wood.

Wood Environment & Infrastructure Solutions, Inc.
4600 East Washington Street, Suite 600
Phoenix, Arizona 85034
T: (602) 733-6000
F: (602) 733-6100
www.woodplc.com

October 6, 2021
Wood Proposal No.: PW21-08-02 R1

City of El Mirage
10355 N. 121st Avenue
El Mirage, AZ 85335

RE: El Mirage WRF Expansion Project
Lump Sum Fee Proposal for Design R1

Dear Mr. Ketchmark:

Attached is our revised scope of services and fee proposal for providing engineering design services for the City of El Mirage expansion project to expand the capacity of the El Mirage Water Reclamation Facility to 3.15 million gallons per day (mgd). The project includes a new equalization basin, Sequencing Batch Reactor (SBR) System, and surge tank, dewatering centrifuge along with other process equipment and systems to meet the new flow requirements, and piping, valves, odor control, a new Blower Building with blower equipment, and a building to enclose the influent channels and coarse screen with added odor control.

The scope of services in this proposal includes civil, mechanical, electrical, HVAC, architectural, and structural design work; geotechnical evaluation, survey, potholing, and preparation and submission of the County ATC and City permits. The APP and AZPDES permits have 3.6 mgd ratings and do not need to be modified. The fee for construction engineering services, including inspections, record drawings and County AOC permit preparation will be provided within a subsequent services contract.

Please contact Ms. Kagie-Hay at (602) 733-6149, (480) 241-6622, or at andrea.kagie@woodplc.com with any comments or questions.

We look forward to the opportunity to working with the City of El Mirage on this project.

Respectfully submitted,

Wood Environment & Infrastructure Solutions, Inc.

Andrea L Kagie-Hay, PE
Project Manager

Reviewed by:

Tim LeClair, PE
Sr. Project Manager

1.0 Introduction

The City of El Mirage (City) owns and operates the El Mirage Wastewater Reclamation Facility (WRF); a tertiary wastewater treatment facility designed with a capacity of 2.5 million gallons per day (mgd). The facility operates using the Sequencing Batch Reactor (SBR) technology that currently has four (4) SBR basins to meet capacity. The WRF influent flow is nearing 80% of its design capacity and the service area, though limited in size, has the potential to increase flows to the plant at build out by approximately 500,000 gallons per day. The City has requested Wood to provide design services for an expansion of the treatment capacity to 3.15 mgd.

Expansion of the facility will generally consist of additional equalization basin capacity, a new SBR basin, expanded surge basin capacity, and additional process equipment and systems required to meet the increased wastewater treatment capacity. The additional items include fine screen, pumps, blowers, tertiary filter, odor control equipment, electrical systems, and controls. A new sludge dewatering centrifuge and a back-up chlorination system are included in the scope of services

The project will require site investigations including survey, geotechnical investigations, and potholing. Support disciplines include electrical and structural engineering. Heating, ventilation and air conditioning (HVAC) and architectural services are included for the new Blower Building, and the new Influent Channel building over the influent channels and screen. Both the Aquifer Protection Permit (APP) and the AZPDES permit have ratings of 3.6 mgd and do not need to be modified. Typical approval-to-construct (ATC) and City permits will be required. The preparation of pre-construction permits is included with our services.

Details of the design services to expand the facility to meet the future needs of the City are provided below.

1.1 Background

Facility staff operates the 2.5-mgd SBR system, which produces Class B+ effluent. The facility is nearing 80% of its design capacity, which triggers the regulatory requirement to begin planning and design for additional capacity. To meet future build-out requirements, the City is requesting a design to expand the plant to keep up with the increasing demands expected from new residential developments that are planned within the service area. This project will expand the treatment capacity of the plant and process equipment essential to operation of the new processes and systems.

