*Registration form*

# Septic Operations and Maintenance CEU Training Course $200.00

**48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL $50.00**

**Start and finish dates: _____**
***You will have 90 days from this date in order to complete this course***

**List number of hours worked on assignment must match State requirement. _____**

**Name_____Signature_____**
*I have read and understood the disclaimer notice on page 2. Digitally sign XXX*

**Address: _____**

**City_____State_____Zip_____**

**Email_____ Fax (____)_____**

**Phone:**
**Home (____)_____ Work (____)_____**

**Operator ID #_____Exp. Date_____**

***Please circle/check which certification you are applying the course CEU's/PDH's.***
Wastewater Collection____ O and M_____ Onsite Installer ____

Oregon CCB ($50 additional fee) _____ Other _____

***Your certificate will be e-mailed to you in about two weeks.***

**Technical Learning College PO Box 3060, Chino Valley, AZ 86323**
**Toll Free (866) 557-1746 Fax (928) 272-0747 info@tlch2o.com**

**If you've paid on the Internet, please write your Customer#_____**

**Please invoice me, my PO#_____**

**Please pay with your credit card on our website under Bookstore or Buy Now. Or call us and provide your credit card information.**

***We will stop mailing the certificate of completion so we need either your fax number or e-mail address. We will e-mail the certificate to you, if no e-mail address; we will fax it to you.***

**DISCLAIMER NOTICE**
I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I also understand that this type of study program deals with dangerous conditions and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury caused by this CEU education training course material. I will call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded.

**Professional Engineers;** Most states will accept our courses for credit but we do not officially list the States or Agencies. Please check your State for approval.

*You can obtain a printed version of the course manual from TLC for an additional $69.95 plus shipping charges.*

**AFFIDAVIT OF EXAM COMPLETION**
I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

**Grading Information**
In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

**Rush Grading Service**
If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line.

**Do not solely depend on TLC's Approval list for it may be outdated.**

**A second certificate of completion for a second State Agency $50 processing fee.**

**All downloads are electronically tracked and monitored for security purposes.**

## Septic Operations and Maintenance Answer Key

## Name_____

## Phone# _____

**You are solely responsible to ensure that this course is accepted for credit by your State. Did you check with your State agency to ensure this course is accepted for credit? No refunds.**

***Method of Course acceptance confirmation. Please fill this section***

**Website __ Telephone Call___ Email____ Spoke to_____**

**Did you receive the approval number, if applicable? _____**

**What is the course approval number, if applicable? _____**
**Do not solely depend on TLC's Approval list for it may be outdated.**

You can also fill this assignment out electronically in Adobe Acrobat DC

***Please circle, underline, bold or X only one correct answer***

| | | | | | |
|---|---|---|---|---|---|
| 1. | A B C D E F | 17. | A B C D E F | 33. | A B C D E F |
| 2. | A B C D E F | 18. | A B C D E F | 34. | A B C D E F |
| 3. | A B C D E F | 19. | A B C D E F | 35. | A B C D E F |
| 4. | A B C D E F | 20. | A B C D E F | 36. | A B C D E F |
| 5. | A B C D E F | 21. | A B C D E F | 37. | A B C D E F |
| 6. | A B C D E F | 22. | A B C D E F | 38. | A B C D E F |
| 7. | A B C D E F | 23. | A B C D E F | 39. | A B C D E F |
| 8. | A B C D E F | 24. | A B C D E F | 40. | A B C D E F |
| 9. | A B C D E F | 25. | A B C D E F | 41. | A B C D E F |
| 10. | A B C D E F | 26. | A B C D E F | 42. | A B C D E F |
| 11. | A B C D E F | 27. | A B C D E F | 43. | A B C D E F |
| 12. | A B C D E F | 28. | A B C D E F | 44. | A B C D E F |
| 13. | A B C D E F | 29. | A B C D E F | 45. | A B C D E F |
| 14. | A B C D E F | 30. | A B C D E F | 46. | A B C D E F |
| 15. | A B C D E F | 31. | A B C D E F | 47. | A B C D E F |
| 16. | A B C D E F | 32. | A B C D E F | 48. | A B C D E F |

49. A B C D E F
50. A B C D E F
51. A B C D E F
52. A B C D E F
53. A B C D E F
54. A B C D E F
55. A B C D E F
56. A B C D E F
57. A B C D E F
58. A B C D E F
59. A B C D E F
60. A B C D E F
61. A B C D E F
62. A B C D E F
63. A B C D E F
64. A B C D E F
65. A B C D E F
66. A B C D E F
67. A B C D E F
68. A B C D E F
69. A B C D E F
70. A B C D E F
71. A B C D E F
72. A B C D E F
73. A B C D E F
74. A B C D E F
75. A B C D E F
76. A B C D E F
77. A B C D E F
78. A B C D E F
79. A B C D E F
80. A B C D E F
81. A B C D E F
82. A B C D E F
83. A B C D E F
84. A B C D E F
85. A B C D E F
86. A B C D E F
87. A B C D E F
88. A B C D E F
89. A B C D E F
90. A B C D E F
91. A B C D E F
92. A B C D E F
93. A B C D E F
94. A B C D E F
95. A B C D E F
96. A B C D E F
97. A B C D E F
98. A B C D E F
99. A B C D E F
100. A B C D E F
101. A B C D E F
102. A B C D E F
103. A B C D E F
104. A B C D E F
105. A B C D E F
106. A B C D E F
107. A B C D E F
108. A B C D E F
109. A B C D E F
110. A B C D E F
111. A B C D E F
112. A B C D E F
113. A B C D E F
114. A B C D E F
115. A B C D E F
116. A B C D E F
117. A B C D E F
118. A B C D E F
119. A B C D E F
120. A B C D E F
121. A B C D E F
122. A B C D E F
123. A B C D E F
124. A B C D E F
125. A B C D E F
126. A B C D E F
127. A B C D E F
128. A B C D E F
129. A B C D E F
130. A B C D E F
131. A B C D E F
132. A B C D E F
133. A B C D E F
134. A B C D E F
135. A B C D E F
136. A B C D E F
137. A B C D E F
138. A B C D E F
139. A B C D E F
140. A B C D E F
141. A B C D E F
142. A B C D E F
143. A B C D E F
144. A B C D E F
145. A B C D E F
146. A B C D E F
147. A B C D E F

148. A B C D E F
149. A B C D E F
150. A B C D E F
151. A B C D E F
152. A B C D E F
153. A B C D E F
154. A B C D E F
155. A B C D E F
156. A B C D E F
157. A B C D E F
158. A B C D E F
159. A B C D E F
160. A B C D E F
161. A B C D E F
162. A B C D E F
163. A B C D E F
164. A B C D E F
165. A B C D E F
166. A B C D E F
167. A B C D E F
168. A B C D E F
169. A B C D E F
170. A B C D E F
171. A B C D E F
172. A B C D E F
173. A B C D E F
174. A B C D E F
175. A B C D E F
176. A B C D E F
177. A B C D E F
178. A B C D E F
179. A B C D E F
180. A B C D E F
181. A B C D E F
182. A B C D E F
183. A B C D E F
184. A B C D E F
185. A B C D E F
186. A B C D E F
187. A B C D E F
188. A B C D E F
189. A B C D E F
190. A B C D E F
191. A B C D E F
192. A B C D E F
193. A B C D E F
194. A B C D E F
195. A B C D E F
196. A B C D E F
197. A B C D E F
198. A B C D E F
199. A B C D E F
200. A B C D E F
201. A B C D E F
202. A B C D E F
203. A B C D E F
204. A B C D E F
205. A B C D E F
206. A B C D E F
207. A B C D E F
208. A B C D E F
209. A B C D E F
210. A B C D E F
211. A B C D E F
212. A B C D E F
213. A B C D E F
214. A B C D E F
215. A B C D E F
216. A B C D E F
217. A B C D E F
218. A B C D E F
219. A B C D E F
220. A B C D E F
221. A B C D E F
222. A B C D E F
223. A B C D E F
224. A B C D E F
225. A B C D E F
226. A B C D E F
227. A B C D E F
228. A B C D E F
229. A B C D E F
230. A B C D E F
231. A B C D E F
232. A B C D E F
233. A B C D E F
234. A B C D E F
235. A B C D E F
236. A B C D E F
237. A B C D E F
238. A B C D E F
239. A B C D E F
240. A B C D E F
241. A B C D E F
242. A B C D E F
243. A B C D E F
244. A B C D E F
245. A B C D E F
246. A B C D E F

247. A B C D E F
248. A B C D E F
249. A B C D E F
250. A B C D E F
251. A B C D E F
252. A B C D E F
253. A B C D E F
254. A B C D E F
255. A B C D E F
256. A B C D E F
257. A B C D E F
258. A B C D E F
259. A B C D E F
260. A B C D E F
261. A B C D E F
262. A B C D E F
263. A B C D E F
264. A B C D E F
265. A B C D E F
266. A B C D E F
267. A B C D E F
268. A B C D E F
269. A B C D E F
270. A B C D E F
271. A B C D E F
272. A B C D E F
273. A B C D E F
274. A B C D E F
275. A B C D E F
276. A B C D E F
277. A B C D E F
278. A B C D E F
279. A B C D E F
280. A B C D E F
281. A B C D E F
282. A B C D E F
283. A B C D E F
284. A B C D E F
285. A B C D E F
286. A B C D E F
287. A B C D E F
288. A B C D E F
289. A B C D E F
290. A B C D E F
291. A B C D E F
292. A B C D E F
293. A B C D E F
294. A B C D E F
295. A B C D E F
296. A B C D E F
297. A B C D E F
298. A B C D E F
299. A B C D E F
300. A B C D E F
301. A B C D E F
302. A B C D E F
303. A B C D E F
304. A B C D E F
305. A B C D E F
306. A B C D E F
307. A B C D E F
308. A B C D E F
309. A B C D E F
310. A B C D E F
311. A B C D E F
312. A B C D E F
313. A B C D E F
314. A B C D E F
315. A B C D E F
316. A B C D E F
317. A B C D E F
318. A B C D E F
319. A B C D E F
320. A B C D E F
321. A B C D E F
322. A B C D E F
323. A B C D E F
324. A B C D E F
325. A B C D E F
326. A B C D E F
327. A B C D E F
328. A B C D E F
329. A B C D E F
330. A B C D E F
331. A B C D E F
332. A B C D E F
333. A B C D E F
334. A B C D E F
335. A B C D E F
336. A B C D E F
337. A B C D E F
338. A B C D E F
339. A B C D E F
340. A B C D E F
341. A B C D E F
342. A B C D E F
343. A B C D E F
344. A B C D E F
345. A B C D E F

346. A B C D E F
347. A B C D E F
348. A B C D E F
349. A B C D E F
350. A B C D E F
351. A B C D E F
352. A B C D E F
353. A B C D E F
354. A B C D E F
355. A B C D E F
356. A B C D E F
357. A B C D E F
358. A B C D E F
359. A B C D E F
360. A B C D E F
361. A B C D E F
362. A B C D E F
363. A B C D E F
364. A B C D E F
365. A B C D E F
366. A B C D E F
367. A B C D E F
368. A B C D E F
369. A B C D E F
370. A B C D E F
371. A B C D E F
372. A B C D E F
373. A B C D E F
374. A B C D E F
375. A B C D E F
376. A B C D E F
377. A B C D E F
378. A B C D E F
379. A B C D E F
380. A B C D E F
381. A B C D E F
382. A B C D E F
383. A B C D E F
384. A B C D E F
385. A B C D E F
386. A B C D E F
387. A B C D E F
388. A B C D E F
389. A B C D E F
390. A B C D E F
391. A B C D E F
392. A B C D E F
393. A B C D E F
394. A B C D E F
395. A B C D E F
396. A B C D E F
397. A B C D E F
398. A B C D E F
399. A B C D E F
400. A B C D E F

*This course contains general EPA's CWA federal rule requirements. Please be aware that each state implements wastewater/safety/environmental /building regulations that may be more stringent than EPA's regulations. Check with your state environmental/health agency for more information. These rules change frequently and are often difficult to interpret and follow. Be careful to not be in non-compliance and do not follow this course for proper compliance.*

**Additional certificate for another Agency – additional fee $50**

## Please fax the answer key to TLC
## (928) 272-0747

**Rush Grading Service**

If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line. Thank you…

# SEPTIC OPERATIONS AND MAINTENANCE
# CEU TRAINING COURSE

## CUSTOMER SERVICE RESPONSE CARD

NAME: _____

E-MAIL _____ PHONE _____

***PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.***

1. Please rate the difficulty of your course.
   Very Easy 0 1 2 3 4 5 Very Difficult

2. Please rate the difficulty of the testing process.
   Very Easy 0 1 2 3 4 5 Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.
   Very Similar 0 1 2 3 4 5 Very Different

4. How did you hear about this Course? _____

5. What would you do to improve the Course?

_____

_____

How about the price of the course?

Poor_____ Fair ____ Average ____ Good____ Great_____

How was your customer service?

Poor___ Fair ____ Average ____ Good _____ Great_____

Any other concerns or comments.

_____

_____

# Septic Operations and Maintenance CEU Training Course Assignment

***The Assignment (Exam) is also available in Word on the Internet for your Convenience, please visit www.ABCTLC.com and download the assignment and e- mail it back to TLC.***

You'll have 90 days from the start of this course to complete in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % is necessary to pass this course. We prefer if this exam is proctored. No intentional trick questions. If you should need any assistance, please email all concerns and the completed manual to info@tlch2o.com.

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your manual and make copy for yourself. You can e-mail or fax your Answer Key along with the Registration Form to TLC. **(S) Means answer may be plural or singular**. **Multiple Choice Section, One answer per question and please use the answer key.**

**Tree Roots vs. Sanitary Sewer Lines**

1. Roots require oxygen to grow, they do not grow in pipes that are full of water or where high ground water _____ prevail.

A. Capacity
B. Location
C. And nutrients
D. Conditions
E. And low sodium
F. None of the Above

2. Roots _____ in the warm, moist nutrient rich atmosphere above the water surface inside sanitary sewers.

A. Penetrate
B. Thrive
C. Attracted
D. Grow
E. Cannot live without Sun
F. None of the Above

3. The flow of warm water inside the sanitary sewer service pipe _____to escape to the cold soil surrounding the pipe.

A. Penetrate
B. Thrive
C. Attracted
D. Grow
E. Makes air
F. None of the Above

4. Tree roots are _____to the water vapor leaving the pipe and they follow the vapor trail to the source of the moisture, which are usually cracks or loose joints in the sewer pipe.

A. Penetrate
B. Thrive
C. Attracted
D. Easy to work around and
E. Not a problem if you have a little gunpowder
F. None of the Above

5. Upon reaching the crack or pipe joint, tree roots will _____ the opening to reach the nutrients and moisture inside the pipe. This phenomenon continues in winter even though trees appear to be dormant.

