

ORIENTATION:

On-Site Testing

3



OBJECTIVES:

After completing this chapter, you will be able to . . .

- Explain how on-site testing will determine whether a site has the proper soil conditions and land features to support an onlot sewage system.
- Describe the various tests that must be performed on a site to determine site suitability.
- Explain that sometimes the results of on-site testing conducted during the site evaluation for planning may be used again during the permitting phase.
- Recognize what testing is required before a permit for an onlot system may be issued.
- Explain how the results of on-site testing will determine which absorption area may be permitted on a site.



TEACHING METHODS:

- Self-study
- Videos



ESTIMATED TIME:

- 3 hours



MATERIALS / RESOURCES:

- Computer with Internet access—www.seotraining.org
- Self-study guide (provided from Internet or DVD)
- Workbook (from provided hard copy, Internet, or DVD)
- Answer key (from Internet or DVD)
- Course O Resource Book (hard copy):
 - ✓ O-B: Regulations Pa. Code Title 25 book
 - ✓ O-C: Orientation DVD
 - ✓ O-D: SEO Field Manual
- Orientation resources material (on Internet):
 - ✓ O-3 On-Site Testing Checklist
 - ✓ O-3 Soil Profile Description & Field Sheet
 - ✓ O-3 Site Investigation & Percolation Test Report
 - ✓ O-3 Onlot System Component Matrix



CHECKLISTS

The checklists below are to help you organize your training activities. All the listed activities should be completed prior to taking the chapter quiz.



WORKBOOK ACTIVITIES:

These activities are found in the workbook for this chapter. Answer keys are found at www.seotraining.org, *Academy Course Material, Courses, Orientation* (a yellow triangle like the one at left will direct you to the Web), or on the Orientation DVD.



- _____ O-3a Exercise: Minimum Horizontal Isolation Distances
- _____ O-3b Exercise: Slope
- _____ O-3c Review: Minimum Horizontal Isolation Distances and Slope
- _____ O-3d Exercise: What Is the Limiting Zone?
- _____ O-3e Exercise: What Is a Qualified Soil Scientist?
- _____ O-3f Review: Soils Analysis
- _____ O-3g Chapter Review



ACTIVITIES OUTSIDE OF WORKBOOK:

At various points throughout this Orientation, you may have to perform an activity outside the scope of your self-study guide or workbook. When you see a green triangle, you will be directed to another location to access the activity. If the activity involves viewing a DVD, you will see a blue triangle.



- _____ O-3i Activity: View DVD—Slope
- _____ O-3ii Activity: View DVD—Soil Test Profile
- _____ O-3iii Activity: View DVD—Percolation Test



TESTING: (www.seotraining.org, Academy Course Material)

When you complete the chapter, you must take the online chapter quiz before you can proceed to the online Orientation test. To successfully complete Course O, you must take the course test. All quizzes must be completed prior to taking the course test online.

