

**AGREEMENT FOR PROFESSIONAL SERVICES FOR DESIGN
ENGINEERING SERVICES FOR THE TREATMENT PLANT
OPTIMIZATION OF THE HORACE P. HINCKLEY WATER
TREATMENT PLANT PROJECT**

This agreement for Professional Engineering Services for the Treatment Optimization of the Horace P. Hinckley Water Treatment Plant Project ("Agreement") is made and entered into this 4th day of August, 2009 ("Effective Date"), by and between the City of Redlands, a municipal corporation ("City") and URS Corporation dba URS Corporation Americas ("Consultant"). City and Consultant are sometimes individually referred to herein as a "Party" and, together, as the "Parties." In consideration of the mutual promises contained herein, City and Consultant agree as follows:

ARTICLE 1 - ENGAGEMENT OF CONSULTANT

- 1.1 City hereby engages Consultant to provide professional engineering services for the Treatment Optimization of the Horace P. Hinckley Water Treatment Plant Project (the "Services").
- 1.2 The Services shall be performed by Consultant in a professional manner, and Consultant represents that it has the skill and the professional expertise necessary to provide the Services to City at a level of competency presently maintained by other practicing professional consultants in the industry providing like and similar types of Services.

ARTICLE 2 - SERVICES OF CONSULTANT

- 2.1 The Services that Consultant shall perform are more particularly described in Exhibit "A," entitled "Scope of Services," which is attached hereto and incorporated herein by reference.
- 2.2 Consultant shall comply with applicable Federal, State and local laws and regulations in the performance of this Agreement including, but not limited to, the Americans with Disabilities Act, the Fair Employment and Housing Act and prevailing wage laws.

ARTICLE 3 - RESPONSIBILITIES OF CITY

- 3.1 City shall make available to Consultant information in its possession that may assist Consultant in performing the Services.
- 3.2 City designates Mr. Wen Huang, PE as the City's representative with respect to performance of the Services, and such person shall have the authority to transmit instructions, receive information, interpret and define City's policies and decisions with respect to performance of the Services.

ARTICLE 4 - PERFORMANCE OF SERVICES

- 4.1 Consultant shall perform the Services in a prompt and diligent manner and in accordance with the schedule set forth in Exhibit "B," entitled "Project Schedule."

- 4.2 During the term of this Agreement, City may request that Consultant perform Extra Services. As used herein, "Extra Services" means any work that is determined necessary by City for the proper completion of the project or work for which the Services are being performed, but which the Parties did not reasonably anticipate would be necessary at the time of execution of this Agreement. Provided the Extra Services do not exceed twenty percent (20%) of the compensation to be paid by City to Consultant for the Services, such Extra Services may be agreed to by the Parties by written amendment to this Agreement, executed by the City Manager, or duly authorized city official. Consultant shall not perform, nor be compensated for, Extra Services without such written authorization from City.

ARTICLE 5 - PAYMENTS TO CONSULTANT

- 5.1 The total compensation for Consultant's performance of the Services shall not exceed the amount of One Million Six Hundred Seven Thousand Eight Hundred Eighty Nine Dollars (\$1,607,889). City shall pay Consultant on a time and materials basis up to the not to exceed amount, in accordance with Exhibit "C" entitled "Project Costs," and based upon the hourly rates shown in Exhibit "D," entitled "Rate Schedule." Both Exhibits "C" and "D" are attached hereto and incorporated herein by this reference.
- 5.2 Consultant shall submit monthly invoices to City describing the work performed during the preceding month. Consultant's invoices shall include a brief description of the Services performed, the dates the Services were performed, the number of hours spent and by whom, and a description of reimbursable expenses related to the project. City shall pay Consultant no later than thirty (30) days after receipt and approval by City of Consultant's invoice, provided (1) the Services reflected in the invoice were performed to the reasonable satisfaction of City in accordance with the terms of this Agreement, and (2) that related expenses, rates and other information set forth in the invoice are consistent with the terms and conditions of the Agreement.
- 5.3 Project communications and notices shall be given in writing by personal delivery or by mail. Notices sent by mail should be addressed as follows:

City

Mr. Wen Huang, PE
Municipal Utilities and Engineering Dept.
City of Redlands.
35 Cajon Street, Suite 15A
Redlands, CA 92373

Consultant

Mr. Mike. N. Agbodo, PE
Project Manager
URS Corporation
3500 Porsche Way, Suite 300
Ontario, CA 91764

When so addressed, such notices shall be deemed given upon deposit in the United States Mail. Changes may be made in the names and addresses of the person to who notices and payments are to be given by giving notice pursuant to this section 5.3.

ARTICLE 6 - INSURANCE AND INDEMNIFICATION

- 6.1 Insurance. Insurance required by this Agreement shall be maintained by Consultant for the duration of its performance of the Services. Consultant shall not perform any Services unless and until required insurance listed below is obtained by Consultant. Consultant shall provide City with certificates of insurance and endorsements evidencing such insurance prior to commencement of the Services. Insurance policies shall include a provision prohibiting cancellation or modification of the policy except upon thirty (30) days prior written notice to City, except for ten (10) days notice for cancellation due to non-payment of premium.
- 6.2 Workers' Compensation and Employer's Liability. Consultant shall secure and maintain Worker's Compensation and Employer's Liability insurance throughout the duration of its performance of the Services in accordance with the laws of the State of California, with an insurance carrier acceptable to City.
- 6.3 Hold Harmless and Indemnification. Consultant shall defend, indemnify and hold harmless City and its elected officials, employees and agents from and against claims, losses or liability, including attorneys' fees, arising from injury or death to persons or damage to property occasioned by Consultant's and its officers', employees' and agents' sole negligent acts or omissions in performing the Services.
- 6.4 Assignment. Consultant is expressly prohibited from assigning any of the Services without the express prior written consent of City. In the event of agreement by the Parties to assign a portion of the Services, Consultant shall add the assignee as an additional insured and provide City with the insurance endorsements required by this Agreement prior to the performance of any Services by the assignee. Assignment does not include printing or other customary reimbursable expenses that may be provided for in this Agreement.
- 6.5 Comprehensive General Liability Insurance. Consultant shall secure and maintain in force throughout the term of this Agreement comprehensive general liability insurance with carriers acceptable to City. Minimum coverage of One Million Dollars (\$1,000,000) per occurrence and Two Million Dollars (\$2,000,000) aggregate for public liability, property damage and personal injury is required. City shall be named as an additional insured. Such insurance shall be primary and non-contributing to any insurance or self-insurance maintained by City.
- 6.6 Professional Liability Insurance. Consultant shall secure and maintain professional liability insurance throughout the term of this Agreement in the amount of One Million Dollars (\$1,000,000) per claim made.
- 6.7 Business Auto Liability Insurance. Consultant shall have business auto liability coverage, with minimum limits of One Million Dollars (\$1,000,000) per occurrence, combined single limit for bodily injury liability and property damage liability. This coverage shall

include all Consultant owned vehicles used in connection with Consultant's provision of the Services, hired and non-owned vehicles, and employee non-ownership vehicles. City shall be named as an additional insured. Such insurance shall be primary and non-contributing to any insurance or self insurance maintained by City.

