

EXHIBIT A.2
STATEMENT OF WORK – ORTHOGONAL IMAGES
FOR
DIGITAL AERIAL DATA

SECTION 1 – STATEMENT OF WORK

1.1 GENERAL

1.1.1 INTRODUCTION

Contractor shall deliver under this Statement of Work Orthogonal Images collected from January through April for each imagery acquisition cycle.

1.1.2 DEFINITIONS

In addition to the terms defined in the Base Agreement, the following definitions shall apply throughout this Exhibit A.2 (Statement of Work – Orthogonal Images): No additional definitions.

1.2 TASKS AND DELIVERABLES

TASK 1 – DEVELOP PROJECT WORK PLAN

Contractor shall review and analyze the Image Requirements for the Orthogonal Images to be provided under this Agreement and develop a Project Work Plan, which shall be used to accomplish the following:

1. Guide project planning;
2. Document project planning assumptions and constraints;
3. Document project-planning decisions regarding alternatives chosen;
4. Facilitate communication between project stakeholders;
5. Define key management reviews as to content, extent and timing; and
6. Provide a baseline for progress measurement and project control.

DELIVERABLE 1 – PROJECT WORK PLAN

Contractor shall provide for County approval a Project Work Plan document in Word and Portable Document Format (PDF) developed in accordance with Task 1 (Develop Project Work Plan).

TASK 2 – PROVIDE GEODETIC CONTROL AND PRE-MARKING

If it is determined to be necessary by Contractor, Contractor shall be responsible for up to four hundred (400) additional ground control points, which Contractor deems necessary to perform the photogrammetric mapping. Contractor should utilize the surveying methodology that provides the most cost effective method of generating any control required to support the photogrammetric mapping. Any survey control generated for this project will be provided as a deliverable to County and shall comply at a minimum with the following requirements:

1. Ground control acquisition shall be overseen and approved by a California Licensed Surveyor, who shall affix a signature and seal to approve all ground control reports.
2. The survey shall utilize existing durable cadastral monuments, which can be referenced on a recorded document (tract map, parcels maps or record of survey) as control monuments wherever possible. Where no cadastral monument exists the Contractor will set a durable monument.

3. Horizontal accuracy shall be consistent with Second Order, Class I, i.e. ninety-five percent (95%) confidence interval of 2 cm base error and 20 parts per million linear errors.
4. Vertical accuracy shall be third order.
5. Survey shall be constrained to National Geodetic Survey (NGS) First Order control monuments, Epoch date 1995.0
6. All GPS surveys will follow procedures spelled out in NOAA Technical Memorandum NOS NGS-58 (Guidelines for establishing GPS-derived ellipsoid heights, 2 cm accuracy)
7. A monument record form shall be prepared for each point providing a description of the monument as well as its location.
8. Vertical datum shall be NAVD88. All vertical stations set will be tied directly to NGS monuments whose orthometric height was determined by differential leveling and adjusted by the NGS on, or after June 1995.
9. Units shall be U.S. Survey Feet.
10. All coordinates will conform to the California Coordinate System of 1983, Zone5. Longitude and latitude will be based on the North American Datum of 1983.

DELIVERABLE 2 – GEODETIC CONTROL AND PRE-MARKING

Contractor shall provide the following Deliverables in accordance with Task 2 (Provide Geodetic Control and Pre-Marking):

- 2.1 Approval of all Geodetic Control reports by signature and seal from a California Licensed Surveyor.
- 2.2 ArcGIS shapefiles with cadastral monuments as points (with geodetic data as attributes).
- 2.3 GPS observation data in RINEX format.
- 2.4 Record Forms for cadastral monuments.
- 2.5 ASCII comma-delimited file, Point Number, Northing, Easting, orthometric height, description
- 2.6 ASCII comma-delimited file, Point Number, longitude, latitude, ellipsoid height, orthometric height, description

TASK 3 – PERFORM AERIAL TRIANGULATION

Contractor shall perform aerial triangulation to support planimetric topographic mapping for deliverables required under this Agreement as well as the update of the Digital Terrain Model (DTM) data. Aerial triangulation shall comply with the following requirements:

1. Aerial Triangulation shall be overseen and approved by a California Licensed Surveyor, who shall affix a signature and seal to approve to final aerial triangulation solutions.
2. The aerial triangulation shall be performed using a bundle adjustment.

3. The RMS of control and tie points in the final block adjustment shall be in the order of 10 microns.
4. The RMS derived by comparison of survey check points not used in the block adjustment with aerial triangulation results shall not exceed 12 microns at digital photo scale

DELIVERABLE 3 – AERIAL TRIANGULATION

Contractor shall provide the following Deliverables in accordance with Task 3 (Perform Aerial Triangulation):

- 3.1 Approval of all Aerial Triangulation information by signature and seal from a California Licensed Surveyor.
- 3.2 Block adjustment printout showing all statistical data pertaining to the adjustment.
- 3.3 ASCII files containing coordinate values of aerial triangulation points.
- 3.4 PATB output containing model settings.

