

**AMENDMENT NO. 1 TO THE PROFESSIONAL SERVICES AGREEMENT
BETWEEN THE CITY OF MANHATTAN BEACH AND DAVEY RESOURCE
GROUP**

This First Amendment ("Amendment No. 1") to that certain agreement by and between the City of Manhattan Beach, a California municipal corporation ("City") and The Davey Tree Expert Company, an Ohio corporation, operating through its Davey Resource Group division ("Contractor") (collectively, the "Parties") is hereby entered into as of January 5, 2016 ("Effective Date").

RECITALS

- A. On January 20, 2015, the City and Contractor entered into an agreement for professional services for the Contractor to draft an Urban Forest Master Plan ("Agreement");
- B. The Parties now desire to amend the Agreement to enable Contractor to perform additional studies and reports outside the original scope of work and incorporate the reports into the draft Urban Forest Master Plan.

NOW, THEREFORE, in consideration of the Parties' performance of the promises, covenants, and conditions stated herein, the Parties hereby amend the Agreement as follows:

Section 1. Contractor shall perform the additional work specified in Contractor's proposal dated October 19, 2015, attached hereto as Exhibit A.

Section 2. Contractor shall perform the additional work specified in Exhibit A for the amount of \$26,980.

Section 3. The additional work shall start January 5, 2016 and be completed on or before July 1, 2016 unless an extension is granted by City in writing.

Section 4. Except as set forth in this Amendment No. 1, the Agreement remains in full force and effect.

IN WITNESS THEREOF, the Parties hereto have executed this Amendment No. 1 on the day and year first shown above.

CITY OF MANHATTAN BEACH

Davey Resource Group, A Division of
The Davey Tree Expert Company (CONTRACTOR)

By: _____
Mark Danaj, City Manager

By:  _____ Jack McCabe
Its: Vice President of DRG Utility Operations

ATTEST:

Liza Tamura, City Clerk

APPROVED AS TO FORM:

 _____
Quinn M. Barrow, City Attorney

Exhibit A



Western Region Headquarters
6005 Capistrano Avenue, Unit A
Atascadero, CA 93422
916-214-5908
anne.fenkner@davey.com

October 19, 2015

Keith Darling
Public Works, Facilities Supervisor
City of Manhattan Beach
Sent via Email

Dear Mr. Darling,

Thank you for the opportunity to provide additional services for your urban forest management program. As requested, we have developed pricing and scope of work for these services.

Urban Tree Canopy Assessment:

A crucial step to protecting and enhancing a community's urban forest is developing land cover strategies that are supported by critical information like an urban tree canopy (UTC) assessment. This is accomplished by first quantifying a community's current percentage of UTC and other land cover. In addition to establishing the location and extent of existing canopy cover, many clients want to evaluate addition metrics, including:

- Percent canopy cover change over time
- Ecosystem benefits provided by the existing tree canopy
- Consideration of different models for estimating the cost and value of increasing canopy and projecting future ecosystem benefits.

Approach

The most detailed and comprehensive approach includes completing a full land cover extraction. Davey Resource Group will obtain either the 2013 National Agricultural Imagery Program (NAIP) leaf-on 1 meter aerial digital imagery acquired by the U.S. Department of Agriculture to provide the most up-to-date land cover extraction. We utilize the NAIP 4-band orthoimagery on a majority of our past and current tree canopy projects, taking advantage of the near-infrared band for a more accurate extraction.

This will provide Manhattan Beach with a valuable tree canopy cover data layer that spatially represents where tree canopy exists, and can provide a road map for available and most desirable planting spaces. In addition, this GIS layer can be used beyond the UTC Assessment in conjunction with existing GIS information to evaluate the relationship of tree canopy to other assets and issues that may be of interest to the City. The priority planting locations can be based on simply increasing canopy in areas with less cover, or it can be further prioritized based

on land use, council districts, human health data, stormwater demands, or any other GIS based data that is available.

Image Analyses and Automated Feature Extraction

Every project and imagery is different and the results vary depending on the area of interest (urban or rural), the type of imagery (multi-spectral, natural color, or panchromatic), the date and time the imagery is acquired, and the accuracy of the processed image. Davey utilizes 3 different techniques to generate the "best" extraction results: 1) a segmentation classification approach, 2) an object-based image analysis (OBIA) approach, and 3) LiDAR (Light Detection and Ranging) data analysis, when available. Secondary source data, provided by the City, can also be utilized in combination with these advanced automated processing techniques.

