

# TEXAS WATER DEVELOPMENT BOARD



STATEMENT OF WORK (SOW) #580-18-SOW0072

## Lidar Derivative Datasets for Central Texas

Class-Item Codes:

920-33 – Mapping & GIS Services, Digitized, Cartography

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TEXAS WATER DEVELOPMENT BOARD

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# **Statement of Work for the Production of Lidar Derivative Data in Central Texas**

## **Introduction**

This Statement of Work is issued by the Texas Water Development Board (TWDB) in cooperation with [the City of San Marcos, Williamson County, City of Round Rock, City of Leander, City of Hutto, and the City of Cedar Park](#). to acquire high quality derivative datasets (1-foot contours and ditch & edge of pavement breaklines), from the StratMap 2017 Central Texas Lidar Project source data. This document contains specifications and identifies the specific Area of Interest (AOI) and requested products. The AOI is directly affected by funding availability and interested parties and is subject to change.

The project AOI (~1,340 DO4Q tiles) resides in the Central Texas region around the I-35 corridor from Williamson County to Hays County. The AOI includes metropolitan areas as well as various vegetation classifications spanning farmland to dense forest.

The data acquired will become part of an ongoing geospatial data collection program by the State of Texas to support regional and local mapping needs.

The products acquired by this contract will be available in the public domain through the Texas Natural Resources Information System (TNRIS) for use by government entities and the public.

**All final products to be delivered on or before September 28, 2018.**

## **INVOICES: RECEIPT AND PAYMENT**

An invoice schedule and payment proportions will be determined at or before the kick-off meeting and adhered to throughout the life of a project, unless otherwise agreed upon by Contractor and/or Project Partner Point-of-Contact (PPPOC).

Contractor shall submit invoice(s) to each of the PPPOC's identified in the Contract according to the invoice schedule. Each invoice must identify work performed in accordance with the SOW. Contractor shall be paid within thirty (30) days from receipt of invoice, in accordance with the Texas Prompt Payment Act, Government Code, Chapter 2251. However, if any PPPOC disputes payment of an invoice, said PPPOC must notify Contractor of the existence of a bona fide dispute. Upon request by any PPPOC, Contractor shall provide detailed documentation in support of the invoice and to the degree necessary to resolve any dispute. Any PPPOC may take any legally authorized actions for purposes of enforcing a remedy or obtaining set-off against payments due. Any PPPOC may also limit payments of the proposed Contract.

## **PAYMENT DISPUTES**

If any PPPOC disputes payment of all or any portion of an invoice from Contractor, PPPOC shall not pay any disputed amount before the dispute is resolved. Notwithstanding any such dispute, Contractor shall, unless otherwise notified by PPPOC, continue to perform the Services and produce deliverables in compliance with the terms of the Contract pending resolution of such dispute so long as all undisputed amounts continue to be paid to Contractor.

## Supplemental Information

The following datasets are provided with this solicitation at:

<http://lt.tnris.org.s3-website-us-east-1.amazonaws.com/58018SOW0072/>

- Areas of Interest: [AOI Tiles](#)
- Supplemental Documents: [supplemental reports](#)

## Texas Strategic Mapping Program Goals

It is the intent of the Texas Strategic Mapping Program (StratMap) to purchase geospatial data products that will provide direct savings, efficiencies, and cost duplication avoidance through inter-governmental collaboration and partnerships. The StratMap Contracts are instrumental to these goals. Both the StratMap Program and the StratMap Contracts are administered by the Texas Natural Resources Information System (TNRIS), a division of the Texas Water Development Board (TWDB).

## Accuracy and Quality of Products

The StratMap Program, through the StratMap Contracts, uses prequalified commercial data providers to collect and process geospatial data and separately selects third party quality assurance consultants, as needed, to review products and processes. Each participant in the program is expected to maintain internal quality controls and assurances to minimize errors and document procedures to ensure the data will meet or exceed requirements.

