

Level 3 Technicals in Constructing the Built Environment (Civil Engineering) (6720-051)

Synoptic Assignment 2019 – V1.0

General guidance for candidates

General guidance

This is a formal assessment that you will be marked and graded on. You will be marked on the quality and accuracy of your practical performance and the written work you produce. It is therefore important that you carry your work out to the highest standard you can. How well you know and understand the subject, and how you have used your knowledge and skills together to complete the tasks must be clear to the marker. This means you will have to explain your thinking and the reasons behind the way you have carried out the tasks and how/why you have made your decisions within your written work eg as part of your planning, reflections, or evaluations.

Plagiarism

This is an assessment of your abilities, so the work must be all your own work and carried out under the conditions stated. You will be asked to sign a declaration that you have not had any help with the assessment.

Your tutor is allowed to give you some help understanding the assignment instructions if necessary, but they will record any other guidance you need and this will be taken into account during marking.

Plagiarism is the failure to acknowledge sources properly and/or the submission of another person's work as if it were your own. Plagiarism is not allowed in this assignment.

Where research is allowed, your tutor must be able to identify which work you have done yourself, and what you have found from other sources. It is therefore important to make sure you acknowledge all sources and clearly reference any information taken from them.

Timings and planning

Where you have to plan your time, you should take care to make sure you have divided the time available between tasks appropriately. In some assignments, there are specified timings which cannot be changed and which need to be taken into account. You should check your plan is appropriate with your tutor.

If you have a good reason for needing more time, you will need to explain the reasons to your tutor and agree a new deadline date. Changes to dates will be at the discretion of the tutor, and they may not mark work that is handed in after the agreed deadlines.

Health and Safety

You must always work safely, in particular while you are carrying out practical tasks.

You must always follow any relevant Health and Safety regulations and codes of practice.

If your tutor sees you working in a way that is unsafe for yourself or others, they will ask you to stop immediately, and tell you why. Your tutor will not be able to continue the assessment until they are sure you are ready for assessment and can work safely.

Presentation of work

Presentation of work must be neat, legible and appropriate to the task.

You should make sure that each piece of evidence including any forms are clearly labelled with your name and the assignment reference.

All electronic files must be given a clear file name that allows your tutor to identify it as your work.

Written work eg reports may be word processed or hand written unless stated otherwise.

All sketches and drawings should be neat and tidy, to scale and annotated.

Calculations should be set out clearly, with all working shown, as well as any assumptions made. You should use appropriate units at all times, and answers must be expressed to a degree of accuracy, consistent with the requirements of the task.

PAST ASSIGNMENT (2019) - DO NOT USE FOR LIVE ASSESSMENT

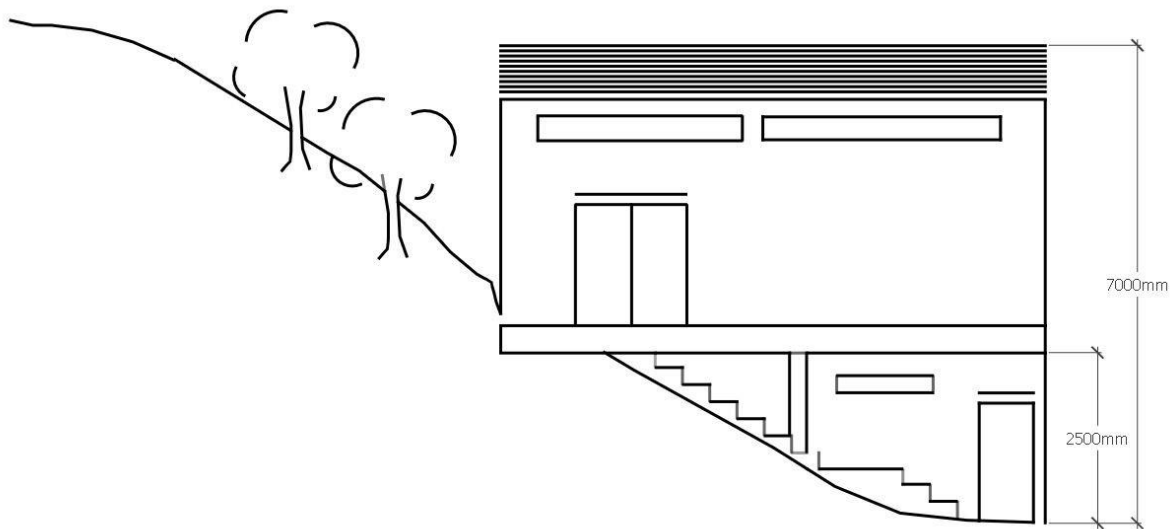
Assignment Brief

You work for a building surveying company that has been commissioned to advise on a building project for a commercial business which specialises in making furniture for the education sector.

Building project overview

The existing business premises is located on a steep sloping site. This building is approximately 80 years old and has been built into the slope so that the main entrance is at the lower side, with stairs that take occupants up to a higher office space level that is approximately three times the floor space of the lower floor space.

Site Section



NB Dimensions not to scale

The existing building has a 1930s structure and with a fabric of solid brick walls and plaster on the inside surface. The original windows, covering a very large area above the main entrance facade, have been replaced with double-glazed uPVC units. The existing building floors are oak boards and are in good condition, except for some surface discolouration. The existing roof surface material is slate and has been maintained over the years. The building is served by gas, electricity, water supply and drainage. The main boiler of the building is gas fired and is around 10 years old.

The client is keen to evaluate the following two options:

- Demolish the existing building and construct new portal frame premises in its place
- Refurbish and extend the existing building

Both options are feasible, but a number of technical challenges, in various stages of the project, will have to be analysed before a final decision can be made.

The client will only make a final decision when a full range of construction project constraints have been considered fully. As a local employer and neighbour to other businesses and residents nearby, the company is also very keen to re-launch itself with this project on the basis of it being positive for the community, the environment (sustainability is important to the owner) and the company's financial future.