Segmentation is an approach that classifies a remotely sensed image by defining image pixels into spectrally similar objects (or segments) and grouped to form a larger cohesive feature, which provides a better visual representation of the true landscape. This approach enables the user to capture smaller landscape features such as individual trees that object based extractions may miss. ArcGIS® and IDRISI Selva will be the GIS and remote sensing software used to complete this automated approach to process remotely sensed multispectral imagery.

An OBIA approach measures various characteristics of an image object such as spectral and spatial properties, texture, and context for a more precise land cover extraction. It is highly suited for applications that utilize medium to high resolution multispectral imagery for land cover mapping and monitoring land cover change. ArcGIS® and Overwatch's Feature Analyst® will be the GIS and remote sensing software used to complete this automated extraction process.

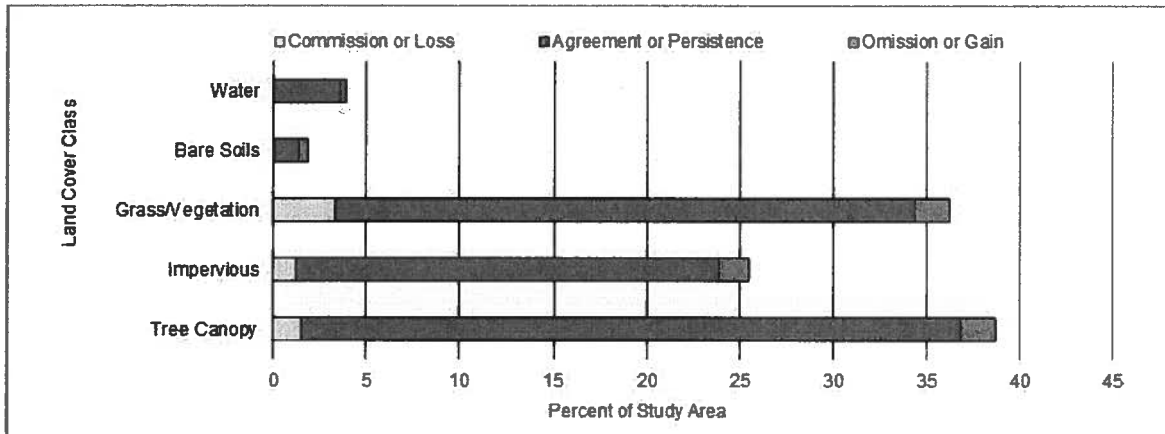
If LiDAR data is available, processing time is greatly diminished from traditional pixel-based, and also from OBIA and segmentation approaches which all require the user to acquire training sets and refine the results with supervised or rule-based classification. Since canopy extraction through LiDAR can be processed in ArcGIS® and only involves the conversion of raw point data, this will enable the City of Manhattan Beach a way to replicate the process allowing canopy cover extractions without having to purchase additional software. In addition, the resulting canopy layer depicts a much more accurate initial representation prior to editing.

Manual Imagery Verification and Quality Control Tactics

Utilizing these powerful classification tools enables Davey to capture a much more accurate representation of the current land cover layer. It also decreases the amount of manual editing time needed in the quality control process.

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. The initial land cover layer extractions will be edited at a 1:1500 quality control scale utilizing the most current high resolution aerial imagery to aid in the quality control process. Random plot locations throughout the City and an error matrix report will be generated to verify. This process will ensure that the data meets client standards and assure that the automated mapping and data analysis performed by GIS specialists accurately reflect the true nature and extent of the canopy cover. Accuracy will be assessed using four metrics: overall accuracy, kappa, quantity disagreement,

and allocation disagreement. These statistical methods will generate an error assessment to ensure that Manhattan Beach's final canopy layer will have a minimum of 94% accuracy.



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%	5.03%
	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

Confidence Intervals					Statistical Metrics Summary	
Class	Acreage	Percentage	Lower Bound	Upper Bound		
Tree Canopy	94,462	37.1%	37.0%	37.2%	Overall Accuracy =	93.87%
Impervious Surfaces	56,033	22.0%	21.9%	22.1%	Kappa Coefficient =	0.9112
Grass & Low-Lying Vegetation	88,525	34.8%	34.7%	34.9%	Allocation Disagreement =	5%
Bare Soils	5,316	2.1%	2.1%	2.1%	Quantity Disagreement =	1%
Open Water	10,113	4.0%	3.9%	4.0%		
Total	254,449	100.00%				
Accuracy Assessment						
Class	User's Accuracy	Lower Bound	Upper Bound	Producer's Accuracy	Lower Bound	Upper Bound
Tree Canopy	95.8%	95.0%	96.7%	95.0%	94.0%	95.9%
Impervious Surfaces	95.0%	93.8%	96.1%	93.2%	91.8%	94.5%
Grass & Low-Lying Vegetation	90.3%	89.0%	91.6%	94.3%	93.3%	95.4%
Bare Soils	95.2%	90.6%	99.9%	74.1%	65.6%	82.5%
Open Water	100.0%	100.0%	100.0%	93.1%	89.8%	96.4%

