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Date: March 3, 2025

Subject: **Scope of Services – Professional Services for Remote Monitoring, Control, and Automation of Two Remote Sites from Water Treatment Plant**

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FL Engineering License #7917
FL Geology License #GB564
FL Surveying License #LB7062

Dear Mr. Manga,

In accordance with Resolution No. 2020-054, RFP #FY 2018-2019-012 Continuing Professional Architectural and Engineering Services and Other Services, Arcadis U.S., Inc. (CONSULTANT) is pleased to provide the following scope of services as requested by the City of Hallandale Beach (CITY) to provide continued Engineering services to implement remote monitoring and control for the two remote sites from Water Treatment Plant.

The CITY owns and operates twenty-six (26) remote sites comprised of water, wastewater, and irrigation and storm water facilities. These are unmanned facilities that have limited remote monitoring from the CITY's water treatment plant (WTP), using a proprietary radio telemetry system. The telemetry system hardware and data transmission service are provided by a third party and consists of remote telemetry units (RTUs) with integral radios and pole mounted radio antennas at each site. The radio telemetry system uses the Supervisory Control and Data Acquisition (SCADA) system software located at the water treatment plant for its human machine interface (HMI).

On June 30, 2021, the CITY issued Purchase Order (P.O.) No. 202110834-00 authorizing the CONSULTANT to provide engineering design and support services for developing Instrumentation and controls (I&C) design documents that could be incorporated into upcoming remote sites upgrade design projects performed by other consultants. At present, upgrade construction work at two sites is complete, some are under construction, and some are under design stage. At the time P.O. No. 202110834-00 was issued, it was premature to finalize design services for developing remote monitoring and control for the remote sites because they were not expected to finish upgrade design and construction in another three or four years. The approved budget for P.O. No. 202110834-00 was \$199,700.00 and the projected total cost (including \$199,700.00) to complete 21 remote sites and Water treatment Plant was \$1,427,505.00.

The scope of services described in this Purchase Order is to provide engineering and support services for developing remote monitoring, control, and automation for the two remote sites that have completed upgrade construction at the end of last year and the required changes at Water Treatment Plant. The design and support services under this proposal will improve the reliability of instrumentation and controls, and automation at the remote sites and at the WTP, and at the same time, reduce operational and maintenance cost. The scope of services also includes services to transition from the proprietary and expensive remote monitoring and control system to a less expensive but reliable communication medium such as cellular, internet, or another similar service.

The equipment at the following five (5) remote sites do not currently require remote monitoring and control:

1. Northwest 10th Terrace
2. 1 Egret
3. Diana Drive
4. Atlantic Shores
5. NMB Interconnect

Attachment 1 contains the remaining twenty-one (21) remote sites, and the WTP that needs I&C improvements and Supervisory Control and Data Acquisition (SCADA) system modifications to migrate into a new telemetry system from the existing proprietary system. The upgrade construction contracts of two of these remote sites were completed at the end of last year and are in need for cutover to new SCADA system for automatic operation of the sites locally and remote monitoring and control of the sites from the WTP. Currently some of the remaining remote sites are under construction to upgrade and some are under the design stage for upgrade. These sites will be soon ready for cutover to the new system and will require I&C improvements and SCADA system modifications to migrate into a new telemetry system from the existing proprietary system, and for automatic operation of the site locally with remote monitoring and control of the station from the WTP.

The CONSULTANT submitted a scope of services on March 30, 2022, to the CITY for engineering design and support services at twenty-one (21) of the remote sites. However, considering that the design, construction, and cutover of the remote sites upgrade schedule extends over several years, the CITY subsequently requested the CONSULTANT to submit a new scope of work and fee proposal for performing a more limited level of effort focused on only two (2) of the remote sites and the WTP. The following presents the CONSULTANT's reduced proposal, as requested.

Scope of Work

CONSULTANT shall furnish professional engineering services to cutover the two (2) remote sites listed below to new I&C and SCADA system, and at the WTP to provide control of these two (2) remote sites locally at the site and remotely from the WTP.

1. Lift station 8 (SE 5th Avenue)
2. Well No. 9

1. Project Management

Project management activities specific to this Project include the following:

1. Provision, monitoring and updating of schedule of services being provided. The initial project schedule will be provided in MS Project format at Project Kickoff and updated as necessary throughout the Project.
2. One (3-hours) Project Kickoff meeting.
3. Up to 3 (1-hour) monthly design progress reporting and invoicing meetings

Assumptions

- Except for the Project Kickoff all project meetings are anticipated to be held virtually.

