Preparing for the NHDES Subsurface Bureau ISDS Designer Exam (Written)

April 2024

Recommended Preparation for the Exam

Examinees must demonstrate a working knowledge of the procedures and practices required in the site evaluation, design and operation of both residential and commercial Individual Sewage Disposal Systems (ISDS) in New Hampshire. Examinees will be asked to:

- Determine wastewater flow and size ISDS components for a given use. [Env-Wq 1008.03, Env-Wq 1010, Env-Wq 1016]
- Calculate sewage loading capacity. [Env-Wq 1005.03]
- Demonstrate knowledge of septic system design procedures and practices, including RSA 485-A and Env-Wq 1000 as well as how it relates to the NHDES Wetlands Bureau and Shoreland Program.
- Review ISDS layouts for compliance of Env-Wq 1000, including the 50% rule [Env-Wq 1014.09].
- Draft by hand an ISDS site to scale, ISDS profile and the minimum elements required for an approvable ISDS design.
- Demonstrate an understanding of the design intent and how it relates to surrounding grade. [Env-Wq 1003.13 (aa)]

Knowledge of all aspects of the design process is incorporated in the exam, including items not included in the law and rules such as reading and understanding contour maps. Examinees are encouraged to review approved plans through the NHDES OneStop website to familiarize themselves with the required elements of approved ISDS, practice hand drafting site plans and drafting ISDS profiles prior to the exam. Working under the supervision of a licensed ISDS designer will assist examinees in obtaining a deeper understanding of the trade.

Recommended Reading

- NH RSA Chapter 485-A (Water Pollution and Waste Disposal)
- NHDES Env-Wq 1000 (Subdivision and Individual Sewage Disposal System Design Rules) Hard copies available at the NHDES Office (29 Hazen Drive, Concord, New Hampshire 03302-0095). Please call for applicable fees and mailings (603) 271-3501
- NH RSA Chapter 482-A (Fill and Dredge in Wetlands)
- NH RSA Chapter 483-B (Shoreland Water Quality Protection Act)
- Munsell Soil Color Charts (available from multiple on-line sources)
- USDA NRCS Web Soil Survey,
- NEHSTC Field Indicators for Identifying Hydric Soils in New England
- USDA NRCS Field Book for Describing and Sampling Soils (Available as a PDF or free hard copy)

Exam Format

Only the exam is provided to the examinees. The exam is open book and examinees are encouraged to bring any materials that may assist them including (but not limited to):

- Pens/pencils/erasers (bring spares as the exam room may not have a sharpener).
- Engineers scale with a 1:20 scale.
- Drafting/geometry compass.
- Calculator.
- Watch or some method of keeping track of time other than a phone.
- Copies of applicable laws and NHDES administrative rules that govern ISDS design in New Hampshire (bookmarked to reference key areas) including, but not limited to RSA 483-B, RSA 485-A, Env-Wq 1000. **Examinees should obtain copies prior to the exam as they will not be available at the time of the exam.**
- Copy of precast concrete manufacturer's catalog (for reference only, cannot be attached to exam).
- Paper copies of standard plan details including profiles, cross sections and notes (for reference only, cannot be attached to exam).
- Example effluent disposal area calculations (for reference only, cannot be attached to exam).
- Copies of ISDS plan (for reference only, cannot be attached to exam).
- Scratch/scrap paper.

Points are not deducted for spelling errors, but answers must be legible to receive credit. Partial credit may be awarded for correct, but incomplete answers.

Other than a calculator, the use of electronics (including phones, laptops, tablets) is prohibited. If phones are brought into the exam room, they need to be turned off or placed off the desk, screen down and silenced. If an examinee needs to make or receive a phone call, they must be escorted out of the exam room.

The exam is divided into two parts. Examinees will have the entire exam time, minimum seven (7) hours, to complete the exam at their own discretion.

Part 1 is approximately 40 short-answer questions that will require calculations to answer. Examinees will be asked to answer questions pertaining to designing an ISDS in the state of New Hampshire including:

- Determining the design flow and ISDS component sizing of systems (including combining residential and commercial flows).
  Example*: Determine the flow in gallons per day, minimum size of any required tankage and minimum effluent disposal area in square feet with the given percolation rate and effluent disposal area type: A condex with 4-bedrooms per unit with garbage grinders. 8 minutes per inch; stone and pipe effluent disposal area.*

- Calculate allowable sewage loading given site information, test pit logs and NRCS soil data.
  Example: *Calculate the maximum sewage loading for a lot with the following characteristics: 54,000 SF; "B" average slope; 36" to estimated seasonal high water table; 2 minutes per inch; off-lot public water supply.*

- General questions contained in RSA 485-Aand Env-Wq 1000.

Example: *What is the minimum lot size allowed for a state subdivision approval?*

- Determining if a given ISDS layout is compliant with RSA 485-A and Env-Wq 1000.

Part 2 consists of hand drafting four (4) ISDS layouts and profile given a plan view and design parameters. Examinees should be familiar with the effluent disposal area types detailed in Env-Wq 1000 (stone and pipe, concrete chambers, trenches, drywells), but at least one of the designs allows the use of an innovative/alternative waste treatment that has received approval for use in New Hampshire.. Examinees are expected to complete the plan view and ISDS profile by hand so that it meets the standards of an ISDS submittal. The designs are graded on completeness including:

- Design criteria (determining ISDS flow, ISDS component sizing).
- Design intent (EDA bed bottom, relation to existing grade).
- Design profile (elevation of ISDS components, specifications of required components and materials).
- Design plan view (location of ISDS components, setbacks, site grading, benchmarks and swing-ties).

Correctly applying and drafting all these components are necessary to receive full credit, but certain items will be weighted more than others. If a required item is missing from the site plan or profile, such as a benchmark or spot grade, examinees are expected to generate a reasonable one from information on the plan. **Attaching pre-drawn details to the exam is not allowed and will not be given any credit.**

To pass the written portion of NHDES ISDS Designers exam, examinees must pass both parts of the exam. There is no time allotment for each portion of the exam and, for this reason, examinees that pass one part, but not both, must take the exam again in its entirety. Examinees that pass the written portion will be invited to the test pit examination at a time and date to be determined. Examinees that do not pass the test pit examination the first time will be allowed to retake it a single additional time before having to retake the written exam.