



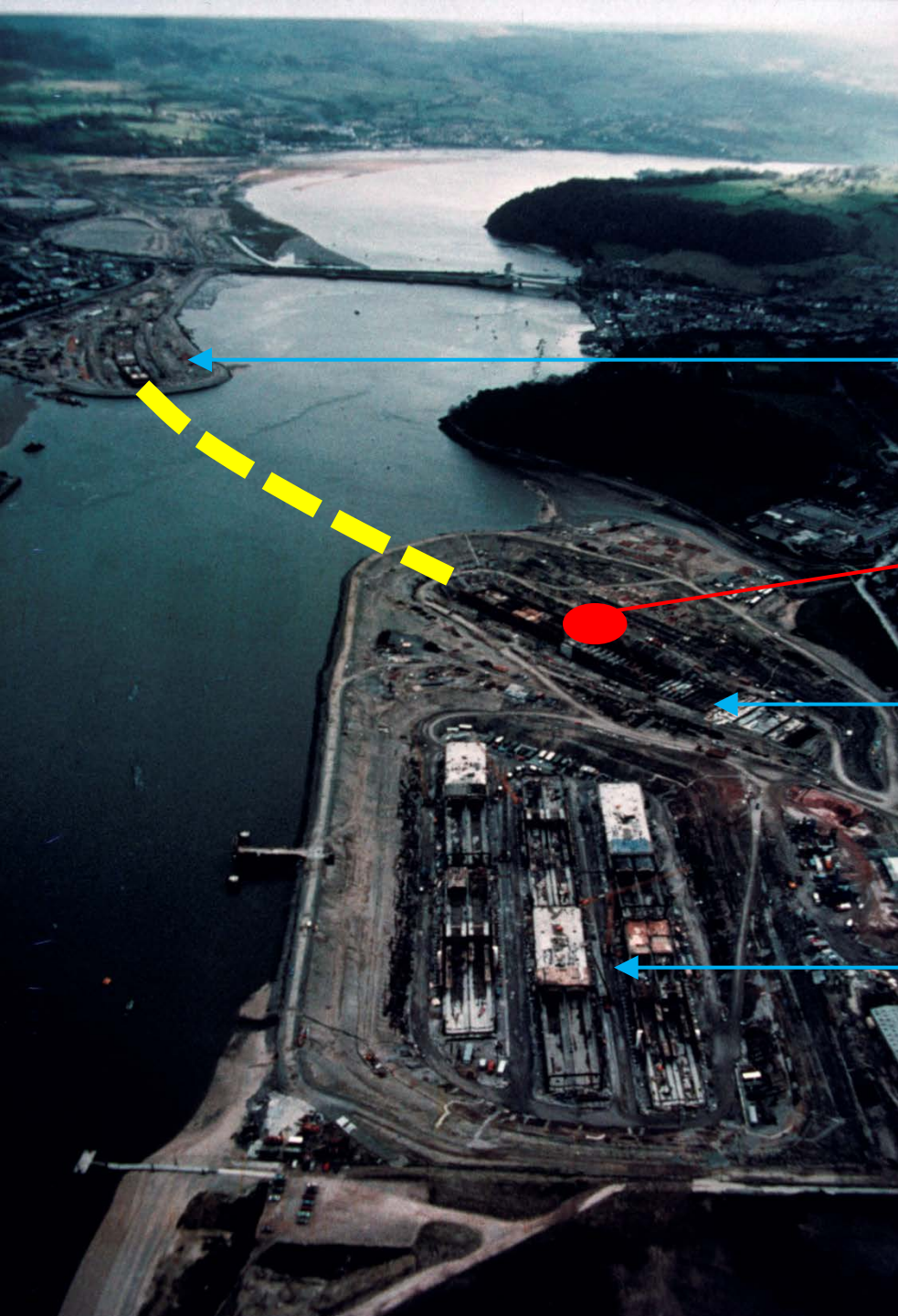
Lucky escapes!



WJ GROUNDWATER
Expert in Groundwater

Dr Toby Roberts
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Conwy Crossing North Wales, UK



