

April 23rd, 2019

Fred Sororian, PE
Thomas and Hutton
50 Park of Commerce Way
Savannah, GA 31405

Reference: Travis Field Water Reclamation Facility

Subject: Cost Allowance and BOM for MBR and MBT Digestion Systems Procurement. Project Specification Section 45 50 00 Membrane Bioreactor (MBR) System.

Dear Fred,

Per your request, Kubota Membrane USA is pleased to provide this detailed cost allowance for MBR and MBT equipment, spares, services, warranty, performance testing, shipping and all other requirements in accordance with Specification Section 45 50 00.

Please note that the RAS actuated flow control valves listed in Section 45 50 00 and indicated as two 24-inch and one 14-inch are not included in our BOM and are not being supplied by Kubota Membrane USA. All bidding contractors will need to include the cost of these three actuated valves separate from our BOM.

Kubota Membrane USA shall provide all equipment listed in the attached Bill of Materials (BOM) for a lump sum price of \$2,932,077. Lump sum price does not include any local or federal sales tax or other fees.

Please do not hesitate to contact Jay Boudreaux or myself with any other questions or comments you may have.

Kind regards,

Damone Supica, PE
Product Engineer - MBR Systems | Kubota Membrane USA Corporation
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4 Scope of Supply

Kubota Membrane USA is including the following equipment, instrumentation, controls, and services for the Travis Field WRF project. Kubota Membrane USA is including spare parts as described in Section 45 50 00 2.04.M.

4.1 Major Equipment and Instrumentation

Table 6. *KMU Scope of Supply and Materials of Construction*

Name	Type	Manufacturer	Model	Size / Motor HP	Power Requirements	Material of Construction	Quantity*
Anaerobic Basin (AN) Equipment							
Anaerobic Mixer	Submersible Mixer	Wilo	TR60-2.27-6/8	2.7 HP	460 VAC	Cast iron casing with Ceram CO protective coating	2
Anaerobic Mixer Ancillary	Guide Rails, Guide Brackets, Lifting Cables, Thermal and Moisture Relays	Wilo	-	-	-	304SS	2 sets
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	3 (2 duty + 1 spare)
Pre-Anoxic Basin (Pre-AX) Equipment							
Pre-Anoxic Mixer	Submersible Mixer	Wilo	TR 75-2.17-6/16	6 HP	460 VAC	Cast iron casing with Ceram CO protective coating	2
Pre-Anoxic Mixer Ancillary	Guide Rails, Guide Brackets, Lifting Cables, Thermal and Moisture Relays	Wilo	-	-	-	304SS	2 sets
RAS Pump	Submersible Pump	Flygt	NP 3202.095-614	60 HP	460 VAC	Cast iron casing and impeller	4 (3 duty + 1 spare)
RAS Pump Ancillary	Pump Mounting Stand and Inlet Elbow	Flygt	-	-	-	-	4 sets
Internal Recycle Flow Meter	Magnetic	Siemens	MAG 5100W	14-inch	115-230 VAC	ANSI B16.1 Class 150 carbon steel flanges	1
Feed Forward Flow Meter	Magnetic	Siemens	MAG 5100W	24-inch	115-230 VAC	ANSI B16.1 Class 150 carbon steel flanges	2

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Name	Type	Manufacturer	Model	Size / Motor HP	Power Requirements	Material of Construction	Quantity*
Level Transmitter	Hydrostatic	Blue Ribbon, E+H, or equal	Bird Cage, FMX, or equal	-	10-30 VDC	316SS	2 (1 duty + 1 spare)
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	2
Pre-Aeration Basin (PA) Equipment							
Pre-Aeration Diffuser Assembly	Fine Bubble	EDI or Sanitaire	FlexAir Disc	1176 scfm	-	EPDM with PVC Manifold Assembly	2 sets
DO Meter	Sensor and Transmitter	Hach	LDO and SC100	-	100-230 VAC	304SS	2 sets
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	4
Feed Channel (FC) Equipment							
Feed Channel Mixer	Submersible Mixer	Wilo	TR50-2.33-6/8	2.7 HP	460 VAC	Cast iron casing with Ceram C0 protective coating	2
Feed Channel Mixer Ancillary	Guide Rails, Brackets, Lifting Cables, Thermal and Moisture Relays	Wilo	-	-	-	304SS	2 sets
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	2
Membrane Bioreactor Basin (MBR) Equipment							
Kubota Submerged Membrane Unit	Flat Plate	Kubota	SP600	-	-	Chlorinated Polyethylene Membrane 304 Stainless Steel Frame	36 units
SMU Ancillary	Plates, Poles, Brackets, etc., for SMU Guide and Stabilizer	Kubota	-	-	-	304 Stainless Steel	36 sets
Air Isolation Valve	Butterfly	Keystone or equal	GRL Lug Style or equal	3-inch	-	Cast Iron	36
Permeate Isolation Valve	Butterfly	Asahi or equal	Type 21 or equal	3-inch	-	PVC	72
Air Piping located inside of MBR basins	Air piping < 4" inside MBR basins	Kubota	-	< 4-inch	-	PVC piping at and below liquid level	36 sets
Permeate piping located inside of MBR basins	Permeate piping < 4" inside MBR basins	Kubota	-	< 4-inch	-	Sch. 80 PVC	36 sets
Degas Valve	Electric Actuated	ASCO or equal	EF Series or equal	3-inch	-	DI Body, EPDM Seat	8

