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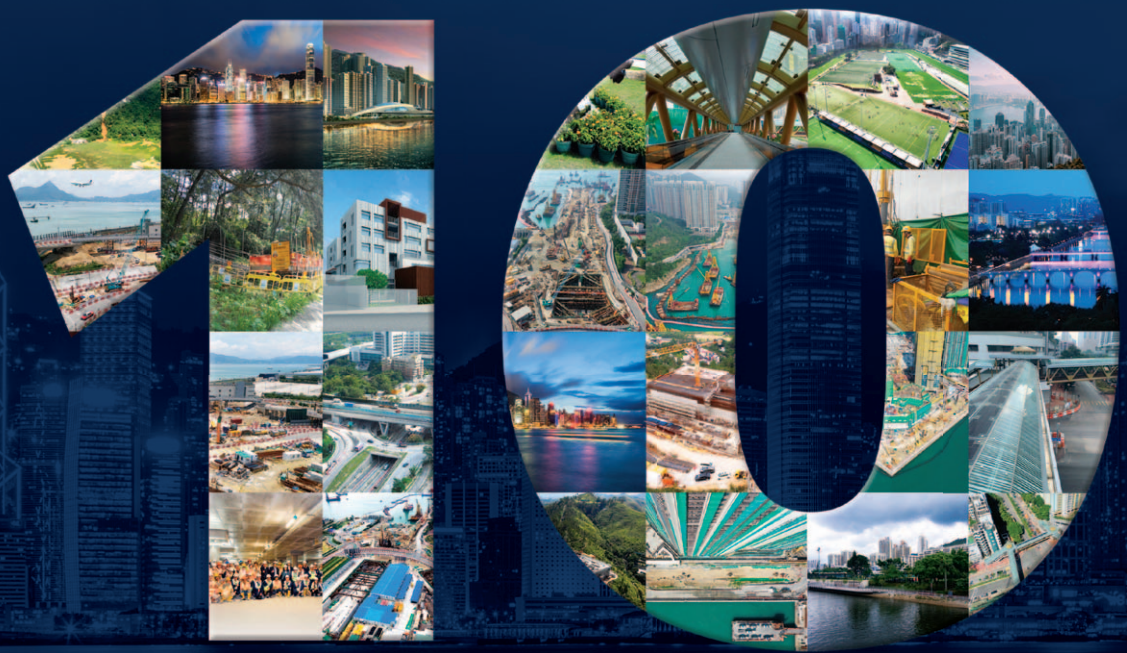

YEARS IN HONG KONG

Proud to support NEC in Hong Kong and Internationally

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For more information on how Pinsent Masons can support your NEC project please contact:
peter.clayton@pinsentmasons.com

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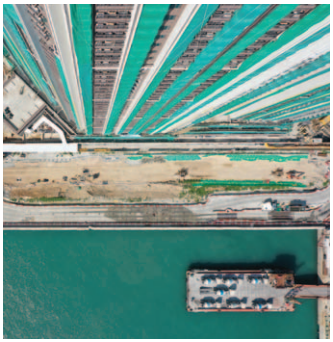
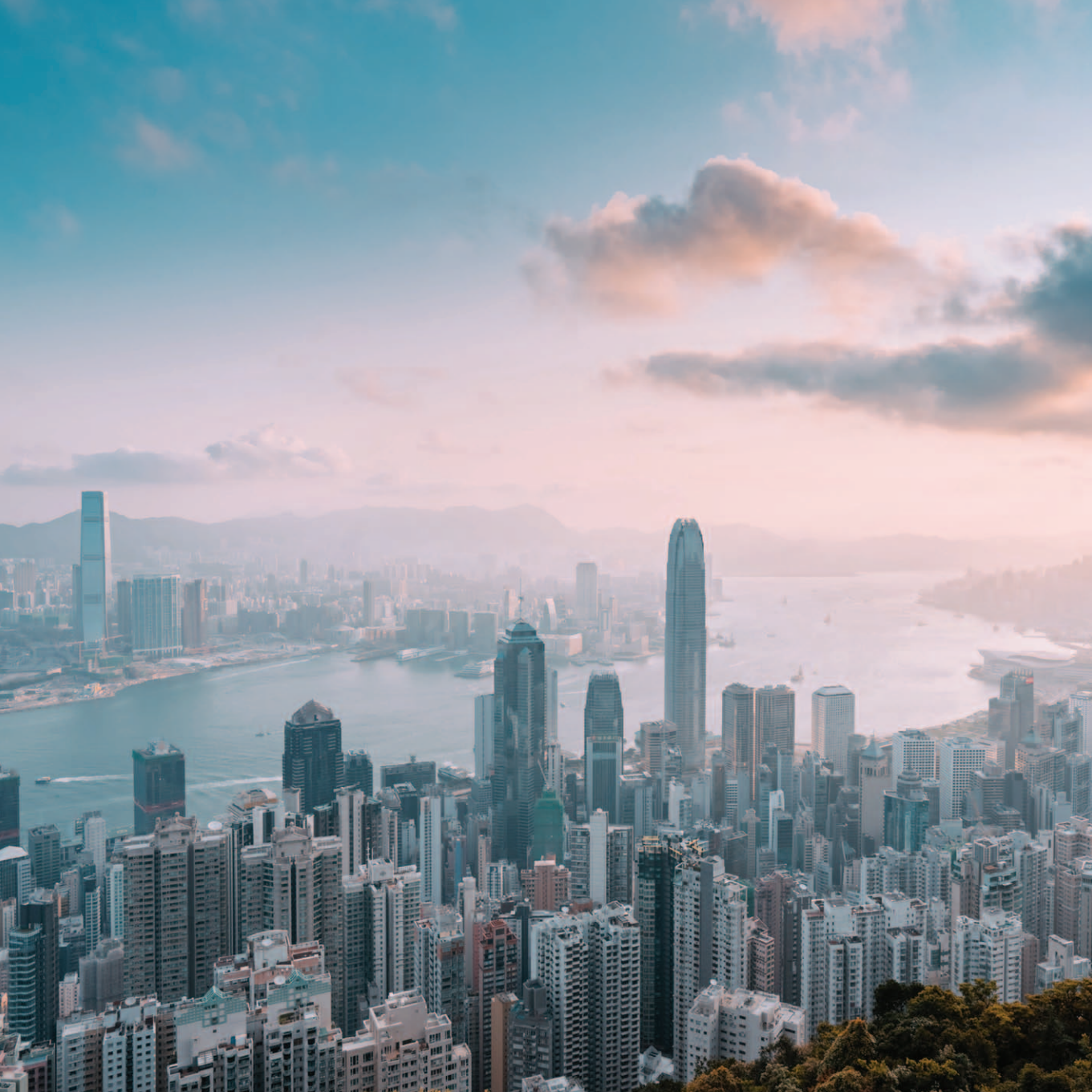


CONTENTS



FOREWORD

The 10-year NEC journey has been resoundingly important to the construction industry in Hong Kong. Using the NEC contract suite has set in motion a transformation of the traditional mindset in the construction industry and showcased the benefits of a collaborative approach to construction projects.

Back to 2000, the Government of the HKSAR set up the Construction Industry Review Committee to review the situation of construction industry, which in turn recommended wider adoption of partnering approach to construction projects. With years of efforts, NEC was subsequently put on trial in public works contracts 10 years ago.

We saw some very successful cases in the early trials of NEC. No doubt NEC is an effective tool to drive the mindset change amongst practitioners towards collaboration, but solely relying on the contract form is not sufficient. To drive a cultural change across the industry, the Development Bureau has promulgated the policy directive to adopt NEC in public works contracts and provided relevant guidelines and training to the supervising professionals. The use of NEC has also been extended to more complex and higher-valued contracts.

As of today, there are over 170 NEC works contracts and 30 NEC PSC contracts, amounting to a value of over HK$70 billion.

With 10 years' experience, it is a right time for us to consolidate our experience and set the way forward. We express our sincere gratitude towards NEC UK in producing this commemorative booklet on "10 Years, 10 Projects", which exemplifies how cultural change towards collaboration can be brought about in the construction industry. Looking ahead, NEC will still be a key driver and the Government will continue to work hand in hand with the construction industry to build a better Hong Kong.

