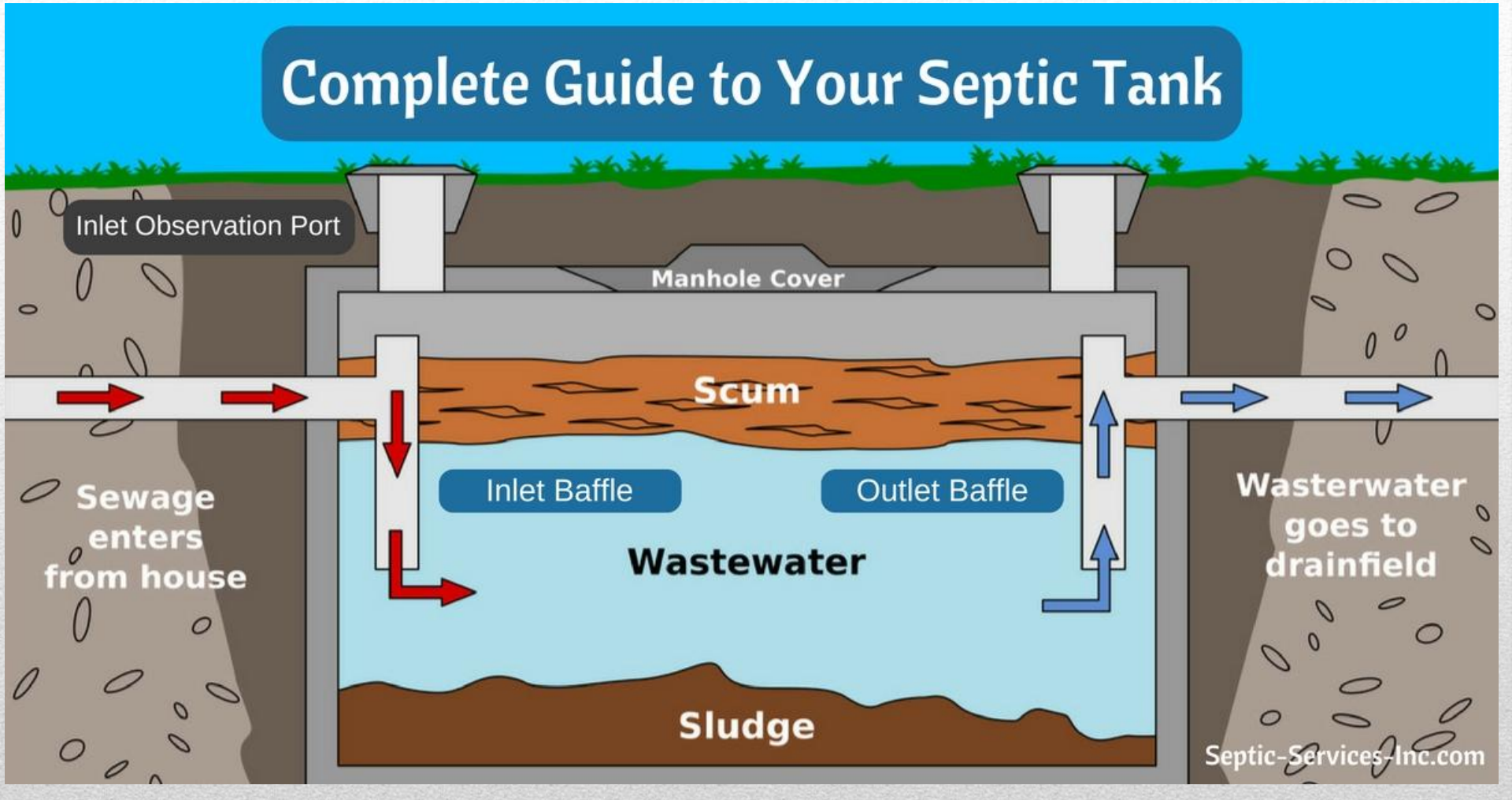
Section 1: Rules

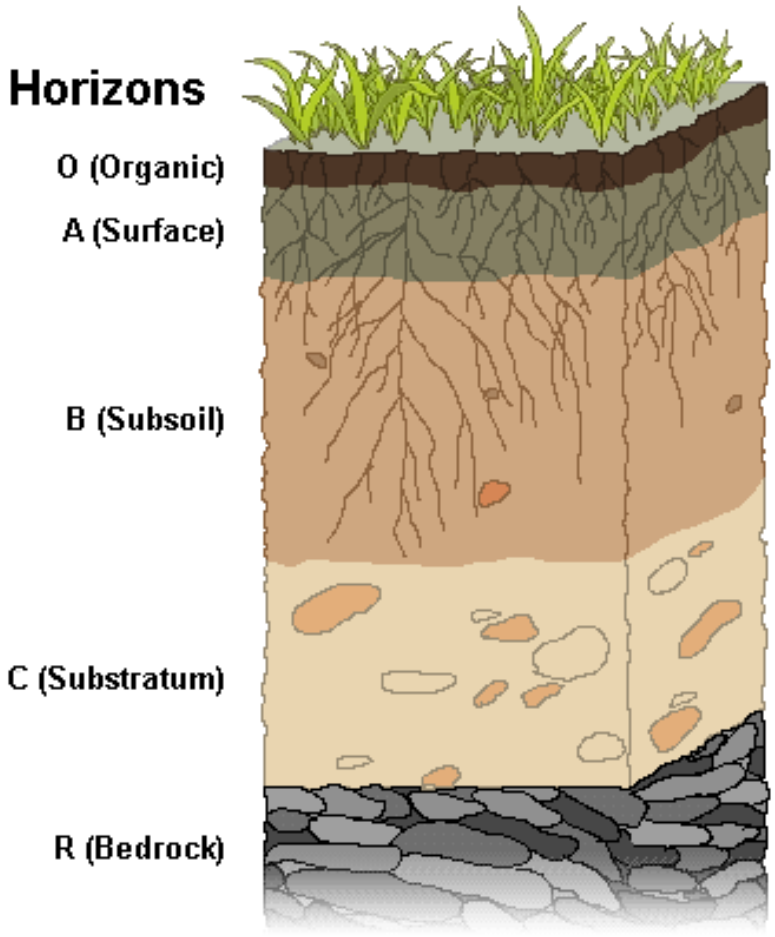
What to expect:

For this portion of the exam, there will be 60 multiple choice questions over items found in the Onsite Wastewater Rules and Act 402 of 1977 (as amended).

Rules and Act 402 can be found here.

