H 00508

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Your Ref : (9) in EP 2/N7/A/52 Pt.17
Our Ref : (CV/2013/08)/M45/200/H00508

28 October 2015

By Hand

Environmental Impact Assessment Ordinance Register Office
Environmental Protection Department
27/F, Southorn Centre,
130 Hennessy Road,
Wanchai, Hong Kong

Attn.: Mr. Charles Pang

Dear Sirs,

Contract No. CV/2013/08
Liantang / Heung Yuen Wai Boundary Control Point
Site Formation and Infrastructure Works – Contract 6

Environmental Permit No. EP-404/2011/C
Condition 2.10 – Habitat Creation and Management Plan (Revision 2)

I refer to your above referenced letter dated 14 September 2015 provided with comments on the submission of Habitat Creation and Management Plan (Revision 1).

With reference to Condition 2.10 of the Environmental Permit (EP) No. EP-404/2011/C for the captioned Project, and on behalf of the Permit Holder, Civil Engineering and Development Department (CEDD), I would like to submit three hard copies of the Habitat Creation and Management Plan (Revision 2) for the Project titled "Liantang / Heung Yuen Wai Boundary Control Point and Associated Works", which had been certified by the ET Leader and verified by the IEC for your approval.

Should you have any queries, please contact the undersigned or our Mr. Perry Yam at 2171 3350.

Yours faithfully,

C T Wong
Chief Resident Engineer
AECOM Asia Co. Ltd.

Encl.

c.c.	CEDD/BCP	- Attn: Mr. Chris Wong / Mr. Steve Lo	- 1 hard copy
	AECOM	- Attn: Mr. Francis Leong / Mr. Pat Lam	- 1 CD copy
	SMEC(IEC)	- Attn: Mr. Antony Wong	- 1 CD copy
	AUES(ET)	- Attn: Mr. T W Tam	- 1 CD copy

CTW/SL/GW/FX/qc

Environmental Permit No. EP-404/2011/C Condition 2.10 – Habitat Creation and Management Plan

Responses to EPD's Comments

Ref.: (9) in EP 2/N7/A/52 Pt.17 dated 14 September 2015

Item	Comments	Responses
1	You propose constructing six ponds in between the bridge foundations instead of providing a mosaic of different habitats including shallow open water and areas with wetland plantings (Fig. 9.28 of the EIA Report). It is noted that the sizes of the ponds are restricted by the distance between the bridge foundations, and as the pond beds are designed to be at +8.50mPD, the banks of the ponds appear to be rather steep. The small ponds bounded by steep banks do not seem to be favorable for wildlife use, and the steep gradients would also pose problem in future management and maintenance. Also, as the steep banks might drain water quickly, it is uncertain if the wetland plantings on the pond bunds would have sufficient water to sustain.	Your comment is noted. The wetland layout has been reviewed and revised. Please refer to the revised Wetland Layout Plan.
2	Please also note the requirement in the EP condition that the Permit Holder shall take into account the recommendations of the EIA Report to set out details of the specifications for the habitats of the EIA Report to set out details of the specifications for the habitats and ecological functions. Please elaborate on the ecological functions provided by the various habitats and the WCA as a whole, and demonstrate that the WCA would contribute to sustaining the aquatic communities such as amphibian and dragonfly species.	The habitats of the proposed wetland area include seven ponds of open water and wetland planting area. The wetland is designed to have a shallow water covering most of the wetland area during the wet season while during the dry months water can still be retained at the lower area of the ponds to sustaining the aquatic communities such as amphibian and dragonfly species year-round and allow their migration within the whole wetland. The ponds are suitable for amphibians to breed and develop larvae. Existing wetland dependent plant species will be planted on the gentle slopes of the ponds while open water will be maintained in the centre of the ponds. Area with vegetation allows safe dispersal, refuge and feeding of the amphibians. Through the openings to the Ping Yuen River, migration of aquatic communities is also expected. In long term the wetland will become an additional area to facilitate a better development of existing local insect and aquatic communities.
3	Please critically review the feasibility of the proposal, review the relevant requirement in the EP and revise the HCMP.	Noted. The wetland layout has been reviewed and revised.
4	Please also see below our detailed comments on the submission: Section 3.3 – The range of groundwater levels at ADH117 described in	Section 3.3 Noted. The range of groundwater levels at ADH117 was from +8.62 to

Item	Comments	Responses
	this section does not tally with the records in Appendix 1. Please check. <u>Section 4 Monitoring Plan</u> - As stated in the EIA Report, the wetland created would be targeted for wetland communities such as wetland associated insects and amphibians. As such, amphibians should be included in the monitoring programme as well. - While noting your response to comment that the management details of the WCA depends on the ecological monitoring and audit results and will be provided at the later stage of the establishment period, please add a note on this in the report. - Please include monitoring of the water level in the ponds. - In addition to the monitoring plan described in the HCMP, please also set action and limit level and responses for the items to be monitored.	10.84mPD. Relevant section is revised accordingly. <u>Section 4</u> - Monitoring of amphibians is included in the monitoring plan. Table 4-4 is updated accordingly. - A paraghare has been added in Section 5. - Monitoring of water level in the wetland is included in the monitoring plan and Table 4-4 is updated accordingly. - Section 4.9 and Table 4-5 are added to specify the performance limits and action plans.
5	<u>Drawing No. 60212563/C6/C00/1021</u> It is noted that the wetland and the planting area also cover the foundation for Bridge D, which is unlikely. Please rectify the plan, and re-confirm the size of the wetland compensation area after excluding the foundation for Bridge D.	Noted. The Wetland Layout Plan is revised. Size of the wetland is 1.52ha including brdige foundation. Size of the wetland is 1.42ha with the areas of the brdige foundation deducted.
6	<u>Appendix 1 Groundwater Monitoring Locations and Results</u> Please provide a plan showing the proposed Wetland Compensation Area and the Groundwater Monitoring Locations to demonstrate the groundwater monitoring results are relevant to the WCA.	Noted. Location of the Piezometer ADH115 and ADH117 are showing in the Wetland Layout Plan.
7	<u>Table 4-1 and Appendix 3</u> There are some other wetland dependent plant species in Appendix 3, such as *Brachiaria mutica* and *Commelina diffusa*. Also, in the footnote of Table 4-1, the full list of flora species should be in Appendix 3.	Noted. Three plants species namely, *Brachiaria mutica, Commelina diffusa,* and *Kyllinga brevifolia*, in Appendix 3 have been identified as wetland dependent plant speicies and added in Table 4-1.

AECOM

Civil Engineering and Development Department

Agreement No. CE 38/2010 (CE)

Liantang/Heung Yuen Wai Boundary Control Point and Associated Works (Site Formation and Infrastructure) – Design and Construction

Habitat Creation and Management Plan

October 2015

(Revision 2)

SMEC
Local People. Global Experience.

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27 October 2015

Our ref: 7076192/L19453/RY/AB/AW/FL/rw
Your ref:

AECOM
8/F, Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, N.T.

By Email & Post

Attention: Mr Simon LEUNG

Dear Sirs

Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Revised Habitat Creation and Management Plan (HCMP)

With reference to the HCMP (Revision 2 dated October 2015) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 2.10 of the Environmental Permit No. EP-404/2011/C.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Mr Francis LEE on tel. 3995 8144 or by email to francis.lee@smec.com.

Yours faithfully
for and on behalf of
SMEC Asia Limited

Antony WONG
Independent Environmental Checker

cc	CEDD/BCP	-	Mr Karl KL Kwan	by fax: 3547 1659
	AECOM	-	Mr Pat LAM / Mr Perry YAM	by email
	AUES	-	Mr TW TAM	by email

ISO 9001:2008 Registered Firm
Certificate No.: Q0022

AUES 安順聯合環境服務及顧問
Action-United Environmental Services & Consulting

Our Ref: TCS00694/13/300/L0018

AECOM
8/f Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, Hong Kong

Attn: Mr. Simon Leung

27 October 2015
By E-mail

Dear Sir,

Re: Agreement No. CE 45/2008 (CE)
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Habitat Creation and Management Plan (Revision 2)

With reference to the Habitat Creation and Management Plan (Revision 2), please note that we have no adverse comments on this submission. We herewith certify the Habitat Creation and Management Plan in accordance with *Condition 2.10* of Environmental Permit (EP) No. EP-404/2011/C.

Should you have any question or require further information, please feel free to contact the undersigned at Tel: 2959-6059 or Fax: 2959-6079 or E-mail: twtam@fordbusiness.com.

