Question No. 1 – Phasing of Works (Cont'd)

NOTES TO ASSESSORS

The objective of this question is to test Candidates' ability to work out the costs of alternative design options with reference to a ballpark estimate of the base option.

Cost Estimation

Although only ballpark estimate is required, reasonable build-ups with assumptions, approximate quantities or factors are expected. Estimates made up of guesstimated sums without any explanation should be marked down. Rounding off is permissible.

Option B	
Option A HK$/m2	26,500
Adjustments:	
Change of perimeter girth to floor area ratio (same building height): Option A = (50+40) x 2 / 2,000 = 0.09 Option B = (25+40) x 2 / 1,000 = 0.13 Façade 3,500 x (0.13/0.09 – 1) = 1,556	
Alternatively: Façade 3,500 x percentage increase in perimeter girth for the same building height = 3,500 x [(50 x 2 + 40 x 4) / (50 x 2 + 40 x 2) – 1] = 1,556	1,556
With two buildings of a smaller footprint, generally the cost effectiveness is comparatively lower than that of one building. For example, two pile caps instead of a large one, two service risers instead of one, increase in total number of lifts and M&E equipment, extra tower cranes, hoists, scaffolding, etc. Assume overall 5% increase in the total cost of the remaining building elements (26,500 - 3,500) x 5% = 1,150	1,150
Total HK$/m2	29,206
Total CFA (m2)	20,000
Total HK$ (excluding covered walkways)	584,120,000
Addition of covered walkway, say with glass canopy, of 50m long x 4m wide @ $25,000/m2 (incl. preliminaries and contingencies) =	5,000,000
Total HK$	**589,120,000**

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Option C	HK$ (all rounded to nearest $10,000)
Phase 1, 10,000m2 @ $29,206/m2 (based on Option B) =	292,060,000
Piling for Phase 2, given piling and substructure = $3,000/m2 x 1.05, say piling only = $2,000/m2 x 10,000m2 =	20,000,000
Allow for protection of starter bars at pile heads e.g., sand filling, protective covering, etc., say 5% of piling cost	1,000,000
Temporary hoardings to enable handover of Phase 1 while Phase 2 is still in progress, say allow 100m @ $5,000/m =	500,000
(A) Phase 1 Total HK$	313,560,000
Phase 2, 10,000m2 @ $29,206/m2 =	292,060,000
Less piling	(20,000,000)
Open up pile heads, say half of protection cost	500,000
Addition of covered walkway as Option B	5,000,000
Extra costs due to disruption to site logistics when Phase 2 is commenced and completed later than Phase 1, e.g., reduced economy of scale, reduced sharing of resources, extra mobilization and demobilization of temporary site facilities and personnel, time prolongation of those which can stay, thinner contribution to head office overheads and profits over time, etc. The mark-ups for preliminaries, overheads and profit should be increased. Say add 5% of total cost of Phase 2. It is the contractor's pricing strategy over how the extra costs are to be spread over Phase 1 and Phase 2 in respect of the uncertainty of Phase 2. For cost estimation, the extra costs are allowed in Phase 2 when they are incurred.	13,880,000
(B) Phase 2 Total HK$	291,440,000
(C) Allow for price fluctuations for 18 months, total of Phase 2 $291,440,000 x [(1 + 2%)^1.5 year – 1]	8,790,000
(A) + (B) + (C) = Total of Phase 1 and Phase 2 (HK$)	**613,790,000**

It is acceptable for the Candidates to assume price fluctuations whether as increase, decrease or naught as long as it is considered and not excessive.

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NOTES TO ASSESSORS

Candidates may also identify some miscellaneous differences between the Options not stated in the Notes to Assessors. As long as they are not overestimated without clear justification, assessors should NOT mark down their answers.

Answers covering 90% of the above warrant full marks.

Presentations adopting tabulated proportional adjustments to the costs/CFA similar to the following format or to elemental total costs are equally acceptable, and should have higher marks because the elemental unit costs or total costs are also shown for further use:

	Option A HK$/m2 CFA	Note	Adjustment	Option B HK$/m2 CFA
Piling and substructure	3,000	(a)	x 1.05	3,150
Structure	5,500	(a)	x 1.05	5,775
Façade	3,500	(b)	x (50 x 2 + 40 x 4) / (50 x 2 + 40 x 2)	5,056
Architectural	4,500	(a)	x 1.05	4,725
Building services	9,000	(a)	x 1.05	9,450
External works	1,000	(a)	x 1.05	1,050
Preliminaries	12% included			
Contingencies	10% included			
Total HK$/m2	26,500			29,206
Total CFA (m2) (excluding covered walkway)	20,000			20,000
Total Construction Cost (excluding covered walkway)	530,000,000			584,120,000
Add covered walkway	Excluded	(c)	Add 50 x 4 m @ $25,000/m2 (including preliminaries and contingencies)	5,000,000
Total Construction Cost at July 2021 Price Level (HK$)	530,000,000			589,120,000

Note

(a) With two buildings of a smaller footprint, generally the cost effectiveness is comparatively lower than that of one building. For example, two pile caps instead of a large one, two service risers instead of one, increase in total number of lifts and M&E equipment, extra tower cranes, hoists, scaffolding, etc. Assume generally 5% increase except for the façade.

(b) When the CFAs are the same, pro-rata the unit cost to the change in facade areas.

(c) Extra covered walkway.