1.2 Scope of Design Services / Project Understanding

The El Mirage WRF expansion project includes not only the installation of new treatment basins, but additional process upgrades to ensure unit processes meet the needs of the expanded capacity of the plant, and to provide operational flexibility. The following is a summary of the main components that will be included in the design documents to construct the new facilities:

Plant Expansion Features

- Additional Fine Screen Capacity
    - Location of screening equipment will be considered with regard to space and operational aspects of the expanded Equalization (EQ) Basin

  - HVAC – for heating/cooling and ventilation requirements in new buildings and assistance with odor control ducting

Electrical Assumptions: Based on existing drawings, this proposal assumes the existing SES and generators are both sized to provide supply power for the new equipment. The design will provide a new breaker to power the new MCC. The PLC cabinet design for controls is to be provided by the SBR manufacturer; PLC and SCADA programming to be performed by others and are not provided in this scope of services. The proposal also assumes the existing grounding system is sufficient to provide the required additional equipment protection.

Key design requirements include:

- New EQ Basin to be hydraulically connected to the existing EQ Basin. The design will need to allow flow through the headworks and into either basin. Neither will require a direct connection to or from the influent pump station.
- New Surge Basin to be hydraulically and operationally connected to the existing Surge Basin.
- Relocation of the existing manhole and sewer piping located towards the north side of the facility, near the west side of SBR 3, is to be avoided in the plant expansion design if possible.

*Deferred Submittal Notes:

The pre-engineered metal building will be designed as a deferred submittal. Wood will provide the preliminary structural foundation design and required specifications for the contractor to procure a pre-engineered building meeting the design criteria provided. Design elements for the pre-engineering building have the following inclusions and exclusions:

- Includes pre-engineered metal building (PEMB) specifications
- Includes related specifications, e.g. Doors and Openings
- Includes schematic plans, as required, to develop building specifications
- Includes preliminary structural foundation design
  - Design to be confirmed/updated during construction to coordinate with the building manufacturer's approved shop drawings
- Includes ventilation design in conjunction with the ionization odor control
- Includes electrical supply to the building
- Excludes interior building electrical design, such as outlet receptacles and lighting
- Excludes redesign of building or foundation after PEMB manufacturer has completed their design (may be added as an additional service with the construction services)
- Excludes building design drawings (building will be shown essentially as a box)
  - Manufacturer is to provide sealed engineering design of building during construction
- Excludes renderings of building and/or building elevations during design

If during permitting additional design work is required to obtain initial permits to start the project construction, Wood can add these design services by change order to the contract.

The following scope of service tasks are required for execution of the project.

Task 2100 – Background Investigations

Wood will review and utilize the background information relevant for the project design. This task consists of gathering, organizing, and reviewing available information, including record drawings, equipment nameplate data, permits, and plant operational and performance data. Wood will work with plant personnel to identify project constraints.

Land Survey

The land survey will identify the surface contour elevations and locate coordinates of the existing surface features, soil boring locations and underground features that are identified by review of existing records and the potholing activity. Site facility locations will be in accordance with the Arizona Plane Coordinate (1983) System Datum and North American Vertical Datum of 1988 (NAVD 88).

Geotechnical Investigations

Geotechnical investigations will include soil borings to determine soil characteristics and structural load capacity of the underlying soils of the new EQ, SBR, and Surge Basin. The proposal includes up to 7 borings, each up to 35 feet deep. Data from a previous boring for Filter #4 will be used along with the other borings for the new Influent Channel Building foundation consideration. Wood geotechnical engineers and/or geologists will supervise the field investigation to be performed by a sub-contracted drill rig and drill crews. Laboratory testing will be performed to provide data for the engineering analysis. A geotechnical report will be prepared to document the localized site conditions for design and construction.

Potholing

It is anticipated that existing underground utilities are not located on record drawings, or not located in accordance with the available documentation. The proposal includes a potholing allowance to uncover the location and depths of buried utilities. A detailed proposal will be developed with costs that will be submitted to the City for approval before proceeding with the work.

