Amendment
clarification of questions related to
Request for Proposals
CTUIR LiDAR and Orthomimagery Data Collection 2020

CONTRACTORS INVITED TO BID THE PROJECT: All licensed contractors with and without Indian preference.

Project Summary: The CTUIR is accepting proposals for collection, processing and delivery of LiDAR data, orthoimagery and land cover classification dataset of areas of interest to the Umatilla Indian Reservation, located in Umatilla County, Oregon.

Administrative Contact: Becky Burke (beckyburke@ctuir.org) 541-276-8221
Technical Contact: Stacy Schumacher (stacyschumacher@ctuir.org) 541-429-7454

Bids will be received at the following mailing address:

CTUIR - GIS
Attn: Stacy Schumacher, GIS Program Manager
46411 Timine Way
Pendleton, OR 97801
541-276-8221

Until 4:00 p.m., prevailing local time January 17th, 2020. Bids must be in a sealed envelope marked with Sealed Bid. Bids will not be accepted if they are turned in later than the deadline specified above.

Critical Dates:
Request for Clarification Deadline: January 23, 2020
Proposal Submission Deadline: January 17, 2020
Tentative Award Selection (est.): February 3rd 2020
Contract Award (est.): February 10th 2020
Project Initiation (est.): June 15th through July 30th 2020
Project Completion: October 30th, 2020
Answers to questions on the RFP

1. Tentative Award Selection is estimated as February 3rd, 2020.

2. Project completion date is October 30th, 2020.

3. A shapefile of the areas of interest can be provided to potential contractors by emailing a request to stacyschumacher@ctuir.org

4. Minimum land cover classifications are a modification of 16 used by EPA in their Report on the Environment https://www.epa.gov/roe/ The 16 land cover classes were aggregated into seven major land cover types: forest, herbaceous/grassland, shrubland, developed, agriculture, wetlands, and other (includes ice/snow, barren areas, and open water).

5. A minimum ground sample distance for the aerial imagery was not identified in order to give the potential contractor the opportunity to provide the best possible resolution within their capabilities.
Request for Proposals

Confederated Tribes of the Umatilla Indian Reservation

46411 Timine Way, Pendleton, OR 97801

CTUIR LiDAR and Orthoimagery Data Collection

Contractors Invited to Bid the Project: All licensed contractors with and without Indian preference.

Technical Contact: Stacy Schumacher (stacyschumacher@ctuir.org) 541-429-7238

Administrative Contact: Becky Burke (beckyburke@ctuir.com) 541-429-7164

Critical Dates:
Request for Clarification Deadline: January 23, 2020
Proposal Submission Deadline: January 17, 2020
Tentative Award Selection (est.): February 3rd 2020
Contract Award (est.): February 10th 2020
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Project Completion: October 30th, 2020
Request for Proposal
Part I – General Information and RFP Process
LIDAR and Orthoimagery Data Collection within the Treaty area of the CTUIR

1.1 Project Purpose
The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) utilizes traditional provisions or First Foods for providing the framework in natural resource management (Quaempts el al. 2018). A major component of preserving First Foods is protecting and enhancing the habitats which sustain them. The CTUIR Department of Natural Resource Forestry Program are implementing forest management projects on the Umatilla Indian Reservation.

The CTUIR is accepting proposals for collection, processing and delivery of LIDAR data, orthoimagery and land cover classification dataset of areas within the Umatilla Indian Reservation, located in Umatilla County, Oregon.

1.2 Scope of the RFP
This RFP is to acquire airborne LiDAR data of 4 timbered areas within the surveyed treaty area and orthoimagery of the entire treaty area for the Confederated Tribes of the Umatilla Indian Reservation. The data will be used for updating forest inventory and developing a land cover classification dataset. The final size of the area to be surveyed is dependent on acquisition costs but includes roughly 99 square miles of 4 areas within the surveyed treaty area and roughly 731 square miles of orthoimagery. Data products to deliver include digital elevation models (DEMs) of the bare earth ground surface and the upper-most surface. A classified point cloud defined by vegetation cover, roads, building and other structures. High resolution, high geographic accuracy aerial imagery organized by townships if too large to provide an orthomosaic. It is desired to have a dataset as a geodatabase identifying 7 major land cover classifications for the area of imagery. A report including methods, results, and accuracy assessment and appropriate metadata (minimum FGDC standard) must accompany the delivered data.