TASK 4 – PROVIDE DTM UPDATES – PROJECT AREA 1

Contractor shall produce Digital Terrain Model (DTM) updates for *Project Area 1* to support generation and rectification of ortho imagery in the event that an imagery acquisition cycle does not include a new LIDAR-based digital terrain data. The DTM updates shall be produced from stereo compilation and shall comply with the following: requirements:

1. The DTM spacing shall be 5 foot or less.

DELIVERABLE 4 – DTM UPDATES – PROJECT AREA 1

Contractor shall provide the following Deliverables in accordance with Task 4 (Provide DTM Updates – Project Area 1):

- 4.1 Project documentation outlining procedures and data collected, and reports of accuracy evaluation.
- 4.2 Bare-earth DTM incorporating the terrain updates in ArcGIS grid format
- 4.3 FGDC compliant metadata.

TASK 5 (OPTION A) – GENERATE ORTHO IMAGERY (TRUE COLOR) – PROJECT AREA 1

Contractor shall generate Orthogonal Images with four inch pixel resolution for *Project Area 1* using Deliverables 1 (Project Work Plan), 2 (Geodetic Control and Pre-Marking) and 3 (Aerial Triangulation), which shall meet the following requirements:

1. Ortho imagery shall be true color (three bands – RGB);
2. Ortho imagery over large water bodies shall be color balanced to ensure uniform and visually consistent water;
3. Ortho imagery shall be color balanced and seamlessly mosaicked;
4. Ortho rectification process shall incorporate bridge elevation data;

5. Ortho imagery will be tiled to specific grid system (the same grid used for the LAR-IAC with slight modifications proposed by County); and
6. Ortho imagery files will be processed in NAD83, CA State Plane Coordinate System, Zone 5, US Survey Feet.

DELIVERABLE 5A – ORTHO IMAGERY (TRUE COLOR) – PROJECT AREA 1

Contractor shall provide the following Deliverables in accordance with Task 5A (Generate Ortho Imagery – Project Area 1):

5.A.1 The three-band ortho imagery shall be delivered in Geo-TIFF file format upon approval by County.

5.A.2 FGDC compliant metadata.

TASK 5 (OPTION B) – GENERATE ORTHO IMAGERY WITH NEAR INFRA-RED – PROJECT AREA 1

Contractor shall generate Orthogonal Images with four inch pixel resolution for *Project Area 1* using Deliverables 1 (Project Work Plan), 2 (Geodetic Control and Pre-Marking) and 3 (Aerial Triangulation), which shall meet the following requirements:

1. Ortho imagery shall be four bands, with the first three bands being true color (RGB) and the fourth band being Near Infrared (NIR);
2. Ortho imagery over large water bodies shall be color balanced to ensure uniform and visually consistent water;
3. Ortho imagery shall be color balanced and seamlessly mosaicked;
4. Ortho rectification process shall incorporate bridge elevation data;
5. Ortho imagery will be tiled to specific grid system (the same grid used for the LAR-IAC with slight modifications proposed by County); and
6. Ortho imagery files will be processed in NAD83, CA State Plane Coordinate System, Zone 5, US Survey Feet.

DELIVERABLE 5B – ORTHO IMAGERY WITH NEAR INFRA-RED – PROJECT AREA 1

Contractor shall provide the following Deliverables in accordance with Task 5A (Generate Ortho Imagery – Project Area 1):

5.B.1 The four-band ortho imagery shall be delivered in Geo-TIFF file format upon approval by County. The hosted solution will provide access only the three band RGB imagery.

5.B.2 FGDC compliant metadata.

TASK 6 (OPTION A) – GENERATE ORTHO IMAGERY (TRUE COLOR) – PROJECT AREA 2

Contractor shall generate Orthogonal Images with one foot pixel resolution for *Project Area 2* using Deliverables 1 (Project Work Plan), 2 (Geodetic Control and Pre-Marking) and 3 (Aerial Triangulation), which shall meet the following requirements:

1. Ortho imagery shall be true color (three bands – RGB);

2. Ortho imagery over large water bodies shall be color balanced to ensure uniform and visually consistent water;
3. Ortho imagery shall be color balanced and seamlessly mosaicked;
4. Ortho rectification process shall incorporate bridge elevation data;
5. Ortho imagery will be tiled to specific grid system (the same grid used for the LAR-IAC with slight modifications proposed by County); and
6. Ortho imagery files will be processed in NAD83, CA State Plane Coordinate System, Zone 5, US Survey Feet.

DELIVERABLE 6A – ORTHO IMAGERY (TRUE COLOR) – PROJECT AREA 2

Contractor shall provide the following Deliverables in accordance with Task 6 (Generate Ortho Imagery – Project Area 2):

- 6.A.1 The three-band ortho imagery shall be delivered in Geo-TIFF file format upon approval by County.
- 6.A.2 FGDC compliant metadata.

