



Caption

Hydraulic Loading Tests

What is a hydraulic loading test intended to accomplish? Can the system drain adequately?

What can a hydraulic loading test determine? (Volume of drainage and distribution of flows)

Do you run an operational test of a system you are inspecting? Discuss

What is the difference? Discussion

An operational test helps verify that loading test flows will not be physically restricted.

Frank Parker

A Satisfactory, or Unsatisfactory Result

The goal is a clear answer

- With a measured, monitored set of procedures, a result is determined.
- Flooding, filling, blowing the system out, are not terms or events that are desirable.
- Using code indicated water volumes first, as guides, we seek a closely watched, measured result, over the course of, at least 24 hours.

When is a Hydraulic Loading Test most appropriate?

- Vacancy of more than 7 days - Absorption systems may appear artificially better, if the system has not been used, so testing determines one way, or another, whether it can dissipate the required volume.
- Interruption of flows to the absorption system, such as pumping within 30 days of an inspection.
- Soil fracturing, if encountered.
- (Atypical flows) A broken/clogged pipe, which prevented flows from fully reaching the absorption component, or a leaking treatment tank.
- Less than one day's reserved capacity on a seepage pit/cesspool, or when the amount dry aggregate in a standard gravity, gravel seepage bed or trench system indicates that the system may not be operating properly.

When a Hydraulic Loading Test is inappropriate?

- When the aggregate of a standard absorption system is fully saturated to the top of the gravel, or chamber ceiling.
- When a seepage pit or cesspool is operating at a level above the invert or incoming pipe.
- When severe weather, or extremely wet conditions would impact the test, (perception of impact may have influence on the parties involved).
- When the structural integrity of a cesspool, or seepage pit is compromised. (Why)
- When any flows from the dwelling will continue to reach the absorption system during the test period. (Pumping or No flows are a must)

Is there room for test flows?

