NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SECTION
ON-SITE WATER PROTECTION BRANCH

INNOVATIVE WASTEWATER SYSTEM APPROVAL

INNOVATIVE WASTEWATER SYSTEM NO: IWWS 2014-01-R1

Issued To:	E-Z Treat Company PO Box 176 Haymarket, VA 20168 703-408-2911; Fax: 703-753-5043
Contact:	Carl Perry, President Michael Stidham, Vice President
For:	E-Z Treat Model 1200 Pretreatment Systems (previously listed as EZ 65 pod or Model 650)
Approval Date:	April 24, 2015

In accordance with General Statute 130A-343, 15A NCAC 18A .1969 and .1970, a proposal by E-Z Treat Company for an updated approval of subsurface wastewater systems utilizing the E-Z Treat Pretreatment systems has been reviewed, and found to meet the standards of an innovative system when all of the following conditions are met:

I. General

A. Scope of this Innovative Approval
   1. Design, installation, use, and operation and maintenance guidelines for E-Z Treat Pretreatment systems to meet TS-I and TS-II effluent standards pursuant to Rule 15A NCAC 18A .1970. Refer to Rule .1970(a) Table VIII – Effluent Quality Standards for Advanced Pretreatment Systems for treatment performance levels.
   2. Operation, maintenance and monitoring requirements for E-Z Treat Pretreatment systems and associated subsurface systems to ensure the treatment performance standards are met.

B. This Innovative System Approval is applicable to domestic strength sewage systems (non-industrial wastewater) utilizing E-Z Treat Pretreatment Systems that have a design flow not exceeding 3,000 gallons per day (gpd).

   Use of E-Z Treat Pretreatment systems for facilities with an influent waste strength that exceeds domestic septic tank quality effluent standards pursuant to Rule 15A NCAC 18A .1970(b) may be proposed by E-Z Treat Company and a North Carolina Professional Engineer to the Department for review and approval on a case-by-case basis, prior to permitting by the local health department (LHD). The system design must include the proposed raw wastewater strength (BOD_5, COD, TN, TSS, fats, oils and grease, etc.), the expected organic loading rate (in pounds of BOD), and hydraulic loading rate on the pretreatment system, and the calculations, references,

and any other needed information to support the proposed design.

C. Any site utilizing these systems shall have wastewater with sufficient alkalinity to facilitate biological treatment processes. The influent shall not have a pH or toxins that significantly inhibit microbial growth.

D. Use of E-Z Treat Pretreatment systems that have a design flow exceeding 3,000 gallons per day may be permitted on a case-by-case basis after approval by the Department in accordance with the Large Systems State Review/Approval Process (Rule 15A NCAC 18A.1938).

II. System Description

The E-Z Treat Pretreatment system consists of the following components: a Department approved septic tank; a recirculation tank (or chamber); single or multiple E-Z Treat Pretreatment pods; and a final dosing tank (or chamber). Additional treatment may be used to ensure that treatment performance standards shall be met.

The E-Z Treat Pretreatment system can utilize either a two tank configuration or a three tank configuration. The two tank configuration has the following components: the first tank is a septic tank and the second separate tank has a recirculation chamber and final dosing chamber. The three tank configuration consists of three separate tanks: a septic tank, a recirculation tank, and a final dosing tank.

III. Siting Criteria

The E-Z Treat Pretreatment systems and associated drainfields shall be sited and sized in accordance with Rule .1970 for TS-I and TS-II systems. Drip irrigation systems used with E-Z Treat Pretreatment systems shall be sited and sized in accordance with the manufacturer specific drip approval. The E-Z Treat Pretreatment systems and associated drainfields shall meet all applicable horizontal setback requirements and be located to prevent surface/subsurface water inflow/infiltration.

IV. System Sizing

The system sizing criteria shall be based upon the long term acceptance rate specified in the appropriate portion of the rules or the Innovative and Experimental system approval for the type of ground absorption system to be used.