ARTICLE 7 - CONFLICTS OF INTEREST

7.1 Consultant covenants and represents that it does not have any investment or interest in any real property that may be the subject of this Agreement or any other source of income, interest in real property or investment that would be affected in any manner or degree by the performance of Consultant's Services. Consultant further covenants and represents that in the performance of its duties hereunder, no person having any such interest shall perform any Services under this Agreement.

7.2 Consultant agrees it is not a designated employee within the meaning of the Political Reform Act because Consultant:

A. Does not make or participate in:

(i) the making or any governmental decisions regarding approval of a rate, rule or regulation, or the adoption or enforcement of laws;

(ii) the issuance, denial, suspension or revocation of permits, licenses, applications, certifications, approvals, orders or similar authorizations or entitlements;

(iii) authorizing City to enter into, modify or renew a contract;

(iv) granting City approval to a contract that requires City approval and to which City is a party, or to the specifications for such a contract;

(v) granting City approval to a plan, design, report, study or similar item;

(vi) adopting, or granting City approval of, policies, standards or guidelines for City or for any subdivision thereof.

B. Does not serve in a staff capacity with City and in that capacity, participate in making a governmental decision or otherwise perform the same or substantially the same duties for City that would otherwise be performed by an individual holding a position specified in City's Conflict of Interest Code under Government Code section 87302.

7.3 In the event City officially determines that Consultant must disclose its financial interests by completing and filing a Fair Political Practices Commission Form 700, Statement of Economic Interests. Consultant shall file the subject Form 700 with the City Clerk's office pursuant to the written instructions provided by the Office of the City Clerk.

ARTICLE 8 - GENERAL CONSIDERATIONS

- 8.1 Attorneys' Fees. In the event any action is commenced to enforce or interpret any of the terms or conditions of this Agreement the prevailing Party shall, in addition to any costs and other relief, be entitled to the recovery of its reasonable attorneys' fees, including fees for the use of in-house counsel by a Party.
- 8.2 Prohibition Against Assignment. Consultant shall not assign any of the Services, except with the prior written approval of City and in strict compliance with the terms, and conditions of this Agreement.
- 8.3 Documents and Records. Project related documents, records, drawings, designs, cost estimates, electronic data files, databases and other documents developed by Consultant in connection with its performance of the Services, and copyright interest in such documents, shall become the property of City and shall be delivered to City upon completion of the Services, or upon the request of City. Any reuse of such documents, and any use of incomplete documents, shall be at City's sole risk.
- 8.4 Independent Contractor Status. Consultant is for all purposes under this Agreement an independent contractor and shall perform the Services as an independent contractor. Neither City nor of its agents shall have control over the conduct of Consultant or Consultant's employees, except as herein set forth. Consultant shall supply necessary tools and instrumentalities required to perform the Services. Assigned personnel employed by Consultant are for its account only, and in no event shall Consultant or personnel retained by it be deemed to have been employed by City or engaged by City for the account of, or on behalf of City. Consultant shall have no authority, express or implied, to act on behalf of City in any capacity whatsoever as an agent, nor shall Consultant have any authority, express or implied, to bind City to any obligation.
- 8.5 Termination.
- A. Unless earlier terminated as provided for below, this Agreement shall terminate upon completion and acceptance of the Services by City.
- B. This Agreement may be terminated by City, in its sole discretion, by providing thirty (30) days' prior written notice to Consultant (delivered by certified mail, return receipt requested) of City's intent to terminate.
- C. If this Agreement is terminated by City, an adjustment to Consultant's compensation shall be made, but (1) no amount shall be allowed for anticipated profit or unperformed Services, and (2) any payment due Consultant at the time of termination may be adjusted to the extent of any additional costs to City occasioned by any default by Consultant.
- D. Upon receipt of a termination notice, Consultant shall immediately discontinue its provision of the Services and, within five (5) days of the date of the termination notice,

deliver or otherwise make available to City, copies (in both hard copy and electronic form, where applicable) of project related data, design calculations, drawings, specifications, reports, estimates, summaries and such other information and materials as may have been accumulated by Consultant in performing the Services. Consultant shall be compensated on a pro-rata basis for Services completed up to the date of termination.

- 8.6 Books and Records. Consultant shall maintain books, ledgers, invoices, accounts and other records and documents evidencing costs and expenses related to the Services for a period of three (3) years, or for any longer period required by law, from the date of final payment to Consultant pursuant to this Agreement. Such books shall be available at reasonable times for examination by City at the office of Consultant.
- 8.7 Entire Agreement/Amendment. This Agreement, including the Exhibits incorporated herein by reference, represents the entire agreement and understanding between the Parties as to the matters contained herein, and any prior negotiations, written proposals or verbal agreements relating to such matters are superseded by this Agreement. Except as otherwise provided for herein, an amendment to this Agreement shall be in writing, approved by City and signed by City and Consultant.
- 8.8 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of California.
- 8.9 Severability. If one or more of the sentences, clauses, paragraphs or sections contained in this Agreement is declared invalid, void or unenforceable by a court of competent jurisdiction, the same shall be deemed severable from the remainder of this Agreement and shall not affect, impair or invalidate the remaining sentences, clauses, paragraphs or sections contained herein, unless to do so would deprive a Party of a material benefit of its bargain under this Agreement.

IN WITNESS WHEREOF, duly authorized representatives of the City and Consultant have signed in confirmation of this Agreement.

CITY OF REDLANDS

URS Corporation dba URS Corporation
Americas

By: Pat Gilbreath
Pat Gilbreath, Mayor Pro Tempore

By: Richard A. Hart 1/30/09
Tariq Hussain, Vice President
Richard A. Hart

Attest:

Jorie G. Grew
City Clerk

EXHIBIT A SCOPE OF SERVICES

PROJECT BACKGROUND

The City of Redlands is in the process of designing improvements for the Treatment Optimization and Upgrade of the Horace P. Hinckley surface water treatment plant (Hinckley).

The City's water system consists of over 400 miles of distribution system pipeline with approximately 21,500 service connections. The City owns and operates approximately 40 wells located throughout the Bunker Hill, Mill Creek, and Yucaipa groundwater basins. These wells provide about 40 percent of the City's water supply. The City derives the remainder of its water supply from two surface water treatment plants: Henry Tate surface water treatment plant and Hinckley. These plants primarily operate on water from a local stream and river. Imported water from the State Water Project (SWP), delivered by San Bernardino Valley Municipal Water District, is periodically used to meet peak demands. During the year 2007, the City delivered over 37,700 acre-feet of water to its customers with a peak day delivery of approximately 50 million gallons.

Hinckley is owned and operated by the City and has a maximum rated capacity of 14.5 mgd. The plant has two primary sources of raw water: Santa Ana River (SAR) water and water from the SWP. SAR water is characterized by low concentrations of organics but has variable and sometimes very high turbidity. This source has the lowest cost and therefore it is the City's goal to maximize its use. SWP water often has lower turbidity level but can experience increased levels of organics that result in difficulty meeting drinking water regulations. This water source is more expensive but is needed during dry periods when sufficient SAR water is not available to meet customer demands.

