

DEEP SYSTEM HYDROGEOLOGY

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WHAT WE WILL TALK ABOUT

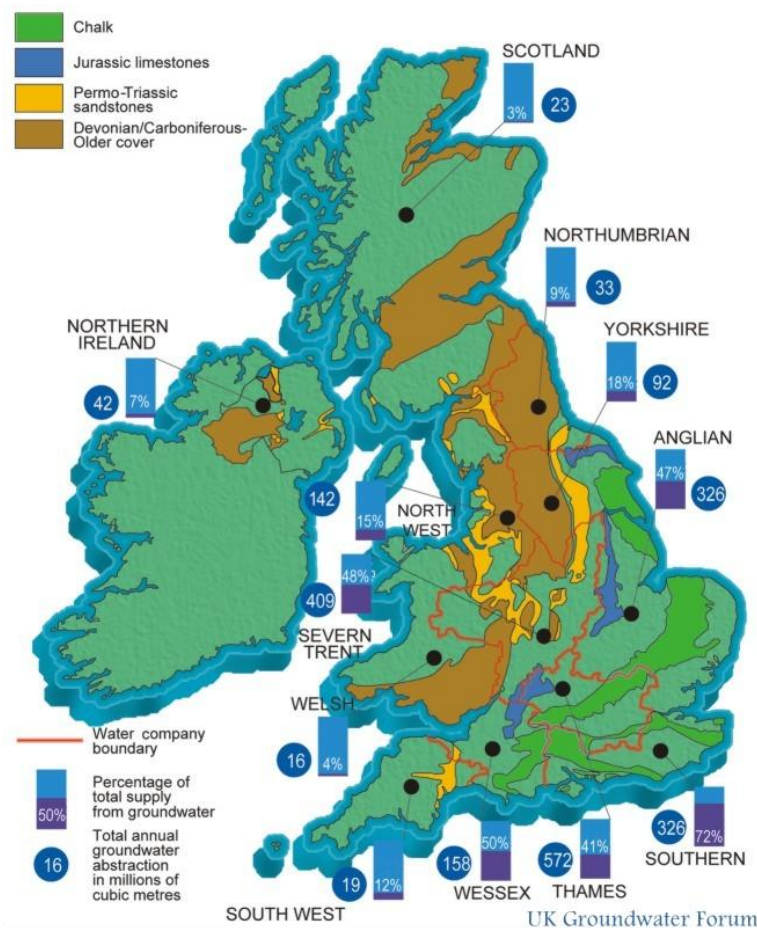
- Key Concepts:
 - Deep hydrogeology vs. shallow hydrogeology
 - Terminology – really important
 - Hydrostratigraphic Layers (conceptual models)
 - Resource Value
- What are the issues? How do they relate to surface?
- Evidence Base & Water Quality Baseline

DEEP VS. SHALLOW

	SHALLOW	DEEP
Hydrogeological depth	< 400m	> 400m Shale >> 400m!
Development Phases	<ul style="list-style-type: none">✓ Wellsite construction✓ Drilling✓ Testing/Fracturing✓ Production✓ Restoration	<ul style="list-style-type: none">✓ Drilling✓ Testing/Fracturing
Hydrogeological risks	Significant	Insignificant
Overall Risk Profile with mitigation	Low	Negligible

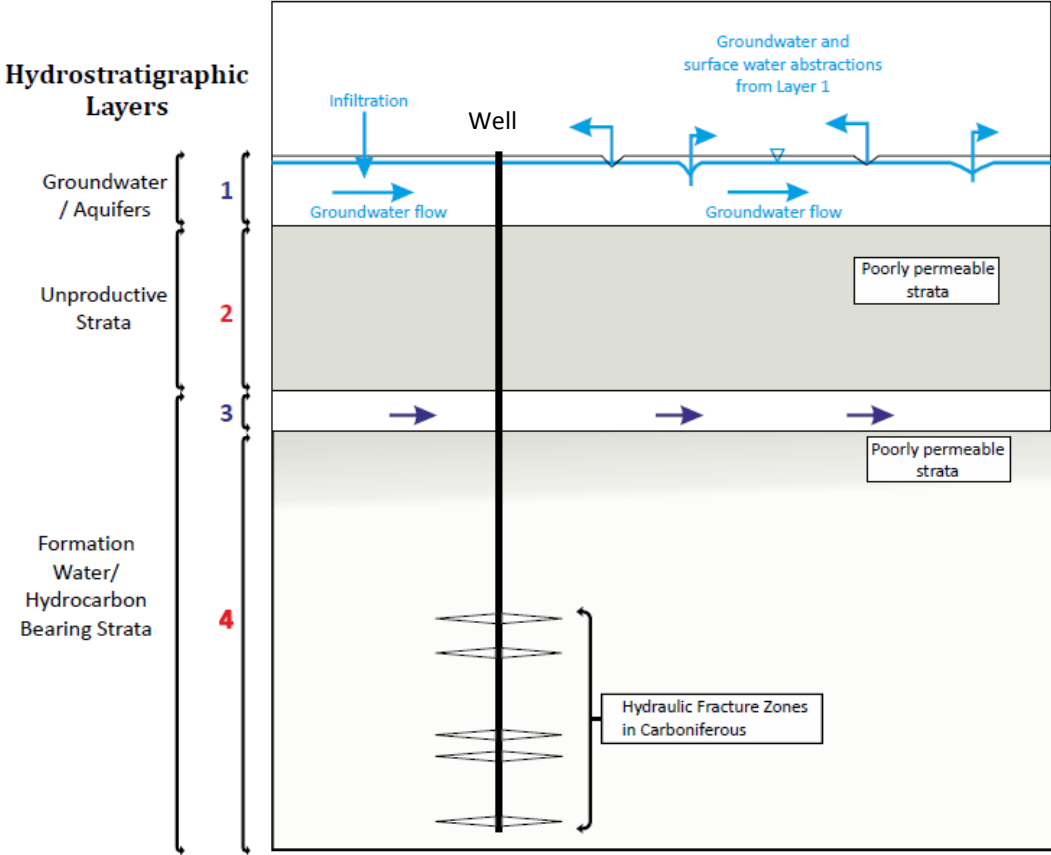
TERMINOLOGY

- “Groundwater” – all water in the saturation zone
- “Groundwater Bodies” – strata containing groundwater
- “Aquifers” – designated by the EA
- No distinction based on depth or water quality

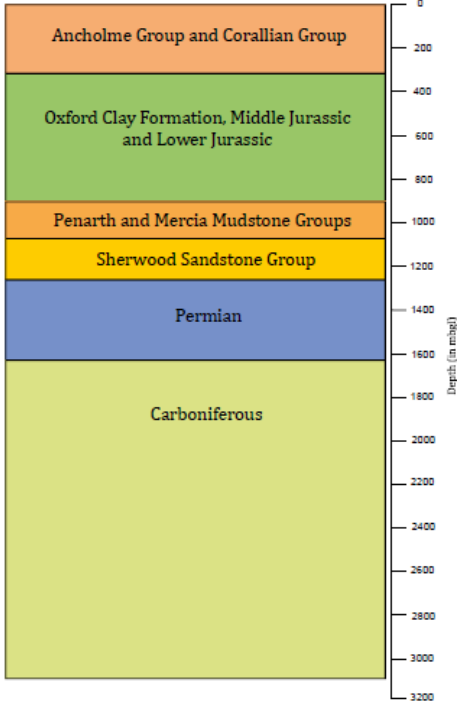


- **Shallow (< 400m)**
 - Groundwater
 - Aquifers
- **Deep (> 400m)**
 - Formation water
 - Water bearing formations

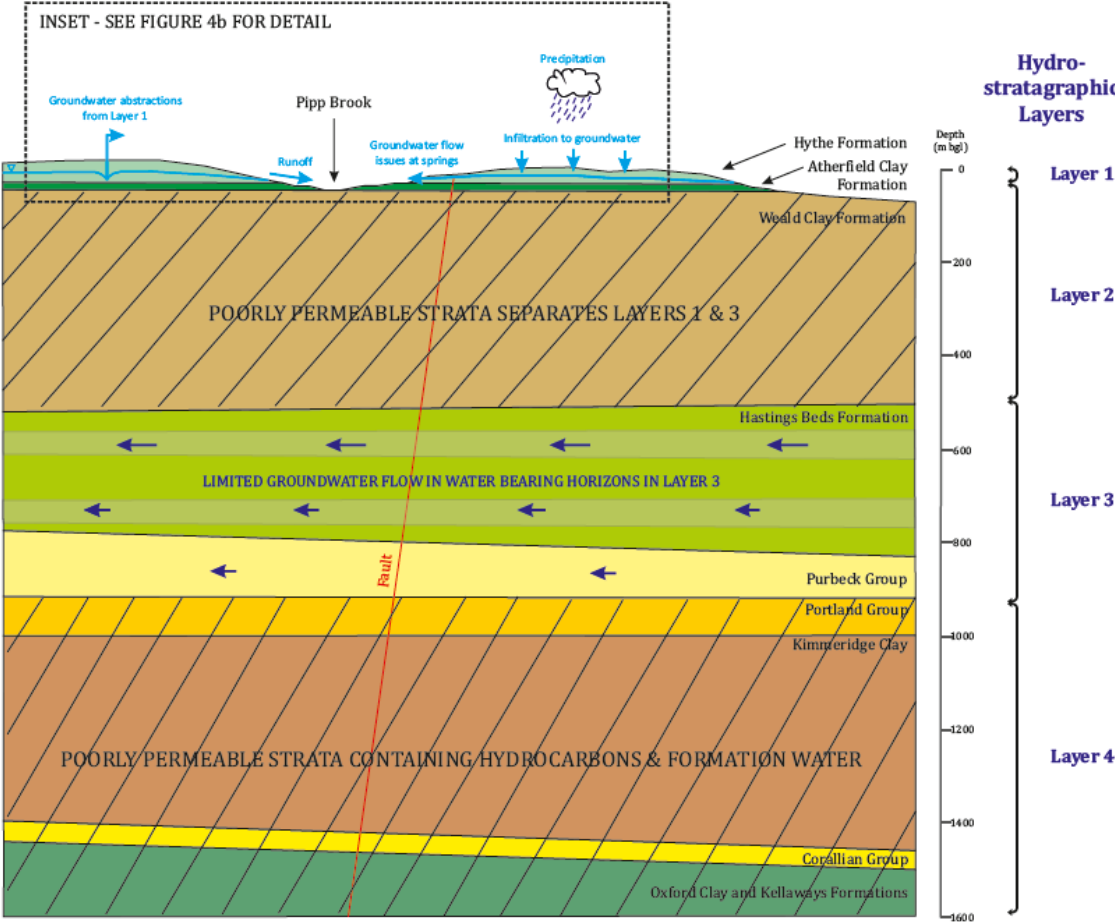
HYDROSTRATIGRAPHIC LAYERS



Generalised Vertical Section



HYDROSTRATIGRAPHIC LAYERS



- Depth Matters
- UKTAG definition of Resource Value
- UKTAG 400m **default** depth



EVIDENCE BASE

DEEP SYSTEM ISSUES

- Hydrogeological risks limited to Layer 1. **But they are low!**
- Risks are understood and can be mitigated
 - Risks: SPR Model; GDT Presentation
 - Mitigation: Best practice & regulation; RH Presentation
- Evidence base required
- Baseline required

- Lots of information about shallow systems
- Limited or no information on deep systems
- What's reasonable to expect?
- Essential to establish an evidence base
- Collect evidence through development

WATER QUALITY BASELINE

- Demonstrate **effectiveness** of mitigation
- Scheme of Monitoring
- What to monitor

CONCLUSIONS

- Need to understand shallow and deep hydrogeology
- Conceptualise interactions – layers
- Collect an evidence base
- Baseline monitoring – for effectiveness, not mitigation



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