V. Special Site Evaluation

A special site evaluation may be required based on the proposed ground absorption system. Refer to manufacturer specific drip approvals and Rule .1970(p).

VI. Design Criteria

A. The E-Z Treat Pretreatment system shall be designed in accordance with the following criteria.
   1. All tanks, septic, recirculation, and dosing, must be approved by the Department and E-Z Treat Company specifically for use with the E-Z Treat Pretreatment system.
   2. The E-Z Treat Pretreatment system can utilize either a two tank configuration or a three tank configuration. The two tank configuration has the following components: the first tank is a septic tank and the second separate tank has a recirculation chamber and final dosing

chamber. The three tank configuration consists of three separate tanks: a septic tank, a recirculation tank, and a final dosing tank.

3. The E-Z Treat Pretreatment system consists of a septic tank, a recirculation tank/chamber, a final dosing tank/chamber, and E-Z Treat media pod(s) as specified in Table 1 below. See attachment A for example drawings of unit configurations.

Table 1 – Model 1200 and Tank Volumes			
Design Daily Flow (gpd)	Minimum Septic Tank Volume (gallons)	Minimum Recirculation/Pump Tank Volume (gallons)**	Number of Media Pods
< 480	1,250	1,250	1 Model 1200 pod
4 Bedrooms	1,500	1,800	1 Model 1200 pod
5 Bedrooms	1,850	2,000	1 Model 1200 pod
6 Bedrooms	2,000	2,200	1 Model 1200 pods
601 – 1,500	V = 1.17Q* + 500	V = 1.17Q + 500	1 Model 1200 pod per 1,200 gallons
1,501 – 3,000	V = 0.75Q + 1,125	V = 0.75Q + 1,125	1 Model 1200 pod per 1,200 gallons

*Q – design daily flow

**Recirculation/pump tank minimum size based on total internal tank volume.

4. Septic tanks will have an inlet sanitary tee and a Department approved, appropriately sized effluent filter on the outlet end approved by the E-Z Treat Company for use with the E-Z Treat.
5. The minimum required volume in the recirculation chamber/tank prior to discharge to the dosing tank/chamber shall be the design daily flow.
6. The recirculation tank/chamber will contain the recirculating splitter valve or an external splitter box may be used. The recirculation tank/chamber shall have an inlet sanitary tee. The sanitary tee shall be visible and reachable from the riser opening to serve as the influent sampling point.
7. When the recirculation tank and dosing tank are combined, the baffle wall between chambers shall extend to the top of the tank and shall be constructed so that the liquid levels in either compartment are independent. Liquids will not by-pass between compartments except as designated by the system's treatment flow path.
8. The final dosing tank must meet the minimum size requirements of Rule .1952(c)(1). For drip irrigation systems, the requirements of the manufacturer specific drip approval for dosing tanks shall also be met.
9. A drainback configuration without a pump check valve is required for the force main supplying the media pod.
10. Recirculation pump shall be either Sta-Rite Model number STEP 20 or manufacturer approved equal.
11. The E-Z Treat media pod is constructed of a polymer suitable for use in contact with wastewater. The Model 1200 pod is approximately 7 ft 9 inches x 7 ft 9 inches with a surface area approximately of 60 square feet and is 39 inches in depth. The pod is fitted with a weatherproof cover properly secured. The pod is designed and constructed to create channels down the sidewalls to facilitate air flow. The sidewall channels provide airspace to the bottom of the pod. The bottom of the vessel is designed to provide total drainage of the treated effluent back to the recirculation tank/chamber.