A. Penetrate
B. Thrive
C. Expand
D. Grow
E. Make trouble
F. None of the Above

6. Once inside the pipe, roots will continue to _____ and if not disturbed, they will completely fill the pipe with multiple hair-like root masses at each point of entry.

A. Penetrate
B. Thrive
C. Expand
D. Grow
E. Make trouble
F. None of the Above

7. The root mass inside the pipe _____with grease, tissue paper, and other debris discharged from the residence or business.

A. Will exert considerable pressure
B. Becomes matted
C. Makes something tasty
D. Break the pipe
E. Will make a stink pickle
F. None of the Above

8. Homeowners will notice the first signs of a slow flowing drainage system by hearing _____from toilet bowls and observing wet areas around floor drains after completing the laundry.

A. Considerable pressure
B. Cries for help from the roots
C. Something like smoke but has an odor
D. Something like a jet plane
E. Something like a cat
F. None of the Above

9. A complete blockage _____if no remedial action is taken to remove the roots/blockage.

A. Will exert considerable pressure
B. Will become matted
C. Will make good money
D. Will break the pipe
E. Is easily repaired
F. None of the Above

10. As roots continue to grow, they expand and _____at the crack or joint where they entered the pipe.

A. Exert considerable pressure
B. Becomes matted
C. Make a pleasant odor
D. Break the pipe
E. Multiply
F. None of the Above

11. The force exerted by the root growth will _____and may result in total collapse of the pipe.

A. Exert considerable pressure
B. Become matted
C. Not be a problem
D. Break the pipe
E. Double
F. None of the Above

12. Severe root intrusion and pipes that are structurally damaged will?

A. Exert considerable pressure
B. Become matted
C. Not be a problem
D. Break the pipe
E. Double
F. None of the Above

13. Tree roots _____sewer pipes are generally the most expensive sewer maintenance item experienced by City residents.

A. Exert considerable pressure
B. Become matted
C. Not be a problem
D. Break the pipe
E. Double
F. None of the Above

14. Roots from trees growing on private property and on parkways throughout the City are responsible for many of the _____ and damaged sewer pipes.

A. Exert considerable pressure
B. Sanitary sewer service backups
C. Wet areas
D. Stink pickles
E. Problems
F. None of the Above

15. Homeowners should be aware of the location of their sewer service and refrain from _____and hedges near the sewer lines.

A. Exertion
B. Digging
C. Observing wet areas
D. Mowing the grass
E. Swearing
F. None of the Above

16. Which of the following terms of a sanitary sewer service line as a result of damage from tree roots may be very expensive?

A. Exert considerable pressure
B. Replacement cost
C. Wet areas
D. Pipe breakage
E. Odor
F. None of the Above

17. When designing a wastewater system, the design engineer begins by first determining the _____ of sewage to be handled. This is accomplished through a careful study of the area to be served.

A. Begins by first determining
B. Types and quantities
C. Sizes, slopes, and distances
D. Acceptance of the preliminary designs
E. Amount and flavor
F. None of the Above

18. Use is greater in the summer than in the winter and greater during the morning and evening than it is in the middle of the day or at night. Therefore, the average daily flow (based on the average utilization) is multiplied by a peak flow factor?

A. UEL
B. To obtain the design flow
C. Slopes and distances
D. To obtain the maximum flow
E. LEL
F. None of the Above

19. Typical peak flow factors range from 4 to 6 for small areas down to 1.5 to 2.5 for larger areas. An allowance for unavoidable infiltration of surface and subsurface water into the lines is sometimes added to the peak flow?

A. UEL
B. Up flow
C. Slopes and distances
D. To obtain the design flow
E. LEL
F. None of the Above

20. A typical infiltration allowance is 500 gallons per inch of pipe diameter per mile of sewer per day. From the types of sewage and the estimated design flow, the engineer can then tentatively _____below grade of the piping to be used for the system.

A. Begins by first determining
B. Begins
C. Select the types, sizes, slopes, and distances
D. Accepted
E. Set
F. None of the Above

21. Which of the following terms are types of joints are used to connect cast-iron soil pipes (CISP) and fittings.

A. Speed Seal Joints
B. Mortar or Bituminous Joints
C. Compression joints
D. Lead and Oakum Joint, Compression Joint and No-Hub Joints
E. No hub
F. None of the Above

22. Which of the following terms is an assembly tool is used to force the spigot end of the pipe or fitting into the lubricated gasket inside the hub?

A. Speed Seal Joints
B. Mortar or Bituminous Joints
C. Pressure joints
D. Compression Joint
E. No hub
F. None of the Above

23. The use of _____ in joining vitrified clay pipe has become widespread.

A. Speed Seal Joints
B. Mortar or Bituminous Joints
C. Compression joints
D. Lead and Oakum Joints
E. Welding
F. None of the Above

24. These _____are also used to clean lift station wet wells, stormwater catch basins and to perform excavations to locate broken water or sewer lines. It reduces repair times and costs by over 50%.

A. Televising Vans
B. Sewer vacuum trucks
C. Versatile vehicles
D. Laser tools
E. Super robots
F. None of the Above

25. Efficient collection system maintenance and repairs are unlikely if _____ is not adequate.

A. Mapping
B. Updating maps
C. Collection system maps
D. Sewer line maps
E. GIS
F. None of the Above

26. Which of the following terms should have a numbering system which uniquely identifies all manholes and sewer cleanouts?

A. Maps
B. Stone lines
C. Collection details
D. Sewer line maps
E. The City
F. None of the Above

27. Which of the following terms should also indicate the property served and reference its cleanout?

A. Maps
B. Stone lines
C. Collection details
D. Sewer line maps
E. The City
F. None of the Above

28. Which of the following terms should indicate the diameter, the length between the centers of manholes, and the slope or direction of flow?

A. Mapping
B. Stone lines
C. Collection details
D. Sewer line maps
E. The City
F. None of the Above

29. Maps may come in different sizes and scales to be used for different purposes. Detailed local maps may be used by maintenance or repair crews to perform the duties. However, these detailed _____should be keyed to one overall map that shows the entire system.

A. Mapping
B. Satellites
C. Instructions
D. As-builts
E. Records
F. None of the Above

30. GIS is a _____ capable of combining mapping with detailed information about the physical structures within the collection system.

A. Mapping term
B. Robot
C. Laser
D. Computerized mapping program
E. Computerized robot laser system
F. None of the Above

**Basic Onsite Treatment Processes**

31. Which of the following terms and clustered wastewater systems are designed to accomplish the same thing—the treatment of wastewater—but how this is accomplished is based on the type of treatment technology used.

A. Individual
B. Septic tank effluent filters
C. Secondary effluent
D. Enhanced organic matter removal
E. Phosphorus precipitation
F. None of the Above

**Primary Treatment**

32. Physical treatment processes involving capture of solids and fats/oils/grease in an enclosed vessel, typically by settling and flotation, such as provided in a septic tank or?

A. Septic tank
B. Tertiary effluent
C. Grease interceptor tank
D. Combining primary and secondary treatment
E. An aerated vessel or chamber
F. None of the Above

33. This process also includes trapping of solids via septic tank effluent filters or screens prior to discharge of the?

A. Tank effluent
B. Septic tank effluent filters
C. Secondary effluent
D. Enhanced organic matter removal
E. Phosphorus precipitation
F. None of the Above

**Secondary Treatment**

34. Which of the following terms designed to remove organic matter, mostly through digestion and decomposition, often aided by introduction of or exposure to atmospheric oxygen?

A. Septic tank
B. Tertiary effluent
C. Conventional systems
D. Combining primary and secondary treatment
E. Biological and chemical processes
F. None of the Above

35. A typical standard for _____ is biochemical oxygen demand (BOD) and total suspended solids (TSS) concentrations less than or equal to 20 mg/L each on a 30-day average basis.

A. Clustered wastewater
B. Septic tank effluent filters
C. Secondary effluent
D. Enhanced organic matter removal
E. Phosphorus precipitation
F. None of the Above

**Conventional Systems**

36. Which of the following terms are the most commonly used wastewater treatment technologies, combining primary and secondary treatment?

A. Septic tank
B. Tertiary effluent
C. Conventional systems
D. Conventional treatment systems
E. An aerated vessel or chamber
F. None of the Above

37. These systems are the least expensive in terms of total cost but _____(e.g., at least 24-36 inches of unsaturated soil) and maintenance to perform adequately.

A. Require specific conditions
B. Septic tank effluent filters
C. Secondary effluent
D. Enhanced organic matter removal
E. Phosphorus precipitation
F. None of the Above

38. A conventional wastewater treatment system consists of a septic tank and _____ that allows primary treatment (i.e., septic tank) effluent to infiltrate into unsaturated soil.

A. Septic tank
B. Tertiary effluent
C. Conventional systems
D. A soil absorption field
E. An aerated vessel or chamber
F. None of the Above

39. Flow through the system usually occurs _____but can be aided by a pump, if necessary, operated by a float switch or timer.

A. Clustered wastewater
B. Septic tank effluent filters
C. Secondary effluent
D. Enhanced pumping
E. Via gravity
F. None of the Above

40. Which of the following terms of effluent to the soil can be configured to optimize treatment via pressurized time-dosing of preset volumes of treated wastewater, which facilitates oxygenation of the soil matrix between doses, promotes film flow of wastewater over soil particles, and ensures a uniform and consistent application of effluent to the entire drainfield.

A. Advanced system(s)
B. Dose/rest cycle
C. Effluent
D. Advanced technologie(s)
E. Subsurface discharge
F. None of the Above

41. The laws of most states and counties prohibit the direct discharge of septic tank effluent onto the ground surface. _____must be covered by an approved NPDES permit. Individual systems require periodic pumping of the tank (e.g., every 5-7 years) and inspection of the dispersal field for signs of problems, such as wastewater surfacing, soggy soil, and odor.

A. Infiltrative surface
B. Treatment system components
C. Surface water discharges
D. Advanced treatment processes
E. Uptake of nutrients by plants
F. None of the Above

42. Which of the following terms is similar to that of primary sedimentation in larger treatment facilities, except that it is generally devoid of oxygen?

A. Septic tank
B. Tertiary effluent
C. Tank effluent
D. Combining primary and secondary treatment
E. An aerated vessel or chamber
F. None of the Above

43. Which of the following terms facilitates aerobic treatment and filtration of the remaining contaminants?

A. Infiltrative surface
B. Treatment system components
C. High organic strength
D. Advanced treatment processes
E. Soil absorption system
F. None of the Above

44. There are also many advanced technologies that have been developed for situations where _____ are not appropriate.

A. Advanced system(s)
B. Dose/rest cycle
C. Effluent
D. Conventional systems
E. State or local requirement(s)
F. None of the Above

**Advanced Systems**

45. Treatment system components designed to pretreat septic tank effluent before discharge to the soil dispersal field are often called?

A. Infiltrative surface
B. Treatment system components
C. High organic strength
D. Advanced treatment processes
E. Alternative, enhanced, or advanced systems
F. None of the Above

46. Advanced systems can be designed and built on-site or can consist of prefabricated units designed to overcome some site and soil limitations including: When the aerated (unsaturated) soil depth below the infiltrative surface in the drainfield is less than the minimum required, advanced treatment processes or components (e.g., fixed film treatment units) can be added to increase?

A. Infiltrative surface
B. Treatment system components
C. High organic strength
D. Pollutant removal prior to soil discharge
E. Uptake of nutrients by plants
F. None of the Above

47. In environmentally sensitive areas, advanced systems can be used to meet effluent standards for_____, bacteria, nitrogen, and phosphorus.

A. Advanced system(s)
B. Oxygen-demanding wastes
C. Effluent
D. Advanced technologie(s)
E. State or local requirement(s)
F. None of the Above

48. If a soil dispersal area malfunctions hydraulically due to a buildup of the biomat (inorganic, organic, and/or bacterial slime) at the infiltrative surface, it may be restored, and treatment may be enhanced, by improving _____through timed dosing of septic tank effluent to the dispersal field.

A. Infiltrative surface
B. Soil oxidation
C. High organic strength
D. Advanced treatment processes
E. Uptake of nutrients by plants
F. None of the Above

49. The dose/rest cycle allows the soil to drain between doses, improving?

A. Advanced system(s)
B. Soil oxygen transfer
C. Effluent
D. Advanced technologie(s)
E. State or local requirement(s)
F. None of the Above

(s) means answer may be singular or plural.

50. Wastewater with high organic strength (e.g., from a restaurant) can employ advanced treatment units/processes to improve aeration, _____, and treatment of organic wastes.

A. Infiltrative surface
B. Treatment system components
C. Biological decomposition
D. Advanced treatment processes
E. Uptake of nutrients by plants
F. None of the Above

**Onsite Introduction**

51. Onsite sewage treatment systems provide septic system owners with best management practices to keep their _____ functioning properly.

A. Onsite systems
B. Wastewater collection
C. Wastewater
D. Treatment system
E. Septic systems
F. None of the Above

52. These practices are really about recycling water: _____and returning safe water to the water cycle.

A. Onsite systems
B. Treatment options
C. Septic system maintenance
D. Full spectrum of treatment facilities
E. Cleaning wastewater
F. None of the Above

53. If a septic system is not functioning properly, clean water is not returned to our?

A. Onsite systems
B. Wastewater collection
C. Groundwater systems
D. Treatment system
E. Septic system
F. None of the Above

54. The high cost of _____and the advances made in individual and cluster (decentralized) system technologies have expanded the array of available treatment options and supported development of a more tailored approach to wastewater management services.

A. Onsite systems
B. Treatment options
C. Septic system maintenance
D. Full spectrum of treatment facilities
E. Centralized wastewater treatment plants
F. None of the Above

55. Today, wastewater collection and treatment can be closely matched to the types and quantities of _____generated through a “just in time” modular approach financed via a “user pays” cost structure.

A. Onsite systems
B. Wastewater collection
C. Sewage
D. Treatment system
E. Septic system
F. None of the Above

56. Options now exist that span the full spectrum of treatment facilities, from large centralized plants, to large and_____, to individual treatment systems providing conventional or enhanced service.

A. Onsite systems
B. Treatment options
C. Septic system maintenance
D. Small soil-discharging clustered facilities
E. Small community cluster system
F. None of the Above

**Key Considerations**

57. Wastewater flow and strength, site and_____, and performance requirements for the dispersed or discharged effluent are all key considerations in deciding what type of wastewater collection and treatment system is needed and how it should be designed.

A. Onsite systems
B. Wastewater collection
C. Local infrastructure conditions
D. Treatment system
E. Septic system
F. None of the Above

58. _____ treat wastewater and disperse it on the property where it is generated. When functioning properly, onsite systems prevent human contact with sewage, and prevent contamination of surface and groundwater.

A. Onsite systems
B. Treatment options
C. Septic system maintenance
D. Full spectrum of treatment facilities
E. Small community cluster system
F. None of the Above

59. Factors that affect the proper functioning of _____ include the site and soil conditions, design, installation, operation and maintenance.

