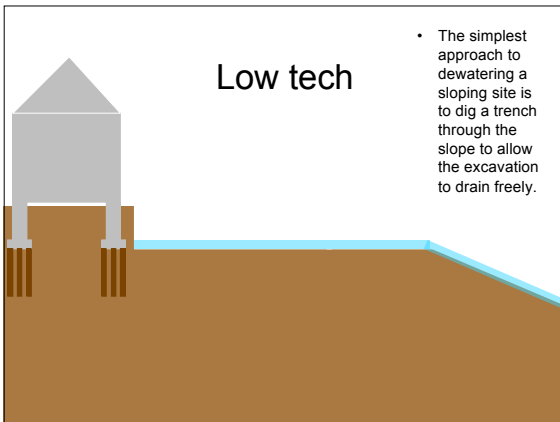


Dewatering & Foundations

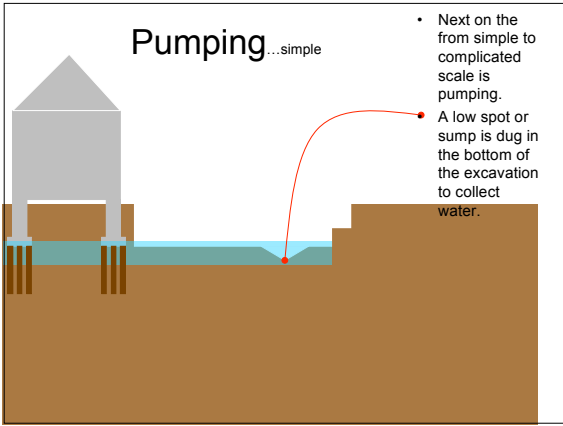
Water

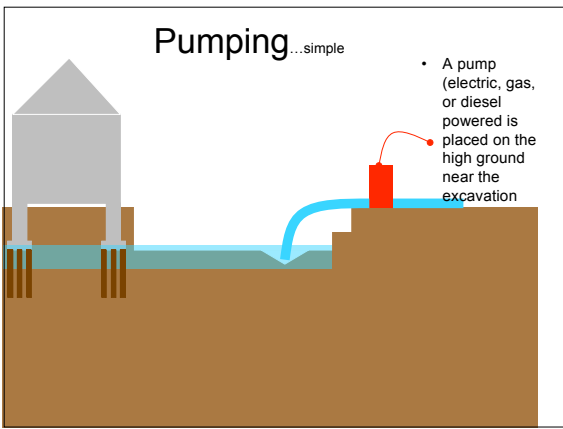
- It seems every time we dig a hole it fills up with rainwater, or groundwater....if we're lucky we hit an underground river or spring that keeps the hole nice and wet.
- But a wet excavation slows down construction, so the builder usually employs some sort of "De-Watering" strategy.

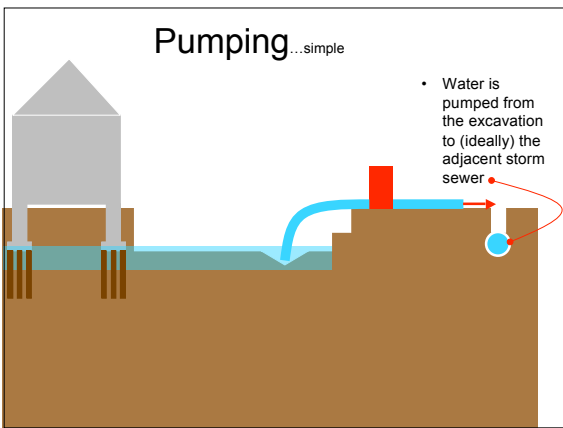
Low tech



- The simplest approach to dewatering a sloping site is to dig a trench through the slope to allow the excavation to drain freely.







