

This exercise is intended to support your self-directed learning.

Start by reading SPM Section I- 4 of Volume 1 for an overview of the new layout.

*You may wish to work with the digital version of the SPM, available at the following link:
<http://owrp.asttbc.org/p/documents.php>*

The 'paper' versions have a separate table of contents at the beginning of each of the four volumes. The digital version has those, plus a single table of contents covering all four volumes. The digital version table of contents have a 'click and go' feature, and it's helpful to use the 'Find' or 'Search' features.

To complete the exercise, first answer the questions, and then check the answer key - which is available at the SPM Learning Resources page: (<http://owrp.asttbc.org/p/resources.php>)

1. Which volume of the SPM contains the glossary?
 - a) I
 - b) II
 - c) III
 - d) IV

2. Which volume of the SPM contains the guidelines?
 - a) I
 - b) II
 - c) III
 - d) IV

3. Which volume of the SPM contains the standards?
 - a) I
 - b) II
 - c) III
 - d) IV

4. Which volume of the SPM contains the rationale, references and a listing of design manuals?
 - a) I
 - b) II
 - c) III
 - d) IV

5. What is the section identifier for vertical separation standards?
 - a) 2 - 5
 - b) II- 5.3
 - c) IV- 5.8
 - d) 3.4.1.1
 - e) I- 4.4.1

6. What is the section identifier for vertical separation guidelines?
 - a) I- 4.4.1
 - b) IV- 5.8
 - c) 2 - 5
 - d) II- 5.3
 - e) III- 5.3

7. Which pair of section identifiers refer to standards and guidelines for maintenance and monitoring frequency?
 - a) I- 4.4.2 and III- 3.1
 - b) II- 7.1 and III- 7.1
 - c) IV- 5.5 and II- 5.5
 - d) II- 3.8 and II- 4.2

8. Which section contains standards for treatment system monitoring?
 - a) II- 7.1.3
 - b) Table II- 2
 - c) III- 6.4.3.2
 - d) IV- 5.9.3 page IV- 22

9. Which section contains guidelines for watertight testing of tanks, including additional detail about procedures, alternative approaches and supporting information?
 - a) II- 6.4
 - b) Table II- 19
 - c) III- 6.4.3.2
 - d) IV- 5.9 page IV- 21

10. What is the section identifier for maintenance and monitoring standards?
 - a) I- 4.4.2
 - b) 2 - 7
 - c) 2.4.2
 - d) II- 7

11. What is the section identifier for maintenance and monitoring guidelines?
 - a) I- 3.4
 - b) IV- 7
 - c) 4 - 7
 - d) 3.3.3.4
 - e) III- 7

12. What is the minimum required horizontal separation distance from a septic tank to a below ground water supply cistern?
 - a) 3 m
 - b) 7.5 m
 - c) 15 m
 - d) 30 m

13. What is the minimum required horizontal separation distance from a septic tank to a lake?
 - a) 7.5 m
 - b) 10 m
 - c) 15 m
 - d) 30 m

14. What is the minimum required horizontal separation distance from a BC zero discharge lagoon to an irrigation well?
- 3 m
 - 7.5 m
 - 15 m
 - 30 m
15. For repair of an existing system, which of the following procedures requires a Filing submission to the Health Authority?
- replacement of transducer
 - installation of new tank risers and lids
 - extending trenches for additional area of infiltrative surface
 - replacement of short sections of pipe when not functioning as intended
16. For repair of an existing system, which of the following procedures does not require a Filing submission to the Health Authority?
- replacement of D-box
 - retrofitting treatment devices
 - addition of grease interceptor
 - upgrading trickle gravity to a pump to D-box configuration
17. What is the minimum initial frequency for flow monitoring of a type 2 system?
- 1 month
 - 6 months
 - 12 months
 - 24 months
18. What is the minimum initial frequency for inspection by a maintenance provider of a type 3 system?
- 1 month
 - 6 months
 - 12 months
 - 24 months
19. What is the minimum initial frequency for effluent sampling of a type 2 system?
- 1 month
 - 6 months
 - 12 months
 - 24 months
20. To determine if wastewater is "typical residential sewage" the MP should compare sampling results to which TSS parameter guidelines?
- 35 - 60 mg/L
 - 50 - 80 mg/L
 - 175 - 400 mg/L
 - 290 - 560 mg/L
21. What is the minimum vertical separation in native soil for gravity distribution when the percolation rate is 0.5 minutes per inch?
- 60 cm
 - 90 cm
 - 150 cm
 - 183 cm

