SECTION 46 20 00

WASTEWATER TREATMENT SYSTEMS

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\*\* NOTE TO SPECIFIER \*\* BioMicrobics, Inc.; wastewater treatment solutions.  
This section is based on the products of BioMicrobics, Inc., which is located at:16002 W. 110th St.Lenexa, KS 66219Toll Free Tel: 800-753-3278Tel: 913-422-0707Fax: 913-422-0808Email: [request info (sales@biomicrobics.com)](https://arcat.com/rfi?action=email&company=BioMicrobics%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(11210bio)%253A%2520&coid=48222&spec=11210bio&rep=&fax=913-422-0808)  
Web: <https://biomicrobics.com> | <http://www.sciencofast.com>   
 [ [Click Here](https://arcat.com/company/biomicrobics-inc-48222) ] for additional information.  
BioMicrobics has grown from one product focused on single-family, decentralized wastewater treatment into a multi-faceted corporation.  
Established in 1996, we are a global leader to provide advanced wastewater, water, greywater, and stormwater filtration treatment systems serving diverse markets. With distributors in more than 80 countries and 80,000 installations worldwide, we provide end-clients with high-performance technology solutions for removing 90-99.9 percent of contaminants from polluted blackwater and greywater sources.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Wastewater Treatment Systems:
       1. Basic wastewater treatment systems. (MyFast)
       2. Wastewater treatment systems. (MicroFast)
       3. Wastewater nitrification systems. (NitriFast)
       4. Wastewater treatment systems. (RetroFast)
       5. High strength wastewater treatment system. (HighStrengthFAST)
       6. Fixed integrated treatment technology wastewater treatment systems. (RetroFITT)
    2. Specialty clarifiers. (ABC)
    3. Biobarriers. (HSMBR) (MBR)
    4. Septic tank effluent pumping system. (BioStep)
    5. Stormwater treatment systems. (BioStorm)
    6. Aeration Systems. (LIXOR)
    7. Rainwater filter drain. (d-Rain)
    8. Effluent filters. (SaniTEE)
    9. Litter control screens. (StormTEE)
    10. Grease interceptors. (FOGHog)
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
    2. Section 22 14 26.13 - Roof Drains.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.
     3. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
  2. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
     2. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
     3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up on might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
       1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
       2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
       3. Retain mock-up during construction as a standard for comparison with completed work.
       4. Do not alter or remove mock-up until work is completed or removal is authorized.
  1. PRE-INSTALLATION CONFERENCE
     1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
     2. Protect from damage due to weather, excessive temperature, and construction operations.
  3. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  4. WARRANTY
     1. Manufacturer's standard limited warranty unless indicated otherwise.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: BioMicrobics, Inc., which is located at:16002 W. 110th St.Lenexa, KS 66219Toll Free Tel: 800-753-3278Tel: 913-422-0707Fax: 913-422-0808Email: [request info (sales@biomicrobics.com)](https://arcat.com/rfi?action=email&company=BioMicrobics%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(11210bio)%253A%2520&coid=48222&spec=11210bio&rep=&fax=913-422-0808);Web: <https://biomicrobics.com> | <http://www.sciencofast.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Unobtrusive and dependable, the FAST® system handles smaller, variable flows generated from onsite applications. The clean effluent prevents biomat formation and leachfield clogging. This septic technology is very compatible with shallow drip, direct discharge, pressure distribution, spray irrigation, and conventional leachfield. Delete article if not required or delete basis of design options not required.

* 1. BASIC WASTEWATER TREATMENTSYSTEMS (MYFAST)
     1. Common Features and Attributes:
        1. Settling Tanks/AMS Zone: 1/2x to 1x daily flow must be used prior to MyFAST. Tanks: Conform to local, state, and other applicable codes, supplied by others per to Manufacturer's dimensions.
        2. Blower Mounting: Outside tank adjacent to Treatment Zone on contractor supplied concrete base.
           1. Elevation: Higher than tank water level and above normal flood level.
           2. Blower Housing: Two-piece, blower housing; tamper-proof screws.
           3. Blower Piping to Tank: Non-corrosive material; galvanized or stainless steel.

Do not run galvanized pipe inside the treatment tank.

Discharge Air Line: 4 inch NPT Steel, MyFAST.

Air Header and Connections: 4 inch NPT provided and installed by others.

* + - 1. Media: Rigid PVC, polyethylene, or polypropylene and supported by polyethylene insert. Fixed in position. No moving parts and non-corrosive.
         1. Sloughed solids are to descend through media to bottom of septic tank.
      2. Biosolids Collection System: Located underneath MyFAST liners consisting of collection grid; trunk line, valves, lateral lines with engineered orifices, biosolids manifold, and biosolids pump.
         1. Contractor to supply piping to connect grid to biosolids pump and to construct the manifold.
         2. Field Adjustable Event Timer: Controls duration and frequency of biosolids wasting from the Treatment Zone.
         3. System is reversible to facilitate back flush operations.
    1. Basis of Design: MyFAST 2.0 BASIC Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein. Designed to treat 20,000 gpd (76 cu m per day) of residential strength wastewater.
       1. Principal Equipment: FAST interconnecting liners with leg attachments, airlifts, hoses, biosolids collection manifold, sludge pump, four SaniTEE screens, blower assembly, and control panel. Treatment unit to be situated in a 20,000 gal (76 cu m) minimum tank, as shown on Drawings.
       2. Blower: 300 to 500 cfm (210 to 850 cu m per hr). Inlet filter with metal filter element.
       3. Ventilation: Vent to desired location. Cover opening with grate having 60 sq in (390 sq cm) open surface area. Secure with Stainless Steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher.
       4. Electrical/Central Control Panel: Conform to codes. Provide power to blower.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power, 60 Hz Electrical Sys: 208-230/460 VAC, 3 phase, 58/31 FLA.
        2. Input Power, 50 Hz Electrical Sys: 220/400 VAC, 3 phase 60/35 FLA.
        3. Conduit and Wiring on Project: Supplied by others.
        4. Motor starters and overloads to be housed in a NEMA 4X enclosure.
        5. Visual and audible alarm to indicate loss of power to blower.
        6. Manual silence switch.
      1. Flow and Pipe Sizing:
         1. Each MyFAST 2.0 has two, 6 inch (152 mm) gasketed effluent connections.

Each Effluent Connection: Maximum unrestricted flow of 250 gpm (945 lpm) with a 2.0 design safety factor.

Tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.

For Residential Strength Waste:

Maximum Flow Rate: 70 gpm (265 lpm).

Maximum Hourly Flow: 10 percent of design daily flow.

* + 1. Basis of Design: MyFAST 4.0 BASIC Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein. Designed to treat 40,000 gpd (151 cu m per day) of residential strength wastewater.
       1. Principal Equipment: Four FAST interconnecting liners with leg attachments, airlifts, hoses, biosolids collection manifold, sludge pump, four SaniTEE screens, blower assembly, and control panel. Treatment unit to be situated in a 40,000 gal (151 cu m) minimum tank, as shown on Drawings.
       2. Settling Tanks/AMS Zone: 1/2x to 1x daily flow must be used prior to MyFAST. Tanks: Conform to local, state, and other applicable codes, supplied by others per to Manufacturer's dimensions.
       3. Blower: 400 to 700 cfm (680 to 1190 cu m per hr). Inlet filter with metal filter element.
       4. Ventilation: Vent to desired location. Cover opening with grate having 120 sq in (775 sq cm) open surface area. Secure with Stainless Steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher.
       5. Electrical/Central Control Panel: Conform to codes. Provide power to blower.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power, 60 Hz Electrical Sys: 208-230/460 VAC, 3 phase, 63/34 FLA.
        2. Input Power, 50 Hz Electrical Sys: 220/400 VAC, 3 phase 60/34.8 FLA.
        3. Conduit and Wiring on Project: Supplied by others.
        4. Utilize motor starters and overloads to be housed in a NEMA 4X enclosure.
        5. Equip with a visual and audible alarm to indicate loss of power to blower.
        6. Manual silence switch.
      1. Flow and Pipe Sizing:
         1. Each MyFAST 4.0 has two, 6 inch (152 mm) gasketed effluent connections.

Each Effluent Connection: Maximum unrestricted flow of 250 gpm (945 lpm) with a 2.0 design safety factor.

Tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.

For Residential Strength Waste:

Maximum Flow Rate: 140 gpm (530 lpm).

Maximum Hourly Flow: 10 percent of design daily flow.

* + 1. Basis of Design: MyFAST 8.0 BASIC Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein. Designed to treat 80,000 gpd (300 cu m per day) of residential strength wastewater.
       1. Principal Equipment: Four FAST interconnecting liners with leg attachments, airlifts, hoses, biosolids collection manifold, sludge pump, four SaniTEE screens, blower assembly, and control panel. Treatment unit to be situated in an 80,000 gal (300 cu m) minimum tank, as shown on Drawings.
       2. Settling Tanks/AMS Zone: 1/2x to 1x daily flow must be used prior to MyFAST. Tanks: Conform to local, state, and other applicable codes, supplied by others per to Manufacturer's dimensions.
       3. Blower: 800 to 1400 cfm (1360 to 2380 cu m per hr). Inlet filter with metal filter element.
       4. Ventilation: Vent to desired location. Cover opening with grate having 240 sq in (1500 sq cm) open surface area. Secure with Stainless Steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher.
       5. Electrical/Central Control Panel: Conform to codes. Provide power to blower.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power, 60 Hz Electrical Sys: 208-230/460 VAC, 3 phase, 126/69.6 FLA.
        2. Input Power, 50 Hz Electrical Sys: 230/400 VAC, 3 phase 120/69.6 FLA.
        3. Conduit and Wiring on Project: Supplied by others.
        4. Utilize motor starters and overloads to be housed in a NEMA 4X enclosure.
        5. Equip with a visual and audible alarm to indicate loss of power to blower.
        6. Manual silence switch.
      1. Flow and Pipe Sizing:
         1. Each MyFAST 8.0 has four, 6 inch (152 mm) gasketed effluent connections.

Each Effluent Connection: Maximum unrestricted flow of 250 gpm (945 lpm) with a 2.0 design safety factor.

Tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.

For Residential Strength Waste:

Maximum Flow Rate: 280 gpm (1060 lpm).

Maximum Hourly Flow: 10 percent of design daily flow.

