



DEPARTMENT OF HEALTH AND HUMAN SERVICES  
DIVISION OF PUBLIC HEALTH

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**MEMORANDUM**

**DATE:** October 20, 2017

**TO:** Environmental Health Directors, Supervisors, Coordinators, Specialists and the Regulated Community

**FROM:** NC DHHS DPH EHS OWPB

**RE:** Permitting and Design Guidance for Wastewater Treatment and Dispersal Systems for Recreational Vehicle Parks - REVISED

**I. Background**

A Recreational Vehicle (RV) is a vehicle that combines transportation and temporary living quarters for travel, recreation and camping. Wastewater stored in RV holding tanks is quite concentrated due to the ultra-low flow fixtures and the widespread use of commercial chemical additives for odor control. This can cause the wastewater from an RV to also be classified as "high strength". Depending upon the circumstances, an RV Park's on-site wastewater system (system) may require design by a North Carolina licensed professional engineer (PE) and may also require approval by the State prior to permitting by the Local Health Department (LHD). Wastewater stored and transported in RV holding tanks is also defined as domestic septage under the State's solid waste laws, subject to removal and disposal requirements regulated by the Division of Waste Management [G.S. 130A-290(a)(1c), and G.S. 130A-290(a)(32)]. (See Section III.E, Dump Stations, in this guidance document.)

This guidance document outlines design considerations, permitting procedures, and management methods for RV Parks consistent with applicable Statutes and Rules. Consistent with National Fire Protection Association Standards (NFPA), an RV Park addressed by this guidance includes two or more RVs located on an individual lot or tract of land or two or more RVs, each located on adjoining lots under common ownership or control. The RVs may be proposed to be collectively served by a common system, by individual systems at each lot or a combination of both common and individual systems

Individual RVs on separately owned parcels not under common control or RVs that are designed or used as permanent dwelling units shall be served by a system that meets the same requirements as

a dwelling unit. Relevant definitions and references from State and Federal codes and standards for RVs and RV Parks are appended to this guidance document.

## II. Design and Review Requirements

RV Parks shall include an approved wastewater system and each space that is individually connected to a water supply source shall also be directly connected to an approved system [G.S. 130A-335(a), 15A NCAC 18A .1937(a)].

### A. GENERAL

The LHD may request State review of any design proposal or may require an engineering design and State review pursuant to 15A NCAC 18A .1938(d-f), and .1964.

### B. LHD REVIEW AND APPROVAL

The LHD may review the application, evaluate the site, and approve the design for the proposed site and system in accordance with 15A NCAC 18A .1900 and this document when all the following apply:

1. Design daily flow is less than or equal to 1,500 gallons per day based on:
  - a. Traditional RVs: 120 gallons per day (gpd)/space in an RV Park, with a maximum of four (4) occupants/RV [15A NCAC 18A .1949(b)] (12 spaces maximum);
  - b. Park Model RVs: 175 gpd/space in an RV Park, with a maximum of four (4) occupants/RV (8 spaces maximum); or
  - c. Any combination of Traditional and Park Model RV's that results in a design daily flow less than or equal to 1,500 gpd, based on flow rates listed in II.B.1;
2. Tank and effluent filter capacity is assigned in accordance with guidance;
3. No collection sewer is proposed;
4. Assigned LTAR is less than or equal to the mean of the range assigned to the soil group;
5. No drainfield reductions are proposed for provisional, innovative, or accepted products or for systems addressed in 15A NCAC 18A .1955(p) and .1956(3)(a); and
6. No design daily flow adjustment is requested.

### C. EVALUATION AND DESIGN BY A LICENSED PROFESSIONAL

A PE shall be required and licensed soil scientist (LSS) or geologist may be required [15A NCAC 18A .1938(d and i)] when any of the following conditions apply:

1. Unreduced design daily flow is greater than 1,500 gpd, per Section II.B.1;
2. Collection sewer is proposed prior to septic tank(s) [15A NCAC 18A .1938(d)(5)];
3. Advanced pretreatment is proposed and the specific unit requires an engineered design in the Residential Wastewater Treatment System (RWTS) or PIA Approval; or
4. A design daily flow adjustment is proposed.