This Request for Proposals ("RFP") provides the specific services to be contracted as well as due dates, information concerning the preparation and submittal of Proposals, an explanation of how Proposals will be evaluated, and terms and conditions of the contract that may be awarded as a result of the RFP.

1.3 Project Timeline:
The data collection period for this effort will be during peak vegetation growth on days with no cloud cover which could extend from June 15th to July 30th, 2020. Post survey data QA\QC and analysis will be completed within 60-90 days of the date of collection. Final delivery of data from the contractor to the CTUIR shall occur before October 30th, 2020.

1.4 Closing Date for Submissions
The closing date for submissions will be on January 17th at 4:00 p.m., prevailing local time. Proposals received after the specified time will not be considered. Contractors must submit one electronic copy and four (4) printed copies of their Proposal to:
1.5 In Writing
Proposals shall be prepared by printer or typewriter. No oral, handwritten, telephone, or facsimile Proposals will be accepted. Please provide 4 printed copies and a digital file of the proposal.

1.6 Necessary Information
Proposals must contain all information requested in the RFP. The CTUIR will not consider additional information submitted after the Closing Date and may reject incomplete proposals.

1.7 Cost of Proposals
The CTUIR shall not be liable for any expenses incurred by Contractors in either preparing or submitting Proposals, evaluation/selection, or contract negotiation process, if any.

1.8 Request for Clarification
Contractors may submit a written request for clarification, no later than seven (7) days prior to the Closing Date specified in Part 1.4. The CTUIR will not consider any requests submitted after the time period specified above. Questions regarding the RFP or request for clarification shall be sent to the RFP contact listed in Part 1.4.

1.9 Response to Requests for Clarification
The CTUIR will promptly respond to each properly submitted written request for clarification.

1.10 Proposals Constitute Firm Offers
Submission of a Proposal constitutes Contractor’s affirmation that all terms and conditions of the Proposal constitute a binding offer that shall remain firm for a period of ninety (90) days from the Closing Date.

1.11 Signature Required; Proposer Affirmations
An authorized representative of the Contractor must sign the original Proposal in ink. Contractor’s signature and submission of a signed Proposal in response to the RFP constitute Contractor’s affirmation that the Contractor agrees to be bound by the terms and conditions of the RFP and by all terms and conditions of the Contract awarded.

1.12 Type of Contract
The CTUIR shall execute a Subcontract for Technical Services.

1.13 Confidential Information
Proposals are confidential until the evaluation and selection process has been completed and the CTUIR has issued a notice of tentative award. Only the total price will be made publicly available at the bid opening. After notice of tentative award, proposals may be available for public inspection. Any information a Contractor submits in response to the RFP that the Contractor considers a trade secret under ORS 192.501(2) or confidential
proprietary information, and Contractor wishes to protect from public disclosure, must be clearly labeled with the following:

“This information constitutes a trade secret under ORS 192.501(2) or confidential proprietary information and is not to be disclosed except in accordance with the Oregon Public Records Law, ORS Chapter 192.”

1.14 Requests for Further Clarification of Proposals
The CTUIR may request additional clarification from Contractors on any portion of the Proposal.

1.15 Cancellation of RFP
The CTUIR may cancel this RFP at any time upon finding that it is in the CTUIR’s best interest to do so.

1.16 Rejection of Proposals
The CTUIR may reject a particular Proposal or all Proposals upon finding that it is in the CTUIR’s best interest to do so.

1.17 Tentative Award and Contract Negotiations
The CTUIR will provide a written tentative award notice to the highest-ranking Contractor, selected based on the process described in Part IV. The CTUIR will enter into negotiations with the highest ranking Contractor on the following contract terms: (a) Contract tasks; (b) Staffing; (c) Performance Schedule; and (d) A maximum, not to exceed Contract price, which is consistent with the Quote and fair and reasonable to the CTUIR, taking into account the estimated value, scope, complexity, and nature of the services to be provided. The CTUIR may also negotiate the statement of work and, at its discretion, add to the scope of services based on a Contractor’s recommendations (but still within the scope of this RFP) or reduce the scope of services.

Final award will be contingent upon successful negotiation of a contract within 14 days after the tentative award.