The City prefers to treat SAR water source at Hinckley due to its high quality and low cost. Depending on the availability of the SAR and SWP supplies, City has the ability to treat 100 percent of either source or to blend the two sources. The existing treatment process at Hinckley consists of flash mixing, three-stage flocculation, sedimentation, and self-backwashing filters.

Primary and residual disinfections are achieved with free chlorine. Treated water is then delivered to the distribution system via the existing Agate reservoir. Currently, the required contact time (CT) is being met with a combination of prechlorination and contact time in the Agate reservoir.

It is the City's objective to continue using free chlorine at Hinckley and to make the necessary modifications to the existing treatment process to meet applicable current and foreseeable water quality regulations, including the EPA Stage 2 Disinfection/Disinfection Byproducts Regulations, which require full compliance including operational treatment systems by October 2012. Additionally, designed facilities must meet the requirements of the California Department of Public Health (DPH).

Task 1—Project Management and Meetings

Task 1.1 Project Management

URS will develop a Project Management Plan that includes the project scope, deliverables, timelines, discipline interface requirements, and QA/QC requirements.

URS will keep the City informed of the progress of the work through telephone conversations, emails and faxes. In addition, we will meet with the City on a monthly basis to review progress of the design as well as submit monthly invoices, progress reports, and schedule updates.

Task 1.2—Progress Meetings

URS has allowed for ten (10) review meetings with the City personnel during development of the detailed design. Participants at the meetings would include City staff, selected members of the URS team and other project stakeholders, if any, as identified by the City. The proposed meetings include:

- A kick-off meeting to establish the design criteria and constraints, review conceptual design alternatives, and collect existing data from the City.
- A 30% level of completion review meeting to review and discuss the initial design concepts and preliminary design layouts, and the preliminary design report.
- A 60% level of completion review meeting to review and discuss the progress of the plans, specifications and probable project cost.

- A 90% level of completion review meeting to review and discuss the final plans, specifications and probable project cost. Comments developed in the final review would be incorporated in the preparation of the final design.

URS will submit four sets of 30%, 60% and 90% plans for review by City prior to the review meetings. URS will furnish an agenda and meeting notes for each meeting.

Task 1.3—Consultant Quality Control Reviews

URS will implement a Quality Assurance Program to include the key elements below.

- Project planning
- Internal review
- Client satisfaction

URS will perform Quality Assurance, a formal process of independent reviews of the project work products prior to submitting to the City—an active exchange of ideas, ongoing review and critique of work products, and documentation of the internal review process.

URS' Quality Assurance Program is documented in its Quality Management System, which stresses active pre-planning and independent technical reviews (peer reviews). The Quality Assurance is an active exchange of ideas among our staff and the pursuit of best practices through the application of sound professional judgment. An audit trail of each project's independent internal reviews is required and subject to periodic verification to ensure compliance with the Quality Assurance Program.

Prior to submitting deliverables to City, work products will undergo an independent technical review to verify the quality of the work products and that work products are in accordance with the scope of services and comply with the standard of professional practice. The work products are reviewed by qualified senior practitioners who are experienced with the type of services being provided and independent from the origination of the activity or work product under review.

URS' Quality Assurance Program requires that Project Managers meet with their clients at time intervals to review performance. Deficiencies are reviewed and corrections made as appropriate.

In addition to URS internal reviewers, Dr Ken Kerri of California State University, Sacramento will provide an outside independent technical review of URS treatment strategy to give his opinion as to whether the URS treatment strategy will produce the necessary TTHM control or whether some other treatment strategy might become necessary.

Task 2—Preliminary Design

The preliminary design for the plant upgrade will be prepared and accepted by the City before final design starts. The text that follows describes the work tasks to be completed.

Task 2.1 – Research and Investigation

The objective of our research is the identification of constraints, restrictions, and operations criteria that would affect the design plans, construction means and methods, and operations and maintenance requirements.

URS will meet with the City at the project kickoff meeting to collect and review existing data, information, and standards relevant to the plant upgrade. We anticipate that the following documents, as available, would be furnished by the City:

- Record drawings for distribution system network and the Hinckley.
- Design and construction reports on the Hinckley.
- Plant operations data including set points, equipment data, analytical reports, and similar relevant data.
- Other available reports that will be critical for project design considerations.
- City easement documentation.
- City of Redlands standards and review requirements.
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Survey. URS will obtain and review survey information from City and identify any additional information that is necessary to complete the scope of services. If additional survey data are needed, URS will notify the City immediately to keep the design process on schedule and perform all necessary survey work.

Utility Research. URS will review and utilize utility drawings provided by City and obtain additional information if necessary for designing the facilities. URS will contact DigAlert at the beginning of the design phase to obtain a list of utilities that potentially have facilities in the project area. Each Utility will be contacted and a record of correspondence will be kept to verify that the current utility records have been received.

Potholing. URS assumed the need to provide five (5) potholes to confirm utility locations/ depths. URS would subcontract with Saf-R-Dig to provide this service.

Task 2.2 - Preliminary Design Report.

URS will submit a Preliminary Design Report (PDR) concurrently with preliminary design of the following:

- Flash Mixing
- Flocculation
- Sedimentation
- Filtration
- Solids handling
- Clearwell storage and CT Basin
- Filter Washwater Treatment and Recycle
- Well Blending Facility

The PDR will include the established design criteria, existing site plans, reports on existing conditions, design alternatives, probable construction cost and schedule estimates, and permit requirements. Specific elements of the PDR include:

- Preliminary design plans, drawn to scale, showing proposed design of facilities
- Table of Contents for the technical specifications for the project;
- Discussions and evaluations related to the plant improvements and the alternatives investigated;
- Discussion of how enhanced coagulation methods will be tested and operated
- Recommended alternatives defined from the evaluations for the plant improvements detailing how and why the recommendations were made;

- Preliminary Project Schedule for design, bidding, and construction;
- A preliminary probable construction cost of the project;

The preliminary design report will discuss each item included under this task. Analysis of proposed design alternatives will include a list of the impacts on system operations, the environment, construction cost and/or schedule, and maintenance budget.

URS will submit a draft copy of the PDR for City's review, which will include the table of contents for Technical Specifications. In conformance with the City's recommendations and upon mutual agreement of modifications deemed necessary by City and URS, we will reevaluate, revise, and finalize the report. The final copy of the PDR will be in sufficient detail to facilitate the final engineering design of the plant upgrade facilities.

URS will submit to City four copies each of the draft PDR and the final PDR. In addition to hard copies, electronic files for the final PDR will be submitted on compact disc with the report, preliminary site layouts, specifications table of contents, and cost estimates saved in the most recent release of MS Word/Excel and AutoCAD 2009 and/or PDF format.

URS will prepare site layout and equipment diagrams (30% design level) for the facilities. URS will provide piping layouts, mechanical components, road and site improvements, structures, and limited cross sections of proposed improvements.