Standard Bed – 12' wide x 60' long x 12" deep

$$12 \times 60 \times 1 = 720 \text{ cubic feet}$$

Aggregate has $\approx 40\%$ void space

1 cubic foot holds ≈ 7.5 gallons of water

$$720 \times 7.5 \times .4 = 2160 \text{ gallons}$$

$$2160 \div 12 = 180 \text{ gallons per inch of height}$$

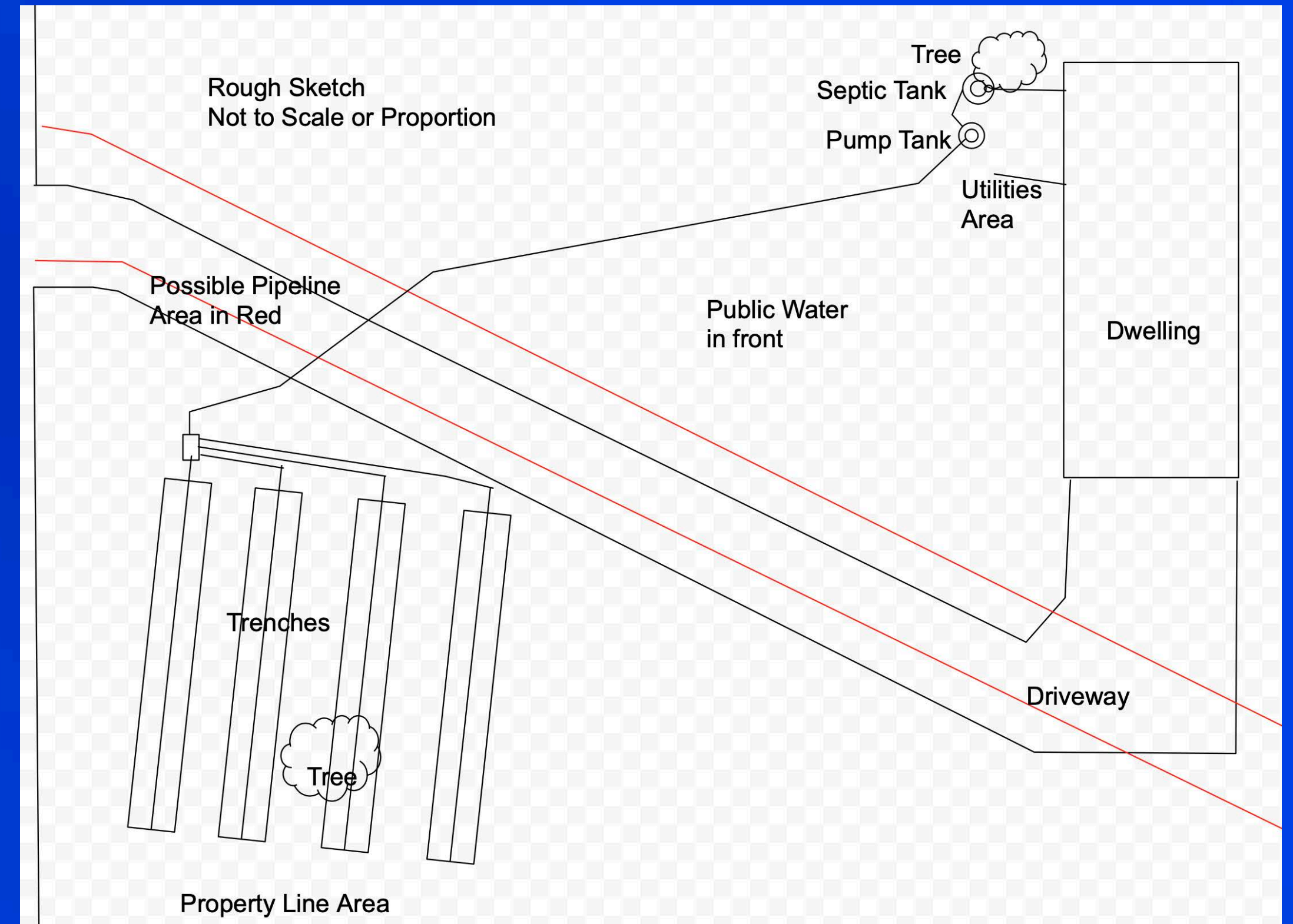
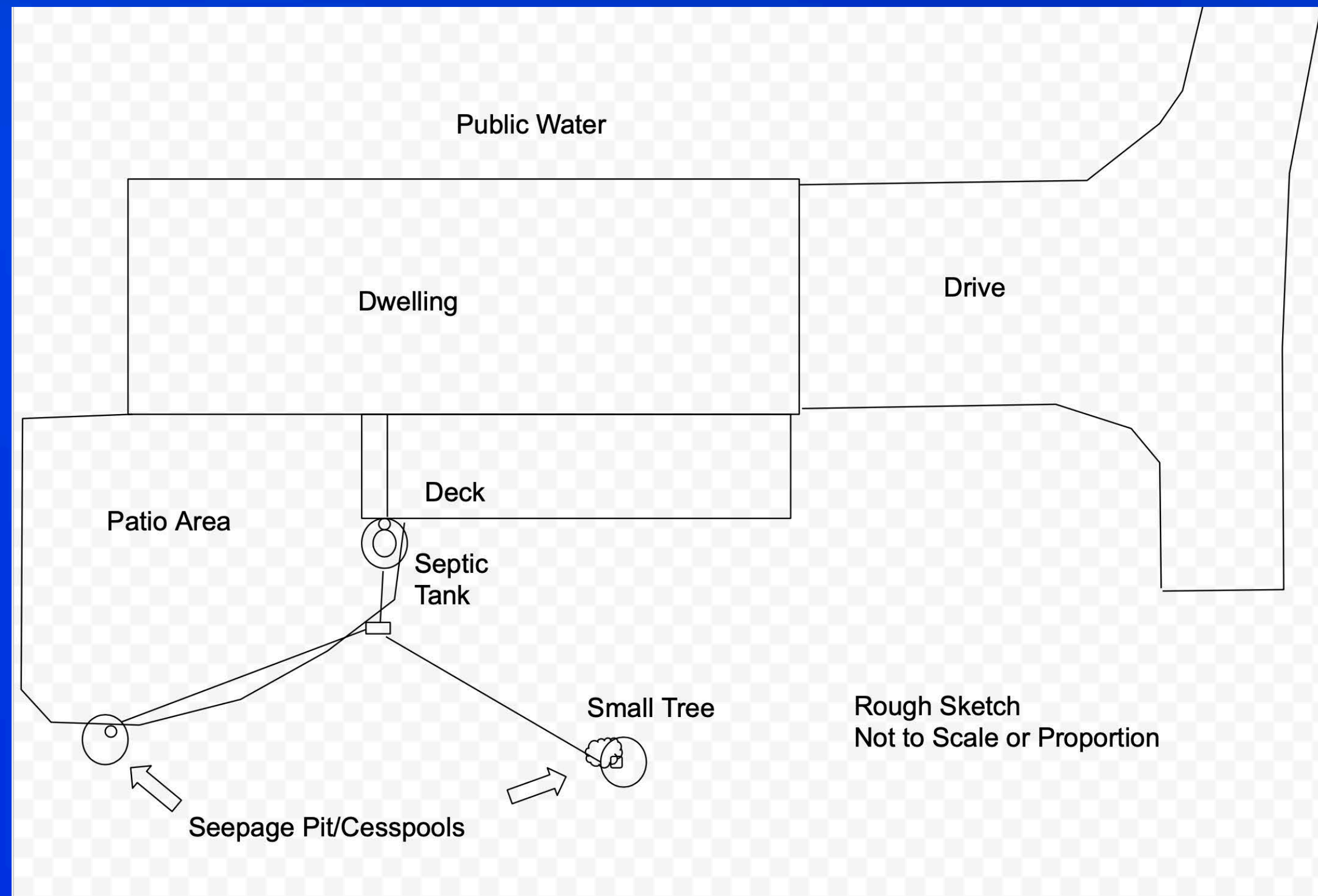


Key point about performing a hydraulic loading test?

