

STAFF REPORT*CITY OF OCEANSIDE*

DATE: July 14, 2010

TO: Honorable Mayor and City Councilmembers

FROM: Water Utilities Department

SUBJECT: **AMENDMENT 1 IN THE AMOUNT OF \$34,946 TO THE PROFESSIONAL SERVICES AGREEMENT WITH MACTEC ENGINEERING AND CONSULTING, INCORPORATED, FOR THE LOWER SAN LUIS REY RIVER BACTERIA SOURCE TRACKING STUDY PROJECT**

SYNOPSIS

Staff and the Utilities Commission recommend that the City Council approve Amendment 1 in the amount of \$34,946 to the professional services agreement with MACTEC Engineering and Consulting, Incorporated, of San Diego for the Lower San Luis Rey River Bacteria Source Tracking Study project, for additional samples to replace samples lost due to the State's stop work order on the project; and authorize the City Manager to execute the agreement upon receipt of all supporting documents.

BACKGROUND

The Lower San Luis Rey River and river mouth currently suffer from elevated bacterial levels negatively impacting water quality in the river mouth and the adjacent shoreline. In 2005, this beach area was posted due to bacterial exceedance 209 days; 186 days were during one consecutive stretch. The City of Oceanside has been sampling the San Luis Rey River since 1994 to determine the source or sources of the bacterial exceedance. Thus far, the results are inconclusive. One potential source is from birds that frequent a sand island in the river mouth. During low tides when the island is not submerged hundreds of birds are found on the island. When tidal influx causes the island to be submerged, the bird waste is washed from the island and is released into the river mouth flow. It is theorized that this may contribute to bacterial exceedance in the coastal mixing zone.

The results of San Luis Rey River Watershed sampling completed by the City of Oceanside's Clean Water Program in FY 2009/10 are in the table below.

San Luis Rey River	Total Coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)	Enterococcus (MPN/100ml)
	GeoMean	GeoMean	GeoMean
Bonsall (Eastern-most sampling point)	1713	139	145
Pacific Ocean (Ocean sample 75 ft south of river mouth)	45	18	43

On July 18, 2007, the City Council approved the adoption of a resolution authorizing entering into a Proposition 50 Clean Beach Grant Program Agreement with the State of California for the award of \$554,375 for the Lower San Luis Rey River Bacteria Source Tracking Study project. The agreement was fully executed on December 11, 2007.

On February 20, 2008, the City Council approved a professional services agreement with MACTEC Engineering and Consulting Services in the amount of \$507,275 for sampling, analysis and preparation of the San Luis Rey River Bacteria Source Tracking Study project.

ANALYSIS

On December 19, 2008, all State Water Resources Control Board (SWRCB) grant project activities were suspended per the California Department of Finance Budget Letter 08-33. On December 17, 2009, the SWRCB gave the City of Oceanside notice that this project had been selected to restart. Due to the suspension of the project a request for time extension was filed and approved by the SWRCB. Amendment 1 to the professional services agreement extends deadlines and increases the total project cost for additional sampling required.

FISCAL IMPACT

The total cost of Amendment No. 1 is \$34,946. Adequate grant funds are available.

Proposition 50 Clean Beach Grant Program Bacteria Source Tracking Study		
Budget Appropriation (908711500711)	Original Agreement	Balance Available
\$554,375	\$507,275.24	\$47,099.76

Unexpended funds must be refunded back to the State under the conditions of the grant.

COMMISSION OR COMMITTEE REPORT

The Utilities Commission approved staff's recommendation at its regularly scheduled meeting on June 15, 2010.

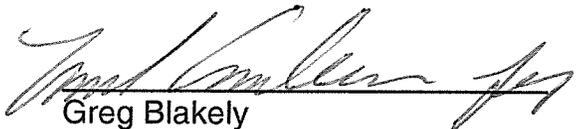
CITY ATTORNEY'S ANALYSIS

The referenced documents have been reviewed by the City Attorney and approved as to form.

RECOMMENDATIONS

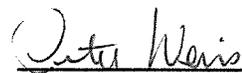
Staff and the Utilities Commission recommend that the City Council approve Amendment 1 in the amount of \$34,946 to the professional services agreement with MACTEC Engineering and Consulting, Incorporated, of San Diego for the Lower San Luis Rey River Bacteria Source Tracking Study project, for additional samples to replace samples lost due to the State's stop work order on the project; and authorize the City Manager to execute the agreement upon receipt of all supporting documents.

PREPARED BY:



Greg Blakely
Administration Manager

SUBMITTED BY:



Peter A. Weiss
City Manager

REVIEWED BY:

Michelle Skaggs Lawrence, Deputy City Manager



Cari Dale, Water Utilities Director



Teri Ferro, Financial Services Director



Exhibit A – Amendment 1

Exhibit B – Original Professional Services Agreement

**CITY OF OCEANSIDE
AMENDMENT TO
PROFESSIONAL SERVICES AGREEMENT**

**PROJECT: LOWER SAN LUIS REY RIVER BACTERIA SOURCE
TRACKING STUDY**

THIS AMENDMENT TO PROFESSIONAL SERVICES AGREEMENT
(hereinafter "Amendment") is made and entered this ____ day of _____ 2010,
by and between the City of Oceanside, Water Utilities Department, a municipal
corporation, hereinafter designated as "DEPARTMENT", and MACTEC ENGINEERING
AND CONSULTING, INCORPORATED of SAN DIEGO, hereinafter designated as
"CONSULTANT".

RECITALS

WHEREAS, DEPARTMENT and CONSULTANT are the parties to that certain
Professional Services Agreement dated February 20, 2008, hereinafter referred to as
the "Agreement", wherein CONSULTANT agreed to provide certain services to the
DEPARTMENT set forth therein;

WHEREAS, the parties desire to amend the Agreement to provide for the
following changes and/or modifications.

AMENDMENT

NOW, THEREFORE, as set forth herein, the parties hereto do mutually agree
that the Agreement shall be amended as follows:

1. Section 2.3 Task III. Consultant shall prepare and deliver a draft final report to the Water Utilities Director no later than April 30, 2011.
2. Section 2.4 CONSULTANT shall prepare and deliver a final report to the Water Utilities Director no later than May 31, 2011.
3. Section 13.1 For work performed by CONSULTANT in accordance with this Agreement, CITY shall pay CONSULTANT in accordance with the schedule of billing rates set forth in Exhibit "B", attached hereto and incorporated herein by reference. No rate changes shall be made during the term of this Agreement without prior written approval of the Water Utilities Director. CONSULTANT'S compensation for all work performed in accordance with this Agreement shall not exceed the total contract price of \$542,221.

SIGNATURES. The individuals executing this Amendment represent and warrant that they have the right, power, legal capacity and authority to enter into and to execute this Agreement on behalf of the respective legal entities of the CONSULTANT and the DEPARTMENT.

IN WITNESS WHEREOF, the parties hereto being duly authorized on behalf of their respective entities to execute this Amendment, do hereby agree to the covenants contained in the Agreement, including this Amendment and have caused this Amendment to be executed by setting hereunto their signatures this 28 day of June, 2010.

MACTEC ENGINEERING

By: *Nath Schaedl*

CITY OF OCEANSIDE

By: _____
Peter Weiss, City Manager

APPROVED AS TO FORM:

Brian Smith, *1887*
City Attorney

Employer ID No.

NOTARY ACKNOWLEDGEMENTS OF CONSULTANT MUST BE ATTACHED.

SEE ATTACHED FOR PROPER
CALIFORNIA NOTARY
ACKNOWLEDGEMENT

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of San Diego

On June 28th, 2010 before me, Rosa Maria Baker, Notary public
Date Here Insert Name and Title of the Officer

personally appeared Nathan Jon Schaedler
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.



Place Notary Seal Above

Signature Rosa Maria Baker
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

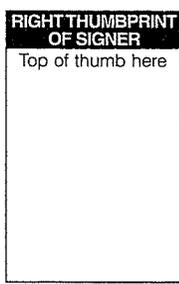
Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____

- Individual
- Corporate Officer — Title(s): _____
- Partner — Limited General
- Attorney in Fact
- Trustee
- Guardian or Conservator
- Other: _____

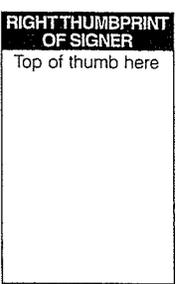
Signer Is Representing: _____



Signer's Name: _____

- Individual
- Corporate Officer — Title(s): _____
- Partner — Limited General
- Attorney in Fact
- Trustee
- Guardian or Conservator
- Other: _____

Signer Is Representing: _____





engineering and constructing a better tomorrow

May 26, 2010

City of Oceanside
Attn: Mo Lahsaie
Clean Water Program
300 N. Coast Highway
Oceanside, CA 92054

Subject: Lower San Luis Rey River Source Identification Project
Grant Agreement Number: 07-577-551

MACTEC is requesting an additional \$34,946 to complete the contracted scope-of-work for the Lower San Luis Rey River Source Identification Study approved by the City of Oceanside City Council on February 20, 2008.

On December 19, 2008, all State Water Resources Control Board grant project activities were suspended per the California Department of Finance Budget Letter 08-33. As a result of the stop work order, the Lower San Luis Rey River Bacteria Source Identification Study was suspended and the project scope-of-work was not completed. Prior to the stop work notice, MACTEC completed the Quality Assurance Project Plan (QAPP) and Monitoring Plan (MP), the first dry weather monitoring season, including two 2-day events, and the first visual observation event.