Name	Type	Manufacturer	Model	Size/ Motor HP	Power Requirements	Material of Construction	Quantity*
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	8
MBR Permeate System Equipment							
Pressure Transmitter	Diaphragm	Siemens	SITRANS P DS III	-	24 VDC	-	5 (4 duty + 1 spare)
Permeate Flow Meter	Magnetic	Siemens	MAG 5100W	12-inch	115-230 VAC	ANSI B16.1 Class 150 carbon steel flanges	4
Permeate Pump	Self-Priming Centrifugal	Gorman-Rupp	T10A60S-B	15 HP	460 VAC	Gray Iron Casing, Ductile Iron Impeller, Gray Iron Housing	4
Permeate Flow Control Valve	Actuated Modulating Butterfly Valve	Limitorque Actuator	SQR05.2/AC01.2	12-inch	120 VAC	DI Body, EPDM Seat	5 (4 duty + 1 spare)
Pressure Gauge	Gauge with Diaphragm Seal	Ashcroft	Duragauge	-	-	316 Stainless Steel Wetted Material	8
Turbidity Analyzer	Probe and Transmitter	Hach	1720E and SC100	-	100-230 VAC	-	4 (with 1 spare probe)
MBR Aeration System Equipment							
MBR Air Flow Meter	Thermal Mass	E+H	Model 65i	8-inch	85-260 VAC	-	4
Pressure Transmitter	Diaphragm	Siemens	SITRANS P DS III	-	24 VDC	-	5 (4 duty + 1 spare)
MBR Air Scour Blower Package	Positive Displacement	Aerzen	GM 35S	75 HP	460 VAC	AISI 1045 Rotor Shaft with CI Blower Housing	4
Aeration Zone Blower Package	Positive Displacement	Aerzen	GM 60S	100 HP	460 VAC	AISI 1045 Rotor Shaft with CI Blower Housing	3 (2 duty + 1 common standby)
MBR/MBT Cleaning System Equipment							
Water Supply Valve	Actuated On/Off Plug Valve	Limitorque Actuator	SQR12.2/MC01.1	4-inch	120 VAC	CI Body	1
Pressure Gauge	Gauge	Ashcroft	Duragauge	-	-	316 Stainless Steel Wetted Material	4

TRAVIS FIELD WATER RECLAMATION FACILITY

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Name	Type	Manufacturer	Model	Size / Motor HP	Power Requirements	Material of Construction	Quantity*
Chemical Flow Indicator	Rotameter	Blue White	-	-	-	Polysulfone	2
MBR Solution Flow Meter	Magnetic	Siemens	MAG5100W	4-inch	115 VAC	-	1
MBT Solution Flow Meter	Magnetic	Siemens	MAG5100W	2-inch	115 VAC	-	1
MBR Chemical Injector	Venturi	Mazzei	-	4-inch	-	PVDF	1
MBT Chemical Injector	Venturi	Mazzei	-	2-inch	-	PVDF	1
Isolation Ball Valve	Ball valve	Asahi	-	2-inch	-	PVC	4
Isolation Ball Valve	Ball valve	Asahi	-	4-inch	-	PVC	4
Digester 1 (DIG1) Equipment							
Digester 1 Diffuser Assembly	Coarse Bubble	EDI or Sanitaire	MaxAir	1241 scfm	-	CPVC	1 set
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	1
Sludge Transfer Pump	Airlift	PB Equipment	-	125 gpm	-	Stainless Steel	1
Digester 2 (DIG2) Equipment							
Digester 2 Diffuser Assembly	Coarse Bubble	EDI or Sanitaire	MaxAir	320 scfm	-	CPVC	1 set
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	1
Level Transmitter	Hydrostatic	Blue Ribbon, E+H, or equal	Bird Cage, FMX, or equal	-	10-30 VDC	316SS	1
Membrane Thickener Basin (MBT) Equipment							
Kubota Submerged Membrane Unit	Flat Plate	Kubota	RM200	-	-	Chlorinated Polyethylene Membrane 304 Stainless Steel Frame	3 units

