

# 環保建築大獎

GREEN BUILDING AWARD 2006

Professional Green Building Council Hong Kong



## GREEN BUILDING AWARD 2006

Green Building Award is a new industry award organized by the Professional Green Building Council (PGBC), which is jointly founded by the Hong Kong Institute of Architects (HKIA), the Hong Kong Institution of Engineers (HKIE), the Hong Kong Institute of Landscape Architects (HKILA), Hong Kong Institute of Planners (HKIP), and the Hong Kong Institute of Surveyors (HKIS). With the launch of the GBA, PGBC aims to provide recognition to buildings and research projects with outstanding features and contributions in sustainability and the environment and also to encourage the industry towards further adoption of sustainable planning, design, construction and maintenance of buildings.

### OBJECTIVES

- To provide recognition to building-related / research projects with outstanding contributions in sustainability; and
- To encourage adoption of sustainable planning, design, construction, maintenance and renovation of buildings.

### AWARDS CATEGORY

Green Building Award 2006 is presented to categories listed below:

- **New Buildings** (buildings completed on or after 1 January 2001)
- **Existing Buildings** (focus on management and maintenance)
- **Newly Renovated Buildings** (renovation completed on or after 1 January 2001)
- **Research and Planning Studies**

Nominated projects must be within the territorial limits of the Hong Kong Special Administrative Region with no limitation in size and cost, yet should be practically completed within the specified period as stated.

### TIMELINE

- January 2006      Announcement of GBA2006 and open for nominations.
- March 2006      Deadline for submission of nomination documents and materials.
- April 2006      First screening on all nominations by the professional institutes' representatives.
- Early May 2006      Confirmation of short-listed projects by the Organizing Committee.
- Late May 2006      Final presentation by the short-listed applicants to the jury panel.
- 30 June 2006      Award announcement and presentation ceremony.

## ASSESSMENT CRITERIA

### NEW BUILDINGS CATEGORY

#### Quality

- Living quality and indoor environmental quality
- Enhancement of natural environment and microclimate consideration
- Consideration of the visual, cultural, environmental & social effects on the surroundings and community

#### Resources

- Resources and energy conservation
- Waste and pollution management and control
- Use of sustainable design, construction materials, and construction / demolition method

#### Sustainability

- Sustainability policy
- Consideration of the overall performance of every stage of a building life
- Buildability and maintainability

#### Innovation

- Bonus for innovation

### EXISTING BUILDINGS CATEGORY

#### Quality

- Living quality and indoor environmental quality

#### Resources

- Efficient use and modifications of existing fabric, facilities and features to enhance energy efficiency and functioning

#### Sustainability

- Sustainability management and maintenance scheme
- Maintenance programme
- Operation, management and maintenance of the building fabric and building features

#### Innovation

- Bonus for innovation

## NEWLY RENOVATED BUILDINGS CATEGORY

### Quality

- Living quality and indoor environmental quality
- Compatibility with the existing building and surrounding environment
- Consideration of the visual, cultural, environmental & social effects on the surroundings and community

### Resources

- Resources and energy conservation
- Waste and pollution management and control
- Use of sustainable design, construction materials, and construction / demolition method

### Sustainability

- Sustainability policy
- Consideration of the overall performance of every stage of a building life
- Buildability and maintainability

### Innovation

- Bonus for innovation

## RESEARCH & PLANNING STUDIES CATEGORY

### Originality

- Fundamental research/ planning study that enhances the advancement in sustainability

### Practicality

- Applicability in the industry in terms of sustainable planning, design, construction and/ or operation of buildings

### Quality

- Fundamental research/ planning study that enhances the advancement in sustainability

### Innovation

- Bonus for innovation

## JURY PANEL

Members of GBA 2006 Judging Panel include: Ir Dr the Hon Raymond HO Chung-tai, S.B.St.J., JP, member of the Legislative Council (Functional Constituency – Engineering), the Hon Patrick S S LAU, SBS, JP, member of the Legislative Council (Functional Constituency – Architectural, Surveying and Planning), the Hon Abraham SHEK Lai-him, JP, member of the Legislative Council (Functional Constituency – Real Estate and Construction), Mr Kenneth CHAN, Chairman of PGBC, Mr Reuben CHU, Chairman of GBA2006 Organizing Committee, Presidents/representatives from professional bodies including Hong Kong Construction Association, Hong Kong Institute of Architects, Hong Kong Institution of Engineers, Hong Kong Institute of Landscape Architects, Hong Kong Institute of Planners, Hong Kong Institute of Surveyors, Real Estate Developers Association of Hong Kong, and Vice President (Research Development) of Hong Kong Polytechnic University.



## GBA2006 LOGO

The logo design concept is to reflect the lifecycle perspective of our built environment which is categorized into 4 key stages: from research / planning, new design and construction, operation and maintenance, and renovation / deconstruction. The notion of sustainability has to be embedded in each of these stages with a view to conserving our environment, locally and globally. This echoes the underlying vision of the Green Building Award initiated by the Professional Green Building Council, Hong Kong.

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# 房屋及規劃地政局局長獻辭

Message from the Secretary for Housing, Planning and Lands

我衷心祝賀環保建築業議會成功籌辦首屆〈環保建築大獎〉。今次大獎的主題與政府提倡可持續樓宇建築的政策甚為配合。而參與競逐的建築及研究計劃的質素之高，以及其所展現的可持續發展及環保設計都非常突出，令我留下深刻的印象。

我們一直與建築業界攜手努力，以改善本港樓宇的設計和建築。今次〈環保建築大獎〉便是一項重要的活動，去宣傳如何在樓宇的各個不同階段應用可持續發展的元素，包括：建築規劃、設計、建築及維修等階段，以及加入環保和具能源效益的設計。憑藉我們的不斷努力，我深信香港定能成為更環保的城市，讓我們引以自豪。

我藉此機會祝願環保建築專業議會在未來推廣環保的工作取得成功。

房屋及規劃地政局局長孫明揚

I offer my warmest congratulations to the Professional Green Building Council on your successful launch of the first Green Building Award. The theme of the Award echoes with the Government's policy initiative to promote sustainable buildings. I am deeply impressed by the high quality of the participating building and research projects, all of which exhibit outstanding sustainability and environmentally-friendly features.

We have always worked hand-in-hand with the building industry to strive to improve the design and construction of buildings in Hong Kong. The Green Building Award serves as an important incentive to promote the adoption of sustainable elements throughout the life cycle of a building, including the planning, design, construction and maintenance stages, as well as green and energy efficient building features. With our continuing efforts, I am sure we can make Hong Kong a greener city which we will all be proud of.

I take this opportunity to wish the Professional Green Building Council every success in your future green endeavours.

**Michael M Y SUEN**

Secretary for Housing, Planning and Lands



# 環保建築專業議會主席獻辭

Message from Chairman, PGBC

環保建築大獎2006是香港推動環保建築運動的里程碑。作為環保建築專業議會的主席，本人十分興幸看到這次於香港舉辦的首屆環保建築大獎，能獲得業界的積極參與及熱烈回應。透過舉辦環保建築大獎，我們得以公開表揚業內曾經為環保建築發揮創意及努力的專業人士，同時更能蒐集有關環保建築項目及研究的詳細資料，協助業界建造可持續發展的香港。這對整合政府部門、專業人士、發展商、管理公司及學界為香港可持續發展建築而作出的研究、規劃、設計、建造及管理工作亦作出了重大的貢獻。

我們深信，集合所有參賽項目於發展香港環保建築進程中所作出的各方面貢獻及所得的資訊，將能惠及學界、專業人士、行業研究人員及其他專才，我們可以從別人成就上有不少的學習。我希望這本刊物中刊載的資料將能啟發您對環保建築的構思及方向。

最後，祝願大家能於開拓可持續發展未來的進程中大展拳腳。

陳佐堅測量師

Green Building Award 2006 is indeed a milestone in the green building movement in Hong Kong. It gives me, as Chairman of Professional Green Building Council, great pleasure to see the immense interest in and enthusiastic response to the first ever 'Green Building' award in Hong Kong. This exercise has given us the opportunity to publicly recognize the innovation and hard work of professionals in our industry and also to gather projects and studies in our course towards building a sustainable future for Hong Kong. This is regarded as the major contribution towards gathering and consolidating the various efforts made by the government, professionals, developers, management companies and academia in the research, planning, design, construction, renovation and management of sustainable buildings in Hong Kong.

We are convinced that it will be very useful to conglomerate the information that represents efforts, big and small, in the quest of green buildings for Hong Kong as provided by entrant projects for the reference of students, professionals, researchers, etc. There are a lot that we can learn from each other. We hope the materials contained in this little humble publication will inspire you and your future undertaking in green buildings.

Finally, let me wish you all the best in the road towards a sustainable future.

**Kenneth CHAN Jor Kin**



# 環保建築大獎2006籌備委員會主席獻辭

Message from Chairman, Green Building Award 2006 Organizing Committee

由環保建築專業議會主辦的環保建築大獎2006乃一嶄新的業界獎項。環保建築專業議會是由香港建築師學會、香港工程師學會、香港園境師學會、香港規劃師學會以及香港測量師學會所組成。

環保建築大獎旨在表揚在可持續發展方面有傑出貢獻的建築，並鼓勵在環保建築方面的研究、規劃、設計、建造、維修及翻新。

環保建築大獎2006能獲業界的熱烈支持，我們實在非常鼓舞。首屆的環保建築大獎共接獲55項提名，當中包括全新建築、現有建築、翻新建築以及研究與規劃四大類別。經過全面的初步評審後，30個優質項目被挑選進入最後評審階段。

經過嚴謹的評審過程及熱烈的討論，評審委員會選出四大類別的大獎和優異獎得獎項目。頒獎典禮於2006年6月30日舉行。

此外，我們非常榮幸邀請到環保建築專業議會榮譽顧問及房屋及規劃地政局局長孫明揚先生，擔任頒獎典禮的主禮嘉賓，與我們共同參與推廣香港的環保建築。

在此，本人衷心地向各參賽隊伍、顧問、評審委員、贊助商、支持單位、籌備委員會委員及為環保建築大獎作出貢獻的各位致以萬分感謝。

最後，祝願大家能在環保及可持續發展方面繼續努力並取得美好的成果。

朱沛坤工程師

Green Building Award 2006 (GBA 2006) is a new industry award in Hong Kong organized by the Professional Green Building Council (PGBC). PGBC is jointly formed by the five professional Institutes - the Hong Kong Institute of Architects (HKIA), the Hong Kong Institution of Engineers (HKIE), the Hong Kong Institute of Landscape Architects (HKILA), the Hong Kong Institute of Planners (HKIP) and the Hong Kong Institute of Surveyors (HKIS).

The main objectives of GBA 2006 are to promote green research, planning, design, construction, maintenance and renovation of buildings by recognition to those projects with outstanding contributions in sustainability.

We are much grateful to have received overwhelmingly encouraging support and participation in GBA 2006 with a total of 55 nominations received under the four award categories of New Buildings, Existing Buildings, Newly Renovated Buildings, and Research & Planning Studies. 30 projects have been short-listed to enter the finalist stage after an initial thorough assessment.

Following quality discussion and rigorous assessment by the jury panel, the Grand Award and Merit Winners of GBA 2006 for all four categories have been selected, with the GBA 2006 presentation ceremony on 30 June 2006.

Furthermore, it is our great honour to have Mr. Michael Suen Ming-yeung, GBS, JP, to participate in the course of promoting green buildings in Hong Kong as the Honorable Advisor of PGBC and also our Guest of Honour for the award presentation ceremony.

Lastly, I would like to take this opportunity to thank all participating teams, advisors, jury panel members, sponsors, supporting organizations, organizing committee members and those who have contributed to GBA 2006. Thank you very much and wish you every success in building a green & sustainable future.

**Ir Reuben CHU**



# 香港建築師學會獻辭

Message from The Hong Kong Institute of Architects (HKIA)

作為環保建築專業議會創會成員之一，香港建築師學會喜見它自2002年創立至今的茁壯。其開創之2006年「環保建築大獎」，獲建築師、工程師、園境師、測量師及規劃師五個專業學會在背後聯合支持，正正反映業界衷力合作推動環保建築之里程，共同正視建築的生命週期，含規劃、設計、建造、翻新、營運、管理以至研究多方面的考慮。

我們要認知的是當今生活模式並不可持續，香港人均「生態足印」達4.6公頃之多，是1997年數句中世界人均之兩倍半！邁向可持續發展，我們極需轉變「硬件」及「軟件」雙方面，包括城市設計與管理，以至我們的生活態度及消費模式。地球只有一個，但我們現在的生活模式需要「兩個地球」以上。

環保創新的新建設須展示設計之高效能水平，指標是二至三倍的節約基數，更理想的應達「四倍」之尺度 (Factor Four)。現成樓宇所佔的量至大，整體質素的提升尤其重要。現成樓宇的改造優化亦須更廣泛倡導，不論從資源保育或是社會文化角度而言。對應香港獨特的高密度城市環境，環保的規劃及建築研究極具意義，藉此可引導創新而合適的本地設計，亦培養本地環保設計的專才。

祝願此首屆「環保建築大獎」，譜出一系列綠色建築之典範，從都市氣候之設計問題以至村郊公廁之翻新改造，讓不同類型及規模的項目作參考比量。「小」亦是美，「少」[環境負荷]即是多[接近可持續發展]。

As one of the founding members, HKIA is delighted to witness the growth of PGBC since its establishment in 2002. The GBA2006 as a new initiative organized by PGBC, jointly supported by HKIA, HKIE, HKILA, HKIS and HKIP, represents another significant step forward with respect to the professional collaboration in accelerating the recognition, understanding and implementation of green buildings based on a lifecycle perspective embracing the aspects of planning, design, construction, renovation, operation and management, and research.

We have to admit that our prevalent lifestyle is not sustainable. The average Ecological Footprint of a Hong Kong citizen is about 4.6 hectares, which is equivalent to 2.5 times of the global fair share (1.85 hectares per capita) according to the 1997 figure. Towards sustainability, on one hand, we need our built environment shaped and managed in a much more environmentally benign way (infrastructure upgrade); on the other hand, we need paradigm shift towards the "One Planet Principle" (attitude change). We are still far away from the goal.

Pioneering new buildings are essential to lead the industry towards benchmarking higher performance since we need them to be 2 to 3 times more resources efficient, if not yet up to the notion of "Factor 4". Existing buildings representing the largest stock deserve much more attention by all – great things are done by a series of small things brought together. Adaptive reuse of existing buildings, from both environmental and social perspectives, needs wider promotion in Hong Kong. For our unique high-density city, sustainable planning and building research will provide us with more solid yet innovative grounds for advancing local practice and knowledge.

We wish that the GBA2006 projects representing a spectrum of "green shades" in Hong Kong would build up exemplary models, from climate-responsive urban design to public toilet renovation, for other projects of different nature and scale to further explore and excel. Small can be beautiful. Last but not least, less [ecological loadings] is more [sustainable].



# 香港工程師學會獻辭

Message from The Hong Kong Institution of Engineers (HKIE)

環保建築專業議會自2002年成立以來，一直積極地舉辦各項推廣可持續發展都市及建築設計的活動。隨著市民大眾對環境可持續發展的意識及關注日益增加，環保建築大獎的舉辦可說是把握時機，與時並進。是次大獎目的在於表揚對可持續發展建築有卓越表現的建築工程及研究，同時鼓勵業界在未來的建築物設計、建造、維修及保養與及各項研究中，多從可持續發展的方向出發。

香港工程師學會非常榮幸能成為環保建築專業議會的一員，與其他建築業相關的專業團體共同舉辦是次大獎。這次活動除了提供一個良好的平台予參賽者去介紹其作品的環保及可持續概念外，亦給予入圍代表一個與評審團分享及交流的機會。

隨著環保建築大獎2006的成功，我們希望此獎項能成為對香港優越環保建築的一個公認指標。而我會亦當盡全力支持是項極具意義的活動。

Professional Green Building Council (PGBC), since its incorporation in 2002, has been actively organising various events to promote a better and sustainable built environment in Hong Kong. With the ever-increasing public awareness on building a sustainable and green environment, the initiative of the Green Building Award (GBA) 2006 came at an opportune time for PGBC to give recognition to buildings/research projects with outstanding features and contributions to sustainability and the environment, as well as to encourage the adoption by the industry of sustainable planning, design, construction, maintenance and renovation of buildings.

The Hong Kong Institution of Engineers (HKIE) is honoured to be one of the members of PGBC and having the opportunity to collaborate with our construction-related counterparts on the organisation of the Award.

The Award provides a platform for our industry practitioners to showcase their concept and idea on green and sustainability and giving an opportunity for the finalists to meet with the Jurors for sharing and exchanging views.

With the success of GBA 2006, we hope that the Award will become a widely recognised honour to green buildings in Hong Kong and HKIE will undoubtedly provide our full support to this meaningful event.



# 香港園境師學會獻辭

Message from The Hong Kong Institute of Landscape Architects (HKILA)

香港園境師學會很榮幸見證首屆「環保建築大獎」的誕生。環保建築專業議會是次舉辦的獎項活動，確實帶領香港建築業跨進另一個里程碑。各專業團體是次的努力，定能引領建築業界對綠色環境及可持續發展的訴求更見關注。

作為園境師，我們不單關注個體建築物，更關注我們城市整體綠化而提升生活質量的需求。我們肩負著的使命是提升社區居住環境及保育大自然資源。在香港，這實在是一個挑戰，把可持續的綠色環境帶到每項建設發展裏。植物，自然環境不就是環保建築最好的綠色元素嗎？環保建築的理念定必帶領業界提升香港的建設水平，實踐及建築一個以環境倡議、合乎環保持續原則、更合乎人民居住的理想都會。

我們祝賀環保建築專業議會所舉辦的「環保建築大獎」成功，並期望將來的「環保建築大獎」能引進更多綠化空間，使香港這個都會城市更美好。

It is indeed a commendable step forward for Hong Kong that PGBC is launching this first GBA in 2006. With the joint collaborative efforts of all building professionals, we are certain that GBA will lead industry awareness of green and sustainable developments to a new level.

Landscape architecture, more so than other building industry professionals, has had to tend to nature's requirements in our city. We have the burden of making every development 'green', with vegetation and other nature's elements. Is not more nature and natural element the desirable trait of all green developments?

We congratulate PGBC in the success of GBA 2006, and hope that this and future Green Building Awards will bring forth more projects with focuses on turning our city more naturally green.





# 香港規劃師學會獻辭

Message from The Hong Kong Institute of Planners (HKIP)

香港規劃師學會今年正式加盟環保建築專業議會，為推動香港成為更環保及可持續發展的城市而出一分力。我們深信透過個別發展，自發性地啟動環保計劃和措施，是推廣及實踐環保意識對城市發展的重要性的最有效方式。只有紮實的公民環保意識，才可令環保城市規劃及發展達至事半功倍的效益。

在最近的環保建築大獎2006評審過程中，見到眾多參與的私人及政府項目，均積極及有創意地自我提升環保設計及相關措施，實在另我們感覺鼓舞，當中包括在節省能源/資源上的設計和措施，盡量利用地盤的天然資源（如採光、通風、等等），創造更環保、更優質的生活和工作環境。這些自發性的努力是應嘉許和鼓勵的。同時，亦為業界注入更大的動力，為未來的城市發展和建設奠定基礎。

要建設一個更環保及可持續發展的城市，我們必須優先處理一些重要的議題，包括優化城市設計、加強公民對環保的意識和責任、提升推動綠環境和綠城市的力度、推動以人為本的原則，設計公共設施等。在過去數十年，香港面對龐大和高速的城市建設及經濟發展壓力。現在正是一個好時機，讓大家仔細想想如何提升我們現在的生活及工作空間質素。

HKIP joined the PGBC this year, and it is our honour to become a part of this active force amongst the professionals in the development industry to strive for greener and more sustainable ways of building our City. We believe that the most effective means to promote and actualise green concepts in city development is through the cumulative effects of green initiatives undertaken through individual projects. Strong public awareness and support are essential for sustaining the momentum for the on-going green movement in the development and planning arena.

In the process of adjudication for the Green Building Award 2006, it is very encouraging to see that both the private and public sectors are actively and creatively pursuing green designs and related facilities. Such efforts to save more energy and resources and utilizing what nature gives to a site (e.g., daylight, natural ventilation etc.) and minimizing unnecessary interventions, would create higher quality living and work environments. Recognizing these initiatives would definitely encourage the industry stakeholders to do better in future and would strengthen the foundations for green developments.

Looking forward, we see a number of important agenda that need to be given priority to achieve a greener and more sustainable city. These include: pursuing quality urban design, increasing public awareness of green development concepts, increasing greenery in the city, creating user-friendly public space etc. Faced with the development pressure in the past decades, our city fabric has grown at extraordinary fast pace. It is perhaps the opportune time to pause and think how we can achieve not only more, but better quality of living and working space in our city.





# 香港測量師學會獻辭

Message from The Hong Kong Institute of Surveyors (HKIS)

在現代社會中，我們對生活的要求越來越高，在享受高生活質素的同時，我們亦要考慮地球資源的運用和保護。為著我們下一代的健康生活，亦為保存現有的生態環境，我們必須追求一個可持續發展的生活，一個更加綠化、更接近大自然的生活。

環保建築大獎2006，是為了表揚對可持續發展建設有貢獻的建築專業人士，他們通過設計、運用、保育、維修各種建築物及居住環境，為我們建立了一個更綠化、更和諧、更為可持續發展的生活平台。

Sustainable development is the hottest issue to be discussed among the world today. It is also the trend of global development. Nowadays, we have increased our expectations to the quality of life and at the same time, we need to protect the limited resources available on the earth. To wisely use the limited resources, it is time for us to consider another way of living, a greener way of living. PGBC, having collaborated with HKIA, HKIE, HKILA, HKIP and HKIS since its establishment in 2002, strives for the best ways to serve our community to create a sustainable living environment for all the people in Hong Kong.

GBA2006 aims at encouraging the building professionals, developers, property managers, etc. in creating a green and sustainable living environment. GBA2006 will be awarded to those outstanding buildings and professionals in terms of planning, design, construction, maintenance & management, and renovation of buildings, creating green and sustainable environmental excellence.

We strongly support and believe that the GBA2006 would contribute positively in promoting the awareness of green buildings across all sectors in Hong Kong and give a better understanding to the construction industry about the economic and social benefit that green buildings would bring.



質素 Quality

資源 Resources



GREEN BUILDING AWARD **2006** 環保建築大獎

全新建築類別  
NEW BUILDINGS CATEGORY

創意 Innovation

永續 Sustainability

# 2006 環保建築大獎『全新建築類別』評審團意見

GBA 2006 New Buildings Category, Jury's Citation

評審團主席:劉秀成太平紳士 副主席:黃澤恩博士、工程師

Jury Chairman: Hon Patrick Lau Shau-shing, Deputy Chairman: Ir Dr Greg Wong

廢物能否變成資源？興建樓宇是否必須採用大量混凝土、金屬和玻璃？香港的樓宇是否必須靠不可再生石化燃料的空氣調節系統？

在寸金尺土的香港，我們實在不能再提供珍貴的土地用以堆填，減少廢物是本港環保項目中的重要一環。建造時，應採取整體方法以回收廢物循環再用和採用循環再用物料作為樓宇構件。在這人口稠密的城市，不管是在市區或是新市鎮，我們都希望在這石屎森林中有更多綠化的空間，恰當的建築設計和市區綠化能減低市區熱島效應。並且，因為空氣調節是本港耗電的主要用途，要挽救我們的藍天和減低日益嚴重的空氣質素問題，就必須大量減少採用空氣調節的耗電；城市空氣質素不但與我們的健康息息相關，亦影響經濟，如醫療、工作效率和居住舒適程度等，日漸惡化的市區環境已經成為社會越來越關注的重要問題。

要達到可持續的目標，新建樓宇就應該採用《係數四》的理論。魏伯樂 (Ernst Ulrich Von Weizsacker) 著述的《係數四》提出促進生態效益理念，利用合適科學技術，邁向可持續發展，符合四倍躍進：生活質素加倍、資源利用減半的策略。要達到這目標，我們就需要「思考模式轉移」，以創新的理念，綜合的設計，恰當的技術和各行各業的合作，得到2006環保建築大獎的項目可說接近這目標。藉著發展商、設計師和承建商的夥伴合作，本地的模範設計可達到節省三分二的能源消耗，採用四分之三循環再用物料的混凝土，以及差不多百分百的綠化屋頂。

## 地鐵迪士尼綫-欣澳站和香港濕地公園第二期

這兩個項目定立了香港的新標準。

地鐵迪士尼綫-欣澳站體現了另類的地鐵站設計，設計採納人居環境、能源效益、成本效益、易於維修保養和生命週期等概念。再加上科學研究和恰當的科技，這另類的設計對環境和人都有益處。地鐵站可以是一個美觀的帳篷，亦減小造成建築廢料。設計既有助天然通風亦有美麗的海景，發揮了跳出框框的思想模式！

同樣地另類，香港濕地公園第二期的展覽館在一個綠化屋頂下，如一座「非建築」的建築。這傾斜的屋頂就如一片綠地毯，不但有助生態環境，亦為附近天水圍的居民，甚至天空中的小鳥帶來視覺上的美感。除了樓宇是「好鄰居」外，濕地公園也採用多個在香港首次使用的環保設施，包括地熱熱泵的混合空氣調節系統，亦採用了高達75%水泥代用物料（再造骨料和煤炭）的結構混凝土。

## 竹篙灣消防局暨救護站及警崗

這建築群既實用亦十分舒適。花園式建築設計，園藝庭院，為員工提供解除工作壓力的作息地方。較少樓層有助於採用太陽能電板、天然光和天然通風。綜合的設計巧妙地融合了科技與建築，並為使用者提供環保設施，如收集雨水作洗車和灌溉用途。所採用概念不但對社會有教育義意，而這樓宇為公共機構樓宇樹立榜樣，同樣理念也應該推廣到新界的其他地區。

## 北京道一號

這樓宇的其中一項創新設計包括全港首次採用的「動態」外牆系統，屋頂太陽能電板收集可再生的太陽能來運作東西面外牆系統內的窗簾，以控制樓宇所吸入的太陽熱能。雖然不在這項目的範圍內，但在土地規劃政策方面，可說是失了與鄰接的舊水警總部一并重建的機會，否則會有更多綜合性設計的潛在機會和空間，以致對這發展項目和鄰近地區有更多環境益處。

## 香港科學園第一期

這科學園項目主要採用低層的樓宇設計，項目負責人在在顯示了很強的可持續設計和管理的策略。在戶外方面，有大概三成的覆蓋是園藝綠化的；而在室內方面，則著重室內環境質素，如空氣質素和減低交通噪音的騷擾。項目也採用了多項環保節能設施，如能藉著現有的成就，把握機會實行入伙後的評估分析，量化環保設施的成效，會對社會有更進一步益處。

## 逸樺園

逸樺園是一項在高密度市區中之高層住宅項目。在部署高層樓宇、空中花園和鄰近行人之平台方面，因應環境而設計，達到適合人性之比例，而恰當的空中花園位置有助微觀氣候；並且，樓宇之間的空間恰當，自然空氣流通，避免了常見的高層樓宇密集、平台全面覆蓋的設計所引至的「牆壁效應」。住宅層方面，內角位置(Re-entrant)既寬敞亦通風，室內房間和升降機大堂都採用天然對流風；升降機大堂都採用天然光和裝置感應器配合人工照明，整體設計有助健康節能的生活方式。環保設計整體全面，包括施工工序，如採納先進的預製件技術、金屬板模等以減廢和優化外牆的質素、耐久性和易於維修保養。

在新建樓宇類別，環保建築大獎2006從二十四個參賽項目中挑選了十個進入決選名單。這些項目的種類包括了基礎建設項目，如風力發電站，變電站和地鐵站；社區項目，如濕地公園、消防局和學校；住宅商業項目，如科技園、商業樓宇和高層住宅。而當中值得注意的環保策略，包括南丫風采發電站的「零廢物方案」，中電掃管笏132千伏變電站的捕風器建築設計，馬灣中華基督教會基慧小學的太陽能電板融入教育，和採用夥伴形式及百分之九十八預製件的康橋大廈。

這些項目體現了香港十種不同程度的「環保新建築」之值得敬佩的努力，為香港的樓宇環境在可持續發展方面邁進一步。

Can wastes be turned into resources? Do buildings need to be made of huge quantities of concrete, metal and glass? Is air-conditioning, which is based on combustion of non-renewable fossil fuels, a must for buildings in Hong Kong?

Evidently, our precious land can no longer afford the ever escalating demand for landfill of solid waste. On one hand, waste reduction is a local priority among our environmental issues; on the other hand, a cradle to grave approach should be promoted for construction through the salvage of "waste" for reuse/recycling and the assimilation of recycled materials as a part of building components. In our hyper-dense city, regardless of Metro Area or New Towns, we dream of more urban greenery against the prevalent context of concrete jungle. Appropriate architectural design together with urban greenery can reduce the urban heat island effect. To save our blue sky and ameliorate our deteriorating urban air quality, we have to cut down our electricity demand substantially through minimizing or even avoiding the use of or the dependence on air-conditioning which is currently the dominant sector of energy consumption. Urban air quality is not only a health concern but also incurs economic implications for the society with respect to medical care, productivity and livability. The worsening quality of urban living space is a surging social concern.

To be "sustainable", towards the Factor Four Theory should be the target for new buildings. Ernst Ulrich von Weizsacker's "Factor Four: A Key to Sustainability" advocates that we can quadruple resource productivity using appropriate technological knowledge and in turn allow the world to double well-being while at the same time halving resource consumption. To approach towards such a target, we need a "paradigm shift" through innovative mindset, integrated design, appropriate technology and team work. The winning projects demonstrate that such a target is not afar. Given the partnership among client, consultants and contractor, the exemplary local designs can achieve 2/3rd of recurring energy reduction, 3/4th of concrete components with recycled contents, and/or almost 100% of roof to be "green"!

### **MTR Disneyland Resort Line: Sunny Bay Station and Hong Kong Wetland Park Phase 2**

Against the local priority issues mentioned above, these two projects set a remarkable benchmark. Sunny Bay Station demonstrates an alternative approach to the mass transit station design, which is bioclimatic responsive, energy efficient, cost effective, easy for maintenance and adaptable from a life-cycle perspective. Coupled with scientific research and appropriate "low" technology, the unconventional design is friendly to both the environment and people. A station can be a delightful "tent", largely made of membrane and metal with minimal construction waste, and configured to harness the ambient wind potential as well as to capture the sea view. Think out of the box!

Similarly, the visitor center/gallery of Wetland Park can be a "non-building" under a green roof. Just like a rolling green carpet, the tilted roof presents a visually and ecologically pleasing face to the surrounding residential towers in Tin Shui Wai new town as well as the birds in the sky. Besides being a "good neighbour building" and among other green concepts, the project is a pioneer in various aspects in Hong Kong, such as applying the Geothermal Heat Pump Hybrid Air-conditioning system, and the total amount of structural concrete used containing recycled aggregates or PFA as partial cement replacement up to about 75% of the total concrete volume.

### **Fire Station with Ambulance Depot and Police Post at Penny's Bay**

It is a delightful building, despite its utilitarian nature. It is a garden architecture, with a nicely landscaped courtyard for relaxation by the staff under high working pressure. Besides the potential of natural ventilation, its low-rise nature further enables it to harness solar energy for both active (PV) and passive (daylighting) uses. The beauty lies in the integrated design, which harmoniously merges the technology with architecture and provides sensible benefits to the occupants, such as harvesting rainwater for vehicle washing and landscape irrigation. It sets a remarkable example for this kind of institutional buildings, which should be promulgated to other parts of the New Territories in Hong Kong. Its educational value to the community at large should be duly respected.

### **One Peking Road**

A particular feature is its pioneering “active” facade system, the first of its kind in Hong Kong. The rooftop Building Integrated Photovoltaic (BIPV) system captures renewable energy to operate the shading blinds in the cavity of the active facade facing East and West, automatically controlling the solar heat gain. Although beyond the ambit of this project itself, a missed opportunity is about the local planning and land policy, which has fragmented the adjoining site of Old Marine Police Headquarters from this redevelopment project; otherwise, there were much more potential for an integrated design benefiting the development itself as well as the neighbourhood in general.

### **Hong Kong Science Park Phase 1**

It is essentially a low-rise office development in a park-setting. The patron of this project demonstrates a strong commitment to the policy for sustainable building design and management. Outdoor, the soft coverage amounts to 30%. Indoor, the focuses are on quality environment includes air quality management and traffic noise abatement. While having explored various “green features”, both active and passive ones, the project could build upon the achievement so far and seize the opportunity to analyze and quantify the environmental performance. Such post-occupancy evaluation would add further value to the society as a whole.

### **The Orchards**

The Orchards is a high-rise residential development amidst a dense urban neighbourhood. Externally, the disposition of pedestrian level massing, sky gardens and towers is environmentally responsive: friendly building scale and urban greenery to face the main pedestrian space, properly located sky gardens to enhance the micro-climate, and appropriately spaced tower blocks to allow urban air ventilation – unlike the conventional “wall-effect” of tower blocks packed shoulder-to-shoulder on top of a boxy podium of 100% site coverage. Internally, the habitable rooms and lift lobbies at typical floors are designed with cross ventilation. The re-entrants are spacious and airy. Typical floor lift lobbies are designed with daylighting, coupled with sensor to synchronize the use of artificial lighting. The overall design is conducive to healthy and energy smart lifestyle for the occupants. The design approach is holistic, including the process of construction, which has engaged the state-of-the-art technique of prefabrication, metal formwork, etc. to minimize waste and maximize the quality of external walls for optimum durability and ease of maintenance in the long run.

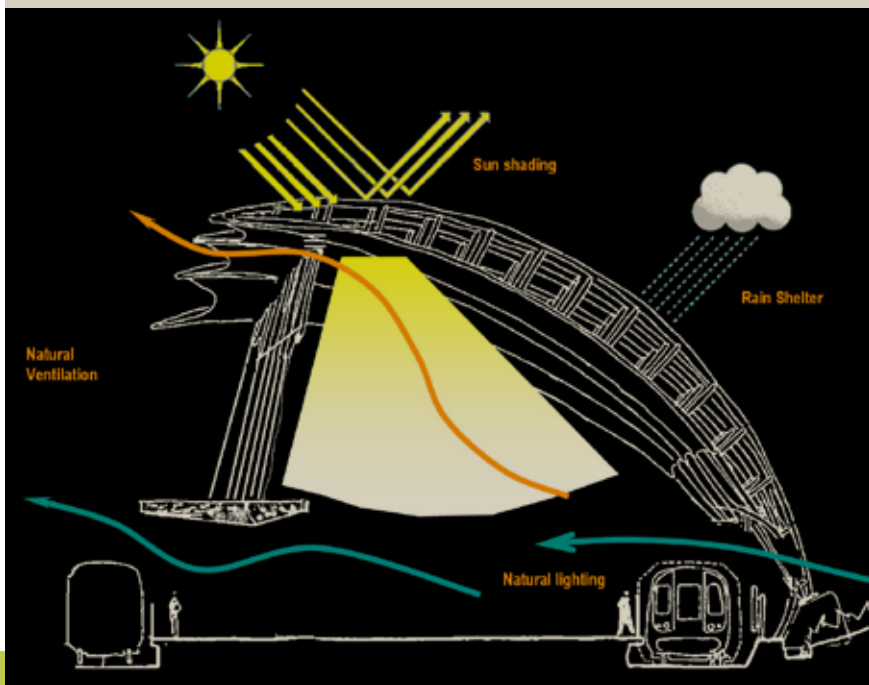
In the category of new buildings, GBA 2006 has short-listed a total of 10 projects out of 24 entries. They embrace various building types, ranging from infrastructure facilities (wind mill for power generation, electrical substation, and mass transit station), community projects (Wetland Park, fire station and school), commercial and office developments (Science Park and commercial/office tower), to high-rise residential. Other notable strategies include “zero waste approach” (Lamma Winds), “wind catcher” (CLP So Kwun Wat Electrical Substation), “BIPV in school” (CCC Kei Wai Primary School in Ma Wan), and “full partnering approach and 98% off-site prefabrication” (Cambridge House).

The “ten shades of green” represents a spectrum of respectable efforts contributing to a more sustainable built environment in Hong Kong.



# 地鐵迪士尼線 - 欣澳站

## MTR Disneyland Resort Line - Sunny Bay Station



Location: Sunny Bay Station,  
MTR Disneyland Resort Line, Lantau Island

Building Type: Station

Completion Date: 2005

Client : MTR Corporation

Project Manager: MTR Corporation

Lead Consultant: Ove Arup & Partners Hong Kong Ltd.

Architect: Aedas Limited

M&E Consultant: Ove Arup & Partners Hong Kong Ltd.

Structural Engineer: Ove Arup & Partners Hong Kong Ltd.

Quantity Surveyor: Widnell Limited

Landscape: Urbis Limited

Specialist Consultant: Ove Arup & Partners Hong Kong Ltd.

Main Contractor: Maeda Corporation









欣澳站於二零零五年六月投入服務，是地鐵東涌綫和迪士尼綫的轉車站。地鐵迪士尼綫是世界首條專為迪士尼主題公園而設的鐵路綫，欣澳站是展開迪士尼奇妙之旅的起點。

為實現一個全新的地鐵車站設計，可持續及綠色建築設計的理念一直貫徹於欣澳站的整個設計過程中。首先，新型的聚四氟乙烯（PTFE）材料應用於半曲面輕鋼結構屋頂，配合專業的設計優化，不但可以遮風擋雨及遮蔽過度的太陽照射，同時使車站大堂充分採用天然光綫和通風。站頂外形和自然通風的設計令人置身其中，充分感受到大自然的空間感，創造一個舒適、高效、節能的半開放的環境。

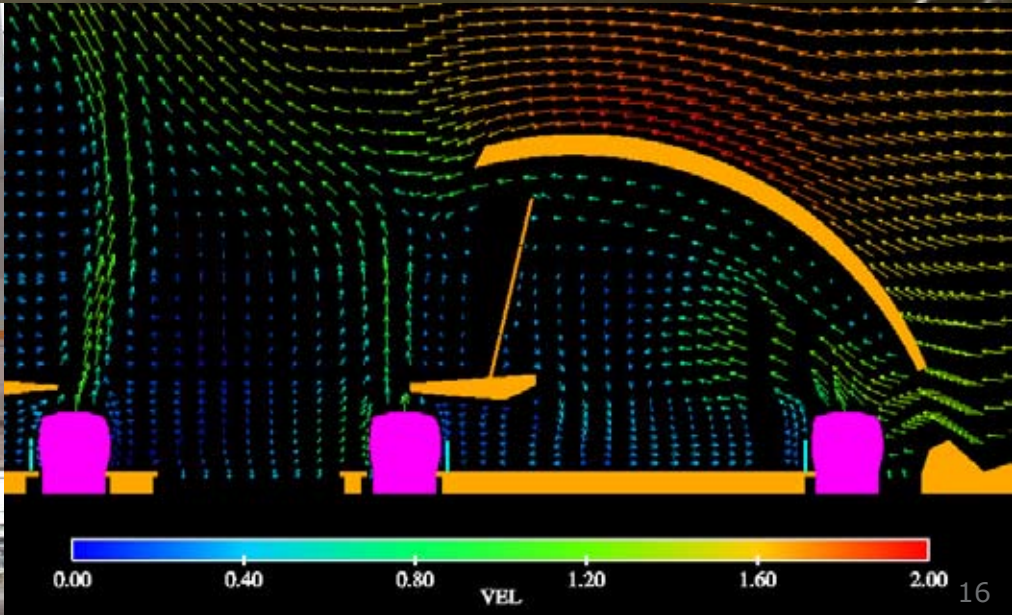
即使在極端炎熱的夏季，特別設計的高效節能的細水霧系統（能耗只為常規空調系統的三分之一），亦可為車站大堂提供涼爽舒適的環境。

Sunny Bay Station was opened in June 2005 and is an interchange station between the MTR's Tung Chung Line and the Disneyland Resort Line. The station is also the starting point of the magical journey to the Hong Kong Disneyland Resort at Penny's Bay.

Sunny Bay Station is designed to be a sustainable and green building even at its first thought in mind. The gentle curving fabric roof, made of Polytetrafluoroethylene (PTFE) membrane, on a lightweight steel roof structure, create a pleasant semi-opened environment sheltered from intense heat, wind and rain for patrons, and most importantly, to achieve energy conservation by making use of natural ventilation and daylight in place of air-conditioning.

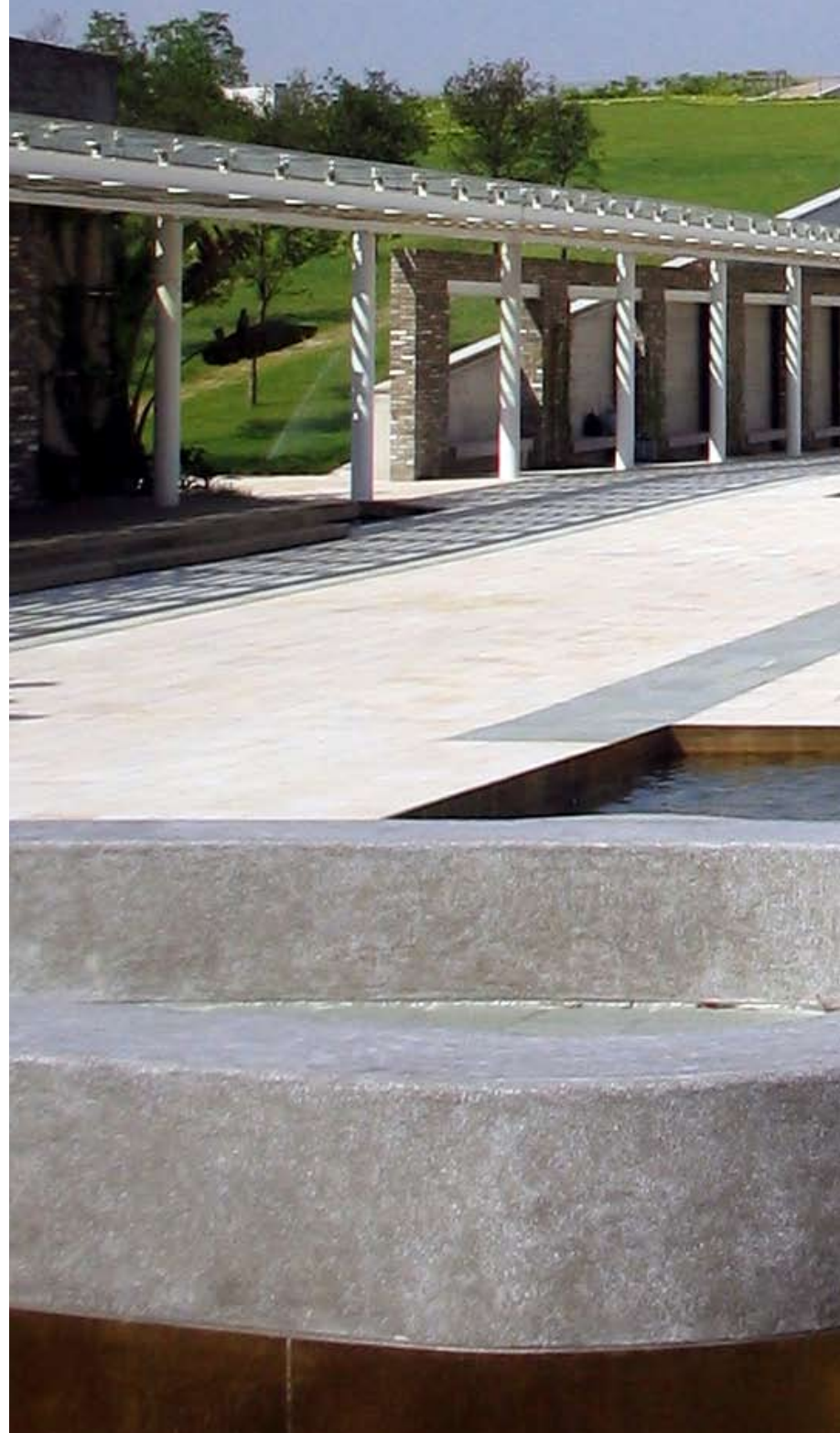
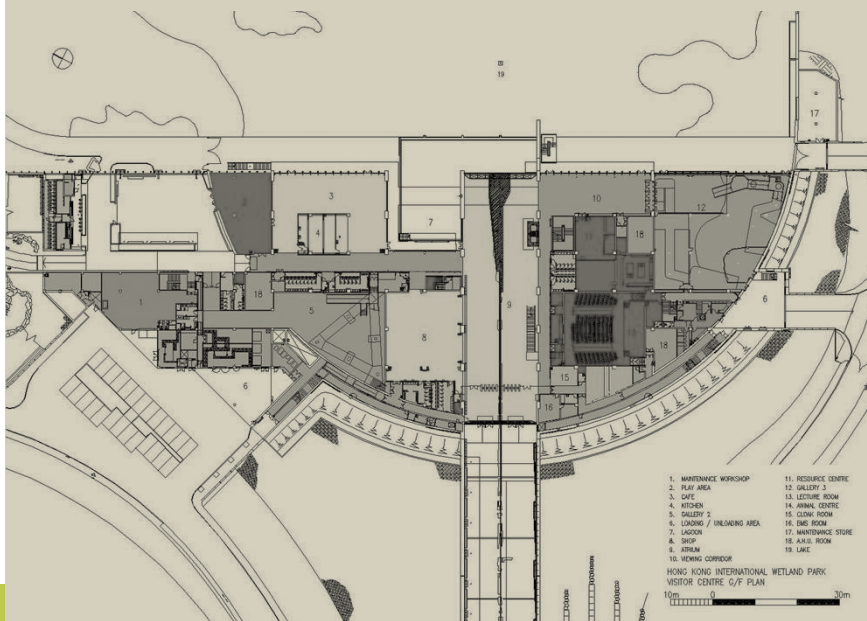
Moreover, the supplementary water mist system operated under extreme hot weather condition can provide cool and pleasant environment with only 1/3 of energy consumption compared to a traditional air-conditioning system.







# 香港濕地公園第二期 Hong Kong Wetland Park Phase 2



Location: Wetland Park Road, Tin Shui Wai, N. T.  
 Building Type: Visitor Center  
 Completion Date: 2005  
 Gross Floor Area: 10,000 sq.m  
 Site Area: 61 hectares  
 Client: Agriculture, Fisheries & Conservation Department, HKSARG  
 Project Manager: Architectural Services Department, HKSARG  
 Architect: Architectural Services Department, HKSARG  
 M&E Consultant: Architectural Services Department, HKSARG  
 Structural Engineer: Architectural Services Department, HKSARG  
 Quantity Surveyor: Architectural Services Department, HKSARG  
 Landscape Architect: Urbis Limited  
 Main Contractor: Chevalier (Construction) Company Limited









香港濕地公園及訪客中心位於天水圍新市鎮東北隅，佔地61公頃。該公園將是環境保育、持續發展及與大自然融和的典範，不但會成為香港的特色，更充分發揮保育、旅遊、教育和康樂多種功能。

圓融於大自然的一所寧謐建築，整座主館隱沒在園景之中，主館的訪客中心佔地約一萬平方米，設有多個展藏豐富的展覽館，資源中心、辦公室、餐廳、禮品店、遊戲區及洗手間。

濕地探索中心在戶外提供課室和實驗室設備，還有在再造濕地設置的三間觀鳥屋和浮橋，各自演繹濕地概念。

The Hong Kong Wetland Park occupies a 61-hectare site on the north-eastern edge of Tin Shui Wai, New Territories, Hong Kong. The Park is envisaged as a prime example of harmony with nature, environmental practice and sustainable development; unique to Hong Kong; seeking to provide equally for the very varied functions of conservation, tourism, education and recreation.

Closely integrated with the natural wetland setting of the park, the structures of the buildings are purposely designed with landscape roof, timber cladding and multiple layers of shades. The Visitor Center has a footprint of approximately 10,000sq.m. consisting of three major Galleries, Resource Center, Office, Café, Shop, Play Area and Toilets.

The Discovery Center building, housing an 'outdoor' classroom and laboratory, and three Bird Hides are located in the re-created wetland habitats of the external area, together with fixed and floating boardwalk pathways, all displaying unique functions conveying wetland conservation and interpretive messages.

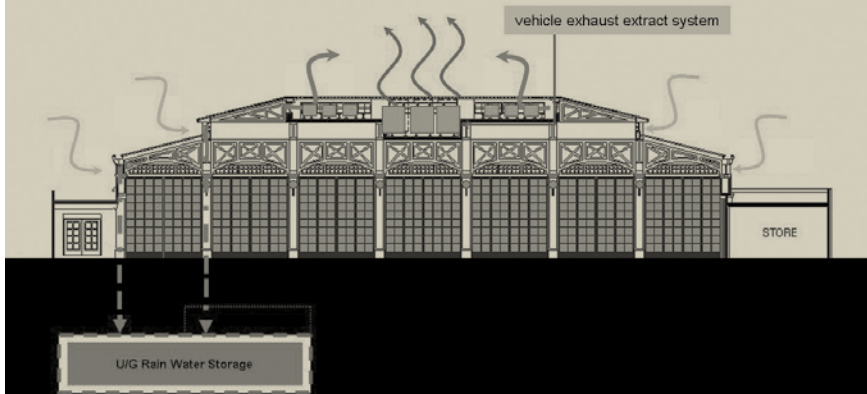






# 竹篙灣消防局暨救護站及警崗

## Fire Station with Ambulance Depot and Police Post at Penny's Bay, Lantau



Location: Penny's Bay, Lantau  
 Building Type: Institutional Building  
 Completion Date: 2004  
 Client: Fire Services Department and Hong Kong Police Force, HKSARG  
 Project Manager: Architectural Services Department, HKSARG  
 Architect: Architectural Services Department, HKSARG  
 M&E Consultant: Architectural Services Department, HKSARG  
 Structural Engineer: Architectural Services Department, HKSARG  
 Quantity Surveyor: Architectural Services Department, HKSARG  
 Landscape Architect: Architectural Services Department, HKSARG  
 Main Contractor: Gammon Construction Limited



早在策劃工程的初段便融入可持續發展的設計，旨在善用土地資源，並配合周邊的自然環境。低層建築群以園林建築為主題，配合周邊環境及氣氛。

設計上採用了大量的預製組件，以提高建築物的耐用性，促進環保。大量的屋簷及遮光裝置可減少吸熱，令建築物的總熱傳送值低至12.64及10.72瓦特/平方米。高能源效益屋宇裝備系統更令此項目達到香港建築環境評估法的鉑金級水平。創新的設計包括以太陽能光電板建造屋頂，提供約百分之十的所需電力；以及收集雨水，循環再用於洗車及灌溉等。大樓採用露天中庭的設計，以引入日光及自然通風，配合大量栽種的樹木，為消防員提供了一個優美的工作環境。公用設施如發電機等則集中放置在屋宇裝備大樓，方便保養。

此項目不單為可持續發展設計建築物建立了一個容易明白的例子，並將會成為香港的未來文化歷史設施的一份子。

An integrated sustainable design approach was used from the start achieving improvements in land use. The "Garden Architecture" theme with low-rise pitch roofs blends the development with the surroundings.

The extensive use of carefully selected prefabricated materials increases construction flexibility and achieves a long building life with low maintenance. Insulated roofs, shade overhangs, pergolas and prefabrication create efficient envelopes with OTTVs of 12.64 and 10.72 W/m<sup>2</sup>. Energy efficient building services contribute to the HK BEAM Platinum Award. Innovative features include building integrated photovoltaic panels (BIPV) used as roofs producing 10% of the electricity requirements and the use of recycled rainwater for vehicle washing and irrigation purposes. Shared facilities including combined building services unit, refuse collection point, emergency generator, transformer, entrance area, etc. contribute to sustainability and easy maintenance. The introduction of the courtyard with small water feature, terrace, extensive landscaping, use of daylight and natural ventilation, significantly improves the working environment for the users.

The project is an excellent example of easily understood sustainable architecture and will become a part of the future heritage of Hong Kong.





# 香港科學園第一期

## Hong Kong Science Park Phase 1



Location: Hong Kong Science Park, Shatin, New Territories  
 Building Type: Office Building for Research and Development  
 Completion Date: 2004  
 Client: HK Science & Technology Parks Corporation  
 Project Manager: Architectural Services Department, HKSARG  
 Architect: Simon Kwan & Associates Ltd. /  
 Architectural Services Department, HKSARG  
 Structural Engineer: Mitchell, McFarlane Brentnall & Partners  
 International Ltd. / Architectural Services  
 Department, HKSARG  
 Quantity Surveyor: Architectural Services Department, HKSARG  
 Landscape Architect: Architectural Services Department, HKSARG  
 Main Contractor: Hong Kong Construction (Holdings) Ltd. /  
 China State Construction Engineering (HK) Ltd. /  
 Dickson Construction Co. Ltd.



香港科學園選址於沙田白石角填海地，兩旁為吐露港公路及優美的吐露港。該發展計劃分三期進行，佔地共二十二公頃。第一期發展佔地約八公頃，包括十座大樓，提供共十二萬平方米樓面面積作應用科技研究及開發用途。第一期配備着先進及優質的基建和支援設施，以促進重點科技領域的創新及科技發展，建立世界級的科技組群。建築設計及建造主要圍繞可持續性發展，並提供以下的創新、綠化、可持續發展及具能源效益的環保特色：

1. 綠化環境
2. 舒適的視覺環境
3. 採用可持續環保建材及保護資源措施
4. 高效率樓宇外牆
5. 採用多項節能技術和裝備提供節能及節約能源的措施
6. 採用再生能源 – 安裝太陽能光伏板發電
7. 安裝中央自動廢物收集系統來處理園內的垃圾
8. 室內環境控制
9. 採用電子感應器節約用水
10. 維持系統的可靠性及可維修性，避免影響用戶的運作

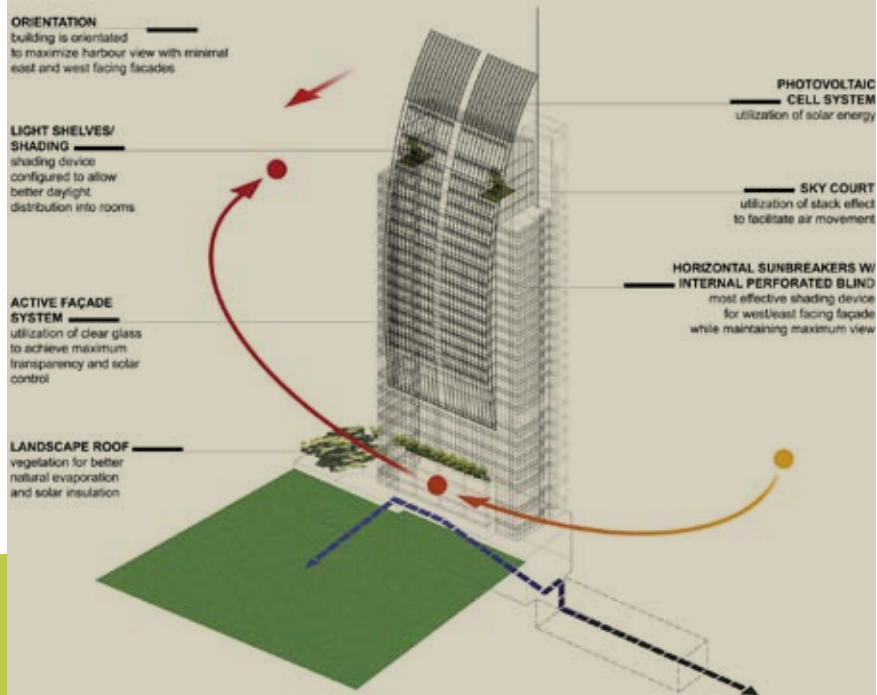
The Hong Kong Science Park is located in Pak Shek Kok, Shatin beside Tolo Harbour. It occupies 22 hectares comprising 3 phases of development. Phase 1 occupies about 8 hectares (120,000sq.m. floor area) and consists of 10 buildings providing an environment for high-tech companies and talented people to create world-class technology clusters focusing on applied research and development. Sustainability has been the key element in the design and construction of the Science Park buildings. Innovative green building design and environmental features can be evaluated against the following:

1. Park-like and Green Environment
2. Visual Comfort
3. Use of Environmentally-Friendly Building Materials
4. Efficient Building Façade Design
5. Application of Energy Saving and Conservation systems to M&E systems
6. Use of Building Integrated Photovoltaic System for electricity generation
7. Use of Automatic Central Refuse Collection System for Waste Management
8. Indoor Environment Control
9. Maximization of Water Conservation
10. Service Reliability and Maintainability





# 北京道一號 One Peking



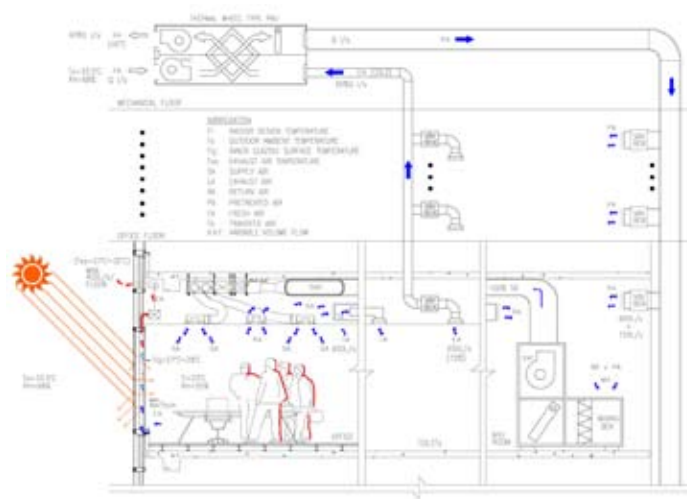
Location: 1 Peking Road, Tsimshatsui, Kowloon.  
 Building Type: Commercial  
 Completion Date: 2003  
 Developer: Glorious Sun Group  
 Project Consultant: DTZ Debenham Tie Leung Project Services Ltd.  
 Design Architect: Rocco Design Limited  
 Project Architect: WMKY Ltd. Architects & Engineers  
 M&E Consultant: J Roger Preston Limited  
 Structural Engineer: WMKY Ltd. Architects & Engineers  
 Quantity Surveyor: Levett & Bailey Chartered Quantity Surveyors Ltd.  
 Main Contractor: Gammon Skanska Limited

北京道一號建築物外型跟環保是一個整體。弧型有助屋頂太陽能板吸收陽光，同時又配合帆的造型；鋁遮陽板在晚間閃耀，日間折射陽光進入室內，外型和功能相輔相承。整個設計已預備好一個環保框架，可以不斷昇級，令未來更環保。

除了太陽能板外，三層清玻璃動態外牆系統，亦是一個環保構思。幕牆系統外面先有一組兩層玻璃，室內一組單層玻璃，室外與室內兩組玻璃之間為中空設計，有冷風流通，具備高透光度，低吸熱量和保持空調的效果。中空設計裡安裝了一層百葉簾：向東向西兩面由電腦自動操作，因應陽光位置而自動昇降並調整百葉簾角度，由太陽能板提供能量，是香港首個案例；向南一面的百葉簾則由用戶電動操控。此外，每層均設有一道鋁遮陽板，除了令建築物外型更具立體感外，更擁有折射陽光的環保功能：陽光射向鋁遮陽板再反射到特別設計的斜面天花板上，減低室溫的同時，亦擴大陽光在室內的覆蓋面，進一步提昇整幢大廈節省電力的環保功能。

The external envelop of One Peking is a triple-glazed walling system using low-E clear glass with a ventilated cavity that results in high light transmission and low OTTV. Aluminum sunshades that double as light reflectors from an integral part of the long south façade, while motorized blinds, installed within the 200mm glazing cavity with the blade angles automatically controlled by computerized sensors tracking the position of the sun, are provided to the short east and west facades.

The sail-like curvilinear south façade is a subtle reference to the roof profile of the Cultural Center across the road, and is also a reflection of the programme within: larger floor plates for offices in the mid-level zone, shallower floor plates for two multi-volume restaurants at the uppermost zone, and an array of photo-voltaic panels at the top where the façade inclines increasingly skyward. The energy generated from the photo-voltaic (PV) panels is used for the powering of motorized blinds in the active façade which is totally self-sufficient. The design of the BIPV inverter also permits future connection to the power supply grid.





# 逸樺園 The Orchards



Location: 3 Greig Road, Quarry Bay, Hong Kong  
Building Type: Residential Building  
Completion Date: 2003  
Developer: Braemar West Ltd. / Swire Properties Ltd.  
Project Manager: Braemar West Ltd. / Swire Properties Ltd.  
Architect: Wong & Ouyang (HK) Ltd.  
M&E Consultant: J. Roger Preston Ltd.  
Structural Engineer: Meinhardt (C&S) Ltd.  
Quantity Surveyor: H. A. Brechin & Co.  
Landscape Architect: Belt Collins Hong Kong Ltd.  
Main Contractor: Hip Hing Construction Co. Ltd.



The Orchards, a new residential complex, has gained recognition for many green initiatives and features used in the design and construction. It was the first urban residential development to be awarded with the "Excellent" rating from HK-BEAM. The implementation of green building concepts has demonstrated a close partnering and environmental commitment among the entire project team including the developer, the consultants and the contractors. It reflects the importance of clients' commitment and participation in environmental protection.

It consists of twin residential towers of 442 units sitting on a 3-level podium housing, with 144 carparking spaces, total site area of 5,714 sq.m. and total gross domestic floor area of 36,720 sq.m..





## 馬灣中華基督教會基慧小學 CCC Kei Wai Primary School, Ma Wan

這項工程有三個主要考慮：持續發展，能源管理及對環境的影響。校舍依原有斜坡建成三個平台，以減少挖土；並適當地升高，增加空氣流通。建築物依東西排列，使課室及特別室的窗戶面向南或北，減少過量太陽照射。露天平台及有蓋走廊利用東南風及適當的遮蔭，提供清爽環境。校舍緩衝區的布局更可減低對鄰近住宅的影響。天台裝有建築構件式太陽能光伏板系統，聯繫電力公司網絡，發電量約佔9%總用電。屋宇裝備系統符合機電工程署的能源效益守則，除採用不同節能措施，如具能源回收的鮮風機；更透過建築物能源管理系統，分析用電狀況和環境因素，以提倡能源管理。

Sustainable planning, energy management and environmental impact were the three main considerations for this project. The school is located on a sloping site in Ma Wan formed into three platforms to reduce the amount of excavation. The buildings are elevated to enhance natural ventilation. The building blocks follow an east-west alignment allowing the windows of classrooms and special rooms to face north/south thus reducing solar heat gain. Open decks and covered corridors provide shading and enhance the cooling effect of south-east wind. Buffer zones are provided next to the adjoining residential buildings. The Building Integrated Photovoltaic system comprising of three different photovoltaic installations at roof level connects to the CLP Power grid and contributes to about 9% of the total electricity consumption. This project complies with the Codes of Practice for Energy Efficiency by EMSD. Various energy conservation measures are adopted such as fresh air pre-conditioner. Energy and environmental data are analysed through the Building Energy Management System to promote energy management.

Location: 12 Pak Lam Road, Park Island Ma Wan, Tsuen Wan, New Territories

Building Type: School

Completion Date: 2003

Client: Education and Manpower Bureau, HKSARG

Project Manager: Architectural Services Department, HKSARG

Architect: Architectural Services Department, HKSARG

M&E Consultant: Architectural Services Department, HKSARG

Structural Engineer: Architectural Services Department, HKSARG

Quantity Surveyor: Architectural Services Department, HKSARG

Landscape Architect: Architectural Services Department, HKSARG

Main Contractor: Guangdong Overseas Construction Corporation

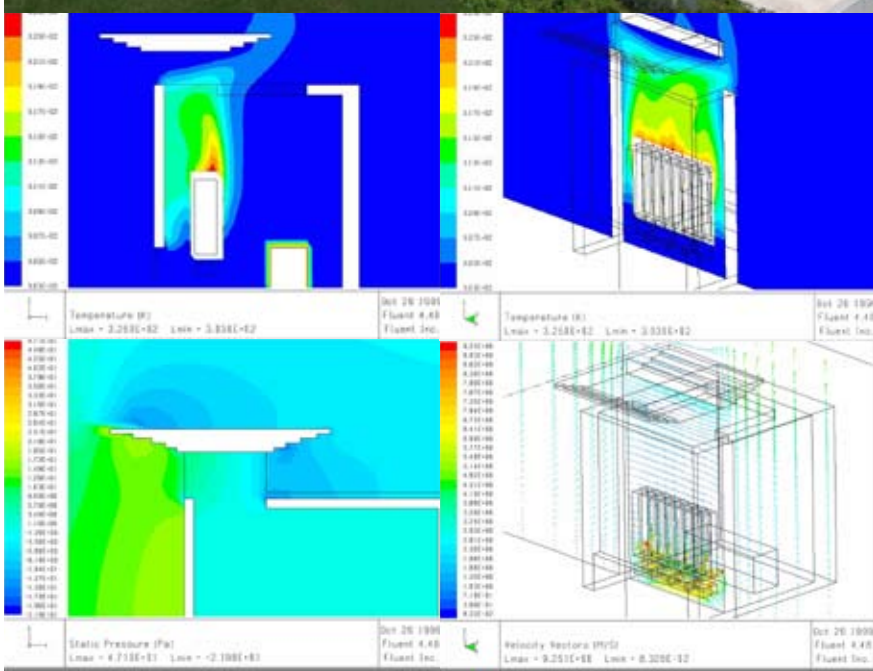




## 中電掃管笏132千伏變電站 CLP Power So Kwun Wat 132kV Electrical Substation

掃管笏變電站於2003年落成，為屯門掃管笏地區供應電力。變電站位於文物古跡遺址，變電站外的仿古文物展覽場融合庭園設計，增加公眾對歷史的認識。車站的外形亦反影了發掘工作的過程。車站的環保特色包括採用低噪音的變壓器及特色屏障。工程師利用精密的流體力學電腦計算程式，設計了熱力傳送及自然風模式。除天然風外，車站亦利用電腦光學分析，善用自然光線，大大節省能源和成本。車站的設計採用和諧的顏色及比例組合，配合周圍的環境、文化、人文生活。

So Kwun Wat 132kV Substation was completed in year 2003, supplying electricity to So Kwun Wat in Tuen Mun area. The substation is situated at an archaeological site; a landscaped garden was designed to accommodate the display of artifacts by Antiquities and Monuments Office. Besides, the design of the substation reflects the archeology context with the grid excavation patterns. The environmental features of substation design include deployment of low noise transformers and architectural screen feature; design of natural ventilation by utilization of Computational Fluid Dynamics Modeling Technique (CFDM). By means of advanced Lighting Model, natural lighting in working areas and service corridors to reduce energy for artificial lighting was introduced. The design of the substation is to blend in with the neighborhood and the architecture to pay respect to the contextual nature of immediate surroundings such as culture, human activities, colour, texture of building fabrics etc of the neighborhood.



Location: So Kwun Wat, Tuen Mun  
 Building Type: 132kV Electrical Substation  
 Completion Date: 2003  
 Client / Developer: CLP Power - Engineering Projects Department  
 Project Manager: CLP Power - Engineering Projects Department  
 Architect: CLP Power - Engineering Projects Department / Department of Architecture CUHK  
 M&E Consultant: CLP Power - Engineering Projects Department  
 Structural Engineer: CLP Power - Engineering Projects Department  
 Quantity Surveyor: Beria Consultants Ltd  
 Landscape Architect: CLP Power - Engineering Projects Department  
 Main Contractor: Paul Y. - ITC

## 康橋大廈 Cambridge House

With its main entrance facing King's Road, Cambridge House forms a landmark for the TaiKoo Place Office Campus and the Quarry Bay District. This commercial tower has a typical office floor plate of approx. 780m<sup>2</sup>, and is equipped with cutting edge building services and communication technologies. Extensive environmental and energy efficiency considerations were incorporated into the building design of Cambridge House. As a green building, Cambridge House is exceptional for obtaining on "Excellent" rating with the highest score ever achieved under HK-BEAM for offices. It is a 36-storey glass curtain wall commercial tower, with 33 floors of multi-tenant offices, 2 podium floors of banking, retail and amenity services. There is a pedestrian bridge connecting with the adjacent Devon House to add to the TaiKoo Place community. Total gross floor area approximately equals to 24,000.m<sup>2</sup>.



Precast Concrete Elements



Typical Office Floor Plan



Location: 981 King's Road, Quarry Bay, Hong Kong  
 Building Type: Commercial Building  
 Completion Date: 2003  
 Client / Developer: Taikoo Place Holdings Ltd. / Swire Properties Ltd.  
 Project Manager: Taikoo Place Holdings Ltd. / Swire Properties Ltd.  
 Architect: Wong and Ouyang (HK) Ltd.  
 M&E Consultant: Meinhardt (M&E) Ltd.  
 Structural Engineer: Maunsell Structural Consultants Ltd.  
 Quantity Surveyor: Levett and Bailey Quantity Surveyors Ltd.  
 Specialist Consultant: L'Observatoire International (Lighting Consultant)  
 Main Contractor: Hsin Chong Construction (Asia) Ltd.



## 南丫風采發電站

Lamma Winds

南丫風采發電站是全港首個具商業規模的風力發電站。採用風能發電不會產生任何污染物排放。除了風力發電機組外，站內亦設有展覽中心，以提高市民對風能發電及應用其他可再生能源的認識。發電站的設計和建築都符合環保和可持續發展的要求。

選址 - 平衡方案  
 設計 - 零廢物方案  
 園景 - 改進方案  
 實施 - 零滋擾方案

Lamma Winds is Hong Kong's first commercial scale wind power station. It harnesses wind energy to generate electricity without producing any emissions. Other than the wind turbine, the station also features an exhibition center to heighten public awareness of utilizing wind for power generation and the application of other sources of renewable energy. Every effort has been made to ensure that the design and construction would be environmentally friendly and sustainable.

Site Selection - BALANCED APPROACH  
 Design - ZERO WASTE APPROACH  
 Landscape - ENHANCEMENT APPROACH  
 Implementation - ZERO DISTURBANCE APPROACH

Location: Tai Ling, Lamma Island  
 Building Type: Wind Turbine and Exhibition Center  
 Completion Date: 2006  
 Architect: The Hongkong Electric Co., Ltd., Projects Division  
 Client: The Hongkong Electric Co., Ltd.  
 Project Manager: The Hongkong Electric Co., Ltd.  
 M&E Consultant: The Hongkong Electric Co., Ltd., Projects Division  
 Structural Engineer: The Hongkong Electric Co., Ltd., Projects Division  
 Landscape Architect: Urbis Limited  
 Main Contractor: Excel Engineering Co. Ltd.





質素 Quality

資源 Resources



GREEN BUILDING AWARD **2006** 環保建築大獎

現有建築類別  
EXISTING BUILDINGS CATEGORY

創意 Innovation

永續 Sustainability

# 2006 環保建築大獎『現有建築類別』評審團意見

## GBA 2006 Existing Buildings Category, Jury's Citation

評審團主席:石禮謙太平紳士 副主席:陳佐堅測量師

Jury Chairman: Hon Abraham Shek Lai-him, Deputy Chairman: Mr Kenneth Chan

在所收到的現有樓宇類別的18份參選樓宇中，只有5份來自非住宅樓宇。明顯可見，不少的管理公司已聯同業主，在其所屬的屋苑，大力推行永續及環保管理，其成效甚為顯注。希望這個能不斷持續下去和創新，囊括更多和廣泛的參與，使在這等環境成長的新一代，成為未來的環境倡導者。更企盼有更多的商業樓宇也爭相效尤，為永續的未來付出一點點的貢獻。

### 中環中心

原設置於大廈內環保及節能的設施由良好的維修維護，進一步的提昇以及用持續創新的文化管理，普遍令業戶使用者與社區雙雙受益。

### 新都城2期

由物業管理代理及業主立案法團共同參與的環境管理，屋苑採用全面的綠化宗旨和政策。有效的利用環境創作綠化角落，能給予住戶綠化教育保證。利用創新的用水節約設備，定期清洗花藝林境及庭園建築等設施。

### 寶馬山花園

善用資源，及持續改善現有的設施。為提高環境管理的持續性，更嘗試於灌溉方面利用可再生能源。

### 星域軒

大廈的持續管理系統特點包括長遠計劃並需深入探討現行的節能表現和顧客的意見等。居民贊同此系統及承認管理代理和住戶之間合作和努力，對有效環境管理的重要性。

### 華景山莊

山莊的廢物管理控制及廢料回收的驕人成績，全賴居民全力的參與。

### 奕翠園

保存自然環境和發展周邊來達至高質素的生活環境，實乃需要居民的參與。透過持續的環保教育，與鄰舍一同分享高質素的居住環境。

There are a total of 18 entries in this category and only five of which are from non-domestic buildings. The management agent and owners of many residential developments have made a head start in sustainability and environmental management. These are good places and appropriate settings to conduct green education. We do hope this movement will continue with more professionals and greater and wider public participation, so that one day all of our children are environmental advocates. It is also hoped that more and more commercial buildings will adopt the same practice in environmental management contributing to our sustainable future.

### The Center

The environmentally friendly and energy saving features provided in the building are well maintained and further enhanced and added to with innovation following a sustainability culture in the management of the building that benefits its occupants and the community in general.

### Metro City Phase 2

The project demonstrates the adoption of comprehensive green objectives and policies with collective efforts of the property management agent and owners committee in the management of the building. Strategies range from the effective creation of green fields and corners (hardware) to the engagement of residents in green education (software). Noticeable effort in conserving water is made by using innovative device in the regular cleaning of the water features in the development.

### Pacific Palisades

For advancing the building performance in response to the environmental agenda, it is imperative for existing buildings to have regular up-keeping and even enhancement. The project demonstrates how to make good use of resources and continuous enhancement of existing facilities, such as trying out the application of renewable energy for the irrigation system.

### Star Crest

The features of the building's sustainable management system include long term planning with in depth reviewing of the performance of existing installations, yearly performance review, continuously setting targets in energy conservation, customer feedbacks, etc. Residents subscribe to the system and acknowledging the importance of cooperation between the management agent and residents in sustaining the environmental management efforts.

### Wonderland Villas

While solid waste management is an imminent local issue, the project shows noticeable achievement in the management and recycling of waste materials with the full involvement and participation of residents.

### Woodland Crest

The project conserves the natural environment in and around the development in achieving a high quality living environment with the participation of residents. The enhanced living environment is shared with other residents in the district through sustainable green education.



# 中環中心 The Center

Location: 99 Queen's Road Central, Hong Kong  
Building Type: Commercial Building  
Completion Date: 1998  
Developer: Agrila Ltd.  
Project Manager: Cheung Kong (Holdings) Ltd. &  
Urban Renewal Authority  
Architect: Dennis Lau & Ng Chun Man Architects &  
Engineers (H.K.) Ltd.  
M&E Consultant: Associated Consulting Engineers Ltd.  
Structural Engineer: Maunsell Consultants Asia Ltd.  
Quantity Surveyor: Davis Langdon & Seah Hong Kong Ltd.  
Landscape Architect: Belt Collins International (HK) Ltd.  
Main Contractor: Paul Y. - ITC Construction Holdings Ltd.  
Facility Management: Citybase Property Management Ltd.











中環中心環保設計特色：

1. 地下冷氣送風系統及提升式地台節省能源達19%；
2. 外牆自動清洗系統，令水可循環再用；
3. 夾層玻璃幕牆能善用自然光，減低吸熱及反射影響環境；
4. 無鋼筋地台板及中樞管道減省工程廢料。

我們注重執行管理措施以達致卓越的環保成效：

1. 數碼錄影及巡邏系統節省用紙；
2. 節能操控照明系統及電解瀘水裝置。

大廈維修人員更體現多項環保發明，如安裝自動清潔散熱器及改裝供水龍頭等。大廈將環保意念推己及人，開放大廈綠化區予公眾活動，其間更委任大廈環保大使，在公眾區播放推廣環保意識短片，加強都市人對大自然的了解，意識到環保對生活的聯繫，及對下一代的重要性。

The Center's unique green features:

1. Underfloor Air-conditioning and Raised Platform saved 19% of energy;
2. Automatic Washing Unit cleans glazing with recycling water,
3. Laminated Curtain Wall System maximizes natural light, reduces heat gain and reflection;
4. Knock-out Floor Panel and Backbone Network System reduce construction waste.

Management measures sustain green elements:

1. Digital Recording and Electronic Patrol System use less paper;
2. Seasonal scheduling of lightings and electrolysis filtration system preserve environment.

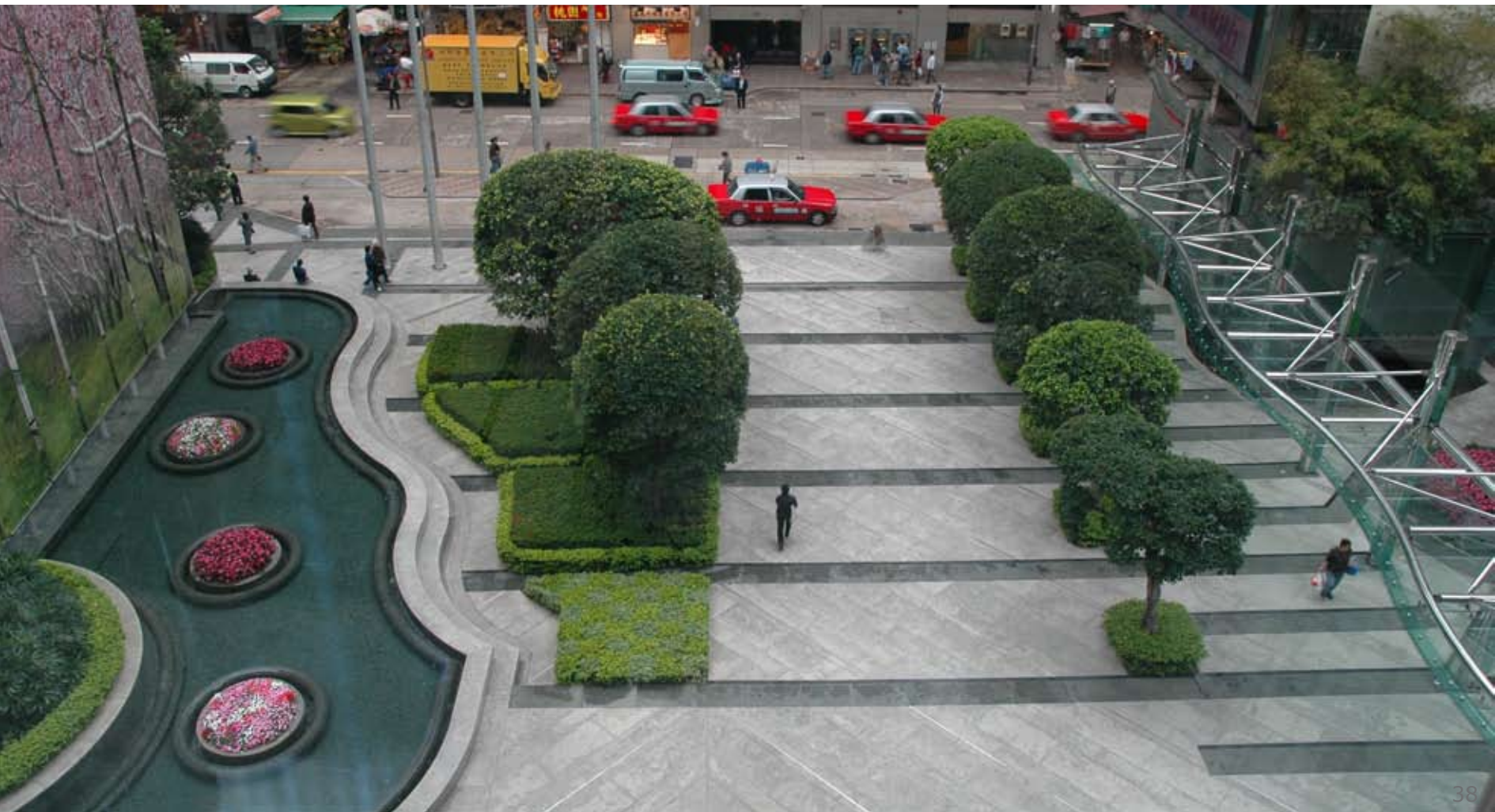
The Center encourages commitment and dedication of the management team by outstanding innovations:

1. Automatic Condenser Cleaning System improves energy efficiency;
2. Install nozzles at water taps save 70% of water consumption.

We also nurture a 'shared vision' with corporate tenants and the community on environmental measures:

1. Provide a landscape area of 60,000sf round the clock to remind green betterment;
2. Appoint Environmental Protection Ambassadors;
3. Broadcast educational videos arose public concern on green concept.







## 新都城二期 Metro City Phase II

Location: Metro City Phase II, No. 8 Yan King Road,  
Tseung Kwan O

Building Type: Residential Building

Completion Date: 1999

Architect: Dennis Lau & Ng Chun Man Architects &  
Engineers (HK) Ltd.

Structural Engineer: Maunsell Consultants Asia Ltd.

Facility Manager: Well Born Real Estate Management Limited  
wholly subsidized company - Metro City  
Management Limited









新都城二期是將軍澳區其中一個大型屋苑，包括11座住宅大樓提供3,344伙單位，並設有大型商場、會所、停車場供住戶享用。

新都城管理有限公司一向秉鼎「互動服務，攜手進步」的宗旨，致力提供優質管理服務。本公司設立及推行「綜合管理系統」，符合了ISO9001品質管理系統、ISO10002投訴處理系統、ISO14001環境管理系統及ISO18001職安健管理系統。

我們定期為轄下員工、承辦商、住戶提供環保知識的訓練及推廣，確保他們更為關注環保工作的責任。

我們熱切希望與其他專業機構分享有關環保管理的經驗及措施，希望透過是次比賽，成功推廣香港樓宇於環保建築的概念。

Metro City Phase II is a complex residential and commercial development located at Tseung Kwan O. It consists of 11 residential towers of buildings with 3,344 apartments. Clubhouse, shopping arcade, car park are also established to serve the need of the residents.

With our mission "Interactive for Quality Management", we have developed and implemented an effective Integrated Management System, which complies with the requirements of ISO 9001, ISO 10002, ISO 14001 and OHSAS 18001, in which ISO 14001 focus on Environmental Management System.

We are devoted to the training and promotion of environmental awareness and knowledge to our staff, as well as our suppliers, contractors, residents and tenants.

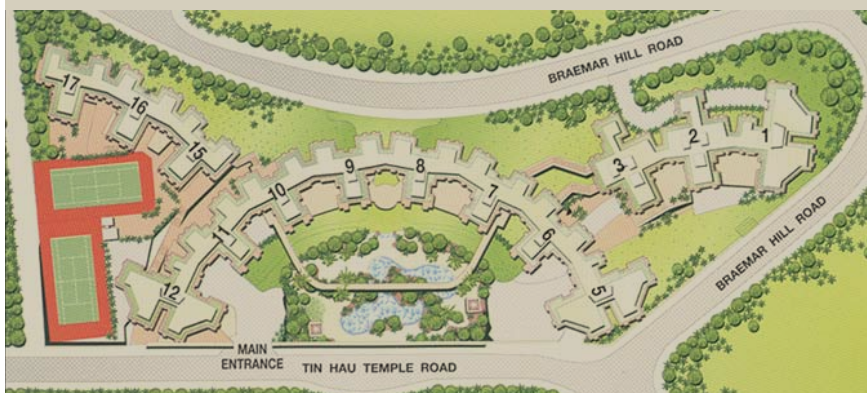
In this competition, we aim at sharing our experience and practices among different professional. It is hoped that the green building concept can be further developed and put into practice in Hong Kong through the sharing.







## 寶馬山花園 Pacific Palisades



寶馬山花園位於北角寶馬山道一號，於1991年興建，共有14座住宅大廈，一個多層停車場及住客會所。

U型的住宅大廈設計，令大量自然光線能透過窗戶及露台進入單位內，住戶能享受自然光線。位於屋苑心臟地點及富熱帶色彩的游泳池，能於天熱時吸收熱力，當風吹過池面時能帶動涼快的空氣到住戶的單位。

節約能源是屋苑的重要政策目的。要達到這個目的，我們定期保養屋苑設備以確保效率。此外，我們亦緊密檢討屋苑能源使用的情況，發掘節約電源機會。例如，停車場光管的傳統電磁火牛已於2001年全部更換為電子火牛。近日我們推行另一個節約能源計劃，目標是能節省2%電力消耗。計劃包括將訪客停車場所有50W水銀燈改為用30W慳電燈泡；此外，健身室內按裝需求控制通風系統；我們亦試行中央光暗調節系統，成功節省15%電力消耗；再者，會所內傳統的出路燈亦將會改為LED燈以節省電力。

寶馬山花園業主委員會宣揚環境保護多年，由居民、業主委員會成員及客戶服務中心職員組成的「持續環保力量」，提倡環境保護及社區持續發展。「持續環保力量」志願人仕逢星期二、四及六於社區進行環境保護及清潔寶馬山行動。為了達到寶馬山花園的環境保護持續性，我們亦參與了廢物原頭分類計劃，於每一層樓梯設置回收箱，根據時間表收集不同種類的可回收物品，回收的數量亦大大增加一倍。

總括來說，寶馬山花園業主委員會、會所及客戶服務中心持續舉辦不同活動及就不同機會，宣揚環境保護訊息予住戶及社區。

Location: 1 Braemar Hill Road, North Point  
 Building Type: Residential Building  
 Completion Date: 1991  
 Developer: Sino Group  
 Project Manager: Bverhill Ltd. & Boatswain Ent. Ltd.  
 Architect: Wong & Quyang (HK) Ltd.  
 M&E Consultant: Wong & Quyang (HK) Ltd.  
 Main Contractor: Grand Choice Construction Co. Ltd.  
 Facility Manager: Sino Estates Management Limited  
 Association of Owners: Owners' Committee of Pacific Palisades





Pacific Palisades is located at 1 Braemar Hill Road of North Point. She was built in 1991 consisting of 14 residential towers, a multistory car park and a clubhouse.

The U-shape design of residential towers allows maximum sunlight penetrating into apartments, in which residents could enjoy natural light through windows and the balconies. A tropical style swimming pool is located at the heart of the estate. During summer when wind blowing across the top of the pool, pool water can absorb heat from the air and the wind can bring cool air to the apartments.

Energy saving is one of the prime objectives of our building management. To achieve that objective, we conduct maintenance work regularly to ensure the efficiency of facilities equipment. Besides, we frequently review the energy consumption status of the building and identify any energy saving opportunities. For example, all the traditional electromagnetic ballasts of fluorescent tubes in carpark were replaced by electronic ones in 2001. Recently, another energy saving programme has been launched and it is aimed to reduce 2% of electricity consumption. To do so, all 50W mercury lamps at visitor carpark have been replaced by 30W energy saving lamps. Also, a demand control ventilation system has been installed at the gymnasium room. Furthermore, a trial run of central dimming system was conducted and the system successfully saved 15% power consumption. In the future, the traditional exit signs in the clubhouse will be replaced by LED to save more energy.

Owners' Committee of Pacific Palisades has been promoting environmental protection for years. A resident's organization, "SEPP - Sustainable Environmental Protection Power" was formed, consisting of Owners' Committee members, residents and staff of Customer Service Center, to voice out messages of environmental protection and sustainable development in the community. Volunteers of SEPP perform environmental protection activities on every Tuesday, Thursday and Saturday on Braemar Hill to help cleaning up the environment in the community. In order to achieve sustainability in Pacific Palisades, we have been taking part in the pilot scheme of Source Separation of Waste programme. Collection boxes have been placed at staircases of every floor levels to collect different recyclable materials according to the designated schedule. Doubled amount of recyclable materials was collected afterward.

In conclusion, the Owners' Committee, Clubhouse and Customer Service Center of Pacific Palisades continually organize various activities and look for different opportunities to promote messages of environmental protection for our residents and the community.



## 寶馬山花園回收率50%

**【本報訊】**(記者 羅敏文) 管理160多個屋苑的信和物業，剛在北角寶馬山花園試行為期一年的家居廢物源頭分類計劃，在樓梯梯設置回收箱，每日回收不同種類的物料，使家居廢物回收率高達50%，成效理想。信和物業計劃在本周起，游說其轄下屋苑的業主立案法團參與源頭分類計劃，建立極具效益的聯環回收系統。

信和物業管理的寶馬山花園，去年9月推出了「廢物源頭分類試驗計劃」，在樓梯梯設置回收箱，每日回收不同的物料，週一至週日回收報紙，週一回收金屬製品，週二回收雷射光碟，週三回收金屬罐粉盒，週四回收電池，週五回收塑膠製品，回收量由剛推出時的每月5公噸，增加至最近的15公噸，增幅高達三倍。

### 每日回收不同物料

除回收量升外，回收率也不錯，寶馬山花園的家居廢物回收率高達50%，即每日30公噸廢物中，有一半被分類回收出來，使物業實地填區的垃圾量只有15公噸，信和物業寶馬山花園總經理司徒建中稱，屋苑法團或住

寶馬山花園家居廢物回收率高達50%，每月有15噸物料。

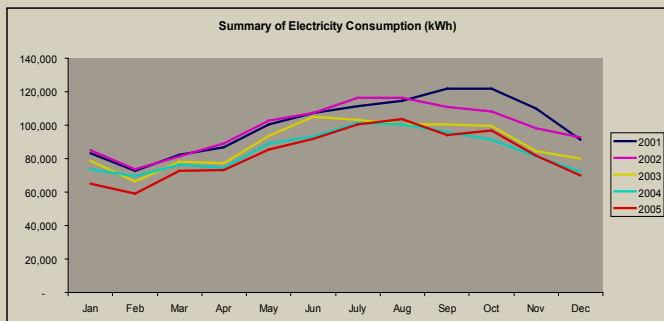
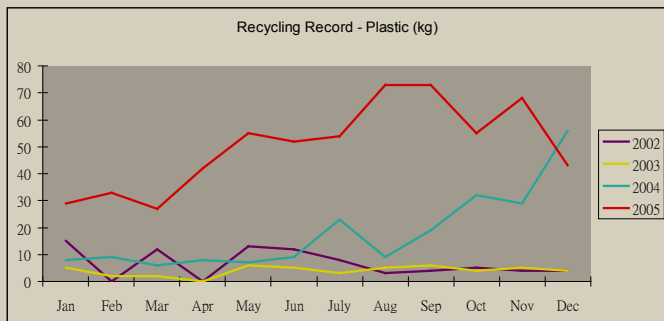
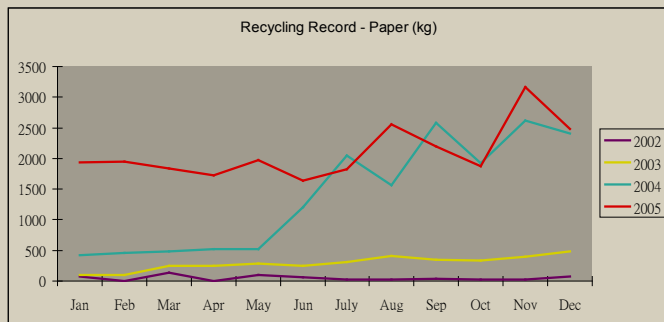
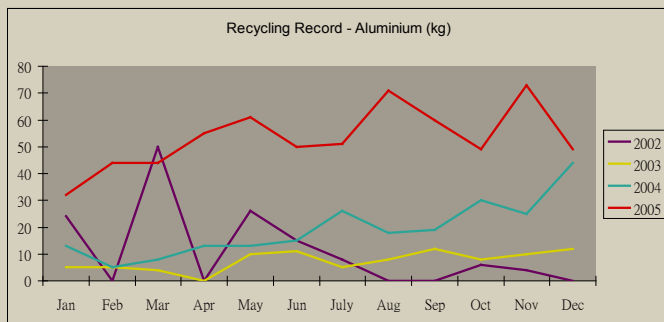
羅敏文攝

客都是日本人，大多有分類回收的意識，在諮詢住戶意見後，便決定每日回收不同的物料。

屋苑更特別製作了回收袋，內裡設計了三個回收筒，住客只需把用完物料清洗，便可放在回收袋中，定期被回收日子把物料拿出後樓梯便可。信和物業董事楊光表示，本周內將會把寶馬山花園回收概念，推廣至其轄下管理其他的屋苑，當日後所有信和旗下的屋苑都參與計劃後，更可建立極具效益的回收聯網。



# 星域軒 StarCrest



Location: 9 Star Street, Hong Kong  
 Building Type: Residential Building  
 Completion Date: 2000  
 Architect: Wong & Ouyang (HK) Ltd  
 Main Contractor: Dragages et Travaux Publics (HK) Ltd.  
 Facility Manager: StarCrest (Management) Ltd.  
 Association of Owners: StarCrest Owners' Committee







星域軒是位於香港灣仔星街九號的高級私人住宅。兩幢大廈共提供三百二十九伙單位、會所、三層停車場、平台花園、游泳池及三間餐廳。由一開始，星域軒(管理)有限公司已實施可持續發展的管理系統。包括長達十年的長遠大廈保養計劃、全面性的節約能源計劃及致力改善住客的生活質素。星域軒能有效地持續每年節約大廈的能源消耗、增加廢物源頭分類的回收數量、獲得環保有關方面的獎項及所有住客對居住於星域軒的滿意程度之提升。

StarCrest is a high class private residential development located at 9 Star Street, Hong Kong. It consists of two residential towers containing 329 units, a clubhouse, a three-level carpark, a podium landscape, roof gardens, a swimming pool and three restaurants. StarCrest (Management) Limited has been practising sustainable management system since the very beginning by committing to a ten-year long term maintenance plan, comprehensive energy saving program and major improvement in living quality. StarCrest has been able to achieve a continuous reduction in energy consumption, substantial increment in waste separation figures, attainment of environmental related awards and last but not the least, residents' satisfaction in overall living experience at StarCrest.



## 華景山莊 Wonderland Villas

Location: 9 Wah King Hill Road, Kwai Chung, New Territories  
 Building Type: Residential Building  
 Completion Date: 1984  
 Client / Developer: Sun Hung Kai Properties Ltd  
 Project Manager: Henderson Land Development Co. Ltd.  
 Architect: Ng Chun Man & Associates Architects (HK) Ltd  
 M&E Consultant: Sun Hung Kai Engineering Co. Ltd.  
 Structural Engineer: Ng Chun Man & Associates Architects (HK) Ltd  
 Quantity Surveyor: Ng Chun Man & Associates Architects (HK) Ltd  
 Landscape Architect: Ng Chun Man & Associates Architects (HK) Ltd  
 Main Contractor: E. Man Construction Co. Ltd.  
 Facility Manager: Hong Yip Service Co. Ltd.  
 Association of Owners: Owners' Committee, Wonderland Villas





「華景山莊」為一私人住宅物業，包括22座大廈，住戶超過5,500名。屋苑已成功考取多項管理、環保及安全認證，包括ISO9001, 14001及OHSAS18001。本邨環保管理亦曾獲獎無數，其中包括“五星級綠色屋苑大獎”、“環保企業獎”、“明智減廢金獎”、“最佳環保報告大獎”等。於過去8年，亦奪取超過30個“三環奪保回收比賽”之獎項。

本邨透過完善設施、自聘技工等，為屋苑提供全面之維修保養，每年撥備維修保養費用達5百萬。節能設備包括車場節能照明系統、會所的活動天幕、室外光線感應及室內溫度控制等。屋苑園林佔地16,000平方米，品種超過200種，於2004年亦贏取最佳園藝大獎。為力求創新，屋苑更要求承判商於搬運泥頭時須借用本邨獨特之環保桶以減低沙塵引致的染污。

藉著全體業戶、承判商及員工之衷誠合作，「華景山莊」之「綠色文化」不斷持續發展令業戶都以環保引以為豪！

Wonderland Villas is a private residential development consisting of 22 blocks, housing over 5,500 residents and operating under certified ISO 9001, 14001, and OSHAS 18001. Environmental achievements include "Five Stars Green Housing Estate Award", "Hong Kong ECO - Business Gold Award", "Gold Wastewise Award", "Best Environment Reporting Award". Moreover, more than 30 awards from the 3R Waste Recycling Campaign were won over the past 8 years.

Maintenance programs are carried out by in-house technical staff. About \$5,000,000 is reserved for repair and maintenance works annually. Energy efficient installations include lighting energy saving devices at car park, skylight and movable curtain at clubhouse, sensor controls for exterior lighting and temperature controls for indoors areas. Landscape has recently been renovated, with coverage of 169,000m<sup>2</sup> and over 200 species, leading to win the 2004 Best Landscape Award. Recently, an innovative concept of monitoring the contractors to hire the in-house environmental buckets for delivery of any construction debris in order to minimize pollution caused by sand and dust.

As a green estate, we are proud of involving. Our entire residents, contractors and staff actively in sustaining green practices on health, environment and resource conservation.





# 奕翠園 Woodland Crest



Location: 33 Tin Ping Road, Sheung Shui  
 Building Type: Residential Building  
 Completion Date: 1996  
 Client / Developer: Sun Hung Kai Properties Ltd.  
 Architect: Y.K.Au Yeung & Associates (Architects) Ltd.  
 M&E Consultant: Meinhardt ( M&E) Ltd.  
 Main Contractor: Teamfield Building Contractors Ltd.  
 Facility Manager: Hong Yip Service Company Ltd.  
 Association of Owners: Woodland Crest Owners' Committee  
 GBA2006 Project  
 Voluntary Consultant: Mr. S.K.Li - Chairman of 10th Woodland Crest Owners' Committee  
 Landscape Maintenance: Chak Sang Garden Co. Ltd  
 Cleansing Contractor: Nixon Cleaning Co. Ltd.  
 Security Service: Hong Yip Service Company Ltd.



奕翠園座落於秀麗的天平山上，佔地十九萬平方呎，設計著重留取原有的自然元素，一草一木，盡得維護。入口面前是一片園林美景，園中天然樹木多達千棵，繁花盛木，身處其中，份覺寧靜和諧。建築設計匠心獨運，窗內窗外，都是淳美空間，配合優質物業管理，進一步提昇住戶綠色生活。

我們堅持透過可持續有效的管理及保養工作以達至與大自然共存和共享的理念，我們的目標是能善用資源達至最大效益。

奕翠園應用了不同的環保節能措施，當中包括善用天然光，自然風及綠色指引，均獲得住戶的認同及支持。透過實踐綠色建築的理念，讓我們共同締造一個美好的生活環境。

Situated in a beautifully landscaped environment with fully equipped facilities, Woodland Crest is distinctive as an unique locality which highlights the conservation of innate landscape and natural habitat. This 190,000 square feet development with more than thousands trees gives you a sense of real peace and tranquillity. The spacious and well-designed interior layouts, together with the efficient building management programme enhance the GREEN living style of the building.

Our vision is to share and co-exist with mother-nature through sustainable effort towards effective property management. Our goal is to be more cost-efficient and to maximize the utilities benefit. Woodland Crest has adopted many different green measures, of which versatile use of natural ventilation; daylight and green practice were highly appreciated by the residents. We look forward to a better environment through the implementation of Green Building Concept.





## 香港大學本部大樓

Main Building, The University of Hong Kong

香港大學本部大樓是香港大學最古舊之建築物，此建築象徵香港大學為遠東地區其中一所歷史悠久兼具西方傳統之大學。大樓以富有古典文藝復興風格之花崗石，希臘愛奧尼亞式石柱，紅磚等組合建成，現時由文學院各部門使用。香港政府古物古蹟辦事處於一九八三年把本部大樓外部列為法定古蹟。

為了達致環保管理，大學物業處執行了一連串環保改善工程及建立樓宇使用常規使樓宇使用者可享用「綠」環境。環保工程包括：使用節能燈泡、二氧化碳感應中央空調系統、限時開關操控小形空調機、安裝低耗水量龍頭、增加園林場地、使用環保防治白蟻系統，拒絕使用含有甲醛或揮發性物質的傢俬等。

The Main Building is the oldest structure in the University of Hong Kong. It is one of the symbolic structure of the oldest universities of western tradition in the Far East. The building was conceived in the Post-Renaissance Style which employed giant Ionic orders and Serliana windows in the revalent red brick and granite colonnades construction. It is now home of the various departments within the Arts Faculty. The exterior of Main Building was declared an historic monument in 1983 by the Hong Kong Government.

For a green building management, the Estates Office implemented a serious of green improvement works and house rules for building user to enjoy green environment. The green works including use of energy saving lamp, adopting CO2 sensor for central air-conditioning system, timer switch control for small air-conditioner, water saving taps installation, increase of landscape area, adopting environmental friendly termite control system, reject the furniture that contains formaldehyde and volatile combustible compound.

Location: Bonham Road, Pokfulam, Hong Kong  
 Building Type: Academic Building  
 Completion Date: 1912  
 Gross Floor Area: 11,935 sq.m  
 Client: The University of Hong Kong  
 Architect: Leigh & Orange Ltd  
 Facility Manager: Estates Office, The University of Hong Kong







## 比華利山 Beverly Hill

比華利山(物業管理)有限公司的環保工作小組，標誌着締造環保大廈的決心。小組有四個功能：綠色行政 - 檢閱最新的法規，以釐定工作上的最低要求；尋找工作中可改善的地方，銳意引入新的環保思維。綠色運作 - 貫徹環保政策致工作層面上，製作不同的講座給員工，獎勵對環保工作有貢獻或新啟發的員工。綠色承辦商 - 承辦商須符合嚴緊的甄選準則，物料亦必須環保，以確保大廈獲得最高質素的服務。綠色活動 - 鼓勵業戶參與環保工作，在不同的活動中，如聖誕嘉年華會，滲入環境訊息及遊戲攤位，讓業戶從中提高環保的意識。小組的工作實現為業戶提供增值的服務，同時亦締造了一個舒適及環保的大廈

Beverly Hill (Estate Management) Limited has been introducing an integrating new scheme - the EP Work Group to reflect our commitments on environment protection. The Group was established to continually improve the following 4 key areas:

*Green Administration* - we review latest legislation requirements, identify rooms for improvements on daily operations, and innovate new ideas for environment protections;

*Green Operation* - we execute our Green Policies on the daily operational levels and maintenance planning. Furthermore, all levels of employees will undergo tailor-make training programs and be awarded for new thoughts on Green issues;

*Green Contractors* - Green-conscious criteria are chosen for selecting contractors and materials to vouch for top quality of our outsourcing services;

*Green Activities* - Green messages are embraced in various estate activities like festival events to increase the awareness of environment protection among clients.

We believe our scheme can create a comfort and Green environments for our clients.



Location: 6 Broadwood Road., Happy Valley, Hong Kong  
 Building Type: Residential Building  
 Completion Date: 1988  
 Client: Lee Chau Company Limited  
 Project Manager: Lee Chau Company Limited  
 Architect: Lee King Fun & Associates  
 Main Contractor: E. Man Construction Co. Ltd  
 Association of Owners: The Incorporated Owners of Beverly Hill



質素 Quality

資源 Resources



GREEN BUILDING AWARD **2006** 環保建築大獎

翻新建築類別  
NEWLY RENOVATED BUILDINGS CATEGORY

創意 Innovation

永續 Sustainability

## 2006 環保建築大獎『翻新建築類別』評審團意見

GBA 2006 Newly Renovated Buildings Category, Jury's Citation

評審團主席:陳佐堅測量師 副主席:黃天祥先生

Jury Chairman: Mr Kenneth Chan, Deputy Chairman: Mr Conrad Wong

在這類別，儘管只有2個參賽項目獲邀親自向評審小組闡述，它們在環保及可持續發展設計方面均達到非常高的水平。項目隊伍不單積極鼓吹環保意識，更是推動策劃和設計翻新項目的先鋒。

### 機電工程署新總部大樓

政府能夠為啟德機場舊址的前空運貨櫃碼頭找到新用戶，實屬可喜。此舉可達雙重效益：既減少建築拆卸廢物之餘，亦可減少使用新建築用料。總部大樓翻新期間，採用了大量新穎的環保設計及綠化設施，並利用先進的科技來節省能源及減少廢物。此外，這個翻新項目亦被用作測試未來建築新科技的試點。另一個值得一讚的地方，是這個翻新項目加入了教育重點（設置「教育徑」），令業界及普羅大眾均可藉此認識節省能源及保護環境的方法。希望這項目能鼓勵有關單位，進一步推動環境保護工作。誠然，整個翻新項目中，還有更多可綠化及可塑造園境的空間。

### 新市鎮公共廁所改善計劃

參與這項翻新工作的建築師，令使用公共廁所頓時成為更愉快及更具教育性的體驗。現有的9個公共廁所的翻新設計，均源自不同的設計，在融入於四周環境及社區中的同時，亦能突顯箇中不同的視覺、文化及社區個性。

Albeit the number of short-listed entries is only two, they are of very high standard in respect of environmental and sustainability design. They are pioneers in advocating environmental responsiveness and exemplary practices in the planning and design of renovation projects.

### **The New Headquarters for the Electrical & Mechanical Services Department (EMSD)**

The government is congratulated on finding a new user for the former air cargo terminal left behind after the removal of Kai Tak Airport. The benefit is twofold: limited demolition waste creation and minimal new resources consumption. Most of the latest environmental design and green features are employed in the renovation of the New Headquarters coupled with innovative use of technology leading to energy conservation and waste reduction. It is also noticeable that future technology is being tested out in the project. It is commendable that considerable effort is made in incorporating educational features in the project (exhibition path) for the industry and general public in energy conservation and environmental protection. It is hoped that this effort is not the end but the starting point and foundation for concerned parties to contribute to the continuous improvement of our environment. There is certainly scope for more greening and landscaping enhancement in the completed project.

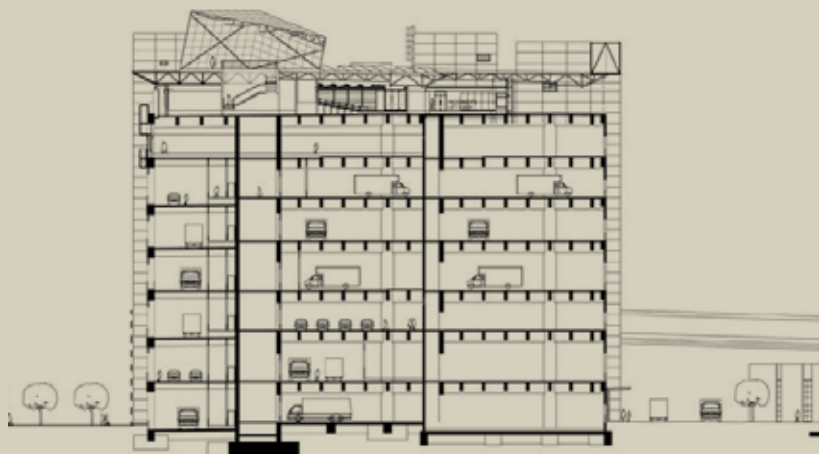
### **Improvement Scheme for Public Toilets in New Town Areas**

The architect has made visiting the public toilets more enjoyable and educational. The nine existing toilets were individually designed with due respect to the surrounding environments and communities with individual visual, cultural and social identities.



# 機電工程署新總部大樓

The New Headquarters for the Electrical and Mechanical Services Department



Location: 3 Kai Shing Street, Kowloon Bay, Kowloon, HK  
 Building Type: Office and Workshop  
 Completion Date: 2004  
 Client / Developer: Electrical & Mechanical Services Department, HKSARG  
 Project Manager: Architectural Services Department, HKSARG  
 Architect: Architectural Services Department, HKSARG  
 M&E Consultant: Architectural Services Department, HKSARG  
 Structural Engineer: Architectural Services Department, HKSARG  
 Quantity Surveyor: Architectural Services Department, HKSARG  
 Landscape Architect: Architectural Services Department, HKSARG  
 Main Contractor: China State - Samsung Joint Venture









香港國際機場自1997年從啟德搬遷後，位於九龍灣的2號機場空運貨站已停止運作。經詳細考慮後，香港特區政府決定把它改建為機電工程署新總部。這不但可以省回龐大的建築成本，減少拆卸和建築產生的廢物，並大大節省了建築過程中所消耗的能源及建材，更令這座建於九十年代初期之大樓結構能夠重生。

新大樓還落實了多項符合環保原則及嶄新概念的設計，包括：(1) 光伏板、(2) 製冰機及儲冰槽、(3) 「氨」水冷式製冷機、(4) 備有回風裝置的雙層玻璃幕牆、金屬檔陽裝置及排孔板、(5) 空中花園、(6) 光導管/天窗、(7) 移動及日光感應器、(8) 廢水回收循環再用系統、(9) 廢料管理，和(10) 紅外線和電熱能噴油房。

另外，新大樓設有一「教育徑」，其目的是通過互動的展覽去推廣機電工程署對市民的服務，以及節能和再生能源概念，並向公眾展示設於新總部大樓的環保科技，希望將環保概念帶進社區。此項目獲得香港建築師學會二零零四年年獎的優異獎。

Since the relocation of the Hong Kong Kai Tak Airport in 1997, the former HACTL 2 (Hong Kong Air Cargo Terminal 2) building has lost its previous function. After detailed feasibility studies, the Hong Kong SAR Government decided to convert this 'city remain' into the New Headquarters for the Electrical and Mechanical Services Department. Converting the building would compare favorably to the cost of a new development, and would also minimize demolition and construction waste. The concrete structures, built in the early nineties, were recycled to save huge amount of energy and building materials in the construction process. By implementing this proposal, the HACTL 2 building was 'reborn' to provide a more effective future use.

Many sustainable features have been incorporated in the building design, including the following: (1) Photovoltaic (PV) Panels, (2) Ice Maker & Tanks, (3) Ammonia Chillers, (4) Ventilated Double-Layered Glass Walls, Metal Sun Shades and Perforated Panels, (5) Green Roofs, (6) Sunpipes and Skylights, (7) Motion & Daylight Sensors, (8) Grey Water Recycling, (9) Waste Management, and (10) Infra-red Systems and Electric Heater Units for Paint Booths.

An Education Path has been incorporated into the building. The purpose is to introduce the public to Sustainable Design through interactive exhibits, and to showcase the innovative and advanced technology integrated into the building, and their wider and future applications in other buildings. The project was awarded the Merit Award of the Hong Kong Institute of Architects Annual Award 2004 in recognition of excellence in architecture.







## 新市鎮公共廁所改善計劃 Improvement Scheme to Existing Public Toilets



Location: Shek Tsai Ling, Kwu Tong/ Tsing Yeung Circuit, Tuen Mun, Tai Mei Tuk, Tai Po/ Tsing Yi New Ferry Terminus, Kwai Tsing, Cheung Fai Road, Kwai Tsing, Wang Pui Road, Shek Pik, Lantau/ Mui Wo, Lantau, Tam Kon Shan II, Kwai Tsing, Tsang Tai Uk, Shatin

Building Type: Public Toilet

Completion Date: 2001

Client: Architectural Services Department, HKSARG

Project Manager: Architectural Services Department, HKSARG

Architect: Andrew Lee King Fun & Associates Architects Limited

M&E Consultant: Rankine and Hill Engineering Consultants Limited

Structural Engineer: Pypun Engineering Consultants Limited

Quantity Surveyor: Internal QS of ASD/ Davis Langdon & Seah (Hong Kong) Limited/ H.A. Brechin & Co. Ltd

Main Contractor: Woon Lee Construction Co., Ltd/ Takenaka Hong Kong Ltd./ Aquality Engineering Co., Ltd./ Yick Hing Construction Company





九個分佈於新界及大嶼山的公共廁所之改建設計充分地體現出持續性建築的概念。每一個公廁的建築設計都盡量利用大自然的能源以供其運作，例如：高舉的屋頂配合設於外牆低位的條子洞口做成自然通風；在屋頂的天窗的傾斜角度配合特意安排在外牆上不同位置的窗口使內部得到盡多的天然光線；雨水特以儲存用作沖廁。

機電之設備亦特意為節省能源而設計，例如：當自然風速低於每小時5公里時，機動風扇會自動啟用；燈光經紅外線感應控制，有人員使用廁所之時會自動亮起來，無人時自動熄滅；感應器自動調節自來水及沖廁水的用量等等。

A practical design concept of sustainability is visualized through renovating 9 nos. of existing public toilets located throughout the New Territories and Lantau Island. Each of these toilets is designed to utilize all available natural resources for its operation – the uplifted roof structure with the low-level wall slots improve natural internal ventilation; purposely built perimeter openings with carefully orientated roof lights enable daylight penetration into the toilets; metal eaves gutter linking to the rear water tank aimed to facilitate rain water collection for recycling.

Installation of low-tech devices further enhance energy conservation - wind direction and speed sensors automatically switch on mechanical fans when wind drops below 5km/hour; infra-red motion detector automatically activates artificial lighting as moving objects are detected; timer controlled taps and urinal flushing devices automatically control use of portable and flushing water.

## METAL ROOFS

Location: Shek Tsai Ling, Kwu Tung, N.T.

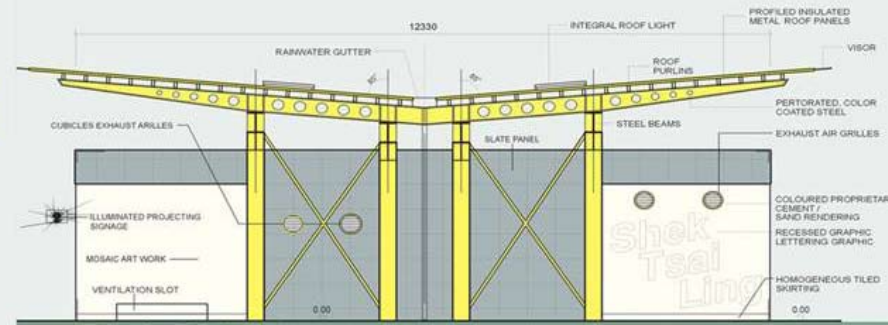
Design Approach: To replace the existing concrete roof with a "lightweight" metal roof to enable natural lighting to enter and to improve natural ventilation.

Material: Prefabricated coloured metal roof construction was selected to minimize wet-trades and wastage on site.

The coloured roofs add visual interest to the dynamic forms.

Educational: Graphically enhanced and enlarged mosaic mural of the 'Many Banded Krait' draws awareness to local wildlife.

Energy conserving installations help to minimize wastage of resources and to encourage conservation and harnessing of natural forms of energy.



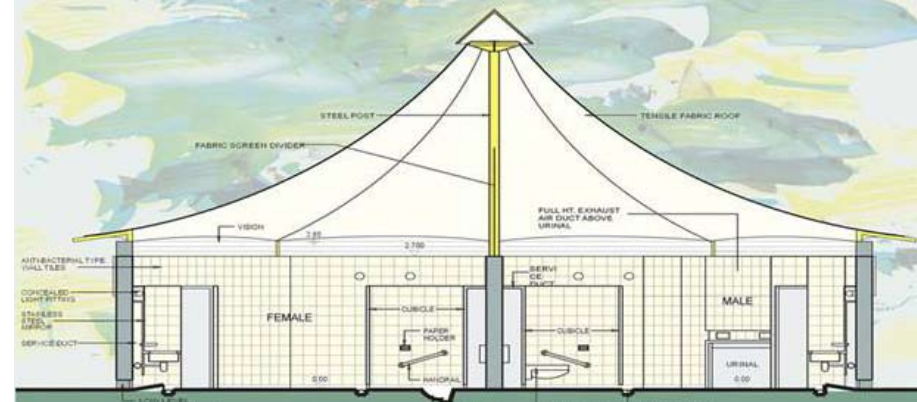
## TENSILE FABRIC ROOF

Location: Tsing Yi New Ferry Terminus

Design Approach: The existing octagonal plan form lends itself to a tent like structure which is appropriate to an island site in close proximity of the water front.

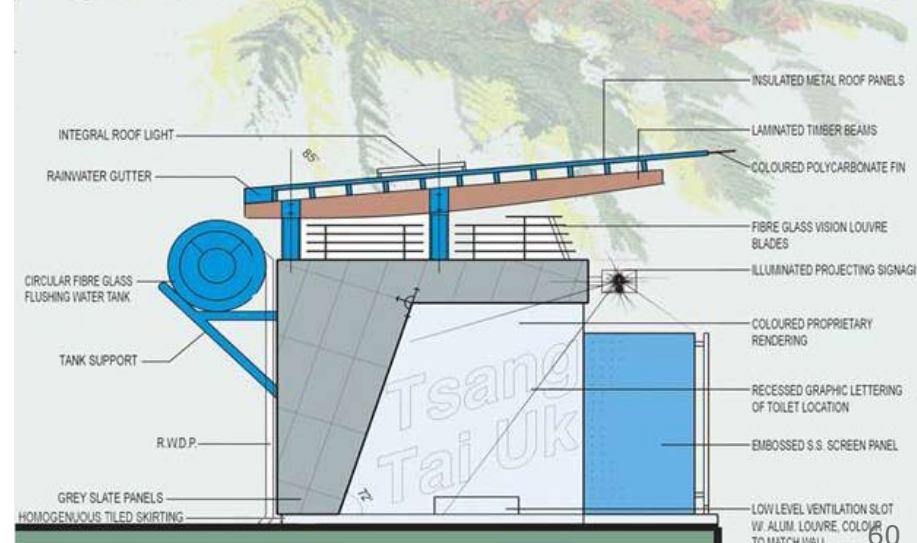
Material: Tensile fabric structures generate interesting roof lines which are reminiscent of boat sails.

Educational: Images of tropical fish are expressed using brightly coloured mosaic murals which are part of Hong Kong marine life and draw awareness to conservation and protection of the environment.



Material: Timber from sustainable forests was sourced for this project. The combination of metal and timber adds visual interest and a rustic feel to the character of this toilet.

Educational: The mural of the delonix regis is local to Tsang Tai Uk. This helps to reinforce ecological awareness to this particular location.





質素 Quality

原創 Originality



GREEN BUILDING AWARD **2006** 環保建築大獎

研究及規劃類別  
RESEARCH AND PLANNING STUDIES CATEGORY

創意 Innovation

實用 Practicality

## 2006 環保建築大獎『研究及規劃類別』評審團意見

GBA 2006 Research and Planning Studies Category, Jury's Citation

評審團主席:何鍾泰太平紳士 副主席:劉秀成太平紳士

Jury Chairman: Ir Dr Hon Raymond Ho Chung-tai, Deputy Chairman: Hon Patrick Lau Shau-shing

這十份參選報告代表在香港所進行了有關規劃及研究廣泛的專門議題；所有提交報告的研究隊伍都獲邀親自向評審小組闡述其研究結果，評審們均讚嘆眾多人員所作的努力及研究成果。他們對香港在環保及永續建築路上的貢獻是肯定的。

### 建立通風評核系統的可行性研究

在此最初步的調查結果中，我們對高密度的空氣環境有一個初期的了解。這個報告更可作為一個起點，去評核及比較不同的方案，有助在新發展上得到良好的通風系數以及了解各方案對建築物臨立的地方的影響。

### 朝著可持續發展的社區:重建牛頭角上邨第二及第三期

採用全面及綜合性的手法，規劃以可持續發展為主要議程的新住宅區，同時透過社區全面參與規劃及設計過程，與可持續社會發展目標連繫在一起。

### 福建中學的游泳池建議

在沒有先例下，此室內游泳池的設計結合了自然通風與機械通風和天然照明，達至節約能源及富可持續性。成為在發展過程中，以學術性研究成果應用於可持續性設計的典範。

### 建築生命週期的能源分析顧問研究報告

可取的能源評核工具，能快速檢測建築組件在整個建築生命週期的能源消耗。

### 建築物料及組合物的研究:生命週期評估及全壽命費用計算

最先為建築物料及組合物發展出來的本地壽命評估及全壽命費用計算的工具，可廣泛用於評估及比較不同的建築物料及組合物。

### 將廢料轉變為建築環保物料

在建築用途上，引入新技術將廢棄物料回收再造。

The ten entries represent a wide spectrum of specialised areas of research and planning studies undertaken in Hong Kong. All of proponents/research teams were invited to present personally to the Jury Panel. The Jurors were impressed by the efforts that were put into these studies and of the opinion that their results had been most useful in contributing to the emerging quest for green and sustainable buildings in Hong Kong.

### Feasibility Study for Establishment of Air Ventilation Assessment System

The initial study results enable us to take a good look at our high-rise and high-density air environment. It is a good starting point for assessing/comparing schemes to achieve good air ventilation in new developments and their effect on the existing built-up areas.

### Towards a Sustainable Community – Redevelopment of Upper Ngau Tau Kok Estate Phase 2 & 3

The project adopts a comprehensive and integrated approach in the planning of a new residential community with sustainability as the main agenda. This is coupled with social sustainability objective by involving the community and full participation in the planning and design process.

### Consultancy Study on Life Cycle Energy Analysis for Building Construction

It is a local research on developing a good energy assessment tool for quick checking on the life cycle energy characteristics of building elements.

### Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) Study of Building Materials & Components

The research represents the first ever local life cycle assessment and life cycle costing tool developed for building materials and components that could be built upon for wider use in assessing/comparing different materials and components.

### Proposed Swimming Pool at Fukien Secondary School

It is a modest project but with unprecedented planning/design efforts in integrating natural ventilation with mechanical ventilation and natural lighting for an indoor swimming pool facility towards energy conservation and sustainability. As an exemplary practice of sustainable design with academic research input in the development process, small efforts but could have big impact.

### Turning Wastes to Environmentally Friendly Construction Materials

The research demonstrates innovation in recycling waste materials for construction applications.





# 空氣流通評估方法可行性研究

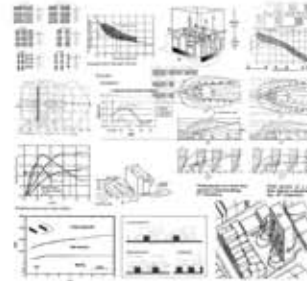
## Feasibility Study for Establishment of Air Ventilation Assessment System



Project Type: Research  
 Study Period: October 2003 – June 2005  
 Project Sum: HK\$1,200,000  
 Client: Planning Department HKSAR  
 Principle Investigator: Professor Edward Ng, CUHK  
 Project Coordinator: Mr Kam-Sing Wong, CUHK  
 Team members: Ms Vicky Cheng, CUHK / Mr Benny Chow, CUHK / Professor Essy Baniassad, CUHK / Professor Tsou Jin Yeu, CUHK  
 Wind Engineer: Mr Anton Davies, RWDI, Canada  
 Town Planning Consultant: City Planning Consultants Ltd.  
 Specialist Consultants: Prof. Baruch Givoni, UCLA, USA / Prof. Lutz Katschner, Kassel University, Germany / Prof. Kenny Kwok, HKUST / Prof. Shuzo Murakami, Keio University, Japan / Prof. Mat Santamouris, University of Athens, Greece / Dr Wong Nyuk Hien, NUS, Singapore  
 Advisors: Professor Phil Jones, Cardiff University, UK / Professor Lam Kin Che, CUHK / Mr Anthony Ng, CUHK / Professor Wong Tze Wai, CUHK

# Establishment of Air Ventilation Assessment System

## 空氣流通評估方法可行性研究



### Background

To promote better layout of building blocks in the city, we are examining the practicality of stipulating air ventilation assessment as one of the considerations, similar to traffic and infrastructure capacities, for all major development or redevelopment proposals and in future planning. We propose to consult stakeholders on the measurement, scope and mechanism of application and other detailed requirements for an air ventilation assessment

Team Clean 8.2003



「為使城市樓宇規劃更趨完善，我們研究在處理所有大型發展、重建計劃和其他未來規劃時，可否如衡量交通流量和評估基礎建設需求一樣，把空氣流通評估作為其中一個考慮因素。」

全城清潔策劃小組

社會人士呼籲政府修訂改善本港都市居住環境的招標。在全城清潔策劃小組最後報告書所提及的建議中，把風環境評估作為其中一個考慮因素。小組要求規劃署對引進風環境評估及一些相關如評估準則、方法、應用範圍和實施機制等，與有關的政府部門討論，並徵詢專業和相關團體的意見。探討能否建立一些標準，以評估大型規劃及發展建議對戶外空氣流動情況所產生的影響，以期取得滿意的總體環境通風狀況。



### Study Objective

Explore the feasibility of establishing protocols to assess the effects of major planning and development proposals on external air movement for achieving an acceptable wind environment.

資料研究，以檢討當前最新的知識及其限制。了解同類研究總結所得的經驗。初步探討，以了解香港目前的城市狀況，找出關鍵的問題及所要注意的事項。探討可否制訂表現效能標準，用來評估都市發展對通風環境的影響。探討制訂實際而富有成本效益的評估方法的可行性。查察有效實施機制的切實可行程度。確立相關原則及應用規範，以供專業人士及業界規劃及設計有助空氣流通的建築環境。





# Feasibility Study for an Assessment System 評估方法可行性研究



行人路的通風量過低是本港市區內其中一項常見的通風問題。密集式的樓宇佈局、單一的樓房高度、封閉的大型平台式建築群、狹窄的建築物間距、逆風向的樓宇排列、稀有的綠化遮陽空間等均令市區行人道通風問題惡化。若能了解現有的城市結構問題，我們便易於掌握該如何有效改善生活環境的質素。

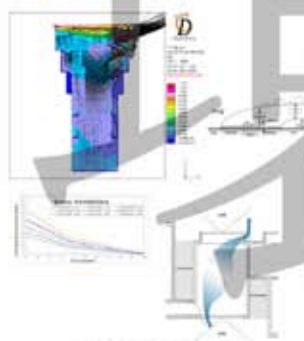


**Key Contributing Team Members:**  
Professor Edward Ng 吳恩瀾教授 (Research Leader) (HKGA) • Mr Kam-Sing Wong 黃錦星 (HKGA) • Ms Iris Tam 譚小旋 (HKP) • Ms Vicky Cheng 鄭寶儀 • Professor Baruch Givoni • Professor Lutz Katzschner • Professor Kenny Kwok 郭小齊教授 • Professor Shuzo Murakami 村上三三教授 • Professor Mat Santamouris • Dr Wong Nyuk Hien 黃玉賢博士 • Professor Lam Kin-Chi 林健枝教授 • Professor Wong Tsz Wai 黃子蕙教授 • and many more ...

協辦：業界人士、土木工程師、環境保護署、香港天文台、房屋署、地產署、屋宇署、房屋及規劃地政局和政務司可長辦公室的可離發展組。

## Issues

# 環境



### Wind / Air Ventilation for What ?

健康與舒適相互關連。身心舒暢能有助個人健康發展。世界衛生組織自一九四八年成立後，對健康作出以下定義：健康不僅為疾病或身體衰弱之消除，而是體格、精神與社會之完全健康狀態。有鑑於環境對人類健康的直接影響，因此研究不能忽視居民的長期健康與其身心舒適的密切關係。

### Indoor:

Effective ventilation of interior spaces improves health and comfort of occupants. A certain air change (ACH) is needed. In addition, to achieve a comfortable thermal environment in the summer months of Hong Kong, a steady indoor air movement across the occupant space is desirable. To maximize the ventilation potentials of interior spaces, it is important to ensure a conducive outdoor macro wind movement environment, and to design building and openings of buildings appropriately.

### Outdoor:

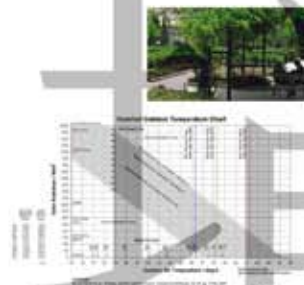
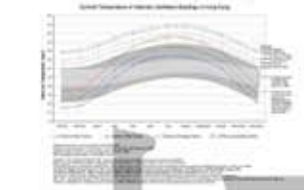
Outdoor thermal comfort could be achieved when the following factors are balanced: air temperature, wind speed, humidity, activity, clothing and solar radiation. Achieving a quality outdoor thermal environment for Hong Kong is an important planning consideration. A well designed urban wind environment will also benefit the individual buildings and their probability of achieving indoor comfort, as well as contributing to other benefits.

### Dispersion:

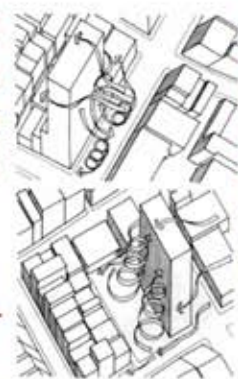
In general, a higher wind movement of a certain characteristics across the urban fabric will assist the dispersion of anthropogenic wastes and pollution. It should be noted that pollution should best be tackled at sources, and the Environmental Protection Department (EPD), HKSAR has already established guidelines and mechanisms to deal with the issue.

### Gust:

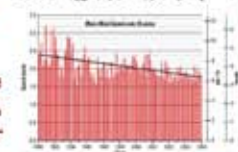
In general, high turbulent wind will cause safety concerns to pedestrians – especially when coupled with colder temperature in winter. Localized wind shelters or canopies may be needed for some exposed locations.



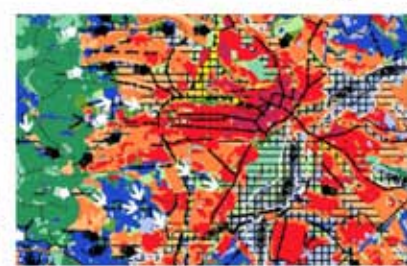
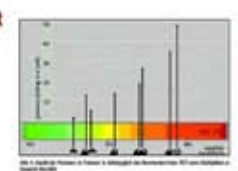
# Feasibility Study for Establishment of Air Ventilation Assessment System 空氣流通評估方法可行性研究



Scientific studies guide the investigations. What is the kind of wind / air ventilation we need? Why are we not getting it? What are the problems / issues not having it? How one could optimize our urban environment? What should be done? What are the most effective ways to implement? Are there methods to guide us? Are there tools one could use? How much do we know our environment? Do we need a new method? And many more...



## Sciences into Design and practice



## Researches guide actions





# Implementation

我們鼓勵官方/半官方

- 制定分區大綱
- 進行編制法律規
- 在指定的主風道
- 涉及多個地點
- 對海傍地區，尤
- 高密度的大型區
- 在高密度市區的

- Preparation of new
- Development that
- Erection of building
- Development that
- Development with
- Large-scale develop
- Massive elevated

**Assessment Methodology**  
The Technical Guide is for  
Ventilation Assessment

**Indicator**  
Wind Velocity Ratio (VR)  
location could be enjoyed  
wind conditions in Hong  
Kong better.

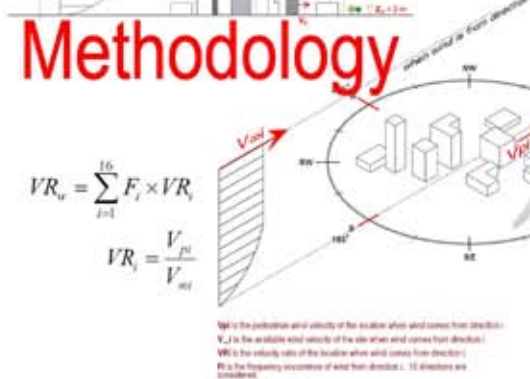
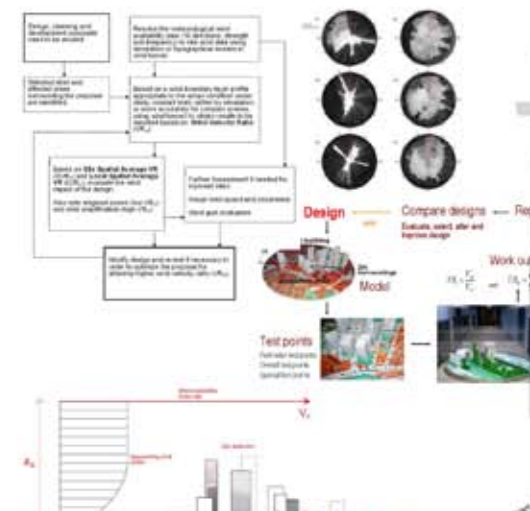
**Assessment**  
Expert Evaluation: (a) It  
obvious problem areas  
Defines "foci" and m  
Initially assesses the ch  
site. (b) Gives a gener  
wind performance at the  
Ratio (VR). (c) Further  
tion. (d) Further defines  
Detailed Study. Detailed  
of the wind availability (V  
points. Report Site VR  
summary of how the ide

**Site Wind Data**  
For the Expert Evaluation  
servatory Waglan weath  
ate mathematical model  
the Detailed Study. "Exp  
Using large scale topog

**Tools**  
Wind tunnel is recomm  
namics (CFD) may be u  
les.

**Project Assessment A**  
The testing model shoul  
fined by the project site  
the project. The Asses  
project's surrounding up  
being the height of the t  
ing Area is important, as  
text to the Assessment A

**Test Points**  
Based on the Wind Vel  
ment of the project can  
fined on the project site  
mediate" effect of the p  
points are evenly distribu  
streets and places of the  
trains frequently access  
areas that problems are  
vide additional informati  
Wind Velocity Ratios of  
Two ratios may also be  
marise the overall impac  
son: Site spatial averag  
erage velocity ratio (LVR



## Feasibility Study for Establishment of Air Ventilation Assessment System

### 空氣流通評估方法可行性研究



在香港，行政長官在《一九九九年施政報告》中清楚闡述，若我們要把香港建設成世界級都會，使香港成為一個整潔、舒適、足以自豪的美好家園，我們需要從根本上改變觀念。市民、商家、政府決策局和部門都應該通力合作，一起實踐可持續發展。根據香港首個可持續發展策略文件，社會人士呼籲政府制定改善本港都市居住環境的措施。同時，在全城清潔策劃小組最後報告中所提及的建議中，在主要計劃建議和未來規劃中，把風環境評估作為其中一個考慮因素。

香港是世界上人煙最稠密的城市之一。高密度城市生活的代價就是難以配合自然環境。因此，完善的設計是非常重要的。而透過一些工具，可令政府當局、規劃師、工程師、建築師和業界人士有效地改善市區內的空氣流通情況。是次研究的目的，是希望提倡以科學的方法改變市區面貌，籍以為香港人在人煙稠密的城市中締造長久的生活質素。在是次研究中，採用了風速比作為指標。風環境評估方法經科學與實際情況的定義了評估範圍、四週環境、測試點的位置、計算的方法，地盤空間的平均風速比，局部空間的平均風速比，和測試的程序。是次研究建議分階段執行，採用指引形式落實風環境評估機制。是次研究亦建議一系列能與香港規劃標準與準則配合的設計指引。

Refer to the 1st Sustainable Development Strategy for Hong Kong, there are calls from the community for measures to improve the quality of our urban living environment. And among the recommendations in the Team Clean Final Report, it is proposed to examine the practicality of stipulating air ventilation assessment as a consideration for major project proposals and in future planning.

Hong Kong is one of the densest populated cities in the world. The "sunk cost" of high-density living is that it is difficult to optimize urban design for the benefits of the natural environment. Good designs are critically important, and tools are beneficial to assist the government, planners, engineers, architects and industry stakeholders to better optimize air ventilation for our city. The study aims to develop more scientific based urban interventions for enhanced, long-term quality of life in the high-density urban context of Hong Kong. The concept of Velocity Ratio has been used. The Air Ventilation Assessment Methodology also defines scientifically and practically the assessment areas, the surrounding areas, the position of the test points, the calculation methods, as well as the test procedures. The study recommends an implementation procedures and conditions of sites requiring AVA. The study also suggests a number of design guidelines, which could be incorporated into HK Planning Standard and Guidelines.





# Implementation

訂組織在任何下列情況下進行風環境評估：

- 對分區大綱圖進行重大修訂。
- 定發展限制的發展項目，但可獲修訂申請予以寬免。
- 建造建築物。
- 結合，兼且封閉現有街道及在街道上興建樓宇的市區重建發展項目。
- 其是對指定區域的大氣域有詳載效應的發展項目。
- 發展項目。
- 道路上興建大型高架建築物。

town plans and major revision of such plans.  
(deviates from the statutory development restriction(s)).  
structures within a designated breezeway.  
involves agglomeration of sites / closure and building over of existing streets.  
shielding effect on waterfront, particularly in confined airsheds.  
ment with a high density.  
structures over a road in the dense urban areas.

ogy  
to assist project proponent to undertake Air  
(AVA).

indicates how much of the wind available of a  
ed by pedestrians. Given the general weak  
Kong, the higher the wind velocity ratio, the

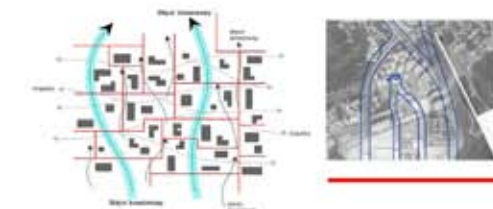
identifies good design features. (b) identifies  
and propose some mitigation measures. (c)  
methodologies of the studies. Initial Study: (a)  
characteristics of the wind availability (V<sub>w</sub>) of the  
pattern and a rough quantitative estimate of  
pedestrian level reported using Wind Velocity  
refines the understanding of the Expert Evalua-  
the "focuses" and methodologies of the De-  
Study. (a) In detail assesses the characteristics  
(V<sub>w</sub>) of the site. (b) Reports all VR of test  
(SVRw) and Local VR (LVRw). (c) Provides a  
nified problems, if any, had been resolved.

in, make reference to data of Hong Kong Ob-  
ser stations. For the Initial Study, use appropri-  
te to "simulate" the site wind data (V<sub>w</sub>). For  
perimental site wind data, should be used.  
aphical model tested in a wind tunnel.

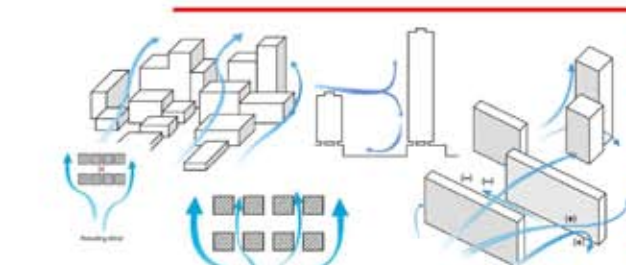
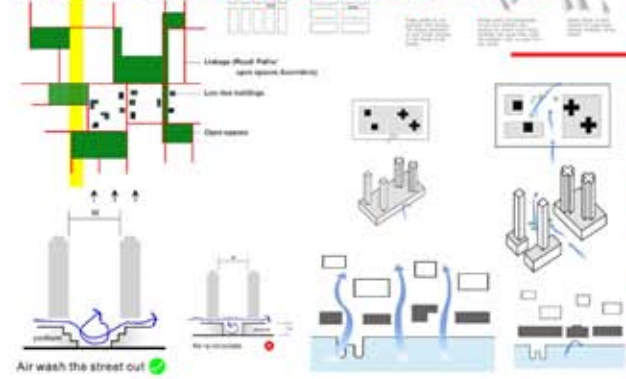
ended for the Studies. Computational Fluid Dy-  
sed and typically admissible for the Initial Stud-

areas  
include the following. The Project Area is de-  
boundaries and includes all open areas within  
ment Area of the project should include the  
to a distance H from the project boundary. H  
allest building on site. Include the Surround-  
it gives a reasonable and representative con-  
Area.

city Ratios of the test points, the wind environ-  
be assessed. Perimeter test points are posi-  
boundary. They are useful to assess the "im-  
ject to the Assessment Area. Overall test  
uted and positioned in the open spaces, on the  
project and Assessment Areas where pedes-  
Special test points may be positioned in  
likely to appear. They independently may pro-  
on to designers. For the purpose of AVA,  
all test points should be individually reported.  
reported, they give a simple quantity to sum-  
on the wind environment for easy compari-  
Velocity Ratio (SVRw) and Local spatial av-  
w).



# Recommendations



## What is next

**Urban Climatic Map:** instead of assessing a proposal when it arises, it is beneficial to know the wind availability and problems of a site beforehand. Urban Climatic Map offers such a possibility. Developed initially in Germany, the map scientifically identifies the wind issues of areas. Sensitive areas warranting special planning requirements could be identified.

**Benchmarking:** Given Hong Kong's existing high density urban form, it is necessary to know - what can reasonably be achieved? - What is the reasonable aspiration? - What could reasonably be done?

**Quantitative guidelines** can be in the form of simple ratios, indexes. When applied, development proposal would be deemed to satisfy air ventilation requirements without the need to go through the testing process.



## Guidelines

The guidelines provide designers with a strategic design guidance. By observing the guidelines, there would be a higher probability that the design is better for the wind environment. This could later be confirmed with the Air Ventilation Assessment.

## Breezeway / Air path

It is important in a dense, hot-humid city to let more wind penetrate through the urban district. Breezeways can be in forms of roads, open spaces and low-rise building corridors through which air reaches inter parts of urbanised areas largely occupied by high-rise buildings.

## Orientation of Street Grids

An array of main streets, wide main avenues and/or breezeways should be aligned in parallel, or up to 30 degrees to the prevailing wind direction, in order to maximize the penetration of prevailing wind through the district.

## Linkage of Open Spaces

Open spaces may be "linked and aligned" in such a way to form breezeways or ventilation corridors.

## Non-building Area

The tendency for developments to maximize views to certain direction and site development potential often results in congested building masses and minimum spaces between buildings. Development plots should be laid out and orientated to maximize air penetration by aligning the longer frontage in parallel to the wind and by introducing non-building areas and setbacks.

## Waterfront Sites

Waterfront sites are the gateways of sea and land breezes. Buildings along the waterfront should avoid blockage of winds.

## Scale of Podium

The 100% site coverage for non-domestic part of developments up to some 15m high often results in large podiums. For large developments/ redevelopment sites particularly in the existing urban areas, it would be critical to increase permeability of the podium structure at the street levels by providing some ventilation corridors or setback in parallel to the prevailing wind. Where appropriate, a terraced podium design should be adopted, which can help air movement at the pedestrian level.

## Building Heights

Height variation should be considered with the principle that the height decreases towards the direction where prevailing wind comes from. The stepped height concept can help optimize the wind capturing potential of the development itself.

## Building Disposition

Adequately wide gaps should be provided between building blocks to maximize the air permeability of the development and minimize its impact on wind capturing potential of adjacent developments. The gaps for enhancing air permeability are preferably at a face perpendicular to the prevailing wind.

## Shading and greenery

Tall trees with wide and dense canopy should be planted along streets / entrance plazas / setback areas for maximizing pedestrian comfort.

## Cool materials

Use of cool materials in the pavements and building facades to decrease absorption of solar radiation. For streets, the use of asphalt with a high percentage of white aggregates has to be considered. A large water body can also serve as a cool sink.

## Projecting obstructions

Massive projecting obstructions, may adversely affect the wind environment at pedestrian level. Signage is preferably of the vertical type, particularly in those areas with a high density of projecting signs over streets.

**主風道 / 風道**  
在人煙稠密、悶熱潮濕的都市中，必須讓充足的空氣流通市區，保持良好通風效果。主風道可以道路、空曠地方及低層樓宇走廊形式，將氣流深入高層大廈林立的都市內部區域。

**街道格網的定向**  
大馬路、主要橫街及 / 或主風道應該與盛行風的方向平行排列或成小角度，這樣，通行風才可充分引入市區。

**將空曠地方連為一體**  
如情況許可，空曠地方應連接、合併一起，形成主風道或通風走廊，並應以低層建築為主以減少阻礙。

**非建築範圍**  
不少建築物會爭取某些方向的景觀，並且盡用地的發展潛力，以致建築物過分集中，大而密佈的建築群尤其有礙通風。因此，在發展用地的規劃及定向，應讓建築物較長的一面與風向平行，並盡量設立非建築範圍及建築退入區，達到最大的通風效果。

**海傍地區**  
在海水與太陽的熱作用下，會出現海陸風，而海傍正是這兩種風的必經大門。因此，在海傍地區建造樓宇時，應避免阻礙海風及盛行風。

**平台結構**  
在現時市區中的大型建築或超地盤，應當於地面設置通風走廊，並與盛行風向平行。這樣，才可改善平台結構對路面的通風度的影響，如情況許可，應盡量採取較型的平台設計，將風流送上空以傳至地面，此舉不但令行人路的空氣更加流通，而且亦有助驅散污染物。

**建築物的高度**  
應盡量避免建築物高度一致。原則上，建築物越靠近盛行風的風源方向，其高度應越低。這種階梯型的建築物高度設計概念，能夠大大改善建築群的通風情況。

**建築物的排列**  
每層樓宇之設置應可保持足夠距離，保持建築群空氣流通，減低對通風的環境的影響。兩次排樓風情況，樓宇之間的空隙應排列在與盛行風向成角度的平面上為佳。

**道路與綠化**  
在街道兩旁、廣場、建築退入區等地方，應種植一些高大、茂密的樹木，使行人區域更加舒適。

**冷質物料**  
路面及建築外牆應採用冷質物料，可減少日光的吸收。

**配件的設置**  
為求減少配件物對通風程度的阻礙，裝置廣告招牌時，應儘可能以垂直的方式排列。

Urban Acupuncture: Towards a healthier city. Minimum intervention, maximum achievement.

都市針灸是本研究的一個發展概念，比繪以最少的干預達到最理想的都市風氣效果，將自然風再次引進我們的都市。



# Urban Acupuncture

## Feasibility Study for Establishment of Air Ventilation Assessment System

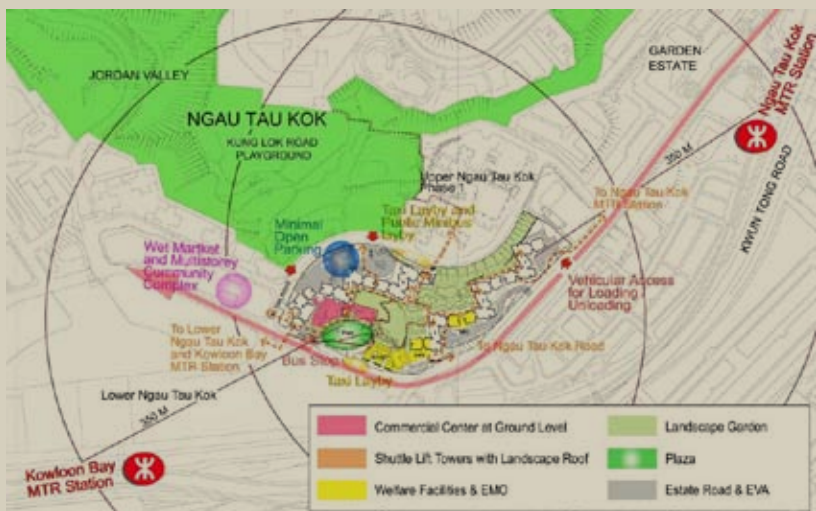
### 空氣流通評估方法可行性研究





# 邁向可持續發展社區 – 牛頭角上邨二、三期重建項目

## Towards a Sustainable Community – Redevelopment of Upper Ngau Tau Kok Estate Phases 2 & 3



Project Type: Research and Planning Study in Public Housing Development

Study Period: Early 2002 to present

Project Sum: HK\$980M

Client: Hong Kong Housing Authority

Principle Investigator: Development and Construction Division, Housing Department, HKSAR / Ove Arup & Partners Hong Kong Limited

Structural Engineer: Development and Construction Division, Housing Department, HKSAR

Specialist Consultants: Ove Arup & Partners Hong Kong Limited / Meinhardt (M&E) Ltd. / Maunsell Environmental Management Consultants Ltd.









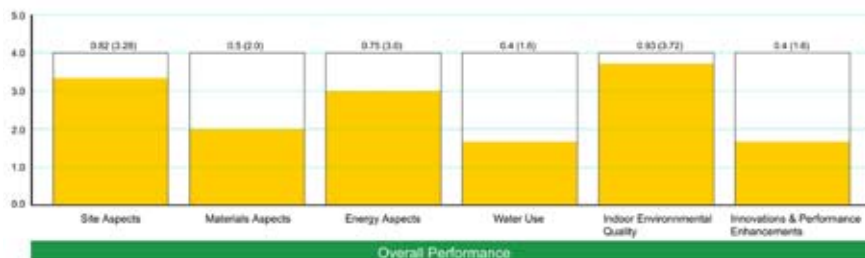
HK-BEAM Society

香港環保建築協會

HONG KONG BUILDING ENVIRONMENTAL ASSESSMENT METHOD FOR NEW BUILDING, Version 4/04

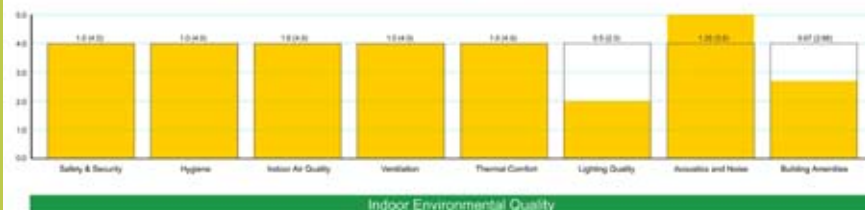
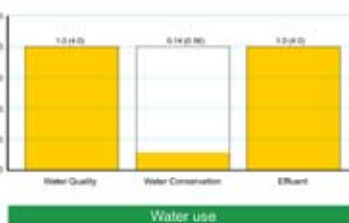
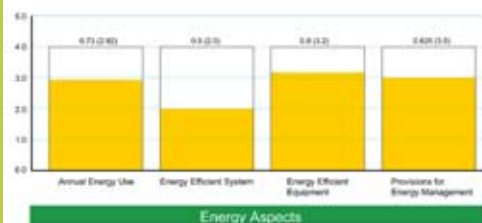
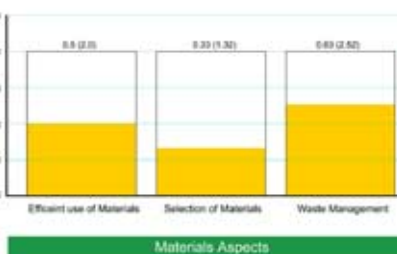
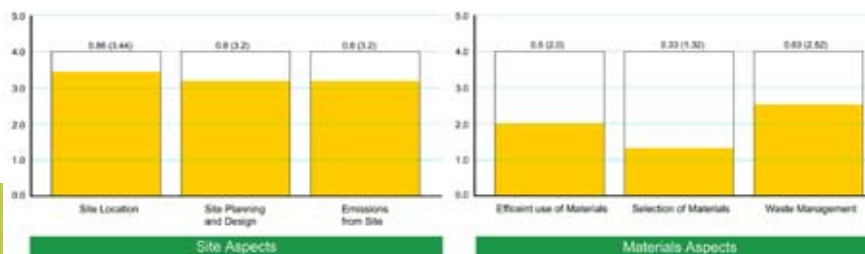
香港建築環境評估法

Assessment Results

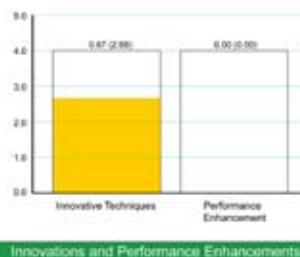


In August 2003, BEC was commissioned by the Housing Authority (HA) to undertake a HK-BEAM New Building Development (Version 4/03) assessment for the Housing Development at Upper Ngau Tau Kok Estate, Phase 2&3. However, following a meeting with designers on 10<sup>th</sup> March 2005 and consequent discussions, it was agreed that HK-BEAM (Version 4/04) for New Building Development would be adopted for this project instead.

Based upon information provided, the design of the Housing Development at Upper Ngau Tau kok Estate, Phase 2&3 has achieved 84 out of the 112 credits available. (Some of the credits achieved are provisional credits i.e. require submission of additional materials from the project team and site inspections for further confirmation). Furthermore, for the Indoor Environmental Quality (IEQ) section, 28 out of the 30 applicable credits have been achieved. This accomplishes the HK-BEAM rating of Platinum at this provisional stage of the assessment.



Section	Credits Applicable	Credits Achieved	% Achieved
Section 2 - Site Aspects	22	18	82%
Section 3 - Materials Aspects	22	11	50%
Section 4 - Energy Use	28.0	21.0	75%
Section 5 - Water Use	10	4	40%
Section 6 - Indoor Environmental Quality	30	28	93%
Section 7 - Innovations and Performance Enhancements	5**	2*	-
<b>Total Credits Achieved</b>	<b>112**</b>	<b>84*</b>	
<b>Total % Achieved</b>		<b>0.75</b>	
<b>Current Rating</b>		<b>Platinum</b>	



建議發展計劃透過全面規劃和設計，在經濟、社會和環保三個可持續發展主要因素之間取得了平衡。而設計目的，是在高密度城市環境下營造健康居住環境、擴大綠化層面，以及締造可持續的鄰舍生活。

我們在不同設計階段進行各種研究，協助確定最終設計方案。其中最重要的，是創先應用全面環境研究到設計過程上。這些研究包括風環境、天然通風、採光和溫適度。其他研究包括噪音和隔音、水管和排水設施、樓宇生命周期成本計算、使用者調查等等。此外，設計小組更與準租戶組成的關注團體維持伙伴關係，聽取他們的需要和意見，並讓他們參與一些特殊地方的設計。

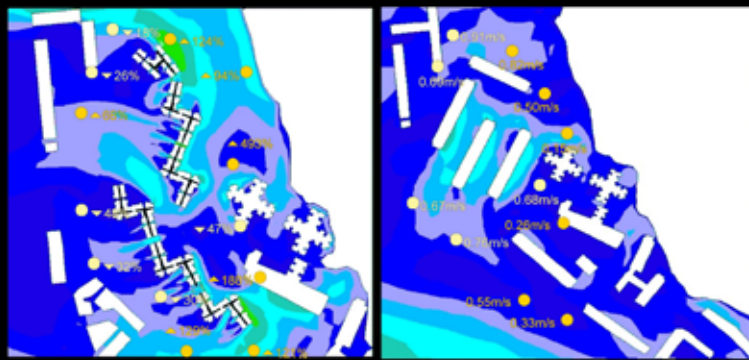
Through a holistic approach on planning and design, the proposed redevelopment demonstrated a design that balances the three major aspects of sustainability, namely Economical, Social and Environmental initiatives. Given a high-density context, the objectives of the design are to urge for a healthy living environment, more greening and a sustainable neighbourhood living.

Various studies have been carried out at different stages of design to mould the final product. One of the most important studies is its pioneer application of a comprehensive environmental study through the design process. These studies include wind environment, natural ventilation, daylight and thermal comfort. Other studies include noise and acoustics, plumbing and drainage, life cycle costing and user survey, etc. The design team has also maintained a partnering relationship with the Concern Groups formed by the prospective tenants through listening to their needs and comments and engaging them in the design of special areas.



Proposed Redevelopment

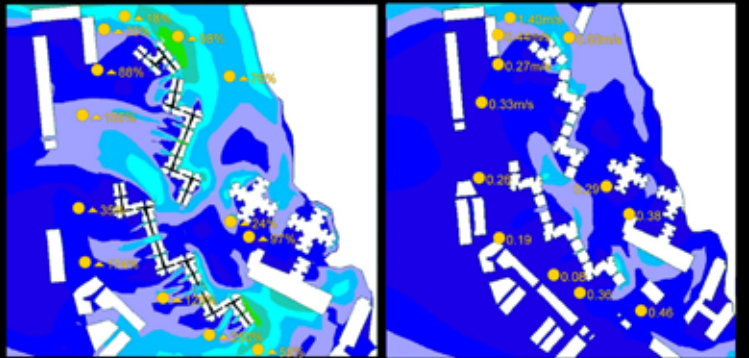
Before Redevelopment



- Simulations carried out to compare wind environment before and after redevelopment

Proposed Redevelopment (WITH cross-ventilated re-entrants)

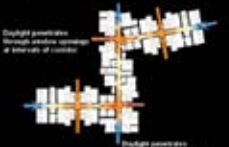
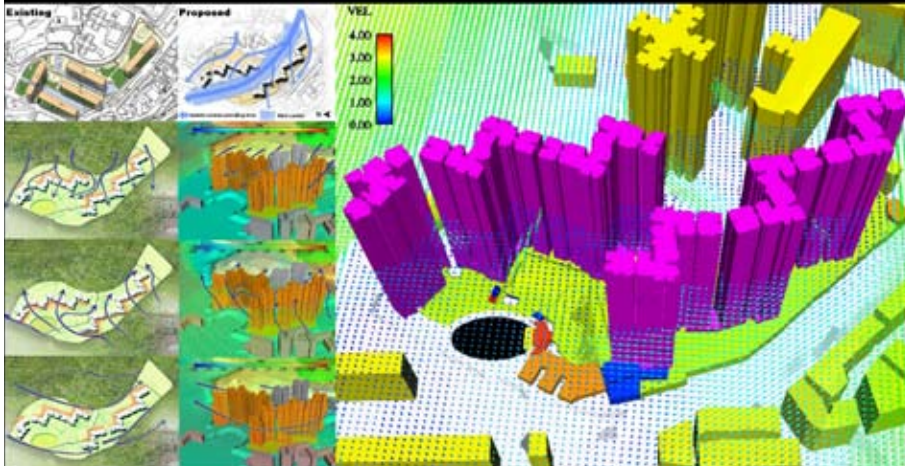
Proposed Redevelopment (WITHOUT cross-ventilated re-entrants)



- Investigation on effect of cross-ventilated re-entrants in domestic towers

Easterly Prevailing Wind + 40mPD

Microclimatic conditions before and after the proposed redevelopment are analysed for facilitating design measures to minimize any adverse impact onto the neighbourhood.



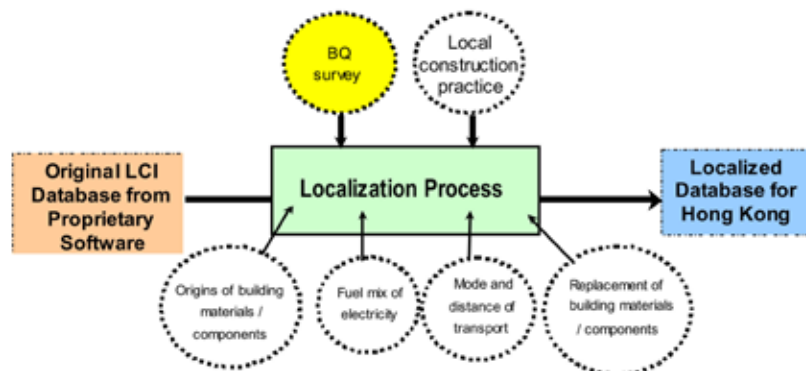
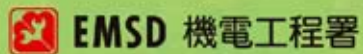


# 建築物生命週期能源分析之顧問研究

## Consultancy Study on Life Cycle Energy Analysis of Building Construction

Project Type: Research  
 Study Period: 2003 - 2005  
 Client: Electrical and Mechanical Services Department  
 Principle Investigator: Ove Arup & Partners Hong Kong Limited  
 Specialist Consultant: Department of Building Services Engineering, Hong Kong Polytechnic University  
 Quantity Surveyor: Levett & Bailey Chartered Quantity Surveyors Ltd.

# Life Cycle Assessment (LCA) and Life Cycle Cost (LCC) Tool for Commercial Building Developments in Hong Kong

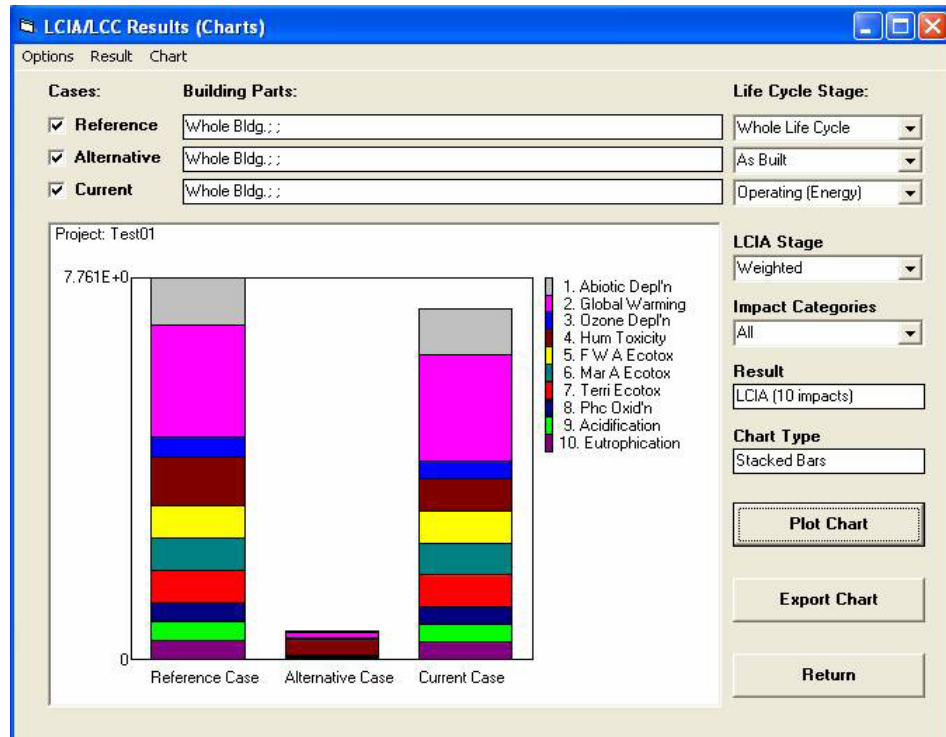
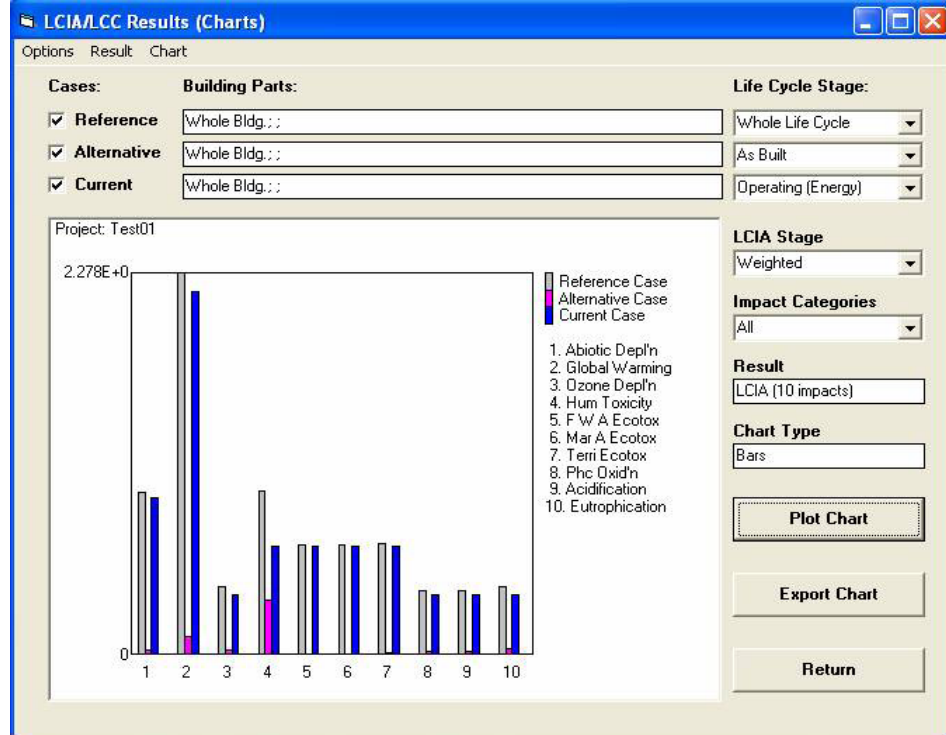


2002年，為響應建造業檢討委員會的建議，機電工程署委託奧雅納工程顧問進行一項研究，名為「建築物生命週期能源分析之評估」。它旨在開發一套給所有建築及建造業持份者包括政府部門、開發商、建築師、工程師、施工人員和建築管理人員客觀的分析評價工具，可以用來對建築開發、施工和運行等階段對環境和成本的影響進行評估。

生命周期能源分析是目前全球用于全面評價建築可持續性的一種高級專門技術。本研究在開發過程中，對本地商用建築進行調查，從而得到本地建築材料和設備系統的實際采用情況，然後建立生命周期能源數據庫進行分析。為了使建築物從“出生到死亡”的循環模型能夠閉合，我們開發了一個詳細但計算效率很高的模型用來模擬建築運行能耗狀況，最後形成一個較易使用的計算工具軟件，可以輔助建築專業人員對建築設計進行全生命周期能源分析。我們亦正在組織工作坊及培訓班給建築專業人員去熟悉工具軟件的操作。（詳情可瀏覽EMSD網頁<http://www.emsd.gov.hk>）

In response to the recommendations of the Construction Industry Review Committee (CIRC), Electrical and Mechanical Services Department of HKSAR initiated a consultancy study titled Life Cycle Energy Analysis of Building Construction (LCEA) in 2002. Ove Arup and Partners Hong Kong Ltd. were commissioned for the Study. The objective of the Study is to develop an objective tool for all the stakeholders of our building and construction industry, including the government, developers, architects, engineers, constructors and building operators etc to assess the environmental and cost impacts associated with the construction and operation of buildings.

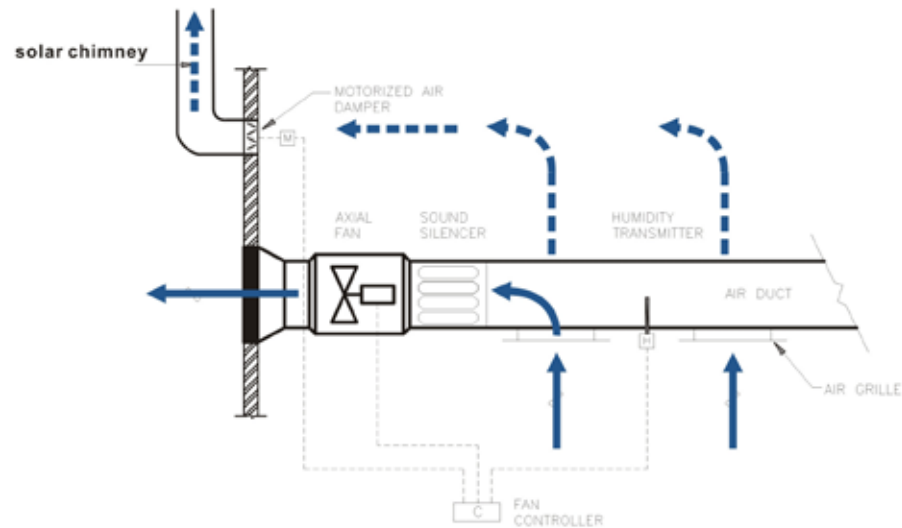
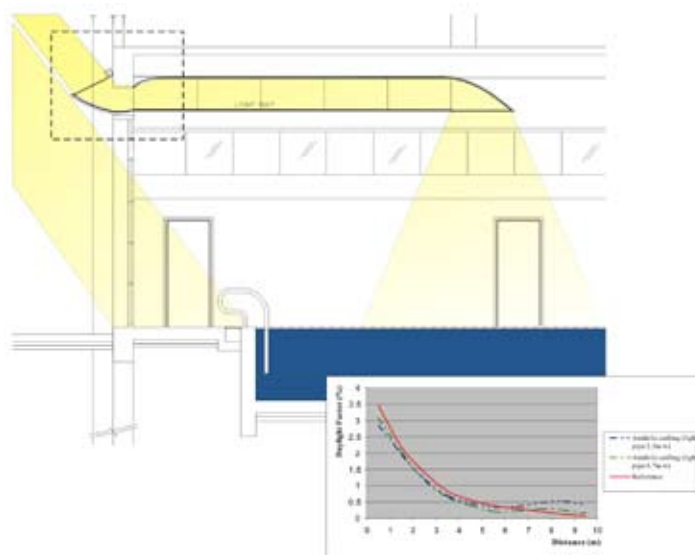
LCEA is a state-of-the-art technology adopted globally to assess the sustainability of buildings. To establish our localized LCEA model, the Study has identified the typical building materials and services systems that were used in the commercial buildings of Hong Kong through a comprehensive survey and then derived a localised database for performing consistent LCEA analysis. In order to close the loop of the “cradle to grave” model, a detailed yet computationally efficient model was also developed for predicting the operating energy use in buildings. The final product is a user-friendly tool that can facilitate building professionals to conduct LCEA study. Technical workshops and training sessions are being organized to familiarize the professionals with the LCEA tool. (Details are found in EMSD website: <http://www.emsd.gov.hk>)





# 福建中學 - 游泳池興建計劃

Sustainable Design for Swimming Pool Complex at the Fukien Secondary School, Hong Kong



Client: Fukien Secondary School  
 Project Manager: Hong Kong Polytechnic University  
 Architect: PK Ng Associates  
 M&E Consultant: Rankine & Hill Associates Ltd.  
 Structural Engineer: Wong and Cheng  
 Sustainable Design: University of Hong Kong: Prof. SSY LAU,  
 Baharuddin, Cargo CHAU, Sam YIU,  
 Man Mo KWOK, Prof. Yuguo LI, X.H. HUANG,  
 HANG Jian

The Fukien Secondary School approaches the University of Hong Kong for advice on sustainable technologies for its new sports facility at the Kwun Tong premises. Research team from HKU consists of Prof. Stephen Lau and Prof. Y Li from the architecture and mechanical engineering departments work closely with the design team adhering to an integrated design process (IDP). There are several sustainable design technologies.

The first feature is the passive solar design directing daylight into the interior for energy saving benefits. The design combines scientific based theory for Anilotic daylight projection for interior space combining solar geometry and light pipe. The design process makes use of daylight design software to generate predictive and visual results. Once the local sun-path is tracked, it is then possible to introduce PASALI design that integrates natural and artificial lighting by means of electronic (dimming) control system and light sensors.

The second feature is an experiment with a climatically acceptable indoor environment that is based on natural (cross) ventilation and minimal assisted mechanical ventilation using exhaust fans with temperature and humidity sensors as a control device. Engineers from HKU provide computational fluid dynamics analysis to simulate performance at different air flow rates to inform the designer about the dynamics of air movement. The designers also propose the deployment of solar chimney as a means to induce air flow by stack effect. The CFD simulation is an effective tool for designers to visualize thermal performance under simulated scenarios.

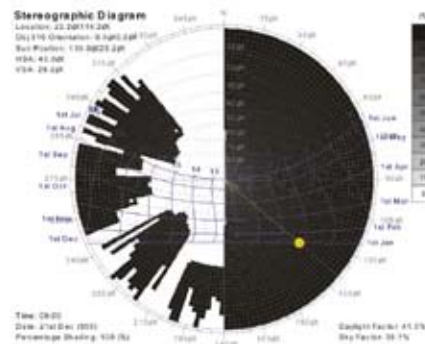
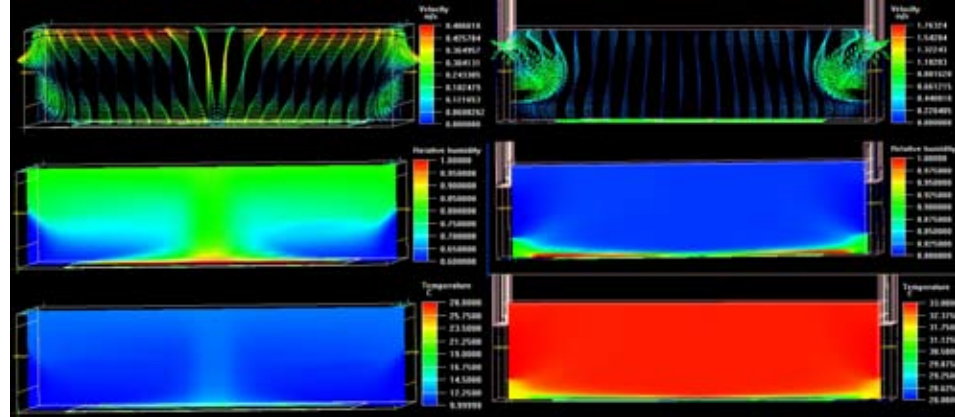
The third feature is the refinement of the mechanical extract system for the changing rooms in response to potential health threats experienced during the 2003 SARS incidents. The designers insists on relocating the extract ducting to be immediate next to the washroom utensils so that foul air could be extracted at source opposed to ceiling extractors in an traditional layout. This is deemed an important statement for maintaining sustainability in an architectural design.

The fourth feature is the introduction of renewable energy facility for demonstrative and education purpose. Due to limited space, the designers could only find limited locations for installing photovoltaic panels installed on the roof and incorporation of data display installation for demonstrative purpose.

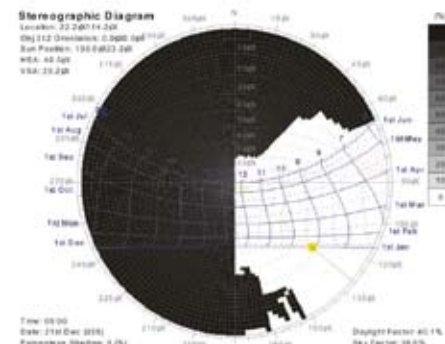
The entire design process is documented for the university team as educational seminars for educating the school students as well as teachers. This is considered the most important contribution for the education of young people, to bring them closer to sustainability consideration.

Last but not the least feature is the use of 'green tile', a proprietary external facing tiles that is designed to be self cleansing and pollutant-free.

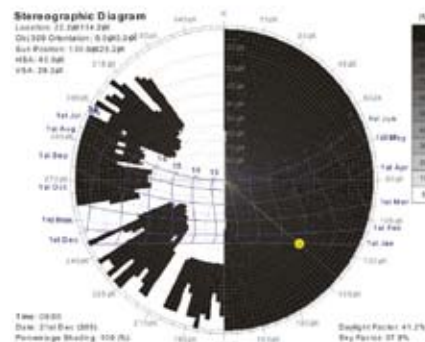
Everything in this project will serve an educational purpose to educate its users, visitors and operators to represent its collective efforts towards a lesser CO<sub>2</sub> emission, and lesser non-renewable energy consumption. It is also used as an applied research, combining the best of academic researchers and that of the professionals



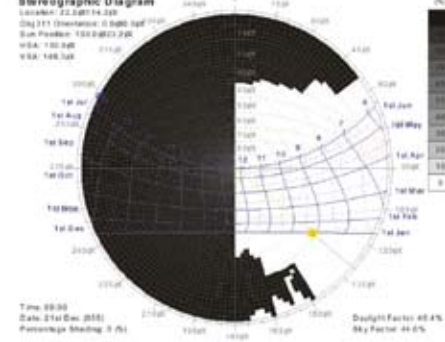
Location 6



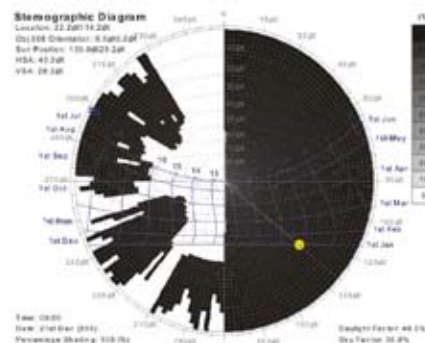
Location 3



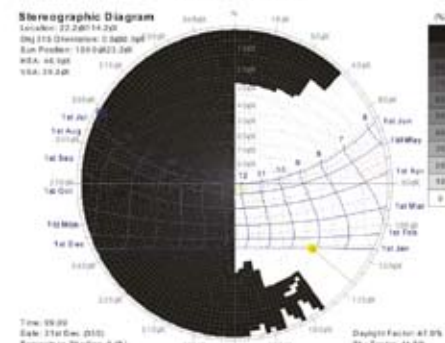
Location 5



Location 2



Location 4

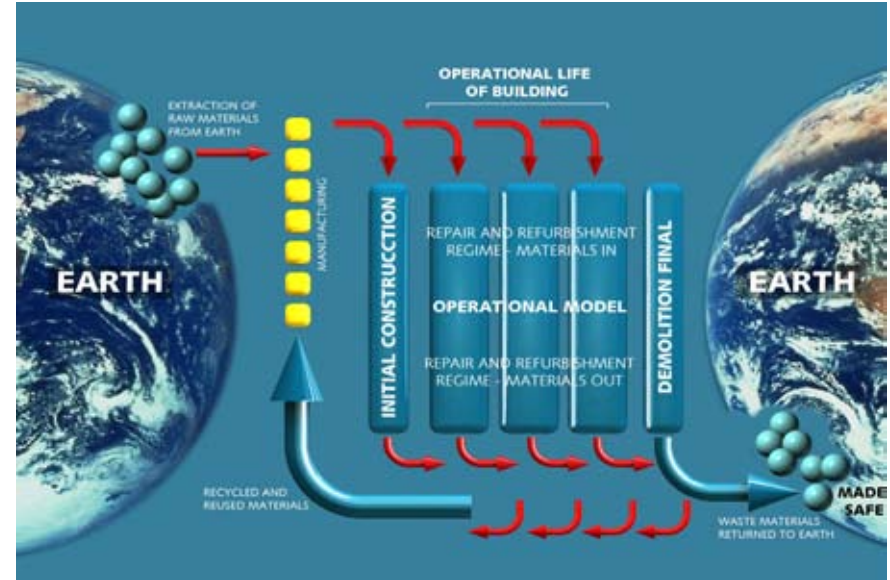


Location 1



# 公屋建築生命週期的物料環保評估及 成本計算研究

Life Cycle Assessment (LCA) and  
Life Cycle Costing (LCC) Study



Project Type: Research  
Study Period: June 2002 - Sept 2005  
Client: The Hong Kong Housing Authority  
Principle Investigator: Business Environment Council  
Specialist Consultants: The University of Hong Kong /  
DLS Management Limited



透過全面檢視國際楷模慣例和工具，經兩年多的深入研究並與業界諮詢，房委會根據認可的國際原則和驗證的科學方法，開創出一套綜合生命周期環保評估和生命周期成本計算模式。這模式是一套電腦軟件，組件包括顯示材料數量的數量模式、以香港環保點數顯示有關數據的環保模式，及以現值淨額顯示成本數據的成本模式。這套軟件可協助分析某種替代材料對生命周期環保評估和對生命周期成本計算的優劣影響，從而作出平衡的取替決策。

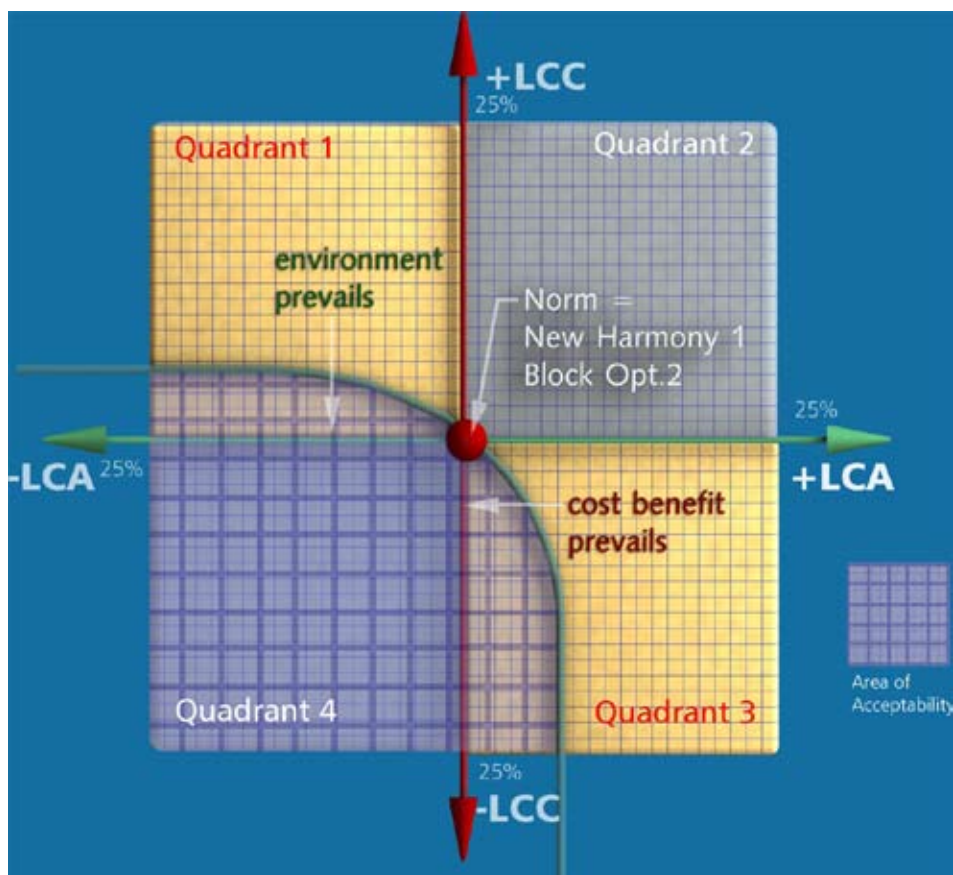
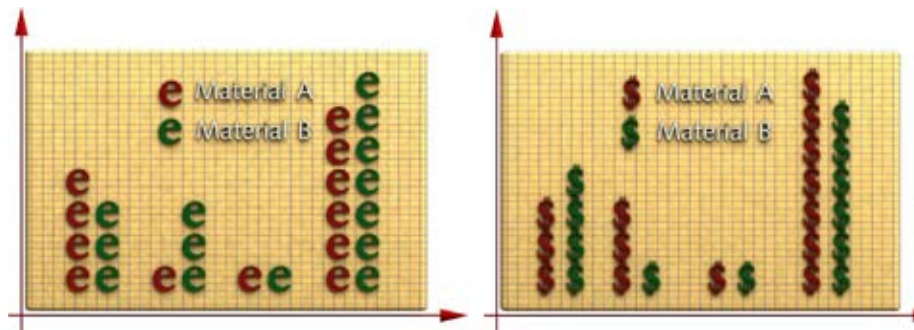
研究亦證實，房委會採用的新和諧一型住宅大廈，在正面的環境影響及生命周期成本效益方面，都已達到最佳的水平。

房委會透過這項創新的研究，示範如何應用這兩個核心元素在可持續發展中的運作。已將研究結果向中央政府及業界發放，藉以廣泛交流，促進採用這個概念。研究報告亦自2005年8月起上載房委會網站，與社會大眾分享有關的知識。

After a comprehensive review of international best practices and tools and more than 2 years of intensive research processes and consultation with the industry, the HA has successfully developed an integrated LCA/LCC model, based upon accepted international principles and proven scientific methodologies. The outcome is a computer model comprising a Quantum Model with quantities of materials, an Environmental Model with data presented in HK-EcoPoints and a Cost Model with cost data in Net Present Value. It serves as a decision making tool to reconcile situations where there are competing LCA merits over LCC deficiencies or vice versa for a given alternative.

The Study also validated that the NH1 domestic block is almost at the optimum point in terms of positive environmental impact and life cycle cost effectiveness.

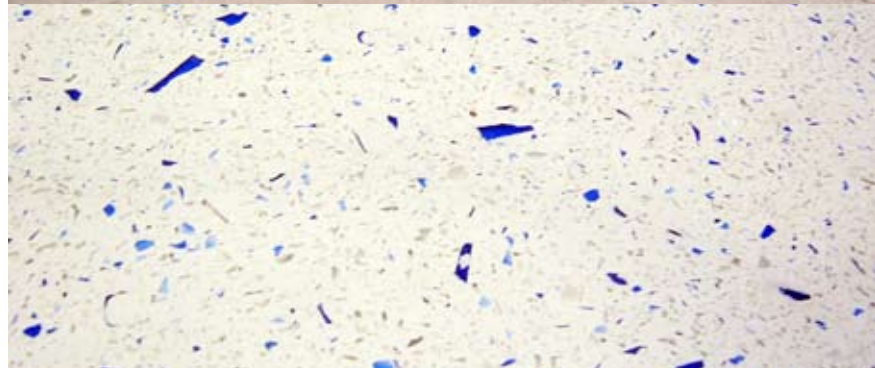
This pioneering study demonstrates the HA's commitment to the implementation of the two core elements in sustainable development. The findings of the study have been presented to the central government and other stakeholders, while the Study Report has been posted onto HA's web site for knowledge sharing with the public since August 2005.





## 環保建材

Turning Wastes to Environmentally Friendly Construction Materials



Project Type: Research

Study Period: 2003 - 2006

Principle Investigator: Prof. C. S. Poon, Hong Kong Polytechnic University

Team Members: Mr. Dixon Chan / Mr. Zinc Lam / Mr. S.C. Kou

本研究成果證明，建築及拆遷廢物，廢玻璃，電廠廢棄粉煤灰和爐底灰渣等低回收利用的材料可以回收再利用做優質建築材料。建築及拆遷廢物，廢玻璃經過破碎篩分可以用做混凝土鋪路磚，建築物隔牆磚和普通混凝土的粗細骨料。最終產品，除了有好的強度，好的耐火性，好的防滑和耐磨性能外，還有一定的價格競爭力。

研究成果還表明，電廠廢棄粉煤灰和爐底灰渣還可以用作自密實混凝土的粘度劑和輕骨料。最終的混凝土產品具有理想的強度，並且大大改善了自密實混凝土的耐久性和減低了混凝土的單位重量。研究成果充分說明，如果這些低回收利用的材料能夠適當的回收利用使其變為有新價值的建築材料且不必再利用堆填區，必將大大解決香港公共堆填區短缺的問題。

This research demonstrates that some of the low recovery rated materials can be re-used as excellent ingredients in construction materials. The low recovery rated materials used include construction and demolition (C&D) waste, glass waste, rejected fly ash and bottom ash. The C&D waste and glass waste can be used, after crushing, as coarse and fine aggregates in paving and partition block productions. The resulting products, at competitive price, have satisfactory strength, adequate fire resistance and good skid and abrasion resistances.

The research also demonstrates that rejected fly ash and bottom ash generated from coal fired power plants can be respectively used as a replacement of viscosity agent and as a lightweight fine aggregate in self-compacting concrete (SCC). The end products have adequate strength, improved durability and lighter unit weight. The results of the research accentuate that, if these waste materials are used appropriately, they are valuable materials and should not be disposed of at landfills. This will greatly alleviate the landfill shortage problem in Hong Kong.





# 以科學性評估研究城市規劃設計中的視覺景觀可持續性

## A Practical Scientific Approach to Study the Visual Sustainability for Urban Planning and Design

這項研究的目的是為鑒證一種於高密度城市環境中評估視覺質素的新方法。為該項研究選作試驗計劃的公共房屋工程項目位於藍田邨第7和8期。主要方法是以定量方式結合視覺參數和景觀資源特性。研究目標包括：

1. 在該區和周遭居住環境設置休憩用地
2. 休憩用地和地盤布局減少對四周住屋 / 康樂用地造成視覺影響
3. 休憩用地保留區內景觀優美的觀景點以及
4. 評估和比較不同的休憩用地布局方案

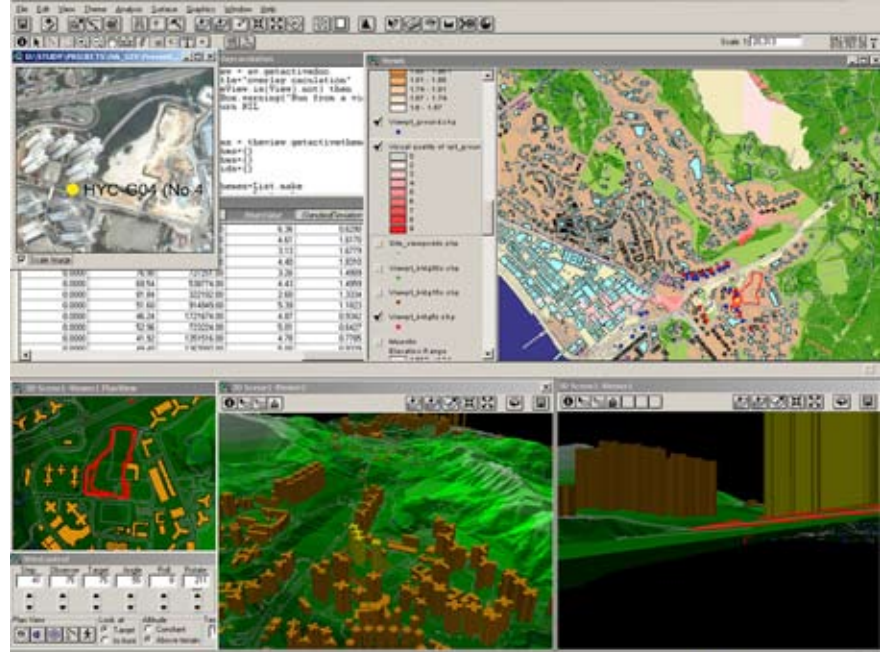
以上方法可在工程計劃設計 / 規劃的前期有助城市規劃、地盤布局設計和屋邨管理方面的決策工作。

This research study evaluates a new approach in assessing the visual quality in high-density urban environment. A public housing project at Lam Tin Estate Phase 7 & 8 was selected as the pilot project for the study. The principal methodology is to quantitatively integrate human visual perception parameters with the visible landscape resources' characteristics. The research objects included:

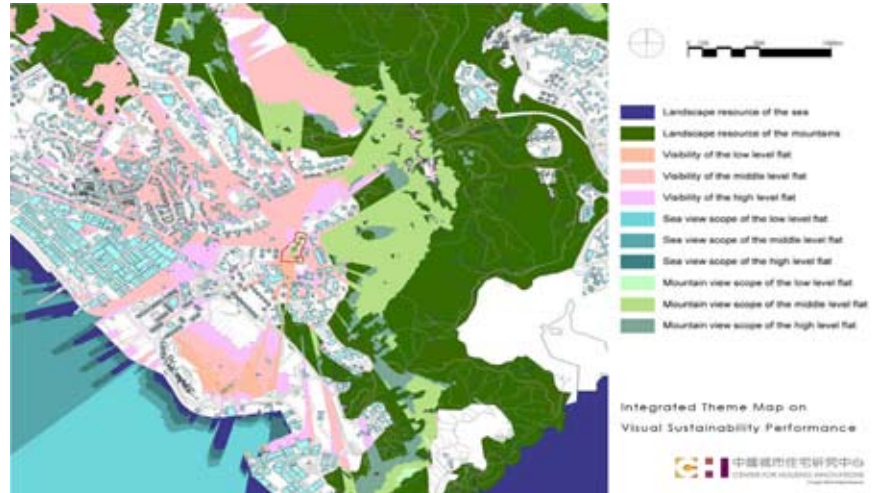
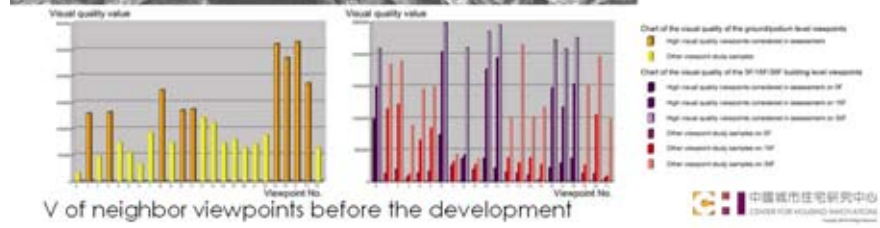
1. Introducing new open space for local and surrounding residential environment;
2. Open space and site layout with less visual perception impact to surrounding residential estate/ recreation area;
3. Open space to inherit in-site high quality visual perception viewpoints; and
4. Assessment and comparison of different open space layout options.

The approach provides decision making support to urban planning, site layout design, and estate management during the early stage of the schematic design/planning process.

Project Type: Research and Planning Study in Public Housing Development  
 Study Period: January 2004 - July 2004  
 Project Sum: HK\$780M for Lam Tin Project  
 Client: Hong Kong Housing Authority  
 Principle Investigator: Center for Housing Innovations, CUHK  
 Architect: |  
 Structural Engineer: |  
 M&E Consultant: | Development and Construction Division, Housing Department, HKSAR  
 Quantity Surveyor: |  
 Landscape Architect: |  
 Town Planning: |  
 Specialist Consultant: CH2M.IDC



The Software Development of the Proposed Visual Sustainability GIS System

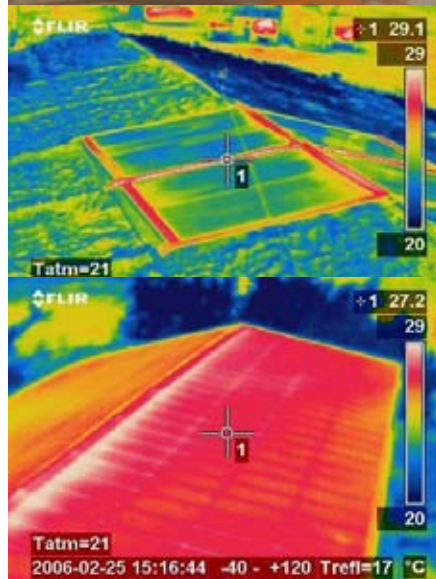




## 工地寫字樓的綠色設計與規劃 Green Design & Planning of a Construction Site Office

為了提高地盤辦公室熱效/能效，加強對資源的更好管理，以提供健康的工作環境，金門聯同香港大學和香港中文大學，進行了對地盤辦公室的環保規劃、設計以及施工的研究專案。環保設計研究主要集中在六個方面：牆體隔熱、屋面隔熱、日光透入控制、運行計畫、照明系統以及天窗/日光。與此同時，在地盤規劃期間有關設施，如停車場、洗車池、洗手間、種植區、廢物回收/再利用和材料存放區、堆肥箱、站崗、水箱等的安排已與項目設計一併考慮。在施工階段，我們利用了各種可迴圈使用材料，包括6個舊貨櫃、鋼結構構件、鋼樓梯、廢棄地板瓷磚以及用於天窗施工的剩餘隔音板。屋頂花園也是按照板式設計以方便將來專案可再利用。

Working in collaboration with University of Hong Kong and Chinese University of Hong Kong, Gammon initiates a research study on green planning, design and construction of a site office with an aim to improve thermal/energy efficiency, enhance better resources/materials management and provide a healthy workplace. Research on green design focuses primarily on six areas including wall insulation, roof insulation, sun control and protection, operational scheduling, lighting system and skylight/day-lighting. In parallel with the design, related site facilities such as car park, wheel washing bay, washrooms, planting area, waste collection/recycling & material storage area, composting boxes, guard post and water tanks have been thoroughly addressed during site planning stage. During the construction stage, we have made use of various recycled materials including 6 old cargo containers, structural steel members, steel staircase, leftover floor tiles and scrappy acoustic panels for skylight construction. Roof top garden has also been designed in a panel form for easy reuse in future projects.



Project Type: Research and Planning Study  
 Study Period: 2002 - present (on-going)  
 Project Sum: HK\$800,000  
 Team Members: Mr. Edmond Chan, Mr. Andrew Kwan, Mr. Niki Lui,  
 Mr. Eddie Tse, Mr. Eric Wong, Mr. K M Chiang,  
 Gammon Construction Ltd. / Dr. Sam CM Hui, HKU  
 / Dr. S W Chiu, CUHK



## 防疫大廈設計概念

### Immunized Building Development for the Hong Kong Community College

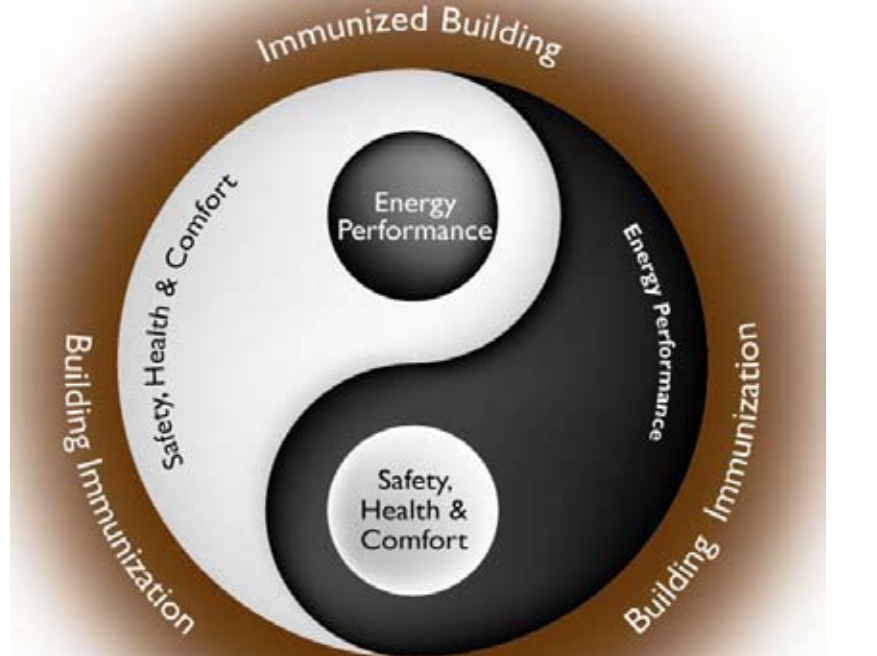
世界衛生組織在1980年代初期認定病態大廈及大廈病嚴重影響人類健康後，「健康大廈」一直成為室內環境質素的一個指標。當非典型肺炎（SARS）於2003年在香港及世界肆虐的時候，從大樓健康管理的束手無策令人覺得過去的科研努力毫無成效。本研究項目在大樓設備系統和人體生理系統的高度相似性找出靈感，發展出「防疫大廈」的品質模式。此模式建基於四個革命性的斑論：「大樓生理學，大樓病理學，大樓營養學及大樓免疫學」。大樓的設計「以人為本」，管理方面「固本培元」。大樓防疫的能力從統一設計及管理清潔及消毒為經，以鼓勵用家運動增進免疫力為緯，來達到本大廈的基本目標。

Healthy building has been the theme for indoor built environmental quality since sick building syndrome and building related illness have been identified as a serious health hazards for building users in the 1960s. However, these efforts were in vain when SARS plagued Hong Kong and the world in 2003. Buildings are still under threats of spread of Avian flu and other communicable diseases. Realizing the remarkable resemblance of the building services systems of a building and the functioning systems of a human body, this project develops a model of 'immunized building'. The model is based on four innovative principles of 'building physiology, building pathology, building dietetics and building immunology'. Design criteria are truly based on users satisfaction on comfort and health. Building immunization is featured by an integrated design and management of cleaning and sterilization. Minimum physical exercises are encouraged to escalate the immunization level of all building users.

Project Type: Research and Planning Study  
 Study Period: 2005 - 2006  
 Project Sum: \$HK 3.07 million  
 Client: Hong Kong Polytechnic University  
 Patron: Hong Kong Polytechnic University / Sun Hung Kai Properties Ltd.

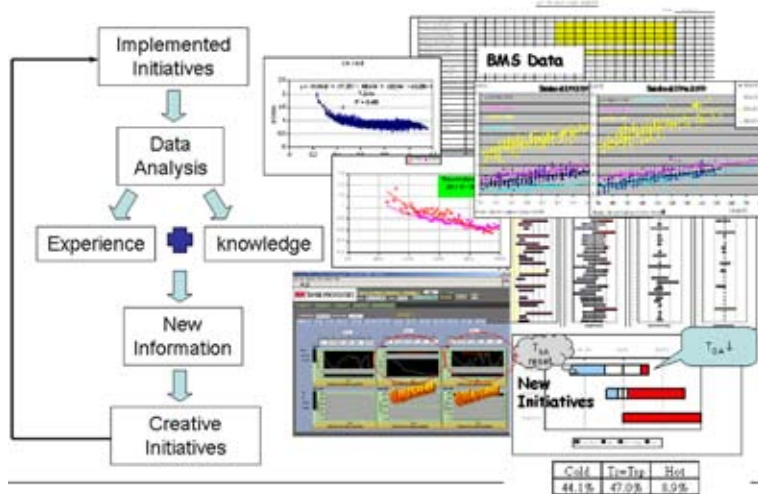
Principle Investigator: Prof. Daniel W.T. Chan, HK PolyU / Prof. Thomas Wong, HK PolyU / Prof. Bernard Lim, AD+RG / Mr. Henry Mak, HK PolyU

Architect: Architecture Design and Research Group Ltd.  
 Co-architect: AGC Design Limited  
 Engineer: Parsons Brinckerhoff (Asia) Ltd.  
 Landscape: Architecture Design and Research Group Ltd





## 建築設施控制系統之應用 BMS Utilization



調查顯示樓宇自動化控制系統 (BMS) 極少用於樓宇運行的效率監測，系統優化以及自動故障診斷和分析。業界的利益相關者各自不同的目的和興趣可能是其主要關卡。太古地產通過他們的“行動研究”方法：

- 持續試驗各種提升設備效率的新技術
- 進行周密的測量和核實
- 建立中央資料庫以便連續不斷地從BMS取回並儲存資料
- 開發軟體以持續不斷地監測系統效率，進行故障診斷與分析
- 開發並應用系統優化策略

從更廣的層面來看，這些研究可以引導：

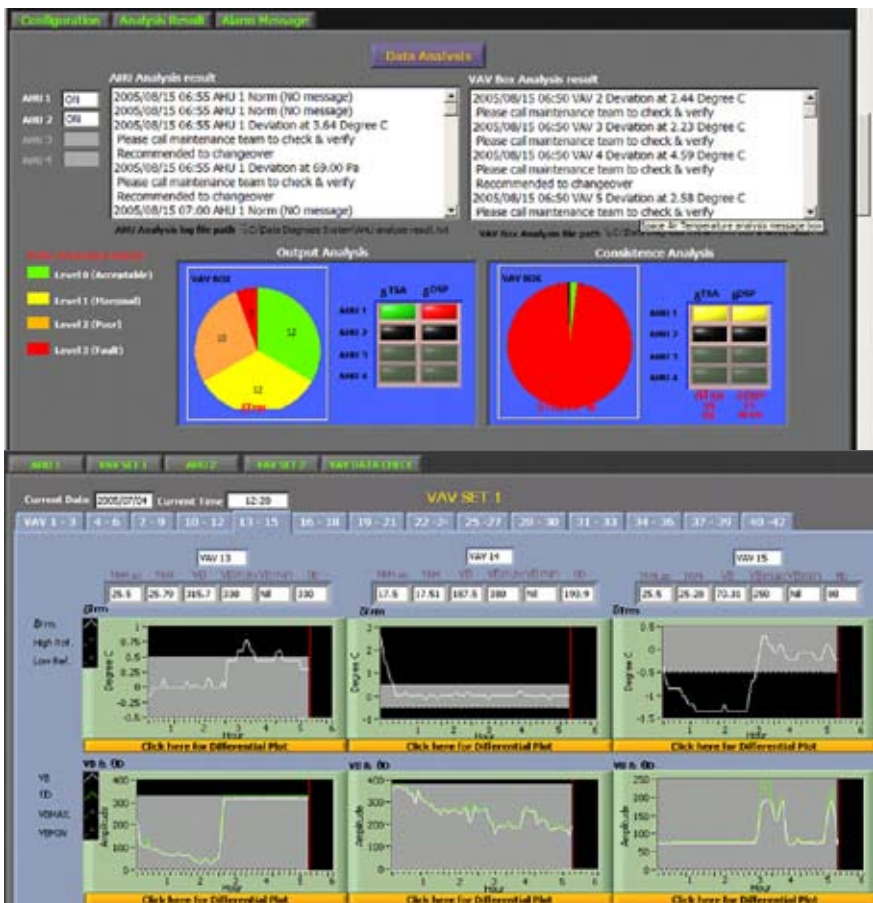
- 在業界積累知識，開發持續提升設備能源和運行效率的工具
- 為利益相關者設立更有效應用BMS的共同長遠目標
- 加強業界知識分享

A survey revealed that Building Management Systems (BMSs) are seldom used for efficiency monitoring, system optimization and automated fault detection and diagnosis. Misalignment of the objectives and interests of the various stakeholders seemed to be a barrier. Swire Properties through their “action-research” approach:

- continuously pilot new technologies to improve their plant efficiency
- carry out extensive measurement and verification
- set up central database to continuously retrieve and store data from the BMS
- establish software programs to continuously monitor plant efficiency, fault detection and diagnosis
- establish and apply self-developed optimization strategies to operate their plants

In a wider perspective, the research can bring about:-

- creating knowledge and developing of tools for the continual improvements on energy and operational efficiency of the facilities for the industry
- setting a vision to align the objectives of various stakeholders towards the better utilization of BMS
- enhance knowledge sharing within the industry



Project Type: Applied Research  
 Study Period: 2004 - present  
 Project Sum: \$HK10,000 (Hardware + Software)  
 Client: Swire Properties Management Limited  
 Principle Investigator: Swire Properties Management Limited  
 Engineer: Swire Properties Management Limited  
 Specialist Consultant: Johnson Controls Hong Kong Limited





鳴謝

ACKNOWLEDGEMENTS

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Council Member, Professional Green Building Council



## 全新建築類別 New Buildings Category

項目名稱 Project Name
康橋大廈 Cambridge House, Taikoo Place
馬灣中華基督教會基慧小學 CCC Kei Wai Primary School, Ma Wan
竹篙灣消防局暨救護站及警崗 Fire Station with Ambulance Depot & Police Post at Penny's Bay
嘉亨灣 Grand Promenade
俊宏軒 Grandeur Terrace. Tin Shui Wai
香港科學園第一期 Hong Kong Science Park Phase 1
香港濕地公園第二期 Hong Kong Wetland Park Phase 2
南丫風采發電站 Lamma Winds
瑪嘉烈戴麟趾紅十字會學校 Margaret Trench Red Cross School, Kowloon
港灣豪庭 Metro Harbour View, Kowloon
地鐵迪士尼綫-欣澳站 MTR Disneyland Resort Line: Sunny Bay Station
新界南總區警察總部 New Territories South Regional Police HQ
港島東中心 One Island East, Taikoo Place
北京道一號 One Peking
富滙豪庭 Regence Royale
香港仔南風道中學 Secondary School at Nam Fung Road, Aberdeen
海天峰 Sky Horizon
中電掃管笏132千伏變電站 So Kwun Wat 132kV Electrical Substation
大埔161地段 (比華利山別墅) Tai Po Town Lot 161 (The Beverly Hills)
逸樺園 The Orchards, Quarry Bay
采葉庭 The Parcville
太古廣場三期 Three Pacific Place
國際金融中心二期 Two International Finance Center

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香港特別行政區政府建築署 Architectural Services Department, HKSARG
香港特別行政區政府建築署 Architectural Services Department, HKSARG
恆基兆業地產有限公司 Henderson Land Development Company Limited
俊和建築工程有限公司 Chun Wo Construction and Engineering Co., Ltd
香港科技園公司 HK Science & Technology Parks Corporation
香港特別行政區政府建築署 Architectural Services Department, HKSARG
香港電燈有限公司 The Hongkong Electric Co., Ltd
香港特別行政區政府建築署 Architectural Services Department, HKSARG
港灣豪庭管理有限公司 Metro Harbourview Management Limited
奧雅納工程顧問 Ove Arup & Partners Hong Kong Ltd
香港特別行政區政府建築署 Architectural Services Department, HKSARG
太古地產有限公司 Swire Properties Limited
旭日集團有限公司 Glorious Sun Holdings Limited
偉邦物業管理有限公司 Well Born Real Estate Management Limited
香港特別行政區政府建築署 Architectural Services Department, HKSARG
信和物業管理有限公司 Sino Estates Management Ltd
中華電力香港有限公司 CLP Power Hong Kong Limited
偉邦物業管理有限公司 Well Born Real Estate Management Limited
太古地產有限公司 Swire Properties Limited
新鴻基地產發展有限公司, 新世界發展有限公司, 康業服務有限公司 Sun Hung Kai Properties Ltd, New World Development Co. Ltd & Hong Yip Service Co. Ltd.
太古地產有限公司 Swire Properties Limited
恆基兆業地產有限公司 Henderson Land Development Company Limited

# 現有建築類別

## Existing Buildings Category

項目名稱 Project Name	參賽單位 Applicant
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淺月灣一期 - 您的生活由環保開始 Casa Marina 1 - Green in mind, Quality of Life	偉邦物業管理有限公司 Well Born Real Estate Management Limited
淺月灣二期 Casa Marina 2	偉邦物業管理有限公司 Well Born Real Estate Management Limited
牽晴間 Dawning Views	偉邦物業管理有限公司 Well Born Real Estate Management Limited
恆峰花園 - 兩水循環再用系統 Granville Garden - Recycle System of Rainwater	偉邦物業管理有限公司 Well Born Real Estate Management Limited
新貴城 La Cite Noble	偉邦物業管理有限公司 Well Born Real Estate Management Limited
新都城一期 Metro City Phase 1	偉邦物業管理有限公司 Well Born Real Estate Management Limited
新都城二期 Metro City Phase 2	偉邦物業管理有限公司 Well Born Real Estate Management Limited
寶馬山花園 Pacific Palisades	信和物業管理有限公司 Sino Estates Management Limited
美利樓重建 Re-construction of Murray House	香港房屋署 Hong Kong Housing Department
信和廣場 Sino Plaza	信和物業管理有限公司 Sino Estates Management Limited
星域軒 StarCrest	星域軒（管理）有限公司 StarCrest (Management) Limited
新港城四期 Sunshine City Phase 4	新港城物業管理有限公司 Sunshire City Property Management Ltd
中環中心 The Center	港基物業管理有限公司 Citybase Property Management Limited
新科技廣場 The New Tech Plaza	康業服務有限公司 Hong Yip Service Company Ltd
香港大學, 本部大樓 The University of Hong Kong, Main Building	香港大學, 物業處 The University of Hong Kong, Estates Office
華景山莊 Wonderland Villas	康業服務有限公司 Hong Yip Service Company Ltd
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## 翻新建築類別

### Newly Renovated Buildings Category

#### 項目名稱 Project Name

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Green Building Innovation in Festival Walk

新市鎮公共廁所改善計劃  
Improvement Scheme to Existing Public Toilets

機電工程署新總部大樓  
The New Headquarters for the Electrical and  
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Architectural Services Department, HKSARG

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Hong Yip Service Company Ltd

# 研究及規劃類別

## Research & Planning Studies Category

### 項目名稱 Project Name

以科學性評估研究城市規劃設計中的視覺景觀可持續性  
A Practical Scientific Approach to Study the Visual Sustainability for Urban Planning and Design

建築設施控制系統之應用  
BMS Utilization

建築物生命週期能源分析之顧問研究  
Consultancy Study on Life Cycle Energy Analysis of Building Construction

空氣流通評估方法可行性研究  
Feasibility Study for Establishment of Air Ventilation Assessment System

工地寫字樓的綠色設計及規劃  
Green Design & Planning of a Construction Site Office

防疫大廈設計概念  
Immunized Building Development for The Hong Kong Community College

公屋建築生命週期的物料環保評估及成本計算研究  
Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) Study

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Sustainable Design for Swimming Pool Complex at the Fukien Secondary School, Hong Kong

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# 環保建築專業議會

## Professional Green Building Council

環保建築專業議會(英文簡稱為PGBC) 於2002年以擔保有限公司形式成立, 目前屬會包括香港建築師學會、香港工程師學會、香港園境師學會、香港規劃師學會及香港測量師學會。

環保建築專業議會屬非牟利學會, 專注有關環保建築項目的研究和教育工作, 並著重專業推廣可持續發展之都市及建築設計。 議會目標包括:

- (1) 推行本地以至外地環保建築項目的合作研究及研究發佈;
- (2) 統籌以環保建築設計及技術為主題的研討會及訓練課程;
- (3) 建議政府有關整理、確立及監察本地環保建築標籤方案。

The Professional Green Building Council (環保建築專業議會) (hereinafter called "the PGBC") is constituted as a company by guarantee. It was formed in 2002 and now comprises 5 Institutional Members: The Hong Kong Institute of Architects (HKIA), The Hong Kong Institution of Engineers (HKIE), The Hong Kong Institute of Landscape Architects (HKILA), The Hong Kong Institute of Planners (HKIP) and The Hong Kong Institute of Surveyors (HKIS).

The PGBC is a non-profit making research and education institute to promote a better sustainable built environment through professional involvement. Its objectives are:

- (1) to conduct collaborative research and publish research results on local and global developments of green buildings;
- (2) to organize researches seminars and training courses in green building design and technology; and
- (3) to advise the government on the formulation, setting up and monitoring of a local green building labeling scheme.



Website: [www.hkpgbc.org](http://www.hkpgbc.org)



## 環境保育・建築永續

Conserving for Livable Environment • Building towards Sustainable Development





## GREEN BUILDING AWARD 2006

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