The Lower San Luis Rey River Source Identification Study utilized a multiple tool approach to identify the sources of bacteria in the Lower San Louis Rey River. The tiered implementation of these various tools allows for the efficient allocation of resources in the source identification project. During the two dry weather monitoring events, samples were collected and were scheduled to be analyzed for fecal indicator bacteria by CRG, human viral pathogens by the University of Southern California (USC), and *Bacteroides* and other potential genetic analysis by the University of North Carolina (UNC).

Although some of the analyses were completed for these sampling events, the genetic analysis by UNC, an integral tool to source tracking, was not completed prior to the State's stop work order. The samples were frozen, however, they were not analyzed within a holding time of one year, and data for that event was lost.

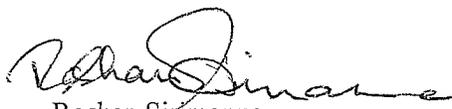
On December 17, 2009, the State Water Resources Control Board gave the City of Oceanside notice that the Lower San Luis Rey Source Identification Project grant had been selected to restart. In order to capture the critical data that was lost during the first dry weather event, MACTEC is requesting additional funding from the grant funds already allocated to the City, to repeat the first dry weather event. In addition, sediment sampling for genetic analysis by SCCWRP has been included in this effort. This was not part of the original effort, however inclusion of the sediment sampling will allow this proposed sampling event to correspond with the recent dry weather sampling event in May 2010 and future dry weather sampling events already planned. A breakdown of the tasks, brief task descriptions, and associated costs is provided below:

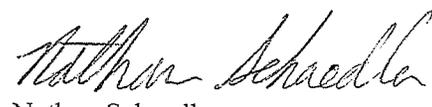
Task	Description	Cost
Project Management	General project management, lab coordination, and invoicing	\$1,350
Field Sample and Data Collection	Collection of water samples at 7 sites, sediment samples at 5 sites, and cross-sectional flow measurements at 2 sites each day on 2 consecutive days.	\$14,825
Fecal Indicator Bacteria Sample Analysis	FIB analysis of 14 water samples, filtering and freezing of 14 subsamples for UNC and USC labs.	\$2,019
Genetic Sample Analysis	Human viral pathogen (USC) and QPCR (UNC) analysis of 7 samples. Sediment analysis of 10 samples (SCCWRP).	\$13,932
Visual Observation Program	Visual observations in surrounding watershed to identify potential pollutant sources.	\$2,820
TOTAL		\$34,946

If you have any questions, please contact us at 858-278-3600 or rdsirimanne@mactec.com.

Respectfully submitted,

MACTEC Engineering and Consulting, Inc.


 Roshan Sirimanne
 Senior Scientist


 Nathan Schaedler
 Project Manager/Principal Engineer

**LOWER SAN LUIS REY RIVER BACTERIA SOURCE
TRACKING STUDY - 711.667115**

CITY OF OCEANSIDE

PROFESSIONAL SERVICES AGREEMENT

THIS AGREEMENT is made and entered into this 20th day of February, 2008, by and between the CITY OF OCEANSIDE, a municipal corporation, hereinafter designated as "CITY", and MACTEC ENGINEERING AND CONSULTING, INC. hereinafter designated as "CONSULTANT".

RECITALS

- A. CITY desires to obtain professional environmental services from an independent consultant for the above named project.
- B. CONSULTANT has submitted a proposal to provide environmental services for the CITY in accordance with the terms set forth in this Agreement.
- C. CITY desires to contract with CONSULTANT as an independent contractor and CONSULTANT desires to provide services to CITY as an independent contractor.
- D. CONSULTANT has demonstrated its competence and professional qualifications necessary for the satisfactory performance of the services designated herein by virtue of its experience, training, education and expertise.

NOW, THEREFORE, THE PARTIES MUTUALLY AGREE AS FOLLOWS:

- 1.0 **SCOPE OF WORK.** CONSULTANT desires to perform environmental engineering services per their proposal dated December 4, 2007 and attached hereto as Exhibit A. The project is more particularly described as follows:

Task 1. Meetings and Project Management

This task consists of attending Technical Advisory Committee (TAC) meetings, management of subcontractors, periodic briefings with team leaders and key specialists, and working with stakeholders to develop required documents and address any revisions and/or concerns that arise during the creation, implementation or reporting of the study. The Consultant shall provide project management services as necessary for project and schedule control. This will include day-to-day project management, contract management, progress reporting, and quarterly invoicing.

Task 2. Quality Assurance Project Plan (QAPP) and Monitoring Plan (MP)

A QAPP and MP shall be prepared and maintained to cover both field and laboratory operations and be in accordance with the State Water Resource Control Board's (SWRCB's) Surface Water Ambient Monitoring Program. This task must include development of a draft and final product for review by the stakeholders and approved by the SWRCB's Quality Assurance officer. Monitoring cannot occur prior to the QAPP and MP approval by the SWRCB's Quality Assurance officer.

Task 3. Implementation of the Bacteria Source Tracking Study

Multi-tiered genetic microbial testing methods will be used to identify bacteria sources in the Lower San Luis Rey River. This multi-tiered approach includes bacterial concentrations assessment using traditional measurements of fecal indicator bacteria to determine the flux of bacteria in the river and river mouth, and genetic microbial source tracking methods which will be approved by the Technical Advisory Committee.

Another reason for the multi-tiered approach is to accommodate the construction of the new Pacific Street Bridge at the mouth of the San Luis Rey River. The estimated completion date for the bridge is November 28, 2008. While there should not be any adverse water quality affects from construction, to rule out the possibility of skewing results it is recommended to wait until the completion of the bridge project to study the bacterial loading at the mouth of the River.

The sampling and analysis study, as detailed in the QAPP and MP (Task 2), will include, at a minimum:

1. A comprehensive visual observation program to identify point and non-point source runoff.
2. Collection and analysis of flow data to be utilized in bacteria loading estimates from the sources identified.
3. Dry and wet weather sampling events will be conducted to identify sources and quantify wet, dry, and annual bacterial loading estimates.
4. Multi-tiered genetic microbial testing in the Lower San Luis Rey River and the river mouth at the Pacific Ocean outlet. The sample site selection process will include appropriate sites for tracking TMDL implementation progress.
5. Recommendations for potential Best Management Practices to reduce and eliminate bacterial sources in the Lower San Luis Rey River and at the river mouth will be developed.

1.1 **PROFESSIONAL SERVICES PROVIDED BY CONSULTANT.** The professional services to be performed by CONSULTANT shall consist of but not be limited to the following:

1.1.1 Work closely with the Water Utilities Director in performing work in accordance with this Agreement in order to receive clarification as to the result which the CITY expects to be accomplished by CONSULTANT. The Water Utilities Director, under the authority of the City Manager, shall be the CITY'S authorized representative in the interpretation and enforcement of all work performed in connection with this Agreement. The Water Utilities Director may delegate authority in connection with this Agreement to the Water Utilities Director's designees. For the purposes of directing the CONSULTANT'S performance in accordance with this Agreement, the Water Utilities Director delegates authority to Mo Lahsaie, Clean Water Program Coordinator.

1.1.2 In compliance with Government Code section 7550, the CONSULTANT shall include a separate section in the proposal prepared pursuant to this Agreement, which contains a list of all the subcontractors and dollar amounts of all contracts and subcontracts required for the preparation of work described in this Agreement.

1.1.3 Visit and carefully examine the location of the project as often as necessary to become acquainted with all conditions which are visible or could reasonably be discovered, and which might have an impact upon the project.

1.1.4 Provide office and field assistance to the City upon request by Water Utilities Director to include the services listed below:

- a. Review and comment on laboratory, test reports.
- b. Prepare needed reports and notices.
- c. Attend meetings with the Water Utilities Director or his designees.

1.2 **SERVICES PROVIDED BY CITY.** The CITY shall perform the following services:

1.2.1 Provide all legal advertising mailings and postings required.

1.2.2 Provide overall project management.

2.0 **TIMING REQUIREMENTS**

- 2.1 Time is of the essence in the performance of work under this Agreement and the following timing requirements shall be strictly adhered to unless otherwise modified in writing as set forth in Section 2.5. Failure by CONSULTANT to strictly adhere to these timing requirements may result in termination of this Agreement by the CITY and the assessment of damages against the CONSULTANT for delays.
- 2.2 Task II. CONSULTANT shall prepare and deliver the final Quality Assurance Project Plan (QAPP) and Monitoring Plan (MP) to the Water Utilities Director no later than April 15, 2008. No work shall be performed by CONSULTANT beyond the draft QAPP and MP until the Water Utilities Director and the SWRCB's Quality Assurance Officer have given written approval of the QAPP and MP.
- 2.3 Task III. Consultant shall prepare and deliver a draft final report to the Water Utilities Director no later than December 31, 2009.
- 2.4 CONSULTANT shall prepare and deliver a final report to the Water Utilities Director no later than January 31, 2010.
- 2.5 CONSULTANT shall submit all requests for extensions of time for performance in writing to the Water Utilities Director no later than ten (10) calendar days after the start of the condition which purportedly caused the delay, and not later than the date on which performance is due. The Water Utilities Director shall review all such requests and may grant reasonable time extensions for unforeseeable delays which are beyond CONSULTANT'S control.
- 2.6 For all time periods not specifically set forth herein, the CONSULTANT shall respond in the most expedient and appropriate manner under the circumstances, by either telephone, fax hand delivery or mail.
- 3.0 **DESIGN CRITERIA AND STANDARDS.** All work shall be performed in accordance with applicable CITY, state and federal codes and criteria. In the performance of its professional services, CONSULTANT shall use the degree of care and skill ordinarily exercised by CONSULTANT under similar conditions.
- 4.0 **INDEPENDENT CONTRACTOR.** CONSULTANT'S relationship to the CITY shall be that of an independent contractor. CONSULTANT shall have no authority, express or implied, to act on behalf of the CITY as an agent, or to bind the CITY to any obligation whatsoever, unless specifically authorized in writing by the Water Utilities Director. CONSULTANT shall be solely responsible for the performance of any of its employees, agents or subcontractors under this agreement.

