REQUEST FOR PROJECT AND COST PROPOSALS FOR THE

SOUTHEASTERN WISCONSIN 2015 ORTHOPHOTOGRAPHY PROJECT

I. GENERAL

The Southeastern Wisconsin Regional Planning Commission, in partnership with the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha, is seeking project and cost proposals from selected qualified Vendors for an imagery and elevation mapping project in Southeastern Wisconsin. The 2015 Orthophotography Project will acquire digital orthophotography for the seven-county Southeastern Wisconsin Region. The project may also acquire oblique aerial photography, LiDAR data, and elevation mapping in the form of digital terrain model (DTM) files and contour and depression line files for all or portions of the Region. Metadata will be created for all datasets prepared for this project.

II. DIGITAL ORTHOPHOTOGRAPHY

A. General

Color digital orthophotography shall be prepared for an area of approximately 2,967 square miles in extent as shown on the map attached hereto as "Exhibit A". Three types of digital orthophoto products may be prepared for all or portions of this project area. Participating counties and municipalities may choose to prepare one or more of the following resolutions of orthophotography:

1. Color, 12-inch pixel resolution, one-inch-equals-200-feet scale digital orthophotography. This is the base product that may be prepared for all or a portion of the project area.

2. Color, 6-inch pixel resolution, one-inch-equals-100-feet scale digital orthophotography. This is the enhanced product that may be prepared for all or a portion of the project area.

3. Color, 3-inch pixel resolution, one-inch-equals-50-feet scale digital orthophotography. This is the high-resolution enhanced product that may be prepared for a portion of the project area.

Color digital orthophotography may be prepared at alternative resolutions in the range between 12-inch and 3-inch pixel resolution. Vendors may provide recommendations for preparing alternative resolutions (e.g. 9-inch or 4-inch resolution) at appropriate scales between one-inch-equals-200-feet scale and one-inch-equals-50-feet scale.

B. File Format

The three resolutions of orthophotography files will be prepared in uncompressed GeoTIFF file format (".tif" extension), with accompanying "world" (".tfw" extension) files for use in displaying and referencing the orthophoto files.

C. File Organization

The color orthophoto files shall be organized into "tiles" based on the Wisconsin State Plane Coordinate System, South Zone, North American Datum of 1927 (Wisconsin SPCS). The 12-inch and 6-inch pixel resolution orthophoto files that may be prepared for this project will each cover an area of 10,000 grid feet by 10,000 grid feet on the Wisconsin SPCS as shown on the map attached hereto as "Exhibit B". The 3-inch pixel resolution orthophoto files that may be prepared for this project will each cover an area of 5,000 grid feet by 5,000 grid feet on the Wisconsin SPCS. The 5,000-foot tiling scheme is a further subdivision of the 10,000-foot tiling scheme shown on "Exhibit B". There will be no image overlap between adjacent files. The origin of the grid or tiling scheme for the color orthophoto files shall be at an easting of 2,315,000 feet and a northing of 175,000 feet on the Wisconsin SPCS. A GIS file containing the grid boundaries of the tiling scheme can be provided to the Vendor if requested.

D. File Naming Convention

The 12-inch and 6-inch resolution digital orthophoto files shall follow the file naming convention of "im15_10K-12_*eeee_nnn*.tif" where the prefix "im15" indicates a 2015 image file; the notation "10K-12" indicates a 10,000 by 10,000 foot color 12-inch pixel resolution orthophoto; the notation "*eeee_nnn*" indicates the easting coordinate ("*eeee*"), in thousands of feet, and the northing coordinate ("*nnn*"), in thousands of feet, of the southwest corner of the image; and ".tif" is the extension for the GeoTIFF file format. For example, a file name of "im15_10K-12_2505_275.tif" indicates a 2015 orthophoto file in GeoTIFF format with 12-inch pixel resolution covering a 10,000 by 10,000 foot tile originating at an easting of 2,505,000 feet and a northing of 275,000 feet on the Wisconsin SPCS grid.

