

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

Submission of Construction Works Schedule and Location  
Plans

October 2015

Airport Authority Hong Kong



**This 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:**



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

Date

28 October 2015



Our Ref : 60440482/C/JCHL151028

By Email

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

Attn: Mr. Eden Ngan, Senior Manager

28 October 2015

Dear Sir,

**Contract No. 3102**  
**3RS Independent Environmental Checker Consultancy Services**

**Construction Works Schedule and Location Plans**

Reference is made to the your submission of Construction Works Schedule and Location Plans (rev. 3) under Condition 2.5 of the Environmental Permit No. EP-489/2014 certified by the ET Leader on 28 October 2015, which was sent to us by e-mail on the same day.

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



## 1. INTRODUCTION

- 1.1 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.
- 1.2 This submission presents the latest available information on Construction Works Schedule and Location Plans in compliance with Condition 2.5 of the EP and includes the following information:
- (a) A detailed phasing programme of all construction works of the project (in Section 2);
  - (b) An updated works programme of the Horizontal Directional Drilling (HDD) works (in Section 3);
  - (c) An updated works programme of the diversion of the submarine cable (in Section 4);
  - (d) Location plans of the planned construction works (in Section 5), including a detailed phasing plan for the land formation works (in Section 6).

## 2. OVERALL PHASING PROGRAMME OF CONSTRUCTION WORKS

- 2.1 Three-Runway System operation is targeted in Year 2023, with some infrastructure such as the third runway concourse (TRC) to be implemented in phases taking into consideration the expected demand. The overall phasing programme of all construction works, with information on updated works programme for the advanced works incorporated, is presented in **Attachment I**.
- 2.2 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.
- 2.3 It should be noted that all marine works, including the above-mentioned submarine power cable diversion and land formation, are subject to the Foreshore and Sea-bed (Reclamations) Ordinance (FSRO) gazettal process. 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 and employment of Contractors before implementation. Therefore, as highlighted in **Attachment I**, more updated programme for the works may only be presented after the completion of the FSRO gazettal process and detailed design process.

### **3. UPDATED WORKS PROGRAMME FOR HDD WORKS**

- 3.1 Diversion of the existing submarine aviation fuel pipelines will use a horizontal directional drilling (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 receiving platform at Sha Chau. Two new 500 mm diameter pipelines will be installed through the drilled tunnels. The total length is approximately 5 km.
- 3.2 **Attachment II** presents the latest updated works programme required under EP Condition 2.5(iii). Drilling works will proceed 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 the existing seawall will be installed by open trench method.

### **4. UPDATED WORKS PROGRAMME FOR DIVERSION OF THE SUBMARINE CABLE**

- 4.1 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. A field joint will be installed to connect the diverted cable to the existing cables running to the Sha Chau Island. While excavation is avoided by adopting the water jetting method, a limited amount of excavation will be needed at the field joint area. The length of cable installation is approximately 6km marine and approximately 0.3km landside, with a burial depth of 3m to 5m below seabed level.
- 4.2 At the field joint, the existing cables will be exposed using open trench method. On completion of the field joint, the cables will be re-laid to a depth of 3m to 5m below seabed level and the open trench will be reinstated.
- 4.3 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. The existing seawall at HKIA will be removed 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 joining location.



- 4.4 **Attachment III** presents the latest updated works programme for diversion of the submarine cables required under EP Condition 2.5(ii). As described in Section 2.3, it shall be noted that the commencement date of the power cable diversion works is subject to the completion of the FSRO gazettal process, and in preparing the updated works programme, it has been assumed that the relevant FSRO gazettal process would have been completed by the end of the second quarter of 2016, which is the latest programme at the time of preparing the submission.

## 5. LOCATION PLANS FOR PLANNED CONSTRUCTION WORKS

- 5.1 The location plans for the planned construction works of the project based on best available information is 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 will use 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 receiving platform at Sha Chau.
- (c) Diversion of submarine 11kV Cables (see **Attachment IV Figure 3**) – diversion of the submarine cables will via water jetting from the edge of the airport island to the field joint location, where the diverted cable will be connected to the existing cables running to the Sha Chau Island. At the daylighting point of the submarine cables, the existing seawall at HKIA will be removed 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 trouble-shooting 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 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. DETAILED PHASING PLAN FOR THE LAND FORMATION WORKS

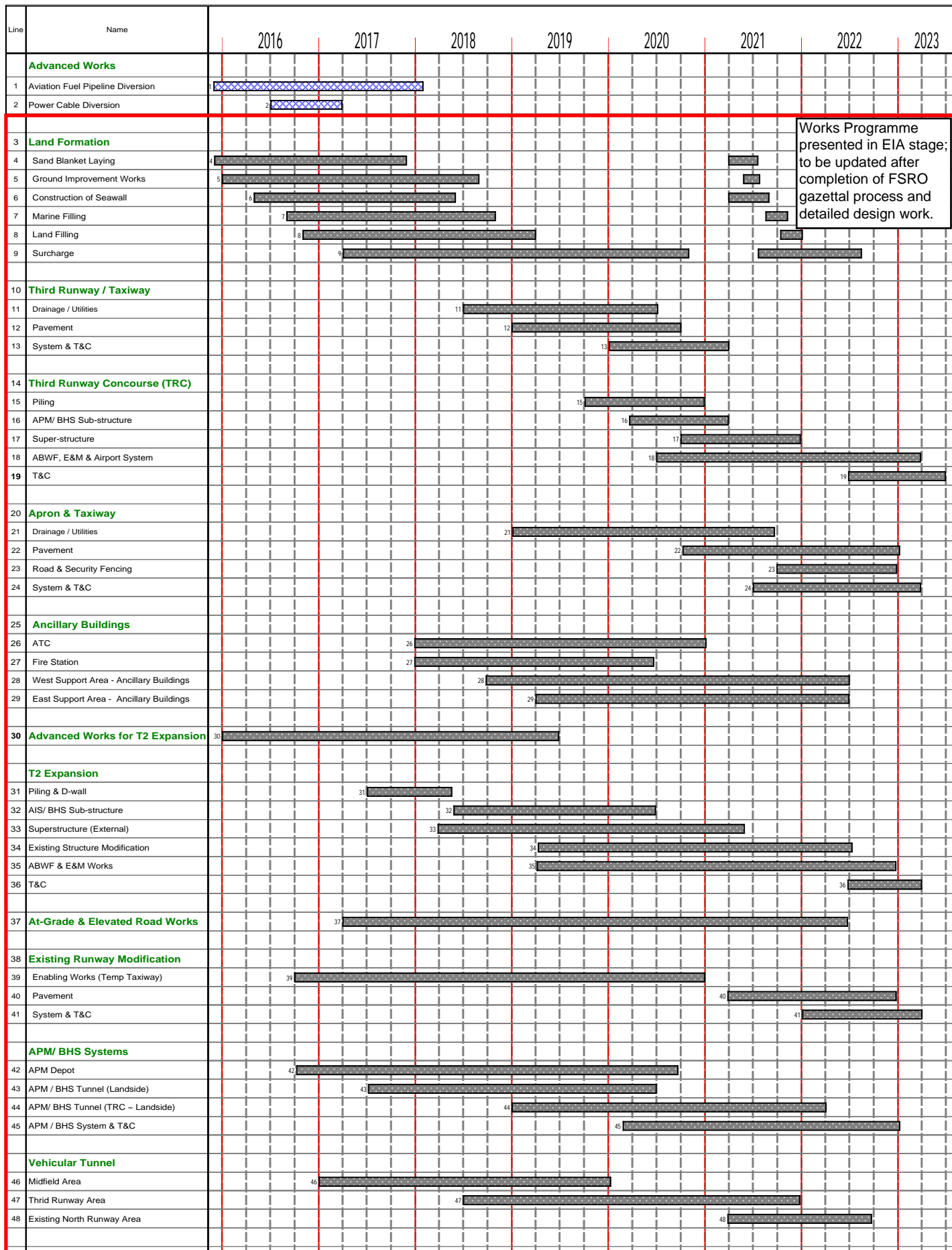
- 6.1 The main components of the land formation works comprise modification and integration of the existing seawall, ground improvement of the underlying marine sediments, seawall construction, filling, and surcharge. A detailed phasing plan for the land formation works based on best available information is presented in **Attachment V**. The phasing plan would be subject to further revision after the detailed design process and when the contractors are employed for the works. Besides, as described in Section 2.3, it shall also be noted that the commencement date of the land formation works is subject to the completion of the FSRO gazettal process.
- 6.2 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 removed and retained as far as practicable for reuse in the construction of the new seawall.
  - (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, steel cell, sand compaction piles,

Expansion of Hong Kong International Airport into a Three-Runway System  
Submission of Construction Works Schedule and Location Plans

vertical sand drains, and prefabricated vertical drains) will be adopted outside the CMP areas. Prior to commencement of ground improvement activities, a sand blanket will be laid on the seabed to contain and minimise the release of marine sediment during ground improvement activities.

- (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 vertical seawalls are required. 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 (except where steel cells are used), 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.





Works Programme presented in EIA stage; to be updated after completion of FSRO gazettal process and detailed design work.

Legend  
 Latest updated works programme (Attachments II & III refer for further details)

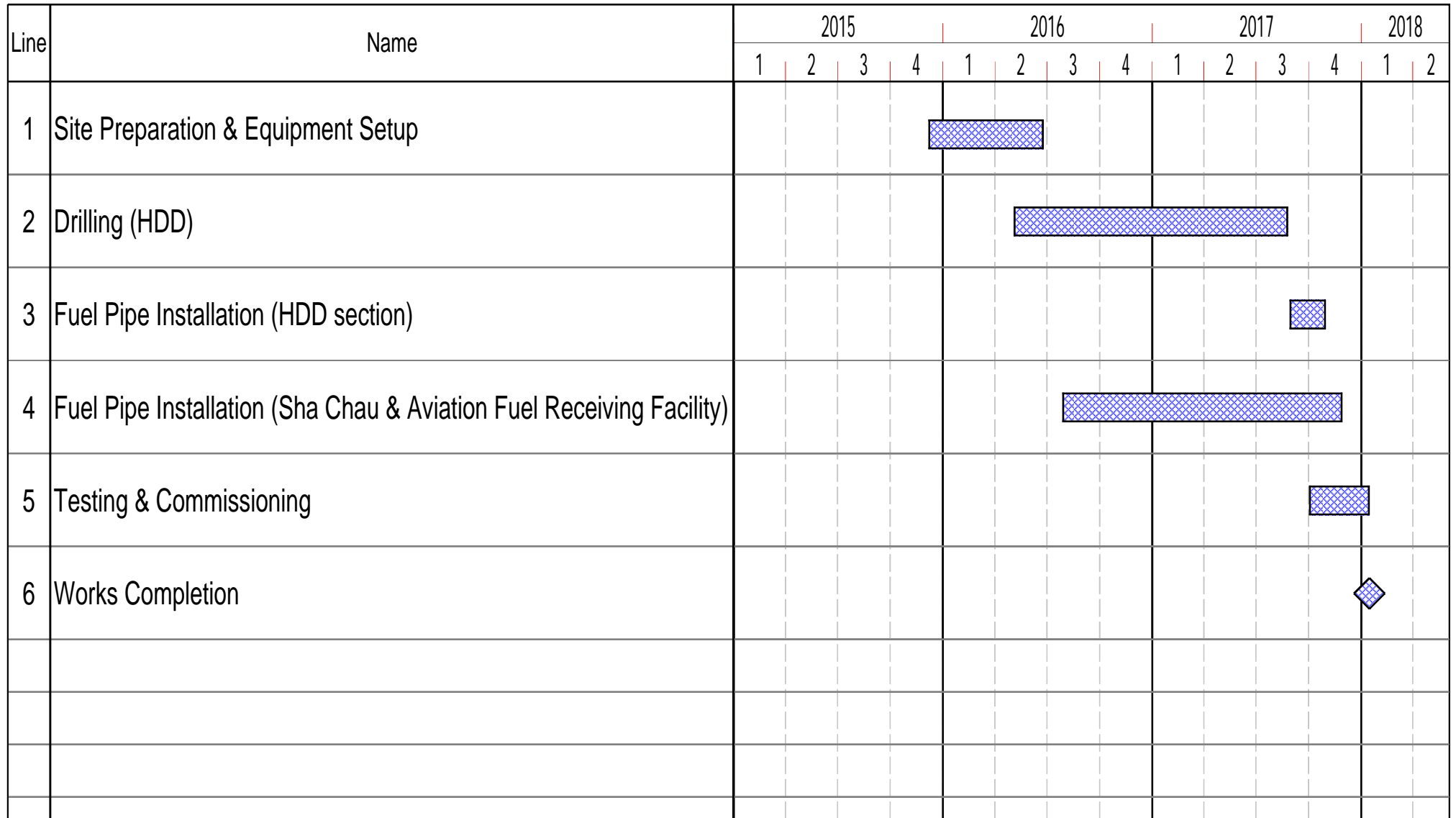
Programme No.	00001
Revision/Date	C/ 20-Oct-15
Prepared	VT
Checked	PY

3RS Phasing Programme





# Attachment II



Reference	EM001
Date	31-Aug-15

**THREE RUNWAY SYSTEM**  
Aviation Fuel Pipeline Diversion Works  
Construction Programme






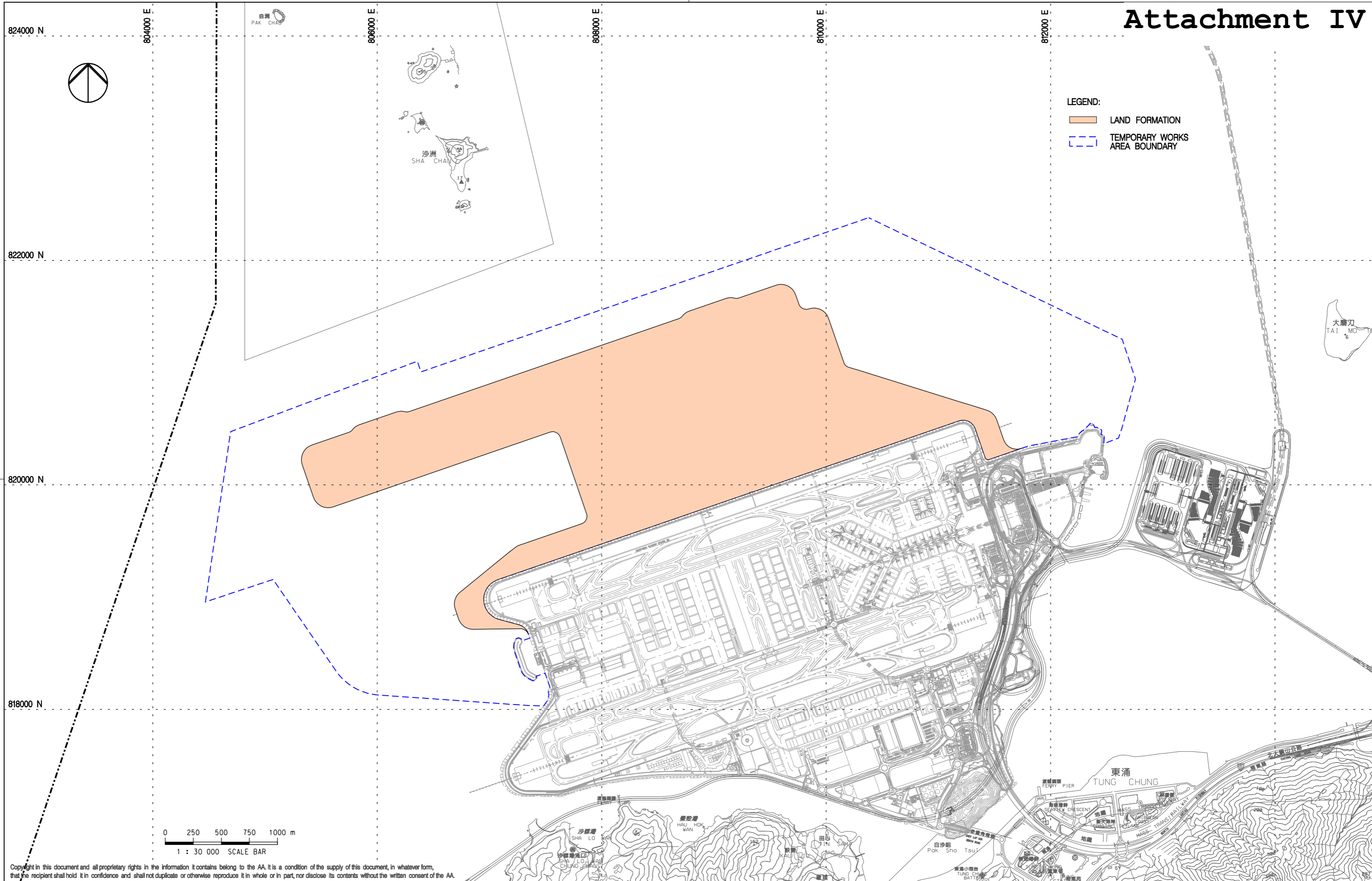


# Attachment III

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	EM002	<b>THREE RUNWAY SYSTEM</b> CLP Submarine Cable Diversion Works Construction Programme	 香港國際機場 HONG KONG INTERNATIONAL AIRPORT
Date	17-Sep-15		