Pumping...assistance

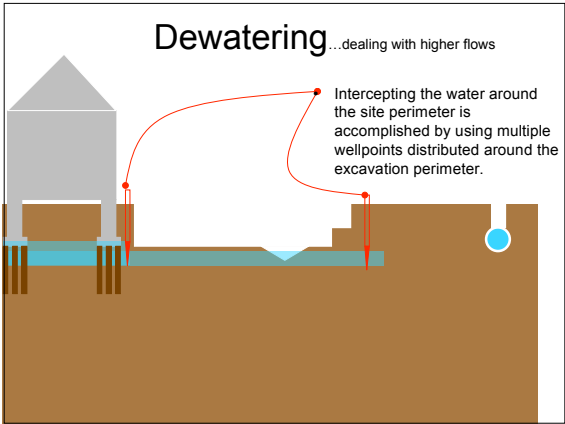
- This works well for some rainwater accumulating in the excavation, but what about that underground spring that keeps filling the excavation with water?

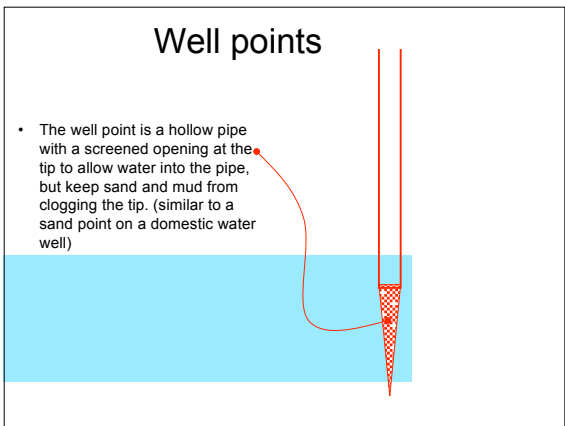
Dewatering...dealing with higher flows

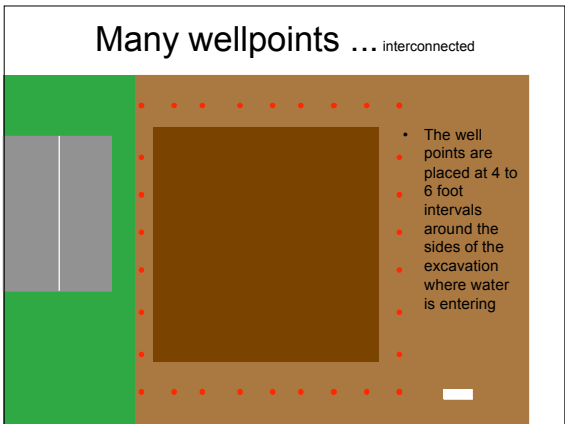
- In cases where the amount of water entering the excavation is steady, not intermittent as in the case of rain, the builder can try to block the water from entering the excavation or intercept the water before it reaches the excavation

Dewatering...dealing with higher flows

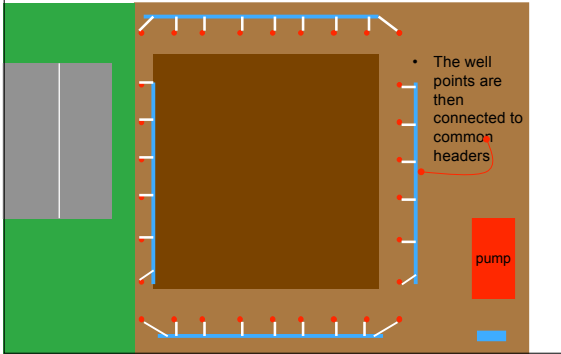
- Slurry walls or corrugated sheet piling are two types of shoring that also act as barriers to underground water flow. Their effectiveness depends on the depth of the water bearing soils or sands, generally they reduce the amount of water in the excavation, but don't eliminate it.