TASK 6 (OPTION B) – GENERATE ORTHO IMAGERY WITH NEAR INFRA-RED – PROJECT AREA 2

Contractor shall generate Orthogonal Images with one foot pixel resolution for *Project Area 2* using Deliverables 1 (Project Work Plan), 2 (Geodetic Control and Pre-Marking) and 3 (Aerial Triangulation), which shall meet the following requirements:

1. Ortho imagery shall be four bands, with the first three bands being true color (RGB) and the fourth band being Near Infrared (NIR);
2. Ortho imagery over large water bodies shall be color balanced to ensure uniform and visually consistent water;
3. Ortho imagery shall be color balanced and seamlessly mosaicked;
4. Ortho rectification process shall incorporate bridge elevation data;
5. Ortho imagery will be tiled to specific grid system (the same grid used for the LAR-IAC with slight modifications proposed by County); and
6. Ortho imagery files will be processed in NAD83, CA State Plane Coordinate System, Zone 5, US Survey Feet.

DELIVERABLE 6B – ORTHO IMAGERY WITH NEAR INFRA-RED – PROJECT AREA 2

Contractor shall provide the following Deliverables in accordance with Task 6B (Generate Ortho Imagery with Near Infra-Red) – Project Area 2):

- 6.B.1 The four-band ortho imagery shall be delivered in Geo-TIFF file format upon approval by County. (NOTE: Only three band RGB imagery will be made available via the online hosted solution.)
- 6.B.2 FGDC compliant metadata.

TASK 7 – PROVIDE DTM UPDATES – PROJECT AREA 2

Contractor shall produce Digital Terrain Model (DTM) updates for *Project Area 2* to support generation and rectification of ortho imagery in the event that an imagery acquisition cycle does not include a new LIDAR-based digital terrain data. The DTM updates shall be produced by using automatic stereo compilation and shall comply with the following requirements:

1. The DTM spacing shall be 5 meters or less.

DELIVERABLE 7 – DTM UPDATES – PROJECT AREA 2

Contractor shall provide the following Deliverables in accordance with Task 7 (Provide DTM Updates – Project Area 2):

- 7.1** Project documentation outlining procedures and data collected, and reports of accuracy evaluation.
- 7.2** Bare-earth DTM incorporating the last return data in ArcGIS raster format.
- 7.3** FGDC compliant metadata.

TASK 8 – CORRECT IMAGE DEFICIENCIES

Contractor shall correct all Image Deficiencies identified by County within the Warranty Period, as further described in Paragraph 6.3.2 (Correction of Deficiencies) of the Base Agreement of Appendix A (Required Agreement) to the RFP.

DELIVERABLE 8 – FINAL ACCEPTANCE

Final Acceptance shall be reached when Contractor has corrected all Image Deficiencies pursuant to Task 8 (Correct Image Deficiencies).

TASK 9 – PROVIDE OPTIONAL WORK

SUBTASK 9.1 – PROVIDE OPTIONAL PRODUCTS

If requested and approved by County, Contractor shall provide to County software, tools, images and other products related to the Licensed Products at the rates and fees set forth in Section 2 (Schedule of Deliverables and Payments) of the applicable Scope of Work. The Optional Products shall be provided in accordance with Paragraph 5.2 (Optional Work) of the Base Agreement of Appendix A (Required Agreement) to the RFP.

SUBTASK 9.2 – PROVIDE OPTIONAL SERVICES

If requested and approved by County, Contractor shall provide to County on-site implementation support, additional training and other consulting services related to the Licensed Products, at County facilities or at Contractor's location, at the rates and fees set forth in Section 2 (Schedule of Deliverables and Payments) of the applicable Scope of Work. The Optional Services shall be provided in accordance with Paragraph 5.2 (Optional Work) of the Base Agreement of Appendix A (Required Agreement) to the RFP.

DELIVERABLE 6 – OPTIONAL WORK

Contractor shall successfully provide Optional Work, including Optional Products and Optional Services, in accordance with Task 9 (Provide Optional Work).

EXHIBIT A.2 – STATEMENT OF WORK – ORTHOGONAL IMAGES

1.3 IMAGE REQUIREMENTS

1.3.1 DATA REQUIREMENTS

Remote-sensed digital orthogonal aerial imagery will be collected to provide source data for creation of orthophotography, stereo models and updates to the digital terrain model.

1.3.2 AERIAL IMAGERY REQUIREMENTS

Due to the County's desire to have a very high resolution digital aerial orthophoto, all aerial imagery shall be collected to support a minimum 4" Ground Sample Distance (GSD) for urban areas and 1' GSD for national forest areas. Stereo pairs must be provided to County upon request and exhibit a 66% overlap at the time of exposure. For the urban project area, where tall structures more than 4 stories tall are present, forward overlap will be 80% and sidelap will be 60% to allow mitigation of building lean.

1.3.3 EQUIPMENT REQUIREMENTS

Prior to commencing flyovers, Contractor shall clearly identify the equipment (aircraft, digital sensor, etc.) to be used to collect imagery.