CONSULTANT shall report to the CITY any and all employees, agents and consultants performing work in connection with this project, and all shall be subject to the approval of the CITY.

- 5.0 **CITY BUSINESS LICENSE.** Prior to the commencement of any work under this agreement, the CONSULTANT shall obtain and present a copy of an Oceanside City Business License to the Water Utilities Director.
- 6.0 **WORKERS' COMPENSATION.** Pursuant to Labor Code section 1861, the CONSULTANT hereby certifies that the CONSULTANT is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, and the CONSULTANT will comply with such provisions and provide certification of such compliance as a part of these Award Documents. The certification shall be in accordance with Subsections 7.3 through 7.8 of this Agreement.

7.0 **LIABILITY INSURANCE.**

7.1 CONSULTANT shall, throughout the duration of this Agreement, maintain comprehensive general liability and property damage insurance, or commercial general liability insurance, covering all operations of CONSULTANT, its agents and employees, performed in connection with this Agreement including, but not limited to, premises and automobile.

7.2 CONSULTANT shall maintain liability insurance in the following minimum limits:

Comprehensive General Liability Insurance
(bodily injury and property damage)

Combined Single Limit Per Occurrence	\$ 1,000,000
General Aggregate	\$ 2,000,000*

Commercial General Liability Insurance
(bodily injury and property damage)

General limit per occurrence	\$ 1,000,000
General limit project specific	\$ 2,000,000

<u>Automobile Liability Insurance</u>	\$ 1,000,000
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*General aggregate per year, or part thereof, with respect to losses or other acts or omissions of CONSULTANT under this Agreement.

- 7.2.1 If coverage is provided through a Commercial General Liability Insurance policy, a minimum of 50% of each of the aggregate limits shall remain available at all times. If over 50% of any aggregate limit has been paid or reserved, the CITY may require additional coverage to be purchased by the CONSULTANT to restore the required limits. The CONSULTANT shall also notify the CITY'S Project Manager promptly of all losses or claims over \$25,000 resulting from work performed under this contract, or any loss or claim against the CONSULTANT resulting from any of the CONSULTANT'S work.
- 7.3 All insurance companies affording coverage to the CONSULTANT for the purposes of this Section shall add the City of Oceanside as "additional insured" under the designated insurance policy for all work performed under this Agreement. Insurance coverage provided to the CITY as an additional insured shall be primary insurance and other insurance maintained by the CITY, its officers, agents and employees shall be excess only and not contributing with insurance provided pursuant to this Section.
- 7.4 All insurance companies affording coverage to the CONSULTANT pursuant to this Agreement shall be insurance organizations authorized by the Insurance Commissioner of the State of California to transact business of insurance in the state or be rated as A-X or higher by A.M. Best.
- 7.5 All insurance companies affording coverage shall provide thirty (30) days written notice to the CITY should the policy be cancelled before the expiration date. For the purposes of this notice requirement, any material change in the policy prior to the expiration shall be considered a cancellation.
- 7.6 CONSULTANT shall provide evidence of compliance with the insurance requirements listed above by providing a Certificate of Insurance and applicable endorsements, in a form satisfactory to the City Attorney, concurrently with the submittal of this Agreement.
- 7.7 CONSULTANT shall provide a substitute Certificate of Insurance no later than thirty (30) days prior to the policy expiration date. Failure by the CONSULTANT to provide such a substitution and extend the policy expiration date shall be considered a default by CONSULTANT and may subject the CONSULTANT to a suspension or termination of work under the Agreement.
- 7.8 Maintenance of insurance by the CONSULTANT as specified in this Agreement shall in no way be interpreted as relieving the CONSULTANT of any responsibility whatsoever and the CONSULTANT may carry, at its own expense, such additional insurance as it deems necessary.

8.0 **PROFESSIONAL ERRORS AND OMISSIONS INSURANCE.** Throughout the duration of this agreement and four (4) years thereafter, the CONSULTANT shall maintain professional errors and omissions insurance for work performed in connection with this Agreement in the minimum amount of One Million dollars (\$1,000,000).

CONSULTANT shall provide evidence of compliance with these insurance requirements by providing a Certificate of Insurance.

9.0 **CONSULTANT'S indemnification of city.** CONSULTANT shall indemnify and hold harmless the CITY and its officers, agents and employees against all direct claims or lawsuits for damages to persons or property to the extent arising out of the negligent acts, errors, omissions or wrongful acts or conduct of the CONSULTANT or its employees, agents, subcontractors or others in connection with the execution of the work covered by this Agreement, except for those claims arising from the willful misconduct, sole negligence or active negligence of the CITY, its officers, agents or employees. CONSULTANT'S indemnification shall include any and all costs, expenses, expert fees, attorneys' fees and liability assessed against or incurred by the CITY, its officers, agents or employees in defending against such claims or lawsuits, whether the same proceed to judgment or not. Further, CONSULTANT, at its own expense, shall, upon written request by the CITY, defend any such suit or action brought against the CITY, its officers, agents or employees resulting or arising from the tortious acts or omissions of the CONSULTANT.

CONSULTANT'S indemnification of CITY shall not be limited by any prior or subsequent declaration by the CONSULTANT.

10.0 **ERRORS AND OMISSIONS.** In the event that the Water Utilities Director determines that the CONSULTANT'S negligence, misconduct, errors or omissions in the performance of work under this Agreement has resulted in expense to CITY greater than would have resulted if there were no such negligence, errors or omissions in the plans or contract specifications, CONSULTANT shall reimburse CITY for the additional expenses incurred by the CITY, including engineering, construction and/or restoration expense. Nothing herein is intended to limit CITY'S rights under Sections 7, 8 or 9.

11.0 **NO CONFLICT OF INTEREST.** The CONSULTANT shall not be financially interested in any other CITY contract for this project. For the limited purposes of interpreting this section, the CONSULTANT shall be deemed a "City officer or employee", and this Section shall be interpreted in accordance with Government Code section 1090. In the event that the CONSULTANT becomes financially interested in any other CITY contract for this project, that other contract shall be void. The CONSULTANT shall indemnify and hold harmless the CITY, under

Section 9 above, for any claims for damages resulting from the CONSULTANT'S violation of this Section.

12.0 **OWNERSHIP OF DOCUMENTS.** All plans and specifications, including details, computations and other documents, prepared or provided by the CONSULTANT under this Agreement shall be the property of the CITY. The CITY agrees to hold the CONSULTANT free and harmless from any claim arising from any use, other than the purpose intended, of the plans and specifications and all preliminary sketches, schematics, preliminary plans, architectural perspective renderings, working drawings, including details, computation and other documents, prepared or provided by the CONSULTANT. CONSULTANT may retain a copy of all material produced under this Agreement for the purpose of documenting their participation in this project.

13.0 **COMPENSATION.**

13.1 For work performed by CONSULTANT in accordance with this Agreement, CITY shall pay CONSULTANT in accordance with the schedule of billing rates set forth in Exhibit "B", attached hereto and incorporated herein by reference. No rate changes shall be made during the term of this Agreement without prior written approval of the Water Utilities Director. CONSULTANT'S compensation for all work performed in accordance with this Agreement shall not exceed the total contract price of \$507,275.

No work shall be performed by CONSULTANT in excess of the total contract price. CONSULTANT shall obtain approval by the Water Utilities Director prior to performing any work which results in incidental expenses to CITY as set forth in Section 13.2.2.

13.2 CONSULTANT shall maintain accounting records including the following information:

13.2.1 Names and titles of employees or agents, types of work performed and times and dates of all work performed in connection with this Agreement which is billed on an hourly basis.

13.2.2 All incidental expenses including reproductions, computer printing, postage, mileage and subsistence.

13.3 CONSULTANT'S accounting records shall be made available to the Water Utilities Director for verification of billings, within a reasonable time of the Water Utilities Director's request for inspection.

13.4 CONSULTANT shall submit monthly invoices to CITY. CITY shall make partial

Lower San Luis Rey River Bacteria Source Tracking Study - 711.667115

payments to CONSULTANT not to exceed the total contract price within thirty (30) days of receipt of invoice, subject to the approval of the Water Utilities Director, and based upon the following partial payment schedule:

- 13.4.1 Prior to submittal and approval of Task II, the QAPP and MP, partial payments shall not exceed \$65,000.
- 13.4.2 Prior to submittal and approval of Task III, additional payments will be made based on completion of performance of each task as detailed in Scope of Work attached hereto as exhibit B and at the approval of the Water Utilities Director.
- 13.4.3 Final payment shall be made to CONSULTANT upon CONSULTANT's completion of a final report approved by the SWRCB Project Manager and to the satisfaction of the Water Utilities Director.