- Where should we add the test flows? (Let's hear from the audience.)
- We always add the test flows at the outflow of the last treatment tank or beyond to prevent solids push into the distribution system, or the soil interface of the absorption area.

Where could test water be introduced?

At the outlet of the tank, or beyond.



Hydraulic loading test key points?

- How do you determine what water volume you are going to introduce?
- We refer to our state regulatory usage tables/code for volumes of daily design flows, based on the number of bedrooms, or usage in the house/building being tested.
- We test for the number of bedrooms, or usage expected for non residential being advertised within the dwelling being sold. We don't allow or prorate for wear and tear, or active occupancy.
- We stop adding water if the top of the aggregate, graveless chamber, or seepage pit/cesspool inflow is reached. (This means close monitoring)

Water Sources



Transporting, Spigot from public and, or well.

Idiosyncrasies of Water Source Options

- Transporting involves filling, weight, (average of 3,300 to 5,000 lbs. per day), freeze exposure, and possible DOT issues. Avoid system flooding with large hose diameter.
- Spigot - verifying a spigot is ON and functional, without leaks, inside, or out. public water usually provides little challenge, has a low cost, and often, a reasonably fast flow rate. It is wise to check inside, as a habit, in case of breaks, leaks, or restricted flows.
- Well - Is there a softener? Can it be easily bypassed to prevent backwash flows, and to maximize gallons per minute flow as a source? Softener backwashing during a HLT must be prevented, even if transporting the water. (Worse case, unplug).

Hydraulic Loading Test focus points

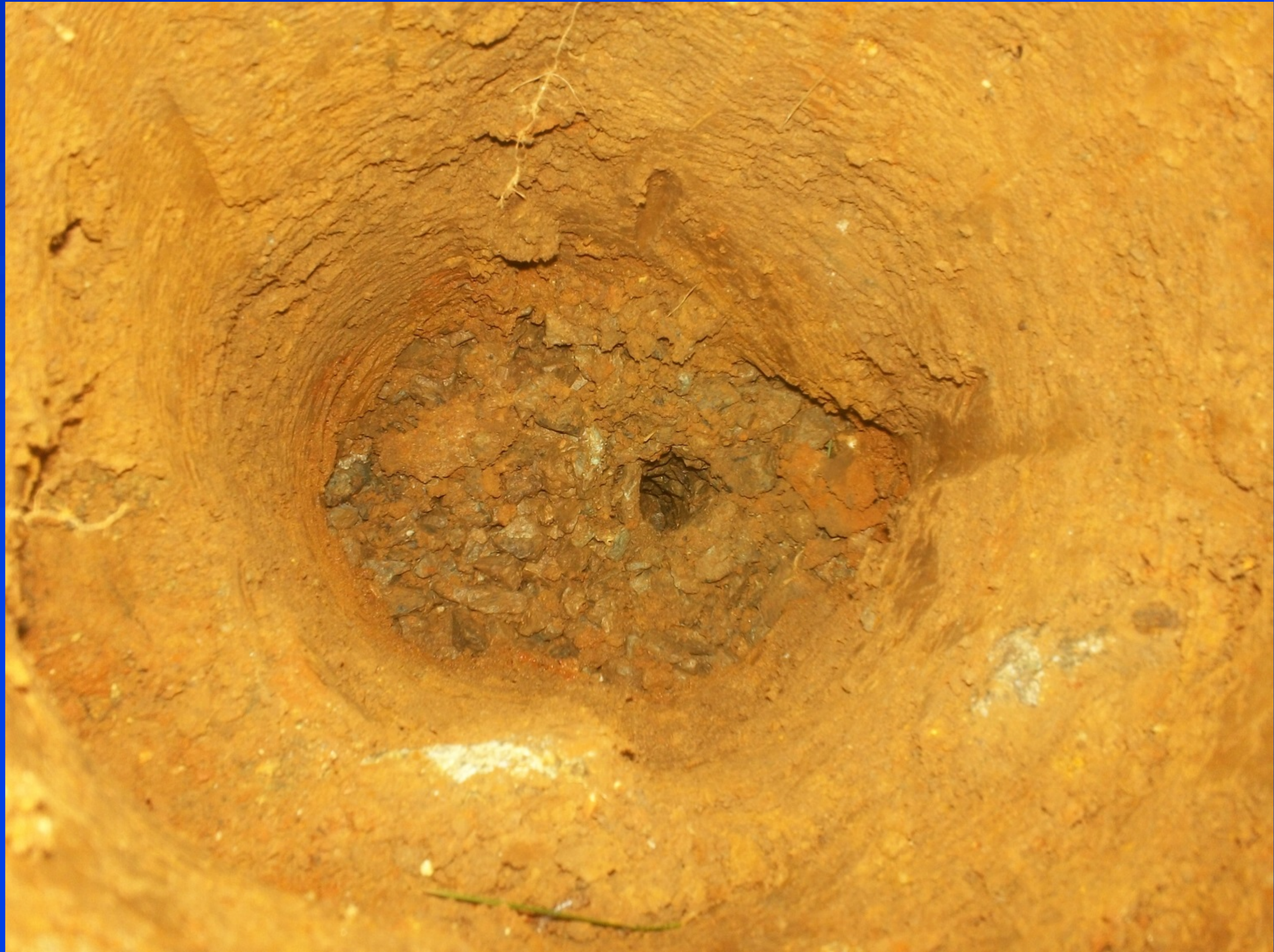
- How long does a hydraulic loading test take to perform?
- A hydraulic loading test always takes at least two days to perform with water being added more than once.
- Day one of the test creates a reference point for ending on the second day.
- Day two verifies that the required design volume of water has been, or has not been, displaced/dissipated.