East cut and cover

M10 blow

West cut and cover

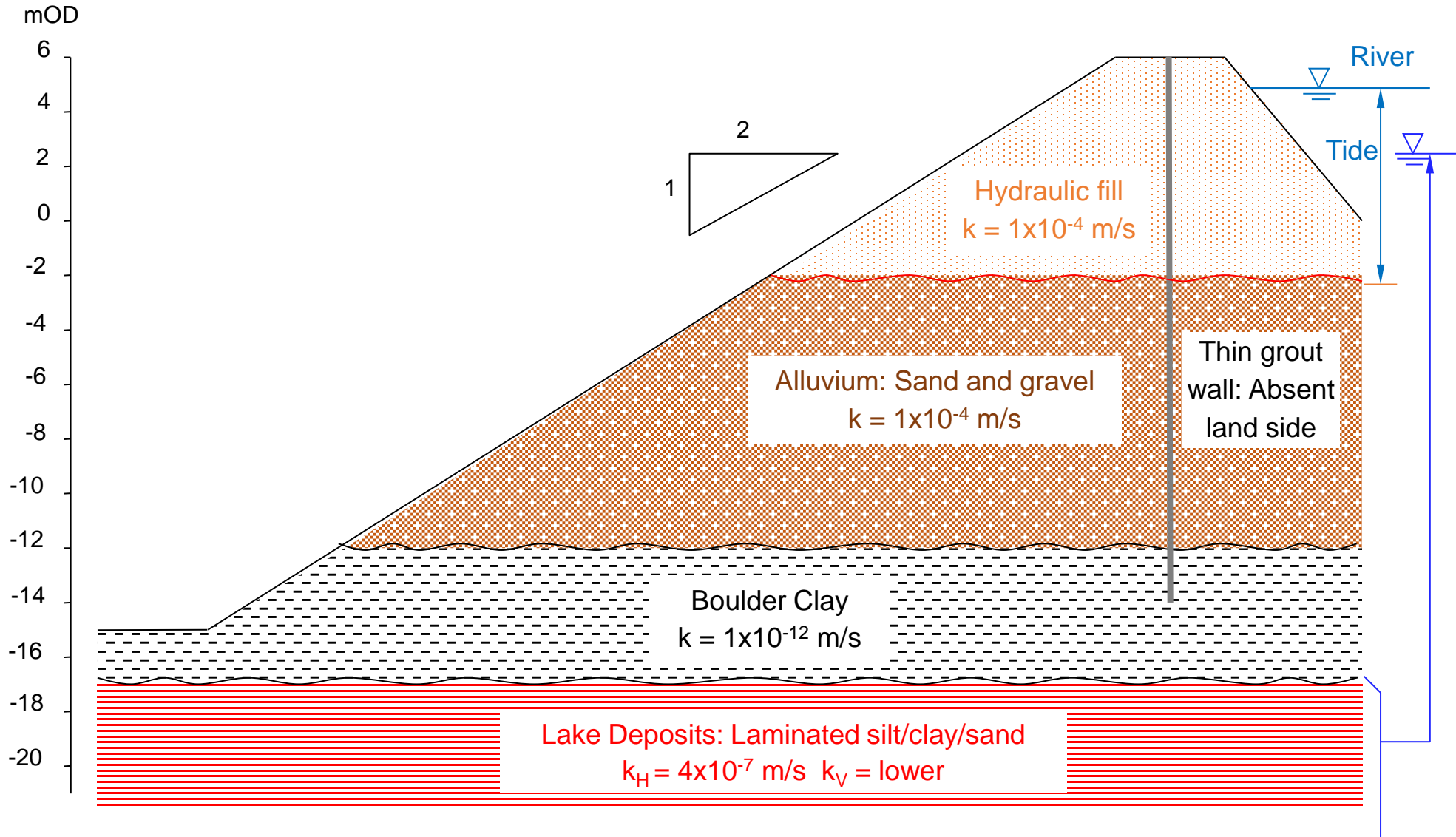
Casting basin: Tunnel units cast in dry, basin flooded and units floated out to form tunnel

