COST SHARING AGREEMENT FOR THE UPPER SANTA ANA RIVER WATERSHED SALT AND NUTRIENT MANAGEMENT PLAN BETWEEN SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT AND CITY OF RIVERSIDE

JULY 23, 2021

COST SHARING AGREEMENT FOR THE UPPER SANTA ANA RIVER WATERSHED SALT AND NUTRIENT MANAGEMENT PLAN BETWEEN SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT AND CITY OF RIVERSIDE

1. PARTIES

This Cost Sharing Agreement for the Upper Santa Ana River Watershed Salt and Nutrient Management Plan ("Agreement") is made and entered into this 23rd day of July, 2021, by and between the City of Riverside, a California charter city and municipal corporation ("Riverside") and San Bernardino Valley Municipal Water District, a municipal water district ("Valley District"), sometimes also referred to herein jointly as "Parties" or individually as "Party."

2. RECITALS

2.1 The Parties produce and serve water in areas including the upper Santa Ana River Basin (the "Upper SAR Basin"). The Parties have undertaken and will undertake various projects regarding basin management, recharge, production, service, and conservation of water in the Upper SAR Basin, which projects may have environmental impacts to salt and nutrient concentrations throughout the Upper Watershed and/or in local locations. Findings from the Salt and Nutrient Management Plan study will help mitigate any adverse effects on water quality and guide future basin management actions.

2.2 A Salt and Nutrient Management Plan ("SNMP") is a required document to permit and implement various water resource management projects in the Upper Santa Ana Watershed. The SNMP assesses any impacts with potential long-term basin-wide effects on groundwater quality that result from activities such as projects involving surface water, groundwater, imported water, and/or recycled water, as well as other salt/nutrient contributing activities, through regional groundwater monitoring.

2.3 The SNMP will benefit the region by facilitating and incentivizing stormwater capture and water reuse projects while assuring that such projects are implemented in a manner that fully protects beneficial uses and mitigates any adverse effects on water quality. The SNMP could also conclude that additional treatment facilities are unnecessary potentially saving the region millions of dollars.

3. AGREEMENT

In consideration of the foregoing recitals that are incorporated herein by this reference and the mutual terms and conditions herein, the Parties agree as follows:

3.1 Term. This Agreement shall be effective on the date of the last signature to this Agreement, and shall remain in effect until June 30, 2023, unless terminated earlier as provided

herein. The term of the Agreement may be extended until June 30, 2034 upon mutual agreement of the Parties. In the event of a material breach of this Agreement by any Party, this Agreement may be terminated upon a sixty (60) day written notice given by a non-breaching Party to the breaching Party. The sixty-day notice period shall be used by the Parties in an attempt to negotiate the resolution of disputes and remedy any breach. In the event of termination or expiration of this Agreement, the parties shall continue to pay invoices for any approved work up to the termination or expiration date, which has not yet been completed.

3.2 Contract Administration. Valley District shall retain Water Systems Consulting, Inc. ("W.S.C.") for the Upper Santa Ana River Watershed Salt and Nutrient Management Plan, and shall serve as contract administrator for the professional services agreement.

3.2.1 Services Agreement. The Scope of Work defined in the Professional Services Agreements ("PSA") between W.S.C and Valley District pertaining to this cost sharing are described in Exhibit 1, which is attached hereto and incorporated herein by this reference.

3.2.2 Project Parties Participation. Riverside and Valley District are among nine other agencies (as listed in Exhibit 2, which is attached hereto and incorporated herein by this reference) agree to participate in and each fund a certain percentage of such services. Riverside has agreed to fund Twenty Three Thousand Six Hundred and Fifty Four Dollars ($23,654.00) of the overall project cost. Valley District will invoice Riverside for costs and Riverside will pay those invoices approximately one month after receipt, in a total amount not to exceed Twenty Three Thousand Six Hundred and Fifty Four Dollars ($23,654.00).

4. GENERAL PROVISIONS

4.1 This Agreement and any dispute hereunder shall be governed by and construed in accordance with the internal laws, other than the choice of laws, of the State of California.

4.2 No failure or delay in exercising any right, power or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise thereof preclude any other or further exercise thereof or the exercise of any right, power or privilege hereunder.

4.3 This Agreement shall not be construed to amend or modify any other agreement between the Parties, which shall remain in all respects in full force and effect. This Agreement represents the entire agreement of the Parties in connection with the subject matter hereof and may be modified only in writing agreed to by all Parties. Further, this Agreement may be executed in counterparts.

4.4 The signatories hereto represent and warrant that they have been duly authorized to enter into this Agreement by the Party on whose behalf it is indicated that the person is signing and, by such signature, to bind such Party to the Agreement.

4.5 Any action at law or in equity brought by any of the Parties hereto for the purpose of enforcing a right or rights provided for by this Agreement shall be tried in a court of competent jurisdiction in the County of Riverside, State of California, and the Parties hereby waive all provisions of law providing for a change of venue in such proceedings to any other county.

4.6 Any notice required to be given hereunder shall be in written and shall be personally served or given by mail. Any notice given by mail shall be deemed given when deposited in the United States Mail, certified and postage prepaid, addressed to the Party to be served as follows:

To City of Riverside:

City of Riverside
Public Utilities Department
3750 University Avenue, 5th floor
Riverside, CA 92501
Attn: General Manager

To Valley District:

San Bernardino Valley Municipal
Water District
380 East Vanderbilt Way
San Bernardino, CA 92408
Attn: General Manager

4.7 Time is of the essence for each and every provision of this Agreement.

4.8 No action or failure to act by any Party shall constitute a waiver of any right or duty afforded such Party under this Agreement, nor shall any such action or failure to act constitute approval of or acquiescence in any breach thereunder, except as may be specifically provided in this Agreement or as may be otherwise agreed in writing.

4.9 This Agreement constitutes the final, complete, and exclusive statement of the terms of the agreement between the parties pertaining to the subject matter of this Agreement, and supersedes all prior and contemporaneous understandings or agreements of the Parties. No Party has been induced to enter into this Agreement by, and no Party is relying on, any representation or warranty outside those expressly set forth in this Agreement.

4.10 Each provision, term, condition, covenant and/or restriction, in whole and in part, of this Agreement shall be considered severable. In the event any provision, term, condition, covenant and/or restriction, in whole and/or in part, of this Agreement is declared invalid, unconstitutional, or void for any reason, such provision or part thereof shall be severed from this Agreement and shall not affect any other provision, term, condition, covenant and/or restriction of this Agreement, and the remainder of the Agreement shall continue in full force and effect.

4.11 The Parties acknowledge and agree that this Agreement is the product of mutual arms-length negotiations and accordingly, the rule of construction, which provides that the ambiguities in a document shall be construed against the drafter of that document, shall have no application to the interpretation and enforcement of this Agreement.

4.12 Titles and captions are for convenience of reference only and do not define, describe or limit the scope of the intent of the Agreement or any of its terms. Reference to section numbers are to sections in the Agreement unless expressly stated otherwise.

4.13 This Agreement shall be governed by and construed in accordance with the laws of the State of California in effect at the time of the execution of this Agreement.

4.14. The following exhibits attached hereto are incorporated herein to this Agreement by this reference:

Exhibit "1" – List of all Agencies Participating in Cost-Sharing for the Salt and Nutrient Management Plan.

.

Exhibit "2" – WSC Proposal for San Bernardino Valley Municipal Water District for the Preparation of a Salt and Nutrient Management Plan for the Upper Santa Ana River Watershed Groundwater Basin

5. **SIGNATURE CLAUSE**

The Parties hereto have caused two originals of this Agreement to be executed by their duly authorized representatives.

CITY OF RIVERSIDE, a California charter city and municipal corporation

By: _____
City Manager

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By: _____
Heather Dyer
General Manager

Attest:_____
City Clerk

Certified as to Availability of Funds:

By:_____
Chief Financial Officer

Approved as to Form:

By: _____
Susan Wilson,
Assistant City Attorney

Upper Santa Ana River Watershed Salt and Nutrient Management Plan

Water Systems Consulting Proposal

Total Proposal Cost - WSC		**$473,073**
Project Management:	$	123,693
Phase 1 Total (Tasks 1-5):	$	156,372
Phase 2 Total (Tasks 6-10):	$	193,008
SBVMWD 50% of Regional Planning Effort:	$	(236,537)
Balance of Project to Participates:	$	236,536

Revised Total Cost per Phase:		
Project Management:	$	61,847
Phase 1 Total (Tasks 1-5):	$	78,186
Phase 2 Total (Tasks 6-10):	$	96,504
	$	236,537

COST SHARING BY AGENCY

	Agency	Project Management	Phase 1	Phase 2	TOTAL PROPOSAL	Total (%)
1	Western Municipal Water District	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
2	City of Colton	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
3	City of Redlands	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
4	City of Rialto	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
5	City of Riverside Public Utilities	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
6	East Valley Water District	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
7	San Bernardino Municipal Water Department	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
8	San Bernardino Valley Water Conservation District	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
9	San Gorgonio Pass Water Agency	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
10	Yucaipa Valley Water District	$ 6,185	$ 7,819	$ 9,650	$ 23,654	10%
		$ 61,847	$ 78,186	$ 96,504	$ 236,537	100%

Actual Cost	$	-
Under Budget	$	(236,537)

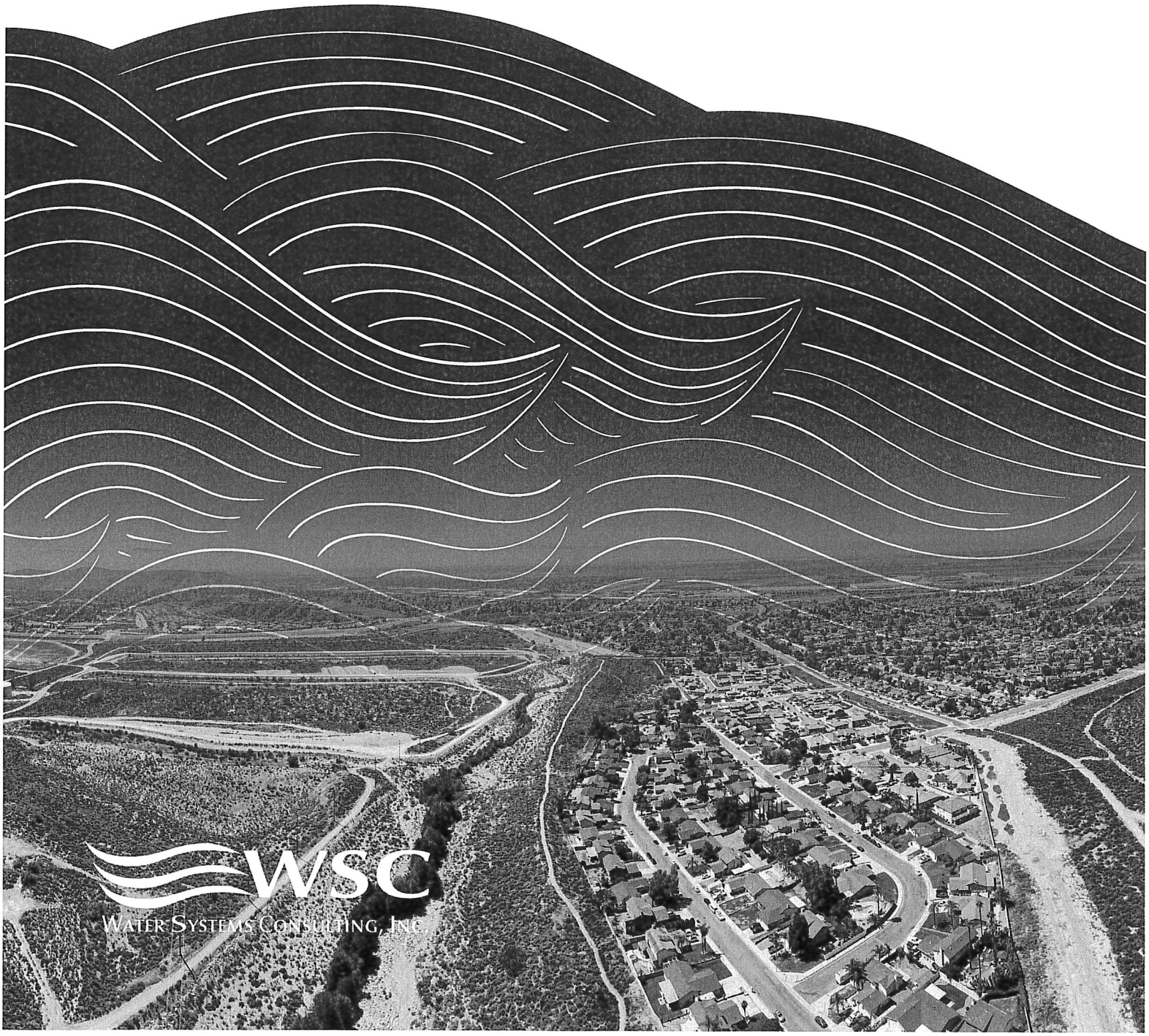
EXHIBIT "2"

WSC Proposal for San Bernardino Valley Municipal Water District for Preparation of a Salt and Nutrient Management Plan for the Upper Santa Ana River Watershed Groundwater Basins

SAN BERNARDINO Valley MUNICIPAL WATER DISTRICT

Preparation of a Salt & Nutrient Management Plan

for the **UPPER SANTA ANA RIVER WATERSHED GROUNDWATER BASINS**



WSC
WATER SYSTEMS CONSULTING, INC.