2. Support Services

The following support activities shall be performed by the CONSULTANT.

2.1 Programming and HMI configuration at Remote Sites

The CONSULTANT shall provide PLC programming and HMI software configuration that will run on the new OITs at the two remote sites. The CONSULTANT shall program the PLC for data collection and configure the network switch (including security measures) and interface it with the hardware used for cellular service. This will include configuring and establishing communication using the drivers in the VTScada HMI software. The CONSULTANT shall coordinate with the CITY, finalize equipment layout and color schemes, and develop HMI graphics for the OITs at each remote site. The CONSULTANT shall link all objects that show equipment status and alarms and display process parameters.

The CONSULTANT will perform PLC programming and HMI software configuration inhouse at the CONSULTANT's office. The PLC programs and configured HMI software will be brought to remote sites and uploaded to the PLC and OIT at the time of the remote sites' startup and testing.

2.2 Configure Existing HMI Software at the WTP

The CONSULTANT shall provide required HMI software configuration at the WTP to integrate the new monitoring and control systems implemented at the two remote site. The HMI software shall be fully configured to display processes along with equipment status, events, alarms, and process variables. The CONSULTANT shall configure the existing layer three network switch, with stringent security measures, at WTP. The CITY shall provide CONSULTANT the control parameters, setpoints, and hidden and system specific safety interlock information.

The CONSULTANT will perform HMI software configuration inhouse at the CONSULTANT's office. The configured HMI software will be brought to WTP and uploaded to the existing SCADA servers at the time of WTP SCADA HMI testing.

2.3 System Testing, Start-up, Commissioning, and Training

Upon completion of programming and HMI configuration of each remote site, the CONSULTANT shall upload the programming and perform field test and startup of the programs and configured OIT HMI software jointly with CITY and, if applicable, jointly with the remote sites upgrade construction Contractor. Following the field test and startup of each site, the CONSULTANT shall perform the following:

- Conduct a seven (calendar) day Integrated System Test (IST) to verify all software programs are functioning as intended.

Completion of the seven days IST without any functional failures will constitute acceptance of the respective remote site's monitoring and control system by the CITY. The CONSULTANT shall develop remote monitoring and control system training and train the CITY's operational and maintenance staff. After the successful

completion of the IST, for a period of three months, the CONSULTANT shall remotely access the system, troubleshoot, resolve any PLC programming or HMI software configuration related issues that arise.

2.4 Relocate Existing SCADA Servers to Server Room

The CONSULTANT shall shutdown the existing SCADA servers one at a time and then allow the CITY's IT team to relocate the servers and the existing UPS from the electrical room to the existing server rack in the server room. When the relocation is completed by the CITY, the CONSULTANT shall reestablish all required communication between all PLCs, and SCADA servers, SCADA workstations and SCADA servers, and coordinate with the CITY's IT team to use the existing layer three network switch in the server room for the SCADA system communication.

2.5 Cutover Existing Radio Telemetry system to Cellular Communication System

Once the hardware listed in the item below is procured and installed by the CITY, the CONSULTANT shall program the PLC at the remote site and establish communication with the new modem and router and program the SCADA servers, network switch, new modem and router at the WTP. The CONSULTANT shall program cellular modems and establish communication between the WTP and the two remote sites. The CONSULTANT shall test, and start up the cellular modem, router, and network switch at the WTP and at the remote sites and verify trouble free operation.

This work will be performed at the same time when PLC programs and configured HMI software is loaded and tested at the remote sites and WTP.

2.6 Purchase Cellular Modem/Antenna

Upon notice to proceed, the CITY shall purchase the cellular modem, antenna, and antenna cable for the two remote sites (Well No. 9, and Lift Station 8), and the master cellular modem with antenna for the WTP. The CITY shall install the cellular modem and antenna at the WTP and notify the CONSULTANT when the cellular modem and antenna is ready for programming.

Task 2 - Deliverables

- CONSULTANT shall attend one virtual (3-hours) workshop to review configured HMI screens.
- CONSULTANT shall perform three (3) 2-hour training session for CITY personnel.
- Six (6) copies of fully developed and tested programs and configured HMI software on an electronic medium;
 - CONSULTANT shall keep a backup copy for two (2) years that will be available to CITY upon request.
- Six (6) hard copies and six (6) electronic copies of remote monitoring and control system training manuals.

