



Construction Works Schedule and Location Plans

Expansion of Hong Kong International Airport into
a Three-Runway System

June 2017

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Construction Works Schedule and Location Plans

Expansion of Hong Kong International Airport into
a Three-Runway System

June 2017

This Submission of Construction Works Schedule and Location Plans

has been reviewed and certified by

the Environmental Team Leader (ETL) in accordance with

Condition 2.5 of Environmental Permit No. EP-489/2014.

Certified by:



Terence Kong
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date

23 June 2017

\
Our Ref : 60440482/C/JCHL170626

By Email

Airport Authority Hong Kong
HKIA Tower, 1 Sky Plaza Road
Hong Kong International Airport
Lantau, Hong Kong

Attn: Mr. Lawrence Tsui, Principal Manager

26 June 2017

Dear Sir,

Contract No. 3102
3RS Independent Environmental Checker Consultancy Services

Construction Works Schedule and Location Plans

Reference is made to the Environmental Team (ET)'s submission of Construction Works Schedule and Location Plans under Condition 2.5 of the Environmental Permit No. EP-489/2014 certified by the ET Leader on 23 June 2017.

We would like to inform you that we have no comment on the captioned plan. Therefore we write to verify the captioned submission in accordance with the requirement stipulated in Condition 1.9 of EP-489/2014.

Should you have any query, please feel free to contact our Roy Man at 3922 9365 or the undersigned at 3922 9376.

Yours faithfully,
AECOM Asia Co. Ltd.



Jackel Law
Independent Environmental Checker

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1 Introduction

The Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-185/2014) prepared for the “Expansion of Hong Kong International Airport into a Three-Runway System” (the project) has been approved by the Director of Environmental Protection, and an Environmental Permit (EP) (Permit No.: EP-489/2014) has been issued for the project under the Environmental Impact Assessment Ordinance.

The first submission of Construction Works Schedule and Location Plans (CWSLP), in compliance with Condition 2.5 of the EP, was made to the Environmental Protection Department (EPD) on 18 September 2015, and finalized and released via the project’s dedicated website in October 2015. This updated submission is to include a more detailed description of ground improvement works and seawall construction, reflect the latest work scope for the diversion of submarine cable works and provide updated indicative phasing plans for Land Formation Works.

The structure of this submission includes the following:

- a) A detailed phasing programme of all construction works of the project (in Section 2);
- b) A works programme of the Horizontal Directional Drilling (HDD) works (in Section 3);
- c) A works programme of the diversion of the submarine cable (in Section 4);
- d) Location plans of the planned construction works (in Section 5); and
- e) Indicative phasing plans for the land formation works (in Section 6).

2 Overall Phasing Programme of Construction Works

The commencement of initial reclamation works was announced on 1 August 2016. The eight-year construction of the three-runway system is expected to be completed in 2024, with the commissioning of the new runway in 2022. The overall phasing programme of all construction works is updated since the first submission and presented in **Attachment I**.

Construction will proceed in the general order of diversion of the submarine aviation fuel pipelines, diversion of the submarine power cables, land formation, and construction of infrastructure, followed by construction of superstructures. It shall also be noted that given the scale and complexity of the project, a number of key project components are still subject to detailed design prior to implementation with future major Contractors yet to be procured. The details of the programme as presented is subject to further revision and update.

3 Works Programme for Horizontal Directional Drilling Works

Diversion of the existing submarine aviation fuel pipelines is undertaken using a HDD method forming two rock drill holes by drilling through bedrock from a launching site located at the west of the airport island to a daylighting point adjacent to the offshore aviation fuel receiving platform at Sha Chau. Two new 500 mm diameter pipelines will be installed through the drilled tunnels. The total length of each pipeline is approximately 5 km.

Attachment II presents the latest updated works programme required under EP Condition 2.5(iii). Construction of the HDD works commenced on 28 December 2015 on the airport island. Drilling works are proceeding from the HDD launching site at the airport island. Upon completion the drilling and reaming of the HDD holes, the permanent aviation fuel pipes will be pushed from the HDD launching site to Sha Chau. To limit the impact to Sha Chau Island, pipe fabrication will be done at the airport island side; however a barge would be required and used as a temporary working platform between Sha Chau Island and the offshore receiving platform to facilitate the works. The remainder of the pipe laying between the HDD launching site on the airport island and connection point to the existing pipeline will be installed by open trench method.

4 Works Programme for Diversion of the Submarine Cable

Diversion of the existing power cables is required in order to maintain continuous power supply to the facilities at Sha Chau. Diversion of the submarine cables will use a direct bury (water jetting) method. The use of water jetting as the preferred method will avoid the need for trench excavation and associated disposal of excavated materials. Works will be conducted beneath the seabed from the edge of the airport island to the 'connecting location' at least 500m outside the boundary of Sha Chau and Lung Kwu Chau Marine Park. The length of cable installation is approximately 6km marine, with a burial depth of 3m to 5m below seabed level, and approximately 0.3km landside.

At the daylighting point of the submarine cables, the cables will cross the existing seawall. A works area on the west side of the existing airport island will be required for the cable daylighting and joining to the existing landside cables. A small section of the existing seawall at Hong Kong International Airport (HKIA) will be excavated by open cut method and cable ducts will be installed before reinstating the seawall. The cables will then run underground, crossing the existing roadway (via cross road ducts) and along the east shoulder area of the roadway to the designated jointing location.

The works programme for diversion of the submarine cables required under EP Condition 2.5(ii) was updated since the first submission and presented in **Attachment III**.

5 Location Plans for Planned Construction Works

The location plans for the planned construction works of the project based on best available information are presented in **Attachment IV**. The major construction works involved are described below:

- a) Land Formation (see **Attachment IV Figure 1**) – comprising approximately 650ha of land to be formed to the north of the existing airport island, with associated seawalls. There will also be minor marine structures including the runway approach lights and the Hong Kong International Airport Approach Area marker beacons.
- b) Diversion of aviation fuel pipelines (see **Attachment IV Figure 2**) – as already described in Section 3 above, diversion of the existing submarine aviation fuel pipelines is undertaken using the HDD method by drilling through bedrock from a launching site located at the west of the airport island to a daylighting point adjacent to the offshore aviation fuel receiving platform at Sha Chau.
- c) Diversion of submarine 11kV Cables (see **Attachment IV Figure 3**) – the diverted submarine cables will be installed via water jetting from the edge of the airport island to the existing cables running to the Sha Chau Island. At the daylighting point of the submarine cables, a small section of the existing seawall at HKIA will be excavated and cable ducts will be installed before reinstating the seawall. The cables will then run underground, crossing the existing roadway (via cross road ducts) and along the east shoulder area of the roadway to the designated joining location.
- d) Airfield Facilities (see **Attachment IV Figure 4**) – paving structures include the third runway, taxiways, aircraft parking stands, apron roads and airside roads located on the newly formed land, as well as modifications to the existing north runway and midfield apron. Superstructures include the air traffic control towers, fire stations, a fire training pit (to be relocated from the southern part of the airport island), petrol filling station, aircraft maintenance hangars, an aircraft engine run-up facility for performing aircraft engine test runs for the purpose of troubleshooting or maintenance, air cargo staging facilities, flight catering facilities, ground service equipment maintenance facilities and storage area, airside communications and office buildings, cross dock facility, seawater pumping stations, meteorological station and other airport support facilities or aviation-related developments.
- e) Passenger Facilities (see **Attachment IV Figure 5**) – these include the Third Runway Concourse (TRC) (including fixed linked bridges and passenger loading bridges), the Terminal 2 (T2) expansion, the automated people mover (APM) and the baggage handling system (BHS), with associated tunnelling works and ancillary buildings. The TRC will be constructed in phases, with Phase 1 to be completed first, and the remaining TRC area to be completed at a later stage depending on demand. The T2 building will be expanded into a full service processing terminal serving the TRC, comprising an expanded main terminal building, new annex buildings, an underground APM interchange station (AIS), a combined depot for the TRC line and the T1/ SkyPier Lines, and BHS basement. Landside supporting facilities and utilities will also be expanded and enhanced to support T2 operation.