GIS Analysis

After completing the accuracy assessments, the final comprehensive canopy cover dataset will be processed in ArcGIS® to measure the overall existing canopy cover for the City of Manhattan Beach. Additional GIS analysis will be completed using current data sources for further investigation and in support of the canopy assessment process. Area and percentages

of canopy cover will be calculated for each land use type and designation (e.g., citywide, parks and open space, land use, zoning, improvement and redevelopment areas, neighborhood, sub divisions, flood zones, etc.). This comparison of canopy cover with land designations will become a primary resource for recommendations and goals for the community forest in Manhattan Beach.

DRG will analyze the “Possible UTC” as determined by the US Forest Service to identify methods for increasing canopy. “Preferable” planting sites or suitable sites will also be determined based on selected criteria for all involved stakeholders that may be affected by trees and that relate to the tree maintenance, management, and design.

Optionally, DRG will identify priority areas for protection by analyzing existing canopy and pervious areas from the resulting land cover data. Specific natural resource factors will be evaluated and prioritized to determine areas that provide multiple functions and benefits; and should be considered high priority for protection and preservation.



A final QA/QC check process will be completed using ArcGIS® geoprocessing, analysis, and management tools to identify and correct any topology errors for the additional GIS layers created during this GIS analysis process.

Deliverables

Findings from the Urban Tree Canopy Assessment will be incorporated into, and become a component of the City of Manhattan Beach UFMP.

View Corridor Study

From the original RFP, it is our understanding that Manhattan Beach wants to examine and explore the current view conflict policy, and seek recommendations and modifications if warranted. To complete this process, we will examine the current processes and standards that currently exist for high value trees. Standards will be developed utilizing comparison communities, (5 beach cities in California) best management practices, and current community culture.

Create Tree Preservation Criteria (High Value Trees)

Also from the original RFP, it is our understanding that Manhattan Beach wishes to develop standardized removal criteria which includes investigating hardscape, utility and view considerations. In addition, the city wishes to create a recommended tree preservation standard for trees that may have a high valuation but are problematic due to disease or structural defect. To proceed with this, DRG will review current appeal processes, and recommend modification if warranted. We will develop and/or recommend a tree valuation standard for the city. We will utilize additional cities for comparison as well as best management practices for the situations. (View, and high value trees.) We will develop the recommendations and give the City an opportunity for review prior to including the final recommendations in the UFMP.

Complete Urban Forest Master Plan

We understand the City of Manhattan Beach is requesting the above components and reports to be incorporated into the Urban Forest Master Plan, rather than presented as appendices. This final step requires extensive reformatting of the UFMP. We have identified a fixed amount to address this request. We will include all components identified within this letter as content within the UFMP.

Future Consultation

Once the UFMP is complete, should the City require additional consultation service such as ordinance development or review, Davey will be charged for this type of service at \$95.00 per hour.

Pricing

Canopy Study + Report (required tasks)	\$8,500.00
View Corridor Study	\$3,040.00
Tree Preservation Criteria	\$3,790.00
Prioritized Planting areas	\$2,500.00
Web-based combined version of both UTC Canopy Tools– includes web version of UTRACE to determine size and number of possible tree plantings and estimated costs to plant; in addition to the Projected Ecosystem Benefits Calculator	\$2,500.00
Incorporate data and findings into the UFMP	5,000.00
Present to Council (Complete plan)	1,650.00
Total	\$26,980.00

Mr. Darling, the Davey team is devoted to providing customized service through our technical expertise and our passion for innovative solutions. We recognize that our success depends on

meeting your needs and we are excited about the opportunity to collaborate with Manhattan Beach again to provide supportive research to your plan. Please feel free to contact me at (916) 214-5908 or anne.fenkner@davey.com if you have any questions.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Anne Fenkner', followed by a horizontal line and a vertical line forming a small box.

Anne Fenkner
Project Developer
Davey Resource Group