A. Onsite systems
B. Wastewater collection
C. Wastewater
D. Treatment system
E. Septic system
F. None of the Above

**Septic System Failures**

60. _____are effective, cost efficient, and easy to maintain. However, failing systems are a major source of groundwater pollution, cause waterborne illnesses, such as dysentery and hepatitis, and are expensive for homeowners to replace.

A. Onsite systems
B. Wastewater collection
C. Wastewater
D. Treatment system
E. Septic systems
F. None of the Above

61. There are many different types of _____and treatment technologies. Systems can treat individual homes, clusters of buildings, or whole subdivisions and/or commercial establishments.

A. Onsite systems
B. Treatment options
C. Septic system maintenance
D. Wastewater collection
E. Cluster systems
F. None of the Above

62. _____are a major source of groundwater pollution. Layers of soil act as a natural filter, removing microbes and other particles as water seeps through. Improperly treated water can carry bacteria and viruses that can cause gastroenteritis, fever, common cold, respiratory infections and hepatitis.

A. Onsite systems
B. Wastewater collection
C. Wastewater
D. Septic system failures
E. Septic system
F. None of the Above

63. _____is like automobile maintenance; a little effort on a regular basis can save you a lot of money and significantly prolong the life of the system.

A. Onsite systems
B. Treatment options
C. Septic system maintenance
D. Septic system maintenance
E. Small community cluster system
F. None of the Above

64. _____for clustered facilities can work by gravity or operate via vacuum or pressure pump.

A. Onsite systems
B. Wastewater collection
C. Collection systems
D. Treatment system
E. Septic system
F. None of the Above

65. Wastewater is typically treated through primary and _____(and sometimes tertiary or advanced "polishing" procedures) and can be disinfected prior to discharge.

A. Onsite systems
B. Wastewater collection
C. Wastewater
D. Treatment system
E. Secondary processes
F. None of the Above

**Elevated (Mound or At-Grade) Systems**

66. This system type includes a septic tank or prefabricated treatment unit to provide primary (and sometimes secondary) treatment prior to discharging the?

A. ATU(s)
B. Effluent
C. Septic tank effluent
D. Effluent to a modified drainfield
E. Enhance biochemical treatment processes
F. None of the Above

67. _____or treatment unit to a pump tank and periodically dosed to the modified dispersal area, which is typically constructed of a layer of clean, uniformly graded sand on a plowed or roughened natural soil surface.

A. Submerged-flow wetlands
B. Colloidal particles
C. Media filters
D. Effluent flows from the tank
E. Aerobic treatment
F. None of the Above

68. The tank effluent is uniformly dosed onto the _____within the mound, which may be 1-4 ft. above the natural grade.

A. Infiltrative surface
B. Effluent
C. Septic tank effluent
D. An oxygen rich environment
E. Enhance biochemical treatment processes
F. None of the Above

69. Sand within the mound compensates for _____below the natural grade.

A. Submerged-flow wetlands
B. Colloidal particles
C. Media filters
D. Microbial activity
E. Shallow unsaturated soil conditions
F. None of the Above

70. Mound systems are appropriate for areas with a high water table or shallow, fractured bedrock. After treatment through the sand, the effluent percolates directly into the soil under the mound. _____feature effluent dispersal piping placed at natural grade, with the mound consisting mostly of cover soil for the piping.

A. ATU(s)
B. At-grade systems
C. Septic tank effluent
D. An oxygen rich environment
E. Enhance biochemical treatment processes
F. None of the Above

71. The mound should have inspection ports, so wastewater distribution across the infiltration area can be monitored. _____should have cleanouts so they can be flushed at least twice a year.

A. Distribution lines
B. Colloidal particles
C. Media filters
D. Microbial activity
E. Aerobic treatment
F. None of the Above

**Aerobic Treatment Units**

72. Aerobic treatment units (_____) consist of prefabricated units featuring consecutive or compartmentalized tanks, pumps, blowers, and internal piping, and are designed to treat wastewater via suspended or attached growth decomposition in an oxygen rich environment.

A. ATU(s)
B. Effluent
C. Septic tank effluent
D. An oxygen rich environment
E. Enhance biochemical treatment processes
F. None of the Above

73. When oxygen is supplied, the rate of microbial activity and related treatment processes accelerates. Three processes are involved in most aerobic systems: physical separation (mostly settling), aerobic treatment (aeration and mixing), and _____(final settling).

A. Submerged-flow wetlands
B. Colloidal particles
C. Media filters
D. Microbial activity
E. Clarification
F. None of the Above

74. These processes may be in separate tanks, compartments of a single tank, or other configurations. _____ vary in design and can consist of simple activated sludge variations, sequencing batch reactors, trickling filters, and combinations of two or more of these unit processes.

A. ATU(s)
B. Effluent
C. Septic tank effluent
D. An oxygen rich environment
E. Enhance biochemical treatment processes
F. None of the Above

75. _____require permanent, regularly scheduled inspections and maintenance attention. The National Sanitation Foundation has a certification program for aerobic treatment units based on testing over a range of operating conditions.

A. Submerged-flow wetlands
B. ATU systems
C. Media filters
D. Microbial activity
E. Aerobic treatment
F. None of the Above

**Media Filters**

76. Septic tank effluent can be applied to a layer of sand or gravel, a tank containing peat or plastic media, or compartments of hanging textile or other material to improve oxygen access and _____.

A. ATU(s)
B. Effluent
C. Septic tank effluent
D. An oxygen rich environment
E. Enhance biochemical treatment processes
F. None of the Above

77. Effluent that percolates through the _____is discharged to the soil dispersal field.

A. ATU(s)
B. Effluent
C. Septic tank effluent
D. Media bed
E. Enhance biochemical treatment processes
F. None of the Above

78. A number of these so-called "_____" are available to treat wastewater. Sand is the most commonly used media, but clean gravel, crushed glass, textile strips, peat, and tire crumbs are also used, depending on site restrictions and state/local regulations.
A. Submerged-flow wetlands
B. Colloidal particles
C. Media filters
D. Microbial activity
E. Aerobic treatment
F. None of the Above

79. In single-pass or _____design, septic tank effluent is pump-dosed uniformly onto the media at regular intervals 12 to 48 times per day.
A. ATU(s)
B. Effluent
C. Septic tank effluent
D. An oxygen rich environment
E. Intermittent filter (ISF)
F. None of the Above

80. As the effluent trickles through the media, suspended and some colloidal particles are filtered, and bacteria growing on the media aerobically treat_____.
A. Submerged-flow wetlands
B. Colloidal particles
C. Organic wastewater
D. Microbial activity
E. Aerobic treatment
F. None of the Above

**Submerged-Flow Wetland or Vegetative Submerged-Bed (VSB**)

81. Vegetative submerged beds are also called submerged-flow wetlands. This system type treats _____through a lined bed of unmulched gravel planted with wetland species.
A. Septic tank effluent by horizontal flow
B. Colloidal particles
C. Media filters
D. Microbial activity
E. Aerobic treatment
F. None of the Above

82. The plants fill in spaces between the rocks and provide aesthetic appeal. Wetland systems are extremely passive and require little management in producing a _____(typically BOD and TSS of less than 30 mg/L).
A. ATU(s)
B. Effluent
C. Septic tank effluent
D. Good quality effluent
E. Enhance biochemical treatment processes
F. None of the Above

83. The _____in the system is mostly anaerobic, with some aerobic microsites on plant roots and near surface areas. Effluent is further treated when discharged to unsaturated soil following flow through the wetland cell(s).
A. Treatment environment
B. Colloidal particles
C. Media filters
D. Microbial activity
E. Aerobic treatment
F. None of the Above

**Cluster System Applications**

84. A _____ is designed to collect wastewater from two to several hundred homes.
A. Septic tanks
B. Advanced systems
C. Wastewater
D. Performance-based management approaches
E. Cluster system
F. None of the Above

85. The Cluster Wastewater Systems Planning Handbook lists a number of potential wastewater collection technologies for small and large cluster systems, including: grinder pump systems, which transport all sewage; effluent sewers, such as the septic tank effluent pump (_____); the septic tank effluent gravity (STEG) collection system; and vacuum systems.

A. Septic tanks
B. Advanced systems
C. STEP
D. Performance-based management approaches
E. Clustered wastewater treatment systems
F. None of the Above

86. Treatment facilities serving clustered buildings may range from a communal septic tank and soil dispersal system to a?

A. Protocol
B. Management services
C. System components
D. Wastewater system
E. More advanced treatment system
F. None of the Above

87. Advanced systems may facilitate local reuse of the _____for toilet flushing, irrigation, industrial purposes, or to replenish aquifers.

A. Septic tanks
B. Advanced systems
C. Treated effluent
D. Performance-based management approaches
E. Clustered wastewater treatment systems
F. None of the Above

88. _____must be managed by an entity with the technical, financial, and managerial capacity to effectively and efficiently handle operation, maintenance, customer billing, repair/replacement, and other tasks.

A. Protocol
B. Management services
C. System components
D. Wastewater system
E. Cluster systems
F. None of the Above

**System Design Standards and Practices**

89. Nearly all states and some local governments have regulatory or guidance documents detailing acceptable design approaches for individual and?

A. Septic tanks
B. Advanced systems
C. STEG
D. Performance-based management approaches
E. Clustered wastewater treatment systems
F. None of the Above

**Performance-Based Standards**

90. Most state and local system design codes traditionally have been based on prescriptive approaches that_____, construction methods, and acceptable tank types and other components.

A. Protocol
B. Management services
C. System components
D. Specify minimum site requirements
E. Installation and operation permits
F. None of the Above

91. Performance-based management approaches have been proposed as a substitute for _____ or system design, siting, and operation.

A. Septic tanks
B. Advanced systems
C. STEG
D. Prescriptive requirements
E. Clustered wastewater treatment systems
F. None of the Above

**System Design Considerations**

92. One of the more common reasons why some individual or cluster systems do not perform properly is _____.

A. Protocol
B. Management services
C. System components
D. Inappropriate system/technology selection
E. Installation and operation permits
F. None of the Above

93. A wastewater system should be matched to the volume and pollutant profile of wastewater, and the site, soil, and groundwater/surface water conditions must be known in detail in order to develop?

A. Protocol
B. Management services
C. System components
D. Wastewater system
E. An appropriate system design
F. None of the Above

94. State and local wastewater system permitting programs are expanding the options available for providing_____, especially for sites with limiting soil conditions and those with threatened or impaired water resources nearby.

A. Septic tanks
B. Treatment services
C. Wastewater
D. Performance-based management approaches
E. Clustered wastewater treatment systems
F. None of the Above

95. The protocol should include a pre-design meeting between the_____, the management entity, the designer, and the owner of the property.

A. Permitting agency
B. Management services
C. System components
D. Wastewater system
E. Installation and operation permits
F. None of the Above

96. All of these parties have a stake in the performance of the system, and such a meeting can assist in identifying?

A. Septic tanks
B. Advanced systems
C. Wastewater
D. Performance-based management approaches
E. Potential problems and solutions
F. None of the Above

(s) means answer may be singular or plural.

97. The protocol should be as complete as possible and should feature a rational, defensible evaluation procedure for proposed designs and?

A. Septic tanks
B. Advanced systems
C. Materials specifications
D. Performance-based management approaches
E. Clustered wastewater treatment systems
F. None of the Above

**Management Considerations**

98. All wastewater treatment systems require management. Management services can be provided by an outside contractor or responsible?

A. Protocol
B. Management services
C. System components
D. Wastewater system
E. Management entity
F. None of the Above

99. In general, individual gravity flow systems with septic tanks and subsurface drainfields require less_____; clustered facilities with collection system pumps, mechanized treatment units, and time or demand-dosed infiltration areas require much more.
A. Septic tanks D. Performance-based management approaches
B. Advanced systems E. Management attention
C. Wastewater F. None of the Above

**Permitting and Approval Process**
100. State and local governments vary considerably in their approach to _____ and components and issuing installation and operation permits.
A. Protocol D. Approving system types
B. Management services E. Installation and operation permits
C. System components F. None of the Above

101. Consultation with state and local regulatory agencies is required in all cases to ensure that _____ are met.
A. Minimum requirements D. Various treatment technologies
B. Septic system(s) E. Complex alternative systems
C. Environmental agency F. None of the Above

102. It is important that the _____include system drawings, narratives, forms, calculations, catalog cuts, photos, and other data, including detailed equipment and installation specifications to make siting the system components easier.
A. Septic system failures D. Household wastewater
B. Application E. System maintenance contracts
C. Previous certifications F. None of the Above

103. If the site has been developed, all structures, utilities, and ingress and _____ should be identified.
A. Egress pathways D. Various treatment technologies
B. Septic system(s) E. Complex alternative systems
C. Environmental agency F. None of the Above

104. The source of potable water and _____ should be identified as well. If there is an existing wastewater treatment system, the condition of all components, including the reserve area, should be recorded and minimum setbacks met.
A. Septic system failures D. Household wastewater
B. Potable water E. System maintenance contracts
C. Distribution lines F. None of the Above

**Regular Maintenance**
105. _____ is required for all systems. However, it is especially important for more complex alternative systems, especially those that use pumps, controls, timers, and pressure distribution.
A. Regular maintenance D. Various treatment technologies
B. Septic system(s) E. Complex alternative systems
C. Environmental agency F. None of the Above

106. Verification of system maintenance contracts, operator expertise, and reporting requirements for system maintenance such as tank pumping and repairs should be included in the?

A. Septic system failures
B. Potable water
C. Approval process
D. Household wastewater
E. System maintenance contracts
F. None of the Above

**Check the Record**

107. Unlike the other parts of a house, the septic system is difficult to see! However, you can check the records on a _____by contacting your local or state sewer or septic agency or environmental agency.

A. Graywater
B. Home's septic system
C. Environmental agency
D. Various treatment technologies
E. Complex alternative systems
F. None of the Above

**These records should reflect:**

108. The age of the system. If properly designed, installed, and maintained, a septic system can effectively treat household wastewater for up to 20 years or more. Look to see if the house has a system that is_____.

A. Septic system failures
B. Potable water
C. Previous certifications
D. Household wastewater
E. Near the end of its life-span
F. None of the Above

109. The size of the system. Size is important because graywater (laundry water, sink water) and_____ (toilet water) need to be retained in the tank for at least a day or more to allow solids to separate from the liquids and begin breaking down.

A. Graywater
B. Septic system(s)
C. Blackwater
D. Various treatment technologies
E. Complex alternative systems
F. None of the Above

110. If wastewater is pushed through without proper settling, the solids can clog the drainfield, stressing and_____.

A. Septic system failures
B. Potable water
C. Previous certifications
D. Household wastewater
E. Possibly damaging the system
F. None of the Above

111. Adequate tank size is 1,000 gallons for a home with up to _____ plus 250 gallons for each additional bedroom in the home.

A. Graywater
B. Septic system(s)
C. Environmental agency
D. Various treatment technologies
E. Complex alternative systems
F. None of the Above

112. The location of the system. Knowing where the tank and drainfield are will help you visually check the area for obvious signs of failure. In addition, poorly sited drainfields can result in _____.

