

**NORTH CAROLINA DEPARTMENT  
OF ENVIRONMENT AND NATURAL RESOURCES  
DIVISION OF ENVIRONMENTAL HEALTH  
ON-SITE WATER PROTECTION SECTION**

**CONTROLLED DEMONSTRATION  
WASTEWATER SYSTEM APPROVAL**

**CONTROLLED DEMONSTRATION NO: CDWS 2009-01**

**ISSUED TO:** Ron Suchecki  
Hoot Systems, Inc  
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**FOR:** Hoot Systems H-Series Treatment System

**APPROVAL DATE:** April 1, 2009

In accordance with General Statute 130A-343, 15A NCAC 18A .1969 and .1970, a proposal by Hoot Systems, Inc., for approval of a subsurface wastewater system utilizing the Hoot Systems H-Series pretreatment system has been reviewed, and found to meet the standards of a Controlled Demonstration system when all of the following conditions are met:

**A. GENERAL**

1. Scope of this Controlled Demonstration Approval includes:
  - a. Use, design and construction requirements for the specified models of Hoot Systems H-Series pretreatment systems to meet TS-I effluent quality standards pursuant to Rule 15A NCAC 18A .1970.
  - b. Special operation, maintenance and monitoring of the Hoot Systems H-Series pretreatment systems to ensure the treatment performance standards shall be met.
  - c. Proposal for evaluation of this Controlled Demonstration system.
2. This Controlled Demonstration Approval is applicable to domestic strength sewage systems (non-industrial wastewater) utilizing Hoot Systems H-Series pretreatment systems that have a design flow not exceeding 3,000 gallons per day.
3. Influent waste strength to the Hoot System H-Series pretreatment system as permitted with this approval shall not exceed domestic septic tank quality effluent standards pursuant to Rule 15A NCAC 18A .1970(b).
4. This controlled demonstration is initially limited to 200 systems with design flows of up to 3,000 gallons per day. The intent of this Controlled Demonstration is to gain field experience sufficient to qualify this system for Innovative Approval, pursuant to Rule .1969(g).

5. Prior to the approval of any individual system under the controlled demonstration approval, the manufacturer of all proposed tanks must be identified and tank construction details must be State-approved, as typically required for generically approved Residential Wastewater Treatment Units (previously termed "ATUs").
6. Use of Hoot Systems H-Series pretreatment systems that have a design flow exceeding 3,000 gallons per day may be permitted after approval by the State on a case-by-case basis in accordance with the Large Systems State Review/Approval Process (Rule 15A NCAC 18A .1938).

## **B. ADVANCED TREATMENT PERFORMANCE STANDARDS (TS-I)**

The Hoot System H-Series pretreatment systems are designed, installed, operated and maintained to meet TS-I effluent standards in accordance with Rule .1970. Refer to Rule .1970(a) Table VII - Effluent Quality Standards for Advanced Pretreatment Systems for treatment performance levels.

## **C. SITING CRITERIA**

1. Sites may be used for the initial installation of a Controlled Demonstration system when they meet the requirements of this Section and the criteria for a conventional, modified, alternative, approved innovative or accepted wastewater system. The site shall have a repair area of sufficient size to install such a system and the Manufacturer agrees to provide another approved system if the Controlled Demonstration system fails to perform properly. Exceptions to the repair area requirement are as set forth in Rule .1969(f)(3) and (4).
2. Controlled Demonstration pretreatment systems may also be used as a repair to an existing malfunctioning system when there are no other approved or accepted repair options.
3. The Hoot advanced pretreatment system and associated drainfield shall be sited and sized in accordance with Rule .1970 for an NSF-40 or TS-I system. Siting requirements for subsurface drip systems receiving effluent treated to the NSF-40 or TS-I standard shall comply with the applicable subsurface drip system approval.

## **D. DESIGN CRITERIA**

The Hoot System H-Series pretreatment system and the corresponding soil absorption system shall be designed and sited in compliance with Rule .1970.