12. As the effluent enters the recirculation tank/chamber, this tank/chamber acts to further separate the septic tank effluent. The effluent entering the recirculation tank/chamber is charged by the recirculation pump to the media pod(s). The effluent is sprayed over the media mattress(es) using a spray manifold of evenly spaced wide-angle spray nozzles. The nozzles are manufactured with a free passage of 0.0625 inches in diameter. The system is set to recirculate effluent through the media pod on an average of 4 to 6 times prior to discharge.
13. The effluent is sprayed on mattress(es) measuring a total area of 60 square feet. The mattress(es) are fabricated from a non-biodegradable, chemically resistant, loose weave polypropylene material. The openings in the weave allows for effluent and air flow while containing the media. The media inside the mattress(es) are made of a styrene material. The specific gravity of this material meets the following criteria: light enough to prevent compaction which results in a loss of effective surface area, and provides a reduction in channeling across the media (short-circuiting).
14. Effluent passes through the media and enters a schedule 40 pipe located at the bottom of the pod. The effluent than gravity feeds back to the recirculation tank/chamber and the process is repeated.
15. The effluent bypass valve or splitter box is piped to intercept filtered wastewater and deliver it to the recirculation tank/chamber or the dosing tank/chamber, based on liquid volumes.
16. The Control Panel for the E-Z Treat System will consist of: recirculation pump on/off timer, discharge pump alarm, and high/low water alarm. Control panels shall meet the requirements of .1952 and shall be approved in writing by E-Z Treat Company for use in their systems.
17. Separate control and alarm circuits will be provided. The E-Z Treat systems will utilize a device for the recording of measurements of daily water flows. The device shall provide a means for determining at least the daily, 7-day, and 30-day flow monitoring requirements of Rule .1970. This information will be stored in the data logger for drip irrigation systems (provided by the manufacturer of the drip irrigation control panel). For pressure manifold and LPP systems, the Aquaworx control panel or manufacturer approved equal shall be used. The operator in responsible charge (ORC) of the system authorized in writing by E-Z Treat Company must be able to access the panel directly on site and shall be available to the LHD with a 24-hour notice in the event a direct connection is necessary.
18. All access riser hatches shall be secured by approved tamper-resistant hardware approved by the manufacturer or by other means approved by the manufacturer as equal. Riser construction, attachment to tanks and security systems shall be pre-approved by the Department and E-Z Treat Company in accordance with the E-Z Treat specific approvals for the septic tanks and pump tanks, as applicable.
19. Buoyancy calculations shall be completed by a NC Professional Engineer if any parts of the tanks, pods, or other system components are installed in a seasonal high water table. Additional ballast may be required.
20. Influent samples shall be taken from the inlet sanitary tee into the recirculation tank. Effluent samples shall be taken from the final pump doing tank or a spigot or sampling port that is placed on the force main from the final dosing tank.

B. E-Z Treat Pretreatment systems shall be designed by a designer authorized in writing by E-Z Treat Company or a NC Professional Engineer. Systems over 1,000 gallons per day shall be designed by a NC Professional Engineer.

VII. Installation and Testing

A. A preconstruction conference shall be required to be attended by the designer authorized in writing by E-Z Treat Company, engineer (if applicable), installer authorized in writing by E-Z

Treat Company, and local health department (LHD) prior to beginning construction of the E-Z Treat Pretreatment system.

B. All E-Z Treat Pretreatment systems shall be installed according to directions provided by E-Z Treat Company. Additionally, all E-Z Treat Pretreatment systems and components used with, but not manufactured by E-Z Treat Company shall be installed in accordance with all applicable regulations and manufacturer instructions.

C. All individuals/companies installing E-Z Treat Pretreatment systems shall be in possession of all necessary permits and licenses before attempting any portion of a new or repair installation. The company/individual must be a Level IV installer and authorized in writing by E-Z Treat Company.

D. Watertightness of the tanks shall be tested by either of the following protocols: 24-hour hydrostatic test or a vacuum test.
   1. Hydrostatic Test[1, 2]
      a. Temporarily seal the inlet and outlet pipes.
      b. Fill tank with clean water to a point at least two inches above the pipe connections or the seam between the tank and the riser, whichever is highest.
      c. Measure the water level.
      d. Allow the tank to sit for 24 hours.
      e. Re-measure the water level.
      f. If the water level change is ½-inch or less or one percent of the liquid tank capacity, the tank passes the leak test.
      g. If the water level change is greater than ½-inch, any visible leaks can be repaired and the tank may be topped off with water and allowed to sit for a minimum of one hour.
      h. The tank passes the leak test if there are no visible leaks (flowing water or dripping in a steady stream) and no measureable drop in water level after one hour. Otherwise, the tank fails the leak test.
   2. Vacuum Test[3]
      a. Temporarily seal the inlet and outlet pipes.
      b. A vacuum of four (4) inches of mercury should be pulled on the tank and held for five (5) minutes.
      c. During the testing, the tank manufacturer or their representative can seal the tank if it is found to be leaking.
      d. If the tank is repaired, the vacuum must be brought back up to four inches and held for five minutes.

