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EVA001_QQ222166-V2_RESP_1

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Response Summary - for QQ Version 2

Vendor Name: The Davey Tree Expert Co
Contact Name: Klimas, Chris
Phone #: 301-829-6915 Ext:
Email: chris.klimas@davey.com
Fax #: 301-829-5438

Response Header

Response ID:	EVA001_QQ222166-V2_RESP_1								
Response Title:	Tree Canopy Assessment								
SWAM:									
Ordering Address:	218B S Main St Mount Airy, MD 21771-5317								
Response Date:	09/14/2017 09:40:04 AM								
Comments:	Addenda 1 viewed.								
Attachments:	<table border="1"> <thead> <tr> <th>Attached Files</th> <th>Proprietary and Confidential</th> </tr> </thead> <tbody> <tr> <td>Cost Proposal.pdf</td> <td>No</td> </tr> <tr> <td>Scope of Work Summary.pdf</td> <td>No</td> </tr> <tr> <td>References Staff Resumes and Project List.pdf</td> <td>No</td> </tr> </tbody> </table>	Attached Files	Proprietary and Confidential	Cost Proposal.pdf	No	Scope of Work Summary.pdf	No	References Staff Resumes and Project List.pdf	No
Attached Files	Proprietary and Confidential								
Cost Proposal.pdf	No								
Scope of Work Summary.pdf	No								
References Staff Resumes and Project List.pdf	No								

Response Items

Item 1

Item ID:	1
Vendor Part Num:	*
Unit Price:	423.08
Quantity:	26
Unit of Measure:	SMI
UOM Description:	mile (statute mile)
NIGP Code:	95845
NIGP Code Description:	Forestry Management Services (Including Inventory, Monitoring, Extension, Pest Control, etc.)
Total Price:	\$11,000.08
Comments:	This is a grand total bid per the QQ our grand total price is 11,000.08 which is equal to the unit price above multiplied by the quantity
Delivery Date:	11/30/2017
Ship To:	2700 S. Taylor St 2700 S Taylor St, Arlington, VA, 22206
Brand Name:	*
Short Name:	Tree Canopy Assessment
Item Description:	Tree Canopy Assessment
Lead Time:	0 Calendar Days After Receipt of Order (ARO)
Met Specs?	Yes
Attachments:	none

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Quick Quote Responses

Lot #	Item #	Buyer Quantity	Buyer UOM	Buyer Item Description	Vendor	Registration Type	SWAM	Q1 Ver	Response ID	Vendor Qty	Vendor UOM	Vendor Unit Price	Total
0	1	26	SMI	Tree Canopy Assessment	The Davey Tree Expert Co	Self-Registered		2	EVA001_QQ222166-V2_RESP_1	26	SMI	423.08	\$11,000.08
0	1	26	SMI	Tree Canopy Assessment	Plan It Geo	Self-Registered		2	EVA001_QQ222166-V2_RESP_1	26	SMI	\$38,4615	\$14,000.00
0	1	26	SMI	Tree Canopy Assessment	SavaTree	Self-Registered		1	EVA001_QQ222166_RESP_1	1	SMI	15360.31	\$15,360.31



Summary: QQ222166

Arlington County, Virginia

September 2017

Prepared for:
Arlington County Government
Buyer: Helena Gilbert
Closing On: September 14, 2017 at 12:00 P.M.

Prepared by:
Davey Resource Group
A Division of The Davey Tree Expert Company
1500 North Mantua Street
Kent, Ohio 44240
800-828-8312



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Tree Canopy Assessment

Land Cover Extraction and Mapping

Land cover will be assessed for the ~26 square miles that comprise Arlington County using remotely-sensed and semi-automated feature extraction methods. Using these methods, Davey Resource Group will be able to provide a cost-effective and accurate picture of Arlington County's tree canopy cover.

