the location of the project by street address (if available).** If a street address is not applicable, provide GPS coordinates or a general description of where the project is located.
7. **Indicate whether the proposed facility is new or existing.** This refers to the project that will be supplying renewable energy in this bid request.
8. **Provide the names, contact information, and ownership share for project owner(s).**
9. Provide the requested project technical information specific to the project being proposed.
- 9.A **Date of Initial Operation.** Provide the date at which the project is operational. This may not be the date at which GPA will begin to receive renewable power (i.e. startup for test)
- 9.B **Agreement beginning date.** Provide the date at which GPA will begin receiving renewable energy. Note: May not be the same as 9.A.
- 9.C **Nameplate capacity of the facility in kW.**
- 9.D **ESS capacity, in MW and MWh.**
- 9.E **Estimated annual capacity factor (net) percentage.**

Invitation for Bid: GPA-007-18
Re-Bid Renewable Resource Acquisition for the Guam Power Authority
QUALITATIVE SCORING WORKBOOK INSTRUCTIONS

- 9.F **Guaranteed net annual generation in MWh/yr.** Bidders are required to provide annual production guarantees for each contract year.
- 9.G **Minimum annual generation in MWh/yr at 95% Confidence Level.** Bidders are required to provide annual production for each contract year.
- 9.H **Guaranteed Success Rate, AC-AC Efficiency and Availability in percentage.**
- 9.I **Estimated equivalent availability factor percentage.**
- 9.J **Expected project life in years.**
10. Provide the requested project interconnection and transmission information:
- 10.A **Voltage at which the project interconnects to the transmission system.**
- 10.B **Point of interconnection or interconnection substation name.**
- 10.C **Name of the transmission line on which the project is interconnected.**
- 10.D **Total interconnection cost.** Bidder is to provide estimate on interconnection costs. GPA will conduct a system interconnection study for bidders who have been selected for award at the cost of the selected bidder to verify and confirm the amount provided here.
11. Provide the requested Power Purchase Agreement Non-Pricing Information:
- 11.A **Term of the agreement, in years.**
- 11.B **Contract net capacity, in MW.** Contracts with selected bidders will be based on the capacity provided here. GPA will not be obligated to purchase additional energy beyond the proposed project capacity.
12. **Provide the monthly estimated average net MWh per hour for every hour of the day.** GPA requests for operation profile to evaluate the project. Annual projections must equal the Guaranteed net annual generation in 9.G above.
13. **Provide the monthly estimated net portfolio credits per hour for every hour of the day.**
14. **If the Bidder is proposing an arrangement not covered by either of the preceding categories, the Bidder may include a description of the agreement here. The Bidder is responsible for providing sufficient information to allow GPA to evaluate this alternative bid package.**

Task 3: Review the Bidder's information referenced under Task 1 and Task 2.
GPA Evaluators Shall Complete Task 3.

Step Directions

- 1 Review Bidder entries in Column E of the sheet "Part 1 - Qual Support References" and additional information in "Part 2 - Technical Data." Using these entries, evaluate the Bidder's supporting documents to determine if the Bidder has provided enough information and has met the Technical Requirements.

Task 3: Score the Bidder's IFB submittal using the worksheet titled "Part 2 - Qual Eval Scoresheet"
GPA Evaluators Shall Complete Task 3.

Step Directions

- 1 Go to the "Part 2 - Qual Eval Scoresheet" worksheet.
- 2 In Column H, rate the quality of the Bidder's response to each requested Checklist Item, based on review of the submittal.

Invitation for Bid: GPA-007-18 Renewable Resource Acquisition for the Guam Power Authority PART 1 - QUAL SUPPORT REFERENCES		
Bidder's Name:	Bidder's No.: <<< BIDDER'S BID NO >>>	DATA MISSING
EVALUATION FACTORS	BID REFERENCE (Enter the chapter/section and page number where information is to be found within submitted materials)	ALERTS
A. PROJECT DEVELOPMENT		
A1. Method and status of project financing (3) Bidders are required to provide responses to all questions below. Bidders are required to demonstrate the financial viability of their project. Bidders should provide the following information:		<<< Reference Required
A1-a. Identification of equity participants. <ul style="list-style-type: none"> • <i>Who are the equity participants in the project?</i> 		<<< Reference Required
A1-b. Evidence that the project will be financed. <ul style="list-style-type: none"> • <i>How will the project be financed?</i> • <i>Is there a written commitment from the equity participants? If so, please provide a copy with confidential information redacted if necessary.</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Discuss and/or provide supporting information on any project financing guarantees.</i> • <i>Does the developer envision any conditions precedent to project financing other than execution of the power purchase agreement and Guam Public Utilities Commission approval of the power purchase agreement? If so, what do you expect them to be?</i> 		<<< Reference Required
A1-c. Description of the Bidder's organizational structure from a financial and legal perspective, including any general and limited partners, involvement of subsidiaries, providers of capital, and percentage interest of each party.		<<< Reference Required
A1-d. Provide a description of the financing plan for the project, including construction and term financing. The financing plan should address information contained in the pro forma, such as:		<<< Reference Required
<ul style="list-style-type: none"> • <i>The project's projected financial structure</i> • <i>Expected sources of debt and equity financing</i> • <i>Estimated capital cost.</i> • <i>Evidence the project is financeable</i> • <i>In addition, the financing plan should address the financing of development costs.</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>All bidders are required to provide this information.</i> 		<<< Reference Required
A1-e. Provide documentation illustrating the experience of the project sponsor in securing financing for projects of similar size and technology. For each project provide the following information:		<<< Reference Required
<ul style="list-style-type: none"> • <i>Project name and location</i> • <i>Project type and size</i> • <i>Date of construction and permanent financing</i> 		<<< Reference Required
A1-f. Provide evidence that the Bidder has the financial resources and financial strength to complete and operate the project as planned.		<<< Reference Required
A1-g. Provide copies of the most recent audited financial statement or annual report for each Bidder, including affiliates of the Bidder. Also, list the current credit rating from Standard & Poor's and Moody's for the sponsor, affiliates, partners, and credit support provider.		<<< Reference Required
A1-h. The Bidder should demonstrate its ability (and/or the ability of its credit support provider) to provide the required security, including its plan for doing so (including type of security, sources of security and a description of its credit support provider).		<<< Reference Required
A1-i. Provide a description of any current credit issues regarding the Bidder or affiliate entities raised by rating agencies, banks, or accounting firms.		<<< Reference Required
A1-j. Describe the implication of the federal Production Tax Credits or Investment Tax Credits (or similar incentives) on the viability of the project.		<<< Reference Required
A1-k. Provide a memorandum with supporting information demonstrating that the proposal will not be subject to Variable Interest Entity treatment[1] and that GPA will not have to carry this entity on its financial statements. NOTE [1] GPA is not willing to be subject to accounting treatment that results from variable interest entity ("VIE") treatment as set forth in Financial Accounting Standards Board Interpretation No. 46 (revised December 2003) ("FIN46R").		<<< Reference Required
A1-l. Pro forma income and cash flow statement conforming to Generally Accepted Accounting Principles for the project for the term of the proposed Power Purchase Agreement (include revenue and cost data by major categories, debt service, depreciation expenses and other relevant information). Bidders may propose to submit their financial pro forma to a mutually agreed upon independent third party rather than to GPA. Bidders should note that this information will be required of short-listed bidders only and will be requested by GPA upon shortlist notification or after. Should GPA request pro forma financial information from the bidder, the information will only be used for project viability assessment only.		<<< Reference Required