Yours sincerely,
For and on Behalf of
Action-United Environmental Services & Consulting

T. W. Tam
Environmental Team Leader
TW/nh

cc SMEC (IEC) Attn: Mr. Antony Wong By e-mail

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1 INTRODUCTION

Background

1.1 The "Liantang/Heung Yuen Wai Boundary Control Point and Associated Works Project" (hereinafter referred to as "the Project") comprises a new Boundary Control Point (BCP) proposed at Liantang/Heung Yuen Wai (LT/HYW), its connecting road and other associated works. The Project comprises the following key components:

- Construction of BCP at the boundary with Shenzhen near the existing Chuk Yuen Village;
- Lin Ma Hang to Frontier Closed Area (FCA) Boundary – this section comprises at-grade and viaducts and includes the improvement works at Lin Ma Hang Road;
- Ping Yeung to Wo Keng Shan – this section stretches from the Frontier Closed Area Boundary to the tunnel portal at Cheung Shan and comprises at-grade and viaducts including an interchange at Ping Yeung;
- North Tunnel – this section comprises the tunnel segment at Cheung Shan and includes a ventilation building at the portals on either end of the tunnel;
- Sha Tau Kok Road – this section stretches from the tunnel portal at Wo Keng Shan to the tunnel portal south of Loi Tung and comprises at-grade and viaducts including an interchange at Sha Tau Kok and an administration building;
- South Tunnel – this section comprises a tunnel segment that stretches from Loi Tung to Fanling and includes a ventilation building at the portals on either end of the tunnel as well as a ventilation building in the middle of the tunnel near Lau Shui Heung; and
- Fanling – this section comprises the at-grade, viaducts and interchange connection to the existing Fanling Highway.

1.2 An Environmental Impact Assessment (EIA) study for the Project was conducted in accordance with EIA Study Brief No. ESB-199/2008. The EIA study concluded that the Project would be environmentally acceptable with the implementation of recommended mitigation measures.

1.3 The EIA Report (Register No.: AEIAR-161/2011) was approved on 24 March 2011 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) was granted on 24 March 2011 (EP No.: EP-404/2011) for the construction and operation of the Project.

1.4 The EIA identified 1.4ha of freshwater wetland habitat loss due to the proposed construction. On the basis of literature review and field surveys, the abandoned wet agricultural land found within the Assessment Area was found only in moderate to low ecological value. Nonetheless, in view of its ecological potential and the ecological significance of cumulative loss of wetland, the loss of freshwater wetland is proposed to be compensated by creation of a freshwater wetland.

1.5 According to Condition 2.10 of the latest Environmental Permit EP No. EP-404/2011/C the Permit Holder shall no later than three months before commencement of construction of the Project, submit to the Director for approval 3 sets of Habitat Creation and Management Plan (HCMP) for the Wetland Compensation Area of an area not less than 1.4 hectares shown in **Figure 2b** of this Permit. The submission shall take into account the recommendations of the EIA Report to set out details of the specifications for the habitats and ecological functions and to define the management and ecological monitoring and audit requirements of the Wetland Compensation Area. Before submission to the Director, the HCMP shall be certified by the ET Leader and verified by the IEC as confirming to the information and recommendations contained in the approved EIA Report.

1.6 AECOM Asia Co. Ltd (AECOM) has been commissioned by the Civil Engineering and Development Department (CEDD) to prepare and submit the Habitat Creation and Management Plan (HCMP).

1.7 This report is to provide the implementation and establishment details for the proposed Wetland Compensation Area (WCA).

Construction Contract Packaging

1.8 To facilitate project management and implementation, the Project will be implemented in the following contract packages: (refer to **Figure 1.0** Project Layout Plan)

- Contract 2 (CV/2012/08)
- Contract 3 (CV/2012/09)
- Contract 4 (TCSS/NE2014/02)
- Contract 5 (CV/2013/03)
- Contract 6 (CV/2013/08)
- Contract 7 (NE/2014/03)

1.9 The details of the contracts are summarized below:

Contract 2	
Contract No.:	CV/2012/08
Contract Name:	Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 2
Contract Period:	The works commenced in December 2013 and will take about 54 months to complete.
Major Scope of Works:	The works include construction of a dual two-lane trunk road (with about 0.4km of at-grade road and 4.8km of tunnel) connecting the Fanling Interchange with the proposed Sha Tau Kok Interchange, provision and installation of ventilation system, E&M works and building services works for Lung Shan tunnel and Cheung Shan tunnel and their portal buildings, Tunnel Administration Building adjacent to Wo Keng Shan Road and associated landscaping works, drainage / sewerage, waterworks, utilities and traffic engineering works.
Contractor:	Dragages Hong Kong Limited

Contract 3	
Contract No.:	CV/2012/09
Contract Name:	Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 3
Contract Period:	The works commenced in July 2013 and will take about 63 months to complete.
Major Scope of Works:	The works include construction of four link roads connecting the existing Fanling Highway with the south portal of the Lung Shan Tunnel, realignment of the existing Tai Wo Service Road West and Tai Wo Service Road East, widening portion of the existing Fanling Highway and the associated works, demolishment of the existing

	vehicular bridge and footbridge at Kiu Tau and reconstruction of the Kiu Tau Footbridge.
Contractor:	Chun Wo Construction and Engineering Company Limited

Contract 4	
Contract No.:	NE/2014/02
Contract Name:	Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 4
Contract Period:	The works are scheduled to commence in Q3 2015.
Major Scope of Works:	The works mainly include provision and installation of Traffic Control and Surveillance System for the connecting road.

Contract 5	
Contract No.:	CV/2013/03
Contract Name:	Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 5
Contract Period:	The works commenced in April 2013 and will take about 24 months to complete.
Major Scope of Works:	The works include site formation of about 23 hectares of land for the development of the new Boundary Control Point (BCP), diversion/modification of Lin Ma Hang Road, landscaping works, drainage/sewerage, waterworks, utilities and traffic engineering works.
Contractor:	Sang Hing Civil - Richwell Machinery JV

Contract 6	
Contract No.:	CV/2013/08
Contract Name:	Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 6
Contract Period:	The works commenced in June 2015 and will take about 40 months to complete.
Major Scope of Works:	The works include construction of a 4.6km long dual two-lane trunk road (with about 0.6km at grade roads, 3.3km viaducts and a 0.7km tunnel) connecting Sha Tau Kok Road Interchange to BCP, and the associated environmental mitigation measures, landscaping, drainage/sewerage, waterworks and utilities works.
Contractor:	CRBC-CEC-KADEN Joint Venture

Contract 7	
Contract No.:	NE/2014/03
Contract Name:	Liantang/ Heung Yuen Wai Boundary Control Point Site Formation

	and Infrastructure Works - Contract 7
Contract Period:	The works are scheduled to commence in Q3 2015.
Major Scope of Works:	The works include construction of the Hong Kong Special Administrative Region (HKSAR) portion of four vehicular bridges and one pedestrian bridge crossing Shenzhen (SZ) River (cross boundary bridges).

2 PROPOSED COMPENSATION ON WETLAND IN THE EIA REPORT

Impact on Ecologically Sensitive Wetland

2.1 According to the EIA Report, Section 9.7.6, the wetland habitat to be lost as a result of this Project is identified as freshwater wetland (mainly the abandoned wet agricultural land) only. Unlike the wetland ecosystem in the northwest New Territories, the wetland habitat found within the Works Area comprises no fishpond or intertidal mudflat and therefore the inhabiting wetland community is less diverse and lower in fauna abundance. For the river crossing section, the Connecting Road is constructed in the form of viaduct so that no permanent deck over structure and no channelization and training works are required. Also, the proposed piers or abutments of the viaduct will not encroach on the existing watercourse.

2.2 According to Table 9.67 of the EIA Report, 1.4ha of freshwater wetland habitat loss was identified.

Compensation on Wetland

2.3 According to the EIA Report, Section 9.8, loss of this type of habitat was identified in Loi Tung, Wo Keng Shan and Nga Yiu Ha area. All the potentially affected freshwater wetlands are derived from wet agriculture and grown with thick herbs, predominantly *Hedychium coronarium*. The habitats are lack of active management and some are seasonally dry generally not regarded optimal habitat for wetland-dependent birds. Freshwater wetland is generally considered as having ecological value for sustaining aquatic community such as amphibian and dragonfly species. On the basis of literature review and field surveys, the abandoned wet agricultural land found within the Assessment Area was found only in moderate to low ecological value. Nonetheless, in view of its ecological potential and the ecological significance of cumulative loss of wetland, the loss of freshwater wetland is proposed to be compensated by creation of a freshwater wetland. Taking into consideration the existing situation of the habitats affected, the wetland created would be targeted for wetland communities in general (e.g. wetland associated insects and amphibians) instead of wetland-dependent birds in particular.