1. Hoot System H-Series Pretreatment
  - a. A Hoot pretreatment system shall utilize models of Hoot Residential Wastewater Treatment Systems (RWTS) that have been pre-approved by the State in accordance with Rule .1957(c), in addition to meeting the requirements listed below.
  - b. The Hoot System H-Series pretreatment system requires a settling tank that is either an integral chamber of the tank or a separate State approved prefabricated septic tank. The system model number and settling tank sizing is specified in Table 1 below.

Table 1		
Design Flow (gallons per day)	Hoot Model Number	Required Septic Tank Size
Up to 500	H-500A	400 gallon integral tank prior to the Hoot unit
501-600	H-600A	400 gallon integral tank prior to the Hoot unit
601-750	H-750A	Separate septic tank with a minimum capacity of 600 gallons and a maximum capacity of 1,000 gallons
751-1,000	H-1000A	Separate septic tank with a minimum capacity of 800 gallons and a maximum capacity of 1,250 gallons

- c. Effluent from Hoot System H-Series pretreatment systems may be conveyed to a gravity distribution nitrification field or to a dosing tank for dosing to a pressure-dosed nitrification field or any other nitrification field. The dosing and construction criteria of Rules .1952 through .1954 shall be met.
- d. The dosing tank may be an integral tank of the precast unit or a separate stand alone pump tank.
- e. Hoot System H-Series pretreatment systems shall be designed by a Hoot certified designer or North Carolina Professional Engineer. A Professional Engineer shall complete buoyancy calculations and make appropriate design modifications as needed on sites where a soil wetness condition is present within five feet of the ground surface.
- f. If multiple homes, outlets or buildings are being served by one of the 750 or 1,000 gpd H-Series systems, the wastewater from the buildings may be discharged into two separate 750 gallon state approved septic tanks.
- g. The 750 and 1,000 gpd systems may either gravity flow to the pretreatment system or be in a flow equalization configuration.
- h. Systems with design daily flows in excess of 1,000 gpd will require multiple Hoot Systems and shall be flow equalized and flow metered. All systems in excess of 1,000 gpd will be designed by a North Carolina Professional Engineer and reviewed and approved by an employee of Hoot Systems.
- i. The 7-day and 30-day flow readings for the system will be stored in the Hoot Systems control panel. There will be a Data Plate on the control panel with the model number "H-500-NC".

**E. INSTALLATION AND TESTING PROCEDURES**

- 1. A preconstruction conference shall be required to be attended by the system designer, Hoot Systems, Inc. certified installer, and local health department (LHD), prior to beginning construction of the Hoot Systems, Inc H-Series pretreatment system.
- 2. The Hoot Systems, Inc. H-Series pretreatment system shall be located in compliance with the horizontal setback requirements of Rule .1950(a) and shall be located to prevent surface/subsurface water inflow/infiltration. The drainfield horizontal setback requirements are

in accordance with Rule .1970 for a TS-I system.

3. All Hoot Systems, Inc. H-Series pretreatment systems shall be installed according to directions provided by the manufacturer in the "Installation Manual" and instructions found on Hoot Systems, Inc. CAD drawings and specifications for each system. Additionally, all Hoot Systems, Inc. systems and components used with, but not manufactured by Hoot Systems, Inc., shall be installed in accordance with all applicable regulations and manufacturer instructions.
4. All individuals/companies installing Hoot Systems, Inc H-Series pretreatment systems shall be in possession of all necessary permits and licenses before attempting any portion of an installation.
5. Watertightness of the tanks and any dosing tanks shall be demonstrated by either a 24-hour water leakage test or a vacuum test conducted at the installation site. A water level change of 1/2 inch or more, within a 24" riser, over 24 hours, or visual observation of leakage shall be cause for failure of the watertightness test. Initial water level shall be to 2" above the riser/adaptor seam.
6. A Hoot Systems, Inc. certified system operator shall startup the Hoot Systems, Inc H-Series unit for each installation and shall provide an acceptance letter to the LHD prior to issuance of the operation permit.
7. 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.
8. Prior to Operation Permit issuance, the final Health Department construction inspection shall include at least the following checks:
  - a. observe the watertightness/vacuum testing
  - b. test the pump float/probe alarm
  - c. record the pump model
  - d. check to ensure vents are installed
  - e. observe the hydraulics of the overall system
  - f. confirm that the riser hatches have tamperproof bolts and/or riser lock ring
9. Each Hoot System, Inc control panel shall have a label as shown in Attachment A.
10. Prior to the issuance of an Operation Permit, the manufacturer or manufacturer's representative shall provide an acceptance letter to the local health department verifying satisfactory installation and operation measures.