Invitation for Bid: GPA-007-18 Renewable Resource Acquisition for the Guam Power Authority PART 1 - QUAL SUPPORT REFERENCES		
Bidder's Name:	Bidder's No.: <<< BIDDER'S BID NO >>>	DATA MISSING
EVALUATION FACTORS	BID REFERENCE (Enter the chapter/section and page number where information is to be found within submitted materials)	ALERTS
A1-m. Bidders must disclose any litigation related to projects owned or managed by them or any of their affiliates in the United States.		<<< Reference Required
A2. Level of site control by developer (3) GPA provides the sites for this bid. GPA has entered into a lease with the Navy for use of specific properties for solar photovoltaic development. Bidders should provide GPA with some confidence in plant siting using these sites.. A2-a. Provide a map of the site that clearly identifies the location of the site, the total acreage, the interconnection point, and the relationship of the site to other local infrastructure. In addition to providing the required map, provide a site layout plan which illustrates the location of all equipment and facilities on the site.		<<< Reference Required
or for interconnection. Describe the status of rights-of-way and easement acquisition, and describe the plan for securing the necessary rights-of-way, including the proposed timeline.		<<< Reference Required
A2-c. Describe whether the project has the capability for expansion at the proposed site. If so, describe the expansion capability possible.		<<< Reference Required
A3. Project team experience (5) Bidders are required to demonstrate project experience and management capability to successfully develop and operate the project proposed. GPA is interested in a project team which has demonstrated success in projects of similar type, size and technology and can demonstrate an ability to effectively work together to bring the project to commercial operation in a timely fashion. A3-a. Provide an organizational chart for the project that lists the project participants and identifies the management structure and responsibilities.		<<< Reference Required
A3-b. For each of the project participants (including the Bidder, partners, and proposed contractors), provide statements that list the specific experience of the firm in developing, financing, owning, and operating generating facilities, other projects of similar type, size and technology, and any evidence that the project participants have worked jointly on other projects. If a bidder is relying on the experience of a consultant or contractor to meet the Experience Threshold Requirement, the bidder should describe any contractual relationships between the bidder and the consultant or contractor.		<<< Reference Required
A3-c. Provide a management chart which lists the key personnel dedicated to this project and provide biographies of the key personnel.		<<< Reference Required
A3-d. Provide a listing of all projects the project sponsor has successfully developed or that are currently under construction. Provide the following information as part of the response: <ul style="list-style-type: none"> • <i>Name of the project</i> • <i>Location of the project</i> • <i>Project type, size and technology</i> • <i>Commercial operation date</i> • <i>Capacity factor of the unit for the past three years</i> • <i>Availability factor of the unit for the past three years</i> • <i>References, including the names and current addresses and telephone numbers of individuals to contact for each reference.</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Construction Period Lender</i> • <i>Operating Period Lender</i> • <i>Financial Advisor</i> • <i>Environmental Consultant</i> • <i>Owner's Engineer</i> • <i>Construction Contractor</i> • <i>Transmission Consultant</i> • <i>Legal Counsel</i> 		<<< Reference Required

Invitation for Bid: GPA-007-18 Renewable Resource Acquisition for the Guam Power Authority PART 1 - QUAL SUPPORT REFERENCES		
Bidder's Name:	Bidder's No.: <<< BIDDER'S BID NO >>>	DATA MISSING
EVALUATION FACTORS	BID REFERENCE (Enter the chapter/section and page number where information is to be found within submitted materials)	ALERTS
A4. Project Schedule & Commercial Operation Date		<<< Reference Required
A5. Status of equipment supply and EPC agreements(3) Bidders should provide information about the specific technology or equipment including the track record of the technology and equipment. A5-a. Provide a reasonable but preliminary engineering plan which includes the following information: <ul style="list-style-type: none"> • <i>Name of principal engineering firm responsible for facility design</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Type of generation technology</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Major equipment considered or expected to be used</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Equipment vendors selected/considered</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>History of equipment operations</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Equipment procurement strategy</i> 		<<< Reference Required
A5-b. Provide name of expected key equipment suppliers and information that illustrates and discusses the proposed equipment and technology, lead times for delivery to GPA, and suppliers prior experience with equipment operation in tropical island environments.		<<< Reference Required
A5-c. Please identify similar equipment by the same manufacturer that are presently in commercial operations including the number installed, installed capacity and estimated generation.		<<< Reference Required
A5-d. Provide evidence that the technology to be employed for energy production is ready for transfer to the design and construction phases. <ul style="list-style-type: none"> • <i>Describe the technology to be employed for energy production.</i> • <i>To the developer's best knowledge, are there, or have there been any similar plants in commercial operation? If not, i) are there, or have there been, any pilot projects, and ii) please provide evidence that the technology to be employed for energy production has been proven. Such evidence may include copies of studies confirming technical feasibility.</i> 		<<< Reference Required
A5-e. Please indicate if the Bidder has secured its equipment for the project. If not, identify the long-lead equipment options and describe the timing for securing equipment.		<<< Reference Required
A6. Bidder concurrence to the draft Purchase Power Agreement (5)		<<< Reference Required
B. PHYSICAL PROJECT CHARACTERISTICS		<<< Reference Required
B1. Operating Profile (5)		<<< Reference Required
B1-a. Conformance with Performance Standards		<<< Reference Required
B1-b. Impacts on System Operations/Stability		<<< Reference Required
B1-c. Generation Profile		<<< Reference Required
B1-d. Quality of Forecasting and Dispatchability		<<< Reference Required
B1-e. O&M Plan and Coordination of Maintenance <ul style="list-style-type: none"> • <i>Provide an operation and maintenance plan for the project that demonstrates the long term operational viability of the proposed project. The plan should include a discussion of the staffing levels proposed for the project, the expected role of the project sponsor or outside contractor, scheduling of major maintenance activity, maintenance funding levels, and the plan for testing equipment.</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Indicate whether or not the project sponsor is willing to coordinate the maintenance schedule for the project with the annual maintenance schedule of GPA.</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Describe the status of the project sponsor in securing any operation and maintenance agreements or contracts. Include a discussion of the sponsors plan for securing a long-term O&M contract.</i> 		<<< Reference Required
<ul style="list-style-type: none"> • <i>Provide examples of the Bidder's experience with O&M services for other similar projects.</i> 		<<< Reference Required
B2. Point of delivery (5)		<<< Reference Required
B2-a. Provide preliminary Single-Line Diagram(s) for the generation and interconnection facilities (see Appendix H for required details)		<<< Reference Required
B2-b. Provide a plan map of the facilities; indicate the interconnection point to the GPA system.		<<< Reference Required

