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MEMORANDUM

To: KLWTD Board

From: Ed Castle, PE

Date: December 28, 2021

Re: Monitoring System for Vacuum Collection System and Force Main System

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The Key Largo Wastewater Treatment District (the District) is planning on installation of continuous monitoring systems in its vacuum collection system and its force main system.

The District's vacuum collection system was completed approximately 10 years ago. Since that time, there have been performance problems caused by fouled controllers or level sensors and valves that have hung open or would not open when called for. These problems can sometimes result in backups into homes or in loss of vacuum in entire neighborhoods. Currently, the District must rely on low vacuum alarms at the vacuum stations or on calls from homeowners to determine when the vacuum collection system is not performing as intended. The trouble-shooting procedures for low vacuum conditions are time consuming and result in significant overtime labor. The length of time the system is down may also result in sewage being held in vacuum pits, causing surcharging of the system and potential backups into homes.

The District proposes to install a vacuum pit monitoring system in the areas currently included in the District's PCA for use of ACOE funding. Those areas included Basins B, C, D, E, F, G, H, I and J/K except for Basin J/K Phases 7 & 8. The vacuum pit monitoring system would give early warning in the event of failures as discussed above. The monitoring system will measure vacuum pressure and sewage levels in the individual vacuum pits, along with other performance parameters. The system would detect and report failures of individual vacuum pits. Since the incidents would be reported very quickly via radio telemetry, the KLWTD maintenance staff will be able to respond and correct the deficiency before the storage capacity of the vacuum pit is exhausted and sewage begins to back up into the homeowner's onsite system. And since the monitoring system will give the exact location of the problem, the length of time needed to troubleshoot the system will be reduced, significantly reducing both the overtime labor costs and allowing for shorter response times and fewer backups into homes.

The District has also experienced occasional blockages in its force main systems. Blockages in the force main system can potentially cause backups and potential overflows at its vacuum stations, which discharge into the North and South Transmission Mains, and at its

conventional pump stations and at its grinder pump stations. Blockages in the force mains may also cause backups at the privately owned pump stations that discharge into the North and South Transmission Mains. In order to prevent such potential overflows, the District proposes to install pressure monitoring and flushing ports at selected locations throughout the force main systems. The District proposes to install the pressure monitoring and flushing systems in the areas currently included in the District's PCA for use of ACOE funding. Those areas included Basins B, C, D, E, F, G, H, I and JK except for PK Phases 7 & 8.

The cost estimate for implementing the vacuum pit and force main monitoring systems in the areas currently included in the PCA is $3,154,500.

In addition, the District intends to install vacuum pit monitoring in Basin A and in Basin JK Phases 7 & 8 and force main pressure monitoring and flushing ports on the North and South transmission mains in Basin A and in Basin JK Phases 7 & 8 and on the C-905 and Unique Properties grinder pump system force mains. The District will request a modification to its PCA to include Basin A, Basin JK Phases 7 & 8 and the C-905 grinder pump service area to add these areas to the PCA.

The estimated cost for implementing the vacuum pit and force main monitoring systems in these areas that are proposed to be added to the PCA via amendment is $1,128,000.

Over the past several years, the District has had demonstration monitoring systems installed by two manufacturers, Flovac and Airvac. Mike Dempsy prefers the Flovac System over the current Airvac system. The Flovac system offers the ability to monitor multiple conditions in the vacuum pits and buffer tanks, including vacuum level, valve position, number of open/close cycles and sump levels. The Flovac system also allows the Field Operations Department to remotely actuate vacuum valves to prevent backups and to flush the system. Currently, this must be done by sending personnel out into the field to manually activate vacuum pits. Finally, the Flovac system has monitoring capabilities for force mains and pump stations.

The current Airvac monitoring system does not provide many of the features offered by Flovac. Most importantly, this system does not indicate sewage level in the sumps and does not transmit the vacuum pressure. The Airvac system also does not accommodate monitoring of force mains and pump stations. Airvac is developing an upgraded monitoring system that may provide information similar to the Flovac capabilities, but that system has not been deployed yet and has no operating history.

Further, both the City of Marathon and K.W. Resort Utilities Corp. prefer the capabilities of the Flovac system and have implemented limited Flovac monitoring in their systems. The City of Marathon is planning an expansion of the Flovac monitoring system.

Based on the above, Staff recommends that the Board either: 1. direct staff to publish a Request for Proposals that would specify monitoring as available from Flovac, but would allow alternative vendors as "or equals" providing the system capabilities meet the minimum requirements; or 2. Authorize the General Manager to enter into negotiations with Flovac as a single source provider for vacuum and force main systems monitoring. The scope of work would include purchase, installation and startup of the monitoring system.

The District has $200,000 in the FY12-22 budget and intends to budget additional funds in the upcoming fiscal years. It is anticipated that this project will span across several fiscal years.