Similarly, the 3-inch resolution digital orthophoto files shall follow the file naming convention of "im15_5K-3_*eeee_nnn*.tif" where the prefix "im15" indicates a 2015 image file; the notation "5K-3" indicates a 5,000 by 5,000 foot color 3-inch pixel resolution orthophoto; the notation "*eeee_nnn*" indicates the easting coordinate ("*eeee*"), in thousands of feet, and the northing coordinate ("*nnn*"), in thousands of feet, of the southwest corner of the image; and ".tif" is the extension for the GeoTIFF file format.

The "world" file accompanying each GeoTIFF file shall be named similar to the GeoTIFF file but contain the ".tfw" file extension

E. Digital Orthophoto Elevation Model

The Commission maintains a digital orthophoto elevation model (OEM) that has been developed for past regional orthophotography projects and has been periodically updated during the course of those projects. The current status of the OEM is shown on the map attached hereto as "Exhibit C". The current version of the OEM was used and updated in the 2010 regional orthophotography project. The OEM is a set of MicroStation 3-D DGN format files, consisting of point features and breakline features with elevation values.

The Vendor may choose to utilize the OEM for the preparation of digital orthophotography described herein. The use of the OEM is optional—the Vendor may prefer to utilize an alternative georeferencing solution for preparation of orthophotography. If the Vendor chooses to use the OEM, they will revise the OEM files where necessary to reflect changes in terrain from previous imagery or to create a greater density of elevational features where needed to prepare the orthophotography. At the completion of the orthophoto preparation, the Vendor shall provide the revised 2015 orthophotography OEM, in the form of updated MicroStation 3-D DGN (V-8) format files or ESRI shapefiles or geodatabase format files, to the Commission for use in future orthophotography projects. The Vendor shall also provide an accompanying digital map file in ESRI shapefile format showing the areas where the previous OEM was revised to create the 2015 OEM. This file will identify the areas of change of the orthophoto elevation model between 2010 and 2015.

F. Accuracy Standards and Specifications

1. The horizontal datum shall be the North American Datum of 1927 (NAD27) referenced to the Wisconsin State Plane Coordinate System, South Zone, in U.S. survey feet.

2. The vertical datum shall be the National Geodetic Vertical Datum of 1929 (NGVD29) in U.S. survey feet, or the North American Vertical Datum of 1988 (NAVD88) in U.S. survey feet.

3. All 12-inch pixel resolution digital orthophotography files prepared for this project shall meet National Map Accuracy Standards (NMAS) for one-inch-equals-200-feet-scale (1" = 200' scale) mapping. All 6-inch pixel resolution digital orthophotography files prepared for this project shall meet NMAS for one-inch-equals-100-feet-scale (1" = 100' scale) mapping. All 3-inch pixel

resolution digital orthophotography files prepared for this project shall meet NMAS for one-inch-equals-50-feet-scale (1” = 50’ scale) mapping.

4. All orthophoto elevation model files prepared for 12-inch pixel resolution orthophotography areas shall meet NMAS for one-inch-equals-200-feet-scale (1” = 200’ scale) mapping. All orthophoto elevation model files prepared for 6-inch pixel resolution orthophotography areas shall meet NMAS for one-inch-equals-100-feet-scale (1” = 100’ scale) mapping. All orthophoto elevation model files prepared for 3-inch pixel resolution orthophotography areas shall meet NMAS for one-inch-equals-50-feet-scale (1” = 50’ scale) mapping.

5. Aerial photography for orthophoto preparation shall be collected in Spring 2015, in leaf-off conditions, with sun angle no less than 30 degrees; imagery must be obtained when the sky is free of clouds, cloud shadows, haze, and smoke; ground and water features shall be free of ice, snow, and flooding.

6. Delivered imagery shall be seamless, georeferenced, edge matched, and free of any pixel gaps. The final images shall be tonally balanced and uniform in appearance with no variation between adjacent flight lines or images. The images shall not contain noticeable building lean or distortion of structures.