A. Septic system failures
B. Potable water
C. Previous certifications
D. Household wastewater
E. System maintenance contracts
F. None of the Above

113. Location of the system in relation to wells, other septic systems, slope of the land, natural drainage patterns, underlying soil conditions, and lot boundaries may indicate potential problems with the _____ and should be reviewed by you or a professional.

A. Graywater
B. Septic system(s)
C. Environmental agency
D. Various treatment technologies
E. Complex alternative systems
F. None of the Above

114. Keep an eye out for previous certifications from your state sewer or septic agency or environmental agency; these should indicate that the system is in compliance with _____ , or will indicate any waivers that were granted and why.

A. Septic system failures
B. Potable water
C. Previous certifications
D. Household wastewater
E. Good septic system standards
F. None of the Above

**Testing and Certification**

115. Approving the use of _____ is under the purview of state and local governments. Some states individually test and validate treatment technologies and maintain a list of those approved in their state.

A. Graywater
B. Septic system(s)
C. Environmental agency
D. Various treatment technologies
E. Complex alternative systems
F. None of the Above

**Certification of System Designers**

116. Most state wastewater management programs require an engineer to design a wastewater system or to certify that it meets the _____ once installed.

A. Septic system failures
B. Potable water
C. Previous certifications
D. Household wastewater
E. System maintenance contracts
F. None of the Above

**Construction Section**

117. Appropriate wastewater treatment system construction and/or installation practices are critical to the performance of_____.

A. Individual and clustered systems
B. Septic system(s)
C. Environmental agency
D. Various treatment technologies
E. Complex alternative systems
F. None of the Above

118. Construction activities can affect short-term and long-term system performance by failing to adhere to material specifications, neglecting proper pipe slope requirements, inadvertently switching_____, or failing to protect infiltration area soils from equipment compaction.

A. Control wiring
B. Tank inlet/outlet orientation
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

119. _____, a key component of good system installation practice, should be carefully considered during site preparation, construction equipment selection and use, and before and during construction.

A. Building sewer line elevation
B. Distribution pipe effluent
C. Infiltration area protection
D. Surface, install outlet filters/screens
E. Site preparation
F. None of the Above

120. The development of a _____that includes drawings, narratives, forms, calculations, photos, and other data, including detailed equipment and installation specifications, will help ensure a successful outcome. This information must be assembled into a cohesive document to allow the proper installation of the design without the need for any assumptions.

A. Control wiring
B. Final design plan
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

**Construction Phases**

121. Construction/installation management of a wastewater system can be divided into the following four basic phases:

**Preparation Phase**

Conduct a _____at the site to identify site component locations, verify setbacks and other site conditions, check surface elevations, and identify potential problems or safety concerns (e.g., overhead electric lines).

A. Pre-construction conference
B. Secure tank covers
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

**Project Execution**

122. Verify designed treatment system_____ , such as tank type, size, and material; piping; and gravel (if used) that is free of fines.

A. Control wiring
B. Secure tank covers
C. Gravity flow pipes
D. Treatment system components
E. Components and materials
F. None of the Above

123. Excavate areas for_____ , the tank(s), secondary treatment units, and infiltration or soil dispersal components according to designated depths and required pipe slopes.

A. Building sewer line elevation
B. Distribution pipe effluent
C. Secondary treatment units
D. Conveyance piping
E. Site preparation
F. None of the Above

124. Use caution to avoid contact with _____ and excavation cave-ins!

A. Control wiring
B. Secure tank covers
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

125. For_____, all elevations are tied to the building sewer line elevation. Ensure that the proper fall is available from the building to the tank, then to the distribution box(es), and to the infiltration area.

A. Building sewer line elevation
B. Distribution pipe effluent
C. Gravity flow systems
D. Surface, install outlet filters/screens
E. Site preparation
F. None of the Above

126. Ensure that the _____is on solid tamped ground, installed level and at the proper elevation, and that inlet/outlet orientation is correct. Secure tank covers after hours to prevent accidents. Backfill tanks as soon as possible.

A. Tank
B. Secure tank covers
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

127. Follow manufacturer's recommendations for installing tanks. _____ usually require special installation techniques (e.g., anchoring, backfilling with sand, tamping backfill in lifts, filling tank with water as its backfilled, etc.)

A. Building sewer line elevation
B. Distribution pipe effluent
C. Secondary treatment units
D. Plastic and fiberglass tanks
E. Site preparation
F. None of the Above

128. Use proper _____ for plastic piping. Attach electric lines and control wiring in accordance with design plans as appropriate.

A. Control wiring
B. Secure tank covers
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

129. Ensure that pumps are plumbed, wired, and installed to allow easy inspection, access, and removal (e.g., use quick-connect union and _____ between pump and uphill dispersal piping).

A. Building sewer line elevation
B. Distribution pipe effluent
C. Secondary treatment units
D. Surface, install outlet filters/screens
E. Backflow prevention valve
F. None of the Above

130. Ensure that trench bottoms for _____ are tamped and stable and free of rocks and roots, and that backfilled areas around pipes are tamped to prevent dips and rises that could impede flow.

A. Control wiring
B. Secure tank covers
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

131. Ensure that distribution pipe effluent dispersal holes go on the?

A. Building sewer line elevation
B. Distribution pipe effluent
C. Secondary treatment units
D. Surface, install outlet filters/screens
E. Site preparation
F. None of the Above

132. Extend _____below tank access ports, but do not block ports to ensure access for pumping and inspection. Use rubber boots or grout to completely seal around pipes and risers.

A. Inlet and outlet piping stubs
B. Secure tank covers
C. Gravity flow pipes
D. Treatment system components
E. Outlet piping stubs
F. None of the Above

133. Install _____to the surface, install outlet filters/screens, and complete installation of pumps, wiring, control panels, and other components.

A. Building sewer line elevation
B. Distribution pipe effluent
C. Secondary treatment units
D. Surface, install outlet filters/screens
E. Access port risers
F. None of the Above

134. Install cleanouts and inspection ports in _____(near building sewer, D-box, etc.); this aids in operation/maintenance later on.
A. Key locations D. Treatment system components
B. Secure tank covers E. Outlet piping stubs
C. Gravity flow pipes F. None of the Above

135. Conduct _____ of the system after installation, checking flows, pump discharge (if used), operation of float switches (if used), and controls.
A. Building sewer line elevation D. Surface, install outlet filters/screens
B. Distribution pipe effluent E. Site preparation
C. Secondary treatment units F. None of the Above

136. Verify _____ finished conditions (e.g., tank type/capacity, riser covers, elevations, location of key components, drainage, landscaping)
A. Control wiring D. Treatment system components
B. Secure tank covers E. Outlet piping stubs
C. Gravity flow pipes F. None of the Above

**Final Inspection**
137. Observe system components prior to_____; determine consistency between design and actual installation; report inconsistencies
A. Organic layer D. Cover-up
B. Construction E. Trench cavity
C. Site access points F. None of the Above

**Site Preparation and Excavation Practices**
138. Overhead power lines, steep slopes, and excavations at the installation site can all present serious safety hazards. A brief preconstruction meeting can ensure that _____and practices to eliminate, minimize, or respond to them are identified.
A. Safety hazards D. Construction practices
B. Site excavation E. Long-term system performance
C. Infiltration area F. None of the Above

139. Site preparation requires a number of activities including clearing and surface preparation for filling. Use of lightweight tracked equipment will minimize_____.
A. Organic layer D. Infiltration trenches
B. Soil compaction E. Trench cavity
C. Site access points F. None of the Above

140. Soil moisture should be determined to ensure that it is _____, and care should be taken to avoid soil disturbance as much as possible.
A. Soil moisture D. Construction practices
B. Site excavation E. Long-term system performance
C. Infiltration area F. None of the Above

141. To avoid potential _____during construction, the soil below the proposed infiltration surface elevation must be below its plastic limit during construction (i.e., it must lack the moisture required to make it moldable into stable shapes). This should be tested before excavation begins.

A. Soil damage
B. Construction
C. Site access points
D. Infiltration trenches
E. Trench cavity
F. None of the Above

142. Site excavation is conducted only when the infiltration surface can be covered the same day to avoid loss of soil permeability from_____.

A. Soil moisture
B. Site excavation
C. Wind-blown silt or raindrop impact
D. Construction practices
E. Long-term system performance
F. None of the Above

143. _____should be limited to mowing and raking with minimal disturbance to the surface. If trees are cut, they should be removed without heavy machinery, and, if necessary, stumps ground out.

A. Organic layer
B. Construction
C. Clearing
D. Infiltration trenches
E. Trench cavity
F. None of the Above

144. Grubbing of the site (mechanically raking away roots) should be avoided. If the site is to be filled, the surface should be moldboard- or chisel-plowed parallel to the contour (usually to a depth of seven to ten inches) when the soil is sufficiently dry to ensure_____.

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Maximum vertical permeability
E. Long-term system performance
F. None of the Above

145. The _____ should not be removed. Scarifying the surface with the teeth of a backhoe bucket is not sufficient. All efforts should be made to avoid any disturbance to the exposed infiltration surface.

A. Organic layer
B. Construction
C. Site access points
D. Infiltration trenches
E. Trench cavity
F. None of the Above

146. Another solution is to use light-weight gravel-less systems, which reduce the damage and speed the construction process. _____ and areas for traffic lanes, material stockpiling, and equipment parking should be designated on the drawings for the contractor.

A. Organic layer
B. Construction
C. Site access points
D. Infiltration trenches
E. Trench cavity
F. None of the Above

147. Heavy equipment should be diverted from the _____to avoid compaction and damage to the area.

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Construction practices
E. Absorption field
F. None of the Above

148. Flagging off the _____ as early as possible is critical to ensure long-term function of the system.

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Construction practices
E. Long-term system performance
F. None of the Above

**Field Construction Practices**

149. Changes in construction practices over the past 25 years have led to improvements in the performance of_____. For example, construction materials used in plumbing, wastewater lines, and lateral fields should meet American Society for Testing and Materials standards.

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Individual wastewater systems
E. Long-term system performance
F. None of the Above

150. Avoid work during wet conditions. _____in infiltration trenches should be scarified and the surface gently raked prior to installing the gravel or gravel-less piping/chambers.

A. Organic layer
B. Construction
C. Site access points
D. Smeared soil surfaces
E. Trench cavity
F. None of the Above

151. If gravel or crushed rock is to be used for the system medium, the rock should be placed in the trench by using the _____to long-term system performance.

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Construction practices
E. Backhoe bucket
F. None of the Above

152. If soil compaction occurs during drainfield installation, it might be possible to restore the area, but only by removing the?

A. Soil moisture
B. Compacted layer
C. Infiltration area
D. Construction practices
E. Long-term system performance
F. None of the Above

153. It might be necessary to remove as much as four inches of soil to regain the _____and permeability.

A. Natural soil porosity
B. Construction
C. Site access points
D. Infiltration trenches
E. Trench cavity
F. None of the Above

154. Consequences of the removal of this amount of soil over the entire infiltration surface can be significant. It will reduce the separation distance to the restrictive horizon and could place the infiltration surface in?

A. Soil moisture
B. Site excavation
C. Infiltration area
D. An unacceptable soil horizon
E. Long-term system performance
F. None of the Above

155. For gravel filled trenches, the _____should be left rough and covered with six inches of clean rock.

A. Trench bottom
B. Construction
C. Site access points
D. Infiltration trenches
E. Trench cavity
F. None of the Above

156. Distribution pipes should be carefully placed over the _____, leveled, and bedded in on the sides.

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Construction practices
E. Long-term system performance
F. None of the Above

157. After the rock and pipes have been placed in the trench, the filter fabric should be placed over the top of the rock to prevent soil from moving into the rock. The _____should be carefully crowned to fill the trench cavity at a height to allow for settling.

A. Soil backfill
B. Construction
C. Site access points
D. Infiltration trenches
E. Trench cavity
F. None of the Above

158. Before leaving the site, the area around the site should be graded to divert surface runoff from the area. All _____over the system should be eliminated, and the area should be seeded and mulched.

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Construction practices
E. Soil depressions
F. None of the Above

159. Post construction activities include accurate documentation of all of the system components and the_____.

A. System location
B. Construction
C. Site access points
D. Infiltration trenches
E. Trench cavity
F. None of the Above

160. Flag off the infiltration area to keep construction and?

A. Soil moisture
B. Site excavation
C. Infiltration area
D. Construction practices
E. Long-term system performance
F. None of the Above

**Conventional Systems**

161. Conventional “septic” systems are the most widely used_____. These systems are simple to operate and, when properly designed, constructed, and maintained, do an excellent job of removing pollutants from wastewater.

A. Clustered system(s)
B. O&M requirement(s)
C. Conventional system
D. Advanced or innovative technologies
E. Wastewater treatment system
F. None of the Above

162. In most communities, the _____ is the responsibility of the homeowner.

A. Alternative technologies
B. Treatment performance
C. Cluster systems
D. Operation and maintenance of conventional systems
E. Wastewater treatment and dispersal/reuse technologies
F. None of the Above

163. _____ require periodic pumping to remove the solids, fats, oils, and grease that accumulate in the septic tank.
A. Clustered system(s) D. Advanced or innovative technologies
B. O&M requirement(s) E. Pumping needs
C. Conventional systems F. None of the Above

164. When a system is poorly maintained and not pumped out on a regular basis, sludge (solid material) can build up inside the tank and may ultimately clog the_____, making the system unusable.
A. Alternative technologies D. Enhanced wastewater treatment systems
B. Treatment performance E. Wastewater treatment and dispersal/reuse technologies
C. Absorption field F. None of the Above

165. A system owner should hire an experienced (i.e., licensed or certified) service provider to inspect the system at least once a year to determine pumping needs and to clean, repair, or replace any _____ as needed (i.e., baffles, tees, effluent screens).
A. Clustered system(s) D. Advanced or innovative technologies
B. O&M requirement(s) E. Pumping needs
C. Components F. None of the Above

166. Most _____ now include risers that allow access to inspect tanks and determine pumping needs
A. Clustered system(s) D. Conventional system designs
B. O&M requirement(s) E. Pumping needs
C. Conventional system F. None of the Above

**Enhanced Treatment Systems**
167. Several wastewater _____ have proven to be effective in situations where conventional systems are not appropriate.
A. Alternative technologies D. Enhanced wastewater treatment systems
B. Treatment performance E. Wastewater treatment and dispersal/reuse technologies
C. Cluster systems F. None of the Above

**Material Replacement**
168. These systems fall into three broad categories: Technologies that replace one component of the _____ with a component manufactured from a different material.
A. Clustered system(s) D. Advanced or innovative technologies
B. O&M requirement(s) E. Pumping needs
C. Conventional system F. None of the Above

**Conventional System Modification**
169. Technologies that enhance or otherwise improve?
A. Alternative technologies D. Conventional operating or treatment performance
B. Treatment performance E. Wastewater treatment and dispersal/reuse technologies
C. Cluster systems F. None of the Above

**Enhanced Wastewater Treatment**

170. _____ that provide a higher level of treatment beyond conventional systems. Generally, these systems have mechanical or moving parts that require periodic operation and maintenance, inspections, and eventual replacement.