URS would summarize the preliminary design in a report to the City that would address the following:

1. Comprehensive filter evaluation. URS would perform filter coring, sieve analysis of existing filter sand and anthracite medias, acid solubility testing, floc retention profiles, and backwash rate (bed expansion) analysis of one filter. In addition, a filter underdrain inspection in one filter would be performed. The coring and filter underdrain inspection will be done in different filters. Additional filter coring and/or underdrain would be performed as Extra Service.
2. Filter test column. Based on evaluation of the existing filters, URS will demonstrate the proposed filter media design with a pilot-scale filter column utilizing the settled water sample line located at Hinckley.

3. Full-scale plant trial. URS will conduct full-scale plant trial to utilize both trains to demonstrate performance utilizing the recommended dose and coagulant upon receipt of approval from DPH. URS will assist City on obtaining necessary permits from DPH to perform full-scale plant trial. Coagulant dosages previously determined from jar testing could be used to demonstrate performance for turbidity and organics removal. URS will perform optimization for enhancement of filter performance to maximize filter run times and turbidity removal. Settled water turbidity, TOC, and filterability index will be performed for the settled water during these trials. It should be noted that the demonstration study will not include the use of the proposed flocculation equipment and plate settlers. Although not expected to occur, if the filters begin to decline in performance during the plant trial testing, City personnel shall be available to perform filter backwashes to restore filters to the original condition while enhancements are made or while the coagulant doses are adjusted.

4.

Following comprehensive plant evaluation, URS will summarize the results in technical memorandum to City. Based on the outcome of the plant evaluations and discussions with City staff, URS will proceed in providing detailed design of the recommended processes as follows:

1. Flash mixing improvements. URS will design flash mixing improvements that would include a pump diffuser mixing system to achieve the recommended G values for optimum performance.
2. Flocculator Improvements. URS will design flocculator improvements that include new flocculators and flocculator motors with VFDs.
3. Chemical Feed Application Relocation. Based on field testing results and analysis, URS will design relocation of chemical feed application point(s). It is possible that coagulant and polymer feed point might be relocated as part of the improvements.
4. Sedimentation Basin Improvements: URS will design sedimentation basin improvements that would include high-rate settling equipment (i.e. plate settlers) and new sludge collection equipment within the existing basins. URS will perform analysis to determine if new sludge collection equipment is required, or whether the water level in the basins could be raised to retain the existing collection equipment. The final design will be based on City's request.

5. Algae Control. Algae control considerations for the sedimentation basins will be evaluated and recommended in the PDR. The evaluation may include canopy-type covers, removable covers, and periodic disinfection upstream of the basins. URS will determine the appropriate disinfection upstream of the basins. URS will determine the appropriate system during preliminary design based on URS bench-scale testing. Once the algae control method is determined, URS will design the selected method as part of the sedimentation basin improvements.
6. Filter Improvements. Based on the results of the comprehensive filter evaluation, URS will design filter improvements that include new media and underdrains. With inputs from DPH and City, URS would also design filter improvements that may include filter-to-waste or rinse-to-waste facilities and the relocation of the filter effluent turbidimeters. URS will also design a filter-to-waste pump station. URS has assumed that the south end of the filters would remain inaccessible except for infrequent maintenance (i.e. no dry pipe gallery with associated improvements) and that piping improvements would be constructed within the existing structure. If the results of the URS filter inspection and/or design investigation during preliminary design reveals that the existing underdrains are acceptable, then the replacement of the underdrains will not be performed.
7. Stub Out to Future GAC Filters. GAC design is not included in this contract; however, URS would design the facilities to include a stub out for future GAC facilities. The site layout design will be completed contemplating potential future GAC facilities.
8. Additional Clearwell Storage. URS will design additional clearwell storage to meet the CT requirements and to provide the City with flexibility in plant operations. URS will design a prestressed concrete (DYK or similar) or aboveground steel circular with appurtenances to obtain the required CT. In lieu of the Clearwell, URS will design a new pipeline to obtain the required CT. Selection between Clearwell vs. Pipeline design for CT requirements will be made by City, with a URS recommendation and input, during preliminary design.
9. Filter Backwash Waste Treatment System (including pump station). URS will design up to a 2 mgd package treatment system to take filter backwash waste and treat it to a maximum of 2 NTU for return to the head of the plant for reuse. The package plant would be an above-grade, steel package plant on a concrete slab and have a maximum

return rate to the head of the plant be 10%, at any given time, in accordance with the DPH guidelines. URS will also design a steel above grade backwash waste storage tank to enable the return of potentially all of the filter backwash waste to the head of the plant. As part of this item, the existing filter washwater pumps will be replaced as necessary with properly designed pumps coordinated with the washwater treatment plant. In lieu of the steel backwash waste storage tank, URS will design a new in ground basin(s), or modifications to the existing basin, capable of meeting the storage and pumping capacity needs of the plant. Selection between the steel backwash tank vs. ground basin will be made by City, with a URS recommendation and input, during preliminary design.

10. Blending Facility. Based on suggestions by City to blend well water from Crafton and Agate No.1 wells into the distribution system, URS will design a blending facility at a location to be determined from the hydraulic modeling to blend well water, and treated water from Hinckley. Location and details of the blending facility will be determined during preliminary design.

11. Solids Handling and Lagoons. URS will design three (3) additional lagoons for solids handling. The size of the lagoon will be determined during preliminary design. The design would accommodate adequate vehicle access into the existing and new lagoons. URS will also design retrofitting the pumps or replacing them to meet dewatering and washwater treatment and recycle needs. URS will evaluate the anticipated sludge lagoon storage necessary for the treatment plant based on expected chemical feed rates and standard solids production conversions. Additional lagoons storage and pumping equipment needed will be defined during preliminary design.

12. Electrical Equipment. URS will provide the required electrical design of the improvements and will coordinate with the City's SCADA consultant to integrate the new equipment into the plant SCADA system. URS will develop new telemetry and SCADA systems for the new pumps and plant upgrade equipment and treatment facilities. A new SCADA RTU would be located in the MCC and would include flow and well level monitoring, remote pump control, operational alarms and intrusion alarms. URS assumed that the new SCADA system would utilize a new SCADA communication link (dedicated phone line, radio, fiber optic) currently in use, and would use a dial-up phone line would be included in the event the telemetry system is down. URS will

coordinate with City and when possible utilize City's SCADA consultant to perform integration and programming services in an effort to keep programming logic language and wiring specifications and installation methods that are consistent and compatible with other City facilities.

13.

Task 2.3 - Preliminary Site Layout

URS will prepare preliminary site plans for the facilities. Specific work tasks to be performed include:

- Provide overall site layout including paving, grading, treatment equipment, electrical equipment, piping, and storm drains and catch basins, if required;
- Provide mechanical layout of pumps, motors, piping, valves, and appurtenances.

