

Case Study 1: Our New Sustainable Housing Development

- Innovative Green Design and Construction at Kai Tak Site 1A
- Green Living at Yau Lai Estate Phase 5
- Lively Community at Choi Wan Road Project



Innovative Green Design and Construction at Kai Tak Site 1A

The Housing Authority's new PRH development at Kai Tak Site 1A (3.47 hectares) is located at the north apron area of the Kai Tak Airport next to the future Avenue Park. Containing six domestic blocks, Kai Ching Estate (Kai Tak Site 1A) is scheduled to be completed in 2013 to provide around 5 200 flats for 13 300 residents.



Overview of Kai Tak Site 1A

We focus our research and development (R&D) efforts on introducing new and improved initiatives during the design, construction and operation phases for this PRH development. To echo with the theme of "Homes in the Park", we have not only incorporated a number of green features during the design phase, but also applied environment-friendly techniques for constructing this estate.

During early design phase of this estate, our architects and engineers have taken initiatives to integrate a number of innovative green features to the building structure in order to achieve a major reduction of the estate's energy consumption and carbon emissions.

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Renewable Energy

Our commitment in supporting innovative R&D for the application of renewable energy leads to a diverse and highly interesting variety of assignments for our technical staff. In this project, photovoltaic panels will be installed on the roofs of the domestic blocks, which will utilise solar energy to generate power for the communal facilities. In addition, the lift operations on the estate can also become a renewable energy source. When operated under heavy load down, light load up or during braking conditions, the lift motors can act as generators and feed electricity back to the power supply system.

Energy Conservation

In this project we devote a considerable amount of R&D efforts to develop innovative initiatives targeting to achieve energy conservation. In order to save electricity as much as possible, lighting in the public areas of the estate has been designed to use energy-saving technologies, such as electronic ballast, T-5 fluorescent tubes and LED lighting. For example, in order to reduce the lighting in the lift lobbies and corridors, a two-level lighting control system has been applied to allow extra lights switched on only when needed, therefore maintaining a lower but acceptable level of lighting under normal conditions. New estates will also be equipped with “Smart Meters”, which monitor electricity and water consumption data on a regular basis. These data are going to be displayed in the ground floor lobbies of the domestic blocks to raise the energy awareness of the residents.



Smart Meters

District Cooling System

We have adopted the centralized and energy-efficient chilled water supply system, the District Cooling System (DCS), implemented by the Electrical and Mechanical Services Department to provide chilled water through underground chilled water pipe network to the air-conditioning systems of the non-domestic facilities including shops, kindergarten and estate management offices. Compared with the conventional air-cooled air-conditioning system, the DCS is able to save energy up to 35%.

Water Preservation

Our R&D team understands tough challenges about usage of freshwater resources and develops solutions for preserving freshwater throughout the design of new estates. In particular, with the support from our R&D works a rainwater collection system will be employed and used for root zone irrigation for part of the planting area. Such a practice can help reducing water consumption for plant irrigation within the estate significantly.

Fuel Reduction

In view of a wider use of electric vehicles in future, electric vehicle charging facilities will also be available in the carparks of new estates to enable electric vehicles to get recharged while parked. Teaming up with China Light Power, our contractor at Kai Tak also made special arrangement to rent an electric car as contract vehicle for the site.

Our team of experienced staff members and engineers work closely to develop initiatives that address the community rising concerns on carbon emissions during our various stages of development. In

view of this, to further reduce the carbon emissions from the construction equipment, we have tried to apply bio-diesel fuel for some construction equipment. Once the application is proved to be effective by our R&D team, we may continue to implement this low carbon initiative in a wider scope.

Waste Reduction and Reuse

Leading to improvements in efficiency and minimise the environmental impact of construction, innovative techniques have been adopted. Our research and development efforts in this project have been concentrated to reduce off-site disposal of materials as far as practicable. Instead of dumping marine mud from dredging activities in landfills or marine dumping sites, we use marine mud excavated from the site for in-situ backfilling and production of eco-pavers by adding cement and recycled aggregates.

In addition, the wider use of Modular Design and Component Prefabrication techniques enables us to enhance the built quality while reduce wastage of raw materials. We have used not only prefabricated elements such as fabric reinforcements, semi-precast slabs, and precast façades and staircases, but also used volumetric precast kitchens and bathrooms.



Volumetric precast bathroom

Green Living at Yau Lai Estate Phase 5

As a newly completed estate, Yau Lai Estate Phase 5 adopts a series of green features in different aspects, including energy saving, water saving, waste reduction, noise mitigation, air quality improvement and greening. The features are summarised in the figure below.



Yau Lai Estate Phase 5



Waste Separation for Recycling

A “mail-box like” Collection System has been installed in the corridors of the new domestic blocks, which provides a convenient way to facilitate residents in separating and disposing different types of wastes. For hygiene and security reasons, the hatch doors of “mail-boxes” are self-closing and the intake from “mail-boxes” will go directly to the Refuse Storage and Material Recovery Rooms. In addition, sensors are installed to alert building security personnel in case the hatch doors are not closed properly.



Mail-box Type Collection System for Sorted Recycling Materials

Renewable Energy

The latest solar technology has been incorporated in the Yau Lai Phase 5. Two different types of panel, polycrystalline panels and thin film amorphous solar panels, are installed on the roofs of the domestic blocks. Their actual performance will be compared afterwards. The Building Integrated Photovoltaic Panels are applied to the entrance porticos of the estate. The panels are optimally positioned for collecting sunlight. The generated electricity will be used in the public areas, such as the carpark and the Ancillary Facilities Block.



Building Integrated Photovoltaic Panels

Water Preservation

In order to make use of rainwater and reduce wastewater, we have designed the Rain Water and Air Conditioning Condensate Water Harvesting System. The system can help collect rainwater from the roof of the carpark block and the condensate water from air-conditioning units. Once filtered, the collected water may be used for washing the floors in the Refuse Storage and Materials Recovery Rooms or irrigating green areas in the estate.



Rain Water and Air Conditioning Condensate Water Harvesting System
(left: reclaimed water pump room, right: floor washing water tank)

By adding a partition wall to the freshwater and flush water tanks as well as applying additional piping system at Yau Lai Estate, the new Twin Roof Water Tanks can reduce water wastage and allow cleaning or repair in one tank without disrupting the water supply of the whole block.

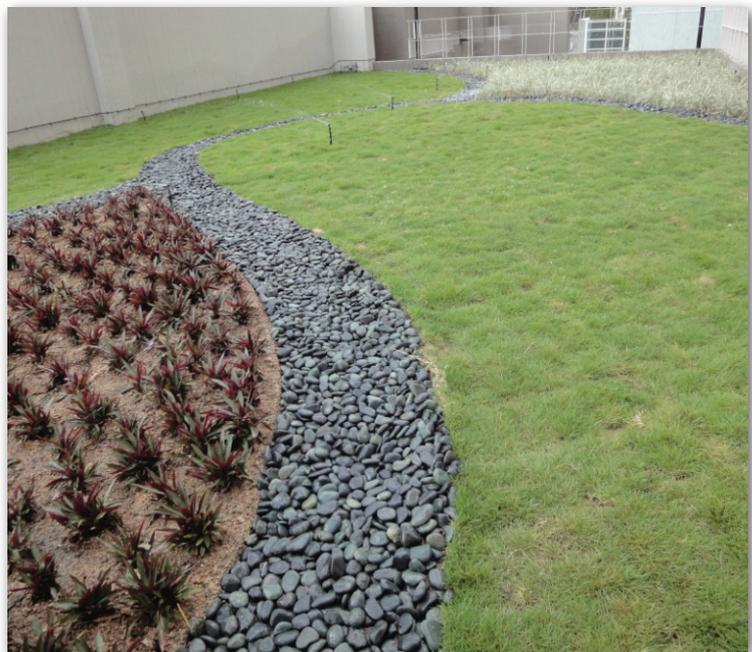
Greening with Style

In order to reduce heat and provide pleasant living environment for residents, we have adopted some new ways of greening the public rental housing estates. A number of vertical green panels have been installed on the noise barrier around the estate, and on certain floor of the estate blocks. The concept of the planting design for the vertical green panels comes from a graphic art competition of local schools, which was part of our public engagement programme in 2009.



Vertical green panels installed at roof and noise barrier

We continue to expand the scope of conventional planting by implementing green roof initiatives. While covering more roofs of the walkways, green plants are also found on top of the plant room of the carpark and Ancillary Facilities Block. With the assistance of an automated irrigation system which uses collected rainwater, these green roofs become home to a wide range of plant species and provide residents with a pleasant environment.



Green roofs

Lively Community at Choi Wan Road Project

Converted from an abandoned quarry, Choi Wan Road Project (Choi Ying Estate, Choi Fook Estate and Choi Tak Estate) has distinct feature to preserve the original landscape while creating a sustainable community full of vitality. Indigenous rocks and special stones are kept in the open areas as reminiscence of the old quarry and enrich the public's understanding about geo-conservation.

To create a green and pleasant living environment, a massive greening programme is carried out in this development project. Green roofs have been widely adopted in various establishments within the estates, including kindergarten, carpark block, estate management office, refuse collection point, elderly centre, etc. In addition, other green features such as green slope and vertical greening have been incorporated as part of the feature elements in the estates.



Conservation of natural granite

Choi Tak Shopping Centre, where residents can buy daily necessities and general services conveniently, has adopted various environmental-friendly designs. For instance, the installation of ceiling windows in the shopping centre facilitates the use of natural sunlight and allows natural ventilation within the premises.

Green concept designs are also found in the leisure walking trail with extensive greening in the estates. Choi Hei Road Park, which transformed barren granite bedrock with little natural vegetation to a "Green Connector", is designed for linking the Choi Tak and Choi Fook Estates. The park witnessed extensive tree transplanting in which over 90 mature trees were transplanted from another public works project. The public toilets utilise natural lighting and ventilation to reduce energy consumption. Solar lamps in the park also provide necessary illumination at key locations and promote environmental awareness.

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Extensive greening in the estates



Choi Tak Shopping Centre and public toilet utilise natural lighting to save energy