

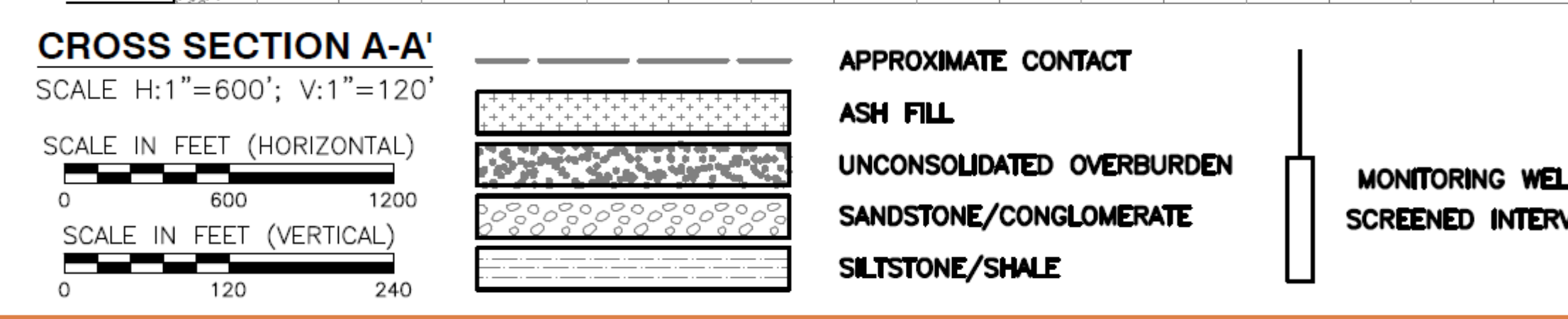
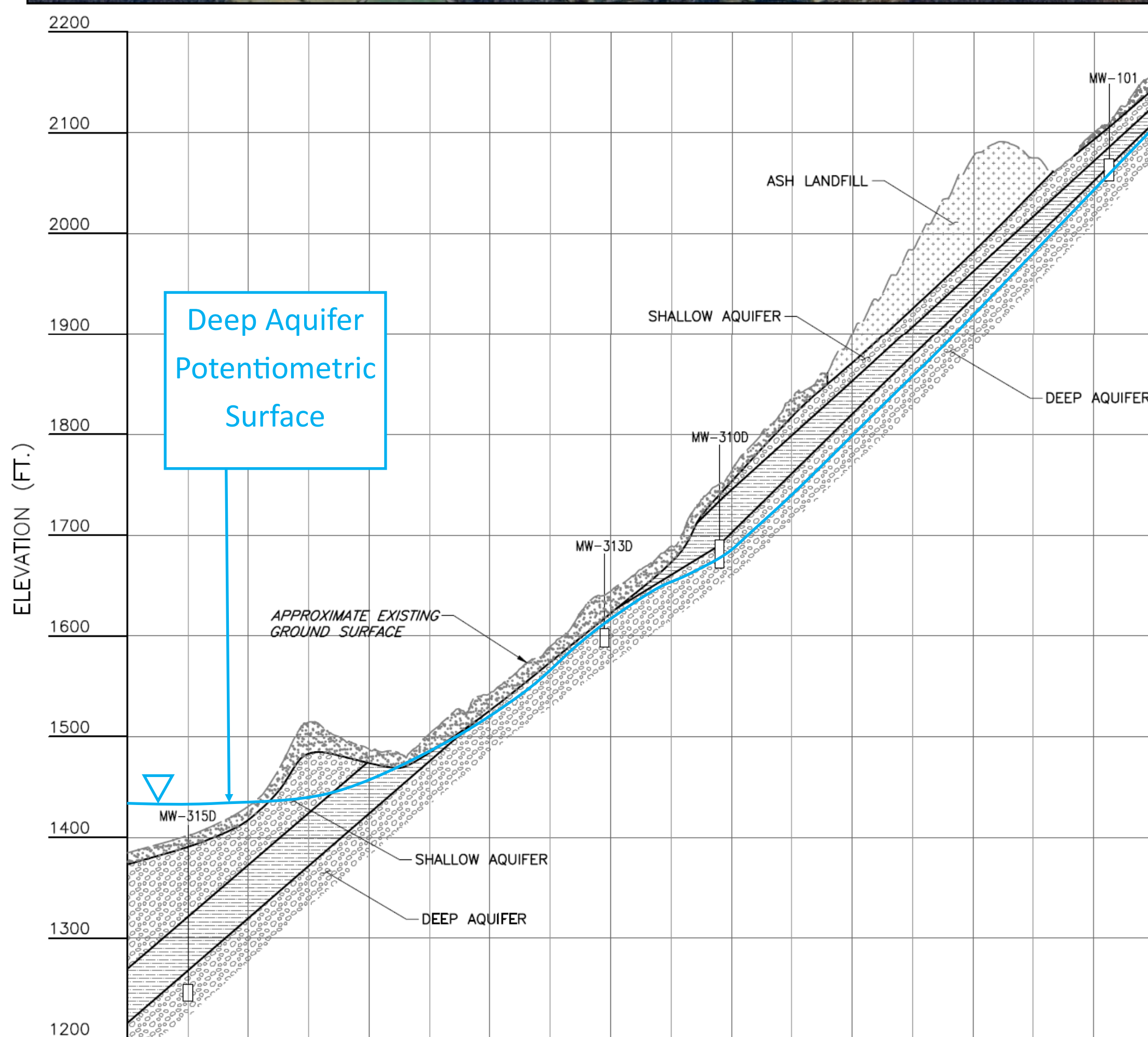
# Water Flows Downhill: An Artesian Well Installation Case Study at a CCR Landfill in West Virginia