**LEGEND:**  
 LAND FORMATION  
 TEMPORARY WORKS AREA BOUNDARY

0 250 500 750 1000 m  
 1 : 30 000 SCALE BAR

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



Title  
**PROPOSED TEMPORARY WORKS AREA FOR LAND FORMATION ACTIVITIES**

Consultant's Signatures for Approval		Date
Design	DC	22OCT15
Checkers	DC	22OCT15
Approver	EC	22OCT15

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

PAK CHAU

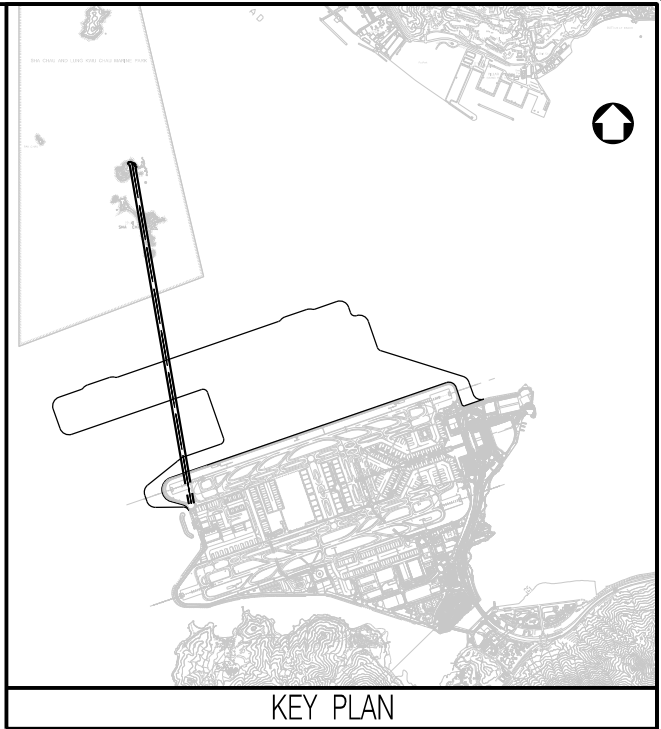


PORITION OF THE FUEL PIPE ABOVE GROUND

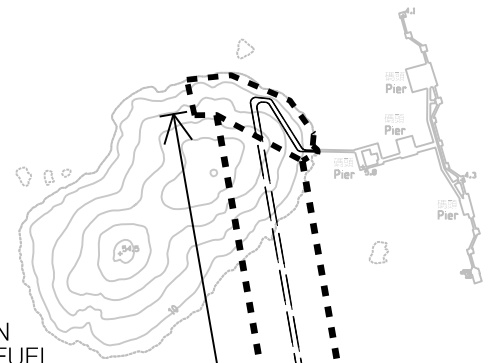
沙洲  
SHA CHAU

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

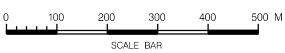
CONSTRUCTION OF AVIATION FUEL  
PIPELINES BY HORIZONTAL  
DIRECTIONAL DRILLING METHOD

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

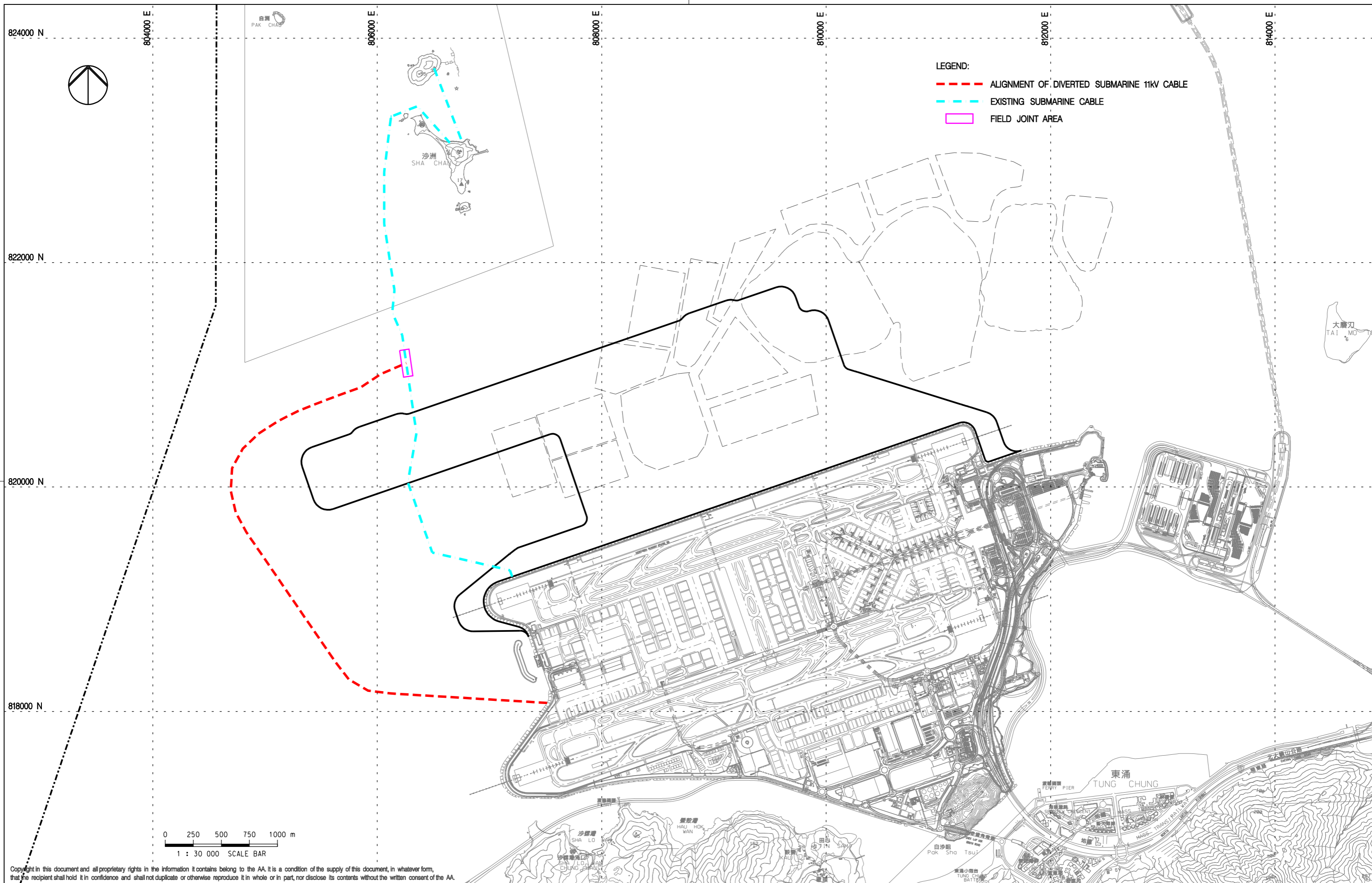
Rev.	Date	Description	Checked
A	22.07.14	FIRST ISSUE	



Title  
DIVERSION OF SHA CHAU  
FUEL PIPELINES

Design Designer	Date
Checked Checker	Date
Approved Approver	Date
	22.07.14

Hong Kong International Airport	
Drawing No.	FIGURE 2
Scale	1 : 15000 (A3)
Rev.	A



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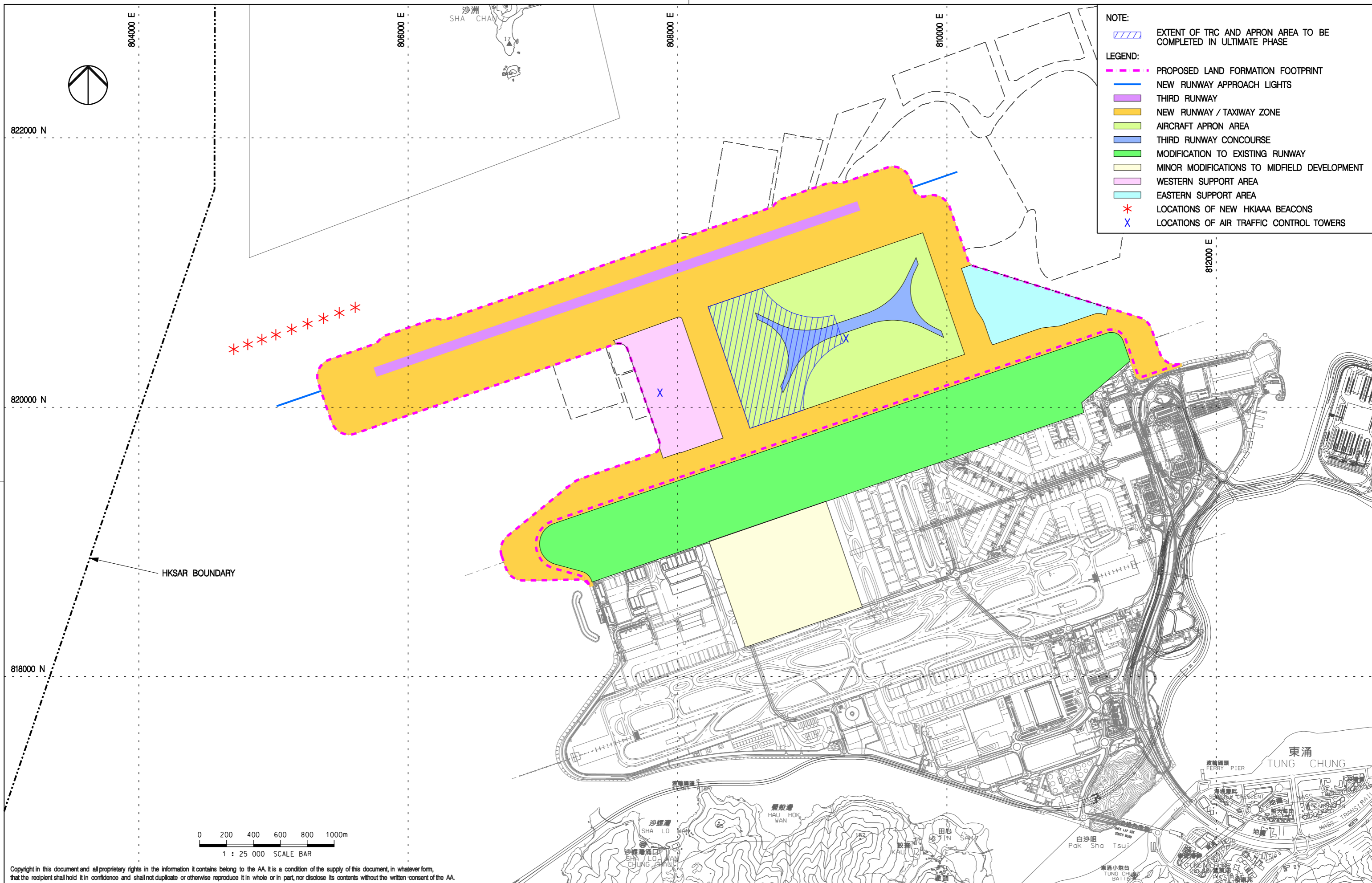
Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC
B	22OCT15	GENERAL REVISION	DC
















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

Consultant's Signatures for Approval		Date
Design	DC	22OCT15
Checkers	DC	22OCT15
Approver	EC	22OCT15

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



- 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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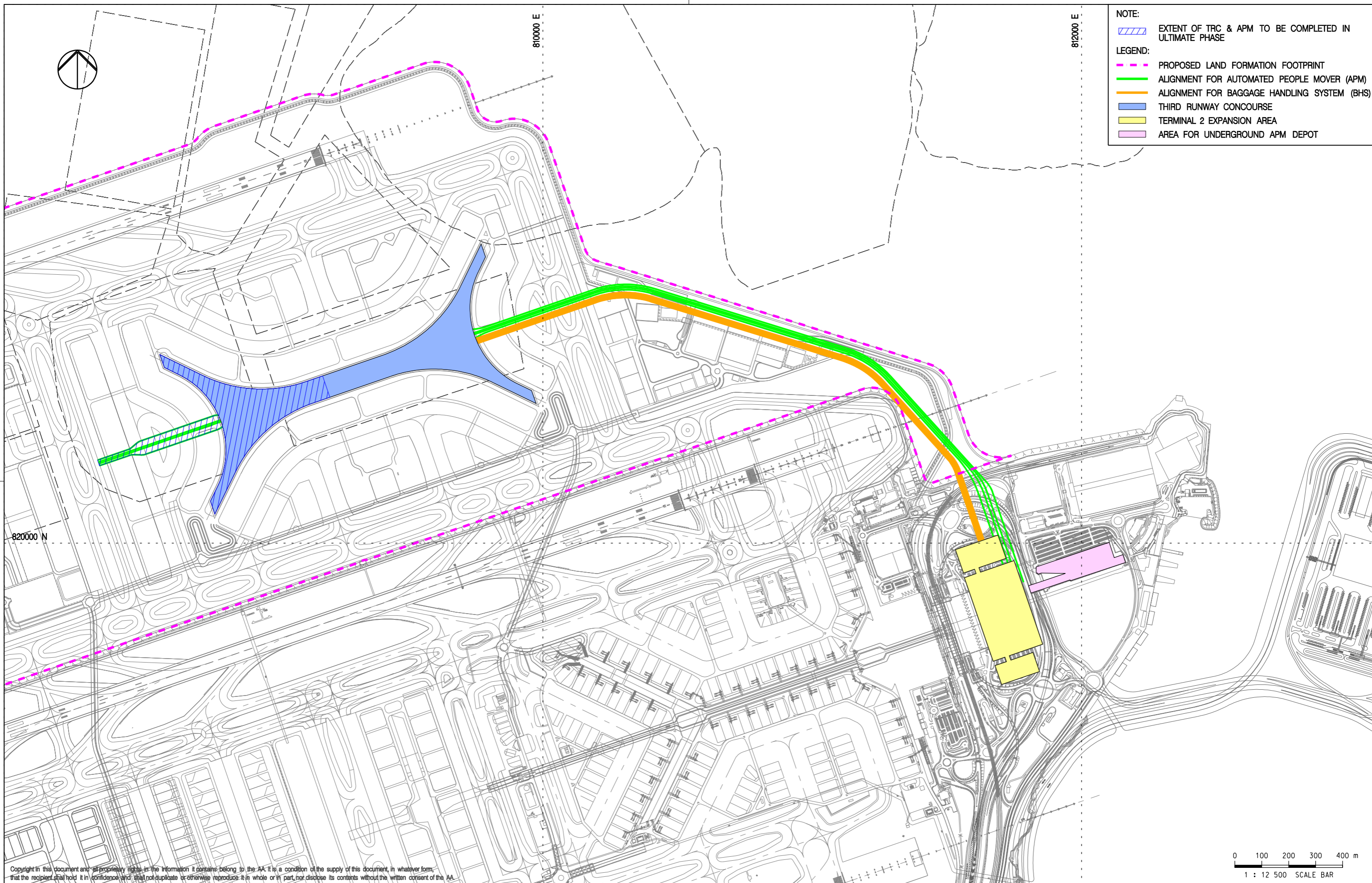
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A	31AUG15	FIRST ISSUE	DC
B	17SEP15	GENERAL REVISION	DC
C	22OCT15	GENERAL REVISION	DC