* + 1. Basis of Design: MyFAST 12.0 BASIC Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein. Designed to treat 120,000 gpd (454 cu m per day) of residential strength wastewater.
       1. Principal Equipment: Four FAST interconnecting liners with leg attachments, airlifts, hoses, biosolids collection manifold, sludge pump, four SaniTEE screens, blower assembly, and control panel. Treatment unit to be situated in a 120,000 gal (454 cu m) minimum tank, as shown on Drawings.
       2. Settling Tanks/AMS Zone: 1/2x to 1x daily flow must be used prior to MyFAST. Tanks: Conform to local, state, and other applicable codes, supplied by others per to Manufacturer's dimensions.
       3. Blower: 1200 to 2100 cfm (2040 to 3570 cu m per hr). Inlet filter with metal filter element.
       4. Ventilation: Vent to desired location and cover opening with grate having 340 sq in (2200 sq cm) open surface area. Secure with Stainless Steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher.
       5. Electrical/Central Control Panel: Conform to codes. Provide power to blower.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power, 60 Hz Electrical Sys: 208-230/460 VAC, 3 phase, 189/104.4 FLA.
        2. Input Power, 50 Hz Electrical Sys: 230/400 VAC, 3 phase 180/104.4 FLA.
        3. Conduit and Wiring on Project: Supplied by others.
        4. Utilize motor starters and overloads to be housed in a NEMA 4X enclosure.
        5. Equip with a visual and audible alarm to indicate loss of power to blower.
        6. Manual silence switch.
      1. Flow and Pipe Sizing:
         1. Each MyFAST 12.0 has six, 6 inch (152 mm) gasketed effluent connections.

Each Effluent Connection: Maximum unrestricted flow of 250 gpm (945 lpm) with a 2.0 design safety factor.

Tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.

For Residential Strength Waste:

Maximum Flow Rate: 450 gpm (1590 lpm).

Maximum Hourly Flow: 10 percent of design daily flow.

* + 1. Basis of Design: MyFAST 16.0 BASIC Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein. Designed to treat 160,000 gpd (600 cu m per day) of residential strength wastewater.
       1. Principal Equipment: FAST interconnecting liners with leg attachments, airlifts, hoses, biosolids collection manifolds, sludge pump, SaniTEE screens, blower assembly, and control panel. Treatment unit to be situated in a 160,000 gal (600 cu m) minimum tank, as shown on Drawings.
       2. Settling Tanks/AMS Zone: 1/2x to 1x daily flow must be used prior to MyFAST. Tanks: Conform to local, state, and other applicable codes, supplied by others per to Manufacturer's dimensions.
       3. Blower: 1600 to 2800 cfm (2700 to 4770 cu m per hr). Inlet filter with metal filter element.
       4. Ventilation: Vent to desired location. Cover opening with a vent grate with 480 sq in (3000 sq cm) open surface area. Secure with Stainless Steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher.
       5. Electrical/Central Control Panel: Conform to codes. Provide power to blower.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power, 60 Hz Electrical Sys: 208-230/460 VAC, 3 phase, 252/139.2 FLA.
        2. Input Power, 50 Hz Electrical Sys: 230/400 VAC, 3 phase 240/139.2 FLA.
        3. Conduit and Wiring on Project: Supplied by others.
        4. Utilize motor starters and overloads to be housed in a NEMA 4X enclosure.
        5. Equip with a visual and audible alarm to indicate loss of power to blower.
        6. Manual silence switch.
      1. Flow and Pipe Sizing:
         1. Each MyFAST 16.0 has eight, 6 inch (152 mm) gasketed effluent connections.

Each Effluent Connection: Maximum unrestricted flow of 250 gpm (945 lpm) with a 2.0 design safety factor.

Tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.

For Residential Strength Waste Maximum Flow Rate: 560 gpm (2120 lpm).

Maximum Hourly Flow: 10 percent of design daily flow.

\*\* NOTE TO SPECIFIER \*\* Unobtrusive and dependable, the FAST® system handles smaller, variable flows generated from onsite applications. The clean effluent prevents biomat formation and leachfield clogging. This septic technology is very compatible with shallow drip, direct discharge, pressure distribution, spray irrigation, and conventional leachfield. Delete article if not required or delete basis of design options not required.

* 1. WASTEWATER TREATMENT SYSTEM (MICROFAST)
     1. Common Features and Attributes:
        1. Operating Conditions: Capable of treating wastewater produced by typical family activities; bath, laundry, kitchen, etc.
        2. Media: Rigid PVC, polyethylene, or polypropylene and supported by polyethylene insert. Fixed in position. No moving parts and non-corrosive.
           1. Sloughed solids are to descend through media to bottom of septic tank.
        3. Blower Mounting: Outside of tank on contractor supplied concrete base. Blower must not sit in standing water. Elevation must be higher than tank and normal flood level.
        4. Blower Piping to Tank: Non-corrosive material (PVC, galvanized, or Stainless steel).
           1. Do not run galvanized pipe inside the treatment tank.
           2. Refer to Installation Manual for further details.
           3. Discharge air line from blower to MicroFAST System to be provided and installed by the Contractor.
        5. Tank: Adequate pump out access. Conform to local, state, and other applicable codes.
        6. Flow and Dosing: FAST systems have been tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.
     2. Basis of Design: MicroFAST 0.50 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
        1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within a 450 gal (1700 L) minimum compartment as shown on Drawings.
           1. Maximum settling zone: 1x daily flow.
        2. Capacity: Up to eight people and not exceeding 500 gpd (1800 lpd) provided waste contains nothing interfering with biological treatment.
        3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
        4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower with a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 75 gph (280 lph).
    1. Basis of Design: MicroFAST 0.75 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within a 625 gal (2400 L) minimum compartment as shown on Drawings.
          1. Maximum settling zone: 1x daily flow.
       2. Capacity: Up to eight people and not exceeding 750 gpd (2800 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower with a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 75 gph (280 lph).
    1. Basis of Design: MicroFAST 0.625 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within a 540 gal (2040 L) minimum compartment as shown on Drawings.
          1. Maximum settling zone: 1x daily flow.
       2. Capacity: Up to eleven people and not exceeding 625 gpd (2400 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220 VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220 VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower with a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 65 gph (240 lph).
    1. Basis of Design: MicroFAST 0.90 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within a 750 gal (2800 L) minimum compartment as shown on Drawings.
          1. Maximum settling zone: 1x daily flow.
       2. Capacity: Up to eleven people and not exceeding 900 gpd (3400 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220 VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220 VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower with a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 90 gph (34 Lph).
    1. Basis of Design: MicroFAST 1.50 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within a 1125 gal (4200 L) minimum compartment as shown on Drawings.
          1. Maximum settling zone: 1x daily flow.
       2. Capacity: 6 to 21 people and not exceeding 1500 gpd (5600 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 20 to 45 cfm (38 to 85 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220 VAC, 1 Phase, 5/2.5 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220 VAC, 1 Phase, 5.7 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower with a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow Rate: Not to exceed 7.8 gpm (28 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 150 gph (570 Lph).
    1. Basis of Design: MicroFAST 3.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within a 2250 gal (8500 L) minimum compartment as shown on Drawings.
          1. Maximum settling zone: 1x daily flow.
       2. Capacity: 10 to 42 people and not exceeding 3000 gpd (11400 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 44 to 85 cfm (68 to 90 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 220 VAC, 1 Phase, 10.6 FLA.
        2. Input Power on 60 Hz Electrical Systems: 220/460 VAC, 3 Phase, 4.9/2.5 FLA.
        3. Input Power on 50 Hz Electrical Systems: 220 VAC, 1 Phase, 12 FLA.
        4. Input Power on 50 Hz Electrical Systems: 230/380 VAC, 3 Phase, 6.1/3.5 FLA.
        5. Actual power consumption varies with site conditions.
        6. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower with a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow Rate: Not to exceed 15 gpm (57 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 450 gph (1700 Lph).
    1. Basis of Design: MicroFAST 4.5 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within a 4220 gal (16000 L) minimum compartment as shown on Drawings.
          1. Maximum Settling Zone: 0.5x to 1x daily flow.
       2. Capacity: 18 to 63 people and not exceeding 4500 gpd (17000 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 90 to 140 cfm (185 to 238 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 220/460 VAC, 3 Phase, 6.4/3.3 FLA.
        2. Input Power on 50 Hz Electrical Systems: 230/380 VAC, 3 Phase, 6.1/3.5 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Visual and Audible Alarm System: Capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow and Pipe Sizing: Each FAST Module.

\*\* NOTE TO SPECIFIER \*\* Delete pipe hole option not required. Consult manufacturer for guidance.

* + - * 1. Effluent Pipe Hole and Gasket: Four, 4 inch (102 mm).
        2. Effluent Pipe Hole and Gasket: Six 6 inch (152 mm).
        3. Flow Rate: Not to exceed 15 gpm (57 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 450 gph (1700 lph).
      1. Unit Weight: 1600 lbs (726 kg).
         1. Four holes for lifting the FAST liner are supplied.
         2. Spreader bars are to be used in lifting the unit. Place spreader bars between lifting holes.
    1. Basis of Design: MicroFAST 9.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid situated within an 8440 gal (31900 L) minimum compartment as shown on Drawings.
          1. Maximum settling zone: 0.5x to 1x daily flow.
       2. Capacity: 30 to 126 people and not exceeding 9000 gpd (34000 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 155 to 200 cfm (38 to 85 cu m per hr). Inlet filter with metal filter element. Two piece, rectangular housing.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 220/460 VAC, 3 Phase, 12.2/5.9 FLA.
        2. Input Power on 50 Hz Electrical Sys: 190/380 VAC, 3 Phase, 17.6/8.8 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Visual and Audible Alarm System: Capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
      2. Flow and Pipe Sizing: Each FAST Module.

\*\* NOTE TO SPECIFIER \*\* Delete pipe hole option not required. Consult manufacturer for guidance.

* + - * 1. Effluent Pipe Hole and Gasket: Four, 4 inch (102 mm).
        2. Effluent Pipe Hole and Gasket: Six 6 inch (152 mm).
        3. Flow Rate: Not to exceed 30 gpm (114 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 900 gph (3400 lph).
      1. Unit Weight: 2300 lbs (1044 kg).
         1. Four holes for lifting the FAST liner are supplied.
         2. Spreader bars are to be used in lifting the unit. Place spreader bars between lifting holes.

\*\* NOTE TO SPECIFIER \*\* The NitriFAST® is designed to meet higher levels of nitrogen reduction for systems with direct discharge into lakes, streams and lagoons or properties with higher levels of ammonia influent. Delete article if not required or delete basis of design options not required.