- 14.0 **TERMINATION OF AGREEMENT.** Either party may terminate this Agreement by providing thirty (30) days written notice to the other party.

If any portion of the work is terminated or abandoned by the CITY, then the CITY shall pay CONSULTANT for any work completed up to and including the date of termination or abandonment of this Agreement, in accordance with Section 13. The CITY shall be required to compensate CONSULTANT only for work performed in accordance with the Agreement up to and including the date of termination.

- 15.0 **ASSIGNMENT AND DELEGATION.** This Agreement and any portion thereof shall not be assigned or transferred, nor shall any of the CONSULTANT'S duties be delegated, without the express written consent of the CITY. Any attempt to assign or delegate this Agreement without the express written consent of the CITY shall be void and of no force or effect. A consent by the CITY to one assignment shall not be deemed to be a consent to any subsequent assignment.

This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns.

- 16.0 **ENTIRE AGREEMENT.** This Agreement comprises the entire integrated understanding between CITY and CONSULTANT concerning the work to be performed for this project and supersedes all prior negotiations, representations or agreements.

17.0 **INTERPRETATION OF THE AGREEMENT.** The interpretation, validity and enforcement of the Agreement shall be governed by and construed under the laws of the State of California. The Agreement does not limit any other rights or remedies available to CITY.

The CONSULTANT shall be responsible for complying with all local, state and federal laws whether or not said laws are expressly stated or referred to herein.

Should any provision herein be found or deemed to be invalid, the Agreement shall be construed as not containing such provision and all other provisions, which are otherwise lawful, shall remain in full force and effect, and to this end the provisions of this Agreement are severable.

18.0 **AGREEMENT MODIFICATION.** This Agreement may not be modified orally or in any manner other than by an Agreement in writing, signed by the parties hereto.

19.0 **DISPUTE RESOLUTION.**

- a. Any controversy or claim arising out of or relating to this Agreement, or concerning the breach or interpretation thereof, shall be first submitted to mediation, the cost of which shall be borne equally by the parties.
- b. No suit shall be brought on this contract unless all statutory claims filing requirements have been met.

20. **NOTICES.** All notices, demands, requests, consents or other communications which this Agreement contemplates or authorizes, or requires or permits either party to give to the other, shall be in writing and shall be personally delivered or mailed to the respective party as follows:

TO CITY:

Lonnie Thibodeaux
Water Utilities Director
300 North Coast Highway
Oceanside, CA 92054

TO CONSULTANT:

Dr. Jerome Welch
MACTEC Engineering and Consulting, Inc.
9177 Sky Park Court
San Diego, CA 92123

Either party may change its address by notice to the other party as provided herein.

Communications shall be deemed to have been given and received on the first to occur:

Lower San Luis Rey River Bacteria Source Tracking Study - 711.667115

- a. Actual receipt at the offices of the party to whom the communication is to be sent, as designated above, or
- b. Three (3) working days following the deposit in the United States mail of registered or certified mail, postage prepaid, return receipt requested, addressed to the offices of the party to whom the communication is to be sent, as designated above.

21.0 **SIGNATURES.** The individuals executing this Agreement represent and warrant that they have the right, power, legal capacity and authority to enter into and to execute this Agreement on behalf of the respective legal entities of the CONSULTANT and the CITY.

IN WITNESS WHEREOF the parties hereto for themselves, their heirs, executors, administrators, successors and assigns do hereby agree to the full performance of the covenants herein contained and have caused this Professional Services Agreement to be executed by setting hereunto their signatures:

PROJECT: Lower San Luis Rey River Bacteria Source Tracking Study - 711.667115

MACTEC ENGINEERING AND CONSULTING, INC.

CITY OF OCEANSIDE

By: Joy Shraake, Project Manager
Name/Title

By: Peter A. Weiss
Peter A. Weiss, City Manager

By: _____
Name/Title

APPROVED AS TO FORM:

Barbara Samilton, ASST.
City Attorney

68-0146861
Employer ID No.

NOTARY ACKNOWLEDGMENTS OF CONSULTANT MUST BE ATTACHED.



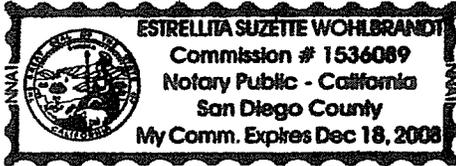
CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California }
County of SAN DIEGO } ss.

On 28 January 2008 before me, Estrellita S. Wohlbrandt Notary Public
Date Name and Title of Officer (e.g., "Jane Doe, Notary Public")
personally appeared Jay Shroake
Name(s) of Signer(s)

personally known to me
 proved to me on the basis of satisfactory evidence

to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



WITNESS my hand and official seal.
[Signature]
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

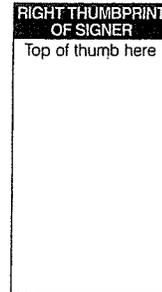
Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer

Signer's Name: _____

- Individual
- Corporate Officer — Title(s): _____
- Partner — Limited General
- Attorney-in-Fact
- Trustee
- Guardian or Conservator
- Other: _____

Signer Is Representing: _____





REVIEW, APPROVAL AND SIGNATURE POLICIES FOR PROPOSALS, CONTRACTS AND SUBCONTRACTS FOR SERVICES, AND PROJECT DOCUMENTS TRANSMITTED TO CLIENTS

POLICY ES-04

Purpose

To establish Company policy and procedure for review, approval, and signing of proposals, contracts and subcontracts for services, and project-related documents sent to clients.

Scope

This Policy applies to all (i) proposals ("Proposals"), contracts and agreements under which MACTEC Engineering and Consulting (Company), a subsidiary of MACTEC, Inc., will provide services ("Contracts"), (ii) all subcontracts under which Company will either provide or receive services under a prime agreement ("Subcontracts") and (iii) all documents prepared by Company for its client which contain technical or test data, observations, conclusions, or commitments, such as work summaries, draft and final reports and documents transmitted between offices that will be incorporated into documents sent to clients ("Documents"). Note that Federal, state or local Governmental Regulations or contractual obligations may impose requirements in addition to those set forth in this Policy. The term "review" is defined to mean an examination for acceptability. It includes examination of the accuracy and completeness of the Contract, Subcontract or Documents and supporting information, compliance of the Contract with the Company's Acceptable Risk Management Profile (see Legal Policy LD-30) and obtaining the required signatures (written or electronic/digital) on the document to indicate approval.

Review, Approval and Signature Policy for Proposals, Contracts and Subcontracts

Client-generated (i) Contracts, (ii) Subcontracts under which Company is to provide services and (iii) modifications to the Company's Proposal Work Acceptance Sheet ("PWAS") or other Standard Company Contracts or Subcontracts shall be reviewed by the qualified Office Contract Analyst under the procedures set forth in Policies LD-6, LD- 30, and LD-32 except for Design-build Contracts which shall be sent to the Office of General Counsel.

Standard Company Contracts, whether modified or not, and Client-generated Contracts and Subcontracts may be signed by the General Counsel or any Company officer or employee who is involved with the project in question and who is a properly designated Principal Professional (See Policy ES-01), Project Manager (See Policy ES- 11), Chief Engineer/Chief Scientist (See Policy ES-02), Office Manager, or Division Manager. Any of these documents that involve the exercise of engineering or scientific evaluation, interpretation, recommendations, professional judgment, or professional opinions and/or contain specific scopes of services, also must be reviewed and signed by a properly designated Principal Professional. Proposals shall be prepared, reviewed and signed by two individuals, at least one of whom is a properly designated Principal Professional. When the Company's Standard PWAS is used in place of a formal proposal, the joint preparation/review requirement shall apply, and those two individuals shall sign the PWAS where indicated.

No Client-generated Contract or Subcontract, nor any Standard Company Contract that has been modified in any way shall be signed unless it has been properly reviewed and approved in accordance with Policies LD-6, LD-7 and LD- 30. This review and approval shall be evidenced by the stamp and initials of either an Office Contract Analyst ("OCA"), a Division Attorney or the General Counsel on the face of the Company file copy of the document or other written authorization from the applicable OCA, Division Attorney or the General Counsel.



REVIEW, APPROVAL AND SIGNATURE POLICIES FOR PROPOSALS, CONTRACTS AND SUBCONTRACTS FOR SERVICES, AND PROJECT DOCUMENTS TRANSMITTED TO CLIENTS

POLICY ES-04

Policies A-1, LD-6, LD-7, LD-30 and LD-32 impose special approval requirements with respect to certain

Proposals, Contracts, and Subcontracts are not authorized until all required approvals have been obtained. The OCA for the office that originated the Contract or Subcontract shall ensure that all requisite approvals, as set forth in this Policy and above Policies, have been obtained, and that evidence of this review and approval is maintained in the project file.

In the case of modified Standard Company Contracts, two copies should be signed first by the Client and returned to the Company for signature by a properly authorized Company representative. The Company shall retain one signed copy in our project file and return the other copy to the Client. This requirement is designed (i) to ensure that any changes made to the Contract by the Client are properly considered by the OCA (and made, if acceptable) before the Company signs it and (ii) to prevent the other party from making changes to the document of which we might not be aware after the Company signs it.

The foregoing requirements also shall apply in full to any and all Task Orders, Work Authorizations, Amendments, and Purchase/Change Orders that require separate execution and reference and/or incorporate a Master Services Agreement, other Contract or Subcontract.