Hydraulic Loading Test focus points

- How do we monitor the test? (Let's hear some thoughts on this.)
- In a standard gravel seepage bed, we create at least one monitoring location, typically the middle of the component, in some cases, multiple locations.
- In a pressure distribution component, multiple locations can be appropriate to monitor, given the operation of pressurized systems and manifold positions.
- In a seepage pit or cesspool, we would use a vertical access opening or pipe, with direct visual access to the liquid.
- In chamber systems, monitoring pipes must be used for direct visual access, rather than on the exterior of the chambers.











HLT Procedure – Day 1

- Introduce Design Daily Volume of water
 - STOP if unsatisfactory water level reached as per Dry Aggregate Rules:
 - Top of aggregate in bed or trench
 - Top of sand in sand mound
 - Top of chamber in gravelless
- Measure water level in each hole after liquid level has stabilized.

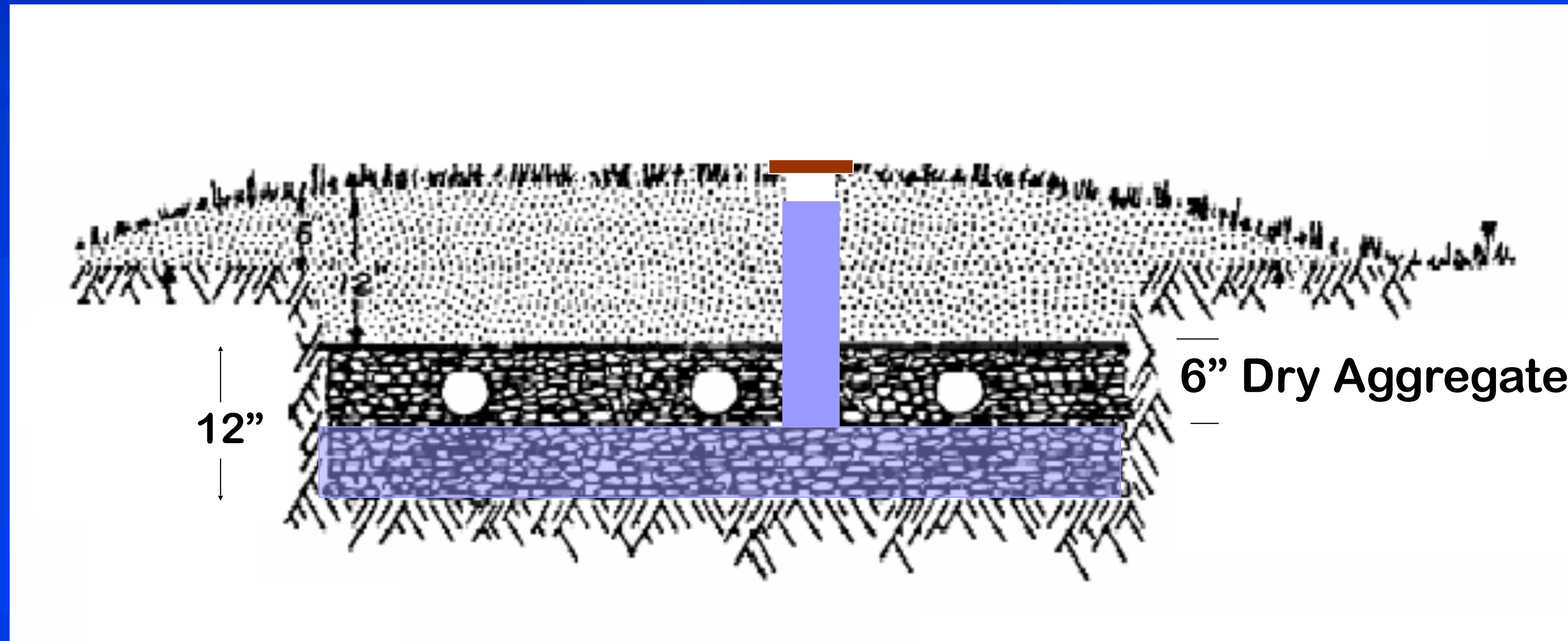
What do you do if the liquid level is at the top of the aggregate?

What do you do if the liquid level rises above the top of the aggregate?

