# STATEMENT OF WORK

## Provide Ecosystem Management Technical Assistance to Promote Carbon Sequestration at Naval Air Station Corpus Christi

### A. Introduction

The purpose of this project is to support the implementation of the Integrated Natural Resources Management Plans (INRMP) at Naval Air Station Corpus Christi (NASCC), Texas. Naval Facilities Engineering Systems Command (NAVFAC) Southeast and respective installation staff are responsible for executing projects outlined in the INRMP to include invasive species control, ecosystem restoration with native species to promote carbon sequestration, and associated scientific research efforts. Two sites at NASCC (Waldron and Truax) are in need of vegetation management and restoration. The INRMPs for NASCC requires that these lands be managed within an ecosystem context while providing optimal landscape benefits for realistic military training. This project will support the improvement of ecosystem management through invasive plant species control, ecosystem restoration with native plant species, and land management techniques that will fix carbon in the soil and root systems, ultimately contributing to the Department of Defense (DoD) goal to offset greenhouse gasses that cause climate change.

### B. Objective

The Cooperator will be responsible for providing technical and scientific research assistance to the NAVFAC Southeast and installation staff in order to implement the INRMP projects, to include the tasks described in Section C (Services Requested) of this project and additional tasks contained in Appendix 1 (Optional Tasks), which will be dependent on the availability of funds. A primary objective of the project is to promote carbon sequestration through storage of carbon in native vegetation (above and below ground) as well as in the soil.

### C. Services Requested

#### Task 1. Kickoff Meeting

The Cooperator will attend a kickoff meeting with NAVFAC Southeast and respective installation staff at NASCC.

#### Task 2. Vegetation Management, Restoration, & Vegetation and Soil Monitoring at NASCC Naval Auxiliary Landing Field Waldron & Main Station Truax

The Cooperator will assist with development and execution of vegetation management, vegetation restoration, and vegetation and soil monitoring strategies at Naval Auxiliary Landing Field (NALF) Waldron and Main Station Truax as described below:

***2a***. *NASCC Vegetation Management & Monitoring Plan*

A primary objective of the restoration project at NASCC is to promote carbon sequestration through storage of carbon in soil and root systems of native plants. Nonnative plants have been linked to increased risk of population declines for many rare, native plant species as well as alteration of fire regimes, hydrologic processes, and carbon storage patterns. The Cooperator will develop a plan to restore degraded areas to native grassland historically present in the Gulf Prairies and Marshes ecoregion, and to monitor the pre- and post-treatment plant community and soil health (i.e., Carbon content).

The Cooperator will develop a vegetation management plan recommending techniques for effective treatment of invasive woody vegetation on ~ 210 acres at NALF Waldron (Figure 1). The plan will identify techniques to restore and maintain native grasses and forbs that will significantly reduce the opportunity of invasive plants to become re-established and promote a healthier native grassland ecosystem on ~ 92 acres of fields previously treated for invasive species at NALF Waldron (Figure 2). The plan will also recommend techniques for effective treatment of a mixture of invasive woody and herbaceous vegetation on approximately 108 acres at NASCC Main Station Truax Airfield and restoration to native grasses and forbs (Figure 3).

**Figure 1. Invasive Vegetation Treatment Areas (Blue) at NALF Waldron**

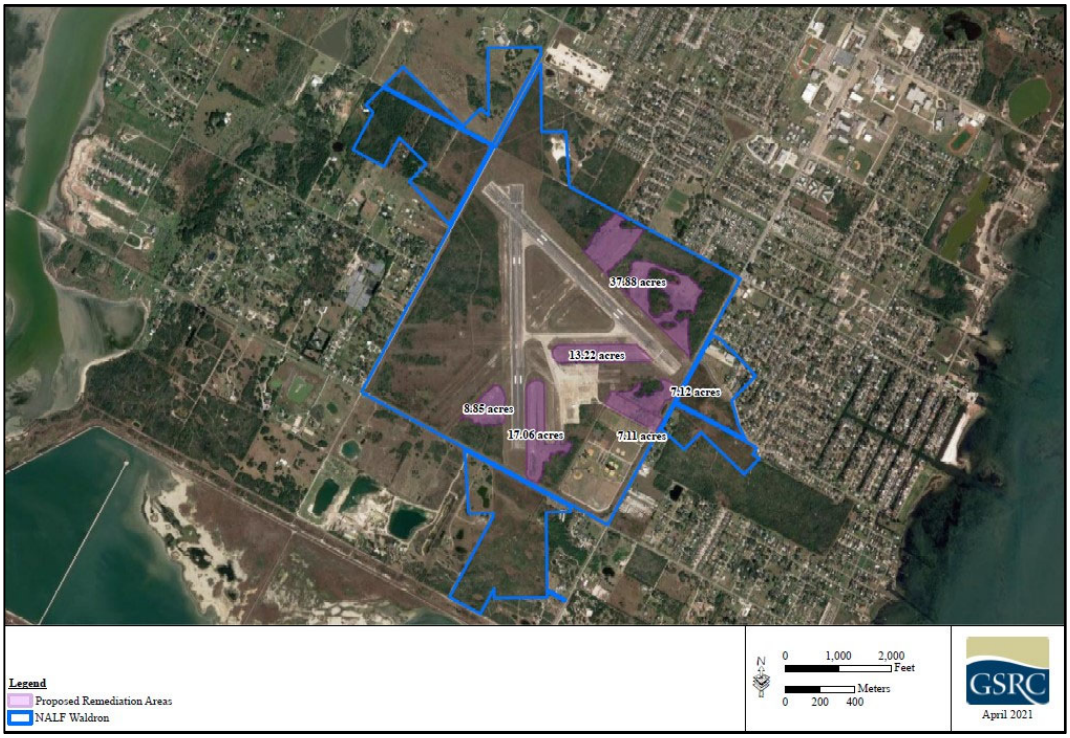


**Figure 2. Native Grassland/Forb Restoration Areas (Purple) at NALF Waldron**


**Figure 3. Invasive Vegetation Treatment Areas (Blue) at Main Station Truax**

The Cooperator will develop a scientifically defensible and statistically rigorous plan to measure and monitor the vegetation community (e.g., invasive control and restoration success) and soil health [e.g., soil bulk density (core method), soil texture, and soil organic carbon (SOC)] before and after vegetation restoration. At a minimum, the plan will identify and justify specific metrics and techniques for monitoring vegetation and soil, and will propose a detailed sampling plan (e.g., the number of samples) and schedule. The plan should include taking geo-referenced photographs at sample sites to document site conditions over time.

NAVFAC Southeast will ensure that vegetative treatment methods and plantings proposed in the plan are coordinated with NASCC BASH Working Group to ensure compatibility with airfield operations, in accordance with OPNAVINST 3750.6, OPNAVINST 5090.1E and the NASCC Wildlife Hazard Management Plan.

**2b.** *Pre-Treatment Monitoring*

The Cooperator will assist NAVFAC Southeast to conduct baseline pre-treatment monitoring in accordance with the methods and metrics outlined in the *Vegetation Management & Monitoring Plan* (sub-task 2a). This will provide a basis of comparison for post-treatment monitoring events. A summary of pre-treatment results will be provided in the next available progress report.

**2c.** *Invasive Species Treatment*

The Cooperator will work closely with NAVFAC Southeast to implement invasive species control measures in accordance with the *Vegetation Management & Monitoring Plan* (sub-task 2a). Approximately 210 acres at NALF Waldron adjacent to an airfield has an overstory dominated by invasive woody vegetation including Brazilian Peppertree (*Schinus terebinthifolius*), Chinaberry Tree (*Melia azedarach*) and Chinese Tallow (*Triadica sebifera;* See Figure 1). These invasive species have medium-to-high cover in the affected areas. The Cooperator should apply methods as outlined and approved in the *Vegetation Management and Monitoring Plan* (Task 2a). The desired end state for this 210-acre area is to control woody invasive species and promote cover by remaining native grasses, forbs or other low-growing species.

Several fields at NALF Waldron totaling +/- 92-acres have been treated twice with herbicide to remove invasive vegetation (See Figure 2). The Cooperator will provide additional treatment, as/if necessary, to prepare for restoring these areas to native grassland and forbs.

Approximately 108 acres adjacent to the airfield at Main Station Truax have been infested by invasive vegetation including Brazilian Peppertree, Chinaberry Tree, Chinese Tallow and Guineagrass (*Urochloa maxima;* See Figure 3). These invasive species have medium cover in the affected areas. The Cooperator should apply methods as outlined and approved in the *Vegetation Management and Monitoring Plan* (Task 2a).

The Cooperator will collect geospatial information and maintain a GIS geodatabase of the location / extent, type, and date of each treatment. The Cooperator shall collect and deliver GIS data in accordance with the 2022, or future, NAVFAC SEGRC Data Delivery and Maintenance

Standards (Appendix 2). Additionally, they will provide sufficient information to enter herbicide treatments into the NAVFAC Online Pesticide Reporting System (NOPRS).

**2d.** *Native Grassland Restoration*

The Cooperator will assist NAVFAC Southeast staff to restore and maintain native grasses and forbs at a 92-acre site with at NALF Waldron and a 108-acre treatment area at Main Station Truax Airfield (See Figures 2 and 3 respectively). This will include selection of native seed sources and forbs, site preparation, and seed application. All plant materials must be appropriate for use in the Gulf Prairies and Marshes ecoregion.

**2e.** *Post-Treatment Monitoring and Reporting*

The Cooperator will assist NAVFAC Southeast to conduct post-treatment monitoring in accordance with the methods and metrics outlined in the *Vegetation Management & Monitoring Plan* (sub-task 2a). For each site the Cooperator will collect and analyze samples to provide measurements of soil bulk density (core method), soil texture, and soil organic carbon (SOC). Photo-documentation at sample sites will be completed to document changes in site conditions. The Cooperator will also note areas with invasive species re-growth or poor cover that may require additional management. A summary of post-treatment results will be provided in the next available progress report. All results will be included and discussed in the Final Report.

## D. Role of NASCC and other Government Personnel (Government)

1. NASCC will coordinate site access for personnel working under this agreement in accordance with access coordination procedures and requirements at each installation.

2. The Government will participate in the planning and implementation of each task described in the scope of work. Government will prioritize tasks based on mission requirements.

3. Substantial Government involvement in all tasks listed above is expected. Government involvement will include participation in field work and data collection for pre- and post-monitoring for carbon sequestration, during invasive control activities, and during site restoration activities. In addition, Government personnel will provide project assistance, technical assistance / oversight and coordinate safety planning for projects and provide a job hazard analysis for installation projects.

4. When available, the Government may allow access to informal conservation-related on the job training opportunities from subject matter experts.

5. The Government will provide GIS data layers necessary to complete deliverables.

## E. Role of the Cooperator

1. To furnish all materials, equipment, supplies, labor and services necessary to conduct the aforementioned technical assistance and restoration tasks.

2. To equip their personnel with gear necessary to complete the tasks including, but not limited to, digital camera, soil sampling equipment, personal computers with necessary software / internet access, personal protective equipment, and transportation.