* 1. WASTEWATER NITRIFICATION SYSTEM (NITRIFAST)
     1. Common Features and Attributes:
        1. Tank: Provide adequate pump out access and conform to local, state, and other applicable codes.
        2. Media: Rigid PVC, polyethylene, or polypropylene. Supported by polyethylene insert. Fixed position. No moving parts. Non-corrosive. Designed such that sloughed solids descend through media to bottom of septic tank.
        3. Blower Mounting:
           1. Remote mounted outside tank on a contractor supplied concrete base.
           2. Blower must not sit in standing water. Elevation must be higher than normal flood level.
           3. Blower Housing: Two-piece, rectangular.
           4. Discharge air line from blower to NitriFAST System: Provided and installed by Contractor.
           5. Blower Piping to Tank: Non-corrosive material; PVC, galvanized, or stainless steel. Do not run galvanized pipe inside the treatment tank.
        4. Flow and Dosing: FAST systems have been tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.
     2. Basis of Design: NitriFAST 0.50 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
        1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid. Other items will be provided by others. The NitriFAST 0.50 Unit is to be situated in a 450 gal (1700 L) minimum compartment as shown on Drawings.
        2. Operating Conditions: Capable of nitrifying wastewater that has been treated to secondary levels not to exceed 500 gpd (1800 lpd) provided waste contains nothing interfering with biological treatment.
        3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element.
        4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
           1. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Consult Manufacturer for additional available voltages. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower and contains a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Sequencing Fixed Reactor(SFR) timed control feature. Manual alarm silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm). Maximum hourly flow not to exceed 10 percent of design daily flow; 50 gph (190 lph).
    1. Basis of Design: NitriFAST 0.625 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid. Other items will be provided by others. The NitriFAST 0.625 Unit is to be situated in a 540 gal (2040 L) minimum compartment as shown on Drawings.
       2. Operating Conditions: Capable of nitrifying wastewater that has been treated to secondary levels not to exceed 625 gpd (2400 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
          1. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Consult Manufacturer for additional available voltages. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower and contains a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Sequencing Fixed Reactor(SFR) timed control feature. Manual alarm silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm). Maximum hourly flow not to exceed 10 percent of design daily flow; 50 gph (190 lph).
    1. Basis of Design: NitriFAST 0.75 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid. Other items will be provided by others. The NitriFAST 0.75 Unit is to be situated in a 625 gal (2040 L) minimum compartment as shown on Drawings.
       2. Operating Conditions: Capable of nitrifying wastewater that has been treated to secondary levels not to exceed 750 gpd (2800 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
          1. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Consult Manufacturer for additional available voltages. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower and contains a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Sequencing Fixed Reactor(SFR) timed control feature. Manual alarm silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm). Maximum hourly flow not to exceed 10 percent of design daily flow; 75 gph (280 lph).
    1. Basis of Design: NitriFAST 0.90 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid. Other items will be provided by others. The NitriFAST 0.90 Unit is to be situated in a 750 gal (2800 L) minimum compartment as shown on Drawings.
       2. Operating Conditions: Capable of nitrifying wastewater that has been treated to secondary levels not to exceed 900 gpd (3400 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 17 to 25 cfm (31 to 46 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
          1. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Consult Manufacturer for additional available voltages. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220VAC, 1 Phase, 1.9 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower and contains a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Sequencing Fixed Reactor(SFR) timed control feature. Manual alarm silence button.
      2. Flow Rate: Not to exceed 5 gpm (19 lpm). Maximum hourly flow not to exceed 10 percent of design daily flow; 90 gph (340 lph).
    1. Basis of Design: NitriFAST 1.50 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid. Other items will be provided by others. The NitriFAST 1.50 Unit is to be situated in a 1125 gal (4200 L) minimum compartment as shown on Drawings.
       2. Operating Conditions: Capable of nitrifying wastewater that has been treated to secondary levels not to exceed 1500 gpd (5600 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 20 to 45 cfm (28 to 85 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
          1. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Consult Manufacturer for additional available voltages. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 110/220 VAC, 1 Phase, 3.5/1.7 FLA.
        2. Input Power on 50 Hz Electrical Systems: 220 VAC, 1 Phase, 5.7 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower and contains a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Sequencing Fixed Reactor(SFR) timed control feature. Manual alarm silence button.
      2. Flow Rate: Not to exceed 7.5 gpm (28 lpm). Maximum hourly flow not to exceed 10 percent of design daily flow; 150 gph (570 lph).
    1. Basis of Design: NitriFAST 3.00 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid. Other items will be provided by others. The NitriFAST 3.00 Unit is to be situated in a 2250 gal (8500 L) minimum compartment as shown on Drawings.
       2. Operating Conditions: Capable of nitrifying wastewater that has been treated to secondary levels not to exceed 3000 gpd (11400 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 40 to 85 cfm (68 to 90 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
          1. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Consult Manufacturer for additional available voltages. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Systems: 220 VAC, 1 Phase, 10.6 FLA.
        2. Input Power on 60 Hz Electrical Systems: 220/460 VAC, 3 Phase, 4.9/2.5 FLA.
        3. Input Power on 50 Hz Electrical Systems: 220 VAC, 1 Phase, 12 FLA.
        4. Input Power on 50 Hz Electrical Systems: 230/380 VAC, 3 Phase, 6.1/3.5 FLA.
        5. Actual power consumption varies with site conditions.
        6. Conduit and Wiring: Supplied by contractor.
      1. Control Panel: Provides power to blower and contains a visual and audible alarm system capable of signaling blower circuit failure and high water conditions. Sequencing Fixed Reactor(SFR) timed control feature. Manual alarm silence button.
      2. Flow and Pipe Sizing: Each FAST Module.

\*\* NOTE TO SPECIFIER \*\* Delete pipe hole option not required. Consult manufacturer for guidance.

* + - * 1. Effluent Pipe Hole and Gasket: Four, 4 inch (102 mm).
        2. Effluent Pipe Hole and Gasket: Six 6 inch (152 mm).
        3. Flow Rate: Not to exceed 30 gpm (114 lpm) with maximum hourly flow not to exceed 10 percent of design daily flow; 900 gph (3400 lph).
        4. Flow Rate: Not to exceed 30 gpm (114 lpm). Maximum hourly flow not to exceed 10 percent of design daily flow; 450 gph (1700 lph).
      1. Unit Weight: 1600 lbs (726 kg). Four holes for lifting FAST liner. Spreader bars are to be used in lifting the unit. Place spreader bars between lifting holes.
    1. Basis of Design: NitriFAST 9.0 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST system insert, blower assembly, blower controls and leg extensions or lid. Other items will be provided by others. The NitriFAST 4.50 Unit is to be situated in an 8440 gal (31900 L) minimum compartment as shown on Drawings.
       2. Operating Conditions: Capable of nitrifying wastewater that has been treated to secondary levels not to exceed 9000 gpd (34065 lpd) provided waste contains nothing interfering with biological treatment.
       3. Regenerative Blower: 155 to 200 cfm (38 to 85 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
          1. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Consult Manufacturer for additional available voltages. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 220/460 VAC, 3 Phase, 11.2/5.9 FLA.
        2. Input Power on 50 Hz Electrical Sys: 190/380 VAC, 3 Phase, 17.6/8.8 FLA.
        3. Actual power consumption varies with site conditions.
        4. Conduit and Wiring: Supplied by contractor.
      1. Alarms: Visual and audible alarm system capable of signaling loss or power to blower. Manual silence button.
      2. Flow and Pipe Sizing: Each FAST Module.

\*\* NOTE TO SPECIFIER \*\* Delete pipe hole option not required. Consult manufacturer for guidance.

* + - * 1. Effluent Pipe Hole and Gasket: Four, 4 inch (102 mm).
        2. Effluent Pipe Hole and Gasket: Six 6 inch (152 mm).
        3. Flow Rate: Not to exceed 30 gpm (114 lpm). Maximum hourly flow not to exceed 10 percent of design daily flow; 900 gph (3400 lph).
      1. Unit Weight: 2300 lbs (1044 kg). Four holes for lifting FAST liner. Spreader bars are to be used in lifting the unit. Place spreader bars between lifting holes.

\*\* NOTE TO SPECIFIER \*\* The RetroFAST® wastewater treatment systems are designed in 3 specific sizes for 1 to up to 8 persons living on the property. The BioMicrobics FAST® systems provide significantly improved nitrification/denitrification performance over traditional systems and exceeding typical effluent requirements for wastewater recycling opportunities or reducing the size of the leach field with less aesthetic disturbance of property value or system components. Offering versatility and consistent high performance, the FAST® are also a favorite on marine vessels and offshore platforms of all types to produce high-quality effluent, specifically designed for extreme environments. Delete article if not required or delete basis of design options not required.