Review, Approval and Signature Policy for Project Documents

Project Documents covered by this Policy are classified into two categories. Each category has different review and signature requirements, as follows:

- A. Test Results - Field and laboratory test results performed and reported in accordance with standard procedures, practices or methods require review by the individual who performed the test and one other individual.
- B. Documents Other Than Test Results - Documents other than test results shall be prepared and reviewed by two individuals. At least one shall be an appropriately qualified Principal Professional.
- B1. Documents Involving Professional Judgment - Documents involving the exercise of engineering or scientific evaluation, interpretation, recommendations, professional judgment, or professional opinions shall be reviewed and signed by a qualified Principal Professional. The Principal Professional shall be licensed in accordance with appropriate federal, state and local requirements. This Principal Professional shall have had suitable experience with the techniques employed, conditions evaluated, and technologies involved and be authorized by the Company
- B2. Design Documents - Design documents (drawings and specifications) shall be signed and sealed by a Principal Professional with a design specialty in the applicable discipline or by the assigned Chief Engineer/Chief Scientist in accordance with applicable federal, state and local requirements.
- C. Electronic Documents – Electronic delivery of project documents is increasing every day. A clear record of the content of these documents and files must be maintained in the project files. Copies of transmitting e-mails shall be kept in the project files along with a copy of what was



REVIEW, APPROVAL AND SIGNATURE POLICIES FOR PROPOSALS, CONTRACTS AND SUBCONTRACTS FOR SERVICES, AND PROJECT DOCUMENTS TRANSMITTED TO CLIENTS

POLICY ES-04

sent. Electronic delivery must comply with applicable federal, state and local requirements as well as the review, approval, and signature requirements of A and B in this Section of this policy. The electronic files should be in read only format.

- D. Electronic/Digital Signatures – Documents may be signed with electronic or digital signatures when allowed by federal, state, and local laws. The Director of Engineering and Science shall prescribe the electronic or digital signature protocols acceptable to the Company.

Signature and Titles – General Considerations

Signature, not initials, shall be used to indicate review and approval. In addition, the appropriate technical title, as defined by Company Policy, shall be used in signing reports and other project deliverables.

Federal, state or local requirements (such as state registration laws) may be more restrictive in regard to the use of technical titles. In such cases, the more restrictive title shall be used.

Company Policy restricts the use of the terms “Project Manager”, “Senior Project Manager”, “Principal”, “Senior Principal” and “Chief”. These terms shall not be used as a part of an individual’s title unless the individual has been so designated with approval from the Director of Engineering and Science. Reports and project documents shall bear the applicable registration seal and signature or other acceptable evidence of registration when required by regulation. However, in many states it is illegal to incorrectly hold oneself out as an engineer or other licensed professional when one is not licensed in that state, since this can constitute the unauthorized practice of the applicable profession. Therefore, individuals who are not a registered professional in the state where the project is located must sign a Proposal, Contract, or other project documents as “Principal Professional”, rather than as a P.E., P.G., etc.

When a document is submitted to a client, a duplicate original with original signatures shall be placed in the project file. The duplicate original shall be marked “File Copy” in the upper right corner of the first page.

Absentee Signatures – When any authorized employee of MACTEC is required to sign a document under this Policy and that employee is not reasonably available (i.e. out-of-the-office) to execute his/her signature, he/she may authorize another employee to sign for him/her. The authorized employee should actually sign their own name and the phrase “for _____ with permission”. The employee’s name for whom the document is being signed should show in the blank. A record shall be kept in the project file that clearly indicates that the proper review has been performed by and permission to sign has been given by the absentee employee. The name of the signing employee shall be clearly documented in the project file.

Exceptions

Draft documents submitted to the client after appropriate review shall be labeled “Draft Copy”. Such copies shall not be signed or sealed unless required by law. A transmittal form signed by the Principal Professional should accompany the draft sent to the client, and a copy of the transmittal form should be placed in the project file along with a copy of the draft document.



December 4, 2007

Water Utilities Department
300 North Coast Highway
Oceanside, California 92054

Subject: Proposal: for City of Oceanside Lower San Luis Rey River Bacteria Source Tracking Study

MACTEC Engineering and Consulting, Inc. (MACTEC) is pleased to provide a proposal for the City of Oceanside Lower San Luis Rey River Bacteria Source Tracking Study. As one of the largest providers of wet and dry weather source tracking studies in California, MACTEC offers the City of Oceanside several major advantages:

A team of skilled local talent. MACTEC's key staff has been carefully selected to provide the City of Oceanside with its best talent available to successfully complete all tasks requested by the City of Oceanside. Our team includes staff with an average of 13 years of experience dedicated to wet and dry weather source tracking. In addition, MACTEC has teamed with Dr. Brock Bernstein, Dr. Rachel Noble, Dr. Jed Fuhrman, and Dr. John Griffith of the Southern California Water Research Project (SCWWRP). These team members specialize in the development, testing, and use of state-of-the-art methods to detect and identify sources of fecal contamination and human pathogenic viruses in the coastal marine environment.

Comprehensive bacteria source tracking experience. MACTEC has been involved in wet and dry weather source tracking policy, management, implementation, and reporting since the late 1980's. MACTEC has implemented some of the wet and dry weather source tracking programs in the country, including programs for the California Department of Transportation, Riverside County Flood Control District, San Diego International Airport, University of California San Diego, City of Monterey, City of Pacific Grove, and SCWWRP, among others. Additionally, our team members have conducted large-scale bacteria source tracking studies involving multi-tiered genetic microbial testing for Santa Monica Bay and Mission Bay in San Diego. Our team members have been involved in efforts to identify sources of indicator bacteria responsible for beach closures and postings in the cities of Huntington Beach, and Avalon, California, as well research funded through USC SeaGrant to examine relationships between levels of indicator bacteria and the presence of human pathogenic viruses in the coastal waters of Los Angeles.

An understanding of the issues facing the City of Oceanside. MACTEC recognizes that one of the primary challenges is coordinating with multiple City of Oceanside Departments and Divisions, as well as numerous Copermittees, to gather and report the required information. We understand your storm water program expectations and know and have worked well with your staff in the past. We have been extremely successful in implementing the San Diego municipal storm water program. Therefore, there is no learning curve for MACTEC and we can provide you cost-effective bacteria source tracking services.

A focus on providing quality services and deliverables. MACTEC has repeatedly performed projects with the same scope of services required by this contract. Not only does MACTEC have the requisite project experience, MACTEC has an excellent record of completing projects on time,

MACTEC Engineering and Consulting, Inc.

9177 Sky Park Court • San Diego, CA 92123-4341 • Phone: 858-278-3600 • Fax: 858-278-5300



within budget, and to the customer's complete satisfaction. Our performance record for storm water work is exemplary: 93% of our storm water evaluations have been "excellent" and client scores have averaged 3.95 (out of 4) for deliverable timeliness and quality. As a result of our work, we received the CELSOC/SWDIV "Excellent Customer Service Award" for our management of the storm water program.

The MACTEC team has the recent specialized project experience, technical expertise, and staff capability to meet all of the requirements of this contract.

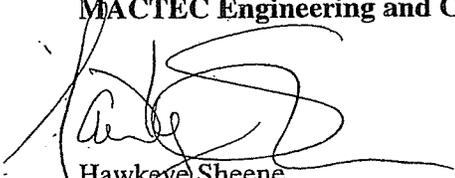
Ms. Hawkeye Sheene is the proposed Project Manager for this contract. Correspondence relating to the subject Request for Proposal can be sent by email to her at hlsheene@mactec.com or transmitted by fax to (858) 278-5300.

We appreciate the opportunity to submit a Statement of Qualifications for this contract, and look forward to providing our services to the City of Oceanside in the near future.

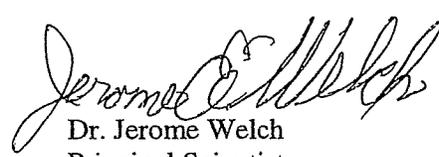
Respectfully submitted,

Sincerely,

MACTEC Engineering and Consulting, Inc.



Hawkeye Sheene
Project Manager



Dr. Jerome Welch
Principal Scientist

MACTEC Engineering and Consulting, Inc.

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PROJECT APPROACH

MACTEC's approach to completing each of the plan components is discussed in the following sub-sections. Each of these sub-sections is further divided into a series of subtasks for each item. MACTEC's quality control approach is discussed at the end of this section.

The City of Oceanside's Lower San Luis Rey Bacteria Source Tracking Study will include the following subtasks:

1. Meetings and Project Management

Management methods are discussed with particular attention to project controls necessary for timely execution of the contract within budget. This section describes MACTEC's management approach, how we will attend Technical Advisory Committee (TAC) meetings, how we work closely with the stakeholders to develop required document and address and revisions and/or concerns that arise during the creation, implementation or reporting of the study, contract management, progress reporting, and quarterly invoicing with stakeholders and the State Water Resources Control Board (SWRCB).

Management Approach – The MACTEC team will use the following methods to control all work on this contract. These methods ensure the work is satisfactorily completed on schedule and within budget.

Project Planning – Projects are initiated with a project plan that describes:

- a. Project execution team members and qualifications
- b. Subtask breakout
- c. Man-hour estimates by skill/grade
- d. Costs/schedule of events
- e. Quality control and assurance procedures
- f. Technical and administrative procedures
- g. List of deliverables with intermediate and final due dates
- h. Invoice requirements

TAC Meetings and Stakeholder Coordination – MACTEC will attend all TAC meetings and review project progress. The project team will work closely with TAC members and stakeholders to achieve both a successful and collaborative project outcome.