The CTUIR may terminate negotiations with the highest ranked Contractor if they fail to result in a contract within a reasonable time. The CTUIR will then enter into negotiations with the second ranked Contractor, and if necessary the third ranked Contractor. If the second or third round of negotiations fails to result in a contract, the CTUIR may formally terminate the solicitation.

1.18 Protest of Tentative Award Selection
A notification of tentative award to the highest-ranked Contractor will be mailed to all Contractors that submitted a Proposal in response to this RFP. A Contractor who claims to have been adversely affected by the selection of a competing Contractor shall have seven (7) calendar days after receiving the notice of selection to submit a written protest of the selection to the RFP contact. The CTUIR will not consider protests submitted after the date established in this Part. The protest must specify the grounds upon which the Protest is based.
1.19 Award
After expiration of the seven (7)-calendar day selection protest period and resolution of all protests, the CTUIR will proceed with final award.

1.20 Investigation of References
The CTUIR reserves the right to investigate the references and past performance of any Contractor with respect to its successful performance of similar services, compliance with RFP and contractual obligations, and its lawful payment of suppliers, sub-contractors, and employees. The CTUIR may postpone award or execution of the contract after the announcement of the apparent successful Contractor in order to complete its investigation. The CTUIR reserves the right to reject any proposal at any time prior to the execution of any resulting contract.

1.21 Amendments
The CTUIR reserves the right to amend the resulting Contract from this RFP. Amendments could include but are not limited to, changes in the statement of work, extension of time and consideration changes for the Contractor. All amendments shall be in writing and signed by all approving parties before becoming effective. Only the CTUIR has the final authority to execute changes, notices or amendments to Contract.

PART II – SERVICES TO BE PROVIDED

Scope of Work

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) is requesting proposals for collection, processing and delivery of terrestrial LiDAR to supplement existing LiDAR datasets and 4-band orthoimagery of areas of the surveyed treaty. The goal of the effort is to acquire data to update timber stand boundary information, habitat change detection, detect historical roads/skid trails and provide a visual inspection of dead or dying timber. A second goal is to acquire high resolution, high accuracy orthoimagery to update CTUIR's GIS library. The CTUIR requests that the contractor develop and submit bids on LIDAR data collection within the following four areas (Appendix A):

1. An area north of the Umatilla river ~ 22.7 miles²
2. an area south of the Umatilla River ~44 miles²
3. An area of 3.5 sections along and north of McKay Creek.
4. An area of ~44 miles² of the Johnson Creek restoration properties
5. And orthoimagery of 731 miles² of the CTUIR treaty area (Appendix B).

Data products are to include digital elevation models, bare earth ground surface, highest-hits surface, intensity images, classified point cloud comprised of modified ASPRS LiDAR point classes, 4-band digital orthoimagery and a vector data type landcover analysis classification. Post processing to include a feature class of polygons for the area of imagery of the following categories; coniferous forest stand, riparian mixed-forest stands, shrublands, grasslands, bare earth, buildings, road, water, unclassified is a desired product.
ESRI shape files of desired area of coverage are available from the CTUIR to assist the contractor in planning.

Proposals should clearly explain the methodology your firm proposes to use to achieve the required results and should be clearly described (using tables and figures) within the proposal. Proposals must include all aspects of survey control, data acquisition and analysis, and Quality Control procedures used to collect the data and correct the data. Describe the attributes of the data as it is to be acquired, including: laser pulse repetition rate; scan pattern, angle and worst-case spacing of laser shots cross and along-track within a swath; number of GPS base stations used for accuracy and maximum distance from a station allowed. All proposals should state an estimate of the Root Mean Square Error (RMSE) for the project in terms of accuracy for the topographic data.

The data collection period of this effort could extend from June 15th to July 30th, 2020. This date range allows for the acquisition of data during peak growing season and cloud free days. Post survey data, QA/QC and analysis should be completed within 60 – 90 days after data collection. Final delivery of data from the contractor to the CTUIR shall occur before October 30th 2020, the anticipated end date of the contract.

Project Specifications

Proposals should include a clear strategy to implement the data collection. It is desired that a standard high-resolution sensor be utilized to capture ≥8 pulse/m² for terrestrial lidar data. The proposal should clearly identify solutions for classification of the point cloud and development of land cover geographic dataset.