**Submerged tube
tunnel**

**Main contractor:
Costain Tarmac JV**



Typical section through perimeter bund

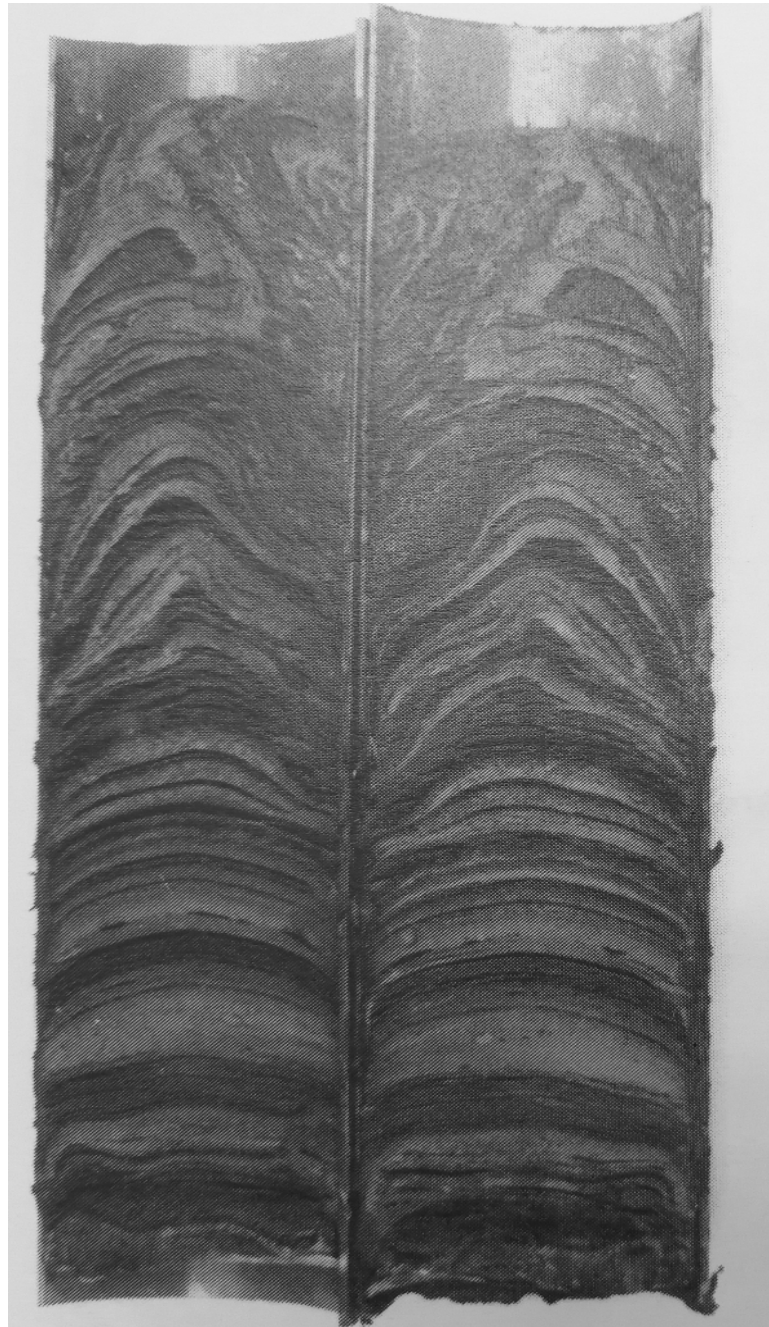




Conwy: Glacial Lake Deposits

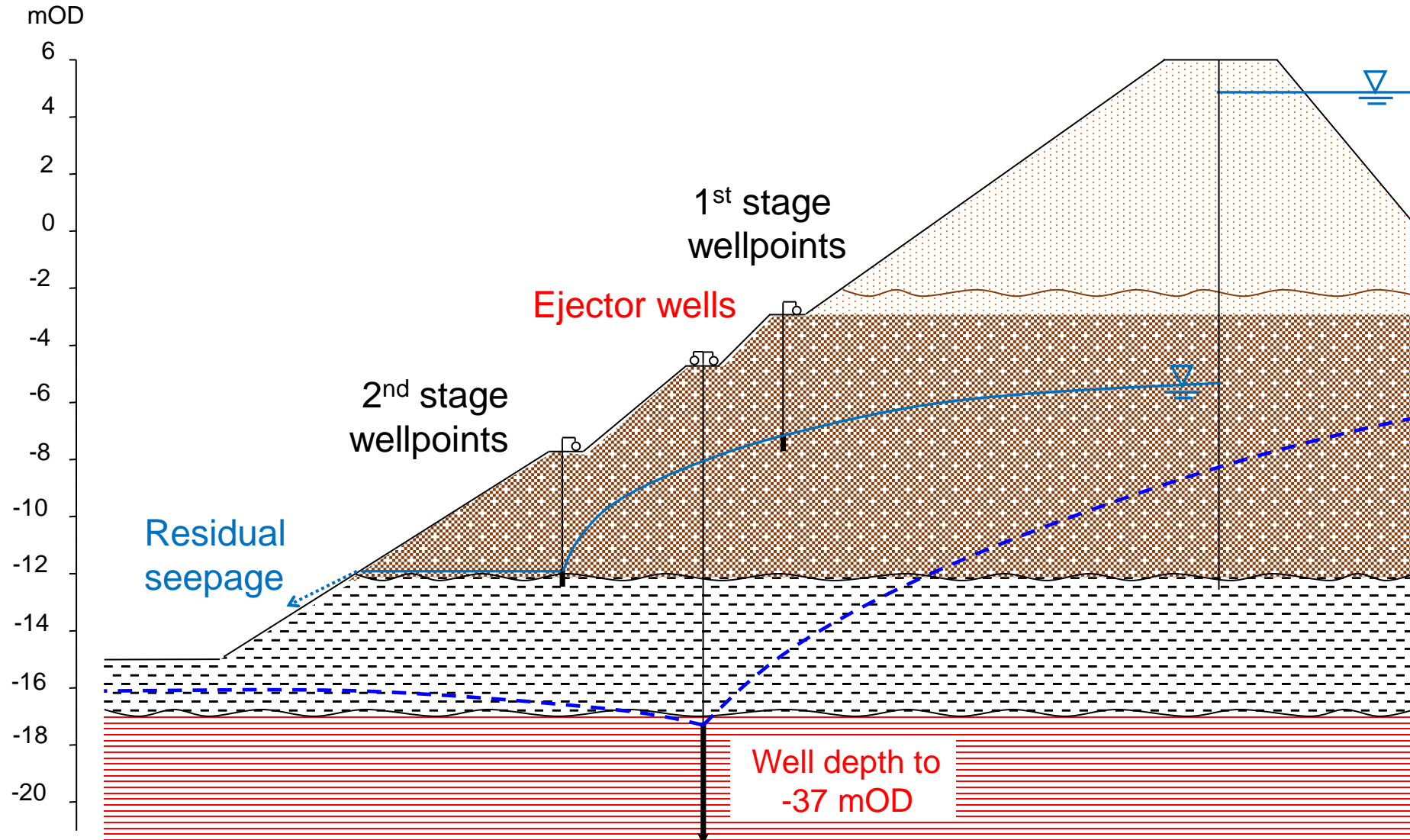