1.3.4 CONTROL ESTABLISHMENT

If it is determined to be necessary by Contractor, additional ground control points, augmenting the county's control points as needed (approximately 200 to 300) to meet the accuracy requirements of this proposal, will be collected by Contractor. All control used in the production of products for this effort shall conform to acceptable errors as set forth by the FGDC. If additional control points are generated as a result of this effort, Contractor will be required to provide these points as an attributed feature layer. The Project Work Plan shall contain a detailed explanation of control methodology and a listing of control data that will be provided under this effort (survey/AT reports, POS EO data, or other control data unique to the control method used). Collection of up to one hundred (100) additional ground control points may be considered Optional Work that may be provided by Contractor at the price and fees agreed to by the parties.

Contractor shall provide a detailed description of the process by which the accuracy standards will be met. This should include a description of how the existing control network might be used, additional control that might be required, source for control survey crews, etc. If fully analytical aero triangulation procedures are used then Contractor shall describe the process to include hardware and software. If direct georeferencing is proposed, Contractor shall fully describe the process and equipment used to eliminate conventional aero triangulation, and the corrective procedures to be employed in the event of equipment failure.

1.3.5 DIRECT DIGITAL AERIAL IMAGERY ACQUISITION

Contractor shall describe the overall methodology for direct digital aerial imagery collection to include flight scheduling/planning, flight plan, procedures for ensuring image quality, photo scale/GSD, etc.

1.3.6 COLLECTION CONDITIONS

All imagery shall conform to the American Society for Photogrammetry and Remotes Sensing (ASPRS) Draft Aerial Photography Standard (1995).

www.asprs.org/asprs/resources/standards/photography.htm with the exception of all requirements specific to film and/or shuttered cameras and the following:

Section 2.1.1 – For the Project, capture window requirements will be as follows:

DATE	START TIME	SOLAR ALTITUDE	END TIME	SOLAR ALTITUDE
January 1, 2014	10:00	26.64	14:00	25.95
January 15, 2014	09:45	25.97	14:15	26.60
February 1, 2014	09:30	26.85	14:30	28.70
February 15, 2014	09:30	30.34	14:45	30.29
March 1, 2014	09:00	29.70	15:00	31.55
March 15, 2014	09:00	34.18	15:15	32.21
DATE	START TIME	SOLAR ALTITUDE	END TIME	SOLAR ALTITUDE
January 1, 2017	10:00	26.65	14:00	25.99
January 15, 2017	09:45	26.00	14:15	26.66
February 1, 2017	09:30	26.91	14:30	28.77
February 15, 2017	09:30	30.42	14:45	30.36
March 1, 2017	09:00	29.78	15:00	31.61
March 15, 2017	09:00	34.27	15:15	32.26
DATE	START TIME	SOLAR ALTITUDE	END TIME	SOLAR ALTITUDE
January 1, 2020	10:00	26.63	14:00	25.89
January 15, 2020	09:45	25.92	14:15	26.51
February 1, 2020	09:30	26.75	14:30	28.59
February 15, 2020	09:30	30.22	14:45	30.16
March 1, 2020	09:00	29.87	15:00	31.68
March 15, 2020	09:00	34.36	15:15	32.32

Solar angles calculated using SunAngle tool available at: <http://susdesign.com/sunangle/> using a location definition of 34.00 N, 118.25 W, and elevation of 0; times given are clock time.

1.3.7 RE-FLIGHTS

If required, the Contractor will correct unacceptable digital aerial imagery at no additional cost to County. All re-flight coverage shall overlap the accepted photography by at least two stereo models.

1.3.8 PROTOTYPE (TEST) AREA

Contractor will provide County with sample imagery displaying the tonal balancing and color enhancements that will provide the best imagery to County. This sample data will be provided to the QA/QC vendor as well as to County. County will have an opportunity to review the samples, and will give written acceptance of the enhancements prior to the Contractor processing the remainder of the project.

1.3.9 METADATA

FGDC-compliant metadata will be provided for the deliverable orthophotography data sets. These metadata will be completed using standard industry metadata tools and output in standard file formats for viewing in all widely available viewing utilities.

1.3.10 ACCURACY STANDARDS

All orthogonal digital imagery should conform to the industry accuracy and quality standards established by the Federal Geographic Data Committee (FGDC) and the American Society for Photogrammetry and Remote Sensing (ASPRS), as specified below:

1. Standard FGDC-STD-007.3-1998, Geospatial Positioning Accuracy Standard Part 3: National Standard for Spatial Data Accuracy, <http://www.fgdc.gov/standards/documents/standards/accuracy/chapter3.pdf>
2. Orthographic imagery produced under this effort shall conform to FGDC-STD-008-1999 Content Standard for Digital Orthoimagery, http://www.fgdc.gov/standards/status/sub3_6.html.
 - a. Accuracy of 4” Orthogonal Images shall conform to the requirements specified below.
 - b. Accuracy of 1’ Orthogonal Images shall conform with requirements specified below.

1.4 ACCEPTANCE CRITERIA

** Contractor is responsible for providing GeoTIFF ortho tiles to County’s QA/QC vendor meeting the format and specifications below.

