



Commercial Open Loop Installations

Best Practice

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Agenda

- ◆ LoopMaster (Europe) Ltd
- ◆ What is Open Loop
- ◆ Open Loop – Pro's & Con's
- ◆ When should the geothermal designers be involved ?
- ◆ Getting Started - Feasibility
- ◆ The Importance of Assessing Thermal Interference
- ◆ Critical Drilling Procedures
- ◆ Summary





LoopMaster (Europe) Ltd

www.loopmastereurope.co.uk

- ◆ Technical consultancy formed to help engineers or companies who are looking to install ground source geothermal heating and cooling systems
- ◆ Formed in 2004, now with 16 staff
- ◆ Evolved from drilling contracting
- ◆ Based in Nuneaton, Warwickshire (UK)
- ◆ Includes experienced drilling engineers and contract managers
- ◆ Provide support in the drilling processes for commercial geothermal technology

 LandSecurities



RIVER ISLAND

Sir Robert
McALPINE

Kew
PLANTS PEOPLE
POSSIBILITIES




GROSVENOR ESTATE


WILLMOTT DIXON


KIER GROUP

Open Loop Scheme



Open Loop Geothermal System – Pro's & Cons

◆ Pro's

- ◆ Offer good energy source when good flows achieved
- ◆ More cost effective than closed loop on larger schemes
- ◆ Requires comparatively small area to install
- ◆ Less disruption to build programme than closed loop

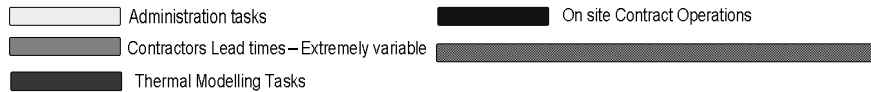
◆ Con's

- ◆ Uncertainty regarding achievable flow rates
- ◆ Subject to lengthy & complex regulatory process
- ◆ On-going maintenance required
- ◆ Time limited abstraction licenses & Discharge Consent



Programming - How Long to Install & Licence an Open Loop Scheme ?

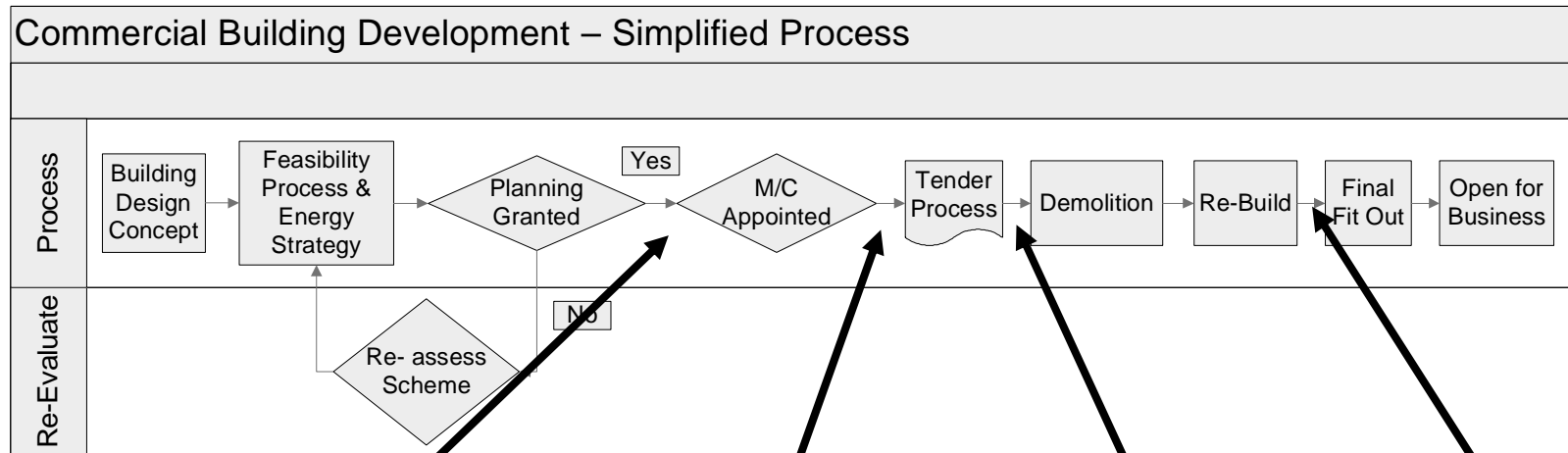
Site X Islington – Geothermal Drilling Operational Programme Indicator Two Drilling Units Installing and Testing 8nr Boreholes



