SPECIAL NOTICE REGARDING
CORONAVIRUS DISEASE 2019 (COVID-19)
AND PARTICIPATION IN PUBLIC MEETINGS

On March 4, 2020, Governor Newsom declared a State of Emergency resulting from the threat of COVID-19. Governor Newsom issued Executive Order N-25-20 (3-12-20) and Executive Order N-29-20 (3-17-20) which temporarily suspend portions of the Brown Act relative to conducting public meetings. Subsequent thereto, Governor Newsom issued Executive Order N-33-20 (3-19-20) ordering all individuals to stay at home or at their place of residence. Accordingly, it has been determined that all Board and Workshop meetings of the San Bernardino Valley Municipal Water District will be held pursuant to the Brown Act and will be conducted via teleconference. There will be no public access to the meeting venue.

BOARD OF DIRECTORS WORKSHOP - ENGINEERING
TUESDAY, AUGUST 11, 2020 – 2:00 P.M.

PUBLIC PARTICIPATION

Public participation is welcome and encouraged. You may participate in the August 11, 2020, meeting of the San Bernardino Valley Municipal Water District online and by telephone as follows:

Dial-in Info: 877 853 5247 US Toll-free
Meeting ID: 753 841 573

https://sbvmwd.zoom.us/j/753841573

If you are unable to participate online or by telephone, you may also submit your comments and questions in writing for the District's consideration by sending them to comments@sbvmwd.com with the subject line "Public Comment Item #" (insert the agenda item number relevant to your comment) or "Public Comment Non-Agenda Item". Submit your written comments by 6:00 p.m. on Monday, August 10, 2020. All public comments will be provided to the Chair and may be read into the record or compiled as part of the record.

IMPORTANT PRIVACY NOTE: Participation in the meeting via the Zoom app is strongly enccouraged. Please keep in mind: (1) This is a public meeting; as such, the virtual meeting information is published on the World Wide Web and available to everyone. (2) Should you participate remotely via telephone, your telephone number will be your "identifier" during the meeting and available to all meeting participants. Participation in the meeting via the Zoom app is strongly encouraged; there is no way to protect your privacy if you elect to call in to the meeting. The Zoom app is a free download.

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT
380 E. Vanderbilt Way, San Bernardino, CA 92408

BOARD OF DIRECTORS WORKSHOP - ENGINEERING

AGENDA

2:00 PM Tuesday, August 11, 2020

CALL TO ORDER -
Chairperson: Director Kielhold
Vice-Chair: Director Hayes

1. INTRODUCTIONS

2. PUBLIC COMMENT - *Any person may address the Board on matters within its jurisdiction.*

3. SUMMARY OF PREVIOUS MEETING

3.1. July 14, 2020 Meeting (Page 3)
Summary Notes BOD Workshop - Engineering 071420

4. PRESENTATIONS

4.1. Presentation by Dr. Daniel Swain: Extreme Atmospheric Rivers as Influenced by California's Warming Climate (Page 7)
Staff Memo - Presentation by Daniel Swain

4.2. Presentation by William Ota (PhD Student, UC Riverside): Current and Future Research Associated with the Santa Ana River (Page 8)
Staff Memo - Presentation William Ota Research

5. DISCUSSION ITEMS

5.1. Discuss Water Use Efficiency End of Year Report (Page 9)
Staff Memo - Discuss Water Use Efficiency End of Year Report

5.2. Completion Report - Citrus Reservoir and Pump Station Floating Cover System Project (Page 13)
Staff Memo - Final Update on Citrus Reservoir Floating Cover System

5.3. Consider a Cooperative Agreement with Huerta Del Valle and a Consulting Agreement with WSC to Conduct Water Supply Studies at the Louis Robidoux Parkland and Jensen Alvarado Historic Ranch (Page 15)
Staff Memo - Consider a Cooperative Agreement with HDV and a Consulting Agreement with WSC for Water Studies at LRP and JAHR
WSC Proposal
Draft Cooperative Agreement
Draft Consulting Agreement with WSC

5.4. Consider A Consulting and Cooperative Agreement to Obtain and Process Aerial Imagery and LiDAR in the San Bernardino National Forest (Page 64)
Staff Memo - Consider A Consulting and Cooperative Agreement to Obtain and Process Aerial Imagery and LiDAR in the SBNF
DMI Proposal
IERCD Cooperative Agreement
Draft DMI Consulting Agreement

6. FUTURE BUSINESS

7. ADJOURNMENT

PLEASE NOTE:
Materials related to an item on this Agenda submitted to the Board after distribution of the agenda packet are available for public inspection in the District's office located at 380 E. Vanderbilt Way, San Bernardino, during normal business hours. Also, such documents are available on the District's website at www.sbvmwd.com subject to staff's ability to post the documents before the meeting. The District recognizes its obligation to provide equal access to those individuals with disabilities. Please contact Melissa Zoba at (909) 387-9228 two working days prior to the meeting with any special requests for reasonable accommodation.

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: August 11, 2020

TO: Board of Directors Workshop – Engineering

FROM: Staff

SUBJECT: Summary of July 14, 2020 Board of Directors' Workshop - Engineering

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The Board of Directors held a Workshop on July 14, 2020. Director Kielhold chaired the meeting via video-conference and Directors Harrison, Navarro, Longville, and Hayes participated in the Workshop supported by Heather Dyer, Wen Huang, Cindy Saks, Melissa Zoba, Kristeen Farlow, Kai Palenscar, Aaron Jones, and Chris Jones of staff. The following agenda items were discussed:

3.1 Summary of Previous Meeting on June 9, 2020. The summary notes of the June 9, 2020, meeting were accepted.

4.1 Presentation: Presentation by Ms. Betsy Miller of the San Bernardino Valley Water Conservation District on the Wash Plan Habitat Conservation Plan. Ms. Betsy Miller of the San Bernardino Valley Water Conservation District made a presentation on the Upper Santa Ana River Wash Habitat Conservation Plan (Wash Plan). Specifically, Ms. Miller shared that the Wash Plan was formally adopted by the Conservation District Board on July 8, 2020. The Wash Plan initiated in 1993 and includes 1,695 acres of habitat conservation. As the Wash Plan moves toward implementation, there will continue to be coordination between Valley District and the Conservation District. Director Longville praised Ms. Miller and the Conservation District for the accomplishment of completing the Wash Plan. Director Navarro thanked Ms. Miller for the update, and will send Ms. Dyer pictures from a water tour he participated in of the Wash Plan area. Director Kielhold thanked Ms. Miller for the update and congratulated her on the tremendous milestone.

Action Items: Receive and File

5.1 Consider Contract Amendment with RMG Communications for Social Media Management. Staff presented the Board with a request for a contract amendment with the social media consultant, RMG Communications. Staff began working with RMG in April 2019. Since that time, our followers and likes on the District's social media accounts have increased tremendously. Looking ahead, Staff will continue working with RMG regularly to increase likes and shares, to curate valuable content for our social media audience, and to position the District as a trusted source of information. The contract amendment is for $30,000 for the annual social media management contract. President Harrison and Directors Navarro and Hayes expressed support for this item. Director Longville acknowledged the importance of the District having a social media presence. Director Kielhold emphasized the importance of this type of outreach and presence in our community, and likes how we can use social media to get our message and content out to the broader audience especially since attendance at District meetings is typically very light.

Action Items: Forward this item to the full Board for consideration.

5.2 Consider Scope of Work from Stillwater Sciences for the Development of the Adaptive Management and Monitoring Program for the Upper Santa Ana River Habitat Conservation Plan. Staff reported that Valley District received a federal section 6 planning grant that will reimburse 50% of the cost ($875,000) of the creating of a Long-Term Adaptive Management and Monitoring Program (Program) for the Upper Santa Ana River Habitat Conservation Plan (River Plan). This Program is necessary to manage and track the success of habitat restoration projects and the status of species, over the 50-year life of the permit, that are covered by the River Plan. A scope of work to create this Program provided by Stillwater Sciences, along with ICF as a subconsultant, was presented to the Board for consideration. The cost to Valley District will be $1,615,000 to create this Program for the River Plan, of which 50% will be reimbursed by the grant ($875,000) and an additional 60% of the remaining expense will be reimbursed by River Plan permittees ($525,000), leaving a net expense of approximately $350,000 to Valley District. All Board Directors were pleased at the efforts and successes of Valley District to receive grant funding to offset Program costs as well as the value the Program will add to the River Plan.

Action Item(s): Forward this item to the full Board for consideration.

5.3 Consider Scope of Services with Scheevel Engineering for Engineering Consulting and Staff Augmentation. Staff reported that Valley District has historically maintained a relatively small staff as compared to its geographic size and responsibilities. As Valley District's responsibilities have increased over the last decade, in addition to new positions that the Board authorized to respond to the workload, the District has also relied on hiring consultants from time to time as an extension of staff. In order to support the substantial engineering workload planned for this fiscal year, staff recommends that the Board of Directors consider engaging Scheevel Engineering to provide engineering consulting services and to work as an extension of staff for fiscal year (FY) 20-21 for an estimated fee up to $160,000.

At the conclusion of the discussion, the Board of Directors asked that this item be forwarded to the full Board for consideration.

Action Item(s): Forward this item to the full Board for consideration.

5.4 Consider Survey Services with Hernandez, Kroone & Associates (HKA) for Devil Creek and Sweetwater Basins. Staff provided background information on Devil Creek and Sweetwater Basins. Staff presented that at a Joint Board Meeting with the City of San Bernardino Municipal Water Department Water Board on January 31, 2019 both boards approved an MOU to jointly develop and implement activities included in the Upper Santa Ana River Habitat Conservation Plan (SARHCP). Among other activities, the Devil Creek Basins are located on land owned by SBMWD and present great opportunities for habitat enhancement as well as recharge for stormwater and State Water Project (SWP) water. Additionally, certain improvements at the Sweetwater Basins, which are owned by the San Bernardino County Flood Control District (SBCFCD) and have been used by Valley District as one of the major recharge basins for SWP water, have been identified to increase the recharge area. In order to begin this development process, an initial survey needs to be completed for the areas. Staff received two (2) proposals for the survey services and is recommending HKA's proposal in the amount of $51,380.

At the conclusion of the discussion, the Board of Directors asked that this item be forwarded to the full Board for consideration.

Action Item(s): Forward this item to the full Board for consideration.

5.5 Consider Participation in Cultural Intelligence Training through the Cultural Intelligence Center. Staff made a presentation to the Board of Directors on the topic of Cultural Intelligence and the Cultural Intelligence Center, per a request from Director Hayes. Cultural Intelligence, or CQ, is the ability to relate in culturally diverse situations and enhance the function of teams and/or the workplace. There are four core capabilities in CQ: Drive, Knowledge, Action, and Strategy. Each of these helps an individual better understand how they interact, relate, and prepare for culturally diverse situations. The CQ Center offers a number of online webinars and live courses that can guide employees through better understanding their behaviors and how they relate in culturally diverse situations. Director Hayes is interested in the District offering this type of training to both employees and directors. President Harrison expressed that he did not feel the District needs this type of training. Director Navarro had questions about race and gender equity at Valley District. The cost for the training is within the limits of the CEO/General Manager signing approval, so Vice President Kielhold, and Directors Longville and Navarro recommended the District leave it at the discretion of the CEO/General Manager to decide if this training should be offered.

Action Item (s): The Board left this item to the discretion of the CEO/General Manager; no additional action is needed by the Board.

6. Future Business:

None discussed.

Staff Recommendation

Receive and File

DATE: August 11, 2020

TO: Board of Directors Workshop – Engineering

FROM: Kristeen Farlow, External Affairs Manager

SUBJECT: Presentation by Dr. Daniel Swain: Extreme Atmospheric Rivers as Influenced by California's Warming Climate

Dr. Daniel Swain will make a presentation titled "Extreme Atmospheric Rivers as Influenced by California's Warming Climate." Dr. Swain is a Climate Scientist with the Institute of the Environment & Sustainability at the University of California Los Angeles. He is also a Research Fellow at the Capacity Center for Weather and Climate Extremes at the National Center for Atmospheric Research and a California Climate Fellow at the Nature Conservancy. Dr. Swain will present on his newly published research on the topic of hydrologic cycles of California in the context of a changing climate.

Fiscal Impact

There is no fiscal impact related to this item.

Recommended Action

Receive and file.

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: August 11, 2020

TO: Board of Directors' Workshop - Engineering

FROM: Kai Palenscar, Project Manager II, Biological Resources

SUBJECT: Presentation by William Ota (PhD Student, UC Riverside): Current and Future Research Associated with the Santa Ana River

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William Ota is a Ph.D. student at the University of California, Riverside within the lab of Associate Professor Kurt Anderson. The Anderson Lab conducts research related to Quantitative Population, Community, and Applied Ecology, where in the last 5 years several researchers have begun assessing the Santa Ana River. The Santa Ana River is a human managed system containing threatened and endangered species that interact with other native and invasive species. The Upper Santa Ana River Habitat Conservation Plan (HCP) has benefitted from the work conducted by the Anderson Lab in the River related to ecological interactions between wastewater discharge and species abundance, distribution, and diversity. William will provide information on recent data collected in the River as well as future research objectives that will inform ongoing monitoring and management of the HCP.

Fiscal Impact

There is no fiscal impact related to this item.

Recommended Action

Receive and file.

DATE: August 11, 2020

TO: Board of Directors' Workshop – Engineering

FROM: Kristeen Farlow, External Affairs Manager

SUBJECT: Discuss Water Use Efficiency End of Year Report

Staff is providing the Board of Directors with an end of year report on the Water Use Efficiency Program.

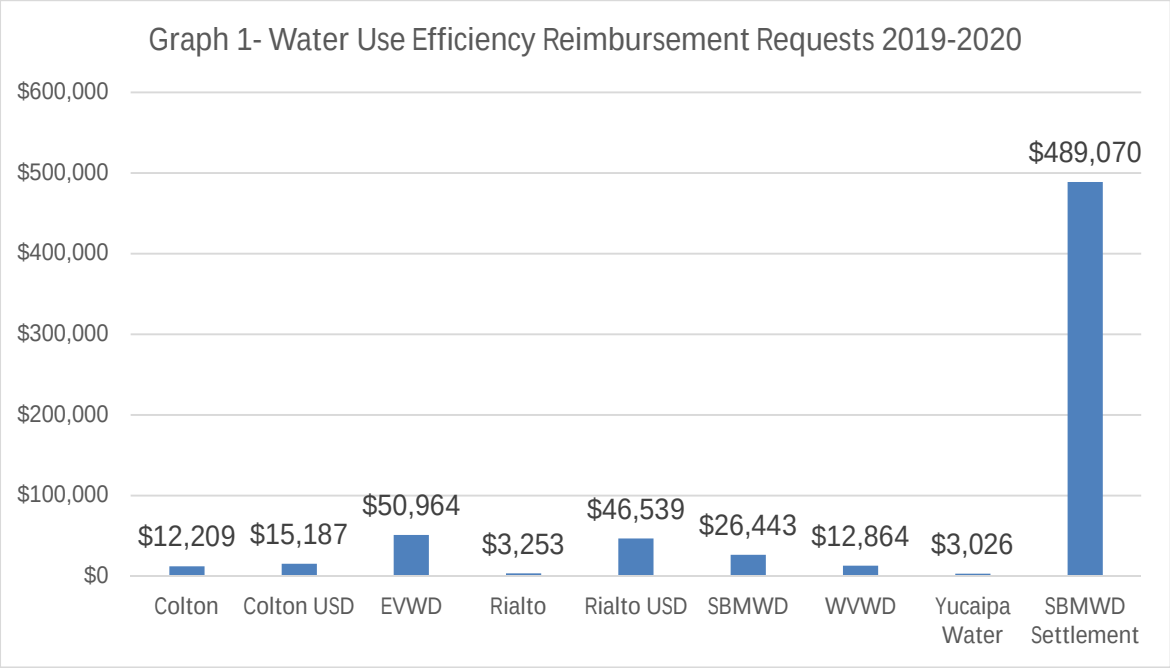
Water Conservation Rebates

In fiscal year 2019-2020, the District budgeted $750,000 for the Water Use Efficiency Program, which included water use efficiency reimbursements to the retail agencies (the 25% program), the Weather Based Irrigation Controller program and the Turf Replacement Rebate program. All retail water providers were asked to submit their requests for reimbursement by mid-July for the year ending June 30, 2020. The total reimbursement requests received was $658,452. This total included the $489,070 that was provided to San Bernardino Manipal Water Department through the Recycled Water Settlement. Separating out this amount leaves a total reimbursement requests of $169,382 from all retailers.

Retail Agency/City	Total Amount Reimbursed to Date	Devices Rebated*
City of Colton	$12,209	Devices
Colton Unified School District	$15,187	Turf Rebates
East Valley Water District	$50,964	Devices
City of Rialto	$3,254	Devices
Rialto Unified School District	$46,539	Turf Rebates
San Bernardino Municipal Water Dept.	$26,443	Devices
West Valley Water District	$12,864	Devices, Turf Rebates

Yucaipa Valley Water District	$1,922	CalWEP Membership, Toilets
San Bernardino Municipal Water Dept. Recycled Water Settlement	*$489,070*	*Landscape Retrofits*
Total Amount Reimbursed to Date	**$658,452**	

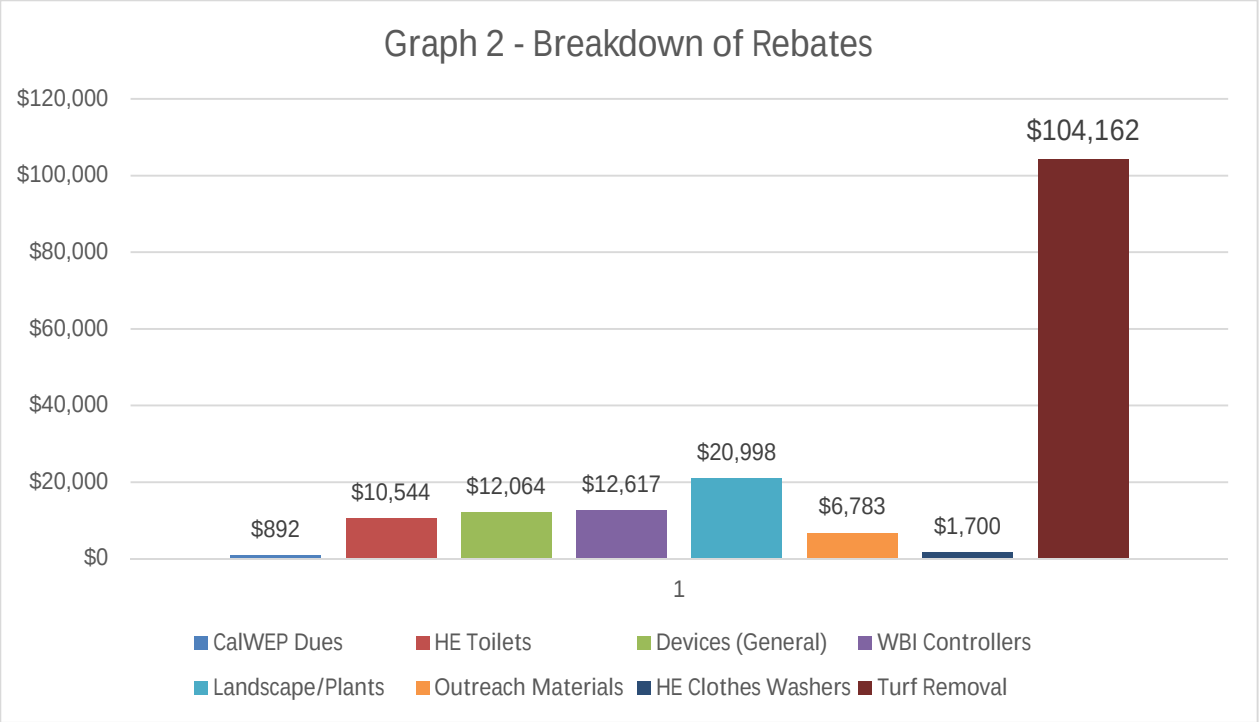
** Devices Rebated include high efficiency toilets, clothes washers and dishwashers, low-flow showerheads and nozzles, residential weather-based irrigation controller installations, residential water efficient landscaping, high efficiency sprinklerheads, and pool covers.*



** The landscape retrofits for the SBMWD Recycled Water Settlement were paid out of Water Use Efficiency budget.*

The retail water providers requested reimbursement for a variety of water use efficiency devices in the last fiscal year, reflected in the graph below. Not surprisingly, the category with the largest amount of reimbursements is the Turf Removal Rebate Program. Other rebates that were well received by customers were for Landscape Materials and Plants and Weather-Based Irrigation Controller. This is positive for Valley District, the retail water providers, and the region, as efficiency in the area of landscape irrigation has the potential to save the most water.

This year, Valley District did not have any Weather-Based Irrigation Controller projects completed (through the Program with Valley Soil). There were three projects that were in discussion, but due to the internal approval processes of the customers and then the COVID pandemic, these projects were not able to proceed. It is anticipated that these projects will be revisited in the new fiscal year.



Background

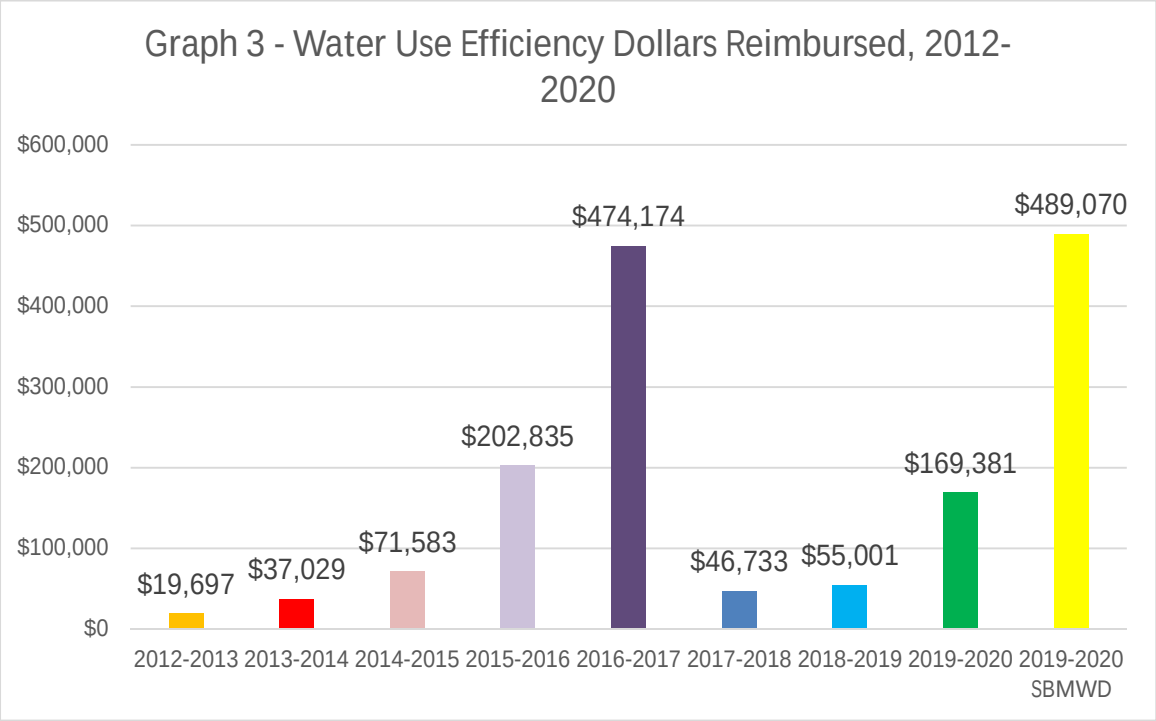
Requirements from AB 1668 and SB 606 allow for the State Water Resources Control Board to issue informational orders to wholesale water suppliers to provide water conservation assistance to retail water agencies. This assistance could include water education, rebates, or technical assistance.

Valley District's Water Use Efficiency Program includes three main components:

- The District contributes to the cost of water use efficiency rebates offered by retailers at a 25% reimbursement rate;
- The District offers $1/square foot of turf removed and replaced with low-water use landscaping;
- The District funds 50% of the retrofit costs for large water users (1,500 cubic feet or more annually) who participate in the Weather Based Irrigation Controller Program, which includes a landscape audit followed by installation of a weather station (if needed) and weather-based irrigation controller(s).

The water use efficiency dollars spent has varied widely over the last eight years. The dollars spent were low in 2012-2013, as reflected below. As the drought ramped up, the reimbursement dollars saw a peak in 2016-2017 of $474,174. Then, in 2017-2018 and 2018-2019, the dollars

reimbursed were closer to the pre-drought numbers. This year, though, even removing the water use efficiency reimbursement to the San Bernardino Municipal Water Department, the reimbursement dollars were higher than they have been in five of the last seven years.



Fiscal Impact

Funds for the Water Use Efficiency Program are included in the approved Water Conservation and Education Program budget account number 6640. A total of $750,000 was budgeted for the water use efficiency programs in 2019-2020, while the total reimbursement requests made were $658,452.

Staff Recommendation

Receive and file.

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: August 11, 2020

TO: Board of Directors' Workshop - Engineering

FROM: Wen Huang, Chief Engineer/ Deputy General Manager
Mike Esquer, Senior Project Manager
Brent Adair, Project Manager

SUBJECT: Completion Report - Citrus Reservoir and Pump Station Floating Cover System Project

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The purpose of this memorandum is to provide a final update on the Citrus Reservoir and Pump Station Floating Cover System Project (Project). On December 17, 2019, the Board of Directors approved a budget of $295,000 for the 2020 Annual Facility Maintenance and Repair Program, of which $280,000 was budgeted for implementation of corrective measures for the floating cover system at the Citrus Reservoir. This Project was completed in June 2020. Staff will provide a presentation with photos during the Workshop.

The reservoir has been in continuous service since June 2017. On November 6, 2018, the Board of Directors authorized procurement of the Rhombo Hexoshield floating cover system to comply with mitigation requirements for the Citrus Reservoir provided in the Wildlife Hazard Management Plan (WHMP) prepared and adopted by the California Department of Water Resources (DWR) as part of the East Branch Extension (EBX) Phase 2 Project. Since then, over 3.7 million balls out of a total of 7.5 million balls have been deployed in the reservoir. Based on the recent biological monitoring events, the floating cover, even at less than half completed, has been very effective deterring migratory birds from using the reservoir.

In November 2019, there was evidence that some of the rhomboidal shaped balls have developed holes, sunk and subsequently been pulled into the reservoir pumps. The Citrus Pump Station was then shut down for investigations. Through the collaboration with DWR staff, corrective measures have since been identified and implemented. On December 17, 2019, the Board approved a budget of $280,000 related to the Project. Due to a relatively-low State Water Project

allocation so far for this year, deliveries to our customers on the east end of the District's service area and to San Gorgonio Pass Water Agency (SGPWA) were successfully met through the Greenspot Pump Station without being impacted by the shutdown of the Citrus Pump Station.

In cooperation with DWR, Valley District staff began to drain the reservoir in the 1st Quarter 2020 using the Citrus Pump Station and switched to rental dewatering equipment in March 2020 to complete the draining of the reservoir at a cost of $59,087. DWR staff completed the deployment of a floating debris boom and net system designed to keep the rhomboidal balls from entering the Citrus Pump Station intake gallery. District staff also worked with DWR staff to complete the design of pump screens at each pump intake column to protect against any future intake of debris or balls that may plug up the pumps. The cost to fabricate the pump screens was $81,056 and was completed in April 2020. DWR staff completed installation of the pump screens in May 2020 and began filling the reservoir after pump columns were inspected and maintenance performed. No significant issues were found during the inspection. Additional District costs for installation were approximately $9,000, which included pump screen isolation kits, bolt and washer kits and fuel expenses. The Citrus Pump Station was returned to normal operation in June 2020 and has been in continuous operation since.

The total cost for the Project by the District is approximately $150,000, which will be shared with SGPWA (22.6%).

Staff Recommendation:
Receive and file.

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

DATE: August 11, 2020

TO: Board of Directors' Workshop - Engineering

FROM: Chris Jones, MESM, Project Manager II, Biological Resources

SUBJECT: Consider a Cooperative Agreement with Huerta Del Valle and a Consulting Agreement with WSC to Conduct Water Supply Studies for the Louis Robidoux Parkland and Jensen Alvarado Historic Ranch

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Background

On July 17, 2019, the Board approved Valley District's participation in a multi-stakeholder proposal to lease (at a cost of $1/year) and manage approximately 40 acres of open space and the 4,500 square foot Louis Robidoux Nature Center (Nature Center) building from the Riverside County Parks and Open Space District (Parks District). The property is located in Jurupa Valley on the north side of the Santa Ana River. A multi-stakeholder group, the Nature Center Consortium (Consortium), was formed in order to propose on the project in a manner that maximized the use of the property and addressed many existing needs of the Consortium partners.

The Consortium is co-lead by the Inland Empire Resource Conservation District (IERCD) and Valley District. The IERCD is the primary leaseholder and the lead partner developing the conservation-focused educational program, including rehabilitation of the Nature Center. Valley District is the other co-lead and along with the Orange County Water District is primarily focused on restoring Sunnyslope Creek. The group also includes Sunshine Haven Animal Rescue and Wildlife Rehabilitation will have an onsite wildlife rehabilitation center and Huerta del Valle, a sustainable agriculture organization that will promote water and soil conservation-based farming practices. The site includes approximately 40 acres with areas for hiking trails, an RV hookup for a site manager, an approximately 4,500 sf building, and a rehabilitation of an historic pecan grove. In 2017, the Parks District was forced to close the site due to budget reductions.

On October 31, 2019 the “46 Fire” destroyed the Nature Center and nearly all of the vegetation along Sunnyslope Creek and the surrounding landscape. The fire and its effects presented both challenges and opportunities for the Consortium and the Parks District. Members of the Consortium, Parks District, and members of the local community have worked hard to clean up the site. The need for a new nature center has changed the scope and timelines of the planned work and thus required the Parks District to create a new scope of work for interested parties to bid on. The Consortium again submitted a proposal and have received notification of our tentative selection by the Parks District.

The updated proposal from the Consortium is similar to the previous winning proposal that was originally submitted in 2018, but with the planning and construction of a new nature center. Another difference since the last agreement is the name of site. It is now referred to as the Louis Robidoux Parkland and Pecan Grove (“LRP”), driven by the fact that the Nature Center is no longer standing due to the fire. Valley District’s main focus of attention remains on the restoration of Sunnyslope Creek that will offer improved habitat along with storm water management benefits and water quality improvements that will be used as conservation measures in the Upper SAR Habitat Conservation Plan (“HCP”). Valley District would also use a portion of the nature center building as a field station for HCP implementation activities such as monitoring and management of the five previously approved restoration sites (Anza Creek, Hole Creek, Hidden Valley Creek, Old Ranch Creek, and Evans Creek). The Consortium has been working with the Parks District to coordinate and approve a Master Services Agreement (“MSA”). A draft MSA has been created by Parks District staff and is in the process of being reviewed by the Parks District legal team. The IERCD has already contributed approximately $260,000 up to this point in an effort to begin planning for the LRP site and implement post-fire clean up and safety measures. They have an additional approximately $375,000 earmarked to continue with startup costs once the MSA is finalized with the Parks District. The MSA is expected to be brought to the Parks District’s Board in September.

The LRP does not currently have a reliable source of water available to the entire site. The former nature center had potable water and the Jurupa Ditch used to provide water for a pond that existed behind the former location of the nature center. Runoff from surrounding areas supplies water to Sunnyslope Creek, although it fluctuates greatly between storm season and summer runoff. Huerta Del Valle became interested in the potential for the Jurupa Ditch to again provide water to both the Jensen Alvarado Historic Ranch and the LRP, since they currently conduct sustainable farming at the Jensen Alvarado Historic Ranch are intending to farm on the east end of the Louis Robidoux property as a member of the Consortium. Currently, the Jurupa Ditch provides water to the Jensen Alvarado Historic Ranch, but does not convey water to the location of the former pond at the LRP. The Jurupa Ditch was originally constructed in the 1840’s. There are likely several maintenance needs along its path and there is anecdotal evidence to suggest unplanned diversions exist as well. Huerta Del Valle and Valley District began discussing a joint effort to get a reliable water supply to the LRP property, including Sunnyslope Creek. Staff worked together on a

Request for Proposals ("RFP") to determine the potential for the Jurupa Ditch or development of other methods to meet water demands for farming at both sites and habitat benefits associated with the pond and Sunnyslope Creek at the LRP (see Attachments for RFP). The RFP was finalized and made available for firms to bid on at the end of May of 2020. The RFP included a scope of services that required prospective consultants to:

- determine the water demand for farming at both sites, pond restoration, and seasonal flow augmentation for Sunnyslope Creek at the LRP;
- recommend ways to most efficiently and practically meet those demands, considering water quality related to both the farming and restoration missions; and
- conduct an evaluation of the Jurupa Ditch and/or groundwater wells to meet water demands, including potential costs for various options..

Proposals were provided by four prospective consulting firms on June 29, 2020. The quotes received are shown in Table 1, below.

Table 1 Cost comparison of received proposals

Contractor	Quote
WSC	$120,780.00
Firm A	$185,640.00
Firm B	$202,400.00
Firm C	$367,742.00

Water Systems Consulting, Inc. ("WSC") provided the lowest cost bid meeting all technical requirements (see Attachments for WSC Proposal). Staff from Valley District, Huerta Del Valle, the Inland Empire Resource Conservation District ("IERCD"), and the Parks District evaluated each proposal. Representatives from each group then met on July 16, 2020 to discuss the proposals and tentatively select a consultant to award a contract to. WSC was unanimously chosen based on a combination of demonstrated technical expertise, ability to meet schedule demands, and cost efficiency.

Huerta Del Valle is contributing $50,000 they were able to secure from the Santa Ana Watershed Project Authority (SAWPA) through the Proposition 1 Integrated Regional Water Management ("IRWM") Disadvantage Community Involvement ("DAC") Program because of overall project benefits to the surrounding communities, which is highly dependent upon a reliable source of water. .It is the intention of Huerta Del Valle to enter into a cooperative agreement with Valley District (see Attachments for Draft Cooperative Agreement) to use the IRWM DAC Grant ("Grant") funds to co-fund the tasks tentatively chosen for award that were included in the draft consulting agreement (see Attachments for Draft Consulting Agreement). Both Huerta Del Valle staff and Valley District staff are in alignment in our interest to fund all tasks described in the RFP with the exception of the development of Plans

and Specifications for potential well installation or Jurupa Ditch improvements. We have decided to remove tasks related to the development of Plans and Specifications in order to more fully evaluate recommendations and consider additional partnership and grant opportunities to fund potential implementation of any recommendations.

If approved, Valley District would enter into a consulting agreement with WSC for a total cost of $120,780.00. If approved, Valley District will enter into a cooperative agreement with Huerta Del Valle resulting in the reimbursement of $50,000 to Valley District. This reimbursement by Huerta Del Valle leaves a balance of $70,780. Since this effort is related to restoration that forms a component of the HCP, 60% of the $70,780 cost balance will be reimbursed to Valley District by HCP partners based on each partner agency's HCP impacts. The remaining 40%, or $28,312.00, would constitute Valley District's final expected contribution.

This project offers significant potential benefits to the HCP related to restoration and long-term management of Sunnyslope Creek and is expected to provide the basis for decisions and designs related to restoration and management of the pond and Sunnyslope Creek. Finally, the true integration of multi-stakeholder objectives evident through the proposed project and the goals of the Consortium, in general, display an excellent example of ways that regional watershed management activities can provide benefits beyond any one project component.

Fiscal Impact

The fiscal impact of this item is $120,780.00. Work associated with the LRP was included in the 2020/2021 General Fund Budget in a line item in 6780 Environmental/HCP Implementation. After reimbursement by Huerta Del Valle and reimbursement from HCP Partners, the final cost to Valley District is expected to be approximately $28,312.00.

Staff Recommendation

Staff recommends the Board direct staff to place this item on the next Board of Directors regular meeting agenda for consideration.

Attachments

1. WSC Proposal
2. Draft Cooperative Agreement
3. Draft Consulting Agreement

WSC
WATER SYSTEMS CONSULTING, INC.

June 29, 2020

Maria Alonso
Executive Director
Huerta del Valle
Corporate Office
310 E. Philadelphia St. #71
Ontario, CA 91761

Chris Jones
Project Manager - Biological Resources
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408

SUBJECT: PROPOSAL FOR PROFESSIONAL SERVICES – Water Supply Studies for Jensen-Alvarado Historic Ranch and Louis Robidoux Nature Center

Dear Ms. Alonso and Mr. Jones,

Water Systems Consulting, Inc. (WSC) is pleased to submit this proposal to provide professional consulting services for the Water Supplies Studies for Jensen-Alvarado Historic Ranch and Louis Robidoux Nature Center. This proposal is submitted in response to the Request for Proposal (RFP) issued by Huerta del Valle and the San Bernardino Valley Municipal Water District (Valley District) provided to WSC via e-mail on May 28, 2020.

We understand that Huerta del Valle and Valley District have teamed up, along with the Louis Robidoux Nature Center Consortium. In order to fulfill its' goals, Huerta del Valle, Valley District and the Consortium are looking for an experienced and responsive consultant to determine an efficient means of meeting irrigation water demands for sustainable agricultural operations at the Jensen-Alvarado Historic Ranch and the Louis Robidoux Nature Center, both of which are located in Jurupa Valley. We also understand that this project may include—either fully or in part—evaluating the same means of meeting water demands for pond and creek restorations at the Louis Robidoux Nature Center site.