2.4 The Wetland Compensation Area (WCA) will be provided near the affected habitat as far as possible for the purpose of on-site mitigation. The low-lying area contiguous with River Ganges near Ping Yeung Interchange is proposed as a potential location for provision of compensation wetland (preliminary indicative boundary and conceptual layout plan of the WCA refer to **Figure 9.27** and **9.28** respectively). Details of the Wetland Compensation Plan (WCP) would be formulated and provided under a Habitat Creation and Management Plan during the detailed design stage.

3 HABITAT CREATION AND MANAGMENT

3.1 The proposed Wetland Compensation Area (WCA) near the Ping Yeung Interchange adjacent to a section of Ping Yuen River was adopted. **Drawings No. C6/C00/1021-GW and C6/C00/1021-PA** and site photos in **Appendix 1** show the layout of the area and current site condition.

3.2 A wetland with approximately 1.42ha in area within the boundary of the potential Wetland

Compensation Area proposed in the EIA Report was identified. Within the Area seven numbers of water ponds will be created between viaduct columns with various sizes by re-contour the wetland area. The water ponds were designed to receive water supply from groundwater, rainfall and Ping Yuen River. The location of the WCA is contiguous with existing river channel which enables a potential ecological linkage between the river and the wetland. With water, silt, plant, seeds and aquatic lives being washed into the ponds, a self-sustaining wetland habitats would be created.

3.3 Water is the major element of the wetland habitats. The ponds are designed with rainfall and infiltration of ground water as the main sources of water supply. Granular material with filter layer is designed at the pond bed to enable infiltration of groundwater. Groundwater Level monitoring at GI No. ADH115 and ADH117 were conducted in 2012 and 2013. Monitoring location and results are shown in **Appendix 1**. Groundwater levels at ADH115 ranged from +9.38 to +11.43mPD, while levels at ADH117 ranged from +8.62 to +10.84mPD. Pond beds are designed at a level of +8.00mPD to 8.50mPD to ensure groundwater infiltration throughout the year. Sufficient fall will be made in the proposed Wetland area to ensure rainfall to be collected by the ponds. To enable water supply from Ping Yuen River (River Ganges) and establishment of linkage between the River and the Wetland, several openings for the ponds will be constructed. Survey of the River bed was conducted on 20 August 2015 and the levels are shown in the **Drawing No. C6/C00/1021-GW**. Monitoring of the water level will be conducted on a monthly basis during the coming dry season from October 2015 to March 2016.

3.4 Since the WCA is designed to be self-sustainable in long term and it is expected invertebrate species such as dragonfly nymph and amphibians will recolonize the created wetland and develop a stable population in the WCA, only seeds of nearby native plants would be collected and deposited in the wetland area to facilitate wetland habitat establishment. Maturation of the wetland through self-generation required a longer period than vegetation planting, however, the system will be much more resilient. Wetland dependent vegetation identified in the survey conducted on 25 August 2015 shown in **Table 4-1** will be planted on the seasonal water level fluctuation area, in case self-generation of vegetation is not satisfaction, to be defined after a year round water level monitoring to be conducted from October 2015 to September 2016.

3.5 The habitats of the proposed wetland area include seven ponds of open water and wetland planting area. The wetland is designed to have a shallow water covering most of the wetland area during the wet season while during the dry months water can still be retained at the lower area of the ponds to sustaining the aquatic communities such as amphibian and dragonfly species year-round and allow their migration within the whole wetland. The ponds are suitable for amphibians to breed and develop larvae. Existing wetland dependent plant species will be planted on the gentle slopes of the ponds while open water will be maintained in the centre of the ponds. Area with vegetation allows safe dispersal, refuge and feeding of the amphibians. Through the openings to the Ping Yuen River, migration of aquatic communities is also expected. In long term the wetland will become an additional area to facilitate a better development of existing local insect and aquatic communities.

3.6 Shrubs and native herb species will be planted around the wetland boundary and within the area without granular material. Location of planting is shown in the **Drawing No. C6/C00/1021-PA**.

3.7 To maximum sunlight reaching the wetland habitats, no tree will be planted within and immediately adjacent to the wetland area.

3.8 Water retaining capacity of the created ponds will reduce the risk of flooding in the subject area.

3.9 To maintain the integrity of the wetland and to avoid any trespass/unauthorized activates railing will be constructed along the footpath next to the wetland. Where the boundary are not demarcated and protected by the railing and Ping Yuen River, a 1.8m high wire mesh fence will be provided to prevent unsupervised public access. During the construction phase, temporary fencing would be provided to demarcate the wetland area.

4 MONITORING PLAN

4.1 Ecological monitoring at implementation and establishment periods will be conducted to cover the ecological attributes. Implementation of the wetland will commence within the construction phase after completion of the construction works at Ping Yeung Section. According to EM&A Manual Section 8.3.2.3, monitoring on the WCA will be conducted in implementation and establishment stages. The monitoring would be conducted by the Environmental Team (ET) and supervised by a qualified ecologist (Project Ecologist) who will be formed as a member of the ET.

Baseline Monitoring

4.2 A baseline monitoring was conducted on 25 August 2015 prior to commencement of construction. This will provide the baseline for evaluation of the success for the establishment of the wetland. Findings of the monitoring are summarized in **Table 4-1** to **Table 4-3**.

Table 4-1 Summary of Baseline Monitoring – Wetland Dependent Species

Common Name	Scientific Name	中文名	Abundance
Water Hyssop [(1)]	*Bacopa monnieri*	假馬齒莧	++
Blunt Signal-grass [(1)]	*Brachiaria mutica*	巴拉草, 爬拉草	+++
Taro [(1)]	*Colocasia esculenta*	芋	++
Diffuse Day-flower [(1)]	*Commelina diffusa*	節節草	+++
Laxspiculate Galingale [(1)]	*Cyperus distans*	疏穗莎草, 疏穎莎草	+
Umbrella Plant [(1)]	*Cyperus involucratus Rottb*	風車草	++
Short-leaved Kyllinga [(1)]	*Kyllinga brevifolia*	短葉水蜈蚣	++
Hairy Knotweed [(1)]	*Polygonum barbatum*	毛蓼	++

Notes:
- [(1)]Wetland dependent species.
- A full list of flora species recorded in the area is shown in **Appendix 3**.
- Code for Abundance: +++++=dominant; ++++=abundant; +++=frequent; ++=occasional; +=scarce

Table 4-2 Summary of Baseline Monitoring – Dragonfly

Common Name	Scientific Name	中文名稱	Abundance
Blue Dasher	*Brachydiplax chalybea flavovittata*	藍額疏脈蜻	+
Common Red Skimmer	*Orthetrum pruinosum neglectum*	赤褐灰蜻	+
Wandering Glider	*Pantala flavescens*	黃蜻	+++++
Pied Skimmer	*Pseudothemis zonata*	玉帶蜻	+
Crimson Dropwing	*Trithemis aurora*	曉褐蜻	++

Note:
Code for Abundance: +++++=dominant; ++++=abundant; +++=frequent; ++=occasional; +=scarce

Table 4-3 Summary of Baseline Monitoring – Butterfly

Common Name	**Scientific Name**	**中文名稱**	**Abundance**
Common Mormon	*Papilio polytes polytes*	玉帶鳳蝶	+
Common Grass Yellow	*Eurema hecabe hecabe*	寬邊黃粉蝶	+
Angled Castor	*Ariadne ariadne alterna*	波蛺蝶	+
Great Egg-fly	*Hypolimnas bolina kezia*	幻紫斑蛺蝶	+
Common Sailer	*Neptis hylas hylas*	中環蛺蝶	+
Common Sergeant	*Athyma perius perius*	玄珠帶蛺蝶	+
Red Ring Skirt	*Hestina assimilis assimilis*	黑脈蛺蝶	+
Note: Code for Abundance: +++++=dominant; ++++=abundant; +++=frequent; ++=occasional; +=scarce			

Monitoring in implementation and establishment stage

4.3 Monitoring in implementation and establishment stage is summarized in the **Table 4-4** and findings of the monitoring would be reported in the Monthly and Quarterly EM&A Reports.

Table 4-4 Summary of Monitoring in Implementation and Establishment Stage

Monitoring Parameters	Frequency
Site Inspection	Weekly
Monitoring of Water level in the ponds	Monthly
Monitoring of Water Quality	Monthly (for in-situ parameters)
	Every six months (for laboratory testing)
Monitoring of Vegetation Cover	Every six months
Monitoring of Dragonflies	Twice per month (April to August) Monthly (September to March)
Monitoring of Butterflies	Monthly
Amphibians	Monthly March to October) Every two Months (November to February)

4.4 Monitoring of Water level in the ponds

Monitoring of water level at the centre of each ponds will be conducted at a monthly basis.

