SECTION ------

ONSITE WASTEWATER TREATMENT SYSTEM WITH ADVANCED TREATMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, tools and equipment necessary to install and put into service an advanced onsite wastewater treatment system with advanced ecological treatment technology as shown on the Drawings and specified herein, complete with subsurface discharge field, and with all connections made, tested and ready for use.

B. Advanced Onsite Wastewater Treatment System shall feature Algaewheel® technology as supplied by Oldcastle Precast, Inc.

C. The Advanced Treatment System shall come with precast concrete equalization tank(s) and associated pumps and controls, advanced ecological treatment unit(s) with ecological and biological filtration processes, precast concrete settling tank(s), precast concrete dosing tank(s) and associated pumps and controls, components for subsurface discharge field and all other ancillary equipment as shown on the drawings and specified herein.

D. Advanced treatment system shall be installed per manufacturer's installation requirements.

E. Work under this section also includes field start-up and training services performed by the Advanced Wastewater System Manufacturer, as described within.

F. These specifications are intended to give a general description of what is required, but do not purport to cover all of the details which will vary in accordance with the requirements of the equipment as offered and specific project site requirements.

2.01 SUBMITTALS

A. Contractor shall provide a complete submittal package for the advanced onsite wastewater system including drawings for all system components up to and including calculations and drawings for sizing the discharge field and associated piping. Any additional surveying required for the discharge field calculations shall be the responsibility of the Contractor at no additional cost to the Owner.

B. Partial or incomplete submittals will be returned as "Incomplete – Revise and Resubmit".

C. Submittals for the onsite wastewater system shall include:

1. Hydraulic profile and process schematic.
2. Collection and treatment system site plan.

3. Ecological treatment unit and settling tank details.
4. Dosing tank details.
5. Discharge field plan and details.
6. Miscellaneous details including controls, pumps and equipment specs.

D. Six (6) copies of Submittals shall be submitted for review and approval.

2.02 MATERIALS

A. PRECAST CONCRETE STRUCTURES

1. GENERAL

i. The equalization tank, settling tanks, and dosing tanks shall be comprised of precast reinforced concrete. The precast structures shall be cast in steel forms to provide smooth interior surfaces.

ii. Joints between precast sections shall be cast on steel surfaces to provide true dimensions within standard industry tolerances.

iii. The Horizontal joints between precast sections shall be sealed with a butyl rubber joint material conforming to ASTM C-990-91 and AASHTO M-198B. The joint material shall be ConSeal CS-202 as manufactured by Concrete Sealants, or approved equal.

iv. All walls, roofs, and floors shall be a minimum of 4" in thickness or as designed to meet local regulations, and or specific loading conditions.

v. All wall penetrations shall be formed utilizing steel or fiberglass hole-formers. Pipes shall be sealed into wall penetrations using Poly III CE rubber seals with stainless steel clamps as manufactured by Polylok Inc., or approved equal. Seals shall meet ASTM C-923

vi. Precast tanks shall have Tuf-Tite plastic access risers, or approved equal, per local regulations to provide inspection and maintenance access over inlets and outlets, pumps, and other equipment.

vii. Pursuant to local codes, tanks may be coated inside and/or outside with ConSeal CS-55 asphalt damproofing as manufactured by Concrete Sealants, or approved equal. Damproofing shall comply with E.P.A. regulation 40CFR261.4.

2. DESIGN

i. Design shall meet local codes.

ii. Design specifications: ACI 318.

3. CONCRETE

i. Concrete used in the manufacture of the various structural components of the precast concrete tanks shall be factory batched.

ii. Portland cement shall be Type I, II, or III conforming to ASTM C-150.

iii. Coarse aggregate shall consist of ½" or ¾" nominal well graded crushed or native stone conforming to ASTM specification C-33.

iv. Air entrainment admixture shall conform to ASTM C260. The air-entrained content shall be not less than 4 percent not greater than 7 percent.

v. A high-range water reducer shall be used and shall conform to ASTM C494 type A or F. Concrete shall be placed at the slump and water/cement ratio of ASTM requirements.

vi. The concrete used for the structural components shall attain a minimum 28-day compressive strength of 4,500 psi.