Invitation for Bid: GPA-007-18 Renewable Resource Acquisition for the Guam Power Authority PART 1 - QUAL SUPPORT REFERENCES		
Bidder's Name:	Bidder's No.: <<< BIDDER'S BID NO >>>	DATA MISSING
EVALUATION FACTORS	BID REFERENCE (Enter the chapter/section and page number where information is to be found within submitted materials)	ALERTS
B2-c. Provide the technical specifications and other information available for the generators included in the proposal.		<<< Reference Required
B3. Risk that the resource will not perform as expected (5) Discuss risks and plans associated with resource performance.		<<< Reference Required
B4. Project life and extension options. (5) Describe willingness to allow GPA to extend the life of a resource beyond the initial term or forecast provide potential future risk mitigation. As a result, proposals that provide rights to long-term access to the resource or energy supply will be scored higher than		<<< Reference Required
C. POWER PRODUCT CHARACTERISTICS		
C1. Guaranteed Annual MWH (3)		<<< Reference Required
C2. Dispatchability (3)		<<< Reference Required
C3. Product flexibility (3)		
C3-a. Discuss In-service date (GPA prefers projects that reasonably propose a commercial operation date in the 2019-2020 timeframe)		<<< Reference Required
C3-b. Willingness to accept contract provisions for flexibility to accommodate future changes to performance standards.		<<< Reference Required
C3-c. Bid size (GPA may prefer contracts in an output range sufficient to allow GPA to contract with more than one project entity to diversify project risk).		<<< Reference Required
C4. Contract term (1) Discuss contract term. (NOTE: No firm capacity payments will be offered for this BID. GPA prefers proposals that have a longer contractual term.)		<<< Reference Required
D. CREDIT EVALUATION		
D1. Debt and equity ratings (3)		<<< Reference Required
D2. Performance assurance (3)		<<< Reference Required
D3. Financial ratio analysis (3)		<<< Reference Required
D4. Default risk (3)		<<< Reference Required
D5. Credit concentration and liquidity effect (3)		<<< Reference Required
D6. Enforceability of contractual credit terms (3)		<<< Reference Required
D7. Bidder revisions to contract templates that may affect credit requirements (3)		<<< Reference Required
E. Environmental Permits and Impacts		
The Bidder should identify environmental impacts associated with the proposed project and its plan to mitigate such impacts. Included in this section are technical environmental issues associated with air, water, solid waste, land use, noise, and other environmental issues. The following addresses specific environmental permitting considerations, E1. Permits (5)		
E1-a. Identify all permits, licenses, and environmental assessments and/or environmental impact statements required.		<<< Reference Required
E1-b. Provide a list of all Federal and GUAM permits, licenses, and environmental assessments and/or environmental impact statements required to construct and operate the project. Identify governmental agencies for issuing permits and licenses.		<<< Reference Required
E1-c. Identify the governmental agencies which will issue or approve the required permits, licenses, and environmental assessments and/or environmental impact statements. Prepare timeline to complete acquisition of permits, licenses, and environmental assessments and/or environmental impact statements.		<<< Reference Required
E1-d. Provide the anticipated timeline for seeking and receiving the required permits, licenses, and environmental assessments and/or environmental impact statements, using the execution date of the power purchase agreement as the starting point. Please include a narrative on the basis for the assumed timeline.		<<< Reference Required
E2. Site Environmental Assessment (5)		
Discuss proposed actions to address environmental issues stated in the Navy Environmental Assessment including		
• Site development		<<< Reference Required
• Air quality		<<< Reference Required
• Water resources		<<< Reference Required
• Ecology		<<< Reference Required

**Invitation for Bid: GPA-007-18
Renewable Resource Acquisition for the Guam Power Authority
PART 2 - TECHNICAL DATA**

BIDDER:	PROJECT NAME.: <<<project name>>>	BIDDER'S NO.: <<< BIDDER'S BID NO >>>
Bidder Information		
1. <u>Company Name:</u>		
<u>Primary Contact:</u>	<u>Alternative Contact:</u>	
2. <u>Contact Name:</u>		
<u>Company Name:</u>	<u>Company Name:</u>	
<u>Street Address:</u>	<u>Street Address:</u>	
<u>City:</u>	<u>City:</u>	
<u>State & Zip Code:</u>	<u>State & Zip Code:</u>	
<u>Phone Number:</u>	<u>Phone Number:</u>	
<u>Fax Number:</u>	<u>Fax Number:</u>	
<u>e-mail Address:</u>	<u>e-mail Address:</u>	
Renewable Energy Project Information		
3. <u>Project Name:</u>	<<<project name>>>	
4. <u>Unique Bid Number (1,2,3...):</u>	<<< BIDDER'S BID NO >>>	
5. <u>Renewable Technology (Select one):</u>	<renewable technology>	
6. <u>Street Address (or general location):</u>		
<u>City / County:</u>		
<u>State & Zip Code:</u>		
7. <u>New or existing? (Click One Below)</u>		
<input type="checkbox"/> Existing Facility		
<input type="checkbox"/> New Facility		
8. Project Owners		
<u>Owner 1:</u>	<u>Owner 2:</u>	<u>Owner 3:</u>
<u>Contact:</u>	<u>Contact:</u>	<u>Contact:</u>
<u>Street Address:</u>	<u>Street Address:</u>	<u>Street Address:</u>
<u>City:</u>	<u>City:</u>	<u>City:</u>
<u>State & Zip Code:</u>	<u>State & Zip Code:</u>	<u>State & Zip Code:</u>
<u>Phone Number:</u>	<u>Phone Number:</u>	<u>Phone Number:</u>
<u>e-mail Address:</u>	<u>e-mail Address:</u>	<u>e-mail Address:</u>
<u>Ownership Share:</u>	<u>Ownership Share:</u>	<u>Ownership Share:</u>
9. Project Technical Information		
9.A <u>Date of Initial Operation, (MM/DD/YYYY):</u>	<< This is the date when the facility will initiate operation mainly for testing	
9.B <u>Agreement Beginning Date, (MM/DD/YYYY):</u>	<u>1/1/2022</u>	<< This is the Commercial Operation Date
9.C <u>Nameplate Capacity, kW:</u>		
9.D <u>ESS Capacity (MW and MWh):</u>	<u>KW</u>	<u>KWH</u> << This will be used for dispatching solar energy production for evaluation purposes.