Proposals should clearly explain the methodology your firm proposes to use to achieve the required results and should be clearly described (using tables and figures) within the proposal. Proposals must include all aspects of survey control, data acquisition and analysis, and Quality Control procedures used to collect the data. Describe the attributes of the data as it is to be acquired, including: laser pulse repetition rate; scan pattern, angle and rate; laser footprint diameter on the ground; number of returns per shot collected (ie. first and last, or multiple); laser swath width, overlap between adjacent laser swaths, average and worst-case spacing of laser shots cross and along-track within a swath; number of GPS base stations used for accuracy and maximum distance from a station allowed. All proposals should state an estimate of the Root Mean Square Error (RMSE) for the project in terms of accuracy for the topographic data and imagery.

For first and last, or multiple returns per shot, state the minimum resolvable distance between returns. States of the amplitude of the laser return and scan angle are to be included as a part of the delivered data. For orthoimagery state the resolution, cell size, data type upon delivery, pixel depth and type and compression if used. List the software used to process the data, include the company name, version used and platform/operating system.

Required Equipment Standards

NIR LiDAR sensor that is 8-bit intensity and a resolution of ≥8 pulse/m².
4-band orthoimagery that is large image format digital camera in 4 bands (R,G,B and NIR)
Minimum Equipment Specifications

Proposed equipment should be sufficient to meet the minimum equipment requirements to complete the necessary work.

Materials and Services Furnished by the Contractor

The Contractor must supply all equipment and experienced operators necessary to complete the work specified in the contract. In addition the contractor must furnish and cover:

1. All costs of equipment, operation and transportation.
2. An experienced, qualified supervisor for crew.
3. All required safety equipment and training for crew members in use of tools.
4. Designated representative to supervise contract operations and represent Contractor.

Regulations and Permits

The contractor shall, without additional expense to the CTUIR, be responsible for complying with any Federal, State, and/or Tribal Laws, Codes, and Regulations applicable to the performance of the work.

Team Competencies

The following are expected minimum consultant team competencies. One person might fill more than one role, and it is expected that proposals will include additional competencies as required.

• Project Manager
• GIS Manager

Timeline and Deliverables

The following are expected minimum deliverables and a proposed partial timeline. Final deliverables and timeline will be negotiated in the contracting process, and proposals that present creativity, efficiency, and/or novel approaches are strongly encouraged. Communication is highly encouraged throughout the data collection process.

a. The scheduled date for completion of the Project is October 30\textsuperscript{th}, 2020. The data will need to be acquired within the work window, on the average year this window should be no earlier than June 15\textsuperscript{th}, 2020 and no later than July 30\textsuperscript{th} 2020, with the goal of collecting data at peak vegetation growth on a cloud free day. The Contractor must complete all aspects of the work on, or before this completion date, unless completion is delayed due to conditions mutually agreed upon and designated in writing by the Contractor and the CTUIR.

b. Once work is commenced, project work shall be ongoing. Work shall commence on a Monday-Friday schedule unless prior arrangements are made with the CTUIR. Any delay in daily production will be discussed and agreed upon through the CTUIR.

c. Work shall not commence until the work schedule is approved, then shall be continuous, unless weather conditions or circumstances beyond Contractor's control prevent working. The CTUIR must approve deviation from the approved work schedule in writing.

d. Minimum deliverables for LiDAR should include: classified point cloud with all returns, surface models (bare earth DEM, 1m resolution, ESRI Grid Format; highest hit DEM, 1m resolution, ESRI Grid Format; intensity images, 1/2m resolution, GeoTiff Format), Vectors (survey boundary, shapefile format and tile delineation, shapefile format). (See Schedule C)
e. Minimum deliverables for orthoimagery should include: minimum area identified with enough buffer for quality assurance of the area of interest of high resolution, high accuracy 4 band imagery (R,G,B and NIR) orthomosaiced GeoTIFF format with no data collars and Vectors (survey boundary, (shapefile format)

f. Minimum deliverables for land cover classification should include: polygon vector feature dataset of land cover classified for the entire area of orthoimagery with metadata. Minimum size area for cover class is 1 acre. Minimum cover classes are the aggregated 7 classes which include forest, herbaceous/grassland, shrubland, developed, agriculture, wetlands, and other (includes ice/snow, barren areas, and open water).

f. Final reporting should include methods, results, accuracy assessment and FGDC compliant metadata.