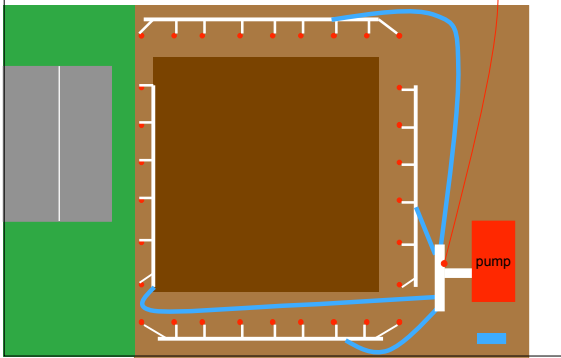




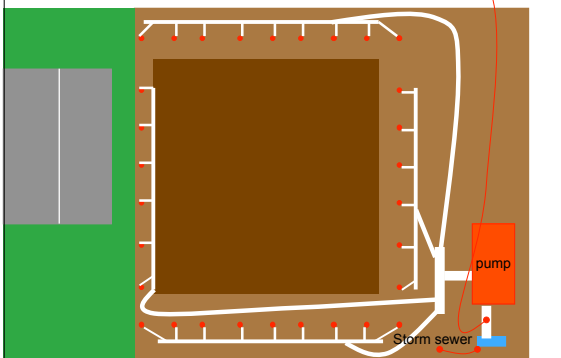
Many wellpoints ... interconnected



• The headers are connected to a manifold at the pump



• And the pump is piped to the storm sewer



Lowering the water table

- The good news is, when the dewatering works, the water table is pulled down below the level of the excavation.

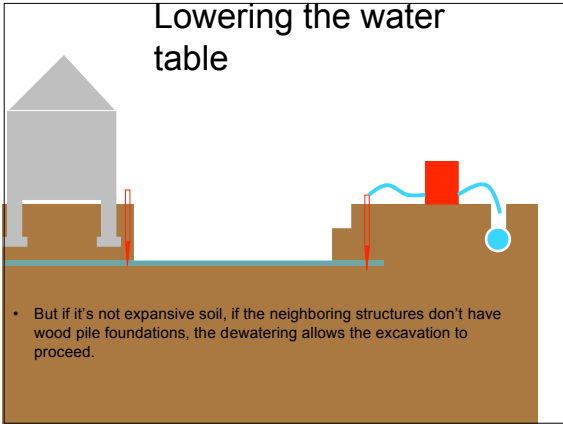
Lowering the water table

- The bad news is, when the dewatering works, the water table is pulled down below the level of the excavation.

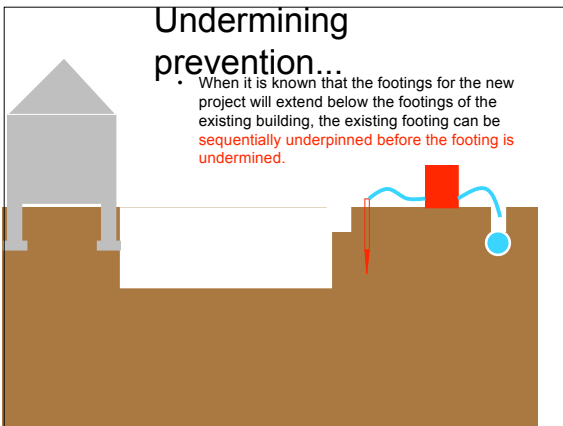
Lowering the water table

- In certain types of soil (expansive clays) and with certain types of existing foundation systems (wooden piles) lowering the water table may have dramatic effects on adjacent structures.
- Dry expansive clays displace less volume... the building next door settles
- The absence of water allows bacteria which eat wood to flourish... the building next door settles