**Invitation for Bid: GPA-007-18
Renewable Resource Acquisition for the Guam Power Authority
PART 2 - TECHNICAL DATA**

BIDDER:

PROJECT NAME.: <<<project name>>>

BIDDER'S NO.: <<< BIDDER'S BID NO >>>

9.E Estimated Annual Capacity Factor (net), %:

9.F Guaranteed Net Annual Generation, MWh/yr:

Contract Year: 1	Contract Year: 11
2	12
3	13
4	14
5	15
6	16
7	17
8	18
9	19
10	20

9.G Expected Minimum Annual Generation, MWh/yr at 95% Confidence Level:

Contract Year: 1	Contract Year: 11
2	12
3	13
4	14
5	15
6	16
7	17
8	18
9	19
10	20

9.H Guaranteed Success rate, AC-AC efficiency and availability for RI-ESS:

Contract Year: 1	Contract Year: 1	Contract Year: 1
1% Ramp Rate Guaranteed Success Rate	Guaranteed AC-AC Efficiency	Guaranteed Availability
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17

**Invitation for Bid: GPA-007-18
Renewable Resource Acquisition for the Guam Power Authority
PART 2 - TECHNICAL DATA**

BIDDER:

PROJECT NAME.: <<<project name>>>

BIDDER'S NO.: <<< BIDDER'S BID NO >>>

Contract Year:	Annual Production (MWH)	Guarantee Match? (9.G)	Capacity Factor
1	0	YES	#DIV/0!
2	0	YES	#DIV/0!
3	0	YES	#DIV/0!
4	0	YES	#DIV/0!
5	0	YES	#DIV/0!
6	0	YES	#DIV/0!
7	0	YES	#DIV/0!
8	0	YES	#DIV/0!
9	0	YES	#DIV/0!
10	0	YES	#DIV/0!

Contract Year:	Annual Production (MWH)	Guarantee Match? (9.G)	Capacity Factor
11	0	YES	#DIV/0!
12	0	YES	#DIV/0!
13	0	YES	#DIV/0!
14	0	YES	#DIV/0!
15	0	YES	#DIV/0!
16	0	YES	#DIV/0!
17	0	YES	#DIV/0!
18	0	YES	#DIV/0!
19	0	YES	#DIV/0!
20	0	YES	#DIV/0!

13. Renewable Energy Project Portfolio Credit Generation Profile

Provide the monthly estimated net portfolio credits per hour for every hour of the day.

Open Fold (Show All Years)

Close Fold (Hide After 1st Year)

CON YR	MON	YR	Hour:																								DAYS	Monthly Total MWh
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	Jan	2022																								31	0	
1	Feb	2022																								28	0	
1	Mar	2022																								31	0	
1	Apr	2022																								30	0	
1	May	2022																								31	0	
1	Jun	2022																								30	0	
1	Jul	2022																								31	0	
1	Aug	2022																								31	0	
1	Sep	2022																								30	0	
1	Oct	2022																								31	0	
1	Nov	2022																								30	0	
1	Dec	2022																								31	0	

<<<<<< END >>>>>>

Invitation for Bid: GPA-007-18 Renewable Resource Acquisition for the Guam Power Authority PART 3 - QUAL EVAL SCORESHEET					
Bidder's Name: Bidder's No.: <<< BIDDER'S BID NO >>>					Date:
EVALUATION FACTORS				BID EVALUTION	
	Raw Score Weight	MAX Possible Score	Maximum Weighted Possible Score	RAW SCORE	WEIGHTED SCORE
A. PROJECT DEVELOPMENT	20	26	520	0	
A1. Method and status of project financing (3)		3			
A2. Level of site control by developer (6)		6			
A3. Project team experience (5)		5			
A4. Project Schedule & Commerical Operation Date (4)		4			
A5. Status of equipment supply and EPC agreements (3)		3			
A6. Bidder concurrence to the draft Purchase Power Agreement (5)		5			
B. PHYSICAL PROJECT CHARACTERISTICS	20	20	400	0	
B1. Operating Profile (5)		5			
B2. Point of delivery (5)		5			
B3. Risk that the resource will not perform as expected (5)		5			
B4. Project life and extension options. (5)		5			
C. POWER PRODUCT CHARACTERISTICS	25	12	300	0	
C1. Guaranteed Annual MWH (3)		3			
C2. Dispatchability (3) - Proposals not capable of energy shifting total daily solar generated energy shall be disqualified.		3			
C3. Product flexibility (3)		3			
C4. Contract Term (3)		3			
D. CREDIT EVALUATION	20	21	420	0	
D1. Debt and equity ratings (3)		3			
D2. Performance assurance (3)		3			
D3. Financial ratio analysis (3)		3			
D4. Default risk (3)		3			
D5. Credit concentration and liquidity effect (3)		3			
D6. Enforceability of contractual credit terms (3)		3			
D7. Bidder revisions to contract templates that may affect credit requirements (3)		3			
E. Environmental Permits and Impacts	15	15	225	0	
E1. Permits (5)		5			
E2. Site Environmental Assessment (10)		10			
TOTALS	100	94	1865	0	
EVALUATION RATING:					
<i>ACCEPTABLE - Scores Greater Than or Equal to:</i>				1492	
<i>POTENTIALLY ACCEPTABLE - Less than Acceptable but Greater Than or Equal to:</i>				1306	
<i>UNACCEPTABLE - Scores are less than:</i>				1306	

**Invitation for Bid: GPA-007-18
Renewable Resource Acquisition for the Guam Power Authority
PRICE OFFER WORKSHEET**

Instructions:

Bidder shall fill in the highlighted fields.

1. Bidder's Name:

2. Bid Reference No.:

(Refers to Bidder's Bid No. if bidder is submitting more than one bid, otherwise enter "N/A")

3. Contract Term, Years:

4. Price Offer Entry:

Enter fixed annual energy purchase price and the Guaranteed Net Annual Generation (MWH/YR) into the table below.

Contract Year	Annual Price (\$/MWH)	Guaranteed Net Annual Generation (MWH/YR)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Contract Year	Annual Price (\$/MWH)	Guaranteed Net Annual Generation (MWH/YR)
16		
17		
18		
19		
20		

GOVERNMENT OF GUAM

GENERAL TERMS AND CONDITIONS

SEALED BID SOLICITATION AND AWARD

Only those Boxes checked below are applicable to this bid.