Test pumping will be carried out at strategic points throughout the drilling operation culminating with a main test and tracer test after the final well is installed

Getting Started – When to Involve the Geothermal Designers

When does geothermal tend to appear on the Radar ?



Here if your lucky

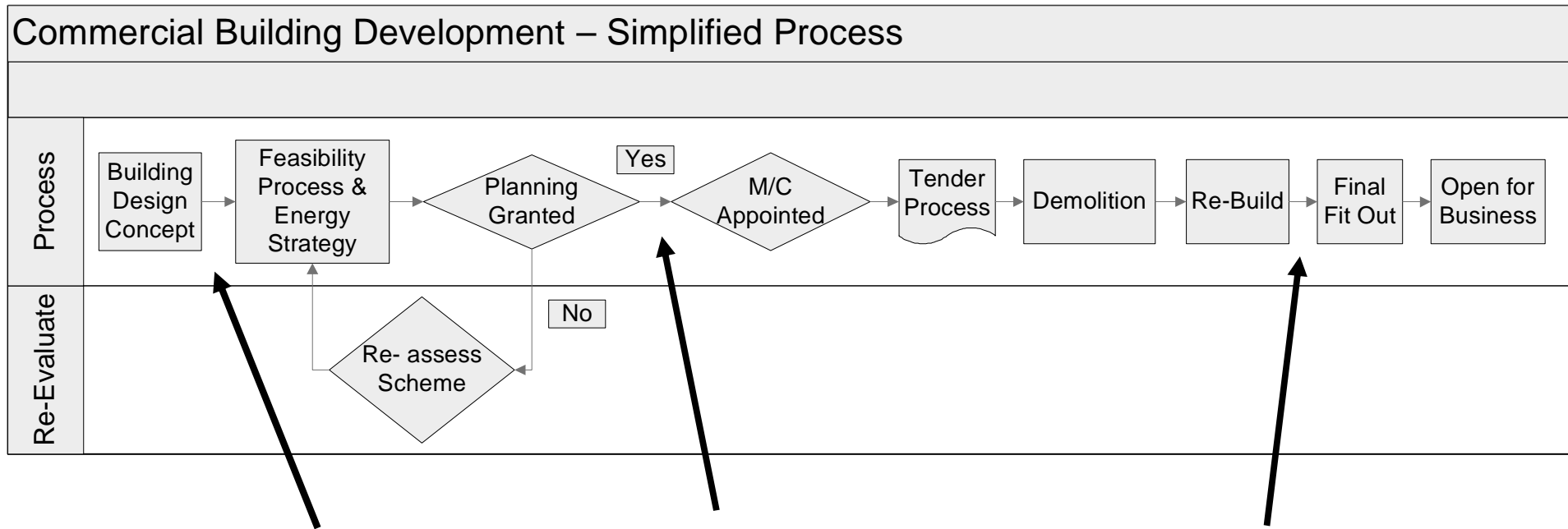
Maybe Here

This has been known

But so has this !!!

Getting Started – When to Involve the Geothermal Designers

Where it should appear on the radar ?



Here if your
lucky

Last chance
saloon !!

But please not
here !!!

