

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 708 - CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT

Universities

The Hong Kong Polytechnic University 27EK – Innovation Tower

Members are invited to recommend to Finance Committee the upgrading of **27EK** to Category A at an estimated cost of \$621.5 million in money-of-the-day prices for the construction of the Innovation Tower by the Hong Kong Polytechnic University within its campus in Hung Hom.

PROBLEM

The Hong Kong Polytechnic University (PolyU) needs additional space and facilities to meet its existing teaching and research needs and to support the development of design programmes and activities.

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 **27EK** to Category A at an estimated cost of \$621.5 million in money-of-the-day (MOD) prices for the construction of the Innovation Tower by PolyU.

/PROJECT

PROJECT SCOPE AND NATURE

3. The scope of **27EK** comprises –
- (a) the construction of a 12-storey building providing about 12 180 square metres (m²) in net operational floor area (NOFA). It will accommodate the following facilities –
 - (i) classrooms and lecture theatres of about 1 250 m² in NOFA;
 - (ii) teaching laboratories of about 7 900 m² in NOFA;
 - (iii) research laboratories of about 870 m² in NOFA;
 - (iv) office facilities of about 1 160 m² in NOFA;
 - (v) student and staff amenities facilities, including a design gallery / exhibition hall and student communal spaces, of about 820 m² in NOFA;
 - (vi) indoor sports facilities of about 180 m² in NOFA; and
 - (b) consequential works¹ involving about 1 320m² in NOFA.

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

JUSTIFICATION

5. The existing campus of PolyU has been in use for decades and with the development over time, PolyU lacks adequate space to carry out teaching and research activities. According to the results of the Review on Space and Accommodation Requirements of the UGC-funded institutions carried out by the UGC in 2006, PolyU had an estimated space shortfall of around 17 600 m² in NOFA in the 2007/08 academic year.

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¹ For reprovisioning of the existing sports facilities affected by the construction of the new building as well as reorganisation and conversion of some 1 320m² (in NOFA) of teaching space to be vacated upon the completion of this project into classrooms facilities, study space, teaching laboratories and research laboratories for better utilization of existing campus space.

6. PolyU plans to construct the proposed Innovation Tower to provide space and facilities of some 12 000 m² in NOFA to meet part of the existing space shortfall. The project will mainly provide specialized teaching and research facilities for the School of Design (“the School”). The School currently occupies a total of about 8 200m² in NOFA at several locations scattered across the campus. The inadequacy of teaching and research space, coupled with the scattering of the School in different locations, is not conducive to effective teaching and learning and has restricted further development of the School. A purpose-built building with adequate provision of space and facilities for the School is required to support the up-to-date teaching and learning need, facilitate inter-disciplinary research and education in the field of design, and help the School achieve its aspiration to establish a niche area in Asia. The proposed Innovation Tower will also accommodate general teaching facilities, offices, and space for student communal activities.

7. The new building will be built on a site within the campus which is currently partly occupied by sports facilities and offices. Upon completion of the new building, PolyU will reprovision most of the sports facilities and will also convert the space to be vacated by the School into uses such as general teaching and learning facilities and study space.

FINANCIAL IMPLICATIONS

8. The estimated cost of the project is \$705.8 million in MOD prices. PolyU will contribute about \$84.3 million in MOD prices from its own sources of funding to cover some enhanced building features and the related costs such as curtain wall, architectural fins as well as extra piling and substructure to facilitate the future expansion².

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² To support the University’s future development, PolyU has also planned for expansion on top of this building (about three additional storeys) by its own sources of private funding as second phase development for its self-financing teaching and research activities. PolyU is planning to develop both phases in tandem in order to take advantage of economies of scale and maximize land development potential.

9. SG, UGC, on the advice of D Arch S, recommends capital funding of \$621.5 million in MOD prices (see paragraph 12 below) to be provided by the Government for this project, made up as follows –

	\$ million	
(a) Site formation and development	74.2	
(b) Building	245.8	
(c) Building services	115.4	
(d) Drainage and external works	13.5	
(e) Additional energy conservation measures	4.8	
(f) Furniture and equipment	36.1	
(g) Consultants' fees	10.9	
(i) contract administration	10.2	
(ii) management of resident site staff	0.7	
(h) Remuneration of resident site staff	6.6	
(i) Consequential works	28.6	
(j) Contingencies	40.2	
(k) Enhanced building features	78.1	
Sub-total	654.2	(in September 2008 prices)
(l) Provision for price adjustment	51.6	
Sub-total	705.8	(in MOD prices)
(m) Less contribution by PolyU	(84.3)	
Total	621.5	(in MOD prices)

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10. PolyU will engage consultants to undertake contract administration and site supervision of the construction of the project. A detailed breakdown of the estimates for consultants' fees and resident site staff costs by man months is at Enclosure 5.