WSC
WATER SYSTEMS CONSULTING, INC.

Mr. Matt Howard
Water Resources
Senior Project Manager

San Bernardino Valley
Municipal Water District

380 East Vanderbilt Way
San Bernardino, CA 92408

(909) 387-9230
MattH@sbvmwd.com

Water Systems Consulting (WSC)

LOCAL OFFICE

9375 Archibald Ave.
Suite 200

Rancho Cucamonga,
CA 91730

P: (909) 483-3200

F: (909) 354-3482

Project Manager
Michael Cruikshank PG, CHG

(949) 528-0960, ext 601

mcruikshank@wsc-inc.com

F: (909) 354-3482

Principal in Charge
Jeff Szytel PE, MS, MBA

(805) 457-8833, ext. 101

jszytel@wsc-inc.com

PROPOSAL FOR PREPARATION OF A SALT AND NUTRIENT MANAGEMENT PLAN FOR THE UPPER SANTA ANA RIVER WATERSHED GROUNDWATER BASINS

Mr. Matt Howard

San Bernardino Valley Municipal Water District (Valley District) is seeking assistance in preparing a Salt and Nutrient Management Plan (SNMP) for the Santa Ana River Watershed Groundwater Basins.

Water Systems Consulting, Inc. (WSC), has partnered with LeClaire & Associates (L&A), Geoscience Support Services (Geoscience), and Woodard & Curran (W&C) for this project. Each member of our team brings expertise to the Valley District, its stakeholders, and the previous technical work that will be analyzed for this project. Together, we have unparalleled insight into the Santa Ana River Watershed groundwater basins and the experience to complete a project that achieves the Valley District's goals and exceeds your expectations.

The WSC team is poised to deliver:

A Quick Start. Through our work on the Ambient Water Quality Recomputation and Integrated Santa Ana River Model (Integrated SAR Model), we have and understand the data and model required to complete this project. This enables us to immediately begin work on this project and means that we do not need time to familiarize ourselves with the relevant studies, data, and tools. This will increase the value and effectiveness of the project through our unmatched insight into and familiarity with the prior work.

Stakeholder Buy-in. The WSC team has a long, productive history with the Valley District and its stakeholder agencies. Our strong, trusted relationships throughout the region will allow our team to effectively work together with the project's stakeholders to build consensus on key decision points. We have built those relationships by delivering valuable solutions for the stakeholder agencies. Two directly relevant examples are WSC's work developing the Ambient Water Quality Recomputation project, which will supply much of the data required for this project, and Geoscience's work developing the Integrated SAR Model, which will be used to evaluate projects.

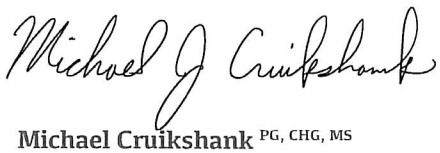
Regional Board Acceptance. This project is vital for the permitting of several important projects in the region, including the Sterling National Resources Center. The WSC team has successfully completed numerous projects that required Regional Board acceptance. We understand their requirements, have strong relationships with their staff, and will provide the information they need to make this critical project a success. The Regional Board's approval is a core pillar of our approach.

WSC is in significant agreement with the Consulting Services Agreement provided in the RFP. WSC has existing contracts with the Valley District and we are confident that we can quickly and efficiently come to mutually agreed upon terms.

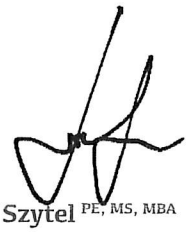
Members of our team live and work in watershed and recognize the stewardship of our resources by the Valley District and all of the stakeholders in the basin. We are proud to have contributed to the sustainable management of our groundwater supplies in the past and we hope to continue that work with this project.

Thank you for this opportunity to submit our proposal. We look forward to partnering with the Valley District on this important endeavor. Please do not hesitate to contact WSC's proposed Project Manager, Michael Cruikshank, or our proposed Principal in Charge, Jeff Szytel, if you have any questions.

Sincerely,
Water Systems Consulting, Inc.



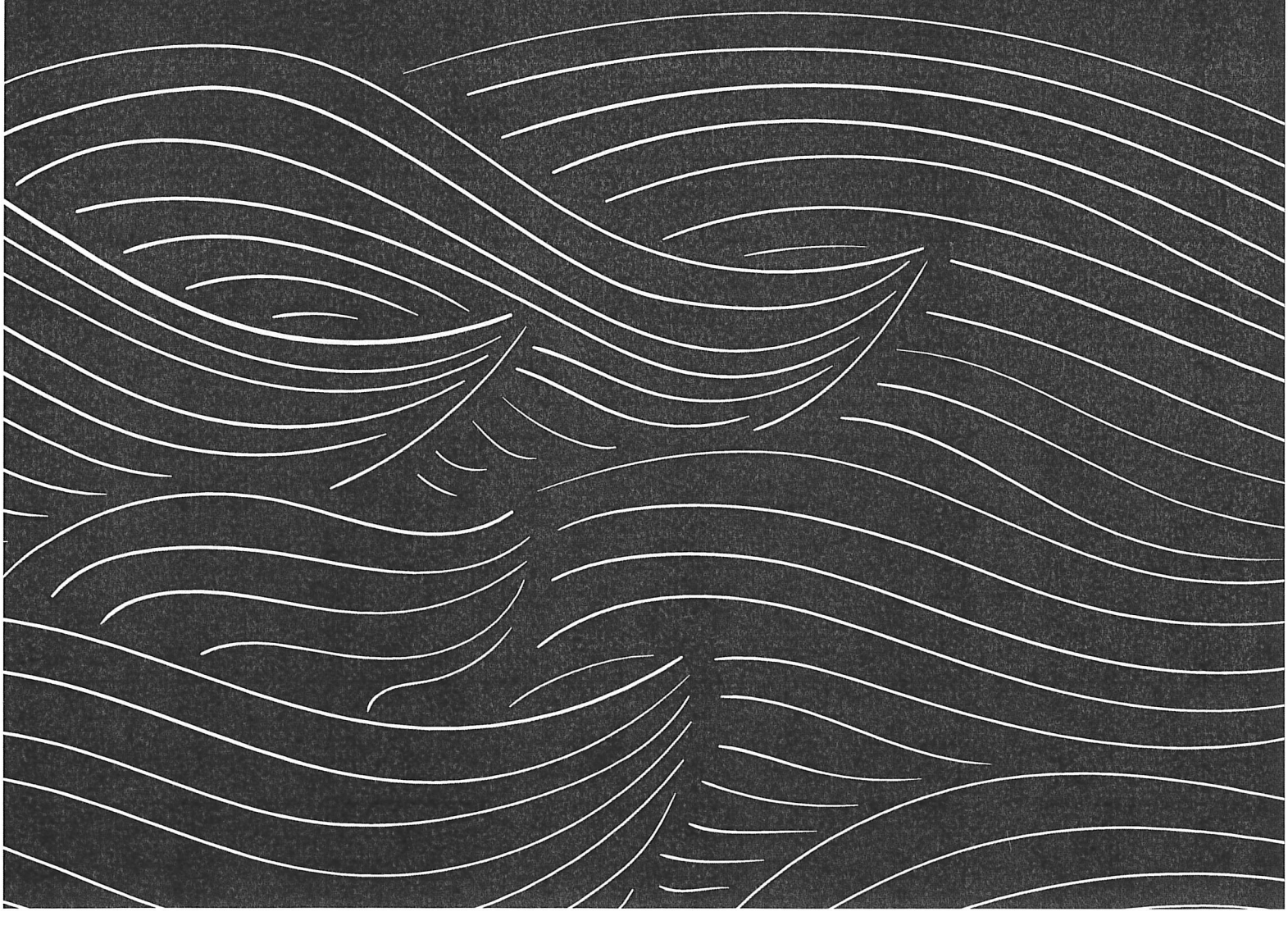
Michael Cruikshank PG, CHG, MS
Project Manager



Jeff Szytel PE, MS, MBA
Principal in Charge / WSC President

CONTENTS

1 PROJECT UNDERSTANDING



PROJECT UNDERSTANDING

Unmatched Local Knowledge

WSC and our partners LeClaire & Associates, Geoscience Support Services, and Woodard & Curran, are the premier groundwater experts in the Santa Ana River Watershed.

- Relationships First
- Tailored Innovation
- Holistic Solutions
- Unrelenting Performance

The San Bernardino Valley Municipal Water District (Valley District), on behalf of the Upper Santa Ana River Watershed Stakeholders and in cooperation with the Santa Ana Regional Water Quality Control Board, is developing a Salt and Nutrient Management Plan (SNMP) required to scientifically evaluate, permit and implement various water resource management projects in the San Bernardino Basin Area (SBBA). The overall objective is to develop a scientific framework where various projects and management strategies can be objectively evaluated for inclusion in the SNMP as viable projects that could enhance the water supply reliability in the region. The SNMP will evaluate the projects on an individual groundwater management zone basis (eg. Bunker Hill-A, Bunker Hill-B, Lytle, etc..) and a combined SBBA groundwater management zone.

Stakeholders in the region have invested in the development of Integrated Santa Ana River Model (Integrated SAR Model) for the Upper Santa Ana Valley Groundwater Basin and continue to improve and add functionality to the model. The model was built to support groundwater management in the Upper Santa Ana River and evaluate projects like the SNMP.

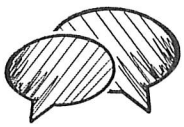
The SBBA Stakeholders include:

- Western Municipal Water District
- San Bernardino Valley Water Conservation District
- San Gorgonio Pass Water Agency
- City of San Bernardino Municipal Water Department
- Yucaipa Valley Water District
- East Valley Water District
- City of Riverside Public Utilities
- City of Redlands
- City of Rialto
- City of Colton
- County of San Bernardino Public Works
- Elsinore Valley Municipal Water District

The SNMP Stakeholders Must Achieve:

A Quick Start

The Integrated SAR Model that will be used for this project has been in development for more than two years and is sophisticated. Valley District needs a consultant that is confident using the model and interpreting the results. WSC's team includes Geoscience who is developing the model, which enables us to efficiently use the model.



Stakeholder Buy-In

This project presents an opportunity for the SBBA stakeholders to work together for the benefit of the entire region. Our understanding of their drivers and relationships with their staff enables this project to proceed smoothly and with buy-in from each party. WSC's team has a long history working in the region and bringing together this stakeholder group.

Regional Board Acceptance

Several projects are already underway that depend on this project being accepted by the Regional Board. Members of WSC's team have successfully worked with the Regional Board for more than 30 years and we have built strong relationships and understanding of their requirements.

