



REQUEST FOR QUALIFICATIONS (RFQ)

FOR

**INDEFINITE DELIVERY – INDEFINITE QUANTITY
ROW AND DESIGN SURVEYING SERVICES**

RFQ NO. 2026-01

SUBMISSION DATE: OCTOBER 28, 2026

I. PURPOSE

The Hidalgo County Regional Mobility Authority (“HCRMA”) recognizes a need to construct roadway infrastructure to improve mobility in the county, as well as the movement of goods and service from the various International Ports of Entry. The HCRMA is requesting Statements of Qualification (“SOQ”) from Professional Surveying Firms (each a “Consultant”) to provide ROW and Design Survey Services as detailed in this document to support the project development efforts for all projects included in the HCRMA’s strategic plan.

For purposes of this RFQ and any resulting contract, the HCRMA is the Project owner and the recipient of all submittals and deliverables, unless the HCRMA directs otherwise in writing or approval by another governmental or regulatory agency is required by applicable law or regulation.

The required surveying services are highly specialized and require specific skills, equipment and in-depth knowledge of all local, state and federal regulations. The Consultant (or Consultants) selected is expected to have a sufficient level of resources and expertise to carry out the scope of service. The qualified Consultant shall analyze the scope of services to ensure that all work complies with all applicable local, state and federal codes, laws, regulations and guidelines, including but not limited to those promulgated by the Federal Highway Administration (“FHWA”) and Texas Department of Transportation (“TxDOT”).

The HCRMA uses qualification-based selection in the procurement of professional services.

II. PROJECT SPECIFICATIONS

A. Goal.

The goal of this project is to complete the following tasks for each of the proposed HCRMA roadways (the “Project”):

- **TASK 1: RIGHT OF WAY SURVEYS**
- **TASK 2: DESIGN SURVEYS**
- **TASK 3: SUBSURFACE UTILITY ENGINEERING (SUE) INVESTIGATION**

The possible tasks, deliverables, and requirements are outlined in the subsequent pages of this document. A detailed breakdown of the final tasks and requirements will be determined during the contract negotiation phase and work will be structured and authorized by tasks, fees, and milestones through work authorizations.

B. Study Area.

The study area for these Project is outlined in the map shown in Exhibit A (the “Study Area”). It should be noted that the Study Area may have to be extended based on the route study requirements during the Projects’ environmental processes and may be adjusted based on the final selected routes.

III. GENERAL REQUIREMENTS

A. Coordination.

The Consultant shall coordinate issues and communications with the HCRMA Project Manager. The HCRMA will communicate the resolution of issues and provide the Consultant direction through the HCRMA Project Manager.

The Consultant shall coordinate all services with HCRMA and coordinate as needed with any other consultants or professionals retained by the HCRMA, who are performing design, engineering, surveying, environmental, utility, or other Project-related services. The Consultant shall also coordinate with all applicable federal, state, and local regulatory agencies having jurisdiction over the Project to facilitate required reviews, approvals, permits, and regulatory compliance.

The Consultant shall prepare each exhibit necessary for approval by each governmental or regulatory agency in compliance with the applicable format and guidelines required by each entity and as approved by the HCRMA. The Consultant shall notify the HCRMA in writing prior to beginning any work on any outside agency's exhibit.

B. Progress Reporting and Invoicing.

The Consultant shall invoice according to the final approved work authorization tasks and approved level of effort and follow the appropriate line items and fee schedule as specified in the contract document. The Consultant shall submit each invoice in a format acceptable to the HCRMA.

The Consultant shall complete the services according to the milestone work schedule established in the work authorization. The Consultant shall submit in the monthly invoice, a written progress report to the HCRMA indicating the actual tasks accomplished during the month, scheduled tasks to be accomplished for the month, the estimated tasks to be accomplished for the coming month, problems encountered and actions taken to remedy them, list of meetings attended, and overall status of the work. The progress report must use a bar chart diagram to indicate the percentage complete of each task shown on the previous report and the percentage complete of each task. The Consultant is required to meet with the designated HCRMA Project Manager on a monthly basis for progress tracking purposes unless prior written agreement is made with HCRMA not to hold a meeting in any given month. The Consultant shall submit minutes of the meeting summarizing the events of the meeting within seven calendar days after each meeting.

The Consultant shall prepare a Project work schedule, using the latest version of Primavera Software or another scheduling program approved by the HCRMA in writing. The schedules shall indicate tasks, subtasks, critical dates, milestones, deliverables, and review requirements in a format that depicts the interdependence of the various items. The work schedule must incorporate an allocation of time for stage reviews of the completed documents and deliverables by HCRMA/TxDOT/FHWA personnel as required. The Consultant shall present the work schedule to the HCRMA for review and acceptance and provide assistance in interpreting the proposed work schedule. The Consultant shall provide advance written notice to the HCRMA if the Consultant is not able to meet the scheduled milestone review date.

Once the Project has been completed and accepted by the HCRMA, the Consultant shall deliver all electronic files to the HCRMA within 30 calendar days of HCRMA's written request. Delivery of electronic files must be in a format approved by the HCRMA.

Final payment is contingent upon the HCRMA's receipt and confirmation by the HCRMA's Project Manager that the electronic files can be opened and are usable utilizing the current version of the software in use by the HCRMA, all files are formatted as requested by the HCRMA, and all the review comments have been addressed.

The Consultant shall prepare a letter of transmittal to accompany each document submittal to the HCRMA. At a minimum, the letter of transmittal must include the Project name, county, Project limits, and HCRMA contract number.

C. Traffic Control.

The Consultant shall provide all planning, labor, and equipment to develop and to execute each traffic control plan ("TCP") needed by the Consultant to perform services under the contract. The Consultant shall comply with the requirements of the most recent edition of the Texas Manual on Uniform Traffic Control Devices ("TMUTCD"). The Consultant shall submit a copy of each TCP to the HCRMA for approval prior to commencing any work on any state/local roadway and for state roadways, the Consultant shall submit each TCP to TxDOT for approval. The Consultant shall provide all signs, flags, and safety equipment needed to execute the approved TCP. The Consultant shall notify the HCRMA in writing three days in advance of executing each TCP requiring a lane closure and shall not begin lane closure without having obtained HCRMA written approval. The Consultant shall ensure that its field crew possess a copy of the approved TCP on the job site at all times. Upon request by the HCRMA, the field crew must make the TCP available to the HCRMA for inspection.

D. Right of Entry.

Prior to performing any work outside of the HCRMA right of way, the Consultant shall request and receive right of entry from public and private land owners to allow services (e.g. environmental services, surveying services, geotechnical services) to be performed and shall request concurrence of same from the HCRMA. The Consultant shall prepare right of entry permissions, which must be signed by the landowner. Letters or other materials seeking right of entry must contain explicit reference to the kinds of activities for which right of entry is requested and an indication of the impacts (if any) that will result from performance of these services. The Consultant shall not commit acts which will result in damages to private property and shall make every effort to comply with the wishes and address the concerns of property owners.

E. Level of Effort.

For this contract, the Consultant shall base the level of effort at each phase on the prior work developed in earlier phases without unnecessary repetition or re-study. As directed by the HCRMA, the Consultant shall provide written justification regarding whether or not additional or repeated level of effort of earlier completed work is warranted, or if additional detail will be better addressed at a later stage in the Project development.

F. Quality Assurance (QA) and Quality Control (QC).

The Consultant shall provide peer review at all levels. For each deliverable, the Consultant shall retain evidence of their internal review and mark-up of that deliverable as preparation for submittal. A milestone submittal is not considered complete unless the required milestone documents and associated internal mark-ups are submitted. If requested by the HCRMA Project Manager, the Consultant shall submit the Consultant's internal mark-up (e.g., red-lines, comments) developed as part the Consultant's quality control step. When internal mark-ups are requested by the HCRMA in advance, the HCRMA may reject the actual deliverable if the Consultant fails to provide sufficient evidence of quality control. The Consultant shall clearly label each document submitted for quality assurance as an internal mark-up document.

The Consultant shall perform QA and QC on all survey procedures, field surveys, data, and products prior to delivery to the HCRMA. If, at any time, during the course of reviewing a survey submittal it becomes apparent to the HCRMA that the submittal contains errors, omissions, or inconsistencies, the HCRMA may cease its review and immediately return the submittal to the Consultant for appropriate action by the Consultant. A submittal returned to the Consultant for this reason is not a submittal for purposes of the submission schedule.

G. Underground excavation.

If necessary, the Consultant shall contact the Texas Excavation Safety System, Inc. (DIGTESS) or call telephone number 811 to have underground utilities marked prior to digging holes for right-of-way monuments, utility engineering investigation or other purposes. The Consultant shall separately contact utilities not a part of the DIGTESS organization. The Consultant shall maintain documentation of all notification calls. The Consultant shall comply with Texas's excavation laws.

H. Personal Protective Equipment ("PPE").

The Consultant shall, and shall require its subcontractors to:

- Provide PPE to their personnel,
- Provide business vehicles for their personnel, and
- Require their personnel to use PPE and drive only business vehicles while performing work on or near roadways.

The PPE must meet all:

- Current standards set by Occupation Safety and Health Administration ("OSHA"), and
- TxDOT requirements (e.g., safety glasses, Type 3 (TY 3) pants for night work).

Each business vehicle must be clearly marked with the Consultant's business name or the name of the appropriate subcontractor, such that the name can be identified from a distance.

I. Task Number and Description.

The Consultant shall categorize each task performed to correspond with the Task Number and Task Descriptions.

IV. TECHNICAL REQUIREMENTS

The Engineer shall ensure that the following general standards for survey work are followed for Task 1 and Task 2:

Unless otherwise indicated, any reference in this RFQ to a manual, specification, policy, rule or regulation, or law means the version in effect at the time the work is performed.

All surveys must meet or exceed all applicable requirements and standards provided by: (1) Professional Land Surveying Practices Act, (2) General Rules of Procedures and Practices promulgated by the Texas Board of Professional Engineers and Land Surveyors (TBPELS), and (3) *TxDOT Survey Manual*. The Surveyor shall perform all work in an organized and professional manner. All surveys are subject to the approval of the HCRMA.

The Surveyor shall use the *TxDOT ROW Preliminary Procedures for Authority to Proceed Manual* and *TxDOT Survey Manual* as the basis for the format and preparation of all right of way (ROW) documents produced, including ROW maps, written parcel descriptions, parcel plats, and other ROW work products, unless otherwise specified by HCRMA.

Unless otherwise directed by the HCRMA, the Surveyor shall use (1) the North American Datum of 1983 (NAD83), Texas Coordinate System of 1983 (State Plane Coordinates) applicable to the zone or zones in which the work is performed, with values in U.S. survey feet, as the basis for all horizontal coordinates derived and (2) the datum adjustment currently in use by HCRMA.

Project or surface coordinates must be calculated by applying a combined adjustment factor (CAF) to State Plane Coordinate values. If provided by the HCRMA, the Surveyor shall use a project specific CAF.

Elevations must be based on the North American Vertical Datum 88 (NAVD88), unless otherwise specified by the HCRMA.

All work using the Global Positioning System (GPS), whether primary control surveys or other, must meet or exceed the requirements provided by the *TxDOT Survey Manual* to the order of accuracy specified in the categories listed below or in a work authorization. If the order of accuracy is not specified in this RFQ or in a work authorization, the work must meet or exceed the order of accuracy specified in the publication listed in this paragraph.

All conventional horizontal and vertical control surveys must meet or exceed the order of accuracy specified in the *TxDOT Survey Manual* unless specified otherwise in the contract.

All boundary determination surveys, whether for ROW acquisition, ROW re-establishment, or other boundary needs, must meet or exceed the accuracy specified in the *TxDOT Survey Manual* unless specified otherwise in the contract.

The HCRMA may authorize the Surveyor to use an Unmanned Aircraft System (UAS) to perform services under this contract. The use of UAS is regulated by the Federal Aviation Administration (FAA). All UAS operators must comply with Federal Aviation Administration (FAA) regulations and the *TxDOT Unmanned Aircraft System (UAS) Flight Operations and User's Manual*.

The survey data must be fully compatible with the HCRMA's computer system and with programs in use by the HCRMA at the time of the submission, without further modification or conversion. The current programs used by HCRMA are: Microsoft Word, Bentley MicroStation, Bentley OpenRoads civil design system, Bentley GEOPAK Survey, Excel, and ESRI ArcGIS. Data collection programs must be compatible with the current import formats allowed by

GEOPAK Survey and be attributed with current feature codes. These programs may be replaced at the discretion of the HCRMA.

Drawing sizes are defined, based on American National Standards Institute (ANSI) standard paper sizes, as follows: A-size means 8.5 inches by 11.0 inches, B-size means 11.0 inches by 17.0 inches, C-size means 17.0 inches by 22.0 inches, and D-size means 22 inches by 34.0 inches.

Variations from these software applications or other requirements listed above shall only be allowed if requested in writing by the Surveyor and approved by the HCRMA.