Key considerations for this project:

- Existing building survey and property maintenance, refurbishment and extension
- New building design and construction
- Demolition and site clearance, maximising the opportunity for re-using existing building materials, e.g. reclaimed slate, bricks and oak floor boards
- Demolition and construction works in the context of full consideration of the local community
- Project management, health and safety and site supervision
- Project costs estimating and construction costs control
- Project quality control
- Business employee comfort and welfare (heating, ventilation and lighting)
- Site levelling survey
- Flexible floor plan design in all parts of the property
- Concrete foundations
- Steel frame construction is the preferred option for any new build
- Building energy performance (super-insulation and passive ventilation)
- Sustainable methods of construction

Structural steelwork in building design and construction



Steel portal frame construction progress



Steel portal frame construction progress



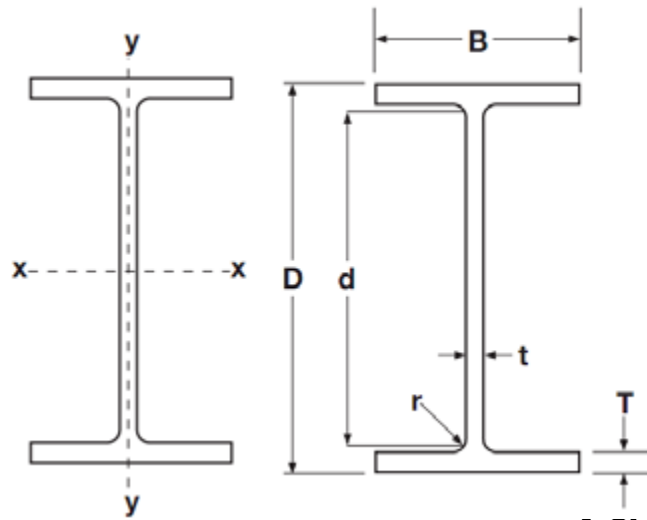
Steel portal frame construction progress



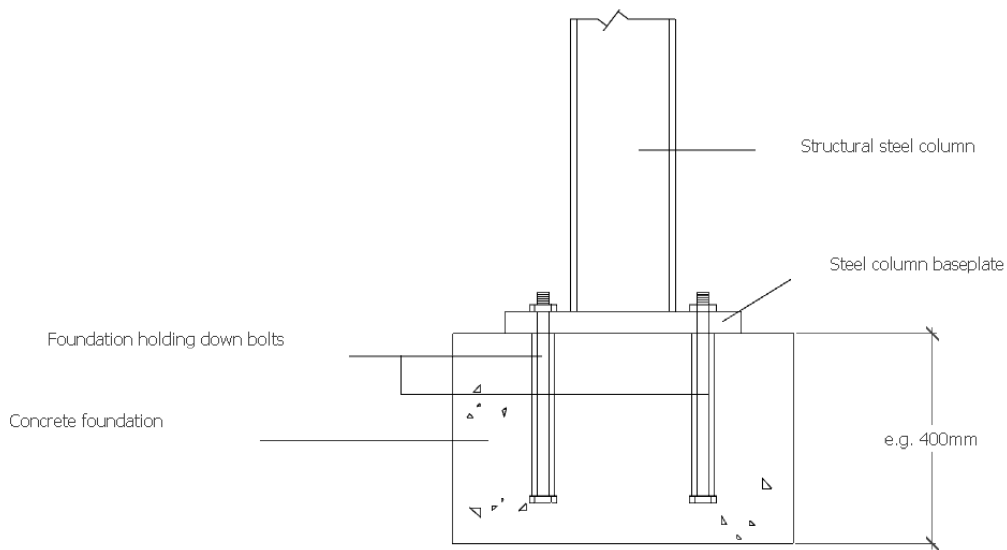
Steel portal frame construction progress



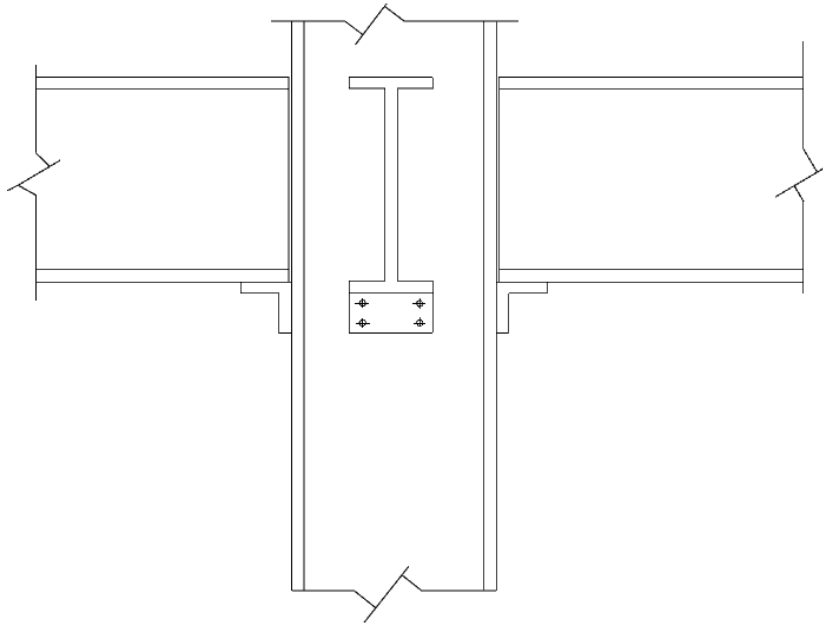
Steel portal frame construction near completion