HLT Procedure – Day 2

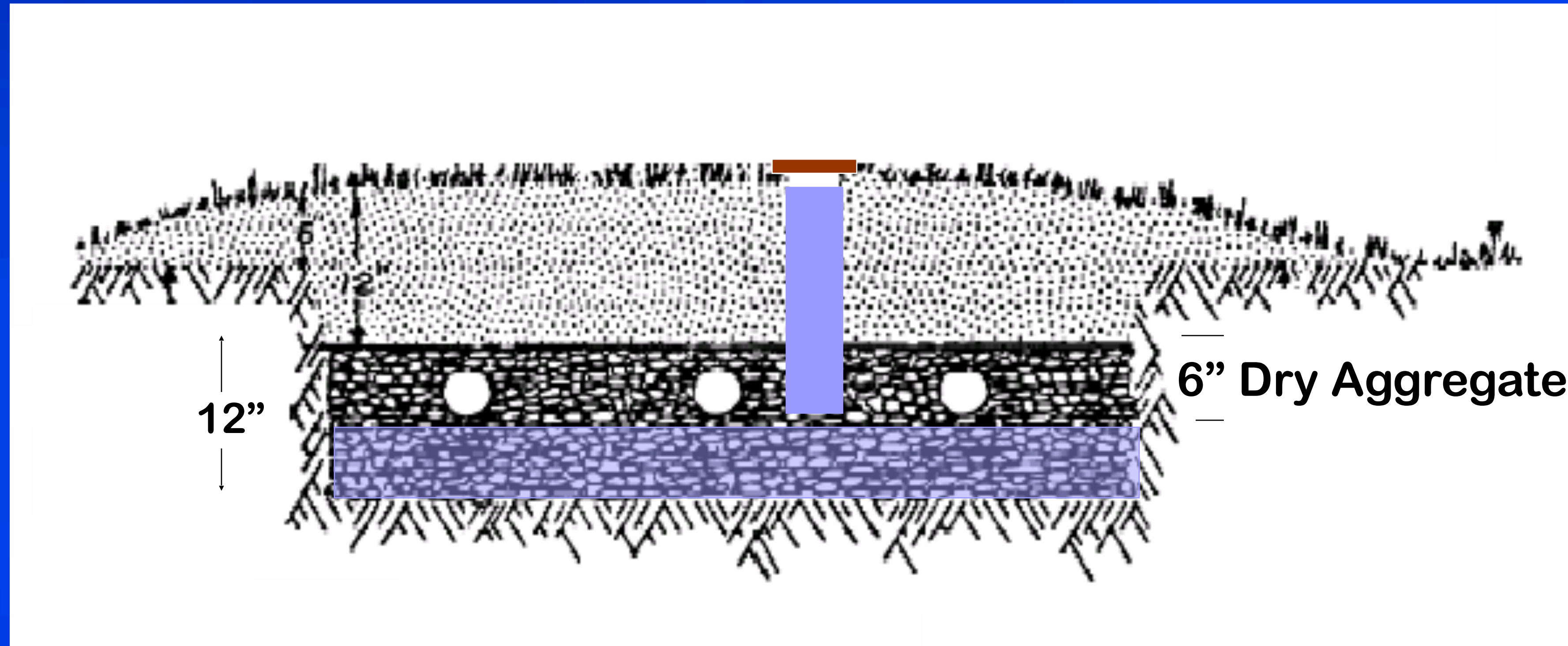
- Return 24 hrs later.
- Measure and record the liquid level remaining in the aggregate.
- Introduce additional water to bring the liquid level to the level reached at the end of day 1.
- The number of gallons introduced on Day 2 is the number of gallons absorbed during the prior 24 hours.

