

College of Arts, Innovation and Technology Engineering and Computing Department

Submission instructions

- Cover sheet to be attached to the front of the assignment when submitted
- All pages to be numbered sequentially

Module code	EG4102		
Module title	Earth and Material Analysis		
Module leader	Dr Jaya Nepal		
Assignment tutor	Dr Arya Assadi Langroudi		
Assignment title	Portfolio of Tutorial Works – <u>Element 1 of 2</u>		
Assignment number			
Weighting	25%		
Handout date			
Submission date	24th January 2018 (Formative) 07th February 2018 by 16:00		
Learning outcomes assessed by this assignment	As listed in module specifications		
Turnitin submission requirement	YES	Turnitin GradeMark feedback used?	YES
UEL Plus Grade Book submission used?	N	UEL Plus Grade Book feedback used?	N
Other electronic system used?	N	Are submissions / feedback totally electronic?	YES
Additional information	None		

Form of assessment:

☒ Individual work ☐ Group work

For **group work** assessment which requires members to submit both individual and group work aspects for the assignment, the work should be submitted as:

☐ Consolidated single document ☐ Separately by each member

Number of assignment copies required:

☒ 1 ☐ 2 ☐ Other

Assignment to be presented in the following format:

- ☒ On-line submission
- ☐ Stapled once in the top left-hand corner
- ☐ Glue bound
- ☐ Spiral bound
- ☐ Placed in a A4 ring bound folder (not lever arch)

Note: To students submitting work on A3/A2 boards, work has to be contained in suitable protective case to ensure any damage to work is avoided.

Soft copy:

- ☐ CD (to be attached to the work in an envelope or purpose made wallet adhered to the rear)
- ☐ USB (to be attached to the work in an envelope or purpose made wallet adhered to the rear)
- ☒ Soft copy not required

Note to all students

Assignment cover sheets can be downloaded from UEL Intranet or via the HUB on request.

Portfolio of Tutorial Work (At least 45 hours' worth of work)

- **Site Investigation Report (SI): 40%**
- **Geotechnical & Geo-environmental Interpretative Report (GIR): 60%**

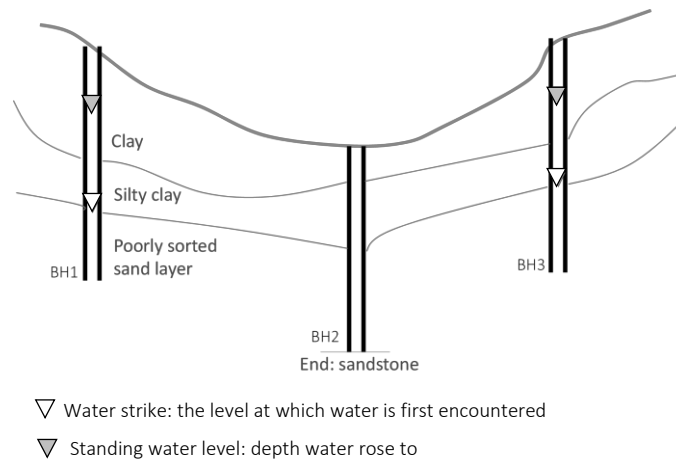
Background Information	<p>London City Airport was opened in 1987 across an area of 48 hectares, located approximately 6 miles east of the City of London and approximately 2 miles east of Canary Wharf. The airport has one runway and there are no parallel taxiways so aircraft arriving and departing have to 'back-track' on the runway in order to take-off. It is proposed to construct a new airfield infrastructure, new passenger (terminal building) facilities, 7 new aircraft stands and associated infrastructure together with a Hotel as elements of extending the London City Airport. In particular, it is proposed to construct two extensions to the existing terminal building (west and east of the building) to match the terminal capacity to future demands).</p> <p>It is necessary to undertake a comprehensive site investigation to supply inputs for designing foundations of the structure, groundworks and infrastructure.</p>
Requirements	<p>The report needs to be based on the observations made, that gleaned from the published information, and where required, arithmetic analysis.</p> <p>Maps showing geology of the area can be obtained from EDINA via the University. This information may be available from other sources, such as BGS, Environmental Agency and geological memoirs.</p> <p>Background information can be obtained from various publications listed below in the section on Useful References, at the end of this note. This list is only for guidance and it is anticipated that students will consult additional sources.</p> <p>Your report should include sections on anticipated geology (based on published information), anticipated geological hazards and hypothesis for drivers of possible instability of planned fills and excavations. It should also include a description of the topography identifying both locations and descriptions of key features that indicate that shallow or deep foundations are most suited.</p> <p>Please note it is not sufficient to drag and drop images with one line caption, or to list your findings in a number of bullet points. The report MUST have a logical structure, and your findings MUST be</p>

