For discussion
On 20 April 2011

Legislative Council Panel on Development
Purchase and Conversion of Industrial Building for Water Supplies Department Facilities

PURPOSE

This paper seeks Members' view on the Government's plan to purchase and convert an industrial building for accommodating the Water Supplies Department (WSD)'s New Territories West (NTW) Regional Office and a new Water Conservation Education Centre.

BACKGROUND

2. The Chief Executive announced in his 2009-10 Policy Address measures to promote revitalization of old industrial buildings through encouraging redevelopment and wholesale conversion of vacant or under-utilized industrial buildings. The objective is to provide readily available and suitable land and premises to meet Hong Kong's economic and social needs. We subsequently issued a LegCo Brief entitled "Optimizing the use of industrial buildings to meet Hong Kong's changing economic and social needs" on 15 October 2009 setting out the details of the proposed measures and their justifications.

3. The Financial Secretary announced in his 2010-11 Budget Speech that the Government, where appropriate, will consider making use of old industrial buildings in the relocation of government offices. It demonstrates that wholesale conversion is a practical way to release the potential of under-utilized industrial buildings for higher value-added uses. This initiative will bring other merits including: (1) speeding up regeneration of older industrial areas by encouraging more subsequent conversions/redevelopment in the neighbourhood; (2) releasing existing sites or leased commercial premises; and (3) demonstrating the application of green building design and features in retrofitting existing industrial buildings.

4. In May 2010, we reported to the Panel on Development[1] that WSD is studying the feasibility of relocating a regional office to a converted industrial building. In the 2011-12 Budget Speech, the Financial Secretary announced that the Government is considering purchasing an industrial building for accommodating WSD New Territories West (NTW) Regional Office. The conversion work will adopt green design and introduce environmental-friendly and water conservation measures. The experience gained will provide practical reference for incorporating green features in retrofitting buildings.

5. On the other hand, the Chief Executive announced in his 2010-11 Policy Agenda that we will establish an education centre to step up the promotion of water conservation through the provision of education resources to the community.

RELOCATING WSD NTW REGIONAL OFFICE

Mong Kok Area Improvement Plan

6. We plan to relocate WSD NTW Regional Office from Mong Kok to a converted industrial building in the NTW region. The relocation of the WSD office has been identified as an improvement proposal in the Area Improvement Plan for the Shopping Area of Mong Kok (AIP) [2] undertaken by the Planning Department.

7. One of the critical planning issues in Mong Kok is the heavy public transport services running along its transport corridors as well as the local streets including Fife Street, Sai Yeung Choi Street South, Tung Choi Street and Fa Yuen Street in the core Mong Kok area. The heavy public transport demand and the on-street passenger queuing facilities have led to poor traffic and pedestrian conditions, imposing heavy vehicular-pedestrian conflicts and road safety problem. The AIP suggests that vacation of the WSD office site, together with the neighbouring Food and Environmental Hygiene Department (FEHD) depot and temporary car park, will offer a good opportunity to bring significant improvement to the aforementioned traffic problems.

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[1] The relevant Panel Paper was titled "CB(1)1957/09-10(01) – The Administration's response to follow-up action arising from the meeting of the Legislative Council Panel on Development held on 27 April 2010 – Optimizing the Use of Private Industrial Buildings"

[2] The Area Improvement Plan had been presented to the Legislative Council Panel on Development for discussion on 28 July 2009 via the Panel Paper titled "CB(1)2342/08-09(03) –District-based Beautification and Revitalisation Projects".

8. According to the preliminary design concept, a district Public Transport Terminus (PTT) facility with overhead commercial development and a substantial piece of open space will be provided at the redeveloped site. An illustration of the design concept is at **Enclosure 1**. With the new PTT in place, some of the existing on-site mid-way stops and queuing facilities can be relocated to the PTT to allow a better traffic and pedestrian environment in the existing road network. The relocation of on-street cross-boundary coach stands at Sai Yee Street near Nelson Street can also improve the overall traffic and pedestrian conditions. In addition, the redevelopment can bring along a variety of open space for the enjoyment of the public ranging from event, podium with commercial activities and food and beverage (F&B) shops, and natural garden space. Overall, the above proposal under the AIP is welcome by the public. The Yau Tsim Mong District Council has also been actively pursuing the proposed PTT to address local traffic problems, especially after the traffic accident at the junction of Sai Yeung Choi Street and Mong Kok Road in June 2009.