1.4.1 ACCEPTANCE CRITERIA A: COMPLETENESS AND AESTHETICS

	RESPONSIBLE COMPANY	TESTED CHARACTERISTIC	MEASURE OF ACCEPTABILITY
A		All Scales Orthoimagery	
A.1.	Contractor	Information will be delivered by contractor to County, who will load data onto County servers.	All files successfully copied to County servers, all files accessible, no files corrupted.
A.2.	Contractor	File organization	Files written in tile sheet order
A.3.	Contractor	File name	Conforms to required convention- based on CA SPCS Zone 5 L4_xxxx_yyya (a-d) for 4 inch and L4_xxxx_yyyy for 1 foot orthos
A.4.	Contractor	GeoTIFF format	File reads in ESRI (see sample of GeoTIFF header)
A.5.	Contractor	Files must open in correct location	Files must open with ESRI software
A.6.	Contractor	Pixel definition	GeoTIFF file must reference to the center of the pixel located in the upper left hand corner of the tile as the point of origin

	RESPONSIBLE COMPANY	TESTED CHARACTERISTIC	MEASURE OF ACCEPTABILITY
A		All Scales Orthoimagery	
A.7.	Contractor	Georeferencing	For correct pixel size 0.33 ft (4 inch) and 1 ft.
A.8.	Contractor	Vertical Datum	NAVD88
A.9.	Contractor	Projection	NAD 1983 State Plane – California Zone V
A.10.	Contractor	Horizontal Datum	NAD 83 reference datum
A.11.	Contractor	Units	U.S. Survey Feet
A.12.	Contractor	24 bit natural color, plus 8 bit NIR	256 levels of value for each band, 0=black, 255=white
A.13	Contractor	Conformance with tile index grid	Tile matches grid, no gaps between tiles at 1:1 view.
A.14.	Contractor	Coverage	Full tiles; no data holidays. As indicated in County Data and Reference Maps. The basic rule is at least 500’ buffer around County boundary (no partial tiles, no seams and no overlaps). Flying and image capture teams should be aware of this.
A.15.	Contractor	Tile grid layout	Full tiles only with no gaps or seams between 4 inch and 1 ft. areas. Flying and image capture teams should be aware of this.
A.16.	Contractor	Metadata	Complies with standard (to be determined by County; to match LAR-IAC metadata). Meets minimum FGDC Content Standard.
A.17.	Contractor	Mosaic lines	Minimize mosaic lines through buildings. No mosaic lines through above-ground transportation structures carrying automobiles or trains unless unavoidable, as well as foot bridges crossing 2-lane roads or larger. Mosaic lines may pass through power transmission towers, cars, trucks and railroad cars.
A.18.	Contractor	Building lean within Downtown areas (polygons provided by County)	The maximum displacement of a 10 story building at the edge of a model will be 16 feet (approximately 1.6 feet per story)
A.19.	Contractor	Bridges (polylines provided by LA County)	For accuracy of multi-layered bridge decks identified by County, 3D breaklines are required to ensure continuity of deck surfaces. County will provide bridge locations countywide in shapefile format (polyline layer)
A.20.	Contractor	“Governor’s Test”	Imagery should not cause alarm by giving false impression that a bridge is sagging or

	RESPONSIBLE COMPANY	TESTED CHARACTERISTIC	MEASURE OF ACCEPTABILITY
A		All Scales Orthoimagery	
			that there are serious hazards to public safety.
A.21.	Contractor	Shadows	TBD
A.22.	N/A	Leaf-off	N/A
A.23	Contractor	Urban Canyon (polygons provided by County)	Specified “Downtown Areas” have been indicated via shapefile and sent to Contractor and external QAQC provider. Special care will be made in these areas to reduce building lean and shadows. Flying patterns may need to be adjusted for this including restricting capture times to optimal sun angles.

1.4.2 ACCEPTANCE CRITERIA B: 1-FOOT GSD

B	1-foot GSD, equivalent to 1”=200’-scale (1:2400)	
B.1.	Ground Resolution	1 foot
B.2.	Tile size	5280’ x 5280’
B.3.	Mismatch of features along mosaic lines and production block boundaries of equal scale	Equal to or less than 3 pixels on well defined ground features (roads, sidewalks, curbs).

1.4.3 ACCEPTANCE CRITERIA C: 4-INCH GSD

C	4 inch GSD, equivalent to 1”=100’-scale (1:1200)	
C.1.	Ground Resolution	0.33 U.S. survey foot (2 decimals)
C.2.	Tile size	2640’ x 2640’ (8000 pixels x 8000 pixels)
C.3.	RMSE of known ground points measured on the image <i>See ASPRS Class I Standards Page 8, Table 16, and NSSDA Part 3, Appendices 3-A and 3-D for explanation of formulas.</i>	RMSE _x = RMSE _y = 1.0-ft RMSE _r = 1.4142*RMSE _x = 1.4142*RMSE _y = 1.41-ft
C.4.	NSSDA radial accuracy	NSSDA accuracy (20+ points) such that 1.73 * RMSE _r < 2.5’
C.5.	Mismatch of features along mosaic lines between pixel resolution blocks of equal scale	Equal to or less than 4 pixels on well defined ground features (roads, sidewalks, curbs).