Getting Started - Feasibility

- ◆ Assess.....
- ◆ General hydrogeological conditions (A fighting Chance ?)
- ◆ EA Stance – SPZ / SSSI
- ◆ Understand What the Client / Team Are Expecting the Ground to Do – Amount of heat rejection
- ◆ Assess potential areas for drilling / Deep Infrastructure - London
- ◆ With the above boxes ticked.....Move into phase one focussed feasibility study
- ◆ If hydrogeological and logistical factors are satisfactory move on to phase two feasibility – thermal impact investigation



Hydrogeological Appraisal & Feasibility Report for Open Loop Geothermal Installation

For

**Site X
London,**

zenithinternational

Report 2422/r1-LM999

The Importance of Assessing Thermal Interference

It is vitally important to assess system sustainability

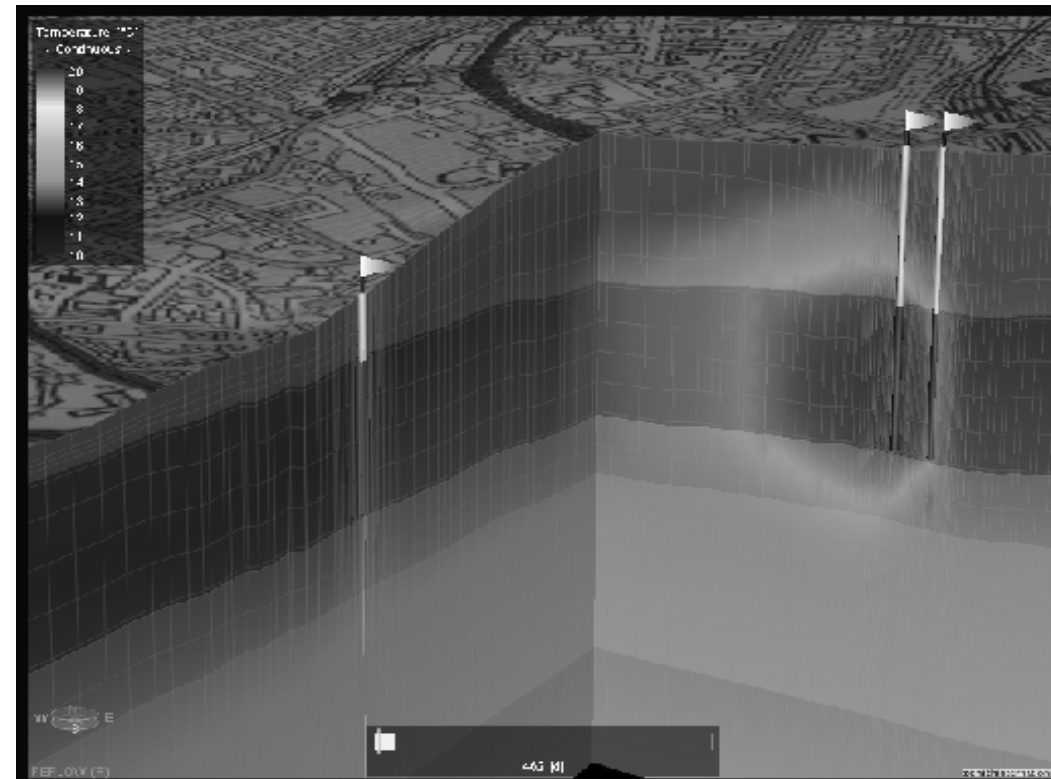
Where building profile is not balanced, the potential for system inefficiency or failure is very real

If distance between abstraction / recharge 'zones' is small, the sustainability question is even greater !