4.5 Monitoring of Water Quality

In-situ water quality will be measured in each pond once per month. The following parameters will be monitored:

- Temperature
- pH

- Dissolved Oxygen
- Turbidity

In addition, every six months (end of the wet season, in September, and end of the dry season, in March) water samples will be collected at each pond and the following parameters will be tested by a HOKLAS laboratory:

- Ammoniacal nitrogen
- Biochemical oxygen demand
- Total oxidized nitrogen
- Total phosphorus
- Total reactive phosphorus (orthophosphate)

4.6 Monitoring of Vegetation Cover

Detailed floristic surveys will be conducted at six monthly intervals at the end of the wet season (September) and the end of the dry season (March). A numbers of 2mx2m quadrats will be used for the survey. Within each quadrat all plant species and their densities will be identified to species-level and estimated respectively. The percentage cover of bare ground, leaf litter cover and coverage by each species will be measured. The tallest height of each plant species will be measured in nearest cm. Any rare or protected species will also be identified.

4.7 Monitoring of Dragonflies and Butterflies

Dragonfly and butterfly utilization of the site will reflect the effectiveness of the wetland and will be useful in assessing the effectiveness of the management strategy. Surveys for dragonflies and butterflies will be undertaken twice per monthly during the peak period of dragonfly emergency in April to August. Monthly monitoring will be conducted during other months. Survey will be conducted during the middle of the day to coincide with the peak flight time for these species. During the surveys a fixed survey route will be followed. All dragonfly species observed will be identified and counted. Dragonfly exuviae will be recorded qualitatively to monitoring breeding success. All butterfly species will be identified and numbers estimated quantitatively or semi-quantitatively.

4.8 Monitoring of Amphibians

Amphibians migrated to the wetland area, breeding and development of larvae will be surveyed. Survey will be conducted on a quarterly basis during both day time and night time. A dip net and bottle-traps may be used depends on the condition by the time of the survey.

Performance Limits and Action Plans

4.9 **Table 4-5** shows the proposed Wetland Quality Performance Limits and the corresponding Contingency Plans. The proposed plans will be reviewed and updated on a quarterly basis by the ER based on the monitoring results and situation of the site in future. Any proposed changes, if necessary, would be agreed with ET, Ecologist and IEC and submitted to relevant Authority for approval.

Table 4-5 Wetland Quality Performance Limits and Contingency Plan

Monitoring Parameters	Action Level	Limit Level	Action
Flooding/storm damage	NA	NA	Discuss among ETL, Ecologist, IEC, ER and the Contractor to review and determine damage. If necessary, ER to review design and agree mitigation measures with ETL, Ecologist and IEC, and the Contractor to undertake repairs/modifications.
Area of water coverage in wet season	<50%	Water in one of the ponds is isolated	**AL**: Double the monitoring frequency. Discuss among ETL, Ecologist, IEC, ER and the Contractor to Identify and review the problem. Action plan for the limit level exceedance should be implemented in case further deterioration is expected.

Monitoring Parameters	Action Level	Limit Level	Action
			LL: Discuss among ETL, Ecologist, IEC, ER and the Contractor to Identify and review the problem. If necessary, ER to review design and agree on mitigation measures with ETL, Ecologist and IEC, and the Contractor to undertake repairs/modifications to establish linkage for all water ponds.
Area of water coverage in dry season	<10%	Water depth in one of the ponds <100mm	**AL**: Double the monitoring frequency. Discuss among ETL, Ecologist, IEC, ER and the Contractor to Identify and review the problem. Action plan for the limit level exceedance should be implemented in case further deterioration is expected. **LL**: Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. If necessary, ER to review design and agree on mitigation measures with ETL, Ecologist and IEC, and the Contractor to undertake repairs/modifications to maintain water level at 100mm.
Monitoring of Water Quality	AL and LL will be established after the wetland formed.		**AL**: Double the monitoring frequency. Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. Action plan for the limit level exceedance should be implemented in case further deterioration is expected. **LL**: Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem and if necessary agree on mitigation measures. The Contractor will be responsible to undertake repairs/modifications to resume the water quality.
Vegetation in permanent open water designed last during dry season	Area >10%	Area >20%	**AL**: Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. Action plan for the limit level exceedance should be implemented in case further deterioration is expected. **LL**: The Contractor will be responsible to remove the vegetation.
Vegetation cover on the seasonal water level fluctuation area	Area <60%	Area <40%	**AL**: Double the monitoring frequency. Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. Action plan for the limit level exceedance should be implemented in case further deterioration is expected. **LL**: Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem, in particular the species of planting. The Contractor will be responsible to undertake supplemental planting.
Monitoring of Dragonflies	Species identified in the baseline monitoring cannot be found in two successive monitoring periods	Species identified in the baseline monitoring cannot be found in four successive monitoring periods	**AL**: Double the monitoring frequency. Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. Action plan for the limit level exceedance should be implemented in case the problem is likely due to the Project works or the design. **LL**: Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. ER/The Contractor to provide feasible mitigation measures in case the problem was due to the Project works. If necessary, ER to review the design and the Contractor to provide necessary modification.
Monitoring of Butterflies	Species identified in the baseline monitoring cannot be found in two successive monitoring periods	Species identified in the baseline monitoring cannot be found in four successive monitoring periods	**AL**: Double the monitoring frequency. Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. Action plan for the limit level exceedance should be implemented in case the problem is likely due to the Project works or the design. **LL**: Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. ER/The Contractor to provide feasible mitigation measures in case the problem was due to the Project works. If necessary, ER to review the design and the Contractor to provide necessary modification.

Monitoring Parameters	Action Level	Limit Level	Action
Amphibians	Not observed	Not observed in two successive monitoring periods	**AL**: Double the monitoring frequency. Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. Action plan for the limit level exceedance should be implemented in case the problem is likely due to the Project works or the design. **LL**: Discuss among ETL, Ecologist, IEC, ER and the Contractor to identify and review the problem. ER/The Contractor to provide feasible mitigation measures in case the problem was due to the Project works. If necessary, ER to review the design and the Contractor to provide necessary modification.

5 IMPLEMENTATION PROGRAMME

5.1 The wetland would be constructed after completion of the construction works at Ping Yeung Section. The implementation stage would firstly include about two years for construction of the wetland. After construction, about twelve months would be required for the establishment of wetland habitats.

5.2 The management details of the WCA depends on the ecological monitoring and audit results and will be provided at the later stage of the establishment period.

5.3 After establishment stage, AFCD will be responsible of the maintenance and the monitoring works.

5.4 Connection details between the wetland and the river bank would be submitted to DSD for approval prior the construction.

6 CONCLUSION

6.1 1.4ha of freshwater wetland habitat loss was identified in the EIA Report. On the basis of literature review and field surveys, the abandoned wet agricultural land found within the Assessment Area was found only in moderate to low ecological value. Nonetheless, in view of its ecological potential and the ecological significance of cumulative loss of wetland, the loss of freshwater wetland is proposed to be compensated by creation of a freshwater wetland.

6.2 The Permit Holder is therefore required to compensate a freshwater wetland area not less than 1.4 hectares and provide a Habitat Creation and Management Plan (HCMP).

6.3 This is the Habitat Creation and Management Plan (HCMP) provide with detailed information for the implementation and establishment of a 1.42ha in area of freshwater wetland.

Figures

839800 N
842800 N
845800 N
836600 E
SHEUNG SHUI
FANLING HIGHWAY
FANLING
HONG KONG
SHENZHEN
MAN KAM TO ROAD
BOUNDARY OF HKSAR
BOUNDARY OF FRONTIER CLOSED AREA
SHENZHEN SHI
LIN MA HANG ROAD INTERCHANGE
EXTENT OF WORKS IN CONTRACT 5
BCP SITE FORMATION
LIN MA HANG ROAD MODIFICATION
PING CHE ROAD
FANLING HIGHWAY INTERCHANGE
LUNG SHAN TUNNEL
LAU SHUI HEUNG
EXTENT OF WORKS IN CONTRACT 3
SHA TAU KOK ROAD
TRAFFIC CONTROL AND SURVEILLANCE SYSTEM IN CONTRACT 4
PING YEUNG INTERCHANGE
CROSS BOUNDARY BRIDGES (HKSAR PORTION) IN CONTRACT 7
CHEUNG SHAN TUNNEL
EXTENT OF WORKS IN CONTRACT 6
NENT LANDFILL
HEUNG YUEN WAI
SHA TAU KOK ROAD INTERCHANGE
EXTENT OF WORKS IN CONTRACT 2
PAT SIN LENG COUNTRY PARK
REPROVISION OF WO KENG SHAN GARDEN AND PUBLIC TOILET
836600 E

SHENZHEN SHI
NORTH DISTRICT
TAI PO DISTRICT
YUEN LONG DISTRICT
SHATIN DISTRICT
TSUEN WAN DISTRICT

LOCATION PLAN
SCALE 1 : 30000

LEGEND:

UNDERGROUND WORKS

REV. 修訂	DESCRIPTION 內容摘要	D.E.	P.E. CHECKED 審核	DATE 日期

CEDD 土木工程拓展署 Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROJECT LAYOUT PLAN

AECOM

DRG.NO. 圖紙編號 60212563/PLP/001

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 批准人
–	–	–
DRAWN BY 繪圖 ZJ	STATUS 階段	
SCALE 比例 A1 1 : 15000 A3 1 : 30000		
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C

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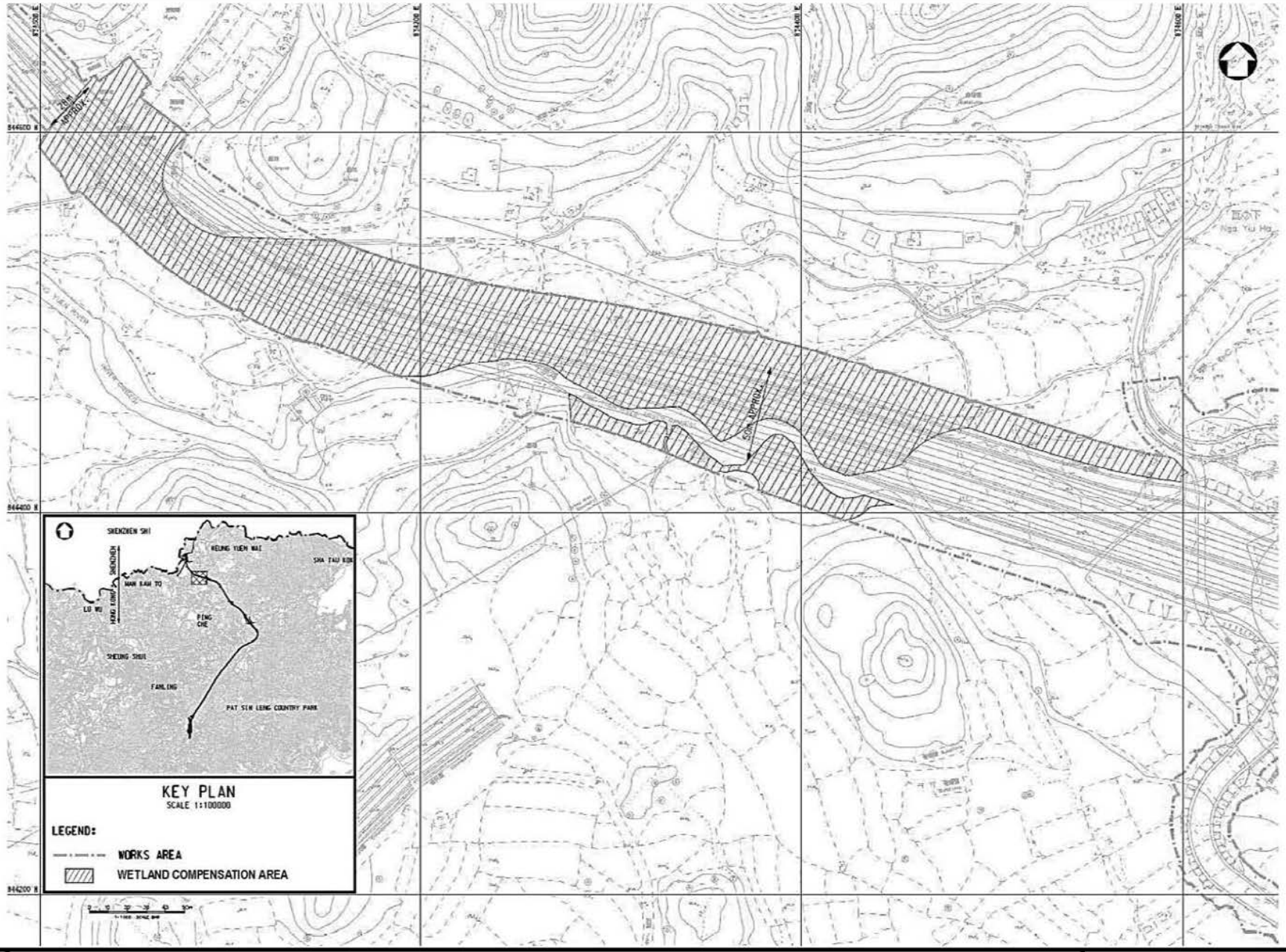


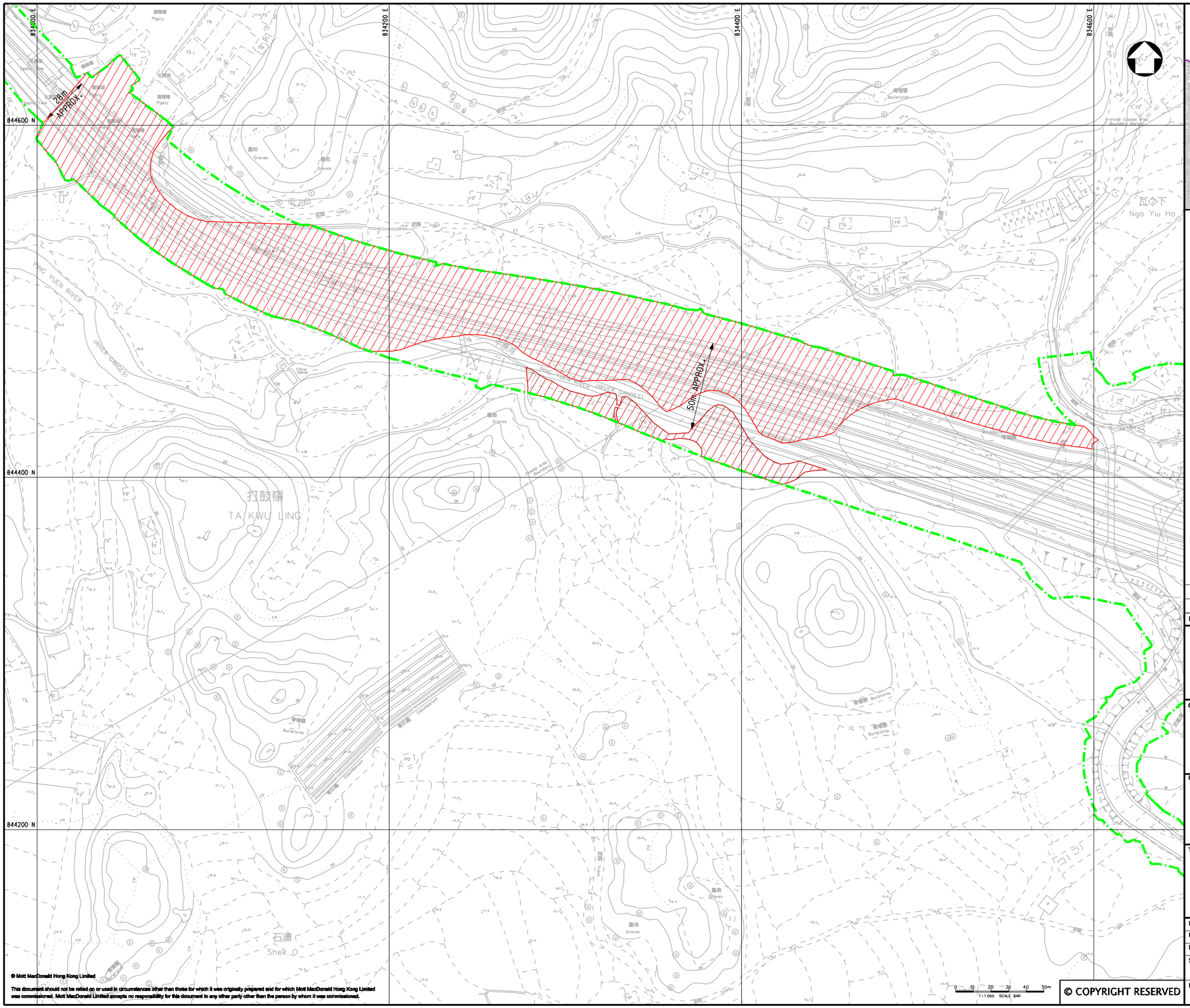
Figure 2b
圖二 b

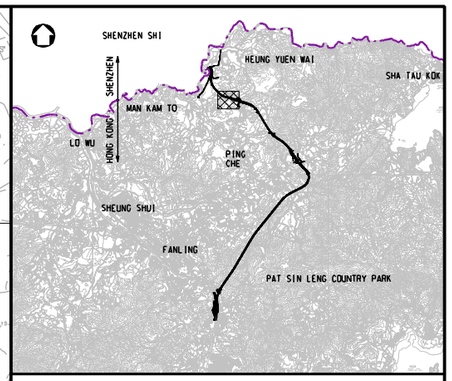
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works (蓮塘／香園圍口岸與相關工程)