Universal Column Section



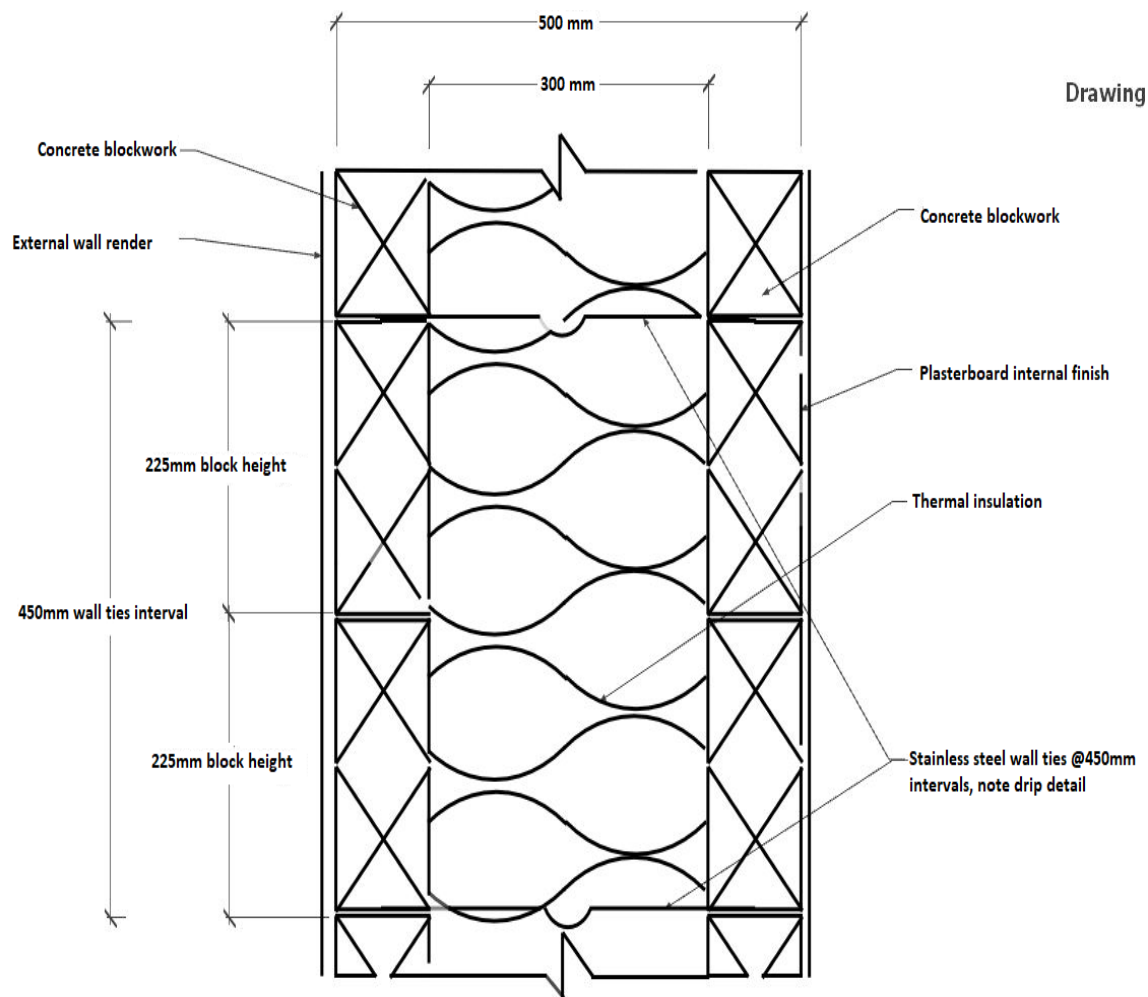
Steel column after being lifted and bolted to a reinforced concrete foundation



ASSESSMENT

Steel column and beam example connections (fitting and fixing operation)

PAST ASSIGNMENT (2019) - DO NOT USE

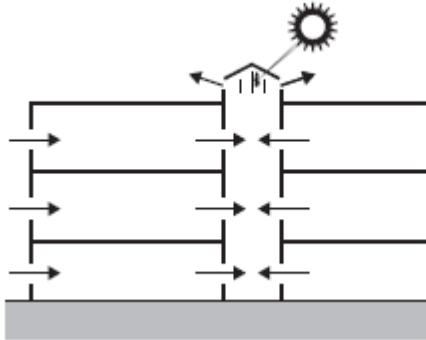


Drawing not to scale

External wall section sketch

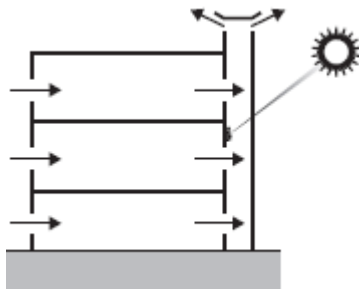
PAST ASSIGNMENT (2013)

Building ventilation sketches and Approved Document F (Ventilation) reference



<https://www.gov.uk/government/publications/ventilation-approved-document-f>

Air flows in through windows and out through a central atrium space (Ref.: CIBSE Guide B (2016))



Air flows in through windows and out through a stairwell space (Ref.: CIBSE Guide B (2016))

Tasks

Task 1

- Carry out a survey of a sloping site identified by your tutor and produce a 4x4 grid of levels (15m x 15m).
- Using a provided datum, calculate the reduced levels of each grid point.
- Plot on your grid one contour line.

Conditions of assessment:

- You may be working as part of a small group while being observed by your tutor for Task 1 part a). You must be careful to contribute as and when needed, and you must avoid dominating the process to the detriment of others. You must always remember that every member of the group is being assessed on their contribution to the group task.
- You must carry out Task 4 parts b) and c) on your own, under supervised conditions.
- You may use a scientific calculator but all workings out must be shown.
- You will be given access to manual drawing equipment to complete the site contour plan in Task 4 part c).
- You may have access to a computer with spreadsheet software to complete Task 4 parts b) and c).

What you must produce for marking:

- A levelling booking sheet.
- A diagram of the grid of reduced levels with one contour line.

Additional evidence of your performance that must be captured for marking:

- Practical Observation form showing individual contribution to what could be a group task. This must be completed by the assessor.
- Photographic / video evidence of being able to set up and use an automatic level. This must include a minimum of 3 photos or a video of the completed levelling exercise, showing the candidate:
 - using the automatic level to read the staff
 - holding the staff at the grid point
 - recording the readings.

Task 2

Specify a suitable drainage system necessary to service a modern commercial building. This must include:

The building services facilities that must be connected to an efficient and effective drainage system.

- Typical pipe diameters for various building services facilities.
- Essential pipework gradients for building services facilities.

Conditions of assessment:

- You may carry out research and collect the information you want to use under unsupervised conditions.
- You may take your research materials into the assessment.
- You must carry out Task 2 on your own, under supervised conditions.