## **F. OPERATION, MAINTENANCE AND TESTING**

1. System classification, management and inspection shall be in accordance with Rules .1961 and .1970.
2. All Hoot Systems, Inc H-Series Pretreatment Systems require an operation and maintenance agreement between the system owner and Hoot Systems, Inc., or its authorized representative is required, as per Rule .1970. The system shall be inspected by a certified Subsurface Operator who is also a certified Grade II biological wastewater treatment operator. The Certified Operator shall

be either an employee of Hoot Systems, Inc. or authorized in writing by Hoot Systems, Inc. to operate and maintain the system. The operator must have proper equipment and training to access and program the control panels on site.

3. Hoot Systems, Inc H-Series pretreatment systems shall be classified at a minimum as a Type V(c) system according to Table V(a) of Rule. 1961(b).
4. All Hoot Systems, Inc. H-Series pretreatment systems shall be operated and maintained according to the latest version of Hoot Systems, Inc O&M manual.
5. At each Hoot Systems, Inc. H-Series pretreatment system inspection the Operator in Responsible Charge (ORC) shall, at a minimum, observe, monitor, and record:
  - a. observe wastewater level in the tanks,
  - b. clean air filter and pull and verify clear intakes on effluent pump(s), if applicable,
  - c. conduct visual inspection of scum layer, color, clarity, in each of the compartments,
  - d. check settleable solids or sludge levels in pretreatment, aeration, and pump tank, (if applicable),
  - e. observe watertightness of tank(s), risers, and conduit pass throughs in and out of risers,
  - f. verify correct operation of blower, controller, NSF Telemetry Device, discharge dumps, and probes or floats,
  - g. record back pressure from controller,
  - h. record 7 and 30 day average gallons per day, including maximum,
  - i. review system operating conditions (Mode 1 of controller) and record of alarms since last visit,
  - j. troubleshoot any alarm codes to ensure condition that created alarm does not persist,
  - k. run effluent pump and observe flow via pulses on the water meter to determine output to field in gallons per minute,
  - l. observe remainder of Hoot System for any structural damage, riser access, odors, observation of disposal field for evidence of ponding or failure, insect or vermin damage, adequate vegetative growth over drainfield, and a sample of effluent for colors and clarity, and
  - m. clear all resettable counters and alarm codes.
6. At least once per year the ORC shall, at a minimum, measure and report to the health department:
  - a. sludge and scum levels in the pretreatment tank, clarifier, and pump tank,
  - b. settleable solids levels in the aeration tank,
  - c. drainfield pump delivery rate (drawdown test),
  - d. note 7 day, 30 day, maximum day, and total gallons since last reset of system, and
  - e. drainfield dosing volume and measure or calculate average pump run time.
7. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenance activities as specified in the Operation Permit and as recommended by the manufacturer.
8. Sampling and Testing
  - a. All sampling shall be done in accordance with Rule .1970(n).
  - b. All systems shall be tested for effluent CBOD<sub>5</sub>, TSS, NH<sub>4</sub>-N, and fecal coliforms. Influent shall be tested for BOD<sub>5</sub> and TKN.

