



# Temporary Measures on a Permanent Footprint

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# Alternate Title



Designing erosion control measures to maximize utility of permanent infrastructure

# Virtual Learning



# About me

- City of Charlotte
- NC State University
- Passion for Water Quality



# Disclaimers



- Charlotte Challenges
- Myopically E&SC

# Alternate Title



Designing erosion control measures to maximize utility of permanent infrastructure

# Why?



- Construction and water quality intersect at timeliness of operations
- Permanent structures are more reliable
- Principles of storm water design\* direct both
- “Hidden efficiencies”

\* normal

- Temporary Sediment Trap (6.60.1)
  - Treatment area <5 acres (but really <1!)
  - 3600 ft<sup>3</sup>/disturbed acre
  - 435 ft<sup>2</sup>/cfs Q<sub>10</sub>
  - 1.5 feet of storage below grade
  - Embankment ≤ 5' and 24 months

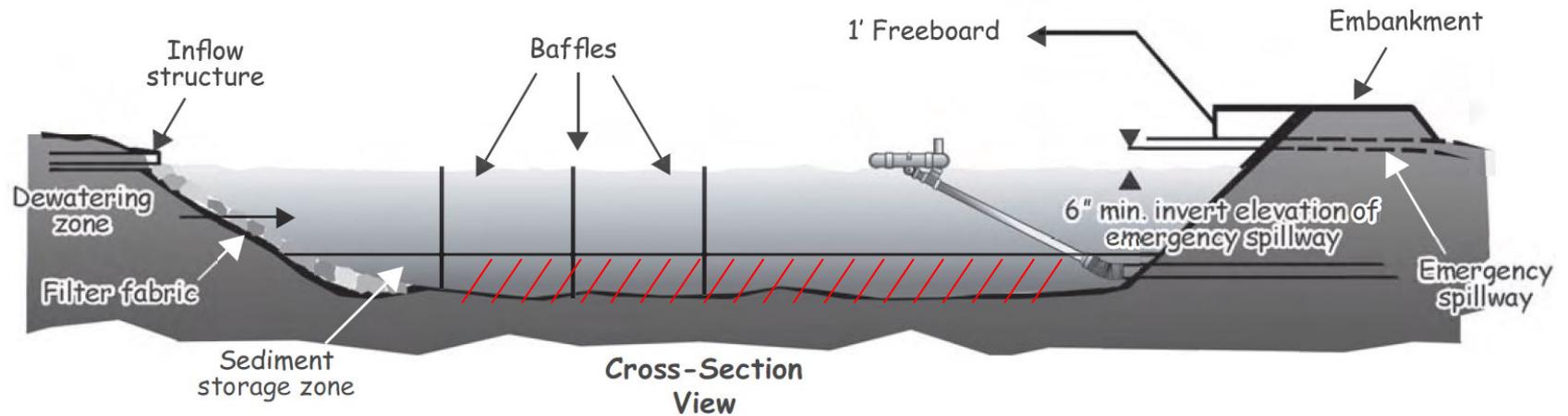






- Skimmer Sediment Basin
  - Treatment area < 10 acres
  - 1800 ft<sup>3</sup>/acre disturbed
  - 325 ft<sup>2</sup>/cfs Q<sub>10</sub>
  - “Sediment Storage Zone”
  - Embankment ≤ 5’ and 36 months
  - Min. dewatering time = 2 days

# 6.64.7



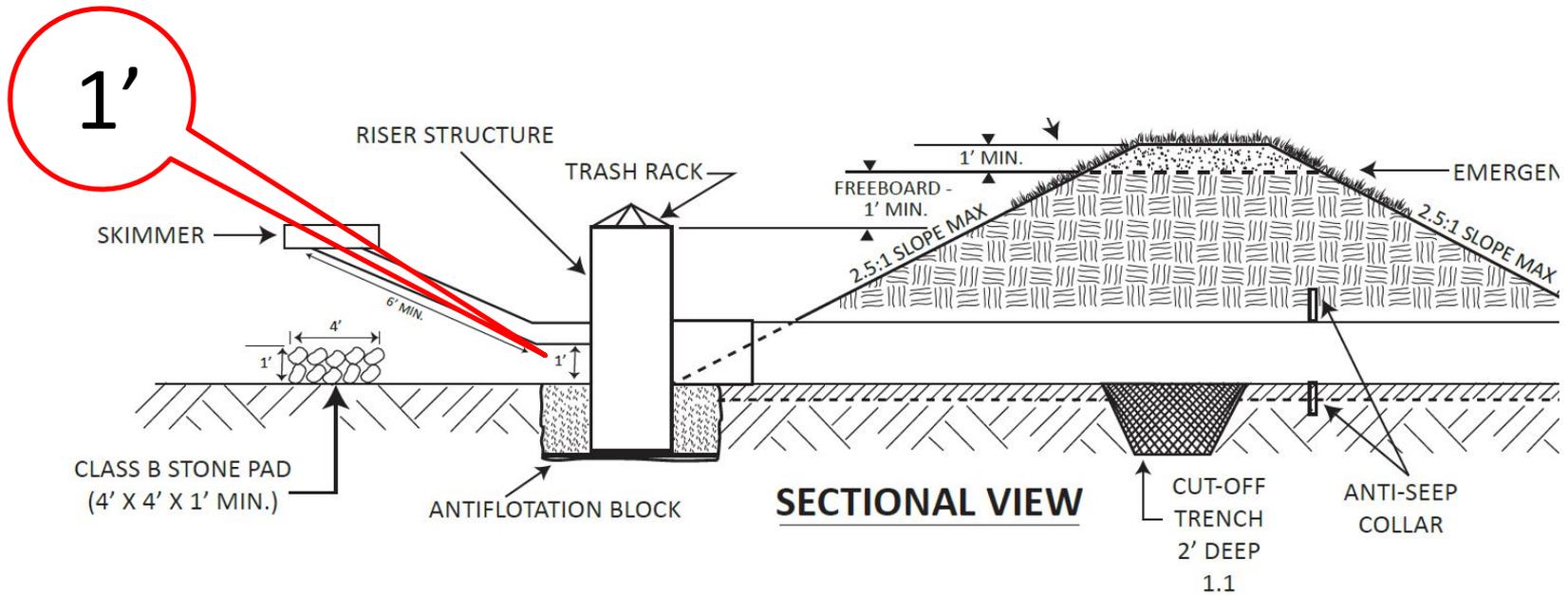
**Figure 6.64c** Example of a sediment basin with a skimmer outlet and emergency spillway. From Pennsylvania Erosion and Sediment Pollution Control Manual, March, 2000.