C	4 inch GSD, equivalent to 1"=100'-scale (1:1200)	
C.6.	Mismatch of features between 1-foot and 4-inch images	Equal to or less than the combination of the B.3. and C.5. criteria (4.3') on well defined ground features (roads, sidewalks, curbs).

1.4.4 ACCEPTANCE CRITERIA D: AEROTRIANGULATION – CONTRACTOR RESPONSIBILITY

D	Tested Characteristic	Measure of Acceptability
D.1.	Report Format	Conforms to required convention
D.2.	Report Completeness	All information complete and readable; reviewed and signed by a CP.
D.3.	PATB format ASCII AT files	Camera data, photo coordinates (PATB), adjusted control (ptXYZ), Orientations (ORI), and AT log files (aat.log)
D.4.	1"=100' map scale AT Horizontal accuracy against ground control	For 100' AT blocks, RMSE _x and RMSE _y values are acceptable up to 0.35'. RMSE _r is acceptable up to 0.5'. Higher RMSE values are subject to review.
D.5.	1"=200' map scale AT Horizontal accuracy against ground control	For 200' AT blocks, RMSE _x and RMSE _y values are acceptable up to 0.6'. RMSE _r is acceptable up to 0.84'. Higher RMSE values are subject to review.
D.6.	RMSE of control and tie points.	<10 micron in x and y. Higher RMSE values are subject to review.
D.7.	RMSE of survey check points	Not to exceed 12 micron in x and y.
D.8	NSSDA analysis [E, N] of 20+ QA points	95% within 1.73 * RMSE for corresponding scale
D.9.	Approval	CA Licensed Surveyor Signature and Seal

1.4.5 ACCEPTANCE CRITERIA E: GROUND CONTROL ACCEPTANCE – COUNTY AND CONTRACTOR RESPONSIBILITY

E	Tested Characteristic	Measure of Acceptability
E.1.	Report Format	Conforms to required convention
E.2.	Report Completeness	All information complete and readable
E.3.	Approval	CA Licensed Surveyor Signature and Seal
E.4.	Monument Record Form	Sufficient information to revisit point, description and picture
E.5.	Network	Meet NGS specifications for Order and Class
E.6.	Geodetic Survey: Horizontal Accuracy	Second Order Class 1 tied to NGS monuments.
E.7.	Geodetic Survey: Vertical Accuracy	Third Order.

E	Tested Characteristic	Measure of Acceptability
E.8.	Coordinate System	California Coordinate System of 1983, Zone 5,
E.9	Epoch	Epoch date: 2004.0

1.4.6 ACCEPTANCE CRITERIA F: DIGITAL TERRAIN MODEL QA (SUITABLE ONLY FOR ORTHORECTIFICATION) – CONTRACTOR RESPONSIBILITY

F	Tested Characteristic All Scales	Measure of Acceptability
F.1.	Information will be delivered by contractor to County, who will load data onto County servers.	All files successfully copied to County servers, all files accessible, no files corrupted.
F.2.	File organization	Files written one per ortho tile provided. Only updated tiles are provided.
F.3.	File name	Conforms to required convention
F.4.	Format	Arc generate .lin and pnt files
F.5.	Format	Microstation .dgn Version V8.
F.6.	Georeferencing	Locates in proper tile grid cell
F.7.	Mass point locations	Mass points updated as needed to accurately build terrain to support orthophotos;
F.8.	Breakline locations	Breaklines updated as needed to control bridges, edge of pavement, hydrographic features, ridgelines, retaining walls as needed for orthorectification, none in open water.
F.9.	Continuity	No spikes, holes or blunders; no gaps of sufficient size to affect orthorectification, regardless of perspective center.
F.10.	Breakline Format	Arc generated .lin and pnt files

1.4.7 ACCEPTANCE CRITERIA G: HORIZONTAL AQ/QC POINT

G	Tested Characteristic All Scales	Measure of Acceptability
G.1.	Visibility on digital imagery	QA/QC checkpoints must be clearly photo-identifiable on images at map scales evaluated (4-inch)
G.2.	Well defined	Points must be clearly visible and not elevated (no fence posts, fire hydrants, etc.) that cast shadows
G.3.	Documentation	Each point is documented to describe the photo-identifiable feature surveyed
G.4.	Terrestrial images	Each point is photographed from the ground to help in photo-identification
G.5.	Survey accuracy and description of survey procedure used	Accuracy estimate, to include description of survey procedures used to achieve such accuracy

1.5 SOFTWARE REQUIREMENTS

1.5.1 SOFTWARE

Orthophotography from the project can be viewed using any software that can read and display the TIFF file formats. The TIFF v6 format is widely used and software that supports this file format can generally be grouped into two categories; image viewers and GIS software.

1.5.2 RASTER IMAGE VIEWING SOFTWARE

Image viewing software will display raster images like the project deliverables. The images can generally only be viewed one tile at a time. With viewer software images do not have any geo-referencing. Therefore, any measurements made on the photo are reported in photo units rather than in ground units.

“Imaging for Windows” by Kodak which comes by default with the Windows2000 operating system is an example of image viewing software. Additional information on TIFF viewers can be found at http://hazmat.dot.fov/ntsb/ntsb_viewer_help.htm.