The standards for services that are not boundary-related but that relate to surveying for engineering projects may be determined by the construction specifications, design specifications, or as specified by the HCRMA:

V. SCOPE OF SERVICES

Upon receiving the Notice to Proceed (“NTP”), the Consultant will schedule a Project kick-off meeting with key stakeholders with the objective of confirming the Project’s schedule, the overall Project methodology, and data requirements. Based on this meeting, the Consultant will develop a Project Management Plan, outlining the identified Project stakeholders, specific Project procedures, Project methodology, data collection needs, schedule, and Project contact information. The Consultant will issue a notice to stakeholders regarding Project commencement and may request assistance in gathering existing data, traffic reports for the area, and details and specifics for the Project and/or other planned facilities in the area of influence, as needed. A dedicated QA/QC file will be maintained for the Project, indicating all relevant aspects and particularities of the QA/QC procedure at hand, including specific risks, notable computer programs, reviewing methods, and a system to record the results of individual and periodic audits.

TASK 1: RIGHT-OF-WAY SURVEYS

1.1. Right-Of-Way Surveys

This includes the performance of surveys to establish land boundaries, preparation of parcel descriptions and parcel plats, and the preparation of right-of-way (ROW) maps.

The Surveyor shall prepare:

- A. boundary surveys and create Property Descriptions (metes and bounds plus plats);
- B. create GIS files for ROWD/ Real Property Asset Map system; and
- C. traditional ROW map as requested by the HCRMA.

The standards and deliverables are detailed in Chapter 4, Section 8 of the *TxDOT ROW Preliminary Procedures for the Authority to Proceed Manual*.

Right-Of-Way Mapping – Traditional ROW Map

If requested in a work authorization, the Surveyor shall conduct traditional ROW mapping.

Traditional ROW mapping includes ground surveying and preparation of parcel maps, legal descriptions also known as metes and bounds descriptions, and ROW maps.

D. Purpose

The purpose of traditional ROW mapping is:

1. To prepare mapping documents suitable for use in the acquisition of real property and the issuance of a title policy.
2. To prepare a map of a resurvey of existing ROW where it is necessary to update or redefine ROW lines.

E. Definitions

In this RFQ, the following definitions shall apply:

1. Abstract Map means a scale drawing prepared from record documents depicting proposed ROW lines, existing ROW lines, easement lines, and private property lines with relevant grantee names, recording data, and recording dates.
2. Closure/Area Calculation Sheet means a computer generated print-out of the area and the perimeter bearings, distances, curve data, and coordinates of an individual parcel of land to be acquired, including the degree of angular and distance mis-closure for each individual parcel.
3. Denial of Access Line means a line that indicates specific location where access to the roadway is denied.
4. Owner means the current title holder of record as determined by the Real Property Records.
5. Parent Tract means a unit or contiguous units of land under single ownership, comprising a single marketable tract of land consistent with the principle of highest and best use.

A parent tract may be described by a single instrument or several instruments. A single parent tract cannot be severed by a public ROW easement, or separate ownership which destroys unity of use.

6. Parent Tract Inset means a small map to an appropriate scale, of the parent tract perimeter placed upon the ROW map in the proximity of the respective parcel. Parent tract insets are used in cases where the parent tract cannot be shown to the same scale as the ROW map. Since parent tract insets are used to identify the limits and location of parent tracts, they must include public ROW, utility easements and fee strips, and identifiable water courses which bound the parent tract.
7. Point of Beginning or POB means a corner of the parcel of land to be acquired, located on the proposed ROW line and being the beginning terminus of the first course of the written property description or plat.
8. Point of Commencing or POC means a monumented property corner identifiable in the real property records that is located outside the proposed ROW corridor. For title purposes, the POC must be a monumented back corner of the parent tract. In the event a monumented back corner of the parent tract cannot be recovered, the nearest identifiable monumented property corner located outside the proposed ROW corridor may be used.

9. Preliminary ROW Layout means a scaled drawing depicting proposed ROW lines, existing ROW lines, proposed pavement, access denial lines, the proposed centerline alignment, private property lines, easement lines, visible improvements, visible utilities, and the station and offset from the centerline alignment to each point of curvature (PC), point of tangency (PT), and angle point in the proposed ROW lines and to each PC, PT, and the angle point in the existing ROW lines in areas of no proposed acquisition.
10. Property Description means a document prepared as an exhibit for the conveyance of a property interest and issuance of a title policy, reflecting the results of a boundary survey, and signed and sealed by a registered professional land surveyor (RPLS), attached to an acquisition deed as Exhibit A, and consisting of the following two parts:
 - a. Written metes and bounds description delineating the area and the boundary and describing the location of an individual parcel of land unique to all other parcels of land.
 - b. Parcel plat, which is an A-size scaled drawing depicting the information recited in the metes and bounds description in 10 a. above, which represents the parcel(s) of land to be acquired.
11. ROW Maps means a series of D-size scaled drawings depicting the results of relevant elements of records research, field work, analysis, computation, and mapping required to determine title, delineate areas and boundaries, and locate and describe utilities and improvements to the extent necessary to appraise the value and negotiate the acquisition of individual parcels of private land for a proposed ROW project.

F. Procedure

All standards, procedures, and equipment used by the Surveyor must be such that, at a minimum, the results of the survey is in compliance with the precision and accuracy requirements set forth by the TBPELS rules.

1. Abstract Map

The Surveyor shall prepare an Abstract Map sufficient to determine the following:

- a. All interests of public record held in the land to be acquired.
- b. The total record holdings to be acquired from an owner contiguous to a land.
- c. All interests in land held in common to be acquired (shopping mall parking lots, subdivision reserves, etc.)
- d. All improvements proposed by other agencies that might have a bearing on project development.
- e. All called monuments, bearings, and distances in recorded information.

2. ROW Map

The Surveyor shall field locate items such as: property corners, existing ROW markers, improvements, and visible utilities. The Surveyor shall verify and update the planimetric file as directed by the HCRMA.

Using the HCRMA's standard title, index, and plan sheets, the Surveyor shall prepare a ROW map for each proposed ROW project. A ROW map must include a title sheet, an index sheet, a survey control index sheet, a horizontal control data sheet, and sufficient plan sheets to cover the proposed project. If requested by the HCRMA, the Engineer shall prepare additional sheets.

Where permitted by applicable TBPELS rules and accepted by the HCRMA, ROW maps need not be signed and sealed by a RPLS.

Plan sheets must include the following:

- a. Proposed ROW lines. Proposed ROW lines must be labeled with appropriate bearings, distances, and curve data. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
- b. Existing ROW lines. Existing ROW lines must be labeled with appropriate bearings, distances, and curve data to the extent necessary to describe the individual parcels of land to be acquired. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
- c. Proposed project baseline alignment. The proposed project baseline alignment must be labeled with appropriate bearings, distances, and curve data. Curve data must include the station of the curve, point of intersection (PI), radius, delta angle, arc length, tangent length, long chord bearing and distance, and the northing (N) and easting (E) coordinates of the curve PI. All alignment PCs, PTs, and even 500 foot stations must be labeled with its station value.
- d. Proposed paving lines. Proposed paving lines combined with relevant existing paving lines must be shown to the extent necessary to compile a complete picture of proposed traffic movements. Proposed paving on the final map submitted to the HCRMA must be shaded with a dot pattern or highlighted by some other means acceptable to the HCRMA.
- e. Denial of Access lines. Denial of Access lines must be drawn to clearly indicate areas where access is to be denied and where access is to be permitted.
- f. Private property lines. Private property lines must be delineated with appropriate bearings, distances, and curve data to the extent necessary to describe the individual parcels of land to be acquired. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
- g. League lines and survey lines. League lines and survey lines must be shown and identified by name and abstract number.
- h. County lines and city limit lines. County lines and city limit lines must be located and identified by name.

- i. North arrow. A north arrow must be shown on each sheet, in the upper right corner of the sheet.
- j. Monuments. Monumentation must be shown with a description of material and size and if the monument is found or set.
- k. PC, PT, and angle points. Station and offset must be shown for each PC, PT, and angle point in the proposed ROW lines. Stations and offsets must be shown with respect to the proposed centerline alignment.
- l. Intersecting and adjoining public ROW. Intersecting and adjoining public ROW must be shown and identified by name, ROW width, and recording data.
- m. Railroads. Railroads must be shown and identified by name, ROW width, and recording data.
- n. Utility corridors. Utility corridors must be identified as to easement or fee.
- o. Easements and fee strips. Easements and fee strips must be shown and identified by width, owner, and recording data.
- p. Set-back lines. Set-back lines (e.g., building lines) must be shown and identified.
- q. Improvements. Visible improvements located within the proposed ROW corridor or within 50 feet of a proposed ROW line must be shown and identified.
- r. Structures
 - (1) Structures must be identified as commercial or residential, by number of stories, and as to construction material type (e.g., brick, wood frame).
 - (2) Structures that are severed by a proposed ROW line must be dimensioned to the extent necessary to completely delineate the severed parts.
 - (3) Parking areas, billboards, and other on-premise signs that are severed by a proposed ROW line must be dimensioned to the extent necessary to delineate that portion of the parking area, billboard, or sign that is located within the proposed ROW corridor.
 - (4) For a structure outside of, but within ten feet of, the proposed ROW line, the distance of the structure to the proposed line must be shown. If the location of the structure is determined using a HCRMA supplied planimetric map, any structure within three feet of the proposed ROW line must be verified by field survey.
- s. Utilities. Visible utilities located within the proposed ROW corridor or within 50 feet of a proposed ROW line must be shown and identified.

- t. Underground fuel storage tanks. Visible location of vents and filler caps of underground fuel storage tanks situated within the proposed ROW corridor or within 50 feet of the corridor must be determined and shown.
- u. Points of commencing and points of beginning. POCs and POBs must be shown and labeled. POBs must be shown with their respective N and E surface coordinates. As an exception, a POC will not be required in the case of a total taking without a remainder.
- v. Parcels. Each parcel of land to be acquired must be identified by a parcel number, which must appear in the ownership tabulation and on the ROW map in the proximity of the respective parcel. If the Surveyor is unfamiliar with the parcel-numbering criteria adopted by the HCRMA, including applicable TxDOT criteria, the Surveyor shall seek the assistance of the HCRMA at the time the Abstract Map is complete.
- w. Ownership tabulation. An ownership tabulation must be shown that includes the parcel number, existing area of the parent tract, lots and blocks constituting the parent tract when applicable, owner's name, type of conveyance, film code, county clerk's file number, taking area, and remaining area of the parent tract located left or right of the centerline alignment or both. The Surveyor shall provide several blank lines in the tabulation block to facilitate future map additions.
- x. Parent tract inset. A parent tract inset must be shown for each parent tract that cannot be shown to scale on the ROW map. When parent tract insets are used, the point of commencing with the appropriate bearing and distance to the point of beginning may be shown on the parent tract inset.
- y. Data sources. A note must be included on the title sheet and each map sheet stating the source of bearings, coordinates, and datum used. The note must also include the National Geodetic Survey (NGS) or other basis monument(s) name or identification number, Texas Coordinate System Zone information, epoch information, grid or surface values and the combined adjustment factor or surface adjustment factor.
- z. Notes. Appropriate notes must be included on the title sheet and each map sheet stating the following:
 - (1) Month (or months) and year of the abstracting upon which the map is based.
 - (2) Month (or months) and year the field surveys were conducted upon which the map is based.
 - (3) Month and year the map was completed by the Surveyor.
- aa. ROW CSJ number. The ROW CSJ number, if available, must be shown on each ROW map sheet.
- bb. Tick marks. The Surveyor shall place four tick marks, one in each quadrant of the map sheet, showing the latitude and longitude (Lat/Long) in decimal degrees and the surface coordinate of each mark. The tick marks may be placed on the match lines of each map sheet, if convenient.

A foot note must also be placed on the sheet defining the tick marks as Lat/Long in decimal degrees.

3. Property Descriptions

The Surveyor shall prepare a Property Description for each parcel (or tract for surplus property) consisting of two parts: (1) a metes and bounds description of the property and (2) a parcel plat. Each part of a Property Description must be signed and sealed by a RPLS.

a. Metes and bounds description

The Surveyor shall prepare a metes and bounds description for each parcel of land to be acquired. The Surveyor shall use the TxDOT standard format for metes and bounds descriptions. Metes and bounds descriptions must be submitted in Microsoft Word format and must include the following information:

- (1) State, county, and original land grant survey within which the proposed parcel of land to be acquired is located.
- (2) Reference to unrecorded and recorded subdivisions by name, lot, block, and recording data to the extent applicable.
- (3) Reference by name to the grantor and grantee, date and recording data of the most current instrument(s) of conveyance describing the parent tract.

The Surveyor shall use the execution date when citing deed references. The Surveyor shall use the recording or filing dates, making clear which date is being used if the execution date is not explicit on the face of the document.

- (4) A POC.
- (5) A POB with the N and E surface coordinates.
- (6) A series of courses, identified by number and proceeding in a clockwise direction, describing the perimeter of the parcel of land to be acquired, and labeled with appropriate bearings, distances, and curve data.
- (7) Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.
- (8) Each course must be identified either as a proposed ROW line, an existing ROW line, or a property line of the parent tract. Each property line of the parent tract must be described with an appropriate ad joiner call.
- (9) A description of all monumentation set or found, which must include size and material.
- (10) A reference to the source of bearings, coordinates, and datum used.

b. Parcel plat

The Surveyor shall prepare a parcel plat for each parcel of land to be acquired using the HCRMA's standard format. Parcel plats must include each and every item of information 1) written in the metes and bounds description and 2) shown on the ROW map (if requested by the HCRMA) for the individual parcel.