- You will have access to a computer with internet access to complete Task 2.

What you must produce for marking:

- Information in a table format showing the main details for above and below ground drainage for the proposed new building or refurbished existing building to suit this project brief.

Additional evidence of your performance that must be captured for marking:

- None for this task.

Task 3

Specify a steel portal frame to provide the necessary flexible space in the proposed development and draw its main structural components.

- Carry out an appropriate structural analysis for determining the steel portal frame main column and rafter sizes.
- Calculate the second moment of area (I_{xx}) of your selected column, confirming compliance with assumed loading conditions.
- Draw an annotated CAD detail of a portal frame connection joint, to an appropriate scale.

Conditions of assessment:

- You may carry out research and collect the information you want to use under unsupervised conditions.
- You may take your research materials into the assessment.
- You must carry out Task 3 on your own, under supervised conditions.
- You may use a scientific calculator but all workings out must be shown.
- You will have access to a computer with internet and any suitable CAD software to complete Task 3.

What you must produce for marking:

- A written report including:
 - Structural analysis for the steel portal frame column and rafter selection.
 - A calculation of the second moment of area (I_{xx}) for your selected column.
- A PDF file of your CAD detail of a portal frame connection joint.

Additional evidence of your performance that must be captured for marking:

- None for this task.

Task 4

Write a report on a method and technique that could be used to transport, place and fix the structural steel frame components for the proposed workshop in this project brief.

Conditions of assessment:

- You may carry out research and collect the information you want to use under unsupervised conditions.
- You may take into the assessment your research materials.
- You must carry out Task 4 on your own, under supervised conditions.
- You may have access to a computer with internet access to complete Task 4.

What you must produce for marking:

- A written report including graphical illustrations of the main plant and equipment used in this type of civil engineering work.

Additional evidence of your performance that must be captured for marking:

- None for this task.

Task 5

Write a report, using calculations, summarising the importance of statistical data in confirming that a concrete mix meets a compressive strength specification.

Conditions of assessment:

- You may carry out research and collect the information you want to use under unsupervised conditions.
- You may take into the assessment your research materials.
- You must carry out Task 5 on your own, under supervised conditions.
- You may use a scientific calculator but all workings out must be shown.
- You may have access to a computer with internet access to complete Task 5.

What you must produce for marking:

- A statistical analysis (e.g. standard deviation, mean, variance, inter-quartile range of concrete test cubes compressive strength results).
- An illustrative summary report of the importance of construction quality control.

Additional evidence of your performance that must be captured for marking:

- None for this task.

Task instructions for centres

Resources

Candidates must have access to a suitable range of resources to carry out the tasks and, where appropriate, to have the opportunity to choose materials demonstrating the ability to select from a range of appropriate materials. Resources specific to the tasks are as follows:

- Candidates should be given access to a computer with internet access during the assessment.
- Candidates should be given access to a scientific calculator for Tasks 1, 3 and 5.
- Where a drawing element is required for a task, either manual or using CAD software as detailed in the task specific guidance, the centre must supply the candidate with the following:
 - Manual drawing equipment which typically includes a drawing board with a T-square, set squares (60/30 and 45), a scale ruler, appropriately sized drawing paper (e.g. A3 and A4) and a pencil. The drawings must be done over using a drawing pen to allow the work to be visible when scanned into the Moderation Portal (additional time may be allowed to do this).
 - Access to a computer with any suitable CAD software, e.g. AutoCAD or SketchUp, Adobe Acrobat and a printer.

Task specific guidance

- The assignment brief should be released **two** academic weeks before completing out Task 1.
- Candidates should be given access to **each** task and any specific technical information outlined in the task guidance below, **one** academic week before that specific task is to be completed under assessed conditions. This is to allow candidates time to undertake any research needed to complete the task.
- **Candidates must submit their research materials to the assessor for approval before candidates can complete each task.** This is to ensure that the notes are checked for security and authenticity of the candidates work. Please see the *Guidance and feedback* section below for further details.

Task 1

Part a): Tutors should consider using the grounds of the college or school for the surveying task. The location for the survey to be undertaken on should be a sloped site that is 15m x 15m in size. If the centre cannot provide the required area of land, then an attempt must be made to locate an alternative area of land outside the school or college grounds. If the area of land under consideration is smaller than that required by the task, the centre should consider reducing the dimensions to fit with the area of land available, but all changes must be agreed in advanced with City & Guilds.

Equipment required for the levelling survey:

- Ranging poles to define survey area boundaries
- An automatic level, tripod and metric staff
- Surveying pins to set out area grid points
- 30 m tape
- Levelling field book/sheet

Parts b) and c): Candidates must be given access to manual drawing equipment for the contour line. Candidates must also have their area levelling survey results available to complete this task.

Task 2

For task 2 to be successfully completed the centre must give candidates access to relevant technical information on **the provision of above and below ground drainage**. This could comprise Building Regulations Approved Documents, trade or manufacturers literature to illustrate case study examples and textbooks on building services.

Task 3

Task 3 has a structural steel portal frame focus and which requires a structural analysis and a drawing detail to be produced.

For part a), centres should give candidates access to the various Eurocodes/British Standards/Standard structural formulae and manufacturers standard section tables for rafters and columns.

For part b), candidates should be guided on the mathematical method to determine the second moment of area (I_{xx}) in a structural steel section and the reason why this is so important to structural engineering practice.

For part c), candidates must be given access to CAD drawing software in order to produce a detail of a portal frame connection joint. The drawing is to be to an appropriate scale for printing.

The following video may be a useful resource for candidates to illustrate the assembly of steel components: <https://www.youtube.com/watch?v=g6sSbazyLw>

Task 4

Candidates need to be guided in task 4 towards knowledge and understanding in the range of **civil engineering mechanical plant** needed to transport, place and fix the structural steel frame components. The centre must also supply candidates with access to technical references on **mechanical plant** for lifting operations e.g. construction textbooks.

Task 5

Candidates need to be guided in task 5 towards further knowledge and understanding in mathematical quality control for construction materials. This could involve a range of statistical techniques (e.g. standard deviation, mean, variance, inter-quartile range of concrete test cubes compressive strength results).