Regular Team Meetings – Periodic briefings will be held with all team leaders and key specialists. The agenda of these meetings is to review the progress of active tasks, identify tasks requiring additional action, and identify any site-specific requirements. The primary objective of these meetings is to identify any issues affecting the successful completion of all work assignments.

Periodic Client Updates – The Project Manager will provide written reports relating activities accomplished, activities to be accomplished, and costs to-date to the City of Oceanside.

Project Resource Scheduling System – MACTEC provides planning, budgeting, and project control through use of project tracking software (Primavera and Microsoft Project). This system

will generate reports showing planned and actual start and completion dates, percent completion, and schedule variance.

Tracking and Progress Reports – MACTEC will closely track project costs and schedule performance of its contract. MACTEC will provide monthly (or more frequently, if requested) progress reports to the City of Oceanside on project costs versus budget and planned schedule. If a report shows scheduling issues, we will add resources to bring projects within schedule.

On-Line, Real-Time Project Accounting System – All project costs are based on weekly time sheets, subcontractor invoices, and expense reports. The basic output of the system is the resource control cost report. Expenses are detailed and include labor, subcontractor expenses, travel, materials, and other direct costs. This report is accessible to the Project Manager on-line. On-line financial reports also provide all pertinent cost and budget data required for evaluating each task. These reports are updated daily through our Oracle accounting system.

Quarterly Progress Reporting and Invoicing - MACTEC will develop and submit quarterly progress reports and invoices to the SWRCB. MACTEC has templates in place for SWRCB grant reporting and budgeting that will be utilized for this project that have been utilized successfully for other SWRCB projects.

Management of Subcontractors – Control of subcontractor performance from a quality, performance, and schedule standpoint is critical to the overall success of the task orders. The subcontractor professional experts will fully participate in the integrated MACTEC team process. Subcontractor assigned staff will be technically and operationally controlled at the lowest possible level to provide integration into project activities.

Project Reviews – MACTEC conducts comprehensive monthly project reviews of program activities, progress, finances, resource needs, and other issues. These meetings are attended by the project manager and task leaders, technical leaders, and key MACTEC staff. This allows timely identification of potential issues and the need for any corrective action.

Quality Control and Quality Assurance – Overall technical quality of the entire program is the responsibility of the project manager, Hawkeye Sheene. Ms. Sheene is responsible for assembling a team, which will plan and execute each task that meets all of City of Oceanside's requirements and expectations. They will assure that adequate technical and quality control procedures are in place and used according to the MACTEC quality assurance/quality control (QA/QC) program. Our QA/QC program is divided into two distinct sets of procedures and responsibilities: (1) quality control and (2) quality assurance or verification.

Quality Control – Quality control consists of identifying objective standards, specifications, or criteria that will guide the project to the desired result (preparation phase), performing work to those established standards (implementation phase), and regularly monitoring work performance to confirm that required results are obtained (follow-up phase).

Each individual staff engineer or scientist is responsible for checking his or her own work according to MACTEC's QA/QC program. An intermediate review is accomplished by the appropriate technical discipline leader or designated technical reviewer in their applicable discipline at the task level. The next review is provided by the Principal Scientist (Dr. Jerome Welch). The final review is provided by the Project Manager (Hawkeye Sheene) who submits the deliverable.

Quality Assurance – Quality assurance, or verification, is an independent check to assure that all QC procedures have been applied to each task. For quality verification to be effective, it must be independent of the day-to-day activities of the project. Thus, for this contract, independent quality assurance/verification is the responsibility of the QA/QC/Principal Scientist (Dr. Jerome Welch). His responsibilities include the following:

- Reviewing the QA/QC.
- Auditing files and reports to verify that all QC was accomplished as required.
- Performing unannounced audits and surveillances of project activities.
- Performing regular checks on City of Oceanside satisfaction.
- Tertiary point of contact with the City of Oceanside.

2. Quality Assurance Project Plan (QAPP) and Monitoring Plan (MP)

The impetus behind the bacteria source tracking study is to identify sources of high bacterial levels in the Lower San Luis Rey River. Therefore, it is imperative that the monitoring plan be designed to answer specific applicable questions to identify sources and that quality data is collected during the monitoring effort. The MP will define how the monitoring will take place to achieve the project objectives. The QAPP describes how the quality of the measurement data will be assured.

MACTEC will prepare and maintain the QAPP and MP to cover field and laboratory operations and be in accordance with the SWRCB's Surface Water Ambient Monitoring Program. This includes a draft and final product for review for the stakeholders and approved by the SWRCB QA officer. The project team will prepare an agreed upon number of copies of the draft MP and QAPP for the stakeholders to review, and an agreed upon number of copies of the final report.

The MP will provide details of the monitoring, including constituents, sampling locations, frequency, and sampling team. In a separate document, the QAPP will discuss the details of how the samples are collected to provide data that are representative and scientifically defensible. The QAPP will be comparable with State of California's Surface Water Ambient Monitoring Program (SWAMP) QAPP standards and will cover both field and laboratory operations as outlined in the MP. The QAPP will also consist of the following elements: project management, data generation and acquisition, assessment and oversight, and data validation and usability.

The project team will submit the draft MP and QAPP to the stakeholders by February 8, 2008 for review and comments and to the SWRCB by February 29, 2008 schedule. The project team will submit the final MP and QAPP to the SWRCB by March 7, 2008 to achieve the required grant deliverable schedule.

3. Implementation of the Bacteria Source Tracking Study

3.A Bacteria Source Tracking Study Approach

1. Dry Weather Monitoring Program

The lower river dry weather monitoring program will consist of multi-day intensive sampling in early summer (May/June) and again in late summer (July/August) at all sampling locations upstream of the river mouth. A dry weather, wet season sampling program will take place in the river mouth in winter (November/December). The sampling will coincide with the collection and analysis of flow data.

2. Wet Weather Monitoring Program

The wet weather sampling program will include two storm events of intensive multi-day sampling to characterize the storm over the duration of the event. The wet season sampling locations for the lower river will be determined by results from the dry season sampling. Locations for the river mouth will be based on flow from storm drains, bird populations and flux measurements. The sampling will coincide with the collection and analysis of flow data.

3. Gull population Characterization

During periods of heavy migration, the project team will also incorporate a component to the proposed work to characterize the contribution of gull populations to fecal contamination at the river mouth. This study will include both water column and sediment sampling, and will be conducted and designed after enough information is gathered from the visual observation program described below.

4. Monthly Visual Observations and Bacteria Indicator Sampling

The project team will develop and manage a comprehensive visual observation program to be implemented in conjunction with monthly river sampling, conducted by the City of Oceanside. The program will assess other ubiquitous non-point sources such as homeless encampments, urban runoff from specific land use activities (agricultural and golf course irrigation, residential dry weather flows, etc.), and waterfowl (and other wildlife) may be contributing to the contaminant loads in the lower river and river mouth.

The visual observation monitoring will be conducted in conjunction with monthly water quality sampling of the San Luis Rey River at locations assessed as having a high potential of contributing bacterial contamination to the river.

Visual observation survey will be split into four categories:

- Human behavior/activities – number and activities at homeless encampments, park visitor behavior, failure of pet owners to pick up waste, etc.
- Maintenance procedures – at adjacent parks, golf course, farmlands, and malls, activities related to trash maintenance and irrigation practices.
- Wildlife distribution patterns – number of birds in area, roosting behavior, feeding behavior, and other wildlife.
- Dry weather runoff - observed flowing or ponded water visible in storm drains and/or on surface areas. Observations will include water quality information such as color, clarity, odor, and floatables.

5. Potential Best Management Practice Recommendations

The project team will develop recommendations for potential Best Management Practices to reduce and eliminate bacterial sources in the Lower San Luis Rey River and river mouth. Candidate BMPs will be evaluated based on site conditions, hydrologic conditions of concern, and identified sources per methods described by California Stormwater Quality Association Stormwater Best Management Practices Handbooks, as well as other sources.

3.B. Study Sampling Methods

Wet and Dry Weather Program Sample Collection and Flow Measurements

The project team proposes to collect dry weather samples at multiple main-stem sites and major tributaries to the Lower San Luis Rey River. The proposed main-stem sites extend from Bonsall Bridge (just east of the City of Oceanside limits) to the river mouth at the Pacific Ocean shoreline. The tributaries representing the largest hydrodynamic inputs to the system are located in reaches between the main-stem sampling sites. Dry weather sampling in the river mouth will occur after bridge construction in the mouth is complete. Wet weather sampling locations will be made up of sites across the river mouth and a selection of lower river dry weather locations of tributaries and “hot spots”.

The collection of discharge (flow) data at each location will be based on a ‘velocity-area’ method that incorporates a fixed water level logger and a water velocity sensor. Flow is determined by measuring the cross-sectional area of a stream and the average velocity for that cross-section using the flow continuity equation:

Flow = Total Average Cross-sectional Area of Stream X Average Velocity, or more accurately,

$$Q = \sum_{i=1}^n A_i V_i$$

where Q = Total Flow, A_i = Area of i^{th} Segment, and V_i = Average Velocity in i^{th} Segment.