22. What is the minimum required residual pressure (squirt height) when using 3.2 mm (1/8 inch) orifices
- 60 cm
 - 90 cm
 - 150 cm
 - 180 cm
23. The data record from a dosing control panel shows cycle count of 11,572. The maintenance plan lists the dose volume as 200 L. The previous maintenance was completed 760 days previously, and at that time the cycle count was 2492. What is the average daily flow since the last service?
- 1,195 L
 - 2,389 L
 - 9,080 L
 - 1,816,000 L
 - 2,314,400 L
24. The data record from a dosing control panel shows 3000 cycle counts over the previous 400 days. Dose volume is 300 L. DDF is 3000 L/day. Which of the following conclusions is accurate?
- usage is 150 % of the design capacity, the system is over loaded
 - usage is 75 % of the design capacity, the system is not overloaded
 - flow monitoring indicates the system is receiving groundwater infiltration
 - flow monitoring indicates the system components were not sized in accordance with DDF
25. A lab analysis report of a sewage sample states that median cBOD5 was 700 mg/L, and median TSS was 500 mg/L. Which of the following conclusions is accurate?
- sewage characteristics are within the SSR definition for type 3
 - cBOD5 are within acceptable standards and guidelines
 - sewage strength is greater than "typical residential sewage" parameters
 - oil and grease quantities exceed acceptable quantities for type 2 effluent
26. What is the minimum DDF for a 3 bedroom residence with 280 m² of living area?
27. What is the minimum DDF for a 3 bedroom residence with 300 m² of living area and projected occupancy of 3 persons?
28. What is the minimum DDF for a 5 bedroom residence with 400 m² and with anticipated occupancy of 8 persons?
29. What is the minimum DDF for a sewerage system that will serve a 2 bedroom residence with 200 m² of living area and a secondary suite within a detached garage that has 1 bedroom and 55 m² of living area? Projected occupancy is 3 persons in the 2 bedroom primary residence and 2 persons in the 1 bedroom secondary residence.

30. What is the minimum DDF for a two story residence, where the upper floor has 3 bedrooms and 200 m² of living area, and a full basement (200 m²) that is currently unfinished? The owner plans to finish the basement as a games room, exercise area, bar and a bathroom. Projected occupancy is no more than 3 persons.
31. What is the minimum DDF for a 5 bedroom residence with 480 m² of living area? The kitchen sink is equipped with a garburator. Projected occupancy is generally less than 5 persons.
32. What is the minimum DDF for a 90 m² cabin with an open floor plan (no bedrooms) used for approximately 60 days per year by 5 persons?
33. What is the minimum DDF for a 2 bedroom mobile home with 67 m² floor area and projected occupancy of 3 persons?
34. What is the minimum required VS for gravity distribution of type 2 effluent to coarse sand?
35. Determine the minimum required VS, given the following conditions:
- uniform distribution
 - demand dosing
 - dose frequency of 6 times per day based on DDF
 - type 2 effluent, type 2 HLR
 - soil texture is loamy sand at the infiltrative surface and at least 30 cm below

The minimum required VS in native soil is _____ (fill in the blank).

36. Determine the minimum required VS, given the following conditions:
- uniform distribution
 - timed dosing
 - dose frequency of 10 times per day based on DDF
 - type 1 effluent, type 1 HLR
 - soil texture is loamy sand at the infiltrative surface and at least 30 cm below

The minimum required VS in native soil is _____
and the minimum as constructed VS is _____ (fill in the blanks).