Location of Wetland Compensation Area (濕地補償地區位置)

This figure was prepared based on Figure 9.27 of the EIA Report (Register No.: AEIA-161/2011)
本圖是根據環境影響評估報告（登記冊編號：AEIAR-161/2011）圖 9.27 編制

Environmental Permit No. EP-404/2011/C
環境許可證編號 EP-404/2011/C





KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA
- PROPOSED WCA

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	NOV 10	MING	GENERAL REVISION	PW	HT
P1	OCT 10	MING	FIRST ISSUE	PW	HT

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

INDICATIVE BOUNDARY OF THE POTENTIAL WETLAND COMPENSATION AREA

Designed	HY		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	HY		Approved	HT	
Scale at A1	1:1000	Project	255228	Status	PRE
		CAD file	J:\255228\REPORT\ENV\EIA\00115\FIG 9-27.dgn		
Drawing No	FIGURE 9.27			Rev	P2

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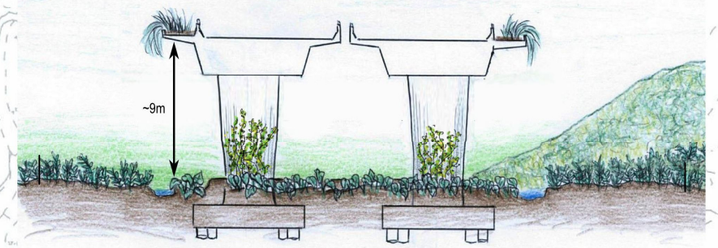
834600 E
834200 E
834400 E
834600 E
844600 N
844400 N
844200 N
Cross-section A
Cross-section B
PING YUEN RIVER
RIVERT CHANNEL)
TA KWU LING
Nga Yiu Ha
Shek O

Cross-section A
Not to Scale



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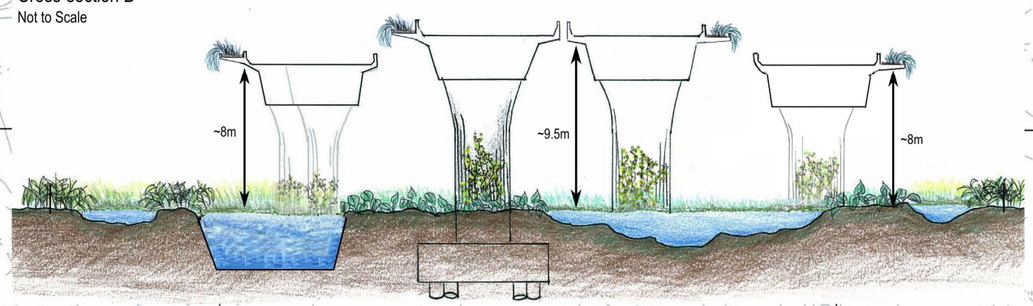

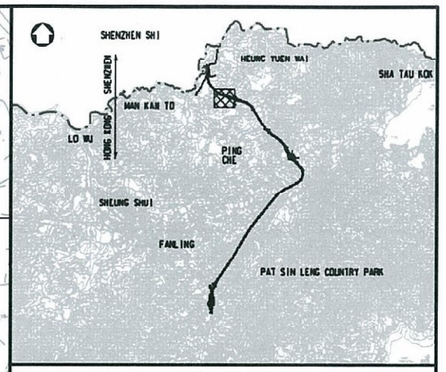

KEY PLAN
SCALE 1:100000

LEGEND:

WORKS AREA

OPEN WATER

INDICATIVE WETLAND PLANTING

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 10	MING	FIRST ISSUE	GC	HT

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CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

CONCEPTUAL PLAN AND TYPICAL CROSS-SECTION VIEWS OF THE PROPOSED WETLAND COMPENSATION AREA

Designed	HY		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	HY		Approved	HT	
Scale at A1	Not to Scale	Project	255228		Status PRE
		CAD file			
Drawing No	FIGURE 9.28				Rev P1

Not to Scale

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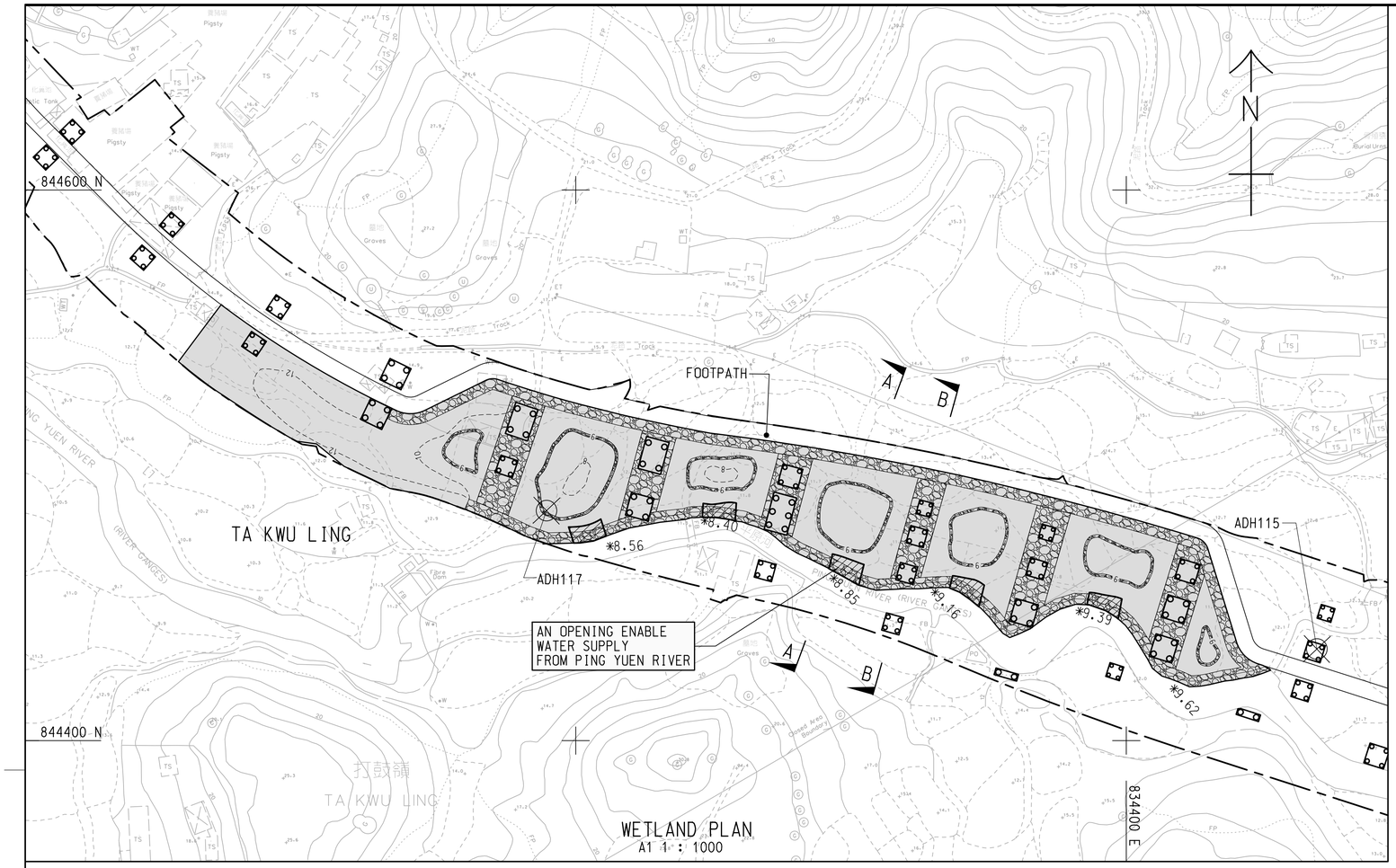
Drawings



WETLAND PLAN
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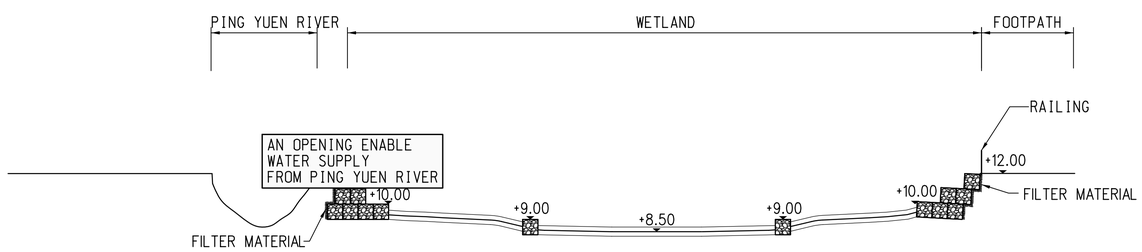