	underpinned with proper reasoning and evidence.
Report	<p>You may use appendices as required to present supporting information. The report must be typed in Calibri Light at font size 12 (or similar font) with 1.5 line spacing. Hand written reports WILL NOT be accepted. References MUST be in standard HARVARD style ONLY. The <u>recommended</u> structure for the report is as of below. You can choose to present written scripts for all or part of the recommended sub-titles, but you do need to take into account the marking criteria.</p> <p>[Executive] Summary Contents list <i>List of Tables</i> <i>List of Figures</i> <i>List of Aerial Photographs</i></p> <ol style="list-style-type: none"> 1. Introduction (OR Object and Scope of the Investigation) 2. Site Setting <ol style="list-style-type: none"> 2.1 Site location 2.2 Site description 2.3 Proposed development 3. Site Investigation <ol style="list-style-type: none"> 3.1 Introduction 3.2 Summary of Historical Developments 3.3 Ground Conditions <ol style="list-style-type: none"> 3.4.1 Published Bedrock Geology 3.4.2 Published Superficial Geology 4. Preliminary Risk Assessment <ol style="list-style-type: none"> 4.1 Ground contamination (sources, pathways, receptors) 4.2 Flooding risk 5. Conceptual Design and Recommendations <ol style="list-style-type: none"> 5.1 General 5.2 Geotechnical parameters (in a table) 5.3 Earthworks conceptual design 5.4 Foundations 5.5 Excavations <p>APPENDICES REFERENCE</p> <p>Please note, maximum number of words for each report (excluding tables, figures, captions, list of contents/figures, and references) is 4000 words.</p> <p>-----</p> <p>See: https://www.londoncityairport.com/aboutandcorporate/cadpsubmission</p>

Marking criteria (SI Report from 40% of this assessment element)	<table><tr><td>Academic writing</td><td>10%</td></tr><tr><td>Desk study (embedded in <i>all chapters</i>)</td><td>20%</td></tr><tr><td>5.3 Earthworks conceptual design</td><td>5%</td></tr><tr><td>5.4 Foundations</td><td>5%</td></tr><tr><td>Ground Conceptual Model</td><td rowspan="3">Bonus mark</td></tr><tr><td>Ground Contamination Conceptual Model</td></tr><tr><td>Client A4 Double-sided folded leaflets OR A3 poster</td></tr></table>		Academic writing	10%	Desk study (embedded in <i>all chapters</i>)	20%	5.3 Earthworks conceptual design	5%	5.4 Foundations	5%	Ground Conceptual Model	Bonus mark	Ground Contamination Conceptual Model	Client A4 Double-sided folded leaflets OR A3 poster
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Teamwork	<p>You are allowed to work in teams, but each individual MUST submit one UNIQUE report. You are NOT ALLOWED to submit a work similar to your colleague. If you decided to work in a team, you then need to explicitly explain the work distribution and number hours spent on each element by each individual on a <u>Log Book</u> (which then needs to be presented in an attachment). The format of the Log Book is up to individuals. If you decided to work in teams, each working group should be ‘ideally’ sized 5 or the maximum number of groups should ‘ideally’ be 10. Any dispute within teams need to be resolved by the team members themselves. To re-emphasis, each individual MUST submit one UNIQUE report.</p>													
<i>Analysis: Following producing your SI report, assume that you need to build on the findings and seek answers to four following key questions. (60% of this assessment element)</i>	1	<p>Under each sub-heading in this section, first write a summary of the question (see below), then an introduction to your analysis, your analysis, and a short discussion of your findings.</p> <p>(a) In general the Alluvium underneath the Made Ground is found to comprise uniform medium sand. Explain what is meant by a uniform medium sand with respect to its particles sizes and uniformity coefficient. Also, explain what this means in terms of its density and permeability characteristics. [2.5%]</p> <p>(b) Extensive deposits of soft to firm and firm to stiff clayey soils were encountered in large zones. Suggest laboratory tests that may be undertaken in order to characterise the deposits and determine its</p>												