III. OBLIQUE AERIAL PHOTOGRAPHY

The project may acquire oblique aerial photography for all or a portion of the seven-county Region. Where requested, color digital oblique imagery shall be prepared at a scale and resolution to complement the accompanying color orthophotography. The Vendor will provide the appropriate software for viewing the oblique photography in concert with the orthophotography. The viewing software should include an option for viewing the obliques and orthos on an individual workstation and on an Internet application such as a county land information website. The viewing software should include measurement and other image analysis tools.

IV. LIDAR DATA

The project may acquire LiDAR data for all or a portion of the seven-county Region. The LiDAR data will be delivered as LAS format files (“.las” file extension). The LiDAR data shall be fully classified to include bare-earth and all other types of classified points. The LiDAR may be collected at two different point spacings: 1) sufficient to support two-foot contour interval elevation mapping (approximately 1.0 meter or 3.28 feet spacing); or 2) sufficient to support one-foot contour interval mapping (approximately 0.7 meters or 2.30 feet spacing), as requested by the customer.

The horizontal and vertical datums to be used for the LiDAR data are NAD27 and NGVD29 or NAVD88 as previously described. The vertical Root Mean Square Error (RMSE) of the LiDAR data shall be 0.5 feet or better relative to NGVD29 or NAVD88. The LiDAR points shall be reported to the nearest hundredth of a foot.

V. ELEVATION DATA

A. General

The project may acquire accompanying elevation data for all or a portion of the seven-county Region. Digital elevation data may include digital terrain model (DTM) files, digital contour line and depression line files, and other products as offered by the Vendor.

B. Digital Terrain Model File Organization and Specifications

1. The DTM files that may be prepared as part of this project shall be capable of supporting the creation of two-foot interval contour lines meeting NMAS at a scale of 1:2400 (one inch equals 200 feet), or capable of supporting the creation of one-foot interval contour lines meeting NMAS at a scale of 1:1200 (one inch equals 100 feet), as requested by the customer.

2. The DTM files shall be prepared in such a manner that all break line and random point data included in the file are capable of generating a triangulated irregular network model through the use of appropriate computer software. The DTM files shall be organized in such a manner that all data features can be selectively retrieved, manipulated, and displayed, either singly or in combination with other data features.

3. The DTM files shall depict terrain features as break lines placed along water courses and shorelines and at major changes in the slope. Random points or mass points shall be used to supplement the break lines and water detail.

4. The DTM files shall be prepared in MicroStation Version 8 three-dimensional design file format (MicroStation V8 3-D DGN file) or a comparable ESRI geodatabase format. The files will be organized to cover quadrants of U.S. Public Land Survey System survey townships. Commission staff will provide information on the tiling scheme and naming convention for the files.

5. The horizontal and vertical datums to be used for the DTM files are NAD27 and NGVD29 or NAVD88 as previously described.

C. Digital Contour Line File Organization and Specifications

1. The contour line files that may be prepared as part of this project shall contain hypsometric features, consisting of contour lines, depression lines, and spot elevation locations. Alternatively, an enhanced version of the contour line files may additionally include annotation features consisting of contour and depression text and spot elevation text, as requested by the customer. All contour and depression line features and spot elevation point features shall contain the elevation of each feature encoded as an attribute value.

2. The contour line files shall contain either 1) two-foot interval contour lines meeting NMAS at a scale of 1:2400 (one inch equals 200 feet), or 2) one-foot interval contour lines meeting NMAS at a scale of 1:1200 (one inch equals 100 feet), as requested by the customer.

3. The digital elevation files shall be organized in such a manner that all data features can be selectively retrieved, manipulated, and displayed, either singly or in combination with other data features.

4. All contour and depression lines in the files will be continuous, connected line features. The contour and depression lines will not be broken or interrupted for text features, structures, or any other map features.

5. Depression line features in the contour line files need to be created in such a way as to facilitate the symbolization of these lines in other digital map file formats. All depression lines in the digital files shall be created in a “clockwise” direction in order to maintain the proper symbology of these features.