- _____ O-3 Chapter Quiz: On-Site Testing
- _____ Orientation Test

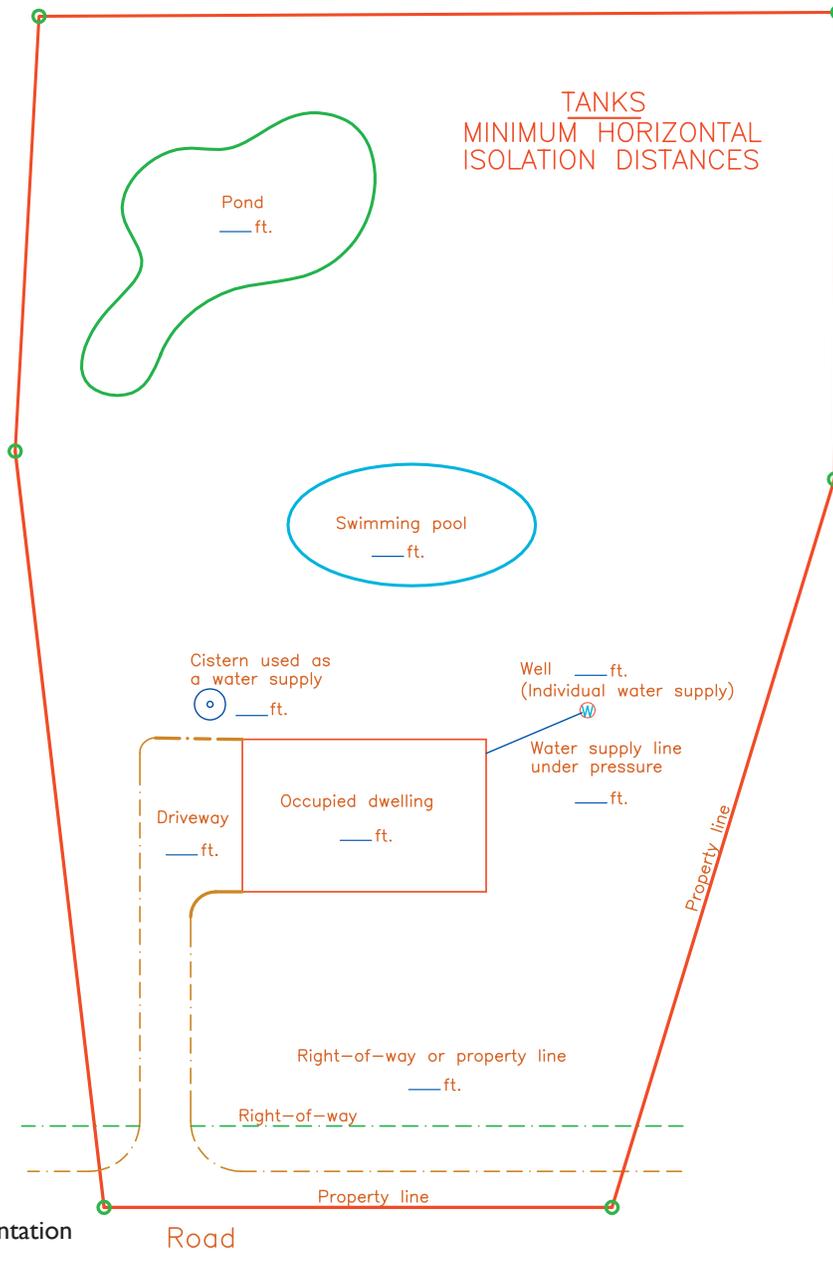


Go to the **self-study guide** for Chapter O-3—On-Site Testing at www.seotraining.org, **Academy Course Material, Courses, Orientation**, or found on the Precertification Academy Orientation DVD. Begin by reading the objectives for the chapter on the first page of the self-study guide. The guide will direct you when you are to return to this workbook to complete exercises.