1. **AUTHORITY:** This solicitation is issued subject to all the provision of the Guam Procurement Act (5GCA, Chapter 5) And the Guam Procurement Regulations (copies of both are available at the Office of the Complier of laws, Department of Law, copies available for inspection at the Guam Power Authority). It requires all parties involved in the Preparation, negotiation, performance, or administration of contracts to act in good faith.
2. **GENERAL INTENTION:** Unless otherwise specified, it is the declared and acknowledged intention and meaning of these General Terms and conditions for the bidder to provide the Government of Guam (Government) with specified services or with materials, supplies or equipment completely assembled and ready for use.
3. **TAXES:** Bidders are cautioned that they are subject to Guam Income Taxes as well as all other taxes on Guam Transactions. Specific information on taxes may be obtained from the Director of Revenue and Taxation.
4. **LICENSING:** Bidders are cautioned that the Government will not consider for award any offer submitted by a bidder who has not complied with the Guam Licensing Law. Specific information on licenses may be obtained from the Director of Revenue and Taxation.
5. **LOCAL PROCUREMENT PREFERENCE:** All procurement of supplies and services where possible, will be made from among businesses licensed to do business on Guam in accordance with section 5008 of the Guam Procurement Act (5GCA, Chapter 5) and Section 1-104 of the Guam Procurement Regulations.
6. **COMPLIANCE WITH SPECIFICATIONS AND OTHER SOLICITATION REQUIREMENTS:** Bidders shall comply with all specifications and other requirements of the Solicitation.
7. **“ALL OR NONE” BIDS:** Unless otherwise allowed under this Solicitation. “all or none” bids may be deemed to be non-responsive. If the bid is so limited, the Government may reject part of such proposal and award on the remainder.

NOTE: By checking this item, the Government is requesting all of the bid items to be bid or none at all. **The Government will not award on an itemized basis.** Reference: Section 3-101.06 of the Guam Procurement Regulations.

8. **INDEPENDENT PRICE DETERMINATION:** The bidder, upon signing the Invitation for Bid, certifies that the prices in his bid were derived at without collusion, and acknowledge that collusion and anti-competitive practices are prohibited by law. Violations will be subject to the provision of Section 5651 of that of the Guam Procurement Act. Other existing civil, criminal or administrative remedies are not impaired and may be in addition to the remedies in Section 5651 of the Government code.
9. **BIDDER’S PRICE:** The Government will consider not more than two (2) (Basic and Alternate) item prices and the bidder shall explain fully each price if supplies, materials, equipment, and/or specified services offered comply with specifications and the products origin. Where basic or alternate bid meets the minimum required specification, cost and other factors will be considered. Failure to explain this requirement will result in rejection of the bid.
10. **BID ENVELOPE:** Envelope shall be sealed and marked with the bidder’s name, Bid number, time, date and place of Bid Opening.
11. **BID GUARANTEE REQUIREMENT:** Bidder is required to submit a Bid Guarantee Bond or standby irrevocable Letter of Credit or Certified Check or Cashier’s Check in the same bid envelope to be held by the Government pending award. The Bid Guarantee Bond, Letter of Credit, Certified Check or Cashier’s Check must be issued by any local surety or banking institution licensed to do business on Guam and made payable to the Guam Power Authority in the amount of \$150,000.00 USD. The Bid Bond must be submitted on Government Standard Form BB-1 (copy enclosed). Personal Checks will not be accepted as Bid Guarantee. If a successful Bidder (contractor) withdraws from the bid or fails to enter into contract within the prescribed time, such Bid guarantee will be forfeited to the Government of Guam. Bids will be disqualified if not accompanied by Bid Bond, Letter of Credit, Certified Check or Cashier’s check. Bidder must include in his/her bid, valid copies of a Power of Attorney from the Surety and a Certificate of Authority from the Government of Guam to show proof that the surety company named on the bond instrument is authorized by the Government of Guam and qualified to do business on Guam. For detailed information on bonding matters, contact the Department of Revenue and Taxation. Failure to submit a valid Power of Attorney and Certificate of Authority on the surety is cause for rejection of bid. (GPR Section 3-202.03.3) **Pursuant to Public Law 27-127, all competitive sealed bidding for the procurement of supplies or services exceeding \$25,000.00 a 15% Bid Security of the total bid price must accompany the bid package.**
12. **PERFORMANCE BOND REQUIREMENT:** The Bidder may be required to furnish a Performance Bond on Government Standard Form BB-1 or standby irrevocable Letter of Credit or Certified Check or Cashier’s Check payable to the Guam Power Authority issued by any of the local Banks or Bonding Institution in the amount equal to Cost for Minimum Annual Energy as described in the Draft Renewable Energy Purchase Agreement for that full or partial fiscal year within the term of the contract. In the event that any of the provisions of this contract are violated by the contractor, the Chief Procurement Officer shall serve written notice upon both the contractor and the Surety of its intention to terminate the contract. Unless satisfactory arrangement or correction is made within ten (10) days of such notice the contract shall cease and terminate upon the expiration of the ten (10) days. In the event of any such termination, the Chief Procurement Officer shall immediately serve notice thereof upon the Surety. The Surety shall have the right to take over and perform the contract, provided, however, that if the Surety does not commence performance thereof within 10 days from the date of the mailing of notice of termination, the Government may take over and prosecute the same to complete the contract or force

account for the account and at the expense of the contractor, and the contractor and his Surety shall be liable to the Government for any excess cost occasioned the Government thereby (GPR Section 3-202.03.4).