WSC is a full-service civil and environmental engineering consulting firm that specializes in innovative and sustainable water solutions. WSC works collaboratively with our clients—always striving to develop a partnership—applying proven approaches, state-of-the-art tools, and expertise-driven innovation to deliver truly outstanding results. We are excited to include Dr. Joseph LeClaire in our team, as he will bring over 37 years of professional experience in water resources and environmental engineering to the project. We understand the development and use of local water resources to meet current and future beneficial use is vital for this project. We believe our team is the ideal partner to support Huerta del Valle, Valley District, and the Consortium for the following reasons:

WATER SYSTEMS CONSULTING, INC.

Local Experience – The WSC team takes pride in being immersed in the local communities that we serve. Members of the WSC team have been working in the Santa Ana River (SAR) Watershed going back as far as 1985. We have just completed the Ambient Water Quality study for the Basin Monitoring Program Task Force, which is administered by the Santa Ana Water Protection Agency (SAWPA) and includes the Valley District and Orange County Water District. In this project, we estimate groundwater quality for each Groundwater Management Zone (GMZ) in the watershed, including GMZs that underlie the area of this project (i.e. Riverside-A and Riverside-C GMZs). We are working with the City of San Bernardino Municipal Water Department to propose to the Regional Water Quality Control Board to change the nitrogen loss coefficient for the Riverside-A GMZ. We are also currently working for the Inland Empire Utilities Agency to estimate nitrogen and total organic carbon concentrations in the Declez groundwater recharge basins, located about 5 miles to the northwest of the two sites associated with this project. Several team members have experience with siting, designing, and overseeing the installation of municipal supply and groundwater monitoring wells within the Bunker Hill and Riverside basins, thereby adding to their overall understanding of the Watershed's surface water and groundwater connection. Finally, our team will be able to speak on the terms of supporting habitat restoration through previous project experience, including a study on the Santa Ana sucker in the area near the confluence of Sunnyslope Creek and the SAR. *The WSC team will apply this knowledge and work closely with you to determine the water supply needs and the best options for fulfilling those needs at both project sites to successfully deliver this project.*

Experienced Project Manager – Our project manager, Joe Kingsbury, is a California Professional Geologist and certified Hydrogeologist with over 20 years of experience providing leadership, management, and client services for water resource projects located throughout southern California. In addition to his knowledge of how to successfully site and oversee new well installations, he has the proven ability to manage water supply projects which require the collaboration and cooperation of multiple parties. *He will apply his experience to deliver this project on time and within budget.*

Available Resources – We have assigned a highly qualified team of hydrogeologists and engineers to meet the needs of this project. Each of our team members have experience supporting water supply studies and know how to pull from all available resources to identify the most suitable options for meeting water supply demands. *Our team has the experience and commitment to identify and resolve potential issues before they impact the project.*

If you have any questions on any aspect of this submittal, please feel free to contact WSC's proposed Project Manager, Joe Kingsbury, at (909) 483-3200 ext. 202 (jkingsbury@wsc-inc.com) or WSC's Principal in Charge, Jeroen Olthof, at (858) 397-2617 (jolthof@wsc-inc.com). Thank you for your consideration, and we look forward to your response.

Sincerely,
Water Systems Consulting, Inc.

Jeroen Olthof, PE
Principal in Charge

Joe Kingsbury, PG, CHG
Project Manager

Proposal Organization

This proposal is organized as follows:

- Section 1 – Project Understanding: Provides our understanding of the Water Supply Studies Project.

- Section 2 – Project Approach: Provides our proposed approach to the Project and includes our Scope of Work to complete the identified tasks. The scope will be determined for some of the Optional Tasks, as required.

- Section 3 – Organizational Chart: Presents WSC's organizational chart and a table which provide contact information for the individuals who will be working on this Project.

- Section 4 – Project Schedule: Presents WSC's proposed Project Schedule for the Project.

- Section 5 – Fee Schedule: Provides our pricing for this project and includes a detailed summary spreadsheet showing the proposed hours and WSC's hourly rates for the tasks described in the Scope of Work. Proposed hours and costs for some of the Optional Tasks are

- Appendix – Consultant Information: Provides WSC's project manager and team experience, and specific project experience with client reference information.

Section 1

Project Understanding

This proposal is in response to a Request for Proposals (RFP) issued by Huerta del Valle and the San Bernardino Valley Municipal Water District (Valley District). These two entities, along with the Inland Empire Resource Conservation District, Orange County Water District, and Sunshine Haven Animal Rescue and Wildlife Rehabilitation, have formed the Louis Robidoux Nature Center Consortium (referred to herein as "The Consortium").

Valley District was formed in 1954 and is responsible for the long-range water supply for the San Bernardino Valley. As a member of the State Water Contractors, Valley District imports State Water Project (SWP) water and conducts other projects to manage groundwater storage within its groundwater basin boundaries. Valley District's service area is 350 square miles with a population of about 698,000 people.

Huerta del Valle is a nonprofit organization whose mission is to develop and implement plans for the construction of organic, community gardens , "…every mile in our region…We envision a region where all people can eat delicious, nutritious, fresh, local, sustainably produced and just food…We envision farming, healthy food access, sustainable production and distribution, nutrition education, and economic development addressing complex regional health issues."

The scope of work defined in the RFP is applicable principally to two sites located in the Jurupa Valley: The Jensen-Alvarado Historic Ranch (JAHR) and the Louis Robidoux Nature Center (LRNC) as shown on Figure 1. While Huerta del Valle has an interest in both sites, the Valley District and the Consortium are focused on the LRNC and the accompanying habitat restoration potential at the Sunnyslope Creek. The overall goal of the study described in the RFP is to determine an efficient means of quantifying and meeting water demands for sustainable agriculture operations at both sites and to potentially enhance pond and creek restoration at the Louis Robidoux Nature Center property and downstream at the Sunnyslope Creek.

A huerta del valle is a fertile area in the valley where crops are grown sustainably for family consumption and for sale to the surrounding community. The modern incarnation of a huerta includes the building of a sense of community, deepening the roots of local culture, and providing for the education of the next generation of organic farmers. The non-profit organization, *Huerta del Valle*, is the embodiment of this vision.

The bulleted items below are the elements of the Project Understanding of the study and together they represent a framework for the Project Approach.

- The JAHR is a 19-acre site that is being improved into a working community farm, with ancillary

educational and cultural benefits. The current plan calls for 5 acres of row crops, 1 acre of hedgerow, 5 acres of pasture lands, 5 acres of cover crop, and 3 acres of citrus, principally orange trees.

- The LRNC is owned and operated by the Riverside County Regional Park and Open Space District. It comprises about 40 acres of open space and a 4,500 square foot building. The long term vision would be to restore the function and public benefit of the park and nature center to the region while also improving habitat for species of concern. A portion of the LRNC plan is to develop a community farm with 4 to 5 acres of row crops as well as 1 or 2 acres of farm-associated landscaping.
- This project will analyze the efficacy of developing these two sites in terms of meeting water demands for the planned community farms. Another potential benefit of the project is to determine water supply needs for a 0.35-acre pond at the LRNC and to augment flows to Sunnyslope Creek in this area during the dry season to provide habitat for special species.

Photo 1. Jurupa Ditch, looking northeast on the Schroeder property between the JAHR and Riverview Drive.

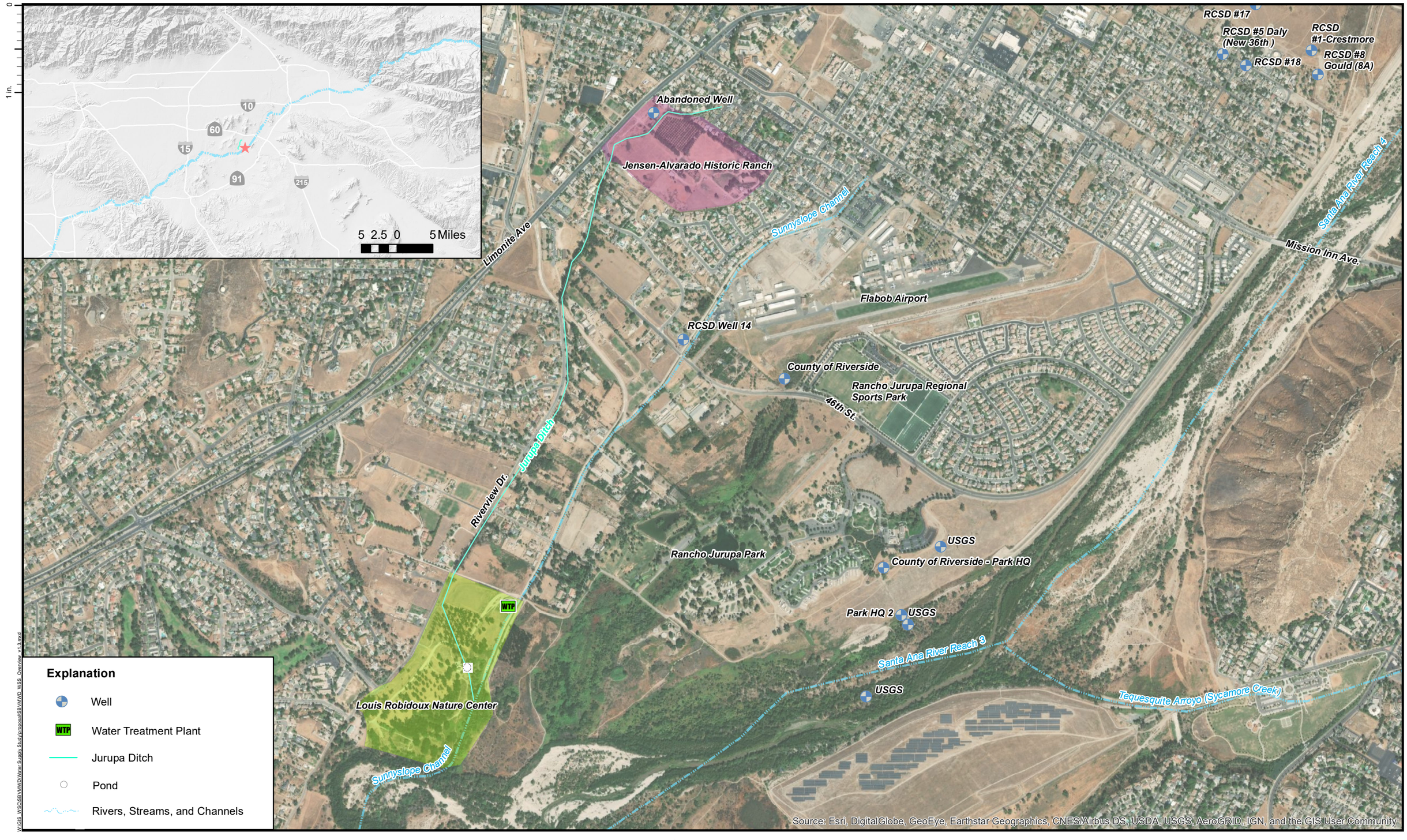
- The Jurupa Ditch was constructed between 1843 and 1845[1].
- The Riverside Public Utilities (RPU) pumps their Jurupa Well 7 and discharges about 2,700 gallons per minute (gpm) into the Jurupa Ditch. This water supply to the ditch is mandated by [Civ. No. 6331. Fourth Dist. Dec. 19, 1960.] RIVERSIDE WATER COMPANY (a Corporation), Appellant, v. JURUPA DITCH COMPANY (a Corporation), Respondent: "... that the said plaintiffs (respondent's predecessors in interest and hereinafter designated "Jurupa") are at all times entitled to have, and do have, three hundred (300) inches of water, measured under a four inch pressure, flow down said Santa Ana River into the mouth of their ditch, for the purpose of irrigation and domestic use; that the defendants and each of them (plaintiff's predecessors in interest and hereinafter designated 'Riverside') shall, at all times suffer and be required to let sufficient water, at all times, pass their canal or canals, in said river…[2]"
- A Miner's inch of water is about 9 gpm, so 300 Miner's inches is about 2,700 gpm or 4,355.12 acre-feet per year (AFY).

[1] US Geological Survey. 1977. Development of Water Facilities in the Santa Ana River Basin California, 1810 to 1968. A Compilation of Historical Notes Derived from Many Sources Describing Ditch and Canal Companies, Diversions, and Water Rights. Prepared in Cooperation with the California Department of Water Resources, San Bernardino Valley Municipal Water District, Western Municipal Water District of Riverside County. Open File Report 77-398.

[2] https://law.justia.com/cases/california/court-of-appeal/2d/187/538.html "This judgment was based upon a decree made and entered by the Superior Court of San Bernardino County on October 11, 1886, in an action between the predecessors in [187 Cal. App. 2d 540] interest of the parties herein dealing with their rights to water in the Santa Ana River, which decree was reaffirmed and modified by contract between the parties dated April 19, 1904.

- RPU purchased the Riverside Water Company in 1961, through a friendly condemnation process[3]. The obligation to discharge 2,700 gpm to the Jurupa Ditch then became RPU's responsibility.
- The JAHR has an allocation of 40 percent of the ditch water (1,080 gpm) for use at their site[4].
- The LRNC, the pond, and the Sunnyslope Creek are all downstream of the JAHR.
- The two project sites, JAHR and the LRNC, are connected by the Jurupa Ditch.
- In sections between the two project sites, there are areas where debris and non-native vegetation has accumulated alongside and within the Jurupa Ditch, which is likely responsible for the evapotranspiration of a large portion of the flow in the ditch.
- The overarching objectives of this water supplies study are to:
    - determine if water demands at the JAHR and the LRNC can be met through the analysis of water supply sources, e.g., new irrigation wells located at the project sites
    - support the goals of the Huerta del Valle
    - maintain flow to the 0.35-acre pond in the LRNC
    - maintain flows in Sunnyslope Creek as a component of the habitat restoration rehabilitation in that area
    - determine if it is possible to provide a remedy for the Jurupa Ditch

[3] Greg Herzog/RPU, Personal Communication, June 17, 2020
[4] Arthur Levine/Huerta del Valle, Personal Communication, June 11, 2020



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Prepared by:
WSC Water Systems Consulting, Inc.
Author: EC
Date: 6/22/2020
File Name: SBVMWD_WSS_Overview_v1.3

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References:
1. Coordinate System: NAD 1983 UTM Zone 11N
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter
2.
3.

Prepared for:
San Bernardino Valley Municipal Water District

San Bernardino Valley Municipal Water District
Water Supply Studies for the Jensen-Alvarado Historic Ranch and Louis Robidoux Nature Center

Project Area

Figue 1

Section 2

Project Approach

The RFP outlines the following ten tasks to complete this water supplies study:

a. Determine the annual irrigation water demands for the JAHR
b. Determine the annual irrigation water demands (plus two optional items) for the LRNC
c. Evaluate the existing conditions of the Jurupa Ditch
d. Identify potential remedies for the Jurupa Ditch
e. Evaluate water quality at locations along the Jurupa Ditch (plus one optional item)
f. Determine groundwater availability and quality for the LRNC and JAHR (plus one optional item)
g. Provide recommendations to reliably meet the water demands (plus one optional item)
h. Facilitate three workshops
i. Prepare a summary report
j. Prepare plans and specifications for well drilling and installation (optional tasks)

We recognize the complexities which are associated with determining the planned irrigation water demands and assessing the suitability of the options available for meeting these demands. To help identify where this project needs to go and how to get there, we recommend approaching these tasks in multiple phases. Our team selected for this project has considerable experience in conducting stakeholder workshops and building consensus with varied stakeholders who may have disparate objectives. As illustrated in Figure 2, each phase will have "off ramps" built in if there is an indication from preliminary results that some portions of the project may not be feasible either technically and/or economically. Table 1 provides the tasks associated with each proposed phase; a more detailed task description is provided in the scope of work.

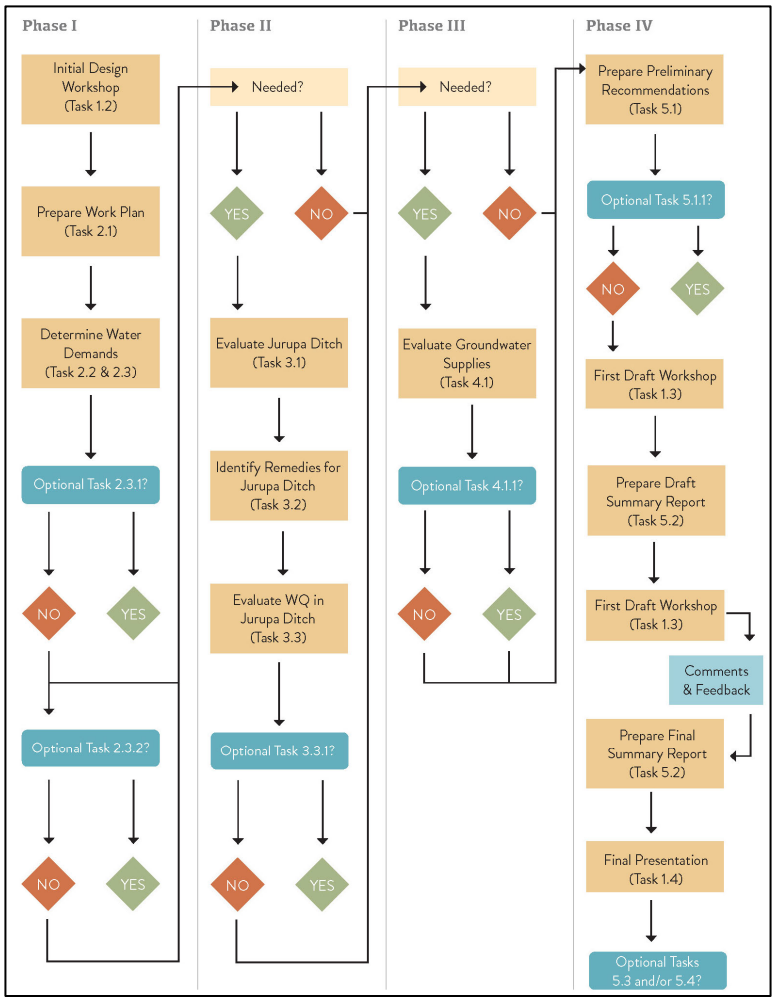


Figure 2. Flowchart of Project Tasks

Table 1. Proposed Phases

Proposed Phase	Original Task	WSC Task	Description
I, II, III, IV	-	1.1	Perform all necessary project management activities.
I	h.1	1.2	Conduct Initial Design Workshop.
IV	h.2	1.3	Conduct First Draft Workshop.
IV	h.3	1.4	Final Presentation.
I	-	2.1	Develop a detailed Phase 1 workplan describing all the subtasks associated with Tasks a and b. This task will also provide the preliminary alternatives based on projected water demands.
I	a	2.2	Determine the water demands for the JAHR.
I	b	2.3	Determine the water demands for the LRNC.
I	(Optional)	2.3.1	Determine the water demands for 0.35 acre pond at the LRNC.
I	(Optional)	2.3.2	Determine water supply needed to augment flows to Sunnyslope Creek during summer/fall.
II	c	3.1	Evaluate the conditions for the Jurupa Ditch.
II	d	3.2	Identify potential remedies for the Jurupa Ditch.
II	e	3.3	Evaluate water quality in the Jurupa Ditch.
II	(Optional)	3.3.1	Evaluate water quality for potential use by terrestrial and aquatic wildlife species at the LRNC.
III	f	4.1	Evaluate available groundwater supplies for the JAHR and LRNC.
III	(Optional)	4.1.1	Evaluate water quality of potential well water at the LRNC for use by terrestrial and aquatic wildlife species at the LRNC.
IV	g	5.1	Provide recommendations on most efficient ways to meet water demands at the JAHR and LRNC.
IV	(Optional)	5.1.1	Expand recommendations to include how best to meet water demands for the 0.35 acre pond and creek restoration at the LRNC.
IV	i	5.2	Prepare a detailed summary report.
IV	j.i (Optional)	5.3	Prepare plans and specifications for up to two new wells.
IV	j.ii (Optional)	5.4	Prepare plans and specifications for Jurupa Ditch remediation.

As part of the overall project approach, WSC will develop three preliminary alternatives that bracket the range of potential project elements described by the subtasks for each phase, as well as a baseline or a no-project Alternative. The no-project alternative will describe current water utilization at the JAHR and the LRNC. These alternatives will be updated based on the information gained from completing the evaluations of the water supply options defined for the project and used as the framework to develop the final recommendations. The no-project alternative will describe current water utilization at the JAHR and the LRNC. Alternatives 1, 2, and 3 will have the following preliminary narrative descriptions.

Alternative 1. JAHR Well(s). In this alternative, water demands are optimized by utilizing efficient irrigation methods, growing varietals that are climate-acclimated, and by using best management

practices (BMPs) for each crop[5]. Irrigation BMPs for farm runoff will also be employed to limit any runoff from the sites[6]. One to two wells will be sited at JAHR and sized to meet the crop irrigation needs, as well as the outdoor water use at the historic home on the JAHR site. The irrigation well(s) must meet peak daily demands for the summer growing season. WSC will survey the area around the JAHR to see if there is an inactive or underutilized well that can be re-purposed as an irrigation well for the JAHR. Under this alternative, JAHR will not utilize its Jurupa Ditch allocation of 1,080 gpm, allowing all Jurupa Ditch water to flow though their property and downstream for use at the LRNC. In Phase 2, the efficacy of potential remedies to the Jurupa Ditch will be explored.

Alternative 2. LRNC Well(s). This alternative is like Alternative 1, except that the proposed irrigation well(s) will be sited at LRNC and sized to meet the crop irrigation needs planned for this site. The ability to augment flows to the 0.35-acre pond and the Sunnyslope Creek will also be evaluated under this alternative. The JAHR can take their full allocation of Jurupa Ditch water (1,080 gpm) and potentially more if agreements can be amended.

Alternative 3. Wells at Both Sites. This alternative is like Alternatives 1 and 2, except that one to two new irrigation wells would be sited at both project sites. At a minimum, all wells will be sized to meet the planned farm water demands less the allocations of Jurupa Ditch water. The new well(s) at the LRNC will also be sized to augment flows to the 0.35-acre pond and the Sunnyslope Creek. The JAHR can take their full allocation of Jurupa Ditch water (1,080 gpm) and potentially more if agreements can be amended.

[5] Balancing irrigation efficiency with Huerta del Valle's desire to plant and grow heirloom crops.
[6] The Santa Ana Regional Board may require salt and nitrate farm management plans to reduce–to the extent practicable–any water quality impacts to groundwater.

Scope of Work

Task 1. Project Management and Meetings. Effectively controlling the scope, schedule, and budget is essential for delivering a project that meets the needs of Valley District and Huerta del Valle. WSC understands the importance of these elements of the project and is dedicated to consistently manage each from start to finish.

WSC will facilitate three workshops with interested stakeholders and provide necessary materials for the meeting. Materials include, but are not limited to, agenda, meeting minutes, print outs, PowerPoint presentations, maps, design drawings, etc.

Task 1.1. Project Management (All Phases). The project manager (PM) will be the point-of-contact for any work executed under this contract. The PM will be responsible for all project management services for the study, including resource allocation and scheduling, cost controls, monthly invoice preparation and review, and the preparation of monthly status reports, including any anticipated changes to the schedule or budget. The PM will be directly responsible for the technical execution of the project, the quality of all deliverables, and the adherence to schedule and budget.

WSC will be prepared to facilitate and participate in regular reoccurring meetings to monitor progress of the study and ensure efficient flow of information from Huerta del Valle and relevant stakeholders to the consultant and vice versa. Regular meetings would happen on the order of every other week, perhaps rotating live meetings with virtual meetings.

Task 1.2. Initial Design Workshop. The intent is to have relevant stakeholders define the objectives of the study and provide pertinent information and identify additional information sources. The potential alternatives will be presented and discussed. WSC will solicit opinions and will draw out wants and needs of stakeholders and study elements that are problematic.

Task 1.3. First Draft Workshop. Presentation of initial findings and methods to relevant stakeholders. Intended to provide an opportunity for stakeholders to provide feedback to the consultant on the preliminary study results and methods prior to finalizing the study and recommendations. Revised potential alternatives will again be presented and discussed. WSC will solicit opinions and will draw out wants and needs of stakeholders and study elements that are problematic.

Task 1.4. Final Presentation. Presentation of the final findings and methods of the study. At this point, the project should be transitioning from studies and planning to the feasibility stage.

WSC will be prepared to facilitate and participate in regular reoccurring meetings to monitor progress of the study and ensure efficient flow of information from Huerta del Valle and relevant stakeholders to the consultant and vice versa. Regular meetings would happen on the order of every other week, perhaps rotating live meetings with virtual meetings.

Deliverables – Task 1

- *Monthly Invoices and Status Reports*

- *Updated Project Schedule*
- *Agenda for each of the three workshops*
- *Materials necessary for meetings, including, but are not limited to, agenda, meeting minutes, print outs, PowerPoint presentations, maps, design drawings, etc.*
- *Meeting notes for each of the three workshops*

Phase I

Task 2. Determine Project Water Demands. The work completed for this task will focus on determining the annual irrigation needs for the planned agricultural uses and habitat restoration goals identified for the JAHR and LNRC.

Task 2.1. Develop a Detailed Phase 1 Workplan. This workplan will describe all the subtasks associated with Tasks a and b. The workplan will be approved by Valley District and Huerta del Valle prior to commencing substantive work. This task will also provide the preliminary alternatives (see Table 2) which will be based on projected irrigation water demands at both project sites. Valley District and Huerta del Valle will provide comments during a 30-day period after submission of the Draft Workplan. During the comment period, WSC will be available for any questions or clarifications. Once the comments have been received, they will be used to finalize the Phase I Workplan.

Task 2.2. Determine Annual Water Demands for the JAHR. WSC will work with Huerta del Valle to determine peak daily and annual water demands for the following uses at JAHR. Irrigation needs for approximately 19 acres at the JAHR for the purpose of a community farm. This community farm will have approximately:

- 5 acres of row crops
- 1 acre of hedgerow
- 5 acres of pasture
- 5 acres of cover crop
- 3 acres of citrus

Irrigation water demands will be optimized by utilizing efficient irrigation methods, growing varietals that are climate-acclimated, and by using BMPs[7] for each crop. Irrigation BMPs for farm runoff will also be employed to limit any runoff from the JAHR.

If appropriate, reference evapotranspiration zones (ET_0) can be ascertained from the nearest California Irrigation Management Information Systems (CIMIS station) while using a crop coefficient (K_c) to translate ET_0 to crop evapotranspiration (ET_c). Staff from the University of California Agriculture and Natural Resources (CANR) Cooperative Extension can also be consulted.

Deliverables for Task 2.2 will be combined with Task 2.3 into one letter report.

[7] Balancing irrigation efficiency with Huerta del Valle's desire to plant and grow heirloom crops.

Task 2.3. Determine Annual Water Demands for the LRNC. A portion of the LRNC plan is to develop a community farm with four to five acres of row crops as well as one or two acres of farm-associated landscaping.

Irrigation water demands at the LRNC will be optimized by utilizing efficient irrigation methods, growing varietals that are climate-acclimated, and by using BMPs for each crop[8]. Irrigation BMPs for farm runoff will also be employed to limit any runoff from the sites. If appropriate, ET_0 can be ascertained from the nearest CIMIS station while using K_c to translate ET_0 to ET_c. Staff from the UC Cooperative Extension can also be consulted.

OPTIONAL Task 2.3.1. Determine Annual Water Demands for 0.35 Acre Pond. A water supply may be necessary to feed the 0.35-acre pond at the LRNC. If this task is pursued, WSC will work closely with Huerta del Valle and Valley District to develop a scope and cost, primarily based on the annual irrigation demands and other preliminary decisions which are determined for both project sites.

OPTIONAL Task 2.3.2. Determine Annual Water Demands to Augment Flows to Sunnyslope Creek. A water supply may be necessary to augment flows to Sunnyslope Creek during the dry season (i.e. summer and fall) at the LRNC. This task is similar to Optional Task 2.3.1 such that, if this task is pursued, a scope and cost will be determined based on the outcomes of Tasks 2.2 and 2.3 and other preliminary decisions identified by the team.

Deliverables – Task 2

- *Detailed draft and final Phase 1 Workplan submitted in electronic format (PDF). The final workplan will incorporate comments from the stakeholders.*
- *Draft and final letter report that describes the range of annual water demands based on variations in ET_0 and crop coefficients for the crops that are planned for the JAHR and the LRNC agricultural areas. One letter report will be written that covers both areas and submitted in electronic format (PDF). The final letter report will incorporate comments from the stakeholders.*

Phase II

Task 3. Assess the Jurupa Ditch and Identify Remediation Options. The work completed for this task will focus on evaluating the existing condition of the Jurupa Ditch for the segment between the JAHR and LRNC. This task will also include describing potential remediation of deficiencies identified and evaluating the water quality at locations along the Jurupa Ditch.

Task 3.1. Evaluate Condition of the Jurupa Ditch. The segment of Jurupa Ditch from the JAHR to the LRNC is about 1.6 miles and is the main conveyance of irrigation water which originates from

[8] Our understanding is that the JAHR intends to plant some of the area with indigenous plants using the Three Sisters technique: companion planting beans, squash, and corn. The corn provides a structure for the beans to climb, the squash provides much needed shade, and the beans fix nitrogen from the atmosphere.

RPU's discharge point. The following are known issues with the segment of the Jurupa Ditch within this segment (i.e. project area):

- The ditch is about 176 years old and appears to not have been maintained over the recent years.
- Non-native vegetation has proliferated in and adjacent to the ditch, which obstructs flow in some sections.
- A significant volume of water is likely lost to evapotranspiration each year.
- The project may face considerable residential opposition to a proposal to remove vegetation from the ditch.
- Vegetation removal and potential repairs to the ditch may be cost prohibitive.

Task 3.1 will include three subtasks; subtask i is the identification of locations where water is supplied to the Jurupa Ditch; subtask ii is an assessment of who owns shares in the Jurupa Ditch Company and the percentage of ownership; and, subtask iii will determine the locations where water conveyance may be compromised due to unauthorized/illegal diversions, and design, structural or other deficiencies of the Jurupa Ditch.

The methods and results of Task 3.1 will be provided in the Summary Report (Task 5.2).

Task 3.2. Describe Potential Remediation to the Jurupa Ditch. WSC will evaluate the deficiencies of the Jurupa Ditch identified through completion of Task 3.1 and will describe the potential remedies for each. This will include the details and associated costs for each potential remediation. The effect that implementing each remediation will have on the conveyance of water to the JAHR and LRNC will be evaluated. Due to the complexity of remediating 1.6 miles of ditch, this engineering task will be at the conceptual level. The proposed remediation tasks will be reviewed in the field by a WSC civil engineer who will walk the length of the ditch and will transcribe detailed notes. Preliminary-level costs will be estimated based on conditions observed during the site walk.

Photo 2. Segment of the Jurupa Ditch along Riverside Drive.

The methods and results of Task 3.2 will be provided in the Summary Report (Task 5.2).

Task 3.3. Evaluate Water Quality within the Jurupa Ditch. Whether or not the water conveyed via the Jurupa Ditch is safe for agricultural use at the JAHR and LRNC needs to be determined. WSC will work with Huerta del Valle to determine the appropriate water quality parameters and number of sampling points, and to identify locations along the Jurupa Ditch for the collection of

water quality samples. WSC will schedule and coordinate all water sampling events, including delivery to the testing laboratory. WSC assumes this will be a single sampling event.

The methods and results of Task 3.3 will be provided in the Summary Report (Task 5.2).

OPTIONAL Task 3.3.1. Evaluate Water Quality for Potential Use by Terrestrial and Aquatic Wildlife Species at the LRNC. As an optional task, water quality will be evaluated for its potential use by both terrestrial and aquatic wildlife species at the LRNC. The primary steps are anticipated to include coordinating directly with Valley District's biologists to determine the appropriate number and location of water quality sampling points, and the required water quality parameters to be tested. Scope and cost for this task may be reduced if the same water samples collected for Task 3.3 include the laboratory analysis needed for this optional task.

The methods and results of Optional Task 3.3.1 (if completed), will be provided in the Summary Report (Task 5.2).

Phase III

Task 4. Assessment of Groundwater Supplies. The goal of this task is to determine the amount of groundwater which could be produced by one or more irrigation wells sited at the JAHR and LRNC sites. This will include estimating annual production potential, identifying well locations, and assessing the potential water quality from groundwater pumped from the proposed wells. This task also includes the option to evaluate water quality produced from the proposed wells for potential use by terrestrial and aquatic wildlife species at the LRNC.

Task 4.1. Evaluate Available Groundwater Supplies for the JAHR and LRNC. WSC will complete an analysis of annual groundwater supplies that could be produced by new irrigation wells at both project sites. Three subtasks are included and described in the RFP as (i) identifying the potential annual production; (ii) determining the most appropriate well locations; and, (iii) evaluating the quality of potential groundwater supplies for agricultural use. In addition, subtask iii may include—**at the option of Valley District and Huerta del Valle**—an evaluation of the quality of well water at the LRNC for use by terrestrial and aquatic wildlife species (see Task 4.1.1).

Suitable well locations will be identified for both project sites using criteria developed in collaboration with Huerta del Valle and other interested stakeholders. WSC's approach will include completing desktop tasks and will make full use of data sets and information made available, along with conventional software programs (e.g., Excel®, ArcGIS, etc.). WSC's team has successfully used this technique for siting new wells and estimating potential yield and water quality for other water supply studies.

To complete subtasks i through iii under this Task 4.1, WSC will collect and evaluate all relevant and available data for existing nearby wells. As shown on the attached Figure 1, there are wells owned and operated by the Rubidoux Community Services District, County of Riverside, and the U.S. Geological Survey (USGS) located near both project sites. Additionally, well construction and

local hydrogeologic information will be obtained from the Department of Water Resource's Well Completion Report website for private (domestic) wells located in the project area. The following types of data and information will be used to complete the evaluations:

- Well locations (existing)
- Borehole lithology
- Well construction details
- Aquifer parameters
- Average well capacity and production
- Water quality

The methods and results of Task 4.1 will be provided in the Summary Report (Task 5.2).

OPTIONAL Task 4.1.1. Evaluate Water Quality of Potential Well Water for Terrestrial and Aquatic Use at the LRNC. WSC will determine the suitability of groundwater produced from the proposed new wells for use by planned terrestrial and aquatic wildlife species restoration at the LRNC. The steps are anticipated to include coordinating with Valley District's biologists to understand the details of the planned water uses and to identify which water quality parameters need to be considered in the evaluation. In addition to the anticipated water quality for the proposed new wells, the evaluation may include data from nearby existing wells, as available.

The methods and results of Optional Task 4.1.1—if completed—will be provided in the Summary Report (Task 5.2).

Phase IV

Task 5. Final Recommendations and Reporting. Work performed under this task will include using Alternatives 1 through 3 to develop recommendations on the most efficient ways to meet the proposed agricultural and habitat restoration water demands at the JAHR and LRNC sites. A detailed summary report will be produced to present the methods used to complete each task and the recommendations to meet the water demands, as described. This task includes the option to prepare plans and specifications for up to two new irrigation wells and/or remediation for the Jurupa Ditch.

Task 5.1. Recommend Most Efficient Ways to Meet Agricultural Water Demands. The purpose of this task is to provide recommendations for the most efficient ways of meeting the irrigation water demands at both project sites. This will be accomplished by considering the potential improvements and limiting factors identified for the Jurupa Ditch from Task 3 and for new irrigation wells from Task 4. As previously described in our Approach section, WSC will develop alternatives to bracket the range of the potential means of meeting water demands at the JAHR and LRNC. Table 2 below is an example of how these alternatives will be used to identify and provide recommendations for the most efficient ways to meet these water supply needs.

Table 2. Elements of Proposed Alternatives

Project Element	Baseline	Alternative 1 JAHR Well(s)	Alternative 2 LRNC Well(s)	Alternative 3 Wells at Both Sites
Define Water Demands	Current	Optimized	Optimized	Optimized
New Irrigation Well(s) at JAHR	No	**Yes**	No	No
All Flows in Jurupa Ditch to LRNC	No	**Yes**	No	No
New Irrigation Well(s) at LRNC	No	No	**Yes**	No
JAHR to Utilize More Jurupa Ditch Water – If 40% Allocation cab be Increased	No	No	**Yes**	No
Take Full Allocation of Jurupa Ditch Water at JAHR and LRNC	No	No	No	**Yes**
New Irrigation Wells at JAHR and LRNC to Augment as Necessary	No	No	No	**Yes**

The methods and results of Task 5.1 will be included in the Summary Report (Task 5.2).

OPTIONAL Task 5.1.1. Determine Most Efficient Ways to Meet Water Demands for 0.35 Acre Pond and Creek Restoration. Options to meet the water demands for pond and creek restoration at the LRNC will be evaluated. Recommendations will account for the most suitable methods (i.e. improved Jurupa Ditch and/or new irrigation wells) of water supply determined under Task 5.1.

The methods and results of Optional Task 5.1.1—if completed—will be provided in the Summary Report (Task 5.2).

Task 5.2. Preparation of a Summary Report. WSC will prepare three drafts of the technical memorandum that summarizes the methods and results of the Water Supply Study for the JAHR and the LRNC, including all approved optional tasks. The technical memorandum will include an Executive Summary, Project Background, Objectives, Methodology, Results, and Recommendations along with all supporting tables, graphs, maps, and appendices. The Stakeholders will provide comments during a 30-day period after each submission of the first and second drafts. During the comment period, WSC will be available for any questions or clarifications. Once the comments have been received, they will be compiled into a table, along with the response from WSC—this table will be included in the final technical memorandum as an appendix. The final technical memorandum will also include intermediate and final work products.

OPTIONAL Task 5.3. Preparation of Plans and Specifications for New Wells. Based on the recommendations of the Study and at the direction of Valley District, plans and specifications for up to two wells (one at each project site) may be needed. These specifications will include bidding sheets, permit requirements, job site controls, noise mitigation measures, mobilization/demobilization and site restoration requirements, drilling, development and well construction measures, and performance testing. Plans and specifications will be submitted in

three drafts (30%, 60%, and 90%) for review and comments for completion of the 100% plans and specifications.