- c. Influent samples shall be taken from the pretreatment chamber. The sample shall be taken from the clear zone beneath any scum layer using a sludge judge or similar device.
- d. Effluent samples for drip disposal systems or other pressurized dispersal systems shall be collected from a tap on the drainfield forcemain (after the filters for drip systems). The preferred location of the tap is in the pump tank discharge assembly. The sample shall not commence until at least 30 seconds of continuous discharge through the sample tap has been completed.

9. Notification and Performance of Maintenance and Repairs

- a. The ORC shall alert Hoot Systems, Inc and the system owner in a timely fashion of needed maintenance or repair activities including, but not limited to, landscaping, tank sealing, tank pumping, pipe or control system repairs, media replacement, and adjustments to any other system component.
- b. The septic tank will be pumped as needed upon recommendation of the ORC and in accordance with the Hoot Systems Operation & Maintenance Manual. 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 4 inches thick.
- c. The ORC shall notify the system owner, Hoot Systems, Inc, and the local health department whenever the pump delivery rate efficiency or average pump run time are not within 25% of initial measurements conducted prior to system startup. 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.

10. Reporting

- a. The ORC shall provide a completed written report to Hoot Systems, Inc, the system owner, and the local health department within 30 days after each required visit. At a minimum this report shall specify:
  - (1) the date and time of inspection,
  - (2) system operating conditions observed according to F.5, above,
  - (3) system operating conditions measured according to F.6 and F.7 above,
  - (4) results from any laboratory analysis of any effluent samples,
  - (5) maintenance activities performed since the last inspection report,
  - (6) an assessment of overall system performance,
  - (7) a list of any improvements or maintenance needed; and,
  - (8) a determination of whether the system is malfunctioning, and the specific nature of the malfunction.
- b. Proposal for Evaluation and Reporting.
  - (1) The manufacturer shall maintain a contract for evaluation of the performance of the controlled demonstration wastewater system with an independent third party laboratory, consultant, or other entity that has expertise in the evaluation of wastewater system and that is approved by the Department. The third party shall review the site-specific sampling and flow-monitoring protocol, collect and analyze the ORC inspection reports, sampling and monitoring data, and prepare Semi-Annual Reports summarizing all data for all the sites. These reports are due to the On-Site Water Protection Section by January 31 and July 31 of each year, and shall include all data gathered through December 31 and June 30 of the previous six-month period, respectively. These reports

shall provide information to the Department based upon the monitoring data and observations made from the Controlled Demonstration 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.

- (2) Upon completion of the research and testing protocol, and prior to completing any application by Hoot Systems, Inc, to the State for reclassification of the Hoot Systems, Inc H-Series Pretreatment System as an Innovative System, and within a maximum of five years of the effective date of the first Controlled Demonstration System Operation Permit (CDSOP) issued pursuant to this approval, the approved third party shall prepare a Final Report to the State that includes the results from all of the systems installed during the Controlled Demonstration, including sampling results, flow-monitoring information, ORC reports, etc., and provide recommendations on future use of the system. The Final Report shall be in electronic format and may be published on the On-Site Water Protection Section's website without confidentiality. The contents of the interim and final reports shall not be altered from the original document without approval from Hoot Systems, Inc.
- (3) The research and testing protocol that has been agreed to is as follows:
  - (a) All systems will be sampled quarterly.
  - (b) A minimum of 50 data points is required, including data from a minimum of 15 sites, with a minimum of two data sets per site collected over at least a 12-month period.
  - (c) For coastal resort communities, the two samples shall take place between June 1 and September 8 of each year. The samples must be taken at least six weeks apart. Other seasonal homes shall be sampled during the times of greatest use.
  - (d) A copy of the sample results will be provided to the On-Site Water Protection Section after the analyses directly from the laboratory.
  - (e) The State of North Carolina and Hoot Systems, Inc, agree that any systems that are out of compliance due to owner intervention, i.e. excessive flows, chemical disposal, or high strength waste, etc., shall not be considered in the Controlled Demonstration approval and any test results from those systems shall not be held against Hoot Systems, Inc.