Green Building Design

9. Whilst the relocation of WSD NTW Regional Office to a converted industrial building meets the economic and social needs by providing readily available land and premises, it also presents the opportunity to enhance the quality of our environment. Conversion instead of redevelopment of an existing industrial building is in itself a sustainable way to reduce demolition waste and conserve natural resources during its demolition and construction phase. Moreover, we can benefit further during the life of the building by adopting a range of green design features, especially in the priority areas of greening, energy and water conservation. It will contribute to better air quality, waste reduction and a smaller carbon footprint.

10. The Hong Kong Green Building Council (HKGBC) is the leading body driving the promotion and creation of sustainable buildings and standards throughout Hong Kong, and engaging the community, industry and Government to create a greener, more sustainable environment. It leads the green building movement in Hong Kong and promotes the adoption of green building standards as well as the construction and maintenance of green buildings. We will take the opportunity of this relocation project to demonstrate the application of green building design in retrofitting existing industrial building. The converted industrial building under this project will be assessed against the

HKGBC recognized green building labeling scheme "BEAM Plus"[3] to demonstrate its environmental performance. A concise guide issued by the HKGBC, which introduces how BEAM Plus green building labeling scheme can be applied to revitalized industrial buildings, is at **Enclosure 2**. A brief account of the green building design and features to be adopted in the converted industrial building for use by WSD is given in paragraph 17.

Operational Efficiency

11. The NTW Regional Office is a depot type office involving daily mobilization of the operation and maintenance staff and vehicles of WSD and its contractors, loading and unloading of water pipes, water tanks, valves, meters, spare parts, tools and equipment required for the operation and maintenance of the waterworks installations and the water supply and distribution network including service reservoirs, pumping stations, catchwaters, underground mains and sub-mains water pipes throughout the whole NTW region[4]. It also has provisions for maintaining a 24-hour attendance to operational emergencies, including mains bursts.

12. The NTW Regional Office has been in use since 1950. Over the past, we have been implementing only minor essential repair works to maintain the building in a mere operable condition in anticipation of its relocation for release of the site for more gainful uses. The building is in need of a full-scale renovation should the relocation be postponed. We consider this a good opportunity to take the Budget initiative forward.

13. Relocating the NTW Regional Office from Mong Kok to a converted industrial building in the NTW region will also enhance the efficiency of the operation and maintenance works including the attendance to operational emergencies. We plan to take this relocation opportunity to merge the Yuen Long sub-office[5] into the NTW Regional Office to gain extra operational synergy. The new NTW Regional Office will require a total

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[3] "BEAM Plus" is a distinctive environmental assessment method for the Hong Kong environment and is aligned with relevant local and international standards to demonstrate the overall qualities of a building. The scheme defines best practice criteria under various key performance categories that promote sustainable sites and healthy indoor environments whilst reducing energy, water and resources consumption and carbon footprint. Buildings are awarded where best practice criteria are achieved, with a rating of 'Platinum', 'Gold', 'Silver' and 'Bronze' corresponding to their overall environmental performance.

[4] The NTW region served by NTW Regional Office covers Tsuen Wan, Kwai Chung, Tsing Yi, Yuen Long, Tuen Mun and Tin Shui Wai.

[5] The Yuen Long sub-office accommodates 23 staff with a total CFA of about 100 sq.m. There are 4 car parks for WSD government vehicles. The location of the depot is on the G/F and 3/F of Yuen Long District Office Building.

construction floor area (CFA[6]) of about **10,000 sq.m** and **car parking space** for a fleet of **49** government vehicles to support its operation.

WATER CONSERVATION EDUCATION CENTRE

14. Major cities in Singapore, Taiwan, United States of America all have their own water resources education centre to promote water conservation. In support of the total strategy to promote water conservation in Hong Kong, WSD has planned to set up a dedicated **Water Conservation Education Centre** (Education Centre) for public use. The Education Centre (about 4,500 sq.m CFA) comprises an exhibition gallery in which members of the public can have sight of large scale models and exhibits to learn about water treatment technologies, distribution methods, leakage detection methods, pressure management technologies and water reclamation technologies. They can also participate in educational games on total water management and experience live demonstration on the effectiveness of various water saving installation and devices. We also plan to arrange organized visits and events for about 75,000 students annually so that our younger generation can gain comprehensive knowledge on various aspects of water conservation. Details of the Education Centre are at **Enclosure 3**.