strength, compressibility and settlement characteristics with respect to foundations. [2.5%]

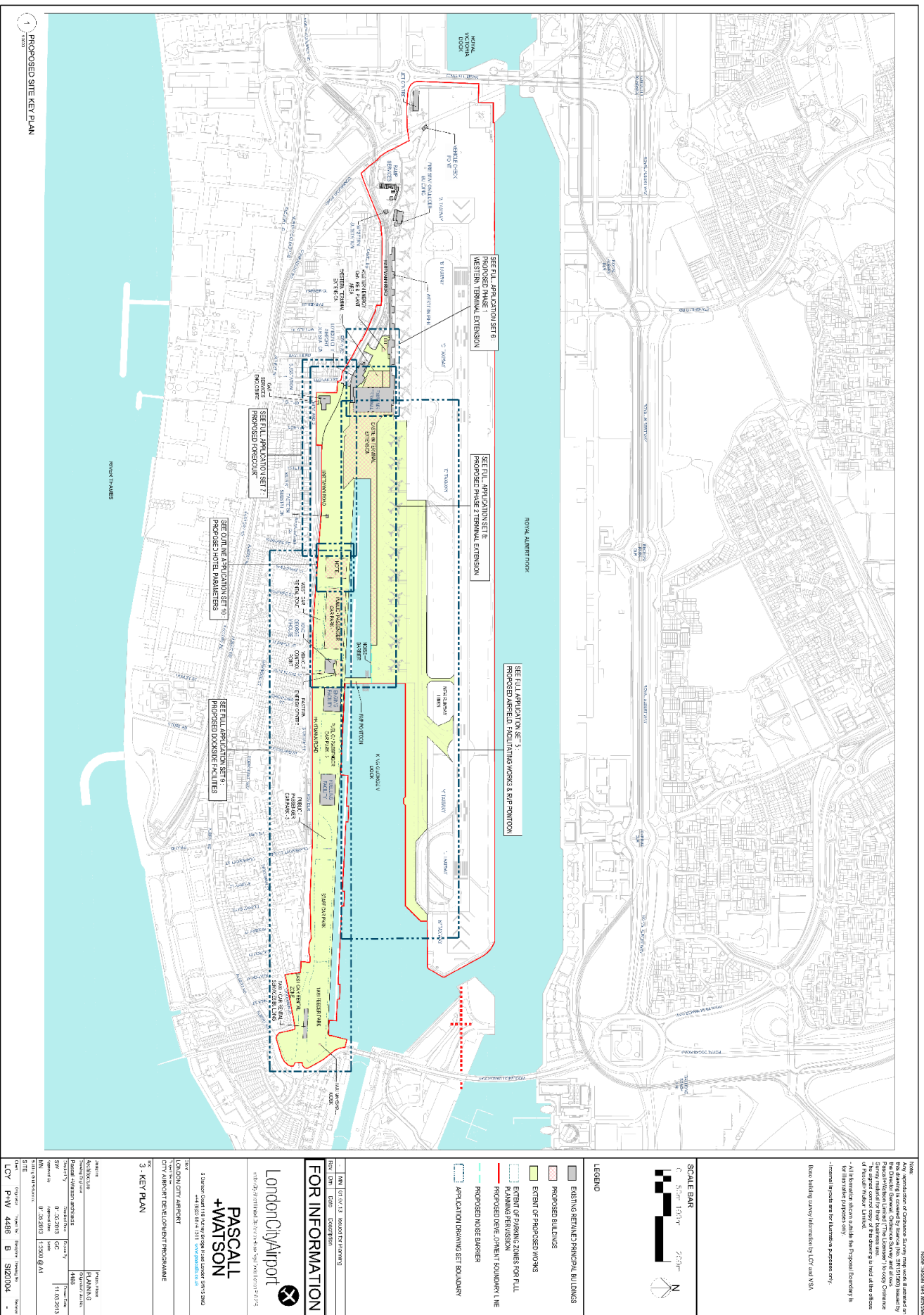
(c) An excavation is required close to BH2 to construct a building with basement levels. The foundation is intended to be constructed on the sand soil layer. The groundwater level is marked on BH1 and BH3 logs as illustrated in the cross section below. The groundwater mark however is missing on BH2 log. To deliver the earthworks economically, the client has queried whether the foundation level can be reached via battering to a safe angle (no temporary excavation support such as sheet piles). Assume there is enough space for battered excavation and a planned exposure time of less than 6 days before foundation installation. Briefly write your advice to the client. [10%]