6. The contour line files shall be prepared in MicroStation Version 8 three-dimensional design file format (MicroStation V8 3-D DGN file) or a comparable ESRI geodatabase format. The files will be organized to cover entire U.S. Public Land Survey System survey townships. Commission staff will provide information on the tiling scheme and naming convention for the files.

7. The horizontal and vertical datums to be used for the contour line files are NAD27 and NGVD29 or NAVD88 as previously described.

VI. PROPOSAL REQUIREMENTS

A. General

The intent of this request for project and cost proposals is to evaluate Vendor qualifications and obtain cost estimates for the deliverable products described herein. Minimum product specifications have been provided for each deliverable, and it is expected that responses to this request will provide significant information about how the Vendor proposes to prepare each product. Vendors should explain how they propose to conduct this project and carry out the procedures necessary to deliver each of the described products. It is in the Vendor's best interest to provide as much information as possible.

B. Proposal Areas

Costs for the 12-inch resolution and 6-inch resolution orthophotography products should be provided for the seven-county area and extended out-of-region area as shown on "Exhibit A". This project area totals 2,967 square miles. Costs for 12-inch and 6-inch orthophotography products should also be provided for each of the seven counties and also for the out-of-region area. The cost for the 3-inch resolution orthophotography product should be provided for the area of Kenosha County only. The size of each county and the out-of-region area are as follows:

County	Area (mi^2)
Kenosha	278
Milwaukee	242
Ozaukee	234
Racine	340
Walworth	578
Washington	436
Waukesha	581
Out of Region Area	278
Total	2,967

C. Proposal Specifics

The project proposal and cost proposals should address the deliverable products of orthophotography, oblique photography, LiDAR data, DTM files, and contour line files. Metadata shall be provided for each type of deliverable product. The Vendor may provide information and costs for other image or elevation products that may be offered.

1. Digital Orthophotography

a. Provide cost proposal for 12-inch resolution orthophotography for entire 2,967 square mile project area and for each individual county and out-of-region area as listed above.

b. Provide cost proposal for 6-inch resolution orthophotography for entire 2,967 square mile project area and for each individual county and out-of-region area as listed above.

c. Provide cost proposal for 3-inch resolution orthophotography for Kenosha County area only.

d. Provide cost proposals for alternative resolutions (e.g. between 12-inch and 3-inch resolution) and appropriate scales of digital orthophotography for each individual county as listed above, if such alternatives are offered or recommended by your firm.

e. Provide information about digital camera to be used, including manufacturer, model, lens and focal length, flight altitude(s) and any other camera information important to this project.

f. Provide information about horizontal photo control, aero-triangulation, and other ground control procedures.

g. Provide information on flight altitude and other image collection information that may be important to this project.

h. Indicate if the Regional orthophoto elevation model that can be provided by the Commission will be used in the orthophoto process, and if the OEM will be updated and returned upon completion of project.

i. Alternatively, describe procedures for use of project-collected LiDAR for use in ground control and georeferencing.

j. Indicate whether triangulated nadir frames and/or camera models developed for this project are available as a deliverable product to interested participants.

k. Indicate possible cost savings for committing to a multiple-year orthophotography program. For example, describe approximate cost savings for a commitment to preparing 3-inch pixel resolution imagery for Kenosha County under these two scenarios: 1) image collection for three flights [e.g. flights in 2015, 2017, and 2020]; and 2) image collection for two flights [e.g. flights in 2015 and 2017 *or* 2018].

2. Digital Oblique Photography

a. Prepare cost proposals for the creation of oblique aerial imagery comparable to each resolution of orthophotography (e.g. 6-inch resolution oblique images to complement 6-inch resolution orthophoto images).

b. More specifically, provide cost proposals for each resolution of oblique photography for each county as listed above. Do not provide cost proposal for entire 2,967 square mile project area, and do not provide cost proposal for out-of-region area.

c. Provide information about procedures used to collect and prepare oblique imagery, including any technical or other information that may be important to this project.

d. Provide information about the software that will be used to view and analyze the oblique imagery. Include information about functionality such as distance measurement, area measurement, slope calculation, and other tools.

e. Describe and explain if the accompanying software is intended for workstation use, such as with ArcMap and other ESRI products. Indicate compatibility with ESRI products.

f. Describe and explain if the accompanying software is a web application suitable for inclusion on a municipal land information web site.