State review shall be required when the unreduced design daily flow is greater than 3,000 gpd, when the design utilizes an advanced pretreatment system not approved under Rule 15A NCAC 18A .1957 or .1969; or for any system designed to handle RV waste disposed of in a dump station.

## III. Design Parameters and Considerations

### A. DESIGN DAILY FLOW

1. Traditional RVs: 120 gallons per day (gpd)/space in an RV Park, with a maximum of four (4) occupants/RV [15A NCAC 18A .1949(b)]
2. Park Model RVs: 175 gpd/space in an RV Park, with a maximum of four (4) occupants/RV

**B. DESIGN DAILY FLOW ADJUSTMENT**

1. Design daily flow adjustments may be granted for RV Parks (Traditional and Park Model spaces) in accordance with 15A NCAC 18A .1949(c). Any design daily flow adjustment request shall be accompanied by documentation required in 15A NCAC 18A .1949(c) and shall account for the resulting increased constituent concentrations. This requires the services of a PE and a LSS or PG (as appropriate).
2. Typically, design daily flow adjustments are based upon multiple RV spaces being connected to a common wastewater system since flow data are generally not available for individual RV units served by individual wastewater systems. Sampled or projected wastewater characteristics are to be included with requests for design daily flow adjustments.
3. Tank and effluent screen capacity shall be based on the unreduced design daily flow.
4. The LTAR shall not exceed the mean of the soil group and no drainfield reduction for use of provisional, innovative, or accepted products or for systems addressed in 15A NCAC 18A .1955(p) and .1956(3)(a) shall be applied unless advanced pretreatment is used.

**C. WASTEWATER STRENGTH**

1. If wastewater strength is not characterized specifically, it shall be assumed to be high strength.
2. Wastewater characterization shall be based on at least two effluent samples collected during normal or above-normal operating periods from the existing RV Park (when expansion or repair of the system is proposed) or from a comparable facility. Samples shall be analyzed for at least BOD, TSS, TKN, and FOG. Wastewater is high strength when BOD, TSS, TKN, or FOG exceed 350, 100, 100 or 30 mg/l, respectively.
3. If the LHD reviews the proposal in-house without requiring wastewater characterization, wastewater shall be assumed to be high strength and all conditions of Section II.B shall be met.
4. For all systems required to be designed by a licensed professional in accordance with Section II.C where the wastewater is assumed or confirmed to be high strength, designers may:
  - a. Design the system to include advanced pretreatment to achieve domestic strength (unless subject to a higher treatment standard pursuant to 15A NCAC 18A .1970) at the point of dispersal; or
  - b. Provide calculations and analysis, as follows:
    - i. mass loading calculations based on site-specific projected or measured effluent characteristics and the design flow or adjusted design flow established in Section III.B. Calculations shall demonstrate that the soil loading rate does not exceed the mass loading rates in the Table in Appendix A of this Guidance; and
    - ii. site-specific nitrate-nitrogen migration analysis based on projected or measured effluent characteristics demonstrates that the effluent dispersal results in < 10 mg/L nitrate-nitrogen at the compliance boundary (property line).
5. For systems subject to Section II.C., the requirements of Section III.C.4 shall not apply if wastewater strength is specifically characterized and determined to be of domestic strength (and not subject to a higher treatment standard pursuant to 15A NCAC 18A .1970).

**D. TANK CAPACITY**

1. Tank capacity shall be based on design daily flow computed prior to any design daily flow adjustment per 15A NCAC 18A .1952(b), except as specified in 2, below.
2. Minimum septic tank capacity shall be based on Table 1.