- [X] 13. **PERFORMANCE GUARANTEE:** Bidders who are awarded a contract under this solicitation, guarantee that goods will be delivered or required services performed within the time specified. Failure to perform the contract in a satisfactory manner may be cause for suspension or debarment from doing business with the Government and to enforce Section 23 of these General Terms and Conditions. In addition, the Government will hold the Vendor liable and will enforce the requirements as set forth in Section 41 of these General Terms and Conditions.
- [X] 14. **SURETY BONDS:** Bid and Performance Bonds coverage must be signed or countersigned in Guam by a foreign or alien surety's resident general agent. The surety must be an Insurance Company, authorized by the government of Guam and qualified to do business in Guam. Bids will be disqualified if the Surety Company does not have a valid Certificate of Authority from the Government of Guam to conduct business in Guam.
- [X] 15. **COMPETENCY OF BIDDERS:** Bids will be considered only from the such bidders who, in the opinion of the Government, can show evidence of their ability, experience, equipment, and facilities to render satisfactory service.
- [X] 16. **DETERMINATION OF RESPONSIBILITY OF BIDDERS:** The Chief Procurement Officer reserves the right for securing from bidders information to determine whether or not they are responsible and to inspect plant site, place of business; and supplies and services as necessary to determine their responsibility in accordance with Section 15 of these General Terms and Conditions (GPR Section 3-401).
- [X] 17. **STANDARD FOR DETERMINATION OF LOWEST RESPONSIBLE BIDDER:** In determining the lowest responsible offer, the Chief Procurement Officer shall be guided by the following:
- a) Price of items offered.
 - b) The ability, capacity, and skill of the Bidder to perform.
 - c) Whether the Bidder can perform promptly or within the specified time.
 - d) The quality of performance of the Bidder with regards to awards previously made to him.
 - e) The previous and existing compliance by the Bidder with laws and regulations relative to procurement.
 - f) The sufficiency of the financial resources and ability of the Bidder to perform.
 - g) The ability of the bidder to provide future maintenance and services for the subject of the award.
 - h) The compliance with all of the conditions to the Solicitation.
- [X] 18. **TIE BIDS:** If the bids are for the same unit price or total amount in the whole or in part, the Chief Procurement Officer will determine award based on Section 3.202.15.2, or to reject all such bids (GPR Section 3-202.15.2).
- [] 19. **BRAND NAMES:** Any reference in the Solicitation to manufacturer's Brand Names and number is due to lack of a satisfactory specification of commodity description. Such preference is intended to be descriptive, but not restrictive and for the sole purpose of indicating prospective bidders a description of the article or services that will be satisfactory. Bids on comparable items will be considered provided the bidder clearly states in his bid the exact articles he is offering and how it differs from the original specification.
- [] 20. **DESCRIPTIVE LITERATURE:** Descriptive literature(s) as specified in this solicitation must be furnished as a part of the bid and must be received at the date and time set for opening Bids. The literature furnished must clearly identify the item(s) in the Bid. The descriptive literature is required to establish, for the purpose of evaluation and award, details of the product(s) the bidder proposes to furnish including design, materials, components, performance characteristics, methods of manufacture, construction, assembly or other characteristics which are considered appropriate. Rejection of the Bid will be required if the descriptive literature(s) do not show that the product(s) offered conform(s) to the specifications and other requirements of this solicitation. Failure to furnish the descriptive literature(s) by the time specified in the Solicitation will require rejection of the bid.
- [] 21. **SAMPLES:** Sample(s) of item(s) as specified in this solicitation must be furnished as a part of the bid and must be received at the date and time set for opening Bids. The sample(s) should represent exactly what the bidder proposes to furnish and will be used to determine if the item(s) offered complies with the specifications. Rejection of the Bid will be required if the sample(s) do not show that the product(s) offered conform(s) to the specifications and other requirements of this solicitation. Failure to furnish the sample(s) by the time specified in the Solicitation will require rejection of the Bid.
- [] 22. **LABORATORY TEST:** Successful bidder is required to accompany delivery of his goods with a Laboratory Test Report indicating that the product he is furnishing the Government meets with the specifications. This report is on the bidder's account and must be from a certified Testing Association.
- [X] 23. **AWARD, CANCELLATION, & REJECTION:** Award shall be made to the lowest responsible and responsive bidder, whose bid is determined to be the most advantageous to the Government, taking into consideration the evaluation factors set forth in this solicitation. No other factors or criteria shall be used in the evaluation. The right is reserved as the interest of the Government may require to waive any minor irregularity in bid received. The Chief Procurement Officer shall have the authority to award, cancel, or reject bids, in whole or in part for any one or more items if he determines it is in the public interest. Award issued to the lowest responsible bidder within the specified time for acceptance as indicated in the solicitation, results in a bidding contract without further action by either party. In case of an error in the extension of prices, unit price will govern. It is the policy of the Government to award contracts to qualified local bidders. The government reserves the right to increase or decrease the quantity of the items for award and make additional awards for the same type items and the vendor agrees to such modifications and additional awards based on the bid prices for a period of thirty (30) days after original award. No. award shall be made under this solicitation which shall require advance payment or irrevocable letter of credit from the government (GPR Section 3-202.14.1).
- [] 24. **MARKING:** Each outside container shall be marked with the Purchase Order number, item number, brief item description and quantity. Letter marking shall not be less than 3/4" in height.
- [] 25. **SCHEDULE FOR DELIVERY:** Successful bidder shall notify the Guam Power Authority, Dededo Warehouse at (671) 653-2073 and/or Guam Power Authority Cabras Warehouse at (671) 475-3319, least twenty-four (24) hours before delivery of any item under this solicitation.

- [] 26. **BILL OF SALE:** Successful supplier shall render Bill of Sale for each item delivered under this contract. Failure to comply with this requirement will result in rejection of delivery. The Bill of Sale must accompany the items delivered but will not be considered as an invoice for payment. Supplier shall bill the Government in accordance with billing instructions as indicated on the Purchase Order.
- [] 27. **MANUFACTURER'S CERTIFICATE:** Successful bidder is required, upon delivery of any item under this contract, to furnish a certificate from the manufacturer indication that the goods meet the specifications. Failure to comply with this request will result in rejection of delivery payment. Supplier shall bill the Government in accordance with billing instructions as indicated on the Purchase Order.
- [X] 28. **INSPECTION:** All supplies, materials, equipment, or services delivered under this contract shall be subject to the inspection and/or test conducted by the Government at destination. If in any case the supplies, materials, equipment, or services are found to be defective in material, workmanship, performance, or otherwise do not conform with the specifications, the Government shall have the right to reject the items or require that they be corrected. The number of days required for correction will be determined by the Government.
- [] 29. **MOTOR VEHICLE SAFETY REQUIREMENTS:** The Government will only consider Bids on motor vehicles which comply with the requirements of the National Traffic and Motor Vehicle safety Act of 1966 (Public Law 89-563) and Clean Air Act as amended (Public Law 88-206), that are applicable to Guam. Bidders shall state if the equipment offered comply with these aforementioned Federal Laws.
- [] 30. **SAFETY INSPECTION:** All motor vehicles delivered under this contract must pass the Government of Guam Vehicle Inspection before delivery at destination.
- [X] 31. **GUARANTEE:**
- a) **Guarantee of Vehicle Type of Equipment:**
The successful bidder shall guarantee vehicular type of equipment offered against defective parts, workmanship, and performance, for a period of not less than one (1) year after date of receipt of equipment. Bidder shall also provide service to the equipment for at least one (1) year. Service to be provided shall include, but will not be limited to tune ups (change of spark plugs, contact points and condensers) and lubrication (change of engine and transmission oil). All parts and labor shall be at the expense of the bidder. All parts found defective and not caused by misuse, negligence or accident within the guarantee period shall be repaired, replaced, or adjusted within six (6) working days after notice from the Government and without cost to the Government. Vehicular type of equipment as used in this context shall include equipment used for transportation as differentiated from tractors, backhoes, etc.
- b) **Guarantee of Other Type of Equipment:**
The successful bidder shall guarantee all other types of equipment offered, except those mentioned in 31a, above, against defective parts, workmanship, and performance for a period of not less than three (3) months after date of receipt of equipment. Bidder shall also provide service to the equipment for at least three (3) months. All parts found defective within that period shall be repaired or replaced by the Contractor without cost to the Government. Repairs, adjustments or replacements of defective parts shall be completed by the contractor within six (6) working days after notice from the Government.
- c) **Compliance with this Section is a condition of this Bid.**
- [X] 32. **REPRESENTATION REGARDING ETHICS IN PUBLIC PROCUREMENT:** The bidder or contractor represents that it has not knowingly influenced and promises that it will not knowingly influence a Government employee to breach any of the ethical standards and represents that it has not violated, is not violating, and promises that it will not violate the prohibition against gratuities and kickbacks set forth on Chapter 11 (Ethics in Public Contracting) of the Guam Procurement Act and in Chapter 11 of the Guam Procurement Regulations.
- [X] 33. **REPRESENTATION REGARDING CONTINGENT FEES:** The contractor represents that it has not retained a person to solicit or secure a Government contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except for retention of bona fide employees or bona fide established commercial selling agencies for the purpose of securing business (GPR Section 11-207).
- [X] 34. **EQUAL EMPLOYMENT OPPORTUNITY:** Contractors shall not discriminate against any employee or applicant of employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that employees are treated equally during employment without regards to their race, color, religion, sex, or national origin.
- [X] 35. **COMPLIANCE WITH LAWS:** Bidders awarded a contract under this Solicitation shall comply with the applicable standard, provisions, and stipulations of all pertinent Federal and/or local laws, rules, and regulations relative to the performance of this contract and the furnishing of goods.
- [] 36. **CHANGE ORDER:** Any order issued relative to awards made under this solicitation will be subject to and in accordance with the provisions of Section 6-101-03.1 of the Guam Procurement Regulations.
- [] 37. **STOP WORK ORDER:** Any stop work order issued relative to awards made under this solicitation will be subject to and in accordance with the provisions of Section 6-101-04.1 of the Guam Procurement Regulations.
- [X] 38. **TERMINATION FOR CONVENIENCE:** Any termination order for the convenience of the Government issued relative towards made under this solicitation will be subject to and in accordance with the provisions of Section 6-101.10 of the Government Procurement Regulations.
- [X] 39. **TIME FOR COMPLETION:** It is hereby understood and mutually agreed by and between the contractor and the Government that the time for delivery to final destination or the timely performance of certain services is an essential condition of this contract. If the contractor refuses or fails to perform any of the provisions of this contract within the time specified in the Purchase Order (from the date Purchase Order is acknowledged by vendor), then the contractor is in default. Defaults will be treated subject to and in accordance with the provisions of Section 6-101-08 of the Guam Procurement Regulations.