O-3a—EXERCISE: Minimum Isolation Distances

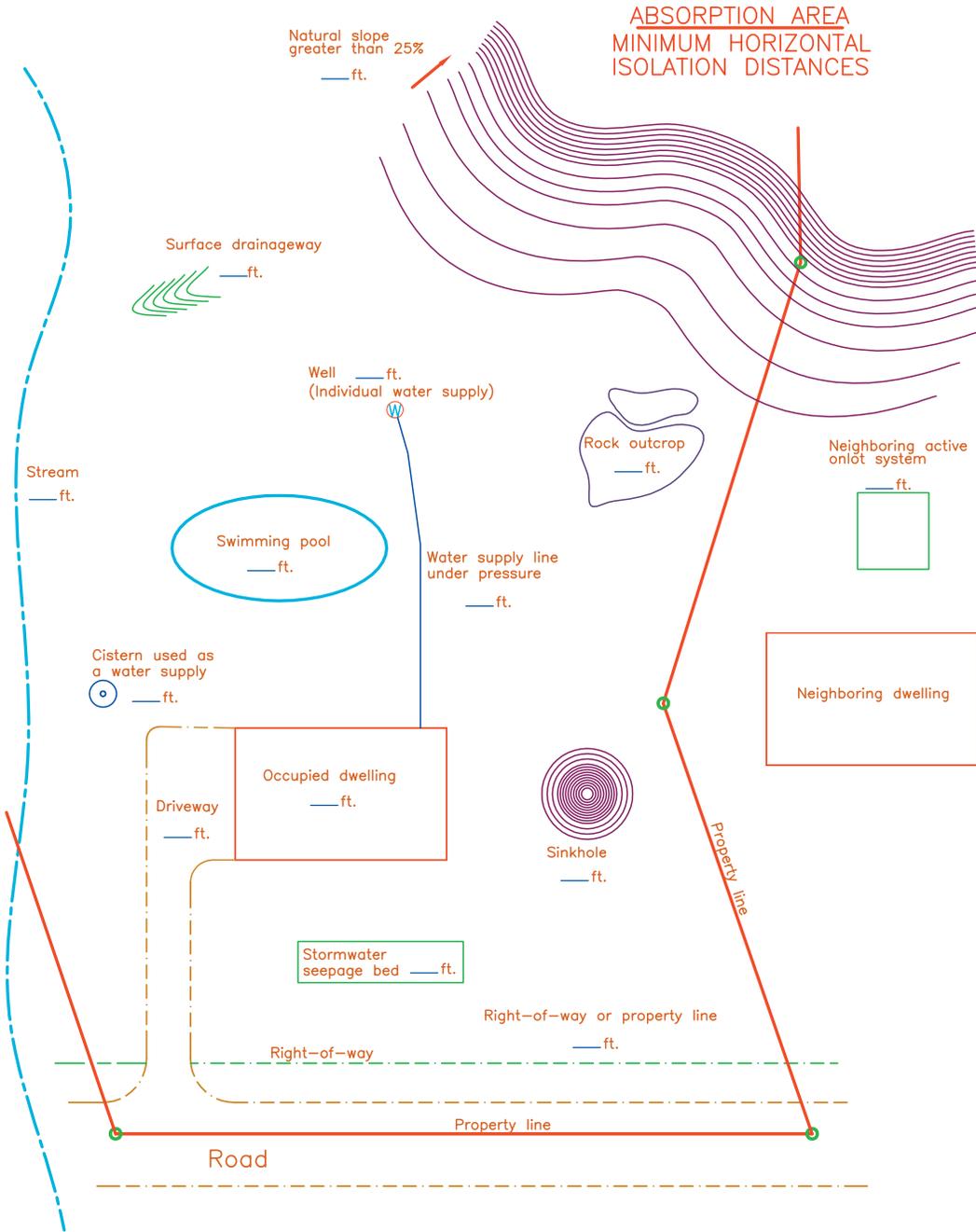


Turn to Section 73.13(b) in your regulations book, and fill in the blanks for the minimum horizontal isolation distances that should be maintained between the system tanks and the following features.





Turn to Section 73.13(c) in your regulations book, and fill in the blanks for the minimum horizontal isolation distances that should be maintained between the absorption area and the following features.



Return to the **self-study guide**.

O3b—EXERCISE: Slope

The maximum slope of the land helps to determine which absorption area may be permitted on a specific site.



Use your regulations book, and look up the following references. Find the maximum slopes for these onlot systems identified in the regulations.

Section 73.53(1)

Seepage bed (in-ground) absorption area – _____ percent

Section 73.55(a)(1)(2)

Elevated sand mound absorption area – _____ percent

Section 73.52(a)

In-ground trench absorption area – _____ percent

Section 73.163(c)

Individual residential spray irrigation system (IRSIS)

On a nonfood-producing agricultural area – _____ percent

On an open-grassed area – _____ percent

On a forested area – _____ percent

The various absorption areas will be explained in greater detail during the Precertification Academy. The important thing to note here is that different absorption areas have different maximum slope requirements.



Return to the **self-study guide**.

O-3c—REVIEW: Minimum Horizontal Isolation Distances and Slope

Answer the following questions as a review.