Laminated clay,
silt and sand

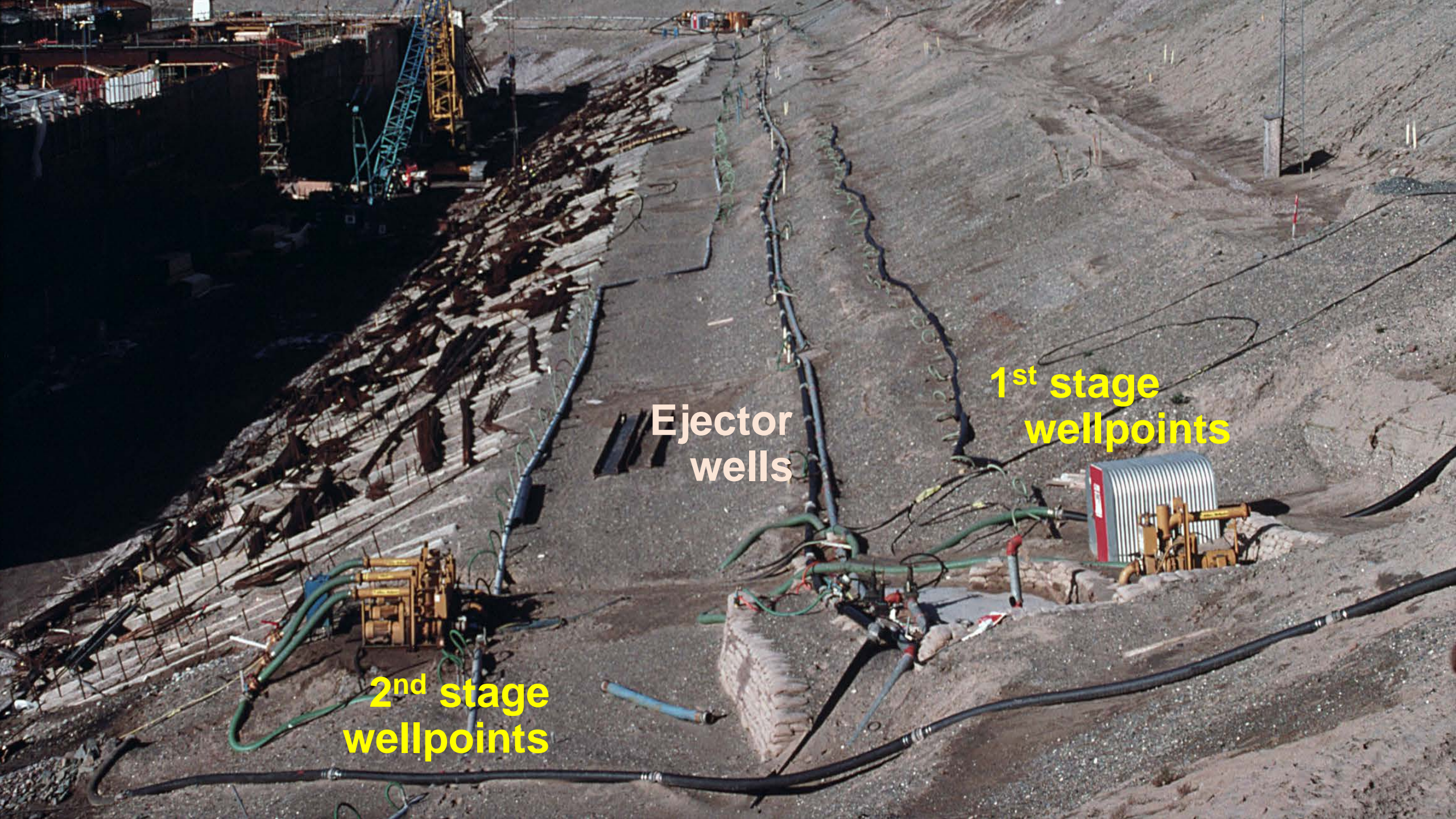
Artesian
relative to
excavation level





Section through bund showing dewatering scheme





Ejector wells

1st stage wellpoints

