

For discussion  
on 8 April 2009

PWSC(2009-10)7

## **ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE**

### **HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT**

#### **Universities**

#### **The Chinese University of Hong Kong**

#### **52EF – Centralized general research laboratory complex (block 1) in Area 39**

Members are invited to recommend to Finance Committee the upgrading of **52EF** to Category A at an estimated cost of \$455.8 million in money-of-the-day prices for the construction of a centralized general research laboratory complex by The Chinese University of Hong Kong in Area 39, Pak Shek Kok, Tai Po.

### **PROBLEM**

The Chinese University of Hong Kong (CUHK) needs additional space and facilities to support the implementation of the normative four-year undergraduate programme under the new academic structure for senior secondary education and higher education (i.e. the “3+3+4” academic structure).

**/PROPOSAL .....**

## PROPOSAL

2. The Secretary-General, University Grants Committee (SG, UGC), on the advice of the University Grants Committee (UGC) and the Director of Architectural Services (D Arch S) as UGC's Technical Adviser, and with the support of the Secretary for Education, proposes to upgrade **52EF** to Category A at an estimated cost of \$455.8 million in money-of-the-day (MOD) prices for the construction of a centralized general research laboratory complex by CUHK in Area 39, Pak Shek Kok, Tai Po.

## PROJECT SCOPE AND NATURE

3. The scope of **52EF** comprises the construction of a 10-storey building providing approximately 9 860 square metres (m<sup>2</sup>) in net operational floor area (NOFA). The following facilities will be provided –

- (a) research laboratories of about 9 160 m<sup>2</sup> in NOFA;
- (b) support facilities of about 200 m<sup>2</sup> in NOFA ;
- (c) office facilities of about 500 m<sup>2</sup> in NOFA;
- (d) 31 open car parking spaces and two open loading and unloading spaces; and
- (e) associated access road works.

4. The site plan is at Enclosure 1. The view of the building (artist's impression), sectional plan and list of facilities are at Enclosures 2 to 4 respectively. CUHK plans to commence construction works in the third quarter of 2009 for completion in the first quarter of 2012.

## JUSTIFICATION

5. The "3+3+4" academic structure will be implemented starting from the 2009/10 academic year. The first cohort of senior secondary students will undergo a four-year undergraduate programme starting from the 2012/13 academic year. The UGC-funded institutions, including CUHK, will need to expand their campus space and facilities in order to accommodate the additional students under the new four-year undergraduate programme, and to provide a suitable teaching and learning environment in support of the curriculum under the new academic structure.

6. CUHK plans to carry out four capital works projects<sup>1</sup> to provide additional space and facilities of some 24 500 m<sup>2</sup> (NOFA) in total to support the implementation of the “3+3+4” academic structure, one of which is the construction of a general research laboratory complex (block 1).

7. The new building will be built on a site in Area 39, Pak Shek Kok which is located to the north of the existing campus. The site is reserved for educational purposes and adjacent to the University’s campus boundary. It is ideal for the development of research facilities in view of its proximity to the Science Park. Since the site is largely undeveloped, CUHK will need to construct access roads to link up the new building and the existing campus.

8. Upon completion of the proposed building, the existing research laboratories of Faculties of Science and Medicine at the central campus will be relocated to the new building in Area 39. The vacated space will be converted into other teaching facilities to meet the space requirements arising from the implementation of the “3+3+4” academic structure.

## FINANCIAL IMPLICATIONS

9. SG, UGC, on the advice of D Arch S, recommends approval of the project at a cost of \$455.8 million in MOD prices (see paragraph 12 below), made up as follows –

	<b>\$ million</b>
(a) Site formation and development	25.2
(b) Building	188.2
(c) Building services	125.2
(d) Drainage and external works	14.4

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<sup>1</sup> The other “3+3+4”-related capital works projects of CUHK are “Student amenity centre”(4 120 m<sup>2</sup>) approved by the Finance Committee in January 2009, and “An integrated teaching building” (some 4 300 m<sup>2</sup>) and “Extension to the existing University Library at Central Campus” (some 6 100 m<sup>2</sup>) which will be submitted to the Legislative Council later this year.