4. REINFORCING

i. Reinforcing steel shall be new billet steel meeting the requirements of ASTM A615 or ASTM A706. Welded wire fabric shall conform to ASTM A185.

ii. Minimum Cover over reinforcement shall be 1 inch. Minimum bar lap shall be 30 bar diameters.

iii. All reinforcement shall be free from loose rust, oil, and contaminates which reduce bond. Any foreign material shall be removed by suitable means prior to installation.

iv. Provide supports for reinforcement including chairs, bolster bars, and other devices for spacing and securing reinforcing in accordance with CRSI requirements. Legs of all supports in contact with exposed-to-view surfaces shall be plastic coated in accordance with CRSI, class I.

B. EQUALIZATION TANK

1. GENERAL

i. Tank construction shall be as specified in section 2.02 A.

ii. Tank shall be sized to hold at least one-third of the maximum daily flow of the system.

iii. Tank shall be two-compartment with volume split into two-thirds equalization and pretreatment, and one-third pump chamber.

iv. The pretreatment and equalization zones shall be approximately 25% and 75% respectively.

2. PUMP SYSTEM

i. Pumping system shall be duplex with alternating doses at timed intervals shown on the plans.

ii. Pumps shall be Hydromatic by Pentair Water, or approved equal, and shall have the following specifications:

1. Horsepower:
2. RPM:
3. Shutoff head:
4. Electrical:
5. Discharge:
6. Design Flow:
7. Solids handling capacity:
8. Liquids handling: Raw sewage.

iii. The advanced onsite wastewater system supplier shall submit rating curves and details of construction for the pumps to the Engineer for approval. The curves shall indicate head, discharge efficiency and horsepower characteristics throughout the full operating range.

iv. Submittals shall include pump cooling volume, equalization volume, pump rate at design condition, dosing interval, number of doses per day, dosing volume per each advanced treatment unit, force main size and length, force main filling/drainback volume, total volume pumped per dose, pumping time per dose, timer control settings, and TDH calculations.

v. Pumps shall be installed on a dual stainless steel rail system by Conery Mfg., Inc., or approved equal.

3. CONTROLS

i. Control panel shall be a RK Series pressure activated system with NEMA 4X Duplex Timed Control Panel with run time meter and event counter for each pump, all as manufactured by CSI Controls, or approved equal.

ii. There shall be an audiovisual alarm as shown on the plans.

iii. Audiovisual alarm shall be on a separate circuit and lock on with any pump failure until manual reset occurs.

iv. Pump shall automatically alternate between doses.

v. Liquid levels shall be monitored by transducers such as CSI Pressure Systems as manufactured by CSI Controls, or approved equal.

C. ADVANCED TREATMENT UNITS

1. Advanced treatment units shall use solar energy to support diverse and ecologically balanced populations of bacteria, algae, phytoplankton, zooplankton and other microorganisms.

2. Advanced treatment units shall be comprised of precast concrete or high-density polyethylene.

3. The cover of the advanced treatment units shall be ultraviolet resistant, dual-layered polycarbonate and shall be mechanically fastened to the base unit.

4. Advanced treatment units shall contain free floating, rotating wheels capable of supporting growth of balanced algal and bacterial populations. Wheels shall be Algaewheel® proprietary technology.

5. The wheels shall be constructed of ultraviolet resistant high density polyethylene.

6. The rotating wheels shall be self-cleaning and have partially open center cores with media to support bacterial growth.

7. Advanced treatment unit(s) shall be powered by Regenair Regenerative Air Blowers as manufactured by Gast Manufacturing, Inc., or equal.