Task 2.4 - Site Survey

The upgrades at Hinckley do not require much surveying; however, surveying would be required for design of new water line to Agate reservoir. The objectives of this task are to establish horizontal and vertical control for Hinckley and to provide a topographic map and aerial photographs for use in developing the design plans. Aerial mapping and ground survey of the project site would be included in order to provide site photos for the design phase at a scale of 1" to 40' and 1-foot contours. The topographic map would include the overall site to be defined by URS and City. URS would use Psomas as our sub-consultant to conduct the site survey. Property lines and easements will be plotted from available information. Acquisition of a preliminary title report and supporting documents are not included in this scope of work but may be included as an Extra Service.

Task 2.5 - Site Grading

URS will provide site grading details associated with the construction of the additional lagoons, tank(s) and other treatment processes will be provided to accommodate the design. No landscaping design is assumed in this scope of services. URS will also design the necessary drainage or erosion control devices.

Task 2.6 - Electrical, Instrumentation and Control

URS will perform the following tasks:

- Determine electrical and instrumentation equipment needs for electrical services to the site.
- Prior to beginning the design, submit a preliminary equipment design, equipment design and electrical operation report including ladder logic sketches or similar diagrams,
- Service changes and phasing will be coordinated with City. New electrical equipment will meet the design standards of the City and agencies that have jurisdiction and would be utilized and supplemented as required for this project.
- The SCADA RTU will be designed with a new PLC based on RTU meeting the current City's standards.
- Telemetry will be established at the site.
- RTU drawings and Bill of Material would be prepared for City staff review. Performance P&IDs will be prepared for the project.
- The P&IDs will reflect well pumps, treatment systems, piping, valves, etc.
- System descriptions will be prepared for PLC programming.
- A schedule and control strategy specification will be prepared indicating PLC I/O and control alarm functions and trigger points.

Task 2-7 - Geotechnical

URS would obtain field and laboratory data and perform geotechnical evaluations necessary to provide conclusions and recommendations for design of the facilities included in the scope of services.

Task 2.7.1—Subsurface Exploration

URS will perform subsurface exploration consisting of excavating, logging, and sampling of the areas that would be affected. Borings will be backfilled in accordance with the conditions of the boring permits. Any excess cuttings and materials from drilling will be removed for the site upon completion of boring. URS will secure soil samples at selected intervals and transported them to the URS geotechnical laboratory in Santa Ana for analysis. These consist of:

Exploratory borings for the CT pipeline. URS will perform two exploratory borings along the CT pipeline route. Boring locations are subject to setback from underground and aboveground utilities and other assets that might be damaged or might result in injury to workers or the public.

These borings will reach a minimum of 5 feet below the estimated bottom of the CT pipeline.

Exploratory borings at the Clearwell Site. URS will perform two exploratory borings at the clearwell site. Boring locations are subject to setback from underground and aboveground utilities and other assets that might be damaged or might result in injury to workers or the public.

One boring will reach a minimum of 40 feet below ground surface and the other would extend approximately 10 feet below ground surface.

Exploratory borings at Lagoon Sites. URS will perform two exploratory borings at the four corners of the lagoon reaching a depth of approximately 10 feet below the elevation of the bottom the cut slopes. URS assumed that the lagoons would be will by excavation below the existing grade (i.e., no embankment to create the impoundment), that the depth of water in the lagoon will be no greater than 15 feet, that the slopes will be lined, and that the lagoons will not come under the jurisdiction of the California division of Safety of Dams (DSOD)

Exploratory borings at Filter Washwater Treatment Plant and Storage Tank Locations. URS will perform two exploratory borings to verify the design criteria for the soils at the locations for the construction of the filter treatment plant and storage tank.

Task 2.7.2—Soil Testing

URS will perform testing of selected soil samples. URS has allowed for the following types and numbers of tests:

- Sixteen (16) natural water content
- Ten (10) dry density (including natural water content)
- Six (6) shear strength (unconfined compressive strength)
- Twelve (12) particle size distribution by sieving,
- Six (6) wash sieves (for percent passing 0.075 mm sieve only)
- Two (2) expansion index,
- One (1) corrosion potential suite (including pH, electrical resistivity, chloride and soluble sulfate content)
- One (1) consolidation test including time curves.

The types of tests and their numbers may be adjusted based on the types of soil actually encountered in the borings.

Task 2.7.3—Geotechnical Report

URS will prepare a geotechnical report to present the findings, conclusions and recommendations for site earthwork (including excavation, backfill, and foundation preparation), stability of the lagoon slopes, foundation types and capacities, seismic design parameters per the 2007 California Building Code, shoring, groundwater, liquefaction, dewatering, surface and subsurface drainage control, lateral pressures on below-grade walls (if any), resistance to lateral loads, and soil corrosivity. The report will also provide geotechnical input for pipeline design (including soil bearing capacities for thrust blocking). Following City's review of the Draft Report, URS will prepare a Final Report incorporating the City's comments.

Task 2-8 - Permits

URS will work closely with the local regulatory agencies to assist the City in obtaining approvals, and prepare and submit the appropriate permit applications with the required fees needed to construct the project. City would be responsible for paying all permit fees.

URS will identify and assist the City in obtaining permits and approvals from the appropriate federal, state, and/or local regulatory agencies for the Hinckley upgrades. The following agencies would likely require permits and/or regulatory approvals for the project upgrades:

- DPH to approve the proposed demonstration study for the filters and/or full scale plant trial. URS will also assist City obtain approvals from DPH for the implementation of the recommended operational changes and filter media replacement identified from the pilot filter operations. This will include approval of design and construction plans, and potentially the operating permit, to meet water treatment requirements including California Title 22, the EPA's Stage 2 D/DBPR regulations and Long Term 2 ESWTR regulations.
- City departments for review and approval of design plans in compliance with City codes, standards and other governmental requirements
- City Fire Department to ensure compliance with fire codes
- Utility companies for potential system modifications

- South Coast Air Quality Management District (SCAQMD) for new or modifications to existing Permit(s) to Operate

Certification of a California Environmental Quality Act (CEQA) document would be required from the City. However, CEQA document preparation is outside this proposed scope of work and would be an Extra Service.

In addition, based on the estimated land disturbance for the project to be less than one acre, unless new clearwell is to be constructed compliance with the California General Permit for Storm Water Discharge Associated with Construction Activities would not be required, e.g., no Notice of Intent (NOI) needs to be filed and no Storm Water Pollution Prevention Plan (SWPPP) is required.

URS will prepare a table specifying the required regulatory approvals, agency contacts, timeframes for approval, and associated fees.

URS will invite the DPH representative from District 13 (San Bernardino) to participate at the beginning of the project since they prefer to be involved in the early stages of design development. URS will keep DPH informed about the design and optimization work (including the full scale and pilot scale trials) at the Hinckley. URS will submit construction documents to City to submit to DPH at the 50 percent complete level, with the understanding that this stage of the design may only provide a preliminary representation of the final project. URS will also provide specific changes proposed to the facility, based on equipment and operational levels, as well as the potential impact the changes have in meeting drinking water standards. URS will provide additional construction documents to City to submit to DPH at the 90 percent complete level. URS will hold up to four (4) meetings with DPH to review any concerns, clarify any issues, and incorporate DPH comments as needed into the design.

