PRRIP – ED OFFICE MEMORANDUM **5/18/2016**

TO: GOVERNANCE COMMITTEE
FROM: LIDAR SELECTION PANEL – JUSTIN BREI, JASON FARNSWORTH, RICH WALTERS
SUBJECT: RECOMMENDATION FOR 2016-2019 LIDAR CONTRACTOR
DATE: MAY 18, 2016

Multi-year RFP Overview

The LiDAR and Aerial Photography RFP includes a scope of work covering the following activities:

- Annual summer aerial imagery acquisition (2016-2019)
- Annual fall LiDAR and concurrent imagery acquisition (2016-2019)
- Annual summer LiDAR acquisition of J-2 Return to Overton bridge reach
- Buy-up option for bathymetric LiDAR acquisition – all LiDAR flights

Bathymetric LiDAR (green LiDAR) is a water-penetrating LiDAR technology that will provide topographic information for the river bottom, essentially removing the need for manual geomorphic anchor point transect surveys. 2016 will be a test year for the bathymetric LiDAR, and if it meets expectations, it will be implemented for all years.

Recommendation

Four proposals were received in response to the RFP. One proposal did not include the required bathymetric buy-up option and was considered unresponsive. The remaining proposals were evaluated based on qualifications and cost. The selection panel recommends that the Governance Committee accept the proposal from Quantum Spatial, Inc (QSI). QSI is one of the largest geospatial data acquisitions firms in the United States and demonstrated the most experience with bathymetric LiDAR. Their proposal includes accuracy and point density standards above what was asked for and the deliverables described in their proposal showed the best understanding of PRRIP's needs under this RFP. QSI's proposal was not the lowest-cost option. At a total cost (including optional buy-ups) of $1,400,181.00 over the four-year contract, this proposal is 10% higher than the lowest-cost offering. However, the other two proposals demonstrated very little experience with bathymetric LiDAR acquisition, and the selection panel believes that the 10% cost difference is justified in experience and quality deliverables.

Budget Implications

The total 2016 expenditure on aerial imagery and LiDAR acquisition will be $297,529. The Program budgeted $200,000 for 2016 acquisition under line items G1 & G2. This was an increase of $75,000 from the 2015 budget to allow for a limited reach bathymetric LiDAR test in June of this year. However, flows in the Associated Habitat Reach are currently elevated and are expected to remain high through much of the summer. Turbidity associated with high flows and local runoff would likely severely limit the accuracy of bathymetric LiDAR. Accordingly, the Executive Director's Office is recommending canceling of the June LiDAR test and substituting with a full bathymetric LiDAR flight in association with fall imagery collection.[1] This substitution of a full fall bathymetric collection ($151,274) for a

[1] Assuming that water clarity is acceptable.

limited 14-mile June collection ($58,352) results in a $97,529 line item budget shortfall in 2016. The line item budget shortfall will be made up with monies from line item LP-2 (habitat management).[2]

If the bathymetric LiDAR test is successful and the Program obtains the permits necessary for full-scale sediment augmentation implementation, annual remote sensing costs in years 2017 – 2019 will be $367,552. This is a substantial increase in expenditures from past years. Approximately $60,000 of the increase is associated with collection of bathymetric LiDAR each June for the reach extending from the J-2 Return downstream to the Elm Creek bridge. The June LiDAR collection will be a key component of sediment augmentation implementation monitoring and is expected to be much more cost efficient than establishing and surveying a channel transect network.

Approximately $45,000 of the increase is due to acquisition of higher resolution imagery during the June flight. June imagery has historically been collected at a much lower resolution than fall imagery. Recent EDO analyses indicate greater potential for error when photo-interpreting channel metrics and changes in land use from June imagery due to the lower quality. Improving June imagery specifications to match the fall acquisition will provide for consistent datasets with lower potential for classification error.

The remainder of the annual increase (~$137,000) is associated with the collection of bathymetric LiDAR in the fall. Assuming bathymetric LiDAR performance is acceptable, it will replace the field survey component of the Program's system-scale geomorphology monitoring in 2017. The Program currently expends in excess of $500,000 on that effort annually. The increased cost of bathymetric LiDAR is expected to be more than offset by the elimination of annual field surveys of channel geometry. The continuous coverage of LiDAR will also dramatically improve the Program's ability to detect and analyze spatial differences in channel morphology within the AHR.[3]

If the Program is unable to implement full-scale sediment augmentation and/or bathymetric LiDAR performance is not acceptable, the Program retains the right to cancel or forego any of the data collections anticipated under the contract. Accordingly, the four-year total contract cost of $1,400,181 represents a maximum potential expenditure.