Day One

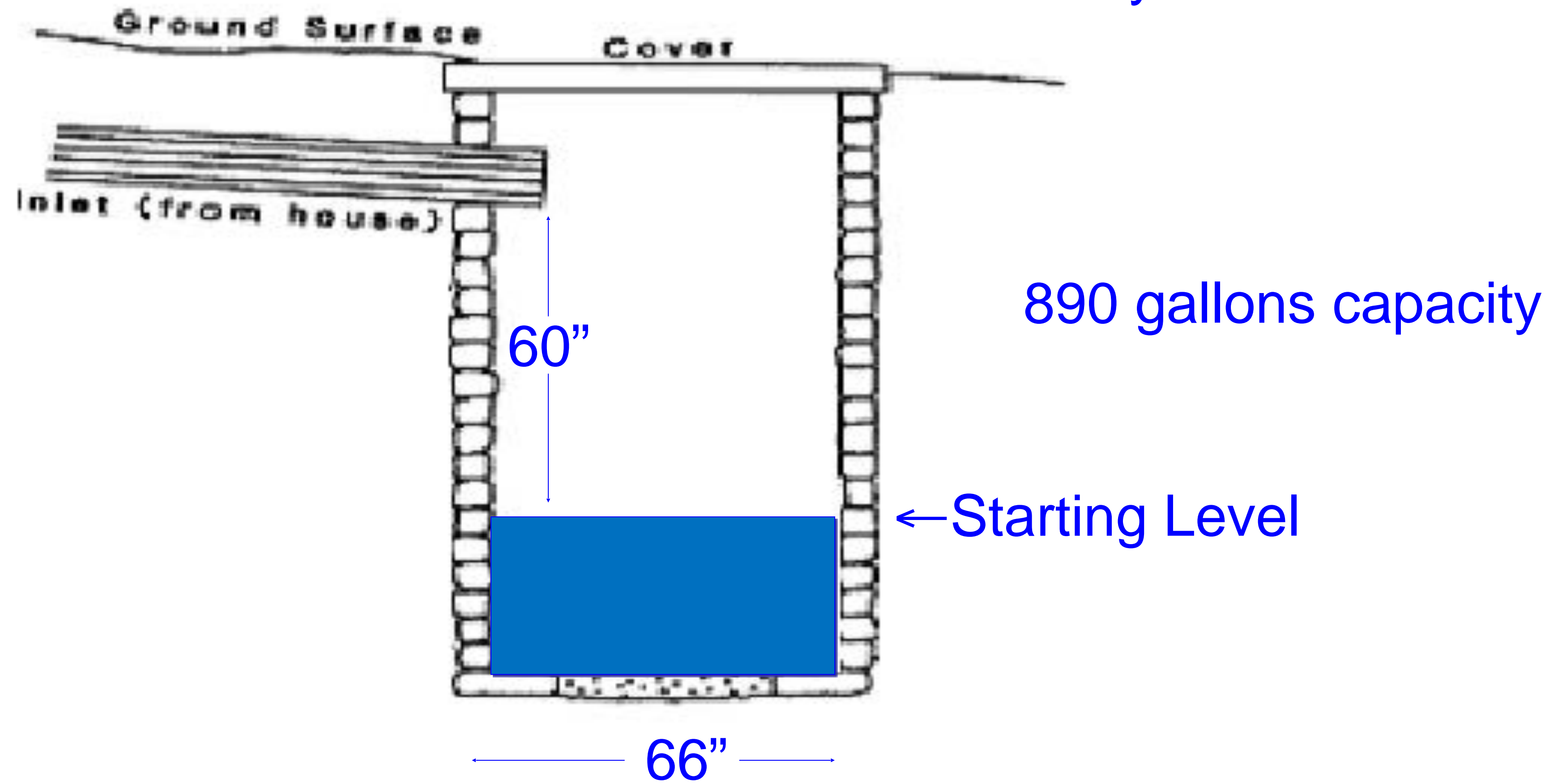


Day Two

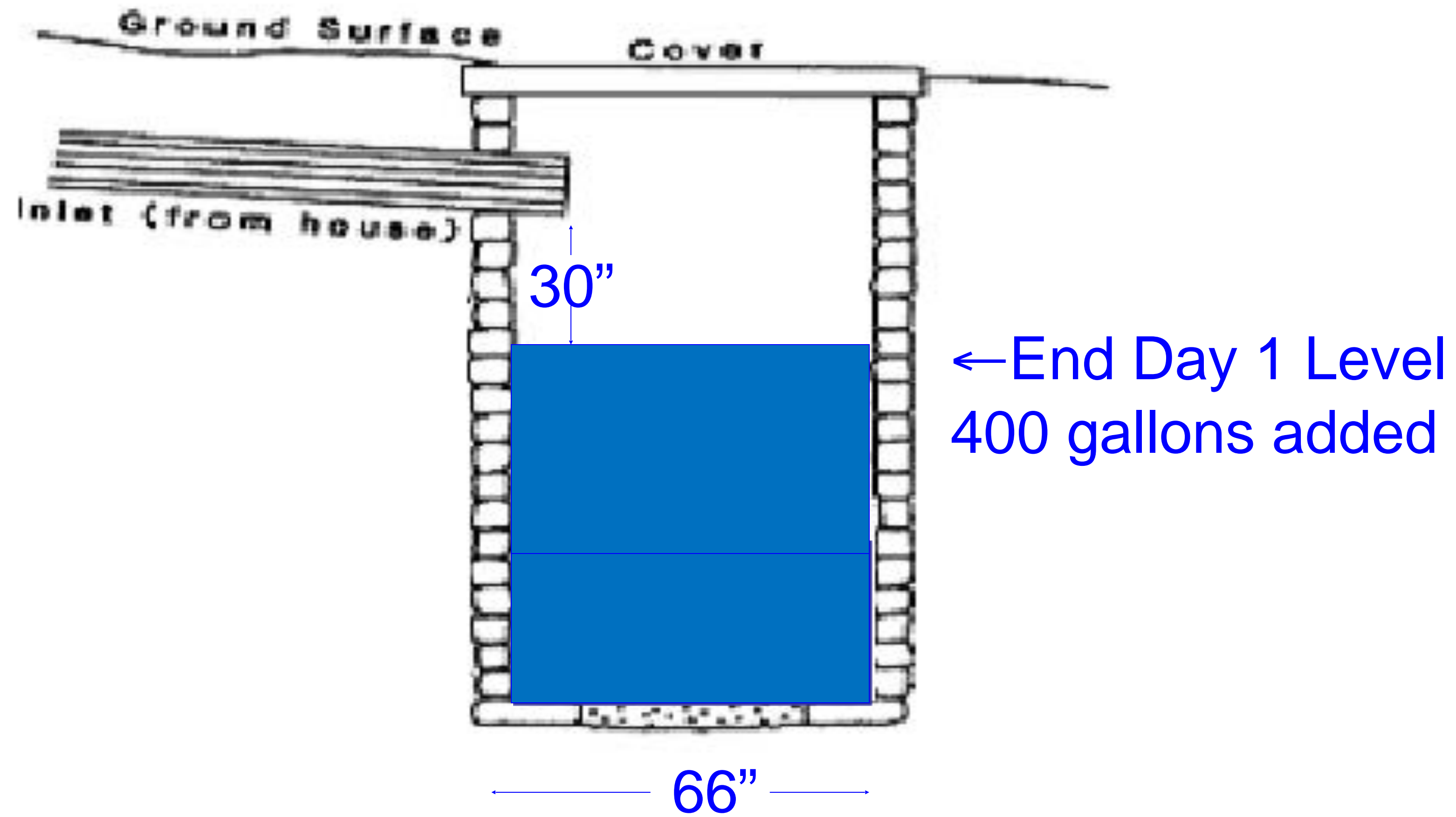
Satisfactory – 500 gallons
Absorbed in 24 hours