Data Mining and Consolidation

For this project, we will obtain the 2016 National Agricultural Imagery Program (NAIP) leaf-on 1-meter aerial digital imagery acquired by USDA. This will provide the most up-to-date land cover extraction possible at this time. Through our NearMap partnership, we also have access to imagery from July 2016 that has a resolution of less than 6 inches. We will use a combination of these two images to accurately define the extent of the tree canopy.

Land Cover Classification

Davey Resource Group utilizes three techniques to generate the "best" extraction results: 1) a segmentation classification; 2) an OBIA approach; and 3) LiDAR data analysis, when available. We will use the data to identify the following land cover classifications: tree canopy, grass, impervious surfaces, bare soils, and water features. Potential planting area will also be identified.

ArcGIS® and Overwatch's Feature Analyst® GIS and remote sensing software will be for the automated extraction process. Feature Analyst® is a powerful automated feature extraction (AFE) tool for extracting object-specific geographic features and allows the minimum mapping unit (MMU) to be set prior to the initial feature extraction process. This option will be set before the classification is run, allowing only areas having this specified area aggregated, as well as certain spectral characteristics, to be classified as a particular cover type.

Accuracy Standards

Davey Resource Group's experience with and knowledge of the classification tools described above enable us to capture a much more accurate representation of the current land cover layer and decreases the amount of manual editing time needed in the quality control process.



Davey Resource Group will manually edit and conduct thorough quality assurance and quality control (QA/QC) checks on all tree canopy and land cover layers. A QA/QC process will be completed using ArcGIS® to identify, clean, and correct any misclassification or topology errors in the final land cover dataset. If a 9-square-meter MMU is utilized, Davey Resource Group will edit the initial land cover extractions in urban and rural areas at a 1:2,000 QC scale, and woodland/forested areas at a 1:5,000 scale. We will achieve a minimum of 95% user's accuracy for tree canopy and impervious classes and an overall accuracy of greater than or equal to 92%.

Reference Data	Classes	Tree Canopy	Impervious Surfaces	Grass & Low-Lying Vegetation	Bare Soils	Open Water	Row Total	Producer's Accuracy	Errors of Omission
	Tree Canopy		529	7	21	0	0	557	94.97%
Impervious		2	340	23	0	0	365	93.15%	6.85%
Grass/Vegetation		18	10	465	0	0	493	94.32%	5.68%
Bare Soils		2	1	4	20	0	27	74.07%	25.93%
Water		1	0	2	1	54	58	93.10%	6.90%
Column Total		552	358	515	21	54	1,500		
User's Accuracy		95.83%	94.97%	90.29%	95.24%	100.00%		Overall Accuracy	93.87%
Errors of Commission		4.17%	5.03%	9.71%	4.76%	0.00%		Kappa Coefficient	0.9112

Land Cover Metrics

The final comprehensive land cover dataset will be processed in ArcGIS® to measure the current tree canopy cover for the project area. We will create a statistical summary.

Area and percentages of canopy cover will be calculated for the project area and the up to five geographic boundaries such as those listed in the county's scope of work for this project.

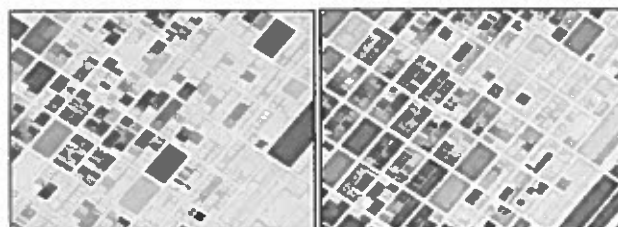


A. NAIP Imagery

B. Parcels

Potential Planting Area

Davey Resource Group will locate potential planting areas per the protocols set by the USDA Forest Service. The identification of potential planting areas takes into account land use and other factors such as approved community master planning that limit where trees may be planted. The planting area analysis will be completed for the entire project and up to five geographic boundaries such as those listed in the county's scope of work for this project.