[2] Sufficient excess budget is available in LP-2 due to the decision not to rebuild mechanical nesting islands at Shoemaker Island and Elm Creek Complexes and reduced need for disking due to persistent high flow conditions in the reach.

[3] The existing protocol includes field collection of three channel transects at approximately 2.5 – 5.0 mile intervals throughout the AHR. Accordingly, the data collection cost is extremely high in relation to area of coverage.

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517 SW 2nd St., Suite 400
Corvallis, OR 97333
TIN# 39-1133181

Nebraska Community Foundation
PO Box 83107
Lincoln, NE 68501-3107
TIN# 47-0769903

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM
Agreement between Nebraska Community Foundation, Platte River Recovery Implementation Program, and Quantum Spatial, Inc.

1. Parties.

This Agreement is made and entered into by and between the Nebraska Community Foundation ("Foundation") of Lincoln, Nebraska, representing all signatories to the Platte River Recovery Implementation Program ("Program") and Quantum Spatial, Inc. ("Contractor"). The following persons are authorized to represent the parties through this Agreement: Diane Wilson of the Foundation, Dr. Jerry Kenny of the Program; and Dr. Andrew Brenner of the Contractor.

2. Purpose and Authority.

The purpose of this Agreement is to allow the Foundation, acting as the fiscal agent for the Governance Committee (GC) of the Program, and the Contractor to enter into a firm fixed price Agreement for the Project "P16-009: 2016-2019 Annual LiDAR and Aerial Photography."

TERMS AND CONDITIONS

3. Scope of Work and Schedule

The Contractor will complete the base scope of work described in the Program's "P16-009: 2016-2019 Annual LiDAR and Aerial Photography" Request for Proposals (Attachment 1), and the Contractor's Response to Request for Proposal (Attachment 2).

The annual acquisition schedule for the base project is as follows:

- June 2016: Sub-project 2 - Aerial photography
- November/December 2016: Sub-project 1 - LiDAR and concurrent aerial photography
- May/June 2017: Sub-project 2 - Aerial photography and Sub-project 2a - LiDAR
- November/December 2017: Sub-project 1 - LiDAR and concurrent aerial photography
- May/June 2018: Sub-project 2 - Aerial photography and Sub-project 2a - LiDAR
- November/December 2018: Sub-project 1 - LiDAR and concurrent aerial photography

- May/June 2019: Sub-project 2 - Aerial photography and Sub-project 2a - LiDAR
- November/December 2019: Sub-project 1 - LiDAR and concurrent aerial photography

The Program's Executive Director's Office (ED Office) will issue a Notice to Proceed to the Contractor prior to each acquisition.

The Foundation shall be responsible only for the financial aspects of the Contractor's relationship with the Governance Committee. Technical aspects of the Contractor's relationship with the Governance Committee will be the sole responsibility of the ED Office.

4. Deliverables

a) **LiDAR (terrestrial and bathymetric)**

i) LiDAR point data meeting or exceeding 2.3 ft (0.7 m) GSD resolution in a classified LAS file format and adhering to the technical specifications in III.3 above. LAS file projected to Nebraska State Plane Feet (1983 datum) and vertical reference NAVD88 feet (Geoid 03). Classified LAS file will include all LiDAR points, including first and last returns.

ii) Daily reports during acquisition that display all flight lines, as well as completed areas. Once acquisition is complete, a project summary report that shows time and date of all flightline acquisitions. Time of day, not just the day, is important to match river flow condition to acquisition.

iii) Tiling scheme shapefile for identifying LAS and DEM file locations. Tile size and file size is flexible and will be discussed upon award of project.

b) **Digital Elevation Model**

i) Hydro-flattened bare-earth digital elevation model raster tiles (3-foot cell size), projected in Nebraska State Plane coordinate system – elevation and projection in feet.

1) See pages 11-13, 15, and Appendix 2 of the USGS LiDAR Guidelines and Base Specifications v13 for details on hydro-flattening: http://pubs.usgs.gov/tm/11b4/. In the proposal, provide details of the software/methodology to be used for this alternative.