# E&SC Refresher



- Sediment Basin with Riser Barrel
  - Treatment area < 100 acres
  - 1800 ft<sup>3</sup>/disturbed acre
  - 325 ft<sup>2</sup>/cfs Q10
  - 1 foot storage below grade
  - Embankment <15' and 36 months
  - Min. dewatering time = 2 days
  - OCS



**NOTES**

1. SEED AND PLACE MATTING FOR EROSION CONTROL ON INTERIOR AND EXTERIOR SIDESLOPES.
2. INSTALL A MINIMUM OF 3 COIR FIBER BAFFLES IN ACCORDANCE WITH PRACTICE STANDARD 6.65.
3. INSTALL SKIMMER AND COUPLING TO RISER STRUCTURE OR DIRECTLY INTO EMBANKMENT 1 FT. FROM BOTTOM OF BASIN.
4. THE ARM PIPE SHALL HAVE A MINIMUM LENGTH OF 6 FT. BETWEEN THE SKIMMER AND COUPLING.



# Commonalities (Temporary)



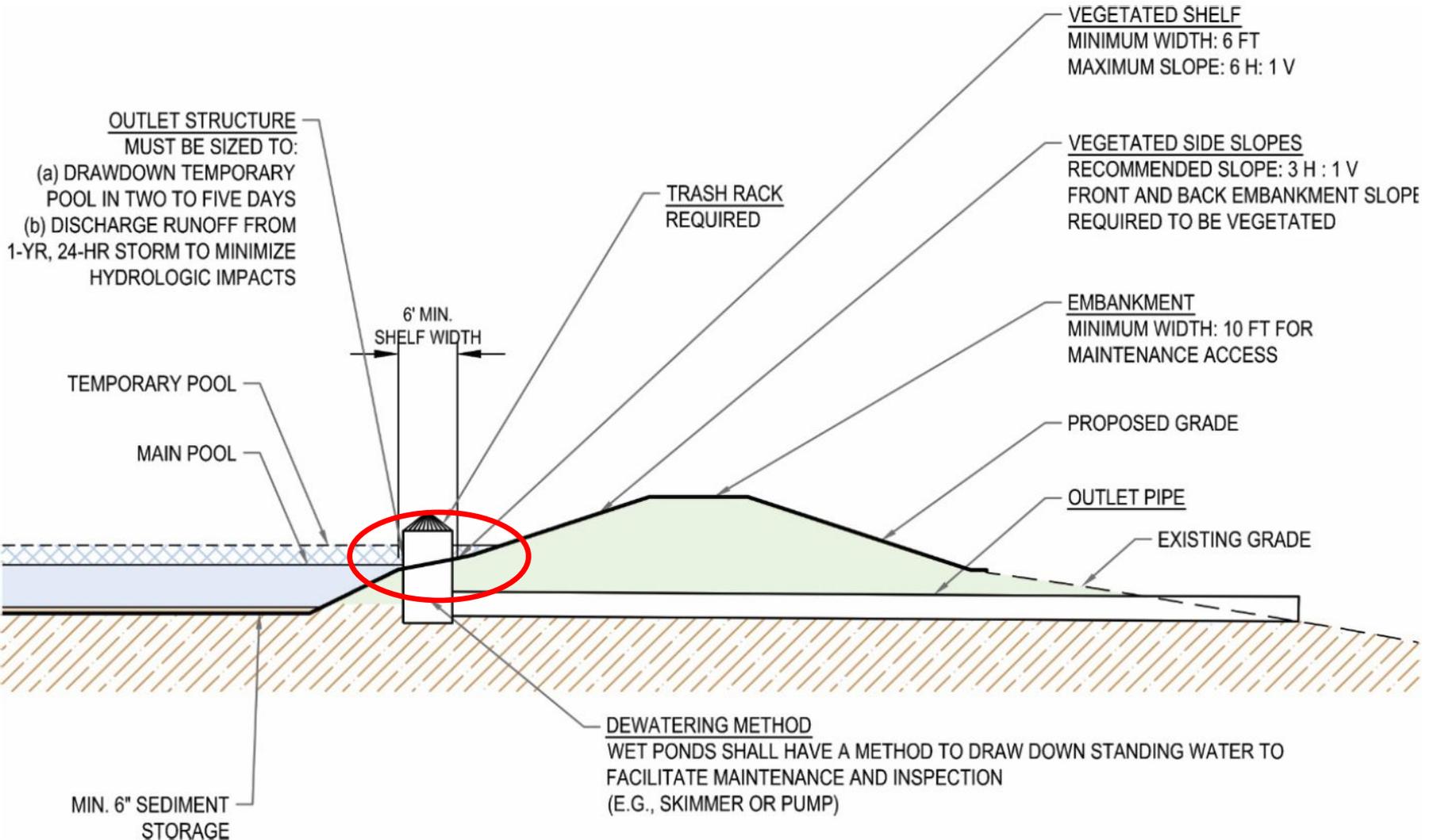
- Embankment life
- Embankment height
- Over-excavation (?)
- Spillway
- Baffles
- Everything can be sed. Basin with riser
- Basin floor flat or sub-grade
- Surface area at primary spillway
- Design volume (between bottom and spillway)