Title  
**LOCATION PLAN – AIRFIELD FACILITIES**

Consultant's Signatures for Approval		Date
Design	DC	22OCT15
Checkers	DC	22OCT15
Approver	EC	22OCT15

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



- 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**

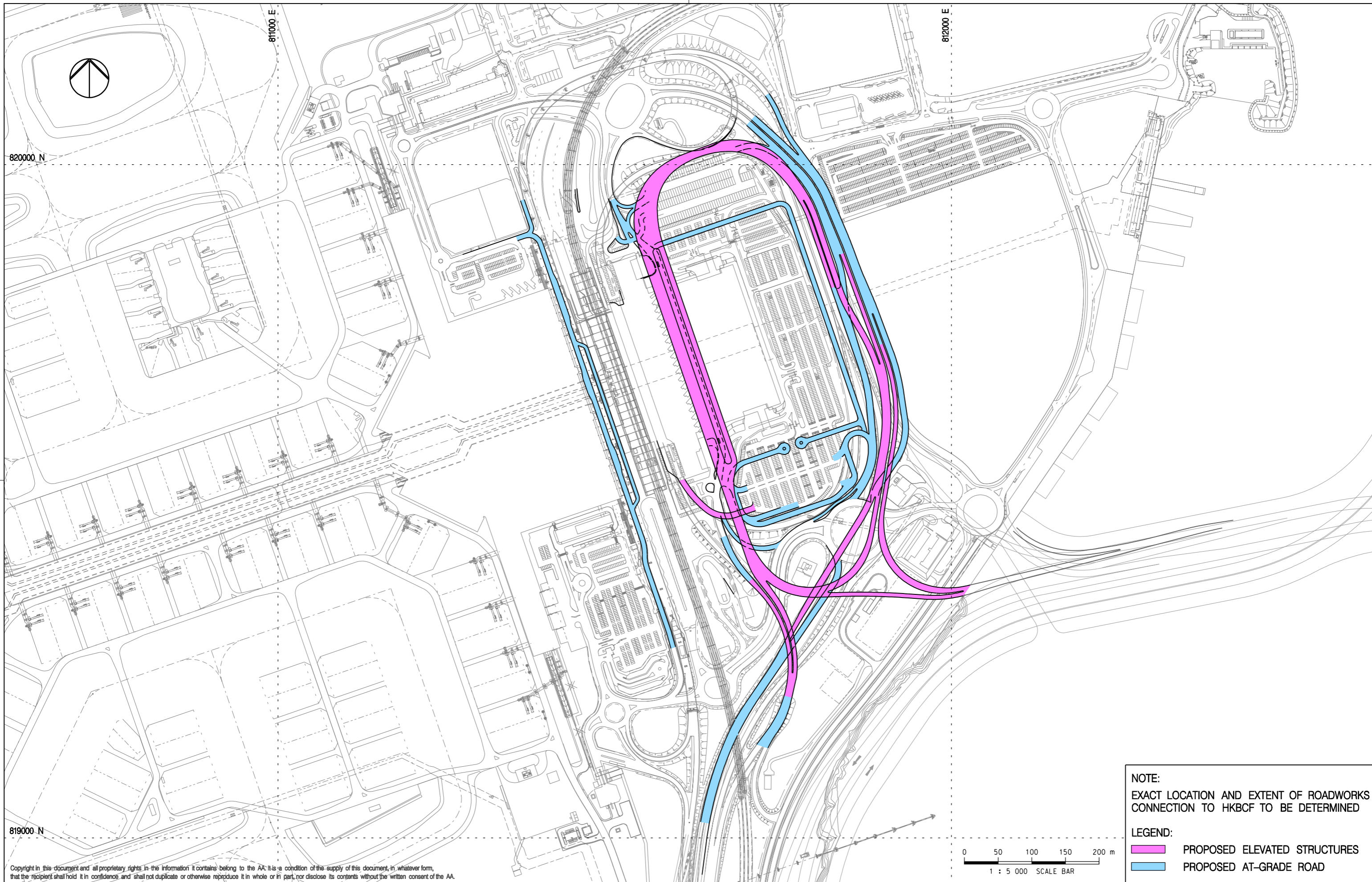
Consultant's Signatures for Approval		Date
Design	DC	22OCT15
Checkers	DC	22OCT15
Approver	EC	22OCT15

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

Drawing No. **FIGURE 5**

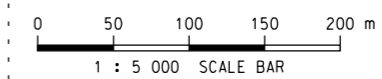
Scale at A3  
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Rev. **B**



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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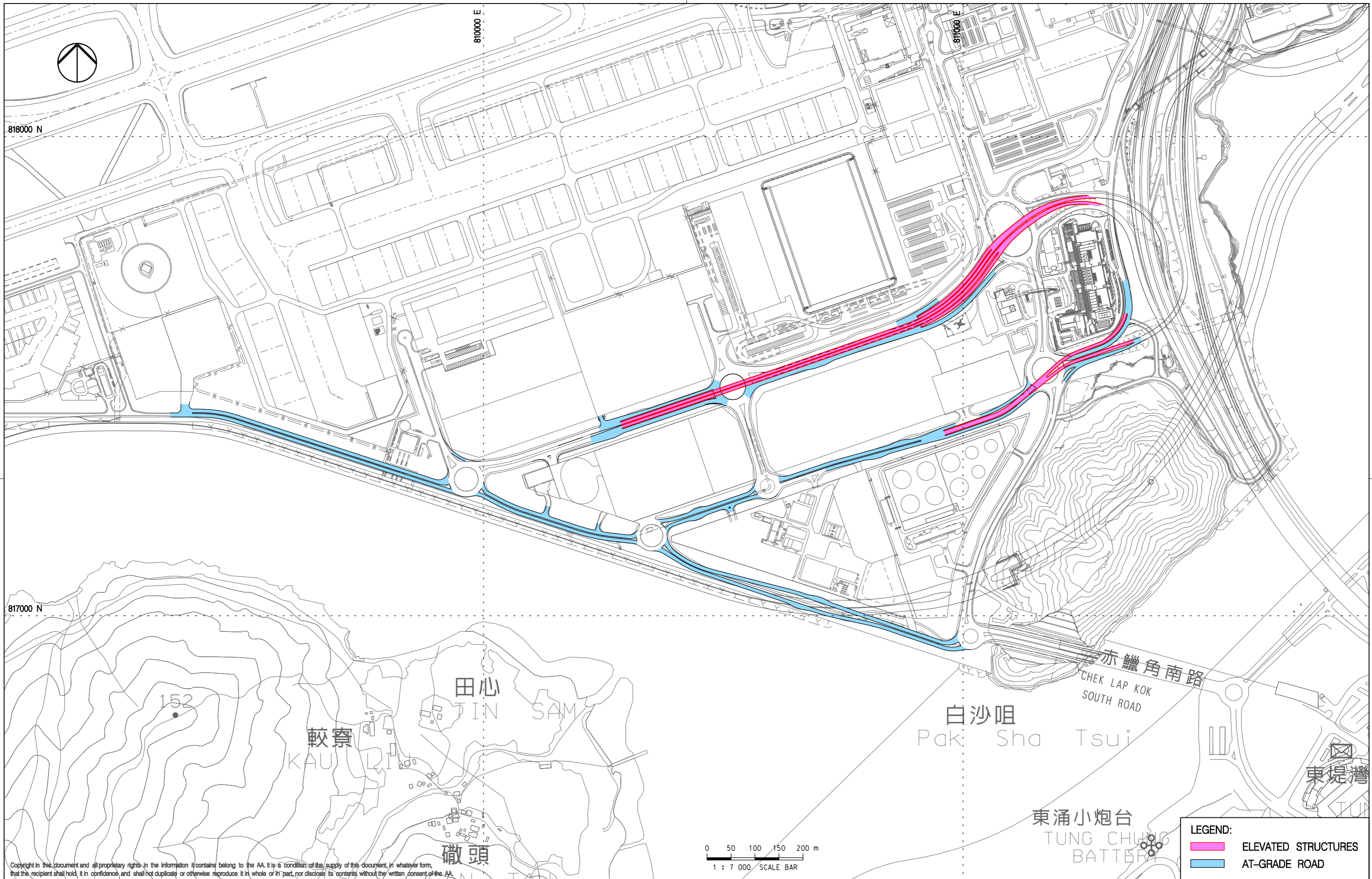


Title  
**LOCATION PLAN –  
TERMINAL 2 ROAD NETWORK**

Consultant's Signatures for Approval		Date
Design	DC	22OCT15
Checkers	DC	22OCT15
Approver	EC	22OCT15

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





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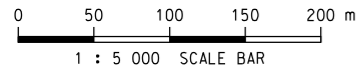
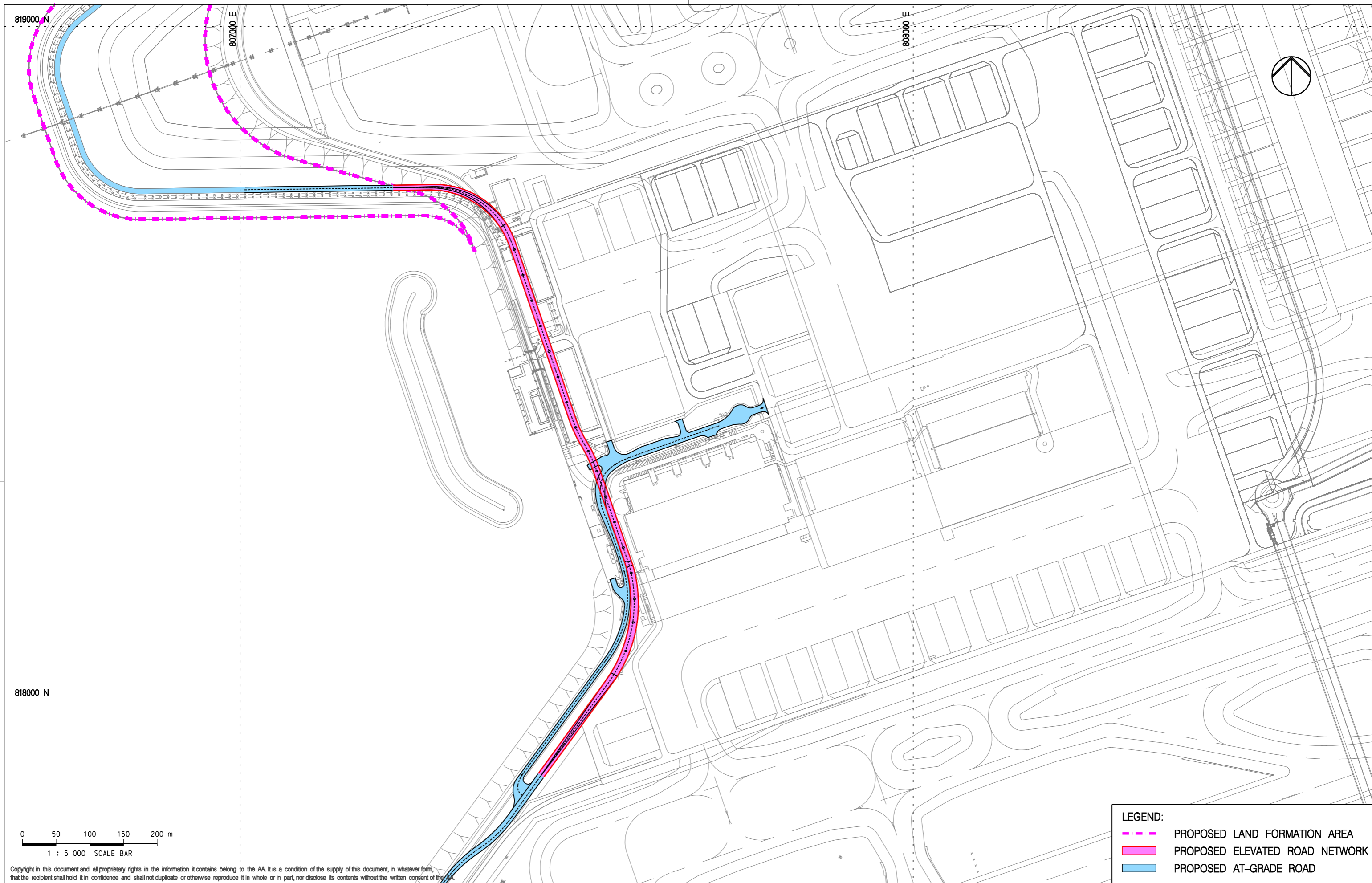
Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC
B	22OCT15	GENERAL REVISION	DC



Title  
**LOCATION PLAN - SOUTH CARGO ROAD IMPROVEMENT WORKS**

Consultant's Signatures for Approval		Date
Design	DC	22OCT15
Checkers	DC	22OCT15
Approver	EC	22OCT15

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



**LEGEND:**

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

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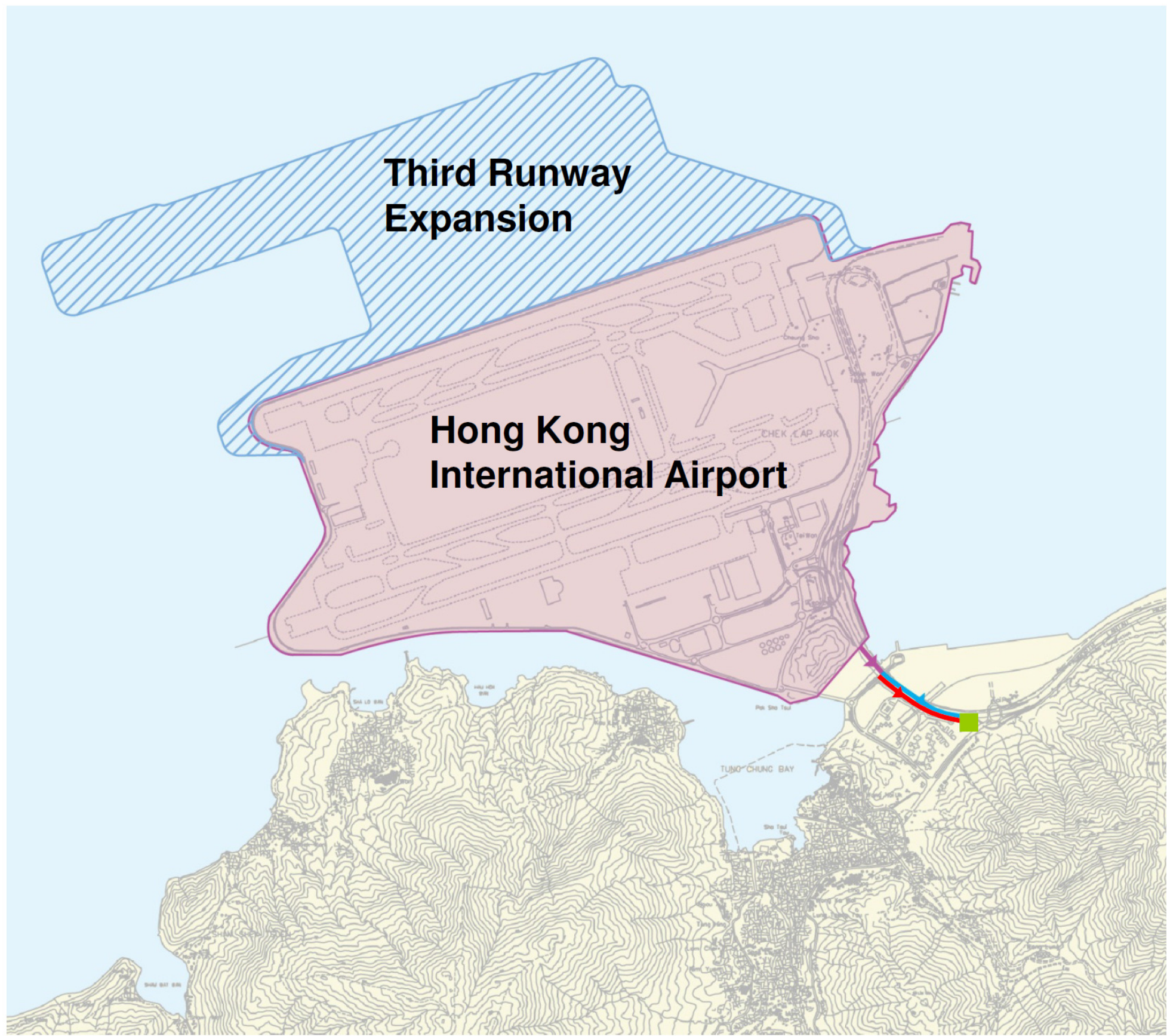
Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC
B	22OCT15	GENERAL REVISION	DC