Numerical Models required to assess heat transmission through aquifer

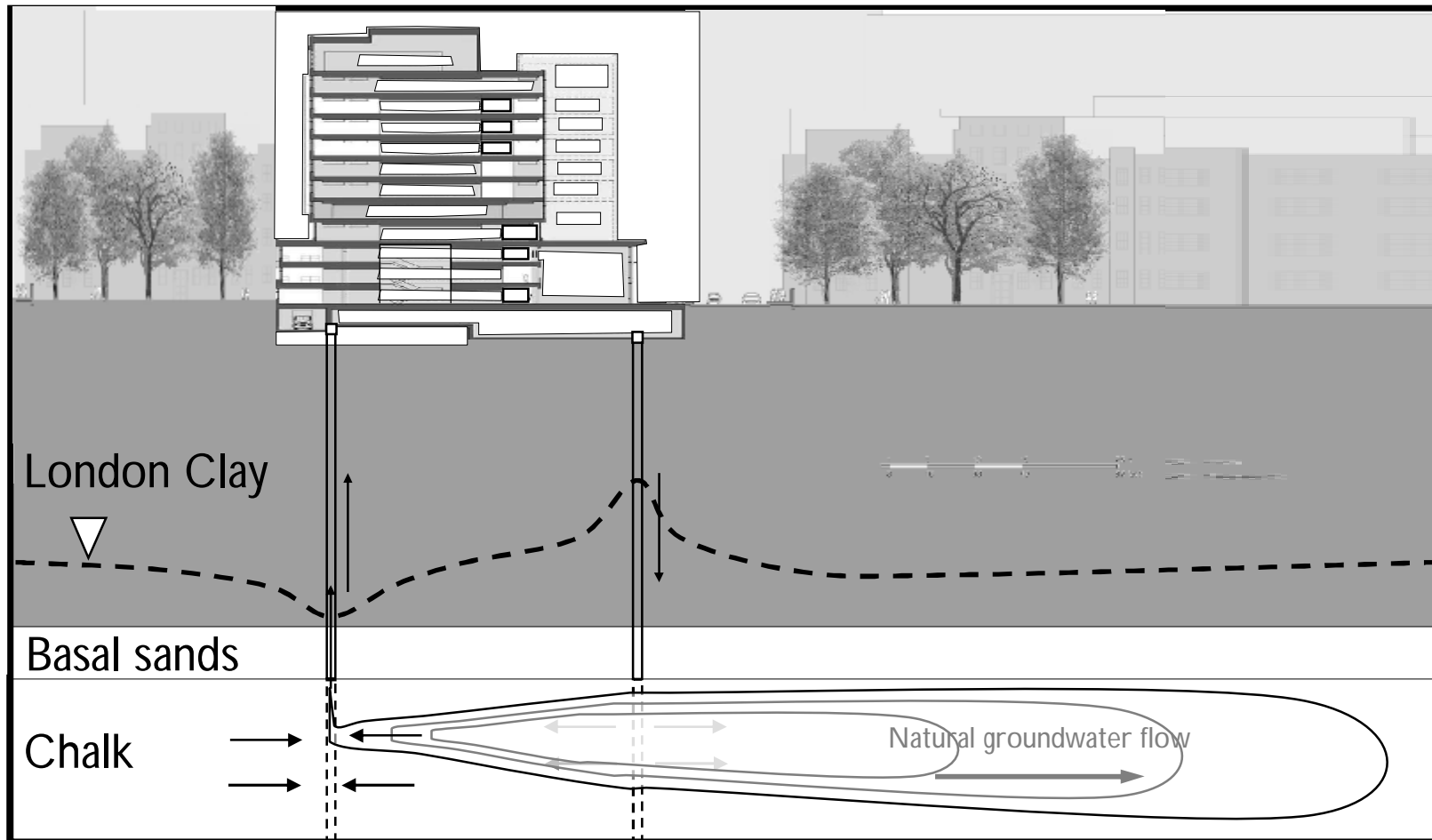
Modelling is expensive but very necessary

It may take several years for sustainability issues to manifest themselves – Are your contractors going to be around then ?