* 1. WASTEWATER TREATMENT SYSTEM (RETROFAST)
     1. Common Features and Attributes:
        1. Tanks: Conform to local, state, and other applicable codes.
        2. Media: Rigid PVC, polyethylene, or polypropylene. Supported by polyethylene insert. Fixed position. No moving parts. Non-corrosive. Designed such that sloughed solids descend through media to bottom of septic tank.
        3. Regenerative Blower:
           1. Mounting: Up to 100 ft (30.5 m) away from RetroFAST unit on a Contractor supplied concrete base. Elevation must be higher than normal flood level.
           2. Housing: Two-piece, rectangular housing assembled with tamper-proof screws.
           3. Blower Piping to Tank: Non-corrosive material; PVC, galvanized, or stainless steel. Do not run galvanized pipe inside treatment tank.
           4. Discharge Air Line from Blower to RetroFAST: Provided and installed by Contractor.
        4. Alarm Panel: Visual and audible alarm indicate power loss to blower. A manual silence switch.
        5. Flow and Dosing: Tested and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.
     2. Basis of Design: RetroFAST 0.150 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
        1. Principal Equipment: FAST System insert, insert lid, blower assembly, and blower housing. RetroFAST unit to be situated within tank that exceeds minimum dimensions and a 16 inch (41 cm) tank opening.
        2. Operating Conditions: Capable of treating wastewater produced by family activities; bath, laundry, kitchen, etc. up to 3 persons and not exceeding 150 gpd (570 lpd).
           1. Systems Installed for Rejuvenation of a Failed Drain field: Flow can exceed maximum flow rate up to 30 percent.
        3. Regenerative Blower: 9 to 24 cfm (15 to 41 cu m per hr). Inlet filter with metal filter element.
        4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 2.3/1.0 Amps.
        2. Input Power on 50 Hz Electrical System: 127/230 VAC, 1 phase 0.253 kw/hr.
        3. Conduit and Wiring: Supplied by contractor.
      1. Maximum Flow Rate: 5 gpm (19 lpm).
    1. Basis of Design: RetroFAST 0.250 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST System insert, insert lid, blower assembly, and blower housing. RetroFAST unit to be situated within tank that exceeds minimum dimensions and a 16 inch (41 cm) tank opening.
       2. Operating Conditions: Capable of treating wastewater produced by family activities; bath, laundry, kitchen, etc. up to 4 persons and not exceeding 250 gpd (950 lpd).
          1. Systems Installed for Rejuvenation of a Failed Drain field: Flow can exceed maximum flow rate up to 30 percent.
       3. Regenerative Blower: 9 to 24 cfm (15 to 41 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 2.3/1.0 Amps.
        2. Input Power on 50 Hz Electrical System: 127/230 VAC, 1 phase 0.253 kw/hr.
        3. Conduit and Wiring: Supplied by contractor.
      1. Maximum Flow Rate: 5 gpm (19 lpm).
    1. Basis of Design: RetroFAST 0.375 Wastewater Nitrification System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: FAST System insert, insert lid, blower assembly, and blower housing. RetroFAST unit to be situated within tank that exceeds minimum dimensions and a 16 inch (41 cm) tank opening.
       2. Operating Conditions: Capable of treating wastewater produced by family activities; bath, laundry, kitchen, etc. up to 5 persons and not exceeding 375 gpd (1420 lpd).
          1. Systems Installed for Rejuvenation of a Failed Drain field: Flow can exceed maximum flow rate up to 30 percent.
       3. Regenerative Blower: 9 to 24 cfm (15 to 41 cu m per hr). Inlet filter with metal filter element.
       4. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring: Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 2.3/1.0 Amps.
        2. Input Power on 50 Hz Electrical System: 127/230 VAC, 1 phase 0.253 kw/hr.
        3. Conduit and Wiring: Supplied by contractor.
      1. Maximum Flow Rate: 5 gpm (19 lpm).

\*\* NOTE TO SPECIFIER \*\* Unobtrusive and dependable, the FAST® system handles smaller, variable flows generated from onsite applications. The clean effluent prevents biomat formation and leachfield clogging. This septic technology is very compatible with shallow drip, direct discharge, pressure distribution, spray irrigation, and conventional leachfield. Delete article if not required or delete basis of design options not required.

* 1. HIGH STRENGTH WASTEWATER TREATMENT SYSTEMS (HIGHSTRENGTHFAST)
     1. Common Features and Attributes:
        1. Operating Conditions: Capable of treating wastewater produced by non-residential or commercial facilities provided waste contains nothing that interferes with biological treatment. The FAST System: Biological treatment system not meant for non-biodegradable or industrial wastewater. Consult Manufacturer for proper sizing and usage.
        2. Tank: Conform to local, state, applicable codes.
        3. Media: Rigid PVC, polyethylene, or polypropylene and supported by a polyethylene insert. Fixed position. No moving parts and non-corrosive.
           1. Sloughed solids are to descend through media to bottom of septic tank.
        4. Electrical: Conduit and Wiring: Supplied by contractor.
        5. Blower Mounting: Blower must not set in standing water. Elevation must be higher than normal flood level. A two-piece, rectangular housing.
           1. Discharge Air Line to HighStrength System: Provided and installed by the Contractor.
        6. Flow and Pipe Sizing: Systems are designed, tested, and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.
     2. Basis of Design: HighStrengthFAST 1.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
        1. Principle Items: FAST system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. Unit to be situated in a 750 gal (2800 L) minimum compartment as shown on Drawings.
           1. Maximum Settling Zone: 1X daily flow.
        2. Regenerative Blower: 20 to 45 cfm (38 to 85 cu m per hr). Inlet filter with metal filter element.
        3. Electrical Source: Within 150 ft (45.7 m) of pump. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 4.6/2.3 FLA.
        2. Actual power consumption varies with site conditions.
        3. Control Panel: Provides power to blower with alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
    1. Basis of Design: HighStrengthFAST 1.50 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principle Items: FAST system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. Unit to be situated in a 1125 gal (4200 L) minimum compartment as shown on Drawings.
          1. Tank: Provide adequate pump out access.
       2. Regenerative Blower: 20 to 45 cfm (38 to 85 cu m per hr). Inlet filter with metal filter element.
       3. Electrical Source: Within 150 ft (45.7 m) of pump. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 220 VAC, 1 phase, 4.9 FLA.
        2. Input Power on 50 Hz Electrical System: 220 VAC, 1 phase, 9.3 FLA.
        3. Actual power consumption varies with site conditions.
      1. Control Panel: Power to blower with visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
    1. Basis of Design: HighStrengthFAST 3.00 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principle Items: FAST system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. Unit to be situated in a 2250 gal (8500 L) minimum compartment as shown on Drawings.
          1. Suggested Maximum Settling Zone: 1X daily flow.
          2. Tank: Provide adequate pump out access.
       2. Regenerative Blower: 44 to 85 cfm (68 to 90 cu m per hr). Inlet filter with metal filter element.
       3. Electrical Source: Within 150 ft (45.7 m) of pump. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 220/460 VAC, 3 phase, 6.4/3.3 FLA.
        2. Input Power on 50 Hz Electrical System: 230/380 VAC, 3 phase, 8.5/4.9 FLA.
        3. Actual power consumption varies with site conditions.
      1. Control Panel: Power to blower with visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with Sequencing Fixed Reactor (SFR) timed control feature. Manual silence button.
    1. Basis of Design: HighStrengthFAST 4.5 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principle Items: FAST system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. Unit to be situated in a 4220 gal (16000 L) minimum compartment as shown on Drawings.
          1. Suggested Maximum Settling Zone: 0.5x to 1X daily flow.
          2. Tank: Provide adequate pump out access.
          3. Sloughed solids are to descend through media to bottom of septic tank.
       2. Regenerative Blower: 9 to 140 cfm (180 to 238 cu m per hr). Inlet filter with metal filter element.
       3. Electrical Source: Within 150 ft (45.7 m) of pump. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 220/460 VAC, 3 phase, 11/4.5 FLA.
        2. Input Power on 50 Hz Electrical System: 230/380 VAC, 3 phase, 13.4/7.2 FLA.

Actual power consumption varies with site conditions.

* + - 1. Alarm System: A visual and audible alarm indicates loss of power to the blower. Manual silence button.
    1. Basis of Design: HighStrengthFAST 9.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principle Items: FAST system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others. Unit to be situated in an 8440 gal (31900 L) minimum compartment as shown on Drawings.
          1. Suggested Maximum Settling Zone: 0.5x to 1X daily flow.
          2. Tank: Provide adequate pump out access.
       2. Regenerative Blower: 155 to 200 cfm (38 to 85 cu m per hr). Inlet filter with metal filter element.
       3. Blower Mounting: Blower must not set in standing water. Elevation must be higher than normal flood level. A two-piece, rectangular housing.
          1. Discharge Air Line to HighStrength System: Provided and installed by the Contractor.
       4. Electrical Source: Within 150 ft (45.7 m) of pump. Consult local codes for longer wiring distances. Conform to applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Contact Manufacturer for other voltages and phases available. Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 220/460 VAC, 3 phase, 17.2/8.6 FLA.
        2. Input Power on 50 Hz Electrical Sys: 230/380 VAC, 3 phase, 19.7/11.4 FLA.

Actual power consumption varies with site conditions.

* + - 1. Alarm System: A visual and audible alarm indicates loss of power to the blower. Manual silence button.
      2. Flow and Pipe Sizing: Systems are designed, tested, and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.
      3. Module Weight: 2300 lbs (1044 kg).
         1. Four holes for lifting ABC liner. Use spreader bars in lifting the unit. Place spreader bars between lifting holes.

\*\* NOTE TO SPECIFIER \*\* Just like the BioMicrobics FAST® Systems, the "energy -efficient" Fixed Integrated Treatment Technology (FITT®-ee) design produces a robust, biological treatment system that combines and integrates several proven wastewater treatment process in one. Delete article if not required or delete basis of design and model options not required.

* 1. FIXED INTEGRATED TREATMENT TECHNOLOGY WASTEWATER TREATMENT SYSTEMS (RETROFITT)
     1. Basis of Design: RetroFITT-ee Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Optimized treatment environment using energy-efficient Fixed Integrated Treatment Technology. A biological system integrating several wastewater treatment processes in one.
        1. Model RetroFITT-ee 0.15: Treatment Capacity: 150 US gpd (570 lpd).
        2. Model RetroFITT-ee 0.25: Treatment Capacity: 250 US gpd (950 lpd).
        3. Model RetroFITT-ee 0.375: Treatment Capacity: 375 US gpd (1420 lpd).
        4. Blower: Locate above flood levels. Concrete Base: 26 x 20 x 2 inch (65 x 50 x 5 cm).
           1. Airline Piping to FITT: Up to 50 ft (15 m) length. 4 elbows maximum in piping system. Distances greater than 50 ft (15 m): Consult Manufacturer.

\*\* NOTE TO SPECIFIER \*\* Blower control system is optional. Delete if not required.

* + - * 1. Blower control system.
      1. Vent Piping: Must not allow condensate build up or create back pressure. Vent to be above finished grade or higher.
         1. Vented to desired location. Cover opening with vent grate having 4 sq in (25 sq cm) open surface area. Secure cover with stainless steel screws.
      2. Appurtenances to FITT; tanks, access ports, electrical, etc., must conform to country, state, province, and local plumbing and electrical codes.
         1. Pump Out Access: Adequate to thoroughly clean out tank.
      3. Inspection and Pump-Out Ports: Secure to stop accidental or unauthorized access.
      4. Tank, piping, conduit, etc. provided by others.
      5. Unit must be secured by bolting through straps, then lid is bolted to the tank.
      6. Piping and Ancillary Equipment Installed After FITT: Must not impede or restrict free flow of effluent.
      7. Effluent Hole: Accepts 3 inch (7.5 cm) schedule 40 PVC pipe which can be then inserted into a 4 inch (10 cm) discharge pipe in septic tank.
    1. Basis of Design: MicroFITT-ee Wastewater Treatment System as manufactured by Bio-Microbics, Inc. Residential small systems.
       1. Model MicroFITT-ee 0.5: Capacity: 500 gpd (1800 lpd): People Serves: up to 8.
       2. Model MicroFITT-ee 0.625: Capacity: 625 gpd (2400 lpd): People Serves: up to 10.
       3. Model MicroFITT-ee 0.75: Capacity: 750 gpd (2800 lpd): People Serves: up to 11.
       4. Model MicroFITT-ee 0.9: Capacity: 900 gpd (3400 lpd): People Serves: up to 14.
       5. Model MicroFITT-ee 1.5: Capacity: 1500 gpd (5600 lpd): People Serves: 6 to 21.
       6. Blower: Locate above flood levels. Concrete Base: 26 x 20 x 2 inch (65 x 50 x 5 cm).
          1. Airline Piping to FITT: Up to 50 ft (15 m) length. 4 elbows maximum in piping system. Distances greater than 50 ft (15 m): Consult Manufacturer.