8. Regenerative air blowers shall be 115V single phase and capable of delivering sufficient cfm to rotate wheels per manufacturers requirements and specifications.

D. SETTLING TANK(S)

1. Tank construction shall be as specified in section 2.02 A.

2. Settling tank capacity shall be twice the daily flow (unless local regulations require other sizing) to provide 48 hour detention time in the system.

E. DOSING TANK PUMPS/COMPONENTS

1. GENERAL

i. Tank construction shall be as specified in section 2.02 A.

ii. Tank shall be sized to hold half of the maximum daily flow of the system.

2. PUMP SYSTEM

i. Pumping system shall be duplex with alternating doses at volume intervals shown on the plans.

ii. Pumps shall be Hydromatic by Pentair Water, or approved equal, and shall have the following specifications:

1. Horsepower:
2. RPM:
3. Shutoff head:
4. Electrical:
5. Discharge:
6. Design Flow:
7. Solids handling capacity:

iii. The advanced onsite wastewater system supplier shall submit rating curves and details of construction for the pumps to the Engineer for approval. The curves shall indicate head, discharge efficiency and horsepower characteristics throughout the full operating range.

iv. Submittals shall include pump rate at design condition, flow rate per lateral, number of doses per day, force main diameter and length, dosing volume on daily flow and interval volume, pumping time per dose, operating depth, pump cooling, and TDH calculations.

v. Pumps shall be installed on a dual stainless steel rail system by Conery Mfg., Inc., or approved equal.

3. CONTROLS

i. Control panel shall be a RK Series pressure activated system with NEMA 4X Duplex Timed Control Panel with run time meter and event counter for each pump, all as manufactured by CSI Controls, or approved equal.

ii. There shall be an audiovisual alarm as shown on the plans.

iii. Audiovisual alarm shall be on a separate circuit and lock on with any pump failure until manual reset occurs.

iv. Pump shall automatically alternate between doses.

v. Liquid levels shall be monitored by transducers such as CSI Pressure Systems as manufactured by CSI Controls, or approved equal.

F. DISCHARGE FIELD

1. The discharge field shall be comprised of …

2.

3. The discharge field shall be laid out in advance and staked. Construction equipment shall be kept from traveling over the area and compacting the soil.

4.

2.03 INSTALLATION

A. The Contractor or his subcontracted installer of the onsite wastewater system shall have prior experience in the State of _____ in the installation of advanced onsite wastewater treatment systems, and, depending on local regulations, shall be an installer approved by the local jurisdiction.

B. The Contractor shall be responsible for all permits, fees and inspections by applicable regulatory authorities.

C. Installation and construction of the onsite wastewater treatment system shall be in strict compliance with the approved plans and specifications. Deviations are not acceptable unless approved in writing.

D. Installation and construction shall be in strict compliance with local regulatory requirements.

E. The Contractor shall notify the local governing regulatory authority of system installation with as much advance notice as they require in order to allow routine and required inspections.

F. The Contractor shall be responsible for coordinating a pre-construction conference at the project site with the engineer of record, local regulatory authority, system manufacturer's representative, and the installer to review proposed system installation prior to start of construction.

G. The Contractor, unless specified elsewhere, shall be responsible for providing electric service as required for onsite wastewater system operation per approved plans and specifications. Electric service shall be provided so as to be available for system testing upon installation completion.

H. All system components shall be installed at locations shown on the approved plans.

I. Tanks and discharge fields shall be installed with minimum setbacks as required by local regulatory codes.

J. Precast concrete tanks shall be installed on firm undisturbed subgrade with sand or crushed gravel leveling layer underneath.

K. Backfill around the septic tank with select material free of rocks, frozen material, etc. Backfill and compact in 12 inch layers to ensure complete compaction especially under pipes. Backfilling should be completed on the same day the septic tank is placed.

L. Installation of Advanced Treatment Units shall be in accordance with manufacturer's installation guidelines.

M. The discharge field shall be constructed as shown on the plans.