OPTIONAL Task 5.4. Preparation of Plans and Specifications for Jurupa Ditch Remediation. Based on the recommendations of the Study and at the direction of Valley District, plans and specifications for remediation of deficiencies within the segment of the Jurupa Ditch located between the two project sites. Plans and specifications will be submitted in three drafts (30%, 60%, and 90%) for review and comments for completion of the 100% plans and specifications.

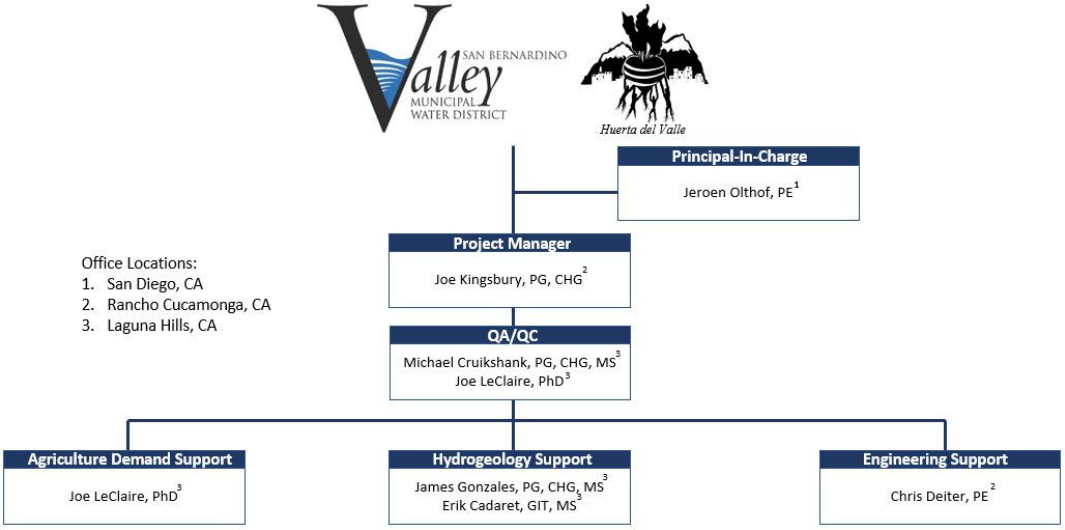
Deliverables – Task 5

- *First Draft, Draft Final, and Final Draft of the Summary Report in electronic format (MS Word and as a single PDF document of the Final Draft)*
- *Electronic files of raw data (Excel)*
- *Digital files (jpeg) of photographs*
- *Electronic files of GIS data (no older than ArcMap version 10.6)*
- *OPTIONAL: 30%, 60%, and 90% Plans and Specifications will be submitted in electronic format (MS Word)*
- *OPTIONAL: 100% Plans and Specifications will be submitted as a single PDF document*

Section 3

Organizational Chart

WSC's proposed Project Manager, Joe Kingsbury, will serve as the primary point of contact. Joe will leverage a highly qualified team along with his experience working on various water supply projects throughout southern California. He will be supported by proposed Principal in Charge, Jeroen Olthof, who is a professional engineer with over twenty years of experience delivering water supply projects. Senior Hydrogeologist Michael Cruikshank, and Soil Scientist Joe LeClaire, are technical experts who will bring extensive knowledge of the link between the groundwater basin, existing water systems, and the Santa Ana River. Chris Deiter is an experienced civil engineer who will support efforts to assess the Jurupa Ditch and identify potential remediation which will help understand the best options for the project. James Gonzales and Erik Cadaret, both hydrogeologists, will use their expertise in data management and will support efforts to obtain information needed to complete the evaluations for both project sites. Below is the team organization chart which graphically displays the chain of responsibility for each of our proposed team members. Contact information for these individuals is provided in the table below.



Name	Firm	Address	Telephone	E-mail
Jeroen Olthof	WSC	9815 Carroll Cyn. Rd., Ste. 205 San Diego, CA 92131	(858) 397-2617	jolthof@wsc-inc.com
Joe Kingsbury	WSC	9375 Archibald Ave., Ste. 200 Rancho Cucamonga, CA 91730	(909) 483-3200	jkingsbury@wsc-inc.com
Michael Cruikshank	WSC	23232 Peralta Dr., Ste. 215 Laguna Hills, CA 92653	(949) 528-0960	mcruikshank@wsc-inc.com
Joseph LeClaire	L&A	249 Albert Place Costa Mesa, CA 92627	(949) 616-0440	joseph.leclaire@outlook.com
Chris Deiter	WSC	9375 Archibald Ave., Ste. 200 Rancho Cucamonga, CA 91730	(909) 483-3200	cdeiter@wsc-inc.com
James Gonzales	WSC	23232 Peralta Dr., Ste. 215 Laguna Hills, CA 92653	(949) 528-0960	jgonzales@wsc-inc.com
Erik Cadaret	WSC	23232 Peralta Dr., Ste. 215 Laguna Hills, CA 92653	(949) 528-0960	ecadaret@wsc-inc.com

Section 4

Project Schedule

We understand that the Water Supply Studies Project is needed to determine an efficient means of quantifying and meeting water demands for sustainable agriculture operations at both sites and to potentially enhance pond and creek restoration at the Louis Robidoux Nature Center property and downstream at the Sunnyslope Creek. Approaching the project in multiple phases as discussed in the previous sections, our knowledge of the project objectives, and our experience with working as a partner on collaborative water supply projects which have linked objectives demonstrate that we can complete the work on schedule and meet all deliverables and milestones, while maintaining the project budget.

We anticipate a maximum duration of 11 months to complete the project. This is based primarily on the allowable durations described in the RFP and our proposed scope of work. However, it should be noted that the actual duration to complete the project will be dependent upon some of the initial findings and whether any of the proposed optional tasks are pursued. WSC will assist with identifying these related changes and coordinate with Valley District and Huerta del Valle to adjust the project schedule.

A preliminary Project Schedule for this study has been prepared and is provided on the following page. Please note that the Optional Tasks are not included in the preliminary schedule; each will be added upon the decision to include for the project. Upon the Notice to Proceed, WSC will develop and maintain the schedule using Microsoft Project in Gantt chart format. The schedule will be updated in accordance with project deliverables and activities and communicated to Valley District and Huerta del Valle by our Project Manager.

Preliminary Project Schedule
Water Supply Studies for Jensen-Alvarado Historic Ranch and Louis Robidoux Nature Center

Task	August				September				October				November				December				2021 January				February				March				April				May				June			
1.0 Project Management and Meetings																																												
1.1 Project Management																																												
1.2 Initial Design Workshop		W																																									
1.3 First Draft Workshop																									W																			
1.4 Final Presentation																																										W			
2.0 Annual Water Demands Evaluation																																												
2.1 Detailed Phase I Workplan							S	R	R	R	R	S																																
2.2 Annual Water Demands for the JAHR																																												
2.3 Annual Water Demands for the LRNC				S	R	R	R	R	S																																			
3.0 Jurupa Ditch Assessment																																												
3.1 Evaluate Condition of the Jurupa Ditch																																												
3.2 Describe Potential Remediation to Jurupa Ditch																																												
3.3 Evaluate Water Quality within the Jurupa Ditch																																												
4.0 Groundwater Supply Evaluation																																												
4.1 Evaluate Potential Groundwater Supplies at the JAHR and LRNC																																												
Task 5.0 Reporting																																												
Task 5.1 Recommendations to Meet Supply Demands at JAHR & LRNC																																												
Task 5.2 Prepare Summary Report Technical Memorandum																										D	R	R	R	R				DF	R	R	R	R			FD				

Key:

S = Submittal

D = Draft Summary Report TM

DF = Draft Final Summary Report TM

FD = Final Draft Summary Report TM

R = Review Period

W = Workshop

Section 5

Fee Schedule

We value the opportunity to submit this proposal to Huerta del Valle and Valley District for the Water Supply Studies Project. This proposal is submitted as Not-To-Exceed Time and Materials and will not be exceeded without prior written authorization from Huerta del Valle and Valley District. A cost revision is not anticipated unless the scope of work is changed.

As specified in the RFP, we have included a Fee Schedule which follows the tasks described in the Scope of Work, including all Optional Items. The Fee Schedule provides a detailed cost estimate presenting the level-of-effort by task based on the Scope of Work described in this proposal. Hourly rates and hours to complete each task and project-related incidentals are included.

The Fee Schedule is provided on the following page.

San Bernardino Valley Water District & Huerta del Valle
Water Supply Studies for Jensen-Alvarado Historic Ranch and Louis Robidoux Nature Center
Cost Proposal
6/29/2020

WSC
WATER SYSTEMS CONSULTING, INC.

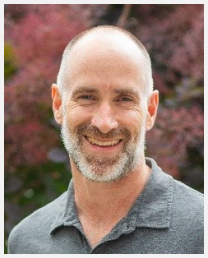
Task No.	Task Description	WSC								LeClaire & Associates		ALL FIRMS			
		Principal In Charge	QA/QC	Project Manager	Hydrogeology Support	Engineering Support	Hydrogeology Support	Project Admin	WSC Labor Fee	Labor Hours	Labor Fee	Total Labor Hours	Total Labor Fee	Expenses	Total Fee
		Jeroen Olthof	Michael Cruikshank	Joseph Kingsbury	James Gonzales	Christopher Deiter	Erik Cadaret	Kay Merrill							
	Billing rates, $/hr	*$280*	*$240*	*$230*	*$200*	*$200*	*$165*	*$145*			*$ 180*				
1	**Project Management and Meetings**														
1.1	Project Management (All Phases)	1		40				12	$ 11,220	0	$ -	53	$ 11,220	$ -	$ 11,220
1.2	Initial Design Workshop		8	12			12		$ 6,660	8	$ 1,440	40	$ 8,100	$ -	$ 8,100
1.3	First Draft Workshop			12			12		$ 4,740	8	$ 1,440	32	$ 6,180	$ -	$ 6,180
1.4	Final Presentation			12			12		$ 4,740	8	$ 1,440	32	$ 6,180	$ -	$ 6,180
	SUBTOTAL	**1**	**8**	**76**	**0**	**0**	**36**	**12**	$ 27,360	**24**	$ 4,320	**157**	$ 31,680	$ -	$ 31,680
2	**Phase I - Project Water Demands**														
2.1	Detailed Phase 1 Workplan		4	8					$ 2,800	24	$ 4,320	36	$ 7,120	$ -	$ 7,120
2.2	Annual Water Demands for the JAHR			4			6		$ 1,910	24	$ 4,320	34	$ 6,230	$ -	$ 6,230
2.3	Annual Water Demands for the LRNC			4			6		$ 1,910	24	$ 4,320	34	$ 6,230	$ -	$ 6,230
	SUBTOTAL	**0**	**4**	**16**	**0**	**0**	**12**	**0**	$ 6,620	**72**	$ 12,960	**104**	$ 19,580	$ -	$ 19,580
3	**Phase II - Jurupa Ditch**														
3.1	Evaluate Condition of Jurupa Ditch					10	8		$ 3,320	0	$ -	18	$ 3,320	$ -	$ 3,320
3.2	Describe Potential Remediation to Jurupa Ditch					24	8		$ 6,120	0	$ -	32	$ 6,120	$ -	$ 6,120
3.3	Evaluate Water Quality within Jurupa Ditch					24	4		$ 5,460	0	$ -	28	$ 5,460	$ -	$ 5,460
	SUBTOTAL	**0**	**0**	**0**	**0**	**58**	**20**	**0**	$ 14,900	**0**	$ -	**78**	$ 9,440	$ -	$ 9,440
4	**Phase III - Groundwater Supply**														
4.1	Groundwater Supply Evaluation at JAHR and LRNC			8	24		18		$ 9,610	24	$ 4,320	74	$ 13,930	$ -	$ 13,930
	SUBTOTAL	**0**	**0**	**8**	**24**	**0**	**18**	**0**	$ 9,610	**24**	$ 4,320	**74**	$ 13,930	$ -	$ 13,930
5	**Phase IV - Recommendations and Reporting**														
5.1	Agricultural Water Demand Recommendations						10		$ 1,650	16	$ 2,880	26	$ 4,530	$ -	$ 4,530
5.2	Summary Report TM	4	8	24	8	6	24		$ 15,320	24	$ 4,320	98	$ 19,640	$ -	$ 19,640
	SUBTOTAL	**4**	**8**	**24**	**8**	**6**	**34**	**0**	$ 16,970	**40**	$ 7,200	**124**	$ 24,170	$ -	$ 24,170
	COLUMN TOTALS	**5**	**20**	**124**	**32**	**64**	**120**	**12**	$ 75,460	**160**	$ 28,800	**537**	$ 98,800	$ -	$ 98,800
OT 1	**Phase I - Additional Water Demand**														
OT 1.1	Annual Water Demand for 0.35-Acre Pond								$ -	0	$ 180	0	$ 180	$ -	$ 180
OT 1.2	Annual Water Demand for Sunnyslope Creek								$ -	0	$ 180	0	$ 180	$ -	$ 180
	Phase I - Additional Water Demand TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	$ -	**0**	$ 360	**0**	$ 360	$ -	$ 360
OT 2	**Phase II - Evaluate Jurupa Ditch Water Quality**														
OT 2.1	Water Quality Evaluation of Jurupa Ditch			2	4	12	26		$ 7,950	4	$ 180	48	$ 8,130	$ -	$ 8,130
	Phase II - Evaluate Jurupa Ditch Water Quality TOTAL	**0**	**0**	**2**	**4**	**12**	**26**	**0**	$ 7,950	**4**	$ 180	**48**	$ 8,130	$ -	$ 8,130
OT 3	**Phase III - Evaluate Water Quality of Well Water at LRNC**														
OT 3.1	Water Quality Evalution of Well Water at LRNC			2	8		16		$ 4,700	8	$ 180	34	$ 4,880	$ -	$ 4,880
	Phase III - Evaluate Water Quality of Well Water at LRNC TOTAL	**0**	**0**	**2**	**8**	**0**	**16**	**0**	$ 4,700	**8**	$ 180	**34**	$ 4,880	$ -	$ 4,880
OT 4	**Phase IV - Expanded Recommendations for Water Demand**														
OT 4.1	Water Demand Recommendations for pond and creek at LRNC		2	4	4	4			$ 3,000	8	$ 180	22	$ 3,180	$ -	$ 3,180
	Phase IV - Expanded Recommendations for Water Demand TOTAL	**0**	**2**	**4**	**4**	**4**	**0**	**0**	$ 3,000	**8**	$ 180	**22**	$ 3,180	$ -	$ 3,180
OT 5	**Phase IV - Preperation of Plans and Specifications**														
OT 5.1	Plans and Specifications for New Well Installations		4	16	24		60		$ 19,340	0	$ 180	104	$ 19,520	$ -	$ 19,520
OT 5.2	Plans and Specifications for Jurupa Ditch Remediation		2			60	80		$ 25,680	0	$ -	142	$ 25,680	$ -	$ 25,680
	Phase IV - Preperation of Plans and Specifications TOTAL	**0**	**6**	**16**	**24**	**60**	**140**	**0**	$ 45,020	**0**	$ 180	**246**	$ 45,200	$ -	$ 45,200
	OPTIONAL TASKS TOTAL	**0**	**8**	**24**	**40**	**76**	**182**	**0**	$ 60,670	**20**	$ 1,080	**350**	$ 61,750	$ -	$ 61,750

10% mark-up on direct expenses
Standard mileage rate $0.57 per mile (or current Federal Mileage Reimbursement Rate)
Rates are subject to revision as of January 1 each year.

Appendix

Key Personnel Capabilities and Experience

JOE KINGSBURY, PG, CHG – Project Manager



Joe Kingsbury is a professional geologist and certified hydrogeologist with more than 20 years of experience and a deep knowledge of the Inland Empire groundwater basins and processes associated with new well installations. His recent project expertise includes well siting assessments, preliminary and final municipal well designs, construction management and inspection for municipal supply and injection wells, and well rehabilitation prioritization plans. Joe will manage the scope, schedule, and budget while providing senior leadership during key decision points and leading the evaluation and analysis portions of the project.

- **Well No. 20 Siting Study, City of Coachella Water Division. Lead Hydrogeologist.** Conducted a city-wide evaluation to locate potential sites suitable for a new municipal supply well.
- **Well No. 125 Replacement Siting Study and Preliminary Design Report, Rancho California Water District. Lead Hydrogeologist.** Conducted a district-wide evaluation to located potential sites for a new municipal supply well.
- **Cooperative Agreement to Protect Water Quality in Santa Ana River Basin, San Bernardino Valley Municipal Water District. Project Hydrogeologist.** Collected and analyzed geohydrologic and water quality data to address salinity objectives and compliance in the Bunker Hill, Lytle Creek, Rialto, Colton, Yucaipa, and San Timoteo Management Zones.

JEROEN OLTHOF, PE, MS, MBA – PRINCIPAL IN CHARGE

Jeroen Olthof has more than 25 years of water resources engineering experience. He specializes in hydraulic modeling of pipe networks, feasibility studies, infrastructure condition assessment, and comprehensive master planning. His experience includes database development and integration of GIS with hydraulic models, recycled water customer databases, and asset databases.

- **Regional Urban Water Management Plan, San Bernardino Valley Municipal Water District, San Bernardino, CA. Project Manager.** Managed development of Regional Urban Water Management Plan which included collaboration and facilitation with 10 local agencies and developed a comprehensive understanding of the local water supplies and demands.
- **Recharge Water Sediment Removal Feasibility Study, Orange County Water District, Orange County, CA. Project Engineer.** Conducted a feasibility study and evaluated alternatives to maximize groundwater recharge within the Santa Ana River Watershed. Recommended results served as the foundation of a capital improvement program.
- **2018 Water Master Plan, City of Victorville, Victorville, CA. Hydraulic Analysis Lead.** Developed, calibrated, and used a hydraulic model to support the condition and capacity evaluation as part of a 2018 Water Master Plan.

MICHAEL CRUIKSHANK, PG, CHG, MS – QA/QC

Michael is professional geologist and certified hydrogeologist with more than 14 years of experience. He has spent most of his career working in the groundwater basins throughout the Santa Ana River Watershed including the Project Area. He will bring a fresh perspective to the QA/QC role and will draw upon his deep, relevant experience. His existing knowledge of the Basin will enable him to effectively review key decisions, calculations, and deliverables.

- **Annual Groundwater Assessment Report, City of Riverside Public Utilities. Project Manager.** Prepared a report that will establish a high-level reporting mechanism to describe the current condition of the groundwater basins in RPU's service area and support decision making.
- **Recomputation of Ambient Water Quality for the Period 1999 to 2018, Santa Ana Watershed Project Authority (SAWPA). Project Manager.** Lead the technical and stakeholder aspects of the project that established updated ambient water quality values for all groundwater management zones in the Santa Ana Watershed.
- **Proposition 1 IRWMP Grant Support, San Bernardino Valley Water District. Project Manager.** Supported agencies in their understanding of the grant process and provided basin-specific knowledge to add value to the preliminary rating and ranking of projects analysis.

JOSEPH P. LECLAIRE, PhD– QA/QC and Agricultural Demand/Environmental Science Support

Dr. Joseph "Joe" LeClaire brings more than 37 years of technical expertise in the areas of groundwater quality and sustainability, equilibrium chemistry, and an understanding of the mobility of trace metals and organics in groundwater. Dr. LeClaire has often demonstrated success in managing large, multi-disciplinary projects involving various local, state, and federal regulatory agencies, and working with stakeholder groups with disparate and often conflicting objectives. L&A now regularly uses this extensive experience working with diverse stakeholder groups to find innovative solutions to solve perplexing and seemingly intractable environmental problems.

- **N/TDS Study for the Santa Ana Watershed Project Authority (SAWPA) Task Force.** Dr. LeClaire was the technical lead on critical components of the Nitrogen/Total Dissolved Solids Study in the Santa Ana River watershed which was the first functionally-equivalent comprehensive Salt and Nitrogen Management Plan for a region of California.
- **San Bernardino Municipal Water Department. Principal Investigator.** Dr LeClaire studied nitrogen loss in the Riverside-A Groundwater Management Zone (GMZ) through soil aquifer treatment (SAT).
- **Central Valley Salinity Alternatives for Long-term Sustainability, Central Valley Salinity Coalition. Research Lead.** Dr. LeClaire was the project lead or contributed significantly to several technical studies that provides the framework for the Central Valley (Salt and Nitrate Management Plan (SNMP).

CHRIS DEITER, PE — Engineering Support

Mr. Deiter has 12 years of experience in civil engineering specializing in water, recycled water, and wastewater systems and has 5 years of construction experience for various municipal water projects throughout the Southern California area. His engineering experience includes pipeline design, water storage reservoir design, water treatment system design, pump station analysis and design, hydraulic analysis, and water master planning.

- **Chino Basin Program Preliminary Design Report, Inland Empire Utilities Agency. Project Engineer.** Analyzed recycled water availability and recharge capacity of multiple recharge basins and created conceptual mass balance models as part of a multi-agency effort to manage water resources and provide drought resiliency.
- **Waterline Replacement Project Kenneth Street, Hastings Boulevard, Foxtail Lane and Water Services Replacement within portions of Indian Hills Area, City of Jurupa Valley. Project Engineer.** Performed waterline design and plan production using AutoCAD Civil 3D and construction submittal review and approval.
- **Xylem (Godwin Pumps), Preparation of Bypass Pumping Plans, City of Riverside. Project Manager.** Lead project team in review and refinement of calculations, selection of pumps and equipment, and approval of bypass plan.

JAMES GONZALES, PG, CHG, MS – Hydrogeology Support

James is a professional geologist and certified hydrogeologist with more than 14 years of diversified experience with groundwater, geotechnical, and environmental projects. He has significant experience in well siting, design, construction, development and testing, and water resource evaluations. James brings experience and availability to support Joe throughout the project. He will have a significant role in data collection and management, and in supporting the well siting analysis and well field evaluation.

- **Production Well Design and Construction Oversight, Golden State Water Company, Claremont. Hydrogeologist.** Provided planning, design, inspection, and construction management for production well Pomello Well No. 5. Prepared preliminary design, bid package (plans, specifications, and front-end documents), and final construction documents. Also, coordinated site inspections, reviewed contractor submittals and request for information, and provided technical support throughout the entire duration of the project.
- **Central Coast Blue, City of Pismo Beach. Hydrogeologist.** Providing planning and design services for the siting and implementation of injection wells and nested monitoring wells for an indirect potable reuse project.
- **North Pleasant Valley Desalter Project, City of Camarillo. Hydrogeologist.** Provided well siting, permitting, and design services for three triple-nested monitoring wells as part of the North Pleasant Valley Desalter project.

ERIK CADARET, GIT, MS – Hydrogeology Support

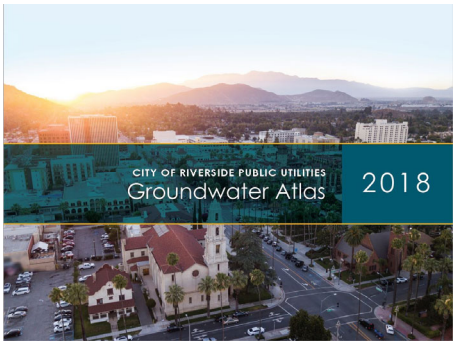
Erik has more than four years of experience working on groundwater related projects as a project and field hydrogeologist. He specializes in field data collection, data analysis and interpretation, and GIS applications. Notably, he has significant experience in the field collecting data for geologic and water quality related projects along with working as a field construction manager overseeing drilling contractors installing production wells and monitoring wells for public and private clients. He will contribute his experience working with large data sets and developing graphics to the project.

- **Annual Groundwater Assessment Report 2018, City of Riverside. Staff Hydrogeologist.** Supported development of report figures, tables, and content.
- **Recomputation of Ambient Water Quality for the Period 1999 to 2018, Santa Ana Watershed Project Authority (SAWPA). Staff Hydrogeologist.** Supported all technical aspects of the project that from start to finish that established updated ambient water quality values for all groundwater management zones in the Santa Ana Watershed.
- **Proposition 1 IRWMP Grant Support, San Bernardino Valley Water District. Staff Hydrogeologist.** Supported agencies in their understanding of the grant process and provided an analysis of all projects that were submitted to develop a preliminary ranking and rating of all projects based on OWOW grant process scoring criteria.

WSC Project Experience

Annual Groundwater Assessment Report 2018

City of Riverside – Riverside, CA

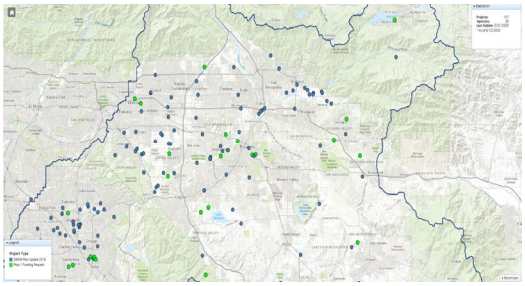


WSC was selected to develop and implement the Annual Groundwater Assessment Report to establish a high-level reporting mechanism to describe the current condition of the groundwater basins it produces from and support its goals and effective decision making as it relates to groundwater management. WSC has developed a forward-thinking report that will provide the stakeholders and decision makers at RPU the right information to make high-level decisions. This report showcases RPU's water infrastructure, water level change and changes in groundwater storage, and water quality from wells throughout RPU's service area.

Reference: Mr. Leo Fernando, PE, Senior Water Engineer, Phone: 951-826-5694
Project Completion: 2020
Key Staff: Michael Cruikshank (Project Manager/Hydrogeologist), Erik Cadaret (Hydrogeologist), James Gonzales and Joe Kingsbury (QA-QC/Hydrogeologist)

Proposition 1 IRWMP Grant Support

San Bernardino Valley Water District – San Bernardino, CA

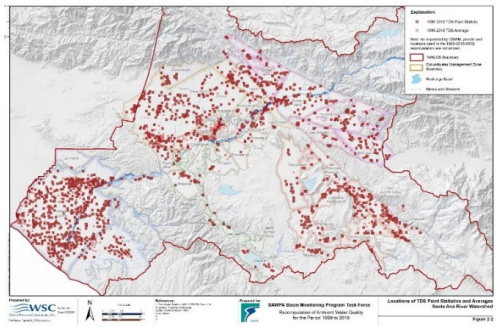


WSC was selected to provide technical and strategic decision-making support through several workshops to help project proponents navigate the SAWPA OWOW process. WSC facilitated several workshops that guided participating agencies on the grant submission process and understanding the scoring criteria. WSC evaluated projects according to the SAWPA OWOW ranking and rating criteria and developed strategies to prepare the project proponents to submit competitive grant applications with a higher degree of confidence. WSC's efforts led to project proponents to being fully prepared for the application process and were provided critical feedback for future consideration when applying for the next round of funding. One of the projects that was a part of the SAWPA OWOW process was Robidoux Nature Center and Sunnyslope Creek Restoration Project.

Reference: Mr. Robert (Bob) Tincher, MS, PE, Deputy General Manager -Resources, Phone: 909-387-9215
Project Completion: 2019
Key Staff: Michael Cruikshank (Project Manager/Hydrogeologist), Erik Cadaret (Hydrogeologist)

Basin Monitoring Program Task Force (BMPTF): Ambient Water Quality Recomputation for the Santa Ana River Watershed

Santa Ana Watershed Project Authority (SAWPA)– Riverside, CA



The Santa Ana River watershed comprises portions of San Bernardino, Riverside, Los Angeles, and Orange Counties, has an area of 2,840 square miles, and is home to over 6 million residents. The Santa Ana River is the major stream draining the watershed—96 miles in length from its headwaters near Big Bear to its discharge location in Huntington Beach.

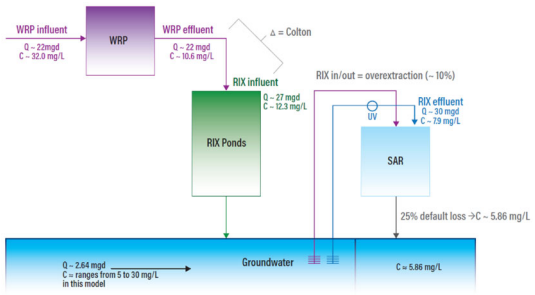
In December 1995, a Task Force consisting of 22 water resources agencies in the Santa Ana River watershed was formed to study what effects and implications salinity (expressed as Total Dissolved Solids (TDS)) and total inorganic nitrogen (TIN) in the groundwater basins of the watershed may have on the long-term sustainability of the groundwater supply. Active participation by decision makers from each of the Task Force members in collaboration with Santa Ana Water Board staff has been key to reaching consensus on the establishment of a TDS/Nitrogen (N) Management Plan in the Santa Ana Region's Basin Plan (functionally equivalent to the Central Valley's SNMP).The TDS/N Management Plan requires implementation of watershed-wide groundwater monitoring program to periodically determine ambient water quality (AWQ) for TDS and nitrate-nitrogen, assess compliance with groundwater quality objectives, and determine if assimilative capacity exists in groundwater management zones. The Basin Plan requires that the AWQ be recomputed every three years. WSC's Mr. Cruikshank is leading the current AWQ recomputation with support from L&A's Dr. LeClaire. Both have played major roles in several previous AWQ recomputation efforts, beginning with the 1954 to 1973 objective-setting period and the 1978 to 1997 current ambient period (both documented in the 2000 Technical Memorandum) dating back to 1996.

AWQ is computed for TDS and nitrate-nitrogen in all 40 groundwater management zones in the Santa Ana River watershed. The recomputation involves collecting, processing, and storing all groundwater quality and groundwater levels data from over 6,000 wells in a centralized database. From the database, point statistics are developed for nitrate and TDS, and groundwater quality and groundwater elevation contour maps are prepared in the management zones with requisite data and computed volume-weighted ambient TDS and nitrate-nitrogen concentrations using the data generated from the contour maps. Interpretive tools applied to the recomputation include a spatial analysis of groundwater quality changes, temporal analysis of groundwater change comparing basin-scale trends to trends observed in key well locations, and a forward-looking well attrition analysis. The findings from each recomputation are used to support updates to the regional TDS/N Management Plan, where needed.

Reference: Mr. Mark Norton, PE, LEED AP, ENV SP, Water Resources & Planning Manager, Phone: 951-354-4221
Project Completion: 2020
Key Staff: Michael Cruikshank (Project Manager/Hydrogeologist), Erik Cadaret and James Gonzales (Hydrogeologist), Joe LeClaire (QA/QC, Technical Advisor)

Nitrogen Loss in the Riverside-A Groundwater Management Zone

San Bernardino Water Department – San Bernardino, CA



The Rapid Infiltration and Extraction (RIX) facility receives approximately 33 MGD of secondary treated wastewater from the Water Reclamation Plant (WRP) and Colton's treatment facility. Natural bio-filtration is employed through the use of percolation basins and ultra-violet disinfection is used to meet the State of California Title 22 tertiary standards, in addition to the discharge standards specified in a separate NPDES permit issued to the RIX facility. RIX treated wastewater consistently meets or exceeds required discharge standards and is often superior in quality to effluent produced through conventional tertiary facilities.

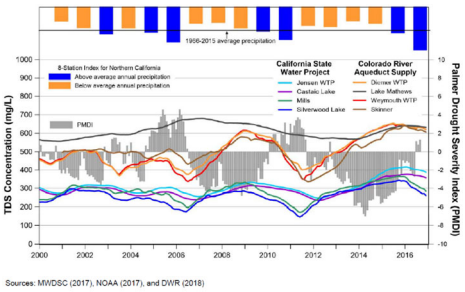
The SBMWD initiated a study of the RIX Facilities operations and discharges to the Santa Ana River overlying the Riverside-A Groundwater Management Zone (GMZ). The purpose of this study is to compile and analyze existing monitoring data in order to understand and quantify nitrogen losses and to determine if there is enough evidence to propose and support a revised Nitrogen-Loss Coefficient for the Riverside-A GMZ. It is well documented that losses of total inorganic nitrogen (TIN) occur through soil aquifer treatment (SAT) in anoxic systems. The RIX facility is unique in that nitrogen losses occur during the rapid infiltration/extraction of secondary effluent discharged to ponds and subsequently – the now tertiary treated effluent – is discharged to the Santa Ana River where the water undergoes further losses of nitrogen during soil-aquifer treatment in the SAR streambed and shallow aquifer system. In this study, nitrogen data were analyzed to estimate Nitrogen Loss Coefficients in the Riverside-A GMZ using the RIX system as an analog for the loss of nitrogen through SAT in the Santa Ana Riverbed downstream of the RIX discharge point. The study described herein is essentially a robust, long-term field study that assessed daily, and weekly data collected over a seven year period.

The SBMWD is using this report and other supporting information to requests that the RWQCB consider and adopt a 35% overall Nitrogen-Loss Coefficient for the Riverside-A GMZ, where the RIX facilities discharge highly treated tertiary effluent. The request from SBMWD is based on over seven years of daily flux and weekly concentration data, as described in this letter report. More so than other sites used to develop the range of Nitrogen-Loss Coefficients in the original Task 2A Study (WEI, 2000), the RIX system is highly instrumented and monitored and the data analyzed in this report represent a full-scale, long-term field study. The SBMWD is proposing that the RIX system be considered an analog for the loss of nitrogen through SAT in the Santa Ana Riverbed downstream of the RIX discharge point. The N-Loss Coefficient is also conservative in that non-RIX discharges to the Santa Ana River would have a longer residence time than discharges from the RIX facility allowing for greater nitrogen losses.

Reference: Ms. Jennifer Shepardson, Director of Environmental & Regulatory Compliance, (909) 771-6508
Project Completion: Ongoing
Key Staff: Dr. Joe LeClaire

Research Support and TDS Trends Study

Southern California Salinity Coalition – Orange, CA



The first objective of this study is to provide support to the Southern California Salinity Coalition (SCSC's) research program, reviewing research proposals, and streamlining research workflow. The SCSC is a nonprofit association of Southern California water resources management agencies. Formed in 2000, SCSC focuses on research, advocacy, and outreach related to the destructive effects of salinity on water systems. For the last 20 years, SCSC has been helping water managers to navigate critical salinity issues and preserve our valuable water resources.

The SCSC is composed of Eastern Municipal Water District, Inland Empire Utilities Agency, Metropolitan Water District of Southern California, Orange County Sanitation District, Orange County Water District, San Diego County Water Authority, Sanitation Districts of Los Angeles County, and Santa Ana Watershed Project Authority. The 2011 to 2016 drought in California, in conjunction with unprecedented statewide conservation legislation, caused several member agencies of the SCSC to face challenges meeting regulatory water quality standards for the salinity of discharge water from their wastewater treatment plants (WWTPs). In particular, total dissolved solids (TDS) concentrations have increased, while the operation of WWTPs have remained consistent with prior years. Key findings of this study include:

- Long-term water quality trends of TDS in wastewater and wastewater effluent show an upward trend over the last several decades.
- Member agency indoor water use has decreased from 80–110 gallons per capita per day (gpcd in the 1990s to 50–70 gpcd by 2016.
- Two variables (volume-weighted source water TDS and indoor per capita water use) can predict with a high degree of statistical significance the TDS concentration of WWTP influent water use. However, the volume-weighted source water TDS concentration is the significant determiner of influent TDS. Source TDS explains more of the variability in influent / effluent TDS than any other factor, including decreased indoor water use. There is a strong inverse correlation between drought and imported water TDS concentrations for both State Water Project (SWP) water and Colorado River Aqueduct (CRA) water.
- Long-term conservation efforts account for a smaller, but still significant, increases in TDS. IEUA and EMWD statistical models predict a 1.2 to 1.7 mg/L increase in TDS for every 1.0 gallons per capita per day (gpcd) decrease in indoor water use; this is a clear unintended consequence of indoor water conservation.

Other unintended consequences of water conservations measures include loss of revenue from water sales, less available recycled water, and increased infrastructure operations and maintenance costs. Unintended benefits include a reduction in energy costs and decreased greenhouse gas formation.

Reference: Ms. Suzanne Sharkey, Water Resources Scientist and Project Manager, (949) 258-2093
Project Completion: Ongoing
Key Staff: Dr. Joe LeClaire, PhD

COOPERATIVE AGREEMENT BY AND BETWEEN

HUERTA DEL VALLE

AND SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

THIS COOPERATIVE AGREEMENT ("***Agreement***") is entered into as of August 18, 2020 ("***Effective Date***"), by and between the San Bernardino Valley Municipal Water District, a municipal water district ("***VALLEY DISTRICT***"), and Huerta Del Valle, a community agriculture 501(c)(3) nonprofit organization ("***HDV***"). HDV and VALLEY DISTRICT are sometimes referred to individually as "***PARTY***" and collectively as "***PARTIES***".

RECITALS

A. The PARTIES seek to cooperate to complete a study to determine water supply needs and the most efficient and appropriate methods to be water demand for the Jensen Alvarado Historic Ranch and the Louis Robidoux Parkland, including Sunnyslope Creek. Tasks associated with the study are described in the Request for Proposals ("RFP) (Attachment 1) and generally include development of water budgets, evaluations of existing water infrastructure and associated water quality, and development of recommendations and plans for implementation of measures to meet the water demand. The tasks described in the RFP, with the exception of Task j, constitute the "***PROJECT***".

B. The PARTIES now desire to provide for contracting by VALLEY DISTRICT for performance of the work on the PROJECT and reimbursement of a portion of the costs of such work by HDV.

NOW THEREFORE, in consideration of the mutual promises contained herein, the PARTIES agree as follows:

AGREEMENT

1. VALLEY DISTRICT shall enter into an agreement with a qualified consultant for performance of the PROJECT work.

2. HDV agrees to reimburse VALLEY DISTRICT $50,000 ("***Reimbursement***") for costs incurred by VALLEY DISTRICT to develop and implement the PROJECT.