Los Angeles, and
a of 2,840 square miles,
residents. The Santa
he watershed—96 miles
ear to its discharge
hows the upper portion
:h the Santa Ana River
depicts the Santa Ana
the total dissolved solids
with each GMZ that
ination. Locations of
are shown in Figure 1.

n Area (SBBA)

r Resources (DWR)
lowing basins/subbasins
- Watershed: 8-2.03
verside-Arlington;
)-Colton; 8-2.06
3-2.07 Upper Santa
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gure 1. The SBBA is an
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gencies overlying the
-om the SBBA per
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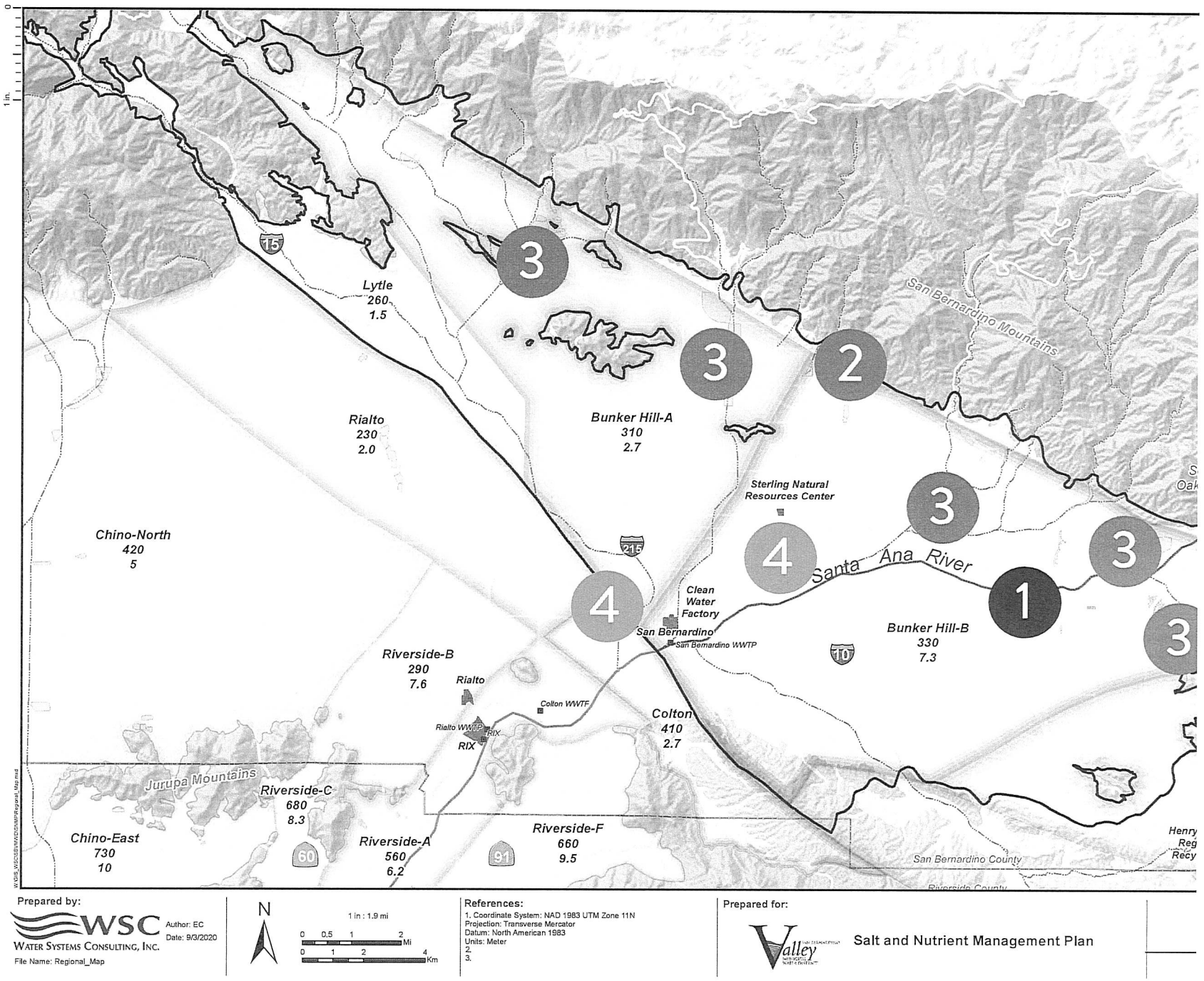
:t per year.

source agency in
their water on a
n. In light of potential
droughts; decreases in
n increased variability
pulation increases –
ely to develop strategies
ndence on imported
id recharge, and
ndscape irrigation, and

WSC develops accurate, informative, and well designed maps for the reports we create, such as the one below. These maps effectively convey important information

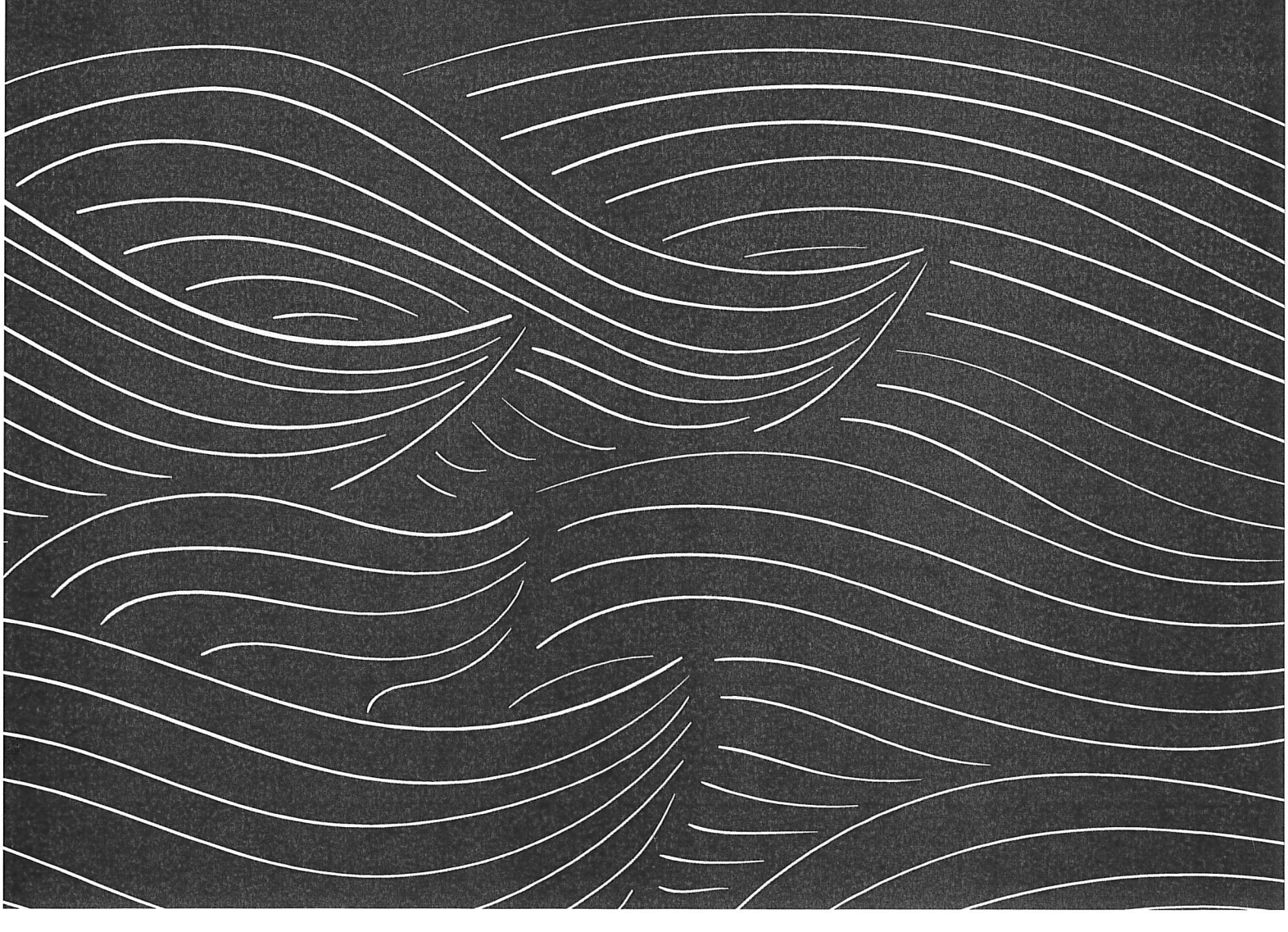


Salt and Nutrient Management Plans

California is part of an integrated water management approach that includes water
e of stormwater, aquifer storage and recovery, and other strategies to achieve a

Valley District, on behalf of the Upper Santa Ana River Watershed Stakeholders, is see
firm (or team of firms) to assist in the development of an SNMP for the SBBA. It is an

2 PROJECT APPROACH



PROJECT APPROACH

Expert Leadership & An Effective Approach

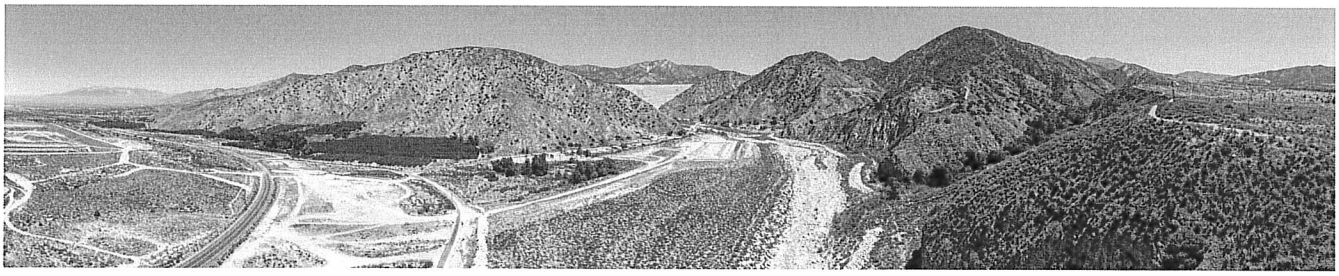
Our approach is designed to achieve stakeholder buy-in, Regional Board acceptance, and a get the project of to a fast start.

The WSC Team has the expertise to produce the technical information necessary to develop a Salt and Nutrient Management Plan for the SBBA. Our approach will create a quick start, stakeholder buy-in, and ultimately Regional Board Acceptance. These three pillars of our team's approach are summarized below and described in more detail within our proposal.

Our understanding is that the Valley District, and other stakeholders, would like to combine the following groundwater management zones (or portions of these GMZs) into a single SBBA groundwater management zone following Bulletin 118 basin boundaries. The thought process is that a larger SBBA GMZ would afford water resource managers more water management flexibility.

- Lytle GMZ
- Bunker Hill-A GMZ
- Bunker Hill-B GMZ
- A portion of the Yucaipa GMZ
- A portion of the San Timoteo GMZ

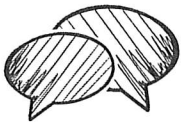
While not proposed to be included in the SBBA, the Rialto GMZ, the Colton GMZ and the Riverside-A GMZs will be included in the evaluation and analyses.



WSC's Approach Will Achieve:

A Quick Start

Our recent participation and leadership in the underlying technical work that will be used in Phases 1 and 2 of this project enables our team to immediately begin providing value to the Valley District and its stakeholders. WSC's team members have worked together on many projects in the past decade and are able to effectively collaborate and deliver.



Stakeholder Buy-In

Our approach considers the Valley District and its stakeholders' regional aspirations as well as their budget realities. We will draw upon our experience with each stakeholder — including our work with the Basin Monitoring Task Force — and our deep knowledge of the Santa Ana River Watershed to lead a collaborative process.

Regional Board Acceptance

We have built strong relationships with the Regional Board through our work on critical projects within the region — such as the Ambient Water Quality Recomputation, Nitrogen Loss Coefficient studies, and others. We will facilitate the iterative process with the Regional Board that gives the project a high likelihood of being approved.

The Integrated Santa Ana River Model is Integral to the Development of the SNMP

WSC Team member, Geoscience Support Services (Geoscience) was previously tasked by Valley District with constructing a groundwater flow model for the Upper Santa Ana Valley Groundwater Basin by integrating existing groundwater and surface water models. This model, known as the Integrated SAR Model, shown in Figure 2, was used as a management tool to determine what factors contribute to reduced streamflow in the SAR and to evaluate potential effects from proposed projects on streamflow and groundwater levels across the basin, including Upper SAR Habitat Conservation Plan (HCP) "Covered Activities". The flow model has been completed, and we are currently in the process of adding a solute transport model to simulate TDS and nitrate fate and transport.

The development of the SNMP includes compiling and analyzing historical observed storm water and imported water recharge data from 1978 through 2019. Since the Integrated SAR Model was calibrated monthly from January 1966 through December 2016, Geoscience has already obtained and is familiar with most of the required data. In addition, some of the projects from the SNMP project list have been included in the existing Model during our previous modeling efforts (e.g., simulation of HCP activities). These will allow us to execute the data analysis tasks efficiently.

Our Team proposes to utilize the Integrated SAR Model in Phase 2 of the SNMP development to:

- Estimate the probable effects of various planned recharge projects on ambient groundwater quality
- Evaluate localized water quality impacts on any drinking water supply wells and any potential effects on an affected agencies' ability to maintain compliance with the effluent limitations in their own discharge permits.
- Identify the advantages or disadvantages of potentially merging portions of all or some of the 8 GMZs (i.e., Bunker Hill-A, Bunker Hill-B, Lytle, Colton, Rialto, San Timoteo, Yucaipa, and Riverside-A) into a large single GMZ with boundaries that match those that DWR has established for the SBBA.