\*\* NOTE TO SPECIFIER \*\* Blower control system is optional. Delete if not required.

* + - * 1. Blower control system.
      1. Vent Piping: Must not allow condensate build up or create back pressure. Vent to be above finished grade or higher.
         1. Vented to desired location. Cover opening with vent grate having 4 sq in (25 sq cm) open surface area. Secure cover with stainless steel screws.
      2. Inspection and Pump-Out Ports: Secure to stop accidental or unauthorized access.
      3. Tank, piping, conduit, etc. provided by others.
      4. Unit must be secured by leg extensions bolted through tank.
      5. Piping and Ancillary Equipment Installed After FITT: Must not impede or restrict free flow of effluent.
      6. Effluent Hole: Accepts 3 inch (7.5 cm) schedule 40 PVC pipe which can be then inserted into a 4 inch (10 cm) discharge pipe in septic tank.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete basis of design options not required.

* 1. SPECIALTY CLARIFIERS (ABC)
     1. Common Features and Attributes:
        1. Operating Conditions: Uses nitrified waste and a carbon source, provided by others, to sustain a biomass for denitrification. Consult Manufacturer for sizing and usage.
        2. Media: Rigid PVC, polyethylene, or polypropylene. Supported by polyethylene insert. Fixed position, No moving parts and non-corrosive.
           1. Sloughed solids are to descend through media to bottom of septic tank.
        3. Pump: Continuous duty recirculation pump and recirculation assembly.

\*\* NOTE TO SPECIFIER \*\* Alarm panel is optional. Delete if not required.

* + - 1. Alarm Panel: Visual and audible when pump loses power. Manual silence switch.
      2. Electrical Source: Within 150 ft (45.7 m) of pump. Consult local codes for longer distances. Conform to applicable codes (IEC, NEC, etc.).
         1. Conduit and Wiring: Supplied by contractor.
      3. Flow and Pipe Sizing: Systems are designed, tested, and certified receiving gravity, demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow.Use multiple dosing events to maximize performance.

\*\* NOTE TO SPECIFIER \*\* Delete basis of design options not required.

* + 1. Basis of Design: ABC-N 0.50 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: System insert, leg extensions, and pump situated in 450 gal (1700 L) minimum tank, as shown on Drawings. Tanks: Conform to local, state, and applicable codes.
       2. Electrical:
          1. Wiring Distances: Must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110 VAC, 1 phase, 6.0 FLA.
        2. Input Power on 50 Hz Electrical System: 120 VAC, 1 phase, 9.0 FLA.
    1. Basis of Design: ABC-N 0.75 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: System insert, leg extensions, and pump situated in 625 gal (2400 L) minimum tank, as shown on Drawings. Tanks: Conform to local, state, and applicable codes.
       2. Electrical:
          1. Wiring Distances: Must prevent significant voltage loss.
          2. Input Power on 60 Hz Electrical System: 115 VAC, 1 phase, 7.5 Amps.
          3. Flow and Pipe Sizing: A four inch effluent pipe hole and gasket.

Maximum Unrestricted Flow: 90 gpm (341 lpm).

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. A six inch effluent pipe hole and gasket utilized on the same centerline dimension or up to 2 inches (5 cm) higher.

Maximum Free or Unrestricted Flow: 260 gpm (984 lpm).

* + 1. Basis of Design: ABC-N 1.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: System insert, leg extensions, and pump situated in a 750 gal (2800 L) minimum tank, as shown on Drawings. Tanks: Conform to local, state, and applicable codes.
       2. Electrical:
          1. Wiring distances must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110 VAC, 1 phase, 6.0 FLA.
        2. Input Power on 50 Hz Electrical System: 120 VAC, 1 phase, 9.0 FLA.
    1. Basis of Design: ABC-N 1.50 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: System insert, leg extensions, and pump situated in a 1125 gal (4200 L) minimum tank, as shown on Drawings. Tanks: Conform to local, state, and applicable codes.
       2. Electrical:
          1. Wiring distances must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 10.7/4.9 FLA.
        2. Input Power on 50 Hz Electrical System: 120/230 VAC, 1 phase, 15.0/7.2 FLA.
    1. Basis of Design: ABC-N 3.00 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: System insert, leg extensions, and pump situated in a 2250 gal (8500 L) minimum tank, as shown on Drawings. Tanks: Conform to local, state, and applicable codes.
       2. Electrical:
          1. Wiring distances must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 10.7/4.9 FLA.
        2. Input Power on 50 Hz Electrical System: 120/230 VAC, 1 phase, 15.0/7.2 FLA.
    1. Basis of Design: ABC-N 4.5 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: System insert, leg extensions, and pump situated in a 4220 gal (16000 L) minimum tank, as shown on Drawings. Tanks: Conform to local, state, and applicable codes.
       2. Electrical:
          1. Wiring distances must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 14.5/7.3 FLA.
        2. Input Power on 50 Hz Electrical System: 120/230 VAC, 1 phase, 15.0/7.8 FLA.
    1. Basis of Design: ABC-N 9.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: System insert, leg extensions, and pump situated in an 8440 gal (32000 L) minimum tank, as shown on Drawings. Tanks: Conform to local, state, and applicable codes.
       2. Electrical:
          1. Wiring distances must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 110/220 VAC, 1 phase, 21.4/9.8 FLA.
        2. Input Power on 50 Hz Electrical Sys: 120/220 VAC, 1 phase, 30.0/14.4 FLA.

\*\* NOTE TO SPECIFIER \*\* The BioBarrier® HSMBR® (High Strength Membrane Bioreactor) Systems help meet the increasingly stringent needs of specialized applications. The membranes and processes used in this advanced system act as an impenetrable physical barrier for all common pollutants found in wastewater today. The advanced technology offers the highest quality effluent possible on the market. The BioBarrier® MBR was the first system to be approved for water reuse (NSF/ANSI Std 350, class R) by the NSF (National Sanitation Foundation) International. Delete article if not required or delete basis of design options not required.

* 1. BIOBARRIERS (HSMBR)
     1. Common Features and Attributes:
        1. Principal Equipment: BioBarrier HSMBR assemblies, controls, filtrate pumps, air blower assemblies, and SoniTEE 818-B pre-screen devices. Other items provided by others.
        2. Suggested Maximum Settling Zone: 1x daily flow.
        3. Tank: Provide adequate pump out access. Conform to local, state, and applicable codes.
        4. Membrane System: Ultrafiltration and microfiltration. PVdF and PES cast material. Adequate turbulence is provided by aeration system insuring movement of MLSS within the membrane system.
           1. Flat Membrane Sheets: Supported by HDPE or ABS and laser welded to plate.
           2. Membrane Module: Membrane sheets arranged in a cartridge aerated via a sub-housing air grid.
           3. Membrane Assembly: Fixed in position using noncorrosive parts.
           4. Blower Mounting: On contractor supplied concrete base, up to 40 ft (12 m) maximum from BioBarrier HSMBR assembly. No more than 4 elbows. Must not set in standing water and elevation must be higher than normal flood level.
           5. Blower Housing: Two-piece, rectangular housing.
           6. Inlet filter with metal filter element.
           7. Discharge Air Line from each blower provided and installed by Contractor.
        5. Filtrate Pumps: Not intended as dosing pump for final disposal of the effluent.
           1. Mounted, up to 20 ft (6 m) from BioBarrier HSMBR tank in Contractor supplied pump chamber. Pumps must not set in standing water. Pump elevation must be higher than normal flood level.
           2. Suction and discharge lines, vacuum gauges, and one-way valve for each pump provided and installed by the Contractor.
        6. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances.
           1. Wiring: Conform to applicable codes (IEC, NEC, etc.).
           2. Wiring Distances: Must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 208-230 VAC, 3 phase, max 20 Amps.
        2. Input Power on 50 Hz Electrical Sys: 208-230 VAC, 3 phase max 20 Amps.
        3. Conduit and Wiring: Supplied by contractor.
      1. Control Panels: Provides power to blower, filtrate pump, and water level floats with visual and audible alarms capable of signaling blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. A manual silence button is included.
      2. Flow and Dosing: Systems are tested and certified receiving gravity, demand-based influent flow. If influent flow is controlled by pump or other means to assist highly variable flow conditions, use multiple dosing events to help ensure even flow.

\*\* NOTE TO SPECIFIER \*\* Delete basis of design options not required.