3. VALLEY DISTRICT will submit one or more invoices to HDV, not later than sixty (60) days after the first anniversary of the Effective Date, for all PROJECT costs incurred and for which reimbursement is claimed under this Agreement. HDV will pay all undisputed PROJECT costs within thirty (30) days after receipt of any such invoice. VALLEY DISTRICT acknowledges and agrees that in no event shall VALLEY DISTRICT receive or have a claim of any kind for any payment in excess of the Reimbursement for any costs related to the PROJECT, except as expressly agreed in writing by the PARTIES.

4. VALLEY DISTRICT shall require any and all subcontractors used to implement the Project to extend the same level of indemnity protection to HDV as is provided to VALLEY DISTRICT. Likewise, VALLEY DISTRICT shall require the same subcontractors to name HDV as additional insured on the same insurance coverage for which VALLEY DISTRICT is named additional insured.

5. VALLEY DISTRICT agrees to provide HDV all data collected as a result of the Project.

6. This Agreement contains the entire understanding between the PARTIES, and supersedes any prior understanding and/or written or oral agreements between them, respecting the subject matter of this Agreement. There are no representations, agreements, arrangements, or understandings, oral or written, by and between the PARTIES relating to the subject matter of this Agreement that are not fully expressed herein.

7. This Agreement may not be modified, altered, or changed in any manner whatsoever except by a written instrument duly executed by authorized representatives of both PARTIES.

8. If any provision in this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions shall nevertheless continue in full force without being impaired or invalidated in any way.

9. This Agreement shall be governed by and interpreted in accordance with the laws of the State of California, excluding any choice of law provision that would apply the laws of any other jurisdiction. Any action taken to enforce this Agreement shall be maintained exclusively in the Superior Court of San

Bernardino County, California. The PARTIES expressly consent to the exclusive jurisdiction of said court and agree that said court shall be the proper venue for any such action.

10. Neither PARTY may assign its rights and obligations hereunder, in part or in whole, to any third party without the prior written consent of the other PARTY, which shall not be unreasonably withheld.

11. Any notice to be given or to be served upon either PARTY hereto in connection with this Agreement must be in writing and shall be deemed to have been given and received: (a) when personally delivered; (b) two (2) days after it is sent by Federal Express or similar overnight courier, postage prepaid and addressed to the PARTY for whom it is intended, at that PARTY'S address specified below; (c) three (3) days after it is sent by certified or registered United States mail, return receipt requested, postage prepaid and addressed to the PARTY for whom it is intended, at that PARTY'S address specified below; or (d) as of the date of electronic mail transmission addressed to the PARTY for whom it is intended, at that PARTY'S electronic mail address specified below, and provided that an original of such notice is also sent to the intended addressee by means described in clauses (a), (b), or (c) within two (2) business days after such transmission. Either PARTY may change the place for the giving of notice to it by thirty (30) days prior written notice to the other PARTY as provided herein.

San Bernardino Valley Municipal Water District
Attn: Heather Dyer, General Manager
380 East Vanderbilt Way
San Bernardino, CA 92408
E-Mail: heatherd@sbvmwd.com

with a copy to:

Varner & Brandt LLP
Attn: Brendan W. Brandt
3750 University Avenue, Suite 610
Riverside, CA 92501
E-Mail: brendan.brandt@varnerbrandt.com

Huerta Del Valle
Attn: Maria Alonso, Founder and Executive Director
310 E. Philadelphia St. SP #71
Ontario, CA 91761
E-Mail: malonso@huertadelvalle.org

12. This Agreement is the result of negotiations between the parties hereto, and the advice and assistance of their respective counsel. The fact that this Agreement was prepared as a matter of

convenience by HDV or VALLEY DISTRICT shall have no importance or significance. Any uncertainty or ambiguity in this Agreement shall not be construed against the PARTY that prepared it in its final form.

13. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same instrument. Signatures may be delivered electronically or by facsimile and shall be binding upon the PARTIES as if they were originals.

[*Signature Page Follows*]

IN WITNESS WHEREOF, the PARTIES have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By: _____
Heather P. Dyer
General Manager

HUERTA DEL VALLE

By: _____
Maria Alonso
Executive Director

CONSULTING SERVICES AGREEMENT

This Consulting Services Agreement ("Agreement") is entered into to be effective as of August 18, 2020 ("Effective Date") by and between the following parties (sometimes referred to herein individually as "Party" and collectively as "Parties"): San Bernardino Valley Municipal Water District, a water district organized and incorporated under the California Municipal Water District Law of 1911 ("District"); and Water Systems Consulting, Inc ("WSC") ("Consultant"). Consultant agrees to furnish certain professional architectural and engineering services to District, upon the following terms:

JOB NAME: Upper Santa Ana River Habitat Conservation Plan

JOB NUMBER: 1770

1. Term. The term ("Term") of this Agreement shall commence on the Effective Date and shall automatically terminate upon earlier of June 30, 2021, or the successful completion of Services, unless earlier terminated.

2. Consulting Services and Responsibilities. During the term of this Agreement, Consultant shall provide professional services to the District, which shall include those services and activities specifically identified in the Consultant's proposal for the Project, with the exception of Tasks 5.3 and 5.4 of the Consultant's proposal, or such other services requested by District, each of which is attached to this Agreement as Exhibit "A", and by this reference incorporated herein ("Services"). All Services provided under this Agreement shall be performed in a manner consistent with current industry standards by individuals who possess the proper skill and knowledge necessary to effectively complete the Services. The performance of all Services and obligations hereunder shall be made in accordance with all federal, state and local laws, rules, regulations or ordinances applicable to the Services or obligations.

3. Additional Services. In the event additional services, which are not specifically included in Exhibit "A", are desired or needed, Consultant shall identify and describe such additional services, including costs, schedule for completion and seek the written approval of District ("Additional Services"). The compensation paid to Consultant for such Additional Services shall be mutually agreed upon in writing by the Parties prior to the performance of the Additional Services. Consultant shall be solely responsible for the costs and expenses associated with any Additional Services, including Additional Services already performed, that have not been specifically agreed upon in writing by Consultant and District. As used in this Agreement, the term "Services" shall include Additional Services.

4. Compensation and Expenses.

4.1 Compensation. As compensation for the Services to be rendered by Consultant, District shall pay Consultant an amount based on the time and materials incurred by Consultant, inclusive of sub-consultants and miscellaneous expenses ("Compensation"), which amount shall not exceed one hundred twenty thousand seven hundred eighty dollars ($120,780.00)

("Maximum Fee"). Consultant acknowledges and agrees that in no event shall Consultant receive or have a claim of any kind for any payment in excess of the Maximum Fee for any work, including Additional Services, performed under this Agreement, unless such amount exceeding the Maximum Fee is specifically approved in writing by District.

4.2 Invoices. Each month Services are rendered, Consultant shall deliver an invoice to District, for work actually performed, which shall include, at a minimum: (i) the project name; (ii) District's job number; (iii) Consultant's point of contact for billing questions; (iv) basis of billing; (v) total contract value; (vi) total billing to date; (vii) amount remaining in contract; and (viii) estimated percentage of completion at time of billing. Attached to each invoice, Consultant shall also include a monthly summary of work actually performed during the billing period. Provided there is no dispute with the invoice, District shall pay Consultant within thirty (30) days of receiving the invoice. In the event District disputes an invoice, District shall provide a written explanation of the dispute to Consultant within thirty (30) days of receiving the invoice. District and Consultant shall cooperate to resolve any disputed amount. District shall not be penalized for any reasonable dispute and shall not be obligated to pay any amount in dispute until a dispute has been resolved.

4.3 Expenses. District shall pre-approve in writing each reasonable and necessary expense that Consultant intends to seek reimbursement for, which expenses are directly related to the performance of the Services. If pre-approved, such expenses for reasonable and necessary travel, lodging, or miscellaneous expenses incurred in the performance of this Agreement will be reimbursed to Consultant in accordance with District's general reimbursement policy. Consultant shall submit an invoice of all incurred expenses accompanied by adequate supporting documentation or transaction receipts. Invoices that fail to include reasonable supporting documentation or receipts will not be honored and District will have no obligation of any kind to reimburse Consultant for such expenses.

5. Project Data. Consultant shall be exclusively responsible for obtaining from the appropriate sources, persons or third parties, all data and information necessary for the proper, timely and complete performance and satisfaction of the Services.

6. Work Product; Confidential Information.

6.1 Work Product. Consultant shall provide to District, and such other consultants approved by District, all work product, works in progress or other deliverables developed from or associated with the Services or the Project. Upon completion of the Services, Consultant shall provide one reproducible physical copy and one electronic copy of all final work products described in Exhibit "A", in such forms acceptable to District. Consultant acknowledges that all work performed or prepared for District by Consultant hereunder, including without limitation all data, reports, models, working notes, drawings, designs, improvements, trademarks, patents, copyrights (whether or not registered or patentable) and specifications developed or prepared by Consultant in connection with, or related to such Services shall become the sole and exclusive property of District, unless specifically otherwise agreed upon in writing by District and Consultant. Consultant hereby unconditionally assigns, transfers and conveys to District all rights,

interests and claims of any kind related thereto, including copyright. Consultant shall promptly disclose such work product to District and, at the District's expense, perform all actions reasonably requested by District (whether during or after the Term) to establish and confirm such ownership (including, without limitation, executing any necessary assignments, consents, powers of attorney and other instruments).

6.2 Confidential Information. Consultant acknowledges that during the Term it may receive or have access to certain information, observations and data (including, but not limited to, trade secrets, designs, ideas, products, research, software, and financial data) concerning the business or affairs of District ("Confidential Information") which is, and shall remain the property of District. Consultant shall take all reasonably appropriate steps to safeguard Confidential Information and to protect it against disclosure, misuse, espionage, loss and theft. Consultant agrees that it shall not disclose to any unauthorized person or use for its own purposes any Confidential Information without the prior written consent of District, unless and to the extent that the Confidential Information becomes generally known to and available for use by the public other than as a result of Consultant's acts or omissions. Consultant shall deliver to District at the termination or expiration of the Term, or at any other time District may request, all memoranda, notes, plans, records, reports, computers and computer records, printouts and software and other documents and data (and copies thereof) embodying or relating to the Confidential Information, work product (as discussed in 6.1) or the business of District, which Consultant may then possess or have under its control. Neither party shall be liable for disclosure or use of Confidential Information which: (a) was known by the receiving party at the time of disclosure due to circumstances unrelated to this Agreement; (b) is generally available to the public without breach of this Agreement; (c) is disclosed with the prior written approval of the disclosing party; or (d) is required to be released by applicable law or court order (provided that Disclosing Party is given prompt written notice thereof and is allowed to exhaust all reasonable legal remedies to maintain the confidentiality of the information).

7. Records. All records, documents or other instruments evidencing all labor costs, payroll costs or other expenses incurred in connection with Consultant's performance of the Services shall be kept in a manner consistent with industry standards and practices and made available to District upon written request. Retention of the records contemplated by this Section 7 shall be retained for a period of no less than four (4) years from the date of final billing or termination of this Agreement, whichever shall first occur.

Consultant further agrees to maintain all design calculations and final work product on file in legible and readily accessible form. A copy of such material shall be available to District, at District's sole cost and expense, and the originals of such materials and items, including any additions, amendments or modification thereto shall not be destroyed by Consultant unless Consultant fails to object to such destruction upon District providing Consultant with sixty (60) days advance written notice, indicating that such material is scheduled to be destroyed.

8. Relations with Construction Contractor. Consultant shall not directly or indirectly communicate with or consult with any construction contractor utilized in the Project, except in the presence of or with the specific written consent of the District.

9. Independent Contractor.

9.1 Status. The Parties hereby acknowledge that in rendering the Services provided hereunder, Consultant shall be deemed to be an independent contractor and shall not be deemed in any way an agent, partner or joint venturer of the District. Consultant acknowledges and agrees that, as an independent contractor, it is solely responsible for the payment of any and all taxes and/or assessments imposed on account of payment to Consultant or the performance of Services by Consultant pursuant to this Agreement.

9.2 Agency Restrictions. Consultant understands and agrees that Consultant shall not represent itself to third parties to be the agent, employee, partner or joint venturer of the District. Furthermore, Consultant shall not make any statements on behalf of or otherwise purporting to bind the District in any contract or otherwise related agreement. Consultant further agrees and acknowledges that Consultant does not have the authority to and shall not sign any contract on behalf of the District or any of its subsidiaries or affiliates. Consultant shall not obligate the District or any of its subsidiaries or affiliates to do any other act that would bind the District or any of its subsidiaries or affiliates in any manner.

10. Further Assurances. Consultant shall furnish District with any documents or records that the District reasonably believes necessary to properly and timely carry out the Consultant's Services. District shall first tender written notice to Consultant regarding any documents or records that it reasonably believes necessary to properly carry out Consultant's Services. Consultant shall then have ten (10) days from the receipt of such notice to provide the District with the requested documents or records.

11. Abandonment or Termination. Agreement may be terminated by either Party upon ten (10) days written notice. In the event the Project is terminated or abandoned before completion of the Services, all Services of Consultant shall immediately terminate. In the event of termination or abandonment, Consultant shall be compensated for the Services in proportion to the amount of work actually completed as of the termination date or date of abandonment. Notwithstanding the foregoing, in the event of telephone notification to stop work, no further work shall be performed on any portion of the Project pending receipt of the written notification. The continuation of work after telephone notification to stop work, shall be at Consultant's sole cost and expense, without the right to seek any form of reimbursement.

12. Indemnification. Consultant shall indemnify, defend and hold harmless the District and its agents, officers, directors and assigns, from and against any and all claims, damages, loss and expense, including attorneys' fees, awards, fines, penalties, judgments or appeals arising out of or related to the performance of the Services, breach of this Agreement, any misrepresentations or any other claim arising out of or related to this Agreement. Consultant's indemnification obligations contained in this Section 12 shall extend to all acts or omissions of its officers, employees, agents or representatives.

The indemnification responsibility of Consultant, with respect to the Services shall exist and continue regardless of the extent to which District may have reviewed and approved the Services performed by Consultant, except that Consultant shall not be responsible for claims attributable to the Services in any case in which the claim is attributable to a decision made by District with respect to which Consultant and District have specifically agreed in writing that District shall be the responsible party.

13. Liability and Insurance. Consultant shall assume responsibility and liability for any damage, loss or injury of any kind or nature whatsoever to any person or property, to the extent such damage, loss or injury was caused by or resulting from an error, omission or negligent or willful act caused by Consultant, its officers, directors, employees, agents or representatives in connection with the performance of the Services under this Agreement.

Consultant shall, at its sole cost and expense, maintain in effect at all times during the performance of the Services, the greater of: (i) the coverage and limits of insurance described herein; or (ii) such coverage and limits as is generally determined to be the general industry standards, which coverage shall be maintained with an insurance company licensed to do business in California and having a minimum A.M. Best rating of A-IX, or better, and under forms of policies satisfactory to District.

Consultant shall, at its sole cost and expense, procure and maintain in effect for the Term the following insurance policies, and to the extent permitted, naming District as an additional insured: (i) professional liability insurance, with policy limits of no less than $1,000,000 (combined single limit per claim and annual aggregate); (ii) workers' compensation insurance, in such amounts and coverage as required by law, and employer's liability insurance policy of at least $1,000,000 per occurrence; (iii) general liability insurance policy of at least $1,000,000 per occurrence, and in the aggregate $2,000,000; and (iv) automobile liability, or equivalent form, with a combined single limit of no less than $1,000,000 per occurrence; such insurance shall include coverage for non-owned and hired automobiles and owned. The workers' compensation policy must include a waiver of Consultant's right to recover from other endorsements.

Certificates evidencing such coverage and adding District as additional insured, where permitted, shall be delivered to District prior to the commencement of the Services by Consultant under this Agreement. Such insurance shall provide no cancellation unless thirty (30) days' prior notice of such cancellation is given to District or ten (10) days notice in the event of cancellation for non-payment of premium. Consultant agrees to timely pay the premiums as required and use its best efforts to maintain said insurance in effect for a period of at least two (2) years after completion of the Services under this Agreement.

14. Representations and Warranties. Each Party individually represents and warrants the following:

a. Each Party is duly organized, validly existing and in good standing under the laws of the state of formation or incorporation and has all requisite power and authority to conduct the business with which it conducts and proposes to conduct;

b. All action on the part of each Party necessary for the authorization, execution, delivery, and performance of this Agreement, and the consummation of the transactions contemplated herein, has been properly taken and obtained in compliance with applicable law;

c. Each Party has not entered into nor will either enter into any agreement (whether written or oral) in conflict with this Agreement or which would prevent a Party from performing its obligations under this Agreement; and

d. Each Party has the contacts and expertise, and will reasonably allocate its financial and time resources on a reasonable best efforts basis to enable it to perform its obligations hereunder.

15. Miscellaneous.

15.1 Entire Agreement. This Agreement constitutes the entire agreement between the Parties and supersedes any prior understandings, agreements, or representations by or between the Parties, written or oral, to the extent they have related in any way to the subject matter hereof.

15.2 No Third-Party Beneficiaries. This Agreement shall not confer any rights or remedies upon any person or entity other than the Parties and their respective successors and permitted assigns.

15.3 Succession. This Agreement shall be binding upon and inure to the benefit of the Parties named herein and their respective successors and permitted assigns.

15.4 Headings. The section headings contained in this Agreement are inserted for convenience only and shall not affect in any way the meaning or interpretation of this Agreement.

15.5 Notices. All notices, requests, demands, claims, and other communications hereunder will be in writing. Any notice, request, demand, claim, or other communication hereunder shall be deemed duly given two (2) business days after it is sent by registered or certified mail, return receipt requested, postage prepaid, and addressed to the intended recipient as set forth below:

If to District: San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408
Attn: Chris Jones
Telephone: (909) 387-9253

If to Consultant: Water Systems Consulting, Inc.
9375 Archibald Ave., Ste. 200
Rancho Cucamonga, CA 91730

Attn: Joe Kingsbury
Telephone: (909) 483-3200

15.6 Governing Law; Venue. This Agreement shall be governed by and construed in accordance with the domestic laws of the State of California without giving effect to any choice or conflict of law provision or rule (whether of the State of California or any other jurisdiction) that would cause the application of the laws of any jurisdiction other than the State of California. Venue for any suit, action or proceeding shall exist exclusively in the courts having jurisdiction over the County of San Bernardino.

15.7 Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original but all of which together will constitute one and the same instrument.

15.8 Waivers. No waiver by any Party of any default, misrepresentation, or breach of warranty or covenant hereunder, whether intentional or not, shall be deemed to extend to any prior or subsequent default, misrepresentation, or breach of warranty or covenant hereunder or affect in any way any rights arising by virtue of any prior or subsequent occurrence.

15.9 Amendment. Except as expressly provided otherwise herein, this Agreement may not be amended without the express written consent of both Parties.

15.10 Severability. Any term or provision of this Agreement that is invalid or unenforceable in any situation in any jurisdiction shall not affect the validity or enforceability of the remaining terms and provisions hereof or the validity or enforceability of the offending term or provision in any other situation or in any other jurisdiction.

15.11 Release of Information and Advertising. Consultant shall not, without the prior written consent of District, make any news release or other public disclosure regarding this Project.

15.12 Construction. The Parties have participated jointly in the negotiation and drafting of this Agreement. In the event an ambiguity or question of intent or interpretation arises, this Agreement shall be construed as if drafted jointly by the Parties and no presumption or burden of proof shall arise favoring or disfavoring any Party by virtue of the authorship of any of the provisions of this Agreement. Any reference to any federal, state, local, or foreign statute or law shall be deemed also to refer to all rules and regulations promulgated thereunder, unless the context requires otherwise. The word "including" shall mean including without limitation.

15.13 Attorneys' Fees. If any legal action is necessary to enforce or interpret the terms of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees, reasonable expert witness fees, costs, and necessary disbursements in addition to any other relief to which that party may be entitled.

IN WITNESS WHEREOF, the Parties hereby execute this Agreement on the date first written above.

DISTRICT:

San Bernardino Valley Municipal Water District, a water district organized and incorporated under the California Municipal Water District Law of 1911

By: _____

Name: Heather Dyer
(type)

Its: General Manager
(type)

CONSULTANT:

Water Systems Consulting, Inc

By: _____

Name: _____
(type)

Its: _____
(type)

EXHIBIT "A"

[Insert Project Proposal and Identification of Services]

DATE: August 11, 2020

TO: Board of Directors' Workshop - Engineering

FROM: Chris Jones, MESM, Project Manager II, Biological Resources

SUBJECT: Consider A Consulting Agreement and Cooperative Agreement to Obtain and Process Aerial Imagery and LiDAR in the San Bernardino National Forest

Background

Staff is requesting the Board consider entering into a cost share agreement with the Inland Empire Resources Conservation District ("IERCD") to co-fund collection and processing of aerial imagery and LiDAR in the San Bernardino National Forest. Staff is also requesting the Board consider entering into a consulting agreement with Digital Mapping, Inc. ("DMI") to obtain and process the aerial imagery and LiDAR that Valley District and IERCD are proposing to co-fund. The resulting georeferenced aerial photographs and LiDAR data will have wide ranging application for Valley District, the IERCD, and the San Bernardino National Forest ("SBNF"). This data could also be used by Engineering and other staff for a variety of applications.

Valley District has a long history of collaboration with the SBNF. The Forest Service has been an important member of the overall scientific advisory committee during the development of the HCP. Staff from the SBNF have been pivotal in the development of the translocation strategy and plan for the Santa Ana sucker (*Catostomus santaanae*) and translocation strategy for the mountain yellow legged frog (*Rana muscosa*) associated with the Upper Santa Ana River HCP ("HCP").

More recently, Valley District and SBNF staff have been meeting to develop strategies to partner on projects to increase forest resiliency in the face of a changing climate. The goal of this partnership is to develop strategies and management projects that will make our headwaters less susceptible to catastrophic wildfires and avoid their negative effects to habitat and water supply such as increased sediment load in our headwater creeks due to

post-fire storm events. Successful projects and strategies resulting from this partnership will enable us to do a better job maintaining water quality, water supply, and our investments in habitat restoration and management for covered species in the Santa Ana River Watershed and will help the SBNF reach management goals they have set for themselves.

Projects and strategies that have been discussed between Valley District and SBNF Staff include fuels management, identification and modelling of habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*), which is an HCP Covered Species, aquatic organism passage analysis, and overall watershed analysis with the goal of identifying opportunities and constraints to improve watershed health and prioritize sub-watersheds for implementation of restoration measures. An important component to all of these efforts is the need to analyze high quality aerial imagery and LiDAR. Imagery and LiDAR are important to identify existing conditions for several reasons, including identification the location and distribution of plants and plant communities, including nonnative species, topography, slope, aspect and other geographic factors that can influence species occurrence and wildfire behavior, and the stature and density of vegetation. The existing conditions analyses are useful now for identification purposes, but they also represent the baseline for future comparison to evaluate the progress of restoration and trends in the distribution of plants, habitats, and populations over time, to name a few.

Georeferenced aerial imagery and LiDAR data are two very different data types that provide extremely valuable data alone, but can also be analyzed together. When data is referred to as georeferenced, it means the image is anchored to an actual point on the ground. This is useful when a dataset is put in a Geographic Information System ("GIS") to conduct analyses on how things related to each other in space.

Aerial imagery is a picture of the earth taken from the air. In this case it will be taken from a fixed wing aircraft (see Figure 1). The four-band imagery that would be gathered by the flight described in this memo would enable us to look at the land surface and vegetation using a typical red-blue-green ("RGB") color ramp, but also add in the near infrared. This enables a GIS analyst to have a broader range of contrasting colors to use when analyzing differences on the image. This is useful in deciphering differentiation between different plants and plant communities, which can be extrapolated to habitats.

LiDAR, which stands for Light Detection and Ranging, is a remote sensing tool that allows for the measurement of surface topography using pulsed lasers.[1] The lasers are projected from a sensor on the underside of, in this case a fixed wing airplane, and bounce back off of objects between the sensor and the ground, including different layers of vegetation, buildings, rocks, and ground surface. The sensors record the 'return' of the laser. This return can be processed to determine the elevation of the point where that laser reflected or

[1] NOAA. What is lidar? National Ocean Service website, https://oceanservice.noaa.gov/facts/lidar.html, April 15, 2020.

returned back to the sensor. These elevations can be analyzed to determine the structure of the various levels of canopy in a plant community, as well as topography. The first return, or top of the tallest plants, are shown in (B) of the photograph shown below. The ground surface, or last return, is shown in (C) of the image shown below. LiDAR data can be used to look not only at plan view surfaces, but also to create 3-dimensional cross-sections of vegetation structure and topography.

Using these images in tandem can enables an analyst to many different things. They can use this combined information to better determine plant types. For example, a color signature from the aerial image might appear similar between two plants, but published information might tell us that one of the two plants can grow to 10 feet tall, while the other never grows taller than 1 foot tall. The heights of plants can then be discerned from the LiDAR to help decipher which plant is which. The elevation of plants and plant communities relative to position on the floodplain can also be determined along with a host of other useful information.

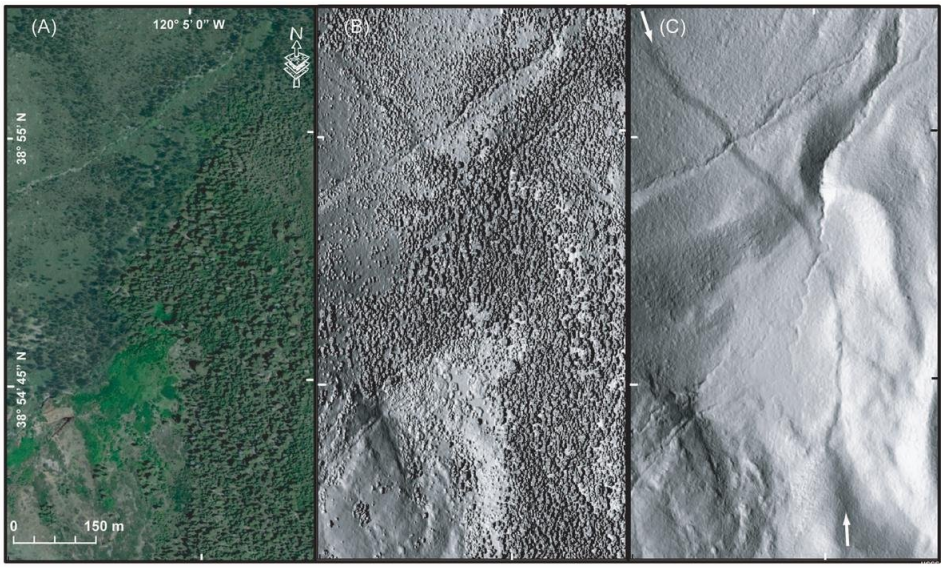


Figure 1 USGS. Comparison of Aerial Photo and LiDAR Image. https://www.usgs.gov/media/images/comparison-aerial-photo-and-lidar-image, Accessed May 28, 2020.

In June of 2020, staff from the IERCD and Valley District connected based on a conversation between Valley District's General Manager, Heather Dyer, and IERCD's District Manager, Mandy Parkes, to explore potential opportunities to collaborate on projects in the SBNF. Through the course of their conversation it became apparent that there was a lot of overlap between the goals of our two agencies and it only made sense for a larger conversation to identify where we could collaborate and cost-share.

One of the first items our agencies identified for collaboration was our collective interest in LiDAR data in the SBNF. The IERCD had applied for and received a grant through the California Regional Forest and Fire Capacity Program ("RFFC") that provided $96,000 to

obtain LiDAR in three sub-watersheds located in the Upper Santa Ana River Watershed. These three sub-watersheds are located within the HCP boundary and represent a subset of the area of interest Valley District has been considering for projects that we had been discussing with SBNF Staff (see Figure 2).

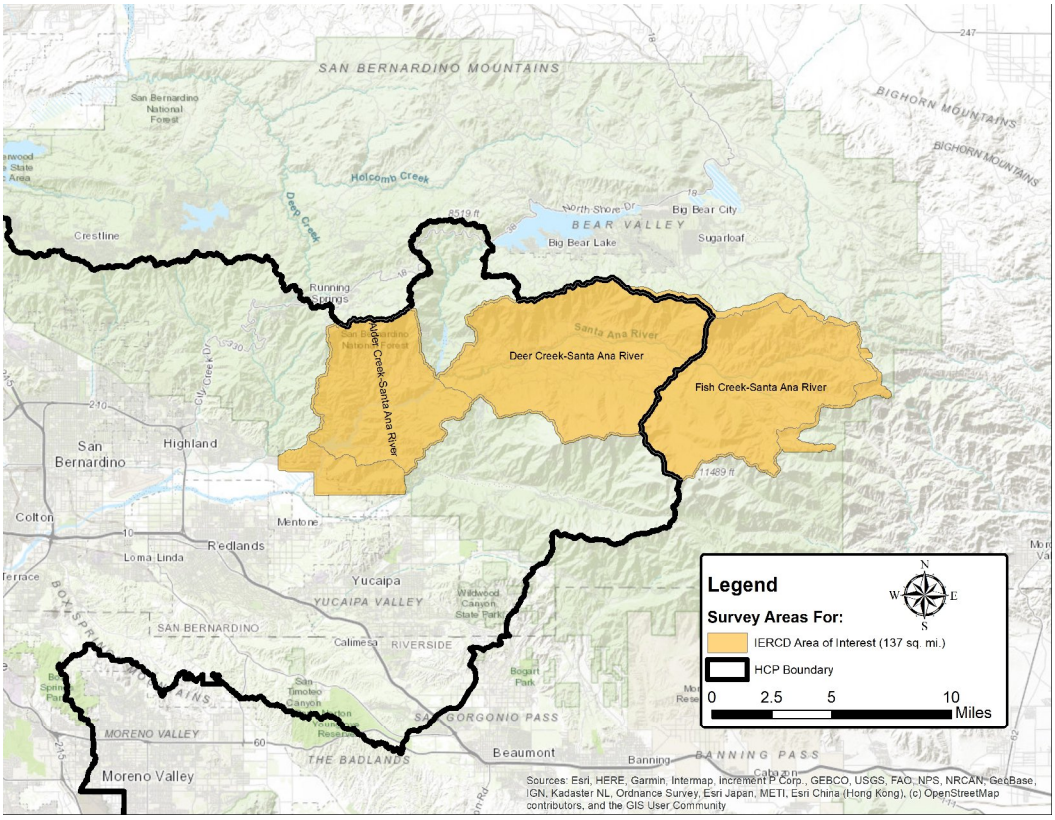


Figure 2 IERCD area of interest in relation to HCP boundary

Subsequent meetings led to the desire to develop a Request for Proposals ("RFP") (see Attachment A) to obtain bids for LiDAR for IERCD's area of interest along with Valley District's area of interest (see Figure 3). Valley District was also interested in obtaining high quality aerial imagery so it was included in the RFP (see Figure 4). The geographic extent of both LiDAR and aerial imagery tasks and subtasks was determined based on perceived priority. Priorities were developed based on relevance to the IERCD project, HCP boundary and Valley District Service Area, and overall ability to support the needs of projects both agencies are working on with the SBNF. Tasks were divided into subtasks to provide flexibility in potential award strategies in case quotes exceeded available funding. SBNF staff were instrumental in the development and coordination of the RFP. They helped ensure proper specifications were included to address the topographic intricacies that occur within the survey areas. The RFP was completed and put out to solicit bids in mid-July, 2020 (see Attachment 1).

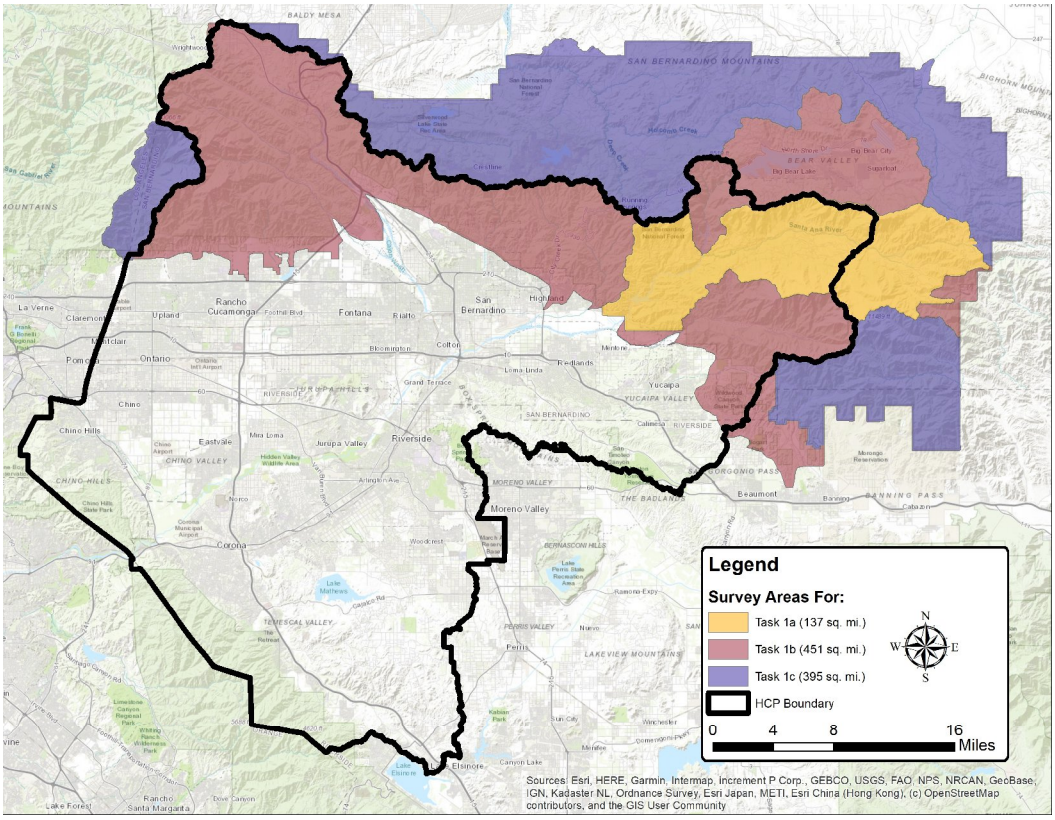


Figure 3 LiDAR areas of interest and associated task areas in relation to HCP boundary

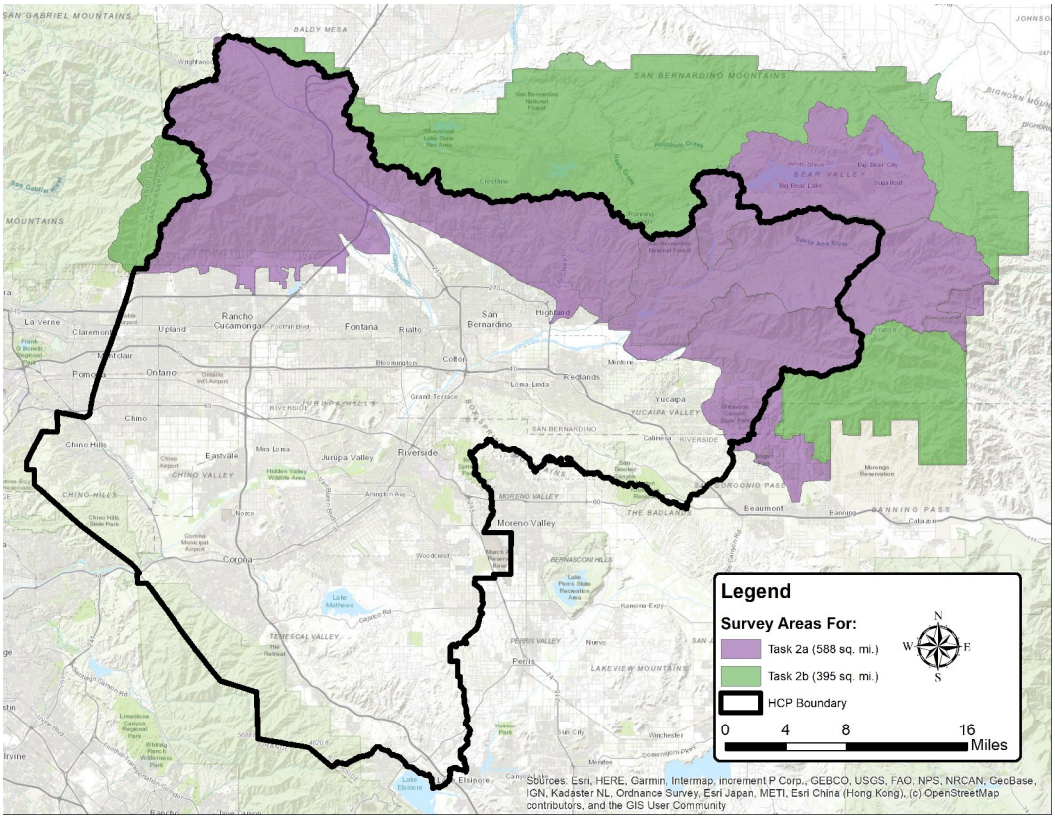


Figure 4 Aerial imagery areas of interest and associated task areas in relation to HCP boundary RFP

Bids were due back on August 3, 2020. Nine different firms provided bids. Staff from the IERCD, Valley District, and SBNF evaluated proposals and reached out to project managers from similar projects described in proposals to inquire about their experiences with prospective firms and the quality of products that were delivered. The cost spread of the nine different firms is shown below in Table 1.

Table 1 Cost comparison of received proposals

Consulting Firm	Quote
DMI	$179,208.41
Firm A	$482,250.00
Firm B	$624,822.00
Firm C	$698,513.98
Firm D	$755,175.00
Firm E	$782,212.00
Firm F	$808,305.34
Firm G	$933,340.00
Firm H	$997,668.00

Staff from Valley District, IERCD, and the SBNF participated in a virtual selection meeting on August 5, 2020. DMI was unanimously selected. They had the lowest cost bid and all of their references provided positive reviews of their work products along with their professionalism and ease to work and coordinate with.