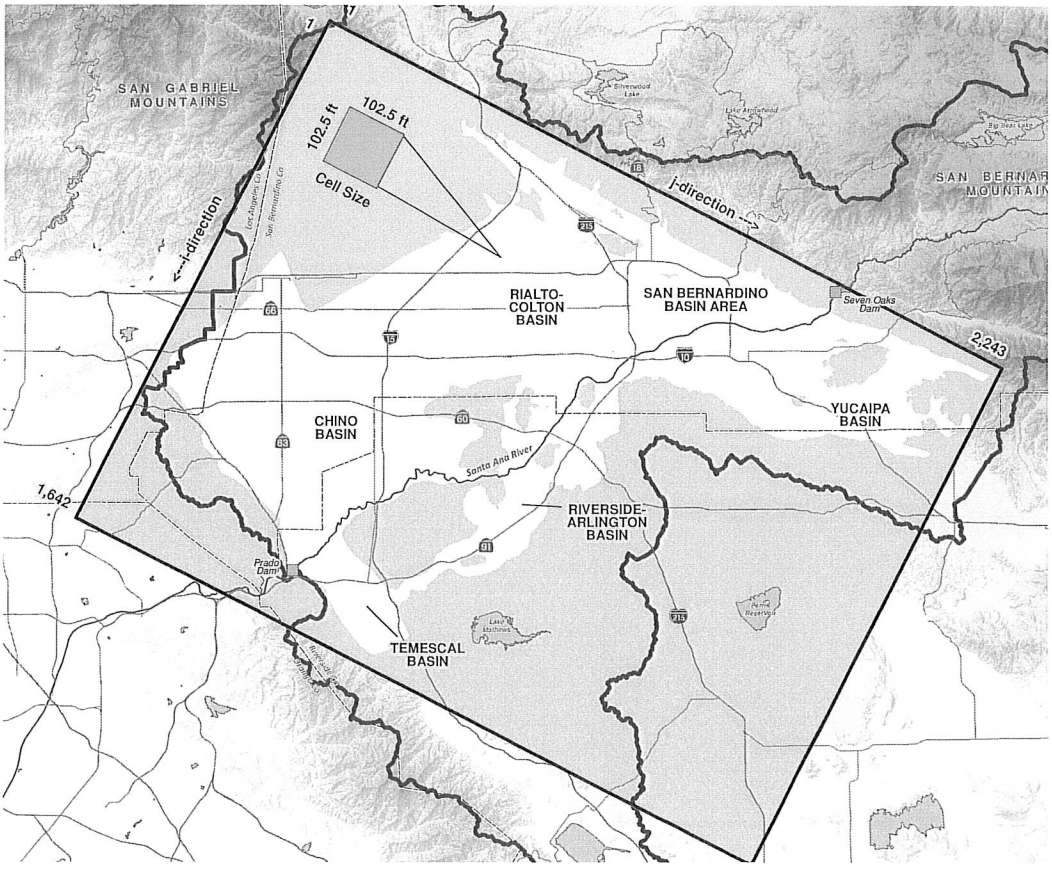


FIGURE 2: Integrated SAR Model Domain

Geoscience developed the Integrated SAR Model to be a management tool that can be used for projects like the Upper SAR HCP and the SNMP.

The Project Will Be Delivered in Three Phases

PHASE 1

The Phase 1 project approach will be to combine GMZs or portions of GMZs discussed above into a single GMZ. The estimate of current ambient water quality and ambient water quality in the historical or objective-setting period would be accomplished using the same methodology used in the original Phase 2A Total Inorganic Nitrogen/Total Dissolved Solids Study Task Order 1998-W-020 -1616-03.

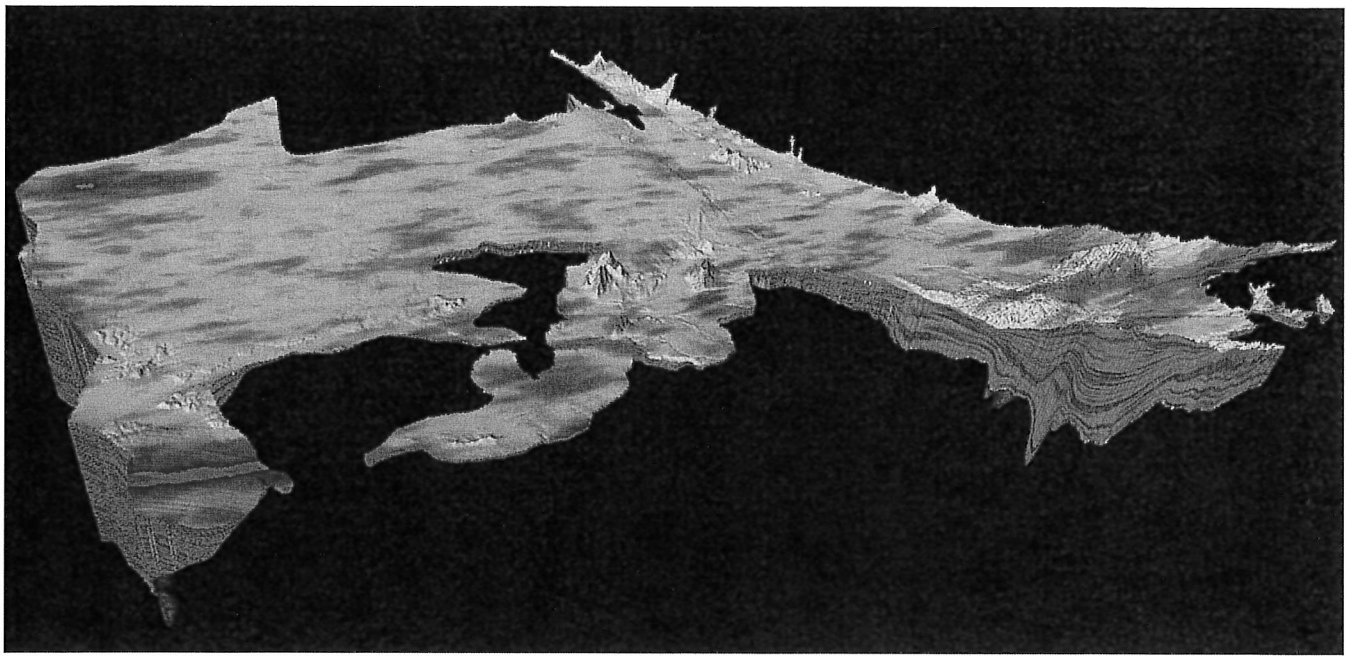
As noted above, the objective of this project is to determine if the combined SBBA would result in added regulatory options for increasing groundwater in storage through water reuse and stormwater capture projects.

PHASE 2

Geoscience has developed an integrated groundwater surface water model, the Integrated SAR Model, designed to evaluate projects in the region. Currently, Geoscience is adding a solute transport model which will be used to evaluate the water quality impacts to the underlying groundwater basins described in this RFP. This intimate knowledge of the model will allow our team to efficiently evaluate the projects identified during Phase 2.

FIGURE 2: INTEGRATED WATER QUALITY MODEL

As part of the model development, Geoscience developed a state of the art 3D lithogic model to accurately represent the complex geology of the Upper Santa Ana Watershed groundwater basins.



PHASE 3

Phase 3 will involve the development of a draft and final SNMP that, after review and concurrence from the stakeholders, will be submitted to the Regional Board for consideration of adoption. The components a state-approved SNMP must be included in the document submitted to the Regional Board including a programmatic California Environmental Quality Act (CEQA) review, a detailed description of the proposed projects, a surveillance and monitoring program, and any salt offsets or other mitigation commitments.

Scope of Work

TASK 0: PROJECT ADMINISTRATION

Our proposed Project Manager (PM), Michael Cruikshank, 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 solely responsible for the technical execution of the project, the quality of all deliverables, and the adherence to schedule and budget.

Task 0. Deliverables

- Monthly Invoices and Status Reports
- Updated Project Schedule
- Powerpoint Presentations

Phase 1: Water Quality Characterization

TASK 1: DEVELOP PROVISIONAL WATER QUALITY OBJECTIVES FOR THE SBBA GMZ

This project is intended to determine if merging certain GMZs into a single GMZ (the SBBA) and using the boundaries established in DWR Bulletin 118 would provide greater flexibility in managing the water resources in the SBBA and expanding the range of regulatory options. The RWP allows for the streamlining of permitting certain projects that will put more high quality in the basin through stormwater capture and the planned recharge of recycled water. Increasing groundwater storage in the SBBA will provide more resiliency and help to drought proof this portion of the watershed.

In order to make valid comparisons of current (1999 through 2018) ambient water quality (TDS and nitrate) with water quality in the historical or objective-setting period, a redetermination of water quality in the 1954 to 1973 period will be required, along with the current ambient water quality for the SBBA. The WSC team will use the new SBBA basin boundaries to delimit the project area. All of the requisite data should have been submitted to Santa Ana Watershed Project Authority (SAWPA) as part of the deliverables for each recomputation. The recomputation will use the rigorous methods and procedures developed in the Basin Monitoring Program Task Force and the Basin Plan. Note that all of the work to develop the water quality concentrations, groundwater levels and aquifer properties for the centroid of each 400 meter by 400-meter grid will be used verbatim in this project. The "raw" contours will be carefully examined to determine if any of the internal GMZs had contours depicting groundwater elevation, TDS concentrations or nitrate concentrations that were truncated at the internal GMZ boundaries. In cases where that is an issue, the WSC team will bring the required maps to the appropriate stakeholder meeting to discuss the implications of potentially recontouring.

Task 1.1: Data Inventory and Evaluation of Historical Data

WSC recently completed the 1999 – 2018 Ambient Water Quality Recomputation and is familiar with the datasets that have been developed over the past two decades. WSC reviewed the historical data included in the RFP and have identified the following steps to confirm and organize the datasets to complete Tasks 1-4:

- Take Inventory on all available data and identify which datasets will need to be converted from an old ESRI format
- Convert old ESRI format datasets to modern ESRI format datasets
- Organize data for Task 1.2, Task 1.3, and Task 2 to streamline workflow for each task

Before proceeding to Task 1.2, the WSC Team will prepare a proof of concept calculation using the 2018 AWQ data to determine the ambient water quality for both TDS and Nitrate for a combined Bunker-Hill A and B Management Zones. The determination is expected to show lower concentrations than if separated and most likely will be representative of the objective-setting period. Task 1.2 will perform the calculation over the SBBA boundary area for the objective setting period.

Task 1.2: Create Grid Extracts for SBBA GMZ from Historical Data

An initial review of the historical data revealed that the some of the data required to complete the Tasks is missing. Specifically, the grid extract data and TDS, Nitrate, and water level rasters from the 1954–1973 AWQ are missing. The Stakeholders should request this information from the Basin Monitoring Program Task Force. If the data request is unsuccessful, the data used to generate these files is included in the data set and can be used to generate the rasters and grid extract files from the historical data for the SBBA. For the purpose of this proposal, we have assumed that we would generate the information required to create the grid extract files and associated ambient water quality calculations.

The WSC Team will also incorporate the updated aquifer geometry and specific yield used in the Integrated Model in to the new SBBA GMZ grid extract data.

Task 1.3: Estimate Ambient Water Quality for 1954 to 1973 for the SBBA GMZ

The updated grid that will be created in Task 1.2 will be used to estimate the ambient water quality for the 1954 to 1973 time period for the volume-weighted TDS and Nitrate using the methods and procedures specified in the Basin Plan for the SBBA GMZ area.

Task 1. Deliverables

- Requisite tables, figures, maps, ArcGIS files/geodatabase
- Letter memorandum describing the work accomplished and the technical assessment of the work

TASK 2: ESTIMATE AMBIENT WATER QUALITY IN THE SBBA GMZ

Using the same methodology as in Task 1, 1954 to 1973: historical or the objective-setting period, the WSC team will conduct an analysis of TDS and nitrate ambient water quality for each of the assessment periods, listed below for the new SBBA GMZ:

- 1990 to 2009
- 1993 to 2012
- 1996 to 2015
- 1999 to 2018

The calculations must be performed using the same data, assumptions, contour map and grid cells that were previously accepted and approved by the Regional Board. Note that the historical TDS and Nitrate concentrations have already been computed and reported for each of the individual GMZs by the Basin Monitoring Program Task Force. This task is intended to perform similar computations for the larger SBBA GMZ (by merging portions of all or some of the small GMZs in the existing Basin Plan).