G. Adherence to Standards

For purposes of clarity, consistency, and ease of understanding, the HCRMA, as an acquiring agency of private property for public use, has adopted the TxDOT standards and formats for a ROW map to facilitate the processes of negotiation, appraisal, relocation assistance, and condemnation. The Surveyor shall adhere to these standards and formats to every extent possible.

H. General Specifications

The following general specifications for 1) description, 2) plat, and 3) ROW mapping apply:

1. Completed ROW maps must be submitted to the HCRMA in both Bentley MicroStation Design File (DGN) and Adobe Portable Document Format (PDF) format. The maps must have a layout that will produce a D-size final print with a 0.5 inch border.
2. Parcel plats must be submitted to the HCRMA on A-size bond paper with a 0.5 inch border. Match lines must be used where more than one sheet is required.
3. ROW maps must be drawn to a scale of 1 inch = 50 feet. Scales other than 1 inch = 50 feet may be used with prior approval by the HCRMA.
4. The minimum lettering size for ROW maps is 0.1 inches at print scale.
5. Parcel plats must be drawn to a scale of 1 inch = 50 feet. Scales other than 1 inch = 50 feet may be used with prior written approval by the HCRMA. In the case of large parcels which are difficult to fit on a single A-size sheet, the Surveyor shall use multiple A-size sheets with match lines.
6. The minimum size lettering for a parcel plat is 0.3 inches at print scale.
7. Property Descriptions shall be submitted on A-size bond paper.

I. General Requirements

The Surveyor shall adhere to the following general requirements:

1. Copies of instruments of record submitted to the HCRMA must be indexed by parcel number.
2. Coordinates appearing on ROW maps, on parcel plats, and in written property descriptions must be surface coordinates based on the Texas State Plane Coordinate System. The appropriate combined adjustment factors (sea level factor multiplied by the scale factor) for each zone of the coordinate system, which have been developed by TxDOT, must be noted.

To obtain surface coordinates, the Surveyor shall multiply grid coordinates by the appropriate combined adjustment factor for each zone, as provided by TxDOT.

3. Line and curve tables may be used when necessary.
4. The number of centerline alignment stations shown on a single plan sheet shall be limited to allow approximately four inches between match lines and sheet borders for future details and notes.
5. A minimum four-inch by four-inch space must be reserved at the bottom right corner of each map sheet for future revision notes.
6. If requested by the HCRMA, the Surveyor shall set a 5/8-inch rebar with a TxDOT aluminum ROW cap (or another appropriate monument) on the proposed ROW line, and replace the rebar at a later date with a TxDOT Type II ROW marker with the HCRMA logo.

When the 5/8" rebar with a HCRMA rod cap is set for PCs, PTs, PIs, and 1500 foot stations, the double asterisk symbol (**) must be shown on the map sheets and written into and shown in the Property Description and must be accompanied by the following note:

**The monument described and set may be replaced with the HCRMA's Type II ROW marker upon the completion of the construction project, under the supervision of a RPLS, either employed or retained by the HCRMA.

When new ROW lines intersect property boundary lines and create new boundary corners in the new ROW line, the Surveyor shall place a 5/8-inch rebar with an HCRMA-approved 2-inch aluminum property corner rod cap that conforms to applicable TxDOT standards.

J. GIS Submission Requirements and Standards

All ROW mapping project work authorizations are subject to the standards and required ArcGIS deliverables detailed in Chapter 4, Section 8 of the *TxDOT ROW Preliminary Procedures for the Authority to Proceed Manual*.

K. Electronic ROW Map Standards

The primary purpose of this section is to provide instructions on the graphics standards, file management structure, and naming conventions, for ROW mapping electronic deliverables submitted to the HCRMA by surveying services providers, as part of the ROW package.

The Surveyor shall adhere to the following requirements for electronic map submittals:

1. Bentley MicroStation

All graphic files for map sheets and parcel plats must be native Bentley MicroStation DGN files created using Bentley OpenRoads civil design system with HCRMA's current seed files, resource files, workspace environment, and settings.

2. Level Library Files

The Surveyor shall use the TxDOT's current MicroStation level library files for ROW mapping. The files contain all the predefined levels that are typically needed for ROW mapping and include levels for existing utilities.

3. Separate DGN Files for Each Map Sheet

The Surveyor shall provide one DGN file for each map sheet. Each file must be spatially registered to the project coordinate system.

The sheet file naming convention is “ROW CSJ_Sheet Number.dgn((e.g., 212104065_S01.dgn).

In the example above, the first nine numbers “212104065” is the ROW CSJ number for the project and “S01” is the sheet number, beginning with number 1 as the cover sheet.

4. Naming convention for the Master Design File or Master ROW Files and Map Sheet.

The recommended naming prefix for design files is MDF (for master design file). Therefore, the prefix must be different for the ROW files because the location of the existing and proposed ROW in the design files from the schematic will change to some degree after an on-the-ground survey is made for a ROW map. Therefore, the prefix might be MRF for master ROW file.

The Surveyor shall provide the corrected Master ROW Files to the design engineer to be used in the final plans, specifications, and estimate (PS&E) so that all features of construction and the relocation of utilities will be correctly placed in relation to the highway ROW and the ROW of cross streets or roadways.

The master ROW file naming convention is: “MRF ROW CSJ_Logical Name.dgn”, with examples as follows:

MRF212104065_Schematic90.dgn (for schematic layout 90% submittal)

MRF212104065_Schematic100.dgn (for schematic layout 100% submittal)

MRF212104065_SchemApprov.dgn (for final approved [HCRMA, TxDOT, and FHWA, as applicable] schematic)

MRF212104065_PSEDesign.dgn (for final PS&E design)

MRF212104065_ExROW.dgn (for existing ROW determined by RPLS)

MRF212104065_PropROW.dgn (for proposed ROW of final design)

MRF212104065_DeedPlot.dgn (for deed record)

MRF212104065_Planimetric.dgn (for aerial mapping topography)

MRF212104065_ROWTopo.dgn (for improvements data collection)

MRF212104065_DesignTopo.dgn (for design level data collection topography)

MRF212104065_ExUtil.dgn (for existing utilities)

All sheet files with a plan view must have the MRF referenced to allow more than one sheet file to be worked on at the same time.

5. File Structure of Master and Reference DGN Files

If possible, the file structure should not contain subfolders.

6. Lines Weights, Line Styles, Colors, Text Size, Text Fonts, Scale, and Annotations

Legibility is the primary concern when choosing the scale, line weights and text size. Sheets must be legible at full scale sheet size (i.e., D-size drawing) and when reduced to half scale sheet size (B-size drawing size). It is not sufficient that originals or first generation plots are legible, reproductions (copies) must retain legibility.

The normal scales for a full-sized sheet (i.e., D-size) is 1 inch = 50 feet (urban) and 1 inch = 100 feet (rural). For a half-sized sheets (i.e., B-size) the scale is 1 inch = 100 feet (urban) and 1 inch = 200 feet (rural).

The standard cell library is TxdotSurv_04.cel or the current TxDOT cell files. The standard font is Leroy. The standard TxDOT color table is V256COLR.ctb or Txgpk.ctb.

The Surveyor shall use the TxDOT's current GEOPAK Survey SMD file that sets up new feature codes in SMD file for alignment chains, parcel chains and survey chains that can be drawn by GEOPAK Survey from the GPK file with the correct line styles, colors and weights to the designated levels loaded into the DGN by the TxDOT's current level library files.

The Surveyor shall use MicroStation Packager for the submission of electronic deliverables, which captures any non-TxDOT-standard files (e.g., rsc, cel, text) that were used in the map that look and plot differently in the TxDOT's MicroStation workspace.

7. Text and Line Color considerations

Text and line colors must be legible when using background imagery.

8. Required Data in the GEOPAK ROW GPK File

Alignments, chains of proposed and existing ROW lines, parent tracts and taking parcels, and all other points collected in the field (start with schematic or design GPK file) are required.

If the design GPK file is too detailed for ROW use, the Engineer shall create input files for the information needed for the design GPK file to load into the ROW GPK file.

9. Surface Coordinate and the ROW GIS Geo-Database

Surface adjustment factors and basis of datum must be well documented in the electronic deliverables "file structure/deliverables read me" file.

10. Requirements for Electronic Deliverables

- a. Native MicroStation DGN files (reference files, sheets files, and parcel plats files);
- b. GEOPAK Survey GPK files;
- c. Separate comma delimited point files (ASCII file) in the following coordinate systems: Surface or Projected Coordinates, Grid Coordinates (Texas Coordinate System of 1983 in U.S. Survey feet) and Geographic

Coordinates (WGS-84 in decimal degrees). The file will have the following format: point number, northing or latitude, easting or longitude, elevation, feature code, and point description. File naming convention is: ROWCSJ_Type of Coordinates.csv (e.g., 212101065_Surface.csv, 212101065_Grid.csv, and 212101065_WGS84.csv);

- d. PDF files created in MicroStation of map sheets (both D-size and B-size sheets), one set in black and white and another set in color if there is orthoimagery for the background;
- e. PDF files and Microsoft Word documents of signed and sealed Property Descriptions and Surveyor's Reports;
- f. Raw and processed GPS files including adjustment reports.

L. ROW Mapping Tasks to be Completed

The Surveyor shall perform the following tasks:

1. Abstracting

The Surveyor shall obtain copies of all existing ownership documents for the parent tracts along with all subdivision plats and recorded documents defining existing easements within, along or intersecting the existing ROW, and prepare an Abstract Map.

2. Field Surveys

The Surveyor shall locate and set additional horizontal and vertical control points, as necessary, at the maximum spacing distance of 1,500 feet; field locate property corners, existing ROW markers, improvements, and visible utilities; verify and update the planimetric file; and as directed by the HCRMA, perform the following:

- a. Obtain right-of-entry to survey on private property and prepare a spreadsheet of the information.
- b. Locate existing horizontal and vertical control and verify the control information, locate property corners, and update the planimetric information with any missing visible improvements or visible utilities.

The Surveyor shall base all field work and calculations on the current controls and datum provided by the HCRMA.

3. Property Description

- a. The Surveyor shall prepare a Property Description(s) for each parcel or tract in the form of a preliminary and a final deliverable(s). Each part of a Property Description shall be signed and sealed by an RPLS. The Surveyor shall prepare preliminary Property Description(s)- for review by the HCRMA.

Metes and bounds descriptions

The Surveyor shall prepare a metes and bounds description for each parcel of land to be acquired. The Surveyor shall follow the standard formats for metes and bounds descriptions that TxDOT has developed. If requested by

the Surveyor, the HCRMA will provide copies of the standard formats for metes and bounds descriptions for all purposes of the work authorizations.

Parcel plats

The Surveyor shall prepare a parcel plat for each parcel of land to be acquired. The Engineer shall follow the TxDOT-developed standard formats for parcel plats adopted by the HCRMA. If requested by the Engineer, the HCRMA will provide copies of the standard formats. Parcel plats must include all items of information shown on the ROW map that concerns the individual parcel.

- b. The Surveyor shall prepare final deliverables.

The Surveyor shall set appropriate monuments on the proposed ROW lines at intersecting property lines, and at all points of curvature (PC), points of tangency (PT), angle points, intersecting ROW lines of side streets, and at 1,500 foot stations.

The Surveyor shall set appropriate monuments on the existing ROW lines in areas of no acquisition at all PCs, PTs, angle points, and 1,500 foot stations, and as directed by the HCRMA.

The Surveyor shall set appropriate monuments at intersecting property lines with the new ROW lines.

The Surveyor shall prepare the final ROW (ArcGIS) database template "ROW_Parcels_Edits" populated with the final parcels, final alignment, and project control points in ArcGIS 10.6.1 format or the current version in use by the HCRMA.

The Surveyor shall prepare final, signed, sealed, and dated Property Descriptions.

4. Traditional ROW Map

The Surveyor shall prepare a traditional ROW map for the specific work location consisting of the existing and proposed ROW lines.

The Surveyor shall work closely with adjoining surveyors to incorporate all relevant information.

The Surveyor shall provide the following:

- a. The Surveyor shall prepare a preliminary ROW map for review purposes.
 - b. The Surveyor shall prepare an initial ROW map for review purposes
 - c. The Surveyor shall prepare a final ROW map.
- 5. The Surveyor shall prepare a ROW project cover sheet using the Microsoft Word document template. The ROW project cover sheet must contain the highway, project limits, county, RCSJ, CCSJ, length of project, equations and exceptions, begin and end project information, datum statement, utility table, and signature lines for acquisition.
 - 6. Quality Assurance and Quality Control (QA/QC)

The Surveyor shall conduct a QA/QC review and prepare a check list for each task performed.

The Surveyor shall prepare a surveyor's report regarding their survey procedures, findings, and decisions made.

M. ROW Mapping Deliverables

The Surveyor shall provide the following:

1. Scanned copies of the ownership documents and one D-size paper copy of the Abstract Map and the associated MicroStation graphics files for review purposes.
2. Field Survey Data
 - a. A spreadsheet of the property owners and right-of-entry information.
 - b. Scanned copies of the field notes, control data sheets, and a graphics file of all field survey data.
3. Property Description Submittals
 - a. Preliminary Property Description Submittals

One paper copy of the preliminary Property Description(s) for review purposes marked "Preliminary – Not to be used for recording purposes", and an electronic copy of each Property Description in PDF format.