C. Canopy Percentage

D. Potential UTC Percentage

Historic Canopy Analysis and Change Assessment

Historic canopy change will be calculated using the 2008 and 2011 tree canopy assessment data. By completing the tree canopy assessment using 2016 imagery, the county will be able to track changes in canopy and development over the past decade. Spatially explicit analysis for canopy change will be completed for up to five geographic boundaries such as those listed in the county's scope of work for this project.

Comparison of Average Surface Temperature

Surface temperature will be derived using Landsat satellite imagery.

Report

Davey Resource Group will develop a report of the tree canopy assessment findings and provide one draft review/comment period. After the draft review/comment period, we will produce a final report that includes county revisions. We will report on the current overall tree canopy cover and tree canopy cover by up to five geographic boundaries such as those specified by Arlington County in the scope of work. This report shall include:

- Methods
- Current tree canopy
- Comparisons to historic tree canopy
- Tree canopy and possible tree canopy by up to five geographic boundaries such as those listed in the county's scope of work for this project.
- Comparison to average surface temperatures
- Summary and recommendations

Timeline

Davey Resource Group will complete the project by November 30, 2017.

Deliverables

All deliverables will be produced and distributed as specified by the county. Davey Resource Group will deliver all GIS data in an ESRI ArcGIS® geodatabase in a projected coordinate system that fully integrates with the county's existing software. Data sets will be delivered with projection files and metadata using Federal Geographic Data Committee (FGDC) specifications.

In addition to the GIS data files, the following will also be delivered to Arlington County:

- Narrative of the classification methodology.
- Metadata that conforms to both Arlington County and FGDC Standards.
- Land cover layer that includes trees, impervious surface, grass, bare soil, and water
- Land cover percentages
- Tree canopy change metrics
- Potential planting areas
- Comparison of average surface temperatures as they relate to tree canopy
- Database/spreadsheets/KMLs as desired
- Tree canopy assessment report in Microsoft Word and PDF formats

About Davey's GIS Services

Davey Resource Group's GIS services staff applies to each project the same high standards that have come to be expected of The Davey Tree Expert Company. Our GIS and IT professionals consist of over 50 GIS professionals and 13 IT software support specialists and software developers. Working in conjunction with urban foresters, environmental scientists, horticulturists, and tree grounds care specialists, Davey Resource Group provides high-quality solutions to clients that include local, state, and national parks, utility companies, government agencies, and military bases. Davey Resource Group can help you easily and efficiently manage data and map information with a variety of state-of-the-art software solutions and the latest hardware technologies.

Davey Resource Group has been a longtime client of Esri with an active GIS user community. We are a silver partner and have an established Esri Enterprise License Agreement (ELA) contract to support our continued growth and development. In addition, we continue to stay innovative on all aspects of software and hardware technology supporting our internal field staff with a variety of GIS solutions.



Our pledge is to offer GIS expertise in the tradition of excellence which is the Davey Resource Group hallmark and provide dependable services and innovative solutions including:

- GIS Mapping and Remote Sensing Analysis
- ArcSDE Database Design, Construction, and Maintenance
- Custom GIS Programming
- Interactive Web Viewer
- Creation of Presentation Quality Maps
- 3-D Modeling and Animation
- Continued Research and Development
- Esri Software Sales and Training

Geospatial Platform and Components

Davey Resource Group utilizes the most current and stable versions of ESRI Products. Keeping up-to-date with current versioning allows for the newest technological advances to be delivered to our clients and allows them to showcase their data as needed. Below is a summary of our current geospatial platform and the components.

ArcGIS Desktop

Davey Resource Group uses ArcGIS Version 10.3 and higher as our main source for data development, maintenance, manipulation, analysis, and map creation. Our team also utilizes state-of-the-art GIS, remote sensing, and image processing software packages such as ERDAS IMAGINE, IDRISI TerrSet, Feature Analyst, Lizardtech GeoExpress, and other various third party extensions such as ET GeoWizards for additional geoprocessing tools and open source GIS software. Davey Resource Group also has working knowledge of AutoCAD, QCAD, and QGIS product lines to supplement our main software.