15. Accommodating the Education Centre and the NTW Regional Office **under one roof** will provide synergy for on-site demonstration of water saving features including grey water reuse and rain water harvesting system for non-potable uses and toilet flushing in the building. Visitors can tour around designated spots in the converted industrial building, including the control room and plant room of the grey water reuse and rain water harvesting system, to appreciate the live operation of various water conservation facilities. Taking into account the requirements of the new NTW Regional Office, the total accommodation requirements amount to about **14,500 sq.m** CFA and **49 car parking spaces**.

PURCHASE AND CONVERSION OF INDUSTRIAL BUILDING

16. Industrial buildings, which are generally designed for industrial

[6] Construction floor area (CFA) includes all construction area which is usually used for calculation of construction cost of a project. We adopt a conversion factor of 2.24 for converting the net operating floor area (NOFA) of WSD NTW Regional Office of 4,463 sq.m into the construction floor area of about 10,000 sq.m.

operations, should have adequate load-bearing capacity for WSD Regional Office's operation and high headroom for entry and exit of WSD vehicles. The spatial layout of the Education Centre, which takes up one-third of total accommodation requirement, could also be accommodated through conversion of existing industrial building. In this regard, the cost of conversion of an industrial building of reasonable quality compares favourably to that of constructing a new Government building for accommodating these WSD facilities.

17. Further, we will demonstrate the application of green building design and features in converting existing industrial buildings in this project. We will introduce best practicable green building design in the conversion work by adopting renewable energy technologies, energy efficient installation, and other green features including photovoltaic panels, solar hot water system, energy efficient LED lightings, high efficiency water cooled air-conditioning plant, energy efficient lifts, green roof, grey water reuse and rain water harvesting system, and water saving devices. We aim at achieving a Silver/Bronze award under the HKGBC Beam Plus green building labeling scheme. The achieving of higher class award namely Platinum/Gold will likely be constrained by the original building design and site condition[7] of the procured industrial building. We will in any case follow the BEAM Plus best practice as far as practicable and devote every effort to achieve the best possible building environmental performance to set an example for incorporating green features in retrofitting buildings.

PROPOSAL

18. In the light of the above, we propose to purchase an industrial building meeting the following criteria:

(a) the building should be in reasonable proximity to the serving areas of NTW region, with sufficient floor area, loading and unloading area, and car parking space;

(b) the building should preferably be not at too heavily trafficked roads to avoid affecting the mobilization of the work teams of

[7] Critical factors for determining the eligibility of Beam Plus award include (a) avoidance of car parking facilities, (b) within 500 meters of (or with shuttle service to) public transport of scheduled operating frequency of 10 minutes or less during 7am to 7pm, (c) at least 10 amenities such as day care center, laundry or dry cleaners, hairdressers, place of worship, within 500 meters of the building, (d) at least 2 amenities recreational facilities (open to public) such as shaded sitting out area/garden/park, swimming pool, indoor/outdoor sport facilities within the building.

WSD during emergency operations;

(c) the building should preferably be within reasonable walking distance from major public transport services for easy access to the Education Centre by the general public;

(d) the building should be situated in "Industrial", "Commercial", or "OU(B)" zones (where the proposed WSD uses are "always permitted" or feasible upon planning approval on a wholesale conversion basis) and should preferably be about 15 - 30 years old;

(e) the purchase price of the building should be reasonable in light of the prevailing market conditions and estimated conversion cost; and

(f) the construction floor area of the industrial building should be no less than 14,500 sq.m[8].

19. In view of the lack of expertise and resources within Government for the sourcing and identification of suitable industrial building, we plan to appoint consultants through open invitation and use established market practice for the procurement of the industrial building. The following paragraphs highlight the procurement approach to be adopted for the project.

Engagement of Consultant

20. The consultant will be appointed via a two-stage approach viz. Expression of Interest (EOI) invitation and Technical and Fee proposal submission. The consultant shall engage sub-consultants of the relevant disciplines including architectural, structural, building services, and quantity surveying to ascertain the technical feasibility and associated conversion cost of the selected industrial building.