2) Breaklines used in the generation of the hydro-enforced DEM are also a required deliverable.

ii) Full project area mosaic of digital elevation model tiles (3-foot cell size).

iii) NOTE: For Bathymetric LiDAR acquisition, two versions of the DEM will be required. One hydro-enforced DEM for the given flow conditions during the flight, and one DEM that incorporates bathymetry below the water surfaces.

c) **Imagery**

i) Color-infrared (Sub-Project 1) and 4-band (Sub-Project 2) digital orthophotography with a six-inch (0.5 ft) pixel resolution (or better), covering the entire project area seamlessly and without data gaps.

ii) The imagery should be geo-referenced and provided in GeoTIFF (.tif) format.

iii) Shapefiles displaying photocenters and flight dates and times for image acquisitions. Time of day, not just the day, is important to match river flow condition to acquisition.

iv) Compressed imagery mosaic (.sid). Typically entire reach compiled into one mosaic, but may be split due to file size. Sub-Project 2 will require both a RGB mosaic and a CIR mosaic. Sub-Project 1 will be a CIR mosaic only.

d) **LiDAR and Imagery**

i) FGDC-compliant metadata to include, but not limited to: flight dates and times, flight altitude, camera system information, LiDAR system information, aircraft information, imagery resolution, LiDAR point density, horizontal accuracy, post-processing software and steps, and horizontal and vertical control references.

ii) Ground survey control points and reports on all points used in this project.

iii) All geo-referenced deliverables to be projected in Nebraska State Plane Feet (1983 datum).

iv) All LiDAR data, photography, and supplemental products will be delivered on USB external hard drives or flash drives and will become the property of the Program. All media and data collected under the contract shall be the sole property of and can be freely distributed by the Program. No restrictions shall be placed on the data by the contractor.

5. Compensation

Compensation will occur for work in accordance with the approved scope of work and Firm Fixed Price Proposal submitted by the Contractor (Attachment 2). The duration of this contract will be the date of execution to December 31, 2019, with the budget allocated accordingly based on Program Fiscal Years (same as calendar years).

Total Base Project Compensation (Program Fiscal Year):
FY2016: $146,254.00
FY2017: $173,165.00
FY2018: $173,165.00
FY2019: $173,165.00

Total Base Project Amount Funded for this Agreement: $665,749.00

At the discretion of the Program, bathymetric LiDAR may be collected in addition to terrestrial LiDAR as described in the buy-up section (Section IV) of the RFP for Sub-project 1 and Sub-project 2A. The following compensation will be added annually, in addition to the base compensation, if the buy-up is selected for that period. All LiDAR flights are subject to retiming or cancellation based on river conditions during the flight window and the billing will be adjusted accordingly.

Buy-up Project Compensation (per sub-project, per year):
Sub-project 1 (November/December 2016-2019): $151,274.00
Sub-project 2a (May/June 2017-2019): $43,112.00

Maximum Buy-up Amount Funded for this Agreement: $734,432.00

Maximum Total Amount Funded for this Agreement (Base + Buy-up): $1,400,181.00

Activities in 2017, 2018, and 2019 are subject to Program Governance Committee budget authorization and a subsequent Notice to Proceed from the ED Office.

Contractor shall provide written requests for payment to the ED Office (address included below). The Contractor may submit partial billing on a percent completed basis. Invoices should be accompanied by a summary of work completed under the invoice. Invoices should be submitted no less than twice per year (after each sub-project delivery). Request for final payment shall be submitted along with final deliverables. The Program's Executive Director, upon receiving a bill, will approve the bill and advise the Foundation of approval. The Foundation will make payment of these funds directly to the Contractor within 30 days. Payments of bills are due within 60 days after the billing date.

Billing Point of Contact (Program):
Dr. Jerry F. Kenny, Executive Director
Platte River Recovery Implementation Program
Headwaters Corporation
4111 4th Avenue, Suite 6
Kearney, Nebraska 68845
Phone: (308) 237-5728
Fax: (308) 237-4651
Email: kennyj@headwaterscorp.com

6. Time Frame

This Agreement describes an approximately four-year program of work encompassing LiDAR and aerial photograph acquisitions and processing occurring twice annually prior to

December 31, 2019. Under the Agreement, Notice to Proceed from the ED Office will be required prior to commencement of each sub-project acquisition.