1. True or False. The only features on a site that an onlot absorption area must be placed a minimum distance away from are the well location, property lines, and structures.

2. Why is it important to measure the slope of a site where an onlot absorption area is proposed? (Circle all that apply.)

- A) Different onlot absorption area technologies have different maximum slope requirements.
- B) Slope affects how the effluent moves throughout and away from onlot absorption areas.
- C) Slope helps to determine where the minimum horizontal isolation distances occur.
- D) Slope on a site proposing any type of onlot absorption area cannot exceed 10 percent.

3. How is the percentage of slope determined? (Circle all that apply.)

- A) By digging a soil probe.
- B) By taking field measurements at a site and dividing rise by run.
- C) By measuring the vertical angle of a slope with the aid of an instrument.
- D) All of the above.



Return to the **self-study guide**.

O-3d EXERCISE: What Is the Limiting Zone?

Turn to Section 71.1 in the regulations and look up the definition of a limiting zone. Fill in the following blanks.

A limiting zone (LZ) is defined as a soil horizon or condition in the soil profile or underlying strata, which includes one of the following:

- i) A seasonal _____ table, whether perched or regional, determined by direct observation of the water table or indicated by **soil mottling**.
- ii) A rock with _____, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.
- iii) A rock formation, other stratum or soil condition, which is so _____ that it effectively limits downward passage of effluent.



Return to the **self-study guide**.

O-3e—EXERCISE: What Is a Qualified Soil Scientist?

Turn to Section 72.1 in your regulations and look up the definition of a qualified soil scientist. Fill in the blanks below.

Qualified soil scientist—A person _____ as a sewage enforcement officer and who has documented _____ years' experience in the characterization, classification, mapping, and interpretation of _____ as they relate to the function of onlot sewage disposal systems . . . and either a _____ _____ degree in soils science from an accredited college or university or _____ by the American Registry of Certified Professionals in Agronomy, Crops and Soils.



Return to the **self-study guide**.

O-3f—REVIEW: Soils Analysis

Answer the following questions as a review of soils.

1. Soil plays an important role in the operation of onlot systems. It absorbs, disperses, and _____ effluent.

2. The depth in soil at which renovation of effluent may no longer occur is called the _____.

3. What are the three types of limiting zones as identified in the regulations?
 - 1)
 - 2)
 - 3)

4. Examination of the soil occurs within a _____.

5. What is the written document that results from the examination of soil?

6. What is determined during the examination of the soil?
(Circle all that apply.)
 - A) Type of limiting zone
 - B) Color, texture, and structure of soil
 - C) Depth to limiting zone
 - D) Minimum horizontal isolation distances

7. What is the minimum depth to a rock limiting zone that must be present on a site for any type of absorption area to be considered?
 - A) 10 inches
 - B) 16 inches
 - C) 20 inches
 - D) 48 inches

8. What is the minimum depth to a seasonal high water table limiting zone that must be present on a site for any type of absorption area to be considered?

- A) 10 inches
- B) 16 inches
- C) 20 inches
- D) 48 inches

9. Which type of limiting zone does the color of soil (mottling or redoximorphic features) help to identify?

- A) Bedrock
- B) Rock with insufficient fine soil
- C) Seasonal high water table

10. What elements are used to estimate the texture of soil?
(Circle all that apply.)

- A) Sand
- B) Blocky
- C) Silt
- D) Granular
- E) Clay



Return to the **self-study guide**.

O-3g—CHAPTER REVIEW

Answer the following questions as a review of this chapter.

1. **True or False.** Since a consultant may conduct the on-site testing, an SEO does not have to know how to perform the on-site tests.

2. **Which on-site tests must the SEO be present for or observe at some point?** (Circle all that apply.)
 - A) Slope
 - B) Soil test probe
 - C) Percolation test
 - D) None

3. **True or False.** The on-site testing results obtained during the planning phase may be used during the permitting phase.

4. **Place the following on-site tests in the proper sequential order (1, 2, 3, 4) that they typically occur on a site where an onlot system is proposed.**
 - _____ Soil analyzed and evaluated
 - _____ Percolation test or soil morphological assessment conducted
 - _____ Slope of land measured
 - _____ Isolation distances measured

5. **What do the minimum horizontal isolation distances determine at a site?** (Circle all that apply.)
 - A) How deep to dig the soil probe
 - B) Where on-site testing can be conducted
 - C) Where treatment tanks or an absorption area can be placed
 - D) How steep the slope is

6. **True or False.** In general, an onlot absorption area could be placed on a site with a slope as steep as 35 percent.

7. Which test determines site suitability for an onlot absorption area? (Circle all that apply.)

- A) Percolation test
- B) Slope measurement
- C) Soil profile evaluation
- D) All of the above

8. Provide the maximum slope limits for the following absorption areas.

- _____ In-ground seepage bed absorption area
- _____ In-ground trench absorption area
- _____ Elevated sand mound bed absorption area*
- _____ Elevated sand mound trench absorption area*

**Not a steep slope elevated sand mound*

9. What on-site test determines the limiting zone on a site?

- A) Percolation test
- B) Soil measurement
- C) Soil profile evaluation
- D) Isolation distance measurement

10. Which of the following is a limiting zone in a soil probe? (Circle all that apply.)

- A) A seasonal high water table
- B) Soil with granular structure
- C) Bedrock
- D) Rock with insufficient soil
- E) Mottling (redoximorphic features)

11. What does a percolation rate help to determine? (Circle all that apply.)

- A) The rate at which sewage effluent can be expected to move through the soil.
- B) The type of absorption are that could be placed on a site.
- C) The size of the absorption area.
- D) The general suitability of a site.

12. Would any of the following details about the soil probe be unacceptable?

- A) The soil probe is excavated by a backhoe.
- B) The probe is large enough to allow a person to enter it.
- C) The probe is located 25 feet from the proposed absorption area.
- D) No. All of the above details about the probe are correct.

13. Who can write the soil profile description for a property owner? (Circle all that apply.)

- A) DEP
- B) The local agency SEO
- C) A consultant
- D) A soil scientist

14. Why is the soil profile description so important? (Circle all that apply.)

- A) It is the written record of soil conditions in a probe.
- B) It provides an evaluation of the soil on a site.
- C) It helps determine whether a site is suitable for an onlot absorption area.
- D) It is used by the commonwealth to help develop an official state plan.

15. What are the minimum depths to a limiting zone that must be met before each onlot absorption area technology can be considered for a site? (This information is found on the On-Site Testing Checklist or the Onlot System Component Matrix in Chapter 0-3 Resources on the Web or the DVD.)

- _____ In-ground absorption area (standard trench or seepage bed)
- _____ IRSIS (seasonal high water table LZ)
- _____ IRSIS (rock LZ)
- _____ Elevated sand mound
- _____ Drip irrigation
- _____ Shallow limiting zone at-grade absorption area (seasonal high water table LZ)
- _____ Shallow limiting zone at-grade absorption area (rock LZ)

16. How long does the percolation test (recording of readings on the percolation form, after the presoak period is completed) typically take?

- A) 30 minutes
- B) No more than four hours
- C) A period of one to two days
- D) A period of one week

17. Match up the following suitable average percolation rate range for each type of absorption area. The answers can be used more than once. (This information is found on the On-Site Testing Checklist or the Onlot System Component Matrix.)

- 6-90 minutes per inch
- 3-180 minutes per inch
- No percolation test performed

IRSIS _____

Elevated sand mound _____

At-grade absorption area _____

Shallow limiting zone at-grade absorption area

In-ground absorption area (seepage bed or standard trench) _____

Drip irrigation absorption area _____



Go to www.seotraining.org, Academy Course Material, Courses, Orientation, Chapter O-3, Chapter Study Materials, Answer Key, to view the answers to the workbook questions.



Return to the **self-study guide** to review the chapter Key Points and for instructions on taking the chapter quiz.