Consultancy Service

21. The consultant is required to provide consultancy services in respect of identification of potential industrial buildings, vetting of offer price, conducting condition survey and technical feasibility of conversion work,

[8] We may purchase an industrial building larger than 14,500 sq.m CFA to cater for possible scenario of converting floor space to make up for insufficient car parking space (approx. 2,200 sq.m CFA for 49 carparks) or when the most advantageous choice of industrial building does not exactly match the required floor area. Any surplus floor area may be allocated for other compatible government use.

production of notional design scheme, estimation of conversion cost, undertaking due diligence check, negotiation for best offer and final completion of the acquisition deal.

22. The consultancy brief will specify that the consultant shall source suitable industrial buildings by open invitation (by press/internet) from industrial building owners coupled with contacting individual owners through their own network. Three most suitable target industrial buildings will be shortlisted based on a set of pre-determined criteria.

23. The consultant will carry out condition survey on the shortlisted target buildings to establish technical feasibility for conversion. A notional design scheme will be worked out for detailed estimation of the repair/conversion cost and subsequent recurrent cost of the target industrial buildings. The most suitable industrial building will be selected based on full cost analysis (acquisition, repair, conversion, and recurrent cost). The consultant will then conduct negotiation with industrial building owner under the direction of a procurement committee for the best available terms and conduct due diligence check for direct negotiation for best offer.

Procurement Committee and Approval Authority

24. We will form a procurement committee chaired by Director of Water Supplies comprising representatives from DEVB, GPA, and ArchSD, to oversee the procurement process including the selection of consultant, recommendation for purchase of the industrial building, and execution of the sale and purchase agreement. We will also appoint an independent checking quantity surveyor to verify the recommendation of the consultant in respect of the conversion costs which form a major proportion of the total project cost.

25. We will form a board to be chaired by Permanent Secretary for Development (Works) to approve, on the advice of FSTB and relevant government departments, the recommendation of the procurement committee for the negotiation with the industrial building owner and the subsequent recommendation for purchase of the selected industrial building. We will also appoint a private solicitor firm to assist in the execution of the necessary legal document.

26. The estimated cost for **purchasing** an industrial building in New

Territories West region[9] is **$178 million** and the associated cost of **conversion**, **furniture and equipment**, **models and exhibits** of the Education Centre is **$590.8 million** in money-of-the-day (MOD) prices. We consider that the purchase price and conversion cost are inter-related, as an industrial building with better quality may cost more for purchase and less to convert and vice versa. The purchasing decision has to be made on the basis of the purchase price together with the conversion cost. The total cost for the purchase and conversion of a suitable industrial building is estimated to be **$768.8** million.

FINANCIAL IMPLICATIONS

27. We estimate the cost of the project to be $768.8 million in MOD prices, broken down as follows –

			$ million
(a)	Purchasing approximately 14,500 sq.m of accommodation and 2,200 sq.m of carpark (@$10,600 per square metres in CFA)		178.0[10]
(b)	Conversion		384.9
	(i) Site works	5.8	
	(ii) Building works[11]	243.3	
	(iii) Building services	119.7	
	(iv) Drainage	4.2	
	(v) External works	4.2	

[9] The Government Property Administrator (GPA) advises an industrial building price range of $10,600 to $11,500 per square meter of construction floor area in the Tsuen Wan and Kwai Chung area which is the upper bound in the NTW region. We therefore adopt a conservative price $10,600sqm for estimating the purchase price of $178M, i.e. [(14,500sqm + 2,200sqm (carpark)] x $10,600/sq.m.

[10] If the actual purchase price turn out to be higher than $178M, funds will be redeployed from within the project vote to meet the gap.

[11] Building works are for conversion and alteration of the structure of the industrial building to cater for the use as WSD NTW Regional Office and the Education Centre. The works involve demolition, structural strengthening and concrete repair to the existing building frame, new finishes to wall, floor and ceiling, internal partitions, doors, roofing system, plumbing services, fittings and fixtures and works to existing façade, fitting-out works to office and Education Centre.

			$ million
	(vi) Additional energy conservation and green features	7.7	
(c)	Furniture and equipment		46.2
(d)	Exhibits for Education Centre		28.0
(e)	Consultants' fees for design and supervision of conversion[12]		45.9
(f)	Remuneration of resident site staff		32.1
(g)	Contingencies		53.7
		Total	768.8

28. Due to insufficient in-house resources, ArchSD will employ consultants[12] to undertake the detailed design, contract administration and site supervision of the conversion works.