**Table 1:** Minimum septic tank capacity for RV Parks according to projected flow

Number of RVs or Unreduced Flow (Q)	Minimum Septic Tank Capacity (gal.)
1-2	1,000
3	1,500
4	1,800 or 3 x Q, whichever is greater
Q = 600 to 1,500 GPD	3 x Q
Q = > 1,500 to 3,000 GPD	2Q + 1,500
Q = > 3,000 to 4,500 GPD	Q + 4,500
Q = > 4,500 GPD	2Q

- Each septic tank shall have an effluent filter rated for commercial use with a maximum screen opening of 1/32-inch filtration slots.
- Pump tank capacity shall be equal to or greater than the required septic tank capacity.

#### E. DISPERSAL FIELD

- Dispersal fields shall be sized based upon a long-term acceptance rate (LTAR) which does not exceed the mean rate for the applicable soil group and system per the 15A NCAC 18A .1900 rules.
- No drainfield reductions for provisional, innovative, or accepted products or for systems addressed in 15A NCAC 18A .1955(p) and .1956(3)(a), unless the wastewater is determined to be domestic strength in accordance with 15A NCAC 18A .1969(m). (See III.B. Wastewater Strength)

#### F. NO WATER OR SEWER CONNECTIONS WITH BATHHOUSE

- RV spaces for independent Traditional RVs that are not provided with water and sewer connections shall be treated as campsites if a bathhouse with an approved wastewater system is provided and if an independent, non-discharging dump station permitted by the Division of Waste Management is available. RVs are not allowed to discharge the holding tank waste into an on-site wastewater system unless it has been specifically designed and approved for RV holding tank waste.
- Bathhouse wastewater systems are sized at 100 gpd/campsite with a maximum occupancy rating of four (4) people/RV site.

#### G. DUMP STATION

- A dump station is highly recommended for RV Parks so that travelers can empty their holding tanks upon entry to the park. Since the contents are expected to be highly concentrated, this practice will decrease loading to the subsurface system.
- Permits for dump stations are to be obtained from the Division of Waste Management [G.S. 130A-290(a)(1c) and (a)(32); 15A NCAC 13B .0832(b)].
- If a dump station is proposed to discharge to a system governed under 15A NCAC 18A .1900, an engineered design shall be required and the design shall be submitted to the State for review and approval.

### IV. Ownership, Operation, and Maintenance

#### A. OWNERSHIP

- RV Parks are typically owned and controlled by a single person or entity. Prior to the construction authorization, the requirements of 15A NCAC 18A .1938(j) shall be met.

2. When the individual spaces are to be separately owned, and a common on-site wastewater system serves two or more individual spaces an owner's association and bi-party agreement are typically required, in accordance with 15A NCAC 18A .1937(h).

#### **B. OPERATION AND MAINTENANCE**

1. An operator in responsible charge (ORC) shall be required in accordance with 15A NCAC 18A .1961 and individual product approvals.
2. Systems meeting the provisions of Section III.C.3 or 4 shall either:
  - a. Monitor effluent prior to dispersal and if maximum levels are exceeded for any stipulated parameters, conduct groundwater monitoring; or
  - b. Monitor groundwater prior to or at the compliance boundary (property line).
3. The following operation and maintenance practices shall be followed:
  - a. If a dump station is available at the site, prominently display signs at all entrances and within the park notifying RV owners that the contents of the RV holding tank are to be dumped at the dump station prior to connecting to the subsurface system.
  - b. Management should specify practices to minimize the need for odor-controlling chemicals to be added while RVs are connected to the system. This includes:
    - i. Leaving the graywater tank valve open and the black water valve closed. The black water tank connected to an RV's sealed mechanical toilet should have minimal odor issues.
    - ii. Proper flushing of solids to prevent build-up of paper/fecal material when dumping the black water tank.
    - iii. Rinsing the tank with fresh water after each dump.
  - c. If utilized, use odor control chemicals sparingly that are enzyme- or bacteria-based and do not contain:
    - i. formaldehyde,
    - ii. para-formaldehyde,
    - iii. quaternary ammonium,
    - iv. dichlorobenzene, or
    - v. pesticides