Payment

One lump sum request for payment per bid item may be submitted to the CTUIR upon successful completion of the project bid item. Thirty percent of the total contractual cost will be withheld until final completion of the project. The Contractor shall contact the CTUIR to request final inspection of work for payment. The CTUIR will make the final payment within 30-60 days of receipt of an invoice following a final inspection that approves all work.

PART III - Proposal Requirements

For the purpose of this RFP, each interested Contractor will submit a proposal package to the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Department of Natural Resources, Forestry Program that includes the following sections and tabbed with the following headings.

1. COVER LETTER

A cover letter must express the Contractor's interest in the project and commitment to the obligations expressed in the RFP. This letter should include the original signature of an authorized representative of the Contractor and indicate that the Contractor accepts all of the terms and conditions contained in the RFP.

2. FIRM SUMMARY

The Contractor will provide general information regarding their particular firm. This should include information about the company size, location, contracting experience within the region, areas of expertise and types of services, staff longevity, staff capabilities and training, and experience with natural resource restoration work and associated construction.

3. ORGANIZATION STRUCTURE

Identify the individuals responsible for managing the project, conducting specific project tasks, and their experience conducting those tasks for your firm. The Contractor should also include an organizational chart showing lines of communication and decision-making hierarchy as well as any
sub-contractors. If a team of individuals from multiple contracting firms are assembled, adequately describe the role of each team member.

4. FIRM QUALIFICATIONS AND EXPERIENCE

The proposal will list the qualifications and relevant project development experience of the Contractor and each team member in relationship to completing projects of similar nature and size.

Please identify a minimum of three LiDAR acquisition projects that are similar to the proposed projects which have been successfully completed within the last five years. Provide a brief description of each project, including the complexity of the project, size and dollar amount of project, completion date of project, and references for each of the projects. Reference information shall include the name and phone number of owner's representatives for the particular projects.

5. PROPOSED APPROACH OF SCOPE OF WORK

Describe the approach the Contractor proposes to complete the project as defined in the RFP and specifications. The contractor should provide enough detail in the proposed approach to fully articulate the Contractor's understanding of the scope and complexities of the project. Describe the method and approach the consultant proposes in order to complete the tasks outlined below from conception through final design. This section should include a description of the steps used to collect necessary data and information and the analysis and summary that will be completed.

6. PROJECT SCHEDULE AND ITEMIZED COST

Provide a detailed schedule describing all significant work tasks, how the individual tasks will be completed, the sequence in which they are to be performed, and the workers and equipment to be assigned, as well as a schedule for the overall project. Provide evidence that adequate management effort, support staff, technical compliance, and resources will be committed to the timely completion of the project. We will assess the realism of proposed completion dates, given the resources to be devoted to the work.

Your proposals should specifically address the following:

- Proposed starting and completion dates;
- Type and size of all equipment to be used, including any electronic data collection devices, and any other equipment to be used on site;
- Project managers, operators and workers and their duties on site;
- Describe the order you plan on completing the work outlined in the contract, and,
- A contingency plan if the contract time runs short.

Provide a lump sum line-item cost for each element of this proposal, provide a cost per acre for the Terrestrial NIR LiDAR Data collection, and 4-Band Orthoimagery. Provide a lump sum line-item cost for each data layer, include land cover classification and DEM to be delivered with the raw data and report. The total price and the cost per acre prices for this work will be considered as part of the evaluation factors. The CTUIR project staff welcomes cost-effective alternatives to expedite the proposed implementation schedule; these alternatives must be provided as an additional line listed below the original cost of the completed proposal. If approved by CTUIR, the project design and specifications will be revised through design change and/or field change notices as applicable.
7. REFERENCES and PAST PERFORMANCE

References are required from at least three (3) projects similar to the proposed project. Include project name, contact name, address, and telephone number, a description of the project (i.e. type of work, location, size of the project and key personnel), project completion date, and the relationship of the contact person to the project referenced.

Past Performance. List all contracts for the past three years. To assess the past performance selection criteria, the CTUIR will assess such attributes as your history of cooperation with clients, and your history of performing quality and timely work. If the offeror has no history of past performance, a neutral rating will be given.