Task 2200 – Conceptual Design

Wood will develop a conceptual design of the facility for discussions with the City. The conceptual design will present the basic features and arrangements of equipment and systems for the expanded plant. The basic layouts include the EQ Basin, SBR Basin, expanded Surge Basin, Blower Building, new centrifuge, and existing centrifuge relocation. The presentation of the conceptual design will be directed to focus on key design approaches, including screen installation, EQ basin and Surge basin hydraulic connections, and centrifuge layout/relocation. The discussions will focus on making decisions on key equipment and layouts, as well as making preliminary selections on major equipment.

In the conceptual design task, Wood will develop a Table of Contents (TOC) for the Technical Specifications to be developed for the project. Outlines of the major equipment design criteria will be included.

Task 3300 – Opinion of Probable Construction Costs Update

The quantity takeoffs and equipment pricing will be reviewed, and the opinion of probable construction costs will be modified based on updated cost and quantities information developed in the 60% design.

2.4 Task 4 – 90% Design Services

Wood will continue to develop the design documents up through a 90% level, including the full set of technical specifications and incorporating comments from the City at the 60% design review meeting. The 90% design documents can be shared with contractor(s) for additional design critique, if the City should chose to follow a Construction-Manager-at-Risk (CMAR) project delivery. These design documents will be ready for submittal for permit application pending any final comments from the City and contractor(s), if any, at the 90% design review meeting. This submittal will include an updated design report, technical specifications, and opinion of probable construction costs.

Task 4100 – Technical Specifications Update

A complete set of technical specifications will be available with the 90% design documents; this excludes the front-end specifications. The Bid Preparation Allowance can be used to prepare front-end specifications and other bid documents in coordination with the City, as needed. The specific scope will be developed with the City once the construction approach is determined.

Task 4200 – Design Report Update

The Design Report will be updated to reflect modifications necessitated by the design process. The Design Report will be submitted with the MCESD ATC permit application.

Task 4300 – 90% Drawings

Drawings of the 60% design phase will be advanced to the 90% design, including the incorporation of comments from the 60% design review. The drawings will describe and detail the project for construction by a competent contractor.

Task 4400 – Opinion of Probable Construction Costs Update

The quantity takeoffs and equipment pricing will be reviewed, and the opinion of probable construction costs will be refined based upon updated cost and quantities information. The cost estimate will be in accordance with an American Association of Cost Engineers (AACE) Estimate Class 2.

2.5 Task 5 – 100% Design Services

The 100%, or final, design documents will incorporate comments provided by the City based on the 90% submittal review and will serve as the set of construction documents.

Task 5100 – 100% Design Set

The final design documents will be sealed and signed by an Arizona-registered Professional Engineer for each discipline. The sealed design documents will be submitted to MCESD and the City. Comments received from MCESD and City permit applications will be addressed and a final conformed set of design

A Fee Proposal table, showing the estimated hours by task, is presented in Attachment A. The fee table is not to be considered as the basis for billing but is provided for informational purposes.

Hours are assigned in the Fee Proposal table for the following team members:

- QA/QC – Quality Assurance/Quality Control Engineer
- PM – Project Manager
- SME – Subject Matter Expert
- PE – Project Engineer
- EIT – Engineer-in-Training
- SrEE – Senior Electrical and Instrumentation & Controls Engineer
- EE – Electrical and Instrumentation & Controls Engineer
- SrSE – Senior Structural Engineer
- Sr. GEO – Senior Geotechnical Engineer or Geologist
- GEO – Geotechnical Engineer or Geologist
- HVAC – Heating, Ventilating and Air Conditioning Engineer
- CAD –Computer-Aided Designer
- ECAD – Electrical Computer-Aided Designer
- SCAD – Structural Computer-Aided Designer
- ADM – Administration/Clerical

The fee and proposal exclude the following scope of service items:

- SCADA programming
- Hydrogeological Report
- APP Amendment
- AZPDES Update
- Permit Fees
- SKM electrical transient analysis
- Full PEMB design (see notes in section 1.2)
- Redesign work for PEMB building elements and/or foundation after PEMP manufacturer has completed design
- Construction Engineering Services
    - Submittal Review / RFI Response and Conflict Resolution
    - Inspection Services
    - Materials Testing
    - Change Order Reviews
    - Associated Project Management, Coordination, Construction Meetings, and Direct Costs
- MCESD Approval-Of-Construction (AOC) Permitting Assistance
- Record Drawings

Wood can provide the last 4 items under a separate construction management services agreement.