A. Clustered system(s)
B. O&M requirement(s)
C. Conventional system
D. Advanced or innovative technologies
E. Pumping needs
F. None of the Above

171. _____ are more complex than conventional systems and require greater oversight to keep all aspects of the treatment process in balance.

A. Alternative technologies
B. Treatment performance
C. Cluster systems
D. Enhanced wastewater treatment systems
E. Wastewater treatment and dispersal/reuse technologies
F. None of the Above

**Clustered Treatment Systems**

172. _____ can serve from two to 200 or more homes and/or commercial facilities. Also known as community systems, clustered systems are a treatment option when individual wastewater systems or centralized sewer service are not viable options.

A. Clustered system(s)
B. O&M requirement(s)
C. Conventional system
D. Advanced or innovative technologies
E. Pumping needs
F. None of the Above

173. _____ have become an attractive option for many locations, especially in areas like small lakeside communities where a higher level of treatment may be needed.

A. Alternative technologies
B. Treatment performance
C. Cluster systems
D. Enhanced wastewater treatment systems
E. Wastewater treatment and dispersal/reuse technologies
F. None of the Above

174. The operation and maintenance requirements of _____ will vary based on the size of the system, the wastewater being treated, and the types of technology used. Various technologies that can be implemented via a cluster system.

A. Clustered system(s)
B. O&M requirement(s)
C. Conventional system
D. Advanced or innovative technologies
E. Pumping needs
F. None of the Above

175. They range in scale from a _____ and soil dispersal system serving a dozen homes to a large alternative sewer system connected to a treatment plant that can treat large wastewater flows with a variety of wastewater treatment and dispersal/reuse technologies.

A. Communal septic tank
B. Treatment performance
C. Cluster systems
D. Enhanced wastewater treatment systems
E. Wastewater treatment and dispersal/reuse technologies
F. None of the Above

**Management Considerations**

176. In the past, state and local wastewater management programs rarely specified _____ for conventional or enhanced wastewater systems.

A. Clustered system(s)
B. O&M requirement(s)
C. Conventional system
D. Advanced or innovative technologies
E. Pumping needs
F. None of the Above

177. The regulation of_____, construction, and operation was considered to be satisfactory community oversight.

A. Alternative technologies
B. System design
C. Cluster systems
D. Enhanced wastewater treatment systems
E. Wastewater treatment and dispersal/reuse technologies
F. None of the Above

178. However, as more and more systems malfunction and threaten waterways and as more systems include higher maintenance electrical and mechanical components, communities are recognizing the value of?

A. Clustered system(s)
B. O&M requirement(s)
C. Conventional system
D. Advanced or innovative technologies
E. Pumping needs
F. None of the Above

179. Many are strengthening programs with a number of tools, including requirements for homeowner service contracts, routine maintenance inspections, revocable operating permits, monitoring, and enhanced reporting and _____ that support proper system performance.

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. Data management
E. Sewage management program
F. None of the Above

**Training and Certification**

180. Communities that require _____ (construction, operations, and maintenance) typically also require using only trained or certified inspectors and service providers.

A. Acceptable proof
B. Regulating agency
C. Manage systems
D. Inspections of wastewater systems
E. Annual system inspections
F. None of the Above

181. Several states have established _____ for inspectors, pumpers, haulers, and other service providers. In addition, some states and jurisdictions have created registries for certified providers to encourage the use of trained professionals.

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. Certification and licensing programs
E. Sewage management program
F. None of the Above

**Inspections and Maintenance Requirements**

182. In many communities, local health officials often have _____ to monitor systems or enter private property unless they receive a complaint or have other evidence that there may be a problem with a system.

A. Acceptable proof
B. Regulating agency
C. Manage systems
D. Enhanced wastewater technologies
E. Annual system inspections
F. None of the Above

183. To prevent widespread problems with systems, some local jurisdictions have amended their codes to include routine maintenance inspections of individual wastewater treatment systems. These programs can be administered and regulated by special entities such as sanitary, sewer, or water districts; by local health agencies; or by other organizations, such as ?

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. Town governments and homeowners' associations
E. Sewage management program
F. None of the Above

184. Enabling legislation must be passed at the state level to give these organizations the legal authority they need to?

A. Acceptable proof
B. Regulating agency
C. Manage systems
D. Enhanced wastewater technologies
E. Annual system inspections
F. None of the Above

185. Other communities and a few states have amended their _____to require a system inspection and documentation of a system's condition when property is sold or transferred.

A. Acceptable proof
B. Regulating agency
C. Wastewater codes
D. Enhanced wastewater technologies
E. Annual system inspections
F. None of the Above

**Maintenance Inspections**

186. Maintenance inspections are gaining appeal as a management tool to assess the condition of systems and determine pumping or?

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. Other O&M needs
E. Sewage management program
F. None of the Above

187. In some cases, this is a_____ , while in other cases; communities have elected to mandate pumping based on third party inspections.

A. Acceptable proof
B. Regulating agency
C. Manage systems
D. Strictly voluntary program
E. Annual system inspections
F. None of the Above

188. Following inspection, the _____ should be notified of any needed corrections and assigned a deadline to furnish acceptable proof that the corrections have been made.

A. Management tool
B. System owner
C. Operation and maintenance
D. Town governments and homeowners' associations
E. Sewage management program
F. None of the Above

189. _____ is usually a certification by the contractor listing the types and dates of corrections made and final inspection.

A. Acceptable proof
B. Regulating agency
C. Manage systems
D. Enhanced wastewater technologies
E. Annual system inspections
F. None of the Above

190. Some local agencies have adopted a _____that requires the annual inspection of systems with newly issued or modified permits and proof of septic tank pumping for all systems (old and new).

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. Town governments and homeowners' associations
E. Sewage management program
F. None of the Above

191. _____have designated certain geographical areas (such as aquifer or shoreline protection zones) as being subject to annual system inspections and/or routine tank pumping.

A. Acceptable proof
B. Regulating agency
C. Other agencies
D. Enhanced wastewater technologies
E. Annual system inspections
F. None of the Above

192. _____are usually coupled with a mandatory septic tank pumping program. The local agency notifies the system owner when pumping is due.

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. Operation and maintenance inspection programs
E. Sewage management program
F. None of the Above

193. Verification of pumping is provided to the?

A. Acceptable proof
B. Regulating agency
C. Manage systems
D. Enhanced wastewater technologies
E. Annual system inspections
F. None of the Above

194. Typical pumping requirements vary from three to five years or more based on the daily sewage flow and?

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. Individual household wastewater characteristics
E. Sewage management program
F. None of the Above

195. Alternative and enhanced wastewater technologies require additional maintenance and/or ongoing attention. In states and communities where these systems are authorized, performance inspections are mandated in the state code or in the?

A. Acceptable proof
B. Regulating agency
C. Manage systems
D. Enhanced wastewater technologies
E. System's operating permit
F. None of the Above

196. For enhanced wastewater systems, a long-term maintenance contract is highly recommended and typically required in state or local regulations, or as a provision of a?

A. Management tool
B. Acceptable proof
C. Operation and maintenance
D. System's operating permit
E. Sewage management program
F. None of the Above

**Maintenance of Systems**

197. While _____are a viable option to better manage enhanced systems, they must be supplemented with adequate reporting and tracking to monitor their use.

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Maintenance contracts
F. None of the Above

198. _____ may also require an increased frequency of inspections to determine if they are performing as required.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Enhanced systems
F. None of the Above

199. A key part of an _____ is to track the maintenance of systems. The only way to ensure that maintenance contracts are kept in effect and that systems are monitored when required is for the management entity or regulatory authority to have a structured reporting program.

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Proper maintenance
F. None of the Above

200. Service providers should report maintenance events and any lapses in maintenance contracts to the management or regulatory authority. This information should be managed in a database to monitor _____ and provide a system of accountability.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. O&M activities
E. Enhanced systems and cluster systems
F. None of the Above

201. Advances in technology via Web-based remote monitoring or _____ can also allow multiple system operating parameters (e.g., pump cycles) to be monitored from remote locations around the clock.

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Proper maintenance
F. None of the Above

**Operating Permits**

202. The _____ also require: Increased levels of management related to risk conditions associated with higher sewage treatment system density, complexity, and reliability and location of systems in areas of high risk for surface water or groundwater contamination.

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Proper maintenance
F. None of the Above

203. Recording of operating permit conditions, service contract requirements, or other _____ information on property deeds as a means to provide notification upon transfer of property.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Enhanced systems and cluster systems
F. None of the Above

204. Utilization of private sector professionals or responsible management entities, or designation of qualified agents to conduct monitoring or other?

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Proper maintenance
F. None of the Above

205. Inclusion of enhanced _____ mechanisms such as Web-based reporting, remote telemetry, and use of publicly and privately available database programs to support O&M tracking requirements. Establishment of a household sewage treatment district.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Enhanced systems and cluster systems
F. None of the Above

206. In some cases, renewable operating permits are used to ensure ongoing maintenance of a wastewater system. In areas where _____ are issued to conventional systems, the permit may specify routine septic tank pumping.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Enhanced systems and cluster systems
F. None of the Above

207. More complex (enhanced) systems, however, often include maintenance inspections, maintenance contracts, and?

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Proper maintenance
F. None of the Above

208. In the case of a _____, the operating permit may include specific standards that must be maintained along with monitoring and reporting requirements.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Enhanced systems and cluster systems
F. None of the Above

**Public and Private Management Entities**

209. Enhanced systems and _____ can pose greater risks of mechanical and performance failure than passive conventional systems.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Cluster systems
F. None of the Above

210. Special districts, water/sewer authorities, and public utilities can be an effective option for managing these?

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Proper maintenance
F. None of the Above

211. Private entities can also be authorized to own, operate, and/or maintain an?

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Enhanced systems and cluster systems
F. None of the Above

**Maintenance**

212. _____ can add years to an older system. Even well-designed and properly installed septic systems can fail earlier than expected if previous homeowners did not perform routine maintenance.

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Proper maintenance
F. None of the Above

**Permit**

213. Generally, a _____ must be obtained before starting construction or repair work. However, certain residential properties may be exempt from state permitting requirements.

A. Permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. Enhanced systems and cluster systems
F. None of the Above

214. When authority is based on a_____, regulation can be more restrictive than the state standard; check with your local authority.

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. Local ordinance
F. None of the Above

215. In most counties, the local health department issues_____. In the other counties the authority is another agency, such as a sewer district, building department, or planning and zoning department.

A. Operating permits
B. O&M management
C. Individual or cluster system
D. Performance-based system
E. OWTS construction permits
F. None of the Above

216. Several factors should be considered when choosing the type of onsite system for a site including: soil/site limitations, available space, operation and maintenance (O & M) requirements, initial costs as well as_____, landscape disturbance, and the owners' preferences and ability to manage the system.

A. O&M program
B. O&M rules
C. Compliance measures
D. O&M management responsibilities
E. O & M costs
F. None of the Above

217. Of these considerations, often the most limiting is the soil resource or site and?

A. Biological processes
B. Gravity lateral trenches
C. Soil infiltrative surface
D. Digest organic matter
E. Space limitations
F. None of the Above

218. When the soil and site are suited to a lagoon or to a _____ and conventional soil absorption system, any registered OWTS installer can assist with the permitting and can install a basic onsite system.

A. Liquid effluent
B. Safety hazard
C. Pressure manifolds
D. System components
E. Septic tank
F. None of the Above

219. When site limitations or other factors lead to_____, the installer must be registered as an advanced OWTS installer.

A. An advanced OWTS
B. Gravity lateral trenches
C. Soil infiltrative surface
D. Digest organic matter
E. A mechanical onsite treatment unit
F. None of the Above

**Basic Onsite Wastewater Treatment Systems and Components**

220. Building sewers and other sewer lines: watertight pipes, which carry waste by _____ from a building to the onsite system or carry effluent by gravity from sewage tanks to other system components.

A. Liquid effluent
B. Gravity
C. Pressure manifolds
D. System components
E. Lateral trenches
F. None of the Above

**Septic Tanks**

221. A watertight, covered container designed and constructed to receive the discharge of sewage from a building sewer. Its function is to separate solids from liquid, digest organic matter, store liquids through a period of detention and allow the _____to discharge to other components of an onsite system. Solids are stored and periodically need to be pumped out and hauled to a point for further treatment.

A. Biological processes
B. Gravity lateral trenches
C. Clarified liquids
D. Digest organic matter
E. A mechanical onsite treatment unit
F. None of the Above

**Septic/Sewage Tank Removal**

222. _____need to be properly abandoned to prevent them from becoming a safety hazard.

A. Liquid effluent
B. Unused sewage tanks
C. Pressure manifolds
D. System components
E. Lateral trenches
F. None of the Above

**Aerobic Treatment Units (ATUs)**

223. A mechanical onsite treatment unit that provides _____by mixing air (oxygen) and aerobic and facultative microbes with the wastewater in a sewage tank.

A. Biological processes
B. Gravity lateral trenches
C. Soil infiltrative surface
D. Digest organic matter
E. Secondary wastewater treatment
F. None of the Above

**Gravity Effluent Distribution Devices**

224. Divide and/or transport the liquid effluent from a septic tank or _____to absorption trenches for dispersal into the soil. These devices include distribution boxes, drop boxes, and step-downs.

A. Liquid effluent
B. ATU
C. Pressure manifolds
D. System components
E. Lateral trenches
F. None of the Above

**Gravity laterals**

225. A system of trenches excavated along ground contours used to distribute effluent by gravity flow from a septic tank or _____and apply the effluent to the soil infiltrative surface.

A. Biological processes
B. Gravity lateral trenches
C. ATU
D. Digest organic matter
E. A mechanical onsite treatment unit
F. None of the Above

226. Generally, 18-inch deep trenches are used; however, with _____can be up to 30 inches deep.

A. Liquid effluent
B. Approval trenches
C. Pressure manifolds
D. System components
E. Lateral trenches
F. None of the Above

**Gravity lateral systems include:**

227. 4-inch perforated distribution pipe in trenches filled with gravel or _____.

A. Biological processes
B. Gravity lateral trenches
C. Soil infiltrative surface
D. Digest organic matter
E. A mechanical onsite treatment unit
F. None of the Above

**Shallow Placed Gravity Laterals**

228. Lateral trenches with the _____12 to 18 inches deep in natural soil with suitable soil fill material properly installed to provide adequate cover over the system.

A. Liquid effluent
B. Trench bottom
C. Pressure manifolds
D. System components
E. Lateral trenches
F. None of the Above

**Dosed Gravity Systems**

229. Use siphons or pumps to dose into a _____or through a pressure manifold into the ends of gravity lateral trenches.

A. Biological processes
B. Gravity distribution device
C. Soil infiltrative surface
D. Digest organic matter
E. A mechanical onsite treatment unit
F. None of the Above

230. Pressure manifolds can be used to more equally divide effluent between _____or to proportion effluent to unequal length trenches; however, effluent is still moved along the length of a trench by gravity.

