

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

**INNOVATIVE WASTEWATER
SYSTEM APPROVAL**

INNOVATIVE WASTEWATER SYSTEM NO.: IWWS-95-1

ISSUED TO: Brunswick County Health Department
Post Office Box 9
Bolivia, North Carolina 28422

FOR: "Brunswick" Bed/Fill Wastewater Disposal Systems

DATE: August 10, 1995

In accordance with 15A NCAC 18A.1969, the "Brunswick" Bed/Fill System has been found to meet the standards for an innovative system when all of the conditions specified herein and in the applicable laws and rules are met.

I. PERMITTING

Prior to the installation of the "Brunswick" Bed/Fill System at a site for which application is being made for an improvement permit or at a site for which an improvement permit has been previously issued for a system described in 15A NCAC 18A.1955, .1956, or .1957, the owner or authorized agent shall notify the local health department. The local health department shall issue an improvement permit allowing for the use of the proposed innovative system upon a finding that all provisions of this approval and all other applicable laws and rules are met. Use of the proposed innovative system and any conditions shall be described in the improvement permit. Such information shall also be described on the operation permit to be issued upon acceptable completion of the system installation. Any improvement permit and operation permit issued for a bed/fill system shall include the specific condition required in Rule. 1957(b)(1)(L)(iv).

II. SYSTEM DESCRIPTION

On-site wastewater systems using fill material are permitted under the provisions of 15A NCAC 18A .1957(b) as an alternative system and have several requirements, including the use of nitrification trenches. Bed systems may be permitted as a modified conventional system under the provision of 15A NCAC 18A .1955(d). The Brunswick County Health Department bed/fill system would combine the alternative fill system with the conventional modified bed-type system. Bed-type systems have greatly reduced sidewall area when compared with nitrification trenches,

which in turn reduces oxygen diffusion through the sidewall area. Thus, the required conventional trench bottom area in 15A NCAC 18A .1955(c) must be increased by fifty percent (50%) [Rule .1955(d)] when a bed-type system is used.

III. SITING CRITERIA

A bed-type system may be installed in fill material where at least the first thirty-six inches (36") below the naturally occurring soil surface consist of sand or loamy sand (Soil Group I). A bed/fill system shall only be used when the local health department determines that there is inadequate space to install a gravity flow trench-type system as required in 15A NCAC 18A .1957(b). The site shall have a uniform slope not exceeding two percent (2%). No soil wetness condition shall exist within the first twelve inches (12") below the naturally occurring soil surface. Artificial drainage shall not be used to meet this requirement. The horizontal setbacks of Rule .1950 shall apply as measured from a point of five feet (5') from the nearest edge of the bed sidewall.

IV. SIZING BED-TYPE SYSTEMS IN FILL MATERIAL

The maximum design daily sewage flow shall not exceed 490 gpd (e.g., 4-bedroom dwelling unit). The LTAR shall not exceed 1.0 gpd/ft². No industrial process wastewater shall discharge to bed-type systems. The bed bottom surface area requirement shall be determined by dividing the design daily sewage flow by the LTAR plus fifty percent (50%) [see Rule .1955(d)]. The available space requirements of Rule .1945 shall apply, except that an approved innovative system may be designated as the required replacement system.

V. INSTALLATION CRITERIA FOR BED/FILL SYSTEMS

Fill material shall be sand or loamy sand, containing not more than ten percent (10%) debris, and shall be approved prior to placement by the local health department. Prior to fill placement, the site shall be void of a vegetative cover, organic litter, and any debris. Fill shall be placed in six inch (6") lifts, with each fill layer mixed with the underlying layer of natural soil or sandy fill material. The side slope of the fill shall not exceed a rise to run ratio of 1:3.

The bed/fill system shall be constructed as an elongated berm with the long axis parallel to the ground elevation contours of the slope. The bottom of the bed shall be excavated level ($\pm 1/4"$) in all directions. The gravel used in the bed/fill system shall be in accordance with Rule .1955(h). The gravel depth in the bed/fill system shall comply with the provisions of Rule .1955(b) or Rule .1957(a)(1)(A), as applicable. The gravel or rock surface of the bed/fill system shall be covered by a geotextile fabric capable of preventing the downward movement of silt-sized particles while allowing the movement of moisture and gases.

- a. Bed/fill systems using gravity distribution shall meet the following conditions:
 - The bed bottom shall have a minimum separation of twenty-four inches (24") from any soil wetness condition.
 - The bed bottom shall have a minimum separation of thirty inches (30") from any soil horizon unsuitable as to soil structure, clay mineralogy, organic soil, restrictive

horizon, rock, or saprolite.

- The distribution device shall be placed in the center of the bed.
- A maximum of sixteen (16) nitrification lines, eight (8) on each side of the distribution device, shall be placed three feet (3') on centers with the outer-most nitrification lines located one and one-half (1½') from the bed side walls.
- The bed width shall be constructed in a multiple of three feet (3') up to a maximum of twenty-four feet (24').
- The final six inches (6") of fill placed over the gravel bed and side slopes shall be classified as a Group II or III soil.

b. Bed/fill systems using low pressure distribution shall meet the following conditions:

- The bed bottom shall have a minimum separation of eighteen inches (18") from any soil wetness condition.
- The bed width shall be constructed in a multiple of three feet (3') up to a maximum width of twenty-four feet (24').
- The low-pressure laterals shall be placed three feet (3') on centers and located no closer than one and one half feet (1½') from the bed side walls. All laterals shall be sleeved in perforated tubing meeting the requirements of 15A NCAC 18A .1955(f).
- Except as described herein, the provisions of Rule .1957(a) shall apply.
- The final four inches (4") of soil cover over the gravel bed and side slopes shall be classified as a Group II or III soil.

c. Bed/fill systems using approved alternative aerobic treatment units (ATU) or approved innovative pretreatment systems shall meet the following conditions:

- The ATU shall be approved in accordance with the provisions of Rule .1957(c).
- The bed bottom shall have a minimum separation of eighteen inches (18") from any soil wetness condition.
- The bed system may utilize a gravity distribution as described in V(a) above.
- If a low-pressure distribution is utilized, the requirements of V(b) shall apply except that a bed bottom shall have a minimum separation of twelve inches (12") from any soil wetness condition.

VI. OPERATION AND MAINTENANCE REQUIREMENTS

The provisions of Table V(a) of Rule .1961(b) shall apply as applicable.

VII. REPAIR OF SYSTEMS

The provisions of Rule .1961(c) shall govern the use of the bed/fill system for repairs to existing malfunctioning septic tank systems.

Approved by: _____ Date: 8/10/95