## Project Phase Overview

| Phase I   | Kick-off Meeting |                         |
|-----------|------------------|-------------------------|
|           | Deliverables     | Schedule                |
| Phase II  | Pilot            |                         |
|           | Deliverables     | Pilot dataset           |
| Phase III | Final Delivery   |                         |
|           | Deliverables     | All Final data products |

| Derivative Data Specification |
|-------------------------------|
| Intellectual Property Rights  |

The contracting agency shall have unrestricted rights to all delivered reports and data. All lidar products will become the property of TNRIS and participating StratMap Partners. All lidar products will be put in the public domain and be accessible from the **Texas Natural Resources Information System**, a division of the Texas Water Development Board.

### Spatial Reference Framework

|  |   |
|--|---|
| <b>Vertical Datum</b>  | NAVD88 with most recent NGS-approved geoid to convert from ellipsoidal to orthometric heights |
| <b>Horizontal Datum</b>  | NAD83 (2011)  |
| <b>Projection</b>  | State Plane 4203 & 4204   |
| <b>Vertical Units</b>  | Meters (Orthometric, NAVD88)  |
| <b>Horizontal units</b>  | US Feet   |
| The projection must be <b>defined</b> (viewable to the data user in stakeholder software) for every product. |   |

### Derivative Data Specifications

#### Project Requirements

|                                    |   |                                    |
|------------------------------------|---|------------------------------------|
| <b>Source Dataset</b>              | <b>StratMap 2017 50cm Lidar for central Texas</b><br><br><b>Derivative data will conform to requirements for a source dataset with RMSEz of ~5cm for NVA and VVA values and horizontal RMSEx of ~19 cm.</b><br><br><b>Source data will be provided to vendor at no cost by TNRIS.</b> |                                    |
| <b>Buffer</b>                      | <b>50 meter buffer surrounding the AOI is required for deriving derivative datasets where permitted by the source data.</b>   |                                    |
| <b>Format</b>                      | <b>Data should be delivered as tiled data in geodatabase and Cad formats(DWG &amp; DGN).</b>  |                                    |
| <b>Minimum Feature attribution</b> | <b>Contours</b>   | <b>Edge of Pavement Breaklines</b> |
|                                    | Elevation, Feature Type   | Elevation, Feature Type, Slope     |
| <b>Hydraulic Enforcement</b>       | Contours should be Hydro-enforced   |                                    |
| <b>Smoothing</b>                   | Level of smoothing will be defined after pilot delivery.  |                                    |

#### Accuracy Standards

|                            |  |
|----------------------------|--|
| <b>Positional accuracy</b> | Contour Accuracy should meet NDEP version 1.0 May 2004 section 1.5.2.4 and 1.5.3.1 fundamental accuracy and satisfy the requirements for contours derived from ASPRS Vertical Accuracy Class 10cm datasets.<br><br>Ditch & Edge of pavement breaklines should adhere to ASPRS standards for planimetric data with a Horizontal Accuracy class of 20cm. |
| <b>Topology</b>            | Products will adhere to required topology for such vector datasets and at a minimum will not include multipart, gaps/voids, overlaps, feature crossing, self-intersects or under/over shooting errors.   |

| Derivative Data Deliverables  |  |
|-------------------------------|--|
| <b>Phase I Deliverables</b>   |  |
| <b>Schedule</b>               | <b>Project timeline (schedule) with projected milestones should also include due dates for Phase II &amp; Phase III</b> , Schedule should be provided to TWDB in a PDF, .docx, or .xlsx format.  |
| <b>Phase II Deliverables</b>  |  |
| <b>Pilot Data</b>             | The vendor (in consultation with TWDB and project partners) will provide a minimum of four (4) contiguous tiles within the project AOI source data which shall serve as a Pilot area. The Pilot will be delivered to TWDB and project partners. The pilot will be delivered in final product form to meet or exceed the specifications established in this document. |
| <b>Phase III Deliverables</b> |  |
| <b>Final Delivery</b>         | The vendor will deliver all data products outlined in the SOW for the entire area of interest to TWDB and project Partners. Final data products will meet or exceed the specification established in this document.  |

| Metadata             |   |
|----------------------|---|
| <b>Format</b>        | Project-level metadata for non-tiled data in XML format.  |
| <b>FGDC Standard</b> | All metadata shall be consistent with the <a href="#">Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata</a> |
| <b>Methodology</b>   | Metadata will include processing steps and software used. If requested, sample metadata will be provided by TWDB.                               |