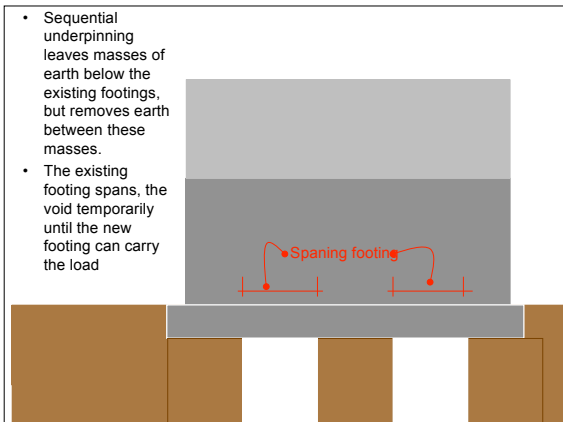
Lowering the water table

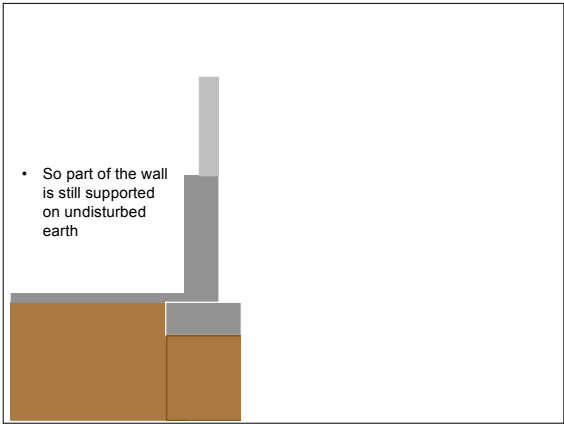


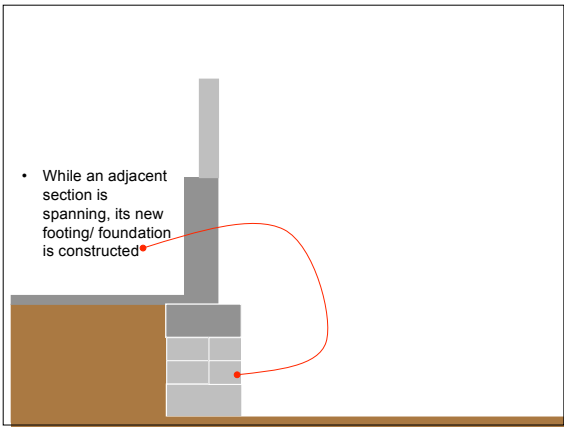
Undermining prevention...

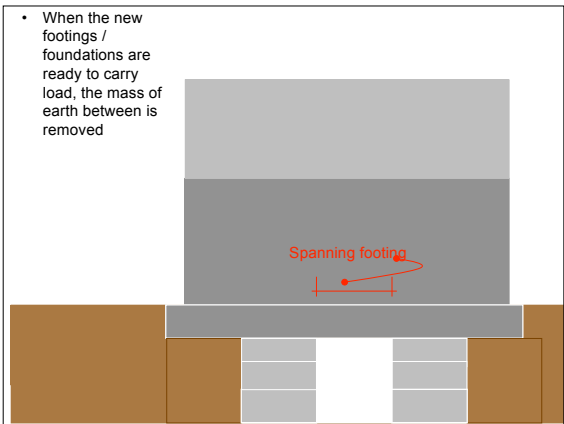


- Sequential underpinning leaves masses of earth below the existing footings, but removes earth between these masses.
- The existing footing spans, the void temporarily until the new footing can carry the load