Task 2. Deliverables

- Requisite tables, figures, maps, ArcGIS files/geodatabase
- Powerpoint presentation

TASK 3: EVALUATE TRENDS IN WATER QUALITY AND QUANTIFY AVAILABLE ASSIMILATIVE CAPACITY

WSC will develop estimates of assimilative capacity in the SBBA GMZ by comparing the water quality objective with the computed current water quality for each of the periods outlined in Task 2. This is similar to work accomplished in the 2018 Ambient Water Quality Recomputation by WSC.

WSC will create time-series charts for current ambient TDS concentrations, current ambient nitrate concentrations, and groundwater in storage. We will also look up projected long-term trends in the data.

Task 3. Deliverables

- Requisite tables, figures, maps, MS Excel files
- Powerpoint presentation

TASK 4: IDENTIFY POTENTIAL AREAS OF SIGNIFICANT WATER QUALITY IMPAIRMENT FOR TDS & NITRATE

WSC will review the most recent 20-year assessment period (1999-2018) and will identify grid cells or drinking water supply wells that are close to or are exceeding thresholds shown in the table below:

Where Nitrate Concentrations:	Where TDS Concentrations:
exceed 10 mg/L	exceed or threaten to exceed 1,000
exceed 8 mg/L, but are less than 10 mg/L	exceed 750 mg/L, but are less than 1,000 mg/L
exceed 5 mg/L, but are less than 8 mg/L.	exceed 500 mg/L, but are less than 750 mg/L

WSC will prepare a draft technical memorandum that summarizes the methods and results from Tasks 1 through 4. The technical memorandum will include all of the necessary tables, graphs and maps to document Tasks 1 through 4. The stakeholder group will provide comments during a 14-day period after submission of the draft technical memorandum. During the comment period, the WSC team 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 of the WSC team – this table will be included in the final technical memorandum as an appendix.

Task 4. Deliverables

- Requisite tables, figures, maps, Microsoft Excel files
- Technical memorandum describing the work accomplished and the technical assessment of the work for Tasks 1-4.

TASK 5: DEVELOP SITE-SPECIFIC NITROGEN-LOSS COEFFICIENTS FOR THE SBBA

Water resource agencies in the Santa Ana watershed signed an Agreement to form a Task Force to conduct a watershed total inorganic nitrogen (TIN)/TDS resources study: ***Monitoring Program for Nitrogen and Total Dissolved Solids in the Santa Ana River Watershed.*** Task 1 of the Phase 2A Study (November 1998) authorized the Task Force to retain consultants to conduct the total inorganic nitrogen/TDS study task order: to develop surface water translator for meeting groundwater objectives account for nitrogen losses during percolation (Nitrogen-Loss Coefficient). It is well documented that losses of TIN occur through soil aquifer treatment (SAT) in anoxic systems. Much of the nitrogen loss occurs in the schmutzdecke, a naturally-developed biological layer formed on the surface of slow sand filters and recharge basins. The schmutzdecke is the layer that provides the majority of the water purification in potable water treatment.

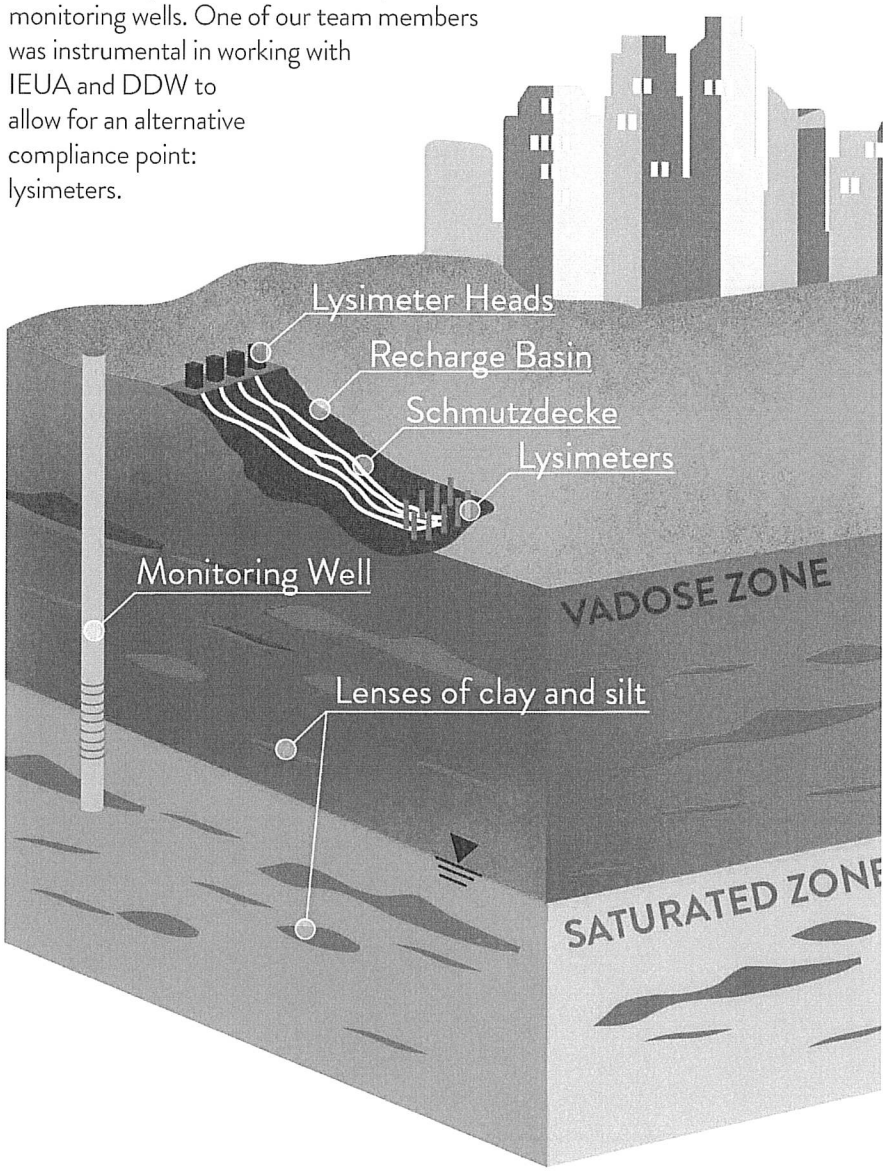
Four studies were proposed for the Phase 2A Nitrogen Loss Coefficient study: Anaheim Lake, Hidden Valley Wetlands Enhancement Program, Rapid Infiltration/Extraction (RIX); and the Redlands discharge ponds (deferred from, but the subsequent study was performed outside of the Task Force processes.) "The City of Riverside also presented data to the Task Force regarding nitrogen transformation and losses associated with wetlands. These data support a nitrogen loss coefficient of 50%, rather than 25%, for the lower portions of Reach 3 of the Santa Ana River that overlie the Chino South groundwater management zone. In fact, the data indicate that nitrogen losses from wetlands in this part of Reach 3 can be greater than 90%. However, given the limited database, the Task Force again recommended a conservative approach, i.e., 50% in this area, with confirmatory monitoring."

"Eastern Municipal Water District also presented data that support a 60% nitrogen loss coefficient in the San Jacinto Basin [Ref 10F]. This 60% nitrogen loss is only applicable to discharges to the following management zones that overlie the San Jacinto Basin: Perris North, Perris South, San Jacinto Lower Pressure, San Jacinto Upper Pressure, Lakeview-Hemet North, Menifee, Canyon and Hemet South."

IEUA has conducted N-Loss Studies in the Chino Basin Chino Basin Recycled Water Groundwater Recharge Program – About 10 basins with Alternate Monitoring Programs. Lysimeter testing/monitoring was first approved for use during the initial startup program and negotiations with Division of Drinking Water (DDW) participated in by one of the WSC team members, Joseph LeClaire. This team member is also currently working on the Declez Basin First Year Operations Report (FYOR) for IEUA and the current (2020) RIX N-Loss Study for the City of San Bernardino Municipal Water Department. The Redlands discharge basin report, written by a WSC team member, will be located and will satisfy the requirement for assessing N-Loss Coefficients at the Redlands Ponds.

FIGURE 3: MONITORING ESTIMATING NITROGEN LOSS COEFFICIENTS IN RECHARGE BASINS

Lysimeters are an innovative technique for sampling percolating recharge water in the vadose zone. Lysimeters are typically installed add at 5, 10, 15, 25 feet below the bottom of the recharge basin. There is a 100% certainty that the water that is being collected from the lysimeter is recharging water from the basins, with the exception of imported water and diverted stormwater. There is far less certainty when attempting to install a monitoring well in a groundwater mound somewhere near the vicinity of the recharge basin. Especially given the tortuous path of recycled water from the basin to the water table especially when the depth to water is a few to several 100 feet. In addition, the drilling and insulation of lysimeters is far less expensive than dedicated monitoring wells. One of our team members was instrumental in working with IEUA and DDW to allow for an alternative compliance point: lysimeters.



Following are potential sites from the RFP:

1. Reach 4 of the Santa Ana River below the RIX and Rialto outfalls
2. San Timoteo Creek below the Yucaipa Valley Water District and City of Beaumont outfalls
3. San Bernardino Water Conservation District's recharge basins adjacent to Reach 5 of the Santa Ana River The City of Redlands recharge basins adjacent to Reach 5 of the Santa Ana River
4. The streambed(s) downgradient of the Sterling Natural Resource Center's (SNRC) outfall and the losses expected to occur if the SNRC effluent were discharged to Redlands existing percolation ponds
5. Reach 3 of the Santa Ana River below the 60 Freeway

The WSC team will determine the efficacy of estimating N-Loss Coefficient given various site conditions at the proposed study sites, including proximity to a source of recycled water, historical and current monitoring programs (RIX is using existing data as a surrogate for nitrogen losses in the River); and concerns about vandalism/site security.

Task 5. Deliverables

- Workplan
- Requisite tables, figures, maps, Microsoft Excel files
- Powerpoint presentation

Task 5.1 Develop a Workplan for Approval by Regional Board

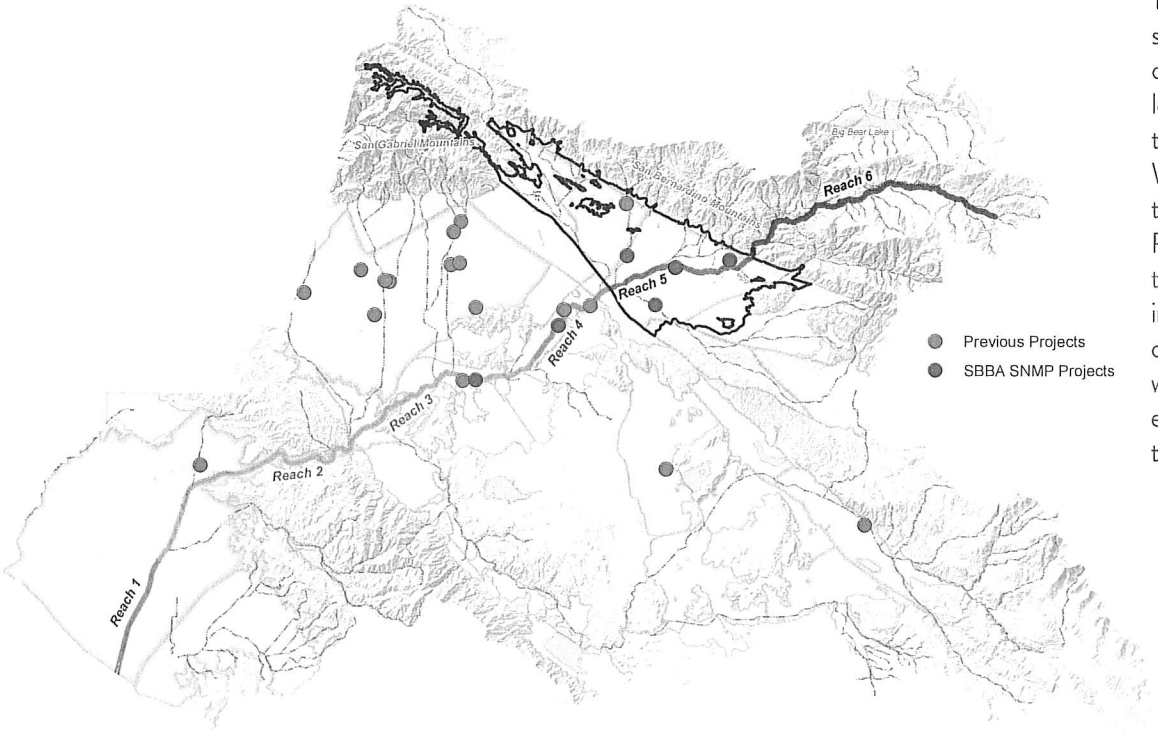
In Task 5.1; the WSC team will develop a work plan that describes the unique conditions at each of the proposed sites and answers the following questions: (i) Can existing data be used for any of the proposed sites? (ii) Similar to IEUA and RIX? (iii) Can existing reports be cited?