## REFERENCES

American Society for Photogrammetry and Remote Sensing. 2013 ASPRS Positional Accuracy Standards for Digital Geospatial Data (EDITION 1, VERSION 1.0. - NOVEMBER, 2014)

[http://www.asprs.org/wp-content/uploads/2015/01/ASPRS\\_Positional\\_Accuracy\\_Standards\\_Edition1\\_Version100\\_November2014.pdf](http://www.asprs.org/wp-content/uploads/2015/01/ASPRS_Positional_Accuracy_Standards_Edition1_Version100_November2014.pdf)

American Society for Photogrammetry & Remote Sensing. ASPRS Guidelines Vertical Accuracy Reporting for Lidar Data. 24 May 2004.

[http://www.asprs.org/a/society/committees/lidar/Downloads/Vertical\\_Accuracy\\_Reporting\\_for\\_Lidar\\_Data.pdf](http://www.asprs.org/a/society/committees/lidar/Downloads/Vertical_Accuracy_Reporting_for_Lidar_Data.pdf)

American Society for Photogrammetry & Remote Sensing. LAS Specification Version 1.4-R6. 10 June 2012.

[http://www.asprs.org/a/society/committees/standards/LAS\\_1\\_4\\_r12.pdf](http://www.asprs.org/a/society/committees/standards/LAS_1_4_r12.pdf)

Federal Geographic Data Committee. Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998). 1998.

<http://www.fgdc.gov/metadata/csdgm>

Federal Geographic Data Committee. Geographic Information Framework Data Content Standard Part 2: Digital Orthoimagery. May 2008.

[http://www.fgdc.gov/standards/projects/FGDC-standards-projects/framework-data-standard/GI\\_FrameworkDataStandard\\_Part2\\_DigitalOrthoimagery.pdf](http://www.fgdc.gov/standards/projects/FGDC-standards-projects/framework-data-standard/GI_FrameworkDataStandard_Part2_DigitalOrthoimagery.pdf)

Federal Geographic Data Committee. Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy. 1998. <http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/chapter3>

Maune, David F. FEMA's Mapping and Surveying Guidelines and Specifications. 2003.

[http://w.psadewberry.com/Libraries/Documents/FEMAs\\_Mapping\\_and\\_Surveying\\_Guidelines\\_and\\_Specifications\\_ASPRS\\_Fall2003.pdf](http://w.psadewberry.com/Libraries/Documents/FEMAs_Mapping_and_Surveying_Guidelines_and_Specifications_ASPRS_Fall2003.pdf)