1.6 COUNTY OBLIGATIONS

1.6.1 SYSTEM REQUIREMENTS

County's system for use of the orthogonal imagery in GEOTIFF or various other formats (MrSID, ECW, etc.) will have sufficient capabilities and capacity to view and manage digital images.

1.6.2 COUNTY RESPONSIBILITIES

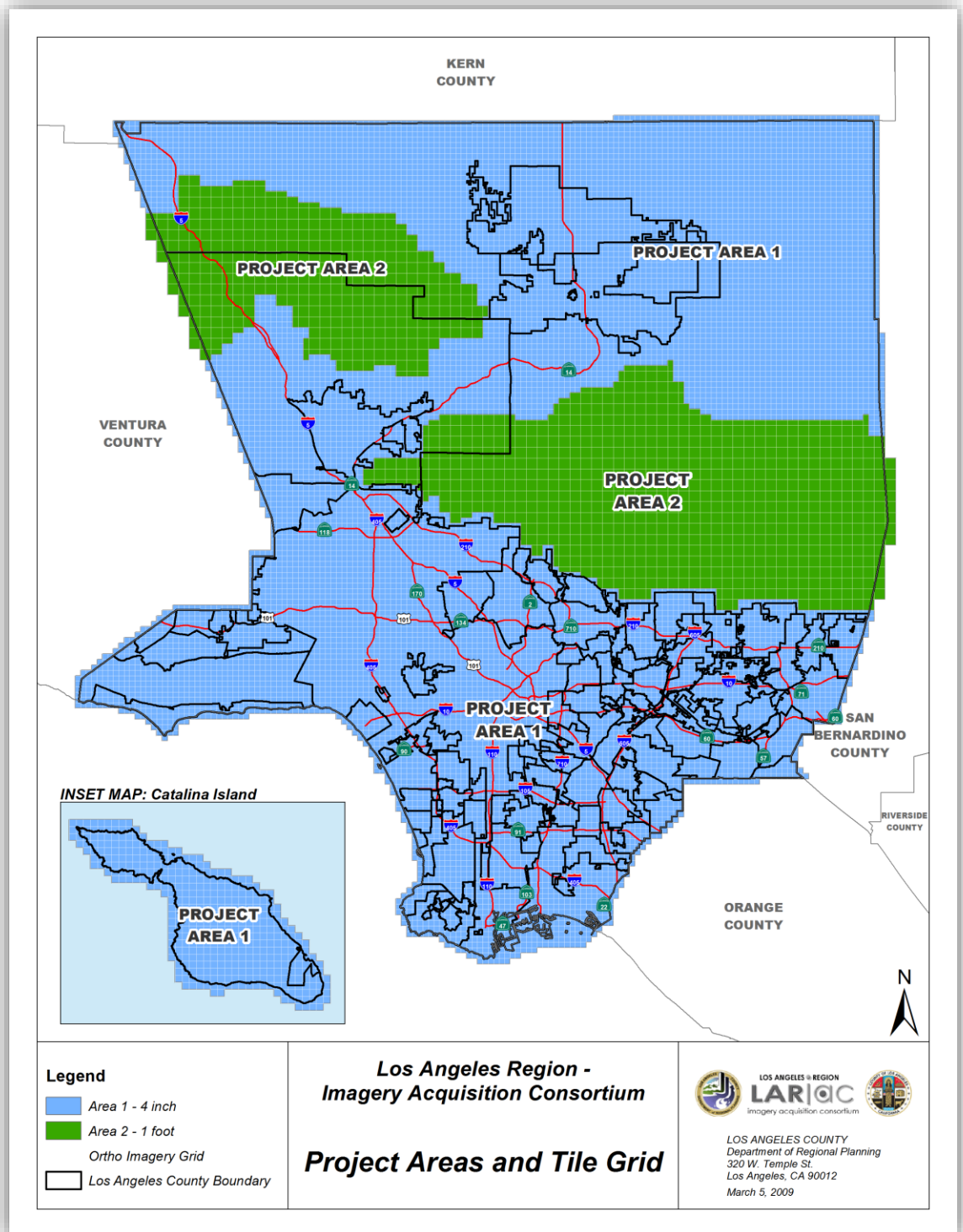
1. County will make available the following countywide information to Contractor at the following URL: <http://egis3.lacounty.gov/dataportal/lariac/lar-iac4/rfp-data/>
 - a) LAR-IAC Project Area Boundaries (shapefile format)
 - b) Detailed County/City Boundaries (for orientation only - shapefile format)
 - c) Grid for project tiles (shapefile format)
 - d) Oblique Aerial Digital Imagery 1 sq. mile sector grid (for orientation only – shapefile format)
 - e) Boundary of Urban Canyons “Downtown Areas” high-rise areas (shapefile format)
 - f) Parcel vector database (for orientation only – shapefile format)
 - g) Existing control cadastral monuments (shapefile format)
 - h) Existing LAR-IAC deliverables in various formats as mutually agreed upon (ie. DTM and/or DSM, first generation 4” ortho imagery)
 - i) Proposed Delivery Areas (shapefile format)
 - j) Proposed Mosaic Tile Areas (shapefile format)
 - k) Boundary of locations that could potentially have large changes in elevation (ie. Significant grading) that would affect ortho imagery rectification
 - l) Other relevant GIS layers mutually determined by the Contractor and County.