Valley District Staff recommends the Board consider entering into a consulting agreement with DMI to enable the completion of all tasks included in DMI's Proposal (see Attachment 2). The sum of all tasks included in DMI's fee schedule is $199,119.65. If all tasks are awarded, a 10% discount is applied, resulting in an overall fee of $179,208.41. Valley District Staff also recommends the Board consider entering into a cooperative agreement with the IERCD to co-fund fees associated with completion of all tasks presented in DMI's Proposal. The cooperative agreement with the IERCD would result in a $96,000 contribution to the costs of this project if approved, leaving $83,208.41 remaining. Since this effort will provide the basis for projects that will directly benefit the HCP, Valley District would be reimbursed 60% by HCP partners based on the impacts associated with each HCP partners' covered activities. The remaining 40%, or $33,283.36, represents Valley Districts final expected contribution.

Fiscal Impact

The fiscal impact of this item is $179,208.41. This work is currently included in line item 6360, Consultants, of the 2020/2021 General Fund budget. After reimbursement by the HCP Partners the final cost to Valley District is $33,283.36.

Staff Recommendation

Staff recommends the Board direct staff to place this item on a future Board of Directors regular meeting agenda for consideration.

Attachments

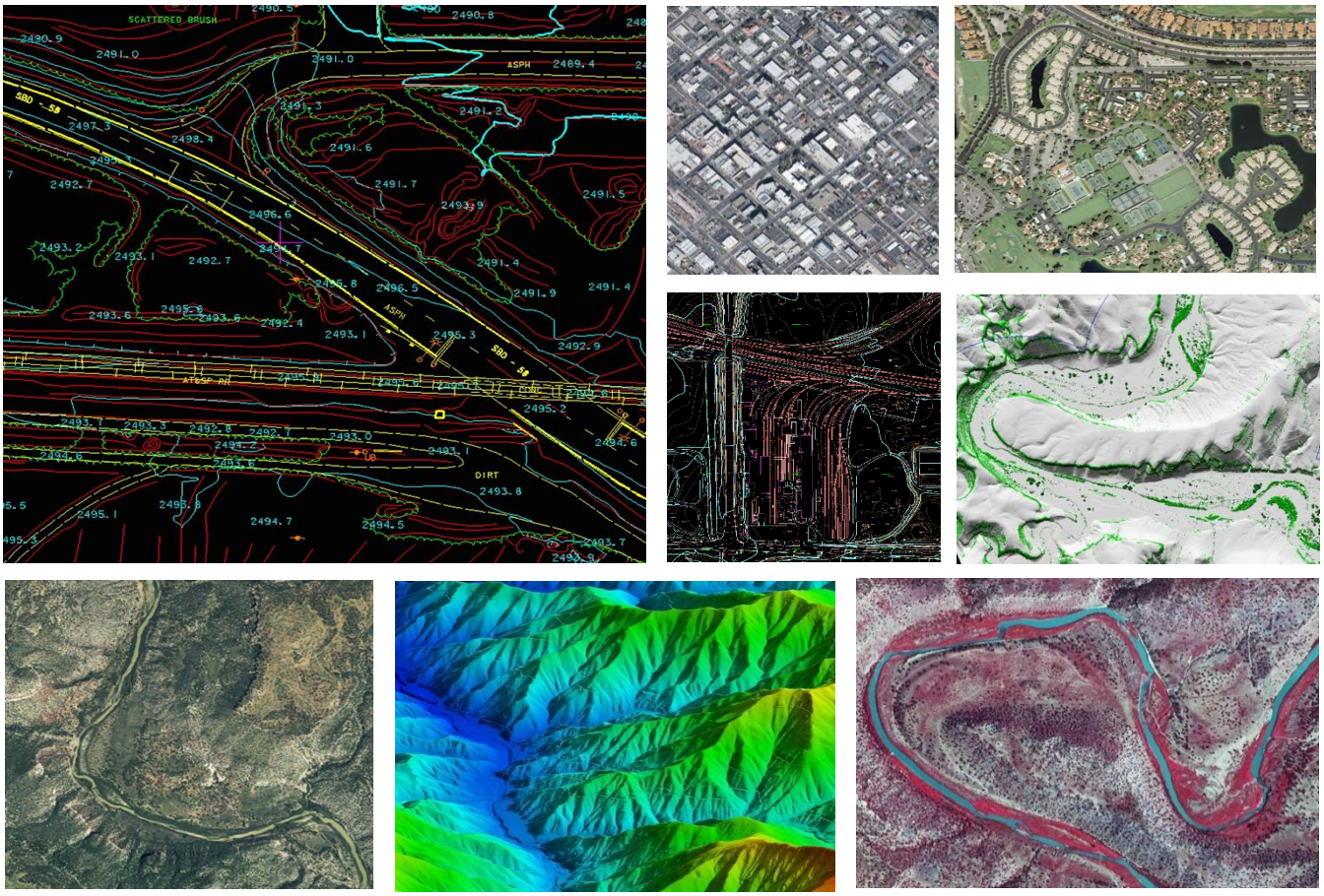
1) DMI Proposal
2) IERCD Cooperative Agreement
3) DMI Consulting Agreement

DIGITAL MAPPING, INC. – PROPOSAL FOR

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT, INLAND EMPIRE RESOURCE CONSERVATION DISTRICT, AND USDA FOREST SERVICES

AERIAL IMAGERY AND LIDAR ACQUISITION

RFP Due Date: August 3, 2020 8:00 pm



Submitted to:
Chris Jones
Project Manager, Biological Resources
San Bernardino Valley Municipal Water District (Valley District)
380 East Vanderbilt Way,
San Bernardino, CA 92408
Phone: (909) 770-4492
chrisj@sbvmwd.com

Submitted by:
Gencaga (Gen)Aliyazicioglu
CFO & Sr Project Manager
Digital Mapping, Inc. (DMI)
21062 Brookhurst St, Suite 101
Huntington Beach, CA 92646
(714) 968-5459
gen@admap.com

Chris Jones
Project Manager, Biological Resources
San Bernardino Valley Municipal Water District (Valley District)
380 East Vanderbilt Way,
San Bernardino, CA 92408

RE: RFP –Aerial Imagery and LiDAR Acquisition

Dear **Mr. Jones**,

Digital Mapping, Inc. (DMI) is delighted to submit its technical and fee proposal in response to **Partners'** (San Bernardino Valley Municipal Water District, Inland Empire Resource Conservation District, And USDA Forest Services) RFP for *"Aerial Imagery and LiDAR Acquisition"* project. We have no doubt that our firm is exceptionally capable of satisfying all the Partners' requirements.

DMI has been a trusted provider of digital mapping, geospatial data, and photogrammetric solutions for over past 33 years and has extensive experience in providing high accuracy imagery and LiDAR data sets throughout the United States with projects similar in size and scope to what is described in this RFP. Most recently in 2019 we have completed 1,272 square miles of 3" orthophotography project for Orange County Fire Authority, 2,000 square miles of orthophotography and building footprint project (3" and 6") for Mesa County, CO, and 2,500 square miles of QL1 LiDAR data collection and processing for County of Tuolumne CA.

Following briefly summarizes DMI's exceptional geospatial services throughout the 33 years of being in business; our overall approach integrates three (3) important elements and strengths:

1. **Methodology** – Our methodology is straightforward, although it follows a traditional photogrammetric approach, we integrate high value digital processing techniques, which we explain further in the Project Approach section of this submittal.
2. **Experience** – We employ top-qualified professionals (photogrammetrist, pilots, land surveyors, analysts and data technicians) to ensure the effectiveness and efficiency of our production by delivering a product that is unblemished and absolute. Our professional will streamline our post-processing and compilation procedures allowing us to meet the timeframe set out by Partners.
3. **Value** – We have been a trustworthy aerial mapping provider to numerous private entities, federal, state, and local government agencies such as USFS, USGS, USDA, NGA, NOAA, USACE, Counties, Cities, and local engineers. Since 1987, we have a history of providing effective GIS database development and resourceful spatial analysis to both domestic and international clients.

Our project manager Mr. Gencaga Aliyazicioglu (Gen), has over 40+ years of photogrammetric and geospatial experience and still manages to make DMI a household name throughout the industry, by offering quality aerial mapping services and products. Mr. Aliyazicioglu will be responsible for ensuring that the delivered service items meet the correctness and completeness set forth by Partners.

We will be available to start work immediately. We believe that you will find the contents of our proposal not only informative but also precisely targeted to meet the Partners' requirements.

Sincerely,

Gencaga Aliyazicioglu

Gencaga (Gen) Aliyazicioglu
Certified Photogrammetrist | CFO | Sr. Project Manager
Digital Mapping, Inc. (DMI)
21062 Brookhurst St, Suite 101
Huntington Beach, CA 92646
(714) 448-7534
gen@admap.com

A.) PROJECT UNDERSTANDING

DMI understands that the main purpose of this project is to obtain 3" resolution 4 band (R,G,B and IR) digital orthophotos and QL1 LiDAR data deliverables covering Partners' area of interest (AOI). Our anticipated scope of service is in conjunction with the Partners' requirements upon the industry's leading turnkey airborne sensors.

For this important project we will deploy our aircrafts equipped with DMC IIe 230 Digital Mapping Camera and Optech ALTM Galaxy T1000 LiDAR sensor (with ABGPS/IMU system) based in ***Chino Airport*** while working two daily shifts to ensure a timely and successful delivery. *In addition to our expertise in 4 band orthophotography services and LiDAR acquisition and processing, we believe that our proximity to project area and extensive knowledge of local flight conditions (and restrictions) will enable us to deliver high quality product within desired delivery time.*

Our detailed analysis of the project area shows that extreme terrain elevation changes and weather conditions would be the biggest challenges during aerial acquisition that would require detailed planning and multiple aerial missions to complete the acquisitions. *As being a local firm with airplanes based in Chino CA, DMI has extensive flight experience in the region. We will be able to monitor conditions and mobilize to project area within 30 minutes whenever flight conditions are favorable.*

We have successfully completed numerous projects similar in size and terrain characteristic to Partners' AOI. More specifically in 2019 DMI successfully acquired and processed QL1 LiDAR data covering 2,500 sq miles over mountainous and forested area in County of Tuolumne and Stanislaus National Forest.

Moreover, DMI's Optech Galaxy LiDAR sensor's PulseTRAK and SwathTRAK technology enables quality data collection over various terrains.

- PulseTRAK technology enables a continuous operating envelope that can accommodate high relief terrain with no data gaps or loss of density across multipulse transition zones.
- SwathTRAK technology can reduce operating costs by as much as 70% by maintaining fixed-width flightlines for consistent point density and fewer flight lines in variable terrain.

After aerial acquisition DMI will allocate its full resources for data processing. DMI uses distributed processing across multiple workstations and/or servers enabling us to process LiDAR data very quickly. DMI currently has 14 workstation and 4 servers dedicated to processing LiDAR data that would provide quick turnaround for Partners.

A.1.) Project Deliverables and Overview

DMI has completed numerous orthophotography and LiDAR processing projects enabling us to achieve an efficient workflow to deliver high quality products within desired delivery schedule. This section of the proposal will provide in-depth technical descriptions on DMI's process methodology on collecting, processing, and delivering the required data for this project. DMI has created a functional and operational project plan that is quality controlled to ensure a successful project completion.

Table 1. Product Specifications and Deliverables

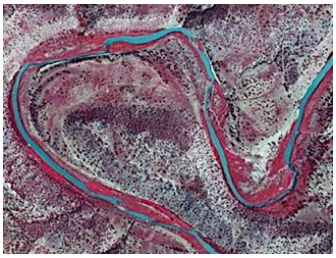
General Specs	
Products	3" 4 band digital orthophoto, QL1 LiDAR data and derived products
Accuracy:	National Map Standards 1" = 50' (+/- 1.6 ft) from true location at 90% confidence level. LiDAR Vertical Accuracy: 10 cm vertical class per ASPRS standards Relative Accuracy: <0.06 meter for smooth surface repeatability <0.08 meter for swath overlap difference Absolute Accuracy: RMSEz (non-vegetated) ≤0.100 m; • NVA at the 95-percent confidence level ≤0.196 m • VVA at the 95th percentile ≤0.30 m

Tiling Index	USGS 7.5- minute quadrangles and divisions (approved by Partners)
Acquisition Window	Leaf-on conditions (before October 2020 with Partners' approval)
Coordinate System	Projection: **State Plane CA Zone 5, NAD83 (WKID: 26911)** Horizontal Datum: **NAD83 (most current)** Vertical Datum: **NAVD88 (most current)** Unit: **US Survey Feet**
Deliverables	
Aerial Data Acquisition	• Exposure Points / Flight Lines and Swaths • Flight Reports • Aircraft Trajectories (SBET files)
Ground Surveying	• Ground Control Point Locations and Survey Report
Aerial Triangulation	• Aerial Triangulation Report (pdf)
Orthophotography	• Uncompressed 4-Band (R, G, B and IR) Imagery in GeoTIFF format • Seamless MrSID mosaic • Camera Calibration Report (pdf) and FGDC compliant Metadata
LiDAR Data	• Classified (standard) LiDAR point cloud in .las format (v1.4) • Bare earth filtered point cloud in .las format (v1.4) • Hydro-Flattening Breaklines • Hydro-flattened bare-earth Digital Elevation Model (DEM) at 0.5m cell size in GeoTIFF format • Normalized Intensity images at 1m cell size in GeoTIFF format • Project and Accuracy Report, and FGDC compliant Metadata
Supporting Shapefiles	• Tiling layout for each deliverable
All deliverables will meet specification set forth in the RFPk	

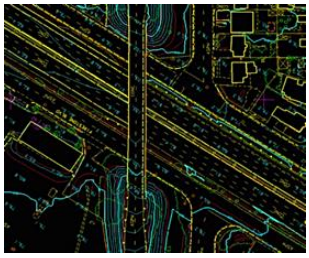
A.2.) Company Profile

Digital Mapping, Inc. (DMI) is a California Corporation and a woman owned business WBE, MBE, SBE certified by the State of California, Office of Small and Minority Business in the County of Los Angeles and San Bernardino, and a variety of other municipalities and districts. DMI has more than 33 years of experience in aerial photography, digital photogrammetry, LiDAR capture and processing, digital orthophotography, topographic and planimetric mapping, and related services. DMI has carried out a large portion of work throughout out the United States.

Firm Name: Digital Mapping, Inc. (DMI) **Office Locations:** 21062 Brookhurst Street, Suite 101 Huntington Beach, CA 92646 **Flight Operations Hangar Location:** 7000 Merrill Avenue, Hangar 60 (PO Box 84) Chino, CA 91710 **Telephone/Fax:** (P) 714-968-5459 (F) 714-968-2429 **Type of Ownership:** C Corporation **Year Establish:** 1987 **President, CEO:** Liliana Aliyazicioglu **VP, PLS** Dennis Dillman **CFO. Sr. Project Manager:** Gencaga (Gen) Aliyazicioglu	**Our Services:** • Topographic / Planimetric Map Production • GIS Database Development • Orthophoto and Oblique Map Production • Map Graphics Production • Aerial Triangulation / Digital Terrain Model / Digital Elevation Model • Geographic Information Systems • Digital Imagery Acquisition and Processing • LiDAR Acquisition and Processing • Imagery Derived Products (Land Use / Land Cover) • Airborne GPS / Remote Sensing • Land Surveying



USDA



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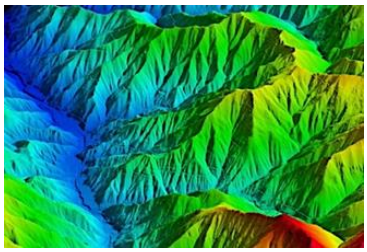


USGS & USFS

A.3.) Airborne Capabilities

			
DMC IIe230 **Digital Mapping Camera**	**DMC I** **Digital Mapping Camera**	**Optech ALTM Galaxy T1000** **LiDAR Sensor**	**Optech Gemini** **LiDAR Sensor**
			
Chieftain Navajo	**Beechcraft Bonanza**	**Geranimo**	

A.4.) Software and Equipment

DMI uses the most technically advanced orthophotography, photogrammetry and LiDAR hardware / software available. With a suite of hardware and software applications used for technical and business operations at our disposal, we can ensure the right equipment and resources are utilized for this contract.

Soft-Copy Workstations - Digital Imaging and Photogrammetry	
Z/I Image Station	12
KLT Atlas	10
VR2/VR1 Cardinal Systems	10
Orthophotography Workstations	
Correction & Editing	17 Workstations
Mosaics & Tiling	4 Servers
Orthorectification	4 Servers
LiDAR Workstations	
Post Processing	6 Workstation – 4 servers
Calibration / Classification	8 Workstations
Software	

Aerial Triangulation & Bundle Adjustment: Intergraph ISAT; PATB-GPS Block Adjustment (10 workstations)
Orthophoto Production: Intergraph ImageStation Orthophoto Professional (8 workstations)
LiDAR Production: GeoCUE, OPTECH LMS, TerraScan, TerraMatch, TerraModeler, LP 360 (8 workstation)
Other: ER Mapper, LizardTech- MrSID, Global Mapper, and Leica Geospatial Imaging/ERDAS, ATLAS: digital stereo plotter software including Atlas on-line data collection, batch, plot program, translator, orientation, raster utilities, and project management. System also has ortho mosaic, orthophoto generation, contour interpolation, and TIN modeling.

ESRI: ArcView, ArcInfo, ArcGIS, and ArcMAP

B.) PROJECT APPROACH

B.1.) Project Management

A project kickoff meeting will be held to discuss the proposed work plan, data collection requests, schedule, and project communications. Being in Huntington Beach, will enable DMI to visit Partners' office locations upon any request. DMI project status reporting is an important task in communicating status updates for the project. Partners will have an opportunity to express the exact needs of status reports and all communication needed. This includes the type of information required, the frequency of reporting, and the format of the reports. DMI will ensure all needs are properly met accordingly

- **Weekly Updates:** DMI will communicate weekly with the Partners to provide updates including task that were completed, issues that may have occurred and the expected completion of current task.
- **Weather Issues:** DMI has a thorough understanding of the project and weather. DMI has experience in conducting aerial missions for the throughout the Western United States. DMI's abundance of aircraft and sensors will allow us to base our aircraft in Chino airport until data capture is completed without interruption.

B.2.) Ground Surveying

DMI's surveying team brings in 40+ years of experience in operating a variety of land surveying techniques to benefit several industries as well as providing data capture services for GIS users. Our team provides technical and operational expertise in land surveying with experience working in states west of the Mississippi. DMI's in-house surveying department, led by California Licensed Professional Land Surveyor Dennis Dillman, will work closely with the Partners and DMI's project manager to carefully select the exact location of the ground control and check points.

B.2.a.) Orthophoto Control

DMI will place ground controls and blind controls, which will be used to rectify imagery and verify the accuracy of the data set. The placement and amount of the controls will meet the general requirements set forth in the USGS, FGDC, NSSDA & ASPRS specifications. We will also ensure that these ground controls are located in easily accessible locations within the project site. For the establishment of targeted ground control points, we will set visible materials with adequate size to allow streamlined identification, beneficial for the aerial triangulation process and pinpointing ground control points in the aerial imagery. Water-based paint will be used in conjunction with a pre-made "X" shape templates. For unpaved surfaces, plastic materials will be used instead of the water-based paint.

Aerial Target in Mesa County, CO (2019 Mesa County Ortho Project)

DMI will conduct a GNSS survey that utilizes OPUS-RS to acquire coordinates of the ground control. The ground control is captured for a minimum of 15-minutes and the data is sent to OPUS-RS at least 28 hours after the data collection. This will ensure that the maximum number of CORS are used in the least square's adjustment and that the postfit satellites orbits are utilized rather than the predicted satellite orbits. DMI will test the OPUS-RS solution by occupying NGS control monuments in the local vicinity of the project area and compare the solution of the OPUS-RS solution to the published coordinate information. If this QA/QC process shows that results from OPUS-RS are not within the acceptable tolerance, a static network of the control data will be complete to derive the horizontal and vertical coordinates holding to the tested control monuments and the CORS horizontally.

Ground controls will be collected using rapid static surveying procedures. The points will be collected along linear features such as road centerline, shoulder, and sidewalk edges will be on bare-earth. The ground control points will be used to adjust the imagery to the ground (rectification) and NOT used for the verification of accuracy.

B.2.b.) LiDAR Control

DMI's ground control plan will include the number of LiDAR ground control and check points to be placed. The placement and amount of the controls will meet the general requirements set forth in the USGS, FGDC, NSSDA & ASPRS specifications. LiDAR controls will be collected using RTK surveying procedures. The points will be collected along linear features such as road centerline, shoulder, and sidewalk edges will be on bare-earth. The LiDAR control points will be used to adjust the LiDAR data to the ground (LiDAR calibration).

B.2.c.) LiDAR Check Points

LiDAR check points will be collected throughout the project areas to report the accuracy of the LiDAR data set. The DMI's surveying team will collect NVA and VVA check points and the accuracy will be reported. These check points will be used only as independent assessment of the accuracy of the LiDAR DEM and will not be used to adjust the LiDAR. The check points will be uniformly dispersed throughout the entire project area, will not be clustered and will not be collected on sloping terrain or within 5-meters of topographic breaklines.

B.2.d.) Access Coordination

DMI's surveying team will be in full contact with the Partners to begin all coordination to ensure the project runs smoothly the surveying team will also begin working with public, private and military land owners to gain access for the control occupation during this period. The surveying team will plan ground control for public or government-owned land as much as possible. Prior to setting any ground control on private property, DMI's surveying team will request approval of the land owner and will document all access permission in the survey notes.

B.2.e.) Ground Control Report

Once our team has completed our QA/QC of the surveyed data, The DMI surveying team will provide a survey report to Partners. This report will contain the inventory, survey method, accuracy and location of the ground control, and CORS used for the project. The report will be in PDF and EXCEL format.

B.3.) Aerial Data Acquisition

Our acquisition crew will be mobilized to an airport within or near the project site. Defined project limit will have a minimum buffer zone and our flight crew will collect the imagery data to the full range of the buffer zone. Data and products in the buffer will be tested for any quality control requirement. Prior to any acquisition, our crew will verify that the airborne sensor settings are set to acquire the required data. Also, our flight crew will operate the sensors during optimal atmospheric condition with prime PDOP condition (less than 3) and satellite network configuration greater than 6 active satellites (viewed by both stationary and roving receivers). DMI will not proceed with any acquisition until consent is received from Partners and all requirements prior to acquisition have been met.

Acquisition Updates

DMI's project manager will provide the Partners with daily updates prior and during the aerial mission. Daily updates will include the following:

- Flight lines successfully flown.
- Weather conditions for the day of acquisition
- Weather outlook for the next 2 days.
- Number of exposures acquired,
- Number of flight lines remaining, Shapefile of acquired data and remaining AOI
- Updated regarding remaining flight lines, resolutions and any setbacks on the acquisition including re-flights. Any issues (i.e. Weather, Sensor, Aircraft)

Flight Logs

DMI's sensor operator will collect the following information for each mission during acquisition: project numbers, sensors used, flight data, flight number, flight line start, flight lines stop time, image range, shutter setting, day and time of capture, and sun angle

Optimal Acquisition Conditions
• Imagery and LiDAR capture will not be undertaken when the ground is obscured by snow, haze, fog or dust; when streams are not within their normal banks; or when the clouds' shadows will appear on more than four percent (4%) of the area in any one photograph.
• Images shall not contain objectionable shadows caused by relief or low solar altitude.
• Crab shall not be in excess of five (3) degrees; and, tilt of the camera from verticality at the instant of exposure shall not exceed three (3) degrees.
• Imagery will be captured when atmospheric conditions are such that clear and well-defined images of physical features (like buildings, trees, and other ground over) can be obtained
• Data will not be collected in moderate to severe turbulence of cross winds of 20 knots or more.

B.3.a.) Proposed Aircrafts

DMI will acquire the imagery and LiDAR data using its FAA compliant aircrafts, the Piper Chieftain Navajo and Beechcraft Bonanza equipped with our state-of-the-art DMC II-e230 Digital Mapping Camera and Optech ALTM Galaxy T1000 LiDAR sensor. All of DMI's aircrafts are equipped with Applanix POS AV inertial navigation system for precise recording of aircraft roll, pitch, and yaw. The POS AV is integrated with ABGPS system through a Kalman filter to obtain exterior orientation parameters to an accuracy of 20 arc seconds.

Piper Chieftain Navajo
(Acquisition Aircraft)

Beechcraft Bonanza
(Back-up Aircraft)

B.3.b.) Proposed Imagery Sensor: Digital Mapping Camera (DMC IIe 230) Specs

DMI recognizes that one of the most critical phases of this project is the timely acquisition of the aerial imagery. Timely, consistent, and quality collection of aerial imagery is the cornerstone for generating accurate and quality orthophotography. Our process is to deploy our digital camera sensors DMC IIe 230a enabling simultaneous acquisition of color imagery and near infrared imagery. Our Leica, DMC IIe 230, is a high-performance digital camera system. It has a high frame rate to maintain fast-air speed for high-forward overlap and high-resolution. The PAN or color ratio of 1:2.6 provides high-radiometric quality images for RGB and Color-Infrared (CIR). The long focal length and small pixel size delivers high-resolution image data. The nadir-looking monolithic PAN camera offers unmatched radiometric and geometric quality.

DMC IIe230

Digital Mapping Camera (DMC IIe 230) Specifications	
• PAN pixel across track: 15552	• B/H: 0.34
• PAN pixel along trac: 14144	• Number of camera heads: 5
• PAN FoV across track: 50.7°	• PAN: Color Resolution: 1:2.6
• PAN FoV along track: 46.6°	• Frame rate: 1.8 sec
• PAN focal length: 92 mm	• Color channels: R,G,B, NIR
• PAN pixel size: 5.6 µm	• Resolution per pixel: 14 bit
• MS pixel across track: 6096	• FMC: yes2
• MS pixel along track: 6400	• CCD dynamic range: 72 dB3
• MS FoV across track: 52,0°	• Onboard storage: 4.8 TB
• MS FoV along track: 54.2°	• Storage capacity: 6900 images4
• MS focal length: 45 mm	• Weight: 65 kg5
• MS pixel size : 7.2 µm	• Power consumption: 280 W
• PAN GSD@500m: 3.0 cm	• Altitude non pressurized: 8000 m
• MS GSD@500m: 8.0 cm	• Operating temperature: –20 °C to 40 °C6

B.3.c.) Proposed LiDAR Sensors: Optech ALTM Galaxy T-1000

ALTM Galaxy is the ultimate wide-area sensor, with best-of-class density performance and collection efficiency. Galaxy is quite simply the smallest sensor on the market with the greatest performance capability, representing a giant leap ahead of its competitors in every way. Galaxy offers incredible collection efficiency and configuration flexibility with the highest data precision and accuracy possible.

- PulseTRAK technology enables a continuous operating envelope that can accommodate high-relief terrain with no data gaps or loss of density across multipulse transition zones.
- SwathTRAK technology maintains constant width flightlines for consistent data density in variable terrain and fewer flight lines.

It also features a 1MHz effective pulse rate, providing on-the-ground point density and efficiency formerly reserved for dual-beam sensors. Up to 8 returns per pulse are possible for increased vertical resolution of complex targets without the need for full waveform recording and processing. Industry-leading data precision and accuracy (< 0.03-0.20 m RMSE from 150-4700 m AGL) results in the highest-quality datasets possible.

Optech ALTM GALAXY T1000 Technical Specifications	
Laser Wavelength-	1064 nm near-infrared
Horizontal Accuracy-	1/10'000 x altitude (M AGL) : 1 sd
Elevation Accuracy-	<0.03-0.20 m RMSE from 150-4,700 m AGL
Laser Repetition Rate	Programmable, 50-1000 kHz
Position and Orientation Rate	POS AV AP60 (OEM), 220-Channel Dual Frequency GPS/GNSS/Galileo
Scan Width (FOV)-	10-60°
Scan Frequency-	0-120 Hz
Sensor Scan Product-	2000 maximum
Beam Divergence	Dual Divergence: 0.25 Mrad (1/e)
Toll Compensation-	± 5° minimum
Range Capture-	Up to 8 range measurements, including last
Intensity Capture-	Up to 8 intensity measurements, including last (12 bit)

Optech Gemini LiDAR Sensor (back-up)

DMI's state-of-the-art airborne sensor, the Optech ALTM GEMINI LiDAR system can collect QL 1/QL 2/QL3 LiDAR data. Our sensor is capable of collecting data at twice the altitude of conventional single-pulse systems for a given sampling rate and can effectively double our collection efficiency. This unit operates at a maximum pulse rate of up to 167 kHz, which means it can collect more than 100,000 elevation points per second. It is also capable of operating in a number of different configurations for range measurements including options for a first return, a first and last return, or a first, second, third and last returns. It can also collect intensity values that coincide with these range measurements.

Optech Gemini LiDAR Specifications	
Laser Wavelength-	1064M
Horizontal Accuracy-	1/5, 500 x Altitude (M AGL)
Elevation Accuracy-	<5-35 Cm; 1 o
Laser Repetition Rate	Programmable, 33-167 kHz
Position and Orientation Rate	POS AV AP50 (OEM), 220-Channel Dual Frequency GPS/GNSS/Galileo
Scan Width (FOV)-	0-50°
Scan Frequency-	0-70 Hz
Sensor Scan Product-	1000
Beam Divergence	Dual Divergence: 0.25 Mrad (1/e) and Mrad (1/e), Nominal
Toll Compensation-	Programmable, ± 5° at full FOV
Range Capture-	Up to 4 range measurements, including 1st, 2nd, 3rd & last returns
Intensity Capture-	Up to 4 intensity returns for each pulse, including last (12 bit)

B.3.d.) Aerial Acquisition Specs

Imagery Acquisition Specs			
Imagery GSD	3”		
Altitude AGL (feet):	4,100’		
Camera System	Leica Z/I Digital Mapping Camera (DMC IIe 230)		
Focal Length:	96 mm		
Imagery Bands and Bit rate:	4 Band (R,G,B, IR), 8-bits per band		
Forward Overlap:	60%		
Side Overlap:	30%		
Solar Angle:	**Between 10:00 am – 2:00 pm**		
LiDAR Acquisition Specs			
Sensor	OPTECH ALTM Galaxy T1000 LiDAR sensor		
Flight Height	1,450 m AGL		
Laser PRF (kHz)	300	**Planned Density (ppm^2)**	**12**
Scan Pattern	Seesaw	**Min Density (ppm^2)**	**8**
Field of View (Degree):	26 (13**° scan angle)**	Overlap	55%
Frequency (Hz):	80	Speed (knots)	140

B.4.) Flight Mission Planning

DMI believes successful data acquisition starts with proper mission planning. DMI’s mission planning team has years of experience in flight planning, resource allocation, and task scheduling necessary for this mission. This includes a step-by-step plan of the required flight lines to acquire required datasets.

DMI utilizes the newly designed mission planning software Leica Mission Planning and Optech AMM to implement and manage the aerial mission. This program is a comprehensive reporting, mission planning, and post-processing tool that provides DMI innovative solutions for our aerial processes. The utilization of these flight planning software allows us to view the project coverage area and the published flight lines in their appropriate coordinate system.

DMI will provide Partners with a proposed flight map to be used for the project during the kick off meeting. DMI will then make any adjustments that Partners’ request. DMI’s project manager will then finalize the flight plan in SHP or KMZ format during the pre-planning stages of the project. Prior to receiving our notice to proceed, DMI will provide the final flight plans to the Partners for a final evaluation and approval.

A preliminary flight map in included as follows assuming all task items are selected. After contract award final flight map for selected areas will be submitted to Partners for approval before aerial acquisition.

Table 2. Imagery Flight Map Statistics

Number of Flight Lines	Number of Exposures	Number of Control Points
120	7154	33

Table 3. LiDAR Flight Map Statistics

Number of Flight Lines	Number of Calibration Points
491	33

Figure 1. Preliminary Flight Plan and Control Layout (LiDAR Flight)

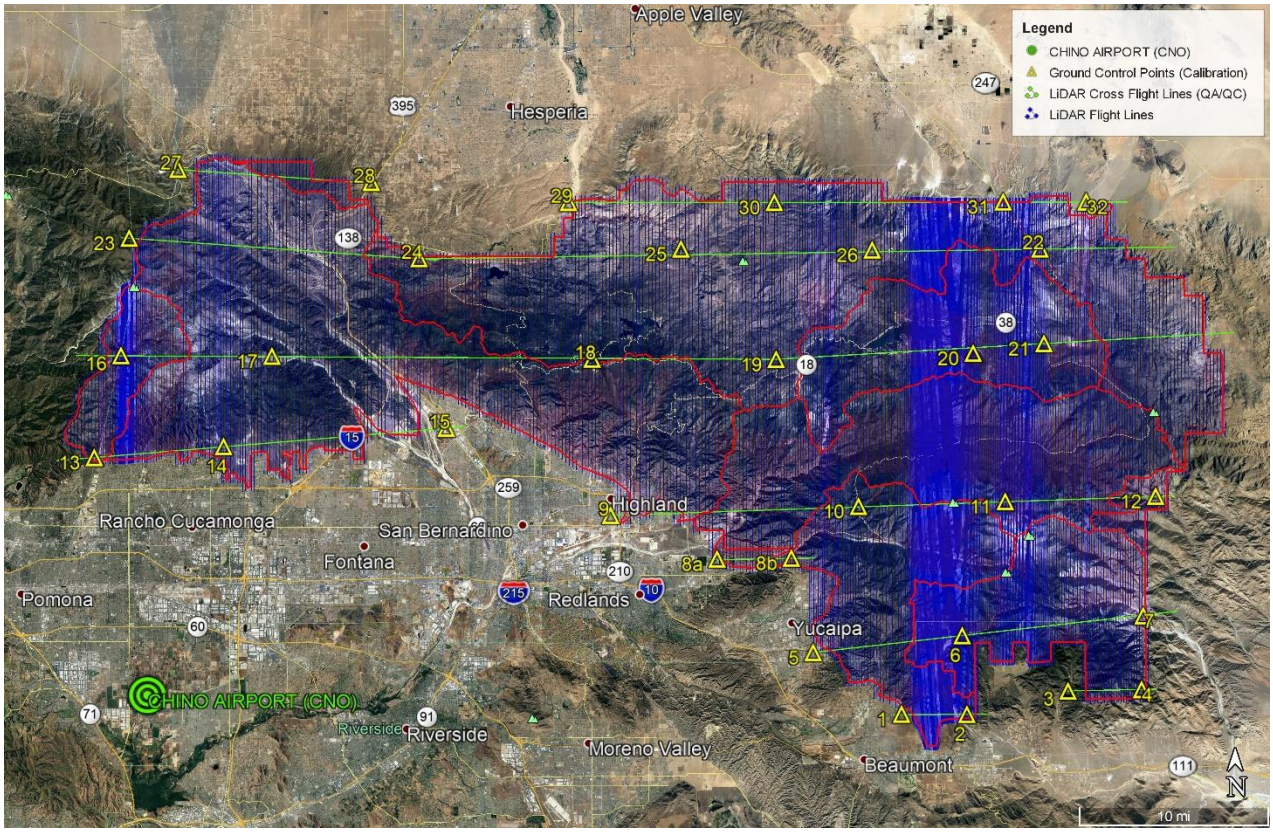
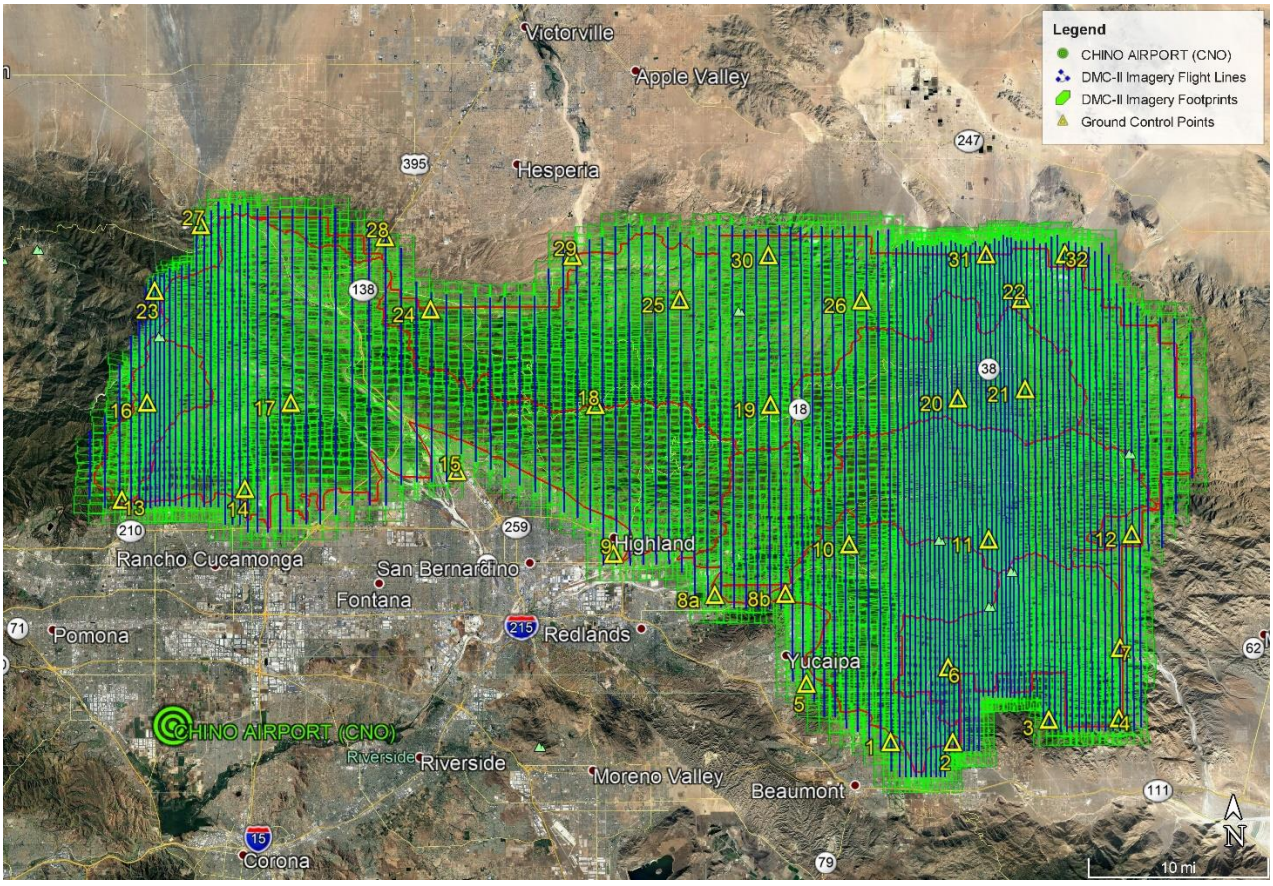


Figure 2. Preliminary Flight Plan and Control Layout (Imagery Flight)



B.5.) Dataset Post-Processing

B.5.a.) ABGPS/IMU Post-Processing

Our technicians process the GPS data using our post-processing program, Applanix's POSPac, in order to calculate the high-accuracy kinematic solution trajectory of our aircrafts. The trajectory is combined with the IMU data for a position as a whole and location solution. Using geodetic algorithms, the finished solution is then combined to the location and orientation to develop the end result X, Y, Z position for each pulse return measured by the GPS receiver. We also use Applanix's SmartBase technology, which in turn joins a filter approach to combine the GPS receiver's raw data with IMU data. SmartBase allows us to process the raw observables from a minimum of six to a maximum of fifty unremittingly operational GPS reference stations, contiguous to the trajectory. SmartBase's quality control tool accomplishes a network modification on all the baselines and reference stations, we also run quality checks for single reference stations.