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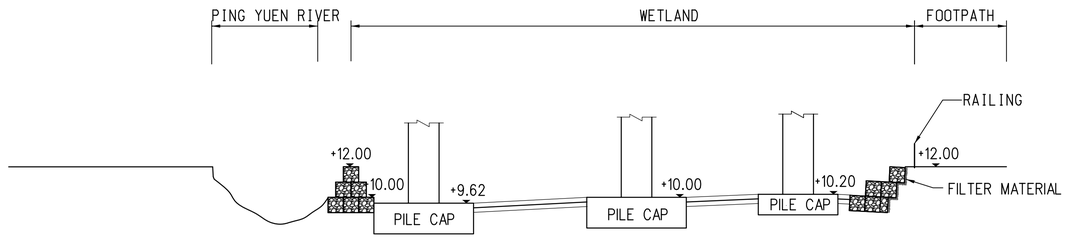

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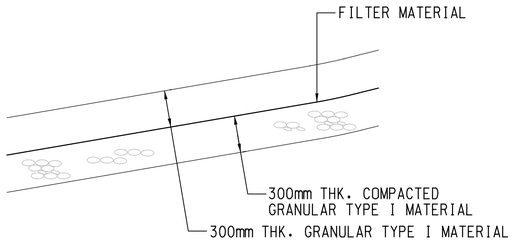

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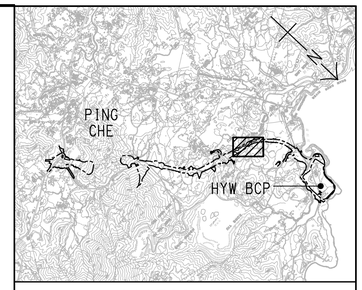

LOCATION PLAN
SCALE 1 : 50000

LEGEND:

- SITE BOUNDARY
- CONTOURS LINE (mPD)
- WETLAND
- FOUNDATIONS FOR BRIDGE D
- *9.62 RIVER BED LEVEL
- GABION WALL
- PIEZOMETER

REV. 修訂	DESCRIPTION 內容摘要	CHECKED 審核	DATE 日期
-	TENDER ADDENDUM NO. 3	WLC KYN	SEP-13

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LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT
SITE FORMATION AND INFRASTRUCTURE WORKS - CONTRACT 6

WETLAND LAYOUT PLAN, SECTION AND DETAILS

AECOM

DRG.NO. 圖紙編號 C6/C00/1021-GW

DESIGNED BY 設計 WLC	CONTRACT NO. 合約編號 CV/2013/08	P. Dir. APPROVED 負責人 JLY
DRAWN BY 繪圖 ZJ	STATUS 階段	
SCALE 比例 A1 AS SHOWN		
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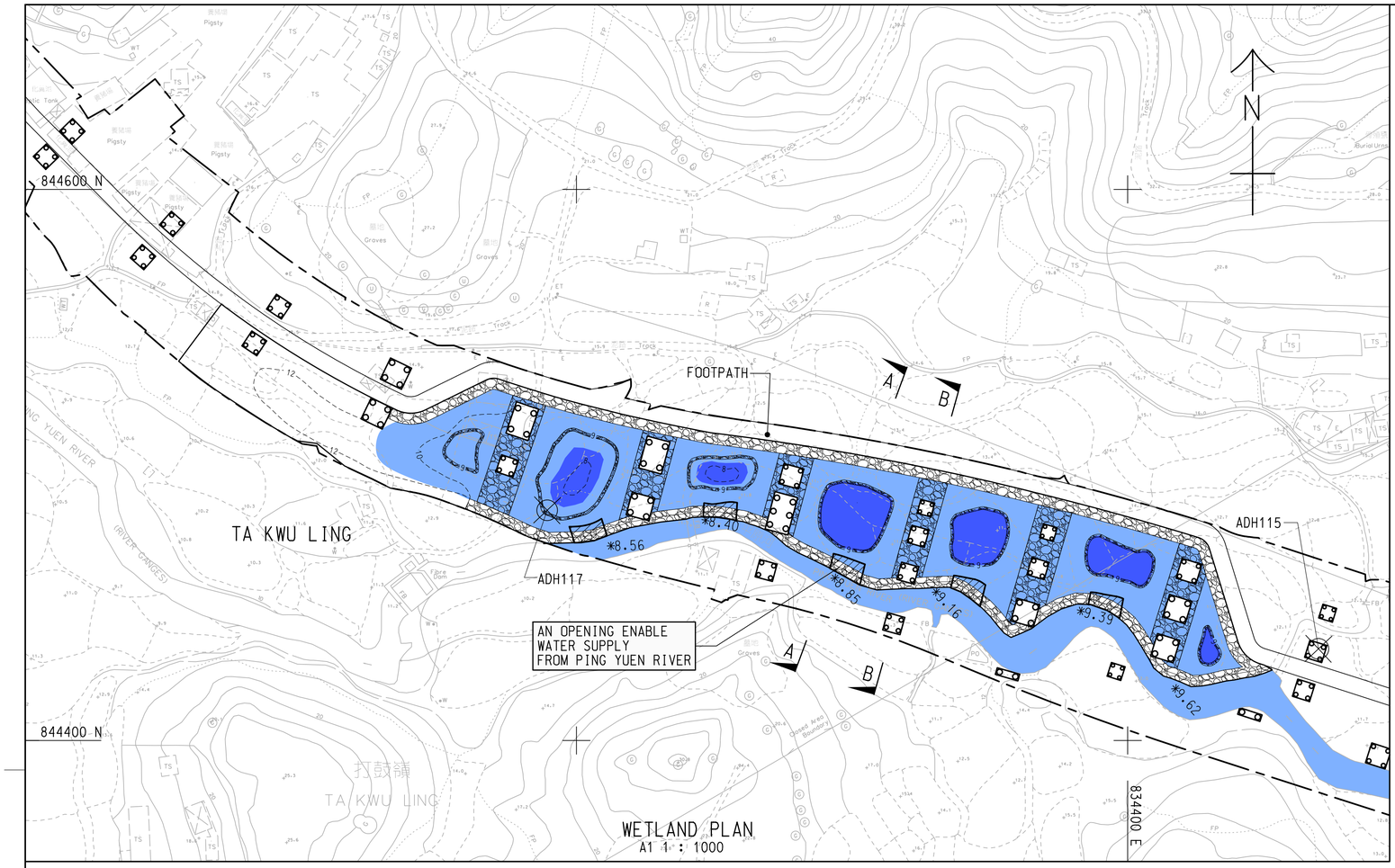

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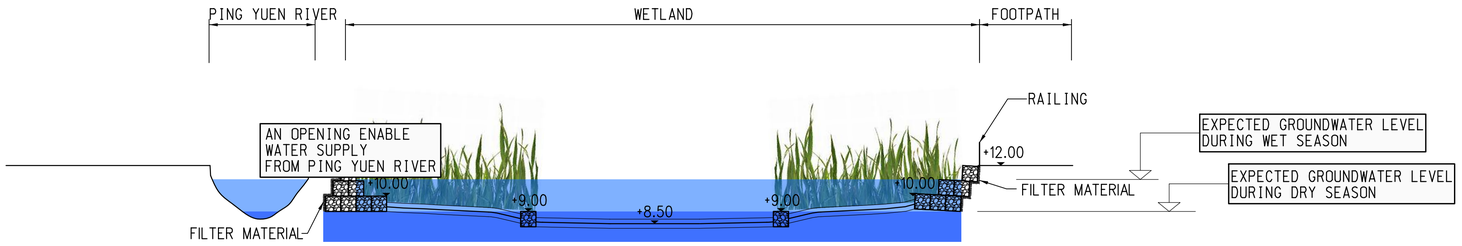

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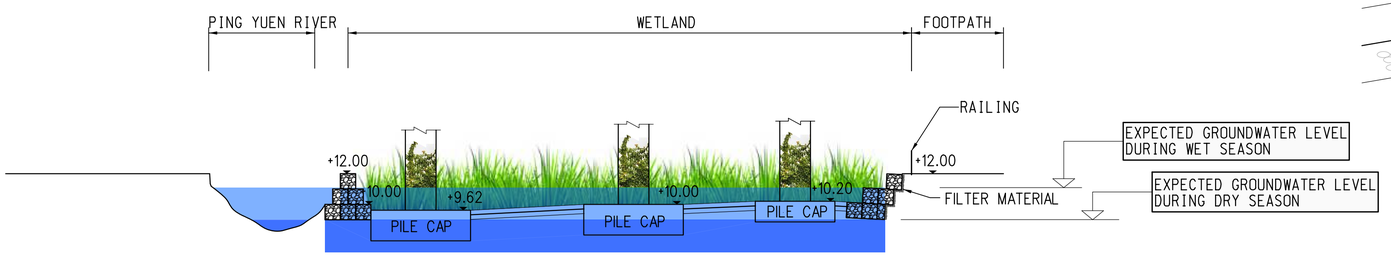