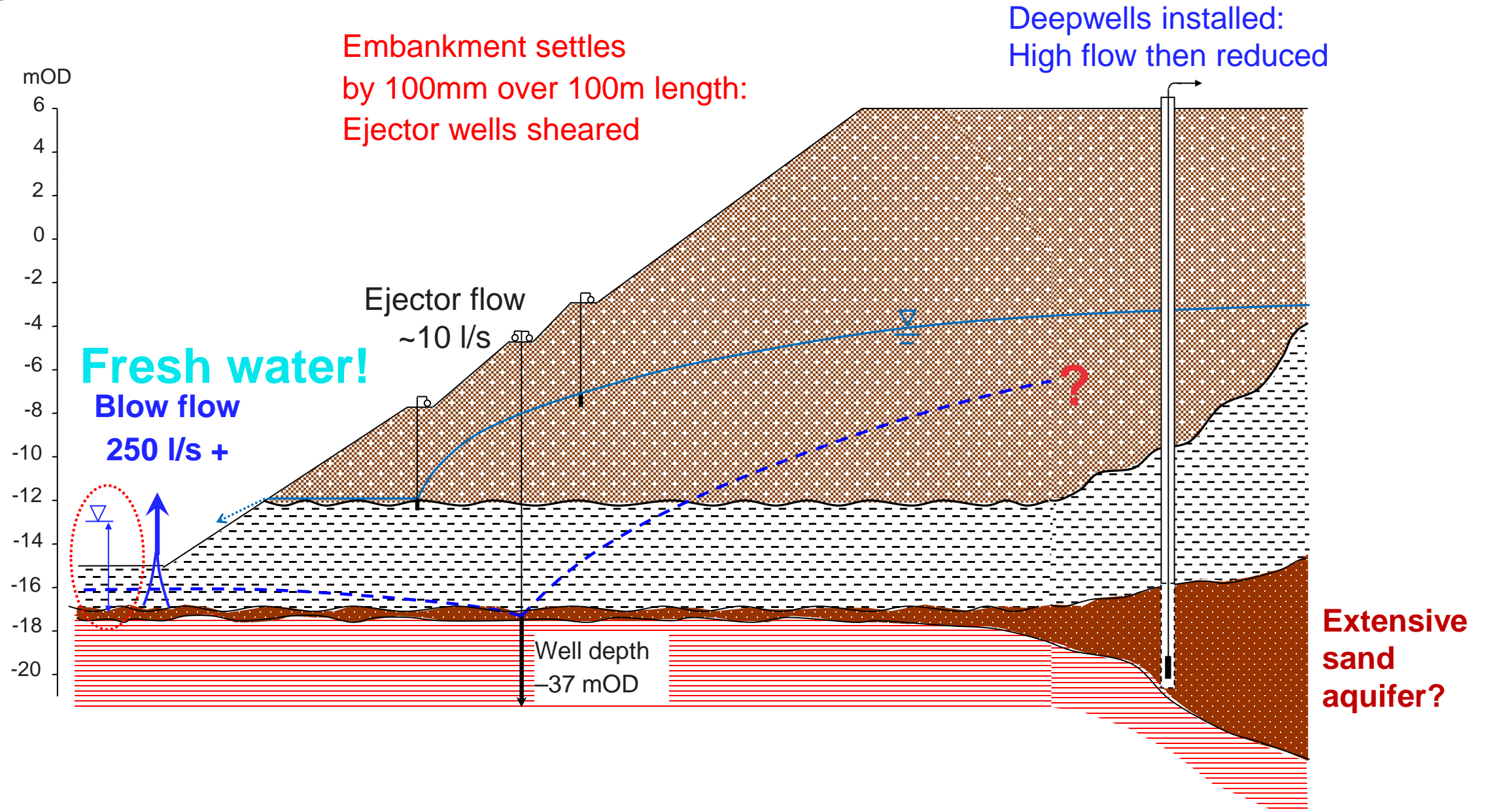
2nd stage wellpoints



Conwy: WCC M10 blow



Conwy M10 blow







Marina channel

Basement excavation

Residential development in Dubai Marina





Diaphragm wall



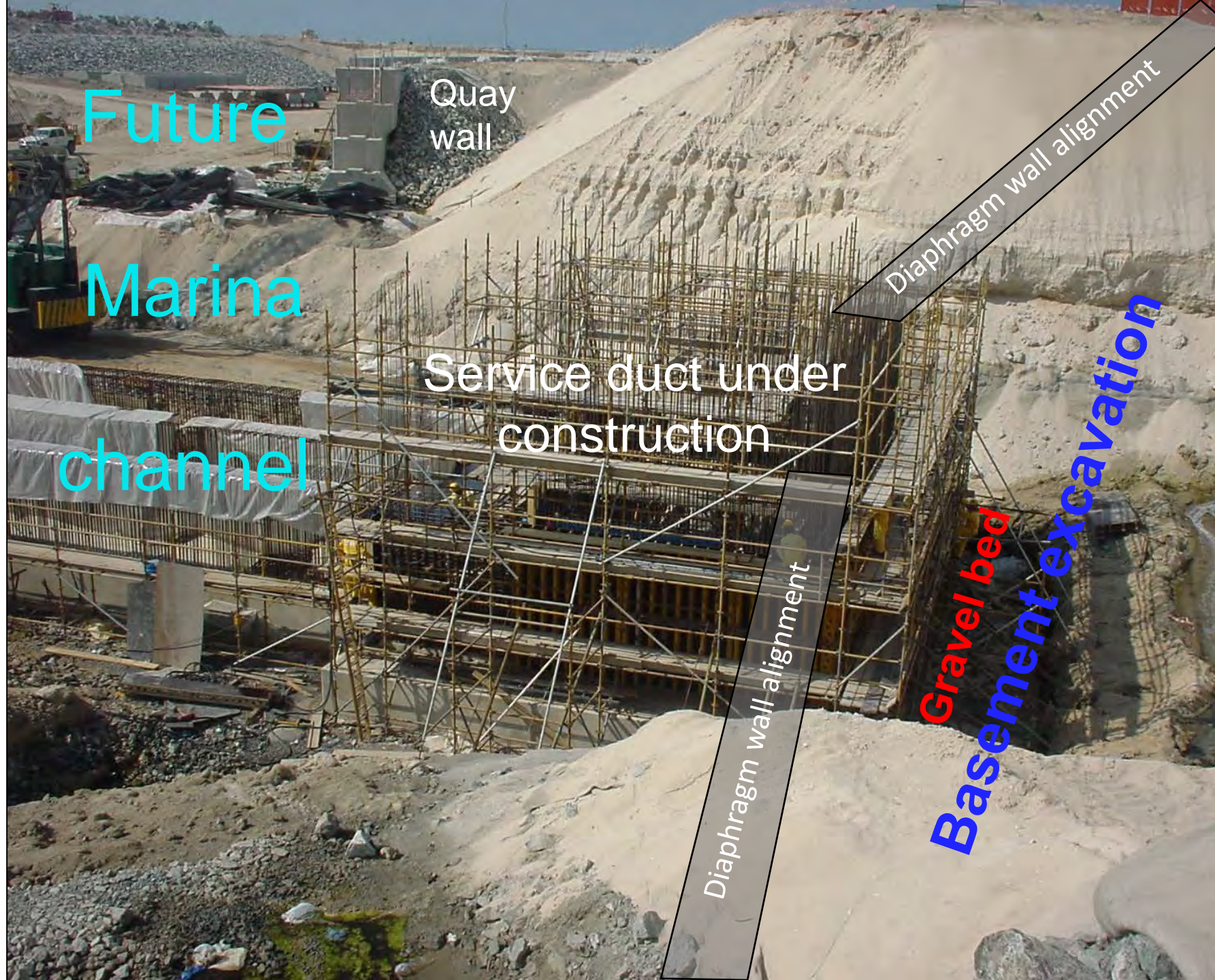
Service duct



Diaphragm wall

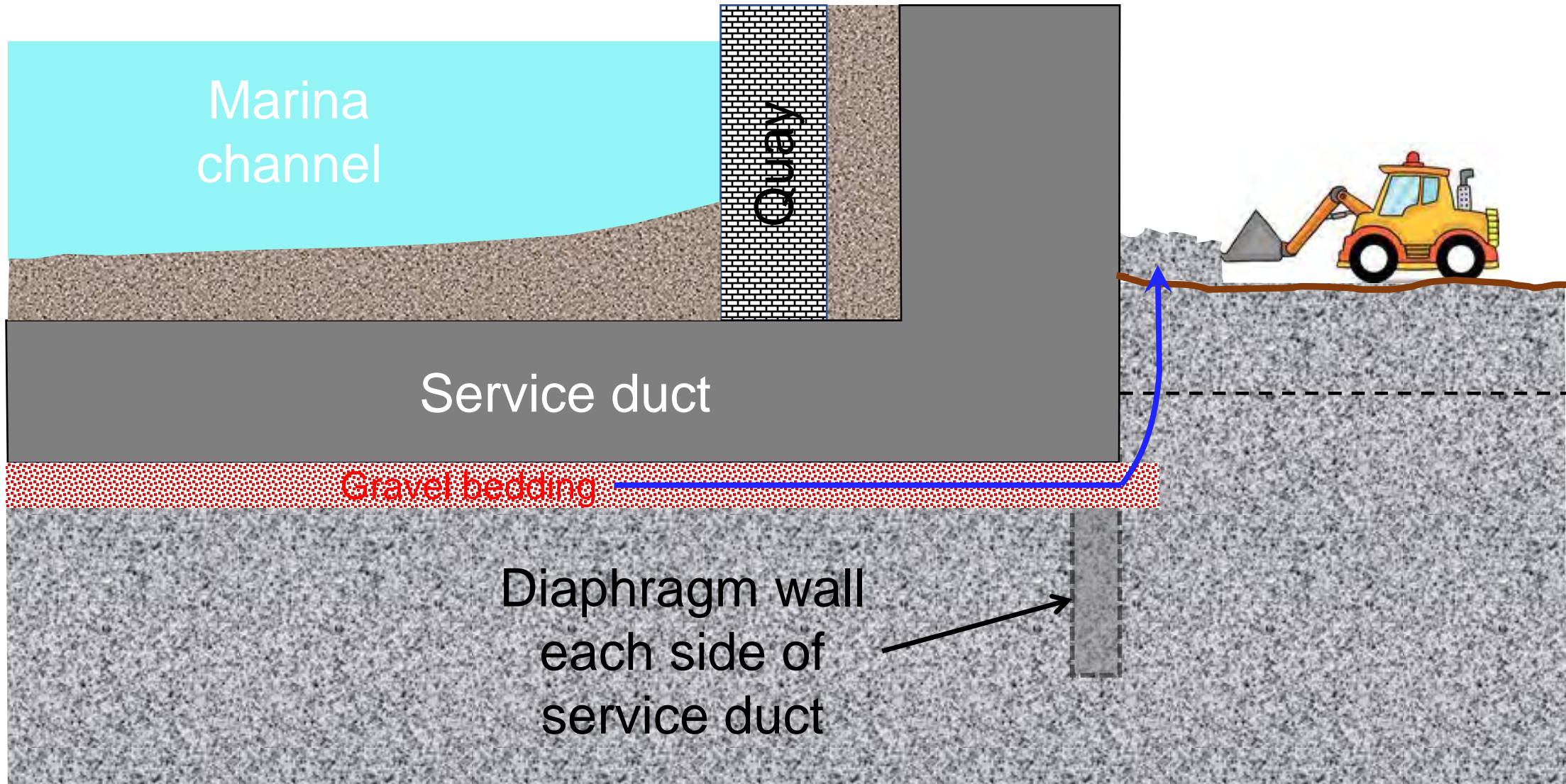


Service duct: Constructed previously



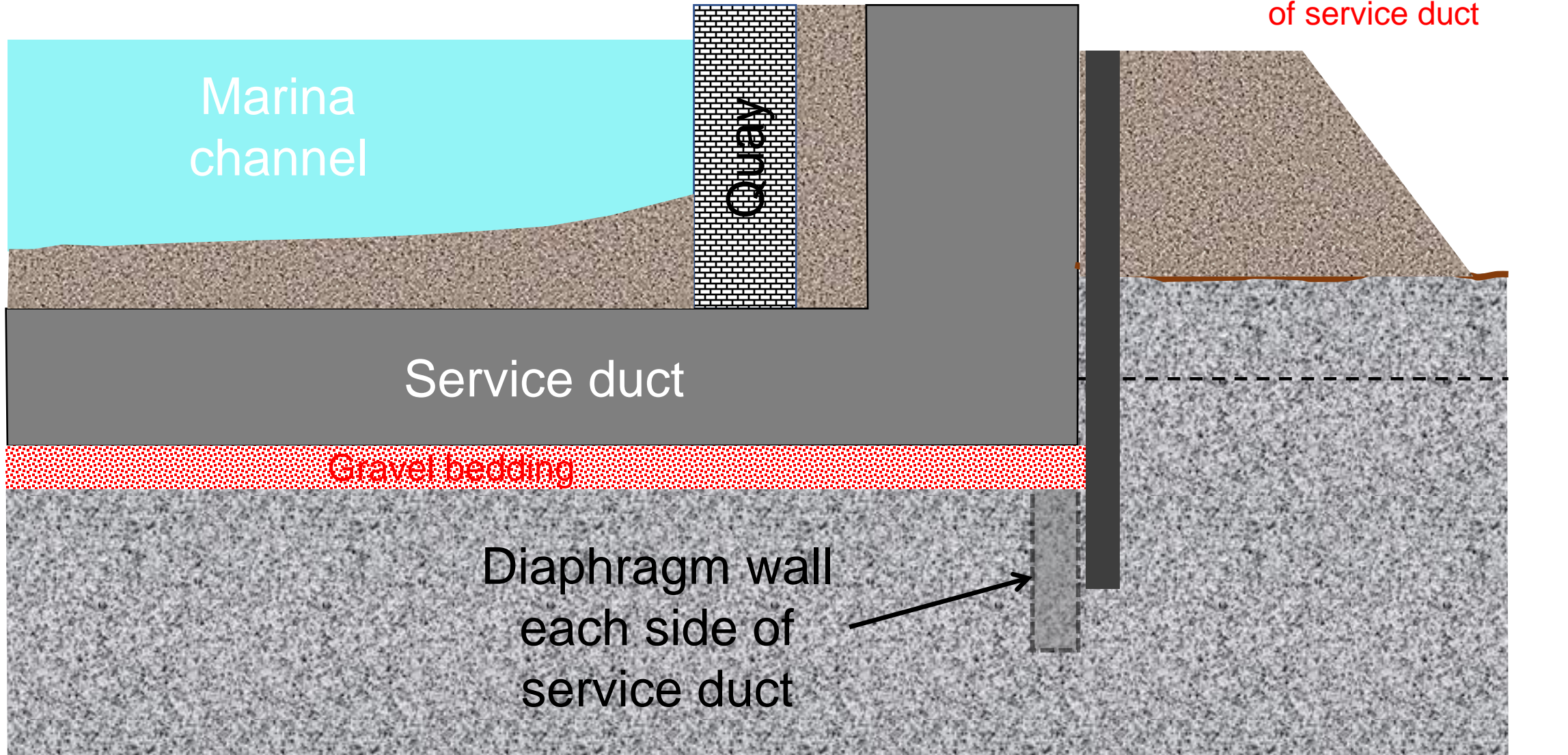


Section through service duct





Section through service duct





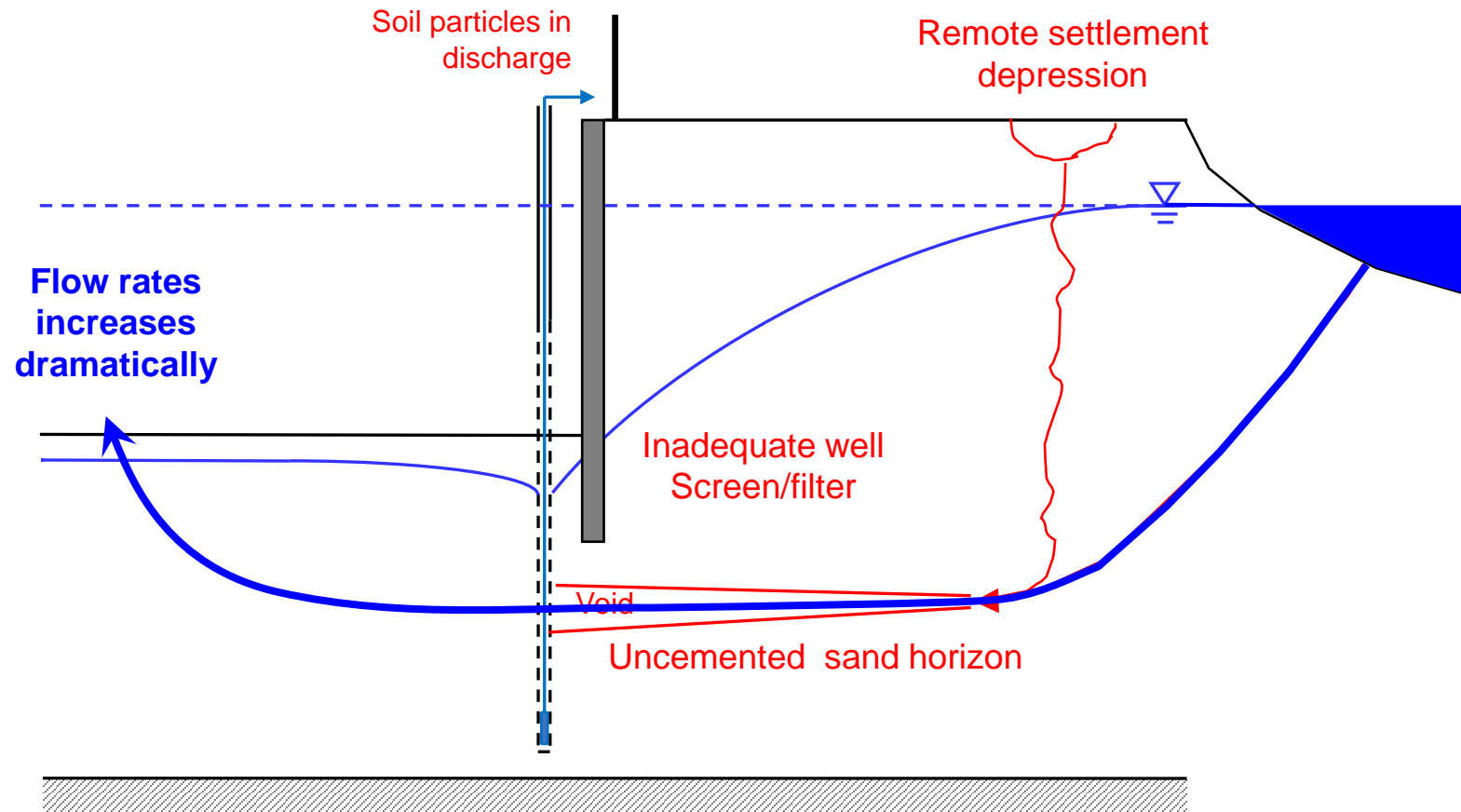
Granular soils: Slotted liner + filter
Filter rules: Conservative filter design?
Sandstone: Formation stabiliser



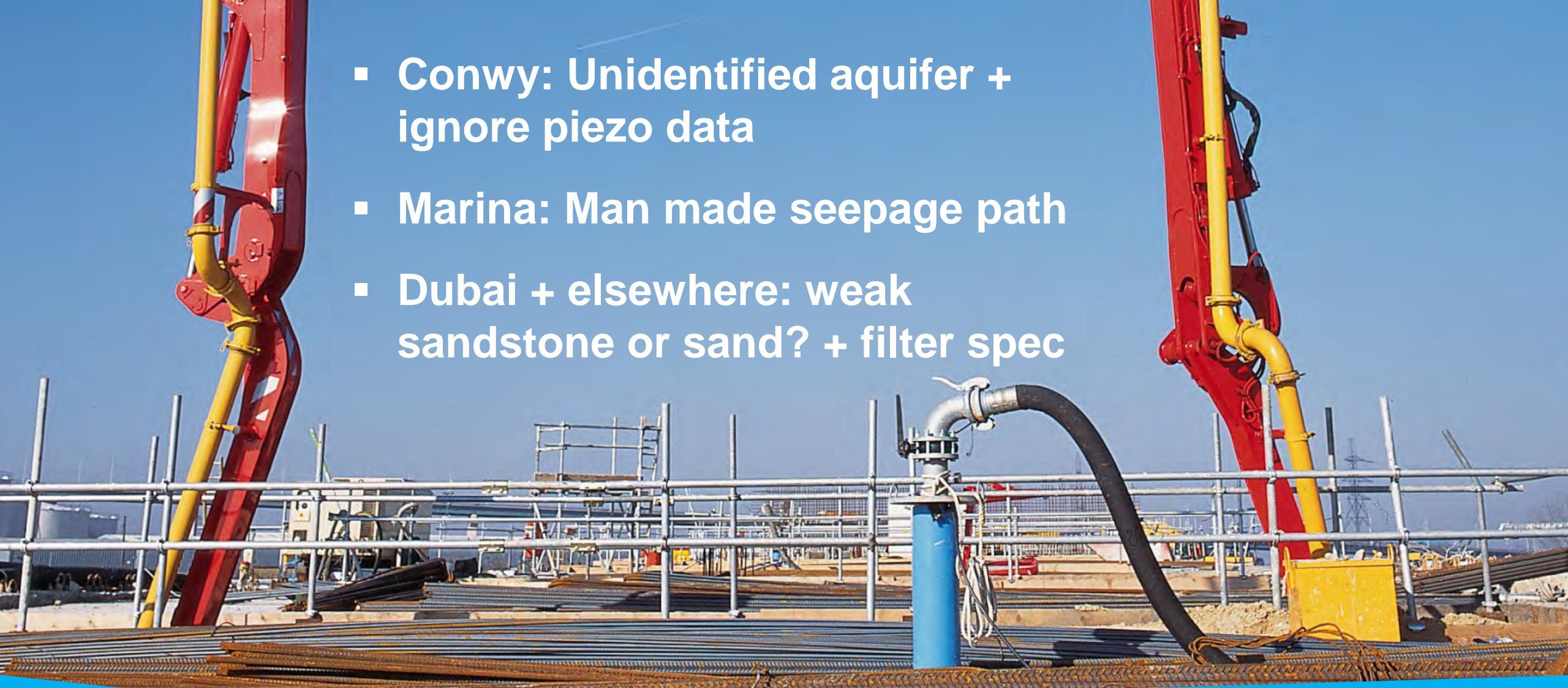


Ground loss due to migration of fines: local piping of uncemented sand horizon in sandstone

Mitigation: Effective filter screens (discharge quality) + deeper cut-off?





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- **Conwy: Unidentified aquifer + ignore piezo data**
 - **Marina: Man made seepage path**
 - **Dubai + elsewhere: weak sandstone or sand? + filter spec**



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