Assumptions

The following are the assumptions made in the development of this scope of work and the budget for this project. Should the work of the project exceed these assumptions, CONSULTANT may request additional fees. Any change to the above scope of work, fee or schedule will not be done without the prior written authorization of CITY.

- The CITY will provide the CONSULTANT access to the remote sites and the WTP for carrying out the required work as well as staff authorized to operate equipment at the site for testing the completed work.
- The CITY will procure and install the antenna on the outside wall of the WTP building and routing the antenna cable from the antenna to the cellular modem in the server room.
- Existing SCADA HMI software licenses at the WTP have enough tags available for configuration of additional IO points and database, and the additional HMI screens required for the remote sites will not exceed the screen limit of the licenses of the existing HMI software.
- Existing SCADA HMI software licenses at the WTP include drivers for communication with Allen-Bradley MicroLogix PLCs.
- Cellular service at each remote site and at the WTP will be acquired by the CITY and fully functional prior to the scheduled cutover from the existing to the new system at each remote site.
- The CITY shall furnish to the CONSULTANT process and equipment operating parameters and setpoints prior to start of programming and HMI configuration.
- CITY will provide CONSULTANT with any available documentation required to adequately perform the scope of work.

Project Schedule

The project has the following schedule:

- Two remote sites and WTP work to be completed within three (3) months after receipt of Notice to Proceed and executed PO.

Assumptions

- Schedule assumes that work by the CONSULTANT for above referenced remote sites will be completed within three (3) months. If for any reason hardware procurement and installation work by the CITY, referenced above, is not complete and ready for the CONSULTANT to perform the work within a year from the approval date of this P.O. the CONSULTANT will coordinate with the CITY for additional compensation related to escalation, and time if necessary.

Project Budget

The table below includes a breakdown of the proposed lump-sum compensation for the additional services.

Task No.	Task Description	Subtotal
1	Project Management	\$20,765.00
2.1	Programming and HMI Configuration	\$29,275.00

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2.2	HMI Configuration at WTP	\$75,765.00
2.3	Testing, Start-up, Commissioning and Training	\$43,655.00
2.4	Program and Configure Relocated Existing SCADA servers	\$44,440.00
2.5	Cutover Existing Telemetry to Cellular Service	\$29,600.00
	TOTAL	\$243,500.00

The CONSULTANT shall invoice for the services monthly based upon percentage complete by task as established in the scope of work section and listed in the table above. We thank you for the opportunity to assist the CITY and look forward to continuing to work with the CITY on this important project. Please contact me if you have any questions or require further information.

Sincerely,
Arcadis U.S., Inc.



Leah K. Richter, P.E.
Vice President

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Mobile: 954-599-7368

CC. Joseph Chiriyankandath
Diego Barrios

Attachment 1

Site Names and Grouping for Programming and Configuration

Program Cellular Modem/Router Furnished and Installed by the CITY			
No.	Site Name	Site Type	Site No.
1	14 th Avenue North PS	Storm Water PS	181
2	14 th Avenue South PS	Storm Water PS	182
3	210 SW PS	Storm Water PS	184
4	SW 5th Avenue	Wastewater Lift Station	8
5	Well No. 9	Well	105

Program Cellular Modem/Router and PLC Furnished and Installed by the CITY			
No.	Site Name	Site Type	Site No.
6	Control Gate Structure	Storm Water Gate	186

Program Cellular Modem/Router and PLC in new control panels installed by an integrator			
No.	Site Name	Site Type	Site No.
7	Beach Tower Elevated Tank	Tank	101
8	Well No. 7	Well	104
9	I-95 Pump Station	Storm Water PS	17
10	Scavo Park (HAL Sprinkler)	Irrigation	183
11	Well No.8	Well	103

Program Cellular Modem/Router and PLC in the new Control Panels furnished and installed under facility upgrade projects.			
Wastewater Lift Stations			
No.	Site Name	Site No.	
12	Beach Triplex	3	
13	Three Islands	4	
14	NE 12 th Avenue	6	
15	NE 4 th Court	7	
16	Foster Road	9	
17	Sunset East	10	
18	Holiday Drive	11	
19	SW 4 th Avenue	12	
20	SW 8 th Avenue	13	
21	Sunset West	15	