PART IV – Selection Criteria

I. COST: 50 points
   a. Lowest price will be considered for addressing all questions and completion of all tasks (25); and,
   b. A cost-benefit matrix will be applied for the remaining half of these points (25).

II. Adequacy of Technical Proposal: 75 points
   a. Proposal content and applicability of the approach for addressing and completing tasks (25);
   b. Creative, efficient, and/or novel approaches presented (25);
   c. Approach explicitly connected to project goal/objectives (15); and,
   d. Adequacy of survey, modeling, and data collection in the proposals (10).

III. Past Performance: 50 points
   a. The percentage of contracts completed on time over the last 5 years (20);
   b. The number of contract change requests submitted on the previous 5 contracts (20); and,
   c. Demonstration of contractor to effectively communicate with the client (10).

IV. Personnel Qualifications: 25 points
   a. Technical experience of principal project staff related to the project performance (10);
   b. Experience with similar projects (10); and,
   c. Educational qualifications related to the project performance (5).

V. Indian Preference: 5 points
   Must meet these factors in order to secure Indian Preference status;
   1. Membership in a Federally recognized Tribe;
   2. Indian Ownership of 51% or more;
3. Indian Control;
4. Indian Management;
5. Financing obtained by Indian person; and,
6. Equipment obtained by Indian person.

The RFP process is designed to result in the selection of a contractor who demonstrates the capability to complete the work at the best value. The CTUIR reserves the right to contract all or portions of the work to individual contractors. Upon completion of the review and selection process, the CTUIR will negotiate with the most responsive/responsible Contractor, as determined by the CTUIR, for the contract scope and price. The negotiated contract will be based on fair and reasonable compensation for the services required.
Part V - Attachments

Appendix A
Appendix B.
The CONTRACTOR shall provide the TRIBES with a digital copy of all finished products that include geographic information; this includes but is not limited to surveys, aerial imagery and data developed in support of Tribal projects. All geographic information shall be delivered in a digital, georeferenced format. Metadata shall be included with all deliverables. The TRIBES use ESRI ArcGIS software as its standard GIS platform, SQL server as its primary database software and Windows as its operating system. GIS files being created for delivery to CTUIR shall be prepared in conformance with the requirements outlined in this schedule.

If attribute information are collected in addition to geographic positions the CONTRACTOR shall provide a digital data dictionary file that has been approved by the persons responsible for the contract for CTUIR in terms of expected content and format. The data dictionary file must describe all the associated attribute information. Included in the data dictionary must be a definition of each table and each column within the table. The table definition must include the purpose, structure, and a list of any associated features. The column definition must include the data type, data precision, and a brief description of each of the values that may be included in the column (including an explanation of any abbreviations or codes that are utilized). If an extensive number of abbreviations or codes will be utilized to populate a column, a separate domain list shall be provided. All domain list values must be accompanied by a description especially in the case of abbreviations. The preferred delivery format for all GIS attribute tables is a comma delimited, ASCII text file format with all column headings specified.

1. **Data Collection Standards.**

   1.1. **Survey Data Standards.** CONTRACTOR shall:

      1.1.1. use known Tribal survey monuments if working within the reservation boundary,
      1.1.2. meet a minimum level or accuracy for all survey work (1/100th of a foot), and
      1.1.3. submit all survey points with an attached attribute description for all of the points.

   1.2. **GPS Data Standards.** CONTRACTOR shall ensure:

      1.2.1. all geographic features collected have a unique identification which associates it with its attribute information in an associated table,
      1.2.2. all attribute tables have a digital data dictionary file,
        1.2.2.1. horizontal coordinates are documented and meet a minimum level of accuracy as is appropriate for the scope of work. To determine appropriateness, the following guidelines shall be used:
1.2.2.2. Survey Grade are the most accurate and most commonly used in situations where accuracy is essential (engineering applications, property boundary determinations, etc.), as such they are the preferred method. They typically provide true positional accuracy within a centimeter in the horizontal direction and elevation accuracies within 10 centimeters.