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

Consultant's Signatures for Approval		Date
Design	DC	22OCT15
Checkers	DC	22OCT15
Approver	EC	22OCT15

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



-  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)

Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC



Title  
GRAVITY SEWER TO BE UPGRADED

Consultant's Signatures for Approval	Date
Design DC	31AUG15
Checkers DC	31AUG15
Design Supervisor EC	31AUG15
Authorised Representative JFP	31AUG15

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



# Attachment V

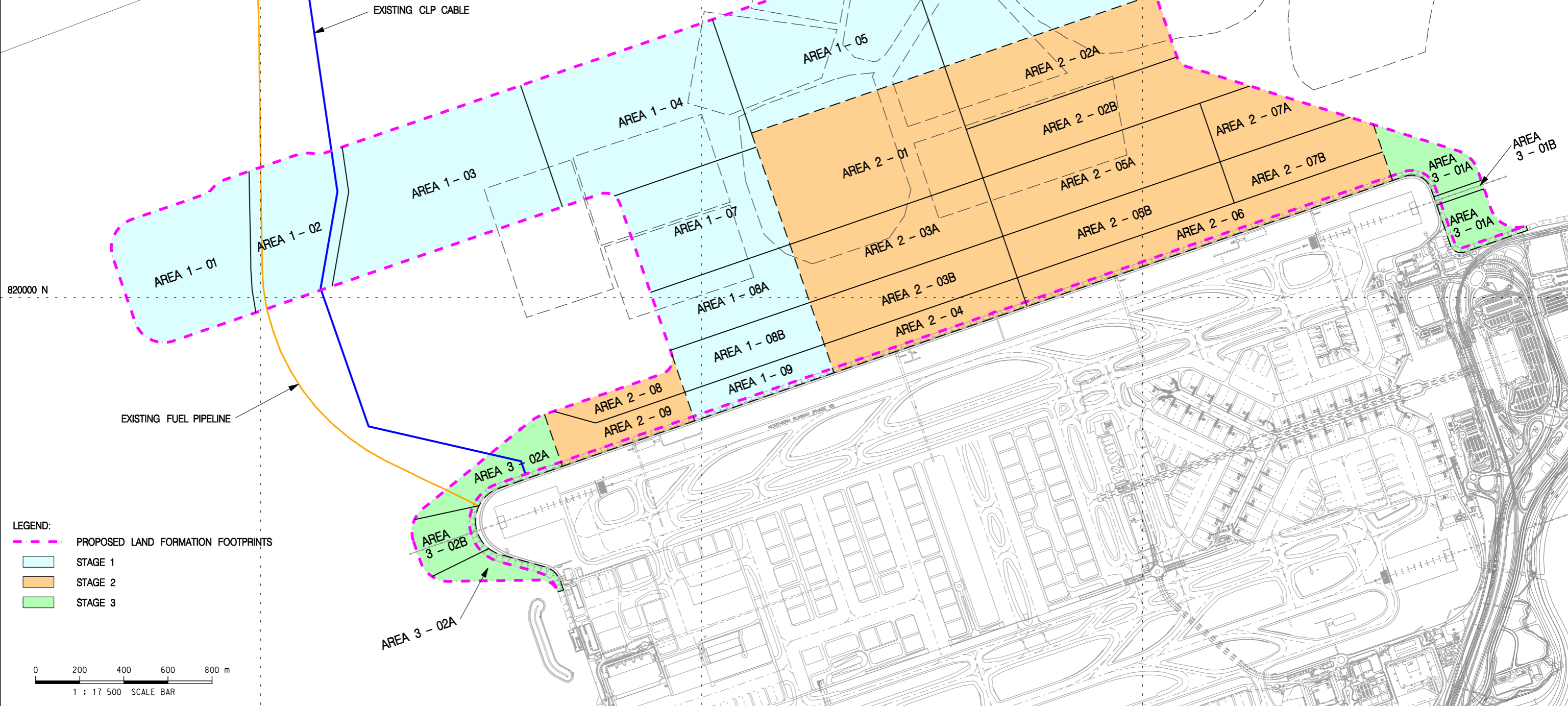


822000 N

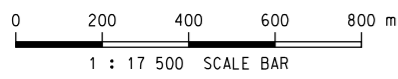
806000 E

806000 E

810000 E

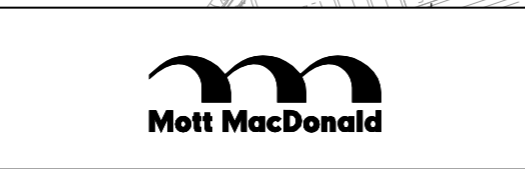


- LEGEND:**
- PROPOSED LAND FORMATION FOOTPRINTS
  - STAGE 1
  - STAGE 2
  - STAGE 3



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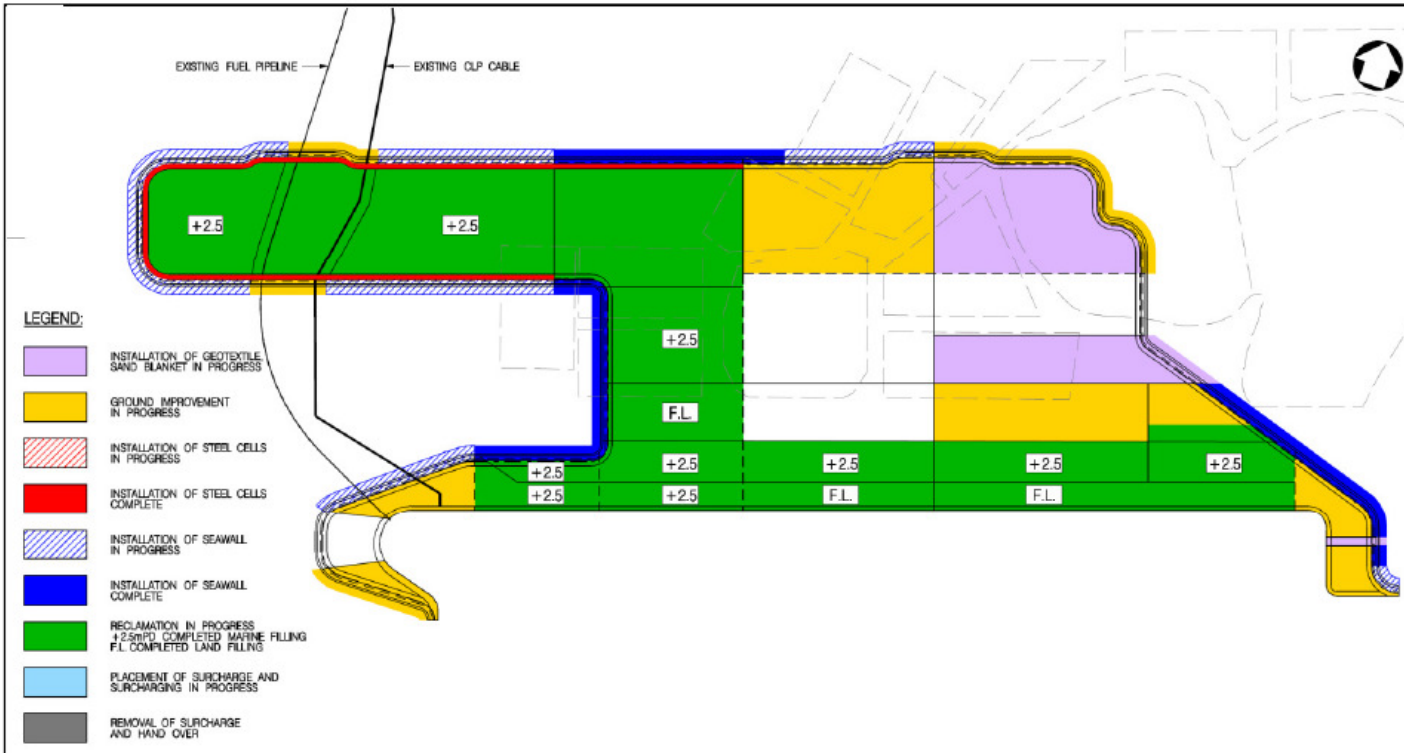
Title  
**LAND FORMATION WORKS AREAS PLAN**

Consultant's Signatures for Approval		Date
Design	DC	31AUG15
Checkers	DC	31AUG15
Design Supervisor	EC	31AUG15
Authorised Representative	JFP	31AUG15

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM		Scale at A3
Drawing No.	<b>FIGURE A</b>	1 : 17500
Rev.	A	