Task 2-9 - Preliminary Engineer's Probable Construction Cost Estimate

URS will prepare an initial probable construction cost estimate for the facilities. This cost estimate will be based on unit pricing methods, equipment vendor quotations, and previous project experience in the San Bernardino County area.

Task 3—Final Design

URS will prepare a bid package of construction plans, specifications, and a probable construction cost. Construction plans will be prepared with AutoCAD 2009 software, but may be saved in any version desired by the City. Specifications will be in Microsoft Word, using a modified CSI format similar to the City's standard specifications. Submittals will be made at the 60%, 90%, and 100% and final stages.

Drawings will reference the City's design criteria and standard drawings. URS will reference standard construction drawings (Greenbook and others) whenever possible.

URS will design and size the new facilities in such way that equipment and piping appurtenances are easily accessible for maintenance. These facilities shall be efficient and economical. URS will develop a construction bid package incorporating the City's standard bid forms, General Provisions, and to the extent applicable, the City's standard plans, details and technical specifications. As necessary and applicable, URS will adopt the Standard Plans and Specifications for Public Work Construction (i.e., the "Green Book") or other standards. URS would also develop Special Provisions, Technical Specifications (CSI format) for equipment not covered in Green Book, and an engineer's estimate of construction costs as part of the final design work.

Task 3.1 - Construction Plans and Designs

URS will prepare detailed construction drawings for the water treatment improvements project as a single construction project. Each plan sheet would be on City's standard 22-inch x 34-inch sheet. The final AutoCAD and PDR electronic files would be submitted to the City.

Task 3.2 – Technical Specifications

City shall supply any City-specific front-end documents and construction specifications for typical waterworks items such as steel pipelines, valves, painting, etc. URS will prepare specifications for specialized items such as equipment and any other front end and technical specifications that the City does not provide.

Task 3.3 – Engineer's Construction Cost Estimate

URS will prepare an itemized construction cost estimate for the facilities along with all other appurtenant costs. URS will update the construction cost estimate after each submittal to account for design updates.

Task 3.4 - Final Design Deliverables

URS will provide final design deliverables. Prior to providing submittals to the City, URS construction management team will perform constructability reviews at 90% design. Submittals will be provided as described below.

- Submit eight (8) copies of the first (60%) submittal. Plans for the first submittal will show basic concepts of each major component of the design such as civil, structural, mechanical, electrical and instrumentation. The first submittal will include the first draft of the technical specifications.
- Submit ten (10) copies of the second (90%) submittal. Plans for the second submittal will clearly show concepts of each component of the design such as civil, structural, mechanical, electrical, and instrumentation. The second submittal will include all sections of the technical specifications.
- Shortly after receiving comments from City from our 90% submittals, URS will make the 100% submittal.

Thereafter, URS will submit stamped and signed reproducible plans on bond, and original signed specifications for City reproduction, assembly and bidding. Finally, Mylar As-Built drawings will be prepared and will be resigned by URS and the City. URS will assist City in distributing the bidding documents.

URS will conduct/attend monthly project review meetings with representatives from the City's to discuss design requirements and scheduling. Review comments will also be held following the 60% and 90% submittals. In addition to design review meetings, URS will attend a meeting to sign plans and specifications after the plans are approved. URS will provide meeting agendas and meeting minutes for each within one week of each meeting date.

URS will prepare a bid package of construction plans, specifications, and cost estimate. Construction plans will be prepared with AutoCAD 2009 software, but may be saved in any version desired by the City. Specifications will be in Microsoft Word, using a modified CSI format similar to the City's standard specifications. Submittals will be made at the 60%, 90%, and 100% and final stages.

Task 4—Construction Management Phase Services

During the construction phase, the URS project team will provide the services listed below.

Task 4.1 – Bidding Phase Assistance

URS will provide the following services to the City during the Bidding Phase of the project.

Task 4.1.1 – Bidding Assistance

URS will respond to bidder's questions during the bid advertisement period and provide information and clarification of bid documents, including preparation of complete addenda documentation per City. Preparation of addenda includes preparation of revisions to plans, specifications, and cost estimate.

URS will assist the City with reproduction and distribution of addenda. URS will provide a conformed set of plans and project manual incorporating any addenda to the bid set before the project goes into construction.

Task 4.1.2 – Pre-construction Meeting

URS will attend/conduct one (1) pre-construction meeting and coordinate the agenda with the design engineer. The pre-construction meeting will be held with the contractor to review schedule and various responsibilities. The Project Manager will prepare and distribute the minutes from the pre-construction meeting.

Task 4.1.3 – Constructors Request for Information (RFI's)

URS assumed that we would respond to approximately forty (60) separate Requests for Information (RFI) submittals. URS will receive, distribute, and establish a process to issue, process and track RFI's for interpretations and clarifications of the contract documents.

Task 4.2 – Construction Phase Services

URS will provide the following services to City during the construction phase of the project.

Task 4.2.1 – Full Time On-Site Project Representative

URS will provide a full-time Resident Project Representative (RPR) on the project site to observe and report the progress and status of the construction activities, with a focus on maintaining the project schedule and construction quality. The full-time RPR would observe work progress and recommend the acceptance, rejection, or modification of equipment delivered or work performed. The RPR shall maintain daily inspection logs. For this task, we assumed the project would last for approximately twelve (12) months, or until project completion.

Task 4.2.2 – Contractor Material Submittals

URS RPR will receive, distribute and develop a process to track material submittals proposed by the Contractor for the Work. The Project Manager will consult and advise the City on the acceptability of substitute materials and equipment proposed by the Contractor. URS RPR will coordinate with URS Engineer of Work as necessary to clarify and confirm specified materials for the Work.

Task 4.2.3 – Contract Change Orders

URS RPR will review, make recommendations, negotiate, obtain approvals, and process construction contract change orders to address contract revisions, design changes, unanticipated field conditions, additional work requests, etc.

Task 4.2.4 – Minor Plan revisions

URS allocated forty (40) hours of staff time for minor plan revisions to construction drawings.

Task 4.2.5 – Shop Drawing Submittals Reviews

URS will review shop drawings submittals. URS assumed a review of forty (40) shop drawings and that a second review would be required for 60 percent of the submittals. URS will conduct these reviews to ensure that documents produced by the contractor are in conformance with design specifications and will recommend approval, rejection, or modification.

Task 4.2.6 - Record Drawing Preparation

URS will prepare record drawings on 22-inch x 34-inch Mylar at construction completion using Contractor's and/or URS RPR's red-lines. URS will deliver final record drawings mylars, reissued signed mylars (as needed), and AutoCAD electronic files.

Task 4.2.7 – Start Up and Operational Testing

URS personnel will provide operational and testing assistance during start up and testing of the facilities. This task includes coordination and consultation with City staff. URS has assumed a total of forty (80) hours of operational and start-up assistance on this task.