# SCM Refresher



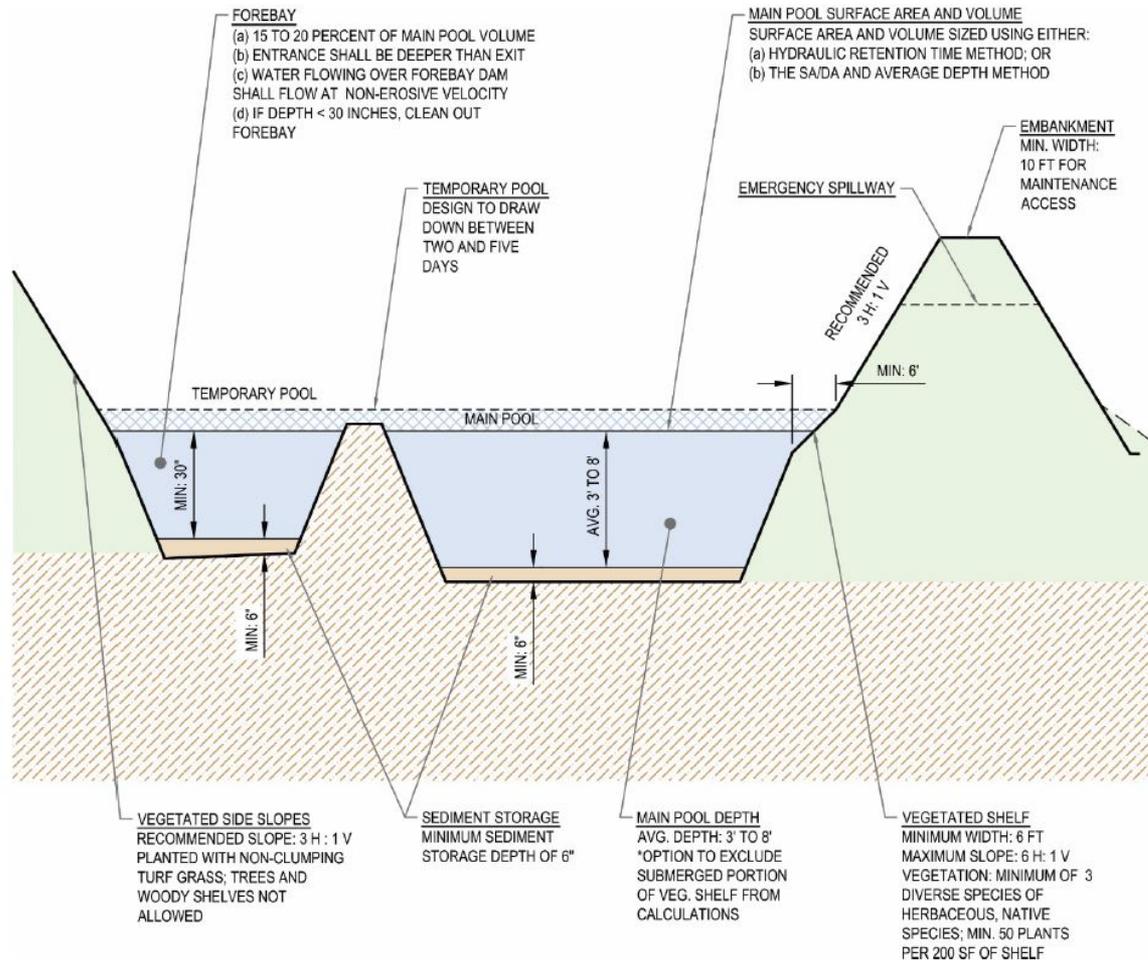
- Wet Pond
  - Forebay structure
  - OCS
  - Permanent and Temp. water elevation
  - Safety/littoral shelf

# Wet Pond Detail



# Wet Pond Detail

Figure 2: Wet Pond Example: Cross-Section View 1



# SCM Refresher



- Sand Filter (open bottom)
  - Max 10 acres drainage
  - Forebay
  - Underdrain system
  - OCS