City of El Mirage
El Mirage WRF Expansion

FEE PROPOSAL
PW21-08-02 R1

Task No.	Description	QA/QC	PM	SME	PE	EIT	CAD	SrGEO2	GEO	SrEE	EE	ECAD	HVAC	SrSE	SCAD	ADM	Total	
	RATES	$205.00	$160.00	$205.00	$140.00	$95.00	$125.00	$215.00	$125.00	$190.00	$145.00	$120.00	$145.00	$190.00	$120.00	$75.00	Hours	Total
Task 1 - Project Management																		
1100	Project Management and Coordination	10	80													16	106	$16,050
1200	Project Meetings	12	40	20		50				20				16			158	$24,550
	TOTAL HOURS AND COSTS	22	120	20	0	50	0	0	0	20	0	0	0	16	0	16	264	$40,600
Task 2 - Conceptual Design / Design Concept Report																		
2100	Background Investigations (Incl Geo/Survey)		24	4		40	120	20	40	8	4			24			284	$39,420
2200	Conceptual Design	16	64	24	60	164	120			40	80	40	60	120	148		936	$130,680
2300	Design Concept Report	8	40	16	40	124				24	60		24	80		4	420	$60,940
2400	Preliminary OPCC	4	16	2	12	44					24		12	24			138	$19,430
	TOTAL HOURS AND COSTS	28	144	46	112	372	240	20	40	72	168	40	96	248	148	4	1,778	$250,470
Task 3 - 60% Design Services																		
3100	60% Drawings	16	100	24	80	316	416			48	172	240	80	164	316		1,972	$260,960
3200	Technical Specifications	4	16	4	20	44				24	40		32	64		4	252	$38,640
3300	OPCC Update	2	8	2		24				4	16		6	16			78	$11,370
	TOTAL HOURS AND COSTS	22	124	30	100	384	416	0	0	76	228	240	118	244	316	4	2,302	$310,970
Task 4 - 90% Design Services																		
4100	Technical Specifications Update	2	16	4	20	48				16	20		36	20		4	186	$26,410
4200	Design Report Update	4	8	4	16	32										4	68	$8,500
4300	90% Drawings	4	80	40	60	256	416			48	136	160	80	120	200		1,600	$212,980
4400	OPCC Update	2	8	2		20					16		4	16			68	$9,940
	TOTAL HOURS AND COSTS	12	112	50	96	356	416	0	0	64	172	160	120	156	200	8	1,922	$257,830
Task 5 - 100% Design Services																		
5100	100% Design Package	4	16	2	8	40	60			4	16	16	8	20	16	4	214	$28,390
	TOTAL HOURS AND COSTS	4	16	2	8	40	60	0	0	4	16	16	8	20	16	4	214	$28,390
Task 6 - Permitting Assistance																		
6100	MCESD ATC		4			16	8										28	$3,160
6200	City of El Mirage Building Permit (FBLSD)		2			8											10	$1,080
	TOTAL HOURS AND COSTS	0	6	0	0	24	8	0	0	0	0	0	0	0	0	0	38	$4,240
TOTAL PROJECT HOURS AND COSTS		88	522	148	316	1,226	1,140	20	40	236	584	456	342	684	680	36	6,518	$892,500
OTHER DIRECT COSTS																		
1	Architect Sub-consultant																	$74,393
2	Geotech Drilling Sub-consultant																	$3,493
3	Geotech Testing Costs																	$4,700
4	Survey																	$15,554
5	Potholing Allowance																	$20,000
6	Bid Document Preparation Allowance																	$15,000
7	Local Travel and Printing Costs																	$2,500
TOTAL OTHER DIRECT COSTS																		$135,640
TOTAL PROJECT COST																		**$1,028,140**