- f) Road Network (see **Attachment IV Figures 6 to 8**) – these include the airside road network and tunnels connecting the new land formation facilities to the existing airport island facilities, as well as landside road improvement works at Terminal 2, the southern cargo area and the western perimeter road.
- g) Infrastructure and Utilities – various infrastructure and utilities will be laid both on the newly formed land and within the existing airport island, including the fuel hydrant system, seawater cooling and flushing system, drainage network, potable water supply, fire fighting system, sewerage network, gas, power, telecommunications, airport systems, and other aviation related utilities and systems. A section of gravity sewer located outside the airport island will also be upgraded (see **Attachment IV Figure 9**), subject to the future sewage capacity demand.

6 Indicative Phasing Plan for the Land Formation Works

The main components of the land formation works comprise modification and integration of the existing seawall, ground improvement of the underlying marine sediments, seawall construction, filling, and surcharge. An indicative phasing plan for the land formation works is presented in **Attachment V**. The phasing plan would be subject to further revision when the contractors' detailed programme is available.

The key construction activities associated with the land formation works are described below:

- a) Modification of Existing Seawall – the existing rock armour from the seawall will be retained or removed for reuse as far as practicable.
- b) Ground Improvement – the deep cement mixing (DCM) method will be adopted within the contaminated mud pit (CMP) areas, while DCM as well as other methods (including stone column, prefabricated vertical drain and vertical sand drains) will be adopted outside the CMP areas. Prior to the commencement of ground improvement, hard materials including rock fill left from previous works in the project area (such as existing fuel pipes and existing seawalls) and rubbish on the seabed that will cause obstruction to the works need to be removed. A sand blanket will then be laid on the seabed within the CMP areas to contain and minimise the release of contaminant during ground improvement activities. For specific obstructions that can neither be removed nor overcome, another type of DCM known as Deep Jet Mixing, which cores through the obstruction and is generally not used for area-wide application due to slow speed, will be used for ground improvement below the obstructions.
- c) Seawall Construction – the majority of the seawalls for the airport expansion will comprise rock sloping seawalls, except for some localised areas (e.g. at the sea rescue landing points and marine loading points) where blockwork vertical seawalls are required. The seawalls will be founded on grounds improved previously by DCM, in which after DCM works the seabed will heave and undulate. The undulate surface, comprise of sandfill and lumps of cement mixed sand, will then be trim back and re-levelled to facilitate seawall blocks placement (for vertical seawall) or core rocks to armours placement (for sloping seawalls). The trimmed material will be reused as fill material. Beyond the toe of the seawall, scour (stone) aprons will be laid to protect the seawall toe against erosion.
- d) Filling Works – different fill materials including rock fill, public fill, sand fill, rock armour and graded filter layer will be used to form the land and seawalls. Seawalls will comprise of rock fill as the seawall core, and rock armour and graded filter layer to form the protective layers. Sand fill or a mix of sand fill and public fill will be adopted as the marine filling material, while a combination of sand fill and public fill will be adopted for land filling activities.
- e) Temporary Surcharge – this will primarily comprise marine sand or public fill. During each stage of land formation, surcharge removed from a completed works area will be reused as far as practicable as fill material or surcharge in other active works areas.

Addendum to Construction Works Schedule and Locations Plans (June 2017)

Section 6(c) should read, with refinement underlined, as follows:

(c) Seawall Construction – the majority of the seawalls for the airport expansion will comprise rock sloping seawalls, except for some localised areas (e.g. at the sea rescue landing points and marine loading points) where blockwork vertical seawalls are required. The seawalls will be founded on grounds improved previously by DCM, in which after DCM works the seabed will heave and undulate. Before seawall construction, the undulate surface, comprised of sandfill and lumps of cement mixed sand, will then be trimmed back and re-levelled to facilitate seawall blocks placement (for vertical seawall) or core rocks to armours placement (for sloping seawalls). The trimmed material will be reused as fill material. Beyond the toe of the seawall, scour (stone) aprons will be laid to protect the seawall toe against erosion.

Certified by:



Terence Kong
Environmental Team Leader

Date:

19 January 2018

Verified by:



Jackel Law
Independent Environmental Checker

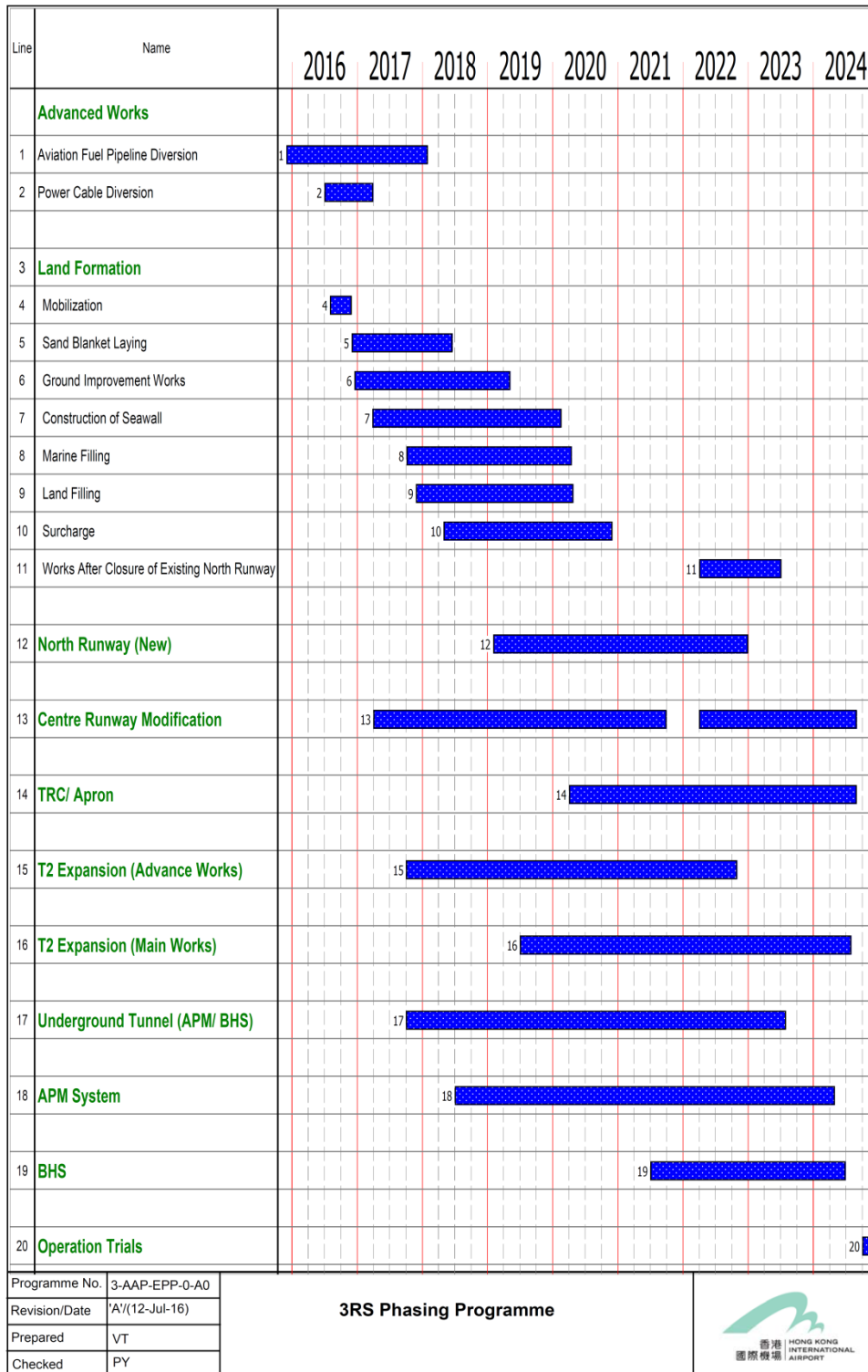
Date:

19 January 2018


Attachments

I.	Overall Phasing Programme	9
II.	Works Programme of the HDD Works	10
III.	Works Programme of the Diversion of the Submarine Cable	11
IV.	Location Plans for Planned Construction Works	12
V.	Indicative Phasing Plan for Land Formation Works	13


I. Overall Phasing Programme



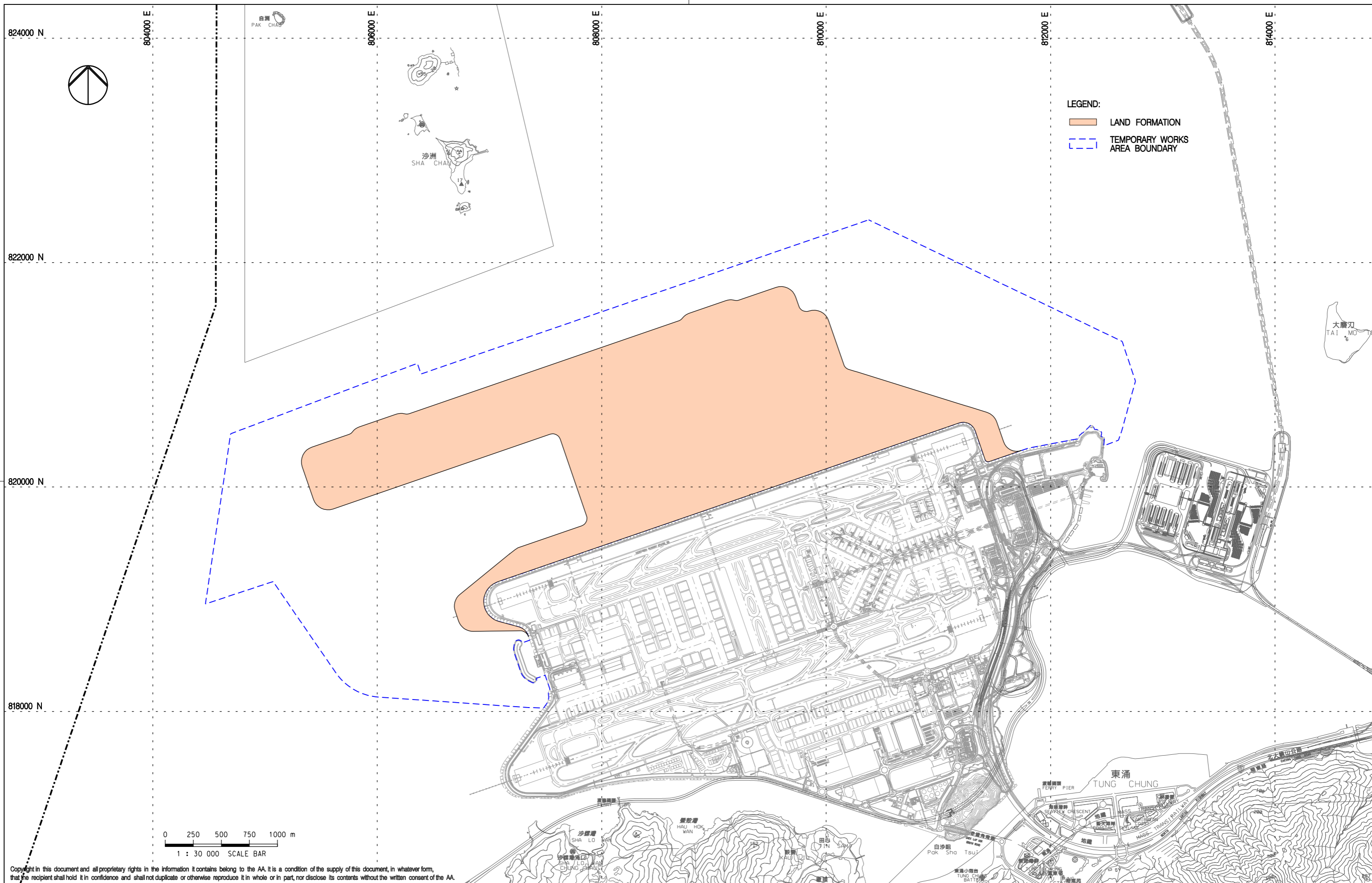
II. Works Programme of the HDD Works

Line	Name	2015				2016				2017				2018	
		1	2	3	4	1	2	3	4	1	2	3	4	1	2
1	Site Preparation & Equipment Setup														
2	Drilling (HDD)														
3	Fuel Pipe Installation (HDD section)														
4	Fuel Pipe Installation (Sha Chau & Aviation Fuel Receiving Facility)														
5	Testing & Commissioning														
6	Works Completion														
Reference	EM001	THREE RUNWAY SYSTEM										 香港 HONG KONG 國際機場 INTERNATIONAL AIRPORT			
Date	31-Aug-15	Aviation Fuel Pipeline Diversion Works Construction Programme													

III. Works Programme of the Diversion of the Submarine Cable

Line	Name	2015				2016				2017			
		1	2	3	4	1	2	3	4	1	2	3	4
1	Enabling Works												
2	Cable Laying												
3	Works Completion												
Reference	EM002A	THREE RUNWAY SYSTEM										 香港國際機場 HONG KONG INTERNATIONAL AIRPORT	
Date	12-Aug-16	CLP Submarine Cable Diversion Works Construction Programme											

IV. Location Plans for Planned Construction Works



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Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC
B	22OCT15	GENERAL REVISION	DC
C	05JUN17	GENERAL REVISION	AM



Title
PROPOSED TEMPORARY WORKS AREA FOR LAND FORMATION ACTIVITIES

Consultant's Signatures for Approval		Date
Design	DC	05JUN17
Checkers	DC	05JUN17
Approver	EC	05JUN17

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM		Scale at A3
Drawing No.	FIGURE 1	1 : 30000
Rev.	C	

PAK CHAU

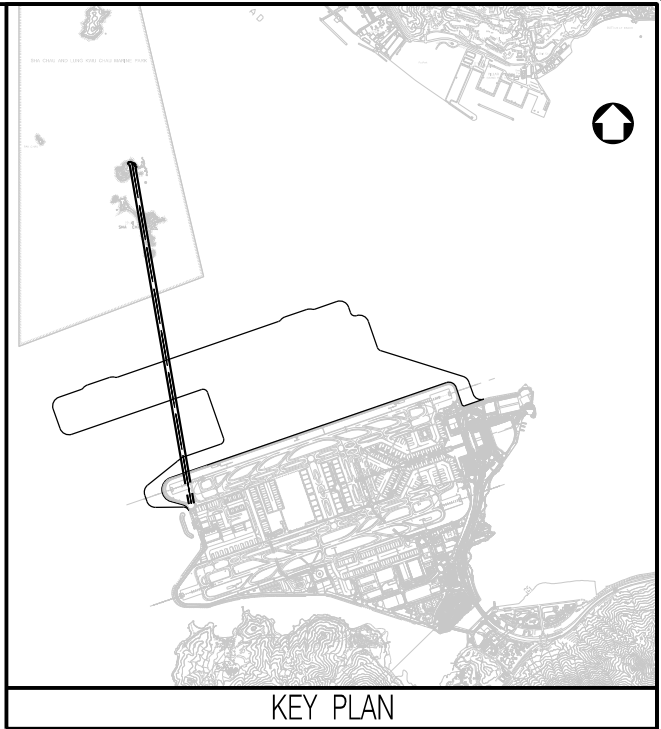


PORITION OF THE FUEL PIPE ABOVE GROUND

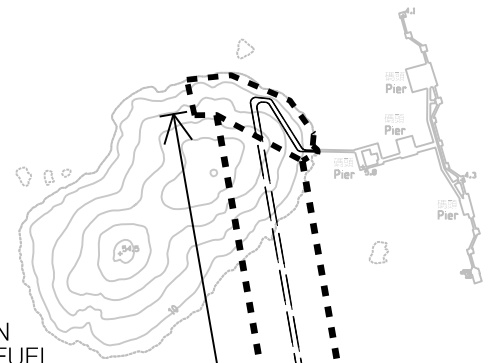
沙洲
SHA CHAU

SHA CHAU AND
LUNG KWU CHAU
MARINE PARK

CONSTRUCTION OF
AVIATION FUEL
PIPELINES BY HORIZONTAL
DIRECTIONAL DRILLING
METHOD



KEY PLAN



ZOOMED IN WORKS AREA AT SHA CHAU
SCALE 1:7500

CONSTRUCTION OF AVIATION FUEL PIPELINES BY HORIZONTAL DIRECTIONAL DRILLING METHOD

NOTES

1. EXACT DAYLIGHT LOCATION OF FUEL PIPELINES AT SHA CHAU SUBJECT TO CONFIRMATION DURING CONSTRUCTION STAGE
2. FOR CONTINGENCY SHOULD ENGINEERING DIFFICULTIES BE ENCOUNTERED DURING PIPELINES INSTALLATION, STAND-BY BARGES NEAR SHEUNG SHA CHAU ISLAND WOULD BE NECESSITATED.

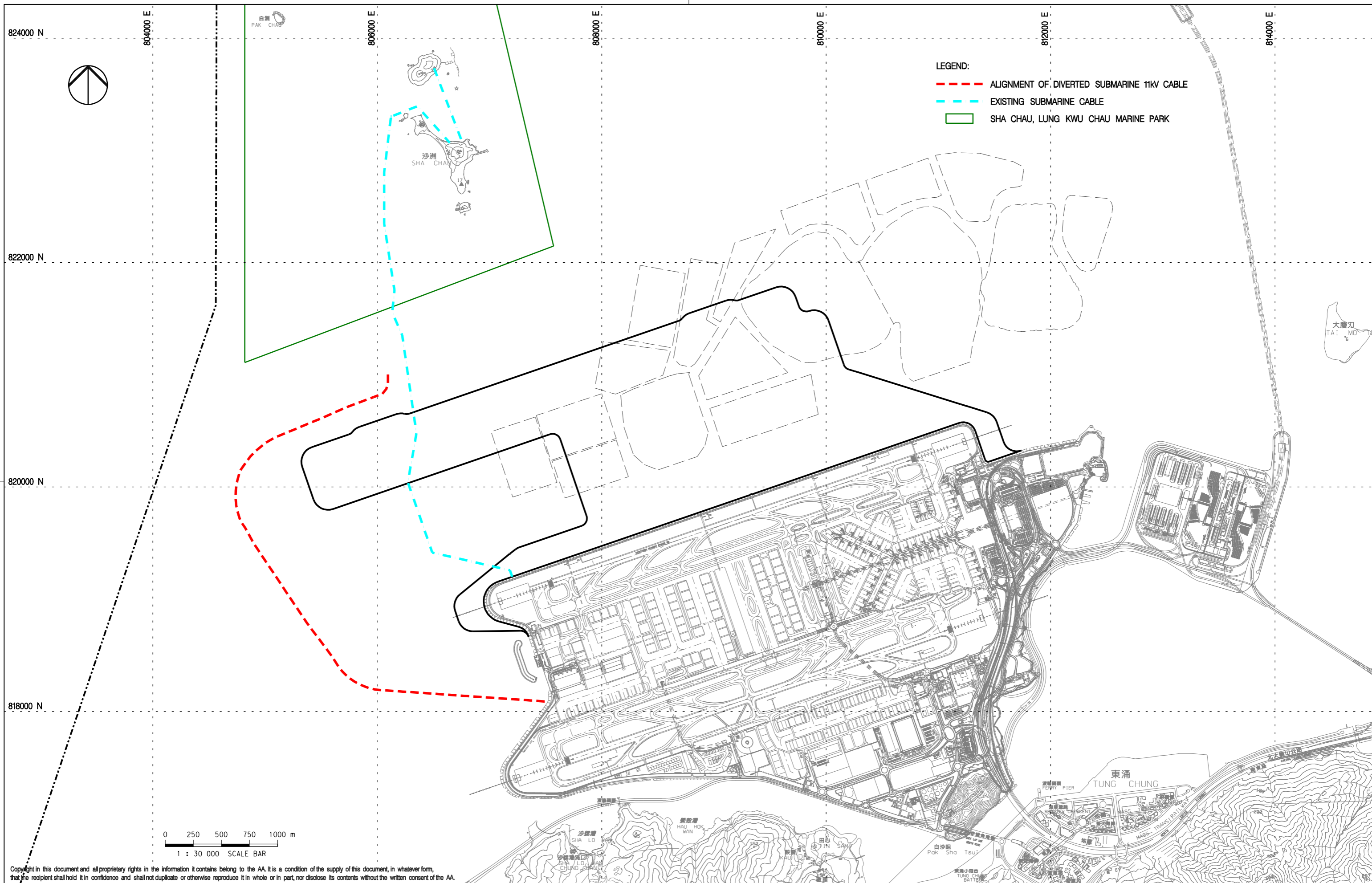
LEGEND

- ■ ■ ■ WORKS LOCATION
- — — UNDERGROUND FUEL PIPELINES
- — — EXPOSED FUEL PIPELINES ABOVE GROUND



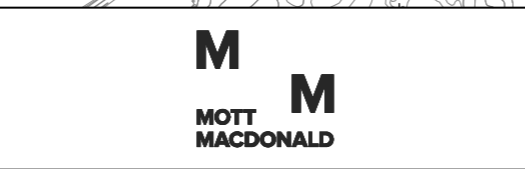
HONG KONG
INTERNATIONAL
AIRPORT

				Title		Design Date		Hong Kong International Airport		
				DIVERSION OF SHA CHAU FUEL PIPELINES		22.07.14		Drawing No.		
A	22.07.14	FIRST ISSUE			Checked		22.07.14		FIGURE 2	
Rev.	Date	Description			Approved		22.07.14		Scale	1 : 15000 (A3)
					Approver				Rev.	A



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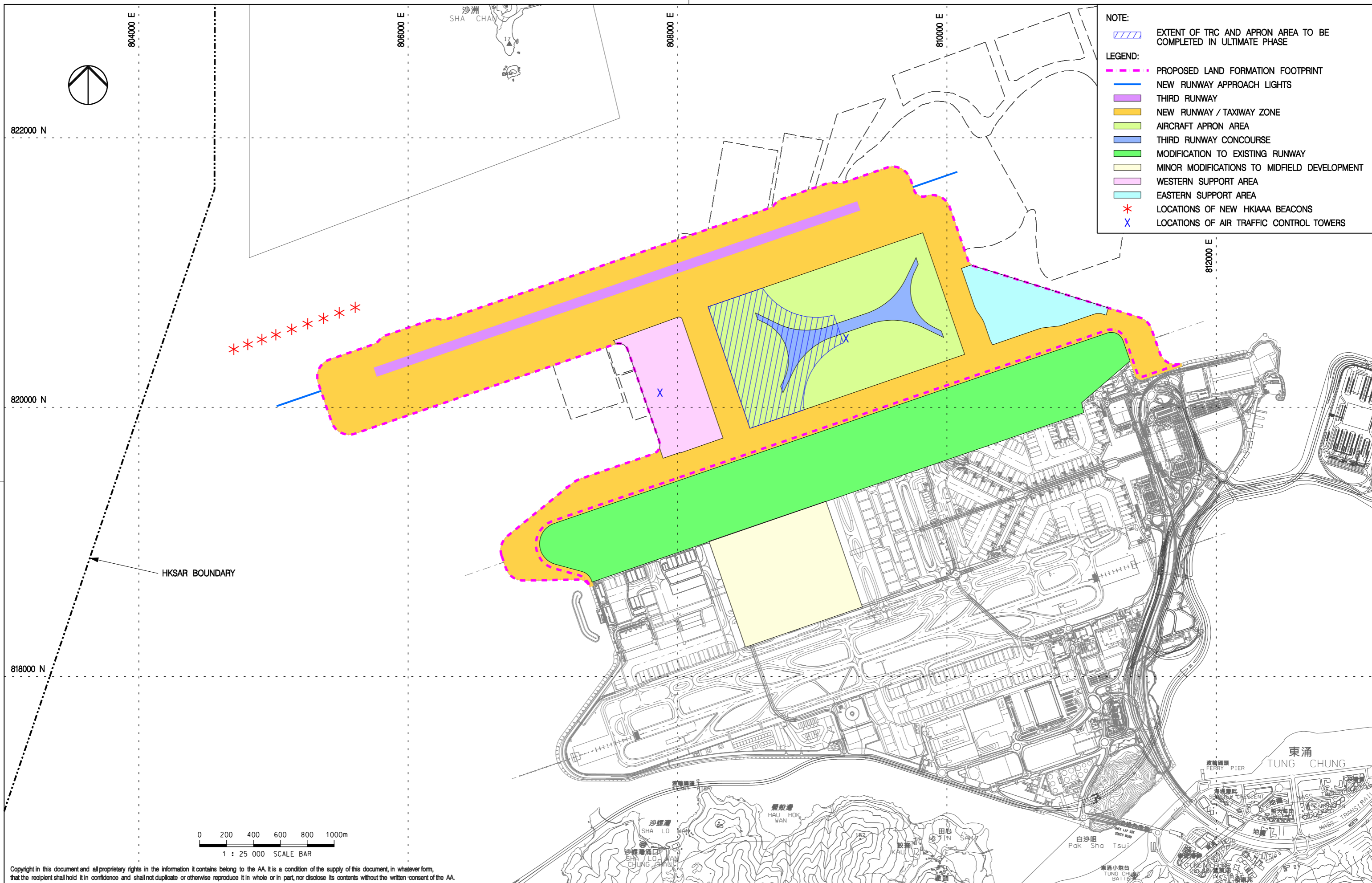
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A	31AUG15	FIRST ISSUE	DC
B	22OCT15	GENERAL REVISION	DC
C	05JUN17	GENERAL REVISION	AM
















Title
**LOCATION PLAN –
 DIVERSION OF SUBMARINE 11KV CABLE**

Consultant's Signatures for Approval		Date
Design	DC	05JUN17
Checkers	DC	05JUN17
Approver	EC	05JUN17

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM	
Drawing No.	Scale at A3 1 : 30000
FIGURE 3	Rev. C



- NOTE:**
 EXTENT OF TRC AND APRON AREA TO BE COMPLETED IN ULTIMATE PHASE
- LEGEND:**
-  PROPOSED LAND FORMATION FOOTPRINT
 -  NEW RUNWAY APPROACH LIGHTS
 -  THIRD RUNWAY
 -  NEW RUNWAY / TAXIWAY ZONE
 -  AIRCRAFT APRON AREA
 -  THIRD RUNWAY CONCOURSE
 -  MODIFICATION TO EXISTING RUNWAY
 -  MINOR MODIFICATIONS TO MIDFIELD DEVELOPMENT
 -  WESTERN SUPPORT AREA
 -  EASTERN SUPPORT AREA
 -  * LOCATIONS OF NEW HKIAAA BEACONS
 -  X LOCATIONS OF AIR TRAFFIC CONTROL TOWERS

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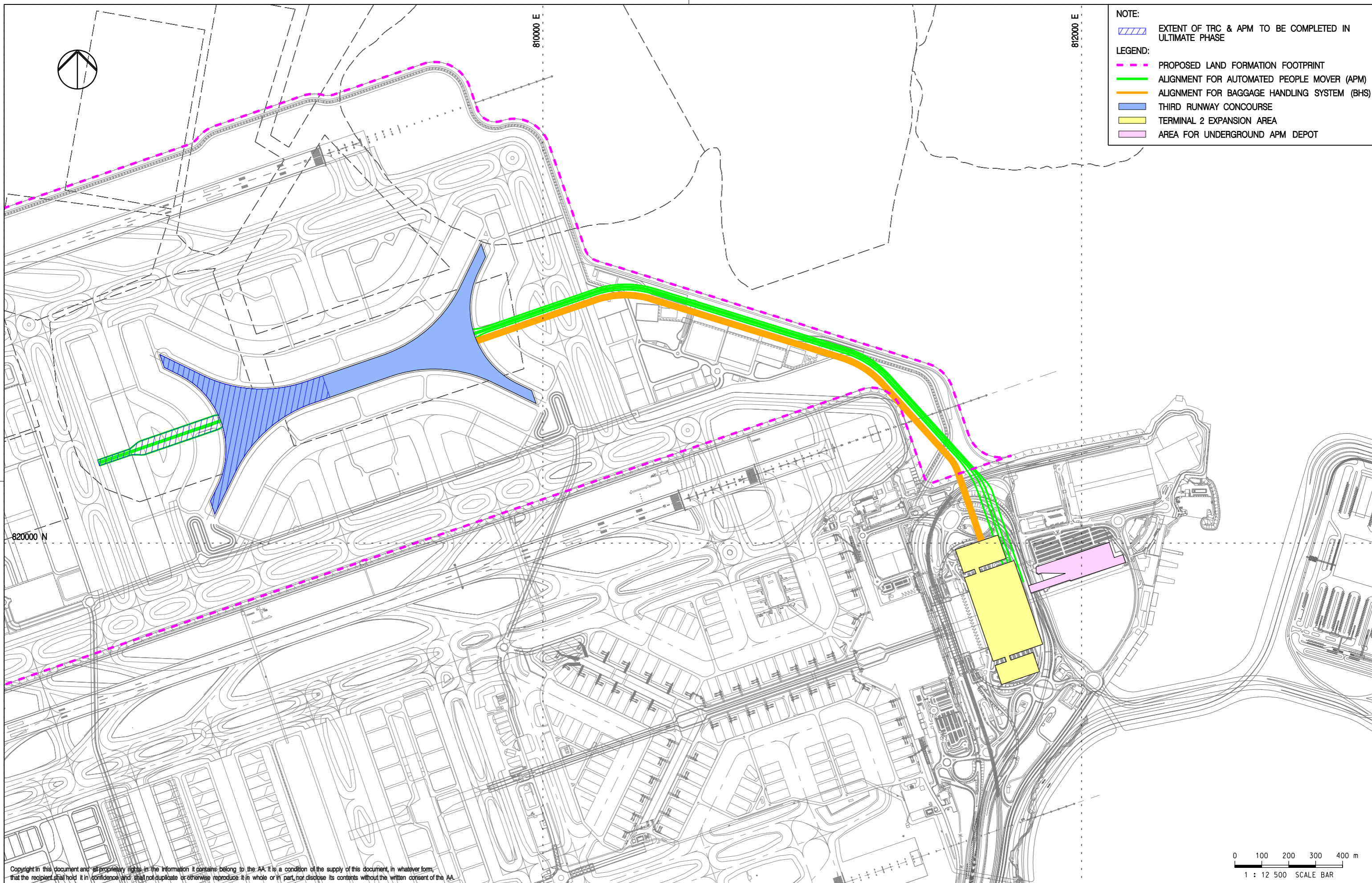
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A	31AUG15	FIRST ISSUE	DC
B	17SEP15	GENERAL REVISION	DC
C	22OCT15	GENERAL REVISION	DC
D	05JUN17	GENERAL REVISION	AM



Title
LOCATION PLAN – AIRFIELD FACILITIES

Consultant's Signatures for Approval		Date
Design	DC	05JUN17
Checkers	DC	05JUN17
Approver	EC	05JUN17

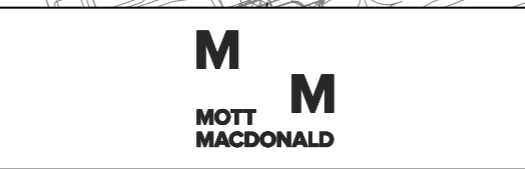
EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM	
Drawing No.	Scale at A3 1 : 25000
FIGURE 4	Rev. D



- NOTE:**
 [Blue hatched box] EXTENT OF TRC & APM TO BE COMPLETED IN ULTIMATE PHASE
- LEGEND:**
 [Magenta dashed line] PROPOSED LAND FORMATION FOOTPRINT
 [Green line] ALIGNMENT FOR AUTOMATED PEOPLE MOVER (APM)
 [Orange line] ALIGNMENT FOR BAGGAGE HANDLING SYSTEM (BHS)
 [Blue area] THIRD RUNWAY CONCOURSE
 [Yellow area] TERMINAL 2 EXPANSION AREA
 [Pink area] AREA FOR UNDERGROUND APM DEPOT

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Title
LOCATION PLAN – PASSENGER FACILITIES

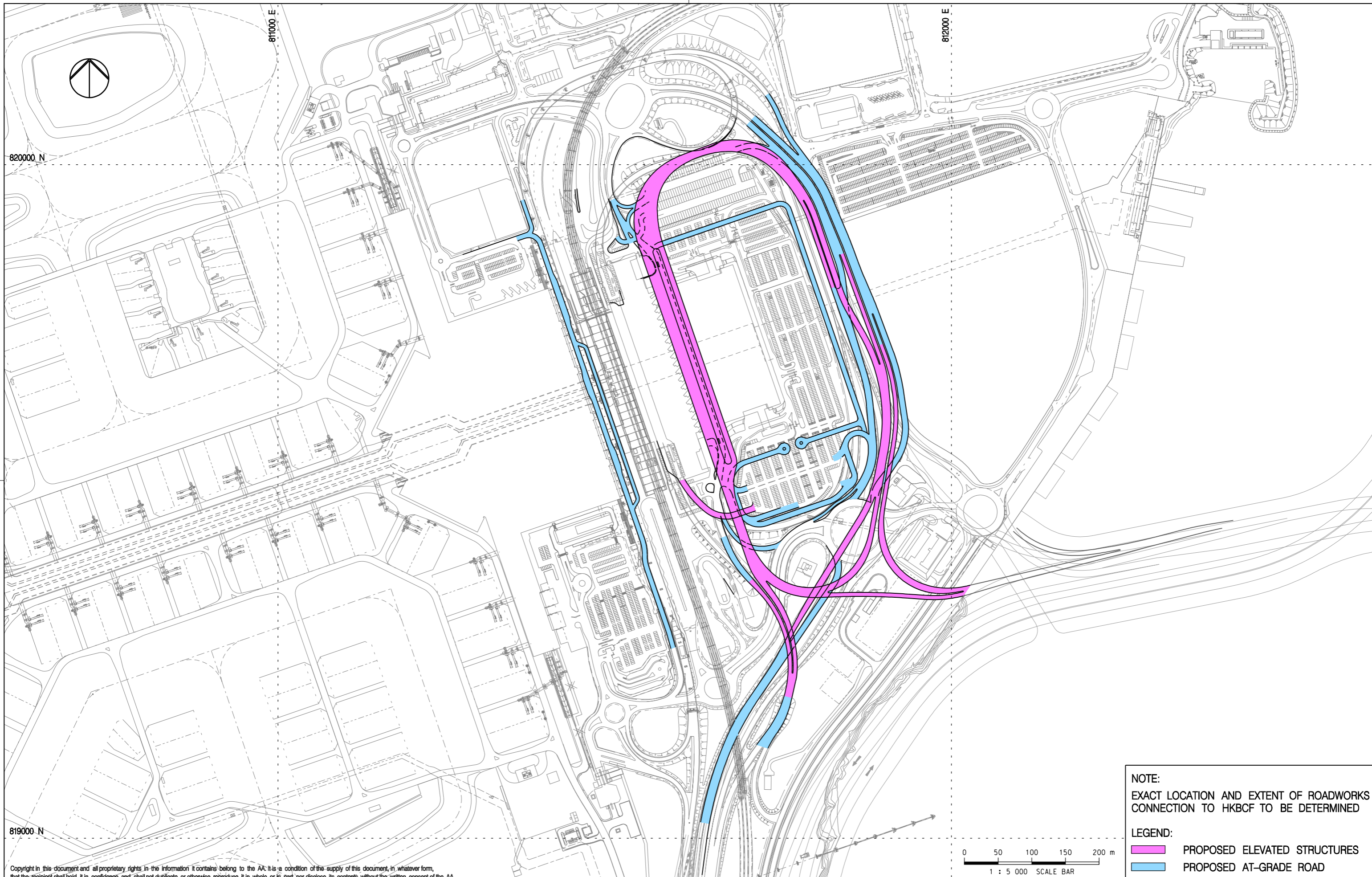
Consultant's Signatures for Approval		Date
Design	DC	05JUN17
Checkers	DC	05JUN17
Approver	EC	05JUN17

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No. **FIGURE 5**

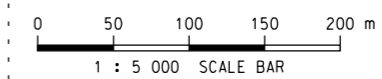
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1 : 12500

Rev. **C**



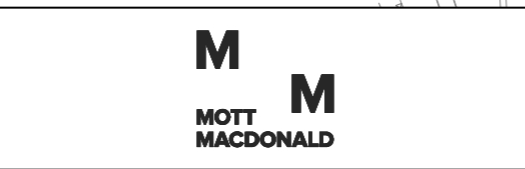
NOTE:
EXACT LOCATION AND EXTENT OF ROADWORKS CONNECTION TO HKBCF TO BE DETERMINED

LEGEND:
 PROPOSED ELEVATED STRUCTURES
 PROPOSED AT-GRADE ROAD



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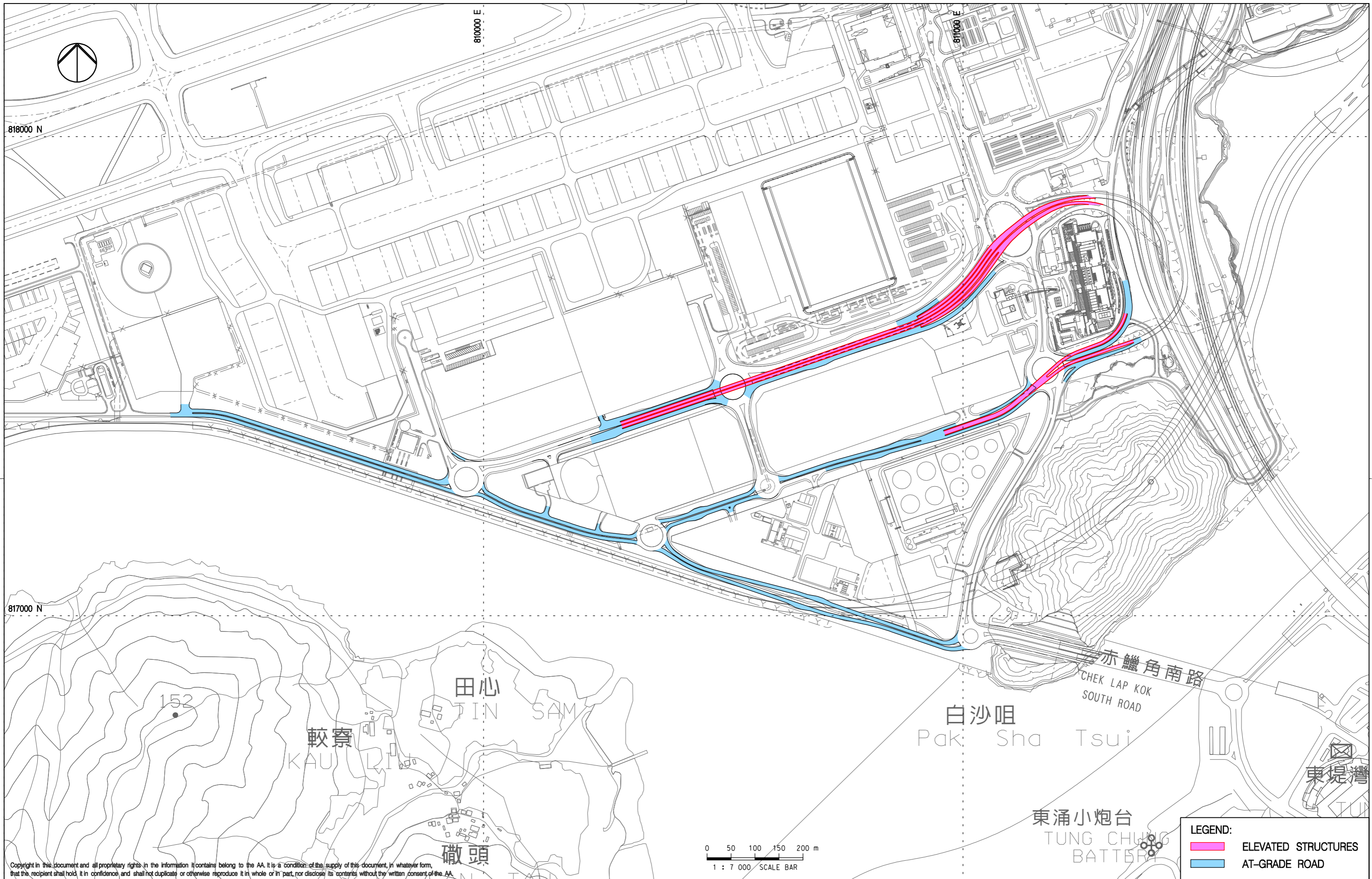
Rev.	Date	Description	Checked
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B	22OCT15	GENERAL REVISION	DC
C	05JUN17	GENERAL REVISION	AM



Title
**LOCATION PLAN -
TERMINAL 2 ROAD NETWORK**

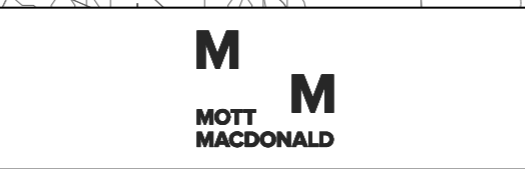
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Design	DC	05JUN17
Checkers	DC	05JUN17
Approver	EC	05JUN17

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM		Scale at A3
Drawing No.	FIGURE 6	1 : 5000
Rev.	C	



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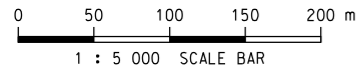
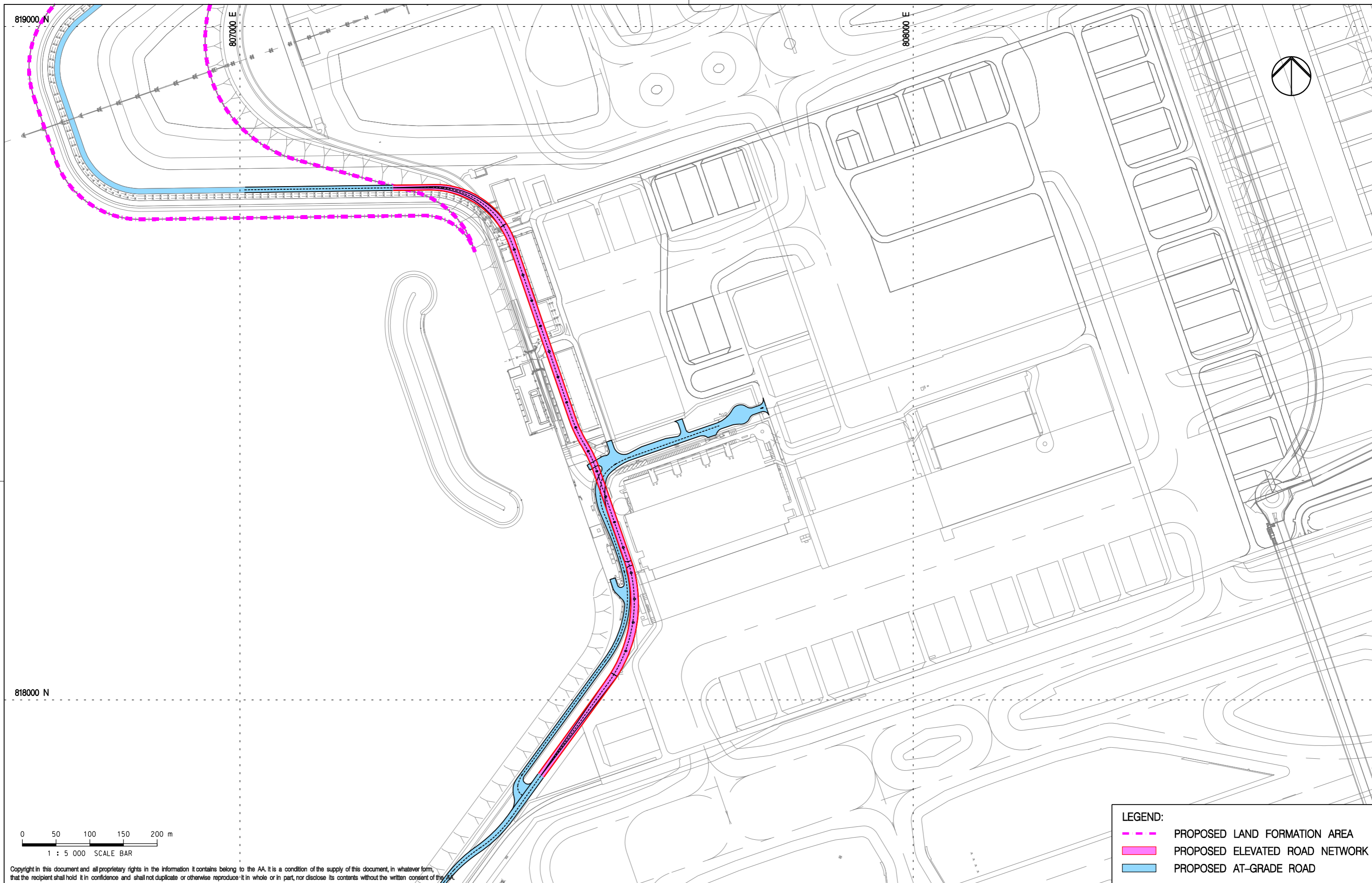
Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC
B	22OCT15	GENERAL REVISION	DC
C	05JUN17	GENERAL REVISION	AM



Title
LOCATION PLAN - SOUTH CARGO ROAD IMPROVEMENT WORKS

Consultant's Signatures for Approval		Date
Design	DC	05JUN17
Checkers	DC	05JUN17
Approver	EC	05JUN17

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM	
Drawing No.	Scale at A3 1 : 7000
FIGURE 7	Rev. C

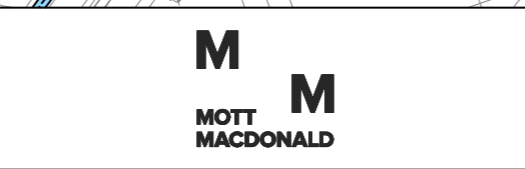


LEGEND:

- - - PROPOSED LAND FORMATION AREA
- PROPOSED ELEVATED ROAD NETWORK
- PROPOSED AT-GRADE ROAD

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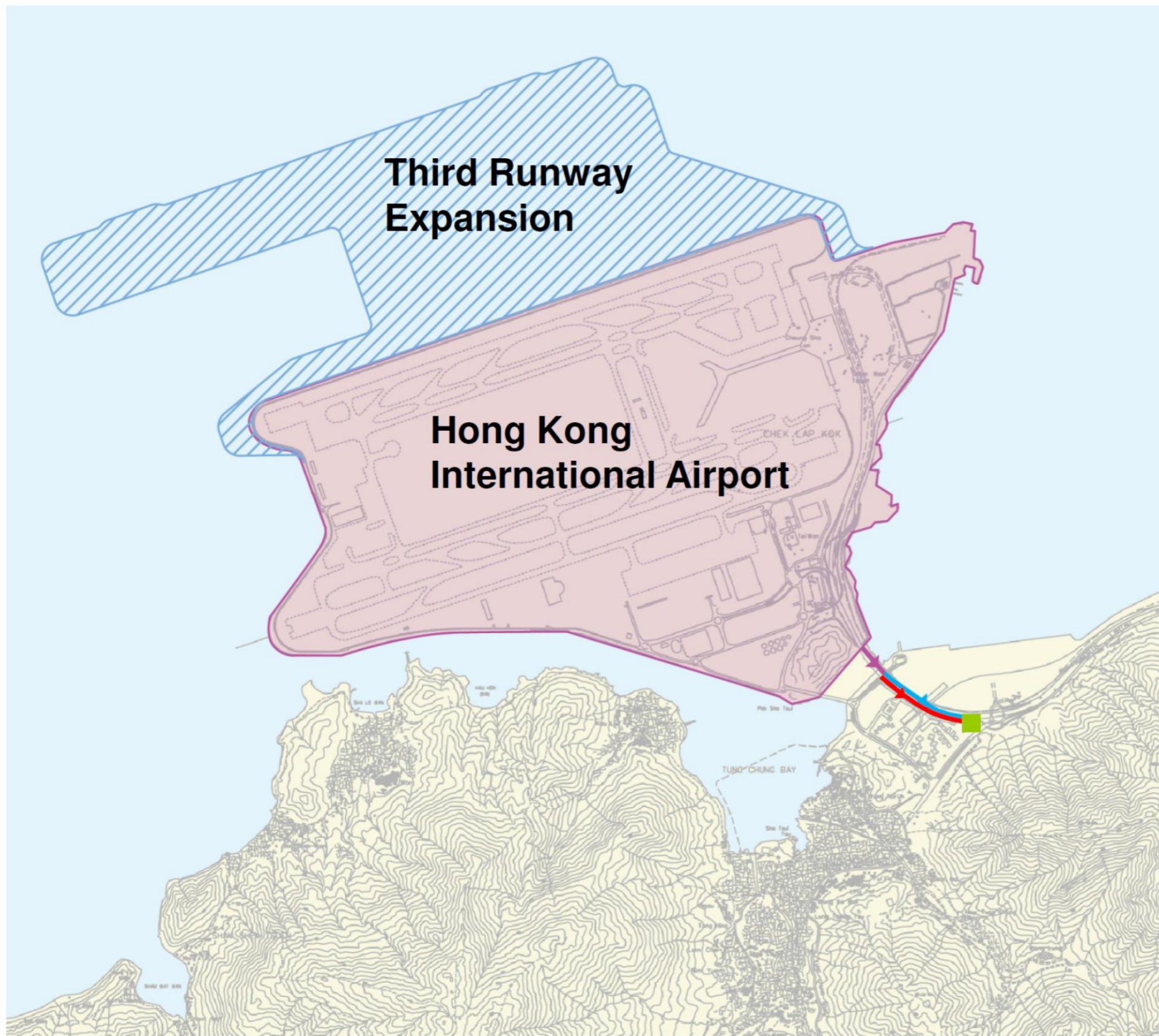
Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC
B	22OCT15	GENERAL REVISION	DC
C	05JUN17	GENERAL REVISION	AM



Title
**LOCATION PLAN –
 EXTENSION OF SOUTH PERIMETER ROAD**

Consultant's Signatures for Approval		Date
Design	DC	05JUN17
Checkers	DC	05JUN17
Approver	EC	05JUN17

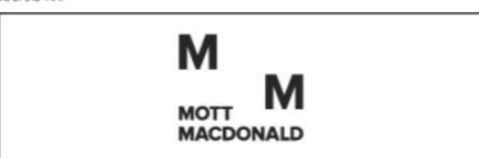
EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM	
Drawing No.	Scale at A3 1 : 5000
FIGURE 8	Rev. C



- Gravity Sewer to be upgraded by AAHK
- Existing Rising Main from Airport to Tung Chung
- Existing Gravity Sewer from Airport to TCSPS
- Tung Chung Sewage Pumping Station (TCSPS)

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Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC
B	06JUN17	SECOND ISSUE	AM



Title
GRAVITY SEWER TO BE UPGRADED

Consultant's Signatures for Approval		Date
Design	DC	06JUN17
Checkers	DC	06JUN17
Approver	EC	06JUN17

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM	
Drawing No.	FIGURE 9
Scale at A3	1 : 30000
Rev.	B

V. Indicative Phasing Plans for Land Formation Works