E. The distribution of flow to the E-Z Treat Pretreatment system and to the septic tank shall be measured during start-up and set to be in accordance with the system design with start-up settings recorded.

F. Specified site preparation steps and construction specifications for the ground absorption system shall be strictly adhered to, including specified depth of trenches in relation to site limiting conditions, cover material specifications (if needed), trench installation method, etc.

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[1] Victor D'Amato and Ishwar Devkota, *Development of Prefabricated Septic and Pump Tank Construction and Installation Standards for North Carolina.*
[2] National Precast Concrete Association, *Best Practices Manual Precast Concrete On-Site Wastewater Tanks*, Second Edition, October 2005, 24.
[3] National Precast Concrete Association, *Best Practices Manual Precast Concrete On-Site Wastewater Tanks*, Second Edition, October 2005, 24.

G. The installer authorized in writing by E-Z Treat Company, the engineer or designer authorized in writing by E-Z Treat Company, and the ORC authorized in writing by E-Z Treat Company. shall conduct an inspection/start-up of the E-Z Treat Pretreatment system and all associated system components. The LHD personnel will attend and observe the inspection/start-up. During the inspection/start-up to include:
   1. System watertightness testing.
   2. Control panel operation and alarm settings.
   3. Pump model numbers and time clock settings.
   5. Pressure head on the E-Z Treat pod wastewater distribution system.
   6. Return flow to the septic tank set per design and recorded, when applicable.
   7. Riser hatches have tamperproof bolts, and/or riser lock ring.

VIII. Operation, Maintenance, Monitoring, and Reporting

A. E-Z Treat Pretreatment systems shall be classified, at a minimum, as a Type Va system in accordance with Table V(a) of Rule .1961(b). Management and inspection shall be in accordance with Rules .1961 and .1970.

B. All E-Z Treat Pretreatment systems require an operation and maintenance agreement between the system owner and E-Z Treat Company, Inc., its authorized representative, or with an operator authorized in writing by E-Z Treat Company as per Rule .1970. The system shall be inspected according to Rule .1961 by a certified subsurface operator authorized in writing by E-Z Treat Company. The ORC shall be either an employee of E-Z Treat Company or authorized in writing by E-Z Treat Company to operate and maintain the system. The operator authorized in writing by E-Z Treat Company must have proper equipment and training to access and program the control panels on site.

C. All E-Z Treat Pretreatment systems shall be operated and maintained according to the latest version of E-Z Treat Company's O&M manual.

D. At each E-Z Treat Pretreatment system inspection the ORC authorized in writing by E-Z Treat Company shall, at a minimum, observe, monitor, and record the following:
   1. Wastewater level in all the tanks.
   2. Sludge, scum and grease levels in all the tanks.
   3. Clogging of effluent filter.
   4. Watertightness of tanks, risers, and pipe connections at the tanks.
   5. Operation of pumps, floats, valves, electrical controls, and alarms.
   6. Drainfield pump delivery rate (drawdown test), determination of the average pump run time, and drainfield dosing volume.
   7. Any structural damage, accessibility issues, adequate ventilation, excess odors, ponding of effluent, insect infestations, vegetative growth over the drainfield, or surfacing of effluent on the drainfield area.
   8. Sample of E-Z Treat Pretreatment system effluent collected from the sampling point to check for effluent clarity and odor and a sample of influent, as required.
   9. Readings from pump cycle counters and run time meters and any water meter readings, as applicable.
   10. Current operational set up for TS-II nitrogen removal enhancement (percent returned to septic tank), and recommendation for modifications (if needed).