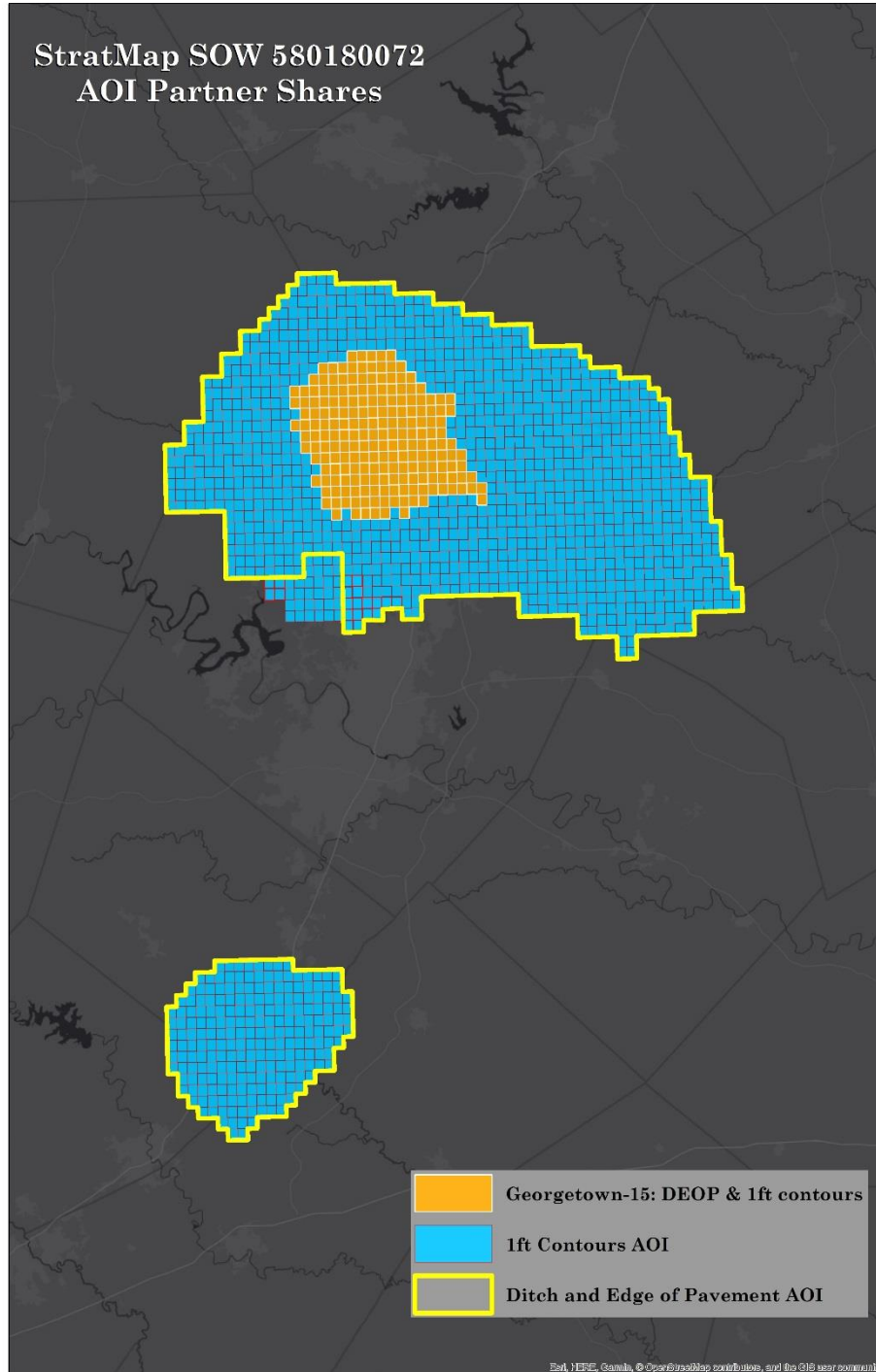
National Digital Elevation Program. Guidelines for Digital Elevations Data (Version 1.0). 10 May 2004.

[http://www.ndep.gov/NDEP\\_Elevation\\_Guidelines\\_Ver1\\_10May2004.pdf](http://www.ndep.gov/NDEP_Elevation_Guidelines_Ver1_10May2004.pdf)

The National Geodetic Survey. The NGS Geoid Page. 11 September 2012. <http://www.ngs.noaa.gov/GEOID/>

U.S. Geological Survey. XMLInput Application. 23 August 2002. <ftp://ftpext.usgs.gov/pub/cr/mo/rolla/release/xmlinput/>