- [X] 40. **JUSTIFICATION OF DELAY:** Bidders who are awarded contracts under this Solicitation, guarantee that the goods will be delivered to their destination or required services rendered within the time specified. If the bidder is not able to meet the specified delivery date, he is required to notify the Chief Procurement Officer of such delay. Notification shall be in writing and shall be received by the Chief Procurement Officer at least twenty-four (24) hours before the specified delivery date. Notification of delay shall include an explanation of the causes and reasons for the delay including statement(s) from supplier or shipping company causing the delay. The Government reserves the right to reject delay justification if, in the opinion of the Chief Procurement Officer, such justification is not adequate.

- [X] 41. **LIQUIDATED DAMAGES:** When the contractor is given notice of delay or nonperformance as specified in Paragraph 1 (Default) of the Termination for Default Clause of this contract and fails to cure in the time specified, the contractor shall be liable for damages for delay in the amount of one-fourth of one percent (1%) of outstanding order per calendar day from date set for cure until either the territory reasonable obtains similar supplies or services if the contractor is terminated for default, or until the contractor provides the supplies or services if the contractor is not terminated for default. To the extent that the contractor's delay or nonperformance is excused under Paragraph 40 (Excuse for Nonperformance or Delayed Performance) of the Termination for Default Clause of this contract, liquidated damages shall not be due the territory. The contractor remains liable for damages caused other than by delay (GPR Section 6-101-09.1).

- [X] 42. **PHYSICAL LIABILITY:** If it becomes necessary for the Vendor, either as principal, agent or employee, to enter upon the premises or property of the Government of Guam in order to construct, erect, inspect, make delivery or remove property hereunder, the Vendor hereby covenants and agrees to take, use, provide and make all proper, necessary and sufficient precautions, safeguards and protections against the occurrence of any accidents, injuries or damages to any person or property during the progress of the work herein covered, and to be responsible for, and to indemnify and save harmless the Government of Guam from the payment of all sums of money by reason of all or any such accidents, injuries or damages that may occur upon or about such work, and fines, penalties and loss incurred for or by reasons of the violations of any territorial ordinance, regulations, or the laws of Guam or the United States, while the work is in progress. Contractor will carry insurance to indemnify the Government of Guam against any claim for loss, damage or injury to property or persons arising out of the performance of the Contractor or his employees and agents of the services covered by the contract and the use, misuse or failure of any equipment used by the contractor or his employees or agents, and shall provide certificates of such insurance to the Government of Guam when required.

- [X] 43. **CONTACT FOR CONTRACT ADMINISTRATION:** If your firm receives a contract as a result of this Solicitation, please designate a person whom we may contact for prompt administration.

Name: _____ Title: _____

Address: _____ Telephone: _____

GOVERNMENT OF GUAM

SEALED BID SOLICITATION INSTRUCTIONS

1. **BID FORMS:** Each bidder shall be provided with two (2) sets of Solicitation forms. Additional copies may be provided upon request. Bidders requesting additional copies of said forms will be charged per page in accordance with Section 6114 of the Government Code of Guam. All payments for this purpose shall be by cash, certified check or money order and shall be made payable to the Guam Power Authority.

2. **PREPARATIONS OF BIDS:**
 - a) Bidders are required to examine the drawings, specifications, schedule, and all instructions. Failure to do so will be at bidder's risk.
 - b) Each bidder shall furnish the information required by the Solicitation. The bidder shall sign the solicitation and print or type his name on the Schedule. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent are to be accompanied by evidence of this authority unless such evidence has been previously furnished to the issuing office.
 - c) Unit price for each unit offered shall be shown and such price shall include packing unless otherwise specified. A total shall be entered in the amount column of the Schedule for each item offered. In case of discrepancies between a unit price and extended price, the unit price will be presumed to be correct.
 - d) Bids for supplies or services other than those specified will not be considered. Time, if stated as a number of days, means calendar days and will include Saturdays, Sundays, and holidays beginning the day after the issuance of a Notice to Proceed. Time stated ending on a Saturday, Sunday or Government of Guam legal holiday will end at the close of the next business day.

3. **EXPLANATION TO BIDDERS:** Any explanation desired by a bidder regarding the meaning or interpretation of the Solicitation, drawings, specifications, etc., must be submitted in writing and with sufficient time allowed for a written reply to reach all bidders before the submission of their bids. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective bidder concerning a Solicitation will be furnished to all prospective bidders in writing as an amendment to the Solicitation if such information would be prejudicial to uninformed bidders.

4. **ACKNOWLEDGEMENT OF AMENDMENTS TO SOLICITATIONS:** Receipt of an amendment to a Solicitation by a bidder must be acknowledged by signing an acknowledgement of receipt of the amendment. Such acknowledgement must be received prior to the hour and date specified for receipt of bids.