The ROW (ArcGIS) database template "ROW_Parcels_Edits" populated with the preliminary parcels, alignment, and project control points in ArcGIS 10.6.1 format or the current version in use by HCRMA.
 - b. Final Property Description Submittals

Two paper sets of the final Property Description(s) showing the metes and bounds descriptions and parcel plats, signed and sealed by a RPLS, and the associated electronic files in PDF and Word formats.

Bentley MicroStation parcel plat graphics files and master reference files (MRF).

The ROW (ArcGIS) database template "ROW Parcels Edits" populated with the final parcels, final alignment, and project control points in ArcGIS 10.6.1 format or the current version in use by the HCRMA.
4. ROW Map Submittals
 - a. Preliminary ROW Map Submittals

Two D-size paper copies and one B-size half-scale paper copy of the preliminary ROW map with the note "Preliminary – Not to be used for recording purposes", and the associated MicroStation graphics files.
 - b. Initial ROW Map Submittals

One D-size paper copy of the initial ROW map with the note "Preliminary – Not to be used for recording purposes", and the associated Bentley MicroStation and GIS graphics files.

c. Final R.O.W. Map Submittals

Two D-size paper copies and one B-size half-scale paper copy of the final ROW map, and the associated Bentley MicroStation and GIS graphics files.

PDFs of the final ROW map.

5. Two A-size paper copies of the ROW project cover sheet and the associated Word document file.

6. QA/QC

Documentation stating that the appropriate monuments were set on the proposed ROW lines at intersecting property lines, PC's, PT's, angle points, ROW lines of side streets and at 1,500 foot stations.

Documentation stating that the appropriate monuments were set on the existing ROW lines in areas of no acquisition at intersecting property lines, PC's, PT's, angle points, ROW lines of side streets and at 1,500 foot stations.

A copy of TxDOT's ROW map checklist signed by the surveyor, if required.

A copy of the surveyor's report signed by the surveyor.

1.2. ROW Hearing Services.

A. ROW Hearing Services

The Engineer shall prepare color exhibits for eminent domain hearing cases (assume XX exhibits). The exhibits must depict the subject property boundaries and the proposed ROW acquisition shown on an aerial map background. The exhibits must also show the pavement edges, drainage or other structures, and driveways.

The Engineer shall prepare for the eminent domain hearings by reviewing the approved design schematic and associated reports, cross-sections, ROW maps, and pertinent plan sheets provided by others, including those showing roadway, bridge, grading, drainage, signals, signs, intelligent transportation systems (ITS), illumination, traffic control plan, and other elements or data.

The Engineer shall attend by teleconference pre-hearings (assume XX meetings) for eminent domain proceedings. The Engineer shall also attend, in person, pre-hearings (assume XX meetings) for eminent domain proceedings near the project location.

Deliverables include all services and documents stated in this section.

B. Expert Witness Services

The Engineer shall attend and provide expert witness services for eminent domain hearings (assume XX hearings) at the HCRMA office. Assume that hearings, on average, last no longer than four hours.

The Engineer shall prepare for and provide expert testimony in eminent domain trial cases (assume XX trials) at the county courthouse near the project location.

Preparation includes developing color exhibits, reviewing material, and providing depositions. Assume that depositions, on average, last no longer than four hours and that trial cases, on average, last no longer than two days.

Deliverables include all services and documents stated in this section.

TASK 2: DESIGN SURVEYS

A. Definition.

A design survey gathers data in support of transportation systems design. A design survey includes the research, field work, analysis, computation, and documentation necessary to provide detailed topographic (3D) mapping of a Project site (e.g. locating existing ROW, surveying cross-sections or developing data to create cross-sections and digital terrain models, horizontal and vertical location of utilities and improvements, collecting details of bridges and other structures, review of ROW maps, and establishing control points).

B. Technical Requirements for Design Surveys.

1. Design surveys and construction surveys must be performed under the supervision of a RPLS currently registered with the TBPELS.
2. All control must meet the of accuracy requirements of the HCRMA.
The Consultant shall comply with the standards of accuracy for control traverses provided in the *TxDOT Survey Manual* or the *TSPS Manual of Practice for Land Surveying in the State of Texas*, as may be applicable.
3. Short traverse procedures used to determine horizontal and vertical locations must meet the following criteria:
 - a. Short traverses must begin and end on horizontal and vertical ground control as described above.
 - b. Required horizontal accuracy (unless otherwise stated):
 - (1) Bridges and other roadway structures: less than 0.1 feet.
 - (2) Utilities and improvements: less than 0.2 feet.
 - (3) Cross-sections and profiles: less than 1 foot.
 - (4) Bore holes: less than 3 feet.
 - c. Required vertical accuracy:
 - (1) Bridges and other roadway structures: less than 0.02 feet.
 - (2) Utilities and improvements: less than 0.1 feet.
 - (3) Cross-sections and profiles: less than 0.2 feet.
 - (4) Bore holes: less than 0.5 feet.

C. Data Requirements for Design and Construction Surveys.

1. Planimetric DGN files must be fully compatible with the version of the MicroStation graphics program currently used by HCRMA without further modification or conversion.

2. Electronically collected and processed field survey data files must be fully compatible with HCRMA's computer systems without further modification or conversion. All files must incorporate only those feature codes currently being used by HCRMA and TxDOT.
3. Digital terrain models (DTMs) must be fully compatible with the version of the Bentley OpenRoads civil design system currently used by TxDOT and HCRMA without further modification or conversion. All DTM must be fully edited to provide a complete digital terrain model with all necessary break lines.

2.1 Design Survey

A. Tasks to be Completed – Design Surveys.

If requested by the HCRMA, the Consultant shall perform one or more Design Surveys. Design Survey tasks include the following:

1. Collect data to create cross-sections and DTMs.
2. Locate existing utilities.
3. Locate existing improvements.
4. Provide details of existing bridge structures, including bridge limits, bents, columns, retaining walls, and natural ground elevations.
5. Locate details of existing drainage features including culverts, manholes, retention and detention ponds, flowlines, and associated features.
6. Locate all waters of the United States (WOTUS), including wetlands.
7. Review existing ROW maps and locate the existing ROW.
 - a. Review existing ROW maps

The Consultant shall review ROW maps prepared by others for completeness using the current schematic and the checklist provided by the TxDOT district.
 - b. Locate existing ROW

The Consultant shall re-survey the existing ROW where it is necessary to update or redefine ROW lines. All standard surveying procedures must be adhered to including record research, recovering existing monuments, and replacing monuments as appropriate. The Consultant shall prepare an abstract map, preliminary map, final map, GIS graphics file, and a Surveyor's report. The final map must also include a monument table showing the property monuments that were found and set, and certified by the Surveyor. The Consultant shall prepare maps either in standard map sheets format or roll map format as requested by the HCRMA.
8. Locate boreholes.
9. Perform hydrographic surveys, according to details requested by the HCRMA.
10. Verify the condition and usefulness of existing control points including verification of the values. Establish additional control as needed. Tie to other

control points in the Project vicinity including points established by the National Geodetic Survey (NGS), FEMA, and any other local entities as directed by the HCRMA.

11. Update existing control information and prepare new survey control data sheets, as directed by the HCRMA to be included in the construction plan set as described below:
 - a. The Consultant shall prepare, sign, seal, and date a survey control index sheet and horizontal and vertical control sheet(s) to be inserted into the plan set.
 - b. The survey control index sheet provides an overview of the primary Project control and must include:
 - (1) An unscaled vicinity map showing the general location of the Project in relation to nearby towns or other significant cultural features.
 - (2) A scaled Project map showing the extents of the Project and the location of the primary control points. The map must show street networks, selected street names, control point identification, and significant cultural features necessary to provide a general location of the primary control.
 - (3) A table containing the primary control point values including the point number, northing, easting, elevation, stationing, and stationing offset values.
 - (4) Map annotation including a graphic scale bar, north arrow, and standard HCRMA title block. The title block shall contain a section for the organization name, county and highway name/number. The title block shall also contain a section for a Texas registered Consultant to sign, seal and date the sheet to include the following statement, "The survey control information has been accepted and incorporated into this PS&E."
 - (5) In the title block under the heading "Notes", identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used, and unit of measure. The Consultant shall include a note stating that the coordinates are State Plane and a notation specifying either grid or surface adjusted coordinates.
 - c. The Consultant shall prepare horizontal and vertical control sheets providing detailed information about the construction, location, and monumentation of the primary control, which must include:
 - (1) An unscaled location map for each primary control point showing the location of the monument in relation to physical features located in the vicinity. The location map must include a north arrow, the monument designation, the monument northing, easting, and elevation.

- (2) Directly below the location map a text description of the monument including size, material, and construction followed by a description of the location of the monument starting with the county and state followed by a description suitable to locate the monument on the ground.
- (3) Map annotation including a graphic scale bar, north arrow, and a standard HCRMA title block. The title block must contain a section for the organization name, county and highway name/number and contain a section for a Texas registered engineer to sign, seal and date the sheet to include the following statement, “The survey control information has been accepted and incorporated into this PS&E.”
- (4) In the title block under the heading “Notes”, identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used, and unit of measure. The Consultant shall include a note stating that the coordinates are either grid or surface adjusted coordinates.

2.2 Deliverables for Design Surveys.

The Consultant shall prepare and submit the deliverables as specified in individual work authorizations for design surveys. The deliverables might be any combination of the following:

- A. Digital terrain models (“DTM”) and the triangular irregular network (“TIN”) files in a format acceptable by the HCRMA.
- B. Maps, plans, or sketches prepared by the Consultant showing the results of field surveys.
- C. Computer printouts or other tabulations summarizing the results of field surveys.
- D. Digital files or media acceptable by the HCRMA containing field survey data (ASCII data files).
- E. Maps, plats, plans, sketches, or other documents acquired from utility companies, private corporations, or other public agencies, the contents of which are relevant to the survey.
- F. Field survey notes, as electronic and hard copies.
- G. A digital and hard copy of all computer printouts of horizontal and vertical conventional traverses, GPS analysis and results, and survey control data sheets.
- H. All GEOPAK files and OpenRoad files.
- I. Survey reports in a format requested by the HCRMA.

2.3 Mapping.

Mapping includes the geospatial data collection and mapping by means of aerial photogrammetry, terrestrial (close range) photogrammetry, terrestrial LiDAR, mobile LiDAR, and other remote sensing technologies.

A. Purpose

The purpose of mapping is to provide map and related data to support transportation projects including Project design and other uses.

B. Definitions

1. Aerial Photogrammetry – Aerial Photogrammetry means the collection and processing of photography acquired from an airborne platform to develop DGN and DTM files.
2. Terrestrial Photogrammetry – Terrestrial Photogrammetry means the collection and processing of photography acquired at or near ground level to develop DGN and DTM files.
3. Airborne LiDAR – Airborne LiDAR means laser scanning equipment mounted on a helicopter or other airborne platform to collect data to process for DGN and DTM files.
4. Terrestrial LiDAR – Terrestrial LiDAR means laser scanning equipment operated from a stationary base on the earth’s surface to collect data to process for DGN and DTM files.
5. Mobile LiDAR – Mobile LiDAR means laser scanning equipment mounted on a moving vehicle operating on the earth’s surface to collect data to process for DGN and DTM files.
6. UAS means Unmanned Aircraft Systems (e.g., drones).
7. UAS LiDAR means laser scanning equipment on an unmanned aerial vehicle (e.g., drones) to collect data to process for DGN and DTM files.

2.4 Aerial Mapping Using a Metric Camera and Manned Aircraft.

Aerial mapping using a metric camera and manned aircraft includes the collection of digital aerial imagery using a calibrated large-format metric aerial camera, performing relative orientation of the imagery through the collection of tie and pass points between adjacent aerial photo frames, performing a least-squares bundled absolute orientation adjustment using ground control points supplemented with airborne GPS and inertial measurement unit (“IMU”) data, and deriving data from the processed imagery including compilation of planimetric and topographic maps, creation of point cloud DEM and digital terrain model (DTM) data, and production of orthophotography.

The Consultant shall provide the services of a certified Photogrammetrist to perform or oversee the tasks under task 3.4. The Consultant remains ultimately responsible and shall ensure that the work is performed as required.

A. Purpose.

The purpose of aerial mapping using a metric camera and manned aircraft is to provide map and related data to support transportation projects including Project design and other uses.

B. Definitions.

In 3.4, 3.5, and 3.6 the following definitions apply:

1. Photogrammetrist means an American Society for Photogrammetry and Remote Sensing (“ASPRS”) Certified Photogrammetrist with a current certification.
2. Mapping Scientist means an ASPRS Certified Scientist-UAS with a current certification.
3. Metric Aerial Photograph means a vertical photograph taken from a manned aircraft using a large-format calibrated digital metric aerial mapping camera.
4. Non-Metric aerial photograph means a vertical or oblique photograph taken from a fixed- or rotary-wing UAS aircraft using a non-metric small format consumer-grade digital camera.
5. Large-format digital metric camera means a camera using charge-coupled device (“CCD”) or complementary metal oxide semiconductor (“CMOS”) technology to capture an image with a minimum final image size of 11500 by 7500 pixels.
6. Analytical triangulation means the process of developing absolute orientation parameters for individual photogrammetric stereo models through the use of image tie and pass points combined with ground control in a fully weighted least-squares bundle adjustment. Airborne GPS and IMU data may be used to reduce the number of ground control points.
7. Ground control means points established on the ground by the Consultant and for which the Northing, Easting, and Elevation coordinates have been determined sufficient in number and geospatial distribution to allow analytical triangulation and mapping to meet the required Project accuracy. Ground control can be targeted using paint or other marker material or can be non-targeted.
8. Airborne GPS/IMU means an airborne GPS receiver on-board the aircraft recording GPS and orientation data to be included in the analytical triangulation with the purpose of reducing the number of ground control points required for a metric aerial mapping task. IMU data to supplement the analytical triangulation is optional and its use is at the discretion of the Certified Photogrammetrist or Mapping Scientist.
9. KML means an uncompressed Google Keyhole Markup Language file, which is a two- or three- dimensional map showing a location on the earth.
10. KMZ means a compressed Google Keyhole Markup Language file, which is a two- or three- dimensional map showing a location on the earth.
11. DEM means digital elevation model, which is a three-dimensional DGN and/or point cloud in ASPRS LAS 1.2 file format containing all features located in the Project area including features both on and above the ground surface.