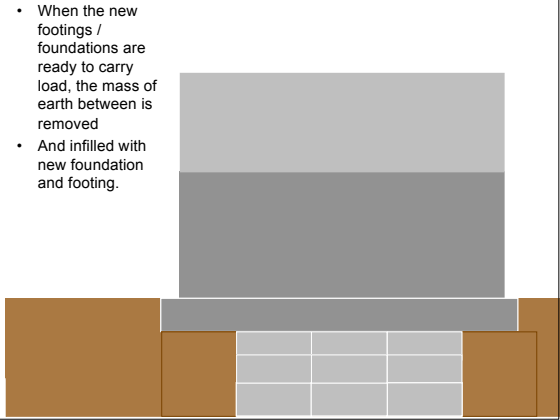




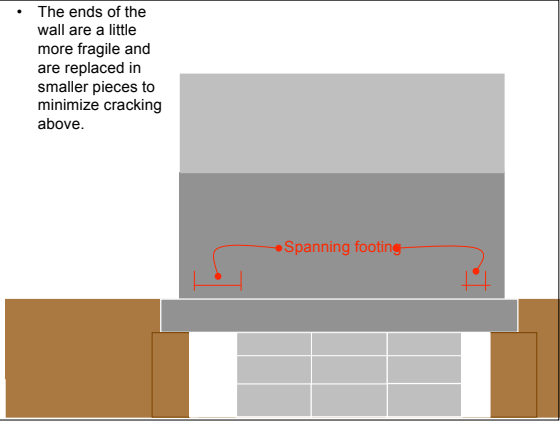




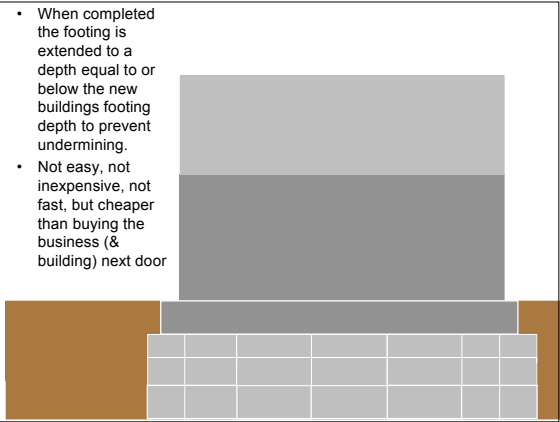
- When the new footings / foundations are ready to carry load, the mass of earth between is removed
- And infilled with new foundation and footing.



- The ends of the wall are a little more fragile and are replaced in smaller pieces to minimize cracking above.



- When completed the footing is extended to a depth equal to or below the new buildings footing depth to prevent undermining.
- Not easy, not inexpensive, not fast, but cheaper than buying the business (& building) next door



Undermining neighbors...

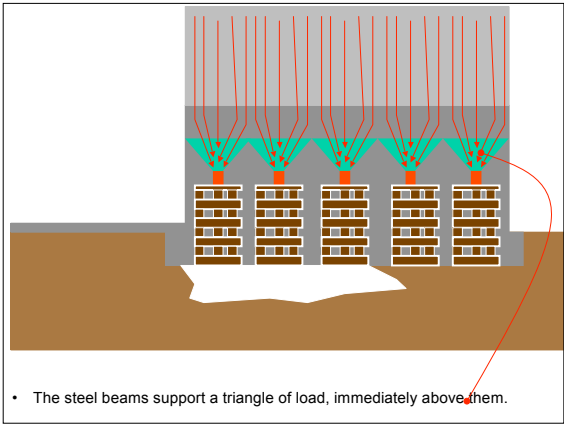
- In a project without shoring or slurry walls, the unexpected sometimes happens... the backhoe bucket takes too big a bite, or a sidewall collapses
- The exposure of the footing of an adjacent structure requires timely replacement of the structural capacity of the exposed footing...**underpinning**

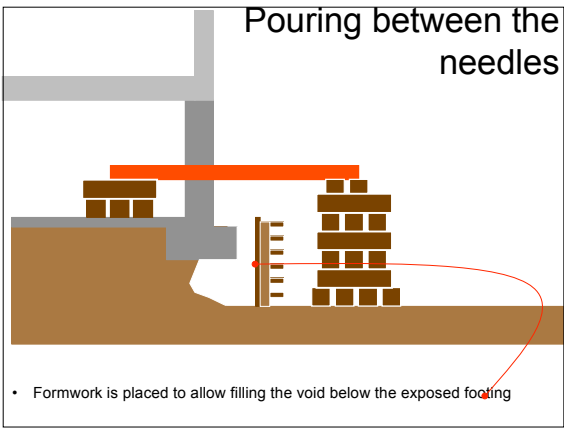
Needling neighbors...

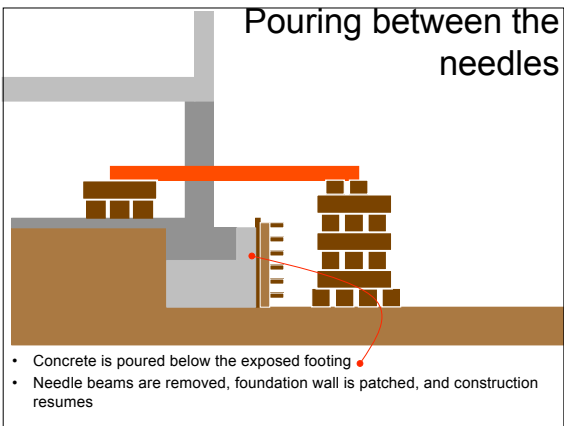
- If the undermined building has a basement, it is possible to temporarily support the foundation wall and building above by placing steel beams through the foundation wall

Needling neighbors...

- The steel beams are blocked up or cribbed up from a temporary footing







Minipile underpinning

