

Design Services

If desired, Enviroquip can offer the following contract design services to clients:

Biological Process Design

The Biological Process design establishes the basis for the design of the entire MBR treatment system. This process design is based on the customer's influent mass loading, diurnal flow curves, peak flow/loading numbers, and permit limits. The design utilizes EnviroSim BioWin wastewater modeling software to establish basin volumes, recycle rates, aeration requirements, chemical dosing requirements, and waste solids projections as well as Enviroquip MBR design tools for setting submersible membrane unit (SMU) requirements, MBR flux rates, and energy consumption projections.

In addition to the base calculations, process flow diagrams, recommended basin layouts defining inside basin dimensions and side water depths, and a 3-D graphical representation of the MBR system can be provided.

The Biological Process Design Scope includes:

- Project Research
- Membrane & Hydraulic Process Design
- Design Summary

Equipment Design

Equipment Design identifies the project-specific requirements for process pumps, blowers, mixers, and valves. The design takes into account duty points, turn-down, supply voltages, materials of construction, communications I/O, equipment access and serviceability, area classifications, pressure ratings, and installation methods.

The Equipment Design Scope includes:

- Headworks
- Equalization Zone
- Headworks
- Equalization Zone
- Pre-Anoxic Zone
- Pre-Aeration Zone
- MBR Zone
- Permeate Control
- MBR Zone Aeration
- PA Zone Aeration
- Supplemental Aeration
- Internal Recycle
- SMU Clean-In-Place
- WAS Handling

Instrumentation Design

Instrumentation Design provides complete specification and documentation of all project instrumentation. Using ISA Specification forms, each instrument's manufacturer, model, size, range, power, communications protocol, units, materials, connections, area classification, and displays can be documented for inclusion in the project specifications. Supporting documentation can include manufacturer's instrument cut sheets and instrumentation installation.

The Instrumentation Design Scope includes:

- Headworks
- Equalization Zone
- Pre-Anoxic Zone
- Pre-Aeration Zone
- MBR Zone
- Permeate Control
- MBR Zone Aeration
- PA Zone Aeration
- Supplemental Aeration
- Internal Recycle
- SMU Clean-In-Place
- Membrane Thickener Zone

Piping Design

The Piping Design scope provides a detailed hydraulic analysis and mechanical design of each process subsystem including all piping, flow channels, and weirs. The piping design uses Pipe-Flo simulation software to verify that piping headers and laterals are sized to provide the necessary flow distribution between membrane units, to establish pump duty points and turn downs, and check flow control valves for correct CV and rangeability.

The piping system design can include a 1:1 representation of all fittings, instruments, and equipment within the piping systems in both plan and elevation views, piping systems details, and a complete bill of materials.

The Piping Design Scope includes:

- Headworks
- Equalization Zone
- Pre-Anoxic Zone
- Pre-Aeration Zone
- MBR Zone
- Permeate Control
- MBR Zone Aeration
- PA Zone Aeration
- Supplemental Aeration
- Internal Recycle
- SMU Clean-In-Place
- WAS Handling

Controls Design

Controls Design defines the complete system integration requirements for the entire treatment process. This design scope establishes Process and Instrumentation Diagrams (P&IDs) utilizing the customer's symbols and tagging schemes, control panel layouts, as well as other relevant schematics and logic to be included in the system.

The Controls Design Scope includes:

- Controls Strategy
- I/O Tag List
- Electrical Load Calculations
- UPS Sizing Calculation
- One Line Diagram
- Riser Diagram
- Panel Drawings
- PLC Programming
- Panel Schematics
- PLC Programming
- SCADA Programming

Drafting Services

Drafting Services include complete drawing sets for all piping, equipment, basins, layouts, and other pertinent specifications related to the MBR process.

Drafting Services include:

- Process Flow Diagram
- Piping & Instrumentation Diagram
- Equipment Plan Drawings
- Piping Plan Drawings
- Section Drawings
- 3-D Basin Layout
- Inventor Model
- Basin Penetration Details
- Design Summary
- Hydraulic Profile
- Instrument Location Plan
- Guide Pipe, Stabilizer, and Brackets
- Unistrut Supports

*PAD™-K and MBT

If the project scope includes thickening and/or digestion, Enviroquip can provide similar design services to those listed above for both the PAD™-K and MBT processes.