12. DTM means digital terrain model, which is a three-dimensional DGN and/or point cloud in ASPRS LAS 1.2 format containing only features located on the ground surface.
13. Field Check means a ground survey validation of the deliverable map product with the purpose of ensuring that the required mapping accuracy has been met.
14. Flight Map means a map depicting the flight line and ground control layout over the Project area.
15. Low Altitude Metric Aerial Photography means a metric aerial photography with a nominal ground pixel size of 5 cm or less.
16. DGN means a two or three-dimensional graphics file produced using Bentley MicroStation. The file may contain features and improvements plotted in a horizontal plane along the N and E axes which correspond to the Texas Coordinate System. The file may contain 2D or 3D elements representing topographic, existing, proposed, schematic, and general layout features.
17. Medium Altitude Photography means aerial photography with a film photo scale of 1:12,000 or a digital image with ground pixel size of 20 cm.
18. Project Photo Length means the distance over which photographs are required to be taken.

C. Procedure for Aerial Mapping Using a Metric Camera and Manned Aircraft.

1. Ground Control.

The positioning and density of ground control is at the discretion of the Photogrammetrist. Ground control is required to be sufficient to meet the accuracy standard required for the final mapping products. Chapter 3 of the TxDOT Survey Manual provides guidance for the location and density of the ground control. The Photogrammetrist must determine the approximate position for ground control points. The Consultant shall locate and mark the ground control points in the field using surveying methods.

2. Metric Digital Aerial Photography.

The Photogrammetrist must acquire metric digital aerial photography using a large-format calibrated metric aerial mapping camera. Unless otherwise stated, the imagery will be low altitude with a maximum nominal ground sampling distance of 5.0 cm. The Photogrammetrist must ensure that all imagery acquisition requirements including all flight parameters are met such that the imagery is suitable for intended use.

3. Analytical Triangulation.

The Photogrammetrist must process the metric digital aerial photography, ground control, and airborne GPS/IMU data (if collected) to develop an absolute orientation of the imagery suitable for map compilation at the required accuracy.

4. Aerial Mapping.

The Photogrammetrist must prepare the following:

- a. A two-dimensional DGN file containing planimetric map features.

b. A three-dimensional DGN file containing DTM features.

c. Orthophotography

The Photogrammetrist must provide orthorectified aerial imagery covering the Project area.

D. Technical Requirements.

1. Aerial mapping using a metric camera and manned aircraft must be performed under the direct supervision of an ASPRS Certified Photogrammetrist.
2. Unless otherwise stated, aerial mapping must meet or exceed the requirements for ASPRS Class 1 mapping at a 1 inch = 40 feet equivalent scale with a one-foot indicated contour interval.

E. Data Requirements.

1. Planimetric DGN files must be fully compatible with the current Bentley MicroStation version graphics program used by TxDOT without further modification or conversion.
2. Electronically collected and processed field survey data files must be fully compatible with HCRMA's computer systems without further modification or conversion. All files must incorporate only those feature codes currently being used by the HCRMA.
3. DTM must be fully compatible with the current version of Bentley OpenRoads civil design system used by HCRMA and TxDOT without further modification or conversion. All DTM must be fully edited to provide a complete digital terrain model with all necessary break lines.
4. File features and level structure must be in accordance with the TxDOT's current photogrammetry mapping legend.
5. Minimum text size is 0.1 inches when plotted at a scale of 1 inch = 40 feet.

F. Deliverables for Aerial Mapping Using a Metric Camera and Manned Aircraft.

The Photogrammetrist must submit the following:

1. Digital orthophotography delivered on USB flash-drive or hard-drive in Tagged Image File format (TIF) compatible with Bentley MicroStation software and including georeferenced world files.
2. A photo index map in DGN and KMZ format showing the location of each digital image frame. The index map must be overlaid on a base map to provide general location information.
3. An orthophoto index map in DGN, KMZ, and PDF format showing the location of each orthophoto panel. The PDF format index map must be overlaid on a base map to provide general locational information.
4. An analytical triangulation report signed and sealed by the Photogrammetrist providing a narrative of the aerial photography Project and processing results. The report must include the number of flight strips, overall number of photo frames, the number of ground control points used, the use of airborne GPS and IMU data,

and the results of the fully weighted least-squares bundled adjustment. The Photogrammetrist must include a description and results of the analytical triangulation.

5. DGN files for the planimetric and DTM mapping.

2.5 Aerial Mapping Using a Non-Metric Camera and Unmanned Aircraft System (UAS).

Aerial mapping using an Unmanned Aircraft System (UAS) includes the collection of digital aerial imagery using either a fixed- or rotary-wing aircraft; the use of a non-metric small-format consumer-grade camera; performing relative orientation of the imagery through the collection of tie and pass points between adjacent aerial photo frames; performing a least-squares bundled absolute orientation adjustment using ground control points supplemented with airborne GPS and IMU data; and deriving data from the processed imagery including compilation of planimetric and topographic maps, creation of point cloud digital elevation model (DEM) and digital terrain model (DTM) data, and production of orthophotography as required.

The Consultant shall provide the services of a certified Photogrammetrist or Mapping Scientist to perform or oversee the tasks under task 3.5. The Consultant remains ultimately responsible and shall ensure that the work is performed as required.

A. Purpose.

The purpose of aerial mapping using UAS is to provide map and related data to support transportation projects including Project design and other uses.

B. Procedure for Aerial Mapping Using a Non-Metric Camera and UAS.

1. Ground Control.

The positioning and density of ground control is at the discretion of the Photogrammetrist or Mapping Scientist. Ground control is required to be sufficient to meet the accuracy standard required for the final mapping products. The Photogrammetrist or Mapping Scientist must determine the approximate position for ground control points. The Consultant shall locate and mark the ground control points in the field using surveying methods.

2. Aerial Photography.

The Photogrammetrist or Mapping Scientist must acquire digital aerial photography using a non-metric small-format consumer-grade digital camera. The Photogrammetrist or Mapping Scientist is responsible for ensuring that all imagery acquisition requirements including all flight parameters are met such that the imagery is suitable for intended use.

3. Analytical Triangulation.

The Photogrammetrist or Mapping Scientist must process the non-metric digital aerial photography, ground control, and airborne GPS/IMU data (if collected) to develop an absolute orientation of the imagery suitable for map compilation at the required accuracy.

4. Aerial Mapping.

The Photogrammetrist or Mapping Scientist must prepare the following:

- a. A two-dimensional DGN file containing planimetric map features.
 - b. A three-dimensional DGN file containing DTM features.
5. Orthophotography.

The Photogrammetrist or Mapping Scientist must provide orthorectified aerial imagery covering the Project area.

C. Technical Requirements.

1. Aerial mapping using a non-metric camera UAS must be performed under the direct supervision of an ASPRS Certified Photogrammetrist or Certified Mapping Scientist-UAS.
2. Aerial mapping using a non-metric camera and UAS must be performed in compliance with the TxDOT UAS Flight Operations and User's Manual.
3. Unless otherwise stated, aerial mapping must meet or exceed the requirements for ASPRS Class 1 mapping at a 1 inch = 40 feet equivalent scale with a one-foot indicated contour interval.

D. Data Requirements.

1. Planimetric DGN files must be fully compatible with the HCRMA's current Bentley MicroStation version graphics program used by HCRMA without further modification or conversion.
2. Electronically collected and processed field survey data files must be fully compatible with the HCRMA's computer systems without further modification or conversion. All files must incorporate only those feature codes currently being used by the HCRMA.
3. DTM must be fully compatible with the current version of Bentley OpenRoads civil design system used by HCRMA without further modification or conversion. All DTM must be fully edited to provide a complete digital terrain model with all necessary break lines.
4. File features and level structure must be in accordance with the HCRMA's current photogrammetry mapping legend.
5. Minimum text size is 0.1 inches when plotted at a scale of 1 inch = 40 feet.

E. Deliverables for Aerial Mapping Using a Non-Metric Camera and UAS.

The Photogrammetrist or Mapping Scientist must submit the following:

1. Digital orthophotography delivered on USB flash-drive or hard-drive in Tagged Image File format ("TIF") compatible with Bentley MicroStation software and including georeferenced world files.
2. A photo index map in DGN and KMZ format showing the location of each digital image frame. The index map must be overlaid on a base map to provide general location information.

3. An orthophoto index map in DGN, KMZ, and PDF format showing the location of each orthophoto panel. The PDF format index map must be overlaid on a base map to provide general locational information.
4. An analytical triangulation report signed and sealed by the Photogrammetrist or Mapping Scientist providing a narrative of the aerial photography project and processing results. The report must include the number of flight strips, overall number of photo frames, the number of ground control points used, the use of airborne GPS and IMU data, and the results of the fully weighted least-squares bundled adjustment. The Photogrammetrist or Mapping Scientist must include a description and results of the analytical triangulation.
5. DGN files for the planimetric and DTM mapping.

2.6 Field Check Survey for Aerial Mapping Using Manned Aircraft or UAS.

Field checking of aerial mapping projects involves surveying a statistical sampling of discreet features shown on the map. It is a collaborative effort between the Photogrammetrist or Mapping Scientist-UAS and the Consultant to validate that the map derived photogrammetrically meets the required accuracy standard. Because not all features shown on the map are good candidates for checking, it is necessary for the Photogrammetrist or Mapping Scientist to select discreet and unambiguous points that can then be surveyed and effectively evaluated between both the photogrammetric and field survey data sets.

The Photogrammetrist or Mapping scientist-UAS will provide a minimum of twenty 20 check point locations randomly distributed throughout the mapping area. The descriptions of the points must be sufficient to eliminate any ambiguity of the exact point to be surveyed.

A. Purpose.

The purpose of a field check for aerial mapping is to validate that map accuracy requirements have been met.

B. Definitions.

In 3.6, the following definition applies:

Check Point means a randomly distributed point captured in the DGN mapping file selected by the Photogrammetrist or Mapping Scientist and provided to the Consultant to be used to verify that the mapping accuracy requirement has been met.

C. Procedure to Field Check Survey for Aerial Mapping Using Manned Aircraft or UAS.

1. The Photogrammetrist or Mapping Scientist-UAS must prepare and provide the Consultant a listing of points to be validated in the field. Sufficient detail and description of the point is required to eliminate the possibility of a misidentification of the point during the field survey. A minimum of 20 horizontal and 20 vertical check points are required. Any single point can be used for both horizontal and vertical data as appropriate. A check point must not be part of the analytical triangulation least-squares adjustment.
2. The Consultant shall locate and measure the provided validation points on the ground using equipment and methodologies with a higher level of accuracy than the map being checked.

3. Using the results from the field survey, the Consultant shall prepare a map accuracy assessment report detailing the results of the field check. The report must include the number of check points used, the field surveying technique used for validation, and the results of the root mean square error (“RMSE”) and 95% confidence computations.
4. Using the validation data provided by the Consultant, the Photogrammetrist or Mapping Scientist must prepare a final report detailing the results of the map check. The report must include both the following Statements of Accuracy, if applicable:
 - a. “This map was compiled to meet the ASPRS Standard for Class 1 map accuracy.”
 - b. “This map was checked and found to conform to the ASPRS Standard for Class 1 map accuracy.”

D. Technical Requirements.

The Consultant shall:

1. Determine the northing, easting, and elevations of the check points provided by the Photogrammetrist or Mapping Scientist using a surveying method of greater accuracy than that used to produce the map being checked.
2. Perform RMSE and 95% confidence computations on the check points using the following methodology:

For each horizontal coordinate, the Consultant shall subtract the Northing value of the map coordinate from the Northing value derived from the field survey and square the resulting value. The Consultant shall perform the same operation for the Easting coordinate and then add the two squared values. The Consultant shall repeat the procedure for each check point. The Consultant shall add up all of the resulting squared values and divide the sum by the number of check points used (i.e., average the squares). Finally, the Consultant shall calculate the square root of the average. The Consultant shall report the resulting value as the RMSE value for the horizontal check point analysis. The Consultant shall multiply the final RMSE value by 1.7308 and shall report the resulting value as the 95% confidence value for the horizontal check point analysis.