A. Liquid effluent
B. Gravity lateral trenches
C. Pressure manifolds
D. System components
E. Lateral trenches
F. None of the Above

**Lagoons (wastewater stabilization ponds)**

231. Sealed earthen basins, which use _____to treat wastewater.

A. Biological processes
B. Gravity lateral trenches
C. Soil infiltrative surface
D. Natural unaided biological processes
E. A mechanical onsite treatment unit
F. None of the Above

**Advanced Onsite Wastewater Treatment Systems and components include**:

**Sand filters**

232. A packed-bed filter of sand or other granular materials used to provide advanced secondary treatment of?

A. Liquid effluent
B. Septic tank effluent
C. Pressure manifolds
D. System components
E. Lateral trenches
F. None of the Above

233. Sand/media filters consist of a lined (e.g., impervious PVC liner on sand bedding) excavation or structure filled with uniform washed sand that is placed over?

A. Biological processes
B. Gravity lateral trenches
C. Soil infiltrative surface
D. An under-drain system
E. A mechanical onsite treatment unit
F. None of the Above

234. The wastewater is dosed onto the surface of the sand through a distribution network and allowed to percolate through the sand to the_____, which collects the filter effluent for further processing or discharge.

A. Dispersal component
B. Under-drain system
C. Evapotranspiration
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

**Other Media Bio-filters**

235. _____using other more porous materials, (e.g., peat, textile, or foam) to provide advanced secondary treatment of septic tank effluent.

A. Packed-bed filters
B. Sewage tank effluent
C. Microorganisms
D. A subsurface soil dispersal system
E. Bacteria and other microorganisms
F. None of the Above

**Constructed Wetlands**

236. An OWTS that incorporates _____consisting of one or more lined basins which may be filled with a medium and where wastewater undergoes some combination of physical, chemical, and/or biological treatment and evapotranspiration.

A. An aquatic treatment system
B. Limit the loading of effluent
C. Evapotranspiration
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

**Sand Mounds**

237. An above ground treatment system that incorporates at least 12 inches of clean sand above the _____ and disperses the treated wastewater into the original soil.

A. Original soil surface
B. Sewage tank effluent
C. Microorganisms
D. A subsurface soil dispersal system
E. Bacteria and other microorganisms
F. None of the Above

**Low-pressure Distribution Systems**

238. An OWTS in which pressurized small diameter distribution lines are used for equal distribution of effluent within the _____and dispersal component.

A. Dispersal component
B. Final treatment
C. Evapotranspiration
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

**Drip Irrigation Systems**

239. A subsurface soil dispersal system that distributes treated wastewater through?

A. Original soil
B. Sewage tank effluent
C. Microorganisms
D. Drip irrigations lines
E. Bacteria and other microorganisms
F. None of the Above

**Modified Shallow Placed Gravity Lateral Trenches**

240. Six to 12 inches deep in natural soil and other engineered distribution systems using?

A. Dispersal component
B. Fill soil material
C. Evapotranspiration
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

**Suitable Soil**

241. Suitable soil is an effective treatment medium for sewage tank effluent because it contains a?

A. Original soil
B. Sewage tank effluent
C. Microorganisms
D. Complex biological community
E. Bacteria and other microorganisms
F. None of the Above

242. _____can contain over one million microscopic organisms, including bacteria, protozoa, fungi, molds, and other creatures.

A. Dispersal component
B. Limit the loading of effluent
C. One tablespoon of soil
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

243. The bacteria and other microorganisms in the soil treat the wastewater and purify it before it reaches groundwater. But the _____must pass through the soil slowly enough to provide adequate contact time with microorganisms.

A. Wastewater
B. Sewage tank effluent
C. Microorganisms
D. A subsurface soil dispersal system
E. Bacteria and other microorganisms
F. None of the Above

244. To provide adequate time for treatment of_____, it is necessary to have at least three feet of aerated or unsaturated soil and limit the loading of effluent.

A. Dispersal component
B. Limit the loading of effluent
C. Septic tank effluent
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

245. Microorganisms in soil treat wastewater physically, chemically, and biologically before it reaches the groundwater, preventing pollution and_____.

A. Public health hazards
B. Sewage tank effluent
C. Microorganisms
D. A subsurface soil dispersal system
E. Bacteria and other microorganisms
F. None of the Above

246. Under some soil conditions, _____ may not accept the wastewater or may fail to properly treat the wastewater unless special modifications to system design are made.

A. Dispersal component
B. Limit the loading of effluent
C. Evapotranspiration
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

247. _____is a major concern because domestic wastewaters contain many substances that are undesirable and potentially harmful, such as pathogenic bacteria, infectious viruses, organic matter, toxic chemicals, pharmaceutical drugs and excess nutrients.

A. Public health
B. Sewage tank effluent
C. Microorganisms
D. A subsurface soil dispersal system
E. Bacteria and other microorganisms
F. None of the Above

248. _____need the same basic conditions as humans do to live and grow: a place to live, food to eat, water, oxygen to breathe, suitable temperatures, and time to grow.
A. Dispersal component
B. Limit the loading of effluent
C. Soil microorganisms
D. Subsurface absorption systems
E. Engineered distribution systems
F. None of the Above

249. _____ attach themselves to soil particles using microbial slimes and use the oxygen and water that are present in the soil pores.
A. Dispersal zone
B. Soil microorganisms
C. Septic systems
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

250. To protect the public as well as the environment, wastewater must be treated in a safe and effective manner. The first component in an individual sewage treatment system is usually a septic tank, which removes?
A. Fresh water
B. Groundwater
C. Source of pollution
D. Dispersal media
E. Some organic material and total suspended solids (TSS)
F. None of the Above

251. _____ removal is very important because it prevents excessive clogging of the soil infiltrative surface.
A. Dispersal zone
B. TSS and organic material
C. Septic systems
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

**Suitably-textured Soil**

252. Suitably-textured soil must be deep enough to allow adequate filtration and treatment of the effluent before it is released into the?
A. Natural environment
B. Groundwater
C. Source of pollution
D. Dispersal media
E. Water percolates
F. None of the Above

253. Usually this release is into groundwater. It has been determined that three feet of aerated soil will provide sufficient treatment of?
A. Dispersal zone
B. Septic tank effluent
C. Septic systems
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

254. Therefore, a three-foot separation distance is required from the bottom of the _____to a limiting soil condition such as groundwater or bedrock.
A. Fresh water
B. Groundwater
C. Source of pollution
D. Dispersal media
E. Water percolates
F. None of the Above

255. This three-foot treatment zone provides sufficient detention time for final bacteria breakdown and sufficient distance for the filtration that is essential for the?
A. Dispersal zone
B. Safe treatment of effluent BOD
C. Septic systems
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

**Impacts of Effluent on Groundwater**

256. Groundwater represents the largest volume of fresh water on earth. Only three percent of the earth's fresh water resides in streams, lakes, and other?

A. Fresh water
B. Groundwater
C. Source of pollution
D. Surface water bodies
E. Water percolates
F. None of the Above

257. The other 97 percent is beneath the surface, flowing toward _____such as streams, lakes, springs, and wetlands.

A. Dispersal zone
B. Points of discharge
C. Septic systems
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

258. Groundwater becomes surface water at these_____. Effective waste treatment is essential to protecting our water supplies.

A. Fresh water
B. Discharge points
C. Source of pollution
D. Dispersal media
E. Water percolates
F. None of the Above

259. Approximately 25 percent of households in North America utilize groundwater for consumption and other domestic uses. These same homes employ _____ as their means for wastewater treatment.

A. Dispersal zone
B. Ground or surface waters
C. Septic systems
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

260. As _____percolates through the soil, it is purified and in most cases requires no further treatment before being consumed.

A. Fresh water
B. Groundwater
C. Source of pollution
D. Water
E. Water percolates
F. None of the Above

261. However, when the soil is overloaded with a _____, or when the contaminant cannot be treated by the soil, the quality of the underlying groundwater may change significantly.

A. Dispersal zone
B. Ground or surface waters
C. Septic systems
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

262. When a _____fails to effectively treat and disperse effluent, it can become a source of pollution. This type of failure can occur in three different ways.

A. Septic system
B. Groundwater
C. Source of pollution
D. Dispersal media
E. Water percolates
F. None of the Above

263. The first way is when effluent ponds on the soil surface, causing a wet seepy area. The second obvious way that _____ can fail is to have effluent backing up into the dwelling.

A. Dispersal zone
B. Ground or surface waters
C. Septic system
D. Treatable contaminant
E. Effluent BOD
F. None of the Above

264. _____ (with nitrogen, pathogens, bacteria, chemicals, etc.) is very difficult to clean up, since the only access to the water table is through wells, trenches (if the water table is high enough), or natural discharge points such as springs.
A. Pollution of groundwater D. Dispersal media
B. Groundwater E. Water percolates
C. Source of pollution F. None of the Above

265. An incident of _____often becomes a problem that persists for many years.
A. Fresh water D. Dispersal media
B. Groundwater E. Groundwater pollution
C. Source of pollution F. None of the Above

**Soil Treatment Processes**
266. The _____and dispersal zone provides for the final treatment and dispersal of septic tank effluent.
A. Soil treatment D. Dispersal media
B. Groundwater E. Water percolates
C. Source of pollution F. None of the Above

267. To varying degrees, the soil treatment and dispersal zone treats the wastewater by acting as a filter, exchanger, or absorber by providing a surface area on which many?
A. Dispersal zone D. Treatable contaminant
B. Ground or surface waters E. Chemical and biochemical processes occur
C. Septic systems F. None of the Above

268. The combination of these processes, acting on the _____as it passes through the soil, and purifies the water.
A. Effluent D. Dispersal media
B. Groundwater E. Water percolates
C. Source of pollution F. None of the Above

**Biomat**
269. As _____flows into a soil treatment trench, it moves vertically through the distribution media to the biomat where treatment begins.
A. Aerobic bacteria D. Septic tank effluent
B. Biomat E. Effluent from the system
C. Equilibrium F. None of the Above

270. The biomat is a _____formed by anaerobic bacteria, which secrete a sticky substance and anchor themselves to the soil, rock particles, or other available surfaces.
A. Biomat D. Gravity-fed system
B. Biological layer E. Site evaluations
C. Septic tank F. None of the Above

271. The _____ develops first along the trench bottom, where effluent begins to pond. The biomat develops along the soil-media contact surfaces on the trench's sidewalls. When fully developed, the gray-to-black sticky biomat layer is about one inch thick.
A. Aerobic bacteria D. Clustered wastewater systems
B. Biomat E. Effluent from the system
C. Equilibrium F. None of the Above

272. Flow through a _____ is considerably slower than flow through natural soil, allowing unsaturated conditions to exist in the soil beneath the soil treatment trench.
A. Biomat
B. Equilibrium
C. Septic tank
D. Gravity-fed system
E. Site evaluations
F. None of the Above

273. Unsaturated flow increases the travel time of effluent through the soil, ensuring that it has sufficient time to contact the surfaces of?
A. Aerobic bacteria
B. Biomat
C. Soil particles and microorganisms
D. Clustered wastewater systems
E. Effluent from the system
F. None of the Above

274. A properly functioning gravity-fed system will have wastewater ponded in the distribution media while the soil a few inches outside of and below the _____will be unsaturated.
A. Biomat
B. Equilibrium
C. Septic tank
D. Gravity-fed system
E. Distribution media
F. None of the Above

275. Unsaturated soil has _____ containing both air and water so aerobic microorganisms living in the soil can effectively treat the wastewater as it travels through the soil system.
A. Aerobic bacteria
B. Biomat
C. Pores
D. Clustered wastewater systems
E. Effluent from the system
F. None of the Above

276. In unsaturated soil under a biomat, water movement is restricted. In order for the wastewater to move through the soil, it must be pulled or wicked through the fine pores by?
A. Biomat
B. Equilibrium
C. Septic tank
D. Gravity-fed system
E. Capillary action
F. None of the Above

**Sewage Treatment Utilizing Soil**

277. A developed biomat reaches equilibrium over time, remaining at about the same thickness and the same _____if effluent quality is maintained.
A. Aerobic bacteria
B. Biomat
C. Equilibrium
D. Clustered wastewater systems
E. Permeability
F. None of the Above

278. For this equilibrium to be maintained, the biomat and the effluent ponded within the trench must be in anaerobic conditions, the organic materials in the wastewater feed the_____, which grow and multiply, increasing the thickness and decreasing the permeability of the biomat.
A. Biomat
B. Equilibrium
C. Septic tank
D. Gravity-fed system
E. Anaerobic microorganisms
F. None of the Above

279. On the soil side of the biomat beneath the drainfield, oxygen is present so that conditions are allowing _____to feed on and continuously break down the biomat.
A. Aerobic bacteria D. Clustered wastewater systems
B. Biomat E. Effluent from the system
C. Aerobic soil bacteria F. None of the Above

280. If the quality of the effluent leaving the septic tank decreases because of failure to regularly pump out the septic tank, more food will be present for the_____, which will cause an increase in the thickness of the biomat and decrease its permeability.
A. Biomat D. Gravity-fed system
B. Equilibrium E. Anaerobic bacteria
C. Septic tank F. None of the Above

281. If seasonally saturated conditions occur in the soil outside the trench, _____will no longer exist, which will prevent aerobic bacteria from breaking down the biomat.
A. Aerobic bacteria D. Clustered wastewater systems
B. Biomat E. Effluent from the system
C. Aerobic conditions F. None of the Above

282. Under these conditions the biomat will thicken, reducing its _____and the effectiveness of effluent entering the soil.
A. Biomat D. Gravity-fed system
B. Equilibrium E. Permeability
C. Septic tank F. None of the Above

**Site Evaluations**
283. Site evaluations are a key driver of treatment system design. The success of any _____ depends on the appropriate match between wastewater flow/strength, the treatment system design, and the site that receives effluent from the system.
A. Aerobic bacteria D. Soil-discharging wastewater treatment system
B. Biomat E. Effluent from the system
C. Equilibrium F. None of the Above

284. _____ and characterization by a qualified, experienced professional is essential to understanding local site conditions and ensuring the proper operation of individual and clustered wastewater systems.
A. Biomat D. Gravity-fed system
B. Equilibrium E. Site-specific observations
C. Septic tank F. None of the Above

**Ensure Compliance with Regulations**
285. Nearly every state and most local, county, and city governments have developed written requirements governing the type of sites that can be permitted for _____from individual and clustered wastewater systems.
A. Aerobic bacteria D. Subsurface effluent discharges
B. Biomat E. Effluent from the system
C. Equilibrium F. None of the Above

286. _____include maximum slope angles acceptable for system components, appropriate soil types and depth, minimum depth-to-groundwater (or bedrock) requirements, and mandatory setback distances between system components and property lines, structures, and water bodies, among others.

