For discussion **PWSC(2008-09)72**
on 11 February 2009

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 708 - CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT
Universities
The Hong Kong University of Science and Technology
12EL - Institute for Advanced Study

Members are invited to recommend to Finance Committee the upgrading of **12EL** to Category A at an estimated cost of $187.2 million in money-of-the-day prices for the construction of the Institute for Advanced Study by The Hong Kong University of Science and Technology within its campus in Clear Water Bay.

PROBLEM

The Hong Kong University of Science and Technology (HKUST) requires a purpose-built building to accommodate its Institute for Advanced Study (IAS).

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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 **12EL** to Category A at an estimated cost of $187.2 million in money-of-the-day (MOD) prices for the construction of the IAS by HKUST within its campus in Clear Water Bay.

PROJECT SCOPE AND NATURE

3. The scope of **12EL** comprises the construction of a six-storey academic building providing approximately 4 580 square metres (m^2) in net operational floor area (NOFA). It will accommodate the following facilities —

(a) classrooms of about 340 m^2 in NOFA;

(b) teaching laboratories of about 530 m^2 in NOFA;

(c) office facilities of about 2 820 m^2 in NOFA;

(d) library facilities of about 400 m^2 in NOFA; and

(e) staff/student amenities facilities of about 490 m^2 in NOFA.

4. The IAS will be built on a slope platform within the University campus. The site is undeveloped and the proposed development includes slope stabilisation works and construction of associated infrastructure[1] such as access roads for vehicles and passages/escalators for pedestrians.

5. A 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. HKUST plans to start construction works in the third quarter of 2009 for completion in the fourth quarter of 2011.

/**JUSTIFICATION** …..

[1] The costs of the slope stabilisation works and infrastructure development will be shared by two other proposed developments of HKUST to be built on the same slope platform, i.e. **10EL** New Academic Building, and a residence block for Institute for Advanced Study to be wholly funded by the University.

JUSTIFICATION

6. The establishment of the IAS by HKUST is intended to complement its role as a research university and facilitate the development of HKUST, and Hong Kong as a whole, as a world renowned research centre and regional education hub. It aims to promote a research culture in Hong Kong and bring knowledge transfer to other quarters of the community.

7. The IAS is modelled on the Institute for Advanced Study of Princeton, New Jersey and other successful research institutes overseas. It will serve to attract talents and distinguished scholars from all over the world and provides a platform for academic interchange between them and local academics/ researchers/ students. With the IAS as their base, these internationally-renowned scholars can work in partnership with local academics with a view to achieving breakthroughs in science and mentoring gifted students.

8. The IAS is multi-disciplinary in nature, with emphasis on a small number of selected areas (e.g. bioscience and technology, nano-science and technology, information technology, environmental and sustainable development, China Studies, etc.). It will nurture cutting-edge scholarship, offer quality teaching and mentorship to students, enhance cross-cultural, cross disciplinary and inter-disciplinary scholastic research, foster the research environment in Hong Kong and promote Hong Kong's position as a prominent centre of learning and discovery in the long run. It also serves as a vehicle to drive major advances and discoveries for Hong Kong to attain the highest level of scholarship.

9. HKUST proposes to develop a new academic building within its campus to provide the necessary space and facilities for the IAS. The project will also partially relieve HKUST's existing space shortfall, which is about 9 600 m^2 in NOFA according to the results of the review on space and accommodation requirements of the UGC-funded institutions carried out by the UGC in 2006.

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FINANCIAL IMPLICATIONS

10. The estimated cost of the project is $280.8 million in money-of-the-day prices. HKUST will contribute $93.6 million from its own sources of funding to provide privately-funded space of some 1 060 m^2 and enhance some building features such as enhanced entrance lobby, skylight void, architectural features, glazed partitions, high quality internal and external finishes, furniture and fittings.