B.5.b.) Image Post-Processing

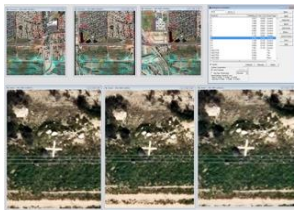
DMI's Z/I post-processing units designed in conjunction with the flight management system, are utilized to convert from raw sensor patterns into finished R,G,B, IR images, which have been specifically intended to extract high detail with few image artifacts and aliasing patterns. The first step is taking the raw images and downloading the data using our Z/I post-processing program to our servers. Then the imagery is tested to see if the data has any inconsistency such as misfires, clouds, or ground conditions. Our technicians will create two back-ups of all the raw imagery data and we analyze the PAN, RGB, and IR bands to assure the quality of the post processed raw images. If any errors are found, it will be flagged and either re-processed or re-flown. The completed raw processed images will be reviewed to ensure the matching quality and color balance throughout the project.

B.6.) Aerial Triangulation (AT)

Once our technicians have completed post-processing the raw images and ABGS and IMU data, DMI will apply the latest digital photogrammetric methodology using our ISAT Intergraph Image Station for a complete a FAAAT to meet or exceed ASPRS and NSSDA accuracy standards. FAAAT is an improvement of conventional aerial triangulation whereas airborne GPS and IMU data are used or the direct measurement of the position and orientation of every exposure in the photogrammetric block.

AT Pass & Tie Points

DMI expects for a substantial number of points to be produced throughout the photo to increase accuracy through redundancy, this method of increased density of points, will at slightest, be equal to what can be attained with an analytical triangulation process. The data will result in highly reliable automatic tie point and pass point measurements because the directly observed exterior orientation data prevents divergence of the solution. The FAAAT process improves upon conventional or manual aerial triangulation by providing numerous automated and manual tie points and pass points. DMI will measure a minimum of 6 tie points and 15 pass points in each frame to tie single models together along a flight strip.



AT Ground Control Check

All selected pass point locations will lie on un-obscured level ground, wherever topographic conditions permit. Particular attention will be taken in consideration with the selection of natural tie points as pass points. Additional effort will be made to avoid the placement of pass points in areas of very bright background that could render a pass point unusable (not locatable) on the orthophoto.

By using the image association method, which is both automatic and manual, we will achieve final point sub-pixel measurements. By appointing each point a unique number, individual digital frames and frame locations are assigned a point. Each block will be continually joined together with the assortment of tie pass points along their individual borders with contiguous blocks. Visual examination of the density and distribution of the tie or pass points are performed and discrepancies will be reported for correction and adjustment. It is recognized that deviation from the ideal distribution

AT RMSE Check

may be necessary for photographs covering bodies of water and areas of heavy ground cover. Tie points between strips will occur with a frequency of at least one per frame.

For increased accuracy of the fully assisted automatic aerial triangulation, the utilization of ABGPS and IMU technologies will assist by delivering highly precise exterior orientation parameters while delivering quality and dependable exterior orientation parameter results. All aerial triangulation tests will be performed by our technicians and endorsed by our project manager.

B.6.a.) Check Points (Blind Control Points)

A true measure of accuracy involves independent checkpoints; these points are precise points that are withdrawn from the aerial triangulation process only to be used as verifications after the adjustment. DMI will place QA/QC blind control points throughout the project site, these points will be excluded from the standard ground control points. The blind control points will enable DMI to confirm the quality of the aerial triangulation corrections to ensure it meets ASPRS standards.

B.6.b.) Image Ground Control Point Measurement

In order to accomplish the image ground control point measurements, this requires a succession of phases, starting with measurement of each surveyed ground control points in every image, which is beneficial for adjustment purposes. Using ISAT, our technicians assist in generating tying points amongst the frames, a manual evaluation is completed after ensuring the correct density and distribution of tie points. Any areas or images with less than the targeted total density of approximately 100 measurements per frame will be evaluated. If necessary, we will auto-generate or manually measure additional points for low-density areas besides tremendously low texture areas and water bodies. Remaining points in water bodies are manually removed, during our meticulous review methods.

This project will be viewed in multiple blocks, thus allowing our technicians to measure shared points in the overlapped regions of separate blocks. For a complete and unblemished orthomosaic, each of the adjusted values for the points must be reviewed in order to have a unified transition over the block boundaries. To ensure top quality mosaics, this approach has been applied to past projects with as many as 100 contiguous aerial triangulation blocks.

B.6.c.) Bundle Adjustment

Large least squares adjustment is utilized repetitively first to assess the reliability, status of image point measurements, and the overall quality of the finalized exterior orientations, consequently ensuring that the requirements of the final deliverable will be met. Ground control coordinates, image measurements, calibrated camera model parameters, and initial exterior orientation values are entered in the bundle adjustment. Our technicians will perform a modification with surveyed ground control points by assessing the association between captured imagery data and individually surveyed ground control coordinates after the initial bundle adjustment. After each bundle adjustment, we will evaluate all residuals between control points and tie points and compare the computed coordinates of any additional existing checkpoints with surveyed coordinates. Statistical breakdown of the error propagation and correctness of the subsequent imagery will be executed with meticulous quality control evaluations

B.6.d.) Aerial Triangulation Report

DMI will deliver to Partners an aerial triangulation report for every completed triangulation block; this will comprise of a debriefing of applied procedures, technologies, and results. The report will also contain duplicates of triangulation input and output, displaying triangulation point allowances, remaining errors, and general block RMSE. Included in the aerial triangulation report will also be the ABGPS locations, quality control checkpoint outcomes, certification of control points, POS exterior orientation data, survey points, control layout, and documentation of additional relevant data. The following will be contained in the final triangulation report:

- A rudimentary account of the project comprising of airborne GPS remarks and results, flight planning, aerial imagery, & ground control.
- Geodetic commentary containing the utilization of a local rectangular system.

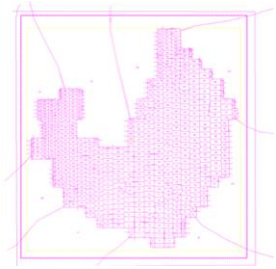
- An executive summary of the aerial triangulation results.
- Input final coordinate data to an excel spreadsheet.
- A narrative explanation of all facets of the assisted automatic aerial triangulation and aerial triangulation bundle block adjustments.
- Control, flight line indexes, equipment, and software information

Outcomes of the preliminary check point modification, classification of the aerial triangulation regarding correctness, and the bundle block adjustment.

B.7.) Digital Orthophotography

B.7.a.) Ortho-Rectification

Orthorectification process involves utilizing automated DEM (or **newly** collected LiDAR), triangulated exterior orientations, aerial imagery data, calibrated camera model parameters, and controls. The utilization of ABGPS and IMU data will offer support for image orientation and positioning; minimizing the required number of ground control points and enabling the creation of an orthophoto. This process will assist in removing horizontal displacement produced by terrain height disparity, camera-based distortions, and the earth's curvature.



Seamline Creation

Imagery will be orthorectified using ImageStation's OrthoPro, which provides a 3D photogrammetric space. The rectified imagery will be color, contrast, and tone balanced; the imagery will also be edge-matched to adjacent images using manual image processing techniques. By choosing optimal positions of the rectified images, our technicians will combine images seamlessly with no apparent edges or breaks in feature geometry. To minimize tonal differences between combined areas, localized modification of the brightness values will be achieved as needed. The referenced orthophoto shall visually have better contrast and will be used for adjustment purposes.

Localized brightness values of the adjacent orthophoto will be fine-tuned to the reference orthophoto. The adjusted area will be restricted by tonal radiometric modification, which will not compromise the clarity, accuracy, and resolution of the orthophoto if possible. DMI will develop a digital orthophoto pilot area prior to commencement of the entire project.

B.7.b.) Mosaicing

Using ImageStation, OrthoPro, and Geomedia allows us to create complete mosaic by processing image blocks using two separate tonal corresponding functions. Each image is processed to remove any hotspots in the middle of the frame. DMI's technicians will then review each frame thoroughly and perform a histogram comparison process so that there is seamless tone throughout the mosaic images.

Orthophoto Mosaic

After radiometric balancing, we will generate manual and automatic seam lines between source frames. In order to generate seamless orthophoto data that is fixed across the project area, seam lines need to be adjusted in order to deliver a successful transition from one image to another for the desired project tiling scheme. This can be accomplished by utilizing a combined method of manual and automated practice for high-quality imagery. This method has proven to be cost effective while delivering excellent results. DMI will utilize automatic seamline creation for rural areas, which is ideal for producing mosaics. Our technicians analyze and manually alter seam lines that have features showing continuity, usually executing manual seam line placement in urban areas to deliver precision of high quality imagery. Tonal matching is accomplished by comparing pixel values in all the images areas, which contain the overlap. Our software reviews and modifies each image so that we are able to achieve an overall unison tone throughout the project. The image mosaics will be produced in such a manner so that adjacent mosaics can be viewed together simultaneously, and with no overlap areas, obscuring any portion of the adjacent mosaics.

B.7.c.) Orthophoto Quality Criterias

Radiometry Balance:	When combining two or more images for a mosaic, the color values and brightness will be fine-tuned to balance that of the main image, thus reducing radiometric dissimilarities between combined areas. The color balance of the project will be gradual and no sudden tonal differences between image files will be found. To minimize tonal variations, the seam lines between the overlapping images must be selected.
Edge Matching:	There will be no excessive horizontal displacement along seamlines or at image file boundaries. We will also ensure transportation features or well-defined linear features to meet the ASPRS standard for maps.
Bridges and Overpasses:	DMI will assess the actual ground heights neighboring to the area beneath the bridge and insert the height of the latter in order to orthorectify the bridges and overpasses. The utilization of ground control points can sometimes be used, the overpasses and bridges will not be signified as offsetting or drooping, and imagery that depicts underlying features that retain their correct ground location and geometry in the digital orthophotography.
Feature Lean/Buildings:	DMI's technicians use the center area "sweet spot" of the image to create the orthophoto, in order to decrease the degree of lean in conjunction to the ground features being hidden and minimizing irregularities resulting from differences in feature lean across seamlines. This will minimize radial distortion. Also, increased overlap will help assist us to minimize building lean and shadowing.

B.8.) LiDAR Data Processing

Figure 3. LiDAR Process Overview

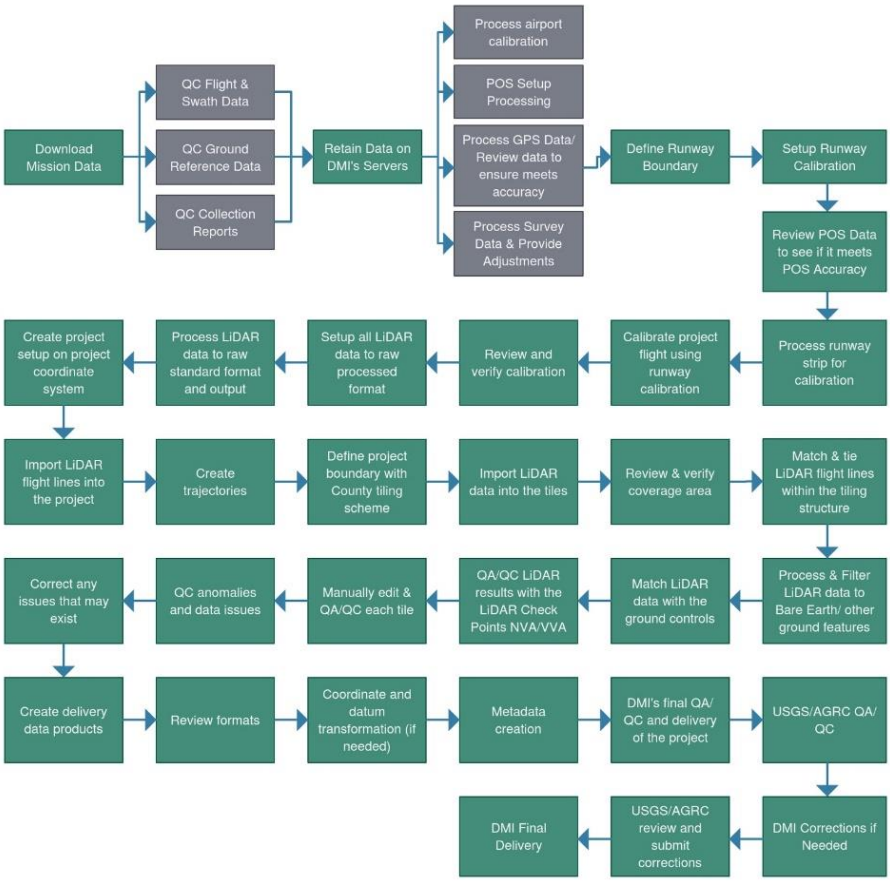
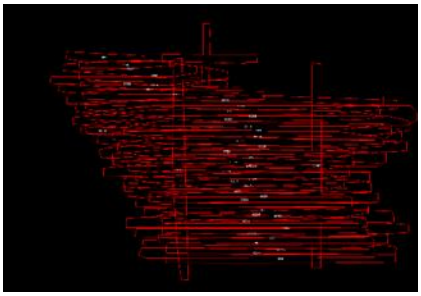
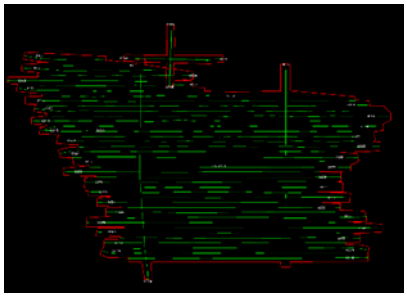


Figure 4. LiDAR Process Samples

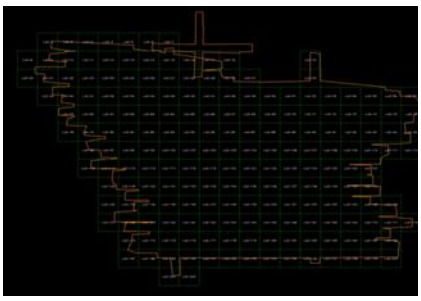


1. LiDAR Swath

2. SBET

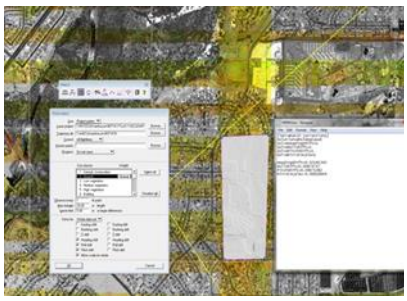


3. Trajectory

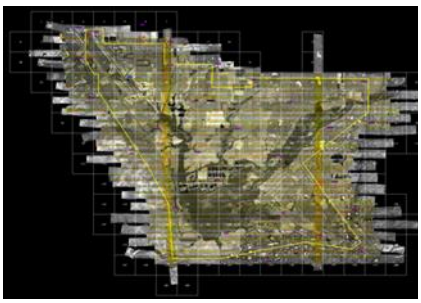


4. Tiling Scheme

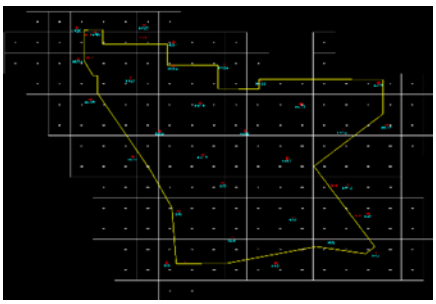
5. Raw unclassified LiDAR Data



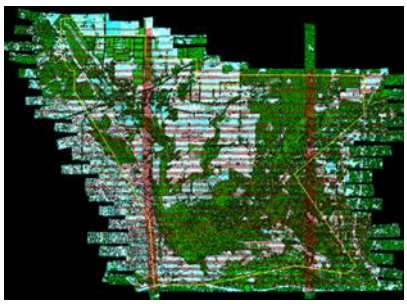
6. Heading Roll Pitch Mirror Scale



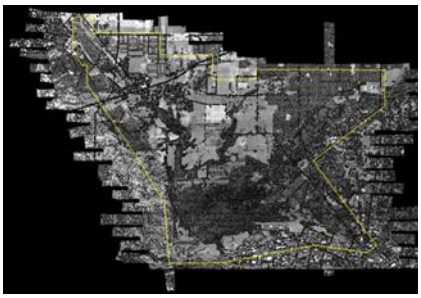
7. LiDAR Orthophoto



8. LiDAR Control



9. LiDAR Classified Data



10. LiDAR Intensity Image

B.8.a.) LiDAR Data Post-Processing

After the data has been acquired, our technicians process the LiDAR, ABGPS/IMU, and base station data by using our Optech and Aplanix programs. We then calculate the high-accuracy kinematic solution trajectory of the aircraft with the use of both these programs. This trajectory solution data is joined with the IMU data for a complete position and orientation solution. Using geodetic algorithms to position and derive the resulting X, Y, and Z positions for each pulse returned, the laser ranging data is consequently merged.

By merging post-processed aircraft position with altitude data, this creates a smoothed and best estimate of trajectory (SBET). Each laser point is connected with the SBET location to generate the development of the point

cloud, which is the 3-D assortment of all the LiDAR sensor pulses. LiDAR data is collected as flight line strips in LAS format to assist in the analysis, filtering, and classification of the data. These LAS files are created in the specified datum and final projection. This data will be reviewed before proceeding with the classifications (ground).

B.8.a.i.) LiDAR Post Processing Tools

DMI's team will utilizes GeoCue, Optech, and Terrasolid LiDAR integration tools throughout the post-processing phase. These tools allow continuous workflow and project management during the entire project. Our technicians process the SBET-generated LiDAR flight lines, project boundary, and tile scheme.

DMI's technicians will launch Optech LMS to decode data, combine the trajectory, and range information to produce LAS point cloud. The point cloud is then examined to determine appropriate system calibration numbers on a mission-by-mission basis. The resulting calibrated flight line data are imported into a project utilizing TerraScan and our project management program GeoCue. Flight line by flight line, LAS files are tied to each other using TerraMatch. We then combine the various flight lines to create the project as whole, while breaking the dataset into manageable pieces. This process converts the dataset from geographic coordinates into the project coordinate system. Finally, LiDAR data is processed using TerraScan to remove vegetation and noise from the data. DMI's technicians will utilize TerraModel to create the surface data and DEM.

B.8.b.) Flight Line Validation

DMI's LiDAR technicians will review each flight line in detail for any potential errors that may have occurred during the processing phase. This process can be completed by using the LiDAR intensity image & color coded orthophoto images to assist in the QA/QC process. We will be able to separate and adjust vertical differences on different points between flight lines. DMI will be able to examine vertical overlap and color code to mark any difference between flight lines by using Geoue. The use of TerraMatch allows us to be able to determine and locate calibration points between flight lines. During this phase it allows DMI's technicians to complete flight line calibration adjustments. The final TerraMatch adjustments are imported and the LiDAR tiles are created in GeoCue. The use of the LiDAR intensity image is used as an added QA/QC step throughout this process.

B.8.c.) Classifications

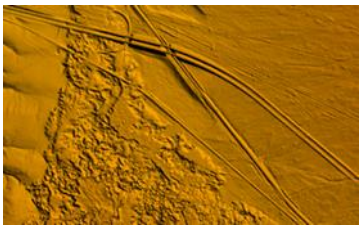
Our unique, cost effective, and time efficient stratagem for processing LiDAR will allow for streamlined productivity and on-time-scheduled deliveries. Using commercial software, our technicians will set parameters to automatically classify different categories for various terrain types. Settings allow for adjustment of parameters to customize acquisition of multiple categories of low, medium, and high vegetation, as well as flight line overlap points, ground points and noise points.

DMI's technicians also perform manual filtering to make sure important terrain data has not been filtered out. After tiles have been reviewed through our quality control process, we will complete one classification process to ensure the data is acceptable. Our LiDAR technicians use Geocue's TerraModeler, Terrascan, and ArcGIS. The following programs assist our technicians to develop base earth creation, classification of data and manual revisions. Our technicians create point classifications and characteristics such as iteration and terrain angles. With detailed development of custom macros, our team has created standards during the processing phase. LAS Point classification will be consistent across the entire project. DMI will insure that there are no variations in the character, texture, or quality of the classification between tiles, swaths, lifts, or other non-natural division.

B.8.c.i.) LAS Classifications Quality Control

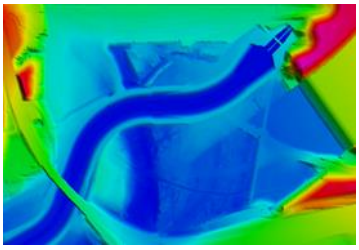
DMI's technicians utilize TerraScan and TerraModeler to manually review the LiDAR data to verify proper classification has been completed. The software assists with the final verification of the bare earth data set. DMI's technicians also perform manual classification techniques to provide an accurate data set. This process allows DMI to deliver a precise illustration of the ground.

B.8.d.) DEM Creation (Hydro-enforced)



A DEM creation involves generating a triangulated surface between ground-classified points data, DMI exports the data as TINs at the pixel resolution put forth by Partners. The acquired data will be imported on an ASCII grid and then mosaiced into a tiling system specified by Partners. DMI will utilize meticulous procedures to guarantee that the data has been imported accurately without tile inaccuracies. One of the most significant phases in DEM creation is the removal of bridges from ground surfaces during classification, this causes a plunging effect in the DEM surface. To correct this issue, DMI will generate digitized breaklines to signify the terrain elevation directly beneath the bridge, while placing multiple breaklines to assist with the plunging effect.

B.8.e.) Hydrographic Breaklines



Break lines are linear features, utilized to show change in smoothness or continuity of the surface area. Using the LiDAR data, our technicians will define hydrographic break lines. For water or rivers, we will create 3D break lines. DMI will meet or exceed the standard requirements for hydro-flattening all bodies of water, which are set at 2 acres, all streams wider than 100 feet and all non-tidal boundary waters.

DMI will generate a polygon for the bodies of waters and will appoint a single lake elevation to the entire polygon, which represents a flat surface. It will also be matched at the edge of the surface water at or below the bordering terrain. Break lines will be generated to designate bank-to-bank condition for rivers and streams, also allocating values at the vertices. Once the break lines have been completed, bare earth LiDAR points within the designed nominal point spacing, will be re-classified as ignored ground, which will be omitted from the DEM generating process. This will thwart unnatural surface objects from being created between mass points and break line vertices. The reclassification of ignored ground will not exceed the aggregate nominal pulse spacing.

These requirements also define the minimum features for which break lines shall be collected and delivered by DMI. DMI will level hydro-flattened water bodies (lake and ponds) at a single elevation and streams and rivers are conditioned for continuous downhill flow. DMI will ensure all hydro-flattened areas will have pleasing aesthetic appearance. DMI will maintain the bare-earth DEM data intact, all road culverts and similar features, regardless of size, defined as having earth between the road surface and the top of the structure.

DMI's technician's will collect breaklines for all hydrographic features. Additionally, breaklines may be collected at roads, bridges, ridges, summits, depressions, valley floors, and other areas of abrupt terrain change where the LiDAR DEM does not portray the surface within the project specifications. It is expected that most areas will be modeled within specification with the LiDAR points alone. These requirements also define the minimum features for which break lines shall be collected and delivered by DMI.

- DMI will level hydro-flattened water bodies (lake and ponds) at a single elevation and streams and rivers are conditioned for continuous downhill flow.
- DMI will ensure all hydro-flattened areas will have pleasing aesthetic appearance.
- DMI will maintain the bare-earth DEM data intact, all road culverts and similar features, regardless of size, defined as having earth between the road surface and the top of the structure.

B.8.f.) Intensity Images

DMI will prepare and deliver intensity images in 8-bit grayscale GeoTIFF format with lossless deflate compression and accompanying TFW world files. Data will be delivered in tiles without overlap, using project tiling scheme. Intensity images will have no visual artifacts or mismatch.

B.8.g.) Control Verification

DMI's technicians will verify (QC) LiDAR data to ensure the data set meets the Partners' project requirements. This process involves utilizing the independently collected check points to verify the accuracy of the data set through each collected check points.

B.9.) Quality Control Plan (QCP)

Our methods and previous experiences will ensure that the goals for all requirements, schedules, and deliverables sought by Partnets, contracting officials are met with full satisfaction. DMI integrates quality control methods into the production process to review and guarantee the desired quality for the project is met. These quality control steps are met by: Our quality assurance begins with a quality control plan, which delineates responsibilities, provides sample control and documentation procedures, specifies analytical methods, calibration techniques, standardization methods, and equipment maintenance routines, and prescribes data assessment, reduction, and reporting procedures. DMI has meticulous procedures to evaluate our deliverables. DMI has quality control stratagems in place to ensure that we can attain measurable results on the excellence of our process and successful deliverables. We will verify that the original project plan and specifications have been adhered to, and follow up with more detailed inspection of deliverables, particularly with final product deliverables.

Ground Survey QA/QC
• The field observation schedule will be made to ensure there are complete sets of data.
• Repeat station occupations will be completed if any GPS data is found to not meet the accuracy.
• Data will not be deleted from the receiver until it has been verified.
• Where applicable, data from selected ground control framework will be incorporated into the project.
• All GPS data will be processed the following day and any inconsistencies will be re-observation.
• A series of free and constrained adjustments (both horizontal and vertical) of all data will be accomplished to ensure that all project data meet project accuracies specified.
• Daily back-ups of all digital data including GPS RINEX data to portable hard drive.

Imagery Flight QA/QC
• With the Digital Mapping Camera, our operator has real-time video-logging. Which allows our camera operator to view the image while its being captured. Any lower quality images or frames captured can be identified in flight and recaptured before aircraft returns to runway.
• Inspection of imagery regarding suitability for purpose, including full photogrammetric model coverage for the project area.
• Coverage gaps or other defects in the imagery are noted and may be cause for re-flight if the threshold for acceptance is not attained.
• Check flight logs to ensure that photography was acquired during time of day when sun angle requirements are adhered to.
• Imagery is inspected to make sure that desired flight scale is obtained

LiDAR Flight QA/QC
• Weather monitoring to conclude which time is best to collect the data
• Monitoring GNSS satellite arrangement and PDOP
• Confirming that all GPS, ground controls and check points (NVA, VVA and Ortho Check Points) are set up prior to Imagery/LiDAR Acquisition
• Automated flight management systems, GPS-supported aircraft navigation interfaced with the camera
• Sensor operator display with touch screen technology to ease configuration and operation and allow inflight control and review of the LiDAR and Imagery Acquisition
• Comprehensive mission data recording enabling post-flight analysis of flight results including time, date, altimeter and reading
• Analysis of the post-processing allows DMI's technician to view actual acquisition allowing an early decision for re-flight requirements

LiDAR Post Flight QA/QC
• Inspection of the LiDAR swaths captured.
• Review for Coverage gaps or other defects in the imagery data are noted and may be cause for re-flight if the threshold for acceptance is not achieved.
• Check flight logs to ensure that correct LiDAR data capture.
• Review LiDAR data to ensure correct point density is achieved.
• In the event re-flights are necessary, the same equipment and process shall be used for acquisition and will be flown as soon as possible from the original flight date

Aerial Triangulation QA/QC
• Assign unique point to individual frames to regulate incorrect replication of control points inside blocks
• Check residuals and aerial triangulation result for errors, both systematic and anomalies
• Check on accuracy achieved on the final product including measures of spot heights, control points (including blind control points established for QC purposes)
• The average of all points will not surpass 1 / 20,000 of the flight height.
• The root mean square error of the concluding block modification will not surpass 1/10,000 of the flight height.
• The maximum permissible error of any point will not surpass ± 1 / 5,000 of the flight height.

Orthophotography QA/QC
• Check overall impression for color balance
• Histogram check for full use of contrast range
• Seam lines (between tiles and mosaic lines within tiles) are well hidden-minimized tonal variations. If automated seamline-generating fails to place seam(s) in optimized location, our orthophoto lab technicians will perform a manual seamline editing and review the mosaic for enhanced output.
• Check for erroneous ortho artifacts (smears, warped roads and bridges, DEM spikes)
• Final RMSE check on image positional accuracy

DMI's Orthophoto Criterias	
Geometric Accuracy:	• All images will meet or exceed project standards.
Ground Features:	• Images will have no distortion of ground features (e.g., roads, railroads, bridges/overpasses, buildings) by inadequate rectification, including bending/warping of roads/railroads/bridges and excessive or mismatched building lean, building/structure warp.
	• Water will not show no ice, glare or contrast between tiles across body of waters
Gaps:	• Images will be 100% free of gaps and no missing imagery at area peripheries.
Overall Image Quality:	• No significant scratches, dust, lint, compression artifacts, stretching, smearing, blurring, blemishes, noise, building lean, warping or other image anomalies.
	• Rectified image quality to be equal to or better than the original aerial images.
	• Feature edge and tone match within specified tolerances and consistent image radiometry.
	• Seam line geometry & aesthetics. No seam lines or discontinuities will be visible.
	• Inspect all imagery of the entire project including the extended buffer
	• Create polygons using ESRI products for image irregularities (i.e. image warping, color balancing & image vector misalignment)
	• Alignment of streets and other linear ground features will be true to the real condition
	• Reviewed image sharpness, color, tone and contrast.
	• Check overall impression for color balance

DEM QA/QC
• Manually review bare-earth DEMs in ArcMap with hillshades to check for issues
• Verify DEMs to be hydro-flattened
• Verify DEMs to be seamless across tile boundaries
• Calculate DEM Vertical Accuracy including NVA, VVA, and other statistics
• Verify all properties of the tiled DEMs, including coordinate reference system information, cell size, cell extents, and compression has not been applied per project specification
• All qualitative issues present in the DEMs as a result of LiDAR processing and editing issues will be marked for corrections in the LiDAR data. These DEMs will need to be recreated after the LiDAR has been corrected
• Load all tiled DEMs into Global Mapper to verify complete coverage to the (buffered) project boundary and that no tiles are corrupt.

Breaklines QA/QC
• Perform Completeness check, breakline variance check, and all automated checks for each completed block
• Perform Completeness check, breakline variance check, and all automated checks for merged dataset
• Check entire dataset for missing features that were not captured, but should be to meet baseline specifications or for consistency
• Verify if features are collected consistently across tile bounds.
• Check horizontal placement of breaklines
• Perform all Topology and Data Integrity Checks
• Perform hydro-flattening checks

B.9.a.) Final Delivery LIDAR QCP Steps

Even though DMI implements QC/QC steps throughout acquisition and processing step, before delivery to Partners, final products will go through following QC steps;

- Reviewed for completeness of delivery content
- Verify projection and coordinate system of delivery
- Perform coverage/gap check to ensure proper coverage of the tiles to be submitted
    - Create a density grid to check that delivery meets data density requirements of the project
    - Conducted a statistical analysis of delivery to check point classifications, variable-length record values, and maximum/minimum x,y,z ranges
- Perform tile-by-tile analysis (100% of the project area);
    - Verify if project specific tile naming conventions is followed
    - Verify that deliverable formats are correct
    - Using TerraScan, check for errors in profile mode (noise, high and low points)
    - Conduct measurements to determine if delivery met applicable specifications outlined in aerial acquisition specifications (overlap, gaps, etc.)

  - Review hydro-breakline data for accuracy and completeness

- Reviewed each tile for anomalies; if problems were found, the areas were identified using polygons in ESRI shape file format and accompanied by comments and relevant screenshots.
- Check and verify Bare Earth data has
  - No Buildings left in the bare-earth points
  - No Vegetation left in the bare-earth points
  - No Water points left in the bare-earth points
  - Proper definition of roads and drainage patterns
  - Bridges and large box culverts removed from bare-earth points
  - No areas that have been “shaved off’ or “over-smoothed” during filtering
- Check and Verify Intensity Images
  - Are normalized if requested
  - Has no artifact

During these steps if any problems are found, the areas will be identified using polygons in ESRI shape file format and accompanied by comments and relevant screenshots to return to relevant production steps

C.) ORGANIZATIONAL CHART

C.1.) Project Team

We have assembled an outstanding project team for this significant project. Led by our project manager, Gencaga (Gen) Aliyazicioglu (Certified Photogrammetrist. DMI's mission is to provide the best possible service and products to Partners. This can only be accomplished by recruiting and training staff with the best possible combination of experience, education, training, technical resourcefulness, management, and communication skills.

Digital Mapping, Inc. Staff					
Certified Photogrammetrist:	2	Mechanical Engineer:	1	Pilots:	3
Compilers:	3	CAD Operators:	2	Camera Operators:	3
Land Surveyors:	2	GIS:	2		
Digital Orthophoto Technicians:	2	LiDAR Technicians:	5		

DMI's team has more than 32 years of experience in all facets of the industry such as proven project management skills, expertise in many technologies, database systems, and GIS platforms. DMI employs more than 25 professionals who have been in the mapping industry for more than 25 years. Our team includes Pilots, Professional Land Surveyors (PLS), Certified Photogrammetrists (CP), GIS Professionals (GISP), Ortho and LiDAR technicians, computer programmers, and mechanical engineers. DMI's staff exhibits the necessary skill set and comprehension of the requirements. Our team will ensure the successful preparation, delivery, and high-quality assurance standards for obtaining the best possible high-resolution imagery, mapping and LiDAR data.

Availability and Commitment:	Key personnel lined up for the project will be available and committed to this project until the final deliverable. DMI possesses sufficient resources and staff to meet the project schedules.
Responsiveness:	Our project team has an impressive track record of quick response, timely completion of assignments, and production of high-quality product.
Experience:	Each of our project team members have technical background and practical experience to complete the services successfully. Therefore, we can mobilize and execute the appropriate tasks for a streamlined and efficient approach.
Reliability:	DMI has adequate resources to meet the requirements set forth by the Partners and surpass the specifications of this project.
Communication:	Continuous and transparent communication with project team from start to finish.

C.2.) Project Manager

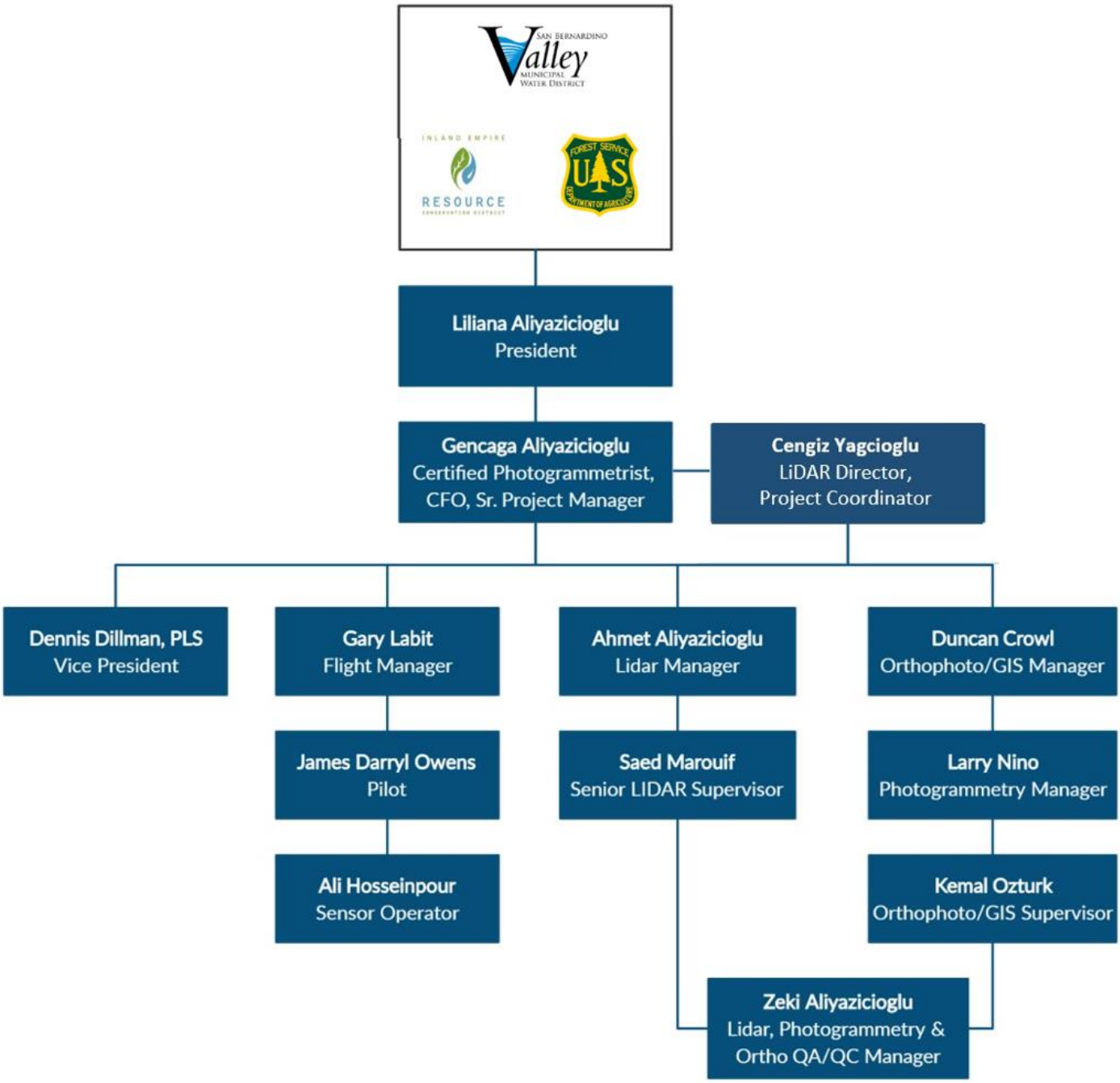
DMI's project manager for this important project will be Gencaga (Gen) Aliyazicioglu (Certified Photogrammetrist). With 40+ years of experience in the field.