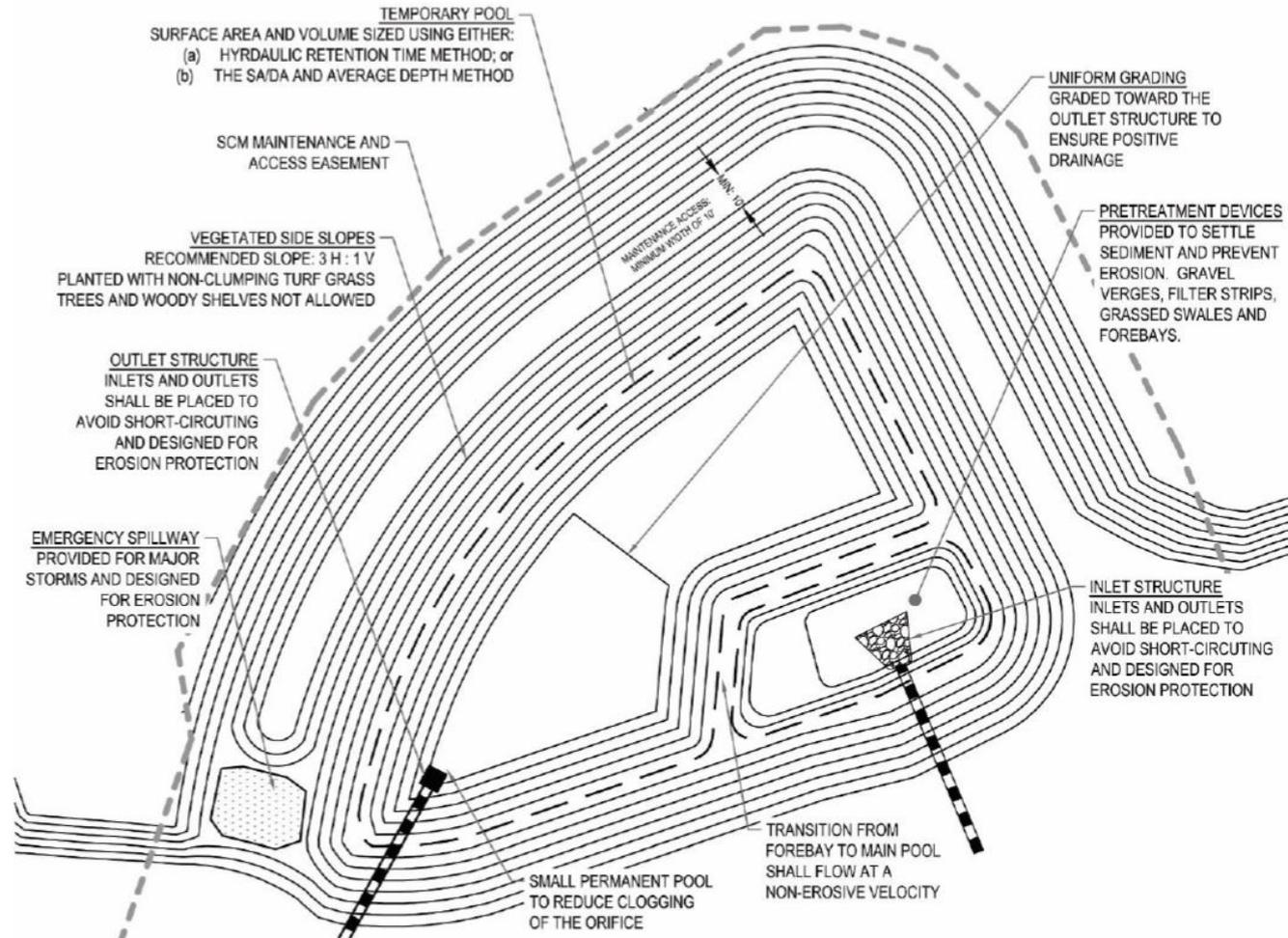
# SCM Refresher



- Dry Detention
  - Bottom with positive drainage
  - OCS
  - Forebay

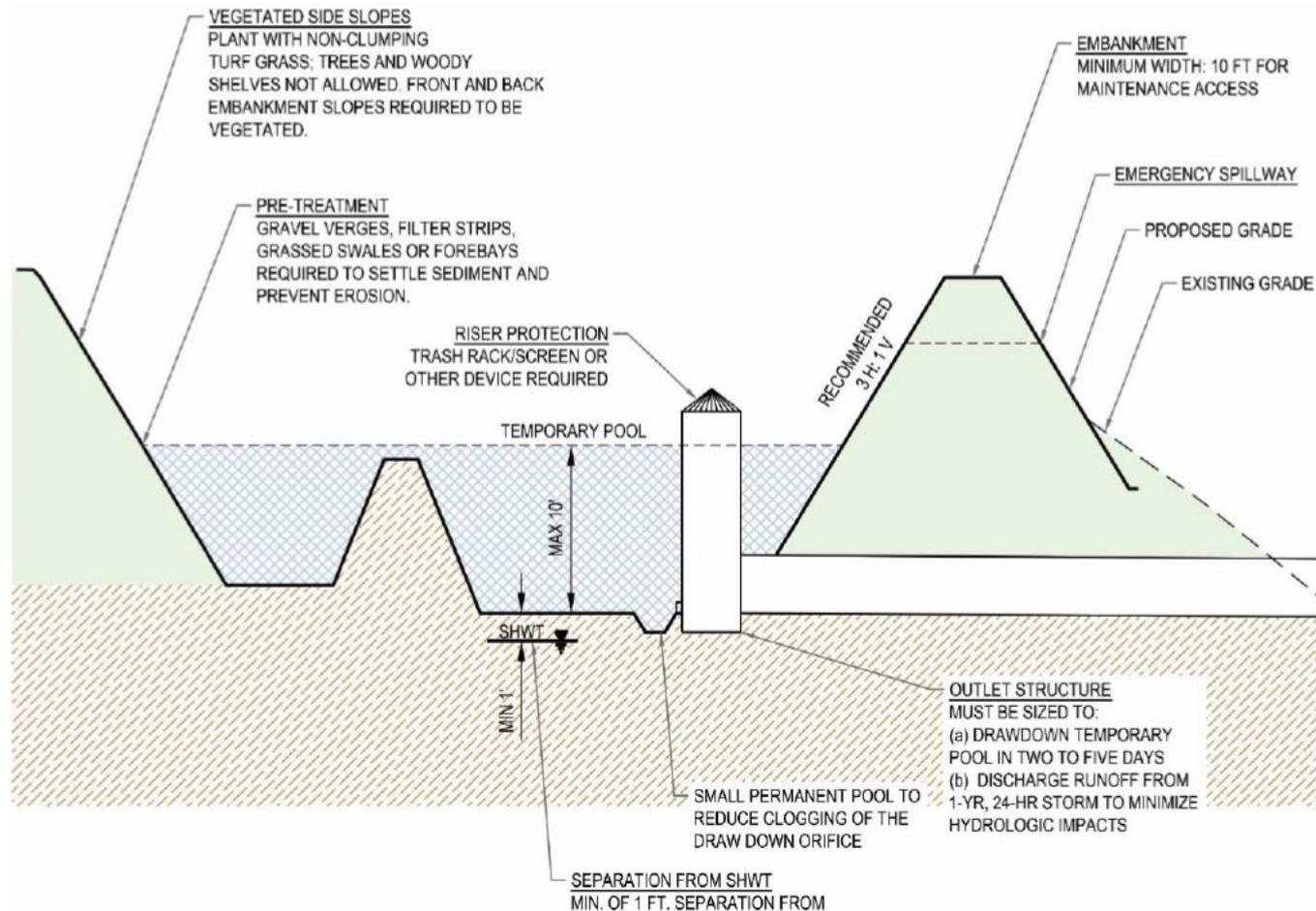
# Dry Pond State Detail

Figure 1: Dry Pond Example: Plan View



# Dry Pond State Detail

Figure 1: Dry Pond Example: Cross-Section