3. LiDAR Data

a. Prepare cost proposals for LiDAR data collected at a point spacing sufficient to support two-foot contour interval elevation mapping (approximately 1.0 meter or 3.28 feet point spacing),

and also collected at a point spacing sufficient to support one-foot contour interval mapping (approximately 0.7 meters or 2.30 feet point spacing).

b. More specifically, provide cost proposals for each point spacing of LiDAR data for each county as listed above. Do not provide cost proposal for entire 2,967 square mile project area, and do not provide cost proposal for out-of-region area.

c. Describe LiDAR collection and processing procedures.

d. Describe LiDAR data classification level, such as bare-earth classification only or fully classified data. Provide classification categories and codes.

4. Digital Terrain Model Files

a. Prepare cost proposals for the creation of DTM files capable of supporting the creation of two-foot interval contour lines meeting NMAS at a scale of 1:2400 (one inch equals 200 feet), and the preparation of DTM files capable of supporting the creation of one-foot interval contour lines meeting NMAS at a scale of 1:1200 (one inch equals 100 feet)

b. More specifically, provide cost proposals for the two different accuracies of DTM files for each county as listed above. Do not provide cost proposal for entire 2,967 square mile project area, and do not provide cost proposal for the out-of-region area.

c. Describe DTM collection and processing techniques, including mass point and breakline feature preparation.

5. Contour Line Files

a. Prepare cost proposals for digital contour and depression line files prepared to two different accuracies: 1) two-foot interval contour lines meeting NMAS at a scale of 1:2400 (one inch equals 200 feet, or 200-scale), or 2) one-foot interval contour lines meeting NMAS at a scale of 1:1200 (one inch equals 100 feet, or 100-scale). For each accuracy, also prepare cost proposals for contour line files without annotation features and contour line files with annotation features.

b. More specifically, provide cost proposals for the two different accuracies and two different feature sets of contour line files for each county as listed above. There will be four costs per county: 1) 200-scale without text; 2) 200-scale with text; 3) 100-scale without text; and 4) 100-scale with text. Do not provide cost proposal for entire 2,967 square mile project area, and do not provide cost proposal for the out-of-region area.

c. Describe contour and depression line collection and preparation procedures.

6. Other Products

a. The Vendor may provide information on additional imagery or elevation mapping products that may complement the 2015 Regional Orthophotography Project.

b. Describe additional products in detail and include any information that may be important to this project.

c. Provide cost proposals for the additional products for each county as listed above. Do not provide cost proposal for entire 2,967 square mile project area, and do not provide cost proposal for the out-of-region area.

D. Document Instructions

The cost proposals and product information provided by the Vendors will be used by the project participants to determine the scope of the regional project. The information will also help to determine Vendor selection for all or portions of the 2015 Regional Orthophotography Project. The Counties may choose a Vendor based on product suitability, timing of delivery, product cost, and other considerations. It is possible that both Vendors may be selected to complete portions of this project.

Please provide the project and cost proposals by **4:00 PM Friday, March 28, 2014**. The preferred format for the proposals is a document in PDF format delivered via email to jmcdougall@sewrpc.org. If you prefer to deliver hardcopy materials, please provide eight (8) copies of the materials to the address below.

Any questions pertaining to the Request for Project and Cost Proposals for the 2015 Regional Orthophotography Project may be directed to:

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(262) 547-1103 *fax*
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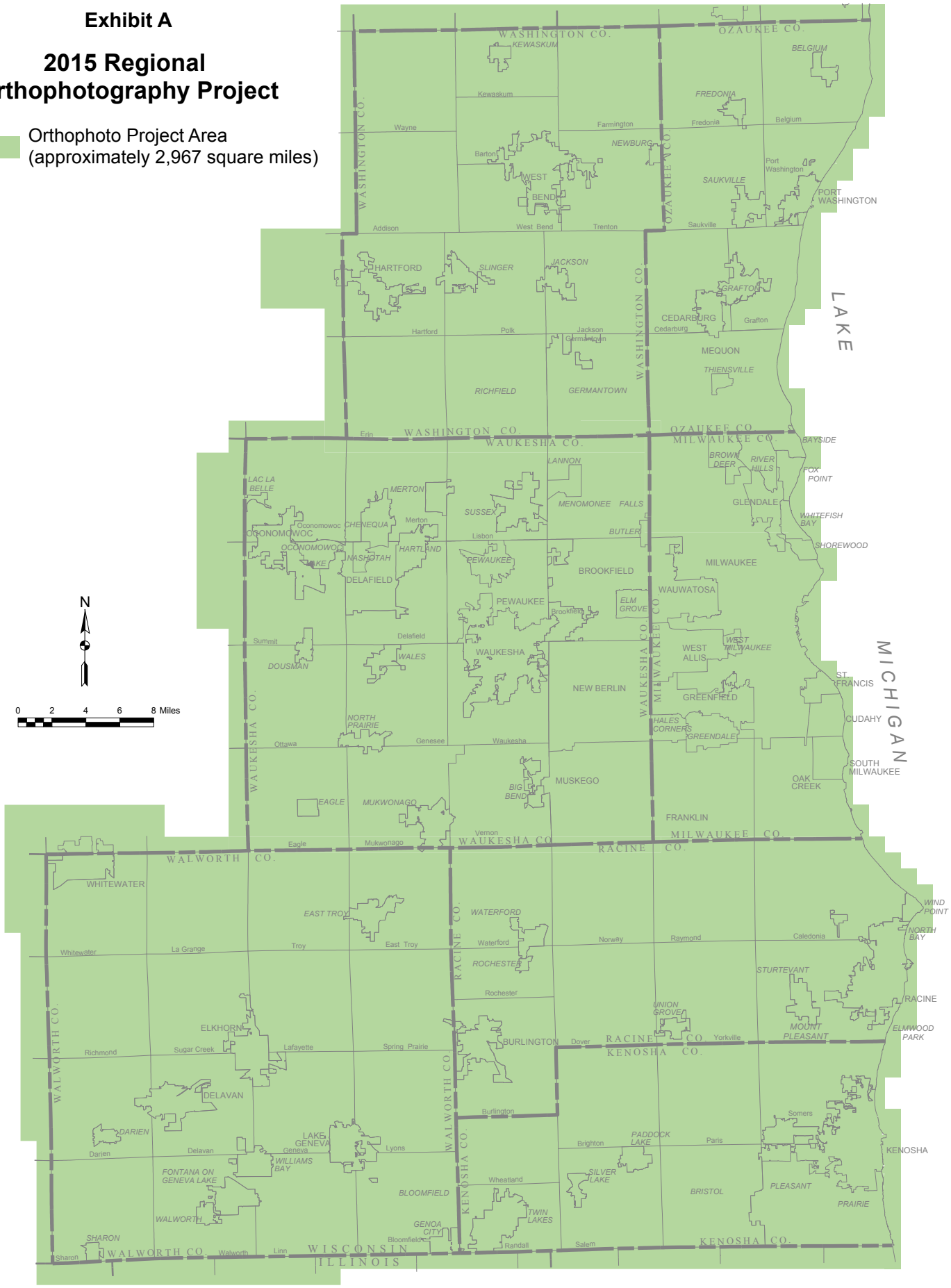
Exhibit A

2015 Regional Orthophotography Project

Orthophoto Project Area
(approximately 2,967 square miles)