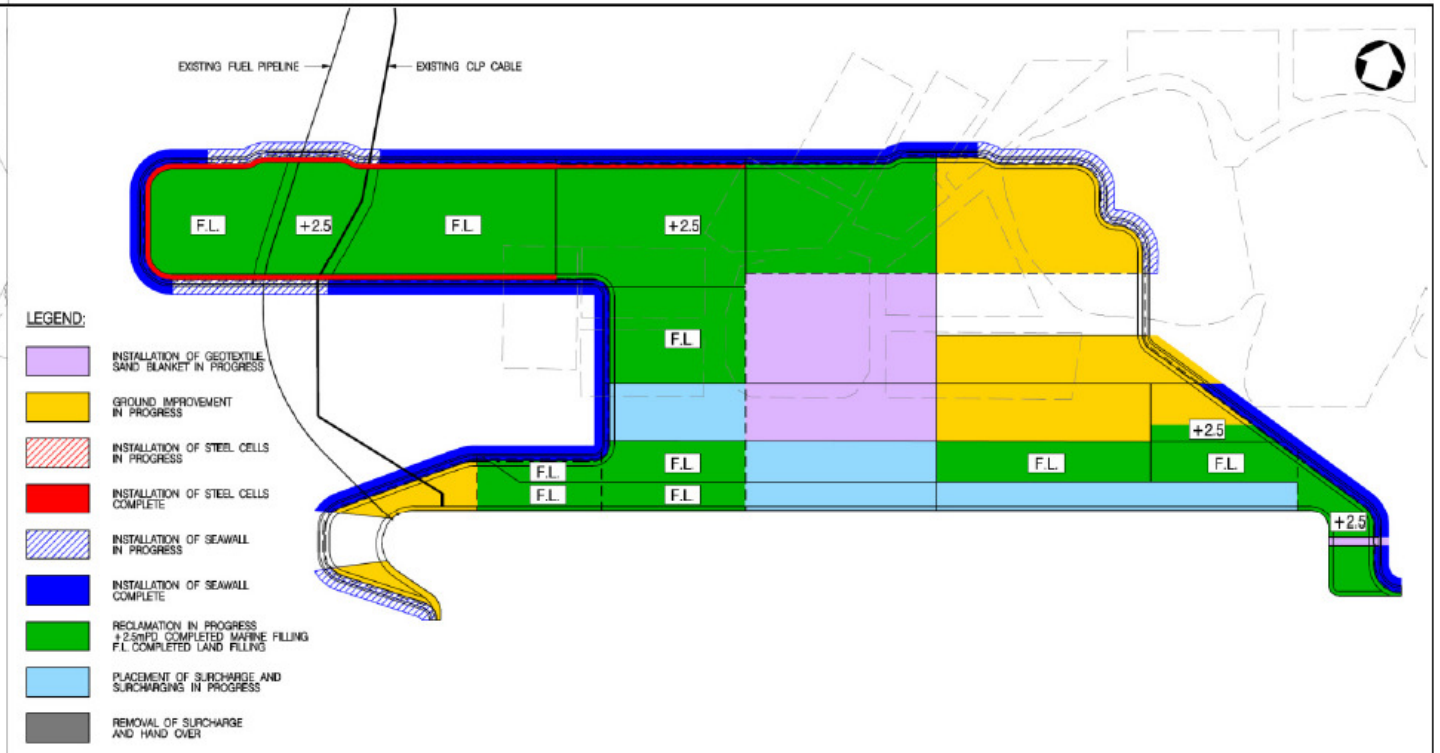
### Key Land Formation Sequence





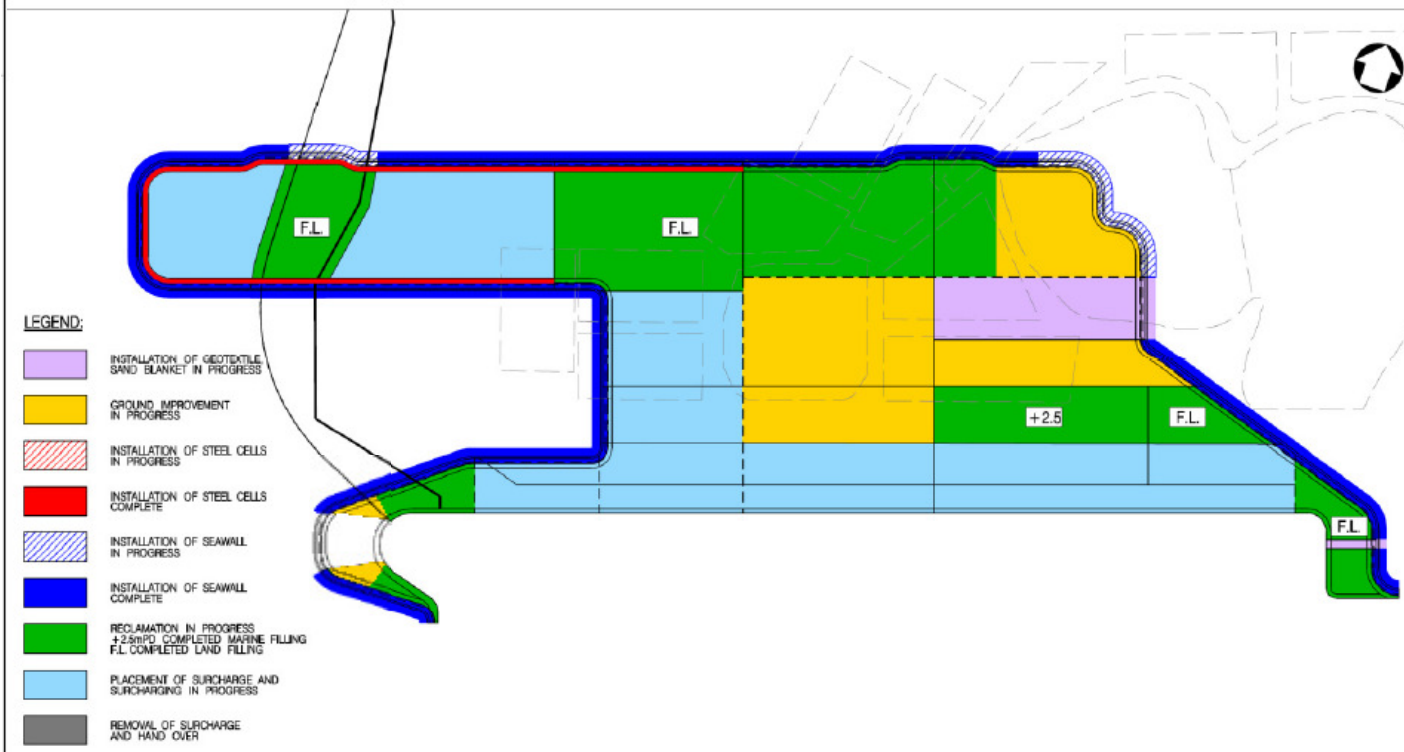
MONTH 15 TO MONTH 18

Snapshot for end of 2017 Q1



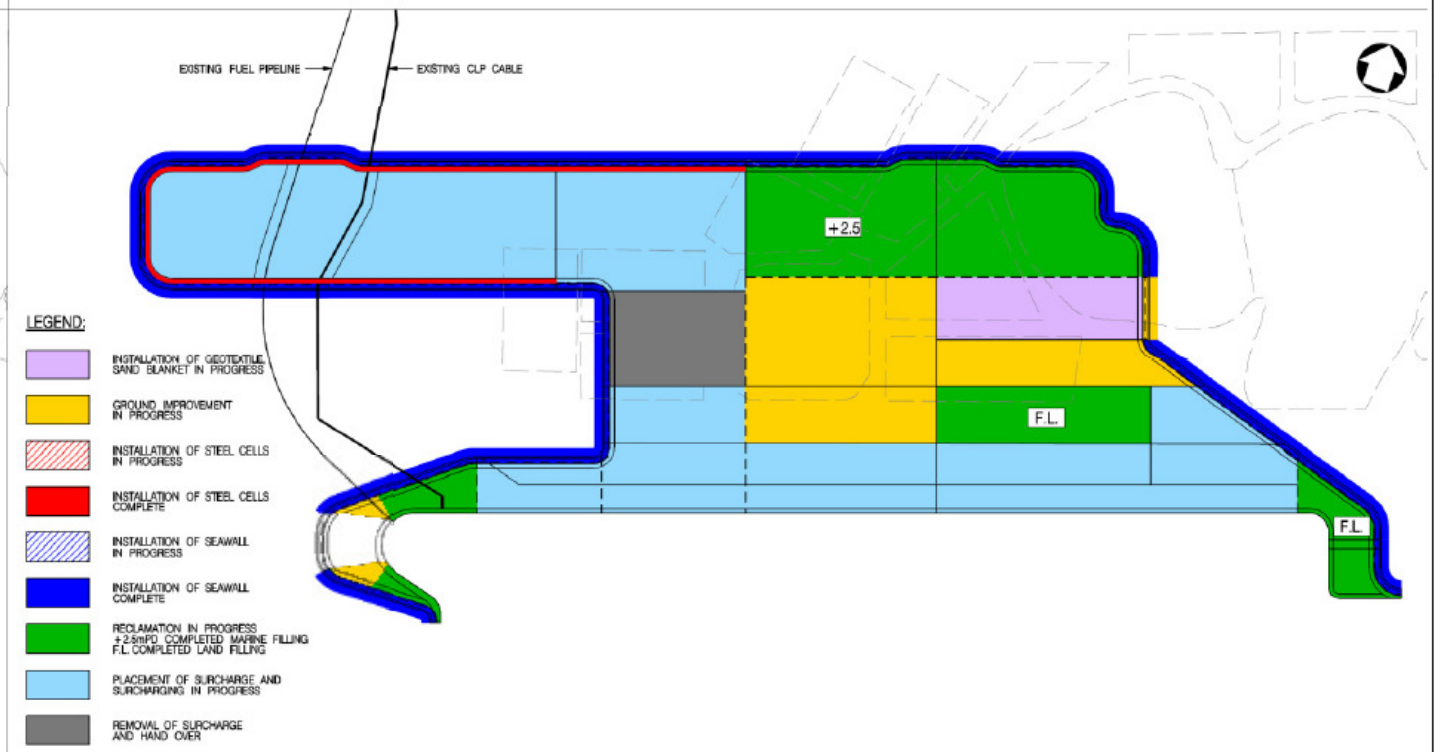
MONTH 18 TO MONTH 21

Snapshot for end of 2017 Q2



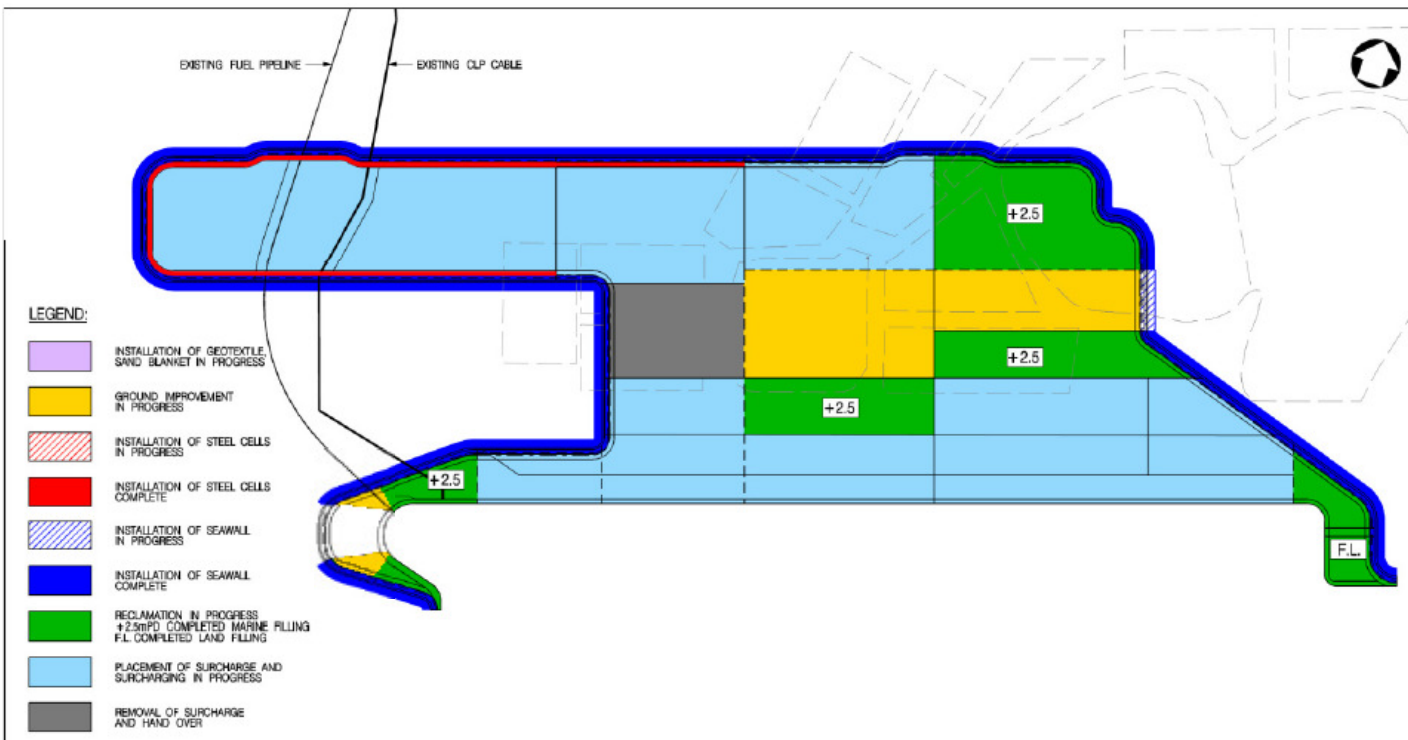
MONTH 21 TO MONTH 24

Snapshot for end of 2017 Q3



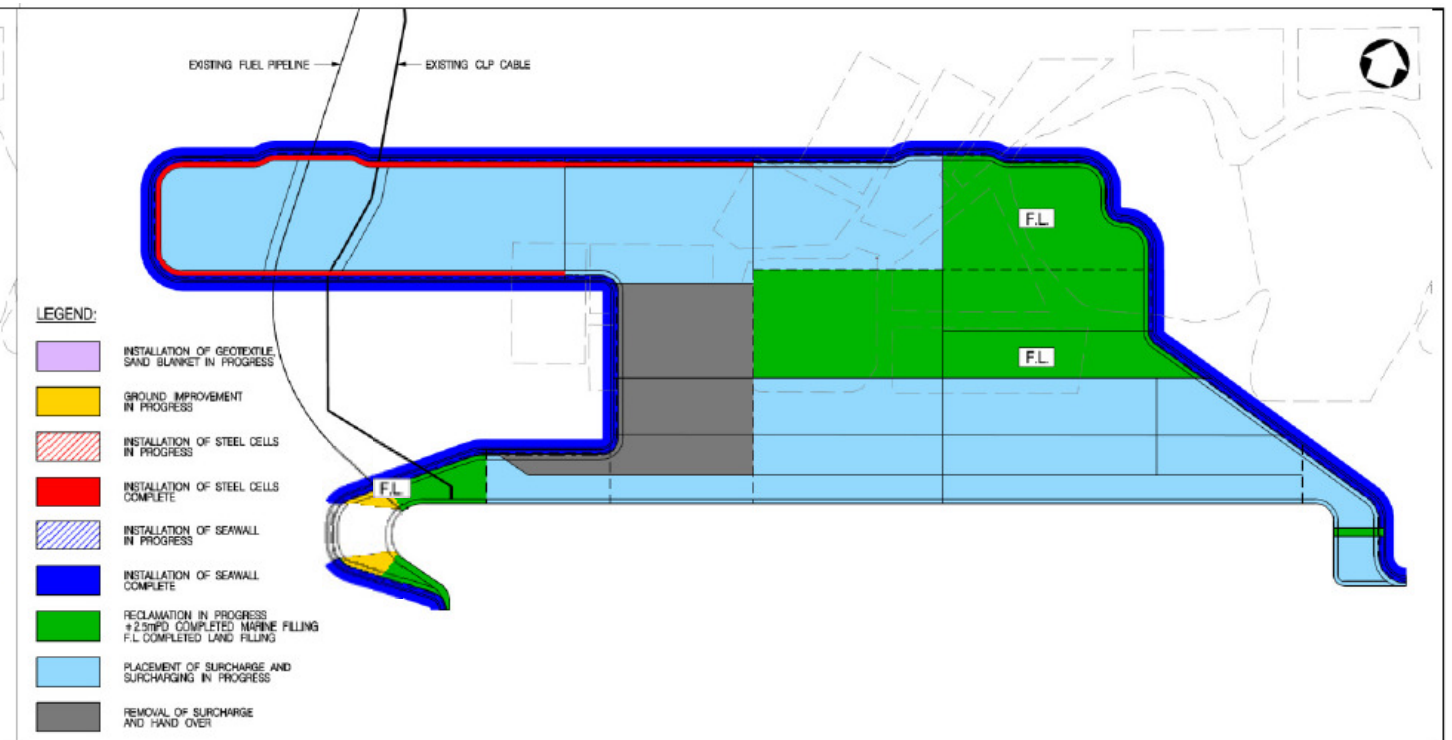
MONTH 24 TO MONTH 27

Snapshot for end of 2017 Q4