# Commonalities



- Forebay
- OCS

Therefore:

Everything can be sediment basin with riser

# Basin → Sand filter



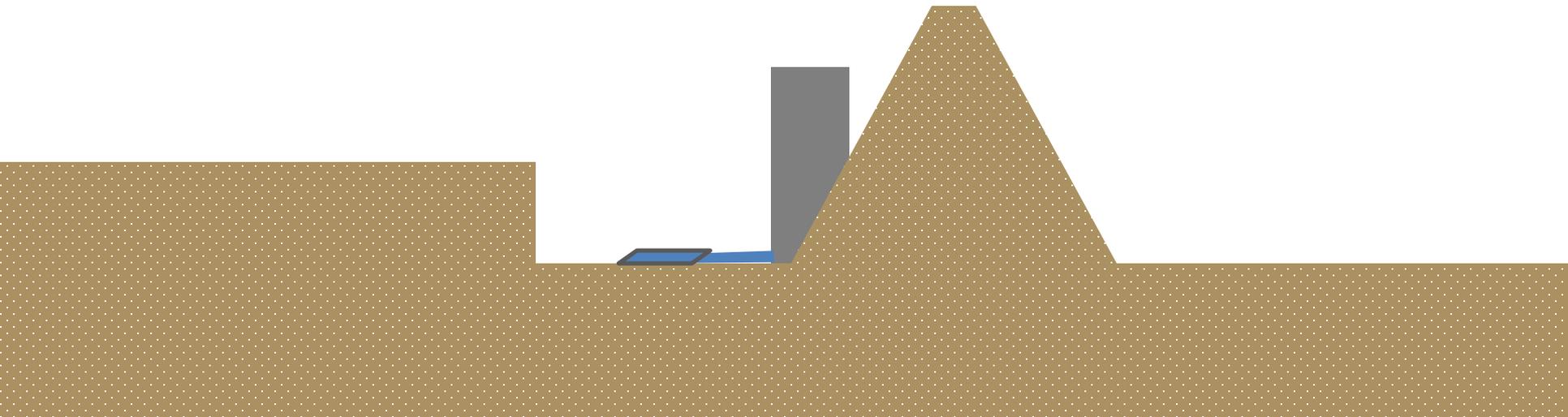
## Problems:

- Sizing
- Excavation for underdrain
  - Lowest invert on OCS too low
  - Bottom not flat
  - Spillway?