發展局
Development Bureau

Ir S H Lam
Permanent Secretary for Development (Works)
Development Bureau
The Government of the HKSAR
Asia-Pacific Users' Group Chair

SIGNATURE PROJECT SCHEME IN SHA TIN: DECKING OF TAI WAI NULLAH IN SHA TIN AND REVITALISATION OF SHING MUN RIVER PROMENADE NEAR SHA TIN TOWN CENTRE (SPS)

MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD), HKSAR

(II) **PROJECT MANAGER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

(III) **SUPERVISOR:** PROJECT DIRECTOR OF BLACK & VEATCH HONG KONG LIMITED (B&V)

(IV) **CONTRACTOR:** CONCENTRIC CONSTRUCTION LIMITED (CCL)

CONTRACT:
NEC3 ECC OPTION D TARGET COST WITH BILL OF QUANTITIES

VALUE: HK$106.1M

Scope and Significance of Project:

The former Chief Executive of the HKSAR Government announced in his 2013 Policy Address that a one-off provision of HK$100 million would be earmarked for each district (total of 18 districts) to initiate project(s) under the Signature Project Schemes (SPS). For Sha Tin District, an additional amount of up to $40 million was offered by the Hong Kong Jockey Club Charities Trust.

SPS in Sha Tin District comprises the Decking of Tai Wai Nullah in Sha Tin and Revitalisation of Shing Mun River Promenade near Sha Tin Town Centre. The objectives of the project were to create space to support the sustainable development of Sha Tin District, to highlight and enhance the key features of the district, and to showcase the history and uniqueness of the local community. The scope of the project mainly comprises construction of an elevated 5-a-side soccer pitch over a nullah, enhancement works on bridges that span across Shing Mun River, a boardwalk on the river bank, and display facilities/ feature showcases to link up public facilities and historic and predominant attractions in the vicinity of the promenade.

Proficiency of Project Management

Apart from the scope of the project that covers a wide range of works including civil, E&M and architectural, the operational need and preference of future management/maintenance authorities also imposes complexity to the design and construction of the works. Both the project manager and the supervisor have made use of their NEC experience to administer the NEC target contract to ensure that the project was completed on time and within budget. Timely communications, prompt instructions and professional responses minimised the impact arising from additional requests of different management/maintenance authorities or changes to complete this project.

Well-defined procedures for the instruction of compensation events were formulated at the beginning of the contract. The period for reply set out in the contract was strictly followed by all parties. Both the contractor and the project manager competently and collaboratively utilised the mechanisms of early warning and risk reduction to manage the risks together in good faith.

Teamworking

The employer organised various NEC workshops throughout development of the project. During pre-tender stage, a mock tendering exercise was arranged for all potential tenderers to emphasise the characteristics/procedures of NEC with the goal of a smoother contract commencement. During construction stage, the contractor, the project manager and the supervisor proactively participated in not only NEC training workshops arranged by the employer, but also other NEC seminars and in-house workshops for continuously enriching the knowledge and application of NEC.

Substantial amount of public involvement and consultation was necessary throughout the implementation of the project, and swift decisions and adjustments to the works for addressing public concerns were crucial. Working within a joint office enabled the team to swiftly share available information and then effectively review the designs and construction methods. From discussion with stakeholders, gathering of site information, detailed design to subcontracting of works, team communication and willingness to co-operate were crucial in obtaining the final acceptance on the revised design for subsequent construction.

Positive impact on Hong Kong

The decking of Tai Wai Nullah and the boardwalk create additional space to support sustainable development of the community. Apart from easing the relatively crowded condition of the footpath along the Shing Mun River promenade and providing a more comfortable environment for pedestrians and joggers, the boardwalk also provides a spot for the public to enjoy the scenic views of the riverside.

The thematic lighting and enhancement works for the bridges across Shing Mun River revitalise Shing Mun River promenade as well as foster a stronger tie between the two banks of Shing Mun River. The showcases, signage and map boards under a central theme that links up public facilities and historical attractions in the vicinity of the promenade facilitate the public to know more about the heritage and enjoy the facilities along Shing Mun River and provide clear direction for visitors.

TSEUNG KWAN O – LAM TIN TUNNEL: ROAD P2 AND ASSOCIATED WORKS

MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD), HKSAR

(II) **PROJECT MANAGER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

(III) **SUPERVISOR:** AECOM ASIA COMPANY LIMITED

(IV) **CONTRACTOR:** CHINA ROAD AND BRIDGE CORPORATION – BUILD KING JOINT VENTURE

CONTRACT: NEC3: ECC OPTION C

VALUE: HK$1.78 BILLION

Project Background

The Tseung Kwan O – Lam Tin Tunnel Project (TKO-LTT) is a major infrastructure project which will form part of Trunk Road Route 6 – an east-west express link connecting West Kowloon and the southern part of Tseung Kwan O (TKO). Route 6 will be part of the planned high capacity external road link, which in combination with the existing metro rail link, will serve to improve accessibility and cater for the projected traffic flow in the TKO development area. The project (Road P2) is one of the six component packages of the TKO-LTT. Road P2 will connect to the TKO town centre at its northern end and a grade separated marine interchange and a footpath and cycle track connection to CBL at the southern end.

Excellence in Contract Management

The project demonstrated exceptional risk management, the employer's and contractor's risks were allocated separately by identification and insertion in the section of "Matters to be included in the Risk Register" in the contract data parts one and two. The risks are shared and borne by the respective party to manage and mitigate them independently.The insurable risks are allocated separately to the employer and the contractor set out in accordance with core clause 8. Each item is clearly divided for both employer and contractor to insure against.

The project had employed several secondary optional X clauses including price adjustment for changes in cost of materials and labour, changes to the law to reflect levy changes for disposal of surplus materials and using key performance indicators to encourage and promote safety at work. Z clauses were kept to a minimum unless necessary; these included inclement weather to suite the weather conditions in Hong Kong.

Proficiency of Project Management

The project manager, contractor and client had exhibited a formulated process for both compensation events and early warnings. Compensation events were implemented through a methodical sequence, quotation for work, changes to target

price and programme were adjusted accordingly and regularly. Early warnings were used when a risk arises, and risk reduction meetings were conducted to discuss options and actions to mitigate the risk.

Two major challenges rose during the project, one being the Re-provisioned Transfer Room for DSD and another being the existing drainage system in the reclamation site discharging into the reclamation area. Through an open and transparent approach combined with the drive for common objectives, the project team utilised the early warning mechanism and ran risk reduction meetings to ensure risk mitigation actions are decided so there is no additional delays to the project plan.

The co-location of project teams in a joint office developed the required culture for working collaboratively along with various workshops, training and review sessions.

Positive impact on Hong Kong

Tseung Kwan O is part of the New Town Development Programme aimed at providing housing for the increasing population of Hong Kong and improving the living environment by decentralising the population from the over-crowded urban districts. The lower intensity residential developments at TKO which includes open parks, recreational facilities and a vibrant waterfront, had been designed to improve the living standards and wellbeing of the local community. The amenities constructed under Road P2 including the landscaped deck, cycle track and footpath together with the improved accessibility to TKO contribute to this objective.

The completed TKO-LTT improves the accessibility of TKO and the southeast New Territories via connections to existing and proposed major arterial road links. The construction of Road P2 was carried out with robust environmental protection. Corals found within the project site were trans-located. An impermeable temporary steel cofferdam was installed to minimise the water quality impact due to the reclamation works. Strict controls on noise and dust were implemented to minimise nuisance.

CROSS BAY LINK, TSEUNG KWAN O:
ROAD D9 AND ASSOCIATED WORKS

MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD), HKSAR

(II) **PROJECT MANAGER:** AECOM ASIA COMPANY LIMITED

(III) **SUPERVISOR:** AECOM ASIA COMPANY LIMITED

(IV) **CONTRACTOR:** BUILD KING CIVIL ENGINEERING LIMITED

CONTRACT: NEC3: ECC OPTION C

VALUE: HK$757 MILLION

Project Background

The Cross Bay Link (CBL) was designed to relieve the traffic within the Tseung Kwan O (TKO) town centre, providing an alternative access route to the south-eastern part of TKO. Once completed, traffic from the south-eastern part of TKO can commute to the western part of TKO via CBL, or commute to Kowloon East using Tseung Kwan O – Lam Tin Tunnel currently under construction, without travelling through Wan Po Road and TKO town centre which are congested with traffic during peak hours.

