SCOPE OF SERVICES

19-061P, MATANUSKA-SUSITNA BOROUGH AERIAL IMAGERY

AERIAL IMAGERY PROGRAM OVERVIEW

The Matanuska-Susitna Borough is implementing a recurring aerial imagery program. The intent of the program is to collect aerial imagery using recurrent three-year contracts.

During each three-year cycle, the Borough aims to collect approximately 3,000 square-miles of imagery, roughly 1,000 square-miles per year. The first two years of each three-year cycle will be used to collect imagery in the most developed areas, which will provide updated imagery for those regions every three years. A third roaming area will provide imagery for more remote regions and will change with each three-year contract.

PROJECT OVERVIEW & PROJECT DELIVERABLES

This solicitation is focused the Aerial Imagery Program's first three-year cycle (2019-2021).

The attached map and ***Table 1*** provides an overview of the areas of interest and project deliverables. A shapefile, provided by the Borough as part of this solicitation packet, provides exact project boundaries.

For this project, each area shall be flown, processed, and delivered during the year indicated in *Table 1*. Square-miles listed are approximate and may shrink or expand slightly (within a few square-miles).

Year	**Region (*General Description*)**	**Size**	**Imagery Type & Pixel Resolution**
2019	Area 1 - *Core Area, Port MacKenzie, Glenn Hwy corridor, plus two natural resource management units*	1,152 sq mi	4-band orthoimagery (RGB-NIR) 6-in pixel resolution (or less) for 367 sq mi 1-ft pixel resolution (or less) for 785 sq mi
2020	Area 2 - *Parks Hwy Corridor*	1,036 sq mi	4-band orthoimagery (RGB-NIR) 6-in pixel resolution (or less) for 22 sq mi 1-ft pixel resolution (or less) for 1,014 sq mi
2021	Area 3 – *Petersville Rd, Oilwell Rd, Susitna River, plus Central Landfill*	1,159 sq mi	4-band orthoimagery (RGB-NIR) 6-in pixel resolution (or less) for 1 sq mi 1-ft pixel resolution (or less) for 1,158 sq mi

Table 1

PROJECT SCOPE

Digital Orthoimagery Specifications

All delivered digital orthoimagery shall meet or exceed the specifications outlined in USGS Digital Orthoimagery Base Specification V1.0, Chapter 5, Section B, Book 11, 2014, **except for the following changes and clarifications** *(page numbers reference the USGS spec)*:

- *Geographic Extent (pg. 1-2)* - The tiling schema will be based on Borough tax map grid.
- *Use and Distribution Rights (pg. 2)* – All imagery and data delivered shall be free from restrictions regarding use and distribution. Data and documentation provided as part of this acquisition shall be freely distributable in the public domain.
- *Acquisition and Processing (pg. 2)* – Acquisitions shall be digital images, not film.
- *Acquisitions Conditions, Acceptable Window (pg. 2; #1)* – Imagery shall be collected in the spring, during a period of time that meets the other acquisitions requirement needs.
- *Acquisitions Conditions, Vegetation Conditions (pg. 2; #6)* – Imagery shall be leaf-off.
- *Acquisitions Conditions, Tide Coordination (pg. 2; #7)* – Tide phases below mean sea level in coastal and tidally influenced areas.
- *Acquisitions Conditions, Image Coverage (pg. 2; #8)* – It is understood that the tile schema and zone boundaries many not align perfectly, as a result, partial tiles are acceptable if a portion of the tile falls outside of a zone boundary. The vendor and Borough project manager will determine a plan for how to deal with the no-data portions of the tiles so those areas can be displayed as transparent without affecting other valid data pixel values.
- *Acquisitions Conditions (pg. 2)* – As outlined in the USGS specification and this SOW, the imagery shall ideally be leaf-off, ground snow-free (with some high elevation leniency), lakes ice-free, and tide below mean sea level. If conflicts arise, these factors should be prioritized as follows: #1 - Leaf-off; #2 - Snow free; #3 - Ice off; #4 - Tide below mean sea level. Furthermore, upper canopy leaf-off is a higher priority than lower canopy leaf-off. If the need for prioritizing acquisition conditions arises, the Borough project manager should be contacted immediately for discussion and approval of a prioritization plan.
- *Aerotriangulation (pg. 3)* – Standards for aerial triangulation shall meet or exceed the standards outlined in sections 7.7 and 7.8 on page A8 of the ASPRS Positional Accuracy Standards for Digital Geospatial Data Edition 1, Ver. 1, Nov 2014.
- *Datums and Coordinates (pg. 3)* – NAD 83; Alaska State Plane Zone 4 Feet; NAVD88 shall be used. The Borough will provide the projection file that should be used so that our mapping system correctly recognizes the information.
- *Digital Orthorectified Image Color (pg. 4)* – Imagery shall be 4-band (RGB-NIR).
- *Spatial Resolution (pg. 4)* – The ground pixel resolution shall meet or exceed the resolutions identified in the provided shapefile.