EXHIBIT A.2 – STATEMENT OF WORK – ORTHOGONAL IMAGES

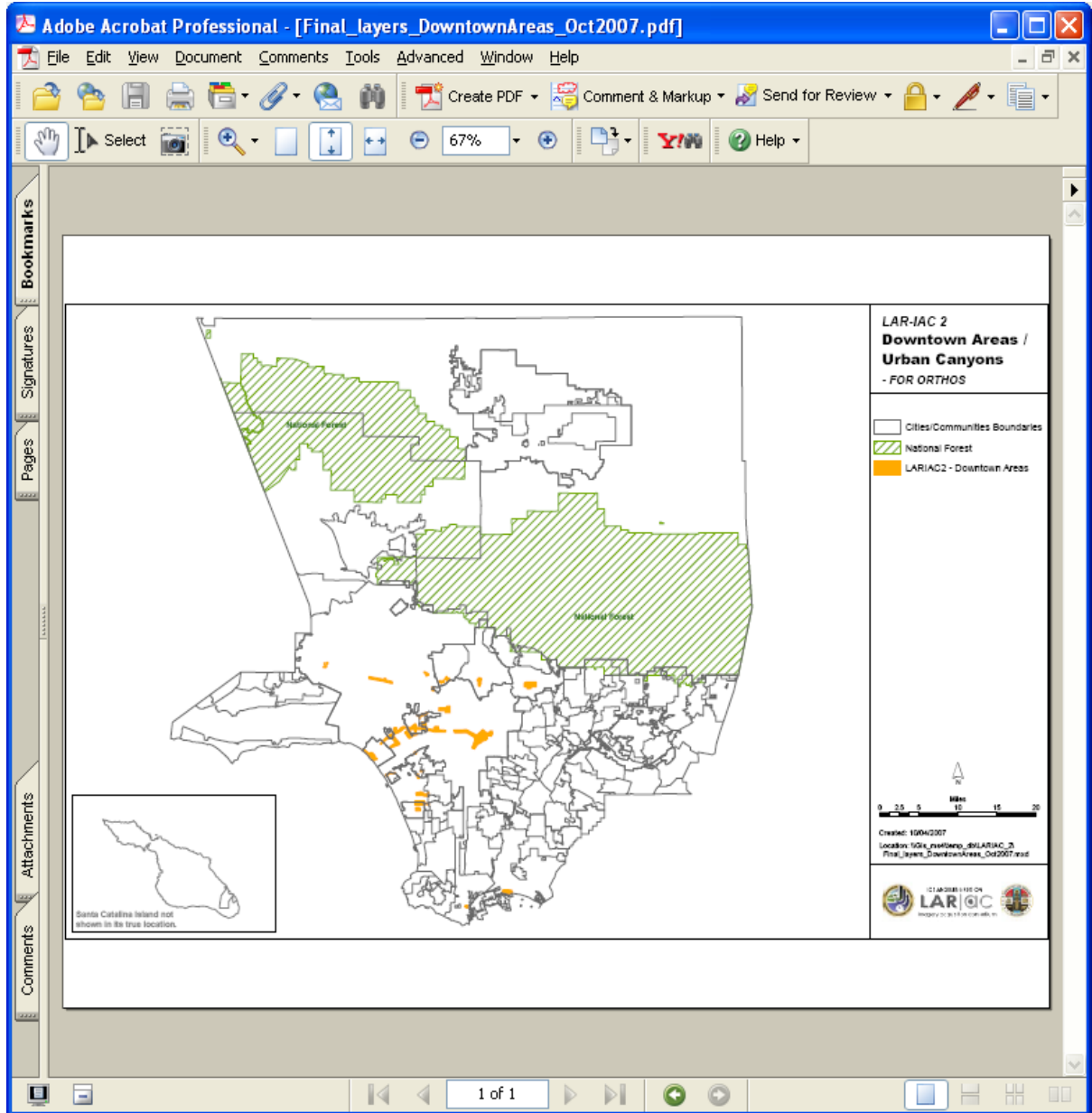
2. Digital Elevation Data (from LiDAR and stereo compilation) provided by County for Contractor will be in ESRI raster format in California State Plane Coordinate System, Zone 5, NAD83, NAVD88.
3. All vector data sets provided by County for Contractor will be in ESRI shapefile format in California State Plane Coordinate System, Zone 5, NAD83, U.S. Survey Feet.
4. County will be responsible for:
 - a) Assignment of all point numbers;
 - b) Provision of blank monument record forms;
 - c) Providing the County Survey Monuments digital files.

1.7 REFERENCE MAPS

1.7.1 PROJECT AREAS AND TILE GRID



1.7.2 URBAN CANYON (DOWNTOWN AREAS)



1.7.3 DELIVERY AREAS