This project, Road D9, is one of the two contract packages of CBL. It connects the main bridge of CBL from the sea to the TKO eastern south development, and to Wan Po Road. The project also includes construction of a ramp connecting the main bridge and the waterfront promenade under construction for cyclists and pedestrians.

Two Effective Early Warnings

Early warnings were important as challenges arose which required coordination with other parties working in the area. The works area is adjacent to LOHAS Park Development, where enormous MTRCL's residential projects are concentrated. As a result of coordination with the interfacing contractors of the residential projects, the works information defined an area called "Portion I" that could not be accessed by the contractor until 2 July 2019. The Portion I area borders two interfacing residential projects and is also the site of the current emergency vehicular access (EVA) of MTRCL's TKO Depot, so traffic is busy. The Portion I planned to be of shared-use by various parties after the said access date.

During the coordination, unexpected delays of construction activities were found in Portion I, meaning the interfacing contractors needed to occupy part of the area for a longer time. An EVA also needed to be maintained for the depot until a new one was formed at a separate location.There was also a staff access for another interfacing contractor to be maintained in Portion I.

These constraints by different parties made the coordination challenging. The contractor notified an early warning to draw attention to the project manager that there was a risk of failure in the coordination which may have led to delay in occupying the works area for piling works.

To reduce the risk, the project manager together with the contractor actively participated in the interface meetings to convince MTRCL and the interfacing contractors to provide working space required for the project Road D9. During the discussions, the contractor rearranged the work fronts, so that pre-drilling works which occupied less space could start earlier while the interfacing contractor was using heavy equipment. Construction of at-grade structures could also start by phases so that the EVA to the depot could be maintained. In return for

this rearrangement, the contractor is allowed to use the area immediately next to Portion I to form a new site entrance which greatly improved the logistics of the site, and subsequently accelerated the piling works.

The second example related to maintaining existing underground utilities, which is the responsibility of the contractor to coordinate the utility undertakers to agree the method of construction and the necessary diversion programme before the commencement of works.

The Road D9 site is a narrow corridor between an existing seawall and the LOHAS Park. After the permanent road structures have been constructed, it leaves an even narrower strip of area for underground utilities realignment and future drainage construction. During the Site Liaison Group Meetings, concerns were raised after they were removed for the roadworks, the contractor would have insufficient space for re-laying the underground utilities. Thus the utilities undertakers were reluctant to abandon the existing utiliites which were essential to provide services to the LOHAS Park.

An early warning was notified by the contractor to the project manager about the potential delay or increase in price if the underground utilities could not be diverted, or their diverted alignment covered up the future area for drainage construction. The project manager proactively worked out a solution with the employer, CEDD and MTRCL. A long strip of area immediately outside the site boundary was assigned for the permanent location of the underground utilities re-laying. This provided an assurance that spaces are allocated for their future utilities laying, thus, the underground utilities were removed in good time. This early resolution not just eliminated the risk of late utilities diversion, but also reduced the risk of damaging live utilities during the works. It benefitted both the utility companies and the project team.

Efficient use of Excavated Material

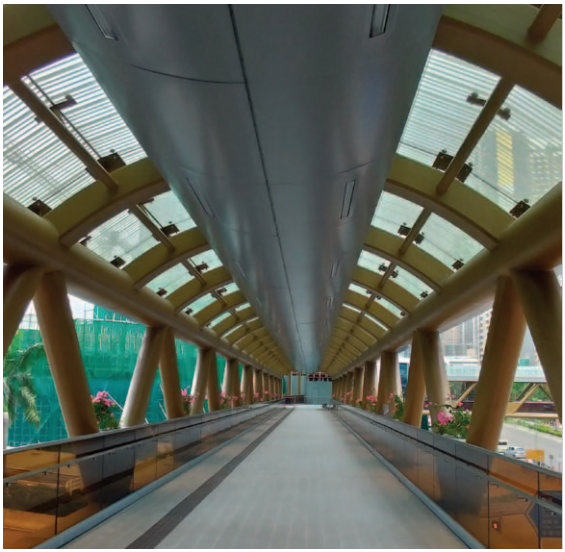
The works information states earthwork materials excavated from the ground shall be disposed to the TKO Area 137 Fill Bank. The works along Road D9 which includes construction of pile caps and at-grade footings will generate thousands of excavated materials. Due to tight space of the site, there is not

enough space to house those materials which can be used for backfilling after those structures are completed. Therefore, they need to be disposed to the fill bank as stated in the works information. This is expensive and wasteful.

The project manager noted the situation and suggested the excavated materials from the project Road D9 could be exported to another contract of CBL, C1 of which a basement of an E&M Plant Room was just completed and need backfilling materials. The contractor agreed the arrangement. Thus, instead of, disposing the materials to the fill bank which is 4km away, the contractor exported materials to the adjacent site at their doorstep, and saved money from discharging materials to the fill bank. The interfacing contractor could also save money from importing fill material. The above arrangement also eased off the burden to the fill bank.

The project celebrated the first-year anniversary in October 2019. The employer, the project manager and the contractor have maintained a good working relationship and mutual trust in the last year, and will continue to do so. The works have been proceeding according to the planning, and together we believe the team will succeed in delivering the Road D9 on time and on budget.

WEST KOWLOON RECLAMATION:
MAIN WORKS (REMAINDER) – FOOTBRIDGE AT THE JUNCTION OF SHAM MONG ROAD AND TONKIN STREET WEST IN SHAM SHUI PO



MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD), HKSAR

(II) **PROJECT MANAGER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

(III) **CONSULTANT:** MOTT MACDONALD CONSULTANT (HONG KONG) LIMITED

(IV) **CONTRACTOR:** WANG KEE CONSTRUCTION COMPANY LIMITED

CONTRACT: NEC3 ECC OPTION B

VALUE: HKD 222 MILLION

Project Background

The project will help to enhance the connectivity between the adjacent private and public housing development, provide a barrier-free and grade-separated linkage for elderly, disabled, nearby residents and students, and improve the pedestrian safety and junction capacity. The contract comprises the construction of:

- covered four-span footbridge system at the junction of Sham Mong Road and Tonkin Street West, with length of each span ranging from about 46m to 67m (235m long in total) and the clear width ranging from about 4.0m to 4.7m;
- six lifts, four covered escalators, two covered staircases and three direct connections linking the proposed footbridge system with future adjacent developments;
- associated road works and ancillary works including a temporary covered staircase, footpaths, drainage, utilities, electrical and mechanical and landscaping works; and
- necessary environmental mitigation measures.

Excellence in Contract Management

With proactive and transparent teamwork from all project team members, the project was delivered successfully with the spirit of mutual trust and co-operation, constructed on time and within budget. The results of implementing NEC were better communication, programme monitoring, budget control, risk management and a trustworthy and amiable working environment.

By adopting a shared office, the physical barriers in communication were removed. Members could work closely together in a speedy manner to resolve site problems. For example, the contractor reported some soil found attached on the surface of a drilling head for a bored-pile construction when the founding level had been reached. An adhoc risk reduction meeting was held immediately to review the abnormal situation, and a decisive decision was agreed. Additional site investigation would be carried out to further verify the rock stratum of the pile in question while boring of another pile would commence first to avoid idling of the machine. As a result, the delay to the

project was greatly mitigated. A common goal of "more talk and less paper" has been achieved.

To enhance quality and safety of the works, the fabrication of steel footbridge segments occurred at a dedicated off-site factory. In order to reduce impacts on the public, erection of footbridge segments was arranged to be carried out at night at weekends. Whilst it was not required under the contract to illustrate the whole erection operation to the local authorities, the contractor proactively adopted 3D animation like BIM to simulate the erection process of two 20m long segments within the limited working area during one single-night road closure to demonstrate the feasibility of the proposed arrangement. The construction programme and safety risk to the public due to exposure of temporary supports would be substantially reduced.

The project progresses successfully with mutual trust and collaboration. An initial success was the footbridge segments erection. It was completed not only on time but also in a shorter construction period than the original plan. With the focus on clause 10.1, risk inherent with the project such as obstruction to the local traffic at the busiest road junction was identified in an early stage of the contract. As a result, the footbridge segments erection was completed in only six nights during weekends to reduce impacts on the public.

Proficiency of Project Management

Compared with traditional contracts, the contractor is more open-minded and willing to share their past experiences for the benefit of the project. There are three lift towers to be covered by glass panels. The contractor proactively shared their previous experience on which the glass panel facing to the RC crosshead structure may pose difficulty to future maintenance and recommended an alternative solution. The recommendation and project team's proactive and helpful attitude was highly appreciated by the maintenance departments.

To echo the Government's appeal for the adoption of LED lighting systems to save energy and reduce carbon emission in public facilities, the contractor swiftly provided a realistic and reasonable quotation with sufficient substantiations for its implementation, facilitating the project manager to make a swift decision to incorporate a state-of-art, environmentally friendly lighting system in the contract.

To save energy consumption and to combat the negative effects of climate change, the project team works proactively and transparently to adopt building-integrated photovoltaics (BIPV) systems on the footbridges to reduce carbon emission in public facilities. With the provision of clause 10.1, the project team worked superlatively to achieve these compensation events, completed on time and within budget. In this way, the financial status of the project is ascertained, and a beautiful, environment-friendly footbridge will soon become reality.

With the adoption of NEC, the relationship between the project manager, contractor and supervisor has fundamentally changed from adversarial to win-win approach for the achievement of common goals. This materialises "Two heads are better than one" spirit.

The successful implementation of NEC was demonstrated by the ontract being awarded as the "Highly Commended" NEC Contract of the Year 2019 and the contractor being awarded as the "Highly Commended" NEC Contractor of the Year 2018 by NEC. The strong relationships of trust, co-operation and collaboration among the project team members were demonstrated by being awarded a Bronze Prize in the Safety Teams Category of Construction Industry Safety Award Scheme 2018/2019 by the Labour Department of the HKSAR Government.

LANDSLIP PREVENTION AND MITIGATION (LPMIT) PROGRAMME:
2013, PACKAGE A, LANDSLIP PREVENTION AND MITIGATION WORKS – INVESTIGATION, DESIGN AND CONSTRUCTION

MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD), HKSAR

(II) **CONSULTANT:** AECOM ASIA COMPANY LIMITED

(III) **CONTRACTOR:** TAI KAM CONSTRUCTION ENGINEERING COMPANY LIMITED

CONTRACT: NEC3: PROFESSIONAL SERVICES CONTRACT (PSC) OPTION C, NEC3 TERM SERVICE CONTRACT (TSC) OPTION A

VALUE: HK$105 MILLION (HK$18 MILLION FOR CONSULTANCY AGREEMENT (PSC) AND HK$87 MILLION FOR WORKS (TSC)

Project background

This is the first use of NEC by the Civil Engineering and Development Department (CEDD) on its rolling LPMit Programme to deal systematically with landslide risks arising from both substandard man-made slopes and vulnerable natural hillside catchments. It is also the first public works contract using NEC form of contract on both consultancy agreements and construction works.

Overcoming New Contract Form Challenges

As the TSC was new to the LPMit contractors, prior to tender invitation, the consultant arranged two tender briefing workshops to let tenderers know how to prepare the tender submission and the basis of evaluation. A dummy exercise was also conducted to help tenderers identify the potential problems in the tendering process.

Excellence in Contract Management

The TSC Option A (priced contract) was used in the works contract. Together with secondary option X19 (task order), the arrangement was similar to the works order arrangement under the conventional form of LPMit works contracts using Schedule of Rates, which local contractors were very familiar with so as to encourage contractors with no or limited NEC experiences to participate in the tendering for the works contract. By issuing task orders, the contractor could be ordered to carry out LPMit works at any time during the contract period to suit the design schedule, contractor's resources and availability of supervising staff.

To allow fair risk allocation in relation to change in salary and construction cost during the service/contract period, option X1 (price adjustment for inflation) has been adopted in the consultancy agreement and works contract to transfer the risk of inflation to the employer.

Z clauses were adopted in the works contract to accommodate legislation particular to the jurisdiction where the contract is being performed, suit the circumstances particular to the project and incorporate the employer's policy/special requirements.

Proficiency of Project Management

Early warnings and risk reduction meetings have been widely and effectively adopted in both consultancy agreement and works contract. A total of 14 early warnings have been issued

in the consultancy agreement and six early warnings have been issued in the works contract. The early warnings were initiated by different parties including the employer, consultant and contractor related to matters such as site constraints, design change, land issues and additional works, which resulted in changing the accepted programme, delaying meeting a key date, increasing the total of the prices and impairing the usefulness of the services to the employer.

In order to resolve the issues related to the early warnings, 17 risk reduction meetings for the consultancy agreement and four risk reduction meetings for the works contract have been conducted. In the risk reduction meetings, the parties involved discussed how to reduce/avoid the effect of the risks, sought solutions that would bring advantage to all parties and decided the actions to be taken. Through co-operation from all parties, the potential problems were solved promptly and the consultant/contractor received the prompt and clear instructions to overcome the difficulties and plan their upcoming works and resources. The performance of the consultant and contractor has been appreciated by the employer, with their performance scores were consistently higher than the industry average.

The mechanism of compensation events has been strictly followed in the consultancy agreement and the works contract. A total of 16 compensation events for consultancy agreement and 59 compensation events for works contract have been implemented. All instructions issued, submissions and assessment of quotations, and the implementation of compensation events were properly recorded in registers and monthly progress reports.

Coherent Teamworking

At the beginning of the consultancy agreement, both employer's and consultant's staff attended NEC seminars to get familiar with the new contract form and cultural shift in mindset to promote openness and mutual trust.

To enhance communication, frequent working level discussions were conducted to streamline the workflow. Through frequent face-to-face communication, mutual trust between the two parties were established. The consultant also delivered a presentation to the Employer at the beginning of the project on the internal auditing and certification systems of time charges to enhance mutual trust between the two parties. Prompt replies (instead of a fixed period for reply) were adopted in working level communications to enhance efficiency.

Following the success in the investigation and design stages, "mutual trust and co-operation" was extended to the construction stage. At the beginning of the works contract, a "Together we can" workshop was held to promote openness and mutual trust. Common goals in terms of time, safety, environment, public relations and quality were established and all parties agreed to work together to achieve them. Frontline staff (from employer, consultant, contractor and resident site staff) were working in a joint site office to enhance communication. "Think Tank" discussions, which are adhoc 15–20 minute tea break discussions on site matters, were held in the joint office. Through working together, all parties have shown the spirit of "one team" with commitment, understanding and fairness.

In addition, regular CO3 Meetings (COmmunication, COoperation and COllaboration) by top management of all parties were held to monitor the status of common goals and to guide the team by thought leadership. Caring visits by top management were conducted at active sites regularly to express concern for workers' welfare facilities, safety and health.

Positive impact on Hong Kong

The construction of slope upgrading works in urban areas in Hong Kong presents numerous challenges to designers and site managers such as road closure at busy roads, limited working space and complaints from the public. By the team's efforts such as early identification of potential risks and timely implementation of mitigation measures on the urban sites, zero complaints were recorded throughout the works contract period.

As this trial use of NEC in LPMit has been very successful, experience sharing workshops have been held to share experience on administration of this pilot use of TSC to other LPMit consultants, contractors, contract administrators and construction industry professional bodies. NEC will be adopted in upcoming LPMit works contracts and it is expected that this project success will be extended to other public works projects in Hong Kong.

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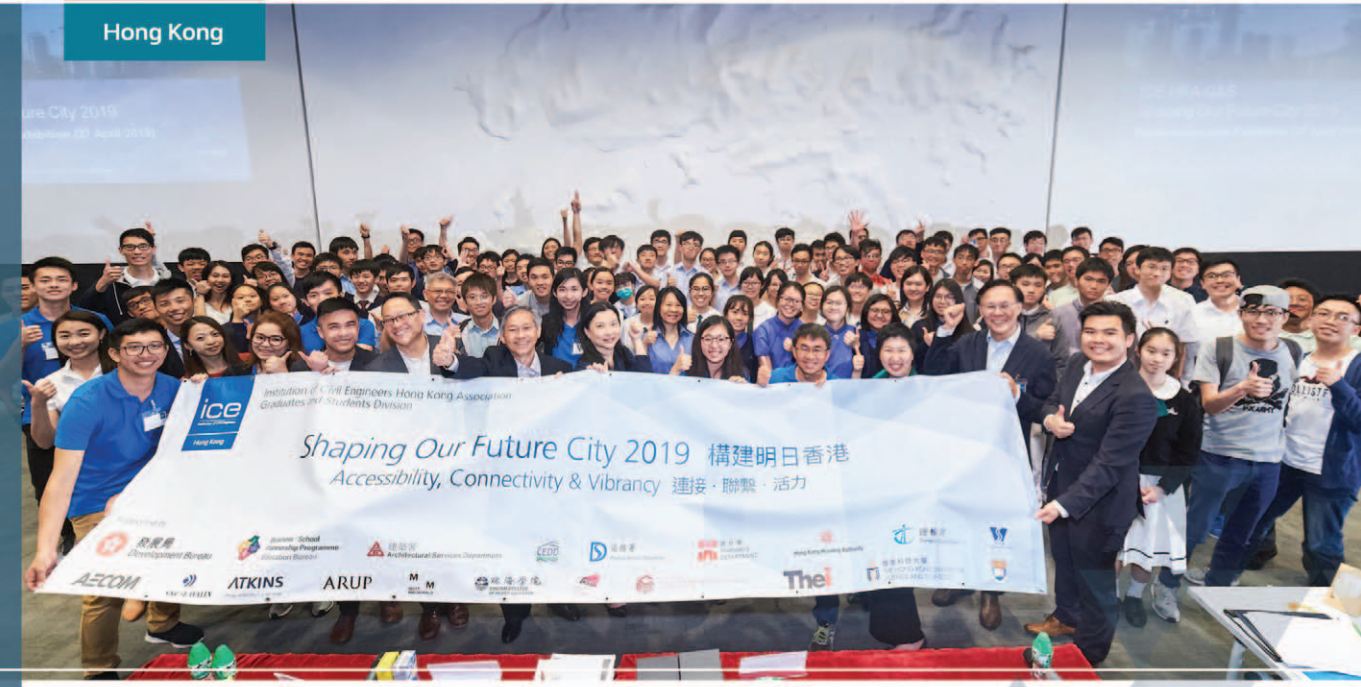

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- Over 140 events organised each year by a vibrant Hong Kong Association and Graduates and Students Branch
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DEVELOPMENT OF KWU TUNG NORTH AND FANLING NORTH NEW DEVELOPMENT AREAS:
ADVANCE WORKS AND FIRST STAGE WORKS – STAGE 2 GROUND INVESTIGATION WORKS

MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD), HKSAR

(II) **CONSULTANT:** AECOM ASIA COMPANY LIMITED

(III) **CONTRACTOR:** GAMMON CONSTRUCTION LIMITED

CONTRACT: CONTRACT ECC OPTION B

VALUE: HK$33.92 MILLION

Project background

This project involved ground investigation works comprising vertical drill holes, trial pits, boulder and utility surveys, groundwater monitoring, and associated in-situ and laboratory tests. The ground investigation obtained data for the detail design of the Phase1 development of Kwu Tung North (KTN) and Fanling North (FLN) New Development Area (NDA), which will provide approximately 21,000 housing units, of which 18,000 are public housing units.

As the ground investigation works had to be carried out only by specialist contractors in the approved list for Ground Investigation Field Work, the contractors in the list have a clear understanding of all the risks involved with the drilling works and the major issue was the uncertainty in the depth of the drill holes. Option B contract form was therefore selected to allow the remeasurement of quantities for a fair risk allocation.

Excellence in Contract Management

From experience of the previous public engagement exercise of the KTN FLN NDA development, the development was sensitive because of the land resumption and move out of the villagers, and there were expected to be a number of objections to the ground investigation works during the course of works. For a better control of the programme of works and risk management, secondary option X5 – section completion was adopted in the contract. The whole works were divided into eight sections based on the types, locations and surrounding environment of the ground investigation works. Suitable Z clauses were inserted to address the soil with naturally occurred arsenic content in the KTN area, relating to the disposal of materials generated by the works in the contract. The contractor was also required to agree the control measures with the project manager on the handling of the excavated materials prior to the commencement of the ground investigation works.

The ECC contract form with its elements of early warnings & risk management, compensation events and a programme provided a good and efficient working platform between the employer, project manager, supervisor and contractor for effective and efficient administration and implementation of the contract. From the delivery of the contract, we realised the mutual trust and co-operation between the employer, the contractor, the project manager and the supervisor is the key to implement a successful project. The exchange and sharing of information on the latest development and availability of works sites for drilling works through a WhatsApp group enabled good planning and allocation of sufficient resources to effectively achieve the targets and programmed works. With

the partnering team established, the early warnings and risk management were useful to get to the problems in good time and resolve them to avoid delays to works. As demonstrated with the case for drill holes at Lo Wu Firing Range, the contractor gave early warning to the project manager that some the drill holes on the hilltop were facing the firing range and might need to be relocated or require additional preventive measures. With this early warning, the employer, project manager and contractor worked together and timely agreed with the police on the temporary working platform setup including protection facing the firing range to avoid delay to the helicopter flight schedule reserved for the transportation of plant and material to the hilltop.

Proficiency of Project Management

Through the early warning and risk management process including risk reduction meetings, the project manager and contractor worked closely together and resolved efficiently the various issues/risk on relocation of drilling works at access to village, arrangements to carry out the drilling works facing the firing range at restricted hours imposed by the police, drilling works near burial grounds etc. Throughout the contract, a total of 41 compensation events were issued. The time periods imposed for communication required the parties to assign resources/efforts to work on the outstanding issues which enabled timely handling of the issues. The requirement on programme was also important to the delivery of the contract. As there were from time to time variations in availability of works sites for drilling works, helicopter flight schedule, relocation of drill holes due to site constraints etc., the upkeeping of an updated programme as required under the contract was useful for the planning and implementation of the works.

With the adoption of ECC Option B, the contractor tried various methods to reduce the operation cost with the drilling works. In this contract, the contractor adopted many innovative methods, technology and techniques to improve the efficiency, working standard and promote safety in the works. The contractor developed its own brand of drilling rig with advancement in the hydraulic rising and lowering of mast, battery powered exoskeleton suits providing extra lifting and posture restraint power to the workers (i.e. preventing injury by using improper posture in manual lifting), and utilising Visual Reality technology

to provide safety training which increased their staff awareness of the major hazards (such as fall of person from height, struck by falling objects, contact with moving machinery ,etc.) in construction works.

The contractor's effort in this aspect was recognised with three accolades: the award of merit on the Best Safety Enhancement Program for Working at Height from the Construction Safety Promotional Campaign organised by OHSC; the Innovation Award for Site Safety by CEDD; and the Considerate Contractors Site Award (Public Works – New Works) by Construction Industry Council and Development Bureau.

With the mutual trust and co-operation between the employer, the contractor, the project manager and the supervisor and the good working platform established through the ECC contract form, the ground investigation works were successfully completed within the design time frame and on budget. The adoption of the ECC contract form also enabled the conclusion of the final account of the contract five months after completion of the contract.

IMPROVEMENT OF WATER SUPPLY TO SHEUNG SHUI AND FANLING

MAIN PROJECT TEAM MEMBERS:

(I) EMPLOYER: WATER SUPPLIES DEPARTMENT (WSD), HKSAR

(II) PROJECT MANAGER: WATER SUPPLIES DEPARTMENT (WSD)

(III) CONTRACTOR: VASTEAM CONSTRUCTION LIMITED (VASTEAM)

CONTRACT:
NEC3 ENGINEERING AND CONSTRUCTION CONTRACT (ECC) OPTION D

VALUE: HK$523.1 million

Project Background

The project is worth HK$523.1 million and involves building a service reservoir, equivalent in size to 10 Olympic swimming pools, and laying of over 3km of water mains.

The first objective of the project is to provide timely fresh water supply to meet the increasing water demand generated from new housing developments in SS&F, especially the public housing development in Queen Hill which will provide about 12,000 flats to low-income people by early 2020. The second objective of the project is that the fresh water supply system will be converted into the first reclaimed water supply system for flushing and other non-potable applications in SS&F in the near future. The service reservoir and water mains are designed to supply fresh water for both potable and flushing purposes with the flexibility to be converted to convey reclaimed water for flushing purpose.

The project consists of construction of a low-level service reservoir near the existing high-level freshwater service reservoir at Table Hill, Sheung Shui. This new reinforced concrete tank with a storage capacity of 24,000m^3 will be fed from the existing Sheung Shui water treatment works by a new 0.6km long, 600mm diameter trunk main, as well as from the aforesaid existing reservoir by a new 0.8km long, 600mm diameter trunk main.

The new fresh water service reservoir will serve SS&F areas and be connected to the existing distribution networks at Tin Ping Road via a new 1.9km long, 800mm diameter primary distribution main which will run along Man Kam To Road and Jockey Club Road (MKTR&JCR).

WSD engaged Vasteam as the contractor to carry out works under an ECC Option D (target contract with bill of quantities) in April 2017. It is WSD's first in-house project adopting NEC and is scheduled for completion three months ahead of programme, i.e. March 2020, and is expected to be under budget.

Excellence in Contract Management

With a view to promptly resolving problems via joint effort, the project manager and contractor notify each other on issues that are critical to time, cost or quality of the project, without focusing on their respective contractual responsibilities in the first place. For example, the project manager took the initiative to issue an early warning immediately upon knowing a potential risk to the laying of distribution mains due to unexpectedly high traffic flows along MKTR & JCR. The contractor has strived for the common goal of timely completion and collaborated with

the project manager in identifying viable alternative alignments and construction methods for water mains via risk reduction meetings. The project manager has issued instructions to shift the water main alignment or adopt trenchless technology and successfully mitigated the delay.

The above measures have the advantages of avoiding traffic disruption, uncharted utilities obstruction, stakeholders' objection, shortening the mainlaying period and minimising disturbance to nearby egrets during the breeding season. The team has issued 65 early warnings so far and the project manager has promptly issued instructions to overcome all project challenges to save considerable time and cost.

Proficiency of Project Management

Building Information Modelling technology (BIM) was adopted in all stages of the project. BIM models have been included in tender documents to facilitate the tenderers to better understand the construction details and requirements. By working together on one common BIM model during the construction stage, the team has successfully accomplished a number of tasks with time and cost savings:

Upon discovery of urns containing human remains during site formation works, the project manager liaised and sought acceptance from relevant stakeholders, while the contractor resequenced excavation works with 4D simulation to minimise delay. With joint efforts, the urns were relocated within one month, instead of at least one year in other similar cases.

The team has obtained the Gold prize in the Outstanding Environmental Management and Performance Awards and the bronze prize for 2018 Hong Kong Awards for Environmental Excellence due to the reuse of about 60% of excavated materials, and the adoption of reusable aluminium or steel formwork and trenchless technology as far as practicable.

Positive impact on Hong Kong

With about 95% and 80% completion for the construction of service reservoir and laying of water mains as of September 2019, the team is confident of completing them by end December 2019, three months ahead of the programme, with a possible saving of budget cost. Upon full commissioning of the reclaimed water supply system, it is estimated that about 21 million cubic metres of fresh water could be saved and treated effluent discharge reduced each year.

Additionally, the team has organised a school fun day, bird seminars, egret-watching tours and a drawing competition for nearby schools to promote water and ecological conservation and visited villages to maintain good relationship with them. Commendation letters and souvenirs have been received from them.

AUTOMATED PEOPLE MOVER AND BAGGAGE HANDLING SYSTEM TUNNELS ON EXISTING AIRPORT ISLAND – CONTRACT 3801

MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** THE AIRPORT AUTHORITY

(II) **PROJECT MANAGER:** THE AIRPORT AUTHORITY

(III) **CONSULTANT:** TURNER & TOWNSEND

(IV) **CONTRACTOR:** CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LIMITED

CONTRACT: NEC3 ECC OPTION D

VALUE: HK$2.3 BILLION

Project Background

The project involved excavation and construction of a 4-cell reinforced concrete Automated People Mover (APM) tunnel and 2-cell Baggage Handling System (BHS) tunnel. This includes all associated road/utility diversions and reinstatement. This project forms a significant connection for the Third Runway System between existing Terminal 2 and the newly reclaimed third runway.

Excellence in Contract Management

The project, Contract 3801, is is one of the largest in Hong Kong in recent years. The Airport Authority and China State Construction Engineering (Hong Kong) Limited understood from the beginning the importance of collaboration and partnering in facilitating the high standard of project management required to implement an NEC contract successfully.

Being a tunnelling project, the nature of the work itself posed a substantial construction risk and in particular, part of the tunnel will be constructed underneath the existing Airport Express Line. ECC Option D was selected because it was the Airport Authority's intention to share risk with the contractor in a reasonable and equitable manner. The share range and percentages have been designed to cope with the varying degrees of construction difficulties and the resulting financial impacts.

Sensible use of Z clauses

There has been little use of Z clauses in Contract 3801. The most notable Z clause drafted is environmentally related to focus on avoiding protracted disagreements between the parties and value engineering. It was also necessary to introduce this Z clause due to statutory requirements and the need to implement environmental mitigation measures. For avoidance of disagreements, a potential application of a Dispute Resolution Advisor was introduced along with the option of Early Neutral Evaluation. However, these were not employed in the first two and half years of the project.

Good use of optional X clauses

Secondary options were partially incorporated into the Z clauses to create win/win opportunities for both parties including implementing an inflation mechanism, limiting design liabilities and flexibility in interim payment to ease case flow challenges.

Only secondary options X7, X13 and X16 are used. In spite of using X16 Retention clause, the cashflow arrangement to the contractor has been acknowledged that there will be no more money to be retained when the price for work done to date for a month has been or exceeded three and a half percent of the forecast of the final total of the prices.

A review was conducted of the contract and a revision of the payment forecast period to align with the contractor's internal payment scheduling further alleviated cash flow concerns.

Proficiency in Project Management

Since the beginning of the contract there has been a strong focus on efficiency and streamlining all unnecessary processes and leveraging on high value productivity critical to overall success. Establishing a project manager instruction register system and compensation event register system has been instrumental to exchange views in advance for potential dispute resolution. Such initiatives led to an outstanding result of 80.1% of assessments being completed.

The implementation of mitigation measures prior to compensation events implementation exemplify project success. Moreover, the willingness to accept the changes for the best interest of the project were pivotal deciding factors along with the employment of a partly independent compensation events team to chart efficient change management. As of today, there are 193 compensation events notified and 156 compensation events have been implemented.

During the regular bi-weekly risk reduction meeting a total of 147 early warnings matters have been resolved from 161 raised, the efficiency of the system was evident and impressive with 91.3% resolution. It is evident that there has been equal involvement from both parties with 89 early warnings (55%) raised by the project manager and 72 early warnings (45%) raised by the contractor.

Teamworking

Airport Authority and China State Construction made collaboration a centrepiece of their working method, flowing through all different levels of interaction and participation. The project team shared an open plan office, hosted regular meetings, utilised value engineering and formed partnerships. A behavioural assessment tool was employed to increase self-awareness, mutual trust, team collaboration and leadership effectiveness. Creating a common behavioural language was necessary for an open, clear and respectful communication. A key factor of success was the introduction of an external consultant, who brought in neutrality and experience.

In addition, alignment workshops were held for senior management, transformation workshops for middle and supervisor level to clearly align and empower everyone in the team. A mission statement was formulated: "To be at the forefront and pioneer of completing the largest NEC contract in Hong Kong, successfully". Additional workshops were facilitated to discuss concerns especially during critical contracting times and project deliverables.

An open and transparent approach played a major role in maintaining a healthy and productive relationship. In assessing interim payments, NEC target contracts requires the contractor to disclose account details with all necessary invoices, receipts, subcontracts, employment letters, etc. to comply with this requirement, the contractor showed willingness to co-operate with an open attitude in providing all necessary information to the project manager including facilitating the project manager to carry out account audit in their head office. As contract 3801 was the first NEC contract for both parties, regular working sessions with a NEC consultant were hosted to openly discuss and resolve current issues.

Positive Impact on Hong Kong

There is no doubt that the use of an NEC contract has had a positive impact on environment, safety and collaboration on contract 3801, but also to the 3rd runway project and its significance to Hong Kong.

By modelling NEC contract to its full potential, contract 3801 not only helped with the airport project; but also, by extension to Hong Kong to change the mindset required when maximising construction project efficiency – grooming the next generations to manifest the NEC spirit.

NEC contracts, like contract 3801, are now setting new heights in collaboration not only in terms of the contract but also of behaviours. As such, contract 3801 stands as a salient benchmark towards collaborative infrastructure development.

It is now a prerequisite to step away from outdated behaviours that governed the world of infrastructure and construction in the last few decades to genuine collaboration between people and organisations.

With the guidance of NEC contracts,contract 3801 aimed to build a harmonious, fair, transparent working relationship, and by extension spreading the positive impact, improving living standards and ultimately the wellbeing of the Hong Kong society.

HAPPY VALLEY UNDERGROUND STORMWATER STORAGE SCHEME

MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER, PROJECT MANAGER AND SUPERVISOR:** DRAINAGE SERVICES DEPARTMENT (DSD), HKSAR

(II) **CONTRACTOR:** CHUN WO CONSTRUCTION AND ENGINEERING CO., LTD. (CW)

(III) **COST CONSULTANT:** MOTT MACDONALD HONG KONG LIMITED

(IV) **NEC CONSULTANT:** ARCADIS CONSULTANCY HONG KONG LIMITED

Project Background

In Hong Kong, the high annual rainfall at 2,400mm, hilly terrain with limited supply of land as well as dense population along the urban coastal strip pose huge challenges to flood prevention projects. Happy Valley (HV) is located in a wide and low-lying terrain located between the uphill hinterland and urban coastal strip. Severe rainstorm events occurred in 2000, 2006 and 2008, causing extensive flooding, threats to public and significant disruption to the traffic and business in the area.

Happy Valley Underground Stormwater Storage Scheme (HVUSSS) was formulated to relieve the flooding risks. Comprising a stormwater storage tank of 60,000m^3 capacity to attenuate the peak stormwater flow through temporary flood storage, HVUSSS thereby allows the existing downstream drainage system to cope with much more severe rainfalls than before, meeting the 1-in-50 year protection standard.

Excellence in Contract Management

HVUSSS was the first highly complex project DSD on which DSD utilised NEC. There were several advantages ECC Option C offered including the promotion a spirit of mutual trust and co-operation, fairer risk allocation, pain/gain sharing mechanism, open book accounting, risk management, early warning and timely assessment of compensation events. The collaborative open-book accounting synergised with the pain/gain share mechanism which encouraged the team to optimise gain share and early completion.

The flexibility of NEC meant DSD were able to introduce an innovative Z clause to implement a special subcontractor management procedure. This meant the project manager and contractor were involved in a competitive tendering process. The project manager took an active role in subcontractor management, starting from the selection process and continued through on-site liaison and payment to subcontract completion.

Proficiency in Project Management

The construction works carried out at Happy Valley was at the renowned Happy Valley Racecourse. The venue is popular with horse racing and other sports activities. To ensure the recreational activities remain unimpeded during construction on the 14 pitches designed for multiple uses, the project manager and contractor demonstrated a 'One Team One Goal' spirit to jointly overcome such challenges under a tight programme and budget.

When completing the two sections of box culvert underneath the racecourse during the horse racing rest season of 18 weeks, the project team established a joint risk reduction system and shared the temporary works system with another contractor employed by the Hong Kong Jockey Club. The strong collaboration among the two project teams swiftly resolved

contractual issues about insurance arrangement of common workplace and overcame other construction challenges. The collaborative efforts meant there were no impact on horse racing activities and early completion of the works in 16 weeks. The sharing of temporary works led to cost savings for both teams.

Coherent Teamwork

To enhance NEC's 'spirit of mutual trust and co-operation', the project manager implemented innovative measures to improve communication and embrace collaboration throughout the whole project team, principally through a geographically and spatially coherent '360° communication network' to ensure timely information exchange and quick decisions.

A joint office, joint organisation chart and regular management meetings were adopted to expedite and strengthen communication in an open and transparent manner among all levels of the project team. Champion group meetings and partnering workshops were also held to enhance mutual understanding and working relationships among different parties and identify common goals.

Regular morning briefings were held among the project team to exchange updated information and to advance planning of site works. Reinforced with risk reduction meetings, swift and informed decisions of site issues were made through cascade communications.

To reinforce communication at all levels, instant message works-specific groups were effectively employed on the Whatsapp communication platform for instant and multi-directional communication. Also, stakeholder workshops and public briefings were held to help identify stakeholders' concerns at an early stage, and let public members understand the project and the potential impact. A project logo and uniform were used to further nurture a sense of project ownership.

Innovation in Construction Works

With the common goal to optimise gain share and early completion, the contractor was motivated to propose innovative ideas demonstrated by the innovative foundation with subsoil drainage and water harvesting system. This was also the first time a stormwater storage tank in Hong Kong featured a foundation design comprising peripheral sheet pile walls and a subsoil drainage system, replacing traditional pile foundation to resist uplift force generated by the groundwater. The HVUSSS harvested groundwater collected from the subsoil drainage system. The water collected from the system was approximately 220,000m^3 annually. To reduce the discharge volume to the sea and to make the best use of precipitation, the water collected is used for on-site irrigation of 11 sports pitches at the Happy Valley Recreation Ground, toilet flushing and street cleansing. The innovative foundation design reduced the construction cost by HK$72 million and construction time by 3 months, as well as lowering the carbon dioxide emission by 88,000kg.

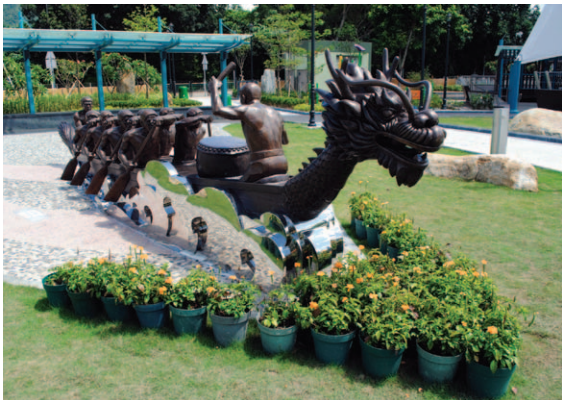
Positive impact on Hong Kong

This project successfully protected Happy Valley and adjacent districts from flooding, thereby preventing damage to properties, threats to public safety and traffic disruption. During an extraordinary intense rainstorm with a record-breaking hourly rainfall at 96mm on 19th October 2016, the half-commissioned storage tank collected 27,000m^3 stormwater and effectively avoided flooding from occurring in Happy Valley and ensured the horse racing event with a bet value of around HK$1 billion could be held as scheduled in that evening.

In addition to flood prevention, the water harvesting system supports sustainable development in Hong Kong. Also, the at-grade spaces occupied by the drainage facilities are entirely opened to the public for land co-use and relief of stressful land supply (e.g. the rooftop of pump house turned into a green lawn for leisure activities, and the fan room with canopy provided a good place for shelter).

The success in HVUSSS demonstrated effective deliverance of a public project through excellent contract management and proficient project management, coherent teamwork and innovation under the spirit of mutual trust and co-operation enshrined in NEC. The encouraging results assured the Hong Kong Government to extend NEC adoption to other mega projects, and also transit progressively from NEC3 to NEC4 to enhance collaborative partnering, unlock innovations and achieve better cost management and value for money in public works.

FUK MAN ROAD NULLAH IN SAI KUNG: PIONEER NEW ENGINEERING CONTRACT IN HONG KONG



MAIN PROJECT TEAM MEMBERS:

(I) **EMPLOYER:** DRAINAGE SERVICES DEPARTMENT (DSD), HKSAR

(II) **PROJECT MANAGER:** DRAINAGE SERVICES DEPARTMENT (DSD)

(III) **SUPERVISOR:** BLACK & VEATCH HONG KONG LTD. (B&V)

(IV) **CONTRACTOR:** CHUN WO CONSTRUCTION AND ENGINEERING CO., LTD. (CW)

(V) **CONSULTANT:** JOHN CARLISLE PARTNERSHIPS (SEA) LTD.

CONTRACT: NEC3 ECC OPTION C

VALUE: HK$77 million

Project Background

The Drainage Service Department started the first pilot NEC3 Engineering and Construction Contract in Government in 2009 on the improvement of Fuk Man Road (FMR) Nullah in Sai Kung. It aimed at improving the local environment of Sai Kung Town by decking over an existing 180m long and 12m wide open nullah, constructing a 4,000m^2 marine-themed Fuk Man Garden on top and upgrading an adjacent road roundabout. The garden featured seats shaped as water drops, a sailing ship and a dragon boat sculpture, providing a landmark and relaxing recreational environment for the public.

Team building and teamworking

Mutual trust and co-operation in Clause 10.1 is the pillar of success for every NEC project. At the initial stage of the contract, the project team encountered a difficult time to accept the high level of notifications, meetings and early warnings as required by NEC. It was difficult to shift the attitude from the conventional one-way directive to a partnering approach. Confrontation often led to additional workloads, administrative efforts and resistance to mindset change which harmed the partnering relationship.

From Confrontation to Collaboration

To overcome the challenge, top management of the project team demonstrated their commitment by proactively engaging in meetings to resolve site issues and promoting partnership with other parties. It was ensured that all early warnings and notifications, instead of being used as contractual evidence for claims and disputes, were submitted in a collaborative spirit for effective risk management.

The project team gradually appreciated that the procedures in ECC were provided for mutual benefit to avoid tremendous effort in dealing with cost and time overruns and disputes at later contract stage. The changed mindset resulted in a trusting relationship among the team; and it was fostered by the setting up of a common site office for the project manager, supervisor and contractor. It facilitated a prompt, effective and transparent communication to resolve problems. The project team also proactively participated in various social and community activities such as the Sai Kung Dragon Boat Festival and table tennis competition to demonstrate and solidify the team spirit.

To encourage the flow of ideas among the project team, partnership training was conducted to nurture a co-operative spirit.

Examples of this included:

- **Initial Partnering workshop:** to gain mutual understanding of each party's expectations, build relationship, set up mutual project objectives, values and behaviours.
- **Quarterly Champion Group & Pioneer Group Meeting:** to review partnering performance between management and frontline staff in respect of mutual objectives, identify problems and directions so resolve major site issues
- **Half-yearly Partnering Workshop:** to review site and partnering performance, identify issues hindering partnering and propose counter measures
- **Partnering Workshop for Subcontractors:** to extend workshop to subcontractors to build partnering relationship

Proficiency of Project Management and Excellence in Contract Management

Provisions in the NEC contract encouraged collaborative foresight to mitigate risks inherent in construction works at an early stage. The project team successfully put the NEC clauses into practice for effective project management.

Early Warnings and Risk Reduction Meetings
The project demonstrated a good use of the early warning mechanism in clause 16.1. When the contractor noticed the nullah embankment footing deviated from the drawings, an early warning notice was issued for this unforeseen condition and convened a risk reduction meeting with the project manager and supervisor.

The project team quickly decided to conduct trial pits to reveal the extent of conflicts. With the trial pit results, the project manager promptly instructed the contractor to modify the box culvert design to suit the footing arrangement, which enabled the problem to be resolved within two weeks from the receipt of the early warning and before the box culvert construction.

With the drive for common objectives, the project team was willing to detect and notify each other of the risks having cost, time or quality implications, and to raise early warnings to strike for an equitable and appropriate risk sharing among the team for the benefit of the project. The contractor fed back that they were incentivised to give early warnings for the good of the project. The project team agreed that the early warning mechanism "gives an early opportunity for all parties to devise mitigation measures jointly and to select the best option".

Formulated Processes for Compensation Events
The compensation event procedure in clause 61 was essential in settling changes early and avoiding disputes. Among some 350 correspondences about compensation events in the project, the average time of reply was about 20 days. The ECC required fast input by both the project manager and the contractor, thereby speeding up the decision making and acceptance process. This facilitated building a collaborative working relationship as all parties had to communicate closely to make timely assessments and decisions.

Positive impact on Hong Kong

The concerted effort of team members led to remarkable project success particularly as NEC was new to the project team. The project was completed six months ahead with HK$4.1M cost saving, enabling the Fuk Man Garden to be opened for public enjoyment earlier than originally expected.

On top of the time and cost savings, the team collaborated with the District Council to organise a competition to engage local artists to design a dragon boat sculpture. Organising the competition on top of the tight construction programme was undoubtedly a great challenge for the project team. While the project manager quickly invited participation of the Hong Kong Sculpture Society and local artists, the supervisor promptly prepared the implementation arrangements and the contractor managed the tendering exercises, without affecting the main construction programme. The symbolic dragon boat sculpture at the marine-themed park is now a landmark in Hong Kong attracting thousands of foreign and local visitors every year.

It was the mutual trust and co-operative relationship of the project team, which established the remarkable success in the first NEC3 ECC project in Hong Kong. With the collaborative working relationship, the provisions in NEC facilitated the contract parties to come up with effective and quick solutions to problems and achieve excellence in construction. The encouraging results have led to a wider adoption of NEC in Hong Kong for both government and private projects in the past 10 years.

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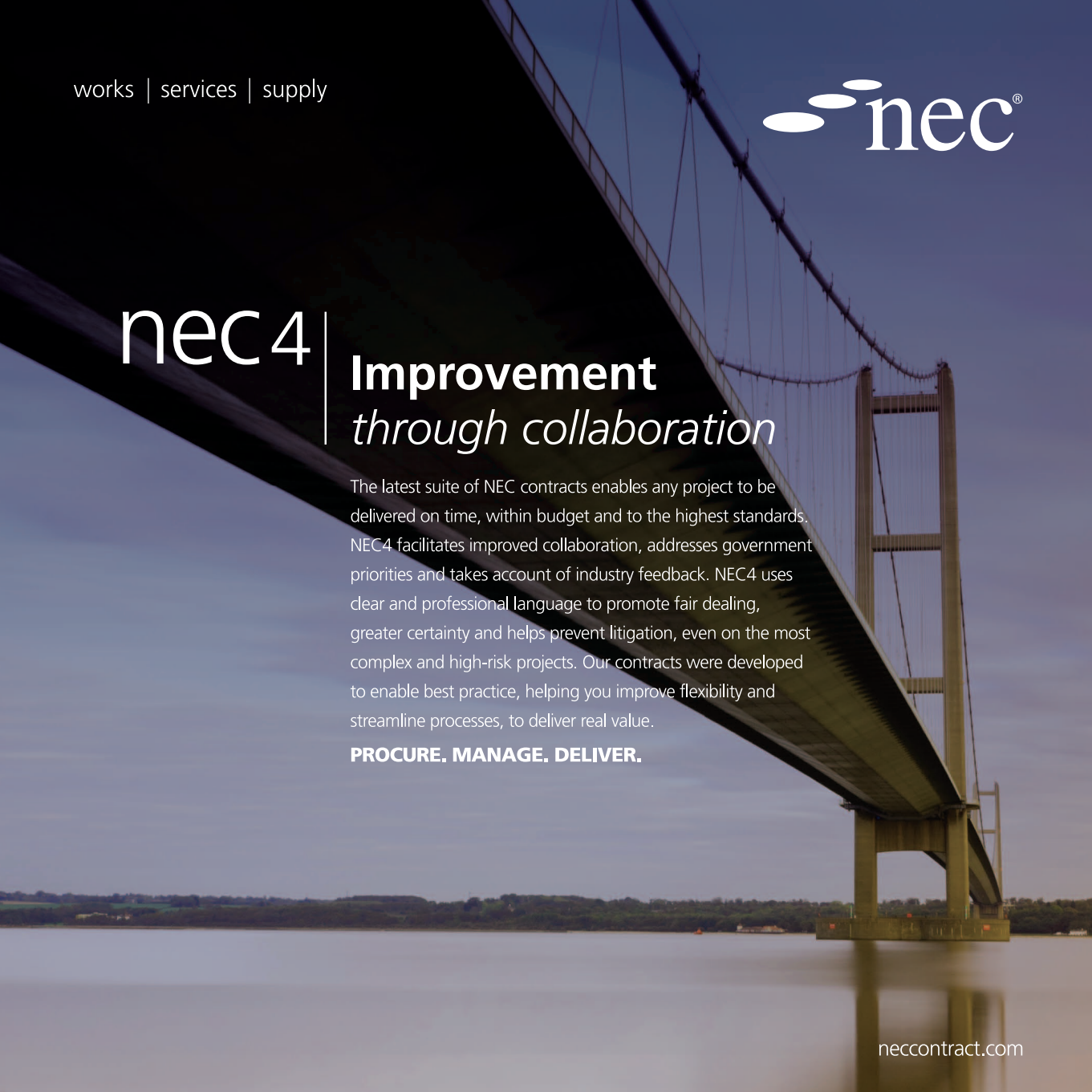

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