Hosted ArcGIS Server

Davey Resource Group has extensive experience setting up, hosting, customizing, updating, and maintaining both internal and client GIS systems for projects have websites both internal client facing. We have a number of internal projects that run with ArcSDE and assist clients in system planning, process design, training, and software and hardware purchases. Our involvement in a client-based system varies from client to client and involves periodic updating of data to performing weekly GIS/Database maintenance.

The Davey Tree Expert Company's Limited Warranty

The Davey Tree Expert Company, its divisions, agents, representatives, operations, or subsidiaries (collectively "Davey") provides this Limited Warranty as a condition of providing the services outlined in the agreement between the parties, including any bids, orders, contracts, or understandings between the parties (collectively the "Services").

Davey provides the Services utilizing applicable standard industry practices and based on the facts and conditions known at the point in time the Services are performed. Facts and conditions related to the subject of the Services may change over time. Davey cannot predict or determine developments concerning the subject of the Services and will not be liable for any developments, changes, or conditions that occur, including, but not limited to, decay or damage by the elements, persons or implements, insect infestation, deterioration, conditions not discoverable using the means and methods used to perform the Services, or acts of God or nature or otherwise. If a visual inspection is utilized, visual inspection does not include aerial or subterranean inspection, testing, or analysis. Davey will not be liable for the discovery or identification of non-visually observable, latent, dormant, or hidden conditions or hazards, and does not guarantee that items will be healthy or safe under all circumstances or for a specified period of time, or that remedial treatments will remedy a defect or condition.

Davey may have reviewed publicly available or other third-party records or conducted interviews, and has assumed the genuineness of such documents and statements. Davey disclaims any liability for errors, omissions, or inaccuracies resulting from or contained in any information obtained from any third-party or publicly available source.

To the extent permitted by law, Davey does not make and expressly disclaims any warranties or representations of any kind, express or implied, with respect to completeness, accuracy, or current nature of the information contained in the Services or the reports or findings resulting therefrom beyond that expressly contracted for by Davey in the agreements between the parties, including but not limited to, performing diagnosis or identifying hazards or conditions not within the scope of the Services or not readily discoverable using applicable standard industry practices. Davey disclaims any warranty of fitness for any particular purpose. Davey's warranty is limited to one year from the date Services are performed. Davey's liability for any claim, damage, or loss, whether direct, indirect, special, consequential, or otherwise, caused by or related to the Services shall be limited to the Services expressly contracted to be performed by Davey.



References, Staff Resumes, and Project List

References

ATTACHMENT B - REFERENCES

Bidders shall provide three (3) references for similar services that have been provided by the Bidder within the past five (5) years. The County reserves the right to evaluate the quality of Contractor's work by contacting the Contractor's references.

REFERENCE No. 1

Company name:	Louisville Metro Government
Contact name:	Erin Thompson
Contact e-mail address:	Erin.thompson@louisvilleky.gov
Contact phone number:	502-574-4030
Contract start/end dates:	May 2014–November 2014

*Emailed 9/15
Phone no. doesn't work*

REFERENCE No. 2

Company name:	Up With Trees
Contact name:	Steve Grantham
Contact e-mail address:	steve@upwithtrees.org
Contact phone number:	918-610-8733 ext. 201
Contract start/end dates:	November 2015–November 2016

*Emailed 9/15
Call at 1 pm
Left msg
Emailed back 9/15*

REFERENCE No. 3

Company name:	City of Largo, FL
Contact name:	Phil Christman, Assistant Parks Superintendent
Contact e-mail address:	pchristm@largo.com
Contact phone number:	727-587-6740
Contract start/end dates:	October 2013–April 2016

*Emailed 9/15
No response
Emailed back
9/18*

Staff Resumes

Davey Resource Group

William D. Ayersman, GISP, Geospatial Services Coordinator



William D. Ayersman, GISP, M.S., is the Geospatial Services Coordinator with the Davey Resource Group. He is a lead geospatial analyst with extensive experience applying spatial analysis and predictive modeling to natural resource issues. His daily responsibilities involve GIS project coordination for remote sensing and image analysis projects, LiDAR analysis, database and project management, and the creation and design of predictive and suitability models. Since 2011, he has been the project lead on all urban tree canopy (UTC) assessment and forestry analysis projects for urban forestry and utility services, including generating custom mapping and reports for transmission right-of-way projects.

