

Notes



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Project title	Geological Society Periglacial and Glacial Engineering Geology Working Party	
Meeting name and number	01/2012	
Location	Arthur Holmes Room, Burlington House	Time and date 10:00 for 10:30 27th February 2012
Purpose of meeting	First meeting of Periglacial and Glacial Engineering Geology Working Party	Page 1 of 5
Attendance	Jim Griffiths (Editor) Chris Martin (Chair) Anna Morley (Secretary) Sven Lukas (Author Ch 2 Quaternary Setting) Dave Giles (Author Ch 3 Geomorphological Framework) Mike de Freitas (Author Ch 7 Engineering Investigation & Assessment) Martin Culshaw (Author Ch 8 Engineering Behaviour & Properties)	
Apologies	Dave Evans (Author Ch 4 Glacial Conceptual Ground Model) Julian Murton (Author Ch 5 Periglacial Conceptual Ground Model) Laurance Donnelly (Author Ch 6 Geohazards and Problematic Ground Conditions) Mike Winter (Author Ch 9 Design & Construction Considerations)	
Circulation	Those attending. EGGS committee.	

Action By

1. Introductions

- As above. Contact details were circulated by ALM.

2. Chairman's introduction and review agenda

- The Chair thanked everyone for attending the first working party meeting.
- The Chair expressed gratitude to the Steering Group for their hard work in developing and setting up the Working Party.
- The background to the Working Party and the Steering Party was outlined by the Chair.
- MdF questioned what the target audience for the publication would be and how it would be sold and marketed. CJM noted that that this was one of three areas that had provoked much discussion by the Steering group. He summarised these discussion areas:

Prepared by Anna Morley

Date of circulation 19th March 2012

Project title

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Action By

- a) What market is the book aimed at;
- b) The classification of relict i.e. not an EG handbook for active conditions in Canada, Russia, etc;
- c) How can *Glacial and Periglacial* conditions be defined and whether these are the best terms to use? The general view of the group is that these terms should be used as the conditions in the field are not discrete boundaries.
- JG noted that a future working party may be needed to cover active Periglacial/Glacial conditions.

Illustrations and Figures

- MdF stressed the importance of clear diagrams to explain complicated issues. The possibility of employing professional cartographics / graphic artists was discussed, in order to produce high quality and consistent illustrations. Options would be investigated as the WP develops.
- **Action 1.1 - JG to produce a guidance document for figure preparation**, based on e.g. USGS, GSPH, QJEGH guidance.
- Royalty/copyright costs were also discussed and need to be considered by the WP.

JG End
Apr-12**3. Terms of Reference (ToR)**

- The proposed ToR as discussed and revised at the meeting are attached.
- **Action 1.2 - Comments are invited on the revised ToR, which will be ratified at the start of the next WP meeting.**
- It was agreed that the term *Quaternary* should be defined in the Introduction and used *sensu lato* within the document.
- The term *comprehensive* has been deleted.
- The term *former* will be used instead of the term *relict*.
- The terms *Periglacial and Glacial* will be used throughout the document, but these will be clearly defined in the Introduction.
- Item 4 of ToR: References will be made to BGS, IGA(?) extents in the main document.
- Item 7 of ToR: The authorship for each chapter will be attributed to Author + Co-Authors + members of the Working Party.

All End
Apr-12**4. Proposed Working Party Schedule**

The proposed WP schedule was discussed and agreed, as outlined below:

- 2012 Q1 - Establish Working Party; Ratify ToR; Agree Schedule; Review ToC; Confirm lead authors and identify co-authors.

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	Action	By
<ul style="list-style-type: none"> 2012 Q2 - Develop and agree ToC; Confirm co-authors; Agree page count, figures, etc. 2012 Q3 - Start drafting text. 2012 Q4 - Complete first draft. 2013 - Internal review and revision of draft report. 2014 - External review, leading to final draft. 		
<ul style="list-style-type: none"> Some concern was expressed that the schedule appeared too ambitious. The Chair and Editor noted that the schedule had to be shorter than previous Working Parties, but that it was considered to be realistic and achievable. The Chair confirmed that the 'complete first draft' stage represents a collection of assembled information from the lead and co-authors, but was not necessarily expected to be complete, edited prose. It was noted that both Year 1 and 2 should be considered as the writing and review process. Action 1.3 - All Lead Authors requested to produce a revised and augmented contents list for each chapter by <u>Monday 23rd April</u>. This should also include bullet points of key areas to be covered and aim to identify co-authors, type and numbers of figures/ tables/ photographs. Outline chapters to be sent to ALM for circulation to the WP. The total publication word limit is set at 240,000, therefore each chapter was agreed to be initially set at 25,000 words, plus figures, tables, etc. This estimate will be refined at the next meeting. Action 1.4 - DG to discuss about ground model vs. land systems approach with DE. At the end of 2012 Q3, a review of the overall progress made on each chapter will be undertaken to identify any gaps and any problematic sections identified. 	Lead authors	23-Apr-12
<p>5. Report Table of Contents (ToC)</p> <ul style="list-style-type: none"> A new structure to the ToC was proposed at this meeting. Chapters 1 to 5 remain largely unchanged. Action 1.5 - The new proposed ToC structure is attached for comment by all WP members. Chapter 1: To be written towards the end of the drafting process. Chapter 2 and 3: It was discussed that as these are fundamental building blocks for the rest of the report that they need to be advanced quicker than the other chapters. Action 1.6 - CJM to brief JM and DE on Chapter 4 and 5 discussions. 	DG	End Mar-12
	All	End Apr-12
	CJM	End Mar-12