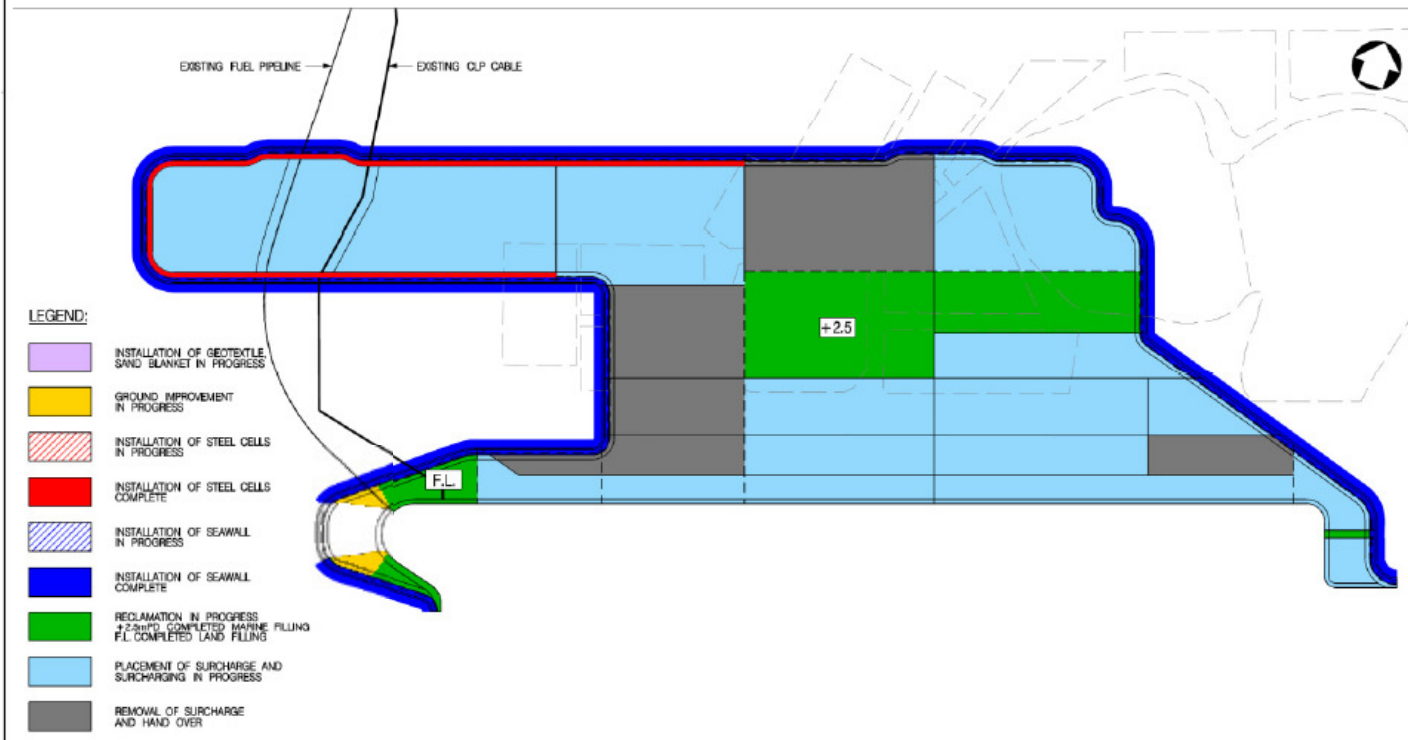
MONTH 27 TO MONTH 30

Snapshot for end of 2018 Q1



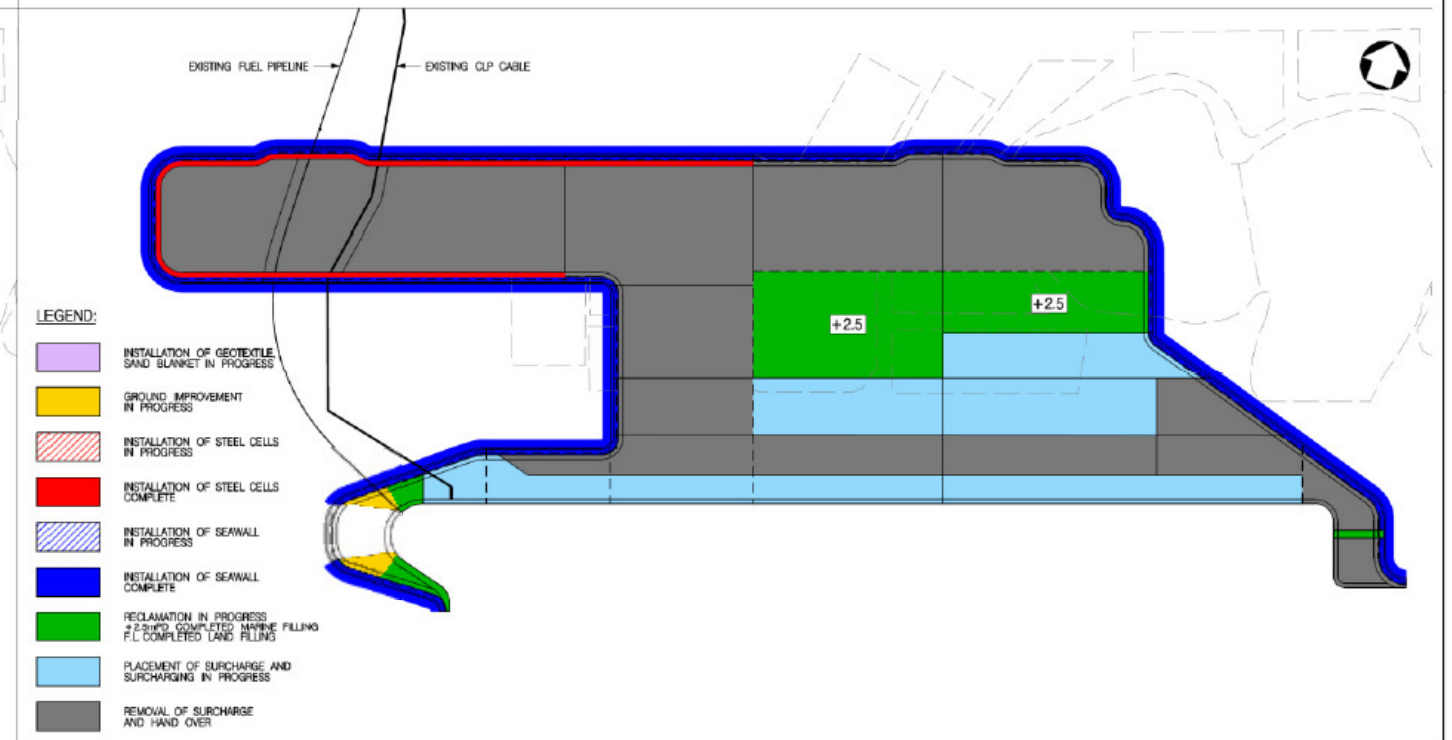
MONTH 30 TO MONTH 33

Snapshot for end of 2018 Q2



MONTH 33 TO MONTH 36

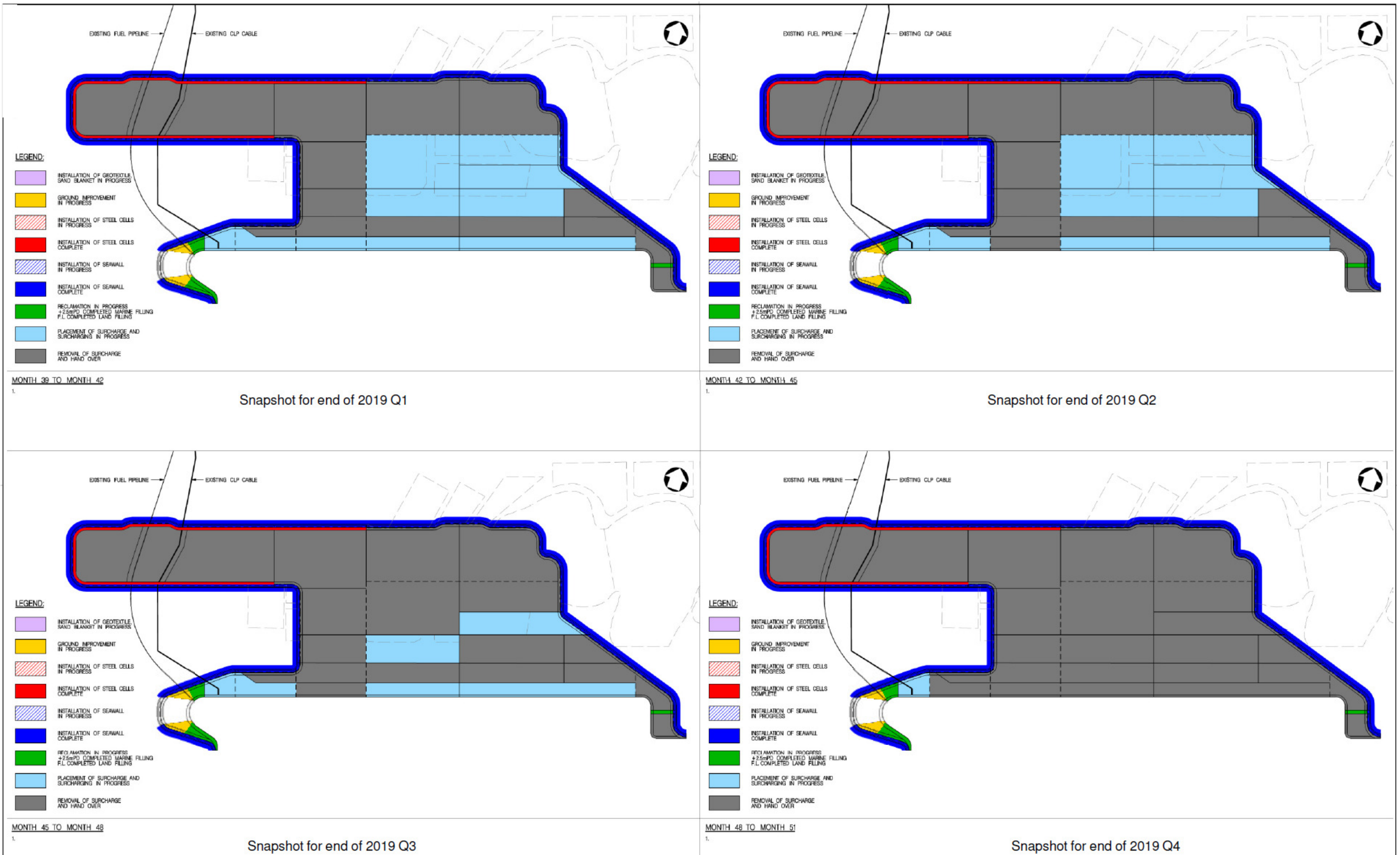
Snapshot for end of 2018 Q3

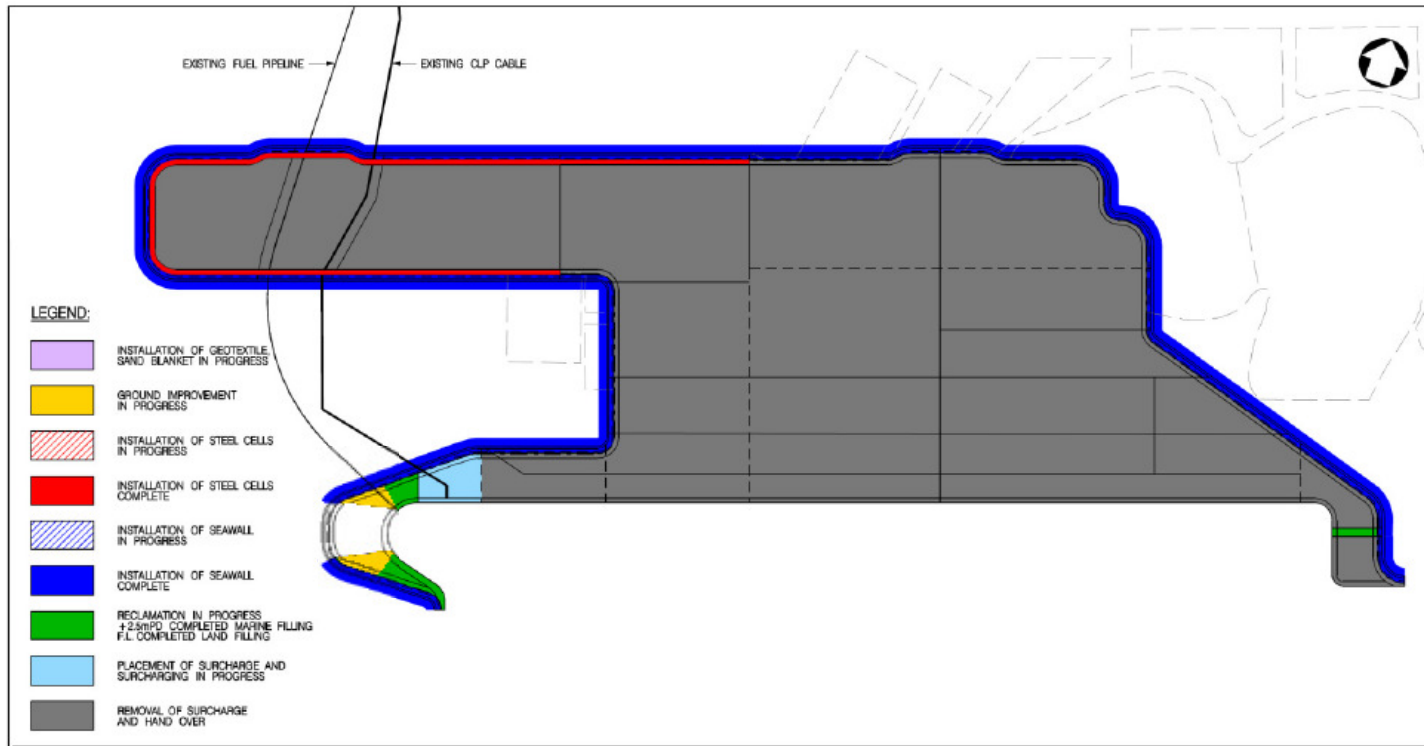


MONTH 36 TO MONTH 39

Snapshot for end of 2018 Q4

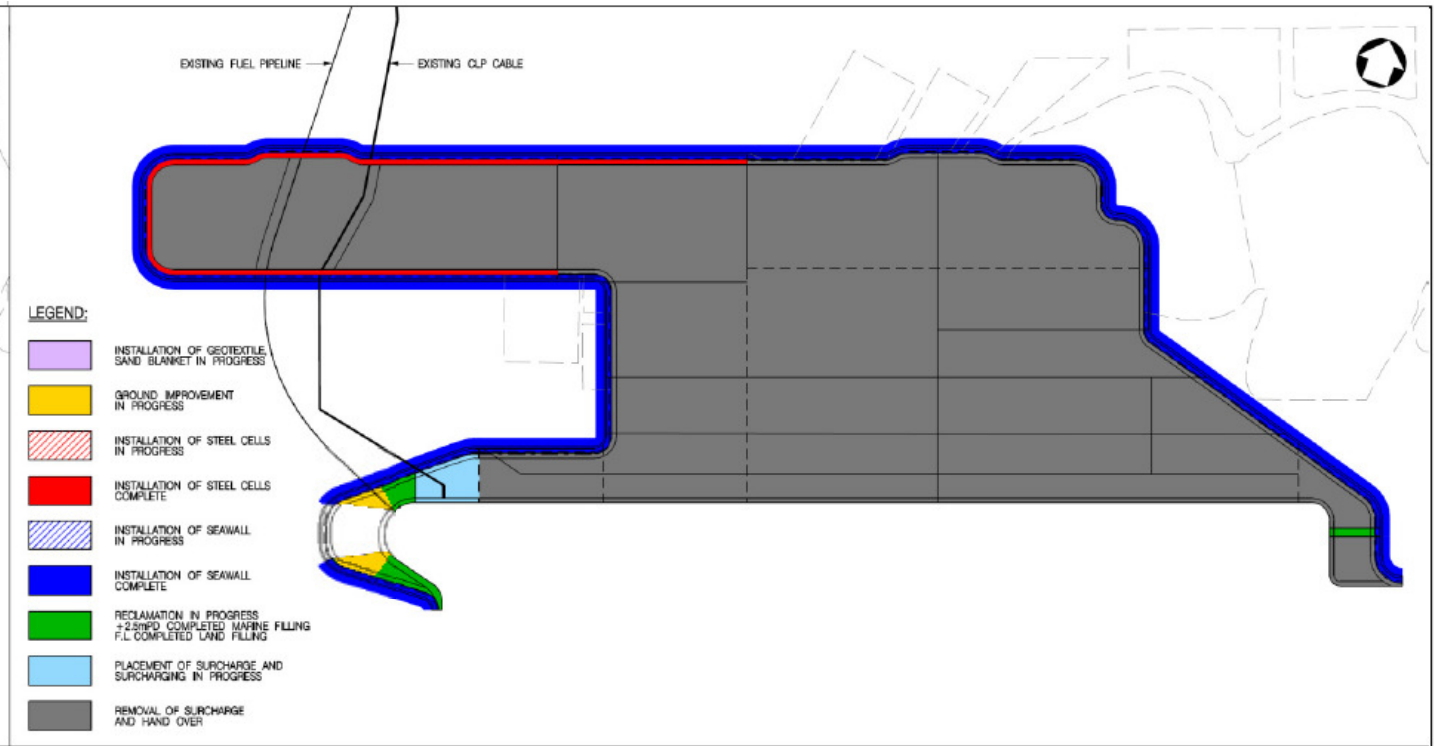