Studies of the estimation of N-Loss will follow the priorities:

- The availability of existing reports.
- The availability of existing data.
- Current monitoring program: collection of samples from the study areas (currently, no recycled water recharge program).
- No current monitoring program: collection of samples from the study areas (currently, recycled water recharge program).

The work plan will include a cost estimate and a schedule. The workplan would be proposed to be implemented in parallel with Phase 2. Task 5 does not include any field studies to collect nitrogen loss data in this phase. The data collection phase will occur after the workplan has been approved by the stakeholders and the Regional Board.

FIGURE 4: Location of Previous Nitrogen Loss Studies Completed in the Santa Ana Watershed



The map to the left shows the location of previous nitrogen loss studies within the Santa Ana River Watershed in relation to the Santa Ana River and SBBA and the projects identified in Task 5. Members of the WSC Team were involved in the evaluation in many of the previous studies.

Phase 2: Project Planning and Impact Analysis

TASK 6: SUMMARIZE THE VOLUME AND QUALITY OF IMPORTED WATER RECHARGED IN THE SBBA

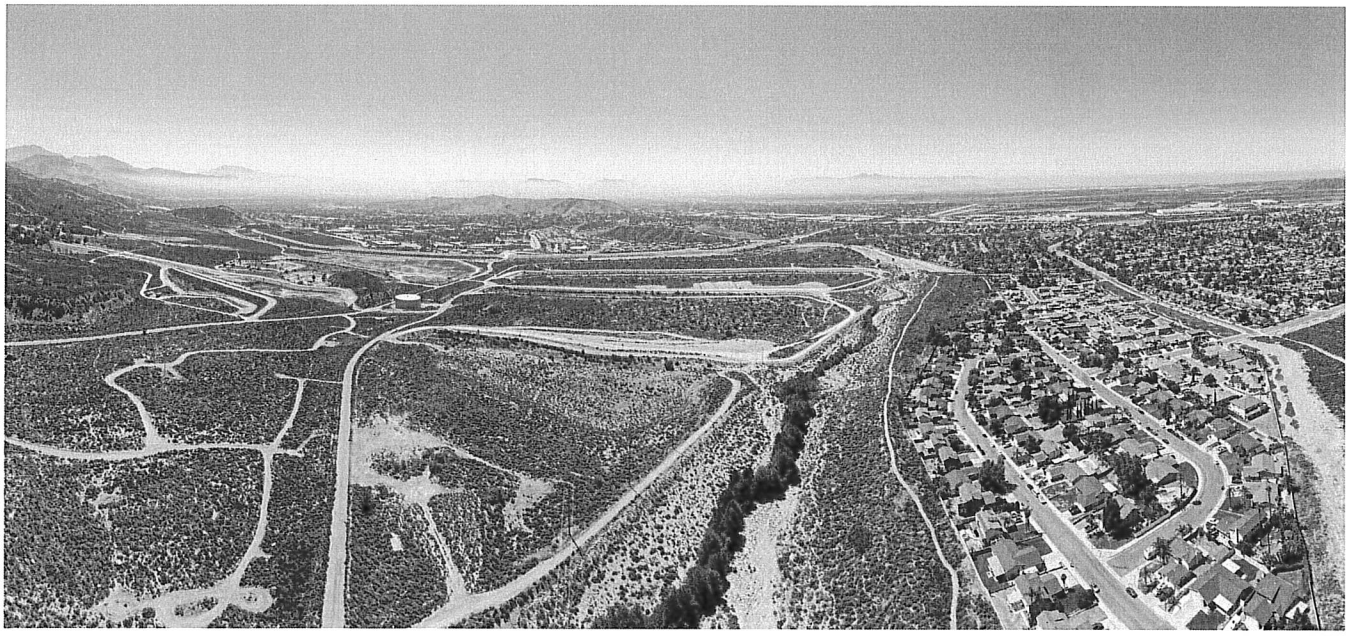
As discussed previously, one of the WSC team members, Geoscience, has developed the Integrated SAR Model for the stakeholders in the upper portion of the Santa Ana River Watershed. The model domain covers the study area in its entirety, as well as groundwater basins downgradient of the SBBA Area. Metropolitan Water District has tables that provide monthly information on the general mineral and physical analysis of Metropolitan's water supplies (Table D)[3]. Metropolitan's Table D includes water quality data for source waters[4], and treatment plant effluents[5].

Based on Table D data, the WSC team will estimate the volume-weighted annualized average concentrations for TDS and nitrate for the period 1978 through 2019. These calculations will be associated with the appropriate source water or water treatment plant effluent. Volume-weighted TDS and nitrate will also be calculated as the moving 5-year, 10-year, and 20-year averages. Electronic data will be provided in an appendix. All requisite tables and figures (map data and time-series data) will be prepared.

The volume-weighted average concentrations of TDS and nitrate will be compared to the eight GMZs as well as the redefined SBBA GMZ – both the current ambient water quality and the historical or the objective setting period. An estimate of the change (more or less than) in computed assimilative capacity will be developed. This is a proxy for future estimates of the effect of additional recharge of State Water Project water to the SBBA.

The final results from Task 6.0, along with the final results from Task 7.0, will be documented in Phase 2 Technical Memorandum No. 1, which is described in detail under Task 7.2.

Valley District receives State Water Project at the Devil Canyon and the Devil Canyon Spreading Grounds can be used to spread State Water Project and stormwater.



[3] Table D includes: Silica (mg/L), Calcium (mg/L), Magnesium (mg/L), Sodium (mg/L), Potassium (mg/L), Carbonate (mg/L), Bicarbonate (mg/L), Sulfate (mg/L), Chloride (mg/L), Nitrate (mg/L), Fluoride (mg/L), Total Dissolved Solids (mg/L), Total Hardness as CaCO3 (mg/L), Total Alkalinity as CaCO3 (mg/L), Free Carbon Dioxide (mg/L), pH Specific Conductance (µS/cm), Color (CU), Turbidity (NTU), Temperature (°C), Bromide (mg/L), Total Organic Carbon (mg/L), Saturation Index, and State Project Water (%).

[4] Lake Havasu , San Jacinto Tunnel , Lake Mathews , Castaic Lake , Silverwood Lake, Lake Perris , Diamond Valley Lake, Lake Skinner.

[5] Weymouth , Diemer, Jensen, Skinner, and Mills.

TASK 7: SUMMARIZE THE VOLUME AND QUALITY OF STORMWATER CAPTURED BY ACTIVE RECHARGE PROJECTS IN THE SBBA

Task 7.1 - Summarize the Volume and Quality of Stormwater Captured by Active Recharge Projects in the SBBA

Similar to the imported water recharge analysis conducted under Task 6.0, Task 7.0 includes compiling observed or model-simulated stormwater captured data for historical stormwater projects. The project team will (i) estimate the volume of water that is purposely diverted and recharged in stormwater recharge ponds; (iii) estimate the volume-weighted annualized average concentration of TDS and nitrate in captured stormwater from 1978 thru 2019; and (iv) calculate and graph the rolling 5-year, 10-year, and 20-year volume weighted average TDS and nitrate concentrations.

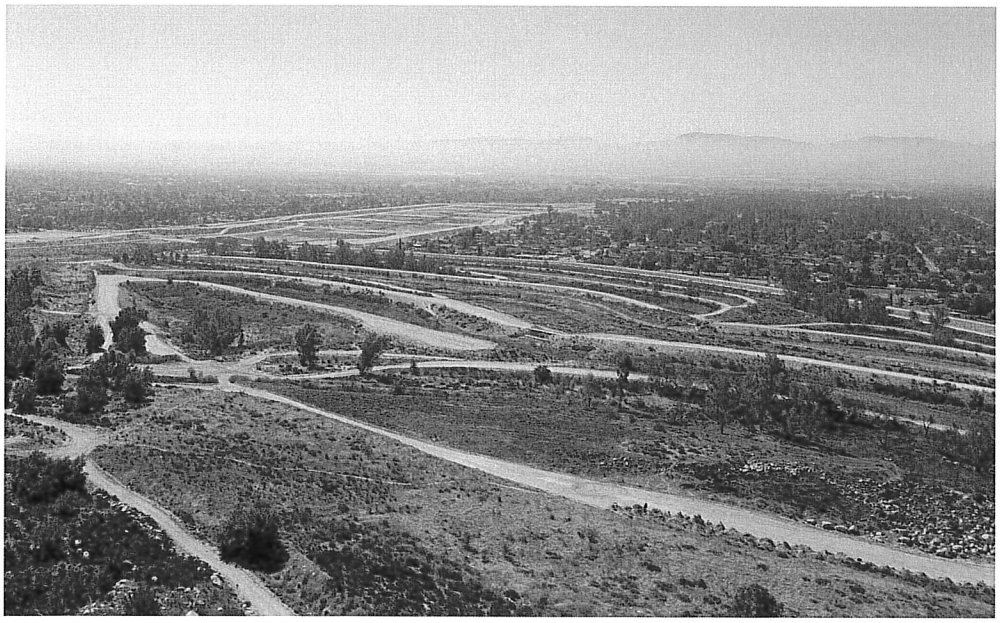
The WSC team will compare these estimates of volume-weighted averages to the applicable water quality objectives and the estimates of water quality objectives computed in Task 1. Task 6 and Task 7 will estimate the additional assimilative capacity due to the capture/import and recharge of higher quality water. This exercise is meant to quantify potential salt and nitrate offset credits. In addition, Task 6 may be changed to include an estimate of the increase in assimilative capacity in one or more of the GMZs adjacent or proximate to the SBBA.

Task 7.2 - Phase 2 Technical Memorandum No. 1 Projects in the SBBA

The final results from Task 6.0 and Task 7.1 will be summarized in Draft Phase 2 Technical Memorandum (TM) No. 1. An electronic copy (i.e., PDF) will be provided and presented to the Valley District and participating agencies for review and comment. Upon incorporation of any comments, the WSC Team will submit an electronic copy of the Final Phase 2 TM No. 1.

Task 6 and 7. Deliverables

- Draft Phase 2 TM No. 1 (PDF)
- Final Phase 2 TM No. 1 (PDF)



The Waterman and Twin Creek Spreading Grounds capture stormwater and recharge State Water Project to the Bunker Hill-A GMZ.

TASK 8: CHARACTERIZE PROBABLE IMPACTS TO GROUNDWATER QUALITY FROM RECYCLED WATER PROJECTS

Task 8.1 Stakeholder Workshop

A workshop is proposed at the start of Task 8 to confirm the current and planned recycled water projects (including recharge locations, recharge quantities, and recycled water qualities) to be included in the SNMP. Other major model assumptions for the predictive scenarios will also be discussed and confirmed during this workshop, including hydrology, imported water recharge, stormwater capture, and groundwater pumping. The WSC team will summarize the draft modeling assumptions prior to the workshop. Any comments received from this workshop will be incorporated into the Task 8.2 recycled water evaluation using groundwater model runs.

The WSC team will provide a detailed description of the potential projects that would be under consideration in the SNMP, including an estimate of the volume-weighted, annual average concentration of TDS and nitrate discharged into the SBBA GMZ or into the overlying surface waters. Example projects include the following:

1. East Valley Water District's Sterling Natural Resource Center
2. San Bernardino Water Department's Clean Water Factory
3. Yucaipa Valley Water District's discharge to San Timoteo Creek
4. City of Beaumont's discharge to tributaries of San Timoteo Creek
5. City of Riverside's planned discharges to Reach 3 of the Santa Ana River above MWD crossing (as part of the HCP implementation strategy).
6. Expanded application to landscape and agricultural irrigation.

A baseline scenario model run without any SNMP projects will be performed. Results from other predictive scenario runs for recycled water projects will be compared to the baseline scenario results to identify net changes of TDS and nitrate concentrations from planned recycled water projects, individually and collectively, over the next 20 years.

Upon the confirmation the scenario assumptions from Task 8.1, the WSC Team will run multiple scenario runs to identify volume-weighted annual average concentrations of TDS and nitrate after implementing planned recycled water projects. The scenario modeling results will be compared to baseline results to identify net changes on average TDS and nitrate concentrations in the receiving groundwater basins that expected to occur as a result of these planned recycled water recharge projects, individually and collectively, over the next 20 years.