Centres may provide the candidates with a series of data results on concrete compressive strength.

Time

The following timings are provided to support centre planning.

Total – 12 hours.

Task 1 – 3 hours (recommended)

Task 2 – 1 hour (recommended)

Task 3 – 3 hours (recommended)

Task 4 – 2 hours (recommended).

Task 5 – 3 hours (recommended).

PAST ASSIGNMENT (2019) - DO NOT USE FOR LIVE ASSESSMENT

Centre guidance

Guidance provided in this document supports the administration of this assignment. The following documents, available on the City & Guilds website, provide essential generic guidance for centres delivering Technical qualifications and **must** be referred to alongside this guidance:

- **Technical qualifications – marking**
- **Technical qualifications – moderation** (updated annually)
- **Technical qualifications – teaching, learning and assessment**

This synoptic assessment is designed to require the candidate to make use of their knowledge, understanding and skills they have built up over the course of their learning to tackle problems/tasks/challenges.

This approach to assessment emphasises to candidates the importance and applicability of the full range of their learning to practice in their industry area, and supports them in learning to take responsibility for transferring their knowledge, understanding and skills to the practical situation, fostering independence, autonomy and confidence.

Candidates are provided with an assignment brief. They then have to draw on their knowledge and skills and independently select the correct processes, skills, materials, and approaches to take to provide the evidence specified by the brief.

During the learning programme, it is expected that tutors will have taken the opportunity to set shorter, formative tasks that allow candidates to be supported to independently use the learning they have so far covered, drawing this together in a similar way, so they are familiar with the format, conditions and expectations of the synoptic assessment.

Candidates should be made aware during learning what the Assessment Objectives are and how they are implemented in marking the assignment, so they will understand the level of performance that will achieve them high marks.

Candidates should not be entered for the assessment until the end of the course of learning for the qualification so they are in a position to complete the assignment successfully.

Health and safety

Candidates should not be entered for assessment without being clear of the importance of working safely, and practice of doing so. The tutor must immediately stop an assessment if a candidate works unsafely. At the discretion of the tutor, depending on the severity of the incident, the candidate may be given a warning. If they continue to work unsafely however, their assessment must be ended and they must retake the assessment at a later date.

Compliance with timings

The timings provided are estimates to support centre planning. They refer to assessment time, not any additional setting up the centre needs to carry out to create an appropriate assessment environment.

It is the centre's responsibility to plan sufficient assessment sessions, under the appropriate conditions, within the assignment window, to allow candidates reasonable time to complete the assessment tasks.

Where candidates are required to plan their work they should have their plans confirmed for appropriateness in relation to the time allocated for each task.

Candidates should be allowed sufficient time to fully demonstrate the range of their skills, however this also needs to be reasonable and practicable. Candidates should be allowed to overrun their planned timings or professional service times (where they exist) in order for evidence of a range of their skills to be captured. If however, the time required exceeds reasonably set assessment periods, or the tolerance suggested for professional service times, the centre may stop the assessment and base the marking on the evidence up to that point, including the tutor's notes of how far over time the task has taken.

Observation evidence

Where the tutor is required to carry out observation of performance, detailed, descriptive notes must be recorded on the practical observation (PO) form provided. The centre has the flexibility to adapt the form, to suit local requirements (eg to use tablet, hand-written format, or to ease local administration) as long as this does not change or restrict the type of evidence collected.

The number of candidates a tutor will be able to observe at one time will vary depending on:

- the complexity of evidence collection for the task
- local conditions eg layout of the assessment environment,
- amount of additional support available (eg to capture image/video evidence), staggered starts etc,
- whether there are any peak times where there is a lot of evidence to collect that will need additional support or any that are quieter.

It is advisable to trial the planned arrangements where possible during formative assessment, reviewing the quality of evidence captured and manageability. It is expected that for straight forward observations, (and unless otherwise specified) no more than eight candidates will be observed by a single tutor at one time, and the number will usually be fewer than this maximum. The key factor to consider is the logistics of collecting sufficient evidence.

As far as possible, candidates should not be distracted, or their performance affected by the process of observation and evidence collection.

Observation notes form part of the candidate's evidence and must describe **how well** the activity has been carried out rather than stating the steps/ actions the candidate has taken. The notes must be very descriptive and focus on the **quality** of the performance in such a way that comparisons between performances can be made. They must provide sufficient, appropriate evidence that can be used by the marker (and moderator) to mark the performance using the marking grid.

Identifying what **is** about the performances that is **different** between candidates can clarify the quantities that are important to record. Each candidate is likely to carry out the same steps, so a checklist of this information would not help differentiate between them. However, qualitative comments on **how well** they do it, and quantitative records of accuracy and tolerances would.

The tutor should refer to the marking grid to ensure appropriate aspects of performance are recorded. These notes will be used for marking and moderation purposes and so must be **detailed, accurate and differentiating**.

Tutors should ensure that any required additional supporting evidence including eg photographs or video can be easily matched to the correct candidate, are clear, well-lit and showing the **areas of particular interest** in **sufficient detail** and **clarity** for assessment (ie taken at appropriate points in production, showing accuracy of measurements where appropriate).

If candidates are required to work as a team, each candidate's contribution must be noted separately. The tutor may intervene if any individual candidate's contribution is unclear or to ensure fair access (see below).

The **Technical qualifications guides on marking and moderation** are essential guidance documents and are available on the City & Guilds website. These provide further information on preparing for assessment, evidence gathering, standardisation, marking and moderation, and must be referred to when planning and carrying out assessment.

Minimum evidence requirements for marking and moderation

The sections in the assignment:

- **What you must produce for marking**, and
- **Additional evidence of your performance that must be captured for marking**

list the minimum requirements of evidence to be submitted for marking and the moderation sample.

Evidence produced during assessment above and beyond this may be submitted, as long as it provides useful information for marking and moderation and has been produced under appropriate conditions.

While technological methods which support the capturing or creating of evidence can be helpful, eg pinboard style websites for creating mood boards, the final evidence must be converted to a suitable format for marking and moderation which cannot be lost/ deleted or amended after the end of the assessment period (eg screen prints, pdf files). Considerations around tracking authenticity and potential loss of material hosted on such platforms during assessment is the centre's responsibility.