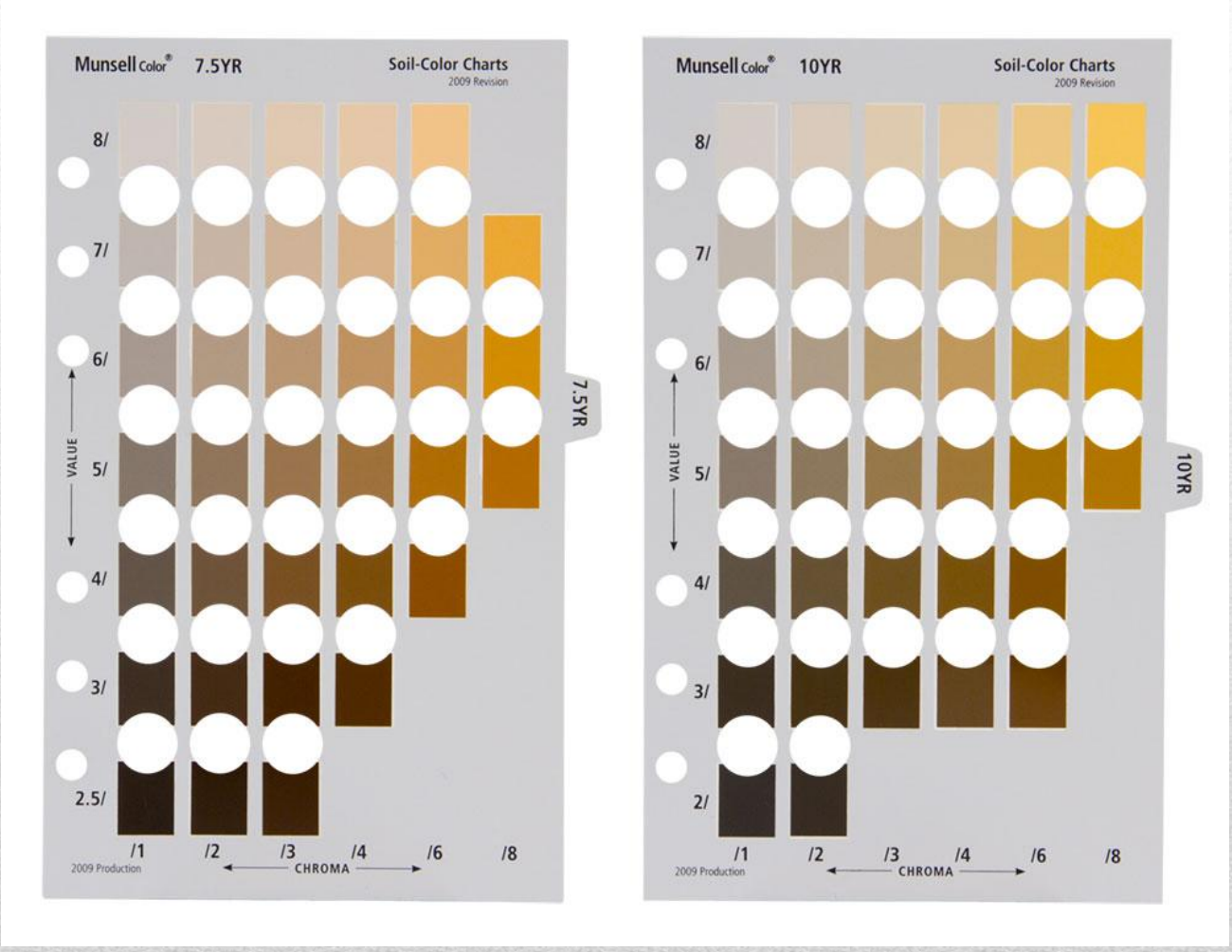

Complete Guide to Your Septic Tank
Inlet Observation Port
Manhole Cover
Scum
Inlet Baffle
Outlet Baffle
Wastewater
Sludge
Sewage enters from house
Wasterwater goes to drainfield
Septic-Services-Inc.com

Soil Horizons



- Horizon are layers within the soil pit wall
- Horizons can have different properties than layers above or below (clay, fragipan, more/less water movement
- Seasonal water tables (SWT) are often found at these horizon changes

Defining Seasonal Water Tables



Munsell Color Book is used to determine the soil and redox feature colors

Defining Seasonal Water Tables
(MUST KNOW THESE)

1. Brief SWT:

- Concentrations or depletions with chroma ≥ 3: less than 20% of the mass is chroma 3 depletions

AND/OR

- 2% or more black (manganese) masses

Defining Seasonal Water Tables
(MUST KNOW THESE)

2. Moderate SWT:

- Depletions with chroma ≤ 2 comprise less than 50% of the mass

AND/OR

- Chroma 3 depletions comprise more than 20%

3. Long SWT:

- Chroma ≤ 2 in 50% or more of the mass

Adjusting Seasonal Water Tables

(pg. 22 in Rules)

(Must know these)

1. Brief & Moderate
   - (Moderate – Brief) ÷ 3 = Difference
   - Moderate – Difference = Adjusted Moderate
2. Moderate & Long
   - (Long – Moderate) ÷ 2 = Difference
   - Long – Difference = Adjusted Long
3. Brief & Long
   - (Long – Brief) ÷ 6 = Difference
   - Long – Difference = Adjusted Long

NOTE: If brief, moderate and long are found; use the adjusted moderate to adjust the long SWT

Adjusting Seasonal Water Tables

1. Soil pit with brief @ 17”, moderate @ 29”

(Moderate – Brief) ÷ 3 = Difference

(29” - 17”) ÷ 3 =

12” ÷ 3 = 4”

29” - 4” = **25” ← Adjusted Moderate**

2. Soil pit with brief @ 13”, moderate @ 28”

(Moderate – Brief) ÷ 3 = Difference

(28” - 13”) ÷ 3 =

15” ÷ 3 = 5”