Map Document: (O:\Orthophoto_Statusmaps\2015OrthophotoStatusMaps\2015OrthoProjectArea_Exhibit_C.mxd)
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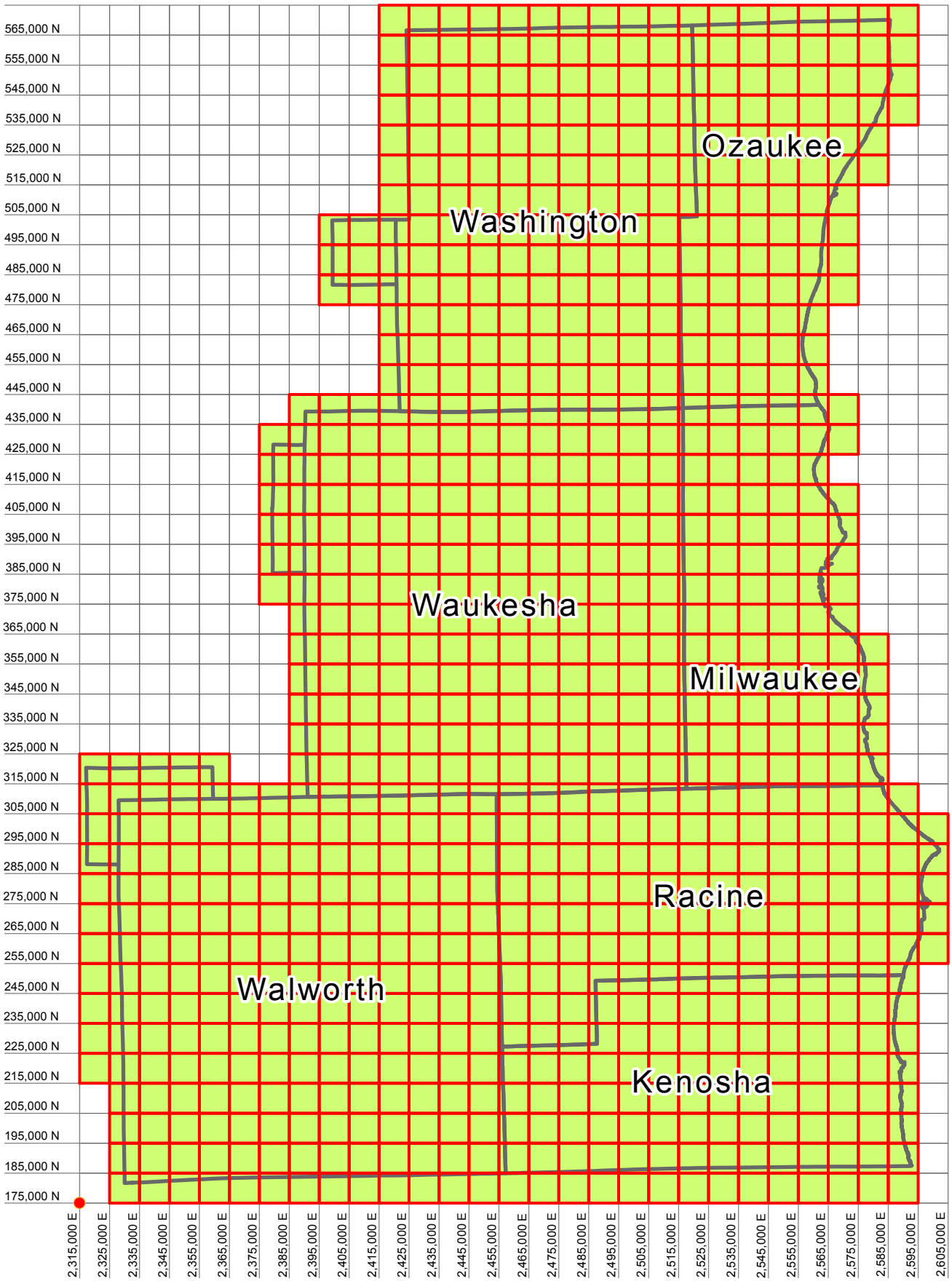

Exhibit B

2015 Regional Orthophotography Project

Orthophoto Project Area

10,000 x 10,000 foot tiles (876 10K Tiles)