Schematic Courtesy zenithinternational

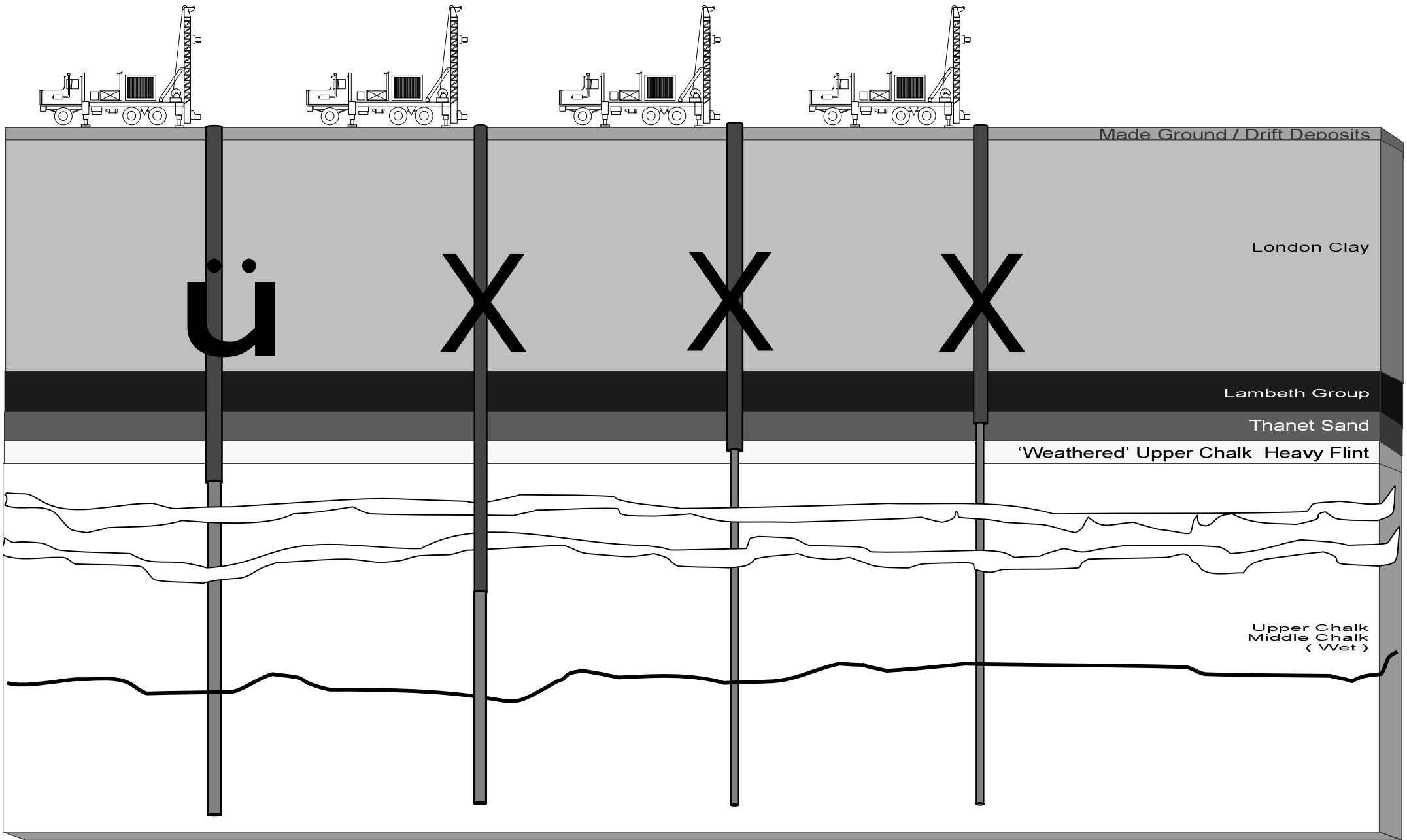
Thermal Impact Assessment – Why ?



Critical Drilling & Test Pumping Procedures !

- ◆ The design of the well is critical for optimising available yields
- ◆ The way in which the drilling contractor undertakes the work is also critical to the success of the well
- ◆ Analysing test pump data is critical to understanding the well hydraulics and sustainability of the system. It is this analysis that determines the second stage development process and demonstrates the system to the EA hydrogeologists