A. Biomat
B. Equilibrium
C. Septic tank
D. Regulatory compliance parameters
E. Site evaluations
F. None of the Above

287. Site evaluators should be familiar with the regulatory requirements for soil-discharging individual and clustered systems and the procedures for accommodating variances to those requirements, in terms of both the legal process for _____ needed to ensure the desired treatment performance.

A. Ponding
B. Site-related causes
C. Preliminary review
D. Large-capacity septic systems
E. Issuing variances and the system adaptations
F. None of the Above

288. In most states, individual system regulations are _____ by the public health agency. Requirements for clustered systems (e.g., those discharging more than 1,000 gallons per day) are sometimes under the purview of the state water resources agency.

A. Clustered
B. Final treatment
C. Underground tanks
D. Site evaluation
E. Soil survey data
F. None of the Above

289. _____ (i.e., those with the capacity to serve 20 or more people per day) are regulated by EPA and the states through the Underground Injection Control Program of the Safe Drinking Water Act.

A. Ponding
B. Site-related causes
C. Preliminary review
D. Large-capacity septic systems
E. Quadrangle maps
F. None of the Above

**Assure System Performance**

290. Wastewater systems depend on the soil for 1) final treatment of effluent from the tank or unit process components, and 2) dispersal of the _____ to the soil. As noted in the resource guide on system design, the desired final quality of the effluent depends on the constructed/installed treatment train and the pollutant removal capabilities of the soil.

A. Effluent
B. Final treatment
C. Underground tanks
D. Site evaluation
E. Soil survey data
F. None of the Above

291. The soil component of the system receives, stores, and treats incoming effluent. The subsurface “ponding” and slow release of effluent to the soil through the biomat facilitates treatment via chemical, physical, and biological processes such as_____, adsorption of potential pollutants (e.g., phosphorus), filtration of solids, and decomposition of organic constituents.

A. Ponding
B. Site-related causes
C. Preliminary review
D. Large-capacity septic systems
E. Aerobic nitrification of ammonia
F. None of the Above

292. Predicting the pollutant removal and overall treatment efficacy of the soil component of the system requires a fairly comprehensive understanding of how these processes work, how they are enhanced or impeded, and how the _____ in the treatment train can be adjusted or adapted to ensure that the soil can handle the flow and pollutant load delivered.
A. Upstream processes D. Site evaluation
B. Final treatment E. Soil survey data
C. Underground tanks F. None of the Above

**Protect Public Health and Water Resources**
293. Individual and clustered wastewater systems can _____ due to soil or site-related causes.
A. Pond D. Large-capacity septic systems
B. Site-related causes E. Quadrangle maps
C. Malfunction F. None of the Above

294. The site evaluation procedures summarized below are designed to identify site characteristics that might contribute to elevated health or environmental risks to ensure that they can be addressed in the selection, configuration, sizing, or operation of the?
A. Cluster D. Site evaluation
B. Treatment system E. Soil survey data
C. Underground tanks F. None of the Above

295. The preliminary review is performed prior to any fieldwork. It is based on information available from the owner and local agencies and on?
A. Ponding D. Large-capacity septic systems
B. Site-related causes E. Quadrangle maps
C. Preliminary review F. None of the Above

296. The objectives of the preliminary review are to identify potential_____, identify potential treatment system design boundaries (e.g., groundwater table, property line, etc.), assess the ability of the soil to provide final treatment, and develop a conceptual plan for supplying the level of treatment required prior to soil discharge.
A. Effluent infiltration sites D. Site evaluation
B. Final treatment E. Soil survey data
C. Underground tanks F. None of the Above

297. Preliminary screening of _____ is an important aspect of the site evaluator's role.
A. Ponds D. Large-capacity septic systems
B. Site-related causes E. Quadrangle maps
C. Preliminary review F. None of the Above

298. More than one receiving environment might be feasible and available for use. In addition, the desktop review might suggest that treatment be provided via _____, rather than individual, facilities.
A. Clustered D. Site evaluation
B. Final treatment E. Soil survey data
C. Underground tanks F. None of the Above

299. Focusing the effort on the most promising receiving environment and the most efficient and effective treatment works allows the evaluator to reasonably and methodically eliminate the least suitable sites early in the_____.

A. Ponding
B. Site-related causes
C. Preliminary review
D. Large-capacity septic systems
E. Site evaluation process
F. None of the Above

300. For example, basic knowledge of the local climate might eliminate evaporation or _____ as a potential receiving environment immediately.

A. Evapotranspiration
B. Final treatment
C. Underground tanks
D. Site evaluation
E. Soil survey data
F. None of the Above

301. Quadrangle maps provide general _____about a site and surrounding landscape.

A. Topographic information
B. Site-related causes
C. Preliminary review
D. Large-capacity septic systems
E. Quadrangle maps
F. None of the Above

302. These maps are developed and maintained by the U.S. Geological Survey (USGS) and provide nationwide coverage typically at a scale of 1 inch = 2000 feet, with either a 10- or 20-foot contour interval. At this scale, the maps provide information related to land use, public improvements (e.g., roadways), _____, landscape position and slope, vegetated areas, wetlands, surface drainage patterns, and watersheds.

A. USGS benchmarks
B. Final treatment
C. Underground tanks
D. Site evaluation
E. Soil survey data
F. None of the Above

303. Aerial photographs are available from several popular online mapping sites (e.g., Google, Yahoo, MapQuest, etc.), many of which are free. _____ varies across the nation. Some rural areas do not have fine resolution coverage.

A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Pan evaporation rates
E. Aerial photographs
F. None of the Above

304. Also, the applicable local codes often prohibit direct or indirect discharges to surface waters (i.e., requiring an_____ ) from small systems. Knowledge of local conditions and regulations is essential during the screening process.

A. Pond
B. NPDES permit
C. Preliminary review
D. Large-capacity septic systems
E. Quadrangle maps
F. None of the Above

305. Property information should include owner contact information, site legal description or address, plat map or boundary survey, description of _____(e.g., existing onsite wastewater systems, underground tanks, utility lines), previous and proposed uses, surrounding land use and zoning, and other available and relevant data.

A. Existing site improvements
B. Final treatment
C. Underground tanks
D. Site evaluation
E. Soil survey data
F. None of the Above

306. Which of the following terms provide soil profile descriptions, identify soil limitations, estimate saturated soil conductivities and permeability values, describe typical landscape position and soil formation factors, and provide various other soil-related information?

A. Ponding
B. Site-related causes
C. Preliminary review
D. Detailed soil surveys
E. Quadrangle maps
F. None of the Above

307. Soil survey data should be supplemented with _____at the site. The NRCS publication Field Book for Describing and Sampling Soils is an excellent manual for use in site evaluation.

A. Detailed soil sampling
B. Final treatment
C. Underground tanks
D. Site evaluation
E. Soil survey data
F. None of the Above

308. If available, _____ can provide information regarding past and existing land use, drainage and vegetation patterns, surface water resources, and approximate location of property boundaries.

A. Technology performance
B. Evapotranspiration systems
C. Aerial photographs
D. Groundwater aquifers and depths
E. Movement of pollutants
F. None of the Above

309. _____ may be available from a variety of other sources, such as county or regional planning offices, property valuation, and agricultural agencies.

A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Pan evaporation rates
E. Aerial photographs
F. None of the Above

310. Geology and basin maps are especially useful for providing general information regarding bedrock formations and depths, groundwater aquifers and depths, flow direction and velocities, ambient water quality, surface water quality, stream flow, and_____ . If available, these maps can be obtained from USGS.

A. Seasonal fluctuations
B. Evapotranspiration systems
C. Effluent treatment
D. Groundwater aquifers and depths
E. Movement of pollutants
F. None of the Above

311. Water resource and health agency information, such as permit and other files for nearby treatment systems, can provide valuable information regarding local system designs, applications, and performance. Interviews with agency permitting, planning, and field staff can often provide valuable information on regional, local, and even site-specific conditions, such as water quality data, septic system complaints, and future plans for provision of?

A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Pan evaporation rates
E. Clustered or centralized treatment services
F. None of the Above

312. Local installers and service providers can provide information on other sites in the vicinity, existing technology performance, and general knowledge of soils and other factors that inform both the site evaluation and the selection of?

A. Technology performance
B. Evapotranspiration systems
C. Effluent treatment
D. Groundwater aquifers and depths
E. Appropriate treatment system components
F. None of the Above

313. _____, such as temperature, precipitation, and pan evaporation rates can be obtained from the National Oceanic and Atmospheric Administration. This information is necessary if evapotranspiration systems are being considered.
A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Climate data
E. Aerial photographs
F. None of the Above

314. _____ must realize, however, that the data from the nearest weather station might not accurately represent the climate at the site being evaluated.
A. Technology performance
B. Evapotranspiration systems
C. Effluent treatment
D. Groundwater aquifers and depths
E. Movement of pollutants
F. None of the Above

315. After the visual assessment of surface conditions are assessed, the site evaluation proceeds to an investigation of subsurface conditions, especially?
A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Pan evaporation rates
E. Soil conditions and groundwater characteristics
F. None of the Above

316. Soils are one of the most important factors to consider during the field investigation, because soil-discharging systems depend on the _____ for a significant portion of effluent treatment.
A. Technology performance
B. Evapotranspiration systems
C. Effluent treatment
D. Groundwater aquifers and depths
E. Soil matrix
F. None of the Above

317. _____ will affect the type of treatment system selected, the design loading rate, and the size of the dispersal field.
A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Soil properties
E. Aerial photographs
F. None of the Above

318. Groundwater proximity and movement is also important in considering effluent residence time in unsaturated soil and the movement of pollutants that enter the?
A. Technology performance
B. Water table
C. Effluent treatment
D. Groundwater aquifers and depths
E. Movement of pollutants
F. None of the Above

**Field Investigation Parameters Soil Profile**

319. A soil profile evaluation typically includes an analysis of soil texture, color, structure, consistence, and layers within the area of the?
A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Proposed dispersal field
E. Movement of pollutants
F. None of the Above

320. Soil borings and pits are used to assess _____ and identify any limiting or restrictive conditions such as rock layers, poor drainage, high water table, or saturated conditions.
A. Technology performance
B. Soil properties
C. Effluent treatment
D. Groundwater aquifers and depths
E. Movement of pollutants
F. None of the Above

321. An ideal soil profile for a _____ is at least four feet of well-drained, aerated soil above any limiting conditions such as bedrock, hardpan, or a water table.

A. An ideal soil profile
B. Visual assessment
C. Septic system complaints
D. Proximity and movement
E. Dispersal field
F. None of the Above

322. When soil limitations exist, adjustments to the upstream treatment train may be needed to reduce biochemical oxygen demand, _____, bacteria levels, nutrients, or other pollutants.

A. Technology performance
B. Evapotranspiration systems
C. Effluent treatment
D. Total suspended solids
E. Movement of pollutants
F. None of the Above

323. Adjustments could involve reducing _____at the source (e.g., better plate and pot scraping prior to dishwashing in restaurant kitchens, adding grease trap tanks, etc.), applying the effluent at lower soil loading rates, or inserting a fixed film or suspended growth treatment unit between the septic tank and drainfield.

A. Pollutant inputs
B. Higher levels of treatment
C. A percolation test
D. Clustered wastewater treatment
E. Various empirical formulae
F. None of the Above

324. Rules differ among states regarding the depth and number of _____required for each proposed drainfield site, the depth of permeable soil located beneath the bottom of the effluent infiltrative surface (i.e., trench bottom), the distance between the drainfield and nearby surface waters, and the types of tests required.

A. Site evaluation
B. Percolation test
C. Design requirements
D. Observation test holes
E. Suspended growth advanced treatment systems
F. None of the Above

**Sampling Soils**

325. Percolation Tests. Local health departments have long used percolation or “perc” tests, to determine the loading rate and size of the_____ , despite some significant shortcomings.

A. Conventional treatment systems
B. Higher levels of treatment
C. A percolation test
D. Soil dispersal area
E. Various empirical formulae
F. None of the Above

326. A percolation test consists of digging one or more holes in the soil of the proposed dispersal field to a specified depth, _____, then completing the test by filling the holes to a specific level and timing and measuring the water level drop as the water percolates into the surrounding soil.

A. Site evaluation
B. Percolation test
C. Design requirements
D. Unsaturated soil conditions
E. Suspended growth advanced treatment systems
F. None of the Above

327. There are _____ for determining the required size of a drainfield based on the size of facility, the percolation test results, and other parameters.

A. Conventional treatment systems
B. Higher levels of treatment
C. A percolation test
D. Clustered wastewater treatment
E. Various empirical formulae
F. None of the Above

328. Many states and communities have written this test into their onsite ordinances, statutes, or building codes. Maryland and a number of other states also require the use of _____ and site evaluations for repairs to existing septic systems that are malfunctioning.

A. Site evaluation
B. Percolation test
C. Design requirements
D. Unsaturated soil conditions
E. Suspended growth advanced treatment systems
F. None of the Above

329. _____, however, has limitations. The test does not reveal limiting conditions in the soil profile and can provide false readings during dry conditions, leading to an inappropriately high loading rate.

A. Conventional treatment systems
B. Higher levels of treatment
C. A percolation test
D. Clustered wastewater treatment
E. Various empirical formulae
F. None of the Above

330. States and communities once relied solely on these tests to determine?

A. Site evaluation
B. Percolation test
C. Design requirements
D. Unsaturated soil conditions
E. Effluent application rates
F. None of the Above

**Site Limitations and Special Considerations**

331. In some cases, soil profile or other limitations create challenges for?

A. Conventional treatment systems
B. Higher levels of treatment
C. A percolation test
D. Individual and clustered wastewater treatment
E. Various empirical formulae
F. None of the Above

332. Most of these limitations are natural or induced restrictions to soil water and air movement, which limit the depth and duration of unsaturated soil conditions. Identifying these limiting conditions is a critical step in the?

A. Site evaluation process
B. Percolation test
C. Design requirements
D. Unsaturated soil conditions
E. Suspended growth advanced treatment systems
F. None of the Above

333. If a site does not demonstrate acceptable _____or has other limiting factors that preclude the use of conventional treatment systems, some states and communities will allow the landowner to consult with an engineer to design an alternative or advanced system that can overcome a site's restrictive soil and site limitations.