3. To comply with all Occupational Safety and Health Administration (OSHA) requirements. To conduct all field activities safely in accordance with the approved safety plan, and to avoid damage to Government property. The Cooperator is liable for the safety of its personnel and representatives conducting work under this agreement.

4. To coordinate each visit to NASCC with the designated points of contact.

    a. NAVFAC Southeast: John Arnett, Biologist, NAVFAC SE john.e.arnett.civ@us.navy.mil
    b. NASCC: TBD

5. To obtain all applicable permits and licensing in accordance with local, state, and Federal laws and regulations necessary to perform required tasks.

**F. Products/Deliverables**

1. *Progress Reports*. Cooperator will submit quarterly progress reports summarizing the work accomplished under each task in Section C. Quarterly reports will be sent to NAVFAC Southeast points of contact as an electronic portable document file (PDF). Source files in Microsoft Word, Excel and/or Access, photographs, and GIS data should also be provided as necessary.

2. *Health and Safety Plan (HASP)*. Cooperator will work closely with the Government to develop a Health and Safety Plan that outlines safety procedures, identifies potential risks and mitigation (e.g., personal protective equipment), identifies procedures for accessing the emergency management system, provides reporting instructions, and includes contact information for key personnel. A copy of the HASP must be on-site during field work.

3. *Vegetation Management and Monitoring Plan*. Cooperator will develop a Draft and Final Vegetation Management and Monitoring Plan for each task as further outlined in Section C. The Cooperator will solicit Government comments on the Draft, will address the comments to produce the Final Plans, and will deliver them as an electronic portable document file (PDF). Source files in Microsoft Word, Excel and/or Access, photographs and GUS data will also be provided, if necessary.

4. *Final Report*. Cooperator will develop Draft and Final Reports that describe the work completed at NAS Corpus Christi. The Cooperator will solicit Government comments on the Draft, will address the Government's comments to produce the Final Report, and will deliver the Final Report as an electronic portable document file (PDF). Source files in

Microsoft Word, Excel and/or Access, photographs and GIS data will also be provided. This Final Report should minimally include the following:

i. Background Information
ii. Summary of Restoration Efforts by Task
    a. Include the following: extent of project area (acres); land conditions prior to and after project completion; before and after photos; list of species being removed and planted and associated planting material information (source, quantity and type); for tree removal include number, species, and average height & diameter at breast height; for tree plantings include number, species, and seedling age
iii. Pre- and Post-Restoration Monitoring Data and Data Analyses
iv. Discussion of Trends in Carbon Sequestration
    a. Include a thorough explanation of the methodology to calculate or estimate carbon loss or gain
v. Recommendations for Future Monitoring and Management Efforts

5. *GIS Data*. All spatial data must be collected and delivered to the Government according to the guidelines outlined in Appendix 2.

**G. Period of Performance**

The period of performance for this agreement will be 24 months from the date of award (base award), with five (5) 12-month renewal options. Appendix 1 contains scopes of work and associated deliverables for Optional Tasks 1 through 5, which can be executed under this agreement. The cost of Optional Tasks will be negotiated during the base award. Award of Optional Tasks will be contingent on the availability of funds and could be executed during the base award or at any other time prior to the end date of the agreement. It is expected that the Cooperator awarded the base award will be able to perform all Optional Tasks, if needed.

**H. Points of Contact**

**Principle Investigators: TBD**

**NAVFAC Contracting Officer Representative**

Mr. Jeffrey DeBerry
Natural Resources Specialist (Code EV52)
Naval Facilities Engineering Command Atlantic
6506 Hampton Blvd.
Norfolk, VA 23508
757-322-4992
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**NAVFAC Southeast (NASCC Tasks)**

Mr. John Arnett
Biologist (EV22)
Naval Facilities Engineering Command Southeast
Building 919
Naval Air Station Jacksonville
Jacksonville, FL 32212
904-542-6844; john.e.arnett.civ@us.navy.mil

**Naval Air Station Corpus Christi**
**TBD**

# Appendix 1 - Optional Renewal Years with Optional Tasks

## Optional Task 1. Restoration Maintenance (Yr-1 Post-Treatment)

### Background

The Cooperator will assist NAVFAC Southeast to assess the restoration sites at NASCC and provide maintenance as necessary to progress toward the restoration objectives. This work will be conducted the first full growing season after restoration measures have been completed (Yr-1 Post-Treatment).

### Tasks

The Cooperator will complete the following tasks:

1. Assess all sites to identify remedial actions necessary for continued progression toward the restoration objectives outlined in the *Vegetation Management & Monitoring Plan*. Based on the assessment, the Cooperator will complete the following as needed:
    a. Complete invasive species control (mop up) in areas with substantial re-growth of invasive plants (assumes ≤ 15% of the original treatment area).
    b. Replant or re-seed restoration areas as necessary to ensure sufficient cover.
    c. Conduct mowing or controlled burning of grassland restoration areas to reduce competition from annual weeds and undesirable grasses.
2. If herbicides are used, provide sufficient information to enter herbicide treatments into the NAVFAC Online Pesticide Reporting System (NOPRS).

### Deliverable

The Cooperator will submit a final written report after completion of analysis and restoration maintenance activities. The final report will include brief summary of the following: assessment findings, description of restoration maintenance activities, supporting maps, and recommendations for future management. The Cooperator will submit the final report as an electronic portable document file (PDF), and will submit (using, for example, DoD SAFE File Exchange for large files) source files in Microsoft Word, Excel and/or Access, photographs, and GIS data (if relevant).