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## Objective

Delineate manganese exceedance in the Deep Aquifer with one additional monitoring well.

## Site Overview



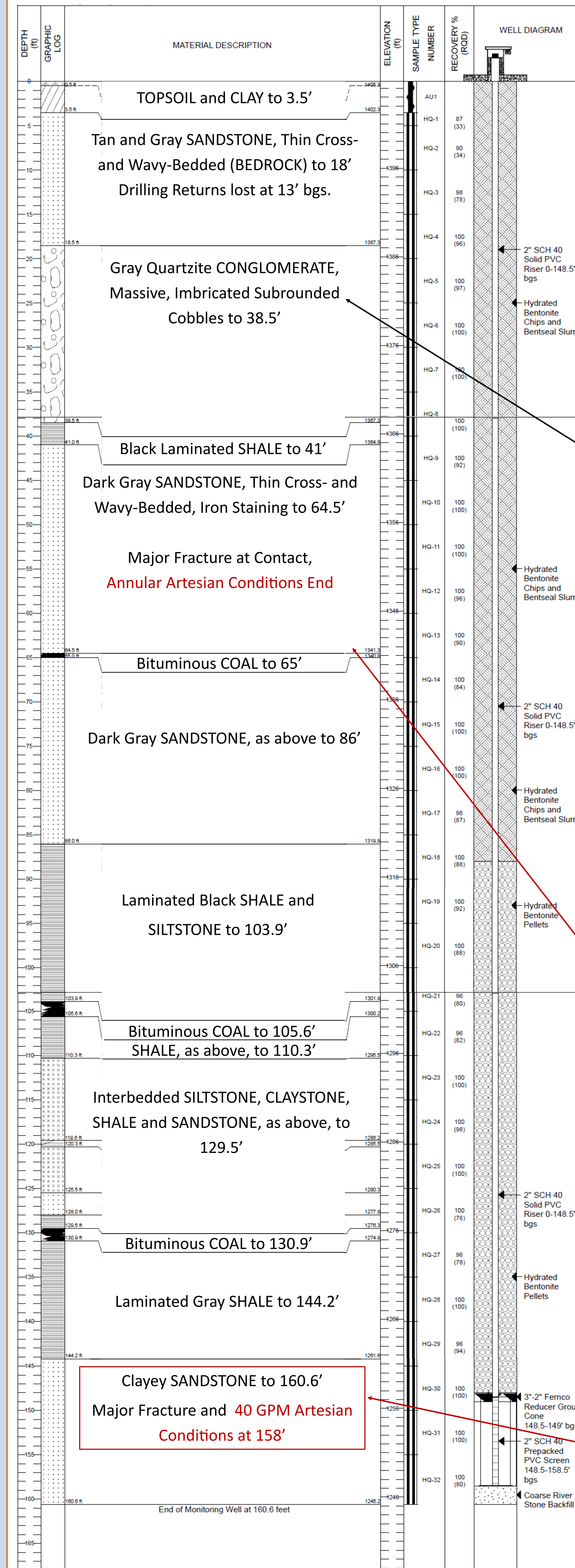
## Challenge



Artesian flow (40 GPM) at target depth! How is a well set in high-flow artesian conditions?

The water in this photo is flowing 12' above the ground surface.

## Subsurface Material Log and Core Photographs



Upper Aquifer sandstone and quartzite conglomerate.



Major fracture and coal seam at 65' bgs, where artesian flow left the borehole.



Major fracture in Deep Aquifer sandstone at 158' bgs, where artesian flow entered the borehole.

## Trials and Tribulations



1. Seal or slow the flow at the base of the borehole with large fill material.



2. Install pre-packed well screen to reduce down-hole material placement and slow annular flow.



3. Use tremie pipe to place thicker bentonite slurry and seal off artesian flow.

Each of these strategies failed. The 40 GPM artesian flow was too strong!  
How was the artesian flow managed?

## Installation Solutions: A Combination Built from Trials



- 10' prepack well screen at the base of the solid PVC riser.
- Fernco reducer at the top of the well screen to seal off annular water flow.
- Threaded PVC riser cap (with water-resistant adhesive) and 1" gas valve with reducers to fit inside steel well riser and seal the well.

Two groundwater samples were collected from MW-315D to successfully delineate the manganese exceedance in the Deep Aquifer.