A. Conventional treatment systems
B. Higher levels of treatment
C. A percolation test
D. Permeability
E. Various empirical formulae
F. None of the Above

**Fixed Film and Suspended Growth Advanced Treatment Systems**

334. Fixed film and suspended growth advanced treatment systems provide an effluent of higher quality than?

A. Site evaluation
B. Percolation test
C. Design requirements
D. Unsaturated soil conditions
E. Conventional septic tank discharges
F. None of the Above

335. _____ allow marginal soils to more easily absorb and treat wastewater.
A. Conventional treatment systems D. Clustered wastewater treatment
B. Higher levels of treatment E. Various empirical formulae
C. A percolation test F. None of the Above

336. However, these systems require more attention to design requirements, _____ , and construction detail.
A. Site evaluation D. Unsaturated soil conditions
B. Material selection E. Suspended growth advanced treatment systems
C. Design requirements F. None of the Above

337. Regular operation and maintenance attention for these systems is critical to maintaining performance and ensuring system operation over the long term. The site evaluator needs to understand and analyze all of these _____when recommending an alternative or advanced treatment system.
A. Conventional treatment systems D. Clustered wastewater treatment
B. Higher levels of treatment E. Various empirical formulae
C. Critical factors F. None of the Above

338. Several additional site evaluation factors may also need to be considered when planning large _____ or clustered facilities.
A. Septage D. Other hydrogeologic conditions
B. Wastewater treatment systems E. Municipal wastewater
C. Anaerobic bacteria F. None of the Above

339. EPA defines a _____ as a system that has the capacity to serve 20 or more people per day.
A. Systems D. Clustered wastewater systems
B. Soil absorption systems E. Sewage treatment site
C. Large capacity septic system F. None of the Above

340. Clustered wastewater systems, as discussed in the _____, can serve a small to large number of connections (two to hundreds of structures).
A. Systems D. Clustered wastewater systems
B. Soil absorption systems E. Sewage treatment site
C. Methodologies F. None of the Above

341. Smaller cluster systems serving a few structures can be gravity flow facilities that resemble individual systems, while larger cluster systems serving hundreds of structures are often highly mechanized with extensive collection piping, and tend to resemble?
A. Septage D. Other hydrogeologic conditions
B. Centralized systems E. Municipal wastewater
C. Anaerobic bacteria F. None of the Above

342. Regular, permanent operation and maintenance of these _____ is required by regulatory authorities.
A. Systems D. Clustered wastewater systems
B. Soil absorption systems E. Sewage treatment site
C. Methodologies F. None of the Above

343. As with conventional systems, sites proposed for soil-discharging cluster systems must be evaluated for_____ , shallow aquifers, land slope, soil texture, and permeability.

A. Septage
B. Water table elevations
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

344. The location of the _____ needs to fit with the overall physical plan of the development.

A. Systems
B. Soil absorption systems
C. Methodologies
D. Clustered wastewater systems
E. Sewage treatment site
F. None of the Above

345. Areas reserved for future development need to be clearly identified, and the proposed _____needs to fit with existing plans for open space and buffers around a development.

A. Septage
B. Wastewater treatment
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

**Soil Absorption Systems**

346. In large cluster or _____ where increased quantities of wastewater will be dispersed, other factors must also be evaluated, such as the potential for groundwater mounding.

A. Systems
B. Soil absorption systems
C. Methodologies
D. Clustered wastewater systems
E. Sewage treatment site
F. None of the Above

347. These systems may experience _____under the drainfield due to the large wastewater contribution, restrictive soil layers, and other hydrogeologic conditions. Both the Hantush Method and MODFLOW are acceptable groundwater flow models that can be used to characterize more complicated sites.

A. Septage
B. Artificial groundwater mounding
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

348. Methodologies to _____and system design influences on the potential for groundwater mounding and lateral spreading can also be found in Guidance for Evaluation of Potential Groundwater Mounding Associated with Cluster and High-Density Wastewater Soil Absorption Systems.

A. Systems
B. Soil absorption systems
C. Evaluate site conditions
D. Clustered wastewater systems
E. Sewage treatment site
F. None of the Above

**Site Evaluator Qualifications**

349. Conducting a _____ requires trained professionals. Training and certification requirements, however, differ from state to state.

A. Septage
B. Site evaluation
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

**Residuals (Septage) Section**

350. Residuals are normally produced as a result of wastewater treatment. The term "_____" is commonly used to describe the liquids and solids that are pumped from a septic tank, port-a-potty, cesspool, or other locality.

A. System
B. Soil absorption systems
C. Septage
D. Clustered wastewater systems
E. Sewage treatment site
F. None of the Above

351. EPA regulates the management of _____ to ensure that this material is treated, used, and/or disposed of in an environmentally sound manner.

A. Septage
B. Site evaluation
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

352. Septic tanks with soil absorption systems are the most commonly used individual wastewater treatment system in rural and suburban areas. _____flows into the tank where the solids separate from the liquid.

A. Systems
B. Soil absorption systems
C. Methodologies
D. Untreated household waste
E. Sewage
F. None of the Above

353. Light solids, such as soap suds and fat, float to the top and form a scum layer. The liquid waste goes into the drainfield, while the heavier solids settle to the bottom of the tank where the _____is partially decomposed by.

A. Septage
B. Organic matter
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

354. Some _____remain, forming a sludge layer that eventually must be pumped out. A septic tank will usually retain 60 to 70 percent of incoming solids, oil, and grease.

A. Systems
B. Soil absorption systems
C. Non-decomposed solids
D. Clustered wastewater systems
E. Sewage treatment site
F. None of the Above

355. Because it is concentrated, the strength of septage is generally fifty to several hundred times greater than _____.

A. Septage
B. Site evaluation
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

356. The physical characteristics of _____vary depending upon the septic tank size, design, and pumping frequency; user habits; climatic conditions; water supply characteristics, and the use of garbage disposals, household chemicals, and water softeners.

A. Systems
B. Soil absorption systems
C. Septage
D. Clustered wastewater systems
E. Sewage treatment site
F. None of the Above

357. It is important that samples of _____ be collected and tested to determine local characteristics, since they can affect the proper management of these materials.

A. Septage
B. Site evaluation
C. Anaerobic bacteria
D. Other hydrogeologic conditions
E. Municipal wastewater
F. None of the Above

**In its Septage Treatment and Disposal Fact Sheet (EPA 832-F-99-068; September, 1999), EPA describes septage as**:

358. Highly variable and organic, with significant levels of grease, grit, hair, and debris. The liquids and solids pumped from a septic tank or cesspool have an offensive odor and appearance, a tendency to foam upon agitation, and?

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. A resistance to settling and dewatering
F. None of the Above

359. _____ is also a host for many disease-causing viruses, bacteria, and parasites.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

360. The volume of residuals generated by a _____will vary based on the treatment method.

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. Wastewater system
F. None of the Above

361. A general method to determine septage generation appears below. Some advanced treatment units, such as_____, can significantly increase the volume of residuals generated. In contrast, filtration technologies are often used to minimize the generation of residuals.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Activated sludge-based aerobic treatment unit (ATU) systems
F. None of the Above

362. Some _____ will significantly increase the volume of residuals generated. If pumping occurs on an as-needed basis, residuals management (receiving) facilities will need a significantly larger short-term capacity for processing.

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. Septage
F. None of the Above

363. The method of residuals processing may also require some additional evaluation of _____ characteristics.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

**Federal Septage Rules**

364. In 1993, EPA issued regulations that address septage use and disposal practices as part of Chapter 40 of the Code of Federal Regulations. 40 CFR part 503 regulates _____as a part of the requirements controlling the use and disposal of sewage sludge.

A. Volume of residuals
B. Domestic septage
C. Minimum requirements
D. Disposal of sewage sludge
E. Septage
F. None of the Above

365. The rule defines "_____" as liquid and solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receive only domestic sewage.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

366. The 503 regulation includes minimum requirements for land application of _____applied to non-public contact sites such as agricultural fields, forestland, and mine reclamation areas.

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. Domestic septage
F. None of the Above

367. 40 CFR Part 257 governs the management of grease trap wastes and other types of residuals resulting from the treatment of _____ by individual and clustered commercial and industrial treatment systems.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

368. 40 CFR Part 258 governs the_____, sewage sludge, and other residuals into municipal solid waste landfills.

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. Disposal of septage
F. None of the Above

**The Federal 503 Rule**

369. Most states build upon the federal 40 CFR part 503 regulation as the minimum requirements for managing_____, although states may and often do impose more stringent requirements. In some cases, municipalities have established local regulations for septage handling, treatment, and disposal in addition to the federal and state regulations.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

**Disposal Options**

370. _____ can be processed through land application, at wastewater treatment plants, or at processing facilities specifically designed to treat septage. The following section describes these alternatives:

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. Septage
F. None of the Above

**Land Application**

371. _____ contains nutrients that can condition the soil and decrease reliance on chemical fertilizers for agriculture production.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

372. Adjusting _____ pH can also reduce or eliminate odors and disease-causing organisms before land application.

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. Septage
F. None of the Above

**Subsurface Application**

373. Subsurface application, or surface application with subsequent incorporation, are the preferred methods for land application of _____ since they minimize odors, reduce vector attraction, minimize ammonia volatilization losses, conserve nitrogen, minimize contact with rain, and reduce potential water contamination.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

374. State regulations for land application of _____ often require pre-approval from the regulating agency through permits and/or licenses, soil tests, and site management plans.

A. Volume of residuals
B. Advanced treatment units
C. Minimum requirements
D. Disposal of sewage sludge
E. Septage
F. None of the Above

375. A storage or transfer tank may be needed when land application sites are inaccessible due to weather conditions or if pre-application treatment of the _____ is required. Some states require septage to be disinfected before application.

A. Septage
B. Nitrogen
C. Application
D. Domestic septage
E. Non-domestic sewage
F. None of the Above

**Pretreatment**

376. Pretreatment, such as screening and_____, may also be necessary prior to discharge into a tank or lagoon. Enclosed holding tanks or lined lagoons in isolated areas are preferred temporary storage facilities.

A. Volume of residuals
B. Grit removal
C. Minimum requirements
D. Disposal of sewage sludge
E. Septage
F. None of the Above

377. _____ and stabilization can reduce minimize odors. The simplest and most economical method is to add lime or other alkali to raise the pH to 12 for a minimum of 30 minutes.

A. Pretreatment
B. Liquid
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

378. Other _____ stabilization options include aerobic digestion, anaerobic digestion, and composting.
A. Septage
B. Disposal of septage
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

379. Relative to_____, these options have higher operating costs and require more skilled operating personnel.
A. Pretreatment
B. Liquid
C. Stabilization lagoons
D. Surface disposal of septage
E. Alkaline stabilization
F. None of the Above

380. A number of states require _____ be stabilized before it is applied to the land.
A. Septage
B. Disposal of septage
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

381. Surface disposal of septage is another alternative outlined under the federal rules, This includes disposal in holding lagoons, trenches, and_____. Some states, however, have more restrictive rules concerning burial.
A. Pretreatment
B. Sanitary landfills
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

**Publicly owned treatment works (POTWs)**

382. Septage can also be handled and processed at wastewater treatment plants. This process usually employs a septage receiving station, which pretreats the _____ by screening and other unit processes.
A. Septage
B. Disposal of septage
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

383. Some of these facilities separate the _____ from the solids, which are then processed by the POTW.
A. Pretreatment
B. Liquid
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

384. The allowable amount of _____ handled by a POTW is a function of the type and size of the treatment plant, capacity of the plant, and characteristics of the septage.
A. Septage
B. Disposal of septage
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

385. Smaller POTWs must be cognizant of how the higher-strength septage will affect overall wastewater organic loads and should control the feed rate. _____ may be required to prevent problems in the treatment system.
A. Pretreatment
B. Liquid
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

**Independent Septage Treatment Facility (ISTF)**

386. When suitable land is unavailable and wastewater treatment facilities are too distant or do not have adequate capacity, independent _____ may be an option.

A. Septage treatment plant(s)
B. Disposal of septage
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

387. ISTFs vary from _____to treatment plants that use aerobic digestion, anaerobic digestion, composting, and other biological and chemical treatment processes.

A. Pretreatment
B. Liquid
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

**Management Considerations**

388. The safe, practical, and acceptable practices for the use or _____ should be a key goal of any wastewater management program.

A. Septage treatment plant(s)
B. Disposal of septage
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

389. _____must be developed within the context of state, local, and federal rules and the nature of residuals produced.

A. Pretreatment
B. Septage management plans
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

**Operation and Maintenance**

390. The need to pump _____ from small wastewater systems cannot be overstated. Without proper operation and maintenance, soil absorption systems will malfunction and can potentially impair water quality or cause sewage surfacing and threats to public health. In most cases, the homeowner is responsible for maintenance of their treatment system.

A. Septage treatment plant(s)
B. Septage
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

391. Some communities, however, have strengthened their _____by conducting periodic inspections of individual treatment systems and maintaining pumping records to better monitor when pumping is needed.

A. Pretreatment
B. Wastewater programs
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

392. In these communities, the _____is required to have his or her tank pumped by a locally approved hauler within a given time period and provide documentation that the tank was pumped in accordance with local requirements.

A. Septage treatment plant(s)
B. System owner
C. Wastewater treatment plant(s)
D. Soil absorption system(s)
E. Capacity of the plant
F. None of the Above

393. Another approach is for a responsible management entity to assume complete responsibility for inspecting, pumping, and disposing of septage. In all cases, the management program goal should be to pump, transport, treat, and use or dispose of the _____in a manner that has the least impact on the system owners, the community, and the environment.

A. Pretreatment
B. Residuals
C. Stabilization lagoons
D. Surface disposal of septage
E. Septage
F. None of the Above

**Training, Certification, and Licensing**

394. The National Association of Wastewater Transporters conducts a comprehensive training and certification program for _____.

A. Proper septage management
B. Pumpers and haulers
C. O&M requirements
D. Wastewater management programs
E. Proper handling and disposal of septage.
F. None of the Above

395. Several states have also established training centers to promote proper?

A. Proper septage management
B. Pumpers and haulers
C. O&M requirements
D. Wastewater management programs
E. Proper handling and disposal of septage.
F. None of the Above

396. Several management programs also provide system owners with access to a list of certified service providers to promote?

A. Proper septage management
B. Pumpers and haulers
C. O&M requirements
D. Wastewater management programs
E. Proper handling and disposal of septage.
F. None of the Above

**State and Local Examples**

397. Septage operators in _____ are required to pass an exam to be certified. Two levels of certification are available for septage servicing and land application.

A. Proper septage management
B. Pumpers and haulers
C. O&M requirements
D. Wastewater management programs
E. Proper handling and disposal of septage.
F. None of the Above

398. State rules require continuing education credits to maintain?

A. Proper septage management
B. Pumpers and haulers
C. O&M requirements
D. Wastewater management programs
E. Proper handling and disposal of septage.
F. None of the Above

**Public Education**

399. Wastewater management programs require that community residents be informed about pumping and?

A. Proper septage management
B. Proper disposal of septage
C. O&M requirements
D. Wastewater management programs
E. Proper handling and disposal of septage.
F. None of the Above

400. Programs must reinforce _____ and proper septage handling and disposal procedures, especially targeting the pumpers and haulers.

A. Proper septage management
B. Pumpers and haulers
C. O&M requirements
D. Wastewater management programs
E. Proper handling and disposal of septage.
F. None of the Above

**You are finished with your assignment.**

You are finished with your assignment, please fax or e-mail the answer key and registration form to TLC. Always call us to confirm that we've received the paperwork.

**Please fax the answer key to**
**TLC Western Campus Fax (928) 272-0747**
Backup Fax (928) 468-0675

Always call us after faxing the paperwork to ensure that we've received it.

For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity