



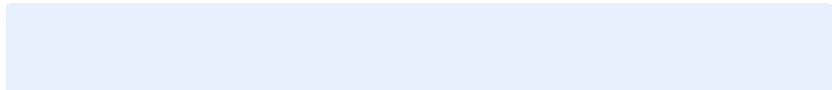
CPCBC4004A

IDENTIFY AND PRODUCE ESTIMATED COSTS FOR BUILDING AND CONSTRUCTION PROJECTS

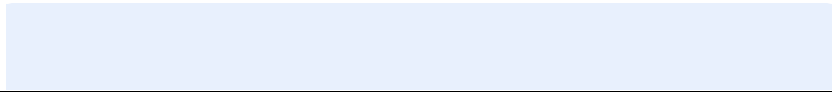
THEORY EXAM INSTRUCTIONS

- This exam will occur under standard assessment conditions.
 - An oral examination may be allowed under certain circumstances. Answers will be documented and FT003 (Oral examination declaration form) must be completed.
- Participants must provide enough detail in their responses to demonstrate their knowledge and skills.
- Please fill in the details below, providing your name, signature and date of assessment.
 - Your signature acknowledges that this is your own work.
- If a participant initially answers a question incorrectly but modifies their response, they must follow the instructions below:
 - If a participant changes their response in writing, they must put their initials next to the written change.
 - If a participant changes their response verbally, this must be noted on the exam paper by the assessor.

Participant name Gavin Wong

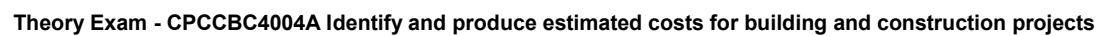
Participant signature 

Assessor name _____

Assessor signature 

Date [Click here to enter a date.](#)

Number of questions	Number of questions answered correctly	Satisfactory?	
		Yes	No
24		☐	☐





Q1. What is the critical aspect of identifying and interpreting plans, drawings and specifications for a building project?

Answer To show all parties involved in a building project what the proposed structure will look like when completed ☐

Q2. What is the purpose for date stamping of plans, drawings and specifications?

Answer To clearly identify superseded and amended plans ☐

Q3. Nominate at least six (6) people and/or entities that would use plans drawings and specifications on a building project.

Answer Client
Local council and authorities
Builders and subcontractors
Engineers
Carpenters
Bricklayers
Concreters
Painter and plasterers
Landscapers ☐

Q4. Plans and drawings usually hold many and varied features.

Name some of the types of drawings and details you would expect to see on plans and drawings for a building project.

Answer

Location Plan – shows relative location of site in a particular street
Floor Plan – horizontal sections through the building viewed from above
Elevations – a view seen from standing in front of a wall
Sections – vertical slice through the building.



Q5. It is necessary to acquire all building plans and specifications at the beginning of the negotiation period so we know all building project details prior to commencing work (including dimensions, construction materials, door and window schedules, masonry control joint locations and smoke alarm locations).

What else would be expected to be provided?

Answer

Footing Construction Report and Foundation Soil Assessment
Framing plans
Roof truss computation
Energy Efficiency Report
High Risk Zoning



Q6. Drawings are usually arranged in the approximate order of construction. What might a set of drawings consist of?

Answer

Civils – plot or site plan, utilities, easements, grading and landscaping
Structural – foundation, structural steel, building support, roof framing
Architectural – floor plans, elevations, building sections, door and window schedules and room finishes
Electrical – electrical wiring, lighting plan, reflected ceiling plan, panel schedules
Mechanical – heating, ventilation, sprinkler system and air conditioning plans
Plumbing – hot and cold water system layout and sewerage disposal system



Q7. Explain how to access the Building Code of Australia (BCA) and its relevance to estimating costs for building and construction projects.

Answer

<http://www.abcb.gov.au/ncc-online/NCC>

NCC 2016 Volume One Amendment 1 is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia, which allows for variations in climate and geological or geographic conditions.

Volume One contains the requirements for Class 2 to 9 (multi-residential, commercial, industrial and public) buildings and structures

NCC 2016 Volume Two is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia, which allows for variations in climate and geological or geographic conditions. Volume Two contains the requirements for Class 1 (residential) and Class 10 (non-habitable) buildings and structures.



Q8. Explain how to access the Plumbing Code of Australia (BCA) and its relevance to estimating costs for building and construction projects.

Answer <http://www.abcb.gov.au/ncc-online/NCC>



NCC 2016 Volume Three is a uniform set of technical provisions for the design and installation of plumbing and drainage systems throughout Australia.

Volume Three contains the requirements for plumbing and drainage for all classes of buildings

Q9. Explain how to access Australian Standards and their relevance to estimating costs for building and construction projects.

Answer <https://www.standards.org.au/standards-catalogue/sa-snz/building>



Standards are documents that set out specifications, procedures and guidelines that aim to ensure products, services, and systems are safe, consistent, and reliable.

They cover a variety of subjects, including consumer products and services, the environment, construction, energy and water utilities, and more.

To ensure they keep pace with new technologies, standards are regularly reviewed by Standards Australia technical committees.

Q10. Identify two (2) standards that would be relevant to the industry sector.

Answer AS 3700:2018 Masonry Structures
AS 1684.2-1999 Residential timber-framed construction – Non-cyclonic areas



Q11. Explain the impact of WorkCover requirements on costs to the project.



Answer WorkCover cost are a direct job cost which are incurred during construction. These costs are included in the project cost



Q12. Explain the impact of Environmental Protection Agency requirements on costs to the project.

Answer Approval costs, waste management fees, water quality monitoring and implementation of management cost all need to be included in project cost ☐

Q13. Calculate and cost the lineal timber order for 93 x 19 DAR Meranti and allow 5% wastage. The cost per lineal metre is \$6.40.

**The requirements are: 22 @ 2400; 30 @ 3600; 10 @ 4800; 12 @ 1880
Show your calculations.**

Answer ☐
 $22 \times 2.4\text{m} = 52.8 \text{ m}$
 $30 \times 3.6\text{m} = 108\text{m}$
 $10 \times 4.8\text{m} = 48\text{m}$
 $12 \times 1.88\text{m} = 22.56$
 $\text{Total required} = 52.8 + 108 + 48 + 22.56 = 231.36$
 $+ 5\% \text{ wastage} = 105\% \times 231.36 = 242.928\text{m}$
 $\text{Total cost } 242.928 \times \$6.40 = \$1,554.74$



- Q14. A building floor plan measures 24000 x 14000 and the specification states the sheet flooring is 3.6 x 0.9 x 19mm Yellow TERMIFLOR T&G H2 at \$58.38 per sheet.

Calculate the area of floor sheeting required when an allowance of 2% is made for waste and cutting. Determine the number of sheets to order to the nearest whole sheet and calculate the cost for the flooring.

Show your calculations.

Answer

Area = 24m x 14m = 336m²
+ 2% for wastage = $102/100 \times 336 = 342.72\text{m}^2$
Each sheet is 3.6 x 0.9 = 3.24m²
No. sheets = $342.72 / 3.24 = 105.77$ rounded up 106 sheets
Total cost = $106 \times \$58.38 = \$6,188.28$



- Q15. If a solid cavity brick wall is to be built 23000mm long and 2400mm high (no windows and no doors), how many bricks would be required if the number of bricks per square metre is 50? Show your calculations.

Answer

Area = 23m x 2.4m = 55.2m²
Bricks per m² = 50
Total No. bricks = $55.2 \times 50 = 2760$



- Q16. You are a QBCC licensed plasterer and a client (Owner Builder) Davey Jones-Locker of 100 Reef Avenue, Brisbane, Queensland wants you to quote for plastering an internal wall of his house build and has described to you the following information over the phone:**

The Client tells you the Council approved plans and drawings state the finished ceiling height from the top of slab floor is 2400mm. There is one external solid timber door (D4) is 2340 x 870 x 35 in this wall and no other openings. The length of this house end wall is 11 metres.

The house is of brick veneer construction and includes a 50mm cavity and the load bearing external framing is 70 x 45 MGP12 (a Boral product "Pineguard Blue"). The bricks are standard bricks 230 x 76 x 100mm. (L x H x W).

The Client tells you that the door is positioned 2100mm from an internal corner (RHS in aerial view) and as seen from inside the house looking out. The specification and drawings state 10mm regular internal plasterboard. You know from experience regular plasterboard is supplied in the following sizes lengths 6M, 4.8M, 4.2M, 3.6M, 3M, 2.7M and 2.4M with recessed edge and widths of 1200mm and 1350mm.

The Client wants a quote to fix and finish this internal wall with plasterboard.

Your labour and on-costs are charged at \$51.50 an hour per tradesman plus materials including sheets, fixing, finishing and sanding. You estimate ancillaries including stud glue, screws, base coat, top and finish coats at \$315.00 and that there is two (2) days' work.

Your business works a 38 hour week you allow workers a 15 minute morning tea break and half hour for lunch. You will need two (2) tradesmen first day and one (1) tradesman second day including materials and equipment supply, fixing, finishing and sanding.

You are to research or acquire plasterboard sheet prices and attach this price list to your email. You are not required to supply or fix cornice.

Sketch the wall in Plan View (not to scale), dimension it with relevant measurements, and position the door on the right side of your plan view sketch and then calculate the plasterboard required and approximate waste expressed as a percentage (%) for internally lining this wall.

Estimate the cost of the job, including supplying plasterboard materials fixing setting, finishing and sanding plus labour. Then write a covering email to be sent to the client. You must show your methods for calculating cost of sheets, waste, plus fixing, setting, finishing and sanding.

Attach your quote, sketch, calculations and pricing list and email this to your Trainer/Assessor (details provided by them).



DRAFT AREA

Materials

2 x Gyprock Plus RE/SE 6000mm x 1210mm x 10mm \$41.30 each

2 x Gyprock Plus RE/SE 4200mm x 1200mm x 10mm \$40.21 each

Ancillaries \$315.00

Labour

2 x Tradie x 7.6hr at \$51.50/hr each

1 x Tradie x 7.6hr at \$51.50/hr

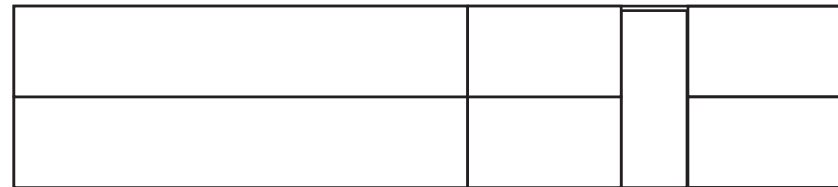
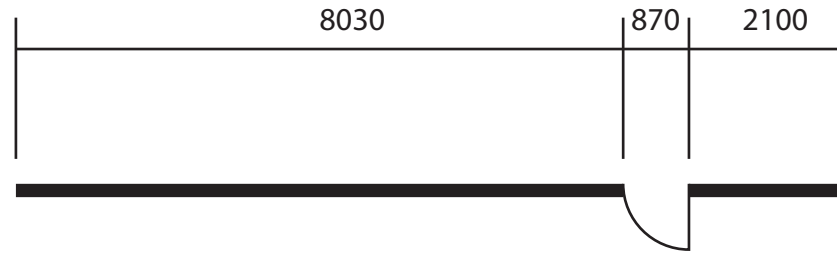
1 tradie daily rate $7.6 \times \$51.50 = \391.40



DRAFT AREA

Answer





$$11000 - 2100 - 870 = 8030$$

$$11000 - 870 = 10130$$

$$8030 - 6000 = 2030$$

$$4200 - 2030 = 2170$$

require

2 sheets 6000 x 1200

2 sheets 4200 x 1200

$$\text{total area of wall to be clad} = 11\text{m} \times 2.4\text{m} - 2.34 \times .87 = 26.4 - 2.0358 = 24.364\text{m}^2$$

$$\text{total area of sheets} = 6\text{m} \times 2.4\text{m} \times 2 + 4.2\text{m} \times 2.4\text{m} \times 2 = 24.48\text{m}^2$$

$$\text{wastage} = 24.48\text{m}^2 - 24.364\text{m}^2 = 0.116\text{m}^2$$

$$\text{percentage wastage} = 0.116/24.48 \times 100 = 0.5\%$$

plastering quote for Davey Jones-Locker

Item	Quantity	Rate	Total
Gyprock Plus RE/SE 6000mmx1210mmx10mm	2	\$41.30	\$82.60
Gyprock Plus RE/SE 4200mmx1200mmx10mm	2	\$40.21	\$80.42
Ancillaries	1	\$315.00	\$315.00
Labour Tradie	3	\$391.40	\$1,174.20
sub Total			\$1,652.22
GST			\$165.22
Total			\$1,817.44



Q17. There are many different ways of estimating project costs. You can use your past experience, or 'square metre' rates but if you are unfamiliar with estimating and pricing then you should resort to the *materials and labour method* of costing using an item-by-item approach which is considered as the best industry approach to estimating.

What are at least three of the nominated methods for estimating?

Answer

1. Costing by area
2. Costing by material and labour
3. Costing by a costing guide or estimating manual

☐

Q18. Name some of the circumstances to consider in relation to labour adjustment factors when estimating a project for construction.

Answer

- Add 10% to 15% when working temperatures are below 4 degrees or above 35 degrees.
- Add 15% to 25% for work at height on a ladder or a scaffold etc, in confined space, in a congested area or remote from the material storage point (added time for material handling).
- Deduct 10% if building conditions are ideal
- Add 1% for each 10 feet that materials must be lifted above ground.
- Add 5% to 50% for tradesmen with untested/unknown skills.
- Deduct 5% to 25% for highly motivated, highly skilled tradesmen with high productivity rates.
- Deduct 10% to 20% when an identical task is repeated many times for several days at the same site.
- Add 30% to 50% on small jobs where fitting and matching of materials is required, adjacent surfaces must be protected, and the job site is occupied during construction.
- Add 25% to 50% for work done following a major disaster while skilled tradesmen are not readily available. Material costs may also be higher after a major disaster
- Add 10% to 35% for demanding specs, rigid inspections, untried suppliers

☐

Q19. If a bricklayer lays 600 bricks in an eight (8) hour day, what is the average number of bricks laid per hour by the bricklayer?
Tick your response.

Answer

Choice	Possible Answers
☐	65
☐	70
☐	55
☐	90
☒	75
☐	105
☐	85

☐

Q20. What and where are some of the potential sources you could go to in choosing your suppliers for goods and services?

Answer

Online
Yellow pages
Attending industry events
Networking
Word of mouth
Local newspapers and magazines

☐

Q21. What are some of the primary (key) factors for choosing your suppliers?

Answer

Obtain written quotations from potential suppliers
Obtains samples of required items if appropriate
Compare which services are the best fit for purpose and most economical

☐



Q22. What are some of the ways you could communicate with your suppliers for gaining quotes?

Answer

Written request
Email request
Faxed request
Telephone request
Verbal request



Q23. Explain the concept of a 'Labour Only' quote?

Answer

Labour only quote only includes the labour rate including overheads and profit, it does not include the cost of materials



*You will be provided an allocated period by your instructor to complete this task.
You may use appropriate costing software programs in completing this task.*

- Q24. Referring to the supplied set of house plans, you must do the following scheduling and costing:
- Identify and nominate a supplier/s and schedule the materials and cost the internal and external timber wall framing.
 - Identify and nominate a supplier/s and schedule the materials and cost the foundations and lower floor concrete slab including the schedule and costing for reinforcement.
 - Identify and nominate a supplier/s and schedule the materials and cost for the sub floor framing and the flooring for the upper floor plan.
 - Calculate the architrave and skirting required for the fit out of the upper floor only in lineal metres.
 - Calculate the wet area tiles for the upper floor only which are client chosen for both floors and walls with the wall tiles 250 x 100 and floor tiles 300 x 300.
 - Estimate the labour only cost to tile all the wet areas only in the home. The tiler charges labour only \$44.00 per square metre.
 - Determine the roofing material and number of square metres of it that are required.
 - Complete the aluminium windows and doors schedule and other external doors schedule for the lower floor only.
 - Complete a full internal doors schedule for the lower floor only.
N.B. Assume all doors are flush panel 2040mm in height and 35mm thick.
 - Estimate the labour only cost for hanging all doors on the lower floor – if a tradesman takes 2 hours to jamb an opening, hang the door, fit the door furniture, door stops, architrave and fit a door-open-restraint. The hourly rate is \$27.80 plus 20% on costs.

Answer

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Answer



a) Identify and nominate a supplier/s and schedule the materials and cost the internal and external timber wall framing.

External timber framing

Rear wall lower floor – $1800 (4) \times 2400 + 2270 (5) \times 2400$ [4070]

Rear wall upper floor – $14000 (31) \times 2400$ (3 x 900, 1 x 2100, 1 x 1800 opening)

Rh side lower floor – $14380 (32) \times 2400$ (2 x 900, 1 x 600, 1 x 820, 1x 2100 openings)

Rear wall garage – $6390 (14) \times 2400$ (1 x 820 opening)

Rh side upper floor – $12580 (28) \times 2400$ (2 x 600, 1 x 1200, 1 x 1800 opening)

Front wall lower floor – $6180 (14) \times 2400 + 2 \times 600 (1) \times 2400 + 2 \times 790 (2) \times 2400$ [8960]

Front wall upper floor – $7260 (16) \times 2400$ (2 x 1800, 1 x 900 opening)

Lh side lower floor – $4710 (10) \times 2400$ (1 x 900 opening) + $10460 (23) \times 2400$ (2 x 900 openings) [15170]

Lh side upper floor – $2440 (5) \times 2400 + 3870 (9) \times 2400 + 5000 (11) \times 2400$ [11310]

Internal timber framing

Study – $3000 (7) \times 2400 + 2180 (5) \times 2400$ [5180]

Lounge – $2 \times 900 (2) \times 2400$ [1800]

Pantry – $2 \times 1520 (3) \times 2400 + 2 \times 1500 (3) \times 2400$ [6040]

Rumpus – $3080 (7) \times 2400 + 4650 (10) \times 2400$ [7730]

Store – $4 \times 2100 (5) \times 2400$ [8400]

Laundry – $3600 (8) \times 2400 + 2840 (6) \times 2400 + 2200 (5) \times 2400 + 560 (1) \times 2400$ [9200]

Ensuite – $3000 (7) \times 2400 + 2070 (5) \times 2400$ [5070]

Bedroom 1 – $4200 (9) \times 2400$

Bedroom 2 – $4200 (9) \times 2400$

Bedroom 2 robe - $2250 (5) \times 2400$

Bedroom 3 – $2 \times 4720 (10) \times 2400 + 2300 (5) \times 2400$ [11740]

Bedroom 4 – $4200 (9) \times 2400$

WC – $2195 (5) \times 2400$

Bath – $2440 (6) \times 2400$

walls	Upper floor load bearing	Lower floor load bearing	Non load bearing
Top plate	2-70x35 F5	2-90x35 F5	70x35 F5
Bottom plate	70 x 35 F5	90x35 F5	70 x 35 F5
Studs	70 x 35 F5 450centres	90x35 F5 450centres	70 x 35 F5 450centres
Nogging	70 x 35 F5 1row	90x35 F5 1row	70 x 35 F5 1row

Top plate upper floor total length – 129.29m at \$2.70/m = \$349.08

Bottom plate upper floor – 64.645m at \$2.70/m = \$174.54

Top plate lower floor length – 17.4640m at \$3.25/m = \$56.76

Bottom plate lower floor length – 87.32m at \$3.25/m = \$283.79

Total no. studs upper floor – 210

Total length of studs upper floor – 210 x 2.4 = 504m at \$2.70 = \$1360.80

Total no. studs lower floor – 179

Total length of studs = 179 x 2.4 = 429.6m at \$3.25 = \$1396.20

Studs at sides of opening ?		
opening	No. of studs	No. of openings
900	1 – 70x35	6 (12 studs)
1200	2 – 70x35	1 (4 studs)
1500	2 – 70x35	
1800	2 – 70x35	4 (8 studs)
2100	3 – 70x35	1 (6 studs)
3600	3 – 70x45 F5	
5000	3 – 70x45 F8	

Studs at sides of opening ?		
opening	No. of studs	No. of openings
900	1 – 90x35	8 (16 studs)
1200	1 – 90x35	
1500	2 – 90x35	
1800	2 – 90x35	
2100	3 – 90x35	1 (3 studs)

Lintels over openings (lower floor)		
opening	size	No. of opening
900	90x45 F8	8 (8x.9x\$4.95) \$35.64
1200	120x45 F8	
1500	140x45 F17	

1800	170x45 F17	
2100	170x45 F17	1 (2x2.1x\$12.55) \$52.71
3600	240x45 LVL	
5000	150 PFC	

Lintels over openings (upper floor)		
opening	size	No. of opening
900	90x45 F8	6 (6x.9x\$4.95) \$26.73
1200	120x45 F8	1 (1x1.2x \$7.90) \$9.48
1500	120x45 F8	
1800	140x45 F8	4 (4x1.8x\$8.25) \$59.40
2100	170x45 F8	1 (1x2.1x\$10.55) \$22.16

Total cost of timber from Narangba Timbers = \$3827.29

Bracing

Lower floor direction A	
TB1	3 x 2700
	1 x 2400
TBHI	1 x 2200
TB5A	2 x 900
	1 x 980
TB5B	2 x 900
TB5Bs	2 x 700

Lower floor direction B	
TB1	1 x 2700
TB341	1 x 1500
TB5A	3 x 900
TB5B	3 x 900
	1 x 1250

upper floor direction A	
TB1	2 x 2700
TB5A	3 x 900
TB5Bs	2 x 600

upper floor direction B	
TB1	2 x 2700
TB5A	4 x 900

- b) Identify and nominate a supplier/s and schedule the materials and cost the foundations and lower floor concrete slab including the schedule and costing for reinforcement.**

Slab area

$14.95\text{m} \times 10.76\text{m} + 1.8\text{m} \times 10.45\text{m} + 7.56\text{m} \times 4.71\text{m} + 7.08\text{m} \times 5.60\text{m} = 160.862 + 18.81 + 35.608 + 39.648 = 254.928 \text{ m}^2$

Volume of slab = $254.928\text{m}^2 \times 0.1\text{m} = 25.493\text{m}^3$

Volume of sand = $245.928\text{m}^2 \times 0.05\text{m} = 12.296\text{m}^3$

Visqueen membrane = $256 \text{ m}^2 = \$125.00$

Area of reinforcement = 256m^2 at $\$6.25/\text{m}^2 = \1600.00

11 bored piers at \$4500

300 x 300 slab thickenings – $29.9\text{m} + 32.28\text{m} + 6.39\text{m} + 7.28\text{m} + 3.63\text{m} + 4.98\text{m} + 7.56\text{m} + 7.54\text{m} = 99.56\text{m}$ (trench mesh 16 lengths at $\$23.30 = \372.80)

Volume of slab thickenings = $.3 \times .3 \times 99.56 = 8.96\text{m}^3$

Total volume concrete = 34.453m^3 at $\$188.89/\text{m}^3 = \6507.82 Eureka Concrete

Concrete pumping $\$175/\text{hr}$ (2hrs $\$350$) $\$100$ travel $\$8/\text{m}^3$ ($\$275.62$)

Reo chairs – 300 at $\$30.50/100 = \91.50

Termite protection approx $\$1500$ from Bitt'n Pest Control with Bite

Total cost = \$15322.74

c) Identify and nominate a supplier/s and schedule the materials and cost for the sub floor framing and the flooring for the upper floor plan.

Hyspan floor joists – 13 at 3.05m, 13 at 1.95m, 19 at 7.04m, 19 at 5.54m

Total length = 304.02 at $\$13.13 = \3991.78 from Finlayson's

Pryda hangers 108 at $\$7.02 = \758.16 from Finlayson's nails included

1 concealed beam 3480m

1 300 x 65 Tas Beam 4830m

Area of flooring = $14\text{m} \times 5\text{m} + 5.385\text{m} \times 8.31\text{m} + 2.195\text{m} \times 7.26\text{m} = 70\text{m}^2 + 44.749\text{m}^2 + 15.936\text{m}^2 = 130.685\text{m}^2$ [$\$81.00$ (1200x2400)] $\$28.12/\text{m}^2$

Cost of flooring = $\$3674.86$

Total cost excluding beams = \$8424.80

d) Calculate the architrave and skirting required for the fit out of the upper floor only in lineal metres.

Robe – $2 \times 3\text{m} + 2 \times 2\text{m}$ [skirting -0.72]

Architrave = 10m

Skirting = 9.28m
 Bed 1 – $2 \times 4.8\text{m} + 2 \times 4.86\text{m}$ [skirting – $(0.72\text{m} + 0.82\text{m})$]
 Architrave = $9.6\text{m} + 9.72\text{m} = 19.32\text{m}$
 Skirting = 17.78m
 Bed 2 – $2 \times 3.6\text{m} + 2 \times 4.2\text{m}$ [skirting – $(0.82\text{m} + 0.72)$]
 Architrave = $7.2\text{m} + 8.4\text{m} = 15.6\text{m}$
 Skirting = 14.06
 Bed 2 robe – $2 \times 2.25\text{m} + 2 \times 2.065\text{m}$ [skirting – 0.72m]
 Architrave = $4.5\text{m} + 4.13\text{m} = 8.63$
 Skirting = 7.91
 Bed 3 robe – $2 \times 2.25\text{m} + 2 \times 2.065\text{m}$ [skirting – 0.72m]
 Architrave = $4.5 + 4.13 = 8.63$
 Skirting = 7.91
 Bed 3 – $2 \times 3.3\text{m} + 2 \times 4.72\text{m}$ [skirting – $(0.72\text{m} + 0.82\text{m})$]
 Architrave = $6.6\text{m} + 9.44\text{m} = 16.04\text{m}$
 Skirting = 14.5m
 Bed 4 – $2 \times 4.2\text{m} + 2 \times 3\text{m}$ [skirting – $(3\text{m} + 1.62\text{m})$]
 Architrave = $8.4\text{m} + 6\text{m} = 14.4\text{m}$
 Skirting = 9.78m
 Bed 4 robe – $3\text{m} + 2 \times 0.53\text{m}$
 Architrave = 4.06m
 Skirting = 4.06
 WC architrave – $2 \times 2.195\text{m} + 0.45\text{m} + 1.02\text{m} + 1.54\text{m} = 7.4\text{m}$
 Landing skirting – $1.72\text{m} + 0.695\text{m} + 2.8\text{m} + 2.84 = 8.055\text{m}$
 Landing architrave – $3.36\text{m} + 3.3\text{m} + 0.69\text{m} + 1.02\text{m} + 2\text{m} + 1.54\text{m} + 0.385\text{m} + 3.81\text{m}$
 $+ 5.07\text{m} = 21.175$

Total architrave = 125.255m

Total skirting = 93.335

e) Calculate the wet area tiles for the upper floor only which are client chosen for both floors and walls with the wall tiles 250 x 100 and floor tiles 300 x 300.