Results from this modeling and analysis effort will include:

- Model-predicted TDS and nitrate concentrations through time with and without recycled water project(s)
- Volume-weighted annual average, rolling 5-year, 10-year, and 20-year average TDS and nitrate concentrations for the baseline run and each scenario run in the applicable GMZs and the larger SBBA GMZ
- Chemographs for TDS and nitrate at water supply wells showing recycled water project local impacts on downstream drinking water wells

It is assumed that two iterations of model runs will be performed; each iteration includes one baseline run and multiple scenario runs to evaluate the above-reference recycled water projects, individually and collectively. The first iteration of model runs will assume a 25% nitrogen loss coefficient. The second iteration of model runs will use the site-specific nitrogen loss coefficient identified from Phase 1 Task 5.0.

Task 8.3 - Phase 2 Technical Memorandum No. 2

Results from Task 8.1 and Task 8.2 will be summarized in Draft Phase 2 TM No. 2. An electronic copy (i.e., PDF) will be provided and presented to the Valley District and participating agencies for review and comment. Upon incorporation of any comments on the Draft Phase 2 TM No.2 and the results of the second iteration model runs, Geoscience will submit an electronic copy of the Final Phase 2 TM No. 2.

Task 8.0. Deliverables

- Draft Phase 2 TM No. 2 (PDF)
- Final Phase 2 TM No. 2 (PDF)

TASK 9: CHARACTERIZE THE PROBABLE CUMULATIVE AND COLLECTIVE IMPACTS TO GROUNDWATER QUALITY

Task 9.1 - Characterize the Probable Cumulative and Collective Impacts to Groundwater Quality

The WSC team will run a model scenario with all planned imported water (Task 6.0), stormwater (Task 7.0), and recycled water (Task 8.0) projects to estimate the probable cumulative and collective impacts to ambient groundwater qualities (i.e., net change on average TDS and nitrate concentrations compared to baseline results) in the applicable GMZs and the larger SBBA. This analysis will include the following results:

- Model-predicted TDS and nitrate concentrations through time with and without SNMP project(s);
- Volume-weighted annual average, rolling 5-year, 10-year, and 20-year average TDS and nitrate concentrations under all SNMP project conditions in the applicable GMZs and the larger SBBA GMZ; and
- Chemographs for TDS and nitrate at water supply wells showing SNMP projects local impacts on downstream drinking water wells.

It is assumed that two iterations of model runs will be performed under Task 9.0; each iteration includes one model run with all planned imported water, stormwater, and recycled water projects. The first iteration model run will assume a 25% nitrogen loss coefficient. The second iteration model run will use the site-specific nitrogen loss coefficient identified from Phase 1 Task 5.0.

The WSC team will evaluate the potential impacts on the ability of publicly owned treatment works (POTWs, which rely on the SBBA for water supply) to maintain consistent compliance with their current effluent limits for TDS, by providing supporting modeling input and output data.

Task 9.2 - Phase 2 Technical Memorandum No. 3

Results from Task 9.1 will be summarized in Draft Phase 2 TM No. 3. An electronic copy (i.e., PDF) will be provided and presented to the Valley District and participating agencies for review and comment. Upon incorporation of any comments, the WSC Team will submit an electronic copy of the Final Phase 2 TM No. 3.

Task 9.0. Deliverables

- Draft Phase 2 TM No. 3 (PDF)
- Final Phase 2 TM No. 3 (PDF)

TASK 10: CHARACTERIZE SOURCE LOADING FOR GROUNDWATERS IMPAIRED BY TDS OR NITRATE

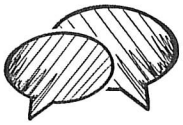
In this task, WSC will identify and quantify the loads of TDS and nitrate to the GMZs. The Integrated SAR Model will estimate the impacts from various water supply sources including storm water, imported water, and recycled water. Best estimates of legacy loads from past discharges, that are moving through the vadose zone will be made. The Integrated SAR model will be used to bound the estimates of legacy loads.

OPTIONAL TASK: PHASE 3 SALT AND NUTRIENT MANAGEMENT PLAN

If the Stakeholders elect to proceed with the development of a SNMP, the WSC Team will prepare a proposal to develop a formal SNMP suitable for submission to the Regional Board. The WSC Team will develop an SNMP that leverages the substantial existing data and advanced modeling and analysis tools available for the SBBA. The SNMP approach will combine the technical effort with a deep understanding of current and proposed recharge projects and with a robust stakeholder outreach process. The input data to the Integrated SAR Model will be used to develop information on background conditions, the basin characterization, and potential sources of salt and nutrient loadings. This method takes advantage of previous work and knowledge within our team to efficiently evaluate the existing conditions and projected conditions and to identify associated salt and nutrient loadings. Further, usage of the existing data collected and analyzed for the modeling effort will maintain consistency between the modeling analysis performed and the SNMP process. Should additional information be learned during the SNMP process, the data will be considered for refinement within the model. The output from the Integrated SAR Model will be used to derive the estimates of Management Zone concentrations of salts and nutrients over time and to support point estimates of concentrations at specific locations, to evaluate local conditions such as downstream wells. By using the Integrated SAR Model platform, the SNMP findings will be consistent and will take advantage of the best available dataset to support the analysis.

Why Select WSC?

A Quick Start



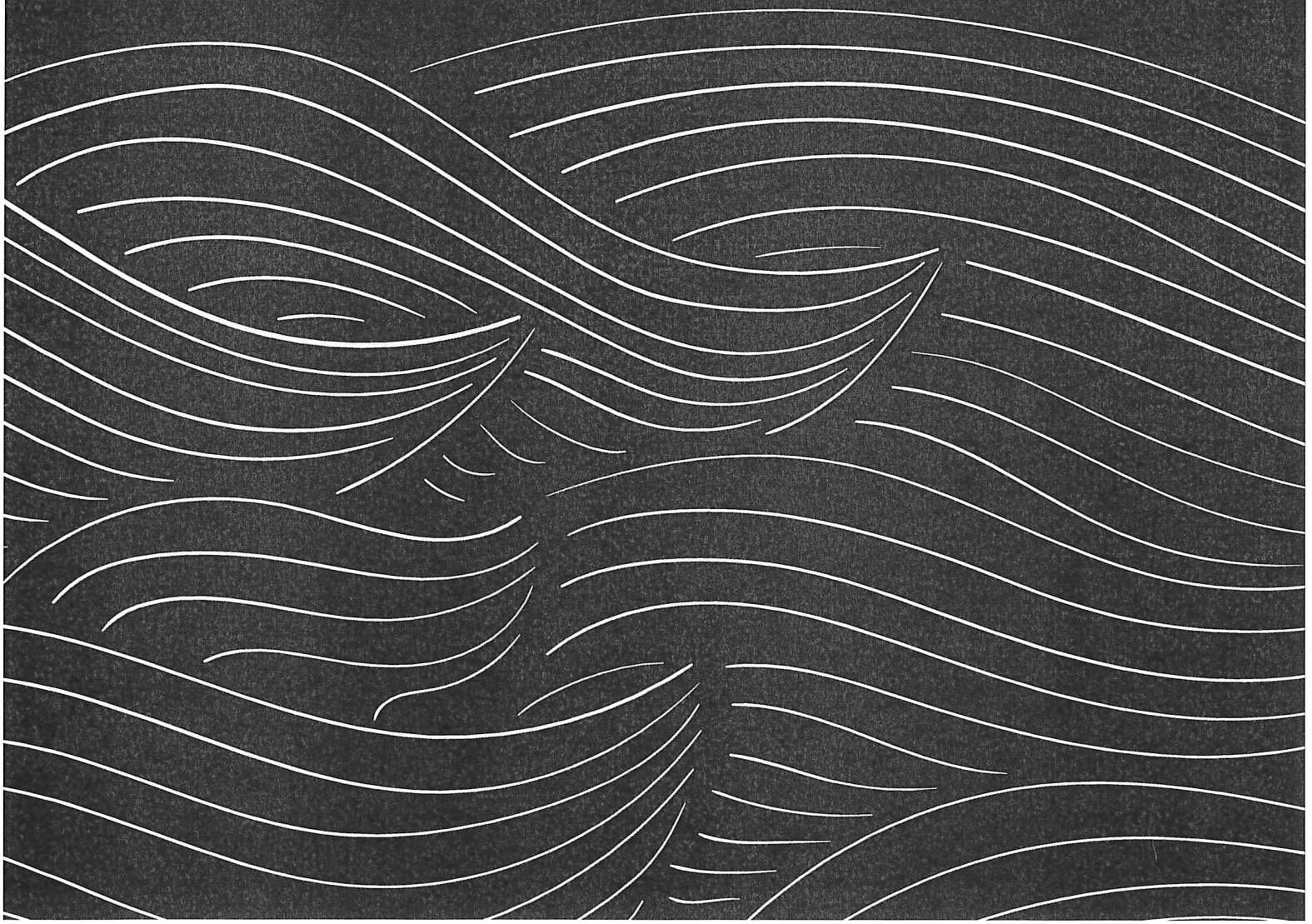
Stakeholder Buy-In

Regional Board Acceptance

WSC's team is committed to the success of the SBBA its stakeholders. We have worked hard to build strong relationships based on trust, to deliver value through the work that we do, and create a sustainable water future that benefits all the people living here.

Our team has a wealth of experience that we will draw upon for this project, enabling us to start fast and deliver immediate benefit to Valley District and the SBBA stakeholders. We will lead a collaborative process with the purpose of building buy-in from those who will be affect by the SNMP. We also have a proven history of successfully working with the Regional Board to gain their approval for critical water resources projects in the Santa Ana River Watershed.

3 ORGANIZATIONAL CHART



Organizational Chart

WSC's team has unparalleled knowledge of the Upper Santa Ana River Watershed groundwater basins and is organized to have the right people with the right experience leading each task so that Valley District can expect a high-quality and innovative SNMP.

Qualifications and resumes for all team members are included in Appendix A.

Principal In Charge
Jeff Szytel (3) PE, MS, MBA

PROJECT MANAGER
Michael Cruikshank (2) PG, CHG

Michael is a proven partner to Valley District on innovative, complex, and collaborative water resource projects and programs.

QA/QC
Rob Morrow (3) PE, MS

Groundwater Quality Characterization
Michael Cruikshank (2) PG, CHG
Joseph LeClaire (4) PHD
Erik Cadaret (2) GIT, MS

Nitrogen Loss Coefficent
Joseph LeClaire (4) PHD
Erik Cadaret (2) GIT, MS

Recharge Water Quality & Flow
Johnson Yeh (5) PHD, PG, CHG
David Barnes (5) MS

Project Evaluation
Laine Carlson (1) PE, T2 & D2 Water Op
Rob Morrow (3) PE, MS
Rosalyn Prickett (6) AICP, MS

Groundwater Modeling
Johnson Yeh (5) PHD, PG, CHG
David Barnes (5) MS
Lauren Wicks (5) PG, MS
Tim Chen (5) MS, EIT

Salt & Nutrient Management Plan
Joseph LeClaire (4) PHD
Michael Cruikshank (2) PG, CHG
James Blanke (6) PE, PG, CHG
Sevim Onsoy (6) PHD
Rosalyn Prickett (6) AICP, MS