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## Optional Task 2. Restoration Maintenance (Yr-2 Post-Treatment)

### Background

The Cooperator will assist NAVFAC Southeast to assess the restoration sites at NASCC and provide maintenance as necessary to progress toward the restoration objectives. This work will be conducted the first full growing season after restoration measures have been completed (Yr-2 Post-Treatment).

**Tasks**

The Cooperator will complete the following tasks:

1. Assess all sites to identify remedial actions necessary for continued progression toward the restoration objectives outlined in the *Vegetation Management & Monitoring Plan*. Based on the assessment, the Cooperator will complete the following as needed:
    a. Complete invasive species control (mop up) in areas of substantial re-growth (assumes ≤ 10% of the original treatment area).
    b. Replant or re-seed restoration areas as necessary to ensure sufficient cover.
    c. Conduct mowing or controlled burning of grassland restoration areas to reduce competition from annual weeds and undesirable grasses.
2. If herbicides are used, provide sufficient information to enter herbicide treatments into the NAVFAC Online Pesticide Reporting System (NOPRS).

**Deliverable**

The Cooperator will submit a final written report after completion of analysis and restoration maintenance activities. The final report will include brief summary of the following: assessment findings, description of restoration maintenance activities, supporting maps, and recommendations for future management. The Cooperator will submit the final report as an electronic portable document file (PDF), and will submit (using, for example, DoD SAFE File Exchange for large files) source files in Microsoft Word, Excel and/or Access, photographs, and GIS data (if relevant).

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**Optional Task 3. Post-Treatment Monitoring Event (Second Monitoring Event)**

**Background**

The Cooperator will assist NAVFAC Southeast to conduct the **second post-restoration monitoring event** at NASCC restoration sites in accordance with the methods and metrics outlined in the *Vegetation Management & Monitoring Plan*.

**Tasks**

The Cooperator will complete the following tasks:

1. Sample restoration sites to provide measurements of soil bulk density (core method), soil texture, and soil organic carbon (SOC).
2. Estimate aboveground vegetation cover at restoration sites.
3. Map areas where re-growth of invasive species is substantial.
4. Maintain a geospatial information system (GIS) geodatabase that identifies test locations, date of samples, and summary results.

**Deliverable**

The Cooperator will submit a monitoring report after completion of fieldwork and analyses. The report will include background, results of monitoring, supporting maps, trends for carbon sequestration efforts, and recommendations for future management. The report will be delivered as an electronic portable document file (PDF). The Cooperator will submit the final report as an electronic portable document file (PDF), and will submit (using, for example, DoD SAFE File Exchange for large files) source files in Microsoft Word, Excel and/or Access, photographs, and GIS data (if relevant).

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**Optional Task 4. Post-Treatment Monitoring Event (Third Monitoring Event)**

**Background**

The Cooperator will assist NAVFAC Southeast to conduct the **third post-restoration monitoring event** at NASCC restoration sites in accordance with the methods and metrics outlined in the *Vegetation Management & Monitoring Plan*.

**Tasks**

The Cooperator will complete the following tasks:

1. Sample restoration sites to provide measurements of soil bulk density (core method), soil texture, and soil organic carbon (SOC).
2. Estimate aboveground vegetation cover at restoration sites.
3. Map areas where re-growth of invasive species is substantial.
4. Maintain a geospatial information system (GIS) geodatabase that identifies test locations, date of samples, and summary results.

**Deliverable**

The Cooperator will submit a monitoring report after completion of fieldwork and analyses. The report will include background, results of monitoring, supporting maps, trends for carbon sequestration efforts, and recommendations for future management. The report will be delivered as an electronic portable document file (PDF). The Cooperator will submit the final report as an electronic portable document file (PDF), and will submit (using, for example, DoD SAFE File Exchange for large files) source files in Microsoft Word, Excel and/or Access, photographs, and GIS data (if relevant).

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**Optional Task 5. Post-Treatment Monitoring Event (Fourth Monitoring Event)**

**Background**

The Cooperator will assist NAVFAC Southeast to conduct the **fourth post-restoration monitoring event** at NASCC restoration sites in accordance with the methods and metrics outlined in the *Vegetation Management & Monitoring Plan*.

**Tasks**

The Cooperator will complete the following tasks:

1. Sample restoration sites to provide measurements of soil bulk density (core method), soil texture, and soil organic carbon (SOC).
2. Estimate aboveground vegetation cover at restoration sites.
3. Map areas where re-growth of invasive species is substantial.
4. Maintain a geospatial information system (GIS) geodatabase that identifies test locations, date of samples, and summary results.

**Deliverable**

The Cooperator will submit a monitoring report after completion of fieldwork and analyses. The report will include background, results of monitoring, supporting maps, trends for carbon sequestration efforts, and recommendations for future management. The report will be delivered as an electronic portable document file (PDF). The Cooperator will submit the final report as an electronic portable document file (PDF), and will submit (using, for example, DoD SAFE File Exchange for large files) source files in Microsoft Word, Excel and/or Access, photographs, and GIS data (if relevant).

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# Appendix 2 – NAVFAC SEGRC Geospatial Data Delivery and Maintenance Standards

## 1.0 Purpose

**Overview:**

The GeoReadiness Center (GRC) is the single, authoritative source and distribution point for all geospatial facility data within the region. The GRC houses the most current geospatial information for the entire Region in the GeoReadiness Explorer (GRX) hosted at NITC, and provides access to the comprehensive data set and analysis tools to all Regional and DOD decision makers/managers, sponsored Cooperators, and other sponsored individuals via a secure government Internet site.

The GRC's primary roles include:

- Act as the single point of contact for all geospatial information and services related issues in the Installation and Environment realm for the Commander Navy Installations Command (CNIC) Region in which it is located.