* + 1. Basis of Design: BioBarrier HSMBR 1.5 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. BioBarrier HSMBR 1.5-D: Installs in two identical treatment trains. Each train includes one BioBarrier assembly in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 1.5-D: Two blowers each delivering 10 to 15 cfm (17 to 25 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 1 .5-D system: Two control panels.
       2. BioBarrier HSMBR 1.5-S: Installs in one treatment train including two BioBarrier assemblies situated in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 1.5-S: One blower delivering 20 to 30 cfm (35 to 50 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 1.5-S system: One control panel.
       3. Operating Conditions: Capable of treating 1,500 gpd (5678 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.
    2. Basis of Design: BioBarrier HSMBR 3.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. BioBarrier HSMBR 3.0-D: Installs in two identical treatment trains. Each train includes one BioBarrier assembly in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 1.5-D: Two blowers each delivering 20 to 30 cfm (35 to 50 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 3.0-D system: Two control panels.
       2. BioBarrier HSMBR 3.0-S: Installs in one treatment train including two BioBarrier assemblies situated in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 1.5-S: Equipped with a blower delivering 40 to 60 cfm (70 to 105 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 3.0-S system: One control panel.
       3. Operating Conditions: Capable of treating 3,000 gpd (11356 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.
    3. Basis of Design: BioBarrier HSMBR 4.5 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. BioBarrier HSMBR 4.5-D: Installs in two identical treatment trains. Each train includes one BioBarrier assembly in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 4.5-D: Two blowers each delivering 20 to 30 cfm (35 to 50 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 4.5-D system: Two control panels.
       2. BioBarrier HSMBR 4.5-S: Installs in one treatment train including two BioBarrier assemblies situated in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 4.5-S: Equipped with a blower delivering 40 to 60 cfm (70 to 105 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 4.5-S system: One control panel.
       3. Operating Conditions: Capable of treating 4,500 gpd (17034 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.
    4. Basis of Design: BioBarrier HSMBR 6.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. BioBarrier HSMBR 6.0-D: Installs in two identical treatment trains. Each train includes one BioBarrier assembly in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 6.0-D: Two blowers each delivering 45 to 60 cfm (75 to 105 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 4.5-D system: Two control panels.
       2. BioBarrier HSMBR 6.0-S: Installs in one treatment train including two BioBarrier assemblies situated in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 6.0-S: Equipped with a blower delivering 90 to 120 cfm (155 to 205 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 4.5-S system: One control panel.
       3. Operating Conditions: Capable of treating 6,000 gpd (22712 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.
    5. Basis of Design: BioBarrier HSMBR 9.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. BioBarrier HSMBR 9.0-D: Installs in two identical treatment trains. Each train includes one BioBarrier assembly in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 9.0-D: Two blowers each delivering 65 to 90 cfm (98 to 135 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 4.5-D system: Two control panels.
       2. BioBarrier HSMBR 9.0-S: Installs in one treatment train including two BioBarrier assemblies situated in a two-compartment tank with 8 ft (2.44 m) minimum wall height.
          1. Blowers: BioBarrier HSMBR 9.0-S: Equipped with a blower delivering 130 to 180 cfm (220 to 310 cu m per hr).
          2. Control Panels: BioBarrier HSMBR 4.5-S system: One control panel.
       3. Operating Conditions: Capable of treating 9,000 gpd (34069 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.

\*\* NOTE TO SPECIFIER \*\* Single-Family, Decentralized Membrane Bioreactor Systems that Meet Future Effluent Standards. Greatly exceeding effluent requirements found in local regulations, this system produces high-quality effluent that provides new opportunities for wastewater reuse projects. NSF/ANSI Standard 40/245/350 and EN12566-3 certified. Delete article if not required or delete basis of design options not required.

* 1. BIOBARRIERS (MBR)
     1. Common Features and Attributes:
        1. Suggested Maximum Settling Zone: 1x daily flow.
        2. Tank: Provide adequate pump out access. Conform to local, state, and applicable codes.
        3. Membrane System: Ultrafiltration and microfiltration. PVdF and PES cast material. Adequate turbulence is provided by aeration system insuring movement of MLSS within the membrane system.
           1. Flat Membrane Sheets: Supported by HDPE or ABS and laser welded to plate.
           2. Membrane Module: Membrane sheets arranged in a cartridge aerated via a sub-housing air grid.
           3. Membrane Assembly: Fixed in position using noncorrosive parts.
        4. Blower:
           1. Blower Housing: Two-piece, rectangular housing.
           2. Inlet filter with metal filter element.
           3. Discharge Air Line from each blower provided and installed by Contractor.
        5. Submersible Filtrate Pumps: Not intended as dosing pump for final effluent disposal. Secured to MBR housing to prevent damage to treatment system. Discharge Line: Must not exceed 4 ft (122 cm)above pump during operations. Installation downstream of Bio-Microbics supplied effluent line must not create any backpressure on pump.
        6. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Conduit and Wiring: Supplied by contractor.
           1. Wiring: Conform to applicable codes (IEC, NEC, etc.).
           2. Wiring Distances: Must prevent significant voltage loss.

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 110/220 VAC, 1 phase, 15/20 Amps.
        2. Input Power on 50 Hz Electrical System: 127/230 VAC, 1 phase 15/20 Amps.
      1. Control Panels: One per system. Provides power to blower, filtrate pump, optional mixing device and water level floats with visual and audible alarms capable of signaling a blower circuit failure and high water conditions. Equipped with Sequencing Fixed Reactor (SFR) timed control feature. A manual silence button is included.
      2. Flow and Dosing: Systems are tested and certified receiving gravity, demand-based influent flow. If influent flow is controlled by pump or other means to assist highly variable flow conditions, use multiple dosing events to help ensure even flow.

\*\* NOTE TO SPECIFIER \*\* Delete basis of design options not required.

* + 1. Basis of Design: BioBarrier MBR 0.5 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: BioBarrier MBR assemblies, controls, filtrate pumps, air blower assemblies, SaniTEE 416 pre-screen devices and mixing devices. Other items provided by others. The system to be situation in a 1500 gal (5.680 L) minimum single compartment tank or 1,875 gal (7,000 L) minimum multiple compartment tank with or without the optional mixing pump.
       2. Operating Conditions: Capable of treating 500 gpd (1893 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.
       3. Blower: One blower per system capable of 10 to 40 cfm (20 to 60 cu m per hr).
          1. Mounting: On contractor supplied concrete base, up to 40 ft (12 m) maximum from BioBarrier MBR assembly. Must not set in standing water and elevation must be higher than normal flood level.
    2. Basis of Design: BioBarrier MBR 1.0 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: Two BioBarrier MBR assemblies, controls, filtrate pumps, air blower assemblies, SaniTEE 808-B pre-screen devices and mixing devices. Other items provided by others. The system to be situated in a 3000 gal (11,400 L) minimum single compartment tank or 3,700 gal (14,000 L) minimum multiple compartment tank with or without the optional mixing pump.
       2. Operating Conditions: Capable of treating 1,000 gpd (3785 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.
       3. Blower: One blower per system capable of 10 to 40 cfm (20 to 60 cu m per hr).
          1. Mounting: On contractor supplied concrete base, up to 40 ft (12 m) maximum from BioBarrier MBR assembly. Must not set in standing water and elevation must be higher than normal flood level.
    3. Basis of Design: BioBarrier MBR 1.5 Wastewater Treatment System as manufactured by Bio-Microbics, Inc. With all needed equipment as shown on Drawings and specified herein.
       1. Principal Equipment: Two BioBarrier MBR assemblies, controls, filtrate pumps, air blower assemblies, SaniTEE 818-B pre-screen devices and mixing devices. Other items provided by others. The system to be situated in a 4500 gal (17,000 L) minimum single compartment tank or 5,550 gal (21,000 L) minimum multiple compartment tank with or without the optional mixing pump.
       2. Operating Conditions: Capable of treating 1,500 gpd (5678 lpd) wastewater from facilities producing appropriate waste to develop and sustain a viable biomass. Consult Manufacturer for proper sizing and usage.
       3. Blower: One blower per system capable of 20 to 60 cfm (30 to 93 cu m per hr).
          1. Mounting: On contractor supplied concrete base, up to 40 ft (12 m) maximum from BioBarrier MBR assembly. Must not set in standing water and elevation must be higher than normal flood level.

\*\* NOTE TO SPECIFIER \*\* BioSTEP® makes it easier to design an effluent sewer system for an entire community. We can assist you with designing the hydraulic grade lines, selecting pump systems and packages, transport line sizing, and any other key details for successful effluent sewer design. Delete article if not required.

* 1. SEPTIC TANK EFFLUENT PUMPING SYSTEM (BIOSTEP)
     1. Basis of Design: BIOSTEP septic tank effluent pumping system as manufactured by Bio-Microbics, Inc. Consists of one ScumGuard mounting sleeve, one SaniTEE wastewater screen, and one sewage effluent pump, and one alarm/controls package.
        1. Tanks: One or multiple compartments. Furnished by others. Must meet applicable regulations. Locate access ports so operation and maintenance functions can be properly performed.
        2. ScumGuard Mounting Sleeves: Serves as mounting device for BioSTEP pumping system and helps deflect large debris. Must mount in an access port at least 18.5 inch (47 cm) diameter utilizing a riser with a minimum internal diameter of 23 inches (58.4 cm). For access ports greater than 18.5 inches (47 cm) diameter, a 3/4 inch Sched 80 pipe can be inserted into ScumGuard for proper fit; consult Manufacturer.
        3. Wastewater Screen and Discharge Assembly: SaniTEE wastewater screen to be mounted inside the ScumGuard mounting sleeve.
           1. Screen: 16 inch (406 mm) diameter with multiple, acutely angled slots having a 1/8 inch (3 mm) width. Supplied with screw on top for easy access to system. A self-contained external cleaning swab for Cleaning.
           2. Discharge Assembly: PVC sched 40 and includes a 2 inch PVC union, 2 inch flexible pipe, 2 inch ball valve, and 2 inch SxMIP adapter.
           3. Other piping and fittings to be supplied by others.

\*\* NOTE TO SPECIFIER \*\* High head pumps are available, consult Bio-Microbics Inc. for recommended options.

* + - 1. Sewage Effluent Pump: UL778 listing. Mounted inside SaniTEE Screen. Cast iron housing, stainless steel shaft, silicon carbide seals, 2 inch NPT discharge port, cast iron impeller, 20 ft (6 m) of stainless steel retrieval cable, and a class B insulated motor capable of withstanding an instantaneous 140 degree F (60 degree C) internal temperature. Capable of passing at 3/4 inch (19 mm) spherical solids.
      2. Controls and System: NEMA 4X enclosure, UL listing, 72 to 95 db alarm with exterior silencing mechanism, exterior alarm light, circuit breakers for the pump, and manual pump run control with status light. Controls can be purchased for most power supplies.
         1. Four Float Switches: High water alarm, overflow protection, On and Off, and low water alarm and shutoff.
         2. Clamps: To be mounted on pump outlet piping and installed to allow free movement and proper operation of each float.

\*\* NOTE TO SPECIFIER \*\* Most other power supplies are available.

* + - 1. Electrical Equipment: Utilize 220 VAC, single phase, 60 Hz power, a NEMA 4X junction box, and 4 cord grips.
         1. Wiring: Conform to applicable codes.
         2. Conduit, Wiring and Miscellaneous Supplies: Supplied by others.

\*\* NOTE TO SPECIFIER \*\* Pre-engineered stormwater treatment system removes trash, sediment, oil, and other pollutants from stormwater runoff. The BioSTORM®'s unique off-line design consists of a patented StormTEE® self-cleaning deflector screen and a modular separation/coalescing unit, all housed in readily-available precast concrete tanks. The versatility of the system allows components to be used separately for different applications, or together to form a complete BioSTORM system. Various sizes are available depending on local site and environmental considerations. Delete article if not required or delete model options not required.