37. Determine the minimum required VS, given the following conditions:
- uniform distribution
 - demand dosing
 - dose frequency of 14 times per day based on DDF
 - type 2 HLR
 - soil texture is loamy sand at the infiltrative surface and at least 30 cm below
 - sand media will not be used ... is not a practical option due to high transport costs

The minimum required VS is _____.

38. Determine the minimum required VS and sand media thickness, given the following conditions:
- sand mound dispersal system (must be uniform distribution, gravity dispersal not allowed)
 - the depth of unsaturated and permeable native soil above seasonal high water table is 30 cm
 - demand dosing
 - dose frequency of 11 times per day based on DDF
 - type 1 HLR is used for sizing the mound sand infiltrative surface (a type 2 HLR is used for the basal loading area check)

The standard for minimum required as constructed VS is _____ and ...
the minimum sand media thickness is _____ ...
the depth of suitable soil above a limiting condition is _____ ...
therefore, the as constructed VS will have to be at least _____.

39. The depth of permeable, unsaturated soil within a proposed dispersal area is 180 cm. Soil texture is loamy sand. What is the maximum depth from surface to trench bottom (i.e. how deep can the trench be) that will achieve VS standards for gravity dispersal trenches?

40. The native soil has a texture of loam, with 90 cm depth to a restrictive layer of clay loam. A type 1 pressure dispersal system is proposed, with demand dosing at 4 doses per day. What is the required elevation relative to original grade of the infiltrative surface (i.e. how deep?), to meet the minimum VS standards?

41. Answer the questions that follow, given the following conditions:

- the configuration of the dispersal system will achieve better than 10% variation in effluent volume applied to each 0.5 sq m portion of the dispersal trenches
- DDF is 2500 L/day
- the dosing system will achieve consistent flow equalization throughout the day
- the volume of each dose will be 155 L per dose
- a type 2 HLR will be used to determine the area of infiltrative surface
- soil texture is sandy loam to a depth of 120 cm, with wet clay under that
- a 10 cm deep blinding layer of mound sand will be used to prevent crusting or “capping”.

a) Is the dosing characterized as ‘normal’ or ‘low’?

b) Which VS Table applies (Table II- 14, 15, 16, 17 or 18)?

c) What is the minimum VS in native soil?

d) What is the minimum as constructed VS?

e) What is the maximum depth of the dispersal trench that will achieve VS standards?

For the remaining portion of the exercise, refer to III- 7 Maintenance Guidelines. The 'questions' are direct quotes from the SPM. Fill in the blanks with the SPM text.

42. The Volume II standards show the minimum intervals for initial maintenance and testing. Start with frequent maintenance, sampling and testing. Then, based on the results of the first year, and on a discussion between the AP who filed the system and the maintenance provider, develop a new maintenance and sampling frequency for the next five to ten years ... As a guideline, maintenance and testing frequency should be at minimum:

- Every _____ years for gravity dispersal Type 1 systems and BC zero discharge lagoons.
- Every _____ years for other systems, including ET and ETA beds.

43. After maintaining the system, provide the owner or client a _____ report. In the report include at least the following:

- Describe if the system is being used in a manner consistent with its _____ and condition.
- An evaluation of the system's _____ summarizing the results of the maintenance service and monitoring in layman's terms, and making conclusions about system _____.
- A listing of monitoring data such as _____, pump run time, pump run amperage, _____ and any other flow or performance data provided by the _____ or other monitoring features.
- _____ heights for pressure systems, _____ for drip systems ...
- A list of _____ or improvements ...

44. _____ has established guidelines which include terminology to be used to describe conclusions about system condition and performance. _____ when reporting on system maintenance.

45. Take _____ to document maintenance and maintenance inspection.

46. For the first maintenance service ...

- Determine the _____, and compare this to the _____ of the system.
- Check for _____ that cause unnecessary _____.
- Check the property for any _____ such as _____, retaining wall footing drains, surface drainage, etc., and assess the potential impact on the wastewater system.
- Check to ensure that no discharges reach the system from any groundwater or surface water drainage system, such as _____, catch basins, _____, etc.
- Conduct a _____ to confirm that all flows, from every plumbing fixture (including from any secondary buildings), _____ at each component of the onsite system in _____.

47. Regarding minimum scope of maintenance ... at each maintenance service, in addition to any specific provisions in the _____:

- Examine, test, and document the condition and performance of the _____ including the _____ system.
- If _____ is used in treatment systems such as sand filters, any packed bed filter, CTDS, or any other products using proprietary media – assess the condition and serviceability of _____ and determine when the media should be _____.
- Carry out any maintenance and monitoring tasks as _____ by the _____ as filed.
- If backups of the dispersal system are observed, use a _____ to check for structural damage or _____ of the piping system.

48. Regarding repair work by maintenance providers ... _____, and replacement of some components, can be included within the scope of maintenance. However, _____, alterations, or replacement of major components, fall outside the scope of maintenance. Major repairs require _____, and must only be carried out by APs that have been qualified and accredited to _____ systems. See Section _____.

49. General maintenance tasks include:

- Confirmation of suitable _____ to facilitate ongoing maintenance and monitoring...
- Confirmation of continuing safety provisions, including, but not limited to, secure _____, and _____ components and junctions.
- Examine electrical connections and components for _____ and general condition and safety. Check for proper _____ and components to prevent _____.
- Check _____. Compare this data to records of commissioning or previous maintenance; calculate the _____ since the last record; and compare to the average flow allowance (_____) over the intervening period.
- Examine, test, and document the condition and performance of the _____ including the soil dispersal system.
- If _____ is used in treatment systems such as sand filters, any packed bed filter, CTDS, or any other products using proprietary media – assess the condition and serviceability of _____ and determine when the media should be _____.

50. For maintenance of septic tanks:

- Examine the _____ in the septic tank for proper configuration, condition, alignment, and blockages.
- Check for _____, and evidence of settling of the tank or _____ of the inlet or outlet piping.
- Check for flows arriving in the septic tank in a consistent manner without surging or 'gurgling', which could indicate _____, damaged, or _____ sewer lines.

- Check for _____ entering the septic tank when no water fixtures are running. This may indicate _____ into the tank, or a _____ in the building.
- Pump out when ... total solids accumulations are _____ of the internal height of the tank ...

51. For maintenance of sewage treatment systems, and for CTDS ...

- Confirm proper operation of (as applicable) _____, and _____.
- Examine and clean _____ and related hardware. UV bulbs should typically be replaced every _____.
- Sample and test the _____, as directed by the _____. If there is no plan, then test the effluent following the minimum interval standards of Section _____.
- If it is time to replace the media, then check that the media is _____ that minimizes health risks. Arrange disposal at a waste handling facility that is _____.

52. For maintenance of dispersal systems ...

- Observe the dispersal system for evidence of _____, excessive settling, or soil or sand erosion. Confirm appropriate _____.
- Examine all _____ in the dispersal area, and assess any _____ found.
- _____ clean any plugged laterals.
- Perform a _____ and record distal pressure (_____. Compare this to the _____, and to previous maintenance records.
- Flush the system. If the force main has cleanout(s), then isolate all laterals, and then _____. Next, use the lateral isolation _____ to increase the _____ by directing the full pump flow to _____.

53. For maintenance of drip systems ...

- Inspect and hand clean the _____.
- Open the field flush valves and _____ the system.
- Check _____, and compare the pressures to the _____ from commissioning records.
- Inspect and clean the _____, and confirm proper operation. Consider _____.

54. For maintenance of dosing systems and controls ...

- Check that the _____ are in working order.
- Check that _____ are performing properly.
- Visually inspect the control panel box for water tightness, _____.
- Record the _____ information, and analyse this to determine the _____.

55. And finally ... from the SSR, what is the required setback from a septic tank or pump chamber to a drinking water well?