- Ensure that the geospatial data holdings of the Navy Facility Engineering Systems Commands (FECs) and Regions meet quality control standards for accuracy, currency and standards compliance.

This document describes the standards that must be met for the successful completion of a contracted delivery of data to be incorporated into, or used in tandem with, the Geographic Information System (GIS) at NAVFACSE. This document forms the basis for technical Statements of Work (SOWs) for projects and contracts solicited by ***INSTALLATION*** at NAVFACSE, which will include a GIS delivery as part of the workflow. The purpose of this document is to provide reliable guidelines with which to create, enhance, or modify NAVFACSE GI&S currently in use at ***INSTALLATION***.

Project-specific contract parameters must be added to this baseline document during the creation of a specific SOW. The nature and scope of a given project make it unique, with requirements that will need to be met in regard to graphic and database design, and data acquisition methodologies. This document provides baseline standards that should be built upon for any given contract.

## 2.0 Project Descriptions

Cooperators shall furnish all necessary personnel, material, equipment, services and facilities to perform the work described in the SOW unless otherwise indicated. Services or products, which can be expected to be within a SOW include, but are not limited to, the following:

1. Digitize or scan graphic or textual information sources into a digital format.
2. Create tabular database files.

3. Collect primary data using approved global positioning system (GPS) equipment and/or explicitly stated field data collection methodologies.
4. Compile graphic data using aerial photogrammetric techniques.
5. Create ESRI ArcGIS 10.8 and Spatial Data Standard for Facilities, Infrastructure and Environment (SDSFIE) Navy Data Model (NDM) 4.3 compliant attributed data files. Cooperators should obtain a File Geodatabase from the GRC for which the final data should be delivered.
6. Produce hard copy graphic or tabular data outputs from GIS data.
7. Make approved modifications to existing GIS data provided by NAVFAC SEGRC as required to meet specific project requirements.

This document does not apply to contracts that will involve property boundary or other legally binding surveys. Cooperators or clients completing such work should contact NAVFAC SEGRC during the creation of the SOW for coordination and inputs on a project-specific basis.

## 3.0 Government-Furnished Property

NAVFAC SEGRC or ***INSTALLATION*** may make source documents available to the Cooperator as deemed necessary to meet project requirements. Source documents may include, but not be limited to, the following:

1. Digital or paper maps
2. Aerial photographs
3. Tabular GIS data files
4. Data dictionary
5. Metadata

The Government will provide the Cooperator access to necessary geospatial data, reports, schematics, or other pertinent information either through the regional NAVFAC GRC, or a data copy upon completion of the appropriate request forms and/or security information.
All Cooperators are required to request an account from the regional GRC at the start of the contract.

The Cooperator must verify with the GRC that they are working with the most recent version of the dataset at the beginning of each contract and must delete any copies of data in their possession at the end of each contract.

When requesting data from the GRC, the Cooperator will identify the SDSFIE NDM 4.3 (OR CURRENT VERSION) data layer names or know which data layers they require. The government POC will be contacted prior to the release of any information to verify requirements. A non-disclosure agreement may need to be completed prior to the release of any data.

Other equipment, such as, but not limited to, GPS receivers may be made available to the Cooperator by NAVFAC SEGRC or the ***INSTALLATION*** under approval by appropriate authorized personnel. Arrangements for the use of such equipment must be made directly with the source owner of the equipment whether NAVFAC SEGRC or the ***INSTALLATION***.

The Cooperator will be responsible for all materials supplied by NAVFAC SEGRC or the ***INSTALLATION***. Any GIS data, or products resulting from the use of such materials, which are provided to the Cooperator by the ***INSTALLATION*** or NAVFAC SEGRC may not be further distributed (or otherwise made available) to external parties without prior written permission from ***INSTALLATION*** or NAVFACSE GIS. The Cooperator may adapt, convert, reformat, translate, or otherwise modify all or any part, of the provided data only for purposes of completing contract requirements. A written record of all changes made will be kept and submitted as part of the required metadata portion of the GIS delivery.

# 4.0 Delivery Requirements

## 4.1 System Parameters

NAVFAC SEGRC uses SDSFIE NDM 4.3 (OR CURRENT VERSION) with Oracle 11g and ESRI ArcGIS version 10.8 as its standard GIS data format and primary database software. However, there are NAVFACSE specific modifications to the SDSFIE NDM 4.3 (OR CURRENT VERSION) standards so the Cooperator must obtain a File Geodatabase from NAVFAC SEGRC to ensure they adhere to NAVFAC SEGRC data format requirements. Microsoft Windows 10 is the operating system. Front-end software used by NAVFAC SEGRC includes ESRI ArcGIS.

GIS files which add to, replace or otherwise modify standard base map graphics files or attribute tables (such as but not limited to roads and buildings) must coordinate with NAVFAC SEGRC and the ***INSTALLATION***.

All figures included in a report that accompany the project will be delivered in a digital format. Any map-related image data sources (*.tif, *.jpg, etc.) presented in the document, or as part of any presentation made to NAVFAC SEGRC or the ***INSTALLATION*** related to this specific undertaking, will be delivered in digital, georeferenced format.

## 4.2 Database Design

Cooperators shall consult NAVFAC SEGRC for the database design standards used from the SDSFIE by the CADD/GIS Technology Center prior to database design, data collection, or other data creation phases of the project. Standard contracts will require Cooperators to utilize existing SDSFIE NDM 4.3 (OR CURRENT VERSION) definitions of features and predefined attribute table structures. Deviations from, or additions to, the existing SDSFIE NDM 4.3 (OR CURRENT VERSION) objects must be approved by the NAVFAC SEGRC in writing prior to the delivery of any GIS product. SDSFIE NDM 4.3 (OR CURRENT VERSION) documentation is available at NAVFACSE GRC.