Where candidates have carried out some work as a group, the contribution of each candidate must be clear. It is not appropriate to submit identical information for each candidate without some way for the marker and moderator to mark the candidates individually.

Note: Combining candidates' individual pieces of evidence into single files or zip files may make evidence management during internal marking more efficient and will greatly simplify the uploading of the moderation sample.

Where the minimum requirements have **not been submitted** for the moderation sample by the final moderation deadline, or the **quality of evidence is insufficient** to make a judgement, the moderation, and therefore any subsequent adjustment, will be based on the evidence that *has been* submitted. **Where this is insufficient to provide a mark on moderation, a mark of zero may be given.**

Preparation of candidates

Candidates should be aware of which aspects of their performance (across the AOs) will give them good marks in assessment. This is best carried out through routinely pointing out good or poor performance during the learning period, and through formative assessment.

During the learning programme, direct tutor instruction in how to tackle practical tasks through modelling, support, guidance and feedback are critical. However gradual removal of this support is necessary in preparation for summative assessment. This, supported approach is **not** valid for summative assessment.

The purpose of summative assessment is to confirm the standard the candidate has reached as a result of participating in the learning process. Candidates should be encouraged to do the best they can and be made aware of the difference between these summative assessments and any formative assessments they have been subject to. Candidates may not have access to the full marking grids, as these may be misinterpreted

as pass, merit distinction descriptors. Refer to the **Technical qualifications – teaching, learning and assessment** centre guidance document, available on the City & Guilds website for further information on preparing candidates for Technical qualification assessment.

Guidance on assessment conditions

The assessment conditions that are in place for this synoptic assignment are to:

- ensure the rigour of the assessment process
- provide fairness for candidates
- give confidence in the outcome.

They can be thought of as the rules that ensure that all candidates who take an assessment are being treated fairly, equally and in a manner that ensures their result reflects their true ability.

The conditions outlined below relate to this summative synoptic assignment. These do not affect any formative assessment work that takes place, although it is advised that candidates are prepared for the conditions they will need to work under during summative assessment.

The evidence for the tasks that make up this synoptic assignment must be completed under the specified conditions. This is to ensure authenticity and prevent malpractice as well as to assess and record candidate performance for assessment in the practical tasks. Any aspect that may be undertaken in unsupervised conditions is specified. It is the centre's responsibility to ensure that local administration and oversight gives the tutor sufficient confidence to be able to confirm the authenticity of the candidate's work.

Security and authentication of candidate work

Candidate evidence must be kept secure to prevent unsupervised access by the candidate or others. Where evidence is produced over a number of sessions, the tutor must ensure learners and others cannot access the evidence without supervision. This might include storing written work or artefacts in locked cupboards and collecting memory sticks of evidence produced electronically at the end of each session.

Candidates are required to sign declarations of authenticity, as is the tutor. The relevant form is included in this assignment pack and must be signed after the production of all evidence.

Where the candidate or tutor is unable to, or does not confirm authenticity through signing the declaration form, the work will not be accepted at moderation and a mark of zero will be given. If any question of authenticity arises eg at moderation, the centre may be contacted for justification of authentication.

Accessibility and fairness

Where a candidate has special requirements, tutors should refer to the *Access arrangements and reasonable adjustments* section of the City & Guilds website.

Tutors can support access where necessary by providing clarification to **any** candidate on the requirements or timings of any aspect of this synoptic assignment. Tutors should **not** provide more guidance than the candidate needs as this may impact on the candidate's grade, see the guidance and feedback section below.

All candidates must be provided with an environment, time frame and resources that allows them reasonable access to the full range of marks available.

Where candidates have worked in groups to complete one or more tasks for this synoptic assessment, the tutor must ensure that no candidate is disadvantaged as a result of the performance of any other team member. If a team member is distracting or preventing another team member from fully demonstrating their skills or knowledge, the tutor must intervene.

Guidance and feedback

To support centre file management, tutors may specify a suitable file format and referencing format for evidence (unless otherwise specified eg if file naming is an assessment point for the assignment). Guidance must only support access to the assignment and must not provide feedback for improvement. The level and frequency of clarification & guidance must be

- recorded fully on the candidate record form (CRF),
- taken into account along with the candidate's final evidence during marking
- made available for moderation.

Tutors **must not** provide feedback on the quality of the performance or how the quality of evidence can be improved. This would be classed as malpractice.

Tutors **should** however provide general reminders to candidates throughout the assessment period to check their work thoroughly before submitting it, and to be sure that they are happy with their final evidence as it may not be worked on further after submission.

Candidates can rework any evidence that has been produced for this synoptic assignment during the time allowed. However, this must be as a result of their own review and identification of weaknesses and not as a result of tutor feedback. Once the evidence has been submitted for assessment, no further amendments to evidence can be made.

Tutors **should** check and be aware of the candidates' plans and designs to ensure management of time and resources is appropriate, and so any allowed intervention can take place at an appropriate time.

Tutors **should** ensure that candidates' plans for completion of the tasks distribute the time available appropriately and may guide candidates on where they should be up to at any point in a general way. Any excessive time taken for any task should be recorded and should be taken into account during marking if appropriate.

It is up to the marker to decide if the guidance the candidate has required suggests they are lacking in any AO, the severity of the issue, and how to award marks on the basis of this full range of evidence. The marker must record where and how guidance has had an impact on the marks given, so this is available should queries arise at moderation or appeal.

What is and is not, an appropriate level of guidance

A tutor **should intervene with caution** if a candidate has taken a course of action that will result in them not being able to submit the full range of evidence for assessment. However, this should **only** take place once the tutor has prompted the candidate to check that they have covered all the requirements. Where the tutor has to be explicit as to what the issue is, this is likely to demonstrate a lack of understanding on the part of the candidate rather than a simple error, and full details should be recorded on the CRF.

- The tutor **should not** provide guidance if the candidate is thought to be able to correct the issue without it, and a prompt would suffice. In other words, only the minimum support the candidate actually needs should be given, since the more tutor

guidance provided, the less of the candidate's own performance is being demonstrated and therefore the larger the impact on the marks awarded.

- A tutor **must not** provide guidance that the candidate's work is not at the required standard or how to improve their work. In this way, candidates are given the chance to identify and correct any errors on their own, providing valid evidence of knowledge and skills that will be credited during marking.
- The tutor **must not** produce any templates, pro-formas, work logs etc unless instructed to in the assignment guidance. Where instructed to do so, these materials must be produced as specified and contain no additional guidance. Templates provided as part of the assignment should be used as provided, and not adapted

All specific prompts and details of the nature of any further guidance must be recorded on the relevant form and reviewed during marking and moderation.

Guidance on marking

Please refer to the **Technical qualifications – marking, and - moderation** centre guidance documents for further information on gathering evidence suitable for marking and moderation, and on using the marking grid and forms.

The candidate record form (CRF) is used to record:

- Details of any guidance or the level of prompting the candidate has received during the assessment period
- Rough notes bringing together relevant evidence from across tasks during marking.
- Summary justifications when holistically coming to an overall judgement of the mark.

The practical observation form (PO) is used to record:

- Descriptive information and evidence of candidate performance during an observation. Although descriptions of the quality of performance should support decisions against the AOs, the notes should follow the flow of the observation, rather than attempting to assign evidence against the AOs at this point.

Marking grid

For any category, 0 marks may be awarded where there is no evidence of achievement

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
20	AO1 Recall of knowledge relating to the qualification LOs <ul style="list-style-type: none"> Does the candidate seem to have the full breadth and depth of taught knowledge across the qualification to hand? How accurate is their knowledge? Are there any gaps or misunderstandings evident? How confident and secure does their knowledge seem? 	(1-4 marks) Recall shows some weaknesses in breadth and/or accuracy. Hesitant, gaps, inaccuracy	(5-8 marks) Recall is generally accurate and shows reasonable breadth. Inaccuracy and misunderstandings are infrequent and usually minor. Sound, minimal gaps	(9-12 marks) Consistently strong evidence of accurate and confident recall from the breadth of knowledge. Accurate, confident, complete, fluent, slick
		Examples of types of knowledge expected: identifying surveying equipment and techniques and describing modern surveying software and the associated benefits; identifying structural terms, structural formulae and appropriate units and describing the methods used to size beams, columns, frames and retaining walls; recognising methods used to construct excavations, control ground water and construct substructure, superstructure and external works and identifying health and safety issues associated with civil engineering works; identifying the factors that influence the provision of electricity, hot and cold water, drainage and gas and describing the principles that underpin safe and effective distribution and installation of building services; identifying manual drawing equipment and CAD components and software and describing the uses and benefits of BIM (Building Information Modelling); describing the mathematical, geometric, algebraic, trigonometrical, statistical and other formulae and techniques used to solve problems in civil engineering, and identifying appropriate units.		

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
		<p>Bottom of band: The candidate has identified a limited number of methods, materials, techniques, practices and documents used in civil engineering, but there is little detail or coherence. Some relevant images, tables, graphs, formulae and calculations have been identified, but used poorly.</p>	<p>Bottom of band: The candidate has described a wide range of methods, materials, techniques, practices and documents used in civil engineering, and in good detail, with clear sketches and acceptable levels of coherence. Most relevant images, tables, graphs, formulae and calculations have been identified and used well, with some working shown but without units.</p>	<p>Bottom of band: The candidate has described a comprehensive range of methods, materials, techniques, practices and documents used in civil engineering, in very good detail, with clear and accurate sketches and generally high levels of coherence. All relevant images, tables, graphs, formulae and calculations have been identified and used well with most working and units shown correctly.</p>
		<p>Top of band: The candidate has identified a limited number of methods, materials, techniques, practices and documents used in civil engineering, but with some detail and some coherence. Some relevant images, tables, graphs, formulae and calculations have been identified and used appropriately.</p>	<p>Top of band: The candidate has described a wide range of methods, materials, techniques, practices and documents used in civil engineering, with good detail, clear and accurate sketches and good coherence. All relevant images, tables, graphs, formulae and calculations are identified and generally applied well with some working shown and some units.</p>	<p>Top of band: The candidate has described a comprehensive range of methods, materials, techniques, practices and documents used in civil engineering, in in-depth detail, with clear and accurate sketches and high levels of coherence. All relevant images, tables, graphs, formulae and calculations have been identified and used correctly with all working shown and with correct units.</p>

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
35	AO2 Understanding of concepts theories and processes relating to the LOs <ul style="list-style-type: none"> Does the candidate make connections and show causal links and explain why? How well theories and concepts are applied to new situations/the assignment? How well chosen are exemplars – how well do they illustrate the concept? 	(1-7 marks) Some evidence of being able to give explanations of concepts and theories. Explanations appear to be recalled, simplistic or incomplete. Misunderstanding, illogical connections, guessing,	(8-14 marks) Explanations are logical. Showing comprehension and generally free from misunderstanding, but may lack depth or connections are incompletely explored. Logical, slightly disjointed, plausible,	(15-21 marks) Consistently strong evidence of clear causal links in explanations generated by the candidate. Candidate uses concepts and theories confidently in explaining decisions taken and application to new situations. Logical reasoning, thoughtful decisions, causal links, justified
		Examples of understanding expected: using and applying data for surveying and setting out purposes; producing drawings using manual drawing equipment and/or CAD and explaining how, when and where BIM is used in the modern design and planning process; selecting appropriate techniques to solve structural problems and explaining the principles involved; specifying and comparing the methods, operations and techniques used in civil engineering work, together with the plant and equipment required to complete the work, and assessing the risks involved in such work; specifying building services installations, explaining the reason for such specifications and producing and/or interpreting layouts of such systems; comparing, selecting and using a range of advanced mathematical techniques to solve problems associated with civil engineering works.		

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
		Bottom of band: Some concepts are referred to, but explanations are typically weak. There is little evidence of the ability to show a chain of cause and effect or to explain the reasons for a specification.	Bottom of band: The candidate has shown a good range of understanding across the qualification and explanations are straightforward but secure.	Bottom of band: Explanations show some additional depth of thought and/or insight in places. Some understanding is being extrapolated to new contexts with some success and the understanding is clearly applied to the project in hand.
		Middle of band: The candidate has shown a somewhat limited range of understanding. Explanations are typically brief or simplistic and understanding is implied, rather than clearly evidenced.	Middle of band: There is good understanding shown across the qualification. Explanations are clear and often show good links between cause and effect. The reasons for the methods and materials specified are made clear.	Middle of band: Explanations are generally in-depth across the qualification. Application to new contexts is generally successful and relevant to the project in hand.
		Top of band: There is evidence of a range of understanding from across the qualification. Concepts are generally explained, in a limited way, with some areas being more secure than others.	Top of band: Understanding across the qualification is consistently good, with reasoning consistently coherent and well-explained.	Top of band: Concepts and understanding across the entire qualification are well-understood and can be applied consistently and effectively in new contexts. All the understanding demonstrated relates to the project in hand.

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
10	AO3 Application of practical/technical skills <ul style="list-style-type: none"> How practiced/fluid does hand eye coordination and dexterity seem? How confidently does the candidate use the breadth of practical skills open to them? How accurately/successfully has the candidate been able to use skills/achieve practical outcomes? 	(1-2 marks) Some evidence of familiarity with practical skills. Some awkwardness in implementation, may show frustration out of inability rather than lack of care. Unable to adapt, frustrated, flaws, out of tolerance, imperfect, clumsy.	(3-4 marks) Generally successful application of skills, although areas of complexity may present a challenge. Skills are not yet second nature. Somewhat successful, some inconsistencies, fairly adept/capable.	(5-6 marks) Consistently high levels of skill and/or dexterity, showing ability to successfully make adjustments to practice; able to deal successfully with complexity. Dextrous, fluid, comes naturally, skilled, practiced,
		Examples of skills expected: producing sketches and construction drawings; working with project documentation and building regulation applications; determining quantities from drawings; producing estimates and tender documents; producing contour maps and traverses; preparing electronic presentations.		
		Processes can generally be carried out in an acceptable manner, up to a point, resulting in drawings and other practical outcomes that are basic and which may be somewhat inaccurate in places. All the tasks have been attempted and, even if not all are correct, they have been completed.	Familiar processes are carried out in a competent way resulting in consistently usable drawings, calculations and other practical tasks as appropriate. Complex situations are attempted well, and mostly effectively. All the tasks have been attempted and completed, and are substantially correct.	Drawings, calculations and other practical tasks are consistently produced to a high standard. Measurements are consistently accurate and within tolerance even in complex situations. All the tasks are attempted and completed, and are all correct. Where relevant, any working is shown and the correct units used throughout.

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
20	AO4 Bringing it all together - coherence of the whole subject <ul style="list-style-type: none"> Does the candidate draw from the breadth of their knowledge and skills? Does the candidate remember to reflect on theory when solving practical problems? How well can the candidate work out solutions to new contexts/problems on their own? 	<p align="center">(1-4 marks)</p> <p>Some evidence of consideration of theory when attempting tasks. Tends to attend to single aspects at a time without considering implication of contextual information.</p> <p>Some random trial and error, new situations are challenging, expects guidance, narrow. Many need prompting.</p>	<p align="center">(5-8 marks)</p> <p>Shows good application of theory to practice and new context, some inconsistencies.</p> <p>Remembers to apply theory, somewhat successful at achieving fitness for purpose. Some consolidation of theory and practice</p>	<p align="center">(9-12 marks)</p> <p>Strong evidence of thorough consideration of the context and use of theory and skills to achieve fitness for purpose.</p> <p>Purposeful experimentation, plausible ideas, guided by theory and experience, fit for purpose, integrated, uses whole toolkit of theory and skills.</p>
		<p>Examples of bringing it all together: applying knowledge and understanding to a particular scenario or problem; justifying decisions made and approaches taken (e.g. materials, techniques, adapting practice to meet contextual challenges, reflecting on risk assessments and their use.</p>		
		<p>The candidate has used knowledge and understanding together in a few straightforward areas.</p>	<p>The candidate typically brings together knowledge, understanding and skills well, when solving problems that arise within the given context, although they may deal with these separately.</p>	<p>The candidate has made excellent use of knowledge, understanding and skills from across the qualification to inform the context of the assignment. Choices and decisions have been well-informed and considered, showing that the candidate appreciates the significance of the different units of the qualification in relation to each other.</p>

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
15	AO5 Attending to detail/ perfecting <ul style="list-style-type: none"> Does the candidate routinely check on quality, finish etc and attend to imperfections/ omissions How much is accuracy a result of persistent care and attention (eg measure twice cut once)? Would you describe the candidate as a perfectionist and wholly engaged in the subject? 	(1-3 marks) Easily distracted or lack of checking. Insufficiently concerned by poor result; little attempt to improve. Gives up too early; focus may be on completion rather than quality of outcome. Careless, imprecise, flawed, uncaring, unfocussed, unobservant, unmotivated.	(4-6 marks) Aims for satisfactory result but may not persist beyond this. Uses feedback methods but perhaps not fully or consistently. Variable/intermittent attention, reasonably conscientious, some imperfections, unremarkable.	(7-9 marks) Alert, focussed on task. Attentive and persistently pursuing excellence. Using feedback to identify problems for correction. Noticing, checking, persistent, perfecting, refining, accurate, focus on quality, precision, refinement, faultless, meticulous.
		Examples of attending to detail: accuracy and detail of drawings and checking of same; thinking about and attending to specific requirements of the client; completeness and attention to usability of all relevant documentation; checking drawings and any calculations.		
		The candidate shows superficial attention to detail. The drawings and other practical outcomes show some inaccuracies or gaps. The client's needs are interpreted in a generic, rather than a personal, manner, with basic attention to their aims and requirements.	The candidate shows adequate attention to detail and drawings and other practical outcomes are accurate. Client's needs are considered sufficiently to meet their needs in the most straightforward and/or conventional way.	The candidate has been highly focused on the task showing extreme care in the accuracy and usability of drawings and other practical outcomes. They have been very attentive to the implied values of the client and thoughtful in using this insight in achieving an outcome that is highly client-centred.

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