11. SG, UGC, on the advice of D Arch S, recommends capital funding of $187.2 million in MOD prices to be provided by the Government for this project (see paragraph 14 below), made up as follows –

			$ million
(a)	Site formation and development[2]		32.9
(b)	Slope works		9.1
(c)	Building		90.8
(d)	Building services		45.7
(e)	Drainage and external works		9.1
(f)	Additional energy conservation measures		2.6
(g)	Consultants' fees for –		8.4
	(i) Tender assessment	0.3	
	(ii) Contract administration	2.4	
	(iii) Site supervision	5.6	
	(iv) Out-of-pocket expenses	0.1	
(h)	Furniture and equipment		13.7

(i) …..

[2] Including associated infrastructure works such as access roads and escalators.

			$ million	
(i)	Contingencies		15.7	
(j)	Enhanced building features		34.6	
		Sub-total	262.6	(in September 2008 prices)
(k)	Provision for price adjustment		18.2	
		Sub-total	280.8	(in MOD prices)
(l)	Less contribution by HKUST[3]		(93.6)	
		Total	187.2	(in MOD prices)

12. HKUST will engage consultants to undertake tender assessment, contract administration and site supervision of the project. A detailed breakdown of the estimate for consultants' fees by man-months is at Enclosure 5.

13. The construction floor area (CFA) of this project is 8 308 m^2. The estimated construction unit cost, represented by the building and building services costs, is $16,430 per m^2 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 **20EH** "Baptist University Road campus development" of Hong Kong Baptist University (with an estimated construction unit cost of $16,860 per m^2 of CFA in September 2008 prices).

14. Subject to approval, HKUST will phase the expenditure as follows –

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[3] HKUST's contribution includes $56.6 million in MOD prices for self-financed space and $37.0 million in MOD prices for enhanced building features.

Year	$ million (Sept 2008)	Price adjustment factor	$ million (MOD)	Contribution By HKUST $ million	12EL $ million (MOD)
2009 – 10	15.0	1.03200	15.5	15.5	-
2010 – 11	80.0	1.05264	84.2	78.1	6.1
2011 – 12	130.8	1.07369	140.4	-	140.4
2012 – 13	21.8	1.09517	23.9	-	23.9
2013 – 14	15.0	1.11707	16.8	-	16.8
	262.6		280.8	93.6	187.2

15. We have derived the MOD estimates on the basis of the Government's latest forecast of trend rate of change in the prices of public sector buildings and construction output for the period 2009 to 2014. HKUST will tender the works through a lump-sum contract 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.

16. The project has no impact on tuition fees. The additional recurrent costs associated with this project will be funded by HKUST. The proposal has no additional recurrent implication on the Government.

PUBLIC CONSULTATION

17. The project is located within the HKUST campus. There are no residential developments nearby, and the project will not affect residents in the vicinity. HKUST has consulted its staff and students and they expressed support to the project. The Sai Kung District Council was briefed on the Campus Development Plan during its visit to HKUST in February 2008 and a public exhibition of the proposed campus developments was held on campus since then till the end of November 2008. A link to the University's campus development plan is posted on the HKUST website.

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18. We submitted a paper on this project to the Legislative Council Panel on Education for discussion on 12 January 2009. Members did not raise any objection to the proposal.

ENVIRONMENTAL IMPLICATIONS

19. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The project will not cause long term environmental impact. HKUST has included in the project estimates of the cost for implementing suitable mitigation measures to control short term environmental impacts.

20. During construction, HKUST 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 lining or shields for noisy construction activities; frequent cleaning and watering of the site; and the provision of wheel-washing facilities.

21. HKUST has considered the topography of the site (e.g. move the new building away from slope edge so that slope stabilization work can be kept to the absolute minimum) in the planning and design stages to reduce the generation of construction waste where possible. In addition, HKUST will require the contractor to reuse inert construction waste (e.g. use excavated materials for filling) on site or in other suitable construction sites as far as possible, in order to minimize the disposal of inert construction waste at public fill reception facilities[4]. HKUST 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.

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[4] 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 at public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

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

23. HKUST estimates that the project will generate in total about 37 568 tonnes of construction waste. Of this, HKUST will reuse about 19 022 tonnes (50.6%) of inert construction waste on site and deliver 16 225 tonnes (43.2%) of inert construction waste to public fill reception facilities for subsequent re-use. In addition, HKUST will dispose of 2 321 tonnes (6.2%) of non-inert construction waste at landfills. The total cost of accommodating construction waste at public fill reception facilities and landfills is estimated to be $728,200 for this project (based on a unit cost of $27/tonne for disposal at public fill reception facilities and $125/tonne[5] at landfills).

ENERGY CONSERVATION MEASURES

24. This project has adopted various forms of energy efficiency features including –

(a) water cooled chillers;

(b) heat recovery fresh air pre-conditioning;

(c) light-emitting diode (LED) type exit signs;

(d) occupancy and daylight sensors for lighting control; and

(e) automatic lighting and ventilation control for lifts.

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[5] 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^3$), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

25. For renewable energy technologies, the project will adopt solar lightings in landscape area.

26. For greening features, the project will adopt greening for open space.

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

28. The total estimated additional cost for adoption of above features is around $2.6 million. There will be about 10.8% energy savings.

HERITAGE IMPLICATIONS

29. The 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

30. The project does not require any land acquisition.

BACKGROUND INFORMATION

31. 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 HKUST's proposal, SG, UGC has, in consultation with D Arch S, adjusted the project estimate proposed by HKUST to arrive at the project estimate set out in paragraph 11 above.

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32. We upgraded **12EL** to Category B in March 2007. HKUST engaged consultants in January 2007 by its own source of funding to carry out topographical survey, site investigation, preliminary design, detailed design and to prepare tender documents at a total cost of $4.7 million. The consultants have completed the topographical survey, site investigation, preliminary design and detailed design of the project. HKUST is finalising the tender documents for this project.

33. The project will involve the removal of 57 common trees and transplanting of 29 trees within the project site. All trees to be removed are not important trees[6]. HKUST will incorporate planting proposals in the project, which will include an estimated quantity of 135 trees, 15 194 shrubs and 3 030m^2 grassed area.

34. HKUST estimates that the proposed works will create about 100 jobs (90 for labourers and another 10 for professional/technical staff) providing a total employment of 2 600 man-months.

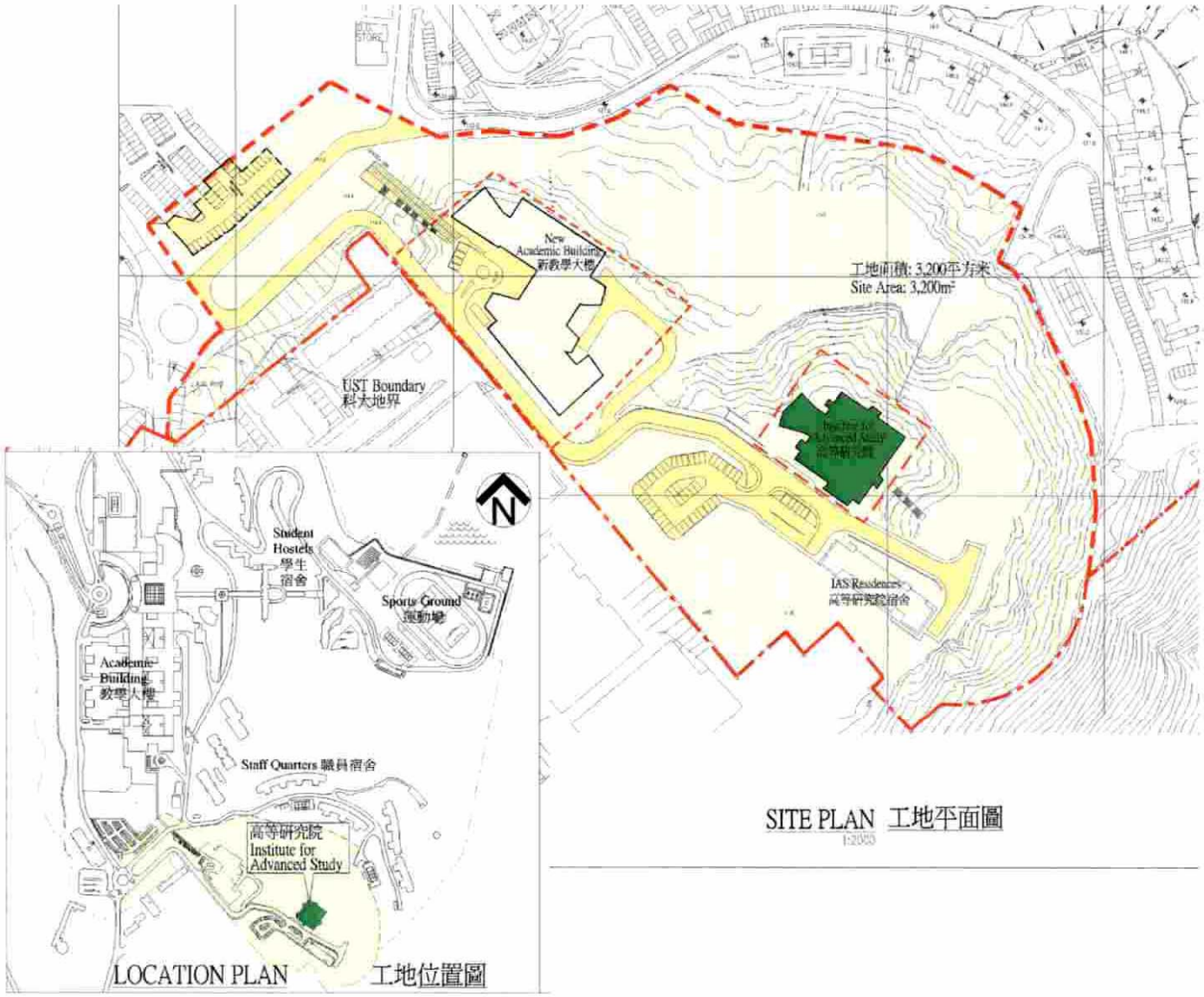
Education Bureau
February 2009

[6] "Important trees" refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –
(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, tree as landmark of monastery of heritage monument, and trees in memory of an important person or event;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
(e) trees with trunk diameter equal or exceeding 1.0 m (measured at 1.3 m above ground level) or with height / canopy spread equal or exceeding 25 m.

附件 1 Enclosure 1 to PWSC(2008-09)72

The Hong Kong University of Science and Technology
12EL – Institute for Advanced Study
香港科技大學
12EL – 高等研究院

Site Plan 工地平面圖



The Hong Kong University of Science and Technology
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View of the building (artist's impression) 外觀構思圖

The Hong Kong University of Science and Technology
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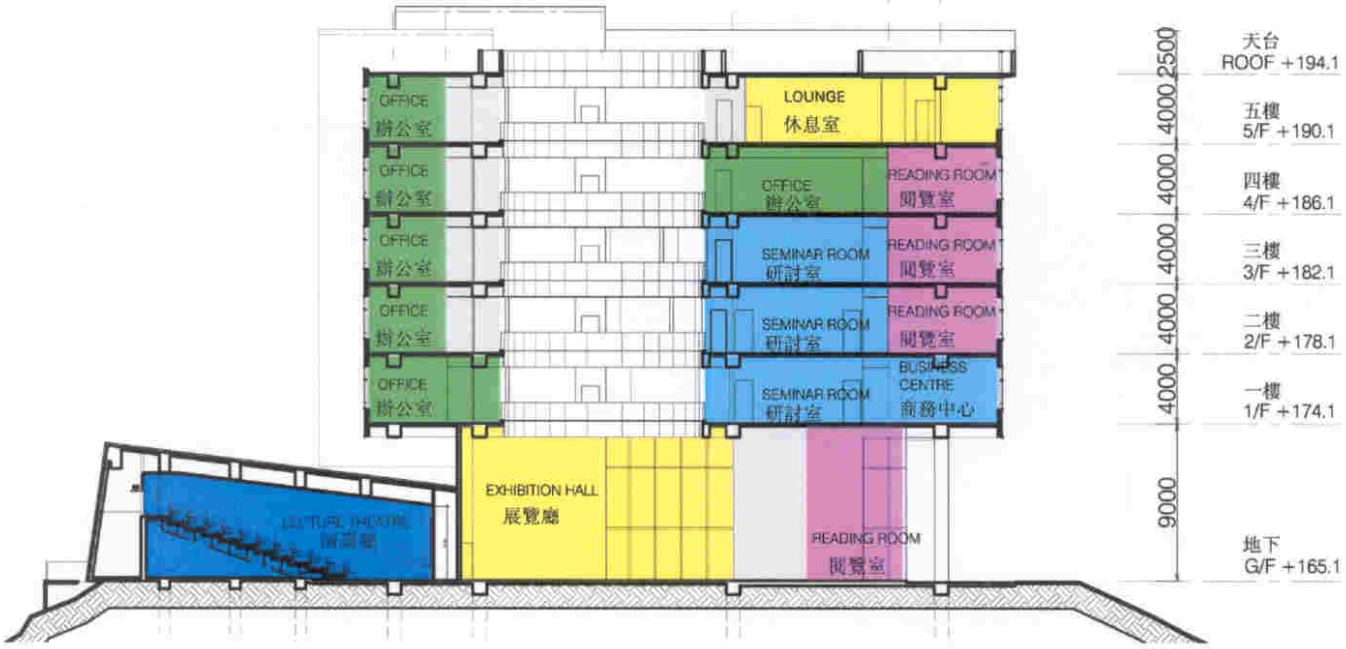
香港科技大學
12EL – 高等研究院

Sectional Plan 截面圖



Enclosure 4 to PWSC(2008-09)72

The Hong Kong University of Science and Technology
12EL – Institute for Advanced Study

List of facilities

	Facilities	Estimated floor area in net operational floor area (NOFA) (m^2)
(a)	Classrooms	343
(b)	Teaching laboratories	526
(c)	Office facilities	2 818
(d)	Library facilities	402
(e)	Student/staff amenities facilities	493
	Total	4 582

The Hong Kong University of Science and Technology
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Breakdown of the estimate for consultants' fees[(Note 1)]

			Estimated man-months	Average MPS* salary point	Multiplier [(Note 2)]	Estimated fees ($ million)
(a)	Consultants' fees[(Note 3)]					
	(i) Tender assessment	Professional	–	–	–	0.3
	(ii) Contract administration	Professional	–	–	–	2.4
(b)	Site supervision[(Note 4)]	Professional	36	38	1.6	3.5
		Technical	66	14	1.6	2.1
(c)	Out-of-pocket expenses [(Note 5)]					
	Lithography and other direct expenses					0.1
					Total	8.4

* MPS = Master Pay Scale

Notes

1. Having examined the consultants' fees estimated by HKUST, the Director of Architectural Services considers the figures acceptable.

2. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of site supervision staff to be employed by HKUST. (As at 1 April 2008, MPS point 38 = $60,535 per month, and 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 for the design and construction of **12EL**. The assignment will only be executed subject to Finance Committee's approval to upgrade **12EL** to Category A.

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4. HKUST 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.

Enclosure 6 to PWSC (2008-09)72

The Hong Kong University of Science and Technology
12EL – Institute for Advanced Study

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

(a)	Breakdown of CFA	**Estimated floor area (m^2)**
	Net operational floor area (NOFA)	4 582
	Circulation areas and toilets	2 746
	Mechanical and electrical plant (Including portion of central plant)	980
	CFA	8 308
(b)	NOFA / CFA ratio	55.2%
(c)	Estimated construction unit cost (represented by the building and building services costs)	$16,430 per m^2 of CFA (in September 2008 prices)