- *Horizontal Accuracy (pg. 4)* – Horizontal accuracy shall meet or exceed the *Standard High Accuracy* class outlined in the USACE Photogrammetric and LiDAR Mapping, EM 1110-1-1000, April 2015 manual, found in Chapter 3, page 3-7, Table 3-5. A portion of the table can be seen in ***Table 2***. Computed accuracy shall meet or exceed the 95 percent National Standard for Spatial Data Accuracy (NSSDA) Confidence Interval.

6 inch	≤6	≤1-pixel	Highest accuracy
	12	2-pixels	Standard high accuracy
	≥18	≥3-pixels	Lower accuracy - visualization
9 inch	≤9	≤1-pixel	Highest accuracy
	18	2-pixels	Standard high accuracy
	≥27	≥3-pixels	Lower accuracy - visualization
12 inch	≤12	≤1-pixel	Highest accuracy
	24	2-pixels	Standard high accuracy
	≥36	≥3-pixels	Lower accuracy - visualization

Table 2

- *Photo Check Points (pg. 4 & 5)* – The number of check points shall meet or exceed those outlined in the USACE Photogrammetric and LiDAR Mapping, EM 1110-1-1000, April 2015 manual. Chapter 3, page 3-13, Table 3-12. A portion of the table can be seen in ***Table 3***.
- *Digital Orthorectified Image Format (pg. 4)* – The Borough will not consider a loss-less compression.
- *Edge Matching (pg. 5)* – The maximum allowable mis-join between transportation features or other well-defined linear features is two (2) product Ground Sample Distance (GSD) pixels.

Project Area (Square Kilometers)	Horizontal Accuracy Testing of Orthoimagery and Planimetrics
	Total Number of Static 2D/3D Check Points (clearly-defined points)
≤500	20
501-750	25
751-1000	30
1001-1250	35
1251-1500	40
1501-1750	45
1751-2000	50
2001-2250	55
2251-2500	60

Table 3

- *File Naming Convention (pg. 5)* – The Borough will supply the file naming convention.
- *Quality Assessment and Testing (pg. 7)* – All quality control items listed on page 7 of the USGS Digital Orthoimagery Base Specification V1.0 shall be checked by the vendor prior to delivery. A report outlining the process and results of those checks shall be delivered with the data. Once the data is delivered to the MSB, a secondary check will be coordinated and performed by MSB staff. The vendor will be asked to correct any tiles that do not meet the specifications outlined in the scope of work.

The following additional specification must also be met:

- *Flight overlap* – At a bare minimum, the images shall be acquired with 60% along-track overlap, and 30% sidelap. Tall objects (such as tall buildings, towers and trees) shall have minimal tilt. If necessary, flight line density and overlap shall be increased to prevent the final products from having significantly tilted features, like the trees shown in ***Figure 1***.