5. **SUBMISSION OF BIDS:**
 - a) Bids and modifications thereof shall be enclosed in sealed envelopes and addressed to the office specified in the Solicitation. The bidder shall show the hour and date specified in the Solicitation for receipt, the Solicitation number, and the name and address of the bidder on the face of the envelope.
 - b) Telegraphic bids will not be considered unless authorized by the Solicitation. However, bids may be modified or withdrawn by written or telegraphic notice, provided such notice is received prior to the hour and date specified for receipt (see paragraph 6 of these instructions).
 - c) Samples of items, when required, must be submitted within the time specified, unless otherwise specified by the Government, at no expense to the Government. If not destroyed by testing, samples will be returned at bidder's request and expense, unless otherwise specified by the Solicitation.
 - d) Samples or descriptive literature should not be submitted unless it is required on this solicitation. Regardless of any attempt by a bidder to condition the bid, unsolicited samples or descriptive literature will not be examined or tested at the bidder's risk, and will not be deemed to vary any of the provisions of this Solicitation.

6. **FAILURE TO SUBMIT BID:** If no bid is to be submitted, do not return the solicitation unless otherwise specified. A letter or postcard shall be sent to the issuing office advising whether future Solicitations for the type of supplies or services covered by this Solicitation are desired.

7. **LATE BID, LATE WITHDRAWALS, AND LATE MODIFICATIONS:**
 - a) Definition: Any bid received after the time and date set for receipt of bids is late. Any withdrawal or modification of a bid received after the time and date set for opening of bids at the place designated for opening is late (Guam Procurement Regulations Section 3-202)
 - b) Treatment: No late bid, late modification, or late withdrawal will be considered unless received before contract award, and the bid, modification, or withdrawal would have been timely but for the action or inaction of territorial personnel directly serving the procurement activity.

8. **DISCOUNTS:**
 - a) Notwithstanding the fact that prompt payment discounts may be offered, such offer will not be considered in evaluating bids for award unless otherwise specified in the Solicitation. However, offered discounts will be taken if payment is made within the discount period, even though not considered in the evaluation of bids.
 - b) In connection with any discount offered, time will be computed from date of delivery and acceptance of the supplies to the destination as indicated in the purchase order or contract. Payment is deemed to be made for the purpose of earning the discount on the date of mailing of the Government check.

9. **GOVERNMENT FURNISHED PROPERTY:** No material, labor or facilities will be furnished by the Government unless otherwise provided for in the Solicitation.
10. **SELLERS' INVOICES:** Invoices shall be prepared and submitted in quadruplicate (one copy shall be marked "original") unless otherwise specified. Invoices shall be "certified true and correct" and shall contain the following information: Contract and order number (if any), item numbers, description of supplies or services, sizes, quantities, unit prices, and extended total. Bill of lading number and weight of shipment will be shown for shipments made on Government bills of lading.
11. **RECEIPT, OPENING AND RECORDING OF BIDS:** Bids and modifications shall be publicly opened in the presence of one or more witnesses, at the time, date, and place designated in the Invitation for Bids. The name of each bidder, the bid price, and such other information as is deemed appropriate by the Procurement Officer, shall be read aloud and recorded, or otherwise made available. The names and addresses of required witnesses shall be recorded at the opening. The opened bids shall be available for public inspection except to the extent the bidder designates trade secrets or other proprietary data to be confidential as set forth in accordance with Section 12 below. Material so designated shall accompany the bid and shall be readily separable from the bid in order to facilitate public inspection of the non-confidential portion of the bid. Prices, makes and models or catalogue numbers of the items offered, deliveries, and terms of payment shall be publicly available at the time of bid opening regardless of any designation to the contrary (Guam Procurement Regulations Section 3-202.12.2).
12. **CONFIDENTIAL DATA:** The Procurement Officer shall examine the bids to determine the validity of any requests for nondisclosure of trade secrets and other proprietary data identified in writing. If the parties do not agree as to the disclosure of data, the Procurement Officer shall inform the bidders in writing what portions of the bid will be disclosed and that, unless the bidders protest under Chapter 9 of the Guam Procurement Act (P.L. 16-124), the bids will be so disclosed. The bids shall be opened to public inspection subject to any continuing prohibition on the disclosure of confidential data (Guam Procurement Regulations Section 3-202.12.3).
13. **MULTI-STEP SEALED BIDDING:**
- a. It is defined as two-phase process consisting of a technical first-phase composed of one or more steps in which bidders submit unpriced technical offers to be evaluated by the territory, and a second-phase in which those bidders whose technical offers are determined to be acceptable during the first-step have their priced bids considered. It is designed to obtain the benefits of competitive sealed bidding by award of a contract to the lowest responsive, responsible bidder, and at the same time obtained the benefits of the competitive sealed proposals procedure through the solicitation of technical offers and the conduct of discussions to evaluate and determine the acceptability of technical offers.
 - b. In addition to the requirements set forth in the General Terms and Conditions and the Special provisions, the following applies:
 - 1). only unpriced technical offers are requested in the first phase;
 - 2). priced bids will be considered only in the second phase and only from bidders whose unpriced technical offers are found acceptable in the first phase;
 - 3). the criteria to be used in the evaluation at those specified in the Special Provisions and the General Terms and Conditions;
 - 4). the territory, to the extent the Procurement Officer finds necessary, may conduct oral or written discussion of the unpriced technical offers;
 - 5). the bidders, may designate those portions of the unpriced technical offers which contain trade secrets or other proprietary data which are to remain confidential; and,
 - 6). the service being procured shall be furnished generally in accordance with bidder's technical offer as found to be finally acceptable and shall meet the requirements of the Invitation for Bids.
 - c. **RECEIPT AND HANDLING OF UNPRICED TECHNICAL OFFERS.**
Unpriced technical offers shall not be opened publicly, but shall be opened in front of two or more procurement officials. Such offers shall not be disclosed to unauthorized persons. Bidders may request nondisclosure of trade secrets and other proprietary data identified in writing.
 - d. **EVALUATION OF UNPRICED TECHNICAL OFFERS.**
The unpriced technical offers submitted by bidders shall be evaluated solely in accordance with the criteria set forth in the Invitation for Bids. The unpriced technical offers shall be categorized as:
 - 1). acceptable;
 - 2). potentially acceptable, that is, reasonably susceptible of being made acceptable; or
 - 3). unacceptable. The Procurement Officer shall record in writing the basis for finding an offer unacceptable and make it part of the procurement file.

The Procurement Officer may initiate Phase Two of the procedure if, in the Procurement Officer's opinion, there are sufficient acceptable unpriced technical offers to assure effective price competition in the second phase without technical discussions. If the Procurement Officer finds such is not the case, the Procurement Officer shall issue an amendment to the Invitation for Bids or engage in technical discussions as set forth in Subsection 3-202.20.5 of this Section.
 - e. Upon the completion of Phase One, the Procurement Officer shall invite each acceptable bidder to submit a price bid. Upon submission of prices, the Procurement Officer shall prepare the final evaluation and reconsideration for the Chief Procurement Officer's approval.