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6 **Woodard and Curran San Diego, CA**
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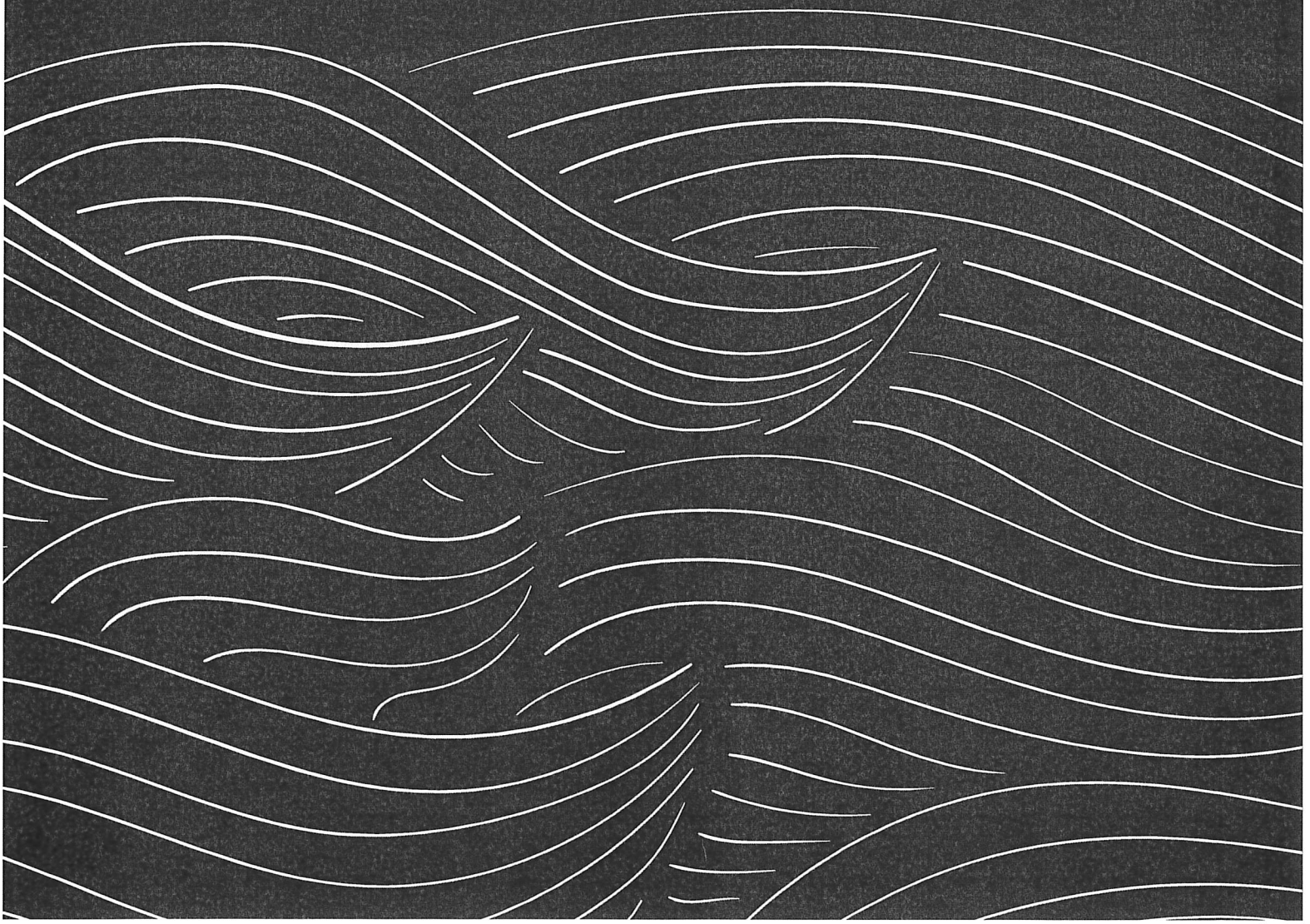
9665 Chesapeake Drive, Suite 320,
San Diego, CA 92123

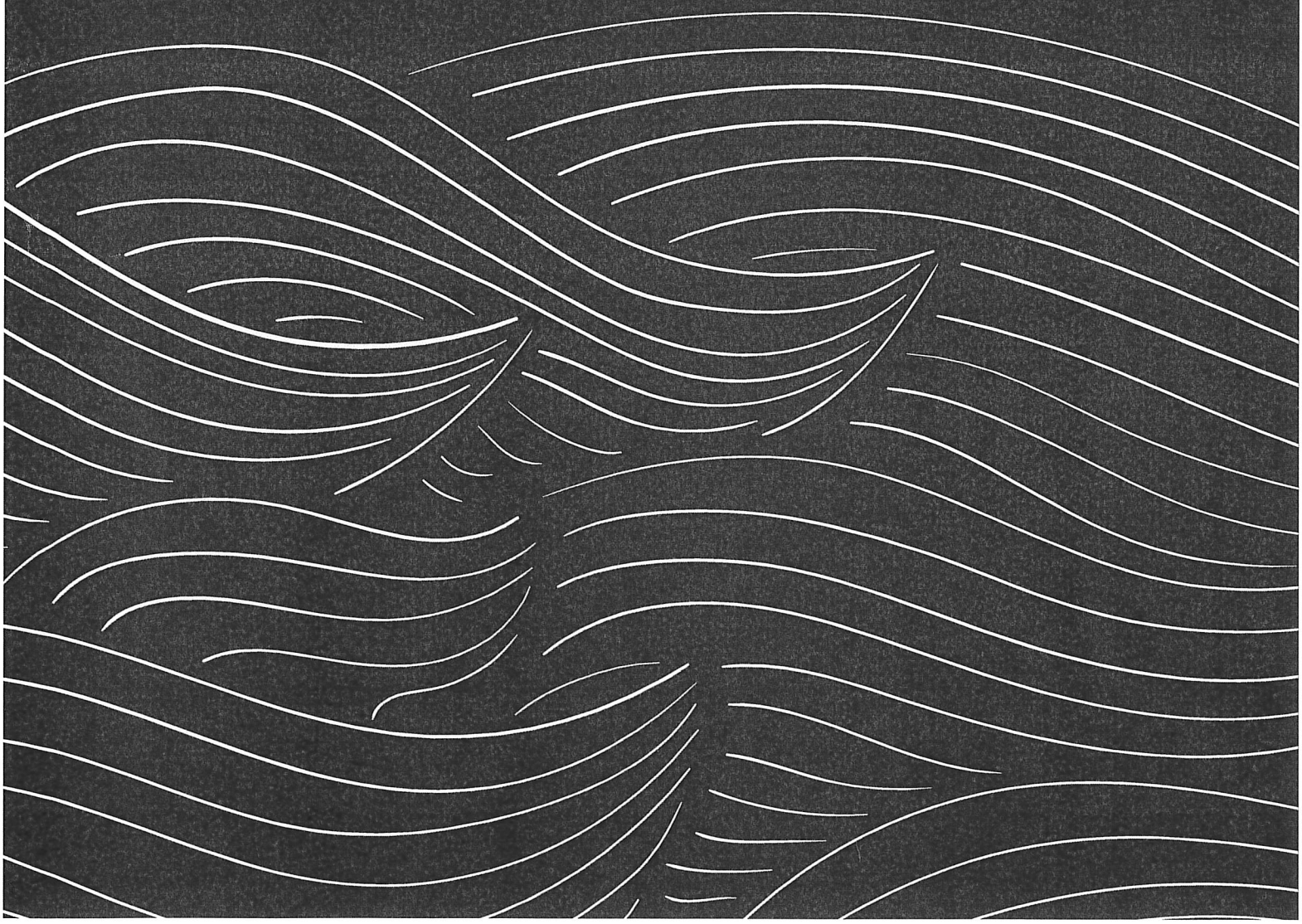
4 PROJECT SCHEDULE



Project Schedule

TASKS	2021											2022							
	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A
Project Meetings																			
Kickoff Meeting																			
Meetings with Staff/Stakeholders (Monthly - 18)																			
Working sessions (Assume quarterly -6)																			
Monthly progress meetings or conference calls - 20																			
Meetings with agencies participating in the SNMP Update (Assume quarterly - 6)																			
Any public meetings required by the process (Assume 2 meetings)																			
Phase 1: Water Quality Characterization																			
Task 1: Develop provisional water quality objectives for the SBBA GMZ																			
Task 2: Estimate ambient water quality in the SBBA GMZ																			
Task 3: Evaluate trends in water quality and quantify available assimilative capacity																			
Task 4: Identify potential areas of significant water quality impairment for TDS & Nitrate						TM													
Task 5: Develop site-specific nitrogen-loss coefficients for the SBBA																			
Workplan for approval by Regional Board								TM											
Fieldwork to support N-loss studies																			TM
Phase 2: Project Planning & Impact Analysis																			
Task 6: Summarize the volume and quality of imported water recharged in the SBBA																			
Task 7: Summarize the volume and quality of stormwater captured by active recharge projects in the SBBA											TM								
Task 8: Characterize probable impacts to groundwater quality from recycled water projects											TM				TM				
Task 9: Characterize the probable cumulative and collective impacts to groundwater quality														TM				TM	
Task 10: Characterize source loading for groundwaters impaired by TDS or nitrate.														TM				TM	

6 FEE SCHEDULE



	Jeffery Szytel	Laine Carlson	Michael Cruikshank	Robert Morrow	Erik Cadaret	Aaron Morland	Kay Merrill								
	$305	*$250*	*$240*	*$250*	*$165*	*$145*	*$145*		*$228*			*$225*		*$180*	
		6	60				16	$ 18,220			44	$ 11,766	10	$ 1,980	
		4	20					$ 5,800					12	$ 2,376	
	8	24		8				$ 10,440							
	8	**34**	**80**	**8**	**0**	**0**	**16**	$ 34,460	**0**	$ -	**44**	$ 11,766	**22**	$ 4,356	
for the SBBA GMZ															
ata			6		20	12		$ 6,480					4	$ 792	
orical Data			6		32	12		$ 8,460					4	$ 792	
GMZ			6		16	8		$ 5,240					8	$ 1,584	
	0	**0**	**18**	**0**	**68**	**32**	**0**	$ 20,180	**0**	$ -	**0**	$ -	**16**	$ 3,168	
GMZ															
			3		30	20		$ 8,570					4	$ 792	
	0	**0**	**3**	**0**	**30**	**20**	**0**	$ 8,570	**0**	$ -	**0**	$ -	**4**	$ 792	
y available assimilative capacity															
ter in storage			6		16	8		$ 5,240					8	$ 1,584	
	0	**0**	**6**	**0**	**16**	**8**	**0**	$ 5,240	**0**	$ -	**0**	$ -	**8**	$ 1,584	
quality impairment for TDS & Nitrate															
quality impairments			6		80	40		$ 20,440					8	$ 1,584	
4			8		40	20		$ 11,420					24	$ 4,752	
	0	**0**	**14**	**0**	**120**	**60**	**0**	$ 31,860	**0**	$ -	**0**	$ -	**32**	$ 6,336	
ts for the SBBA															
Board		4	24		120			$ 26,560					140	$ 27,720	
	0	**4**	**24**	**0**	**120**	**0**	**0**	$ 26,560	**0**	$ -	**0**	$ -	**140**	$ 27,720	
ted water recharged in the SBBA															
ed water recharged in the SBBA			8					$ 1,920	18	$ 5,511	22	$ 5,452	4	$ 792	
	0	**0**	**8**	**0**	**0**	**0**	**0**	$ 1,920	**18**	$ 5,511	**22**	$ 5,452	**4**	$ 792	
water captured by active recharge projects in the SBBA															
ater captured by active recharge			8					$ 1,920	14	$ 4,310	22	$ 5,452	4	$ 792	
			8					$ 1,920			37	$ 7,715	2	$ 396	
	0	**0**	**16**	**0**	**0**	**0**	**0**	$ 3,840	**14**	$ 4,310	**59**	$ 13,167	**6**	$ 1,188	
ter quality from recycled water projects															
			8					$ 1,920			26	$ 6,323	4	$ 792	
			40					$ 9,600	20	$ 6,217	216	$ 55,361	8	$ 1,584	
			8					$ 1,920			58	$ 12,404	2	$ 396	
	0	**0**	**56**	**0**	**0**	**0**	**0**	$ 13,440	**20**	$ 6,217	**300**	$ 74,087	**14**	$ 2,772	
llective impacts to groundwater quality															
llective Impacts to Groundwater Quality			8					$ 1,920	24	$ 7,383	44	$ 11,013	16	$ 3,168	
			8					$ 1,920			54	$ 11,761	2	$ 396	
	0	**0**	**16**	**0**	**0**	**0**	**0**	$ 3,840	**24**	$ 7,383	**98**	$ 22,774	**18**	$ 3,564	
rs impaired by TDS or nitrate.															
r impaired by TDS and Nitrate			12		40			$ 9,480			20	$ 4,950	40	$ 7,920	
	0	**0**	**12**	**0**	**40**	**0**	**0**	$ 9,480	**0**	$ -	**20**	$ 4,950	**40**	$ 7,920	
	4	4	4					$ 3,180					2	$ 396	
		20	30		24			$ 16,160	12	$ 3,674	39	$ 11,391	12	$ 2,376	
		4	8					$ 2,920							
8 meetings)		12	40		24			$ 16,560			39	$ 11,391	18	$ 3,564	
	4	**40**	**82**	**0**	**48**	**0**	**0**	$ 38,820	**12**	$ 3,674	**78**	$ 22,781	**32**	$ 6,336	
			3		90	40		$ 21,370					4	$ 792	
	0	**0**	**3**	**0**	**90**	**40**	**0**	$ 21,370	**0**	$ -	**0**	$ -	**4**	$ 792	
	12	**78**	**338**	**8**	**532**	**160**	**16**	$ 219,580	**88**	$ 27,095	**621**	$ 154,977	**340**	$ 67,320	

ed services

e Reimbursement Rate)
e Mileage Reimbursement Rate)

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