Task 4.2.8 – Final Inspection and Punchlist

URS RPR will perform a final inspection of the Project with City staff and prepare a punchlist of corrections prior to acceptance. URS Project Manager will verify completion of the punchlist items and coordinate final acceptance of the Project with the City.

Task 4.2.9 – Field Changes

URS RPR will coordinate the preparation and issuance of contract revisions, if required, during construction to resolve problems due to unanticipated field conditions or other field changes. The RPR will coordinate revisions of the Contract Documents with the Project Manager and will consult with and advise City on contract changes and related issues. These contract revisions may or may not result in change orders.

Task 4.2.10 – Weekly Construction Progress Meetings

URS RPR will prepare the agenda for and chair a weekly construction progress meeting with City and Contractor. Based upon the estimated project schedule, a total of fifty two (52) – one year construction progress meetings with City and Contractor are anticipated.

Task 4.2.11 – Schedule Management

The Contractor will maintain a construction schedule, identify critical path construction activities, and variances to the schedule. URS RPR will assist City in developing the necessary Contractor recovery plans, and communicate critical schedule issues to City.

Task 4.2.12 – Construction Cost Accounting

URS RPR will coordinate progress payment review, cost accounting, budget tracking, general correspondence with City, and Contractor. The URS RPR will consult and advise City on construction cost related issues, recommendations for final payment and release of Contractor retention or securities.

Task 5—Water Distribution System Modeling

This modeling will be in support of meeting the Stage II D/DBP requirements to predict the TTHM formation in the City's water distribution system. This modeling will enhance the City's efforts to ensure TTHM formation meet EPA's Stage II D/DBP requirements. URS was provided a copy of the City's H20MAP water distribution system model that will be updated and used as a basis for developing the water quality model. The current system model was developed for evaluating the hydraulics of the water distribution system and did not address the systems water quality needs.

Task 5.1 – Data Gathering and Review**Objectives:**

The objective of this task is to review existing data pertinent to the project and also to review previous hydraulic model developed by others. Key activities include:

Subtask 5.1.1– Records Review

Following the project kick-off meeting, project team will review existing information and collect data from the City that will assist in updating the existing hydraulic model. Once obtained, this information will be reviewed and incorporated into the hydraulic model. Activities include:

- Obtain and review existing hydraulic model developed for the water distribution system.
- Technical reports prepared by previous consultant(s) on the hydraulic modeling of the water distribution system.
- As-built maps of the system for various system attributes such as storage tanks, new pipelines, pump stations, system modifications etc. that need to be enhanced as part of the water quality evaluation.
- Roughness factors estimates that would help with developing the hydraulic analysis model.
- Review of the existing SCADA data including measurements locations, outputs and data availability for having confidence in the model.
- Review of SCADA data to develop diurnal curves which is not currently included in the existing H2OMAP hydraulic model.

Assumptions:

City staff is responsible for providing the pertinent data and information such as as-built drawings of storage tanks, recently constructed pipelines, etc. that URS needs to perform the analyses.

Deliverables:

Provide recommendations for additional data needs to complete the model enhancement.

Task 5.2 – Updating the Existing Hydraulic Model

Objectives:

The City indicated the existing water distribution system model was developed in 1998, and since then, there have been some upgrades and additions to the City water distribution system. The objective of this task is to review existing model and incorporate the changes that have occurred in the system since the model was developed over 10 years ago. URS will complete the

activities identified in the work breakdown structure presented below. Key subtasks of our modeling approach are described in the following subsections:

Subtask 5.2.1– Records Review

Following the project kick-off meeting and gathering of the pertinent data on the water distribution system, URS will update the existing system hydraulic model. Activities include:

- Update the model to reflect current system configuration, location of wells, tanks, pump stations etc.
- Review recently completed projects with the City's service area and include recent system enhancements in the model.
- Review as-built maps of the system for various system attributes such as storage tanks and input these data into the existing model if they are not already included.
- Review pipe roughness factors and incorporate factors in the model that reflect current condition of the system.
- Review existing land use information provided by the City and incorporate current flow projections in the model. Also, obtain future planning horizon land use projections from the City and incorporate the estimated flow projections into the hydraulic model.
- Review of SCADA data to develop diurnal curves which is not currently included in the system.

Assumptions:

City staff is responsible for providing the pertinent data and information that URS data needs to enhance the existing system model.

Deliverables:

Provide recommendations for additional data needs to complete the model update development.

Task 5.3 – Hydraulic Model Calibration

Objectives:

The objective of this task is to calibrate the hydraulic model to field data to establish confidence in the model, prior to its use in evaluating the system.

Subtask 5.3.1 – Perform Field Testing (Pressure, Velocity, Flows) for Calibrating the Hydraulic Model

URS will perform pressure, velocity, flow and hydrant testing at key locations in the system for calibrating the hydraulic model. URS will prepare the data in a format that can be included in the hydraulic data for calibrating the model. Key elements for model include:

- Review the pressure, velocity, flow, and hydrant testing data to verify the data integrity and its completeness and accuracy prior to using it for the model calibration.
- Prepare the field results data in a spreadsheet format for input into the hydraulic model.
- Prepare system operational data and SCADA data provided by the City for input into the hydraulic model.

Assumptions:

URS has assumed City will provide data on the system operation and SCADA data. URS has also assumed City staff will provide assistance during the field testing of pressures, flows, and velocity – this assistance may involve closing or opening certain valves and assistance with hydrant testing

Subtask 5.3.2– Hydraulic Model Calibration

Model calibration is an iterative process to match field data to model predicted flows, velocities and pressure readings. Activities include:

- Run the existing system model and compare results with flows, velocities and pressure readings from data gathered in the field or to SCADA data.
- Review the recently completed projects with the City's service area and include recent system enhancements in the model.
- Review as-built maps of the system for various system attributes such as storage tanks and input these data into the existing model if they are not already included.
- Review pipe roughness factors and incorporate factors in the model that reflect the current condition of the system.
- Review the existing land use information provided by City and incorporate current flow projections in the model. Also, obtain future planning horizon land use projections from City and incorporate the estimated flow projections into the hydraulic model.

- Review of SCADA data to develop diurnal curves which is not currently included in the system.

Assumptions:

City staff is responsible for providing all pertinent URS data needs to enhancing the existing system model.

Deliverables:

Provide recommendations for additional data needs to complete the model update development.

Task 5.4 – Water Quality Model Development

Objectives:

The objective of this task is to develop a water quality model using the updated hydraulic model of the City water distribution system. The water quality model would form the foundation of the evaluation. The water quality model would be calibrated to data collected in the field, prior to its use to evaluate the system water quality.

Subtask 5.4.1 – Water Quality Model Development

URS will utilize the existing H20MAP hydraulic model in conjunction with other pertinent information provided by the City to develop a water quality computer model. Key elements for model include:

- Review the model input data in the existing hydraulic model to ensure the model has been developed properly. URS preliminary review of the data indicates that diurnal curves were not provided in the model, therefore URS will undertake the necessary steps to develop a diurnal curve for input into the model.
- Add information related to the pumping regime, previous pumping tests, pump and efficiency curves, design documentation and operation data.
- Review SCADA data provided by City to determine the adequacy of the data for use in water quality modeling.
- Develop appropriate boundary conditions for the water quality model and review the boundary data with City staff.