Mr. Ayersman plays a key role in the development of Davey Resource Group's innovative GIS tools and solutions, focusing on the urban canopy effects of stormwater, watersheds, and ecosystem cost/benefits analysis. He has experience and knowledge in the field of forestry resource management, cartography, landscape metrics, and spatial statistics. He also has strong interests in the research and development of new spatial analysis procedures, timber stand dynamics, and the ecological impacts of invasive species.

Prior to joining Davey Resource Group, Mr. Ayersman worked as a GIS Analyst for the Natural Resource Analysis Center in Morgantown, West Virginia where he collaborated with WV Department of Natural Resources to obtain goals for a wetland predictive model, conducted watershed and remote sensing analysis, and performed predictive/suitability modeling for invasive species. As a graduate research assistant at West Virginia University, he worked with the USDA Forest Service to design and create a spatial predictive model for the spread of emerald ash borer using GIS as well as a role in applying spatial analysis in order to complete his thesis requirements.

Relevant Projects

- Louisville/Jefferson County, KY Historic Tree Canopy Assessment (2013-2014)
- Tulsa County, OK Historic Tree Canopy Assessment (2015-2016)
- Largo, FL Tree Canopy Assessment and Urban Forest Master Plan (2015-2016)

Education

- M.S., Forestry, West Virginia University
- B.S., Forest Resource Management, West Virginia University

Certifications

- Certified Geographic Information Systems Professional (GISP) #72590

Professional Affiliations

- American Society of Photogrammetry and Remote Sensing (ASPRS)
- Association of American Geographers (AAG)
- Ohio Urban Regional System Association (URISA), Ohio Chapter

Presentations

- Kentucky GIS Conference, "Combining GIS and Urban Forestry to Assist in Lexington's Green Infrastructure," October 2013
- Ohio GIS Conference, "Applying GIS to Analyze Urban Ecosystems in Communities for Green Infrastructure Planning," September 2013
- Esri Forestry Conference, "Integrating GIS Data and Management Systems to Assess Urban Forest Ecosystems," May 2013