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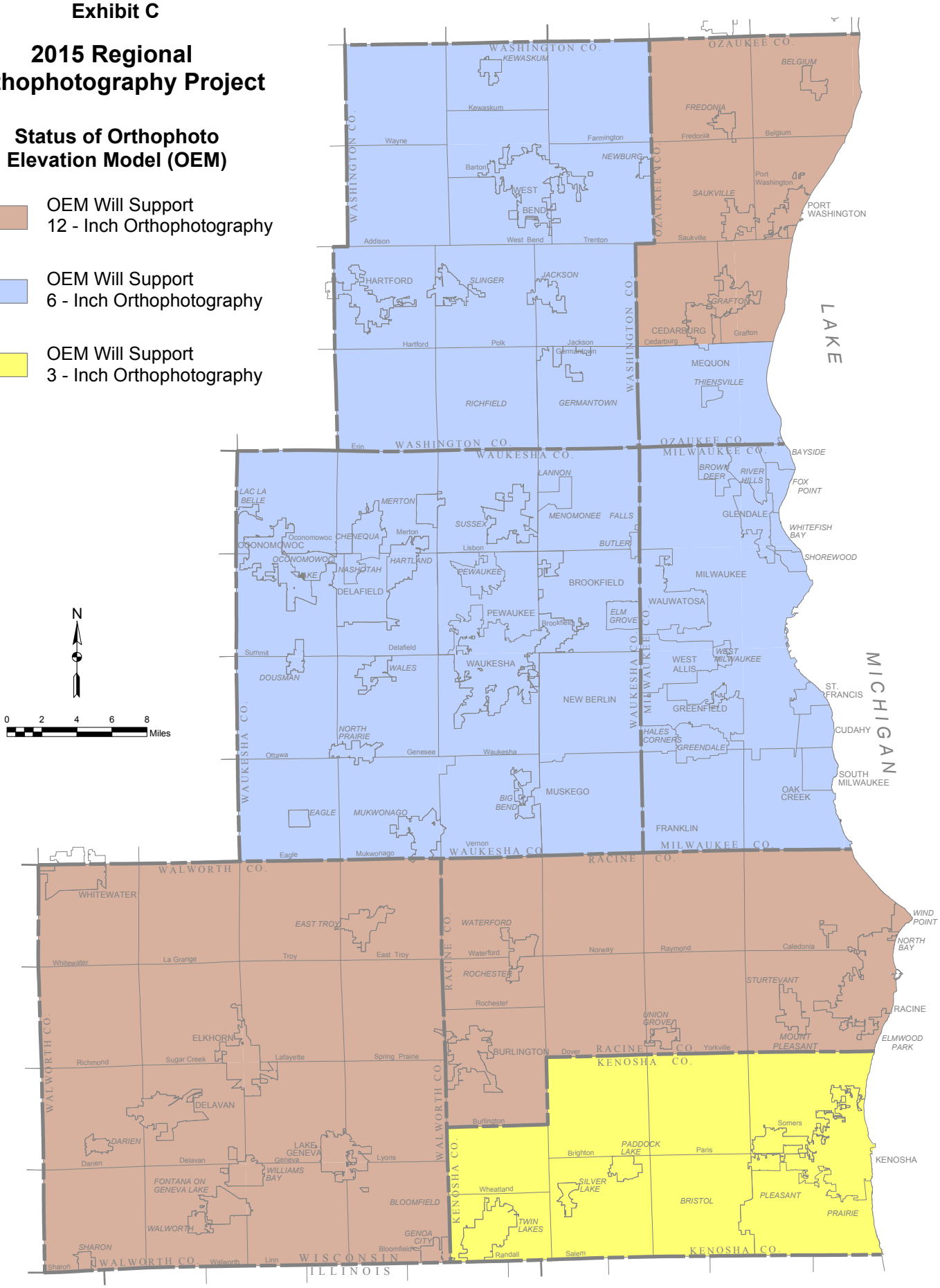
Exhibit C

2015 Regional Orthophotography Project

Status of Orthophoto Elevation Model (OEM)

- OEM Will Support 12 - Inch Orthophotography
- OEM Will Support 6 - Inch Orthophotography
- OEM Will Support 3 - Inch Orthophotography



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