Geotechnical baseline reports

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BONUS

What is a GBR?

- *"A single source contract document containing measurable contractual descriptions of the geotechnical conditions to be anticipated or to be assumed to be anticipated during construction"*
- Contractor pays for those conditions equal to or less adverse than the baseline
- Employer pays for those conditions more adverse than the baseline

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Why did they come into being?

- No unforeseen ground conditions clause (*'left to chance'*)
- No or limited (poorly considered?) information provided at tender (factual report – *'points/values in space'*)
- Geotechnical Interpretative Report (pre-design – *outcome not known*)
- Inconsistent with Contract Documents
- Construction overruns and claims and rising costs for 'ground' works

- Unforeseen ground conditions clause
- Since early/mid 90's (in US) (tunnels)
- 'Reference Ground Conditions' - CIRIA 79 'Tunnelling - Improved Contract Practices' (1978)
- Gap in our ability to communicate
- Reintroduced in UK early 00's – but for major infrastructure projects only
- GBR a requirement under ABI/ITA 'rules' for tunnel construction
- Gradually being adopted worldwide

How does a GBR work?

- Statements called 'baselines'
- GBR issued at ITT
- Contains all geo-information relevant to the bid and execution of Contract
- Takes precedence over other geo-information
- Same for all bidders
- Comparison of bids
- If adverse, may lead to compensation (additional cost and time)
- Resolves to Contract administration

- Not a warranty that conditions will occur
- Baselines should be realistic
- May not be real but define 'performance limits' within which the Contractor is expected to perform
- Should not be used as a basis for design (a GBR is not a GIR)
- Clearly, need to know the implications of the baseline statement set and the risk they may be exceeded.
- Buy in from Employer

What geotechnical baselines?

- Estimated amounts and distribution of different materials (a drawing!)
- Description of strength, permeability, grain size and mineralogy of the materials
- Strength and permeability of the ground mass
- Quality of the rock mass – characteristics of discontinuities
- Groundwater levels and groundwater conditions
- Ground & groundwater geochemistry
- Anticipated behaviour of the ground to planned construction activities
- Construction impacts on adjacent facilities
- Location of potential faults etc.
- Description of the presence of boulders, foundations, utilities or other geotechnical hazards

Example of a baseline statement (1)

- Tunnel in glacial till
- Boulders of rock are to be anticipated
- Estimated 100 to 300 boulders
- Set baseline at 300 boulders – the risk of unforeseen ground conditions is removed
- But, Employer pays for 300 boulders whether encountered or not
- Set baseline at 100 boulders
- Employer pays for first 100 boulders and others encountered are subject to additional payment
- Owner will get lower bid for 100 boulders than for 300
- Risk and impact of encountering more than 100 boulders needs to be assessed (*the contingency*)
- Baseline is weighed decision both - commercial and technical

Example of a baseline statement (2)

- Excavation for new building to replace old
- Expected presence of old foundations likely to cause an obstruct (*lengthen time or use different or bigger plant*)
- But location/depth and extent of old foundations are not known (*no plans no ground investigation*)
- Was this a known risk?
- Employer wants a price from Contractor
- How would the Contractor price for this?
- What should the Employer pay?
- What baseline should be set?
- What if there were no baseline?

Example of a baseline statement (3)

- Piled foundation
- Employer's design (DBB)
- Contract drawings would state pile size, depth and loads.
- GBR would define: -
  - anticipated ground conditions
  - preferred method of construction
  - design parameters
  - requirements to control groundwater
  - presence of hazards such as obstructions that need to be priced
  - how ground is likely to behave for likely construction methods to be used

What's in a typical GBR?

Introduction
Sources of information
Project description
Description of 'the Site'
Site geology
'Ground/Site' characterisation
Considerations for design
Considerations for construction
References
± Previous construction experience

How should a GBR be written?

- Unambiguous
- Avoid repetition
- Succinct
- Explicit
- Measurable
- Quantitative terms
- Qualitative (e.g. suits formalised terms)
- Avoid imprecision (e.g. terms like 'may', 'should' , 'shall' etc)
- Content varies according to type of contract DBOT – DB – DBB and how risk is allocated.

Summary of benefits of a GBR

Preparation

- Collaborative
- Focuses thought
- Sets performance limits
- Identifies risk and contingencies

Bid

- Inform at ITT (single interpretation)
- Common basis for evaluating bids
- More reliable bids (known contingencies)
- May be negotiable/contractor input

Implementation

- Ground conditions are now measurable
- A basis for determining eligibility for compensation under the Contract
- Greater certainty of output

Current situation

- Are they necessary?
- Little experience in the UK
- ASCE Guidelines (Gold Book, 2007)
- Relevance to the UK?
- Compatibility with forms of Contract?
- Standardised?
- Who should write the GBR?
- Shift in attitude – nothing left to chance (risk management, CDM etc).
- Integration with Bills of Quantities/Activity Schedule?
- Integration with Eurocode 7?
- Integration with CDM2007?
- Better (more accurate or complete?) interpretations of the ground
- Use of geological models?
- How do you measure the ground?
- Emphasis on construction processes and ground behaviours

'a specification for the ground'

- *'a specification for the ground'*
- Culmination of what we are trying to achieve
- Fills communication gap
- Involved
- Attitude

Way forward

- Working Party established in 2008 by EGGS
- Early 2010 - Draft Commentary on the use of Geotechnical Baseline Reports
- May 2010 - EGGS meeting