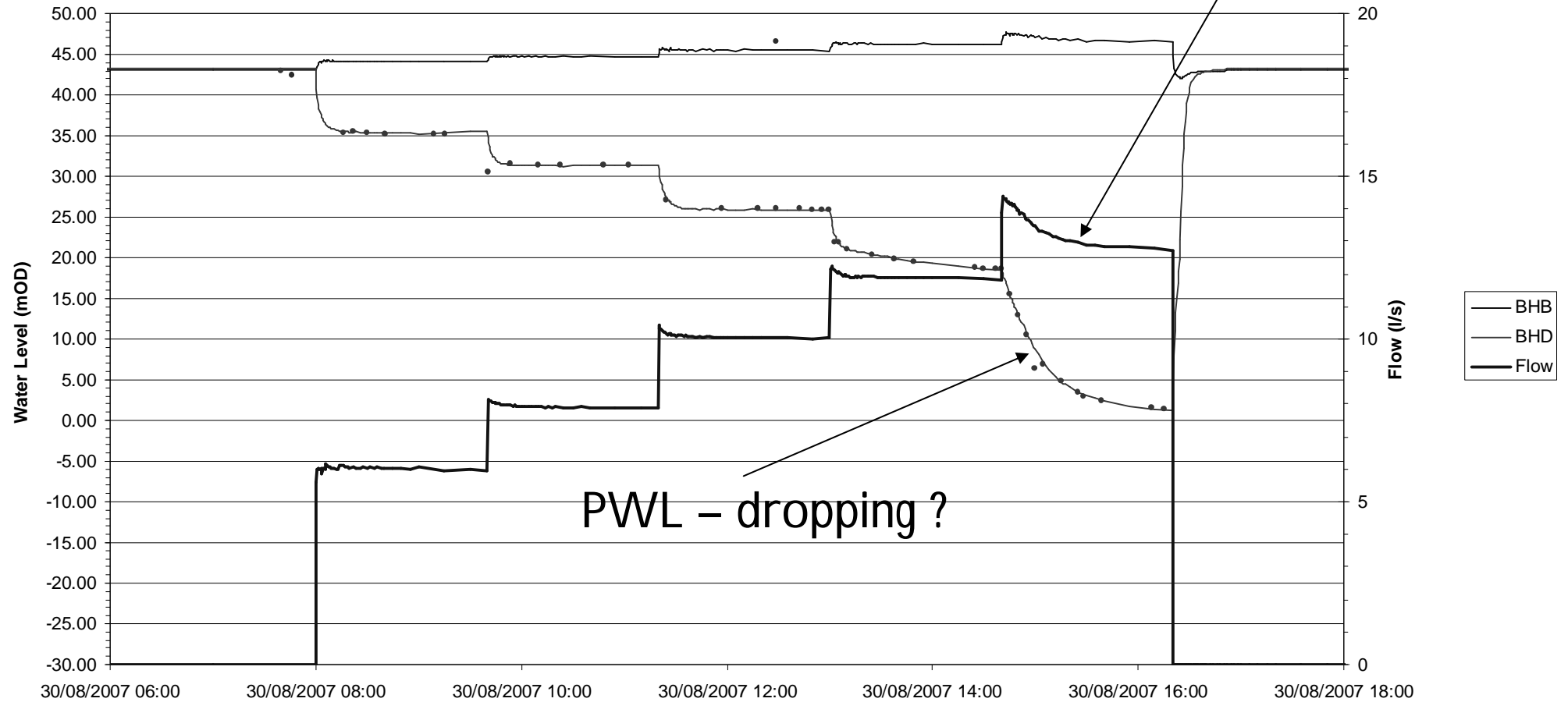




Interpreting Data

Yield diminishing ?

Figure 3: Step Test BHD



Who's Doing Your Job ?

- ∅ You must carefully scrutinise your contractor / consultant
- ∅ If they claim they have completed similar works, get references; Don't take their word for things !
- ∅ Get an understanding of the company structure. It is possible that the organisation is fronting a group of sub-contractors. If they are, scrutinise their sub-contractors !
- ∅ Don't make the mistake of assuming that they are competent. It is upto the team to determine who and why they employ someone.