11. The construction floor area (CFA) of this project is 22 285 m². The estimated construction unit cost represented by the building and building services costs is \$16 208 per m² 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 54EF "Two integrated teaching buildings" of the Chinese University of Hong Kong (with an estimated construction unit cost of \$16,004 per m² of CFA in September 2008 prices).

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

Year	\$ million (September 2008)	Price adjustment factor	\$ million (MOD)	Contribution by PolyU \$ million (MOD)	27EK \$ million (MOD)
2009-2010	26.2	1.03500	27.1	27.1	--
2010-2011	131.3	1.05570	138.6	57.2	81.4
2011-2012	301.0	1.07681	324.1	--	324.1
2012-2013	149.1	1.09835	163.8	--	163.8
2013-2014	46.6	1.12032	52.2	--	52.2
	<u>654.2</u>		<u>705.8</u>	<u>84.3</u>	<u>621.5</u>

13. 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. PolyU will tender the works through lump-sum contracts because it can clearly define the scope of works in advance. The contracts will provide for price adjustment to reflect market fluctuations in labour and material costs.

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

PUBLIC CONSULTATION

15. The proposed building is located within the PolyU campus and there are no residential developments in its immediate vicinity. In August 2008, PolyU submitted a planning application to the Town Planning Board (TPB) for relaxation of building height restriction for the proposed development. Views of the public on the application were invited. While the overwhelming majority of the comments received were in support of the application, there was one comment that the proposed building height was not consistent with the general height restrictions in the area. The application was considered and approved by the TPB in October 2008. Furthermore, PolyU presented the project to Members of the Yau Tsim Mong District Council at a meeting in April 2009. Members raised various concerns, including the possible glare problem to nearby residents, the accessibility of the subject area to the public, the possibility of greening works in relation to the project, etc. PolyU explained that the building materials used in the external façade would be of a low-reflective nature and the project has adopted appropriate greening works. Members attending the meeting supported the project.

16. PolyU has also conducted several rounds of exhibition and organized an open forum in June 2008 to consult its staff and students on the design of the proposed development. The participants gave positive comments and were generally in support of the project. We submitted a paper to the Legislative Council Panel on Education for discussion on 11 May 2009. While the Panel in general supported the project, PolyU was reminded that it should deploy its private source of funding in a prudent and responsible manner.

ENVIRONMENTAL IMPLICATIONS

17. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The project will not cause long term environmental impact. PolyU has included in the project estimates the provisions required to implement suitable mitigation measures to control short term environmental impacts.

18. During construction, PolyU 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. When the building is in use, PolyU will equip all noise sensitive rooms in the proposed development with central air-conditioning system and well-gasketed windows to minimize the road traffic noise impact from the nearby roads.

19. PolyU has considered measures (e.g. use metal site hoardings and signboards so that these materials can be recycled or reused in other projects) in the planning and design stages to reduce the generation of construction waste where possible. In addition, PolyU 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 minimize the disposal of inert construction waste to public fill reception facilities³. PolyU 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.

20. PolyU 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. PolyU will ensure that the day-to-day operations on site comply with the approved plan. PolyU will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. PolyU 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.

21. PolyU estimates that the project will generate in total about 24 940 tonnes of construction waste. Of these, PolyU will reuse about 6 420 tonnes (25.7%) of inert construction waste on site and deliver 16 290 tonnes (65.3%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, PolyU will dispose of 2 230 tonnes (9.0%) of non-inert construction waste at landfills. The total cost for accommodating construction

/waste

³ 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.

waste at public fill reception facilities and landfill sites is estimated to be \$718,580 for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne⁴ at landfills).

ENERGY CONSERVATION MEASURES

22. This project will adopt various forms of energy efficient features including –

- (a) water cooled chillers;
- (b) heat wheels for heat energy reclaim of exhaust air;
- (c) automatic demand control of supply air;
- (d) T5 energy efficient fluorescent tubes and compact fluorescent tubes with electronic ballast and lighting control by occupancy and daylight sensors;
- (e) light-emitting diode (LED) type exit signs;
- (f) automatic on/off switching of lighting and ventilation fan inside the lifts; and
- (g) service on-demand control for escalator (on-off control).

23. For renewable energy technologies, PolyU will adopt solar park lighting in the landscape area.

24. For greening features, PolyU will adopt greening on podium and sky gardens.

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⁴ 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/m³), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

25. For recycled features, PolyU will adopt the rainwater and condensate water recycling system for irrigation and air-conditioning make-up purposes respectively.

26. The total estimated additional cost for adoption of the above features is around \$4.8 million (including \$3.5 million for energy efficient features), which has been included in the cost estimate of the project. The energy efficient features will achieve 9.6% energy savings in the annual energy consumption with a payback period at about 7.9 years.

HERITAGE IMPLICATIONS

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

LAND ACQUISITION

28. The project does not require any land acquisition.

BACKGROUND INFORMATION

29. 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 PolyU's proposal, SG, UGC has, in consultation with D Arch S, adjusted the project estimate proposed by PolyU to arrive at the project estimate set out in paragraph 9 above.

30. We upgraded **27EK** to Category B in October 2007. PolyU engaged consultants in November 2007 to carry out preliminary design, detailed design and prepare tender documents at a total estimated cost of about \$16.8 million. We have charged about \$9.1 million of the cost to block allocation Subhead **8100EX** “Alterations, additions, repairs and improvements to the campuses of the UGC-funded institutions” and PolyU contributed about \$7.7 million to finance the remaining balance. The consultants have completed the preliminary design and detailed design of the project. PolyU is finalizing the tender documents for this project.

31. The project will involve transplanting of 17 trees and no tree will be felled. All trees to be transplanted are not important trees⁵. PolyU will incorporate planting proposals as part of the project, including estimated quantities of 500 shrubs and 200 m² of grassed area.

32. PolyU estimates that the project will create about 305 jobs (270 for labourers and another 35 for professional/technical staff) providing a total employment of 9 000 man-months.

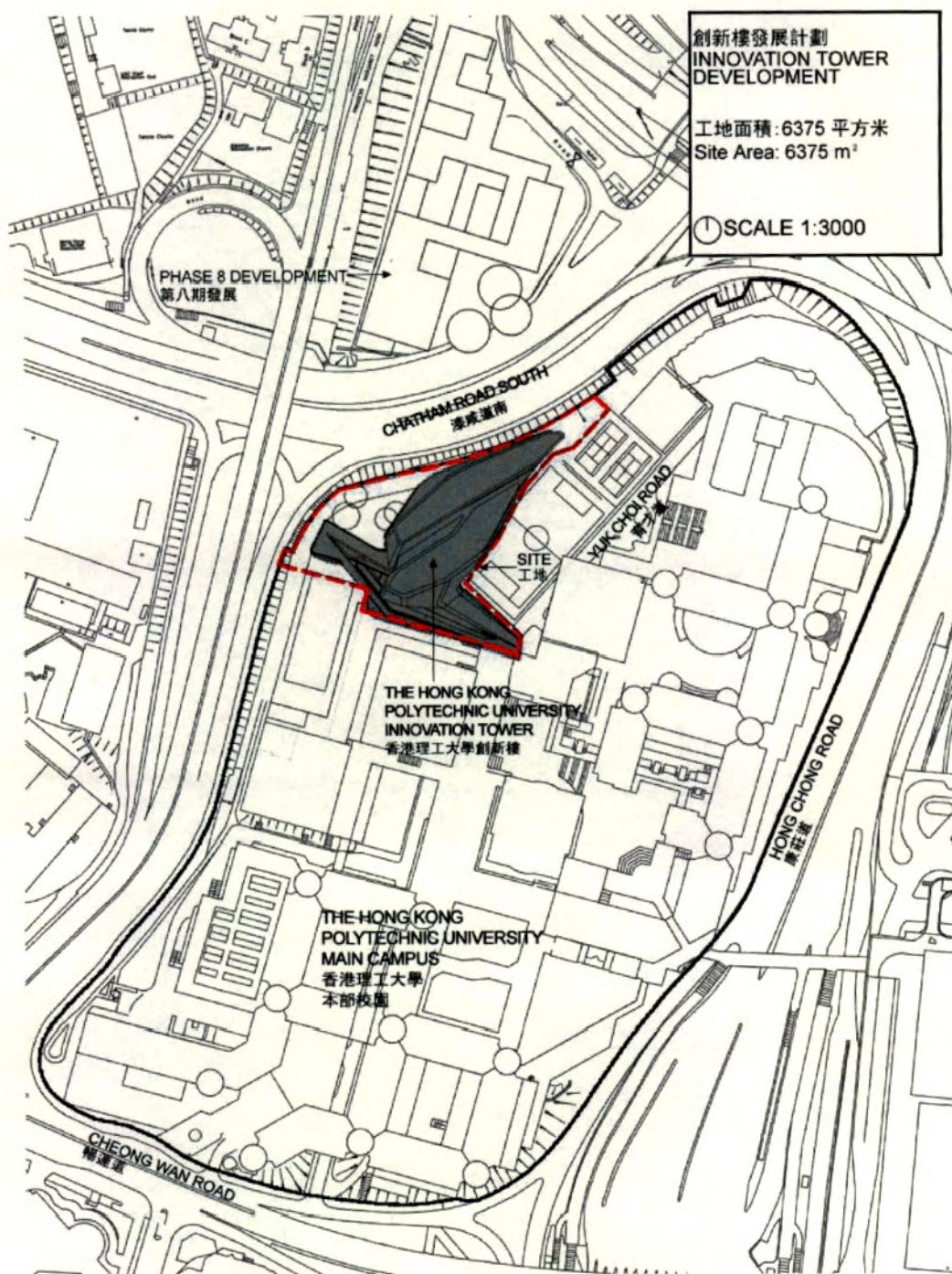
Education Bureau
May 2009

⁵ “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.

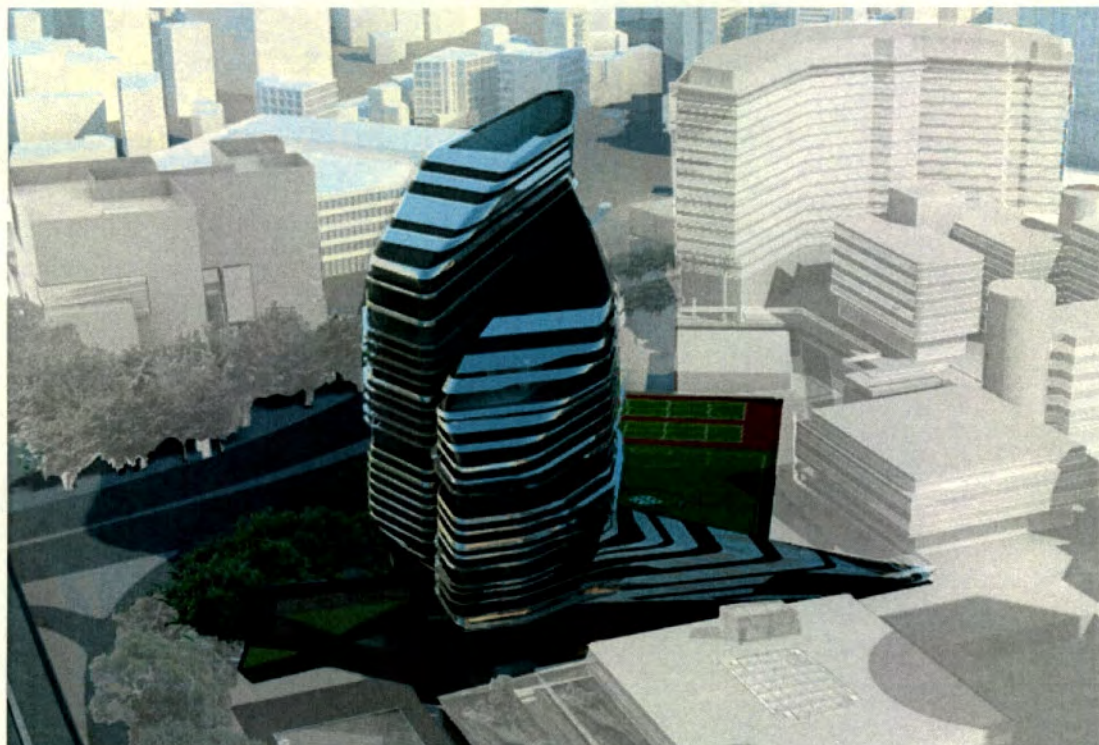
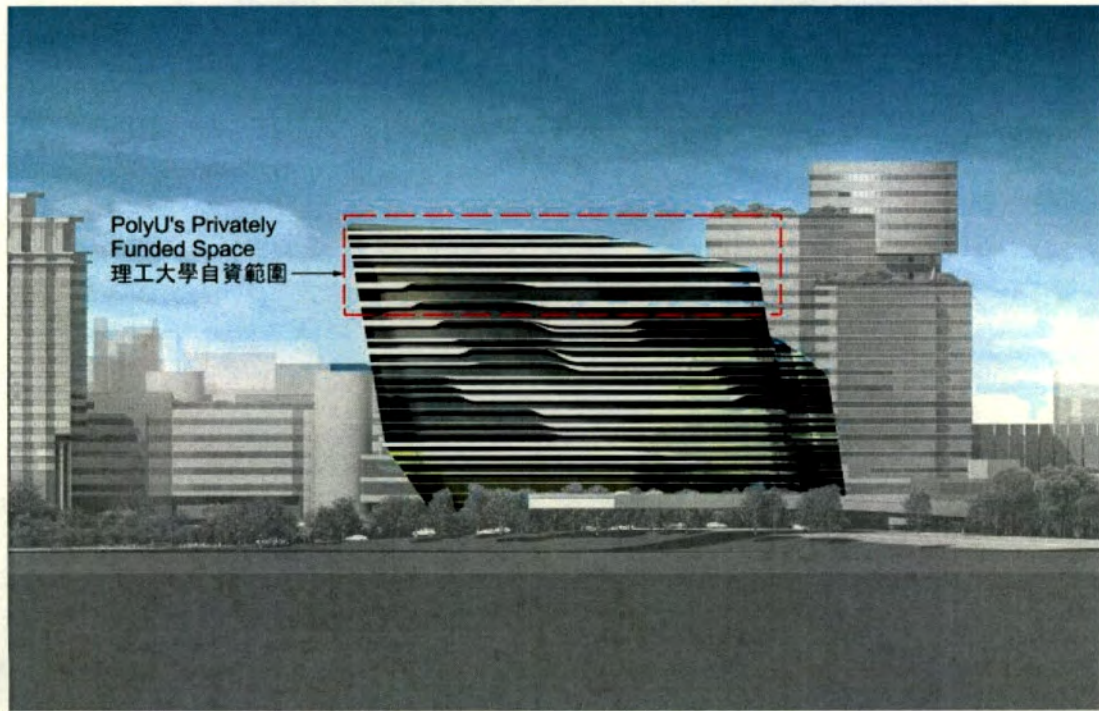
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27EK - Innovation Tower
香港理工大學
27EK - 創新樓

Site Plan 工地平面圖



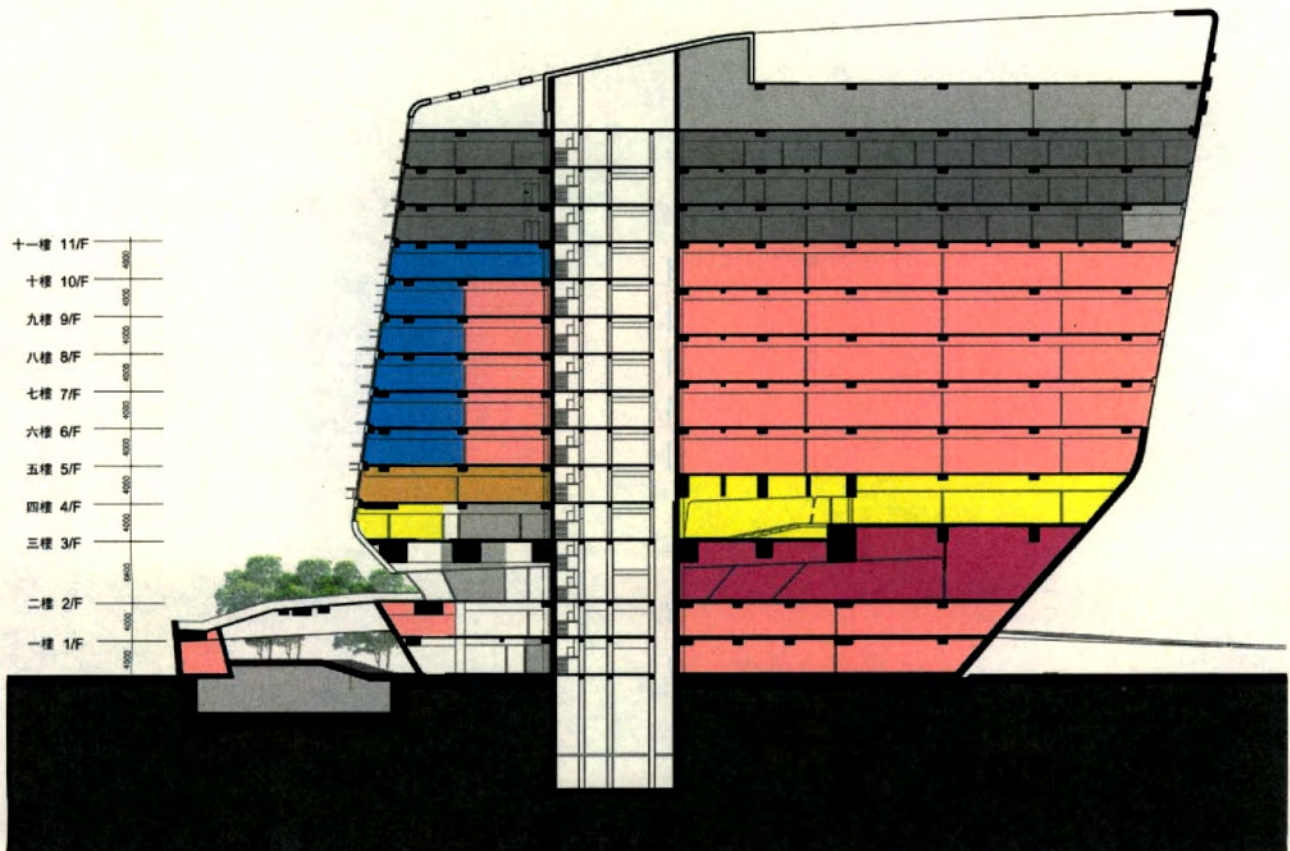
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27EK - 創新樓

View of the building (Artist's Impression) 外觀構思圖



The Hong Kong Polytechnic University
 27EK – Innovation Tower
 香港理工大學
 27EK - 創新樓

Sectional Plan 截面圖



- | | | |
|---|--|--------------|
|  | Teaching Laboratories | 教學實驗室 |
|  | Research Laboratories | 研究實驗室 |
|  | Student / Staff Amenities | 學生及教職員康樂設施 |
|  | Classroom Facilities | 課室 |
|  | Office Facilities | 辦公室 |
|  | Plant Rooms | 機房 |
|  | PolyU's Privately Funded Space | 理工大學自資範圍 |
|  | Toilets, lobbies, Circulation & Stairs | 洗手間、大堂、通道及樓梯 |

The Hong Kong Polytechnic University
27EK –Innovation Tower

List of facilities

Facilities	Estimated floor area in net operational floor area (NOFA) (m ²)
(a) Classroom facilities	1 250
(b) Teaching laboratories	7 900
(c) Research laboratories	870
(d) Office facilities	1 160
(e) Student / staff amenities facilities	820
(f) Indoor sports facilities	180
Total	<hr/> 12 180 <hr/>

Enclosure 5 to PWSC(2009-10)39

**The Hong Kong Polytechnic University
27EK – Innovation Tower**

**Breakdown of estimates for consultants' fees and resident site staff costs
(in September 2008 prices)**

		Estimated Man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fees (\$ million)
(a) Consultants' fees for contract administration (Note 2)	Professional	--	--	--	10.2
				Sub-total	<hr/> 10.2
(b) Resident site staff costs (Note 3)	Professional	10	38	1.6	1.0
	Technical	200	14	1.6	6.3
				Sub-total	<hr/> 7.3
Comprising -					
(i) Consultants' fees for management of resident site staff					0.7
(ii) Remuneration of resident site staff					6.6
				Total	<hr/> 17.5

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of resident site staff supplied by the consultants. (As at 1 April 2008, MPS pt. 38 = \$60,535 per month and MPS pt. 14 = \$19,835 per month.)
2. The consultants' fees for contract administration are calculated in accordance with the existing consultancy agreements. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade 27EK to Category A.
3. PolyU will know the actual man-months and actual costs for resident site staff only after completion of the construction works.

**The Hong Kong Polytechnic University
27EK – Innovation Tower**

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)	12 180
	Circulation areas, toilets	7 255
	Mechanical and electrical plants	2 850
	CFA	22 285
(b)	NOFA / CFA ratio	54.7%
(c)	Estimated construction unit cost (represented by the building and building services costs)	\$16,208 per m ² of CFA (in September 2008 prices)