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Periglacial and Glacial Engineering Geology Working Party (PGEG WP)	27th February 2012

	Action	By
<ul style="list-style-type: none"> New Chapter 6: to be <i>Engineering Geomaterials</i> authored by Martin Culshaw. This chapter will subsume some aspects of the former Chapter 6 (<i>Geohazards</i>) and 8 (<i>Engineering Materials and Behaviour</i>) Chapter 7: To remain as <i>Engineering Investigation and Assessment</i> (MdF). MdF proposed a further section 7.5 Conceptual / Engineering Ground Model. MdF proposed a number of co-authors who might be approached including David Norbury, Peter Phipps, Willie Burgess, Geophysics experts, input from LD. New Chapter 8: Design and Construction Considerations. The WP suggested inclusion of case studies in this chapter. Action 1.7 - CJM to discuss Chapter 8 suggestions with MW. Reference to the 'Earth Manual' approach was recommended. Action 1.8 - ALM to find 'Earth Manual' reference and circulate to WP. New Chapter 9: Problematic Ground Conditions / Risk. Chapter contents and approach may be left open; to be developed by the WP as the main publication developed. MdF recommended consulted the insurance under-writing industry; he has links via London Basin Forum. Action 1.9 - CJM to discuss Chapter 9 approach with LD. 	CJM	End Mar-12
<p>6. Lead and co-authors</p> <ul style="list-style-type: none"> Lead authors for each chapter have been identified. Ideas for co-authors were discussed and will be confirmed before the next meeting (see Action 1.3). ALM noted that her colleague Tom Berry was keen to contribute to the geohazards or problematic ground conditions sections. His CV and an unpublished paper on paleo-shears is attached. Action 1.10 - ALM to develop and maintain a register of possible contributors / interested parties and possible case studies. This should also include copyright log of photographs. 	ALM	End Apr-12
<p>7. Correspondence</p> <ul style="list-style-type: none"> Correspondence between Matt Pope of the Institute of Archaeology was discussed. It was agreed that possible input from archaeology colleagues could be included in the desk study part of the report. AM noted her colleague Richard Hughes who may be willing to contribute. Action 1.11 - MdF to develop ideas on collaboration with Institute of Archaeology. Links with the QRA were discussed. Action 1.12 - SL and DE were requested to maintain links with QRA. This might include providing co-authors and external reviews of appropriate chapters, and organising 	MdF	Ongoing
	SL/DE	Ongoing

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27th February 2012

		Action	By
	a joint meeting between QRA and EGGS.		
	<ul style="list-style-type: none"> Comments received from LD and CM in advance of the meeting were largely addressed during the meeting. It was agreed by the members present that specifics of active volcanic activity in glacial/periglacial terrain was considered outside the scope of the WP. It was agreed that post-glacial neotectonics would be addressed; possibly in 4.4 and 5.3. It was agreed that it would be useful for all WP members to forward any useful case studies that could be included to ALP for circulation (see Action 1.10). 		
8.	Expense claims		
	<ul style="list-style-type: none"> The expense claim form has been circulated. Action 1.13 - All expense claim forms and receipts to be sent to ALM for collation and forwarding to Ursula Lawrence of EGGS. EGGS would approve the expenses but that they are paid directly by the Geological Society. 	All/ ALM	End Mar-12
9.	AOB		
	<ul style="list-style-type: none"> The Geological Society Publishing House Letter of Support was reviewed at the meeting and accepted by the WP members present. Action 1.14 - JG/CJM to confirm acceptance of GSPH Letter of Support. <u>Post-meeting note</u> - DG has set-up a working area on the following link to share electronic resources across the W: http://www.ukgeohazards.info/pages/Glacial_Periglacial_Working_Party/pgeg_wp.htm Action 1.15 - All WP members requested to review web-content and propose recommendations. 	JG/CJM	End Mar-12
		All	End Apr-12
10.	Date of Next Meeting(s):		
	<ul style="list-style-type: none"> 11am to 5pm, Tuesday 22nd May. 11am to 5pm Wednesday 3rd October 11am to 5pm Wednesday 12th December 		
	Action 1.16 - All WP members to book travel arrangements and ALP to confirm venue.	All/ ALP	End Apr-12