Name	Type	Manufacturer	Model	Size/ Motor HP	Power Requirements	Material of Construction	Quantity
SMU Ancillary	Plates, Poles, Brackets, etc., for SMU Guide and Stabilizer	Kubota	-	-	-	304 Stainless Steel	3 sets
Air Isolation Valve	Butterfly	Keystone or equal	GRL Lug Style or equal	3-inch	-	Cast Iron	6
Permeate Isolation Valve	Butterfly	Asahi or equal	Type 21 or equal	3-inch	-	PVC	3
Diffuser Cleaning Valve	Actuated On/Off Plug Valve	Limitorque Actuator	SQR12.2	6-inch	120 VAC	DI Body	1
Air Piping located inside of MBT basins	Air piping < 4" inside MBR basins	Kubota	-	< 4-inch	-	PVC piping at and below liquid level	3 sets
Permeate piping located inside of MBT basins	Permeate piping < 4" inside MBT basins	Kubota	-	< 4-inch	-	Sch. 80 PVC	3 sets
Level Switch	Float	Conery or Kobold	2902 Series or NAE Series	-	120 VAC	ABS or Polypropylene	2
Degas Valve	Electric Actuated	ASCO or equal	EF Series or equal	3-inch	-	DI Body, EPDM Seat	1
MBT Permeate System Equipment							
Pressure Transmitter	Diaphragm	Siemens	SITRANS P DS III	-	24 VDC	-	1
Permeate Flow Meter	Magnetic	Siemens	MAG 5100W	1-inch	115-230 VAC	ANSI B16.1 Class 150 carbon steel flanges	1
Permeate Pump	Progressive Cavity	Netsch	NEMO	2 HP	460 VAC	Cast Iron Housing, Plated Steel Rotor	2 (1 duty + 1 standby)
Pressure Gauge	Gauge with Diaphragm Seal	Ashcroft	Duragauge	-	-	316 Stainless Steel Wetted Material	4
Pressure Switch	Diaphragm	UE	Series 25	-	24 VDC	EPDM Sensor	2
MBT Aeration System Equipment							
MBT Air Scour Blower Package	Positive Displacement	Aerzen	GM 10S	20 HP	460 VAC	AISI 1045 Rotor Shaft with CI Blower Housing	1
Digester 1 Blower Package	Positive Displacement	Aerzen	GM 35S	75 HP	460 VAC	AISI 1045 Rotor Shaft with CI Blower Housing	2 (1 duty + 1 common standby)
Digester 2 Blower Package	Positive Displacement	Aerzen	GM 25S	30 HP	460 VAC	AISI 1045 Rotor Shaft with CI Blower Housing	1

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WAS Pump Equipment							
WAS Flow Meter	Magnetic	Siemens	MAG 5100W	4-inch	115-230 VAC	ANSI B16.1 Class 150 carbon steel flanges	1
WAS Pumps	Self-Priming Centrifugal	Gorman-Rupp	T4A	5 HP	460 VAC	Gray Iron Casing, Ductile Iron Impeller, Gray Iron Housing	2
WAS/Drain Flow Control Valve	Actuated Open/Close Plug Valve	Limitorque Actuator	SQR05.2/AC01.2	4-inch	120 VAC	DI Body, EPDM Seat	2
Pressure Gauge	Gauge with Seal	Ashcroft	Duragauge	-	-	316 Stainless Steel Wetted Material	4
MBR/MBT Control Panel							
MBR and MBT Control System	MBR SCADA, PLC, HMI	Kubota / MR Systems	-	-	-	-	1

*-all units are duty except where noted otherwise.