## AREA OF INTEREST MAP





## PRICING TABLE

Electronic table available online (see **Supplemental Information**)

| Pricing Table for Lidar Derivative Datasets |          |                                   |   |  |         |
|---|----------|-----------------------------------|---|--|---------|
| TWDB 580-18-SOW0072                         |          |                                   |   |  |         |
| Company Name:                               |          |                                   |   |  |         |
| DO4Q Tiles                                  |          | 1340                              |   |  |         |
| Contour Interval                            |          | 1 foot                            |   |  |         |
| Source Data                                 |          | StratMap 2017 Central Texas Lidar |   |  |         |
| 1ft Contour AOI                             |          |                                   |   |  |         |
| Lidar Derivative Data Deliverables          |          |                                   |   |  |         |
| 1 foot Contours<br>Metadata                 |          |                                   |   |  |         |
| Lidar Cost Per DO4Q Tile                    | \$ 32.81 | DIR Discount                      | % | Lidar Cost Per DO4Q Tile with DIR Discount | \$31.25 |

| Pricing Table for Lidar Derivative Datasets     |          |   |   |  |         |
|---|----------|---|---|--|---------|
| TWDB 580-18-SOW0072                             |          |   |   |  |         |
| Company Name:                                   |          |   |   |  |         |
| DO4Q Tiles                                      |          | 1304                                      |   |  |         |
| Breaklines                                      |          | ASPRS Class 20cm Ditch & Edge of Pavement |   |  |         |
| Source Data                                     |          | StratMap 2017 Central Texas Lidar         |   |  |         |
| Ditch & Edge of Pavement AOI                    |          |   |   |  |         |
| Lidar Derivative Data Deliverables              |          |   |   |  |         |
| Ditch & Edge of Pavement Breaklines<br>Metadata |          |   |   |  |         |
| Lidar Cost Per DO4Q Tile                        | \$ 47.17 | DIR Discount                              | % | Lidar Cost Per DO4Q Tile with DIR Discount | \$44.93 |

| Optional Multi/Other-Source Contour & Edge of Pavement |          |  |   |  |         |
|--|----------|--|---|--|---------|
| Company Name:  |          |  |   |  |         |
| DO4Q Tiles   |          | 202  |   |  |         |
| Breaklines   |          | ASPRS Class 20cm Ditch & Edge of Pavement                          |   |  |         |
| Contour Interval                                       |          | 1 foot   |   |  |         |
| Source   |          | StratMap 2017 Central Texas Lidar<br>City of Georgetown 2015 Lidar |   |  |         |
| Georgetown 2015 Lidar AOI                              |          |  |   |  |         |
| Lidar Deliverables                                     |          |  |   |  |         |
| 1 foot Contours  |          |  |   |  |         |
| Ditch & Edge of Pavement Breaklines                    |          |  |   |  |         |
| Metadata   |          |  |   |  |         |
| Cost Per DO4Q Tile                                     | \$ 79.99 | DIR Discount   | % | Lidar Cost Per DO4Q Tile with DIR Discount | \$76.18 |

| Partner            | DO4Q Tiles  | Total               |
|--------------------|-------------|---------------------|
| Williamson County  | 1041        | \$80,067.19         |
| City of Hutto      | 53          | \$4,037.54          |
| City of Round Rock | 84          | \$6,399.12          |
| City of Leander    | 92          | \$7,008.56          |
| City of Cedar Park | 53          | \$1,656.25          |
| City of San Marcos | 219         | \$16,683.42         |
| <b>Total</b>       | <b>1542</b> | <b>\$115,852.08</b> |

# Execution of Offer

## Texas Water Development Board

Company Name: Merrick & Company

Address: 5970 Greenwood Plaza Blvd.

Greenwood Village, CO 80111

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Vendor Identification Number: 18404997027

DIR Contract #: DIR-TSO-3388

Federal Tax Identification Number:

840499702

I, Brian Holzworth / Sr. Project Manager, am the above-referenced company's representative and I

am authorized to submit this response and sign future contract documents.



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6/25/18

Authorized Signature

Date