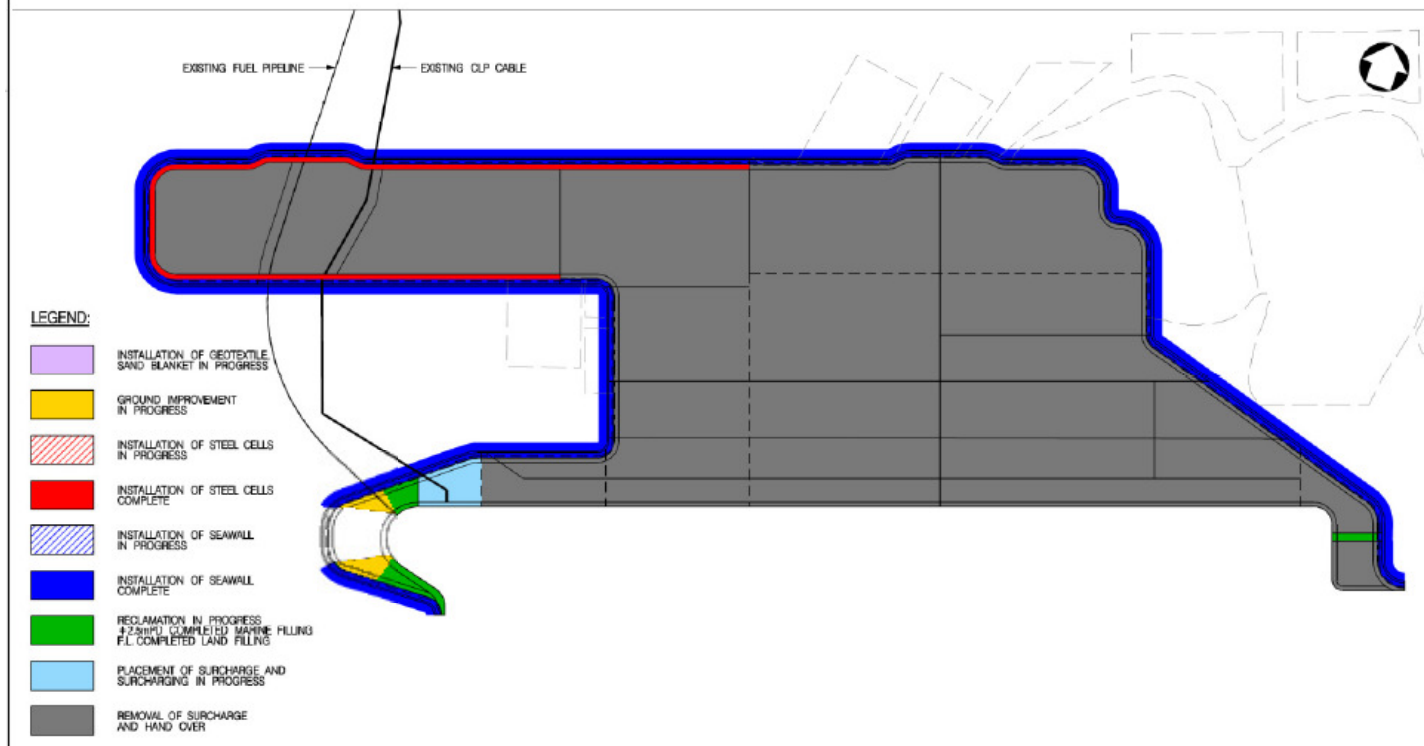
MONTH 51 TO MONTH 54

Snapshot for end of 2020 Q1



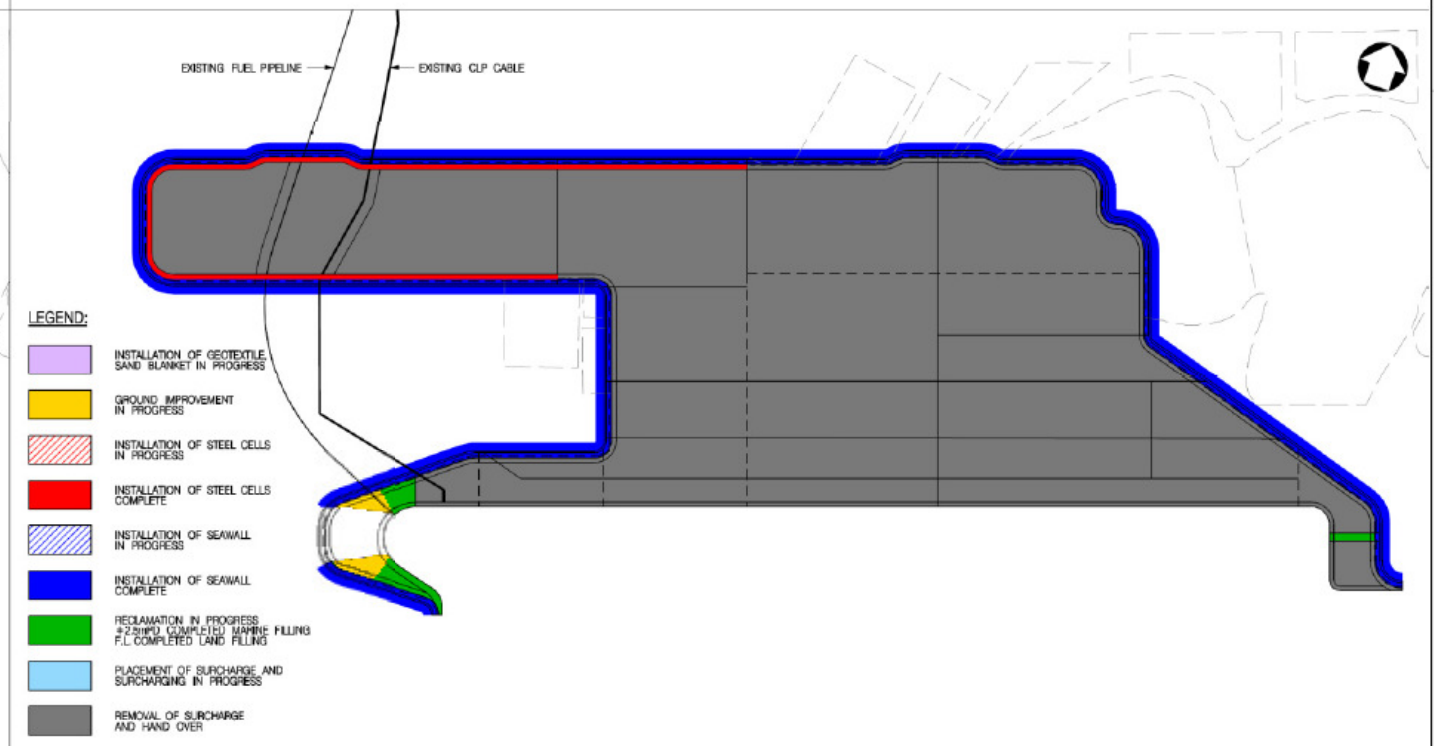
MONTH 54 TO MONTH 57

Snapshot for end of 2020 Q2



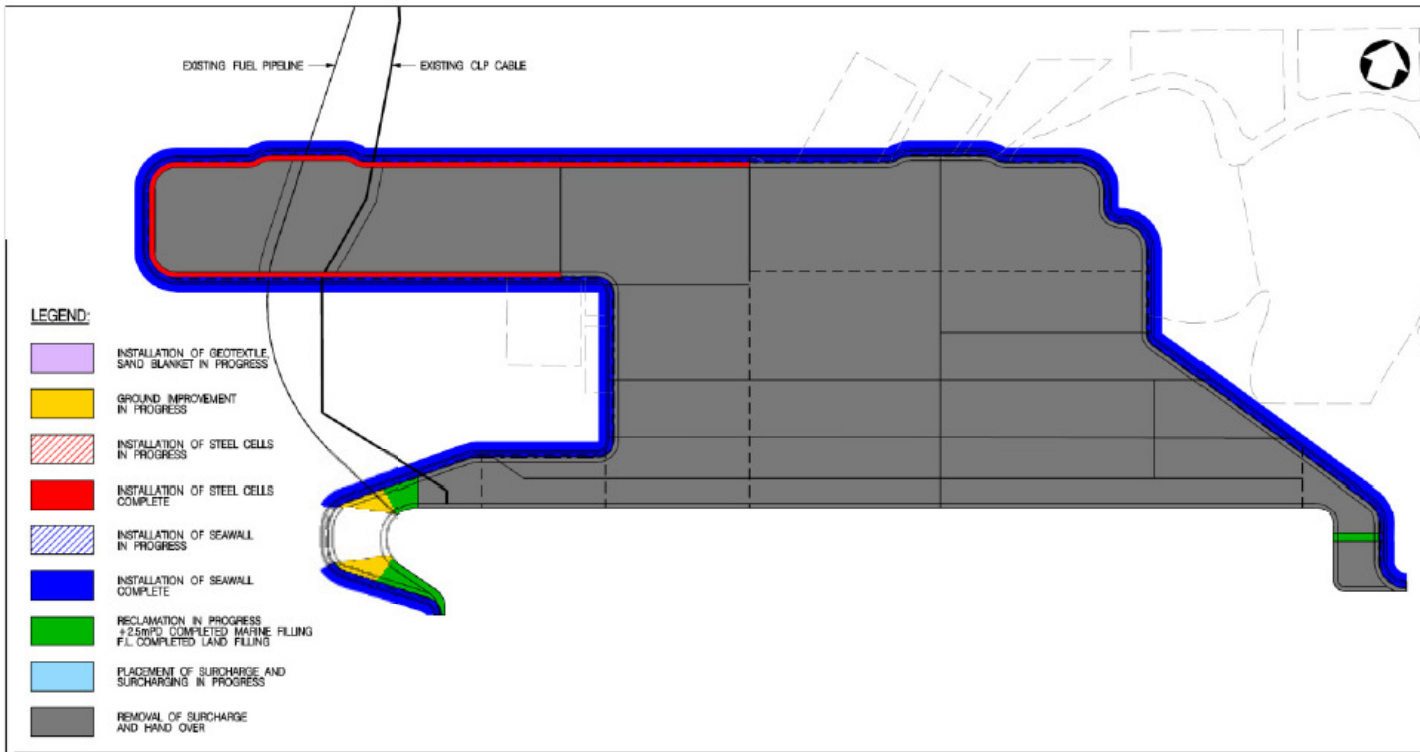
MONTH 57 TO MONTH 60

Snapshot for end of 2020 Q3



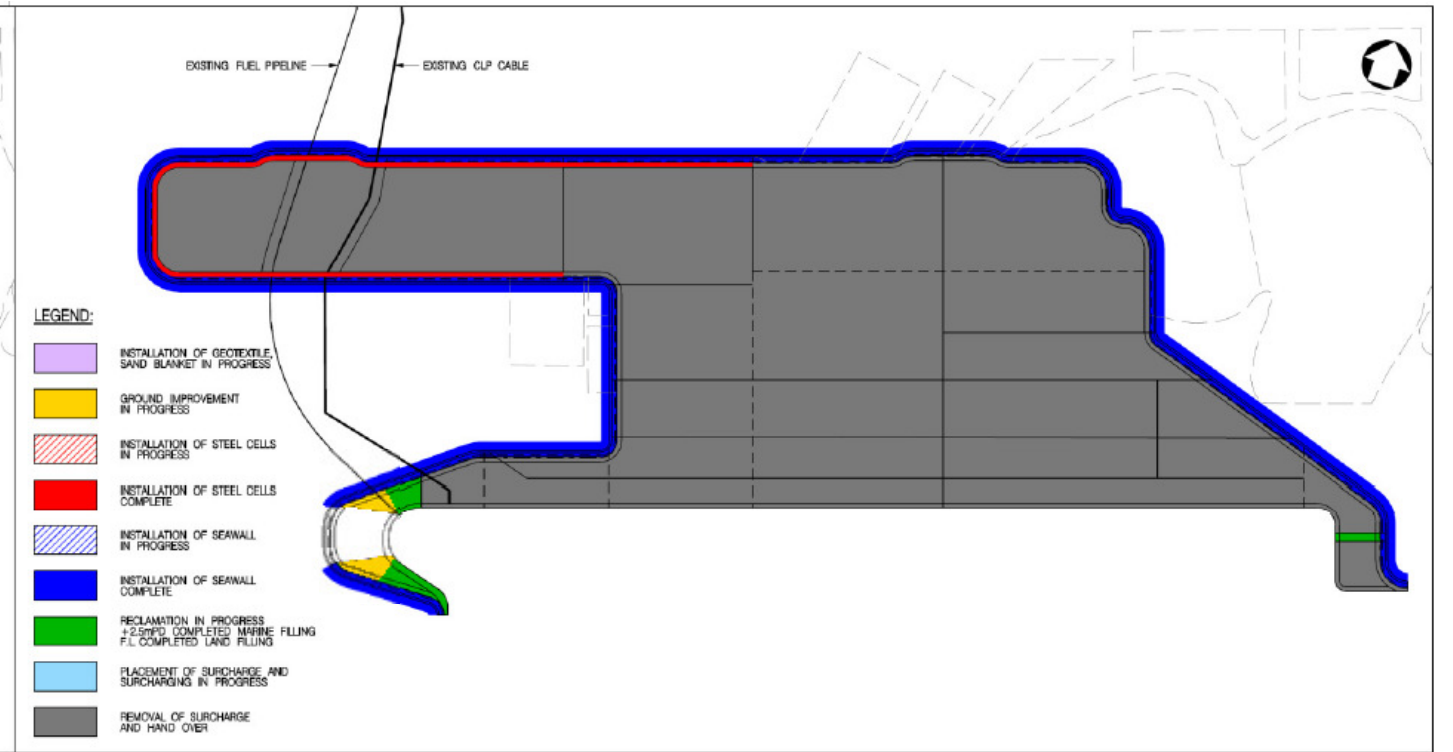
MONTH 60 TO MONTH 63

Snapshot for end of 2020 Q4



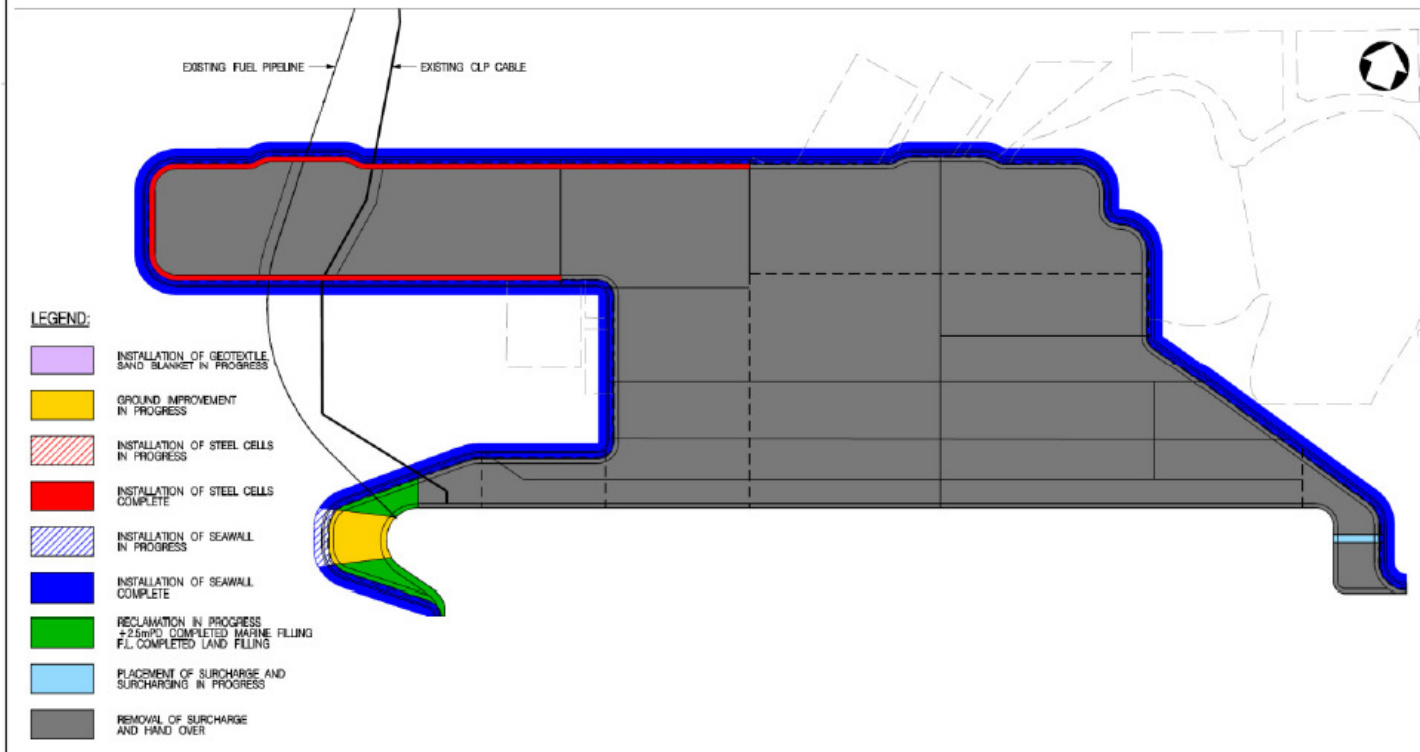
MONTH 65 TO MONTH 66  
1.