The cross-sectional area of each stream will be determined by establishing a transect, and making sets of equally spaced depth measurements across the stream. Within each segment, a Stream-Stick will be used to hold the velocity sensor of a Marsh-McBirney Flo-Mate™ hand-held flow meter into the oncoming stream. The Stream-Stick is a graduated vertical mounting device that allows a person to determine the depth of the velocity sensor at a given stream location. At the midpoint of each of the transect segments, current speeds will be measured at depths that represent 20%, 60%, and 80% of the mid-point depth, as measured from the water surface. Average current speed within each segment is determined as follows:

$$V_i = .25V_{20i} + .50V_{60i} + .25V_{80i},$$

where V_i = average current speed, V_{20i} = current speed at 20% of the water depth, V_{60i} = current speed at 60% of the water depth, and V_{80i} = current speed at 80% of the water depth, all in the i -th segment. The products of cross-sectional area and average current speed is summed up over the transect segments to give a computed flow. A discharge rating curve can be calculated when this measurement is performed numerous times when the stream is at different discharge rates. Once a rating curve is established it is possible to calculate flow at any stage. All flow measurements shall be used to develop stream rating curves. Rating curves will be updated each time new stream flow measurements are collected.

One-hour composite water samples will be collected immediately downstream of flow measurement devices at each site. The sampling period will correspond to the approximate hydrodynamic travel time from Bonsall Bridge to the river mouth. Hourly 4-liter composite samples at each site will be created by combining 10 individual 400-ml grab samples collected every 6 minutes into a single container. After collection, samples will be placed on ice and transported immediately to CRG or the University of Southern California for processing.

3.C. Study Laboratory Analytical Approach

1. Analysis of Indicator Bacteria

The project team proposes to measure concentrations of *E. coli* and *Enterococcus* spp. by defined substrate technology using kits supplied by IDEXX Laboratories, Inc. (Westbrook, ME) according to the manufacturer's instructions. Laboratory staff will make 10-fold and 100-fold dilutions of the water samples with deionized water containing the appropriate media and sodium thiosulfate. The samples will be mixed to dissolve, then dispensed into trays (Quanti-Tray/2000), and heat sealed. *E. coli* will be measured using the Colilert-18 reagents, while *Enterococcus* spp. will be measured using Enterolert reagents. Samples will be incubated overnight according to the manufacturer's instructions and inspected for positive wells. Conversion of positive wells from these tests to a most probable number will be accomplished following Hurley and Roscoe (21). Indicator bacteria analysis will take place at CRG Laboratories.

2. *Bacteroides thetaiotamicron*

The project team proposes to use the already developed, tested and optimized, rapid QPCR method for *Bacteroides thetaiotamicron* (Noble et al. in preparation, Shanks et al. in press), which is an exciting candidate for an alternative indicator of fecal contamination. *Bacteroides* sp. make up approximately one-third of the human fecal microflora, considerably outnumbering *Enterococcus* and *E. coli*. The *Bacteroidetes* group belongs to a group of nonspore forming, gram negative, obligate anaerobes, so there is little concern over regrowth in the environment. More importantly, a range of human and animal specific *Bacteroides* sp. markers have been developed increasing the value of this potential indicator (e.g. Bernhard and Field 2000, Carson et al. 2006). The species *B. thetaiotamicron* is highly abundant in human fecal waste, has been demonstrated to be tightly related to the presence of human fecal contamination, and is typically found in very low numbers or not at all in animal feces (Wang et al. 1996). Finally, bacterial markers such as *Bacteroides* sp. have been shown to be potentially useful source tracking tools. In Griffith et al. (2003) the *Bacteroides* sp. markers correctly identified human sources of fecal pollution when present in mixed water samples delivered blind to the laboratory.

We propose to analyze all samples collected over the course of this study using the rapid QPCR assay developed by PI Noble, and currently in use by Rich Haugland (USEPA) for *B. thetaiotamicron* targeting the 16S rRNA gene. As a target and potential alternate indicator, the utility of *B. thetaiotamicron* has been previously demonstrated (Carson et al. 2006). In the Noble lab, we have developed and optimized a rapid QPCR assay that is specific, accurate, and quantitative for this target (other publications have generally utilized conventional PCR for this target). We have shared this assay with Rich Haugland at USEPA, where the assay has been tested for specificity and for relation to potential human health effects through the analysis of previously collected epidemiology study samples (from the Great Lakes), showing highly promising results (Noble et al. in preparation). In NC, we

originally pursued the use of an alternative *Bacteroides*-related probing system because we identified significant cross-reactivity using the other *Bacteroides* sp. human and cow specific markers developed by Bernhard and Field (2000) with other types of animal scat (Noble et al. 2006). Layton et al. (2006) discussed similar findings when trying to translate existing *Bacteroides* markers into a QPCR format (Layton et al. 2006). In eastern NC, and in urban stormwater outfalls of southern California, *B. thetaiotamicron* has been shown to be present in high concentrations in human impacted areas and at baseline levels in areas where human fecal contamination was demonstrated to not be present (Noble et al. in preparation).

3. Human Viral Pathogens: (Enterovirus, and Hepatitis A virus):

The viral pathogens targeted in this project will be human-specific, important causative agents of waterborne disease and the approaches for quantifying them have been previously published.

Of the enteric viruses, human enteroviruses are one of the most commonly detected viruses in polluted waters (Rusin et al. 2000). Enteroviruses are members of the Picornaviridae family and are estimated to cause 30 million to 50 million infections per year with 30,000 to 50,000 of these resulting in meningitis hospitalizations (Oberste et al. 1999). PIs Fuhrman and Noble have conducted extensive enterovirus research in southern California storm and marine waters, and have demonstrated that enteroviruses are a useful tracer of human fecal contamination in this urban setting. Routine monitoring of FIB in environmental waters has demonstrated weak or non-existent predictive relationships to enteroviruses and other human pathogens, suggesting a need for viral pathogen specific assays in environmental waters (Noble and Fuhrman, 2001, Jiang et al. 2001, Jiang and Chu, 2004). We have developed and optimized assays for the detection of the human enterovirus group, and have used these assays to successfully identify and quantify the extent of human fecal contamination in a range of aquatic environments (Gregory et al. 2006, Fuhrman et al. 2005, Noble et al. 2006). We propose to conduct enterovirus analysis on all samples for this study.

Other previously identified, important human enteric viruses that we have the capability to quantify include HAV, which is highly infective and transmittable among human populations. HAV is one of the better-known viruses often found to be present and persistent in coastal waters (reviewed by Griffin et al. 2003), and is an excellent marker of human fecal contamination, as recently demonstrated in the Tijuana River, CA by Gersberg et al. (2006). A TaqMan® quantitative PCR assay suitable for detection of HAV from environmental samples has recently been reported to be sensitive enough to detect 0.5 infectious units and 40 copies of a synthetic transcript (Jothikumar et al, 2005). If appropriate, given our initial findings we can analyze samples for HAV in this study with the same extracts used for enteroviruses. We will conduct Quantitative Reverse Transcriptase PCR (QRT-PCR) assays for both human enteroviruses and HAV. Previous work in southern California waters has demonstrated low concentrations of HAV, so we plan to use an adaptive approach for these viral pathogen analyses. The assays provide a means to accurately quantify viral loads, with sensitivity, specificity, accuracy, and precision not found with conventional fecal source tracking methods. The enteroviral and HAV QRT-PCR assays routinely detect 25 to 50 copies of viral genome per reaction. Microscopic analysis of titered enterovirus reveals that there are between 102 and 326 single genome viral particles per infectious plaque forming unit (PFU) of enterovirus. This translates to a detection limit between 0.5 and 0.15 PFU per reaction, making the assays extremely sensitive (Gregory et al., 2006), and furthermore, pertinent to human health effects. Due to the natural occurrence of PCR inhibitors in environmental waters, we can also utilize a novel genome specific competitive internal

positive control (CIPC) that allows for assessment of PCR inhibition that is characteristic to each viral target. The CIPC assures that specific run conditions are met before data is analyzed, greatly reducing the occurrence of false negative results. The CIPC allows precise quantification of viral targets and provides data on inter- and intra-assay variability ensuring run conditions remain consistent. Virus specific quantification standards permit accurate determination of viral genome concentrations and provide a means for determining the QRT-PCR efficiency (see methods section and Gregory et al. 2006 for more details).

4. Enterococcus faecium Enterococci Surface Protein (esp) gene:

Studies have demonstrated that the *esp* gene in *E. faecium* is the virulence factor in this microorganism and plays a role in its pathogenesis (Leavis et al., 2004 and Routsis et al., 2003). A study conducted using 120 isolates associated with hospital outbreaks from the United States, Europe and Australia reported that the *esp* gene in clinical isolates of *E. faecium* were genetically distinct from the non-epidemic isolates (n=45) and animal isolates (n=98) and it also suggested that its presence was a marker of increased virulence (Willems et al, 2001). Several groups have utilized *esp* gene analysis to effectively characterize sources of fecal contamination in a range of different environments (McQuaig et al. 2006, McDonald et al. 2006, Lu et al. 2006, Soule et al. 2006).