Contact Info:

Gencaga (Gen) Aliyazicioglu
Certified Photogrammetrist | CFO | Sr. Project Manager

Tel: (714) 968 5459
Cell: (714) 448 7534
Fax: (714) 968 2429
Email: gen@admap.com
Address: 21062 Brookhurst Street, Suite 101, Huntington Beach, CA, 92646

Figure 5. Organizational Chart



D.) PROJECT SCHEDULE

DMI's proximity and familiarity with the project area will enable us capture imagery as soon as all the conditions are met and work two daily shifts to deliver final products until proposed deadlines. A project schedule is included as below dependent on contract award and weather conditions.

	Task 1a	Task 1a+1b	Task 1a+1b+1c	Task 2a	Task 2a+2b
Schedule Items	**Working Days**	**Working Days**	**Working Days**	**Working Days**	**Working Days**
Data Collection					
Ground Surveying	5	8	10	8	10
Aerial Imagery Acquisition				10	16
Airborne LiDAR Acquisition	5	10	20		
Processing (After completion of acquisition)					
ABGPS/IMU Processing	3	4	5	3	5
Imagery Production				5	10
Aerial Triangulation				5	10
Digital Orthopoto Production				20	40
LiDAR Data Calibration	5	12	14		
LiDAR Data Classification	10	20	30		
Deliverable Production	5	10	15		
	Task 1a+1b	**Task 1a+1b+1c**	**Task 1a+1b+1c**	**Task 2a**	**Task 2a+2b**
Delivery Schedule (after aerial acquisition)	**20**	**35**	**45**	**30**	**45**

Weather conditions are considered for estimated days for aerial acquisition. Actual acquisition time frame might be shorter depending on weather conditions.

Resource Allocation

Name	Resources Allocated
Aerial Acquisition	% 50
Aerial Triangulation	% 40
LiDAR Processing	% 60
LiDAR Deliverable Production	% 60
Orthophoto Production	% 60

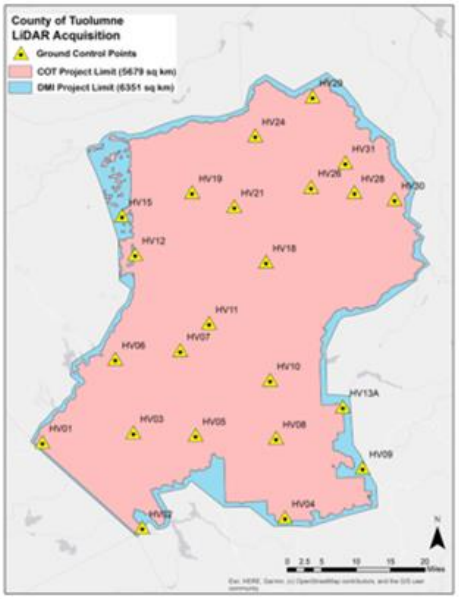
D.1.) Contingency Plan

We have prepared a resource allocation to enable project completion before planned delivery date. DMI maintains a fleet of three aircrafts, two (2) Digital Mapping Camera systems, and two (2) LiDAR sensors. Should any issues arise during aerial acquisition and/or processing, DMI would be able to deploy a second aircraft with additional sensors and increase processing resources for timely delivery.

E.) OTHER INFORMATION

E.1.)Project References

Project # 1
County of Tuolumne and Stanislaus National Forest Lidar Acquisition Project, County of Tuolumne CA (2019)

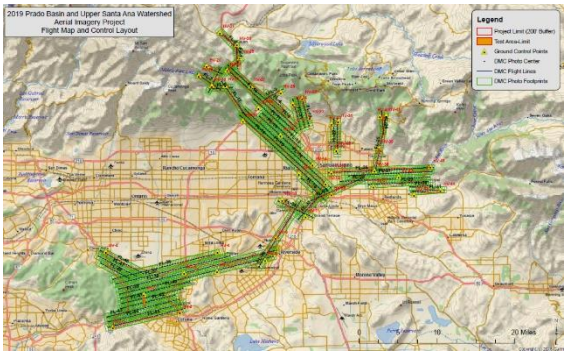


DMI performed ground surveying, aerial LiDAR data acquisition (QL1) and processing services covering an area of 2,500 sq miles in County of Tuolumne and Stanislaus National Forest Project area. Digital Mapping Inc.'s professional land surveyor identified, targeted, and surveyed 23 ground control points for LiDAR swath calibration as well as 92 check points in Vegetated and Non-Vegetated land cover classifications as an independent test of accuracy for this project.

Aerial Acquisition was performed using Optech Galaxy ALTM 1000 LiDAR. DMI delivered calibrated unclassified LiDAR swath data, bare-earth classified LiDAR point cloud, Digital Elevation Model (DEM), Digital Surface Model (DSM) and Intensity Images as part of the project.

Contact Name and Title	Liz Peterson	Address	2 South Green Street Sonora, CA 95370
Phone	(209) 533 6396	Project Term	2019
Email	EPeterson@co.tuolumne.ca.us	Project Amount	$449,750.00
Company Name	County of Tuolumne	Project Area	2,500 sq miles

Project # 2:
2019 Prado Basin and Upper Santa Ana Watershed Aerial Imagery (2019)



For our client, Orange County Water District (OCWD), DMI provided 3" pixel resolution **4 band** digital orthophoto imagery of Prado Basin and Upper Santa Ana Watershed area. DMI flown approximately 84 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230) consist of 49 flight lines and 1248 exposures. Prior to flight DMI survey team established 44 ground control points to be utilized at aerial triangulation. DMI's staff completed the project within schedule and within budget. DMI provided uncompressed 4 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area.

Contact Name and Title	Marsha Westropp *Senior Planner*	Address	18700 Ward Street, Fountain Valley, CA 92708
Phone	(714) 378-8248	Project Term	2019
Email	mwestropp@ocwd.com	Project Amount	$55,375
Company Name	Orange County Water District	Project Area	84 sq miles

Project # 3:

On-Call Aerial Imagery, LiDAR and Photogrammetry Services for The OCPW (1987 – On Going) and Prado Basin Project

For 29 years, (since 1991), DMI has been contracted by Orange County Public Works (OCPW) to provide on-call aerial surveying and LiDAR collection services throughout Orange County, CA. DMI has completed small to large scale mapping projects with our state of the art Z/I DMC I and Optech LIDAR sensor equipped with Airborne GPS/IMU. These projects includes a map scales ranging from 1"= 20' with 0.5' CI, 1"=40' with 1' CI, 1"= 50' with 1'/2' CI, and 1"= 100' with 2' CI. DMI has also provides delivery of digital terrain models, digital elevation models, LiDAR raw point cloud, LiDAR classified point cloud, contours, breaklines, & hydro-flattening.

In 2015, DMI was contracted by OCPW to conduct an aerial survey of **Prado Basin** located in Chino, CA. DMI was tasked to collect aerial imagery and LiDAR data for an area of thirty-five square miles. DMI's project manager and certified photogrammetrist worked closely with the OCPW Land Surveying crew to establish the location of the aerial targets and LiDAR blind controls for the project. Once the aerial targets were set, DMI's aircrew created the imagery and LiDAR flight plan and did a final QA/QC prior to data acquisition. Once notice to proceed was given, DMI began acquiring the imagery and terrain data with our Digital Mapping Camera (DMC IIe 230) and Optech Gemini LiDAR sensor. These sensors were equipped with ABGPS/IMU. DMI delivered 3: CDOP, Digital 1' Contours with OCPW-CAD Library Microstation format at a scale of 1" =40', DTM files in MicroStation binary format, LiDAR LAS 1.2, LiDAR Classification LAS 1.2, Breaklines in Mircostation and Mylar Plot.

Contact Name and Title	Kevin Stephens | PLS	Address	300 N. Flower St, Rm 221 Santa Ana, CA 92703
Phone	(714) 967-0806	Project Term	2014-ongoing
Email	Kevin.Stephens@ocpw.ocgov.com	Project Amount	$600,000.00
Company Name	Orange County Public Works	Project Area	35 Square Miles

Project # 4:

Holy Fire Burn Area Impact Mapping – Digital Aerial Photography and Lidar DEM (2018-2019)

For our client, Riverside County Flood Control and Water Conservation District, DMI has provided four aerial mission to acquire aerial imagery, Lidar data collection and deliver DEM data. DMI has flown the project area utilizing our state-of-the-art large format Digital Mapping Camera (DMCIIe230) and Optech Gemini LiDAR sensor.

DMI delivered color imagery at 6"pixel resolution. Utilizing Lidar data (8 points per square meter) DMI also delivered QL1 accuracy level Digital Elevation Model (DEM). Final products were delivered in State Plane Coordinate (NAD 83).

Contact Name and Title	Jim McNeil *Chief of Surveying and Mapping*	Address	1995 Market Street Riverside, CA 92501
Phone	(951)-955-1200	Project Term	2018
Email	jmcneill@rivco.org	Project Amount	$57,750
Company Name	Riverside County Flood Control and Water Conservation District	Project Area	57

Project # 5: Multiple Aerial Mapping, Orthophoto & LIDAR Projects (2006 - On-Going)

For our client, Southern Nevada Water Authority (SNWA), DMI has been providing photogrammetry, digital orthophoto imagery and LiDAR throughout regions of the Las Vegas Valley Spring Valley, Muddy and Virgin River. DMI has flown approximately 10,000+ square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMC I & DMCIIe230) and Optech Gemini LiDAR sensor since 2006. DMI has collected data over multiple resolutions ranging from 3" to 6" and has been delivering 4-band imagery to SNWA. DMI's most recent success for SNWA, was the aerial imagery acquisitions for Muddy and Virgin River in 2019. DMI mobilized our Beechcraft Bonanza equipped with our new state of the art Z/I Digital Mapping Camera (DMC IIe230) for data acquisitions. DMI's staff completed the project ahead of schedule. DMI provided 6-inch (4-Band Imagery, 8-Bit) uncompressed GeoTIFF, AT report, Meta Data.

Contact Name and Title	Craig Hale, *Supervisor, Data Resources Division*	Address	100 City Parkway, Suite 700 Las Vegas, Nevada 89106
Phone	(702)-862-3730	Project Term	2006-On Going
Email	craig.hale@snwa.com	Project Amount	$5,130,000.00
Company Name	Southern Nevada Water Authority	Project Area	10,000+ square miles

Project # 6: Multiple Aerial Mapping, Orthophoto & LIDAR Projects (2005 – On Going)

Since 2005, DMI has performed multiple mapping, orthophoto and LiDAR projects for Resource Strategies, Inc. (RSI); DMI has delivered Color Digital orthophotos in RGB or CIR with a resolution of 3", 4", 6", 1' & 2' GSD covering more than 50,000+ square miles using our state of the art DMC cameras and Optech LiDAR sensors integrated with ABGPS/IMU. One of many DMI's recent success with Resource Strategies came in 2015 (March 2015-September 2015) when DMI was contracted by the Coachella Valley Association of Governments (CVAG) and RSI to provide 3-inch color digital orthophotos encompassing an area of 1,226 square miles located in Riverside County.

Contact Name and Title	Richard Schulman	Address	3952 Claremont Mesa Blvd, Suite D San Diego, CA 92117
Phone	(858) 735-7424	Project Term	2005-On Going
Email	resourcestrategies@usa.net	Project Amount	$4,000,000.00
Company Name	Resource Strategies, Inc.	Project Area	50,000 Sq Miles +

Project # 7 – Color Digital Orthophotography of Orange County CA (2019)

For our client, Orange County Fire Authority (OCFA), DMI provided 3" pixel resolution digital orthophoto imagery of entire Orange County. DMI captured imagery for an area of approximately 1200 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230). Prior to flight DMI survey team established ground control points to be utilized in aerial triangulation of the imagery. DMI provided uncompressed 3 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area at various resolutions.

Contact Name and Title	Mike Vuang *GIS Supervisor*	Address	1 Fire Authority, Irvine, CA 92602
Phone	(714) 573-6000	Project Term	2019
Email	mikevuong@ocfa.org	Project Amount	$78,750
Company Name	Orange County Fire Authority	Project Area	1200 sq miles

E.2.)Past Performance

In 2017, 2018 and 2019 DMI has successfully completed a total of 329 projects within planned deadlines and budget. DMI's project pool is a combination of one-time purchase orders and long-term contracts with government agencies and private engineering firms. List of DMI's major contracts are included as follows for your consideration.

Year	Entity	Project / Contract Name
2019	City of Cupertino	Citywide Orthophoto Project
2019	Mesa County, CO	Countywide 6" and 9" Orthophotography and Building Footprints
2019	Orange County Fire Authority	Entire Orange County 3" Color Digital Orthophoto (1000 sq miles)
2019	San Diego County	Photogrammetric Mapping and Aerial Photographic Services (multiple tasks)
2019	San Bernardino County	On-Call Photogrammetry Services Contract (multiple tasks)
2019	Orange County Public Works	Aerial Imagery and LiDAR Acquisition Contract (multiple tasks)
2019	Kern County Public Works	Aerial Photography and Topography
2019	City of Fullerton	Citywide LiDAR Data Acquisition and Processing (15 points per sq meters)
2019	City of Hawaain Garden	Citywide Color Digital Orthophotography
2019	Riverside County Flood Control	Holly Fire Emergency LiDAR and Imagery Project
2019	Private Engineering Firm	Powerline LiDAR and Orthophoto Acquisition and Processing
2019	Private Engineering Firm	Powerline LiDAR and Orthophoto Acquisition and Processing
2019	Private Engineering Firm	Freeway 405 Aerial Photography for mapping with CALTRANS's standards and 3" Color Digital Orthophotos
2019	Private Engineering Firm	Freeway I-15 Aerial Photography for mapping with CALTRANS's standards
2019	Private Engineering Firm	Powerline LiDAR and Orthophoto Acquisition and Processing
2019	Private Engineering Firm	Rosemond Powerline LiDAR and Orthophoto Acquisition and Processing
2018	City of Cupertino	Citywide Orthophoto Project
2018	Riverside County Flood Control	Helena LiDAR Project
2018	Hancock Forest Management	QL1 LIDAR Acquisiton and Processing in IDAHO
2018	Southern Nevada Water Authority	Muddy and Virgin Rivers Digital Aerial Imaging Project
2018	Southern Nevada Water Authority	Spring Valley Ranches Color Digital Orthophoto Imagery
2018	County of Tuolumne	QL1 LiDAR Acquisition and Processing
2018	Orange County Water District	Prado Basin 3" Color Digital Orthophotography
2018	San Diego County	Photogrammetric Mapping and Aerial Photographic Services (multiple tasks)
2018	San Bernardino County	On-Call Photogrammetry Services Contract (multiple tasks)
2018	Orange County Public Works	Aerial Imagery and LiDAR Acquisition Contract (multiple tasks)
2018	Kern County Public Works	Aerial Photography and Topography
2018	USDA	Aerial Photography Contract
2018	County of Fresno	Aerial Photography and Topographic Mapping
2018	Idaho Department of Lands	GNA IDAHO PANHANDLE QL1 LiDAR Data Acquisition and Processing
2018	Private Engineering Firm	San Elijo LİDAR Project
2018	Riverside County Flood Control	Holly Fire Emergency LiDAR and Imagery Project (3 times)
2017	San Diego County	Photogrammetric Mapping and Aerial Photographic Services (multiple tasks)
2017	San Bernardino County	On-Call Photogrammetry Services Contract (multiple tasks)
2017	Orange County Public Works	Aerial Imagery and LiDAR Acquisition Contract (multiple tasks)
2017	Private Engineering Firm	West Valley Connector Project LİDAR Photogrammetry for Mapping

F.) FEE SCHEDULE

		Task 1 LiDAR Collection and Processing						Task 2 Aerial Imagery Collection and Processing				Task 3 Meetings		Task 4 Reporting	
		Task 1.a.		Task 1.b.		Task 1.c.		Task 2.a.		Task 2.b.		Task 3		Task 4	
Fee Schedule	**Hourly Rate**	**hours**	**cost**	**hours**	**cost**	**hours**	**cost**	**hours**	**cost**	**hours**	**cost**	**hours**	**cost**	**hours**	**cost**
Data Collection															
Ground Surveying	$166.13	15	$2,491.95	30	$4,983.90	30	$4,983.90	30	$4,983.90	30	$4,983.90				
Aerial Imagery Acquisition	$1,075.00							20	$21,500.00	15	$16,125.00				
Airborne LiDAR Acquisition	$1,350.00	6	$8,100.00	17	$22,950.00	9	$12,150.00								
Processing															
ABGPS/IMU Processing	$145.36	20	$2,907.20	20	$2,907.20	20	$2,907.20	20	$2,907.20	10	$1,453.60				
Imagery Production	$91.37							40	$3,654.80	30	$2,741.10				
Aerial Triangulation	$110.36							40	$4,414.40	20	$2,207.20				
Digital Orthopoto Production	$91.37							150	$13,705.50	125	$11,421.25				
LiDAR Data Calibration	$91.37	30	$2,741.10	55	$5,025.35	40	$3,654.80								
LiDAR Data Classification	$74.76	50	$3,738.00	45	$3,364.20	40	$2,990.40								
Deliverable Production	$74.76	40	$2,990.40	50	$3,738.00	40	$2,990.40	50	$3,738.00	45	$3,364.20				
Meeting	$157.66											20	$3,153.20		
Reporting	$157.66													20	$3,153.20
TOTAL (Each Task):		161	$22,968.65	217	$42,968.65	179	$29,676.70	350	$54,903.80	275	$42,296.25	20	$3,153.20	20	$3,153.20
TOTAL (All Tasks Selected)*:		$199,120.45													
If all tasks are selected DMI will apply an additional 10% discount.															
TOTAL (All Tasks after discount)*:		$179,208.41													

Gencaga Aliyazioglu

Gencaga (Gen) Aliyazicioglu
Certified Photogrammetrist | CFO | Sr. Project Manager
Digital Mapping, Inc. (DMI)
21062 Brookhurst St, Suite 101
Huntington Beach, CA 92646
(714) 448-7534
gen@admap.com

G.) APPENDIX

G.1.) Key Personnel Resumes

Gencaga Aliyazicioglu-CFO, Certified Photogrammetrist, Sr. Project Manager

Mr. Gencaga Aliyazicioglu (Gen), our Senior Project Manager, will be the single point of contact for this project. Mr. Aliyazicioglu will oversee the entire project and team. Mr. Aliyazicioglu is a Certified Photogrammetrist (ASPRS Registration #R969) with over 40+ years of profound experience and technical understanding of geospatial and photogrammetric services. He has an MBA in Mechanical Engineering (1976) and a BS in Photogrammetric Engineering (1972) from Ohio State. Mr. Aliyazicioglu has extensive experience with all aspects of digital aerial mapping starting with the project management, flight planning, ground control frameworks, data compilation, post processing, aerial triangulation, ortho-production, LiDAR data collection and processing, GIS, and quality assurance of all project deliverables. Gen's role with DMI is supervising and overseeing the creation of Photogrammetry, LiDAR and Ortho projects. He is also in charge of staff and equipment allocation and his hands-on approach allows for the project to stay on schedule. He interacts with all project managers to ensure that all client requirements are met. Should any client concerns arise during the project he makes it his priority to address them in a timely-manner. Gen has completed a myriad of private, state, local and federal projects over four decades.

2019 Prado Basin and Upper Santa Ana Watershed Aerial Imagery (2019)

For our client, Orange County Water District (OCWD), DMI provided 3" pixel resolution 4 band digital orthophoto imagery of Prado Basin and Upper Santa Ana Watershed area. DMI flown approximately 84 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230) consist of 49 flight lines and 1248 exposures. Prior to flight DMI survey team established 44 ground control points to rectify imagery. DMI's staff completed the project within schedule. DMI provided uncompressed 4 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area. Mr Aliyazicioglu served as the project manager for this effort.

Color Digital Orthophotography of Orange County CA (2019)

For our client, Orange County Fire Authority (OCFA), DMI provided 3" pixel resolution digital orthophoto imagery of entire Orange County. DMI captured imagery for an area of approximately 1200 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230). Prior to flight DMI survey team established ground control points to be utilized in aerial triangulation of the imagery. DMI provided uncompressed 3 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area at various resolutions. Mr Aliyazicioglu served as the project manager for this effort.

Multiple Aerial Imagery, LiDAR and Photogrammetry Projects Throughout Nevada. (2006 - Current)

Mr. Aliyazicioglu has been serving as the project manager for SNWA projects since 2006. He oversees the project with constant communication with SNWA's project manager for milestone updates and successful deliverables. Over the years, these projects involved stereo-pair and LiDAR data acquisition, ground controls, post-processing of data, aerial-triangulation, ortho-rectification, LiDAR data sets and QA/QC of deliverables. Over the past 10 years, DMI has acquired over 10,000 square miles of aerial mapping, orthophoto and LiDAR data for SNWA.

Holy Fire Burn Area Impact Mapping – Digital Aerial Photography and Lidar DEM (2018-current)

For our client, Riverside County Flood Control and Water Conservation District, DMI has provided four aerial mission to acquire aerial imagery, Lidar data collection and deliver DEM data. DMI has flown the project area utilizing our state-of-the-art large format Digital Mapping Camera (DMCIIe230) and Optech Gemini LiDAR sensor. DMI delivered color imagery at 6"pixel resolution. Utilizing Lidar data (8 points per square meter) DMI also delivered QL1 accuracy level Digital Elevation Model (DEM). Final products were delivered in State Plane Coordinate (NAD 83). Mr Aliyazicioglu serves as the project manager for this effort.

Multiple Aerial Photography, LiDAR and Photogrammetry Projects throughout SoCal for SoCal & San Diego Gas (Southern CA) (2013 - 2016)

DMI has been contracted by Jacobs, PSOMAS & PSEP (since 2013) to provide aerial imagery, LiDAR and Photogrammetric Surveying of natural gas transmission pipelines throughout Southern California. Mr. Aliyazicioglu is responsible for the acquisition and creation of photogrammetry mapping of more than 1500 linear miles. Also, Mr. Aliyazicioglu is in charge of overseeing the creation and delivery of mapping projects at a scale of 1"=20', 1"=40', 1' Contours, 0.5' Contours, LiDAR Data, LiDAR DEM, 2" and 3" Color Digital Orthophoto. DMI utilized (2) two aircrafts, (2) two large format digital mapping cameras (DMC I, IIe 230) and an Optech LiDAR sensor, all equipped with ABGPS/IMU.

The City of Temecula - Digital Ortho Imagery and Lidar Photogrammetry Project (2018)

For our client, the City of Temecula, DMI has provided digital orthophotography and Lidar processing services for entire City of Temecula. DMI has flown the entire city approximately utilizing our state of the art large format Digital Mapping Camera (DMCIIe230) and Optech Gemini LiDAR sensor. DMI prepared digital orthophotos at 1" and 3" resolution. Utilizing Lidar data and aerial imagery DMI also delivered Digital Elevation Model (DEM), Digital Terrain Model (DTM), 1' interval topographic contours, building footprints, edge of pavement outlines and existing sidewalks.Final products were delivered in California State Plane Coordinate, Zone 6 (NAD 83) with FGDC compliant metadata. Mr Aliyazicioglu served as the project manager for this effort.

Multiple Aerial Photography, LiDAR and Photogrammetry Projects for Resource Strategies, Inc. (Various Locations Through Southern California) (2005 - Current)

Since 2005, DMI has delivered to RSI over 50 projects that include aerial imagery, LiDAR and photogrammetry. Gen worked with staff on delivering multiple RSI orthophoto, LiDAR datasets and mapping projects conducted throughout California. Mr. Aliyazicioglu and RSI continue to grow their 11-year relationship. DMI has flown and processed 50,000+ square miles of Imagery, LiDAR and Planimetric/topographic data for RSI.

High Resolution LiDAR data acquisitions for Association of Monterey Bay Area Governments (AMBAG) (Monterey, San Benito and Santa Cruz Counties) (2010-2011)

Mr. Aliyazicioglu served as project manager under this contract with AMBAG. He was responsible for providing Optech LiDAR data acquisitions for 1,723 square miles throughout Monterey, San Benito and Santa Cruz Counties. Mr. Aliyazicioglu managed the entire project while working with LiDAR and QA/QC managers to deliver metadata, raw point, classified point, and bare earth surface (DEM) to AMBAG. Also, Mr. Aliyazicioglu was responsible for client communication, milestone and delivery updates.

Topographic LiDAR Mapping & Digital Orthophotography (Fort Irwin, CA) (USACE St. Louis District) (2014)

As a subcontractor to Magnolia River Geospatial (MRG), Mr. Aliyazicioglu duties was working with Mr. Dillman (PLS) and MRG's Project Manager on the strategic placement of ground controls and LiDAR QA/QC Points. He also worked with Mr. Labitt (Chief Pilot) on flight planning in regards to the aerial imagery and LiDAR data acquisition. This project consisted of 1,473 square miles located in the Mojave Desert in Northern San Bernardino County, California. Mr. Aliyazicioglu also oversaw the asset allocation of our DMC and Optech LiDAR Sensor.

Other Orthophoto, Mapping & LiDAR Projects

- 2017 Socal & San Diego Gas Orthophoto
- 2017 Muddy & Virgin Rivers 4-Band Orthophoto
- 2016 Muddy & Virgin Rivers 4-Band Orthophoto
- 2016 USDA 1' Color Digital Orthophoto for Cibola National Forest
- 2016 Spring Valley Digital Orthophoto Imagery
- 2016 City of Modesto Aerial Imagery, 2D building foot print & 3D Layer project
- 2015-Mesa County, CO. 6" & 9" Color Digital Orthophoto
- 2015-Channel Islands Regional Geographic Information Systems, Inc. (CIRGIS) 3", 6" & 1' Orthophoto Project
- 2015 Garnet Valley 4-Band Orthophoto
- 2015 USDA 1' Color Digital Orthophoto for the Cibola National Grasslands
- 2015 Coachella Valley Association of governments 3" Color Digital Orthophoto

Dennis Dillman -California PLS # 5424

Dennis Dillman, DMI's lead-surveyor, is a Licensed Professional Land Surveyor in California with 40+ years of professional experience in land-surveying. He has been with DMI for 31 years and during this period, Mr. Dillman has completed several projects related to every area of his discipline. With his field experience and education at San Bernardino Valley College in land surveying, Mr. Dillman is considered an expert in boundary and retracement surveys. He has completed his certifications (PLS# 5424) In the construction field area of surveying and successfully completed jobs with several million yards of earthwork. Mr. Dillman has worked on multi-million dollar public works projects and thousands of subdivision lots throughout California, Arizona, and Nevada.

2019 Prado Basin and Upper Santa Ana Watershed Aerial Imagery (2019)

For our client, Orange County Water District (OCWD), DMI provided 3" pixel resolution 4 band digital orthophoto imagery of Prado Basin and Upper Santa Ana Watershed area. DMI flown approximately 84 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230) consist of 49 flight lines and 1248 exposures. Prior to flight DMI survey team established 44 ground control points to rectify imagery. DMI's staff completed the project within schedule. DMI provided uncompressed 4 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area.

Color Digital Orthophotography of Orange County CA (2019)

For our client, Orange County Fire Authority (OCFA), DMI provided 3" pixel resolution digital orthophoto imagery of entire Orange County. DMI captured imagery for an area of approximately 1200 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230). Prior to flight DMI survey team established ground control points to be utilized in aerial triangulation of the imagery. DMI provided uncompressed 3 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area at various resolutions.

USGS QL1 LiDAR Acquisition (QL-1) for the USDA (Happy Camp, CA) (2013-2014)

DMI was contracted in 2013-2014 by the USGS to conduct high point density aerial LiDAR acquisition of 500 square miles throughout Happy Camp, CA. DMI's Lead Surveyor, Dennis Dillman was responsible for the monitoring the capture of 250 ground controls and LiDAR NVA/VVA points throughout Happy Camp, CA. The LiDAR QA/QC (NVA/VVA) points Mr. Dillman captured were used as quality control to ensure the LiDAR data meet the project accuracies. **(Contract Amount: $223,250.00)**

Digital Orthophotography & 2D Building Foot Print in Mesa County, CO (2015)

DMI was contracted in 2015 to conduct an aerial orthophoto acquisition of 3,366 square miles throughout Mesa County, CO. Mr. Dillman was responsible for occupying thirty-one ground controls and utilizing existing monuments for the project. These ground controls were established within or near the AOI of the project. Mr. Dillman made every effort to keep these ground controls off private land and place them on public land. Also, Mr. Dillman placed the ground controls with sixty penny spike on dirt and a concreate nail and ten were set on pavement.

Topographic LiDAR Mapping & Digital Ortho in Yakima Training Center, WA(USACE St. Louis) (2015)

Mr. Dillman worked with military personal and MRI project manager on acquiring security clearance to place the aerial targets and LiDAR QA/QC check points for this project. He was in constant communication with Range Operations while on the military base placing the targets. Mr. Dillman was tasked with placing eighty-three aerial targets and eighty-three NVA/VVA LiDAR Check points throughout 1,126 sq. miles in Yakima, WA.

Boundary Survey for Smiling Construction in Perris, CA (2015)

DMI was contracted by Smiling Construction to conduct a boundary survey in Perris, California. Upon completion of the research to perform the boundary, Mr. Dillman located existing monuments in the field so that he could establish the boundary corners of the property. When all field work was completed, Mr. Dillman set the corners requested by the client and per the deeds recorded in Riverside County, CA. When all monuments were set Mr. Dillman recorded them in a record of survey recorded with the County.

Cengiz Yagcioglu-LiDAR Director, Project Coordinator

Mr. Cengiz Yagcioglu, our Senior Project Coordinator and LiDAR Director, will be responsible to project coordination within the firm to make sure project scope and deliverables meets requirements. Mr. Yagcioglu has more than 10 years of LiDAR processing experience and currently oversees LiDAR calibration production as well. He has an MBA from University of Southern California (USC) and BS in Mathematics (1999) from Koc University. Mr. Yagcioglu has extensive experience with all aspects of aerial data acquisition and processing starting with the project management, flight planning, post processing, LiDAR data collection and processing, GIS, and quality assurance of all project deliverables. He interacts with all project managers to ensure that all client requirements are met.

County of Tuolumne and Stanislaus National Forest Lidar Acquisition Project, County of Tuolumne CA (2019)

DMI performed ground surveying, aerial LiDAR data acquisition (QL1) and processing services covering an area of 2,500 sq miles in County of Tuolumne and Stanislaus National Forest Project area. Digital Mapping Inc.'s professional land surveyor identified, targeted, and surveyed 23 ground control points for LiDAR swath calibration as well as 92 check points in Vegetated and Non-Vegetated land cover classifications as an independent test of accuracy for this project. Aerial Acquisition was performed using Optech Galaxy ALTM 1000 LiDAR. DMI delivered calibrated unclassified LiDAR swath data, bare-earth classified LiDAR point cloud, Digital Elevation Model (DEM), Digital Surface Model (DSM) and Intensity Images as part of the project. Mr Yagcioglu acted as coordinator for this project and was also responsible for LiDAR data calibration of approximately 500 flight lines.

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For our client, Orange County Water District (OCWD), DMI provided 3" pixel resolution 4 band digital orthophoto imagery of Prado Basin and Upper Santa Ana Watershed area. DMI flown approximately 84 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230) consist of 49 flight lines and 1248 exposures. Prior to flight DMI survey team established 44 ground control points to rectify imagery. DMI's staff completed the project within schedule. DMI provided uncompressed 4 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area. Mr Yagcioglu served as the project coordinator for this effort.

Color Digital Orthophotography of Orange County CA (2019)

For our client, Orange County Fire Authority (OCFA), DMI provided 3" pixel resolution digital orthophoto imagery of entire Orange County. DMI captured imagery for an area of approximately 1200 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230). Prior to flight DMI survey team established ground control points to be utilized in aerial triangulation of the imagery. DMI provided uncompressed 3 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area at various resolutions. Mr. Yagcioglu served as the project coordinator for this effort.

Multiple Aerial Imagery, LiDAR and Photogrammetry Projects Throughout Nevada. (2006 - Current)

Mr. Yagcioglu has been serving as the LiDAR calibration expert for SNWA projects since 2006. He oversees the process with constant communication with project and department managers. Over the past 10 years, DMI has acquired over 10,000 square miles of aerial mapping, orthophoto and LiDAR data for SNWA.

Holy Fire Burn Area Impact Mapping – Digital Aerial Photography and Lidar DEM (2018-current)

For our client, Riverside County Flood Control and Water Conservation District, DMI has provided four aerial mission to acquire aerial imagery, Lidar data collection and deliver DEM data. DMI has flown the project area utilizing our state-of-the-art large format Digital Mapping Camera (DMCIIe230) and Optech Gemini LiDAR sensor. DMI delivered color imagery at 6"pixel resolution. Utilizing Lidar data (8 points per square meter) DMI also delivered QL1 accuracy level Digital Elevation Model (DEM). Final products were delivered in State Plane Coordinate (NAD 83). Mr Yagcioglu was responsible for LiDAR swath calibration.

Duncan Crowl – Orthophotography and GIS Manager

Duncan Crowl has over 32 years of professional experience (12 years with DMI) (ASPRS Member '86) and knowledgeable specifically with the photogrammetry and GIS industry. Mr. Crowl received his BS in Geography and Advanced GeoTechnical Mapping and Geomatics from California State University Fullerton. He has operated with a wide array of softcopy photogrammetry software and hardware systems. Most notably ImageStation, SoCET Set, ER Mapper, and Leica Photogrammetry Suite of products and solutions. His responsibilities include overall project administration, layout of photography and control, photogrammetry, DTM collection, GIS, CAD, digital and quality control quality assurance, technical development of new technologies. Also, Mr. Crowl is responsible for ensuring all requirements are met with highest quality and timely delivery.

2019 Prado Basin and Upper Santa Ana Watershed Aerial Imagery (2019)

For our client, Orange County Water District (OCWD). DMI provided 3" pixel resolution 4 band digital orthophoto imagery of Prado Basin and Upper Santa Ana Watershed area. DMI flown approximately 84 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230) consist of 49 flight lines and 1248 exposures. Prior to flight DMI survey team established 44 ground control points to rectify imagery. DMI's staff completed the project within schedule. DMI provided uncompressed 4 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area. Mr Aliyazicioglu served as the project manager for this effort.

Color Digital Orthophotography of Orange County CA (2019)

For our client, Orange County Fire Authority (OCFA), DMI provided 3" pixel resolution digital orthophoto imagery of entire Orange County. DMI captured imagery for an area of approximately 1200 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230). Prior to flight DMI survey team established ground control points to be utilized in aerial triangulation of the imagery. DMI provided uncompressed 3 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area at various resolutions. Mr Aliyazicioglu served as the project manager for this effort.

Multiple Aerial Imagery, LiDAR and Photogrammetry Projects Throughout Nevada. (2006 - Current)

Mr. Aliyazicioglu has been serving as the project manager for SNWA projects since 2006. He oversees the project with constant communication with SNWA's project manager for milestone updates and successful deliverables. Over the years, these projects involved stereo-pair and LiDAR data acquisition, ground controls, post-processing of data, aerial-triangulation, ortho-rectification, LiDAR data sets and QA/QC of deliverables. Over the past 10 years, DMI has acquired over 10,000 square miles of aerial mapping, orthophoto and LiDAR data for SNWA.

Holy Fire Burn Area Impact Mapping – Digital Aerial Photography and Lidar DEM (2018-current)

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CALTRANS Photogrammetric Services for California Department of Transportation (Statewide) (1988 - Current)

DMI has delivered over 100 photogrammetry mapping projects to CalTrans. Mr. Crowl is responsible for the CAD and GIS services provided to Caltrans. DMI provides Caltrans with 3D-DGN Topographic data at a scale of 1"=20' with .5-foot contour intervals, and DTM quality check were conducted for each project requested by Caltrans. DMI utilized Caltrans's SEED file and cell library to create topographic data with MicroStation.

National Trails Highway LiDAR/Photogrammetry project in San Bernardino County(San Bernardino County & Caltrans District 8) (2015)

As a subcontractor to Biggs Cardosa Associates, Mr. Crowl (DMI) was responsible with working with LiDAR, Ortho and Photogrammety technicians and supervisors to deliver Digital Topomap (1"=50' with 1' Contours) for 235 liner miles of roadway. Mr. Crowl ensured clear communication & detailed updates on the completed milestones for this project.

