

## COMPANY

Architectural Services Department, HKSAR  
China State Construction Engineering (Hong Kong) Limited  
China State Construction International Medical Industry Development Company Limited

## PROJECT

**Design and Construction of Community Isolation and Treatment Facilities at Penny's Bay and Area Adjacent to the Kai Tak Cruise Terminal**

## LOCATION

**Penny's Bay and Area Adjacent to the Kai Tak Cruise Terminal**

## TYPE

**Government Project**

## SCHEDULED TIME OF COMPLETION

**June 2022**

"In the post-pandemic era, faced with various changes and uncertainties, we should always maintain an adaptive and creative mindset. We should quickly introduce innovative methods to build the necessary infrastructures. By this we can fulfill the mission bestowed by this era, and also breathe new vitality into the traditional construction industry."

—Zhang Yi

Assistant President, China State Construction Engineering (Hong Kong) Limited

General Manager, China State Construction International Medical Industry Development Company Limited

## BIM PARTNERS

**China State Construction Science and Technology Limited**

## AUTODESK PRODUCTS USED

**Autodesk® 3ds Max®**

**Autodesk® AutoCAD®**

**Autodesk® BIM 360®**

**Autodesk® CFD**

**Autodesk® Civil 3D®**

**Autodesk® Navisworks®**

**Autodesk® Revit®**

# Turn the impossible to possible!



Graphic Design Works for KT Community Isolation Facility  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited

In late January 2022, the fifth wave of Covid-19 struck Hong Kong, and the demand for medical isolation facilities increased sharply. Our project team is honored to undertake the anti-pandemic project's design and medical planning work once again.

As the isolation and treatment facilities with the highest standards, projects located adjacent to the Cruise Terminal located on the runway of the former Kai Tak Airport and Northeast to the Lantau Island.

The Kai Tak project covers an area of 108,200 square meters with a construction area of 114,773 square meters. Penny's Bay project covers an area of 449,743 square meters, with construction area of 271,784 square meters. In total the two projects provided 9,112 isolation units with 20,064 isolation beds, which is more than double of the existing isolation beds number in Hong Kong.

The projects also provide supporting facilities for the Civil Aid Service, the



The KT Community Isolation Facility  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited



The Penny's Bay Community Isolation Facility  
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Hospital Authority, the Department of Health, the Fire Services Department, the Electrical and Mechanical Services Department and the Hong Kong Police Force for the daily operations. Penny's bay used "Nature" as the graphic design theme, combining with the theme's colors and the blue sky and beautiful sea view of the Penny's Bay, relieve the tension of the users. For the first time in Hong Kong, an elevator system has been built to service the 4-storey building within community isolation facility. A series of color schemes and the theme patterns of city silhouette, sunshine, rainbow, combining with the design elements of "Kai Tak Current of Vitality", bring in vitality and color to the facility. The design theme is named "Hong Kong Kai Tak ♥ Rainbow After Rain", which symbolizes Hong Kong people standing together to overcome the epidemic and welcome the rainbow after the storm. Total Green areas of 140,000 square meters are incorporated with plants of different colors to bring vitality to the community. A stone feature wall with the shape of lion is set in Kai Tak project Phase 3, symbolizing the Lion Rock Spirit of overcoming adversity in the epidemic.

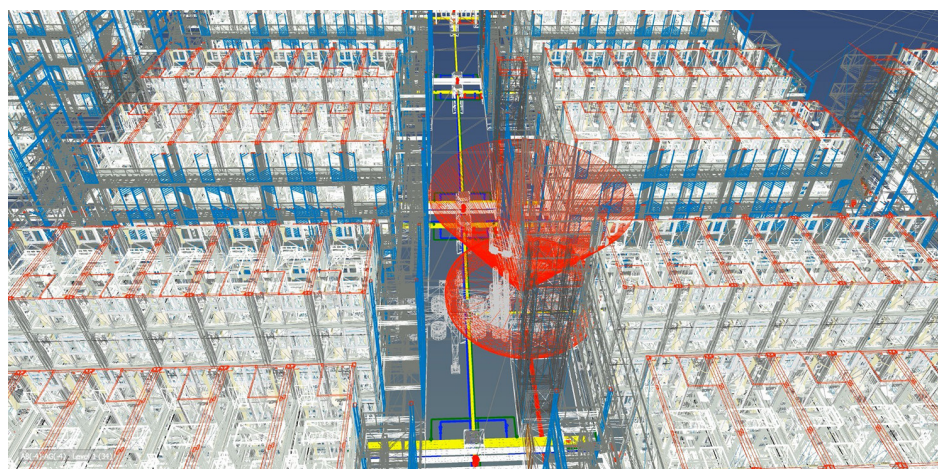
As medical isolation facilities, the separation of clean and dirty zones is well planned for both projects. The MiC area is the dirty zone, while the supporting facilities are clean zones. In each isolation building, the isolation room is the dirty zone, and the corridor is relatively clean zone. The bathrooms are offset to the opposite building; natural ventilation design is adopted to avoid the un-predicted flow due to the use of exhaust fans. The condensate drainpipe of the air-conditioner is specially equipped with U-Trap to prevent cross infection and backflow of polluted air. The interior wall finishing is made of antibacterial material, with easy-cleaning skirting. Sewage system adopts W-Trap design,

and drainage pipes are connected to the vent pipe to prevent siphon effect; the drainage system is two pipes system with easy maintenance design. CFD simulation is carried out for the air flow pattern in the roof area. By using the Autodesk CFD, according to results under extreme conditions such as wind speed

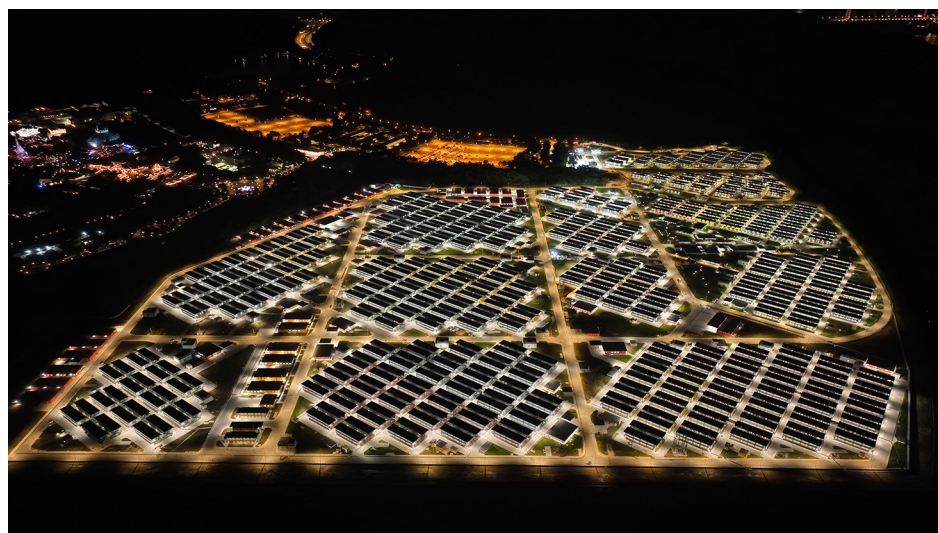
of 220 kilometers per hour, the height of the vent pipe was raised to more than 3 meters, so that the polluted air can be directly discharged into high-velocity area, complying with the infection control standards and requirements of the World Health Organization and Hong Kong local standards.

Based on DfMA design concept, with the help of the Autodesk products and BIM technologies, the design team uses MiC rooms as the main body, with MiC corridors, MiC stairs, MiC ELV Room, DfMA corridors and the first mixed-structure DfMA lift shaft in Hong Kong. Compared with traditional methods, modular construction method reduces 80% construction waste, and is low-carbon and energy saving. The factory production work runs simultaneously with the site preparation work, achieving higher quality and efficiency. The dimensions of all modules are designed to enable easy transportation and installation, and disassembly and reassembly in future. The project has set a record in the prefabrication ratio among the permanent buildings in Hong Kong and is a pioneer in the era of construction industrialization.

In addition to the modular building, the team use DfMA method to design the



BIM Simulation in MiC Hoisting and Installation  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited



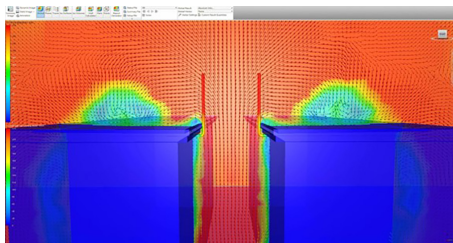
The Penny's Bay Community Isolation Facility View in Night  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited



Project Team Reviewing the BIM Smart Construction System  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited



Laser Scan for BIM Model Checking  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited



The CFD Simulation by Using the Autodesk CFD Product  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited

supporting facilities as well. For instance, the DfMA water pump is assembled at the factory, and shipped to the site for quick installation. All pumps are equipped with LoRaWan wireless signal transmission system. By this IoT technology, the transmission distance can be up to 10 kilometers and the operation of pumps can be remote monitored at the central control room in real time.

The two project provides 8408 standard rooms, 306 2-unit family rooms, and 216 3-unit family rooms. There are 182 units designed for handicapped, with 1.5-meter width barrier-free corridor. This meticulous attention to meet the needs of various users reflects a human-centered design approach.

The Community Isolation and Treatment Facility at Kai Tak and Penny's Bay Project meet the permanent building standard and requirement. It is also a major pandemic cum people's livelihood project. It can be used as an important backup medical facility in Hong Kong. Once again, by adopting the BIM and related innovative technologies, we have created an icon for design and rapid construction, and another leading success on the road of construction industrialization!



The Lion Rock inside the KT Community Isolation Facility  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited



DfMA Water Pump Designed by BIM  
Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited



Image Courtesy of Architectural Services Department, HKSAR and China State Construction Engineering (Hong Kong) Limited and China State Construction International Medical Industry Development Company Limited The project team

### About Architectural Services Department, HKSAR

The Architectural Services Department (ArchSD) serves and cares for our community by enriching the living environment through quality professional services. ArchSD ensures the quality, cost effectiveness and sustainable development and upkeep of community facilities; provides quality professional advisory services on community facilities and related matters; and promotes best practices in the building industry. ArchSD is also committed to collaborating with the industry partners, user departments and stakeholders in developing and maintaining the public facilities for providing a better service to the general public.

### About China State Construction Engineering (Hong Kong) Limited

China State Construction Engineering (Hong Kong) Limited started its construction business in Hong Kong in 1979. The Company engages in building construction and civil engineering works. China State Hong Kong plays an active role in the construction industry by means of its sound quality management and has professional expertise capable of undertaking high quality and technically advanced projects. It has undertaken over 800 construction projects in Hong Kong and Macau over the past 40 years and has acquired substantial experience and capabilities in doing so.

### About China State Construction International Medical Industry Development Company Limited

CSIM is well known for its expertise in the design and construction of high-standard hospitals and is exceptionally familiar with Hong Kong, UK, US & EU construction standards. In addition, through its continuous and active participation in the construction of numerous large-scale hospitals projects in Hong Kong over the past decades, CSIM has built up its reputation in high-standard international hospital construction and has developed a highly experienced management team for EPCO hospital projects.