Attachments:

- Revised ToR
- Revised ToC
- Tom Berry CV and unpublished paper

PERIGLACIAL AND GLACIAL ENGINEERING GEOLOGY

A Geological Society Engineering Group Working Party

DRAFT TERMS OF REFERENCE

**to be formulated into the final Terms of Reference
at the second meeting of the Working Party**

1. These Terms of Reference are as agreed by the Periglacial and Glacial Engineering Geology Working Party (PGEWGP).
2. The PGEWGP has been established by the Engineering Group of the Geological Society and comprises officers and specialist participating members who will act as lead authors. The participating members may be assisted by any number of co-authors and corresponding members.
3. The PGEWGP will produce a report, in book format, to complement the earlier report on Tropical Residual Soils produced by an earlier Working Party of the Engineering Group, first published in 1990 and republished in book format in 1997. A similar format was adopted by the Hot Deserts Working Party, which is due to publish their final report in 2012. It is intended that the report will be a state-of-the-art review on the ground conditions associated with former Quaternary* periglacial and glacial environments and their materials, from an engineering geological viewpoint. There necessarily will be appropriate coverage of the modern processes and environments that formed these materials.
4. It is not intended to define the geographic extent of former periglacial and glacial environments around the world, but to concentrate on ground models that would be applicable to support the engineering geological practitioner.
5. The aim of the PGEWGP is to produce a report that will act as an essential reference handbook for professionals as well as a valuable textbook for students and others. The style will be concise and digestible by the non-specialist, yet be authoritative, up-to-date and extensively supported by data and collations of technical information. The use of jargon will be minimised and necessary specialist terms will be defined in an extensive glossary. There will be copious illustrations, many of which will be original, and many good quality photographs.
6. The content of the report will embrace a full range of topics, from the latest research findings to practical applications of existing information. Likely directions of research and predictions of future developments will be highlighted where appropriate. The report will be based on world-wide experience in periglacial and glacial terrain and will draw upon the experience of its members and publications on periglacial and glacial conditions.
7. The Working Party members will be collectively responsible for the whole report. Although each participating member will be the named author or co-author of one or more chapters, all members will be expected to review and contribute to the chapters drafted by other members and would be acknowledged as such. Individual book chapters will be included in the Thomson Book Citation Index.
8. It is intended that the report will be completed within three years.

* *Nomenclature subject to review over the duration of the Working Party.*

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DRAFT TABLE OF CONTENTS

Draft 5, as reviewed and revised at first Working Party meeting (27/03/12).
All Lead Authors to develop their own chapters by end April-12.

WP members & acknowledgements.

Contents.

Forward.

Preface.

1. INTRODUCTION

Consider important case studies, e.g. Sevenoaks Bypass, Carsington Dam, Waltons Wood, South Wales
TRL Scotland?

2. QUATERNARY* SETTING (*Nomenclature to be reviewed by WP)

- 2.1 Event framework
- 2.2 Stratigraphic framework
- 2.3 Geographic framework

3. GEOMORPHOLOGICAL FRAMEWORK (Landsystems approach)

- Mega / Macro-model - 'notes for guidance' style. Identify chapter headings in following two chapters.
- Discuss interrelationships and overlaps. Should define scope of Report and each ground model.

4. GLACIAL CONCEPTUAL GROUND MODEL

- Types of materials & variations.
- List of ground models (GM).
- For each GM
 - processes, landforms, deposits
 - list of geohazards (g/h).
- For each g/h
 - list of problems (eg g/h = gulls, prob = voids, deposits at elevation below expected from stratigraphy, etc.)
 - risk register (L/M/H)

4.1 Ice-related terrains: sub-glacial, supra-glacial & glaciated valley

- a) Processes, Landforms & Deposits
- b) Ground Model
- c) Geohazards checklist and engineering significance

4.2 Water-related terrains: glaciofluvial, glaciolacustrine & glaciomarine

- a) Processes, Landforms & Deposits
- b) Ground Model
- c) Geohazards checklist and engineering significance

