CONTRACT FOR AERIAL OBSTRUCTION SURVEY CONSULTANT SERVICES

**AIRPORT NAME (airport name)**

**BOA PROJECT NUMBER (project#)**

**AIP/STATE AID PROJECT NUMBER (project#)**

Between the

**OWNER**: (owner), Wisconsin

Represented by: SECRETARY OF TRANSPORTATION, agent for the owner

and

**CONSULTANT**: (consultant)

(consultant address)

This Contract made and entered into by and between the (airport owner), Wisconsin represented by its duly authorized agent, WISCONSIN DEPARTMENT OF TRANSPORTATION SECRETARY, Bureau of Aeronautics (BOA), in accordance with Wis. Stat. §114.32(1) (1993), hereinafter called the owner and (consultant), hereinafter referred to as the consultant.

The owner proposes to: (description)

ALL SERVICES

The consultant represents it is in compliance with the laws and regulations relating to the profession of engineering and is willing and able to do the consultant services required in the proposed work in accordance with this contract.

It is expressly understood and agreed that the lump sum amount totals $(total amount), the actual costs shall not exceed $(amount) and in no event will the total compensation and reimbursement paid hereunder exceed the maximum combined sum of $(amount) for all of the services required under this contract except by amendment to this contract.

The consultant representative is (consultant) whose telephone is (phone number).

The owner representative is (BOA Project manager) whose telephone number is (Phone number).

The Disadvantaged Business Enterprise goal on this contract is (percentage)%.

Attached and made part of this survey contract are the “General Provisions” and “Special Provisions.” This contract incorporates and the parties agree to all of the **CONSULTANT SERVICES GENERAL PROVISIONS DATED** May 30, 2013.

This contract has been agreed to and signed on the dates shown. Effective date of the contract is the latter of the two dates.

AS AGENT FOR OWNER CONSULTANT

By: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ By: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

David M. Greene, Director Signature

Bureau of Aeronautics

 Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 SS#/FEIN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Airport: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 CONSULTANT BILLING ADDRESS:

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SPECIAL PROVISIONS FOR OBSTRUCTION SURVEY CONTRACT**

Part I. Payment/Scope of Services

Section A. Payment

1. Lump Sum
2. Actual Costs

Section B. Scope of Services

1. Phase I
2. General
3. Work Plan Outline and Project Approach
4. Task 1 – Meetings
5. Task 2 – Survey Control Monuments
6. Task 3 - Acquire and Submit Aerial Imagery

iv. Task 4 – Format and Submit all Data Collected to FAA

1. Task 5 – Runway Data and NAVAID Survey
2. Task 6 – Email Weekly Project Status Reports
3. Task 7 – Delivery of Information to the Bureau of Aeronautics

Part II. Other Provisions (As Required)

Part III. Special Attachments (As Required)

**Part I. Payment/Scope of Services**

Attached to and made a part of the Consultant Survey Services Contract:

 Airport Name: (airport name)

 BOA Project Number: (project number)

 AIP/STATE AID Project Number: (project number)

**Section A. Payments**

1. **Lump Sum** - The owner agrees to pay the consultant as compensation for professional services furnished under this section and in accordance with the “General Provisions,” a lump sum for each unit of work performed in Phases I in the time specified as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Phase** | **Item No.** | **Description** | **Completion Time in Calendar Days or Date are Specified Herein Below** | **Fee** |
| I | 1. | Obstruction Surveys | (days/date) | $  |
|  |  |  | (days/date) | $  |
|  |  |  | (days/date) | $  |
|  |  |  | (days/date) | $  |
|  |  |  | (days/date) | $  |
|  | **TOTAL PHASE I – LUMP SUM TOTAL** |  | $  |

1. **Actual Costs**

The owner agrees to pay the consultant for the following services a reimbursement rate based on actual costs, including overhead and profit. For services of the consultant’s staff engaged directly on the following portion of the project, the compensation will be an amount equal to the consultant’s direct labor cost times a factor of      \*, plus reimbursable expenses not included in the consultant’s overhead rate.

\*factor = (1 + overhead rate) x profit

1. Meeting costs will be paid for only on an occurrence basis if ordered by the owner and if the meetings are actually held. If the consultant requires more than one (1) person at a meeting, approval, prior to the meeting for more than one (1) must be obtained from the BOA project manager or charges for more than one (1) may be disallowed.

|  |
| --- |
| **Meetings** |
| **Total Actual Cost Amount** | $  |

 **Maximum Combined Amount (Lump Sum and Actual Costs) - $ (Lump Sum & Actual Costs)**

**Section B. Scope of Services.**

The consultant agrees to perform the following services:

**PHASE I**

1. **GENERAL**

All obstruction surveys performed by the consultant will be in accordance with the criteria contained in the FAA Advisory Circulars found at: <http://www.faa.gov/regulations_policies/advisory_circulars/>:

**AC 150/5300-16A:** General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey

**AC 150/5300-17B:** General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey

 **AC 150/5300-18B:** General Guidance and Specifications for Submission of Aeronautical Surveys To NGS: Field Data Collection and Geographic Information System (GIS) Standards.

The consultant will provide obstruction airport surveys including but not limited to verification of geodetic control, obstruction surveying, Navigation Aid (NAVAID) surveying, and runway/stop-way surveys. An obstruction survey is performed for the development of a vertically guided instrument approach and will therefore follow the specifications established by AC 150/5300-18B, Section 2.6., which will include the analysis of the following surfaces:

* Vertically Guided Runway Primary Surface (VGRPS)
* Vertically Guided Primary Connection Surface (VGPCS)
* Vertically Guided Approach Surface (VGAS)
* Vertically Guided Protection Surface (VGPS)
* Vertically Guided Approach Transitional Surface (VGATS)
* Vertically Guided Horizontal Surface (VGHS)
* Vertically Guided Conical Surface (VGCS)

Additionally, tasks will be controlled by Table 2-1 “Survey Requirements Matrix,” as specified by the column “Instrument Procedure Development.”

**B. WORK PLAN OUTLINE AND PROJECT APPROACH**

The consultant will, prior to executing field tasks, hold a pre-survey coordination meeting with the State to review project survey requirements and specifications, field and overall schedules, and to verify airport point of contacts.

Upon completion of the pre-survey coordination meeting, the consultant will contact airport authorities (airport manager) to coordinate a kick-off meeting to present and coordinate field survey activities and schedules as well as perform an interview with the airport manager per AC 150/5300-18B. The consultant will hold additional coordination meetings with others, such as air traffic control, to coordinate flight path requirements.

**TASK 1: Meetings (On Going Task)**

In assisting with the administration of this project, the consultant will hold several meetings with the State to facilitate project communication as well as the acceptance-and-delivery of project data from the State to the National Geodetic Survey (NGS) and/or FAA Airport Surveying – Geographic Information System (GIS) program. This work plan includes the following meetings (in chronological order):

|  |  |  |
| --- | --- | --- |
| **Meeting** | **Suggested Attendees** | **Objective** |
| Pre-Survey CoordinationMeeting | 1. State2. Contractor3. NGS4. FAA Airport District Offices (ADO)5. FAA Airport-Survey | 1. To review the Contractor’s Survey and Quality Control plan;2. To conference with FAA ADO, FAA Airport Survey-GIS office, and NGS to share Airports’ work plan objectives and expectations for this contract. |
| Airport Interview | 1. Airport Manager2. Contractor | 1. To conduct interviews withindividual airport manager’s and gather specific airport data as required in FAA’s Airport Survey- GIS “interview checklist” |
| Deliverable Acceptance Meeting | 1. State2. Contractor | 1. To review the deliverables as prescribed by AC 150/5300-18B, Chapter 5, Airport Features. This will include a review of captured obstructions and survey data. |
| Deliverable Acceptance Meeting and Project Close-Out | 1. State2. Contractor | 1. To review the deliverables as prescribed by AC 150/5300-18B, Final Project Report. This meeting will serve to review the Final Reports and ensure completion of all agreed upon deliverables for all project airports.  |

It is anticipated that each of these meetings, with the exception of the airport interviews will be held at the office of the bureau.

**TASK 2: Survey Control Monuments**

* 1. Utilize the existing survey control on and near the airport, establish temporary control if necessary. Horizontal and vertical accuracy and datums of the control monuments shall be sufficient to meet the requirements in FAA Advisory Circulars. Establishment of PACS/SACS is not required.

A review of the existing monumentation in the vicinity of the airport revealed the following information:

|  |  |  |  |
| --- | --- | --- | --- |
| **Monument Name** | **Vertical Order** | **Horizontal Order** | **Stability Code** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**TASK 3: Acquire and Submit Airport Imagery**

**3.1 Aerial Acquisition Mission**

New color aerial photography will be utilized for the collection of obstruction data and will follow all the requirements in AC-150/5300-17B. Prior to the flight missions, the contractorshall provide a flight line and ground survey control point layout for execution of the flight and control missions. After receiving the aerial photography from the flight missions, the imagery will be edited and reviewed for proper aerial coverage and image quality by the consultant.

**3.2 Data Processing**

Upon acquisition by a single lens metric film camera, the imagery will be scanned on a precision photogrammetric scanner at a resolution of 12-15 microns. It will then be delivered to the NGS ASP for analysis and acceptance. The scanned images will be exported to a workstation and the aero triangulation process will be completed. Through this process, individual stereo pairs will be oriented along with ground surveyed control coordinates. Upon completion, an ASCII file detailing the results of the aero triangulation process will be generated. This file will include camera focal length, X, Y, Z, omega, phi, and kappa for each image.

**3.3 Create a Geo-Reference Image.**

The triangulated color aerial images will be used for the creation of the geo-referenced mosaic encompassing all areas. A digital elevation model (DEM) will be produced from an auto-correlation terrain extraction routine and/or extracted from an existing dataset (e.g., USGS quadrangle map) for the areas of interest and the images will be rectified. The final geo-referenced images will be mosaic and will be reviewed to ensure that seams are not visible between sheets.

The final digital geo-referenced mosaic will be produced as uncompressed tiled TIFF files. These files shall be delivered on an external hard drive provided by the consultant. The external hard drive will be returned to the consultant as soon as necessary files have been downloaded and verified by the Department.

**3.4 Collection of Obstruction Spot Shots and Airport Airspace Analysis**

Utilizing the aerial photography and the analytical triangulation solution, each photographic stereo pair will be oriented for compilation of obstruction data. Each stereo pair will be analyzed and obstruction spot shots (easting, northing, elevation) will be collected to show objects penetrating the obstruction identifications, as prescribed by AC-150/5300-18B. In addition, non-penetrating representative objects and landmarks aiding in geographical orientation will be collected within the VGAS surface. Once all obstruction data has been collected, it will be analyzed, formatted, and reported with the attribute information, in an AutoCAD and/or MicroStation format, as prescribed by Chapter 5 of AC-150/5300-18B. The Department will specify which format, AutoCAD or MicroStation, prior to work beginning on the obstruction survey project.

**3.5 GIS format & feature attribute data**

Chapter 5 of AC 150/5300-18Boutlines the requirements for feature collection, accuracies, documentation, formatting, and attribution. Features collected as part of this project will meet all of these collection, accuracy, documentation, formatting and attribution requirements. The contractorrecognizes the importance in the completion of attribution information for collected features. Completeness of these attributes is essential to the goals of the FAA Airports-GIS program.

**TASK 4: Format and Submit all Data Collected to the FAA**

* 1. **Submit all data as defined in Chapter 5 of AC 150/5300-18B**.

The only attributes that will be utilized are those directly attributable to data normally gathered by ground survey operations. Additional data such as runway load bearing capacity or luminescence of airfield lighting will not be included in this contract.

**TASK 5: Runway Data and NAVAID Survey**

The consultant will collect the following additional information as part of the obstruction survey:

* 1. **Runway Data**

The accurate positioning of runway end points, runway profiles and other specific points such as thresholds and stop-ways will need to be included in the submission to the FAA. The positioning of these features is detailed in AC 150/5300-18B and the consultant will coordinate with the appropriate airport authorities to ensure that the correct positions are identified and published. As with all work on airports, safety of survey staff as well as aircraft is paramount and the consultant will carefully coordinate work on the airport with the airport manager including issuing NOTAMs, maintaining radio contact with airport ground control (if available) and complying with all security and airport specific safety requirements. Working on airport runways can often be difficult due to traffic on the runway. To complete the work efficiently the consultant will coordinate work with the airport manager in order to avoid times of high traffic (if any).

* 1. **Navigational Aid (NAVAID) Surveys**

Accurate positioning of navigational aids, like runway and obstruction data, is critical to airport safety and approach/departure procedure development and must be determined using only the most rigorous and established procedures. NGS and FAA have specific requirements on where and how accurately these instruments need to be positioned and familiarization with airport surveys is critical to efficiently identify these very specialized units. Utilizing AC 150/5300-18B the consultant will determine horizontal and vertical positions for all applicable NAVAIDs on the runway. The consultant will include obstruction data files at final delivery. In order to ensure that the correct position is obtained, the consultant will have redundant checks on all ground-based observations for NAVAIDs and runway points.

**TASK 6: Email Weekly Project Status Reports**

The consultant will:

* 1. **Maintain a clear line of communication with the State.**

This is done in order to prevent unforeseen complications and delays from hampering the successful completion of the project. This is especially true during airport surveys; the successful completion of which depends on a tightly regimented schedule.

* 1. **Submit weekly reports to the Bureau of Aeronautics and NGS.**

Include progress updates and any significant issues and deviations from the quality control plans and the impact they may have, if any, on the project schedule. These weekly reports can be submitted on the FAA-GIS website.

**TASK 7: Delivery of Information to the Bureau of Aeronautics**

All information collected and processed through this contract is considered property of the State of Wisconsin. Upon completion of the project, the consultant shall deliver the following to the bureau on an external hard drive that will be returned to the consultant:

* High resolution digital files of imagery (12-15 microns)
* ArcGIS data (e.g. shape files (.shp), layer files, and/or personal geodatabases)
* Imagery Ground Control Point file
* Geo-referenced imagery
* Flight report
* Digital orthoimagery
* Film negatives
* Index of imagery (Imagery Plan diagram and ASCII file of photo centers)
* Analytical Triangulation Solution

The bureau reserves the right to request any additional files or submittals from the consultant, and those shall be provided at no charge. Materials shall be available for a period of at least three (3) years after contract close-out is complete.