29. Subject to approval, we will phase the expenditure as follows –

Year	**$ million (MOD)**
2011-12	18.0
2012-13	160.0
2013–14	55.8
2014–15	289.3
2015–16	213.4

[12] According to the current plan, consultants will be employed to undertake the detailed design and site supervision of the conversion works due to insufficient in-house resources. However, we will not preclude the option of carrying out the detailed design and construction of the conversion works under a Design and Build Contract if it is proved to be more appropriate. Should it be the case, the fees will be absorbed in the contract prices for the conversion works.

Year	$ million (MOD)
2016–17	20.5
2017–18	7.2
2018–19	4.6
	768.8

30. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2011 to 2019. The contract will provide for price adjustments.

31. We estimate the additional annual recurrent expenditure arising from this proposal to be 8.8 million.

IMPLEMENTATION TIMETABLE

32. We plan to seek funding approval of the Public Works Subcommittee and the Finance Committee in Q2 of 2011 for the purchase and conversion of the industrial building. Subject to funding approval of the Finance Committee and availability of suitable buildings in the market, we plan to complete the purchase in 2012 and complete the conversion and fitting out works in late 2015.

ADVICE SOUGHT

33. Members are invited to note and provide views on the above proposal.

Development Bureau
Water Supplies Department
April 2011

Design concept of the redeveloped site 重建地點設計概念圖

Proposed commercial building on podium
建議在平台上興建商業大廈

Proposed food & beverage (F&B) /retail shops on podium
建議在平台上興建食肆/ 零售商店

Proposed public transport terminus (PTT) at ground level
建議在底層設立公共運輸總站

*The Proposal is subject to detailed design and images provided are for illustrative purpose only
擬議圖象僅作圖解之用，因應詳細設計會有所差別

The open space
公共休憩空間

The natural garden space
林蔭公園空間

HKGBC
香港綠色建築議會

HKGBC Green Guide : Revitalising Industrial Buildings

The Chief Executive announced new measures in his 2009-10 Policy Address to promote the revitalisation of industrial buildings. Whilst meeting economic and social needs by providing readily available land and premises, this also presents the opportunity to enhance the quality of our environment. As such, all three pillars of sustainable development can be addressed – social, economic, environmental – while helping owners to maximise the value of their buildings.

The conversion of vacant or under-utilised industrial buildings is in itself a sustainable way to reduce waste and conserve natural resources. However, building owners can benefit further from a range of other "green design features", especially in the priority areas of ***energy conservation***, ***greening***, ***waste reduction***, and ***water use***.

The ***BEAM Plus*** green building label, Hong Kong's comprehensive and voluntary environmental assessment scheme, helps owners to understand and capture these opportunities.

Adopting green features in revitalised industrial buildings provides benefits not just to you as the owner, but to your tenants and the broader community. These benefits include:

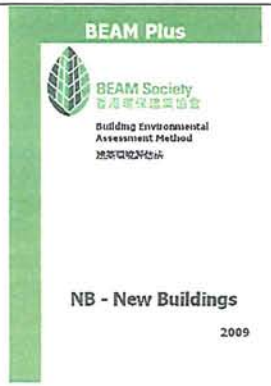
- reducing your costs – for ongoing energy and water charges during the life of the building, and waste disposal charges during its demolition and construction phase
- attracting the growing generation of environmentally conscious tenants – by providing a healthier, more efficient and productive workplace, and helping them to promote their own green credentials
- strengthening your reputation as a responsible corporate citizen – by demonstrating your commitment to green building, innovation and conservation
- contributing to better air quality, waste reduction and a smaller carbon footprint for Hong Kong, whilst creating a cooler and greener urban landscape

These reasons and more make the investments in green building worthwhile over time, by ensuring a "future-proof", viable and higher value asset for the longer term.

HKGBC
香港綠色建築議會

HKGBC Green Guide: Revitalising Industrial Buildings

BEAM Plus



Developed with widespread industry engagement, ***BEAM Plus*** is Hong Kong's home-grown rating system to enhance building environmental sustainability. ***BEAM Plus*** defines over 100 criteria that promote sustainable sites and healthy indoor environments whilst reducing energy, water and resources consumption and carbon footprint.

Certification of buildings is voluntary and undertaken on behalf of HKGBC by the non-profit BEAM Society. Credits are awarded where the ***BEAM Plus*** best practice criteria are achieved, with a rating of ***Platinum***, ***Gold***, ***Silver*** or ***Bronze*** issued according to the building's overall level of performance.

Clients use their ***BEAM Plus*** building ratings to demonstrate their adoption of best practice local and international standards for green building. HKGBC also oversees the training and accreditation of ***BEAM Professionals*** who use their green building and assessment knowledge to support clients in optimising their building's performance.

Industrial buildings are eligible for certification during their design, construction, conversion and renovation using ***BEAM Plus for New Buildings***. For more information and to register your project for certification, please contact the Secretariat at:

T: 2784 3900
E: info@hkgbc.org.hk hk-beam@bec.org.hk
W: www.hkgbc.org.hk www.hk-beam.org.hk

Examples of the ***BEAM Plus*** best practices are highlighted here. Download the ***BEAM Plus New Buildings*** standard for free for further details.

Energy Use (EU)

- compliance with the *Building Energy Codes* (BEC) as the minimum target
- use of *energy efficient building services systems and equipment* better than the requirements of the BEC
- *separate energy metering* for cooling systems and electricity use (including common/ public areas)
- 0.5% or more of base building energy use from *renewable energy sources*, where appropriate

Benefits

- reduce your ongoing energy costs for the operational life of your building by 10 to 15% or more
- contribute to a reduced carbon footprint and better air quality in Hong Kong
- attract the growing generation of environmentally conscious tenants and occupiers

Site Aspects (SA)

- appropriate *planting and greenery* targeted at 20% or more of the site area (e.g. green roof and vertical greening)
- shading to outside areas to *enhance the local microclimate*, trees planting at pedestrian levels where possible
- *convenient pedestrian access* to public transport
- adopt an *Environmental Management Plan* during construction to minimize air, water and noise pollution

Benefits

- provide a healthier and more productive working environment for your customers
- help create a cooler, greener and more interesting urban environment for Hong Kong
- strengthen your reputation as a responsible corporate citizen in your neighbourhood

Materials Aspects (MA)

- target collection of 30% or more of *construction and demolition waste* for recycling
- avoid timber during temporary works, and ozone damaging refrigerants in cooling systems
- use *recycled building materials* (e.g. pavers) and materials from local or regional sources
- provide *recycling collection facilities* for use by the occupants of the revitalised building

Benefits

- bring down your waste disposal charges during the demolition and construction phase
- stimulate demand for green materials and recycling in Hong Kong, and help bring down their future costs
- help your tenants demonstrate their own green credentials through waste reduction and recycling

Water Use (WU)

- install *water economy devices* to reduce water use by 10% or more
- provide *leak detection devices* to prevent fresh water wastage
- install water efficient appliances that are at least 20% more efficient than the norm
- where possible, adopt *grey water recycling* (e.g. rainwater) equivalent to 5% of fresh water use

Benefits

- reduce your operating costs – both water supply and sewage disposal – for the operational life of your building
- help Hong Kong conserve its valuable water resources and reduce future costs to society
- demonstrate your commitment to green building, innovation and conservation

Enclosure 3

WSD Water Conservation Education Centre

Objective

Water Supplies Department (WSD) plans to set up a new Water Conservation Education Centre (Education Centre) to step up promotion of water conservation in Hong Kong. The Education Centre will occupy about 4,500 sq.m CFA and comprise versatile facilities for educating the general public, especially our younger generation, about the development of Hong Kong water supply system and the importance of water conservation in daily life.

Target Visitors

2. The Education Centre is open to general public with a primary focus on the younger generation in particular Primary 4 students, who are studying water supply in the school curriculum. All Primary 4 students will be invited to visit the Education Centre to participate in an education programme that is supplemental to their school curriculum. We will also invite other primary and secondary students to visit the Education Centre and provide guided tour in the Education Centre.

Facilities

Exhibition Gallery

3. The exhibition area is intended to be divided into five different themes as follow:

a) The Water Supply History of Hong Kong
Visitors will walk through the development of the public water supply system in Hong Kong, from as early as the sinking of the first public well in 1851 to the current water supply arrangement. They will appreciate the difficult time when water rationing was in place as well as the efforts made by the Government to secure water supply. Exhibits and models showing the Dongjiang water supply system will also be displayed. Valuable photos and exhibition boards will be displayed together with videos and

interactive games to recapitulate the important message of water conservation.

b) The Water Cycle

In this theme, visitors will go through the journey on how water in Hong Kong is collected, treated and distributed to the consumers and how the waste water is discharged and reused. Visitors will also appreciate the constraints and considerations in conveying raw water from different sources for treatment before delivering to their homes. Different treatment technologies and their applications will also be exhibited. The distribution network model will draw visitors' attention to the effect of high operation pressure environment and the associated problems. Different leakage detection and management technologies will be shown and the importance of proper maintenance of water pipes within residential developments will de demonstrated.

c) New Water Resources

Different new water resources will be introduced in this theme, including desalination, use of sea water for flushing purposes and water reclamation such as grey water reuse and rain water harvesting. The history of the use of sea water for flushing will be exhibited. In addition to showing how water reclamation works, visitors will be able to see a real grey water reuse system and a rain water harvesting system.

d) World Water Resources

The theme will provide visitors factual information of the water crisis occurring worldwide and how different cities deal with the issue. Visitors will be prompted to answer question like "how much water you need?" as compared to "how much water you use?" Water pollution will form another focus of this theme. Visitors will appreciate how scarce water resources are decreasing as a result of water pollution and how they can help to sustain them. Visitors will be prompted to think about the sustainable use of our precious water resources through the water resource model of the Pearl River Delta. Effect of climate change on water resources will also be presented. Through this

theme, we hope that visitors will appreciate the need to get prepared for the worst.

e) Total Water Management

This theme introduces the Total Water Management initiatives. Its focus is on water conservation and how visitors can conserve water. Games and interactive activities will be designed to enable visitors to appreciate the effect of change in their water using habits on the quantity of water they can save. Live demonstration of different products registered under the Water Efficiency Labeling Scheme will be made available for visitors to have a hand-on experience of those products.

4. The Education Centre will also have a separate exhibition room for exhibiting special areas of interest matching with the public relation and promotion activities of WSD at the time.

Theatre/Lecture Room/Classroom

5. Theatre/lecture room/classroom will be provided to facilitate delivery of the important messages on water conservation to visitors. Scheduled seminars and lectures will be conducted to promote water conservation. The facilities will also be used to broadcast videos on water resources conservation and treatment.

6. Educational activities will also be organized for students in the classroom to equip them with knowledge of water supply and conservation.

Grey Water and Rainwater Harvesting System

7. The converted industrial building will be equipped with a grey water and rainwater treatment facilities to recycle the grey water and rainwater for non-potable uses and toilet flushing in the building. The public can visit the control room and the plant room of the treatment facilities to learn about the management and operation of a live grey water reuse and rainwater harvesting system.

8. A comparison of the proposed facilities and floor area of the Education Centre with water conservation education centres in other major cities is at **Appendix**.

Opening Hours

9. The Education Centre will be open six days a week from 9:00 am to 5:00 pm and close on one of the weekday.

Enclosure 3 **Appendix**

Comparison of Facilities in the Proposed Water Conservation Education Centre with similar centers in major cities

Name:	**NEWater Visitor Centre**	**Taiwan Water Resources Centre**	**Water Resources Education Centre**	**Proposed Water Conservation Education Centre**
Location:	Singapore	Taiwan	United States of America	Hong Kong
Floor Area(m^2)	2,200	1,230	1,486	2,030[1]
Facilities:	• Exhibition hall • Models • Interactive educational games • Multimedia theatre • Live demonstration of water treatment plant adjacent to the Centre	• Exhibition hall • Models • Interactive educational games • Multimedia theatre	• Exhibition hall • Models • Interactive educational games • Multimedia theatre • Classroom / Lecture room • Water sciences laboratory • Art gallery	• Exhibition hall • Models • Interactive educational games • Multimedia theatre • Classroom / Lecture room • Live demonstration of Water Efficiency Labeling Scheme (WELS) products • Live demonstration of grey water recycling and rainwater harvesting plant[2]

[1] Floor area is presented in net operation floor area (NOFA) for comparison purpose. The relationship between NOFA and the construction floor area (CFA) is as follows: NOFA x 2.24 = CFA, i.e. 2,030 sq.m (NOFA) x 2.24 = approx. 4,500 sq.m (CFA)

[2] Grey water recycling and rainwater harvesting plant occupies an area of approx. 600 sq.m NOFA where the public can visit the operation of the control room and the plant room of the treatment facilities to learn about the management and operation of a live grey water reuse and rainwater harvesting system.