11. System operating conditions, from the review stored data for indication of 7-day and 30-day flows and flow variances or other abnormal conditions.

E. The ORC authorized in writing by E-Z Treat Company shall also conduct other additional observations, measurements, monitoring, and maintenances activities as specified in the Operation Permit and as recommended by the manufacturer.

F. Sampling and Testing
1. All sampling shall be done in accordance with Rule .1970(n)(3) and (5). E-Z Treat systems shall be sampled annually (semi-annualy for systems with a design flow of 1,501 to 3,000 gpd).
2. TS-II systems influent shall be analyzed for TKN.
3. Effluent for all systems shall be tested for effluent $CBOD_5$ and NH_4-N and shall be tested in the field for turbidity. Systems specified to meet the TS-II standard shall also have the effluent analyzed for TN (TKN and NO_3-N). Field testing of effluent for pH and DO is also highly recommended for all systems, and for alkalinity for TS-II systems. Systems designed to meet the TS-II standard with design flow of 1,501 gpd to 3,000 gpd shall have the effluent analyzed for fecal coliforms.
4. Additional sampling of effluent or influent may be determined to be necessary by the ORC authorized in writing by E-Z Treat Company during a system inspection to assist with troubleshooting or to verify system performance.
5. Effluent samples shall be taken from the final dosing tank/chamber or a sampling port located downstream from the final treatment process.
6. Influent samples shall be taken from a sampling port located between the septic tank and recirculation tank/chamber.

G. Notification and Performance of Maintenance and Repairs
1. The ORC authorized in writing by E-Z Treat Company shall alert E-Z Treat Company, the LHD, and the system owner within 48 hours of needed maintenance or repair activities including but not limited to landscaping, tank sealing, tank pumping, pipe or control system repairs, media replacement, and/or adjustments to any other system component.
2. System troubleshooting and needed maintenance shall be provided to maintain the pump delivery rate and average pump run time within 25% of initial measurements conducted during system startup. The ORC authorized in writing by E-Z Treat Company shall notify the system owner, E-Z Treat Company, and the LHD whenever the pump delivery rate efficiency or average pump ran times are not within 25% of initial measurements conducted prior to system start-up.
3. The septic tank will be pumped as needed upon recommendation of the ORC authorized in writing by E-Z Treat Company and in accordance with the E-Z Treat Pretreatment system Operation and Maintenance instructions. However, at a minimum, the septic tank will be pumped whenever the solids level exceeds 25% of the tank's total liquid working capacity or the scum layer is more than four inches thick.
4. The tanks shall be pumped by a properly permitted septage management firm, and the septage handled in accordance with 15A NCAC 13B .0800.
5. The ORC authorized in writing by E-Z Treat Company shall notify the LHD and E-Z Treat Company in writing whenever repairs are indicated. All maintenance activities shall be recorded in the ORC reports provided to the LHD and E-Z Treat Company.

H. Reporting
1. The ORC authorized in writing by E-Z Treat Company shall provide a completed written

report to the system owner, E-Z Treat Company, and the LHD within 30 days of each inspection. At a minimum this report shall specify:

a. The date and time of inspection,
b. System operating conditions according to Section VII.D, VII.E, and VII.F.
c. Results from any laboratory analysis of any influent and effluent samples,
d. Maintenance activities performed since the last inspection report,
e. An assessment of overall system performance,
f. A list of any improvements or maintenance needed,
g. A determination of whether the system is malfunctioning, and the specific nature of the malfunction,
h. Any changes made in system settings, based on recommendations of the manufacturer, and
i. A summary report of data retrieved from the control panel verifying actual daily, 7-day, and 30-day flows, flow variances, and other operating conditions.

IX. Responsibilities and Permitting Procedures

A. Prior to the installation of an E-Z Treat Pretreatment system at a site, the owner or owner's agent shall file an application at the LHD for the proposed use of this system. After the LHD conducts a soil and site evaluation, the LHD may issue an Improvement Permit or Authorization to Construct or amend a previously issued Authorization to Construct allowing for the use of a E-Z Treat Pretreatment system.