* 1. STORMWATER TREATMENT SYSTEMS (BIOSTORM)
     1. Basis of Design: BioStorm Stormwater Treatment Systems as manufactured by Bio-Microbics, Inc. A Diversion structure, and two cells.
        1. Model BioStorm 0.50: Flow Capacity: 225 gpm (851 lpm).
           1. StormTEE Dia: 8 inch (203 mm). Internal Piping Dia: 8 inch (203 mm).
        2. Model BioStorm 1.00: Flow Capacity: 450 gpm (1703 lpm).
           1. StormTEE Dia: 8 inch (203 mm). Internal Piping Dia: 8 inch (203 mm).
        3. Model BioStorm 1.50: Flow Capacity: 675 gpm (2554 lpm).
           1. StormTEE Dia: 8 inch (203 mm). Internal Piping Dia: 12 inch (305 mm).
        4. Model BioStorm 3.00: Flow Capacity: 1350 gpm (5109 lpm).
           1. StormTEE Dia: 16 inch (406 mm). Internal Piping Dia: 12 inch (305 mm).
        5. Model BioStorm 5.00: Flow Capacity: 2250 gpm (8516 lpm).
           1. StormTEE Dia: 16 inch (406 mm). Internal Piping Dia: 12 inch (305 mm).
        6. Model BioStorm 10.00: Flow Capacity: 4500 gpm (17032 lpm).
           1. StormTEE Dia: 16 inch (406 mm). Internal Piping Dia: 18 inch (457 mm).
     2. Diversion Structure: A concrete vault installed in the stormwater outfall pipe.
        1. Collects first flush of stormwater and remaining flow up to design flow capacity of stormwater treatment system.
        2. Contains a concrete weir. Weir height directs first flush into first cell of treatment system and provides correct hydraulic flow to rest of the treatment system.
        3. Excess Flow: Passes over weir and through Diversion Structure into outfall piping which takes excess flow to receiving stream or discharge point.
     3. BioStorm First Cell: Settling tank following the diversion structure.
        1. Concrete vault used to settle large debris and floatables present in first flush.
        2. Material Captured in First Cell: Street litter and trash, such as cans, bottles, paper, plastic cups, leaves and lawn waste.
        3. Discharge End: A StormTEE screen used to filter effluent from first cell through 3/8 inch (9.5 mm) slots.
        4. Hydraulic Capacity of StormTEE: Limits flow through first cell into second cell. Excess flow is backed up into Diversion Structure where it overflows the weir into outfall pipe.
        5. The StormTEE Screening Device: No moving parts or electrical requirements.
           1. Manual plunger used in between storm events to clean StormTEE surface.
           2. Construction: Noncorrosive plastic designed to withstand forces from high flow rates and debris customary in stormwater.
        6. Solids which settle out and floatables retained in first cell is removed via a vacuum truck on a periodic basis as required.
     4. BioStorm Second Cell: Receives filtered effluent from first cell.
        1. Concrete vault containing BioStorm solids and floatable hydrocarbon recovery device.
        2. Recovery Device: No moving parts or electrical requirements
           1. Plastic liner containing honeycomb media to settle fine soil particles.
           2. Honeycomb Media: Acts as oil coalescer. Hydrocarbon particles attach to media, grow, and float to surface within upper zone of liner.

Honeycomb Media: Polypropylene, oleophilic sheets corrugated and angled at 60 degrees from vertical. Projected surface to be 15 sq m per cu meter minimum.

Solids are removed from media by settling down the 60 degree surface of media.

* + - * 1. Liner must extend above operating water level so hydrocarbons floating to surface are contained within the liner.
        2. Vertical height adjustable legs allowing solids which settle off honeycomb media to settle out under the bottom of the liner in an undisturbed zone in the second cell.
      1. Effluent from first cell enters second cell. Flow is directed around the recovery liner reducing the incoming flow velocity. Flow enters recovery system at front of liner and flows through honeycomb media to opposite end of liner.
      2. Effluent from recovery system is collected from a point below the static water level allowing floatable hydrocarbons to remain on surface inside the liner.
      3. Effluent from recovery liner exits the second cell of the system through effluent pipe which extends outside of concrete vault.
      4. Effluent Pipe: Ties into stormwater outfall piping to receiving stream or discharge point.
      5. Solids which settle out and floatable hydrocarbons retained in second cell and under the recovery liner are removed via vacuum truck on a periodic basis as required.

\*\* NOTE TO SPECIFIER \*\* Lixor® System, a low cost, non-clogging, Venturi-type aeration device for a variety of wastewater applications, such as pre-aeration, supplemental aeration, aerating a sludge holding tank, and mixing. Delete article if not required or delete basis of design options not required.

* 1. AERATION SYSTEMS (LIXOR)
     1. Common Features and Attributes:

\*\* NOTE TO SPECIFIER \*\* Control panel is optional. Delete if not required.

* + - 1. Control Panel: Power to blower with visual and audible alarm system for signaling blower circuit failure and high water conditions. SFR timed control feature. Manual silence button.
      2. Flow and Dosing: Tested, and certified receiving gravity demand-based influent flow. Consult Manufacturer when influent flow is pump controlled or has highly variable flow. Use multiple dosing events to maximize performance.
      3. Tanks: To have adequate pump out access and conform to local, state, and other applicable codes.
      4. Operating Conditions: Capable of providing supplemental oxygen in treating wastewater requiring higher oxygen demand than wastewater generated by typical residential activities (bath, laundry, kitchen, etc.).
      5. Aerator: Rigid PVC and ABS. Fixed in position and contain no moving parts and non-corrosive. Designed and installed to ensure tank contents is well mixed and aerobic.
      6. Blower Mounting: 50 ft (15 m) maximum, from LIXOR unit on contractor supplied concrete base. Must not set in standing water . Elevation must be higher than normal flood level. A two-piece, rectangular housing.
         1. Discharge Air Line from Blower to LIXOR Unit: Provided and installed by contractor.
      7. Electrical Conduit and Wiring: Supplied by contractor.
    1. Basis of Design: LIXOR 0.50 Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 0.50 aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 2000 gal (7500 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 1.5 to 3 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 5 to 25 cfm (8.5 to 43 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 2 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. All wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 220 VAC, 1 Phase, 2.6 FLA.
        2. Input Power on 50 Hz Electrical System: 240 VAC, 1 Phase, 2.6 FLA.
    1. Basis of Design: LIXOR 1.00 Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 1.0 aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 2000 gal (7500 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 2 to 4 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 5 to 20 cfm (8.5 to 34 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 2 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. All wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 230-277 VAC, 1 Phase, 4-2.75 FLA.
        2. Input Power on 60 Hz Electrical System: 480 VAC, 3 Phase, 1.6 FLA.
        3. Input Power on 50 Hz Electrical System: 200-230 VAC, 1 Phase, 4.0-2.75 FLA.
        4. Input Power on 50 Hz Electrical System: 400 VAC, 3 Phase, 1.6 FLA.
    1. Basis of Design: LIXOR 2.00 Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 2.0 aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 6000 gal (22700 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 6 to 10 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 20 to 50 cfm (34 to 85 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 2 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 230-208 VAC, 1 Phase, 12-6.3 FLA.
        2. Input Power on 60 Hz Electrical System: 460 VAC, 3 Phase, 2.9 FLA.
        3. Input Power on 50 Hz Electrical System: 200-230 VAC, 1 Phase, 12-6.1 FLA.
        4. Input Power on 50 Hz Electrical System: 400 VAC, 3 Phase, 3.5 FLA.
    1. Basis of Design: LIXOR 3.00 Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 3.0 aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 9000 gal (34000 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 9 to 15 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 40 to 80 cfm (68 to 136 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 2 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 220-208 VAC, 1 Phase, 46-9.4 FLA.
        2. Input Power on 60 Hz Electrical Sys: 460 VAC, 3 Phase, 4.1 FLA.
        3. Input Power on 50 Hz Electrical Sys: 200-230 VAC, 1 Phase, 16-6.18.5 FLA.
        4. Input Power on 50 Hz Electrical Sys: 400 VAC, 3 Phase, 4.9 FLA.
    1. Basis of Design: LIXOR 4.00 Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 4.0 aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 12000 gal (45000 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 12 to 20 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 60 to 140 cfm (102 to 238 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 3 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical System: 208/460 VAC, 3 Phase, 17.5/8.0 FLA.
        2. Input Power on 50 Hz Electrical System: 230/400 VAC, 3 Phase, 14.0/8.1 FLA.
    1. Basis of Design: LIXOR 4.00XD Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 4.0XD aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 12000 gal (45400 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 12 to 20 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 60 to 140 cfm (102 to 238 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 3 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 208/460 VAC, 3 Phase, 19.7/11.4 FLA.
        2. Input Power on 50 Hz Electrical Sys: 230/400 VAC, 3 Phase, 19.4/11.2 FLA.
    1. Basis of Design: LIXOR 6.00 Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 6.0 aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 15000 gal (56750 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 25 to 45 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 100 to 140 cfm (170 to 238 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 3 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 208/460 VAC, 3 Phase, 19.7/11.4 FLA.
        2. Input Power on 50 Hz Electrical Sys: 230/400 VAC, 3 Phase, 19.4/11.2 FLA.
    1. Basis of Design: LIXOR 6.00XD Aeration System as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
       1. Principal Equipment: LIXOR 6.0XD aerator, blower assembly, optional blower controls and alarms. Other items provided by others. System to be situated within a 15000 gal (56750 L) maximum compartment or tank as shown on the plans.
       2. Oxygen Transfer: To meet 25 to 45 lbs per day BOD demand of wastewater.
       3. Regenerative Blower: 110 to 150 cfm (187 to 255 cu m per hr). Inlet filter with metal filter element.
       4. Piping to LIXOR unit: 3 inch pipe. Pipe Transition at LIXOR: 1.5 inch PVC pipe.
       5. Electrical Source: Within 150 ft (45.7 m) of blower. Consult local codes for longer wiring distances. Wiring must conform to all applicable codes (IEC, NEC, etc.).

\*\* NOTE TO SPECIFIER \*\* Delete input power option not required.

* + - * 1. Input Power on 60 Hz Electrical Sys: 208/460 VAC, 3 Phase, 20/9.5 FLA.
        2. Input Power on 50 Hz Electrical Sys: 230/400 VAC, 3 Phase, 19.4/11.2 FLA.

\*\* NOTE TO SPECIFIER \*\* The RollsAIR®, RollsAIR® XL, and RollsAIR® XXL Extended Aeration Systems offer a cost-effective method and versatility to treat larger flows for a multitude of applications.