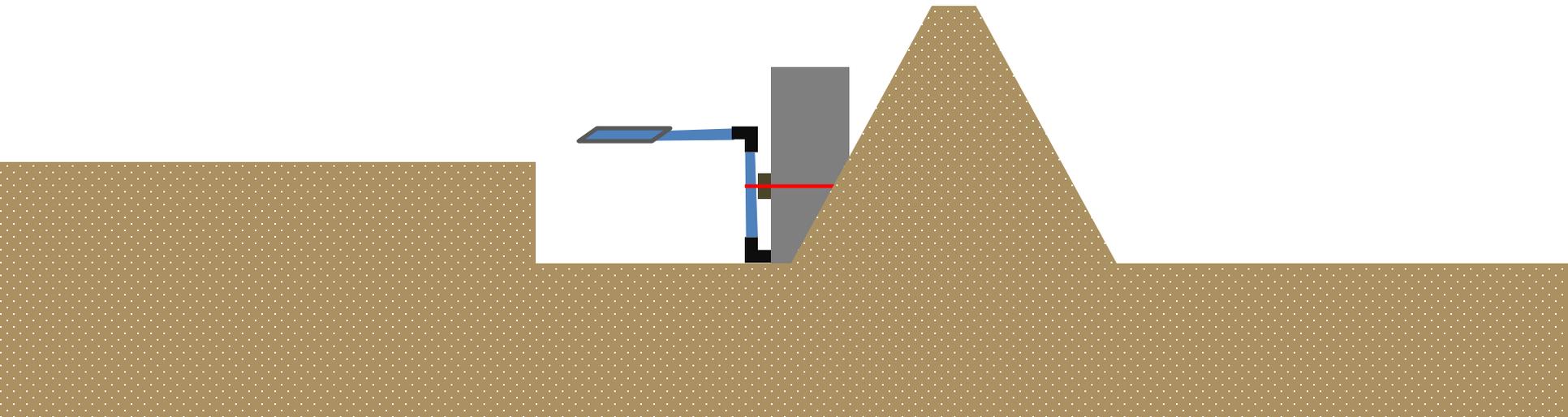
## Solution:

- Manipulate skimmer invert
- Ensure treatment volume
- Ensure treatment surface area





# Manipulated Invert





# Basin → Wet pond



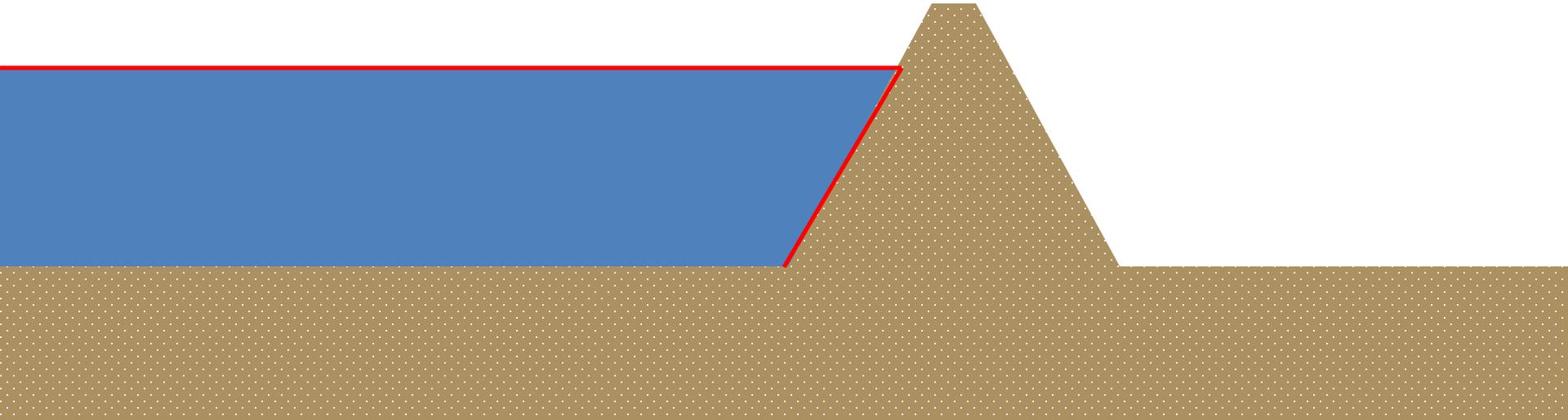
## Problems:

- Safety/littoral shelf
- Sizing
- Dam height
- Spillway elevation
- Surface area  
“jump”
- Baffles inundated

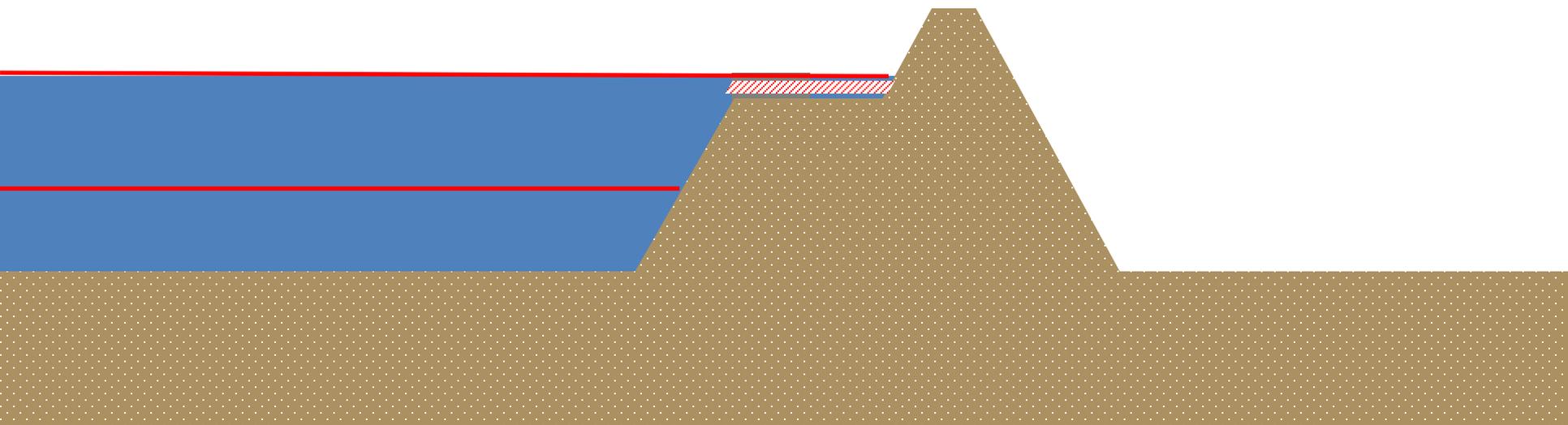
## Solution:

- Excavate basin only to safety shelf elevation as temp. floor
- Let basin fill to WQ elevation; treat between there and primary spillway
- Floating baffles?

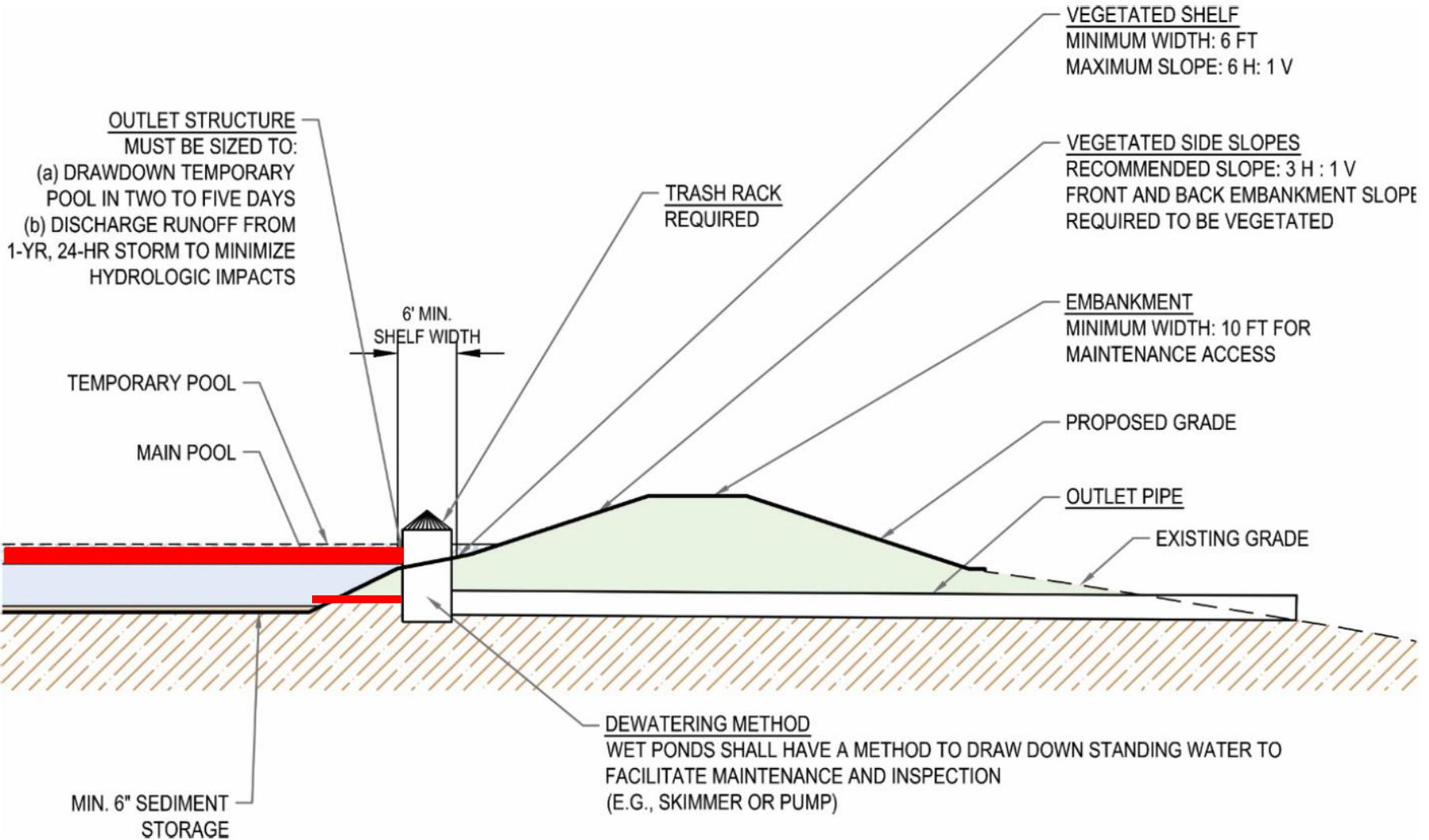
# Surface Area “Jump”