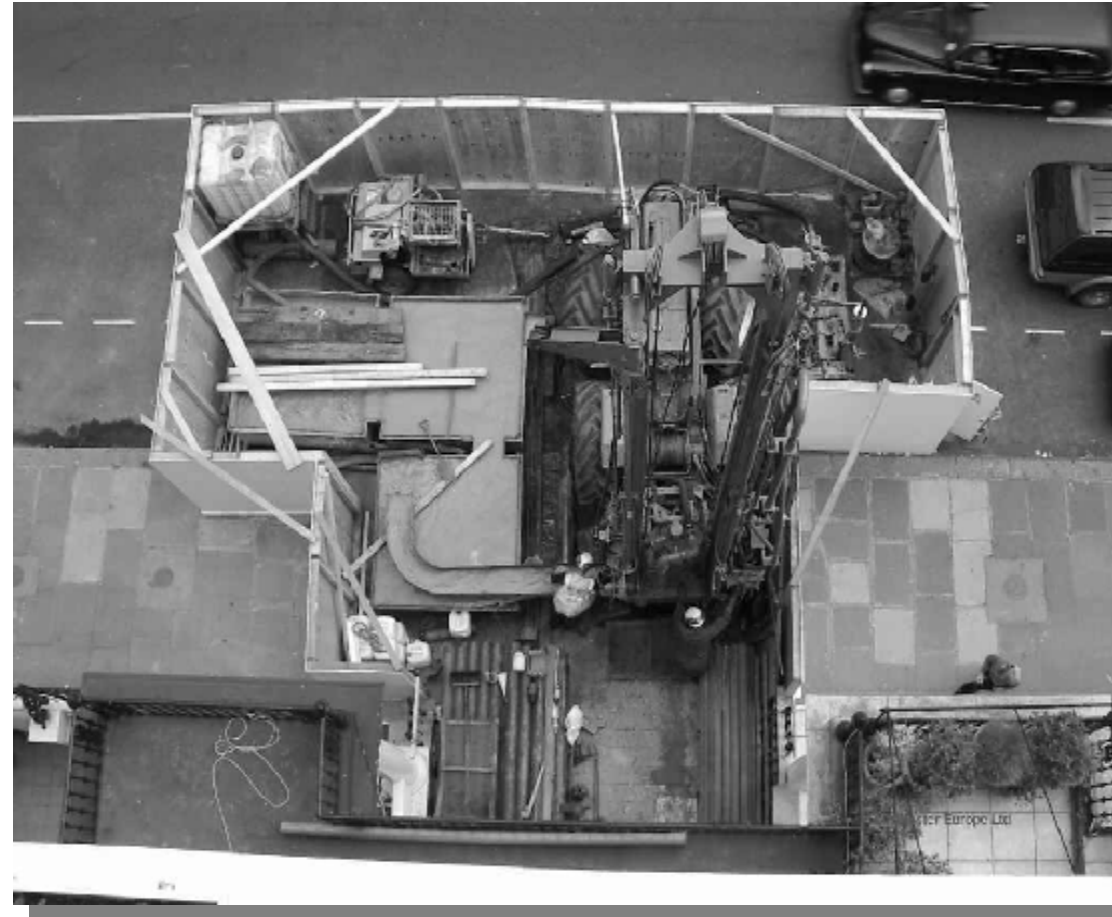
Drilling Contractors

Good Contractors in very short supply !!

Drilling contractors are not designers. They need direction and supervision ; They carry no PI

Beware of inexperienced drilling contractors. Every drilling contractor now adds "Geothermal Drillers" to their resume's. Beware ! :

Geothermal drilling is not all the same. Open Loop is very very specialised work !



Summary

- Hydrogeological and thermal feasibility assessments must be evaluated at an early stage of the project
- Early dialogue with the EA office concerned is essential
- Whoever is to design and install your project, assess their capabilities and track record. Make sure you get references from other similar projects – Do not take their word for it !
- Remember, drilling can be very unpredictable !! Make sure that a comprehensive technical document is used where work is to be sub-contracted to drillers. A detailed and clear scope and material spec. is essential
- Make sure that both the reporting and way in which the work progresses is totally transparent to the team

Thanks For Listening & Good Luck !

Iain Howley

Director

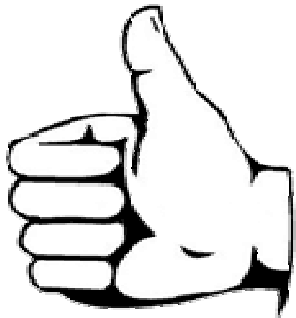
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