Ensuite floor = $3\text{m} \times 2.79\text{m} = 8.37\text{m}^2$
 Bathroom floor = $2.74 \times 2.195 = 6.014\text{m}^2$
 WC floor = $2.195 \times 1.02 = 2.239\text{m}^2$
 Total floor area to be tiled = 16.619
 Area per floor tile = $.3 \times .3 = 0.09$

Total no. of floor tiles = $16.619 / 0.09 = 184.656$ (185 tiles)

Ensuite wall area = $2 \times 3\text{m} \times 2.4\text{m} + 2 \times 2.79\text{m} \times 2.4\text{m} - (.72\text{m} \times 2.04\text{m}) = 14.4\text{m}^2 + 13.392\text{m}^2 - 1.469\text{m}^2 = 26.323\text{m}^2$
 Bathroom wall area = $2 \times 2.195\text{m} \times 2.4\text{m} + 2 \times 2.74 \times 2.4\text{m} - (.72\text{m} \times 2.04\text{m}) = 10.536\text{m}^2 + 13.152\text{m}^2 - 1.469\text{m}^2 = 22.219\text{m}^2$

Total wall area to be tiled = $26.323\text{m}^2 + 22.219\text{m}^2 = 48.542$

Area per wall tile = $.25\text{m} \times .1\text{m} = 0.025\text{m}^2$

Total No of wall tiles = $48.542 / 0.025 = 1941.68$ (1942 tiles)

f) Estimate the labour only cost to tile all the wet areas only in the home. The tiler charges labour only \$44.00 per square metre.

Total area to be tiled = $16.619\text{m}^2 + 48.542\text{m}^2 = 65.161\text{m}^2$

Labour = $65.161 \times 44 = \$2,867.08$

g) Determine the roofing material and number of square metres of it that are required.

Upper floor roof 0.42 BHT Bondek zinalume – $15.2\text{m} \times 6.2\text{m} + 5.07\text{m} \times 9.66\text{m} + 2.66\text{m} \times 8.76\text{m} = 94.24\text{m}^2 + 48.976\text{m}^2 + 23.302\text{m}^2 = 166.518\text{m}^2$

Rear roofing – 0.42 BHT Bondek zinalume - $1.45\text{m} \times 10.45\text{m} = 15.153$

Garage – 0.42 Kliplik roof sheeting – $7.56\text{m} \times 7.2\text{m} = 54.432$

Over dining – $5\text{m} \times 0.8\text{m} = 4\text{m}^2$ Bondek Zinalume?

Over lounge/study – $6.36 \times 3 = 19.08\text{m}^2$ Bondek Zinalume?

Porch/entry – $2.5 \times 5.34 = 13.35\text{m}^2$ (Colourbond Trimdek)

Rest of lounge – $3.2 \times 2.19 = 7.008\text{m}^2$ Bondek Zinalume?

Total Bondek Zinalume – 211.759m^2

Total Kliplik – 54.432m^2

Total colourbond Trimdeck – 13.35m^2

h) Complete the aluminium windows and doors schedule and other external doors schedule for the lower floor only.

2100 x 1500 w

2100 x 3000 Sliding Door

2100 x 1600 w

2100 x 3600 Sliding Door

2100 x 3000 Sliding Door

2100 x 1500 w

1200 x 900 w

1200 x 2100 w

900 x 600 w

820 d

900 x 900 w

820 d

900 x 1500 w

1800 x 900 w

2 x 820 d

1800 x 1800 w

1800 x 900 w

1800 x 900 w

i) Complete a full internal doors schedule for the lower floor only.

N.B. Assume all doors are flush panel 2040mm in height and 35mm thick.

3 x 820 x 2040 x 35

1 x 870 x 2040 x 35

3 x 720 x 2040 x 35

1 x 620 x 2040 x 35

j) Estimate the labour only cost for hanging all doors on the lower floor – if a tradesman takes 2 hours to jamb an opening, hang the door, fit the door furniture, door stops, architrave and fit a door-open-restraint. The hourly rate is \$27.80 plus 20% on costs.

13 doors, 2 hours per door at $\$27.80 + 20\%$

$$13 \times 2 \times \$27.80 \times 120/100 = \$867.36$$