28” - 5” = 23” ← Adjusted Moderate

Adjusting Seasonal Water Tables

3. Soil pit with moderate @ 24”, long @ 38”

(Long – Moderate) ÷ 2 = Difference

(38” - 24”) ÷ 2 =

14” ÷ 2 = 7”

38” - 7” = **31” ← Adjusted Long**

4. Soil pit with brief @ 15”, long @ 39”

(Long – Brief) ÷ 6 = Difference

(39” - 15”) ÷ 6 =

24” ÷ 6 = 4”

39” - 4” = **35” ← Adjusted Long**

Adjusting Seasonal Water Tables

5. Soil pit with brief @ 18”, moderate @ 24”, long @ 38”

(Moderate – Brief) ÷ 3 = Difference

(24” - 18”) ÷ 3 =

6” ÷ 3 = 2”

24” - 2” = **22” ← Adjusted Moderate**

(Long – Adj. Moderate) ÷ 2 = Difference

(38” - 22”) ÷ 2 =

16” ÷ 2 = 8”

38” - 8” = **30” ← Adjusted Long**

What would the loading rate be for this soil on 8’ centers?

→ 0.35 ←

Adjusting Seasonal Water Tables

6. Soil pit with brief @ 15”, moderate @ 27”, long @ 47”

(Moderate – Brief) ÷ 3 = Difference

(27” - 15”) ÷ 3 =

12” ÷ 3 = 4”

27” - 4” = **23” ← Adjusted Moderate**

(Long – Adj. Moderate) ÷ 2 = Difference

(47” - 23”) ÷ 2 =

24” ÷ 2 = 12”

47” - 12” = **35” ← Adjusted Long**

What would the loading rate be for this soil on 10’ centers?

→ 0.40 ←

Adjusting Seasonal Water Tables

What is the loading rate at 10’ centers for a cap and fill system with a 12” settled cap and brief @ 10”, moderate @ 16”, & long @ 32”

Brief @ 10	+ 6”	= 16”
Moderate @ 16	+ 6”	= 22”
Long @ 32	+ 6”	= 38”

(Moderate – Brief) ÷ 3 = Difference

(22” - 16”) ÷ 3 = 2”

22”- 2” = 20” ← Adjusted Moderate

(Long – Adj. Moderate) ÷ 2 = Difference

(38” - 20”) ÷ 2 = 9”

38”- 9” = 29” ← Adjusted Long

Loading rate of **0.35 GPD/sq. ft** for moderate @ 20”

Wastewater Flows for Residences

1 bedroom →	150 GPD
2 bedroom →	270 GPD
3 bedroom →	370 GPD
4 bedroom →	450 GPD

Each bedroom over 4 → 50 GPD

How many gallons per day would a 7-bedroom house be sized for?

600 GPD

Sizing Septic Tanks for Residences

1 bedroom → 1000 gallon

2 bedroom → 1000 gallon

3 bedroom → 1000 gallon

Each bedroom over 3 → 250 gallons

How many gallons would the septic tank be for a 7 bedroom house?

2000 gallon

Sizing Septic Tanks for Commercial Business

How many hours of flow do we require for capacity?

48 hour flow or 1000 gallon minimum

Minimum size septic tank for Dollar General with 150 GPD flow?

1000 gallon

Sizing Holding Tanks for Commercial Business

How many hours/days of flow do we require for storage capacity?

10 days of flow or 1000 gallon minimum

Minimum size holding tank for Dollar General with 150 GPD flow?