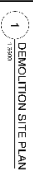


2	<p>(a) The site investigation for the new terminal development reveals that the site consists of a 3m deep stratum of Sand underlain by Clay that extends to a great depth as shown below. The ground water level was found to be at 3.0m below the ground surface, and the properties for each soil type are as follows:</p> <div data-bbox="580 427 984 703" data-label="Diagram"> </div> <p>SAND: $\gamma_d = 16.5 \text{ kN/m}^3$; $K_0 = 0.5$ CLAY: $\gamma_{\text{sat}} = 20.0 \text{ kN/m}^3$; $K_0 = 0.8$</p> <p>Assuming hydrostatic pore water pressures, calculate the following quantities at depths of 3m and 7m only below Ground Surface level.</p> <p>[1] Vertical total and effective stresses [4%] [2] Pore water pressure [1%]</p> <p><i>(Take the unit weight of water as 10 kN/m^3.)</i></p> <p>(</p>
	<p>b) From an undisturbed U100 sample obtained from depth 5mbgl, a cylindrical specimen with diameter of 38mm and length of 76mm and mass of 183.4g is retrieved. After oven-drying, the mass is reduced to 157.7g. Determine for this soil: [1] bulk density and bulk unit weight, [2] dry density and dry unit weight, [3] moisture content, [4] void ratio and porosity, [5] degree of saturation, [6] air voids content, [7] saturated water content. [10%]</p> <p>Take the particle density as of 2.72 Mg.m^{-3}</p>
3	<p>(a) A constant head permeameter test has been carried out on an undisturbed sand sample. With a head difference of 234mm, 200ml of water was collected in 3 minutes 45 seconds. The diameter of the sample is 75mm and the distance between the</p>

		<p>manometer points in 100mm. Determine the coefficient of permeability of the sand.</p> <p>(b) Using the same sand, a layer of silt, 5mm thick, is placed within the sand between the manometer points. With a head difference of 672mm, 100 ml of water was collected in 12 minutes 25 seconds. Assuming the value of the coefficient of permeability of the sand as obtained from part (a), determine the coefficient of permeability of the silt.</p> <p>[15%]</p>												
	4	<p>The following results were obtained from a shear box test on a 60mm square specimen of dense sand. The rate of strain was kept at 0.01 mm/min. [1] Determine the shear strength parameters for peak and ultimate strengths. [2] Would failure occur if the shear stress is 60 kN/m² and the effective normal stress is 20 kN/m²? Determine the angle of obliquity?</p> <p>Specimen height: 20mm</p> <table><tr><td>Normal load: N</td><td>105</td><td>203</td><td>294</td></tr><tr><td>Shear load (N) at peak</td><td>95</td><td>183</td><td>265</td></tr><tr><td>Shear load (N) at ultimate</td><td>65</td><td>127</td><td>184</td></tr></table> <p>(N=Newtons)</p> <p>[15%]</p>	Normal load: N	105	203	294	Shear load (N) at peak	95	183	265	Shear load (N) at ultimate	65	127	184
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[illegible]