The Geodatabase schema shall follow the GIS Data Guide implementation of the SDSFIE data model and data layers will be captured accordingly. Information on the SDSFIE data model can be found at: http://www.sdsfieonline.org/

If new data is being created the Cooperator must provide the GRC with a data dictionary identifying all of the SDSFIE NDM 4.3 (or current version) Entity Types, attributes, and/or

domain values associated with the new feature(s), the geographic area(s) covered by the data and Spatial extent information prior to the creation/editing of GIS data.

Acceptable formats: MS Excel, MS Word and PDF. Local attributes (meeting SDS experienced level) will require precise schema definitions.

For stand-alone GIS attribute tables (no graphics) or for tables including point data as coordinates, the preferred delivery format is a comma delimited, ASCII text file with all column headings specified or an MS Access table that is provided to the Cooperator from NAVFACSE GRC. A different data delivery format may be used if approved by, and coordinated with, NAVFAC SEGRC prior to file delivery.

### 4.3 Data Integrity

Data accuracy standards for all deliverables will be in accordance with those set forth in the section entitled GPS Data Collection Specifications.' All deliverables should follow the Data Collection Guide (DCG) chapters associated with the data being collected and shall include an accuracy report in the metadata. The DCG chapters can be obtained from the NAVFAC SEGRC or after requesting an account at http://www.datacollectionadvisor.com/.

The Cooperator shall employ appropriate QA/QC standards to ensure that data is topologically correct, accurate and complete (to include):

- No erroneous overshoots, undershoots, dangles or intersections in the line work
- Point and line features will be snapped together where appropriate to support networks. For example, do not break linear features for labeling or other aesthetic purposes.
- Lines should be continuous and point features should be digitized as points. For example, point features, such as manholes, should not be drawn using only a circle (polygon) to represent its location. Preferably, use an attribute block symbol that has an insertion point in the center of the manhole.
- No sliver polygons
- Digital representation of the common boundaries for all graphic features must be coincident, regardless of feature layer
- Geometric network connectivity must be maintained for utility networks.

A summary of the methods used to correct inconsistencies and any remaining errors by case should be included in the metadata under the 'Logical Consistency Report' and 'Completeness Report' sections.

### 4.4 Graphic Design

Cooperators shall deliver graphic files that match the existing geometry type for each type of feature in use on the CNRSE GIS. If a new feature must be created, NAVFAC SEGRC must approve its definition and use prior to file delivery. Cooperators shall deliver graphics in an ESRI ArcGIS 10.3 File Geodatabase format. If the Cooperator needs to submit the delivery in a different format or a combination of multiple formats, then NAVFAC SEGRC must approve the

alternate format prior to delivery. All mapping data will be delivered to NAVFAC SEGRC with clean line work using the following parameters:

1. All intersecting lines shall be processed to remove overshoots and undershoots
2. Zero length segments shall be removed
3. All area features must be closed polygon shapes
4. All delivered files shall be checked to see that they are corruption-free
5. All feature elements shall have a unique Primary key assigned, consult with NAVFAC SEGRC for any applicable naming conventions
6. All feature classes shall have metadata, consult with NAVFAC SEGRC for minimum metadata requirements
7. All feature classes shall have all specified minimum attribution populated, consult with NAVFAC SEGRC for minimum attribute requirements

Graphics delivered in non-preferred formats will be subject to additional line work requirements. The Cooperator may request copies of existing graphics appropriate to the SOW as agreed upon by the ***INSTALLATION*** and/or with NAVFACSE GRC. The NAVFAC SEGRC will provide such files in a File Geodatabase.

### 4.5 Digitizing/Conversion

Where Digitizing/Conversion is stipulated in the contract, the Cooperator shall digitize/convert features from designated sources (including remotely sensed data, hardcopy scans and vector data) to support various GIS applications.

Digitizing/conversion routines will insure that 90 percent of all features will measure within 0.01 inches when reproduced at the scale of original imagery or data source.

### 4.6 Data Dictionary

Accompanying the final GIS delivery shall be a digital data dictionary file that has been previously approved by the ***INSTALLATION*** and NAVFAC SEGRC in terms of expected content and format. For all parts of the data dictionary that match the SDSFIE NDM 4.3 (OR CURRENT VERSION), the data dictionary may reference the SDSFIE NDM 4.3 stating each feature class table being provided and each column within the table for which data has been populated. If additional codes or values outside of the SDSFIE NDM 4.3 (OR CURRENT VERSION) and the current NAVFAC SEGRC data structure domains will be utilized to populate a column, these values must first be approved by NAVFAC SEGRC and must be provided as part of the data dictionary documentation submittal. All domain list values must be accompanied by a description especially in the case of abbreviations.

### 4.7 Feature Definitions

Should the Cooperator need to create new feature classes not in the current CNRSE GIS or the SDSFIE NDM 4.3 (OR CURRENT VERSION), NAVFAC SEGRC must first approve them. New features that are created by the Cooperator for inclusive use into the CNRSE GIS shall be defined in an appendix as part of the data dictionary documentation. Documentation of added feature classes shall follow the SDSFIE NDM 4.3 (OR CURRENT VERSION) documentation standards. Elements of the feature that must be declared in this documentation include:

1. Data Set (Category) name
2. Feature class (table) name with definition
3. Geometry type (point, line, polygon)
4. Associated attributes with definitions
5. Data type, data precision, domain table assignment, Primary Key and Foreign Key assignments, required field assignments, etc.