Snapshot for end of 2021 Q1



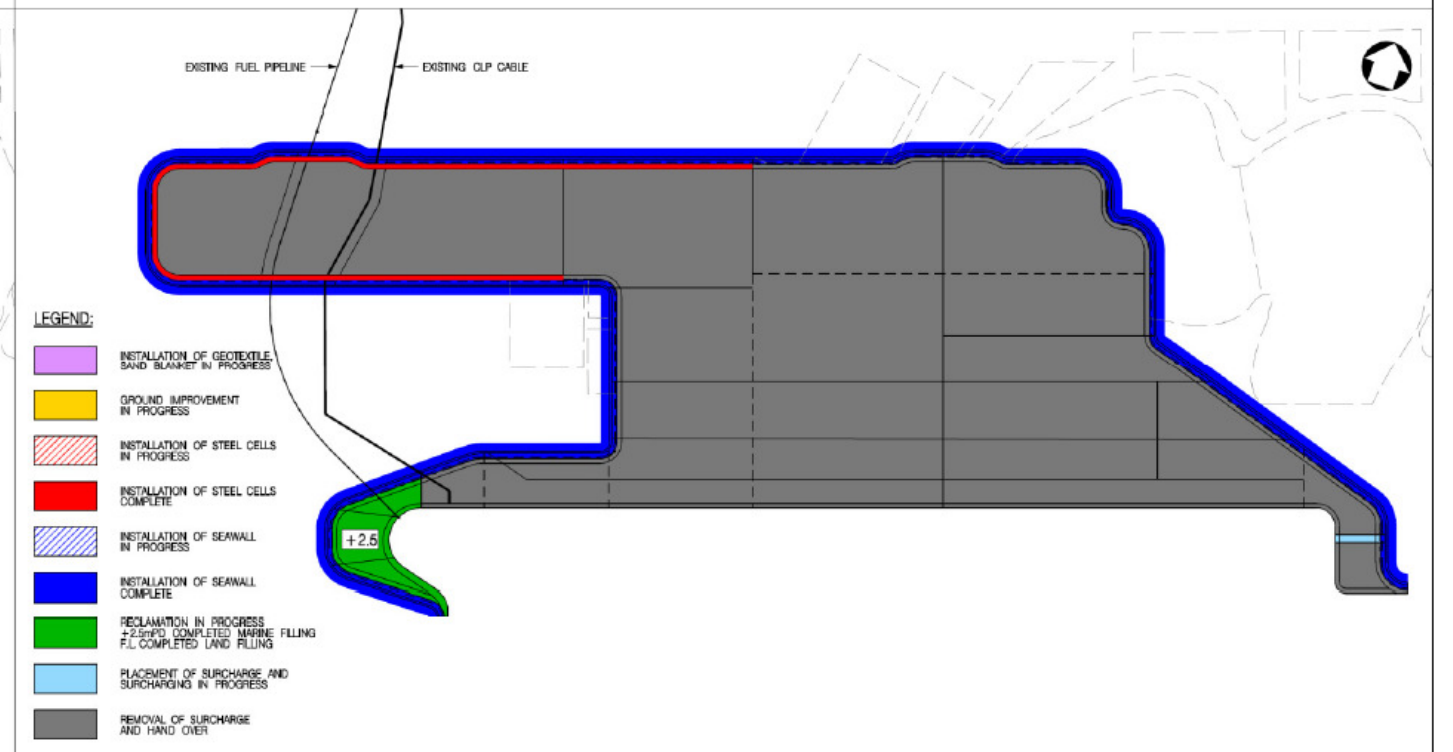
MONTH 66 TO MONTH 69  
1.

Snapshot for end of 2021 Q2



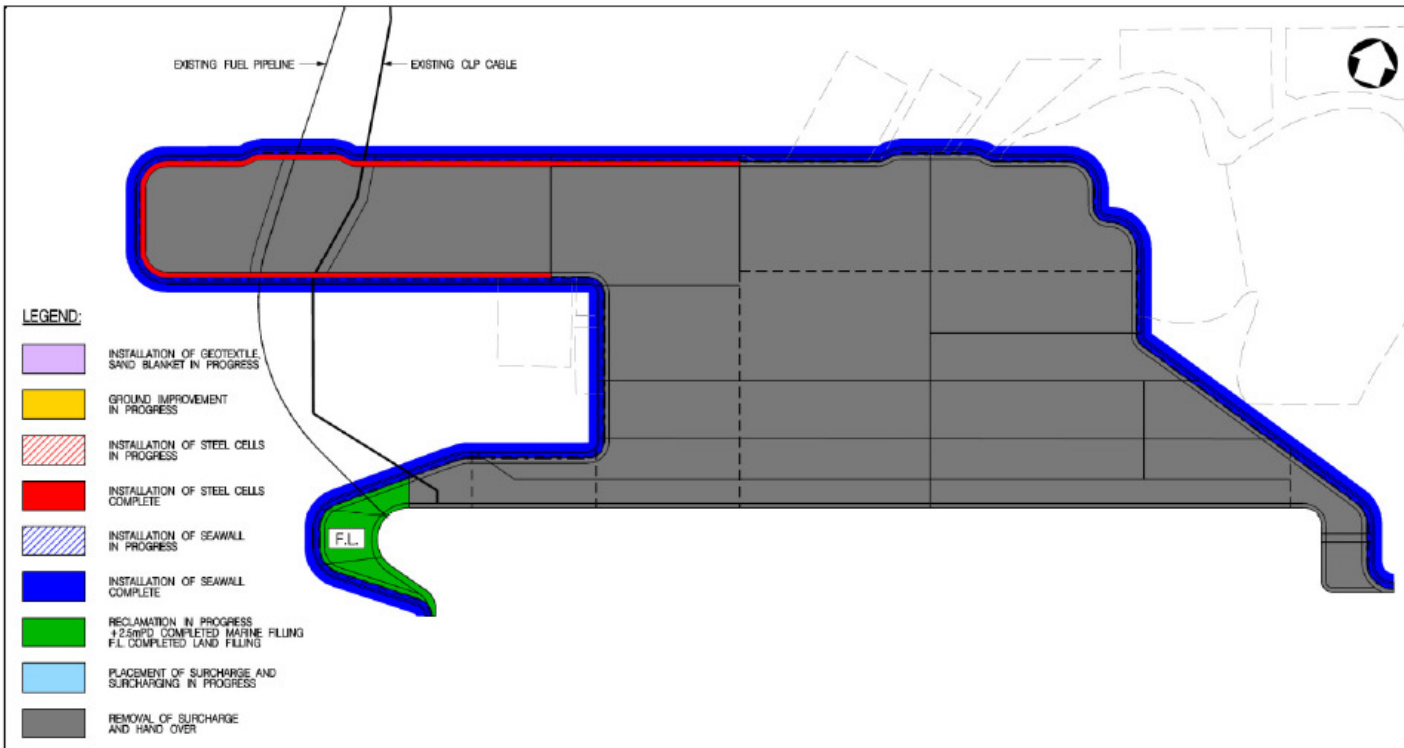
MONTH 69 TO MONTH 72  
1.

Snapshot for end of 2021 Q3



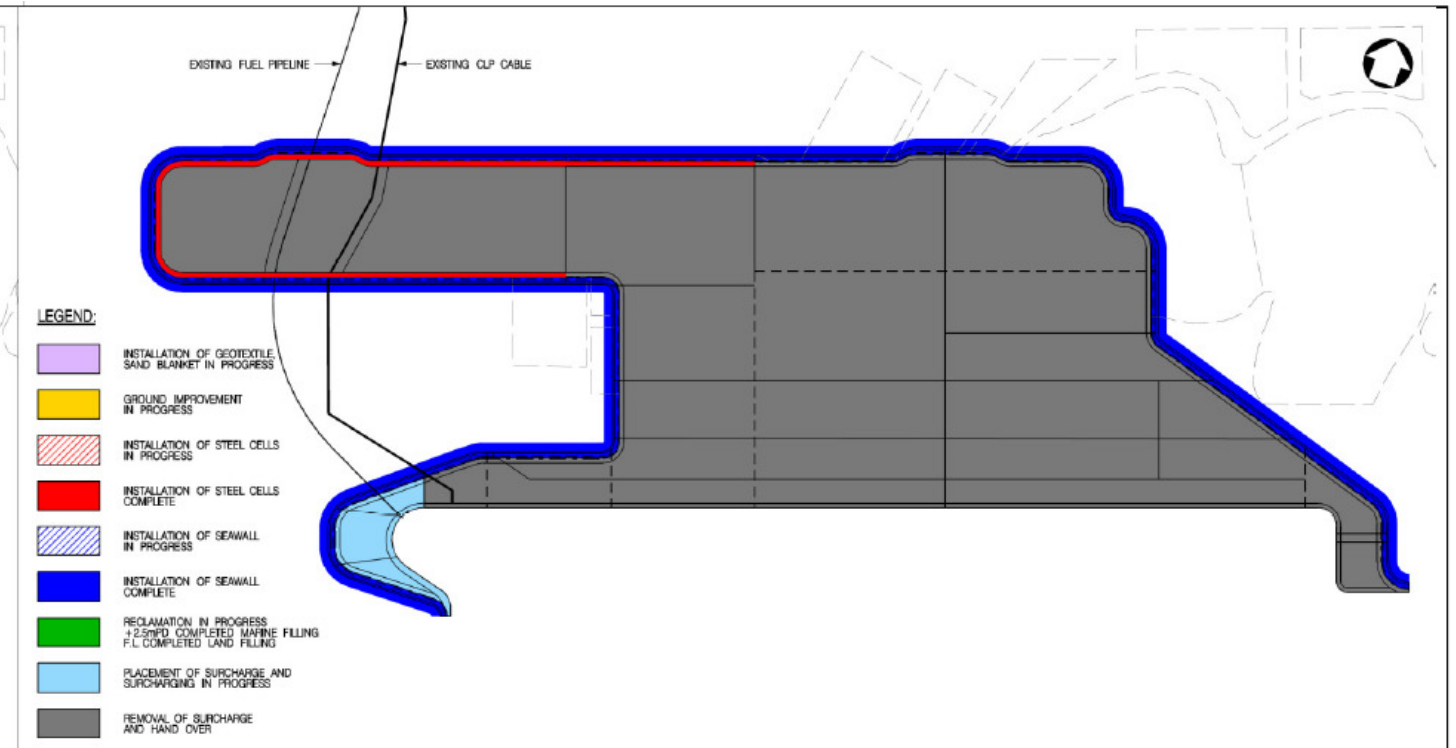
MONTH 72 TO MONTH 75  
1.

Snapshot for end of 2021 Q4



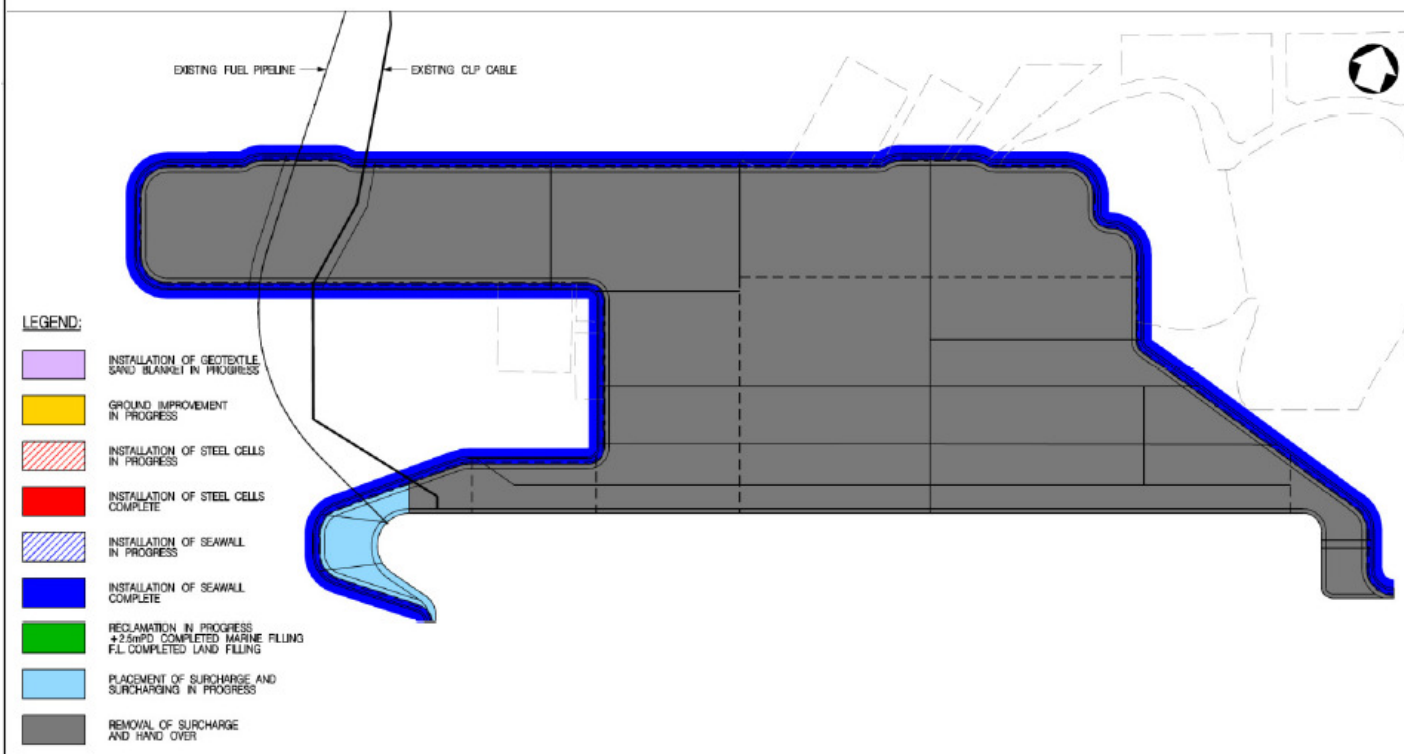
MONTH 75 TO MONTH 78

Snapshot for end of 2022 Q1



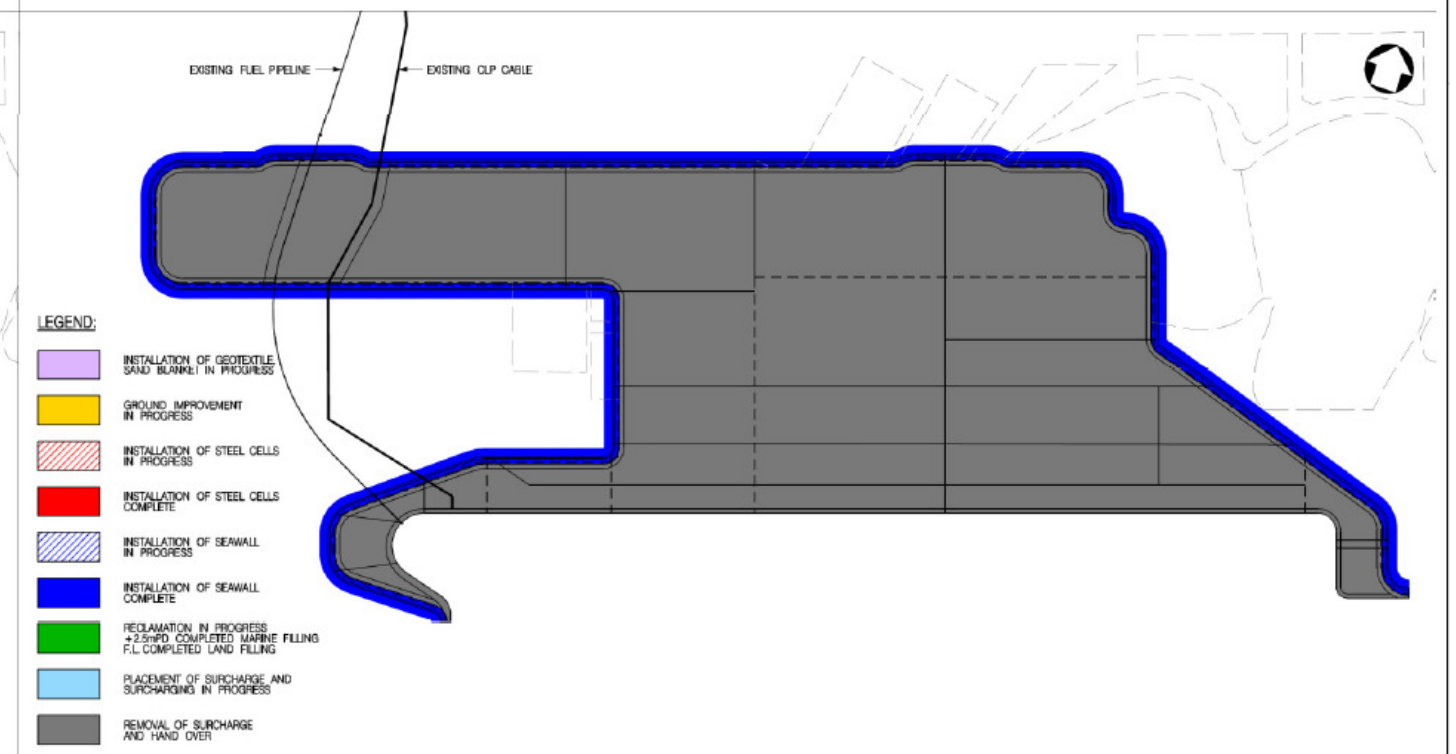
MONTH 78 TO MONTH 81

Snapshot for end of 2022 Q2



MONTH 81 TO MONTH 84

Snapshot for end of 2022 Q3



MONTH 84 TO MONTH 87

Snapshot for end of 2022 Q4