# Surface Area “Jump”



# Wet pond Detail





# Basin → Dry Detention

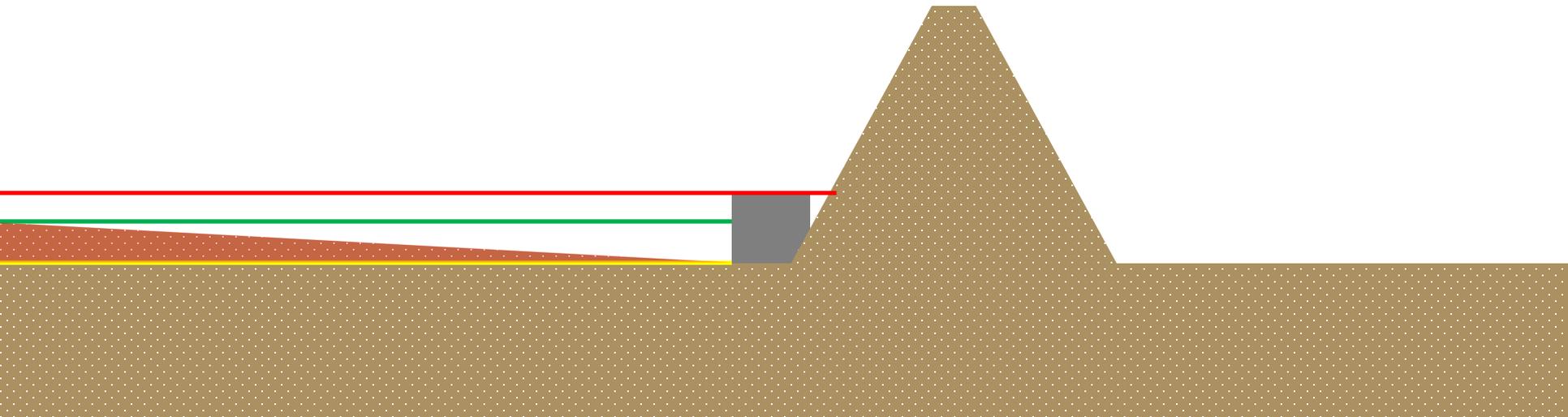


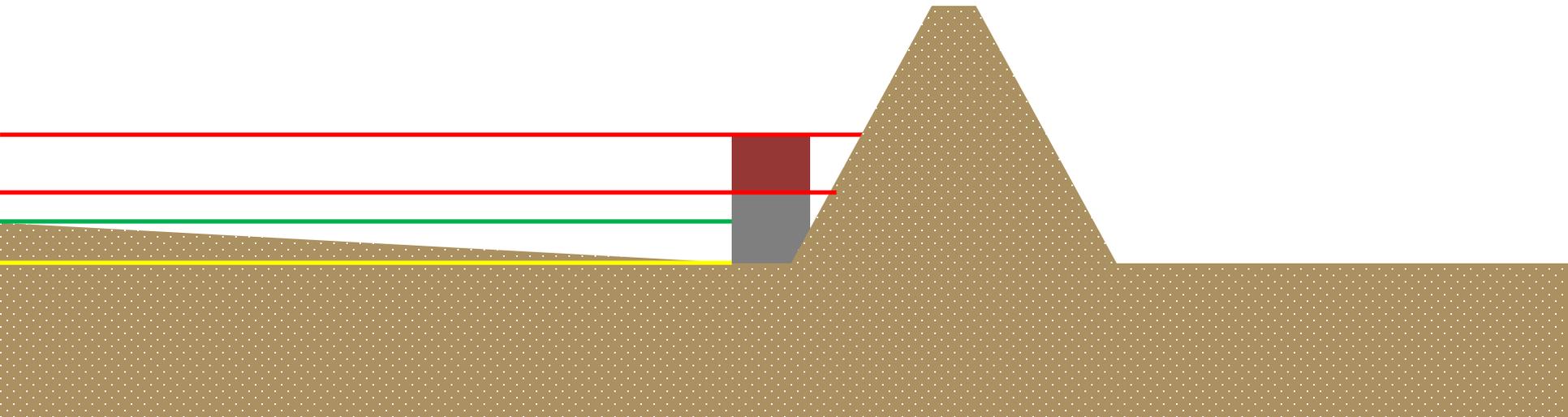
## Problems:

- Sloped bottom
- Sizing
- Spillway elevation (too low)

## Solution:

- Manipulate skimmer invert
- Check volume/surface area
- Adjust riser sections









# Recap



- Build embankments once, permanently
- Build permanent OCS
- Use entire basin footprint
- Consider treatment profile
  - Invert
  - Spillway
  - SA Jump?

# Recap



- Baffle depth of flow
- Plan additions/fills carefully
- Know and follow jurisdictional req's
- Build in margin of safety when possible
- Communicate with contractor

# Thank you