Any new features, which are created for a GIS delivery to be included in the ***INSTALLATION*** GIS, must be coordinated with the ***INSTALLATION*** and NAVFAC SEGRC prior to delivery.

### 4.8 Projected Coordinate System

All geospatial data stored by the GRC resides in WGS84 datum with the appropriate UTM coordinate system for US States, Territories and insular areas. The Region's geospatial data collection is comprised of data from:

| Activity Area | UIC | State | UTM Zone (Schema) |
|---|---|---|---|
| *NAVSTA Guantanamo Bay* | *N60514* | *Non-US* | *18* |
| *NAS Jacksonville* | *N00207* | *Florida* | 17 |
| *NAS Key West* | *N00213* | *Florida* | 17 |
| *NAVSTA Mayport* | *N60201* | Florida | 17 |
| SUBASE Kings Bay | N42237 | Georgia | 17 |
| *NAS Orlando* | *N61007* | *Florida* | 17 |
| *Naval Hospital Beaufort* | *N50173* | *South Carolina* | *17* |
| *NAS Pensacola* | *N00204* | *Florida* | 16 |
| *NAS Meridian* | *N63043* | *Mississippi* | 16 |
| *NSA Panama City* | *N61008* | *Florida* | 16 |
| *NAS Whiting Field* | *N60508* | *Florida* | 16 |
| *CBC Gulfport* | *N62604* | *Mississippi* | 16 |
| ***NAS JRB New Orleans*** | ***N00206*** | ***Louisiana*** | **15** |
| ***NAS Corpus Christi*** | ***N00216*** | ***Texas*** | **14** |
| *NAS Kingsville* | *N60241* | *Texas* | 14 |
| *NAS JRB Ft Worth* | *N83447* | *Texas* | 14 |
| *NSA Mid South* | *N00639* | *Tennessee* | 16 |

### 4.9 Metadata

The Cooperator will turn over, at a minimum, metadata for each feature class in XML format. The following elements of the FGDC Content Standard for Digital Geospatial Data (CSDGM) that must be included as part of the deliverable. Feature-level metadata may be required at the discretion of the government. Details on the standard can be found at http://www.fgdc.gov/metadata/geospatial-metadata-standards

1) Identification Information
   *a)* Contact (Details) - *contact information for the data steward*

i) Person
ii) Organization
iii) Position
iv) Telephone
v) Email

*b)* Description – *characterization of the data*
i) Abstract
ii) Purpose

*c)* Time Period - *explains how current the dataset is*
i) Currentness Reference
ii) Date

*d)* Keywords – *word/phrase descriptors of the data*

2) Data Quality
*a)* Positional Accuracy – *accuracy assessment of the data*
i) Horizontal Accuracy Report
*ii)* Vertical Accuracy Report *(if applicable)*

*b)* Source Information – *list of sources and a short citation of each*
i) Source Citation (Details)
(1) Title
(2) Originator
(3) Publication Date

*c)* Process Step – *an explanation of how/when the data was created*
i) Process Description
ii) Process Date

3) Spatial Reference
a) Horizontal Coordinate System
*b)* Vertical Coordinate System *(if applicable) – vertical datum information*
i) Datum Name
ii) Distance Units

### 4.10 GPS Data Collection Specifications

***INSTALLATION*** GIS will accept GPS data only if the positional data are differentially corrected to assure locational accuracy. Exact accuracy levels of each data feature shall be agreed upon with the ***INSTALLATION*** and NAVFAC SEGRC prior to contract start.

Where field data collection is stipulated in the contract, the Cooperator shall utilize conventional and other methods, such as a total station, or Global Positioning System (GPS) in accordance with the applicable Geospatial Positioning Accuracy Standards published by the Federal Geographic Data Committee (FGDC).

At a minimum, the Cooperator shall provide resource grade GPS collection at an accuracy level of +/- < 1m and shall use differential correction to target accuracies of +/- .5 m.

Where appropriate (as stipulated in the contract or as otherwise determined by the Government), the Cooperator shall use survey grade GPS, at an accuracy level of +/- 2cm. Global Positioning System (GPS) data collection activities will be based on a post- processed environment using an

accurately sighted base station. Base station files for post processing acquired locally (off-site CORS Continuous Operating Reference Station) will be verified for accuracy.

GPS data on the location of utility lines and other features shall be captured at a minimum every 50ft and at each turn or bend in the line and processed as a line feature type. GPS data on the location of utility points and other features should be captured at the centroid of the feature unless signal obstruction or access prohibits; otherwise points will be captured at a uniform distance and direction from the centroid and the offset captured in the metadata for that feature. Data on polygon features will be collected at every vertex of the feature and processed as a polygon.

All survey-grade data collected shall be provided to the Government in a digital format with an attached Survey Report identifying survey method, equipment list, calibration documentation, survey layout, description of control points, control diagrams, quality control report and field survey data.

A digital Survey Control Database (consisting of a survey marker database and a survey traverse database) will be produced for all survey control points established under this contract, including the horizontal and vertical order and coordinate location of each point.

All GPS data collection specifications should follow what is outlined in the DCG chapters associated with the data being collected and shall include an accuracy report in the metadata. The DCG chapters can be obtained from the NAVFAC SEGRC or after requesting an account at http://www.datacollectionadvisor.com/.