Color Digital Orthophoto of SoCal and San Diego Gas Transmission lines Throughout Southern California (Southern California) (2011- Current)

DMI was contracted by SoCal Gas & San Diego Gas (2011) to complete 1-foot color digital orthophoto of transmission lines encompassing 2,200 square miles throughout Southern California. Mr. Crowl was responsible for working with ortho-technicians, managing the data processing, orthophoto creation, quality control and quality assurance of the delivered data imagery. In 2016, DMI utilized our new (DMC IIe230) for data acquisition allowing for higher accuracy.

Multiple Aerial Photography, LiDAR, Photogrammetry and GIS projects for the Port of Long Beach (Long Beach, California)(1995 - Current)

Mr. Crowl is responsible for the GIS services provided to Port of Long Beach. DMI has performed photogrammetric services for 80% of the LA Harbor and Port of Long Beach. The aerial photography was flown at a photo scale of 1"=280'. He worked with DMI's staff to deliver digital topographic mapping data on MicroStation at a scale of 1" = 40', 1-foot contour intervals and digital orthophoto at 0.2' pixel sizes.

Hungry Valley SVRA Aerial Photo, LiDAR/Photogrammerty Project for the California State Parks (Gorman, CA) (2012)

DMI provided aerial imagery, LiDAR and LiDAR/Photogrammetry Services for the California State Parks. Mr. Crowl worked with Ortho, LiDAR, CAD & QA/QC technicians/managers to ensure a timely delivery of the LiDAR Data set (LAS Format), Digital Topomap (1"=40' & 1' CI), 3" CDOP GeoTIFF.

Gary Labbitt – Chief Pilot

Mr. Labbitt has over 36 years of experience in aviation management and as DMI's chief pilot, both in California and throughout the United States. He has been serving as chief pilot for DMI since 2001. Mr. Labbitt has gained extensive experience flying digital imagery and LiDAR acquisition missions. Mr. Labbitt brings over 18,000 hours of total pilot time, and a verifiable perfect safety record. He is competent and knowledgeable in flight operations management, with specific expertise in medium and large aircraft with digital and integrated avionics. Mr. Labbitt is responsible for evaluating all flight priorities and directing the firm's flight crews to ensure completion of all aerial photography, LiDAR hyperspectral, sensor services, flight planning, weather checks, aircraft staging, and coordination of aerial missions. Mr. Labitt also has extensive experience in performing aerial surveys within military controlled airspace.

2019 Prado Basin and Upper Santa Ana Watershed Aerial Imagery (2019)

For our client, Orange County Water District (OCWD), DMI provided 3" pixel resolution 4 band digital orthophoto imagery of Prado Basin and Upper Santa Ana Watershed area. DMI flown approximately 84 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230) consist of 49 flight lines and 1248 exposures. Prior to flight DMI survey team established 44 ground control points to rectify imagery. DMI's staff completed the project within schedule. DMI provided uncompressed 4 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area.

Color Digital Orthophotography of Orange County CA (2019)

For our client, Orange County Fire Authority (OCFA), DMI provided 3" pixel resolution digital orthophoto imagery of entire Orange County. DMI captured imagery for an area of approximately 1200 square miles utilizing our state-of-the-art large format Digital Mapping Camera's (DMCIIe230). Prior to flight DMI survey team established ground control points to be utilized in aerial triangulation of the imagery. DMI provided uncompressed 3 band imagery in GeoTIFF format together with compressed MrSID file covering entire project area at various resolutions.

Holy Fire Burn Area Impact Mapping – Digital Aerial Photography and Lidar DEM (2018-current)

For our client, Riverside County Flood Control and Water Conservation District, DMI has provided four aerial mission to acquire aerial imagery, Lidar data collection and deliver DEM data. DMI has flown the project area utilizing our state-of-the-art large format Digital Mapping Camera (DMCIIe230) and Optech Gemini LiDAR sensor. DMI delivered color imagery at 6"pixel resolution. Utilizing Lidar data (8 points per square meter) DMI also delivered QL1 accuracy level Digital Elevation Model (DEM). Final products were delivered in State Plane Coordinate (NAD 83).

3" Color Digital Orthophoto for the Coachella Valley Association of Governments (CVAG) (Central and Eastern Riverside County) (2015)

Mr. Labbit was in charge of acquiring approximately 1,200 square miles of aerial imagery with our DMC I. Aerial images were collected an altitude of 2400' AGL, to generate the orthophotography at a 3" resolution. Mr. Labbit utilized Intergraph Flight Management system to prepare flight plan and grouped flight lines ensuring complete stereo imagery cover. Mr. Labbit worked with DMI's aircrew on getting the necessary flight approvals to acquire the data. This project comprised of a variety of terrain from flat land to high mountains.

Mesa County Color Digital Orthophoto & Building Foot Print Project (Mesa County, CO) (2015)

DMI was contracted by Mesa County to conduct an Orthophoto project throughout Mesa County, CO. Mr. Labbitt worked with DMI's air crew on mobilizing our DMC I and DMC IIe230. He was tasked with acquiring 6" leaf off imagery in march and 9" summer imagery flight in July. Also, he was responsible for working on getting the necessary air space approvals and monitored the weather, sun angel and ground conditions daily.

Topographic LiDAR Mapping & Digital Orthophotography in Yakima Training Center, WA (USACE St. Louis District) (2015)

As a subcontractor to Magnolia River Geospatial (MRI), Mr. Labitt was responsible for working with Gen (DMI) and MRI's project manager, military personal on necessary airspace permits and flight plans for the aerial imagery and LiDAR Data acquisition. This project consisted of 1,126 square miles located in Yakima Washington. Mr. Labitt oversaw the asset allocation of our aircrew, Chieftain Piper Navajo, Digital Mapping Camera and Optech LiDAR Sensor for data acquisitions.

Multiple Aerial Imagery and LiDAR Projects for The Riverside County Flood Control and Water Conservation District (Riverside County, CA) (2007- Current)

DMI has been providing aerial imagery and LiDAR services since 2007. Mr. Labitt is responsible for coordinating flights with aircrews and mobilizing multiple sensors and aircrafts at a time. Mr. Labitt is also responsible with communicates with RCFC surveyors pre/post flight.

Multiple Aerial Photography, LiDAR & Photogrammetry Projects Throughout Nevada (2006 - Current)

Over the past 10 years, Mr. Labbit has flown and managed multiple flight crews over 10,000 square miles, to deliver digital orthophoto and LiDAR data to SNWA. Mr. Labbitt was responsible for acquire the aerial imagery and LiDAR data on time and within the current project specifications (i.e. sun angel, clear ground cover, cloud free). Also, managing multiple aircraft and flight crews. Mr. Labitt also worked on getting the necessary permit approvals to fly over down town Las Vegas, McCarran International Airport and surround military airspace.

Ahmet Aliyazicioglu - LiDAR Manager

Mr. Aliyazicioglu, DMI's LiDAR Manager, is responsible for LiDAR production, production scheduling, quality training of personnel. He manages projects from post-calibration through delivery using LP 360, AutoCAD, Geocue, TerraScan, TerraModeler, and MicroStation software. He has 21 years of experience (21 years with DMI), which include quality control and accuracy assessment of LiDAR data and the development of terrain products for GIS integration. He has received his BS. Mr. Aliyazicioglu has successfully lead LiDAR and GIS projects for a range of government agencies at the County, State level, and for Federal Agencies.

Aerial Imagery, LiDAR and Mapping Project for the-LADWP Owens Valley Solar Ranch (2013)

DMI was contract by Worley Parsons & LADWP in 2013 to conduct an aerial imagery, LiDAR and photogrammetry mapping project in Inyo County, CA. The project consisted of 16 square miles. Mr. Aliyazicioglu was responsible for working with compiler and LiDAR technicians on creating this multiple delivery project. Mr. Aliyazicioglu team completed the digital surface model (DSM) and digital terrain model (DTM) displaying 1' contours. Also, Mr. Aliyazicioglu ensured the successful delivery of the Digital Topo map and DTM (break line top/toe and 5' LiDAR grid) at mapping scale of 1"=40', 1' CI. In DGN, DWG & DTM-XML format.

LiDAR acquisition(QL-1) for the USDA Forest Service Region 5 (Happy Camp, CA)(2013-2014)

In 2013, DMI was contracted by the USDA to conduct a QL1 aerial LiDAR survey throughout 500 square miles in Happy Camp, CA. Mr. Aliyazicioglu was responsible for the processing and delivering of high point density LiDAR set. Mr. Aliyazicioglu managed the delivery of: All return point cloud, classified LiDAR data, SBET, LiDAR report, Bare-earth filter point cloud, DEM, first returns, LiDAR intensity image, meta data and vector data in shp/dgn file format.

USGS LiDAR (QL-1) Telemetry Project for NAVFAC (Ventura, Seal Beach, Fresno, CA)-(2015)

As a subcontractor to Cirtigen and NAVFAC, DMI was contracted to acquire USGS Quality Level One LiDAR data over 4 military properties. Mr. Aliyazicioglu worked with LiDAR technicians on the LiDAR data processing, data extraction, classification of the high point density data set. Mr. Aliyazicioglu utilize Geocue, Terrasolid, MicroStation to process and deliver the data. DMI delivered Metadata, raw point cloud, Breaklines, hydro flatting, bare-earth and classified point cloud.

USGS LiDAR (QL-1) LiDAR Acquisition for the State of Utah (2016)

In 2016, DMI was contracted by the State of Utah to conduct a QL1 aerial LiDAR survey throughout 718 square miles in Richfield Utah. Mr. Aliyazicioglu is responsible for managing the processing and delivery of the high points density dataset.

LiDAR data acquisitions for Association of Monterey Bay Area Governments (AMBAG) 2010-2011)

In 2010, DMI was contracted by the AMBAG to conduct an aerial LiDAR survey throughout 1,723 square miles in Monterey, CA and surrounding areas. Mr. Aliyazicioglu managed the LiDAR team and delivered to AMBAG: QL 2 LiDAR data, DEM, unclassified raw LiDAR data, Classification, TIN, Metadata, survey report. Hydro flattening, breaklines and LiDAR intensity imagery.

Aerial Imagery, LiDAR & Mapping Project for the West Valley Connector Project (Ontario, CA)(2016)

As a subcontract to David Evans & Associates Inc. DMI was contracted to collect aerial imagery, LiDAR data and LiDAR/Photogrammetry. Mr. Aliyazicioglu was responsible for the creating a Digital Topo map at a scale of 1"=40' with 1' CI on Caltrans CAD Library and DTM in MicroStation and InRoads Format.

Zeki Aliyazicioglu - QA/QC Manager

DMI's QA/QC Manager, Zeki Aliyazicioglu, brings over 21 years of professional experience, all with DMI, in the field of electrical engineering, digital orthophoto production with a strong background in computer programming skills in the following programming languages: C++, MS Visual C++, and Visual BASIC. He received his PhD in Electrical Engineering (1995), M.S. Electrical Engineering (1991) from Southern Methodist University. Dr. Aliyazicioglu is experienced in digital orthophoto production, photogrammetry, CAD and GIS mapping. His responsibilities include overall project quality control, quality work plans, deliverables, program support and new technologies. Mr. Aliyazicioglu is responsible for ensuring that all requirements are met with highest quality for a timely delivery to our clients; he brings experience in designing and implementing of geospatial information systems.

Multiple Color Digital Orthophoto Projects (CIR, RGB & 4-Band Imagery) for the Mojave Water Agency (Mojave, CA) (2008 - Current)

For this client, Mojave Water Agency, DMI has been providing RGB, CIR and 4-band aerial imagery for 3,500 square miles in Mojave, CA. Mr. Aliyazicioglu's responsibilities were the DMC project set-up, this includes management, verification of software, and QA/QC steps with staff. Mr. Aliyazicioglu also provided QA/QC assistance with staff to ensure seamless timely delivery of the 4-band imagery.

High Resolution Color Orthophoto, Planimetry and Contour's Project (Mountain View, Sunnyvale, Cupertino and Morgan Hill, CA) (2011)

DMI provided the professional services surrounding all Aerial Photogrammetry, Digital Topographic and Planimetric Mapping (1"=40' & 1'CI), Orthophotography, and Light Detection And Ranging (LiDAR) for multiple city limits and a landfill. Mr. Aliyazicioglu was responsible for ensuring that all planimetric data, text annotation, and adhereing to the existing city agencies symbology tables and cell libraries. Provided QA and QC of the 3" CDOP

Color Digital Orthophoto, LiDAR and Mapping for The SGSRP Alignment (SB and Riverside County, CA) (2014-2015)

DMI was contracted by PSOMAS & SPEC services to conduct aerial mapping for 16 miles. Mr. Aliyazicioglu QA/QC the imagery and digital topographic map and delivered the final project at a mapping scale of 1"=40' and 1' Contours in MicroStation format. Reviewed DTM data to ensure breaklines and mass points extended 2-3 points outside of the boundary.

High Resolution Aerial Photography, LiDAR and Mapping Project (Ventura, CA) (2015)

As a subcontractor to SPEC services and California Resource Production Corporation, DMI provided 3" Color Digital Orthophoto, and LiDAR DEM with 1' Contours for an area encompassing 100 square miles. Mr. Aliyazicioglu was responsible for providing with the quality assurance and quality control of the 3" Ortho and LiDAR deliverables. Mr. Aliyazicioglu reviewed the imagery to ensure there was no image distortion, correct overall color, no seam lines distortion, correct ortho-rectification and review the final RMSE check on image positional accuracy. He also QA/QC the LiDAR check points with the DEM to ensure the data was rectified to the ground per the required accuracy. Reviewed 1' contours to ensure they were fitting correctly with spot elevation.

On Call Imagery, LiDAR & Mapping Project for the Orange County Public Works (2014 - Current)

DMI was contracted by OCPW to conduct an aerial imagery, LiDAR and photogrametry survey. Mr. Aliyazicioglu was responsible for QA/QC of the 3" Color Digital Orthophoto, LiDAR DEM, LiDAR Classified points, breaklines and Digital Topomap (1"=40' & 1'CI). Programs used to QA/QC: Geoque, Image Station Geomedia, VrOne CAD Map.

G.2.) Licenses and Certifications

American Society for Photogrammetry and Remote Sensing

Having successfully demonstrated the requisite degree of technical knowledge and competence in the art and science of Photogrammetry, this is to attest that

Gencaga Aliyazicioglu

has met the minimum requirements for ethical conduct and professional practice as established by the Society for recognition as a

Certified Photogrammetrist (ASPRS)

and is therefore entitled to all rights and privileges thereunder

This grant of certification shall expire or be deemed inactive on Jan. 13, 2023
unless, by that date, the individual shall have successfully completed recertification

Certification Number R969 *Date Certified* Jan 13, 2018 *Original Certification Date* July 11, 1995

President *Chair, Evaluation Committee* *Executive Director*

STATE OF CALIFORNIA
DEPARTMENT OF
Consumer Affairs

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

THIS IS TO CERTIFY THAT PURSUANT
TO THE PROVISIONS OF CHAPTER 15, DIVISION 3 OF THE BUSINESS AND PROFESSIONS CODE

Dennis Herbert Dillman

IS DULY LICENSED AS A

LAND SURVEYOR

IN THE STATE OF CALIFORNIA, AND IS ENTITLED TO ALL THE RIGHTS AND
PRIVILEGES CONFERRED IN SAID CODE

WITNESS OUR HAND AND SEAL

CERTIFICATE NO. 5424

THIS 16 DAY OF March 1984

STATE BOARD OF REGISTRATION
FOR PROFESSIONAL ENGINEERS

Nicki Bendacquen
SECRETARY

Joel B. Klein
PRESIDENT

THIS CERTIFICATE IS THE PROPERTY OF THE STATE OF CALIFORNIA AND IN THE EVENT OF ITS SUSPENSION, REVOCATION OR INVALIDATION FOR ANY REASON IT MUST UPON DEMAND BE RETURNED TO THE STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

O1L-37 (REV. 2-80)

22957-3019-81 200 CAM • QSP

COOPERATIVE AGREEMENT BY AND BETWEEN

INLAND EMPIRE RESOURCE CONSERVATION DISTRICT

AND SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

THIS COOPERATIVE AGREEMENT ("***Agreement***") is entered into as of September 15, 2020 ("***Effective Date***"), by and between the San Bernardino Valley Municipal Water District, a municipal water district ("***VALLEY DISTRICT***"), and the Inland Empire Resource Conservation District, a special district ("***IERCD***"). IERCD and VALLEY DISTRICT are sometimes referred to individually as "***PARTY***" and collectively as "***PARTIES***".

RECITALS

A. The PARTIES seek to cooperate to complete aerial imagery and light detection ranging ("***LiDAR***") surveys in and around the San Bernardino National Forest to facilitate baseline mapping efforts related to nonnative plant mapping and management, fuels management, species modelling and other efforts related to improving the overall ecological health of the headwaters of the Santa Ana River Watershed. The data collected during the aerial imagery and LiDAR surveys will be processed as described in the Request for Proposals attached as ***Attachment 1*** to this Agreement and incorporated herein by reference. The survey and post processing of data collected during the survey constitute the "***PROJECT***".

B. The PARTIES now desire to provide for contracting by VALLEY DISTRICT for performance of the work on the PROJECT and reimbursement of a portion of the costs of such work by IERCD.

NOW THEREFORE, in consideration of the mutual promises contained herein, the PARTIES agree as follows:

AGREEMENT

1. VALLEY DISTRICT shall enter into an agreement with a qualified consultant for performance of the PROJECT work.

2. The IERCD agrees to reimburse VALLEY DISTRICT up to $96,000 ("***Maximum Reimbursement***") from its Regional Forest and Fire Capacity Block Grant for costs incurred by VALLEY DISTRICT to develop and implement the PROJECT.

3. VALLEY DISTRICT will submit one or more invoices to the IERCD, not later than sixty (60) days after the first anniversary of the Effective Date, for all PROJECT costs incurred and for which reimbursement is claimed under this Agreement. The IERCD will pay all undisputed PROJECT costs within thirty (30) days after receipt of any such invoice. VALLEY DISTRICT acknowledges and agrees that in no event shall VALLEY DISTRICT receive or have a claim of any kind for any payment in excess of the Maximum Reimbursement for any costs related to the PROJECT, except as expressly agreed in writing by the PARTIES.

4. VALLEY DISTRICT shall require any and all subcontractors used to implement the Project to extend the same level of indemnity protection to IERCD as is provided to VALLEY DISTRICT. Likewise, VALLEY DISTRICT shall require the same subcontractors to name IERCD as additional insured on the same insurance coverage for which VALLEY DISTRICT is named additional insured.

5. VALLEY DISTRICT agrees to provide IERCD all data collected as a result of the Project.

6. This Agreement contains the entire understanding between the PARTIES, and supersedes any prior understanding and/or written or oral agreements between them, respecting the subject matter of this Agreement. There are no representations, agreements, arrangements, or understandings, oral or written, by and between the PARTIES relating to the subject matter of this Agreement that are not fully expressed herein.

7. This Agreement may not be modified, altered, or changed in any manner whatsoever except by a written instrument duly executed by authorized representatives of both PARTIES.

8. If any provision in this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions shall nevertheless continue in full force without being impaired or invalidated in any way.

9. This Agreement shall be governed by and interpreted in accordance with the laws of the State of California, excluding any choice of law provision that would apply the laws of any other jurisdiction.

Any action taken to enforce this Agreement shall be maintained exclusively in the Superior Court of San Bernardino County, California. The PARTIES expressly consent to the exclusive jurisdiction of said court and agree that said court shall be the proper venue for any such action.

10. Neither PARTY may assign its rights and obligations hereunder, in part or in whole, to any third party without the prior written consent of the other PARTY, which shall not be unreasonably withheld.

11. Any notice to be given or to be served upon either PARTY hereto in connection with this Agreement must be in writing and shall be deemed to have been given and received: (a) when personally delivered; (b) two (2) days after it is sent by Federal Express or similar overnight courier, postage prepaid and addressed to the PARTY for whom it is intended, at that PARTY'S address specified below; (c) three (3) days after it is sent by certified or registered United States mail, return receipt requested, postage prepaid and addressed to the PARTY for whom it is intended, at that PARTY'S address specified below; or (d) as of the date of electronic mail transmission addressed to the PARTY for whom it is intended, at that PARTY'S electronic mail address specified below, and provided that an original of such notice is also sent to the intended addressee by means described in clauses (a), (b), or (c) within two (2) business days after such transmission. Either PARTY may change the place for the giving of notice to it by thirty (30) days prior written notice to the other PARTY as provided herein.

San Bernardino Valley Municipal Water District
Attn: Heather Dyer, General Manager
380 East Vanderbilt Way
San Bernardino, CA 92408
E-Mail: heatherd@sbvmwd.com

with a copy to:

Varner & Brandt LLP
Attn: Brendan W. Brandt
3750 University Avenue, Suite 610
Riverside, CA 92501
E-Mail: brendan.brandt@varnerbrandt.com

The Inland Empire Resources Conservation District
Attn: Mandy Parkes, District Manager
25864 Business Center Drive, Suite K
Redlands, CA 92374
E-Mail: mparkes@iercd.org

12. This Agreement is the result of negotiations between the parties hereto, and the advice and assistance of their respective counsel. The fact that this Agreement was prepared as a matter of convenience by the IERCD or VALLEY DISTRICT shall have no importance or significance. Any uncertainty or ambiguity in this Agreement shall not be construed against the PARTY that prepared it in its final form.

13. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same instrument. Signatures may be delivered electronically or by facsimile and shall be binding upon the PARTIES as if they were originals.

[*Signature Page Follows*]

IN WITNESS WHEREOF, the PARTIES have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By: _____
Heather P. Dyer
General Manager

INLAND EMPIRE RESOURCES CONSERVATION DISTRICT

By: _____
Mandy Parkes
District Manager

CONSULTING SERVICES AGREEMENT

This Consulting Services Agreement ("Agreement") is entered into to be effective as of September 15, 2020 ("Effective Date") by and between the following parties (sometimes referred to herein individually as "Party" and collectively as "Parties"): San Bernardino Valley Municipal Water District, a water district organized and incorporated under the California Municipal Water District Law of 1911 ("District"); and Digital Mapping, Inc. ("Consultant"). Consultant agrees to furnish certain professional architectural and engineering services to District, upon the following terms:

JOB NAME: Upper Santa Ana River Habitat Conservation Plan

JOB NUMBER: 1770

1. Term. The term ("Term") of this Agreement shall commence on the Effective Date and shall automatically terminate upon earlier of January 15, 2021, or the successful completion of Services, unless earlier terminated.

2. Consulting Services and Responsibilities. During the term of this Agreement, Consultant shall provide professional consulting services to the District, which shall include those services and activities specifically identified in the Consultant's proposal for the Project, or such other services requested by District, each of which is attached to this Agreement as Exhibit "A", and by this reference incorporated herein ("Services"). All Services provided under this Agreement shall be performed in a manner consistent with current industry standards by individuals who possess the proper skill and knowledge necessary to effectively complete the Services. The performance of all Services and obligations hereunder shall be made in accordance with all federal, state and local laws, rules, regulations or ordinances applicable to the Services or obligations.

3. Additional Services. In the event additional services, which are not specifically included in Exhibit "A", are desired or needed, Consultant shall identify and describe such additional services, including costs, schedule for completion and seek the written approval of District ("Additional Services"). The compensation paid to Consultant for such Additional Services shall be mutually agreed upon in writing by the Parties prior to the performance of the Additional Services. Consultant shall be solely responsible for the costs and expenses associated with any Additional Services, including Additional Services already performed, that have not been specifically agreed upon in writing by Consultant and District. As used in this Agreement, the term "Services" shall include Additional Services.

4. Compensation and Expenses.

4.1 Compensation. As compensation for the Services to be rendered by Consultant, District shall pay Consultant an amount based on the time and materials incurred by Consultant, inclusive of sub-consultants and miscellaneous expenses ("Compensation"), which amount shall not exceed one hundred seventy nine thousand two hundred eight dollars and forty

one cents ($179,208.41) ("Maximum Fee"). Consultant acknowledges and agrees that in no event shall Consultant receive or have a claim of any kind for any payment in excess of the Maximum Fee for any work, including Additional Services, performed under this Agreement, unless such amount exceeding the Maximum Fee is specifically approved in writing by District.

4.2 Invoices. Each month Services are rendered, Consultant shall deliver an invoice to District, for work actually performed, which shall include, at a minimum: (i) the project name; (ii) District's job number; (iii) Consultant's point of contact for billing questions; (iv) basis of billing; (v) total contract value; (vi) total billing to date; (vii) amount remaining in contract; and (viii) estimated percentage of completion at time of billing. Attached to each invoice, Consultant shall also include a monthly summary of work actually performed during the billing period. Provided there is no dispute with the invoice, District shall pay Consultant within thirty (30) days of receiving the invoice. In the event District disputes an invoice, District shall provide a written explanation of the dispute to Consultant within thirty (30) days of receiving the invoice. District and Consultant shall cooperate to resolve any disputed amount. District shall not be penalized for any reasonable dispute and shall not be obligated to pay any amount in dispute until a dispute has been resolved.

4.3 Expenses. District shall pre-approve in writing each reasonable and necessary expense that Consultant intends to seek reimbursement for, which expenses are directly related to the performance of the Services. If pre-approved, such expenses for reasonable and necessary travel, lodging, or miscellaneous expenses incurred in the performance of this Agreement will be reimbursed to Consultant in accordance with District's general reimbursement policy. Consultant shall submit an invoice of all incurred expenses accompanied by adequate supporting documentation or transaction receipts. Invoices that fail to include reasonable supporting documentation or receipts will not be honored and District will have no obligation of any kind to reimburse Consultant for such expenses.

5. Project Data. Consultant shall be exclusively responsible for obtaining from the appropriate sources, persons or third parties, all data and information necessary for the proper, timely and complete performance and satisfaction of the Services.

6. Work Product; Confidential Information.

6.1 Work Product. Consultant shall provide to District, and such other consultants or partners approved by District, all work product, works in progress or other deliverables developed from or associated with the Services or the Project. Aerial imagery and LiDAR acquisition will occur prior to October 15, 2020, unless otherwise coordinated with, and agreed upon in writing, by Valley District. Upon completion of the Services, Consultant shall provide all final work products described in Exhibit "A", in such forms acceptable to District. Consultant acknowledges that all work performed or prepared for District by Consultant hereunder, including without limitation all data, reports, models, working notes, drawings, designs, improvements, trademarks, patents, copyrights (whether or not registered or patentable) and specifications developed or prepared by Consultant in connection with, or related to such Services shall become the sole and exclusive property of District, unless specifically otherwise agreed upon

in writing by District and Consultant. Consultant hereby unconditionally assigns, transfers and conveys to District all rights, interests and claims of any kind related thereto, including copyright. Consultant shall promptly disclose such work product to District and, at the District's expense, perform all actions reasonably requested by District (whether during or after the Term) to establish and confirm such ownership (including, without limitation, executing any necessary assignments, consents, powers of attorney and other instruments).

6.2 Confidential Information. Consultant acknowledges that during the Term it may receive or have access to certain information, observations and data (including, but not limited to, trade secrets, designs, ideas, products, research, software, and financial data) concerning the business or affairs of District ("Confidential Information") which is, and shall remain the property of District. Consultant shall take all reasonably appropriate steps to safeguard Confidential Information and to protect it against disclosure, misuse, espionage, loss and theft. Consultant agrees that it shall not disclose to any unauthorized person or use for its own purposes any Confidential Information without the prior written consent of District, unless and to the extent that the Confidential Information becomes generally known to and available for use by the public other than as a result of Consultant's acts or omissions. Consultant shall deliver to District at the termination or expiration of the Term, or at any other time District may request, all memoranda, notes, plans, records, reports, computers and computer records, printouts and software and other documents and data (and copies thereof) embodying or relating to the Confidential Information, work product (as discussed in 6.1) or the business of District, which Consultant may then possess or have under its control. Neither party shall be liable for disclosure or use of Confidential Information which: (a) was known by the receiving party at the time of disclosure due to circumstances unrelated to this Agreement; (b) is generally available to the public without breach of this Agreement; (c) is disclosed with the prior written approval of the disclosing party; or (d) is required to be released by applicable law or court order (provided that Disclosing Party is given prompt written notice thereof and is allowed to exhaust all reasonable legal remedies to maintain the confidentiality of the information).

7. Records. All records, documents or other instruments evidencing all labor costs, payroll costs or other expenses incurred in connection with Consultant's performance of the Services shall be kept in a manner consistent with industry standards and practices and made available to District upon written request. Retention of the records contemplated by this Section 7 shall be retained for a period of no less than four (4) years from the date of final billing or termination of this Agreement, whichever shall first occur.

Consultant further agrees to maintain all design calculations and final work product on file in legible and readily accessible form. A copy of such material shall be available to District, at District's sole cost and expense, and the originals of such materials and items, including any additions, amendments or modification thereto shall not be destroyed by Consultant unless Consultant fails to object to such destruction upon District providing Consultant with sixty (60) days advance written notice, indicating that such material is scheduled to be destroyed.

8. Relations with Construction Contractor. Consultant shall not directly or indirectly communicate with or consult with any contractor utilized in the Project, except in the presence of or with the specific written consent of the District.

9. Independent Contractor.

9.1 Status. The Parties hereby acknowledge that in rendering the Services provided hereunder, Consultant shall be deemed to be an independent contractor and shall not be deemed in any way an agent, partner or joint venturer of the District. Consultant acknowledges and agrees that, as an independent contractor, it is solely responsible for the payment of any and all taxes and/or assessments imposed on account of payment to Consultant or the performance of Services by Consultant pursuant to this Agreement.

9.2 Agency Restrictions. Consultant understands and agrees that Consultant shall not represent itself to third parties to be the agent, employee, partner or joint venturer of the District. Furthermore, Consultant shall not make any statements on behalf of or otherwise purporting to bind the District in any contract or otherwise related agreement. Consultant further agrees and acknowledges that Consultant does not have the authority to and shall not sign any contract on behalf of the District or any of its subsidiaries or affiliates. Consultant shall not obligate the District or any of its subsidiaries or affiliates to do any other act that would bind the District or any of its subsidiaries or affiliates in any manner.

10. Further Assurances. Consultant shall furnish District with any documents or records that the District reasonably believes necessary to properly and timely carry out the Consultant's Services. District shall first tender written notice to Consultant regarding any documents or records that it reasonably believes necessary to properly carry out Consultant's Services. Consultant shall then have ten (10) days from the receipt of such notice to provide the District with the requested documents or records.

11. Abandonment or Termination. Agreement may be terminated by either Party upon ten (10) days written notice. In the event the Project is terminated or abandoned before completion of the Services, all Services of Consultant shall immediately terminate. In the event of termination or abandonment, Consultant shall be compensated for the Services in proportion to the amount of work actually completed as of the termination date or date of abandonment. Notwithstanding the foregoing, in the event of telephone notification to stop work, no further work shall be performed on any portion of the Project pending receipt of the written notification. The continuation of work after telephone notification to stop work, shall be at Consultant's sole cost and expense, without the right to seek any form of reimbursement.

12. Indemnification. Consultant shall indemnify, defend and hold harmless the District and its agents, officers, directors and assigns, from and against any and all claims, damages, loss and expense, including attorneys' fees, awards, fines, penalties, judgments or appeals arising out of or related to the performance of the Services, breach of this Agreement, any misrepresentations or any other claim arising out of or related to this Agreement. Consultant's indemnification

obligations contained in this Section 12 shall extend to all acts or omissions of its officers, employees, agents or representatives.

The indemnification responsibility of Consultant, with respect to the Services shall exist and continue regardless of the extent to which District may have reviewed and approved the Services performed by Consultant, except that Consultant shall not be responsible for claims attributable to the Services in any case in which the claim is attributable to a decision made by District with respect to which Consultant and District have specifically agreed in writing that District shall be the responsible party.

13. Liability and Insurance. Consultant shall assume responsibility and liability for any damage, loss or injury of any kind or nature whatsoever to any person or property, to the extent such damage, loss or injury was caused by or resulting from an error, omission or negligent or willful act caused by Consultant, its officers, directors, employees, agents or representatives in connection with the performance of the Services under this Agreement.

Consultant shall, at its sole cost and expense, maintain in effect at all times during the performance of the Services, the greater of: (i) the coverage and limits of insurance described herein; or (ii) such coverage and limits as is generally determined to be the general industry standards, which coverage shall be maintained with an insurance company licensed to do business in California and having a minimum A.M. Best rating of A-IX, or better, and under forms of policies satisfactory to District.

Consultant shall, at its sole cost and expense, procure and maintain in effect for the Term the following insurance policies, and to the extent permitted, naming District as an additional insured: (i) professional liability insurance, with policy limits of no less than $1,000,000 (combined single limit per claim and annual aggregate); (ii) workers' compensation insurance, in such amounts and coverage as required by law, and employer's liability insurance policy of at least $1,000,000 per occurrence; (iii) general liability insurance policy of at least $1,000,000 per occurrence, and in the aggregate $2,000,000; and (iv) automobile liability, or equivalent form, with a combined single limit of no less than $1,000,000 per occurrence; such insurance shall include coverage for non-owned and hired automobiles and owned. The workers' compensation policy must include a waiver of Consultant's right to recover from other endorsements.

Certificates evidencing such coverage and adding District as additional insured, where permitted, shall be delivered to District prior to the commencement of the Services by Consultant under this Agreement. Such insurance shall provide no cancellation unless thirty (30) days' prior notice of such cancellation is given to District or ten (10) days notice in the event of cancellation for non-payment of premium. Consultant agrees to timely pay the premiums as required and use its best efforts to maintain said insurance in effect for a period of at least two (2) years after completion of the Services under this Agreement.

14. Representations and Warranties. Each Party individually represents and warrants the following:

a. Each Party is duly organized, validly existing and in good standing under the laws of the state of formation or incorporation and has all requisite power and authority to conduct the business with which it conducts and proposes to conduct;

b. All action on the part of each Party necessary for the authorization, execution, delivery, and performance of this Agreement, and the consummation of the transactions contemplated herein, has been properly taken and obtained in compliance with applicable law;

c. Each Party has not entered into nor will either enter into any agreement (whether written or oral) in conflict with this Agreement or which would prevent a Party from performing its obligations under this Agreement; and

d. Each Party has the contacts and expertise, and will reasonably allocate its financial and time resources on a reasonable best efforts basis to enable it to perform its obligations hereunder.

15. Miscellaneous.

15.1 Entire Agreement. This Agreement constitutes the entire agreement between the Parties and supersedes any prior understandings, agreements, or representations by or between the Parties, written or oral, to the extent they have related in any way to the subject matter hereof.

15.2 No Third-Party Beneficiaries. This Agreement shall not confer any rights or remedies upon any person or entity other than the Parties and their respective successors and permitted assigns.

15.3 Succession. This Agreement shall be binding upon and inure to the benefit of the Parties named herein and their respective successors and permitted assigns.

15.4 Headings. The section headings contained in this Agreement are inserted for convenience only and shall not affect in any way the meaning or interpretation of this Agreement.

15.5 Notices. All notices, requests, demands, claims, and other communications hereunder will be in writing. Any notice, request, demand, claim, or other communication hereunder shall be deemed duly given two (2) business days after it is sent by registered or certified mail, return receipt requested, postage prepaid, and addressed to the intended recipient as set forth below:

If to District: San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408
Attn: Chris Jones
Telephone: (909) 387-9253

If to Consultant: Digital Mapping, Inc.
21062 Brookhurst St., Suite 101
Huntington Beach, CA 92646
Attn: Gencaga (Gen) Aliyazicioglu
Telephone: (714) 968-5459

15.6 Governing Law; Venue. This Agreement shall be governed by and construed in accordance with the domestic laws of the State of California without giving effect to any choice or conflict of law provision or rule (whether of the State of California or any other jurisdiction) that would cause the application of the laws of any jurisdiction other than the State of California. Venue for any suit, action or proceeding shall exist exclusively in the courts having jurisdiction over the County of San Bernardino.

15.7 Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original but all of which together will constitute one and the same instrument.

15.8 Waivers. No waiver by any Party of any default, misrepresentation, or breach of warranty or covenant hereunder, whether intentional or not, shall be deemed to extend to any prior or subsequent default, misrepresentation, or breach of warranty or covenant hereunder or affect in any way any rights arising by virtue of any prior or subsequent occurrence.

15.9 Amendment. Except as expressly provided otherwise herein, this Agreement may not be amended without the express written consent of both Parties.

15.10 Severability. Any term or provision of this Agreement that is invalid or unenforceable in any situation in any jurisdiction shall not affect the validity or enforceability of the remaining terms and provisions hereof or the validity or enforceability of the offending term or provision in any other situation or in any other jurisdiction.

15.11 Release of Information and Advertising. Consultant shall not, without the prior written consent of District, make any news release or other public disclosure regarding this Project.

15.12 Construction. The Parties have participated jointly in the negotiation and drafting of this Agreement. In the event an ambiguity or question of intent or interpretation arises, this Agreement shall be construed as if drafted jointly by the Parties and no presumption or burden of proof shall arise favoring or disfavoring any Party by virtue of the authorship of any of the provisions of this Agreement. Any reference to any federal, state, local, or foreign statute or law shall be deemed also to refer to all rules and regulations promulgated thereunder, unless the context requires otherwise. The word “including” shall mean including without limitation.

15.13 Attorneys' Fees. If any legal action is necessary to enforce or interpret the terms of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees, reasonable expert witness fees, costs, and necessary disbursements in addition to any other relief to which that party may be entitled.

IN WITNESS WHEREOF, the Parties hereby execute this Agreement on the date first written above.

DISTRICT:

San Bernardino Valley Municipal Water District, a water district organized and incorporated under the California Municipal Water District Law of 1911

By: _____

Name: Heather P. Dyer
(type)

Its: General Manager
(type)

CONSULTANT:

Digital Mapping, Inc.

By: _____

Name: _____
(type)

Its: _____
(type)

EXHIBIT "A"

[Insert Project Proposal and Identification of Services]