11. Effluent Quality, System and Site Compliance. Compliance of each site and the system shall be in accordance with requirements set forth in Rule .1970. Consideration shall be given for the system to be reclassified as an approved Innovative system when the requirements of Rule .1969(g)(2) for "Fast Track" approval and system compliance requirements of Rule .1970(o)(2) have been met.

## **H. RESPONSIBILITIES AND PERMITTING PROCEDURES**

1. Prior to the installation of a Hoot Systems, Inc H-Series pretreatment system at a site, the owner or owner's agent shall notify the local health department of their proposed use of such a system. The local health department shall issue an Improvement Permit or Authorization to Construct or amend a previously issued Improvement Permit or Authorization to Construct allowing for the use of up to 200 Hoot Systems, Inc. H-Series pretreatment systems statewide upon a finding that all provisions of this Approval and all other applicable rules are met. Use of the proposed Controlled Demonstration System and any conditions shall be described in the Improvement

Permit and Authorization to Construct or amended Improvement Permit and Authorization to Construct, as well as described on the Operation Permit to be issued upon the acceptable completion of the system installation. **Notification of the issuance of all Operation Permits by the local health department pursuant to this Controlled Demonstration Approval shall be submitted to the On-Site Water Protection Section.**

2. Prior to the issuance of the Improvement Permit, the site shall be evaluated by a Licensed Soil Scientist and a written, sealed report provided to the local health department, as required pursuant to Rule .1970. The local health department may request the assistance of their Regional Soil Specialist in evaluating this report prior to Improvement Permit issuance.
3. When a special site evaluation is required pursuant to Rule .1970(p)(1), the report shall contain the information as specified in Rule .1970(p)(2).
4. Design responsibility: Prior to the issuance of an Authorization to Construct for a Hoot Systems, Inc. H-Series pretreatment system, a submission prepared by a Hoot certified designer or North Carolina Professional Engineer and a Licensed Soil Scientist, as applicable, shall be submitted for review and approval by the local health department. Approval shall be contingent upon the following:
  - a. Site-specific design for the pretreatment system including the H-Series pretreatment system with approved tankage, and sampling point.
  - b. Site-specific soils report is provided as applicable.
  - c. The drainfield dosing tank and drainfield layout may be completed by either the local health department or the Certified Designer/Professional Engineer.
  - d. All design submittals shall be accompanied by a letter from Hoot Systems, Inc, or its North Carolina authorized representative(s) concurring with the proposed design.
  - e. All designs greater than 1,000 gallons per day will be designed by a North Carolina Professional Engineer.
5. It is recommended that local authorized environmental health practitioners attend a design training session offered by the manufacturer prior to permitting the system. Also, at the request of the local health department, your Regional Engineer will review the design.
6. The Hoot Systems, Inc, authorized installer must certify in writing that the system was installed in accordance with the approved design prior to Operation Permit issuance. A professional engineer shall certify in writing that a system required to be designed by an engineer was installed in accordance with the approved plans and specifications prior to Operation Permit issuance. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist (see Section H.2, above), 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.
7. The operator shall be present during initial system commissioning. The ORC shall be certified as a NC Subsurface Operator, a Grade II biological wastewater treatment plant operator, and an authorized Hoot Systems, Inc, Treatment System Operator.



**I. REPAIR OF SYSTEMS**

The provisions of 15A NCAC 18A .1961 (c) shall govern the use of the Hoot Systems H-Series Treatment System for repairs to existing malfunctioning wastewater systems.

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

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**Attachment A**

Label is 4.75" long by 1.5" tall.

**NON-TYPICAL SEPTIC SYSTEM  
HOOT SYSTEMS H-SERIES  
CONTROLLED DEMONSTRATION  
GRADE II WW OPERATOR NAME AND  
CONTACT INFORMATION**