1500 gallon

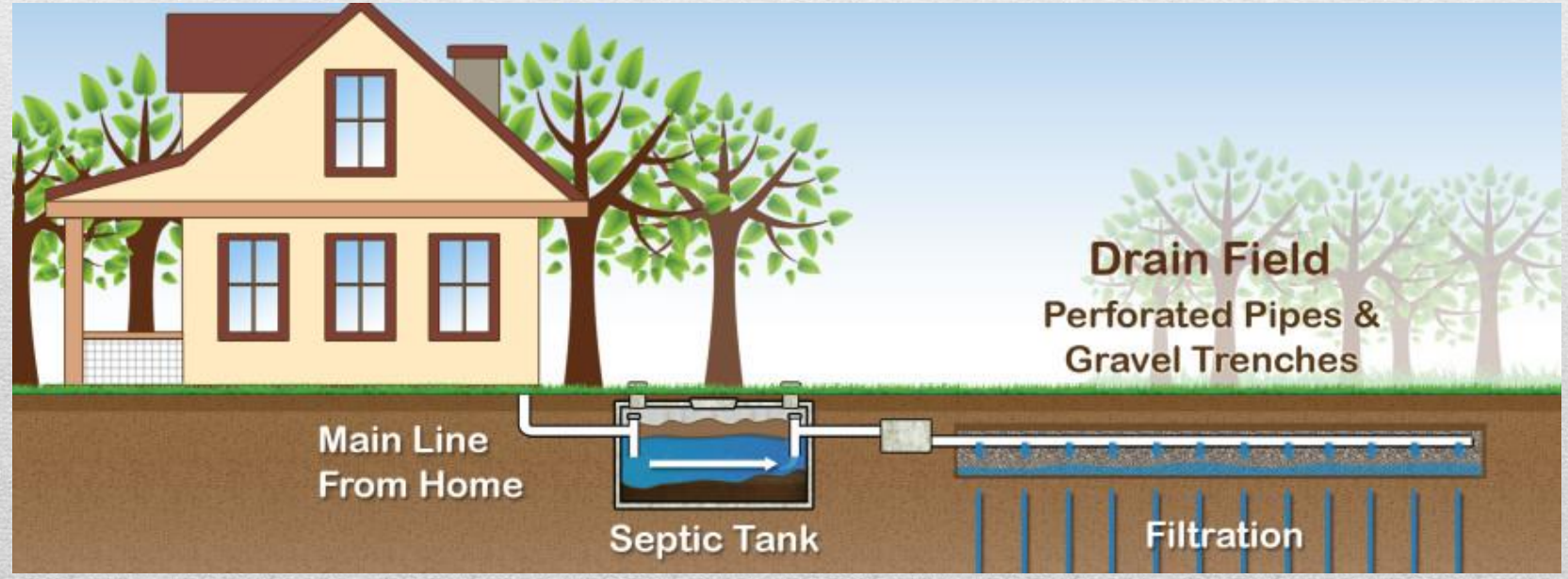
Sizing Absorption Areas

2. How much field line would a 3 bedroom house require with loading rate of 0.53

3 bedroom house = **370 GPD**

370 GPD ÷ .53 (GPD/ft^2)= 698.11 ft^2

698.11 ft^2 ÷ 2 ft (trench width) = **349.055 ft**



Sizing Absorption Areas