Figure 1

PROJECT SCHEDULE:

Responses to this solicitation should include a proposed timeline that includes project meetings with Borough staff (*see the Project Management section below for more detail*), key acquisition and post processing steps, and deliverable dates.

Regarding the deliverable dates, imagery shall be delivered within 6 weeks of collection flights. Processing of lower elevation data should not wait for the collection of higher elevation data (which can often push into June or July due to snow conditions, particularly in Hatcher Pass). The Borough will review the data based on the specifications outlined in this scope of work and respond with any correction requests within 2-weeks. The vendor shall make corrections and redeliver within 2-weeks. The Borough will perform a second review and accept the data if the identified errors have been adequately corrected. Ideally, the review and correction cycle should only need to occur once.

PROJECT MANAGEMENT:

The selected vendor is responsible for the following project management items:

- *Permits* - The vendor shall be responsible for applying for, and obtaining, any required permit for access, overflight, or intrusion into restricted or otherwise limited ground access and/or airspace.
- *Project Status Reports & Meetings* – The vendor shall provide weekly written project status reports. The vendor shall coordinate face-to-face or teleconference meeting(s) for the following:
    - 1-hour project kick-off and closeout meetings (one each).
    - ½-hour project update meetings including the vendor project manager and Borough project manager (every two weeks from May to September (or until final products are delivered) each year).

    - 1-hour project overview meetings including the vendor project manager, Borough project manager, and project sponsor (IT director) (two per collection year).
- *Preliminary Data Review Coordination* – After data collection but prior to full data delivery, the Borough project manager shall be provided access to preliminary data for review. The simplest method for achieving this objective can be determined between the selected vendor and the Borough project manager.

OPTIONAL – OBLIQUE IMAGERY RESPONSE:

Response to this portion of the proposal is not required and will not be graded. If responding to this section, separate the cost for this deliverable from all of the orthoimagery costs.

Interest in oblique imagery is on the rise at the Borough

If responding to this portion of the proposal, please address each of the following topics:

- Cost to also provide 6-inch (or better) oblique imagery for 367 sq mi in Area 1. This area coincides with the area of 6-inch orthoimagery in Area A. Provide the additional cost beyond what was already proposed in the orthoimagery portion of the proposal.
- Data quality details; e.g. pixel resolution, horizontal accuracy, and vertical accuracy. If a specification can be provided, please do so.
- Outline the collection and post-processing quality control process.
- Data restrictions/options and associated costs; e.g. can the data be considered public domain, licensing options, options for sharing with the public, etc.
- Potential additional products and associated costs; e.g. building footprints, change detection, etc.
- Identify the standalone application(s) that can be used to view the oblique imagery and the cost(s) (please clearly outline one-time vs. annual costs). Identify key application capabilities; e.g. viewing only, measuring capabilities, adding other GIS data (including allowable formats), etc.
- Identify which of the following software programs the oblique imagery can be integrated with and the cost for each (please clearly outline one-time vs. annual costs). Identify key capabilities of each integration; e.g. viewing only, measuring capabilities, etc.:
    - ArcMap 10.x
    - ArcGIS Pro 2.x
      ArcServer 10.6.1
    - AutoCAD Civil 3D 2017
    - GeoCortex 4.10.0
    - WebApp Builder 10.6.1 (on premises Portal)
    - WebApp Builder AGO
    - Cartegraph (desktop) 17.7.18278.11
    - Cartegraph (mobile)
    - Mobile Assessor (Data Cloud Solutions)
    - Govern Open Forms 6.x
    - Tiburon Command CAD version 2.9.1 (this system is also leveraging Maverick Integrated Mapping version 5.3.2.122)
    - Spillmen Flex CAD 6.3.517
- Oblique imagery capture capabilities and experience (particularly in Alaska) and information regarding any sub-contractor support.
- Additional project team members who would be required.
- Cameras and equipment that would be used for such a collect. Include information about whether or not the cameras are USGS certified.