		\$ million	
(e)	Additional energy conservation measures	5.8	
(f)	Consultants' fees for –	8.6	
	(i) Tender assessment	0.8	
	(ii) Contract administration	4.8	
	(iii) Site supervision	2.8	
	(iv) Out-of-pocket expenses	0.2	
(g)	Furniture and equipment	32.4	
(h)	Contingencies	30.0	
	Sub-total	429.8 <sup>2</sup>	(in September 2008 prices)
(i)	Provision for price adjustment	26.0	
	Total	455.8	(in MOD prices)

10. CUHK will engage consultants to undertake tender assessment, contract administration and site supervision of the project. A detailed breakdown of the estimate for consultants' fees is at Enclosure 5.

11. The construction floor area (CFA) of this project is 18 264 m<sup>2</sup>. The estimated construction unit cost, represented by the building and building services costs, is \$17,159 per m<sup>2</sup> of CFA in September 2008 prices. A detailed account of the CFA vis-à-vis the construction unit cost is at Enclosure 6. D Arch S considers the estimated construction unit cost reasonable, having regard to the current economic situation and prevailing construction prices, and comparable to those of similar projects such as **52EG** "Human Research Institute – phase 1" of The University of Hong Kong (with an estimated construction unit cost of \$17,343 per m<sup>2</sup> of CFA in September 2008 prices).

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<sup>2</sup> This represents an increase of 68.2% over the original estimated cost of \$255.6 million in September 2004 prices.

12. Subject to approval, CUHK will phase the expenditure as follows –

<b>Year</b>	<b>\$ million (Sept 2008)</b>	<b>Price adjustment factor</b>	<b>\$ million (MOD)</b>
2009 - 10	43.6	1.03200	45.0
2010 - 11	195.3	1.05264	205.6
2011 - 12	180.7	1.07369	194.0
2012 - 13	10.2	1.09517	11.2
	429.8		455.8

13. We have derived the MOD estimate on the basis of the Government's latest forecast of trend rate of change in the prices of public sector building and construction output for the period 2009 to 2013. CUHK will tender the works through lump-sum contracts because it can clearly define the scope of works in advance. The contract will provide for price adjustment to reflect market fluctuations in labour and material costs.

14. The project has no impact on tuition fees. The additional recurrent costs associated with this project will be absorbed by CUHK. The proposal has no additional recurrent implications on the Government.

## **PUBLIC CONSULTATION**

15. The Chairman of Tai Po Rural Committee and the village representatives of Cheung Shue Tan and Tai Po Mei villages were briefed on the proposed development by the CUHK in March 2008. Representatives from Owners' Corporation and management of the housing estates in the neighbourhood, accompanied by the Chairman of Environment, Housing and Works Committee of Tai Po District Council, were briefed on the proposed development by CUHK in April 2008. No objection to the project has been raised, and residents' concerns about the environment such as landscaping and building height have been addressed in the design by providing more green areas around the building, and keeping the building height the same as that of the Science Park.

16. CUHK has briefed and consulted its staff and students on various occasions, including student assemblies and Campus Master Plan engagement meetings and fora. Their concerns on existing environment and facilities such as landscaping, supporting facilities, layout and flexibility have been addressed in the building design and there is no objection to the project.

17. We submitted a paper on the project to the Legislative Council Panel on Education for discussion on 9 March 2009. Members did not raise any objection to the proposal and requested supplementary information on CUHK's development plan in Area 39 and management of waste generated from research activities. The Administration provided the supplementary information to Members on 30 March 2009.

## **ENVIRONMENTAL IMPLICATIONS**

18. The project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). CUHK completed a Preliminary Environmental Review (PER) for the project in September 2008. The Director of Environmental Protection (DEP) agreed that with proper building orientation and layout design, the project would not have long-term environmental impact. CUHK has addressed these matters in the design of the project to the satisfaction of DEP.

19. CUHK has included in the project estimates the provisions required to implement suitable mitigation measures to control short-term environmental impacts. During construction, CUHK will control noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of mitigation measures in the relevant contract. These include the use of silencers, mufflers, acoustic linings or shields for noisy construction activities, frequent cleaning and watering of the site, and the provision of wheel-washing facilities.

20. CUHK has considered measures (e.g. adjusting the building layout and foundation system) in the planning and design stages to reduce the generation of construction waste where possible. In addition, CUHK will require the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of

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inert construction waste to public fill reception facilities<sup>3</sup>. CUHK will encourage the contractor to maximize the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further minimize the generation of construction waste.

21. CUHK will also require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. CUHK will ensure that the day-to-day operations on site comply with the approved plan. CUHK will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. CUHK will control the disposal of inert construction waste and non-inert construction waste to public fill reception facilities and landfills respectively through a trip-ticket system.

22. CUHK estimates that the project will generate in total about 60 536 tonnes of construction waste. Of these, CUHK will reuse about 35 237 tonnes (58.2%) of inert construction waste on site and deliver 21 142 tonnes (34.9%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, CUHK will dispose of 4 157 tonnes (6.9%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be \$1,090,459 for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne<sup>4</sup> at landfills).

## ENERGY CONSERVATION MEASURES

23. This project will adopt various forms of energy efficient features including —

- (a) water cooled chiller (fresh-water cooling tower);
- (b) automatic demand control of chilled water circulation system;

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<sup>3</sup> Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

<sup>4</sup> This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m<sup>3</sup>), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

- (c) automatic demand control of supply air;
- (d) heat wheels for heat energy reclaim of exhaust air;
- (e) occupancy and daylight sensors for lighting control;
- (f) light-emitting diode (LED) type exit signs;
- (g) heat pump for space heating and dehumidification; and
- (h) automatic on-off switching of lighting and ventilation fan inside lifts.

24. For renewable energy technologies, this project will adopt solar park lighting in the landscape area.

25. For greening features, this project will provide greening on podiums and rooftops.

26. For recycled features, this project will include recycling of cooling tower bleed-off water for flushing.

27. The total estimated additional cost for adoption of the above features is around \$5.8 million. There will be about 10.5% energy savings in the annual energy consumption.

## **HERITAGE IMPLICATIONS**

28. This project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interests and Government historic sites identified by the Antiquities and Monuments Office.

## **LAND ACQUISITION**

29. The project does not require any land acquisition.

**/BACKGROUND .....**



**BACKGROUND INFORMATION**

30. Under existing procedures, UGC-funded institutions submit capital works proposals to the UGC annually. The UGC examines all these proposals carefully, with professional advice provided by D Arch S who acts as UGC's Technical Adviser, and refers those supported proposals to the Government for consideration of bidding of funds under the established mechanism. Having examined CUHK's proposal, SG, UGC has, in consultation with D Arch S, adjusted the project estimate proposed by CUHK to arrive at the project estimate set out in paragraph 9 above.

31. We upgraded **52EF** to Category B in June 2006. CUHK engaged consultants in January 2008 to carry out site investigation, and to prepare preliminary design, detailed design and tender documents at a total estimated cost of \$10.3 million. We have charged this amount to block allocation **Subhead 8100EX** "Alterations, additions, repairs and improvements to the campuses of the UGC-funded institutions". The consultants have completed site investigation, preliminary design and detailed design of the project. CUHK is finalising the tender documents for the project.

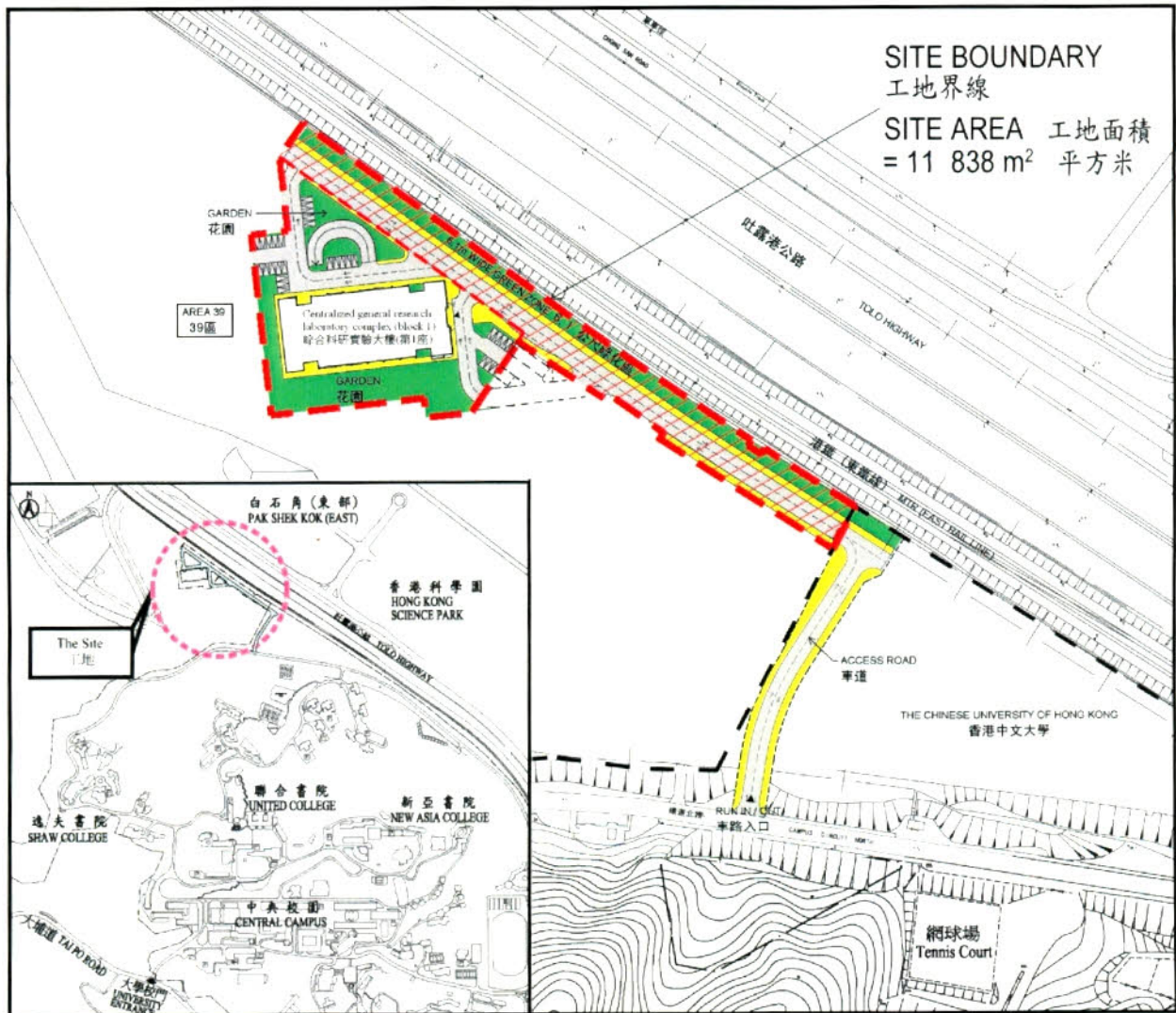
32. The project will not involve any tree removal. CUHK will incorporate a planting proposal, which will include an estimated quantity of 56 trees, 2 270 annuals as well as 567 m<sup>2</sup> grassed area, as part of the project.

33. CUHK estimates that the project will create about 190 jobs (170 for labourers and another 20 for professional/technical staff) providing a total employment of 5 200 man-months.

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The Chinese University of Hong Kong  
52EF - Centralized general research laboratory complex (block 1) in Area 39  
香港中文大學  
52EF- 第 39 區綜合科研實驗大樓(第 1 座)

Site Plan 工地平面圖



The Chinese University of Hong Kong  
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香港中文大學  
52EF- 第 39 區綜合科研實驗大樓(第 1 座)



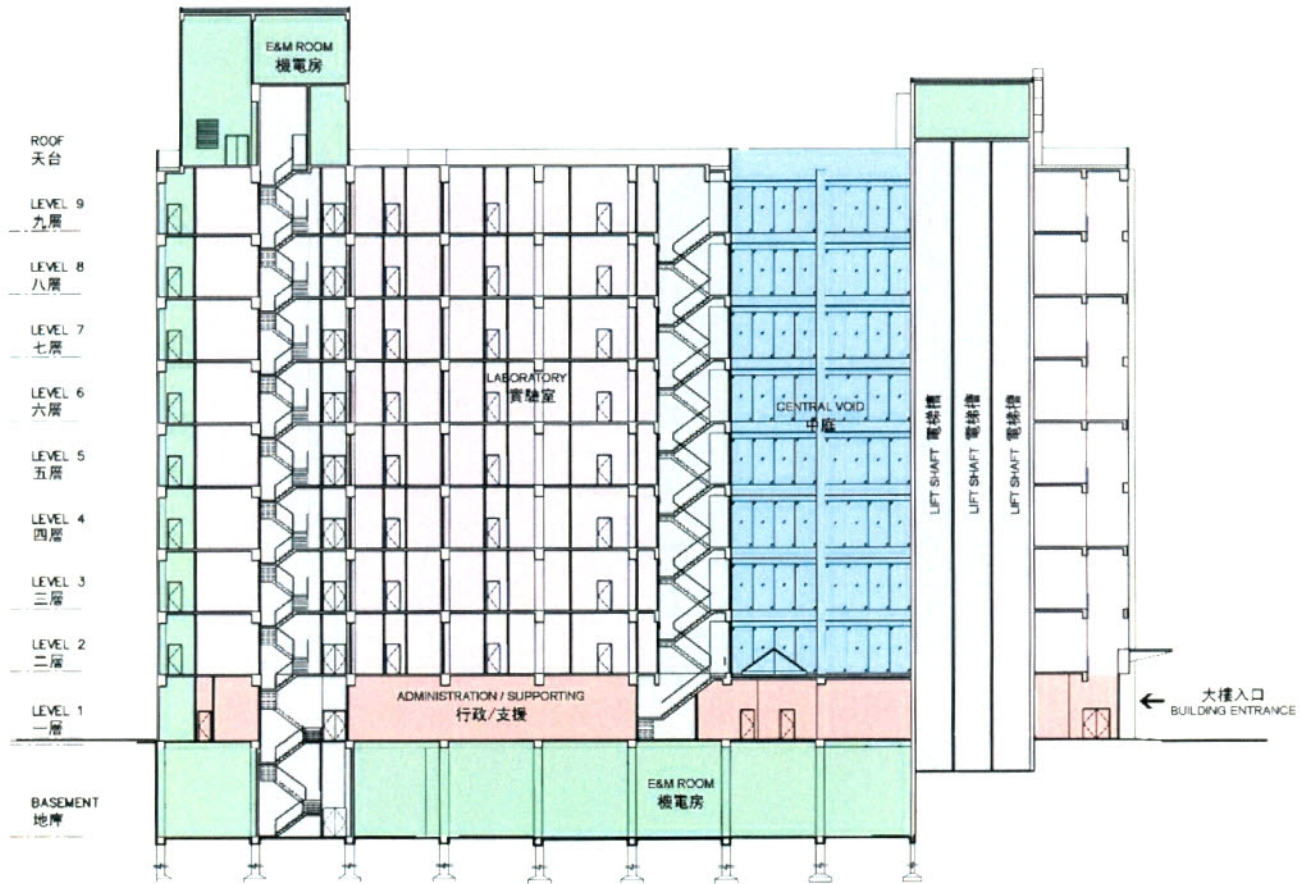
View of the building from southern direction (Artist's impression)  
從南面望向大樓的構思圖



View of the building from northern direction (Artist's impression)  
從北面望向大樓的構思圖

The Chinese University of Hong Kong  
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 香港中文大學  
 52EF – 第 39 區綜合科研實驗大樓(第 1 座)

Sectional Plan 截面圖



LEGEND 圖例：

- RESEARCH LABORATORY  
科研實驗室
- OFFICE  
辦公室
- PLANT ROOM  
機房
- CIRCULATION & LIFT SHAFT  
通道及電梯槽
- CENTRL VOID  
中庭

**Enclosure 4 to PWSC(2009-10)7**

**The Chinese University of Hong Kong  
52EF – Centralized general research laboratory complex (block 1) in Area 39**

**List of facilities**

<b>Facilities</b>	<b>Estimated floor area in net operational floor area (NOFA) (m<sup>2</sup>)</b>
(a) Research laboratories	9 164
(b) Support facilities such as store rooms and waste treatment store rooms	197
(c) Office facilities	499
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Total	9 860
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## Enclosure 5 to PWSC(2009-10)7

### The Chinese University of Hong Kong 52EF – Centralized general research laboratory complex (block 1) in Area 39

#### Breakdown of the estimate for consultants' fees <sup>(Note 1)</sup>

		Estimated man- months	Average MPS* salary point	Multiplier <small>(Note 2)</small>	Estimated fees (\$ million)
(a) Consultants' fees <sup>(Note 3)</sup>					
(i) Tender assessment	Professional	–	–	–	0.8
(ii) Contract administration	Professional	–	–	–	4.8
(b) Site supervision <sup>(Note 4)</sup>	Technical	88	14	1.6	2.8
(c) Out-of-pocket expenses <sup>(Note 5)</sup>					
Lithography and other direct expenses					0.2
				Total	8.6

\* MPS = Master Pay Scale

#### Notes

1. Having examined the consultants' fees estimated by CUHK, D Arch S considers the figures acceptable.
2. A multiplier of 1.6 is applied to the average MPS point to estimate the costs of site supervision staff to be employed by CUHK. (As at 1 April 2008, MPS point 14 = \$19,835 per month.)
3. The consultants' fees for tender assessment and contract administration are calculated in accordance with the existing consultancy agreements obtained through competitive tendering for the design and construction of **52EF**. The assignment will only be executed subject to Finance Committee's approval to upgrade **52EF** to Category A.
4. CUHK will know the actual man-months and actual costs for site supervision only after completion of the construction works.
5. Out-of-pocket expenses are the actual costs incurred. The consultants are not entitled to any additional payment for the overheads or profit in respect of these items.

**The Chinese University of Hong Kong**  
**52EF – Centralized general research laboratory complex (block 1) in Area 39**

**Breakdown of the construction floor area (CFA) vis-à-vis the construction unit cost**

(a) Breakdown of CFA

	<b>Estimated floor area (m<sup>2</sup>)</b>
Net operational floor area (NOFA)	9 860
Circulation areas and toilets	4 731
Mechanical and electrical plants	3 673
CFA	<hr/> 18 264 <hr/>

(b) NOFA / CFA ratio 54.0%

(c) Estimated construction unit cost (represented by the building and building services costs) \$17,159 per m<sup>2</sup> of CFA  
(in September 2008 prices)