Scott et al. 2005 previously developed a set of primers specific for the *E. faecium esp* gene and a cultivation-PCR based method to detect human sewage. A total of 167 wastewater and fecal samples were screened for the target gene and the gene was detected in primary sewage influent (40/40), secondary sewage effluent (10/10), filtered wastewater (5/5) and septic tank effluent (8/10). The marker was never detected 0% (n=102) in animal wastewater samples. Survival studies showed that the marker was detectable in fresh water up to 5 d when ENT counts ranged from 19-122 CFU, and in seawater up to 7 d when the total ENT was 70 CFU (Scott et al. 2005). More recent work using this marker has streamlined the method. We have reassessed presence of the marker in a year-long study of untreated sewage, in treated secondary effluent and have undertaken a blind study with the US Geological Survey (Kumar et al., 2006 in preparation). The method has several advantages: 1) it can detect viable ENT and aids in distinction of adequately treated sewage (detected only in 10% of effluent samples compared to 100% of untreated sewage), 2) the sensitivity of the method averages 45 +/- 28 CFU in untreated sewage based on a 1-year study, 3) the approach can be utilized with current membrane filtration methods commonly used by local laboratories, and 4) in a blind study, no false positives (all animal sources were negative) were noted and the only false negatives were associated with samples with CFU below the detection limit. We propose to use both the QPCR approach developed by Scott et al. (Scott et al. in prep) for enumeration of the *esp* gene in beach samples and relate these results to human health effects.

5. Enterococcus speciation

Additional to the above mentioned approaches, the project team also has the capability to use of Enterococcus speciation as a source tracking and research tool during this study. The current methods utilized for measuring Enterococcus, such as Enterolert and EPA 1600 quantify up to 20 species that belong to the genus Enterococcus (SM document, references). It has long been known that specific species of Enterococcus are more closely associated with human fecal contaminatin (*E. faecalis* and *E. faecium*), other species are more closely associated with bird fecal contamination (*E. avium*) and still other species can be found indigenous to marine environments and directly associated with fecal contamination (*E.*

casseliflavus). The project team has the capability to quantify the *E. faecalis*, *E. faecium* and *E. casseliflavus* species using QPCR methods similar to those described above for *B. thetaiotamicron*.

6. Community Fingerprinting

We propose to employ community fingerprinting of the bacterial communities within the river, its tributaries, and in sediments to identify sources of bacteria to the system. Previous work using these methods has shown that it is possible to use the “fingerprint” of bacterial populations to characterize their contributions and relationships to spatially distinct bacterial communities in both water and sediments (Cao et al. 2006). Targeting only samples that contain a pre-determined level of fecal indicator bacteria, we will compare the fingerprint of the bacteria in these samples to that of potential sources in both the upper and lower rivers using statistical methods designed to tease out relationships. To minimize costs, this analysis will utilize the same DNA collected for the *Bacteroides thetaiotamicron* assay described above.

3D. Study Calculations and Statistical Analyses Approach

Data analysis will be comprised of six steps. First, the hydrologic budget will be evaluated to determine if the majority of the flow was sampled. This evaluation will be conducted by comparing the volumetric inputs from each of the tributaries to the volumetric discharges along the main stem of the Lower San Luis Rey River. The second step will be to examine temporal and spatial trends in the flux of both fecal indicator bacteria and *bacteroides thetaiotamicron*. The flux of fecal indicator bacterial cells per hour will be calculated by multiplying the concentration of the fecal indicator bacteria by the flow rate. The mean hourly flux (temporal analysis) will be calculated by averaging the flux of fecal indicator bacteria at all main-stem locations for each hourly interval. The mean flux at each site (spatial analysis) will be calculated by averaging the flux at each main-stem or tributary site for all hourly samples. The same approach will be used for *bacteroides thetaiotamicron*. Statistical analysis of the differences in bacterial flux between hourly time periods or, alternatively, between main-stem sites will be conducted using analysis of variance.

The third data analysis step will be to examine the spatial and temporal extent of human specific enterovirus concentrations. The presence of enterovirus will be quantified, so the magnitude of enterovirus concentrations can be tabulated among the different locations across the different time period. Patterns moving downstream, adjacent to tributaries, and loading or trends over time will be examined.

The fourth data analysis step will be to utilize as needed, the quantification of specific species of Enterococcus that are more closely associated with human fecal contamination (*E. faecalis* and *E. faecium*), bird fecal contamination (*E. avium*) or other species that can be found indigenous to marine environments and directly associated with fecal contamination (*E. casseliflavus*). If this analysis is required, the project team can quantify the *E. faecalis*, *E. faecium* and *E. casseliflavus* species to examine spatial and temporal patterns in the frequency of these species.

The fifth data analysis step will be to examine the community fingerprint of the bacterial communities within the river, its tributaries, and in sediments to characterize their contributions and relationships to spatially distinct bacterial communities in both water and sediments. Statistical comparisons will be made between the fingerprint of the bacteria in the samples to that of potential sources in both the lower river and river mouth using molecular methods.

The sixth data analysis step will examine the identified spatial and temporal patterns of bacteria and their sources and to identify candidate Best Management Practices (BMPs) to reduce or eliminate these sources. Candidate BMPs will be evaluated based on site conditions, hydrologic conditions of concern, and identified sources per methods described by California Stormwater Quality Association Stormwater Best Management Practices Handbooks, as well as other sources.

3E. Study Reporting Approach

The project team will develop the draft final report and final report for submittal to the SWRCB to satisfy the grant requirements. The final report will include the following elements:

- I. Title Page: Including title, date, Watershed, project type, funding sources, and cost of project
- II. Grant Summary Form – Completed & Updated
- III. Table of Contents
- IV. Executive Summary
- V. Problem Statement & Relevant Issues
- VI. Project Goals
- VII. Project Description:
Including Project Type, Project Costs – total costs; matching funds & fund sources; Project Methodology/Construction/Description/Pollutant Load; Existing data (graphs & tables) and/or Before Photos; New data (graphs & tables) and/or After Photos; and Data Evaluation/Pollutant Reduction
- VIII. Public Outreach
- IX. Conclusions:
Including Project Evaluation & Effectiveness – Results of PAEP; individual goals: corresponding performance measures; explanation if goals were met, if not why; what changes would be made with hindsight & overall effectiveness of the project; Next Steps- costs, funding sources and schedule
- X. Appendices:
Including List of References; List of Deliverables (contracts) or Items for Submittal (grants); List of Sub-contractors; Tables & Graphs of Summarized Numerical Data; Photos; and Copies of Peer Reviewed Articles

The draft final report and final report includes a draft and final product for review for the stakeholders and approved by the SWRCB grant manager. The project team will prepare an agreed upon number of copies of the draft final report for the stakeholders to review, and an agreed upon number of copies of the final report. The project team will submit the draft final report to the stakeholders by December 1, 2009 for review and comments and to the SWRCB by December 15, 2009. The project team will submit the final report to the stakeholders for review and comment by January 8, 2010 and to the SWRCB by January 28, 2010 to achieve the required grant deliverable schedule.

**Exhibit B - Project Budget
Lower San Luis Rey Bacteria Source Tracking Study**

MACTEC Engineering
and Consulting, Inc.

Tasks and Subtasks	MACTEC	Subconsultants and Lab Costs	Totals
Task 1. Meeting and Project Management			
MACTEC will attend Technical Advisory Committee meetings and working with stakeholders to develop required documents and address any revisions and/or concerns that arise during the creation, implementation or reporting of the study. MACTEC will provide project management and schedule control including day-to-day project management, contract management, progress reporting, and quarterly invoicing.	\$86,472.50	\$0.00	\$86,472.50
Task 2. Quality Assurance Project Plan (QAPP) and Monitoring Plan (MP)			
MACTEC will prepare and maintain a QAPP and MP to cover field and laboratory operations in accordance with the State Water Resources Control Board's (SWRCB's) Surface Water Ambient Monitoring Program. MACTEC will develop and draft a final product for review by the stakeholders and approved by the SWRCB's Quality Assurance officer prior to the implementation of monitoring.	\$32,604.50	Subconsultant and researcher costs for study developed included in 3.4	\$32,604.50
Task 3. Implementation of the Bacteria Source Tracking Study			
3.1 MACTEC will conduct a comprehensive visual observation program to identify point and non-point source runoff.	\$23,040.00	\$0.00	\$23,040.00
3.2 MACTEC will collect and analyze flow data to be utilized in bacteria loading estimates from the sources identified.	\$24,800.00	\$0.00	\$24,800.00
3.3 MACTEC will conduct dry and wet weather sampling events to identify sources and quantify wet, dry, and annual bacterial loading estimates.	\$45,300.00	\$32,500.00	\$77,800.00
3.4 The project team will conduct multi-tiered genetic microbial testing in the Lower San Luis Rey River and the river mouth at the Pacific Ocean outlet. The sample site selection process will include appropriate sites for tracking TMDL implementation progress.	MACTEC sampling costs included in 3.3	\$13,500.00	\$13,500.00
Laboratory analyses and data interpretation: Bacteroides thetaiotamicron, ESP gene, and/or virus work and enterococcus speciation (UNC).	\$0.00	\$128,163.24	\$128,163.24
Laboratory analyses and data interpretation: Enterovirus (USC).	\$0.00	\$63,000.00	\$63,000.00
Laboratory analyses and data interpretation: Community analysis (SCCWRP).	\$0.00	\$14,650.00	\$14,650.00
3.5 The project team will develop recommendations for potential Best Management Practices to reduce and eliminate bacterial sources in the Lower San Luis Rey River and at the river mouth. Includes Draft Final and Final Report.	\$43,245.00	Subconsultant and researcher costs included in 3.4	\$43,245.00
Totals	\$255,462.00	\$251,813.24	\$507,275.24