For each vertical coordinate, the Consultant shall subtract the elevation value of the map coordinate from the elevation value derived from the field survey and square the resulting value. The Consultant shall repeat the procedure for each check point. The Consultant shall add up all of the resulting squared values and divide the sum by the number of check point used (i.e., average the squares). Finally, the Consultant shall calculate the square root of the average. The Consultant shall report the resulting value as the RMSE value for the vertical check point analysis. The Consultant shall multiply the final RMSE value by 1.96 and shall report the resulting values as the 95% confidence for the vertical check point analysis.

3. Provide the results of the RMSE and 95% confidence computations to the Photogrammetrist.

E. Data Requirement.

The Photogrammetrist or Mapping Scientist must provide a map accuracy assessment report detailing the methodology used and results of the map accuracy assessment .

F. Deliverables.

The Consultant shall deliver the result of the field check as a report in PDF format.

2.7 Horizontal and Vertical Control for Aerial Mapping.

Placement and survey of horizontal and vertical control for aerial mapping establishes ground control for aerial mapping projects.

A. Purpose.

The purpose of an aerial photography control survey is to provide ground control for aerial mapping projects.

B. Definition.

In 3.7, Aerial Photography Control Survey means reconnaissance, field work, analysis, computation, and documentation necessary to provide horizontal and vertical position of specific ground points. The ground control points are used in photogrammetric processing.

C. Procedure for Horizontal and Vertical Control for Aerial Mapping.

The Consultant shall:

1. Prepare and submit for approval an aerial ground control layout in DGN and KML format based on the target positions selected by the Certified Photogrammetrist. The layout must show the location of the proposed primary Project control and aerial ground control points.
2. Establish and determine the horizontal and vertical coordinates of the primary Project control points and aerial ground control points.
3. Place aerial ground control targets at the point location and maintain the targets until the aerial flight has been completed.

D. Technical Requirements.

1. Aerial photography control surveys must be performed under the direct supervision of a RPLS currently registered with the TBPELS.
2. The horizontal and vertical coordinates of the aerial control points must be based on acceptable methods, conducted by the Consultant, and must meet the standards of accuracy as set forth below:

Survey Level 3 accuracy, as described in the *TxDOT Survey Manual*, latest edition, or the equivalent level of accuracy described in the *TSPS Manual of Practice for Land Surveying in the State of Texas*.

E. Data Requirement.

The Consultant shall perform post processing of field data, which will be reviewed by the HCRMA. Data processed by standard calculators, computers, and other business

hardware and software normally maintained and used by the Consultant will be considered acceptable.

F. Deliverables.

The Consultant shall submit the following:

1. A final aerial control point layout in DGN and KML format showing the location of the primary control and target points labeled with their respective alpha-numeric designation.
2. A plot and computer graphics of a B-size index map showing an overall view of the Project and the relationship of primary monumentation and control used in the preparation of the Project, signed and sealed by a RPLS, and as directed by the HCRMA.
3. A plot and computer graphics of a B-size horizontal and vertical control sheet showing the primary survey control monumentation used in the preparation of the Project, signed and sealed by a RPLS, and as directed by the HCRMA.
4. An A-size data sheet for each aerial ground control point, which must include a location sketch, a physical description of the point, surface coordinates, elevation, and datums used.
5. A USB flash drive containing the graphics files and scanned images of the control data sheets.
6. A written statement describing the datum used along with copies of all relevant NGS and data sheets.
7. A written tabulation of all aerial control points with their respective alpha-numeric designations and horizontal and vertical coordinates.

2.8 Mapping Services to be Provided.

The Consultant shall provide the following mapping services as requested by the HCRMA:

A. Aerial Photogrammetry.

The Consultant shall prepare planimetric design (DGN, DTM, and TIN) MicroStation graphics files and orthophotography files covering the specific work location, meeting standards and specifications as required.

B. Terrestrial Photogrammetry.

The Consultant shall prepare planimetric design (DGN, DTM, and TIN) MicroStation graphics files covering the specific work location, meeting standards and specifications as required.

C. Terrestrial Lidar.

The Consultant shall prepare planimetric design (DGN, DTM, and TIN) MicroStation graphics files covering the specific work location, meeting standards and specifications as required.

D. Mobile and Aerial Lidar.

The Consultant shall prepare planimetric design (DGN, DTM, and TIN) MicroStation graphics files covering the specific work location, meeting standards and specifications as required.

E. Mapping Tasks to be Completed.

The Consultant shall perform the following tasks as requested for each mapping service:

1. Horizontal and Vertical Control for Aerial Mapping.

- a. The Consultant shall prepare and submit an aerial ground control layout showing the proposed aerial ground control points, for approval by the HCRMA.
- b. The Consultant shall establish and determine the coordinates of the aerial ground control points.
- c. The Consultant shall establish and determine the elevations of the aerial control points.
- d. The Consultant shall place aerial ground control target material at the established points and maintain until the photographs from the flight are approved.
- e. The Consultant shall prepare, to scale, a survey control index sheet for the aerial control points.
- f. The Consultant shall be prepared to locate additional points, as determined by the ASPRS certified Photogrammetrist, if any panel points are not visible from the air.

2. Deliverables for Horizontal and Vertical Control for Aerial Mapping.

The Consultant shall provide the following deliverables:

- a. A final aerial control point layout showing the location of the points and labeled with their respective alpha-numeric designations.
- b. A plot and computer graphics of a B-size index map showing an overall view of the Project and the relationship of primary monumentation and control used in the preparation of the Project, signed and sealed by a RPLS, and as directed by the HCRMA.
- c. An A-size data sheet for each aerial ground control point, which must include a location sketch, a physical description of the point, surface coordinates, the elevation, and datums used.
- d. A USB flash drive containing the graphics files and scanned images of the control data sheets.
- e. A written statement describing the datum used along with copies of all relevant NGS and data sheets.
- f. A written tabulation of all aerial control points with their respective alpha-numeric designations, surface coordinates (for center panel points only), and elevations.

3. Prepare Planimetric and DTM Data.

The Consultant shall perform the following tasks for each requested mapping service:

- a. The Consultant shall provide low altitude aerial mapping to cover an area 1,200 feet wide centered on the roadway unless otherwise specified, with cross flights as directed by the HCRMA.

The Consultant shall follow all standards and specifications in accordance with established guidelines and recommended or approved by the HCRMA.

- b. The Consultant shall prepare planimetric design (DGN, DTM, and TIN) Bentley MicroStation graphics files and orthophotography files covering the specific work location, meeting standards and specifications as required.
 - (1) The Consultant shall collect supplemental planimetric and DTM survey data.
 - (2) The Consultant shall update aerial 2D and 3D mapping with ground surveys.
 - (3) The Consultant shall maintain the current DGN level structure and legend used by TxDOT.
 - (4) The Consultant shall maintain the current DTM level structure and legend used by TxDOT.
 - (5) The Consultant shall use file features and level structures in compliance with TxDOT's current photogrammetry mapping legend.
 - (6) The Consultant shall locate, and field check random points.
- c. The Consultant shall conduct QA/QC for each task performed and prepare a Surveyor's Report.

4. Deliverables for Planimetric and DTMs.

The Consultant shall provide the following:

- a. Certification that the photographs or LiDAR imagery were taken on the date indicated, signed by the airplane pilot or aerial photographer.
- b. The DGN, DTM, and TIN files on a medium and in a format acceptable to the HCRMA, delivered on USB flash-drive or hard-drive.
 - (1) Orthophotography (created using the DTM) delivered on USB flash drive, or hard-drive in tiff format (3 banded) with world files.
 - (2) TxDOT's photogrammetry mapping legend and supplements.
- c. A tabulation showing the field-check points.
- d. QA/QC and Statement of Map Accuracy.
 - (1) Statement of map accuracy.
 - (2) A surveyor's report signed and sealed by an RPLS.

2.9 Horizontal And Vertical Control.

This includes the establishment of horizontal and vertical control for survey projects.

A. Overview of Horizontal and Vertical Control.

A horizontal control survey is performed for the purpose of placing geographic coordinates of latitude and longitude on permanent monuments for referencing lower levels of surveys. A projection is used to place the coordinates on a plane of northing and easting values for simplified measurements. Scale and elevation factors are applied to make the distance measurements applicable to the exact location on the working surface and the type of projection chosen is an “equal angle” type.

A vertical control survey is performed for accurately determining the orthometric height (elevation) of permanent monuments to be used as bench marks for lower quality leveling. Spirit leveling is the usual method of carrying elevations across country from “sea level” tidal gauges. However, Global Positioning System (“GPS”) can be used indirectly but with less accuracy. Height measurements from the ellipsoid (as opposed to the “sea level” geoid) can be determined very accurately with GPS and only GPS. Trigonometric leveling, with a total station, is not acceptable for vertical control work.

B. Definitions.

1. BM means bench mark, which is a relatively permanent object whose elevation above or below an adopted datum is known.
2. CORS means continuously operating reference station, which is a network of the highest quality horizontal stations, forming the National Spatial Reference System (“NSRS”).
3. Control Survey means a survey providing positions (horizontal or vertical) of points to which supplemental surveys are adjusted.
4. Datum means a mathematical model of the earth designed to fit part or all of the geoid.
5. Datum Point Rod or Deep Rod Monument means a monument driven to refusal by a power driver, used for major Project control.
6. GPS means the Global Positioning System, which is based on a constellation of 24 satellites orbiting the earth at a very high altitude.
7. Horizontal Control Survey means placing geographic coordinates of latitude and longitude on permanent monuments.
8. Level 1 survey means RRP, CORS or major control densification.
9. Level 2 Survey means primary Project control.
10. Level 3 Survey means secondary Project control.
11. NGS means National Geodetic Survey
12. RRP means Regional Reference Point, which is a TxDOT Continuously Operating Reference Point.

13. Type II Monument means a disk driven onto a length of 5/8-inch rebar with the hole filled flush with concrete.
14. Vertical Control Surveys means a survey performed for accurately determining the orthometric height (elevation) of permanent monuments to be used as bench marks for lower quality leveling.

C. Procedure for Horizontal and Vertical Control.

1. The Consultant shall establish horizontal and vertical control points, including offsite points. The Consultant shall prepare signed survey control data sheets, a survey control index sheet, and a composite layout of the horizontal and vertical controls, and as directed by the HCRMA.
2. The Consultant shall update existing control information and prepare new survey control data sheets, as directed by the HCRMA, to be included in the construction plan set as described in task 3.9, D.

D. Technical Requirements for Horizontal and Vertical Control.

The Consultant shall adhere to the following technical requirements.

1. Horizontal and vertical controls must be performed under the supervision of a RPLS currently registered with the TBPELS.
2. Horizontal ground control used for design surveys and construction surveys, furnished to the Consultant by the HCRMA or based on acceptable methods conducted by the Consultant, must meet the standards of accuracy required by the HCRMA.

The Consultant shall comply with the standards of accuracy for horizontal control traverses, as described in the *TxDOT Survey Manual* or the *TSPS Manual of Practice for Land Surveying in the State of Texas*, as may be applicable.

3. Vertical ground control used for design surveys and construction surveys, furnished to the Consultant by the HCRMA or based on acceptable methods conducted by the Consultant, must meet the standards of accuracy required by the HCRMA.

The Consultant shall comply with the standards of accuracy for vertical control traverses, as described in the *TxDOT Survey Manual* or the *TSPS Manual of Practice for Land Surveying in the State of Texas*, as may be applicable.

4. Monuments.

The Consultant shall install survey monuments for a horizontal and vertical control survey that are reasonably permanent and substantial. The monuments shall be easily identified and afforded reasonable protection against damage and or destruction.

- a. Offsite primary control points whether set by GPS or conventional survey methods must be set in pairs approximately 2000 feet apart outside of the Project on side roads. Offsite points must be constructed approximately every 2 miles and set approximately 6 inches below natural ground and must be inter-visible between each pair of points.

- b. Secondary control points must be set approximately 6 inches below ground at a maximum distance of 1,500 feet apart.
- 5. Side shots or short traverse procedures for total stations used to determine horizontal and vertical locations must meet the following criteria:
 - a. Short traverses and instrument setups for side shots must begin and end on horizontal and vertical ground control as described above.
 - b. Standards, procedures, and equipment (e.g., GPS Equipment, LiDAR, Total Stations) used must be such that horizontal locations relative to the control can be reported within the specification to allow the Consultant to accurately create the design to the following limits:
 - (1) Bridges and other roadway structures: less than 0.02 feet.
 - (2) Utilities and improvements: less than 0.2 feet.
 - (3) Cross-sections and profiles: less than 0.2 feet.
 - (4) Bore holes: less than 0.5 feet.
 - c. Standards, procedures, and equipment (e.g., GPS Equipment, LiDAR, Total Stations) used must be such that vertical locations relative to the control may be reported to within 0.02 feet.
- 6. The Consultant shall update existing control information and prepare new survey control data sheets, as directed by the HCRMA, to be included in the construction plan set as described below:
 - a. The Consultant shall prepare, sign, seal, and date a survey control index sheet and horizontal and vertical control sheets to be inserted into the plan set.
 - b. The Consultant shall prepare a survey control index sheet that provides an overview of the primary Project control and must include:
 - (1) An unscaled vicinity map showing the general location of the Project in relation to nearby towns or other significant cultural features.
 - (2) A scaled Project map showing the extents of the Project and the location of the primary control points. The map must show street networks, selected street names, control point identification, and significant culture features necessary to provide a general location of the primary control.
 - (3) A table containing the primary control point values including the point number, northing, easting, elevation, stationing, and stationing offset values.
 - (4) Map annotation must include a graphic scale bar, north arrow, and standard HCRMA title block that conforms to applicable TxDOT formatting standards. The title block must identify the HCRMA as the owner and include the county, project or highway name and number, and CSJ or HCRMA project number, as applicable. The

title block must also contain a section for a Texas registered engineer to sign, seal, and date the sheet to include the following statement, "The survey control information has been accepted and incorporated into this PS&E".