4.3 Ice-front-related terrains: glaciotectonic & ice marginal. (Possibly combine with 4.1 and 4.2?).

- a) Processes, Landforms & Deposits
- b) Ground Model
- c) Geohazards checklist and engineering significance

5. PERIGLACIAL CONCEPTUAL GROUND MODEL

5.1 Upland regions.

- a) Processes, Landforms & Deposits
- b) Ground Model
- c) Geohazards checklist and engineering significance

5.2 Lowland regions.

- a) Processes, Landforms & Deposits
- b) Ground Model

c) Geohazards checklist and engineering significance

6. ENGINEERING MATERIALS & HAZARDS (to be developed by MC)

- Focus on difficult areas.
- More details of the main g/h from Ch 3 & 4. Sub-headings for each g/h described.
- Start with lists from Ch 3 & 4.
- Same sub-headings in Ch 3 & 4 as Ch 5. Expand to para-pages as required.
- Matrix based on higher level of classification eg cambering.
- Link to SI in Ch 6.
- PRELIMINARY STRUCTURE, depending on outcome of Ch 4 & 5.
- Engineering behaviour of rock and soil materials.
 - a) Deformed/shattered bedrock, frost heave and thaw settlement deposits, ice-rich soil/rocks, till, sand & gravel, laminated silts & clays, quick clay, loess & brickearth, solifluction deposits, ice rafts, boulder fields, patterned ground, peat (associated with periglacial/glacial terrain - acknowledge / cross-ref, or just mention in Ch3-5?).
 - b) Example for tills – engineering classification, PSD, Atterbergs, moisture content, liquidity, post-depositional modification, shear strength, influence of discontinuities, compressibility, in-situ stress.

Consider structuring as:

- 6.1 Hazards related to particular soil types or associations of soil types
- 6.2 Ice-related terrains: sub-glacial, supra-glacial & glaciated valley
- 6.3 Water-related terrains: glaciofluvial, glaciolacustrine & glaciomarine
- 6.4 Ice-front-related terrains: glaciotectonic & ice marginal
- 6.5 Upland region periglacial terrains
- 6.6 Lowland region periglacial terrains

7. ENGINEERING INVESTIGATION & ASSESSMENT

- Needs to reference BS5930 and EC7, but not repeat verbatim. Should highlight difficulties and possible alternatives / work-arounds.
- 7.1 Soil & rock description & characteristics.
 - 7.2 Desk study, remote sensing (include Lidar, etc.), walk-over/field evaluation & eng geol mapping.
 - 7.3 Ground investigation, testing & interpretation.
 - a) Drilling, trial pitting & trenching.
 - b) Sampling equipment & quality. Include 'representativeness'
 - c) In-situ testing – SPT, CPT, plate bearing, pressuremeter, permeability.
 - d) Geophysics.
 - e) Lab. testing.
 - Onshore vs Offshore
 - 7.4 Hydrogeological investigation.
 - a) Aquifers, recharge, abstraction, hydrochemistry, superficial cover.
 - 7.5 Ground Models

8. DESIGN & CONSTRUCTION CONSIDERATIONS

Consider 'Earth Manual' type approach. Focus on case studies. Further combine sections where possible:

- 8.1 Foundations.
 - a) Common problems, bearing capacity & settlement, rockhead, shallow foundations, piles, wind farms.
- 8.2 Slopes and slope stability
 - a) Cut
 - b) Natural slopes
- 8.3 Earthworks
- 8.4 Aggregates and other materials (e.g. brickearth, glass sands, fuller's earth?, boulderfields as armourstone, placer deposits)
- 8.5 Retaining walls

- a) Depending on detail this may end up under either foundations or earthworks or drop-out completely.

8.6 Dams and reservoirs

- a) Common problems, valley profiles, rockhead, rock conditions, groundwater, construction materials, buried valleys, superficial deposits.
- b) Inevitably some overlap with earthworks, foundations and slopes so we may need to refer back and deal only with issues that reflect the unique issues surrounding dams (i.e. the need to impound water) here.

8.7 Tunnels and underground structures

- a) Common problems, water, variability of ground conditions.
- b) Specific features – sand lenses, etc.

8.8 Issues related to linear infrastructure

- a) Roads (highway vs wind farm/forestry access).
- b) Railways.
- c) Pipelines and buried cables.
- d) Transmission lines.

8.9 Offshore

9. RISK ASSESSMENT AND MITIGATION

- Approach and content to be developed by WP as main publication progresses?
- Consider input from insurance underwriters.
- Links with Managing Geotechnical Risk (Barry Clarke and Paul Maliphant)?

References and Bibliography - at end of each chapter. Include 'key references' in Introduction, each chapter or separate appendix?

Appendices.

Glossary.

Index.