Assumptions:

This task assumes all the information required for developing water quality model are readily available. URS has made allowances to visit the City's offices to gather or retrieve the missing information.

Task 5.5 – Water Quality Model Calibration

Objectives:

The objective of this task is to calibrate the water quality model in order to establish confidence in the model prior to its use in evaluating the TTHM formation in the system.

Subtask 5.5.1 – Conduct Tracer Studies for Calibrating the Water Quality Model

URS will conduct tracer studies to gather the pertinent water quality data for calibrating the model. URS will prepare the data in a format that can be included in the water quality data for calibrating the model. Key elements for model include:

- Review the tracer study data to verify the data integrity and its completeness and accuracy prior to using it for the model calibration.
- Prepare tracer study data in a spreadsheet format for input into the water quality model.
- Prepare the system operational data and SCADA data provided by the City for input into the water quality model.
-

Assumptions:

URS has assumes City will provide data on the system operation and SCADA data.

Subtask 5.5.2 – Water Quality Model Calibration

URS will utilize the data gathered from the tracer studies and the information on the system operational data as well as SCADA to calibrate the water quality model. Calibration is an iterative process, and is repeated a number of times until the model results closely match the field data. Key elements for model include:

- Incorporate the tracer study data and system operational as well as SCADA data into the H20MAP model.

- Run the H20MAP model and compare results with the tracer study data as well as the system operational and SCADA data.
- Review the comparison graphs and determine if the model results closely match the field data. Repeat this step and verify the integrity of the field data. Adjust the model input data if necessary and rerun the model and compare results. This process will be repeated a few times until the model results closely match the field data.
- Model is considered calibrated after the model results closely match the field data.

Assumptions:

This task assumes that the model is as good as the information put into it. There are times the model results do not match the field data. URS does not intend to force fit the model to match the field data. In some instances it is very difficult to match the field data because the model does not truly represent the physical layout of the system. In such cases, URS will discuss the results with the City and try to find possible reasons why the model results do not match the field data, instead of trying to force fit the results.

Task 5.6 – Hydraulic Capacity Evaluation and Recommended Improvements

Objectives:

The objective of this task is to use the updated hydraulic model developed by URS for the system to evaluate the hydraulic capacity deficiencies in the system and recommend solutions to addressing the deficiencies. This involves the following steps:

- Run the existing system model to identify capacity deficiencies.
- Run the built-out system model to identify deficiencies.
- Develop mitigation measures for the deficiencies identified and run the revised model and review if recommended solutions address the deficiencies identified.
- Use the model to test possible scenarios for addressing the problem with hydraulic deficiency. The remedial measures would include but not limited to: tank turnover times, system reconfiguration etc.
- Develop a list of possible solutions and meet with the City staff to discuss.
- Develop a shortlist of up to three alternatives and prepare an estimate of these alternatives.

- Meet with City following this shortlist and select the most feasible alternative.
- URS would analyze and report on up to four (4) scenarios.

Assumptions:

URS and City would work closely after the identification of the possible alternative solutions. URS plans to hold a meeting with the City at this point to solicit City staff input into arriving at the most feasible alternative solution. The scope assumes that only up to four (4) scenarios would be performed by URS under this scope. Requests for evaluation of additional alternatives would be considered outside this scope of work.

Deliverables:

- The results from the analysis will be presented in the draft & final report. The report will address hydraulic deficiency locations and the recommended solutions.
- URS would analyze and report on up to four (4) scenarios.

Task 5.7 – Water Quality Evaluation and Recommended Improvements

Objectives:

The objective of this task is to use the water quality model developed by URS for the system to evaluate the location of high TTHM formations. Following the evaluation, URS will determine the appropriate remedial measures to ensure the TTHM formation are below EPA's Stage 2 D/DBPR limits. This involves the following steps:

- Run the existing system model to identify the locations of high TTHM.
- After running the model and identifying these locations, review the model results to determine the root cause of the TTHM formation.
- Use the model to test possible scenarios for addressing the problem with the high TTHM formation. The remedial measures would include but not limited to: tank turnover times, blending, system reconfiguration etc.
- Develop a list of possible solutions and meet with City staff to discuss.
- Develop a shortlist of up to three alternatives and prepare an estimate of these alternatives. Meet with City following this shortlist and select the most feasible alternative.

- URS will analyze and report on up to four (4) scenarios.

Assumptions:

URS and City would work closely after the identification of the possible alternative solutions. URS plans to hold a meeting with the City at this point to solicit City staff input into arriving at the most feasible alternative solution. The scope assumes that only up to four (4) scenarios will be performed by URS under this scope. Requests for evaluation of additional alternatives will be considered outside this scope of work.

Deliverables:

- The results from the analysis will be presented in the draft and final report. The report would address hydraulic deficiency locations and the recommended solutions.
- URS will analyze and report on up to four (4) scenarios.

Task 5.8 – Prepare Report

Objectives:

The objective of this task is to prepare a report summarizing the findings from the analysis, existing system deficiencies, and future system concerns and recommendations for addressing the problems identified by URS through the analysis.

Subtask 5.8.1 – Prepare Draft Report

URS will prepare a draft report summarizing the results of the water quality analysis. The report would include the following

- Documentation on the model development and assumptions made in developing the water quality model.
- The report would also include the methodology used for the water quality model analysis with tables, graphs etc., a description of the water quality analysis and URS recommendations to address the high TTHM formation areas identified.
- Cost estimates for the recommended solutions would be provided.

Subtask 5.8.2 – Prepare Final Report

Following a meeting with City staff to discuss the City's comments on the draft report, URS will prepare a final report summarizing the results of the analysis and incorporating the City's comments.

Deliverables:

- Three (3) copies of Draft Report.
- Five (5) copies of Final Report.

EXHIBIT B PROJECT SCHEDULE

Our estimated schedule to complete the work described in the scope of services is provided on the attached Project Schedule. The design aspect of the project will be completed within 8 months from the time the Notice to Proceed (NTP) is issued, modeling activities will be completed within 12 months from the time the Notice to Proceed (NTP) is issued.

The construction aspect of the project is estimated to last for an additional twelve months following the approval of the design by DPH and the bidding and award of the project.

EXHIBIT C PROJECT COSTS

We propose to complete the scope of work described herein on a time-and-materials basis in accordance with the Fee Schedule presented in Table 1. Our billings would not exceed our authorized project budget without prior written approval by the City.

**EXHIBIT D
RATE SCHEDULE**

Classification	Billing Rate
Principal-in-Charge	\$200
Project Manager	\$190
Senior Project Engineer	\$170
Project Engineer	\$150
Staff Engineer	\$110
CADD Designer	\$90
Structural Engineer	\$150
Electrical Engineer	\$150
Geotechnical Engineer	\$150
Clerk	\$65
QA/QC	\$150
Construction Administrator	\$140
Resident Project Representative	\$110