The Consultant shall download the required format of the survey control index sheet from the TxDOT website.

- (5) In the title block under the heading "Notes", identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used, and unit of measure. The Consultant shall include a note stating that the coordinates are State Plane and a notation specifying either grid or surface adjusted coordinates.

E. Data Requirement.

The Consultant shall perform post processing of field data, which will be reviewed by the HCRMA. Data processed by standard calculators, computers, and other business hardware and software normally maintained and used by the Consultant will be considered acceptable.

F. Tasks to be Completed.

The Consultant shall perform the following tasks:

1. The Consultant shall establish horizontal and vertical control points, including offsite points. The Consultant shall prepare signed survey control data sheets, a survey control index sheet, and a composite layout of the horizontal and vertical controls, and as directed by the HCRMA.
2. The Consultant shall set primary offsite control points in pairs, approximately 2 miles apart outside of the Project area.
3. The Consultant shall set secondary control points approximately 6 inches below ground at a maximum distance of 1,500 feet apart.
4. The Consultant shall establish horizontal and vertical control from the TxDOT Virtual Reference Station (VRS) Network, and as directed by the HCRMA.
5. The Consultant shall tie and tabulate horizontal and vertical control to other control points and datums in the vicinity established by other sources such as the National Geodetic Survey (NGS), FEMA, TxDOT VRS Network, and as directed by the HCRMA.

G. Deliverables.

The Consultant shall provide the following:

1. A B-size plot and MicroStation graphics files of the index map showing an overall view of the Project and the relationship of the primary monuments and control points established for the Project, signed and sealed by a registered professional land surveyor (RPLS), and as directed by the HCRMA.

2. One A-size data sheet for each control point which shall include, but need not be limited to, a location sketch, a physical description of the point, surface coordinates, the elevation, and the datum used.
3. A USB flash-drive containing the graphics files and scanned images of the control data sheets.
4. A written statement describing the datum used, signed and sealed by a RPLS, along with copies of all relevant NGS and TxDOT data sheets.

TASK 3: UTILITY ACTIVITIES

3.1 Utility Engineering Investigation.

Utility engineering investigation includes utility investigations subsurface and above ground prepared in accordance with ASCE/CI Standard 38-02

- A. [(<http://www.fhwa.dot.gov/programadmin/asce.cfm>)] and Utility Quality Levels.

Utility Quality Levels are defined in cumulative order (least to greatest) as follows:

1. Quality Level D - Quality level value assigned to a utility segment or utility feature after a review and compilation of data sources such as existing records, oral recollections, locations marked by DIGTESS, and data repositories.
2. Quality Level C - Quality level value assigned to a utility segment or utility feature after surveying aboveground (i.e., visible) utility features and using professional judgement to correlate the surveyed locations of these features with those from existing utility records.
3. Quality Level B - Designate: Quality level value assigned to a utility segment or subsurface utility feature whose existence and position is based upon appropriate surface geophysical methods combined with professional judgment and whose location is tied to the Project survey datum. Horizontal accuracy of Designated Utilities is 18" (including survey tolerances) unless otherwise indicated for a specific segment of the deliverable. Quality Level B incorporates quality levels C and D information. A composite plot is created.
4. Quality Level A – Quality level value assigned to a portion (x, y, and z geometry) of a point of a subsurface utility feature that is directly exposed, measured, and whose location and dimensions are tied to the Project survey datum. Other measurable, observable, and judged utility attributes are also recorded (per District Best Practices). The utility location must be tied to the Project survey datum with an accuracy of 0.1 feet (30-mm) vertical and to 0.2 feet (60-mm) horizontal. As test holes may be requested up front or during the Project, test holes done prior to completion of QL D, C, or B deliverables must be symbolized on the QL B deliverable with a call out indicating test holes number. This is in addition to and not in lieu of the test hole.

- B. Utility Investigations Methodology.

1. Utility Investigation Quality Level D

The Consultant shall:

- a. Perform records research from all available resources. Sources include: Texas811, Railroad Commission of Texas (Texas RRC), verbal recollection, as-built information from plans, plats, permits and any other applicable information provided by the utility owners or other stakeholders.
- b. Document utility owners and contact information.
- c. Create a utility drawing of information gathered.

2. Utility Investigation Quality Level C

The Consultant shall:

- a. In combination with existing Quality Level D information, utilize surveyed above-ground utility features and professional judgement to upgrade Quality Level D information to Quality Level C. For those utilities unable to be upgraded, retain as Quality Level D.
- b. Overhead utilities information must be gathered and depicted. Sag elevations of lowest utility must be documented at road crossings, per best practices document.
- c. Storm and sanitary sewer information must be gathered from Level D and upgraded to Level C as possible, unless otherwise directed by the HCRMA.
- d. Mapping of underground vaults may be requested by the HCRMA.
- e. Create composite utility drawing of information gathered.

3. Designate (Quality Level B)

Designate means to indicate the horizontal location of underground utilities by the application and interpretation of appropriate non-destructive surface geophysical techniques and reference to established survey control. Designating (Quality Level B) services are inclusive of Quality Levels C and D.

The Consultant must:

- a. As requested by the HCRMA, compile "as-built" information from plans, plats and other location data as provided by the utility owners.
- b. Coordinate with utility owner when utility owner's policy is to designate their own facilities at no cost for preliminary survey purposes. The Consultant shall examine utility owner's work to ensure accuracy and completeness.
- c. Designate, record, and mark the horizontal location of the existing utility facilities using non-destructive surface geophysical techniques.
- d. Using both active and passive scans to attempt to locate any additional utilities, including unrecorded and abandoned storm and sanitary sewer facilities, at the direction of the HCRMA, may be investigated using additional methods such as rodding that would then classify them as Quality

Level B. A non-water based pink paint or pink pin flags must be used on all surface markings of underground utilities.

- e. Correlate utility owner records with designating data and resolve discrepancies using professional judgment. The Consultant must prepare and deliver to HCRMA a color-coded composite utility facility plan with utility owner names, quality levels, line sizes and subsurface utility locate (test hole) locations. The Consultant and HCRMA acknowledge that the line sizes of designated utility facilities detailed on the deliverable will be from the best available records and that an actual line size is normally determined from a test hole vacuum excavation. A note must be placed on the designate deliverable only that states "lines sizes are from best available records". All above-ground utility feature locations must be included in the deliverable to the HCRMA. This information must be provided in the latest version of OpenRoads civil design system used by the HCRMA. The Consultant shall deliver the electronic file on USB flash drive, as requested by the HCRMA. A hard copy is required and must be signed, sealed, and dated by the registered Consultant overseeing the utility engineering investigation. When requested by the HCRMA, the designated utility information must be overlaid on the HCRMA's design plans.
 - f. Determine and inform the HCRMA of the approximate electronic utility depths at critical locations as determined by the HCRMA. The limits of this additional information should be determined prior to the commencement of work. This depth indication is understood by both the Consultant and the HCRMA to be approximate only and is not intended to be used preparing the ROW and construction plans.
 - g. Provide a monthly summary, with weekly updates, of work completed and in process with adequate detail to verify compliance with agreed work schedule.
 - h. Close-out permits as required.
 - i. Clearly identify all utilities that were discovered from Quality Levels C and D investigation but cannot be depicted in Quality Level B standards. These utilities must have a unique line style and symbology in the designate (Quality Level B) deliverable.
 - j. Comply with all applicable TxDOT policy and procedural manuals.
4. Subsurface Utility Locate (Test Hole) Service (Quality Level A)

Locate is the process used to obtain precise horizontal and vertical position, material type, condition, size, and other data that may be obtainable about the utility facility and its surrounding environment through exposure by non-destructive excavation techniques that ensures the integrity of the utility facility. Subsurface Utility Locate (Test Hole) Services (Quality Level A) are inclusive of Quality Levels B, C, and D.

The Consultant must:

- a. Review requested test hole locations and advise the HCRMA in the development of an appropriate locate (test hole) work plan relative to the existing utility infrastructure and proposed highway design elements.
- b. Coordinate with utility owner inspectors as may be required by law or utility owner policy.
- c. Place Texas 811 ticket 48 hours prior to excavation.
- d. Neatly cut and remove existing pavement material, such that the cut does not exceed 0.10 square meters (1.076 square feet) unless unusual circumstances exist.
- e. Measure and record the following data on an appropriately formatted test hole data sheet that has been sealed and dated by the Consultant:
 - (1) Elevation of top of utility tied to the datum of the furnished plan.
 - (2) Minimum of two benchmarks utilized. Elevations must be within an accuracy of 15mm (.591 inches) of utilized benchmarks.
 - (3) Elevation of existing grade over utility at test hole location.
 - (4) Horizontal location referenced to Project coordinate datum.
 - (5) Outside diameter of pipe or width of duct banks and configuration of non-encased multi-conduit systems.
 - (6) Utility facility materials.
 - (7) Utility facility condition.
 - (8) Pavement thickness and type.
 - (9) Coating/wrapping information and condition.
 - (10) Unusual circumstances or field conditions.
- f. Excavate test holes in such a manner as to prevent any damage to wrappings, coatings, cathodic protection, and other protective coverings and features. Water excavation may be utilized only with prior written approval from the HCRMA and, when the work is within TxDOT right-of-way, the appropriate TxDOT district office.
- g. Be responsible for any damage to the utility during the locating process. In the event of damage, the Consultant must stop work, notify the appropriate utility facility owner, the HCRMA, and appropriate regulatory agencies. The regulatory agencies include: the Railroad Commission of Texas and the Texas Commission on Environmental Quality. The Consultant shall not resume work until the utility facility owner has determined the corrective action to be taken. The Consultant is liable for all costs involved in the repair or replacement of the utility facility.
- h. Back fill all excavations with appropriate material, compact backfill by appropriate mechanical means, and restore pavement and surface material. The Consultant is responsible for the integrity of the backfill and surface restoration for a period of three years.

- i. Furnish and install a permanent above-ground marker (as specified by the HCRMA, directly above center line of the utility facility.
- j. Provide complete restoration of work site and landscape to equal or better condition than before excavation. If a work site and landscape is not appropriately restored, the Consultant shall return to correct the condition at no extra charge to the HCRMA.
- k. Plot utility location position information to scale and provide a comprehensive utility plan signed and sealed by the responsible professional engineer. This information must be provided in the latest version of MicroStation and be fully compatible with the OpenRoads civil design system used by the HCRMA. The electronic file will be delivered on USB flash drive as requested. When requested by the HCRMA, the locate information must be over laid on the HCRMA's design plans.
- l. Return plans, profiles, and test hole data sheets to the HCRMA. If requested, conduct a review of the findings with the HCRMA.
- m. Close-out permits as required.

VI. Submittal Requirements

Consultant acknowledges and accepts that any costs incurred from the Consultant's participation in this RFQ shall be at the sole risk and responsibility of the Consultant.

Each SOQ must address the following issues using the enumeration below:

1) FIRM INFORMATION.

- a) Consultant firm name, including the addresses of all offices identifying in which office the work will be performed.
- b) Name, position, phone, email, and fax numbers of contact person.
- c) Names of principals in the firm; years consultant has been in business.
- d) Confirmation that the Company is in good standing with the State of Texas.
- e) Number of staff by discipline in the office that will be working on Project, copies of their resumes and appointed Project manager for proposed Projects.
- f) Current workload of the staff and personnel that would be responsible for the Project(s).
- g) Listing of all pending litigation against or involving the firm or its agents or employees with respect to any work performed by the firm, its employees, or its subcontractors.
- h) Amount of general and professional liability insurance coverage carried by the company. (HCRMA requires a minimum of \$1,000,000.00 in Commercial General Liability insurance and \$2,000,000.00 in Professional Liability coverage at time of contract execution.)
- j) Evidence of registration with the Texas Board of Professional Engineers and Land Surveyors.
- k) Executed Architect-Engineer Qualifications (Standard Form 330).

2) REFERENCES.

- a) Provide at least three related ROW and design surveying services projects of similar scope and complexity with TxDOT, USACE, Toll Authority/Regional Mobility Authority Projects of a transportation nature conducted within last five (5) years. Include detailed description of scope of work and timelines and contact information (email and telephone) for the owner's project managers.

3) SUBCONTRACTORS.

- a) Names, disciplines, and consultant profiles (with resumes listed under key personnel) for any sub-consultants (if any) proposed for the Project.
- b) [Disadvantaged Business Enterprise (DBE) and Affirmative Action status of consultant and sub-consultants.]

4) ABILITY TO PERFORM THE WORK.

- a) Describe the Consultant's proven ability to deliver quality services on time and at a fair and reasonable price.
- b) Describe the Consultant's strategy for delivering the services required under this RFQ.

5) OTHER ITEMS.

- a) Any other items, which the consultant deems necessary, excluding cost proposals,

6) REQUIRED VERIFICATIONS AND INFORMATION.

- a) Describe Prime Consultant's ethics and compliance policy, ability to maintain ethical standards and industry best practices as it pertains to perceived or actual conflicts of interest in assigning tasks to Prime or Subconsultant staff. Acknowledge that Prime Consultant will report to HCRMA in writing within five working days any behavior that seriously and directly affects its responsibility to the HCRMA (criminal convictions, conflicts of interest, bribery, payment of kickbacks, etc.). Confirm the Prime Consultant has a written code of conduct for its employees.
- b) Consultants are required to file form CIQ Conflicts of Interest Questionnaire for Vendor and Other Persons Doing Business with Local Governmental Entity, with their proposal. See Attachment "A".
- c) The Prime Consultant is required to make certain verifications or explain why it is exempt from such verifications under Texas law:
 - (i) No-Boycott Israel Verification. Pursuant to Section 2271.002, Texas Government Code, the Consultant hereby represents that it, and its parent company, wholly- or majority-owned subsidiaries, and other affiliates, if any, do not Boycott Israel and, subject to or as otherwise required by applicable Federal law. The Consultant agrees not to Boycott Israel during the term of this Agreement. For purposes of this Section, "Boycott Israel" shall have the meaning given such term in Section 808.001, Texas Government Code. The Consultant understands "affiliate" for this section to mean an entity that controls, is controlled by, or is under common control with the Consultant and exists to make a profit. The term does not include a sole proprietorship.](ii) Anti-Boycott Energy Companies Verification. Pursuant to Section 2276.002, Texas Government Code, the

Consultant hereby represents that it and its parent company, wholly- or majority-owned subsidiaries, and other affiliates, does not boycott energy companies, and will not boycott energy companies during the term of the contract. For purposes of this Section, "Boycott Energy Company" shall have the meaning given such term in Section 809.001, Texas Government Code.

- (iii) Non-Discrimination of the Firearm Industry Verification. Pursuant to Section 2274.003, Texas Government Code, the Consultant hereby represents that it and its parent company, wholly- or majority-owned subsidiaries, and other affiliates, does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and will not discriminate during the term of the contract against a firearm entity or firearm trade association. For purposes of this Section, "discriminate against a firearm entity or firearm trade association" shall have the meaning given such term in Section 2274.001, Texas Government Code.
- (iv) Certification Regarding Business with Certain Countries and Organizations. The Consultant and the person or persons executing the contract or contract amendment on behalf of it, or respectively representing themselves as executing the contract or contract amendment on behalf of the Consultant (the "Signing Entity"), hereby acknowledge that (i) the Signing Entity does not engage in business with Iran, Sudan, or any foreign terrorist organization and (ii) the Signing Entity is not named on a list prepared and maintained by the Texas Comptroller of Public Accounts under Section 2252.153 or Section 2270.0201, Texas Government Code, and posted on any of the following pages of the Comptroller's website:
 - i) <https://comptroller.texas.gov/purchasing/docs/sudan-list.pdf>
 - ii) <https://comptroller.texas.gov/purchasing/docs/iran-list.pdf>
 - iii) <https://comptroller.texas.gov/purchasing/docs/fto-list.pdf>
- v) Non-Discrimination. In the execution of an agreement with the HCRMA, Consultant, its respective employees and others acting by or through them shall comply with all federal and state policies and laws prohibiting discrimination, harassment, and sexual misconduct. Any breach of this covenant may result in termination of the agreement.

All information, documentation, and other materials submitted in response to this solicitation are considered non-confidential and/or non-proprietary and are subject to public disclosure under the Texas Public Information Act after the solicitation is completed. The HCRMA complies with all statutes, court decisions, and opinions of the Texas Attorney General with respect to disclosure of RFQ information.

VII. Evaluation Process

After the deadline for receipt of SOQ's, an evaluation committee made up of the HCRMA's designated representative(s) will review all proposals utilizing the proposal requirements and

evaluation criteria noted below. Consultants and their representatives are strictly prohibited from contacting the evaluation committee members as well as HCRMA Board Members during the evaluation period as it will result in an automatic rejection of their SOQ.

Based on the committee's review, it is expected that several Consultants may be short-listed for further consideration and may be required to submit supplemental information and/or participate in interviews with the committee. Additionally, after review of the findings of the committee by the HCRMA Board of Directors, the short-listed Consultants may be required to make a formal presentation before the HCRMA Board of Directors.

After selecting the most qualified Consultant(s), the HCRMA will negotiate a suitable fee schedule for the services to be provide by the Consultant(s).

VIII. Evaluation Criteria

The following criteria and rating points (100 points maximum) will generally be used to evaluate the responsive SOQ:

1. Consultant's Project Manager capability and relevant experience required to perform the management of the surveying services and required documentation to deliver the Project. (0-30 Points)
2. Consultant's key personnel's professional background, experience for the proposed Project. (0-30 Points)
3. Minimum of three Consultant's reference projects of comparable scope and complexity that can confirm the Consultant's ability to perform the required work to deliver the Project successfully. (0-40 Points)

By submitting its SOQ in response to this RFQ, Consultant accepts the evaluation process and acknowledges and accepts that determination of the "most qualified" Consultant(s) will require subjective judgments by the committee. Determinations by the committee will be subject to routine administrative review by the HCRMA's executive officers but, once a selection is announced, it will not be subject to further review.

IX. Contract Award

It is estimated that this Project will be issued and awarded once the authorization is given by the HCRMA Board of Directors and/or HCRMA Executive Director to negotiate a contract. Therefore, the intention of developing ratings of the interested Consultants through the proposed evaluation process is to issue award to the selected Consultant(s)_ based on qualifications rating/rank, current workload at time of selection, and knowledge of the work that is necessary for the Project. The HCRMA does not guarantee that a contract will be awarded as a result of the RFQ. In the event that a contract is awarded, but the contract is not executed, the HCRMA does not guarantee that the contract will be re-awarded. The award date for this contract is anticipated in Q4 of 2026. No work may begin on the Project until contract is signed and a notice to proceed is issued.

The HCRMA reserves the right to select multiple Consultants for this work.

This solicitation and a selected Consultant's response will be included in the contract documents. The requirements and specifications contained in this RFQ, together with all attachments and addenda, will be incorporated into and made an attachment to the contract upon execution.

X. Compensation

HCRMA uses Qualification-Based Selection (QBS) procedures to procure architectural, engineering and surveying services. Under QBS, HCRMA selects Consultants based on their qualifications. The Authority will not request or determine any selection based on cost. Cost is negotiated once a firm(s) is selected.

This is an Indefinite Delivery, Indefinite Quantity (IDIQ) contract with services to be provided for a single task or for multiple tasks under the Project and is anticipated to be a unit cost contract. The solicitation describes the typical work types to be performed under the contract. The original contract period will be for a maximum of five years from the execution date. With an option for time extensions as the Project requires and if both the HCRMA and the Consultant agree.

XI. Inquiries

RFQ packets may be obtained from the HCRMA website (www.hcrma.net) where a CivCAST link will be posted. Any informational questions regarding this RFQ may be directed to Ruben Alfaro, PE, CFM, PMP Development Engineer, in writing via CivCAST no later than 4:00 PM, October 22, 2026.

Discrepancies, omissions or doubts as to the meaning of RFQ documents shall be communicated in writing to the HCRMA for interpretation. Any responses to inquiries, clarifications, or interpretations of this RFQ that materially affect or change its requirements will be posted by the HCRMA as a written addendum. All such addenda issued by the HCRMA before the proposals are due become part of the RFQ. Consultants shall acknowledge receipt of and incorporate each addendum in its SOQ. Consultants shall be required to consider only those clarifications and interpretations that the HCRMA issues by addenda. Interpretations or clarifications in any other form, including oral statements, will not be binding on the HCRMA, and should not be relied on in preparing SOQ. It is the responsibility of all Consultants to check the status of formal addenda five calendar days before the submittal deadline.

XII. Disqualification

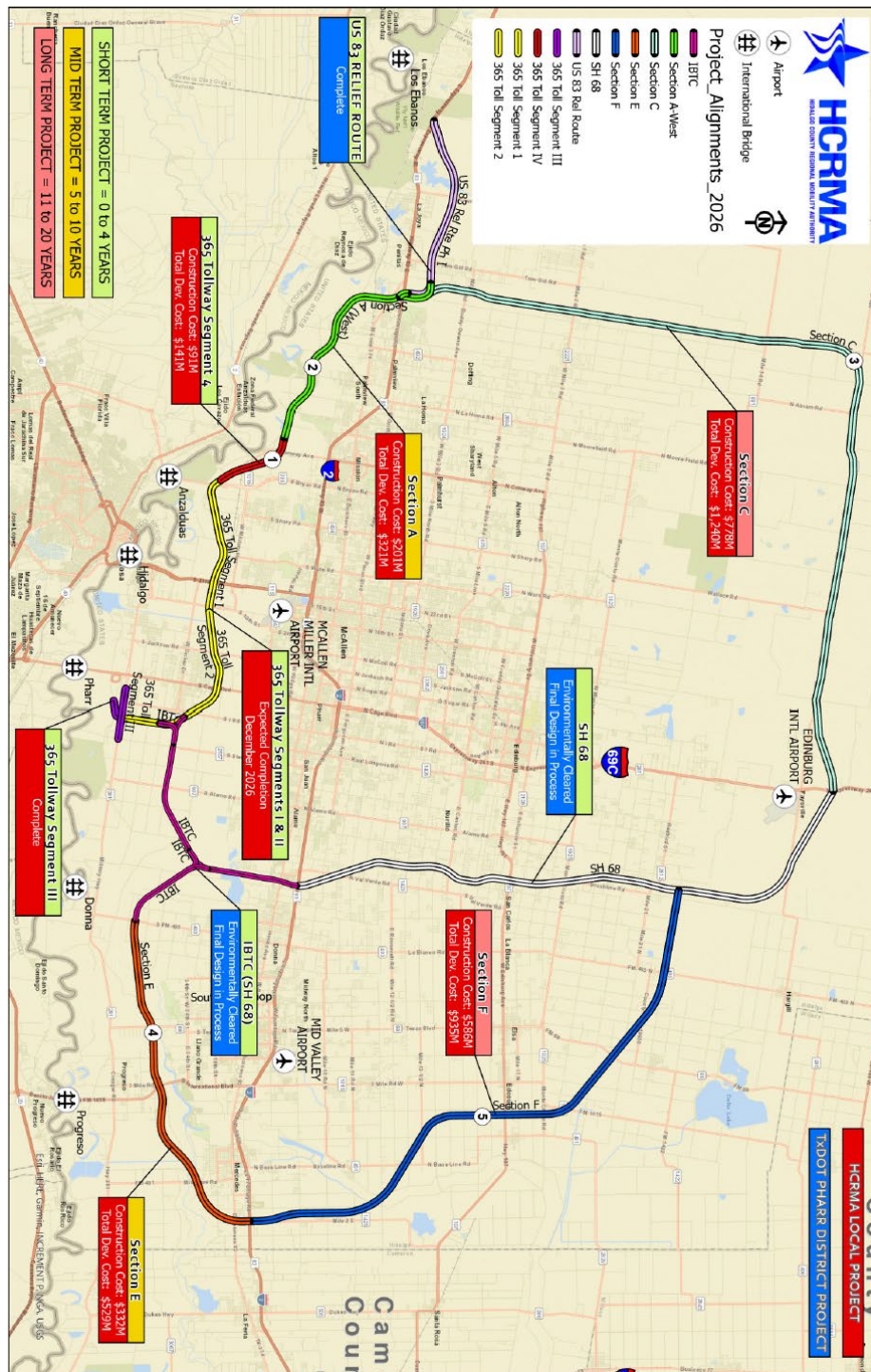
Consultants shall restrict all contact with the HCRMA Board of Directors or any evaluation committee member and direct all questions regarding this RFQ, including questions regarding terms and conditions and technical requirements, to the point of contact through CivCAST. Failure to comply with this procedure may result in disqualification.

XIII. Response Deadline

Responses to the RFQ must be received at the office of Daniel Garcia, P.E., Executive Director, Hidalgo County Regional Mobility Authority (HCRMA), 203 W. Newcombe Avenue, Pharr, Texas 78577, by 4:00 PM, October 30, 2026, for consideration. Each firm should submit a PDF version

(through CivCAST) and ten (10) complete hardcopies of their proposal to the HCRMA no later than this date and time in a sealed envelope clearly marked with the following: **“SOQ – INDEFINITE DELIVERY – INDEFINITE QUANTITY ROW AND DESIGN SURVEYING SERVICES ”.**

EXHIBIT “A”



APPENDIX "A"

FORM CONFLICTS OF INTEREST QUESTIONNAIRE FOR VENDOR AND OTHER PERSONS DOING BUSINESS WITH LOCAL GOVERNMENT ENTITY (CIQ)

CONFLICT OF INTEREST QUESTIONNAIRE For vendor doing business with local governmental entity		FORM CIQ
This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session. This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a). By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code. A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.	OFFICE USE ONLY	
1 Name of vendor who has a business relationship with local governmental entity.	Date Received	
2 ☐ Check this box if you are filing an update to a previously filed questionnaire. (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)		
3 Name of local government officer about whom the information is being disclosed. _____ Name of Officer		
4 Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary. A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor? ☐ Yes ☐ No B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity? ☐ Yes ☐ No		
5 Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.		
6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).		
7 _____ _____ Signature of vendor doing business with the governmental entity Date		