3. How much field line would a 5 bedroom house require with loading rate of 0.64?

5 bedroom house = **500 GPD**

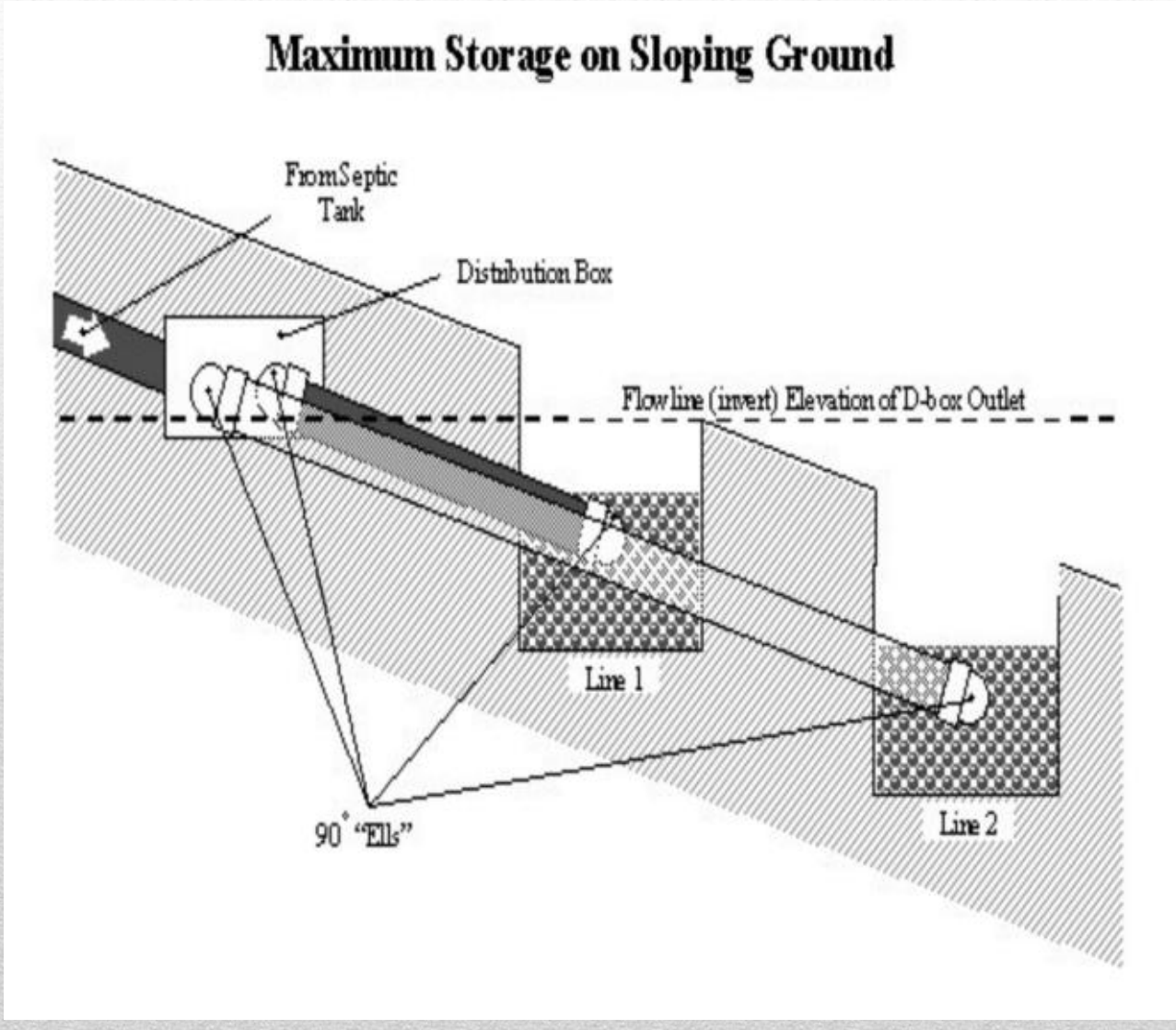
500 GPD ÷ 0.64 (GPD/ft^2)= 781.25 ft^2

781.25 ft^2 ÷ 2 ft (trench width) = **390.625 ft**

Bonus: What size septic tank would we use on this house (no pump)?

1500 gallon tank

Sloping Ground:



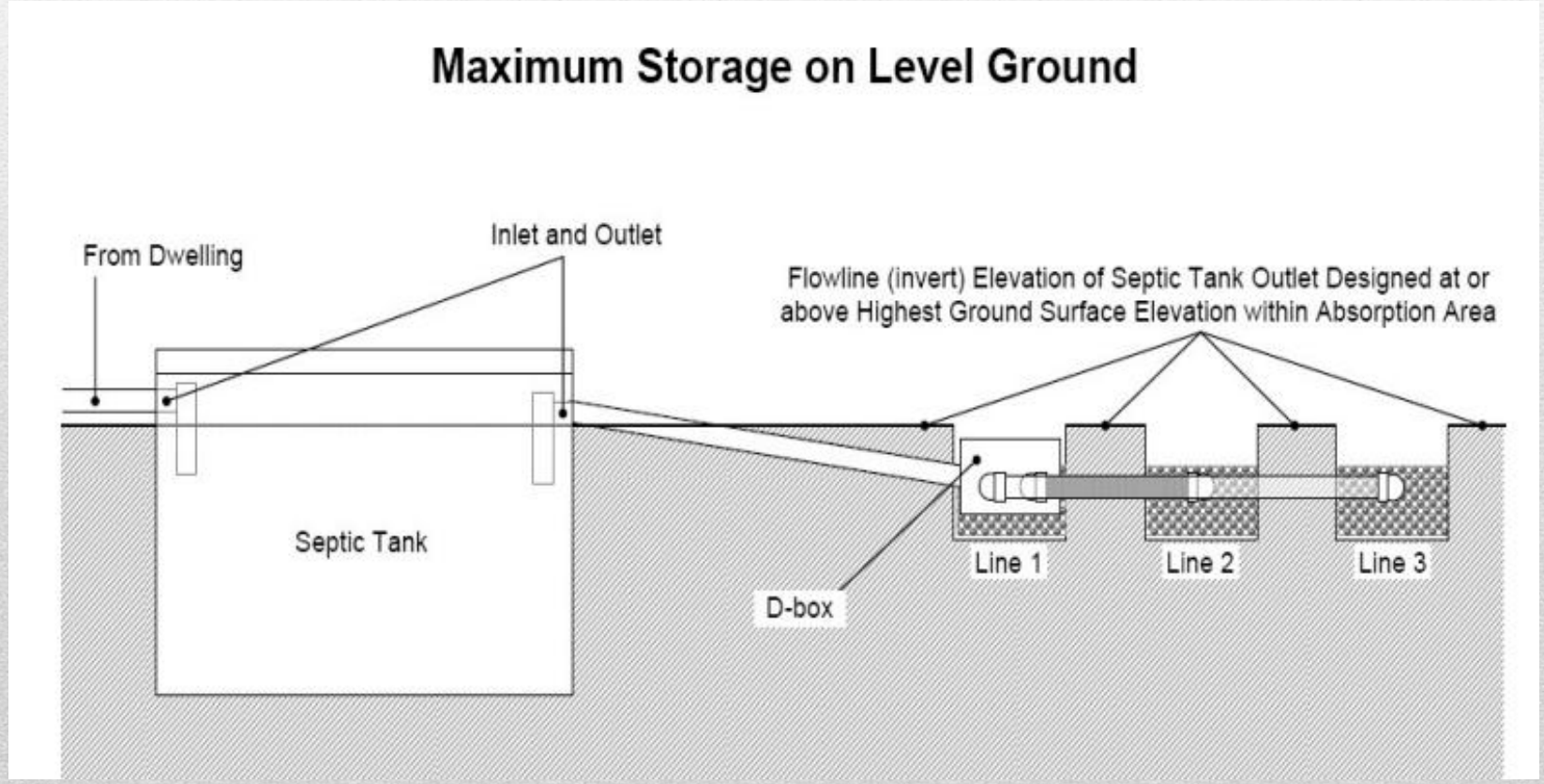
6” or more of difference between ground elevation of first and last line

D-box outlet has to be at or above the ground elevation of highest line

Flat Ground:

< 6” of difference between ground elevation of first and last line

Septic tank outlet has to be higher than ground elevation at highest line



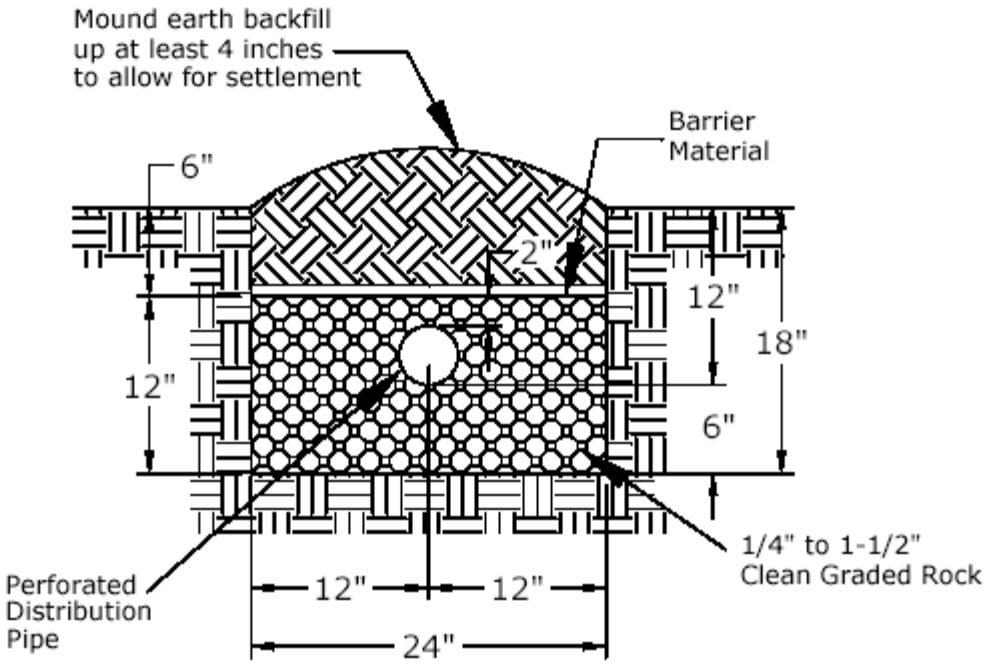
Flow Line Elevations

Line		Beginning		Middle		End
Line 1	TB		TB		TB	
	FL		FL		FL	
	GE	4’ 11”	GE	4’ 11”	GE	4’ 11”
Line 2	TB		TB		TB	
	FL		FL		FL	
	GE	5’ 3”	GE	5’ 3”	GE	5’ 3”
Line 3	TB		TB		TB	
	FL		FL		FL	
	GE	6’ 1”	GE	6’ 1”	GE	6’ 1”

Is this system flat or sloping ground?

fig. 9

Lateral Line Trench Detail



18" Trench Depth

Flow Line Elevations

Line		Beginning		Middle		End
Line 1	TB	**6’ 5”**	TB	**6’ 5”**	TB	**6’ 5”**
	FL	**5’ 11”**	FL	**5’ 11”**	FL	**5’ 11”**
	GE	4’ 11”	GE	4’ 11”	GE	4’ 11”
Line 2	TB	**6’ 9”**	TB	**6’ 9”**	TB	**6’ 9”**
	FL	**6’ 3”**	FL	**6’ 3”**	FL	**6’ 3”**
	GE	5’ 3”	GE	5’ 3”	GE	5’ 3”
Line 3	TB	**7’ 7”**	TB	**7’ 7”**	TB	**7’ 7”**
	FL	**7’ 1”**	FL	**7’ 1”**	FL	**7’ 1”**
	GE	6’ 1”	GE	6’ 1”	GE	6’ 1”

*Using 18” deep gravel trenches

Common Setbacks for Septic Systems

- 10 feet from all property lines
- 10 feet from house/building system services
- 10 feet from any water service line (or sleeved if closer)
- 50 feet from a pond entirely on property of septic system
- 100 feet from a pond with shared owners/properties
- 100 feet from a sinkhole
- 100 feet from a well (on same or neighboring properties)
- 100 feet from high water mark of stream/lake
- 300 feet from high water mark of reservoir/lake if within ¼ mile of drinking water intake

Minimum Setbacks for Surface Discharging Systems

- Requires 3 acres or more for surfacing discharging systems
- 300 feet from point of discharge (POD) and neighboring homes or commercial buildings
- 150 feet from POD and property line
- 200 feet from POD to property line in direction of flow (downhill side)
- Maximum of 12% slope at POD

Recent Changes to Onsite Rules

- Maximum line length is now 150’
- Remain on contour
- Only with mechanical dosing

Recent Changes to Onsite Rules

Subdivision Review

- Capping fill, interceptor/curtain drains, and drip can now be used to determine minimum lot size during review

Recent Changes to Onsite Rules

Drip in Subdivision Review

- Minimum lot size is 0.5 acres
- Primary & secondary areas flagged on contour
- Brief legal descriptions of primary & secondary areas
- Separation to bedrock:
- 18” with a Moderate SWT
- 24” w/o a moderate SWT

Recent Changes to Onsite Rules

Interceptor Drains in Subdivision Review:

- When brief SWT is between 0 – 18 inches in depth
- 30% clay maximum
- 3% minimum slope
- **Must submit complete permit for lots utilizing I-drains in lot size during subdivision review**
- To verify uphill slope to catch water and check for discharge point and location
- 4 mil plastic barrier on field line side of trench

Recent Changes to Onsite Rules

Capping Fill in Subdivision Review:

- Must meet minimum soil criteria:
  - 13” brief, 18” adj mod, 24” adj. long
- 12% maximum slope
- Figures 4 – 7 in rules
- Credit for up to half the depth of the SETTLED cap
  - Up to 7” of credit in SWT depths

Choosing a Good Benchmark

- Gives starting point to relay out system if flags are missing or contours are charged
- Permanent non movable objects

- Don’t like nails in trees? Try paint?