William Ayersman
william.ayersman@davey.com
330-673-5685, ext. 8048

Davey Resource Group
daveyresourcegroup.com
800-828-8312

DAVEY 
RESOURCE GROUP
A Division of The Davey Tree Expert Company

Tree Canopy Assessment Project List

Project Location	Project Type	Year	Project Location	Project Type	Year
Grand Traverse Bay, MI	UTC Mapping/Analysis	2017	Louisville/Jefferson	UTC Mapping/Analysis	2014
Columbia, MO	UTC Mapping/Analysis/Master Plan	2017	Goshen, IN	UTC Mapping/Analysis	2013
Edmonds, WA	UTC Mapping/Analysis/Master Plan	2017	Howard Beach, NY	UTC Mapping/Analysis	2013
Patterson, CA	UTC Mapping/Analysis/Master Plan	2017	Easton, MD	UTC Mapping/Analysis	2013
East Lansing, MI	UTC Mapping/Analysis	2017	Lexington, KY	UTC Mapping/Analysis	2013
Sacramento, CA	UTC Mapping/Analysis/Master Plan	2017	Village of Richfield	UTC Mapping/Analysis	2013
Columbia City, IN	UTC Mapping/Analysis	2017	Stow, OH	UTC Mapping/Analysis	2013
Lawrenceburg, IN	UTC Mapping/Analysis	2017	Macedonia, OH	UTC Mapping/Analysis	2013
Woodland, CA	UTC Mapping/Analysis/Master Plan	2017	Asbury Park, NJ	UTC Mapping/Analysis	2013
Morden, MB (Canada)	UTC Mapping/Analysis	2017	Whitpain, Twp PA	UTC Mapping/Analysis	2012
St. Augustine, FL	i-Tree Canopy Assessment	2017	Tukwila, WA	UTC Mapping/Analysis	2012
Up With Trees (Tulsa County)	UTC Mapping/Analysis/Master Plan	2016	Roseville, CA	UTC Mapping/Analysis/Master Plan	2012
City of Manhattan Beach	UTC Mapping/Analysis/Master Plan	2016	West Memphis, AR	UTC Mapping/Analysis	2012
City of Golden, CO	UTC Mapping/Analysis	2016	Greenville, NC	i-Tree Canopy Assessment	2012
City of Plano, TX	UTC Mapping/Analysis/Master Plan	2016	Adrian, MI	i-Tree Canopy Assessment	2012
City of Ferndale, IN	UTC Mapping/Analysis	2016	Ann Arbor, MI	i-Tree Canopy Assessment	2012
Montana Statewide (17 cities)	UTC Mapping/Analysis	2016	Kalamazoo, MI	i-Tree Canopy Assessment	2012
Atwater, CA	UTC Mapping/Analysis/Master Plan	2016	Lansing, MI	i-Tree Canopy Assessment	2012
Whitpain Twp, PA	UTC Mapping/Analysis	2016	Marquette, MI	i-Tree Canopy Assessment	2012
Kendallville, IN	UTC Mapping/Analysis	2016	Madison, MI	i-Tree Canopy Assessment	2012
Midshore RiverKeeper Conservancy	UTC Mapping/Analysis/Master Plan	2016	Traverse City, MI	i-Tree Canopy Assessment	2012
Florida A&M, Tallahassee FL	UDAR Analysis	2016	Fort Bragg, NC	UTC Mapping/Analysis	2011
West Lafayette	i-Tree Canopy Assessment	2016	Port Angeles, WA	UTC Mapping/Analysis	2011
Mamaroneck, NY	i-Tree Canopy Assessment	2016	Watsonville, CA	UTC Mapping/Analysis	2011
Citrus Heights, CA	UTC Mapping/Analysis/Master Plan	2015	Ypsilanti, MI	UTC Mapping/Analysis	2011
Largo, FL	UTC Mapping/Analysis/Master Plan	2015	Anderson, IN	UTC Mapping/Analysis	2011
Pacific Grove, CA	UTC Mapping/Analysis/Master Plan	2015	Cedar Lake, IN	UTC Mapping/Analysis	2011
Oakland, CA	UTC Mapping/Analysis	2015	Evansville, IN	UTC Mapping/Analysis	2011
AuGres, MI	UTC Mapping/Analysis	2015	Madison, IN	UTC Mapping/Analysis	2011
Standish, MI	UTC Mapping/Analysis	2015	Ft Wayne, IN	UTC Mapping/Analysis	2011
Holyoke, MA	UTC Mapping/Analysis	2014	South Bend, IN	UTC Mapping/Analysis	2011

Patrick Davis, Urban Forester/Report Writer

Patrick Davis provides urban forestry services to clients in both the private and public sector from Cary, North Carolina. Mr. Davis is experienced in urban and utility forestry, forest pathology, and GIS mapping and analysis. He has been with Davey Resource Group for 5 years.

His diverse field experience includes tree risk assessments, tree appraisals, tree and utility system inventories, and invasive species surveys. Mr. Davis has also used GIS programs to provide clients with risk management plans and maintenance schedules based on their tree inventory data.

Education

- M.S., B.S., A.A., Forest Resources Management, State University of New York (SUNY), College of Environmental Science and Forestry (ESF)

Certifications

- Certified Arborist (NE-6907A), International Society of Arboriculture
- Tree Risk Assessment Qualification (TRAQ), International Society of Arboriculture
- Certified Forester (163367), Society of American Foresters
- Licensed Pesticide Application (026-34832), State of North Carolina