B. The Improvement Permit and Authorization to Construct shall contain all conditions the site approval is based upon, including the proposed used of the Innovative system. The Operation Permit will include all conditions specified in the Improvement Permit and the Authorization to Construct.

C. When a special site evaluation is required pursuant to Rule .1970(p)(1) or a drip approval, as applicable, an evaluation and written, sealed report from a Licensed Soil Scientist regarding the site shall be provided to the LHD. The report shall contain the information as specified in Rule .1970(p)(2) and "Requirements for Submittals of Soil Reports and Pretreatment and/or Dispersal System Designs". The LHD may request the assistance of their Regional Soil Scientist in evaluating this report prior to permit issuance.

D. The E-Z Treat Pretreatment system shall be designed by one of the following: a designer authorized in writing by E-Z Treat Company or a North Carolina Professional Engineer. Systems over 1,000 gallons per day, or as otherwise required for drip irrigation systems, shall be designed by a North Carolina Professional Engineer.

E. Prior to issuance of an Authorization to Construct for an E-Z Treat Pretreatment system, a design submittal prepared by a designer authorized in writing by E-Z Treat Company or a North Carolina Professional Engineer shall be submitted for review and approval by the LHD. The design submittal shall include the information required in "Requirements for Submittals of Soil Reports and Pretreatment and/or Dispersal System Designs".

F. It is recommended that local authorized environmental health practitioners attend a design training session offered by the manufacturer/authorized representative prior to permitting the system. Also, at the request of the LHD, a Regional Engineer will review the design.

G. A designer authorized in writing by E-Z Treat Company shall certify in writing that the E-Z Treat Pretreatment system was installed in accordance with the approved design prior to Operation Permit issuance.

H. A North Carolina Professional Engineer shall certify in writing that a system designed by an engineer was installed in accordance with the approved plans and specifications prior to Operation Permit issuance.

I. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist (see Section V and IX.C), the health department may specify as a condition on the Improvement Permit and Authorization to Construct that a Licensed Soil Scientist or Professional Geologist oversee critical phases of the drainfield installation and certify in writing that the installation was in accordance with their specified site/installation requirements prior to the Operation Permit issuance.

J. The ORC authorized in writing by E-Z Treat Company shall be present during the final inspection of the system prior to the issuance of the operation permit. The ORC shall be certified as a NC Subsurface Operator and authorized in writing by E-Z Treat Company.

K. The LHD issues the Operation Permit after the following:
   1. Field verification of installation completion;
   2. Receipt of written documentation from the designer authorized in writing by E-Z Treat Company, or the engineer, as applicable, that the system has been designed, installed, and is operating in accordance with the approved plans; and
   3. All necessary legal documents have been completed, including the contract between the system owner and the ORC authorized in writing by E-Z Treat Company.

L. On an annual basis, E-Z Treat Company shall provide a report to the On-Site Water Protection Branch including the number and location of new system installations during the previous year, and effluent data and operator reports for each operational E-Z Treat Pretreatment system installed in North Carolina under this Innovative Approval. Effluent data should be compiled and submitted electronically. If available, a web-based system for data posting of laboratory results should be utilized. These reports shall provide information to the Department based upon the monitoring data and observations made from the Innovative systems installed pursuant to this Approval. This should include an assessment of system performance in relation to the established treatment performance standards; an assessment of physical and chemical properties of the materials used to construct the system, in terms of strength, durability, and chemical resistance to loads and conditions experienced, recommended areas of applicability for the system; and any conditions and limitations related to the use of the system. The report shall also include an updated list of authorized designers, installers, and ORCs.

X. Repair of Systems

The provisions of 15A NCAC 18A .1961(l) shall govern the use of the E-Z Treat Pretreatment System for repairs to existing malfunctioning wastewater systems.

Approved By: _____ Date: _____

Attachment A