* + - * 1. The complete RollsAIR System uses the MyTEE® in the "headworks" zone, to screen trash and settle grit. The MyTEE® Screen deflects non-soluble solids to stay in the vault. All non-biological screened and settled items require periodic - NOT daily maintenance from the MyTEE® Vault. The easy maintenance of the MyTEE®'s patented Clean-in-Place swab alleviates the need for manual raking from non-biological solids. Delete article if not required or delete model options not required.
  1. EXTENDED AERATION WASTEWATER TREATMENT SYSTEM (ROLLSAIR)
     1. Basis of Design: RollsAIR Extended Aeration Wastewater Treatment System as manufactured by Bio-Microbics, Inc.
        1. Model RollsAIR 2.0: Capacity: 20000 gpd (75 cu m/d). People: 400.
        2. Model RollsAIR 4.0: Capacity: 40000 gpd (150 cu m/d). People: 600.
        3. Model RollsAIR 6.0: Capacity: 60000 gpd (227 cu m/d). People: 900.
        4. Model RollsAIR 8.0: Capacity: 80000 gpd (300 cu m/d). People: 1200.
        5. Model RollsAIR 12.0: Capacity: 120000 gpd (454 cu m/d). People: 1900.
        6. Model RollsAIR 16.0: Capacity: 160000 gpd (600 cu m/d). People: 2500.
        7. Model RollsAIR XL 20.0: Capacity: 200000 gpd (757 cu m/d). People: 2900.
        8. Model RollsAIR XL 30.0: Capacity: 300000 gpd (1135 cu m/d). People: 4500.
        9. Model RollsAIR XL 40.0: Capacity: 400000 gpd (1500 cu m/d). People: 5900.
        10. Model RollsAIR XL 50.0: Capacity: 500000 gpd (1893 cu m/d). People: 7400.
        11. Model RollsAIR XL 60.0: Capacity: 600000 gpd (2250 cu m/d). People: 8800.
        12. Model RollsAIR XL 70.0: Capacity: 700000 gpd (2650 cu m/d). People: 10300.
        13. Model RollsAIR XL 80.0: Capacity: 800000 gpd (3028 cu m/d). People: 11800.
        14. Model RollsAIR XL 90.0: Capacity: 900000 gpd (3400 cu m/d). People: 13300.
        15. Model RollsAIR XXL 100.0: Capacity: 1000000 gpd (3785 cu m/d). People: Consult Factory.
        16. Model RollsAIR XXL 120.0: Capacity: 1200000 gpd (4542 cu m/d). People: Consult Factory.
        17. Model RollsAIR XXL 140.0: Capacity: 1400000 gpd (5300 cu m/d). People: Consult Factory.
        18. Model RollsAIR XXL 160.0: Capacity: 1600000 gpd (6057 cu m/d). People: Consult Factory.
        19. Model RollsAIR XXL 180.0: Capacity: 1800000 gpd (6814 cu m/d). People: Consult Factory.
        20. Model RollsAIR XXL 200.0: Capacity: 2000000 gpd (7571 cu m/d). People: Consult Factory.
        21. Non-corrosive, simple-to-install, easy-to maintain "Activated Sludge" treatment system utilizing an aerobic, suspended growth treatment process.
        22. Combines supplemental aeration devices with clean-in-place screening devices, in the "headworks" zone, to screen trash and settle grit in the treatment zone prior to clarifiers. No need for daily manual raking from non-biological solids.
        23. The submerged aeration devices mix and aerate wastewater, creating an environment for aerobic bacteria and microorganisms to biodegrade and digest incoming organic matter. Non-clogging aerators do not require cleaning or replacement at regular intervals. Submerged effluent clarifier weirs do not require regular brushing of scum.

\*\* NOTE TO SPECIFIER \*\* The d-Rain Joint™ device directs the surface rainwater to an installed drainage bed beneath the impervious, "hardscape" surface(s). Using low-cost, harder substrate, the solution to provide a permeable, pavement system (PPS) can be used wherever stormwater management requirements are needed for a driveway, parking lot, garage, large patio, community-common areas, and streets, pool areas, sports architecture, shopping or theme park developments, alleyways, or public walkway. Delete Article if not required.

* 1. RAINWATER FILTER DRAIN (D-RAIN)
     1. Basis of Design: d-Rain Joint Rainwater Filer Drain System as manufactured by Bio-Microbics, Inc. Linear filtration device providing permeability and filtration.
        1. ADA compliant.
        2. Material" PPIC; Gray plastic.
        3. Installs like an expansion joint between concrete slabs. Less than 1 inch (25 mm) in width and comes in 8 ft (2.43 m) lengths. Opening: 7/16 inch (1.1 cm).
        4. Stackable to 4 inch (10.1 cm), 6 inch (15.2 cm), and 8 inch (20.3 cm) height for typical patio installations to heavy traffic pavements.
        5. Capture Rate: Up to 2 gpm (7.5 lpm) per ft.

\*\* NOTE TO SPECIFIER \*\* An easy to install/maintain effluent filter screening device to reduce suspended solids discharged in septic tank by promoting natural sedimentation and excludes gas-lifted particles from entering the outlet pipe. Delete article if not required or delete model options not required.

* 1. EFFLUENT FILTERS (SANITEE)
     1. Basis of Design: SaniTEE Effluent Filter Systems as manufactured by Bio-Microbics, Inc. Protects absorption areas from premature clogging and failure due to the release of non-settleable solids and/or non-degradable flushed materials from the septic tank and provide consistent retention of wastewater solids.
        1. Model SNT416: Flow Range: Up to 1000 gpd (3785 lpd).
           1. Screen Diameter: 4 inch (10.16 cm).
           2. Screening Level: 1/16 inch (0.15 cm).
        2. Model SNT418: Flow Range: Up to 2000 gpd (7571 lpd).
           1. Screen Diameter: 4 inch (10.16 cm).
           2. Screening Level: 1/8 inch (0.32 cm).
        3. Model SNT818: Flow Range: Up to 6000 gpd (23 cu m per day).
           1. Screen Diameter: 8 inch (20.32 cm).
           2. Screening Level: 1/8 inch (0.32 cm).
        4. Model SNT838: Flow Range: Up to 10000 gpd (38 cu m per day).
           1. Screen Diameter: 8 inch (20.32 cm).
           2. Screening Level: 3/8 inch (0.95 cm).
        5. Model SNT1618: Flow Range: Up to 10000 gpd (38 cu m per day).
           1. Screen Diameter: 16 inch (40.64 cm).
           2. Screening Level: 1/8 inch (0.32 cm).
        6. Model SNT1638: Flow Range: Up to 20000 gpd (75 cu m per day).
           1. Screen Diameter: 16 inch (40.64 cm).
           2. Screening Level: 3/8 inch (0.95 cm).
        7. As wastewater enters tank, light-weight floatables form a scum layer at water surface. Sediment and heavy solids settle to the bottom forming a sludge layer. ' Clarified' water enters screen by passing through angled slots. Screened water is discharged for further treatment or dispersal.
        8. Solids trapped in angled slots are dislodged by pulling swab handles.
        9. Extension rods can easily be added to handles for a custom fit.

\*\* NOTE TO SPECIFIER \*\* StormTEE® is a patented, low maintenance, screening device that can be used alone or in conjunction with the combination fine-particle separation and oil/ water coalescing modular unit as part of a complete BioSTORM® system. Delete article if not required or delete model options not required.

* 1. LITTER CONTROL SCREENS (STORMTEE)
     1. Basis of Design: StormTEE Litter Control Systems as manufactured by Bio-Microbics, Inc. Removes trash, litter, and debris carried by storm water runoff ahead of treatment detention ponds, storm sewers, and storm water works. Installs into single compartment tanks.
        1. Model SMT818: Flow Range: 450 to 750 gpm (1703-2838 lpm).
           1. Screen Diameter: 8 inches.
           2. Screening Level: 1/8 inches.
        2. Model SMT838: Flow Range: 450 to 750 gpm (1703-2838 lpm).
           1. Screen Diameter: 8 inches.
           2. Screening Level: 3/8 inches.
        3. Model SMT1618: Flow Range: 2250-4500 gpm (8513-17026 lpm).
           1. Screen Diameter: 16 inches.
           2. Screening Level: 1/8 inches.
        4. Model SMT1638: Flow Range: 2250-4500 gpm (8513-17026 lpm).
           1. Screen Diameter: 16 inches.
           2. Screening Level: 3/8 inches.

\*\* NOTE TO SPECIFIER \*\* For use in commercial kitchens, restaurants, motels, and other installations requiring entrapment of grease and oil prior to effluent discharge to sewer systems. Delete article if not required or delete model options not required.

* 1. GREASE INTERCEPTORS (FOGHog)
     1. Basis of Design: FOGHog Grease Interceptor Systems as manufactured by Bio-Microbics, Inc. Complete treatment system as shown on Drawings and specified herein.
        1. Model FOG HOG 20g. Flow Rate: 20 gpm (76 lpm). Grease Capacity: 40 lbs.
        2. Model FOG HOG 35g. Flow Rate: 35 gpm (132 lpm). Grease Capacity: 70 lbs.
        3. Model FOG HOG 50g. Flow Rate: 50 gpm (189 lpm). Grease Capacity: 100 lbs.
        4. Model FOG HOG 75g. Flow Rate: 75 gpm (284 lpm). Grease Capacity: 150 lbs.
        5. Model FOG HOG 100g. Flow Rate: 100 gpm (378 lpm). Grease Capacity: 200 lbs.
        6. Constructed from corrosion resistant material.
        7. Approved by international Association of Plumbing and Mechanical Officials (IAPMO).
        8. Traps and separates grease, fats, soap, oils, waxes, and other like substances capable of being retained by relative buoyancy and dynamic flow attenuation.
        9. Liquid Level in Grease Interceptor: Maintained by proprietary device which regulates head conditions assuring proper retention levels.
        10. Holding Tank: Cross-linked polyethylene for structural integrity, durability, and high heat temperature resistance. Smooth interior finish for ease of cleaning.
        11. Interceptor Baffles: Temperature resistant Acrylonitrile Butadiene Styrene (ABS).
        12. Integrated Gaskets: Heat resistant neoprene used to seal plumbing connections.
        13. Cover: Rigid ABS. Assembled with corrosion resistant stainless steel fasteners.
        14. Inlet and Outlet Assemblies: PVC Schedule 40 Pipe and associated fittings. Metal Inlet and outlet fittings may be substituted, depending on local plumbing codes.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly constructed and prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION
      1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   4. FIELD QUALITY CONTROL
      1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
  1. CLEANING AND PROTECTION
     1. Clean products in accordance with the manufacturers recommendations.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION