CPCCBC6014
APPLY STRUCTURAL PRINCIPLES TO THE CONSTRUCTION OF LARGE, HIGH-RISE AND COMPLEX BUILDINGS

ASSESSMENT SUMMARY

The assessment activities for *CPCCBC6014 Apply structural principles to the construction of large, high-rise and complex buildings* cover all aspects of the unit of competency. For Apprentices/Trainees, this includes supervisor completion of the Apprentice/Trainee Record (ATR).

Participants must read all the information given before starting any assessment task. The assessment tasks are intended to be fair, flexible, valid and reliable. If a Participant has any questions or requires alternative arrangements to be made such requests should be directed to their Trainer/Assessor, who should note such arrangements in the 'Assessor Comments' on the affected assessment. If a Participant feels they are not yet ready to be assessed, they should discuss their options with their Trainer/Assessor.

To satisfactorily complete the assessment, the Participant is required to answer all questions correctly and demonstrate their skills to industry standards. If a Participant does not answer all questions or perform all tasks, they will be deemed 'Not Satisfactory' for the task and 'Not Yet Competent' for the unit of competency.

The Trainer/Assessor can provide the Participant with additional information on interpreting the assessment outcomes and guide the Participant's options. If a Participant is still deemed 'Not Satisfactory' they will have the opportunity to undertake a supplementary assessment or appeal the result as per the process in the Student Handbook.

By signing below, the Participant acknowledges:
- They understand the assessment instructions and requirements, and consent to being assessed.
- The work submitted is to be their own work – with the work of/with others needing to be clearly acknowledged and documented.
- They consent to any photo/video recording of their work that occurs during assessment.

Participant name	Brett Eldred
Participant signature	

Pre-requisite unit(s) to be achieved and authenticated prior to undertaking assessment
☑ Not applicable

Task	**Date completed**	**Assessment Results**	
Theory Exam	Select Date.	☐ Satisfactory	☐ Not Satisfactory
Workbook	Select Date.	☐ Satisfactory	☐ Not Satisfactory
Practical Assessment	Select Date.	☐ Satisfactory	☐ Not Satisfactory
Outcome for CPCCBC6014	Select Date.	☐ **Competent**	☐ **Not Yet Competent**

Evidence requirements checklist (ticked by assessor and evidence supplied to RTO)	
☐ Theory Exam	☐ Document/screenshot showing performance characteristics required of structural elements
☐ Workbook	☐ Document/screenshot showing performance requirements of materials in the building plan
☐ Practical Assessment	
☐ Site and soil assessment	

Assessor name	
Assessor signature	

CPCCBC6014
APPLY STRUCTURAL PRINCIPLES TO THE CONSTRUCTION OF LARGE, HIGH-RISE AND COMPLEX BUILDINGS

THEORY EXAM

Participant name	Brett Eldred

FOR THE PARTICIPANT
Instructions

• You will complete written questions as outlined on the following pages. You must attempt all questions and provide enough detail in your responses to demonstrate your knowledge.
• It is anticipated that you should complete this assessment within two (2) hours, but additional time may be allowed upon negotiation with the Assessor.
• You must complete all questions unassisted by the Assessor or other personnel but may refer to reference material as needed. All questions must be answered correctly for a 'Satisfactory' assessment outcome to be awarded.
  o An oral examination may be allowed under certain circumstances, whereby your answers will be documented by another party.
  o Any written questions that are incomplete, or not answered satisfactorily will need to be completed again after further training support.
  ▪ If you answer a question incorrectly but modify your response, put your initials next to the written change (or the Assessor must initial a verbal change).

Resources required
Pen

FOR THE ASSESSOR
Instructions
• Where oral examination has occurred, ensure that this is acknowledged in writing (e.g. FT001 and Assessor Comments) • All questions must be satisfactorily demonstrated by the Participant for a Satisfactory determination (indicated by an Assessor tick to the right of the question). • Assessors are to complete marking in pen of a different colour to the Participant. • If the Participant verbally modifies their response, write in the modified response verbatim and put your initials next to the written change.

ASSESSOR COMMENTS
As necessary, outline: • Details on reattempts, alternative arrangements or reasonable adjustments made. • Where a Participant is deemed 'Not Satisfactory', provide recommendations for future training.

Q1. **a) What is the Building Act 1975 relevance in Queensland?**
b) Who is affected by the Building Act 1975?

Answer

a) The Building Act 1975 governs all building work in Queensland, empowering the regulation of certain aspects of buildings and structures.

b) The entire industry is affected by this legislation, including licensees, building professionals, local councils and the general community

Q2. **Discuss the basic principles of structural design and how stress or strain occurs.**

Answer

The structure of a building is the component that is responsible for keeping the building's shape under the influence of the forces to which it is subjected.
A structure must be designed to withstand the most severe combination of forces or loads that are likely to be applied during its lifetime.
The nature of the loads varies significantly depending on the architectural design, materials, and location of the structure.
Loading conditions on the same structure may change gradually over time or rapidly
The overall strength and stability of a building and its components must be considered in any building design. This entails performing structural calculations to determine the effects of all forces acting on any building component and the building as a whole. To do so, we must first resolve the system's forces to predict the overall effects.

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Q3. **Discuss the impact the following forces can impose on a building structure.**

Answer

Force	Impact
Wind	Wind force on a building impacts the lateral stability and uplift applied to a building Because of the growing use of lighter materials and more efficient construction techniques, the wind has become a substantial burden in recent years. Wind load may not influence a building with heavy masonry and a timber tiled roof. Still, wind load dominates the structural design of a modern light-gauge steel-framed building, affecting its strength, stability, and serviceability
Snow	Weight of the Snow is a live load that is added to eh structure and must be considered in the loads being applied structures resultant forces. The latitude and altitude of the site will determine the magnitude of the snow load. In the lower latitudes, snow is unlikely, but it might continue for six months or longer in the high latitudes. Buildings in such areas must be designed to endure a certain quantity of snowfall
Groundwater	Hydrostatic pressure is water pressure applied form the external of ground slab and below ground retaining walls. Water pressure from the external will place a force upon these structural elements and design must be considered and applied to withstand the forces. Suiable drainage beneath or behind structural elements will assist in reducing the pressures from groundwater.
Earthquake	Earthquake loads impact structure design in seismically active places such as the north and south American west coastlines, New Zealand, Japan, and various Mediterranean countries. Only minor interruptions have occurred in East Asia and Australia.

Question continued over page

Answer

Force	Impact
Liquid pressure	liquid pressure: - Uplift pressure or liquid pressure is an upward pressure applied to a structure that can raise it relative to its surroundings
Rainwater	rainwater: - Water entering through seepage or leakage damages the internal structure
Earth pressure actions	earth pressure actions: - The earth pressure is significant because it influences the soil's consolidation behaviour and strength, and it is taken into account when designing geotechnical engineering projects such as retaining walls, basements, tunnels, deep foundations, and braced excavations

Q4. **Discuss the basic principles of structural design that must be considered in any building design.**

Answer

Structural design must consider , functional use, of building , aesthetics, stability, strength, equilibrium, live loads, dead loads, Fire resistance levels to suit function of building Another factor to be considered is economy.

Q5. **Discuss compressive and tensile stresses on buildings.**

Answer

Compressive stress: -Compressive stress causes a material to be compressed by crushing or deforming it, leading it to fail during operation.

Tension stress: -A structural member is said to be under tensile stress or 'under tension if the stress acting on it tends to lengthen it

Q6. **Discuss the structural significance of building basements in tall buildings.**

Answer

Basements are built in tall buildings to assist with dealing with lateral loads in the superstructure

Furthermore, the compacted soil around the basement generates passive pressure when the building moves towards the soil. As a result, the effect of the basement walls could be taken into account in the structural analysis.

The spring elements are frequently used to model the soil beneath the foundation. Springs restrain the pile, and springs are placed beneath the footings to represent the behaviour of the soil.

Q7. **What is meant by the term the 'aesthetics' of a structural design?**

Answer

Aesthetics: -Construction work must proceed smoothly, and the finished product should portray cultural and artistic flavour

Q8. **Explain economic factors and how these affect design.**

Answer

Economy: -Construction work must be done rationally with an inventive mind to overcome all constraints at the lowest cost

Q9. **'The function of a structure is to resist forces in equilibrium' - What does this mean?**

Answer

Equilibrium: - A structure is in equilibrium when all forces or moments acting upon it are balanced.
The function of a structure is to resist forces in equilibrium. Forces in equilibrium = a stable structure - the basis of design.

- Concrete has steel reinforcement placed in it to keep it together, prevent big cracks, and improve overall strength.
- Because of the reinforcement, longer, thinner cantilevered structures can be built, and slabs are less supported but more structurally sound.
    - Steel-reinforced concrete combines the compressive strength of concrete with the tensile strength

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Q10. **Explain why reinforced concrete is commonly used for the construction of high-rise buildings.**

Answer *Steel's high tensile strength is paired with concrete's excellent compressive strength in traditional reinforced concrete to create a robust structural material in compression and tension.*

Q11. **Why might you need to consult the structural engineer regarding the loads and forces acting on a beam or column?**

Answer **Structural components** are the primary load-bearing components of a building, and each has its structural properties that must be taken into account. Foundation, Plinth, Wall and Pier in Superstructure, Shear wall, Column, Floor, Slab, Beam are examples of such components
After determining the load on the structure, structural analysis is used to determine forces such as bending moments, shear forces, torsional moments, etc. The idealisation of the actual structure is the most difficult component of structural analysis. This is the role of structural engineer in the design of structures.

Q12. **Determine the bending behaviour of a column under axial load.**

Answer

Columns are meant to handle Axial Loads and are hence built for compression. Other weights, such as snow, wind, or other horizontal forces, might cause the columns to bow. The columns must then be constructed to withstand Axial Load and Bending.

A axially loaded column is one in which the line of action of the compressive force corresponds with the centre of gravity of the cross-section of the column. (The entire load from the top acts on the column's centroid.)

The behaviour of columns under axial loads can be divided into two categories: short columns under axial loads and long (or slender, specific) columns under axial loads. A long column is distinguished from a short column by its height and thickness (least dimension).

Under axial and concentric loads, columns tend to become shorter in length. The term "length" refers to the height or dimension in the same direction as the loading axis in general. The columns tend to expand in a direction perpendicular to the loading directions. The shape of the column changes somewhat from cuboid to barrel as a result of this activity. Poisson's ratio is the ratio of the change in height to the change in lateral dimensions. It varies depending on the substance.

Q13. **What is the performance characteristic of columns under eccentric load?**

Answer

Eccentrically loaded column (Uniaxial or Biaxial): An eccentrically loaded column is one in which the line of action of compressive force does not correspond with the centre of gravity of the cross-section of the column.

Under Eccentric load: -

It is generally known that when a load on a column is eccentric, the column's strength is significantly reduced compared to when the resultant line of pressure runs through the column's axis. Theoretically, this eccentricity is demonstrated using assumptions that may or may not be true in actuality.

Q14. **Discuss bending moments, shear forces, deflection and torsion of beams and slabs.**

Answer

Beams/Slabs	Response
Beams	**Bending moments**: - For beam, Bending Moment is the torque that keeps a beam together (anywhere along the beam). **Shear force**: For the beam, the applied loads and the support reaction produce vertical shear forces in a beam. While the burden pulls down, the reactions push up. Shear reaches its maximum magnitude near the supports in most circumstances **Deflection**: In a beam, the vertical movement of a spot on a loaded beam is known as deflection. **Torsion: -** For both beam Torsion is imparted to beams and slabs under various situations in addition to bending moment and shear force. Bending moment and shear force are produced by loads operating normally to the plane of bending. On the other hand, loads distant from the plane of bending will cause torsional moment and bending moment and shear.
Slabs	**Bending moments: -** For slab, the design bending moments are zero at discontinuous ends, negative at continuous ends and positive at midspans. **Shear force: -** For slab, the shear strength of a slab that resists flexural stresses in two orthogonal directions around a column (flat plates, footings, and pile caps) is measured using a prism placed half the slab depth d away from the column sides. **Deflection**: - In a slab, slabs bending or distortion over time due to shrinkage and temperature are long-term deflection. The state of the cracking and concrete creep can have an impact. **Torsion: -** For a slab Torsion is imparted to beams and slabs under various situations in addition to bending moment and shear force. Bending moment and shear force are produced by loads operating normally to the plane of bending. On the other hand, loads distant from the plane of bending will cause torsional moment and bending moment and shear.

Q15. **Discuss how beams are connected to columns. Explain your answer.**

Answer

Connections: -No matter what material is utilised, connections are essential to all structures and construction. The function of a connection is to transmit loads, limit movement, and/or provide overall stability to a component or structure. As a result, one of the most important aspects of precast/prestressed concrete structure design and engineering is connection design

Q16. **Describe the slenderness ratio and its effect on columns.**

Answer

The slenderness ratio is the proportion of a column's length to its smallest radius of gyration. It's often used for calculating design loads and sorting columns into short, long, and intermediate categories. The column's slenderness ratio indicates whether or not the column is buckling. The higher the slenderness ratio, the more likely the column may fail due to buckling in the direction.

Q17. **Discuss the characteristics of dead loads and live loads. Include how each is calculated.**

Answer

Load	Characteristics and calculations
Dead load	**Dead Load: -**The term "dead loads" refers to structural loads that remain constant in magnitude over time. They include structural members such as walls, plasters, ceilings, floors, beams, columns, roofs, and their weight. Dead loads include the loads of fixtures that are permanently connected to the structure. Members are preliminarily scaled based on architectural drawings and other relevant documentation. Their weights are estimated using most codes and other civil engineering literature before studying and designing structures **Dead load = volume of member x unit weight of materials**
Live load	Live loads can be moved around or are temporarily attached to a structure. They include the loads imposed on a structure by furniture and equipment storage, occupancy (people), and impact. The table below shows typical live load values. Maintenance loads, where fresh or old roof sheeting may be placed in concentrated regions, are the primary source of living (or imposed) loads acting on the roof of a portal frame building. The loading code AS/NZS 1170.1 specifies the live roof loads for cladding, purlins, and rafters, with the roofs of industrial buildings generally falling into the non-trafficable category. Roof cladding must withstand a concentrated force of 1.1 kN in any location. However, this is normally taken into account by the sheeting manufacturer, who specifies the maximum spans that can withstand this stress.

Q18. **Discuss the advantages of using composite floor systems consisting of steel beams, profiled metal decking, and reinforced concrete slabs.**

Answer

The advantages include easier construction, reduced foundation costs, faster installation, versatility, structural integrity, high strength to weight ratios, dimensional stability, minimised site storage requirements, non-contamination of other materials, easier stockpiling and cleaning, durable finishes, sound absorption and more. Steel and concrete composite slabs are lighter and stronger than most conventional slabs. The steel decking provides the tensile reinforcement while the compressive strength of the concrete makes for an all-round stronger slab.
The composite columns have large load carrying capabilities, small cross-sections and good fire protection properties. They are also known to possess high axial strength and flexural stiffness

Q19. **Discuss the characteristics of the following high performance structural elements.**

Answer

Structural element	Characteristics
Castellated beams	Standard hot-rolled I-H- or U-sections are used to construct Castellated beams. In a rack-shaped design, the web of the beam is divided longitudinally. The halves are then fused at the tops of the teeth after being moved a half-pitch in respect to one another. As a result, the body of the beam has a row of hexagonal perforations. The beam is significantly deeper than the original profile from which it was constructed, and its weight is (nearly) the same. Welding square or rectangular plates between the cut halves results in a castellated beam with octagonal holes in its body much deeper.
Laminated beams	A wood beam composed of a series of overlapping wood members glued together

Answer

Structural element	Characteristics
Pre-stressed concrete beams	Because strain or stress was imparted to the concrete beam before it was set in place, this system became known as "prestressed" concrete. When the working stress is imparted to a concrete beam, it is "prestressed" because tension is produced before, or "pre," the actual usage of the beam. A correctly constructed prestressed-concrete beam may span greater lengths than a reinforced-concrete beam while also being thinner, lighter in weight, and using less concrete.
Trusses	In engineering, a truss is a structural element made of straight pieces of metal or wood arranged in a single plane to produce a series of triangles. (Stress does not affect a triangle.
Waffle slabs	Waffle slabs, also known as two-way joist slabs, are reinforced concrete slabs having concrete ribs running in two directions on the underside. The waffle gets its name from the grid pattern created by the reinforcing ribs. For more than 40 feet (12.2 m), waffle slabs outperform flat slabs, flat slabs with drop panels, two-way slabs, one-way slabs, and one-way joist slabs (12 m)

Q20. **Describe the process associated with fabricating and installing tilt-up concrete panels.**

Answer

Tilt-up construction utilises concrete in its hardened form rather than in its plastic form.

It involves casting wall panels, usually at the job site, and their erection by a crane or other means to a vertical position for attachment to a floor slab.

Q21. **Discuss considerations that must be made when using masonry in the construction of high-rise buildings.**

Answer

Unreinforced masonry is widely used in Australia as an architectural and structural material. It has high mass, lack of ductility and low tensile strength and is unsuitable for use in areas of high seismicity.

The thermal mass of a structure can be increased by using materials like bricks and stones.

Masonry is a non-combustible material that can help to keep a building safe from fire.

Masonry is a very long-lasting type of construction.

Projectiles such as hurricane or tornado debris are more resistant to masonry walls.

Under certain conditions, extreme weather can cause masonry to deteriorate due to the expansion and contraction pressures associated with freeze-thaw cycles.

Masonry is typically heavy, and to avoid settling and cracking, it must be erected on a solid foundation, such as reinforced concrete.

Q22. **Discuss what must be organised as part of the site assessment to ensure the soil in the site can support the construction loads.**

Answer

Field soil's acceptable bearing pressure (SBC) is determined using various shear failure and settlement criteria. The actual behaviour of each type of soil is determined by its strength, permeability, stability, and a variety of other characteristics.
Several field tests can be used to determine a soil's bearing capacity. To determine the bearing capacity of the soil, field tests such as: -

- The Plate bearing test,
- A standard penetration test,
- Pressuremeter test,
- Field vane shear test

Q23. **What are the requirements relating to retaining walls over 1m in height according to the NCC and the Building Regulations 2006 (Qld)?**

Answer

Where a total height of the wall and of the fill being retained by the wall is no more than 1 m above the walls natural ground surface. Adversely, any retaining wall measuring in excess of 1 m must be subject to a Building Application being lodged for consent to construct the wall and approval being given by a licensed Building Certifier and also requiring a Final Inspection Certificate to be issued at the conclusion of the walls construction

Q24. **Discuss the use of the following temporary structures and components in the construction of large and complex buildings.**

Answer

Temporary structure	Use
Bracing	Bracing: -The function of temporary bracing is to transfer the adequate load to the ground from the frame or the other members. During an erection, the building structure is not stable without temporary bracing. Before applying outside sheathing, temporary restraint/bracing provides stability against unintended movement or loading during component installation. Under typical use conditions, structural components are designed to endure loading conditions for the duration of the structure's life. Under some conditions, like heavy winds or seismic occurrences, insufficient temporary restraint/bracing may cause instability and collapse during construction.
Closed Sheeting	Close sheeting: -Sheeting and shoring are commonly employed at construction sites to temporarily support the earth and existing buildings. Many materials and techniques are available depending on the amount of space available, the magnitude of forces, and the region's criticality to be shored. Soldier piles and timber lagging are two common methods. Soldier piles are I-beams driven into the ground below the excavation pit to create passive soil resistance. Between the piles, lagging is slid. When the depth of the piles below the excavation is insufficient to provide lateral stability, rakers, or diagonal steel supports, may be used. The loads are distributed across the raker support locations using horizontal members known as wales or walers. Sheeting comprises entire shoring systems that are driven or vibrated into the earth without the use of lagging. However, because the same structural stability principles apply, rakers and walers may be required.
Formwork props	Formwork props: -Propping is a system of structural components used to support loads while being built. The forces generated by these loads must be fully resolved, with props or columns providing the necessary support for the work in progress, such as beams, formwork, and so on.

Pressure resistant formwork	Pressure resistance formwork: - Pressure resistance formwork is used to create a temporary mould into which concrete is poured and formed. Pressure resistance formwork is fabricated from steel, glass fibre reinforced plastics and other materials. The sidewalls of the formwork must withstand the hydrostatic pressure of wet concrete, which will drop to zero within a few hours depending on the rate of setting and curing. The formwork foundation or soffit must withstand both the wet concrete's initial dead load and the dry concrete's dead load. The formwork can be struck once the concrete has reached sufficient strength (removed) when striking vertical formwork, a minimum force of 5 N/mm^2 is suggested in all circumstances to avoid damaging the permanent concrete.
Scaffolding sole plates	Scaffolding sole plates: -The load is distributed from a base plate to the ground using a timber spreader. Tie Scaffold components, such as tie tubes affixed to the scaffold, are installed to give an anchor point for a scaffold to a building or structure. Used to give the scaffold lateral stability. The sole plate, also known as the sill plate, mud sill, or base plate, is the main supporting beam in the building industry. These are usually the first pieces of wood to come into contact with the basement or foundation's masonry. Sole boards must be at least 450mm x 225mm x 35mm, however depending on leg loads and/or ground conditions, the size may need to be increased. Base plate Base plates and sole boards must be provided on level ground and inspected at all times.
Shields	Shield: -Shield formwork consists of a canvas and an elongate (characterised by a sheet of plywood comprising a wooden canvas of which there is a supporting frame body and Olances in the back of the framing voice which consists of a rectangular frame multiple or one beam horizontally positioned inside the outer frame, and the beam is positioned vertically on the horizontal beam as in the centre of beam E an elongate (characterised by a sheet of plywood comprising a wooden canvas of which there is.

Question continued over page

Answer

Temporary structure	Use

Shoring collar set	Shoring collar set: -Shoring is a type of support that is used to keep a structure from collapsing. We met the most prevalent shoring techniques during the excavation stage of the building process. Shoring is used to stabilise a deep excavation to keep the retained dirt from overturning and causing a project catastrophe. Shoring support is generally supplied when we need to support an excavation with at least a 1.20-meter difference in levels from our gate level or the +/- 0.00 level, depending on the soil type. Friction collar systems are used with prefabricated columns or columns in which anchors are not intended to be left within them. Thanks to its design, it can support high loads transferred by the slab system, working in friction with the column.
Soldier set	Soldier set: -The twin vertical 150x100 (6"x4") timbers serve as the soldiers. The soldiers, in this case, are built of general formwork wood, which is utilised for a variety of purposes on the project. Contractors in other locations may choose for a custom-made steel wall soldier. These include lightweight twin "C" section beams to lattice beam frames with built-in jacks for plumb adjustment. Walers are horizontal elements that are 100x75 (4"x3") in size. In this situation, it's the ones that are closer together that need to be finished first.
Ties	Ties: -The horizontally acting formwork pressure is largely taken up by vertical formwork by tying the two formwork faces together using formwork ties. Slinging a steel wire (3.1 mm to 4.2 mm, annealed) around the formwork bearers, directing it through boreholes in the formwork sheeting, and twisting it tightens the formwork sheeting. A stull (of wood or concrete) should be installed immediately near the tie wire to maintain the required width of formwork. Because the concrete mix assumes the bracing function (pressure), the stull (if made of wood) must be removed before pouring the concrete. Screwing using steel screws is another method of bracing.

Q25. **Explain the differences between structural steel and cold-formed steel.**

Answer	
	Cold-formed steel, also called light-gauge steel or metal stud framing, is made from structural quality sheet steel formed into C-sections and other shapes usually by rollforming the steel through a series of dies. No heat is required to form the shapes (unlike hot-rolled steel), hence the name cold-formed steel Structural steel is hot-rolled, much thicker, and considerably stronger and heavier than CFS. “Hot-rolled” means the member is shaped while the steel is molten hot. Because it is thicker and much heavier than CFS, hot-rolled steel fastening methods employ welding, bolting and riveting.

Q26. **Discuss three (3) uses of aluminium in the construction industry and why it is used.**

Answer	
1.	An aluminium alloy is desirable (sites difficulty of access or with corrosive atmospheres)
2.	aluminium alloy constructions may reduce installation costs,
3.	Aluminium alloy constructions may have a lower installation cost when helicopters are used in difficult-to-reach regions, offsetting their higher prime cost

Q27. **Explain what is involved when coordinating the set-out of the building.**

Answer

Setting out is an accurate operation that establishes the exact location of the building on the property and the baseline measurements that all other employees will use. Any mistakes made when laying out a building will have an impact on the whole project's outcome.
Before you begin, make sure you have precise information and instructions on setting out an operation properly and securely.

Because setting out entails transferring information from plans to the actual Jobsite, it's a good idea to conduct a preliminary site assessment before getting started. The work environment will establish the conditions you must prepare and will impact how you execute the assignment.
Identifying the building location:

- Subdivisions and building lots
- Recognising and designating site boundaries

Building lot: -
Identifying and marking the boundary
Reading the site plan: A site plan depicts the entire property or the structure's area. It contains the majority of the necessary information for laying out a structure, such as:

- the size and shape of the lot
- the location of the boundary lines
- the location and distance between the boundary pegs
- the building's orientation
- contour lines depicting the lot's topography
- the proposed building's outline in respect to the borders

Q28. **What different items should you assess in the building plan before laying footings? Explain your answer.**

Answer

A properly planned and operating foundation system should, in general:

- maintain the structure's bulk without causing undue settling
- Large lateral earthquake loads should be transferred between the structure and the ground (the design may achieve this by transferring load directly to a solid bearing stratum or spreading the load over a sufficiently large area)
- withstand earthquake-induced ground deformations, both transient and permanent, without causing excessive structural displacements or in-plane distortions in structure-supported components (such as partitions and claddings).

earth pressure actions: - The earth pressure is significant because it influences the soil's consolidation behaviour and strength, and it is taken into account when designing geotechnical engineering projects such as retaining walls, basements, tunnels, deep foundations, and braced excavations

The first step in the foundation building process is choosing the depth, width, and marking pattern for excavation and foundation centreline. The section of the structure below the plinth level that is in direct contact with the soil and transmits the load of the superstructure to the ground is known as the foundation.

It is usually found below ground level. If any component of the foundation is above ground level, earth filling is used to cover it. This part of the structure is not exposed to air, light, or other elements, or to put it another way, it is the hidden component of the structure.

A footing is a structure built under the base of a wall or column in bricks, masonry, or concrete to distribute the load across a vast area.

Q29. How do you ensure allowances have been made for plumbing, electrical conduits and other services to be installed?

Answer

MEP (Mechanical, Electrical, Plumbing) systems are often provided as individual drawings in a package.

Mechanical plan: -The mechanical plans depict a building's heating, ventilation, and air conditioning (or HVAC) systems. All of these features may be found in mechanical drawings.

- HVAC (HVAC) systems
- System of exhaust
- Systems that use direct digital control (DDC)
- Refrigerated water systems
- Water heating systems
- Infection prevention HVAC

Electrical plan: The electrical blueprints indicate how the electrical system will provide the power supply for lighting and appliances. Electrical experts plan the optimum wire routes and create systems that

can be operated safely and constantly. The following are some of the elements of electrical plans:

- Requirements for on-site power generation and distribution
- Plans in the areas of information technology (IT) and audiovisual (AV)
- Systems for lighting and fire protection
- Power backup systems

Plumbing plan: -
The building's complicated pipe and sewage pathways, as well as hot water and rainfall collecting and storage, are reflected in the plumbing designs. Plumbing designers are increasingly asked to create efficient systems that may lower a building's water use and save money on water bills. They install low-flow bathroom fixtures, insulate pipes, and use alternate water sources, for example. The following are examples of plumbing systems found in MEP drawings:

- pipework for natural gas
- Warm and cold water for domestic use
- pipework for acid waste
- Stormwater management systems
- compressed air/vacuum

To begin, realise that the complete package of drawings contains different building parts that, when combined, depict all of the house's construction features. Start reading building blueprints from the outset, starting with the site plan, to acquire a comprehensive image of a house. As you go through the package, the blueprints provide greater structural information

Q30. **Outline workplace policies and procedures that should be held in the site office.**

Answer

Workplace health and safety procedures are at the heart of every HSE management system. The procedures provide a step-by-step process for adhering to corporate rules, the HSE management system, and the Occupational Health and Safety Act (WHS Act). These processes may be thought of as a collection of concrete measures for controlling risks and establishing a safer workplace.

Compliance with both external and internal compliance standards is outlined in WHS procedures. Company policies are frequently written and communicated to employees to ensure that everyone understands their role in adhering to established work practices. High-risk activities may be included in some of the categories covered, such as:

Work at heights procedures;

Hazardous chemicals procedures; and

Infectious diseases procedures.

WHS rules and procedures are frequently included in these procedures. The procedures indicated in the working at a heights training course, for example, serve as the foundation for assessing and controlling hazards when working at heights. Organisations then implement these standards in their own set of policies.

Workers closest to the dangers are typically the most prepared to assess the situation and determine how to eliminate or decrease the risk. Health and safety representatives can also address workers' needs, who can ensure that they have the resources they need to handle hazards. On the other hand, senior management is responsible for putting processes in place to guarantee that all employees follow the same rules.

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WORKBOOK

Participant name	Brett Eldred

FOR THE PARTICIPANT
Instructions

• You will complete written activities as outlined on the following pages. You must attempt all questions and provide enough detail in your responses to demonstrate your knowledge.
• The timeframe for these tasks will be established by your Assessor or Training Plan, but additional time may be allowed upon negotiation with the Assessor.
• You must complete all questions unassisted by the Assessor or other personnel but may refer to reference material as needed. All questions must be answered correctly for a 'Satisfactory' assessment outcome to be awarded.
  o An oral examination may be allowed under certain circumstances, whereby your answers will be documented by another party.
  o Any written questions that are incomplete, or not answered satisfactorily will need to be completed again after further training support.
  ▪ If you answer a question incorrectly but modify your response, put your initials next to the written change (or the Assessor must initial a verbal change).

Resources required
Pen

FOR THE ASSESSOR
Instructions
• Where oral examination has occurred, ensure that this is acknowledged in writing (e.g. FT001 and Assessor Comments) • All questions must be satisfactorily demonstrated by the Participant for a Satisfactory determination (indicated by an Assessor tick to the right of the question). • Assessors are to complete marking in pen of a different colour to the Participant. • If the Participant verbally modifies their response, write in the modified response verbatim and put your initials next to the written change.

ASSESSOR COMMENTS
As necessary, outline: • Details on reattempts, alternative arrangements or reasonable adjustments made. • Where a Participant is deemed 'Not Satisfactory', provide recommendations for future training.

NOTE

At times, you will be provided with a specific business context to which you must respond, otherwise it is anticipated that you will use a workplace of your choosing (your own, or hypothetical) to provide the context to the task.

At all times, the responses in your assessment must reference **Australian** (Queensland or Federal) documentation, including legislation, regulations, codes of practice, standards and guidance publications.

The following activities require access to the internet.

ACTIVITY 1

Access the Queensland Building and Construction Commission and clearly describe its purpose and its relationship to the National Construction Code (NCC).

The legislation listed in the QBCC Act sets out the legal framework for the administration of the National Construction Code (NCC) in Queensland. The NCC sets out the performance and general requirements for construction of a house, building or plumbing and drainage installation. The relevant laws and codes allow for the Commissioner, QBC Board and the Adjudication Registrar to develop policies to guide the delivery of the QBCC's services and regulatory functions

Satisfactory Outcome ☐

ACTIVITY 2

Access the National Construction Code (NCC) Volume Two Amendment 1 – Part 3.0 Structural provisions and discuss what the following points explain.

a) 3.0.2 Resistance to actions
b) Construction in cyclonic areas

a) Resistance to actions

3.0.2 Resistance to actions

The resistance of a building or structure must be greater than the most critical action effect resulting from different combinations of actions, where—

(a) the most critical action effect on a building or structure must be determined in accordance with 3.0.3 and the general
design procedures contained in AS/NZS 1170.0; and

(b) the resistance of a building or structure is determined in accordance with 3.0.4

A building or structure must be designed to resist the most critical effect resulting from different combinations of actions,taking into consideration—

(a) the probability of simultaneous occurrence of two or more actions; and

(b) the levels of reliability of the structure when subject to combined actions; and

(c) the characteristics of the action.

Determining the levels of reliability of the structure when subject to combined actions should be consistent with the
levels of reliability implicit in the design events for natural phenomenon.

When designing for the maximum combined actions, a principle frequently adopted is that the maximum is likely to
occur when at least one of the actions is at its maximum value.

b) Construction in cyclonic areas

Construction in cyclonic areas

The intent of building construction in cyclonic areas (see Figure 3.0.1) is to ensure the structure has sufficient strength to transfer wind forces to the ground with an adequate safety margin to prevent collapse of the building and the building being lifted, or slid off its foundations.

To resist these forces it is necessary to have—

(a) an anchorage system, where the roof is connected by the walls to the footings by a chain of connections; and

(b) a bracing system to prevent horizontal collapse due to wind forces; and

(c) continuity of the system where each structural element is interlocked to its adjoining structural element throughoutthe building.

Anchorage

Anchorage of the system is achieved by using a variety of connectors. Each connector must be capable of carrying the uplift force, because the ability of the building to resist the wind forces is directly related to its weakest link. Acceptable construction manuals to achieve these requirements are described in this Part.

Satisfactory Outcome ☐

ACTIVITY 3

Access the NCC via the internet to locate the requirements applicable to a building development in the Brisbane area, containing 6 sole-occupancy units, two (2) on each level, each being a separate dwelling.
This building includes one (1) basement level designated for car parking.
The proposed building structure requires reinforced concrete floors and columns.
Document your findings or where in the NCC the information can be located.

Building Description

Classification

A Class 2 buildings

- A Class 2 building is one with two or more sole-occupancy apartments.

In a Class 2 building, each sole-occupancy unit must be a separate dwelling &

Basement considered Class 7
Class 7 buildings: These are classified under two categories;
Class 7a buildings include car parks.

Rise in Storeys

In NCC Volume One, the rise in storeys of a building generally means the number of storeys above natural ground level and any storeys in the roof space. The rise in storeys is calculated in accordance with C1.
In this example the rise in storeys is 3

Number of Storeys

Storey

A space within a building which is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but not—

1. a space that contains only—

a) a lift shaft, stairway or meter room; or
b) a bathroom, shower room, laundry, water closet, or other sanitary compartment; or
c) accommodation intended for not more than 3 vehicles; or
d) a combination of the above; or

2. a mezzanine.

In thi instances there would 3 number of story given carpark is likely housing more than 3 cars.

Type of construction

Based on 3 storey rise, type A construction would be required.

RISE IN STOREYS	CLASS OF BUILDING 2,3,9	CLASS OF BUILDING 5,6,7,8
4 OR MORE	A	A
3	A	B
2	B	C
1	C	C

Climate Zone and description

State	Location	Climate zone
QLD	Brisbane	2

Fire resistance and stability

Locate fire resistance information

— C2D10 Non-combustible building elements

(1) In a building *required* to be of Type A or B construction, the following building elements and their components must be *non-combustible*:

(a) *External walls* and *common walls*, including all components incorporated in them including the facade covering, framing and insulation.

(b) The flooring and floor framing of lift pits.

(c) Non-*loadbearing internal walls* where they are *required* to be *fire-resisting*.

(2) A *shaft*, being a lift, ventilating, pipe, garbage, or similar *shaft* that is not for the discharge of hot products of combustion, that is non-*loadbearing*, must be of *non-combustible* construction in—

(a) a building *required* to be of Type A construction; and

(b) a building *required* to be of Type B construction, subject to C3D11, in—

(i) a Class 2, 3 or 9 building; and

(ii) a Class 5, 6, 7 or 8 building if the *shaft* connects more than 2 *storeys*.

(3) A *loadbearing internal wall* and a *loadbearing fire wall*, including those that are part of a *loadbearing shaft*, must comply with Specification 5.

Compartmentation and fire separation

— C3D7 Vertical separation of openings in external walls

(1) If in a building of Type A construction, any part of a *window* or other opening in an *external wall* is above another opening in the *storey* next below and its vertical projection falls no further than 450 mm outside the lower opening (measured horizontally), the openings must be separated by—

(a) a spandrel which—

(i) is not less than 900 mm in height; and

(ii) extends not less than 600 mm above the upper surface of the intervening floor; and

(iii) is of *non-combustible* material having an FRL of not less than 60/60/60; or

(b) part of a *curtain wall* or *panel wall* that complies with (a); or

(c) construction that complies with (a) behind a *curtain wall* or *panel wall* and has any gaps packed with a *non-combustible* material that will withstand thermal expansion and structural movement of the walling without the loss of seal against fire and smoke; or

(d) a slab or other horizontal construction that—

(i) projects outwards from the external face of the wall not less than 1100 mm; and

(ii) extends along the wall not less than 450 mm beyond the openings concerned; and

(iii) is *non-combustible* and has an FRL of not less than 60/60/60.

— C3D8 Separation by fire walls

(1) Construction — A *fire wall* must be constructed in accordance with the following:

(a) The *fire wall* has the relevant FRL prescribed by Specification 5 for each of the adjoining parts, and if these are different, the greater FRL, except where S5C19(3)(c)(i), S5C22(3)(c)(i) and S5C25(3)(c)(i) permit a lower FRL on the *carpark* side.

(b) Any openings in a *fire wall* must not reduce the FRL *required* by Specification 5 for the *fire wall*, except where permitted by the *Deemed-to-Satisfy Provisions* of Part C4.

(c) Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or *sarking-type material*, must not pass through or cross the *fire wall* unless the *required fire-resisting* performance of the *fire wall* is maintained.

(2) Separation of buildings — A part of a building separated from the remainder of the building by a *fire wall* may be treated as a separate building for the purposes of the *Deemed-to-Satisfy Provisions* of Sections C, D and E if it is constructed in accordance with (1) and the following:

(a) The *fire wall* extends through all *storeys* and spaces in the nature of *storeys* that are common to that part and any adjoining part of the building.

(b) The *fire wall* is carried through to the underside of the roof covering.

(c) Where the roof of one of the adjoining parts is lower than the roof of the other part, the *fire wall* extends to the underside of—

(i) the covering of the higher roof, or not less than 6 m above the covering of the lower roof; or

(ii) the lower roof if it has an FRL not less than that of the *fire wall* and no openings closer than 3 m to any wall above the lower roof; or

(iii) the lower roof if its covering is *non-combustible* and the lower part has a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17.

(3) Separation of *fire compartments* — A part of a building separated from the remainder of the building by a *fire wall* may be treated as a separate *fire compartment* if it is constructed in accordance with (a) and the *fire wall* extends to the underside of—

(a) a floor having an FRL *required* for a *fire wall*; or

(b) the roof covering.

Fire hazard properties of materials, assemblies, fixtures and linings

Specification 7 Fire hazard properties

+ S7C1 Scope

− S7C2 Application

Linings, materials and assemblies must comply with the appropriate requirement described in Table S7C2.

− S7C3 Floor linings and floor coverings

A floor lining or floor covering must have—

(a) a *critical radiant flux* not less than that listed in Table S7C3; and

(b) in a building not protected by a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17, a maximum *smoke development rate* of 750 percent-minutes; and

(c) a *group number* complying with S7C6(b), for any portion of the floor covering that is continued more than 150 mm up a wall.

+ S7C4 Wall and ceiling linings

Other materials

Table S7C7 Other materials

Material or assembly location	Flammability Index	Spread-of-Flame Index	Smoke-Developed Index
Fire control rooms subject to Specification 19 and fire-isolated exits, other than a sarking-type material used in a ceiling or used as an attachment or part of an attachment to a building element. Note 1	N/A	0	2
Class 9b buildings used as a theatre, public hall or the like: Any part of fixed seating in the audience area or auditorium.	N/A	0	5
Class 9b buildings used as a theatre, public hall or the like: A proscenium curtain required by Specification 32.	N/A	0	3
Escalators, moving walkways or non-required non fire-isolated stairway or pedestrian ramps subject to Specification 14.	N/A	0	5
Sarking-type materials: In a fire control room subject to Specification 19 or a fire-isolated exit or fire control room used in the form of an exposed wall or ceiling.	0	N/A	N/A
Sarking-type materials: In other locations. Note 2	5	N/A	N/A
Other materials or locations and insulation materials other than sarking-type material. Notes 2 and 3	N/A	9	8 if the Spread-of-Flame Index is more than 5

Material requirements

Reinforced concrete requirements relative to Australian Standards

B1D4 Determination of structural resistance of materials and forms of construction

The structural resistance of materials and forms of construction must be determined in accordance with the following, as appropriate:

(a) Masonry (including masonry-veneer, unreinforced masonry and reinforced masonry): AS 3700, except—

(i) '(for piers—isolated or engaged)' is removed from Clause 8.5.1(d); and

(ii) where Clause 8.5.1 requires design as for unreinforced masonry in accordance with Section 7, the member must also be designed as unreinforced masonry in accordance with Tables 10.3 and 4.1(a)(i)(C) of AS 3700.

(b) Concrete:

(i) Concrete construction (including reinforced and prestressed concrete): AS 3600.

(ii) Autoclaved aerated concrete: AS 5146.1 and AS 5146.3.

(iii) Post-installed and cast-in fastenings: AS 5216.

Glazing requirements specifically for windows, sliding doors with frames and balconies.

(h) Glazed assemblies:

(i) The following glazed assemblies in an *external wall* must comply with AS 2047:

(A) Windows excluding those listed in (ii).

(B) Sliding and swinging glazed doors with a frame, including french and bi-fold doors with a frame.

(C) Adjustable louvres.

(D) Shopfronts.

(E) Window walls with one piece framing.

(ii) All glazed assemblies not covered by (i) and the following glazed assemblies must comply with AS 1288:

(A) All glazed assemblies not in an *external wall*.

(B) Revolving doors.

(C) Fixed louvres.

(D) Skylights, roof lights and windows in other than the vertical plane.

(E) Sliding and swinging doors without a frame.

(F) Windows constructed on site and architectural one-off windows, which are not design tested in accordance with AS 2047.

(G) Second-hand windows, re-used windows and recycled windows.

(H) Heritage windows.

(I) Glazing used in balustrades and sloping overhead glazing.

Satisfactory Outcome ☐

ACTIVITY 4

Research the Euler–Bernoulli beam theory and respond to the questions below.

a) What is the Euler-Bernoulli beam theory?
b) Provide a Euler-Bernoulli equation.
c) What is the Euler-Bernoulli theory (EBT) generally used for?

a) What is the Euler–Bernoulli beam theory?

The *Bernoulli-Euler* beam theory (Euler pronounced 'oiler') is a model of how beams behave under axial forces and bending. It was developed around 1750 and is still the method that we most often use to analyse the behaviour of bending elements. The Euler–Bernoulli equation describes the relationship between the beam's deflection and the applied load:

b) Provide a Euler–Bernoulli equation

the Bernoulli-Euler Beam Theory results in the following equation:

$$\frac{\mathrm{d}^2}{\mathrm{d}x^2}\left(EI\frac{\mathrm{d}^2 w}{\mathrm{d}x^2}\right) = q$$

where d2Δdx2$d2Δdx2$ is the second derivative of the deflection of t he beam ΔΔ with respect to the position along the beam xx, MM is the internal moment in the beam at location xx, EE is the Young's modulus of the beam material, and II is the moment of inertia (second moment of area) of the beam cross-section. This differential equation applies for any point along the beam, as long as our assumptions (plane sections remain plane and small angles) remain reasonably valid.

c) What is the Euler-Bernoulli beam theory (EBT) generally used for?

Euler-Bernoulli beam theory (EBT) is generally used for the analysis of the distribution of stresses and displacements in the beam element with a small thickness. It has been observed that in case of deep beam. s, the beam section warp under loaded conditions.

Satisfactory Outcome ☐

CPCCBC6014
APPLY STRUCTURAL PRINCIPLES TO THE CONSTRUCTION OF LARGE, HIGH-RISE AND COMPLEX BUILDINGS

PRACTICAL ASSESSMENT

Participant name	Brett Eldred

FOR THE PARTICIPANT

Instructions

- The tasks outlined on the following pages will require performance of normal workplace activities, as a result of a structured activity set by an Observer in the workplace or a simulated activity set by your Assessor/Observer.
- The timeframe for these tasks will be established by your Assessor/Observer, in consideration of location conditions and industry requirements.
- You must complete all tasks unassisted by the Assessor or other personnel, unless the steps note this assistance.
- You must attempt all tasks (and itemised steps) for a 'Satisfactory' assessment outcome to be awarded.
    - For any observation conducted that is incomplete, or without satisfactory performance, the observation will need to be completed again after further training support.

FOR THE ASSESSOR/OBSERVER

Instructions

- The following observation record should be used to judge and record your observations of the Participant as they complete the task(s) set. You must record your observations of the Participant's performance.
    - For each occasion, indicate the task performed and whether it was a simulation or workplace-based task.
        - Any simulated assessment must ensure the Participant still performs under workplace conditions which reflect industry standards.
    - In the comments, provide clear detail regarding the task that the Participant was required to do (e.g. PPE used, materials handled, attachments connected, plant types).
- All steps must be satisfactorily demonstrated by the Participant for a 'Satisfactory' determination (indicated by an Assessor tick to the right of each itemised step, or an Observer tick to the right of each itemised step, and confirmation by an Assessor in the Assessor Comments).
    - Where you have determined that one or more task steps have not been satisfactorily demonstrated, provide the Participant with additional support and outline details of such assistance in the Assessor/Observer Comments. Allow the Participant two (2) further opportunities to demonstrate the task again to allow an opportunity for a 'Satisfactory' assessment outcome to be achieved.
    - If after three (3) attempts the Assessor determines that the Participant cannot demonstrate the required steps, a 'Not Satisfactory' outcome is to be determined.

TASK OUTCOME					
Task	Date	Task Type (Tick)	Location	Task outcome (Tick)	
				Satisfactory	Not Satisfactory
Task 1	Select Date.	☐ Workplace ☐ Simulation		☐	☐

ASSESSOR COMMENTS: GENERAL
As necessary, outline: • Details on reattempts, alternative arrangements or reasonable adjustments made. • Where a Participant is deemed 'Not Satisfactory', provide recommendations for future training.

ASSESSOR COMMENTS: PRACTICAL TASK 1	
☐ Individual student (as named on cover page) ☐ Multiple students [☐ All from Attendance Report, ☐ Specific students involved – identify students]	
Task	**Provide detail**
1.2B.	Specify retaining walls applied to planning process:
1.2C.	Specify temporary structural elements added to planning process:
1.2D. 1.5A. 1.5B.	Specify digital tools/devices used to communicate and collaborate with professionals, suppliers, HR and others:
1.2E.	Specify equipment used to access and extract information:
1.3A.	Specify set-out coordinated:
1.3B. 1.3C.	Specify footing laid:
1.3D.	Specify damp coursing and termite barriers installed:

ASSESSOR COMMENTS: PRACTICAL TASK 1	
1.4A. 1.4B. 1.4C. 1.5B.	Specify how processes and construction elements were checked for compliance with manufacturer specifications and relevant Australian Standards and codes.
1.5D. 1.5E. 1.5F. 1.5G. 1.5H. 1.5I. 1.5K.	Specify how the effect of force and movement were assessed against structural material properties and design.
1.5L.	Specify faults identified and action undertaken:

CPCCBC6014
APPLY STRUCTURAL PRINCIPLES TO THE CONSTRUCTION OF LARGE, HIGH-RISE AND COMPLEX BUILDINGS

Practical Task 1

Description of task:
The participant must demonstrate the skill and ability to take responsibility for ensuring the structural integrity of materials and building and construction work for a large, high-rise, or complex building project so that site safety and quality control measures are maintained including:

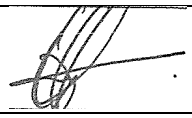
- Apply structural principles to the planning of a construction project.
  - Determine structural principles applicable to the construction of the large, high-rise or complex structure.
  - Document the performance characteristics required of structural elements of the project.
  - Document performance of materials in the building plan as part of the schedule and requirements.
- Coordinate and manage the site assessment and job set-up.
  - Organise site and soil assessment.
  - Confirm and schedule the instalment of retaining walls to meet legislated requirements.
  - Determine and schedule the requirements for temporary structural elements.
  - Use digital tools and devices to communicate and collaborate effectively with others.
  - Use equipment and programs to access, extract information and develop relevant documentation.
- Coordinate and manage construction of footing systems.
  - Coordinate the set-out of the building in accordance with documented building plans, following the full assessment of the site.
  - Assess structural performance of the footings specified in the building plan for compliance with relevant codes and accepted industry construction structural principles.
  - Lay footings, as specified in the building plan, and check for compliance with standards and accepted industry construction principles.
  - Plan, implement and check damp coursing and the provision of termite barriers and other relevant techniques in accordance with codes, standards and industry practice.
- Coordinate and manage structural elements of the construction process.
  - Identify and analyse technical construction principles and performance characteristics of construction materials in the planning of project.
  - Determine, schedule and check processes for construction of all structural elements for compliance with manufacturer specifications and relevant Australian Standards and codes.
  - Confirm building plans and relevant standards and schedule appropriate allowances for plumbing, electrical conduits and other services to be installed.
- Analyse and plan for structural integrity of buildings.
  - Consult and coordinate professional input to evaluate structural integrity of large and complex buildings.
  - Consult effectively with professionals, using relevant industry terminology and concepts.
  - Assess structural requirements and loads of the building design.
  - Analyse the effects of force and movements on structural elements.
  - Analyse properties and behaviours of structural materials.
  - Analyse section properties of structural elements using standard industry formulas and performance comparisons.
  - Evaluate performance characteristics of columns using standard industry techniques.
  - Assess methods used for stress distribution in connections between structural elements.
  - Assess impact of various loads on the building structure.
  - Consider design impact of high-performance structural elements.
  - Select, position and size all structural members that form fixed or temporary building structures.
  - Identify typical faults and problems and the action required to rectify such faults.

Practical Task 1

These tasks may be simulated or real. The Participant is to gather evidence of how they have completed each component of the Practical Task, which is to be submitted with this Practical Assessment sheet. The Observer is to provide detailed comments on the tasks completed by the Participant (on the Observer Comments, overleaf). The Assessor is to verify the Observer's comments, noting their findings in the Assessor Comments (on the back of the Practical Assessment cover page) and provide the assessment outcome.

Resources required:
Access to: relevant current government building and construction and WHS legislation; The NCC, and other relevant industry and Australian codes and standards; environmental requirements and sustainability principles; Manufacturer's materials and product ``s and installation instructions for building materials in the project specifications; Project plans, design brief, working drawings and specifications.

Observer details

Name of observer:	Llyod Evans
Role of observer (Confirm suitability to sign)	Project Manager
Email address of observer	llevans@besixwatpac.com
Signature of observer:	
Date:	27/05/24

When completing the task, did the Participant:		Tick if satisfactorily completed. Provide comments if left unticked.
1 Apply structural principles to the planning of a construction project		
1.1A.	Determine structural principles applicable to the construction of the large, high-rise or complex structure	☑
1.1B.	Document the performance characteristics required of structural elements of the project. *(attach copy or screenshot)*	☑
1.1C.	Document performance of materials in the building plan as part of the schedule and requirements. *(attach copy or screenshot)*	☑
2 Coordinate and manage the site assessment and job set-up.		
1.2A.	Organise site and soil assessment.*(attach copy)*	☑
1.2B.	Confirm and schedule the instalment of retaining walls to meet legislated requirements.	☑
1.2C.	Determine and schedule the requirements for temporary structural elements.	☑
1.2D.	Use digital tools and devices to communicate and collaborate effectively with others	☑
1.2E.	Use equipment and programs to access, extract information and develop relevant documentation	☑
3 Coordinate and manage construction of footing systems.		
1.3A.	Coordinate the set-out of the building in accordance with documented building plans, following the full assessment of the site.	☑
1.3B.	Assess structural performance of the footings specified in the building plan for compliance with relevant codes and accepted industry construction structural principles.	☑
1.3C.	Lay footings, as specified in the building plan, and check for compliance with standards and accepted industry construction principles.	☑
1.3D.	Plan, implement and check damp coursing and the provision of termite barriers and other relevant techniques in accordance with codes, standards and industry practice.	☑

	When completing the task, did the Participant:	Tick if satisfactorily completed. Provide comments if left unticked.
4 Coordinate and manage structural elements of the construction process		
1.4A.	Identify and analyse technical construction principles and performance characteristics of construction materials in the planning of project.	☑
1.4B.	Determine, schedule and check processes for construction of all structural elements for compliance with manufacturer specifications and relevant Australian Standards and codes.	☑
1.4C.	Confirm building plans and relevant standards and schedule appropriate allowances for plumbing, electrical conduits and other services to be installed.	☑
5. Analyse and plan for structural integrity of buildings		
1.5A.	Consult and coordinate professional input to evaluate structural integrity of large and complex buildings	☑
1.5B.	Consult effectively with industry professionals, and use relevant industry terminology and concepts	☑
1.5C.	Assess structural requirements and loads of the building design.	☑
1.5D.	Analyse the effects of force and movements on structural elements.	☑
1.5E.	Analyse properties and behaviours of structural materials.	☑
1.5F.	Analyse section properties of structural elements using standard industry formulas and performance comparisons.	☑
1.5G.	Evaluate performance characteristics of columns using standard industry techniques.	☑
1.5H.	Assess methods used for stress distribution in connections between structural elements.	☑
1.5I.	Assess impact of various loads on the building structure.	☑
1.5J.	Consider design impact of high-performance structural elements.	☑
1.5K.	Select, position and size all structural members that form fixed or temporary building structures	☑
1.5L.	Identify typical faults and problems and the action required to rectify such faults.	☑

Observer comments:

Brett worked through the process required for the footing so required for a precast panel with myself. He demonstrated understanding of the structural principles and discussed the design with eth structural engineer responsible for its design, working through the design approach, material selection , engineering considerations. Brett was able to revert back to myself and demonstrate a working knowledge from this session wit heh engineer.

Brett assisted in the soil classification process undertaken by the geotechnical engineer. Once the report was finalised, brett reviewed and broke out the aspects of the report applicable to the engineering considerations including the soil classification, the rosk extent found and groundwater found during investigations.

During the planning phase of the footing, Brett assisted the site engineer, site foreman in actioning he procedures and steps to enable the set out , the scheduling of footing steel and concrete. Engineering plans , schedules and site particulars were reviewed to ensure accuracy and understanding. ITPS were prepared and signoff in accordance with the plans.