The initial date of this agreement shall be the date of signing. The final date of this agreement shall be approximately December 31, 2019. This time frame may be extended upon mutual agreement of the parties and pursuant to the Program.

7. Amendments and Termination

This Agreement, scope, and budget may be amended by mutual written consent of the parties pursuant to the Program. This Agreement may be terminated within 30 days notice by any party.

8. Agreement Contingent Upon Available Funding

This Agreement is contingent upon funding availability and continuation of the Platte River Recovery Implementation Program.

9. Inspection and Acceptance

All deliverables furnished by the Contractor shall be subject to rigorous review by the ED Office prior to acceptance.

10. Office Space, Equipment, and Supplies

The Contractor will supply its own office space, equipment, and supplies.

11. Independent Party

The parties intend that the Contractor will not be considered an employee of the Foundation, but will act as an independent party for the Foundation. As an independent party, the Contractor will be responsible for all applicable taxes and is not eligible for any benefits provided by the Foundation.

12. Confidentiality

All documents, reports and any other work provided to or produced by the Contractor in the performance of this Agreement shall be kept confidential by the Contractor unless written permission for release is granted by the Program.

13. Publicity

Any publicity or media contact associated with the Contractor's services and the result of those services provided under this Agreement shall be the sole responsibility of the Program. Media requests of the Contractor should be directed to the Director of Outreach and Operations in the ED Office.

14. Publication

It is understood that the results of this work may be available to the Contractor for publication and use in connection with related work. Use of this work for publication and related work by the Contractor must be conducted with full disclosure to and coordination with the Program's Technical Point of Contact.

15. Rights in Data and Hardware

All rights in data will be vested to the Program with the intent of sharing among stakeholders and the public as appropriate. Hardware and software purchased under this agreement shall be the property of the Program.

16. Insurance

The Contractor will maintain insurance coverage for Workers' Compensation, General Liability, Professional Liability, and Automobile Liability and will provide certificates of insurance to Program upon request.

17. Indemnification and Mutual Waiver

A. *Indemnification by Contractor.* To the fullest extent permitted by law, Contractor shall indemnify and hold harmless Foundation and Program, Foundation and Program's officers, directors, partners, agents, consultants, and employees from and against any and all claims, costs, losses, and damages (including but not limited to reasonable fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to the Project, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property, including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor or Contractor's officers, directors, partners, employees, or sub-consultants.

B. *Indemnification by Foundation and Program*. To the fullest extent permitted by law, Foundation and Program shall indemnify and hold harmless Contractor, Contractor's officers, directors, partners, agents, employees, and sub-consultants from and against any and all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to the Project, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property, including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Foundation or Program or Foundation or Program's officers, directors, partners, agents, consultants, or employees, or others retained by or under contract to the Contractor with respect to this Agreement or to the Project.

C. *Mutual Waiver*. To the fullest extent permitted by law, Foundation, Program and Contractor waive against each other, and the other's employees, officers, directors, agents, insurers, partners, and consultants, any and all claims for or entitlement to special, incidental, indirect, or consequential damages arising out of, resulting from, or in any way related to the Project.

18. Contacts

Administrative Point of Contact (Foundation):
Diane M. Wilson
Manager of Public/Private Partnerships
Nebraska Community Foundation
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Admin. Point of Contact (Program):
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Email: kennyj@headwaterscorp.com

Technical Point of Contact (Program):
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Administrative Point of Contact (Contractor):
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Technical Point of Contact (Contractor):
Mr. Steven Miller, Sr. Project Manager
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Email: Stevenmiller@quantumspatial.com

IN WITNESS WHEREOF, the Parties have executed this Agreement.

Nebraska Community Foundation	Quantum Spatial, Inc.
By_____	By_____
DIANE M. WILSON, Manager of Public/Private Partnerships	Andrew Brenner, Senior Program Director
Date: _____	Date: _____

ATTACHMENT 1: 2016-2019 ANNUAL LIDAR AND AERIAL PHOTOGRAPHY REQUEST FOR PROPOSALS

ATTACHMENT 2: QUANTUM SPATIAL, INC RESPONSE TO REQUEST FOR PROPOSALS