## 5.0 CADD Standards

The Government may approve the use of AutoCAD when it is determined that the format will not compromise the spatial accuracy or structure of the delivered data and that the data will easily integrate with the enterprise GIS system. All CADD data shall be provided in AutoCAD 2020 and shall be in the same projection and use the same coordinate system, datum and units as stated below in the paragraph titled Geospatial Data Projection. Drawing files shall be full files, uncompressed, unzipped and georeferenced.
CADD drawings and data used for the planning, design, construction, operations, maintenance and demolition of Department of the Navy facilities and installations shall be delivered in conformance with the United States National CADD Standard, developed jointly by the National Institute of Building Sciences (NIBS), American Institute of Architects (AIA), Construction Specifications Institute (CSI), Tri-Service CADD/BIM Technology Center and several U.S. Government agencies, including NAVFAC. The United States National CADD Standard may be purchased from NIBS, from the individual publishing agencies (NIBS, AIA, CSI) or at

http://www.nationalcadstandard.org/

The Navy's current, network certified CADD software applications are the Autodesk version 2020 suite of CADD programs. This does not prohibit the use of other CADD systems or third party packages designed to work with Autodesk applications. All products developed under this

policy shall be saved in a format which is readable by the target system (.dwg). Any objects or entities created by other systems or software must be readable by the target system.

File naming, sheet identification and layer names shall be per the National CADD Standard (NCS).

References:

- NAVFACINST 4250.1, Electronic Bid Solicitation
- NAVFACSE Drawing Format Standards, Chapter 03 of the NAVFACSE CAD Standards, Revision 1, October 2009
- NAVFACSE File Naming Conventions, Chapter 04 of the NAVFACSE CAD Standards, Revision 1, October 2009
- NAVFAC Layer Names Master List, Appendix A, Model File Level/Layer Assignment Tables
- NAVFACSE Layer Naming Standards, Chapter 05 of the NAVFACSE CAD Standards, Revision 1, October 2009

## 6.0 Quality Assurance / Quality Control

Unless otherwise specified in the SOW the Cooperator is responsible for performing quality assurance and quality control checks of all GIS data files prior to delivery to the ***INSTALLATION*** and NAVFACSE GRC. All data (graphic and non-graphic) must work with the existing ***INSTALLATION*** and NAVFAC SEGRC system upon submittal.

Erroneous files will not be accepted and will be returned to the Cooperator for review and correction prior to formal acceptance of the GIS product delivery.

## 7.0 Data Submittal Environment

The Cooperator will be required to deliver a copy of all data in ArcGIS File Geodatabases specific to each installation and matching the current version of the GRC repository (on a project specific basis as determined by the government POC).

The Cooperator will provide one (1) set of ArcGIS File Geodatabase files. Specific transmittal instructions will be provided to the Cooperator when the data is ready to be delivered.

### 7.1 Media Specifications

The ***INSTALLATION*** and NAVFAC SEGRC are currently able to accept deliveries of electronic data on the following media:

- DOD Secure Access File Exchange (SAFE) file transfer
- CDs in ISO format
- DVD+Rs
- USB hard drive

Digital media must have an **external label** listing a short description of contents, a sequence number if there are multiple volumes and the date of CD creation.

A **transmittal sheet** must accompany the media containing the information included on the external labels, total number of volumes being delivered, a list of file names *and* file descriptions on each volume and certification that all delivery media is free of known computer viruses.

### 7.2 Government Review

All contracts, internal or with Cooperators, that provide for the changing or creation of geospatial data must adhere to the following process for data deliverables as this data will be published in GRX.

1. All data goes through a QA/QC process to check for standards, attribute and contractual compliance. The data structure is checked to ensure it meets current standards.

2. Minimum attributes and metadata information required for the feature data layers are verified. If any of the feature layer table structures, attributes, or metadata do not meet the standards or are incomplete, the data will be returned to the submitter for corrections.

3. All data submitted to the GRC should be submitted by the Installation or the Business Line GIS POC after the data deliverable(s) has been quality checked for compliance.

Note: Business Line GIS POCs are professionals with expertise in a particular industry, e.g. planning, environmental, facilities. Business Line personnel are the actual data owners of their data layers and are ultimately responsible for the accuracy and integrity of their own data layers. Business Lines can maintain their data integrity in the M&A environment using direct department personnel, Cooperators, or GRC personnel. Resources and business processes needed to create and maintain their geospatial data are determined by each installation and Business Line.

In instances where BL GIS POCs are not available to the review data, the NAVFAC SEGRC can provide this service. All contracted GIS work should have prior funding allocated for services performed by the NAVFACSE GRC. In instances where prior funding has not been allocated, the NAVFAC SEGRC will determine the level effort and will provide a cost estimate.

### 7.3 Data Integration

Coordination, management and maintenance of GRX involves collaboration and teaming efforts between the NITC, the GRC, Business Line personnel and geospatial data users.

As stated earlier, the NITC is the centralized information repository for GIS and other source data hosted at Port Hueneme, CA. The NITC is responsible for managing the configuration of the M&A environment and performing system-level administration of Oracle and ArcSDE. This includes assuring user-level application profile settings are properly maintained; loading plot

drivers for NMCI approved plotters and printers being used by M&A users; assigning Citrix M&A user accounts and privileges; and assigning ArcSDE Geodatabase accounts for data maintainers. All account requests and privilege levels made to NITC on behalf of a user must be requested through the GRC.

NOTE: ALL DATA ABSOLUTELY MUST BE PUBLISHED IN GRX AND NOT REMAIN CONFINED TO A PARTICULAR PWD, BUSINESS LINE, OR ON ANY INDIVIDUAL'S LOCAL WORKSTATION.

1. Each layer published in GRX will have a designated data editor assigned who will be responsible for maintaining the accuracy and currency of the data. Designated roles are determined by each installation and Business Line.

2. Where data editor responsibilities have not been established, the NAVFAC SEGRC can be appointed this role as a reimbursable service. Contact the NAVFAC SEGRC to request funding estimate.