1.2.2.3. Mapping Grade receivers must be differentially corrected GPS to reduce positional errors. Differential correction is the process of improving fixed positions utilizing data from a base station. With differential correction, horizontal accuracies from one to two meters can be achieved, while vertical accuracy is around 3 meters. These receivers are most commonly used by GIS professionals for gathering data for inventories, resource mapping, environmental management and infrastructure management. This method is permissible if Survey Grade cannot be provided.

1.2.2.4. Recreational Grade are the least accurate units, and are not permitted without express authorization from the TRIBES’ Office of Information Technology. This is typically used for outdoor recreational activities, these receivers can have up to 20 meters in positional error.

1.3. Georeferencing.

1.3.1. Survey grade information must be georeferenced to the approved coordinate system as adopted by the Oregon Legislature in the Oregon Revised Statute 93.330:

Oregon State Plane North
Projection: Lambert_Conformal_Conic
False_Easting: 8202099.737533
False_Northing: 0.000000
Central_Meridian: -120.500000
Standard_Parallel_1: 44.333333
Standard_Parallel_2: 46.000000
Latitude_Of_Origin: 43.666667
Linear Unit: Foot (0.304800)

Geographic Coordinate System: GCS_North_American_1983
Angular Unit: Degree (0.017453292519943299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_North_American_1983
Spheroid: GRS_1980
Semimajor Axis: 6378137.0000000000000000
Semimajor Axis: 6356752.3141403561000000
Inverse Flattening: 298.257222101000020000
1.3.2. Geographic data including data other than survey grade information, such as CAD, GIS, Aerial Imagery, and Photography must be georeferenced using the following coordinate system:

NAD83 UTM Zone 11 North
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -117.000000
Scale_Factor: 0.999600
Latitude_Of_Origin: 0.000000
Linear Unit: Meter (1.000000)

Geographic Coordinate System: GCS_North_American_1983
Angular Unit: Degree (0.017453292519943299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_North_American_1983
Spheroid: GRS_1980

1.3.3. All aerial photography and satellite imagery must be georeferenced and orthographically rectified unless otherwise authorized by the TRIBES’ Office of Information Technology.

2. Data Development Requirements.

2.1 All intersecting lines shall be processed to remove overshoots and undershoots.

2.2 Zero length segments shall be removed.

2.3 Different feature types shall not share a common line segment. Snapping shall be set such that lines intersect.

2.4 All block definitions (CAD) shall be provided.

2.5 Equivalent CAD or ERSI symbol sets shall be provided.

2.6 A project report (metadata) shall be provided.

2.7 A detailed layer list shall be provided.
3. Data Delivery Requirements:

3.1 Vector Data – points, polygons and lines (parcels, roads, streams, buildings, etc.) – shall be delivered in the following formats:
- ESRI Shape file format,
- ESRI Personal Geodatabase format,
- ESRI Coverage Export format (E00).

3.2 CAD data. Electronic files of all developed CAD data as DWG shall be provided including a PDF of survey or as-built.

3.3 Raster Data (aerial photos and other remote sensing imagery) shall be in the following formats: TIFF, JPEG, ERDAS IMAGINE.

3.4 Metadata. Accompanying the final GIS delivery shall be a sufficient level of metadata regarding the project files to allow a reasonable understanding of the source, accuracy, modifications to, and applicability of the data provided. All submitted metadata shall follow Federal Geographic Data Committee (FGDC) Standards specified in *Content Standard for Digital GeoSpatial Metadata (FGDC-STD-001-1998)* (FGDC 1998). The FGDC Standards can be found at [http://www.fgdc.gov/standards/standards.html](http://www.fgdc.gov/standards/standards.html). All metadata should be submitted in text (*.txt), Microsoft Word (*.doc), or the ESRI compatible XML format (as compiled through ArcCatalog: [http://www.esri.com/metadata/esriprof80.html](http://www.esri.com/metadata/esriprof80.html)).

Minimum metadata standards for geographic information. The CONTRACTOR shall:

- **a.** Provide a purpose statement identifying the project for which the data was created,
- **b.** identify the original source of the data,
- **c.** identify the creator of the data,
- **d.** indicate the date that the data was created/input into a GIS system,
- **e.** provide confidence of attribution data,
- **f.** provide positional confidence of the object location (horizontal and vertical),
- **g.** identify hardware used to collect and process the data,
- **h.** identify software used to collect and process the data,
- **i.** identify the name of the data dictionary file.