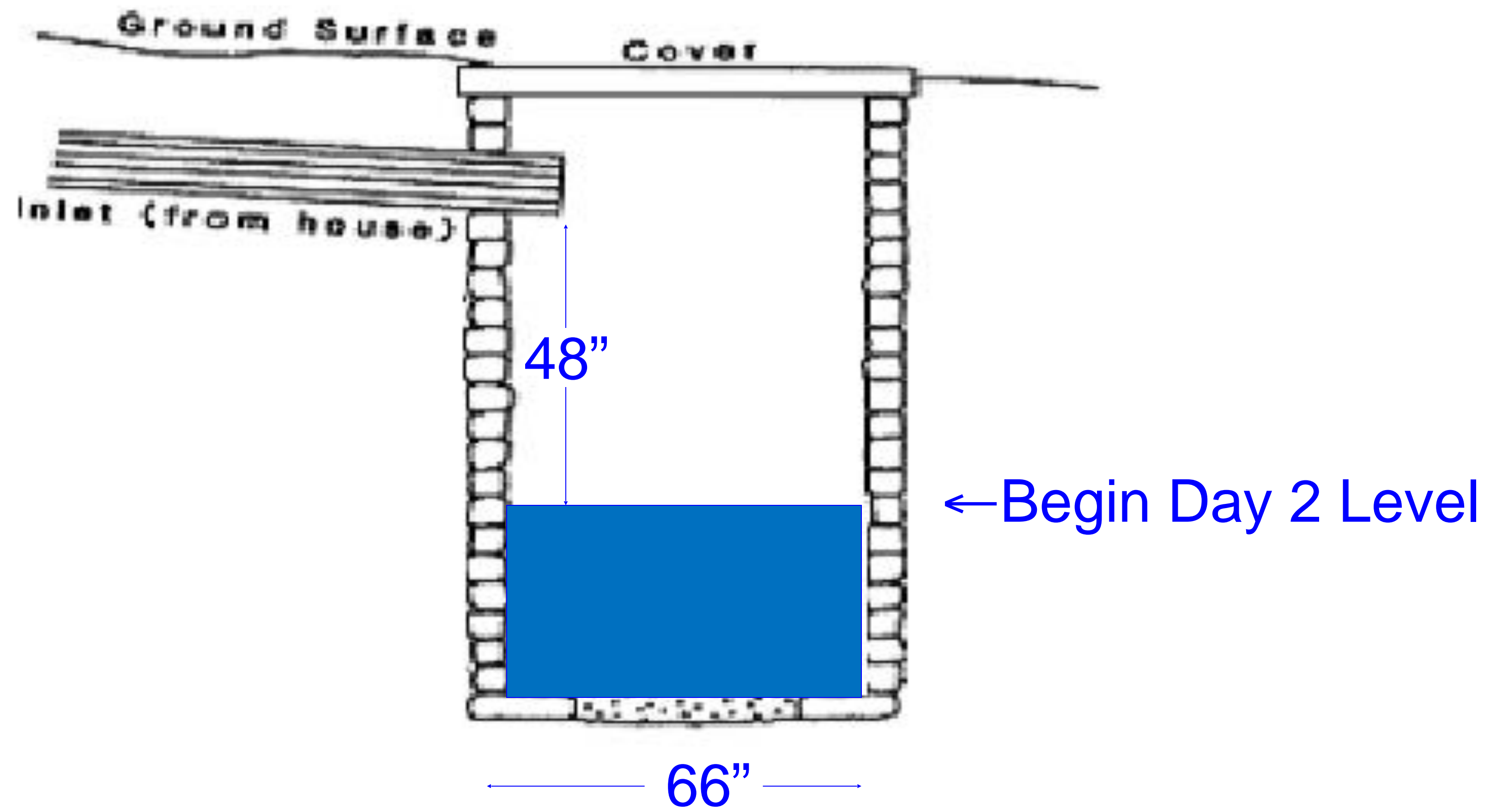
Before Day one



3 Bedroom Home

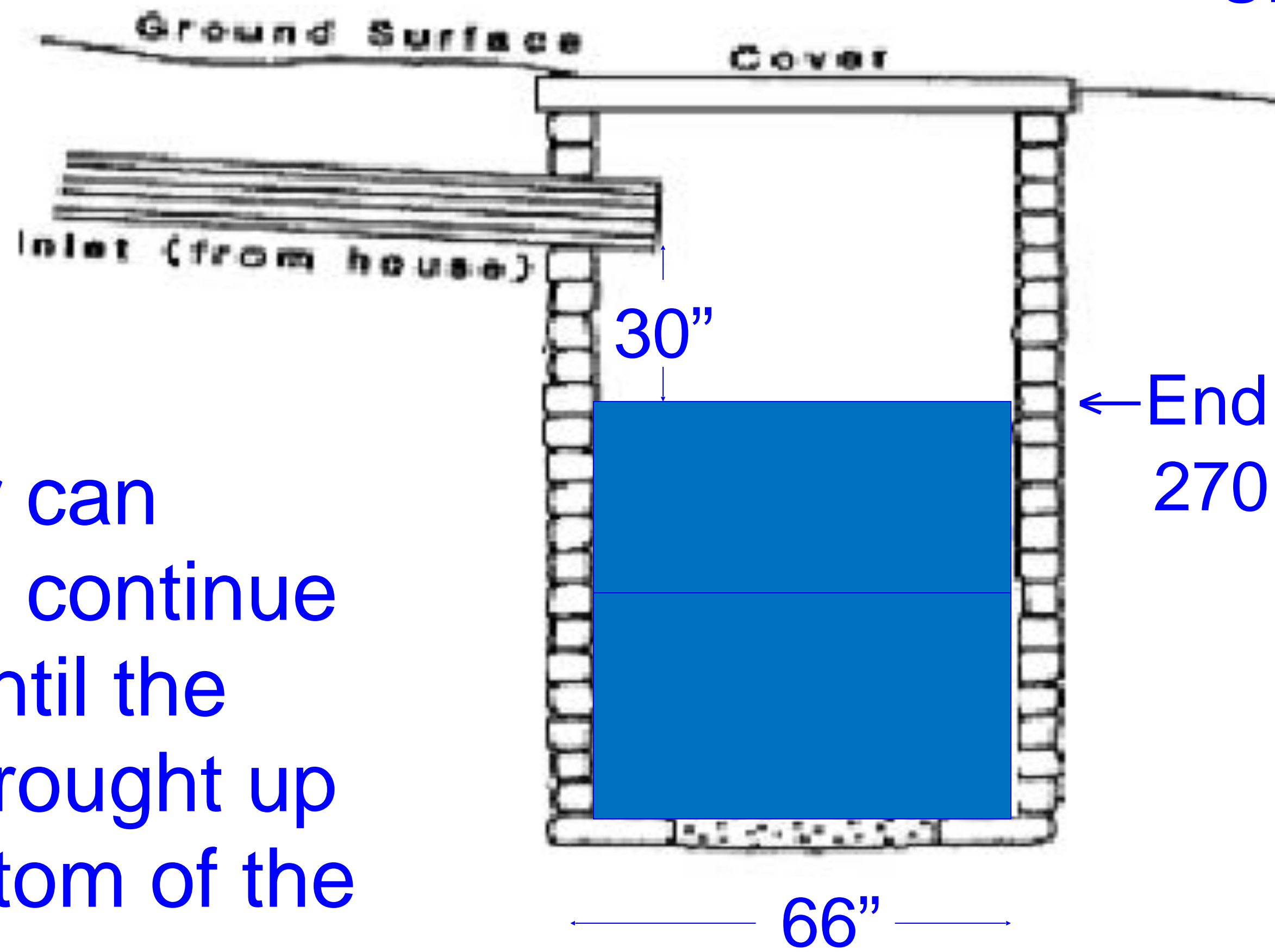


3 Bedroom Home



3 Bedroom Home

Did not accept 400 gallons –
Unsatisfactory



Customer can choose to continue the test until the liquid is brought up to the bottom of the inlet pipe

DAY 1

WATER METER FINISH 59 459
" " START 58 959
GALLONS INTRODUCED 500

DAY 2

WATER METER FINISH 60 122
WATER METER START 59 459
GALLONS ABSORBED 663

DEPTH TO LIQUID	HOLE #1	#2
DAY 1 START	42 1/2	40 1/2
FINISH	41	38 1/2
DAY 2 START	42 3/4	41
FINISH	41	38 1/2