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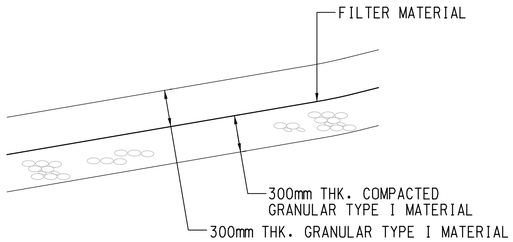
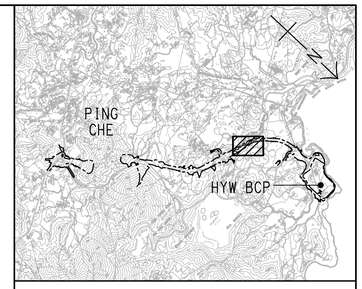


DETAIL OF POND BED
N.T.S



LOCATION PLAN
SCALE 1 : 50000

LEGEND:

- SITE BOUNDARY
- CONTOURS LINE (mPD)
- WETLAND
- FOUNDATIONS FOR BRIDGE D
- *9.62 RIVER BED LEVEL
- GABION WALL
- PIEZOMETER
- OPEN WATER IN WET SEASON
- OPEN WATER IN DRY SEASON
- WETLAND PLANTING

REV. 修訂	DESCRIPTION 內容摘要	D.C.	P.C. CHECKED 審核	DATE 日期
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Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT
SITE FORMATION AND INFRASTRUCTURE WORKS - CONTRACT 6

WETLAND PLANTING ARRANGEMENT

AECOM

DRG.NO. 圖紙編號 C6/C00/1021-PA

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 批准人
WLC	CV/2013/08	JLY
DRAWN BY 繪圖 ZJ	STATUS 階段	
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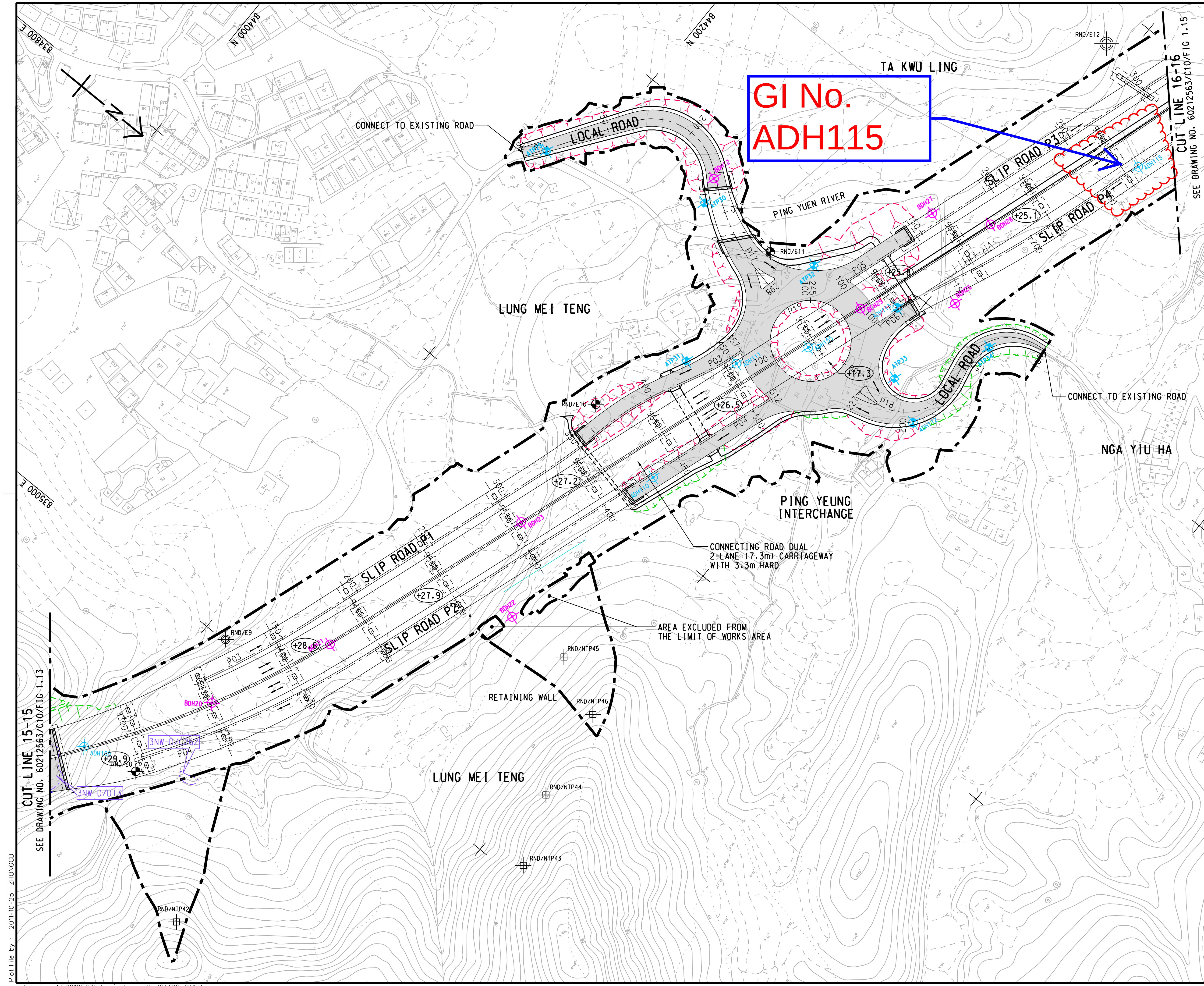
Appendix 1 Groundwater Monitoring Locations and Results



GI No. ADH115
TA KWU LING
CONNECT TO EXISTING ROAD
LOCAL ROAD
PING YUEN RIVER
LUNG MEI TENG
SLIP ROAD P3
SLIP ROAD P4
CUT LINE 16-16
SEE DRAWING NO. 60212563/C10/FIG 1.15
CONNECT TO EXISTING ROAD
NGA YIU HA
PING YEUNG INTERCHANGE
CONNECTING ROAD DUAL 2-LANE (7.3m) CARRIAGEWAY WITH 3.3m HARD
SLIP ROAD P1
SLIP ROAD P2
AREA EXCLUDED FROM THE LIMIT OF WORKS AREA
RETAINING WALL
LUNG MEI TENG
CUT LINE 15-15
SEE DRAWING NO. 60212563/C10/FIG 1.13
834000 N
844000 N
835000 E
833800 E
RND/E12
RND/E11
RND/E10
RND/E9
RND/E8
RND/NTP45
RND/NTP46
RND/NTP44
RND/NTP43
RND/NTP42
3NW-D/DT3
3NW-D/C262
+25.7
+25.8
+17.3
+26.5
+27.2
+27.9
+28.6
+29.9

NOTE:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60212563/C10/FIG 1.1.

REV. 修訂	DESCRIPTION 內容摘要	D.C.	P.C. CHECKED 審核	DATE 日期

土木工程拓展署
CEDD Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

GENERAL LAYOUT (PING YEUNG INTERCHANGE)

SHEET 14 OF 18

AECOM

DRG.NO. 圖紙編號 60212563/C10/FIG 1.14

CHECK BY 設計 -
CONTRACT NO. 合約編號 -
P. Dir. APPROVED 批准人 -
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SCALE 比例 A1 1 : 1000
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Gammon

STANDPIPE / PIEZOMETER MONITORING

CONTRACT NO. : CV/2011/03

HOLE No.

ADH115

Piezometer : P1

Project : Liantang / Heung Yuen Wai Boundary Control Point - Ground Investigation for Site Formation and Infrastructure Works

Project No. :	J3430	**Date of Installation :**	30/05/2012 **(Piezometer)**
Piezometer No. :	ADH115-P1	**Pipe Top Level (mPD) :**	+11.92 **mPD**
Base of Drillhole (mPD) :	-14.40 **mPD**	**Ground Level (mPD) :**	+11.87 **mPD**
Response Zone (m) :	16.80 **To** 19.80 **m**	**Tip Level (mPD) :**	-7.43 **mPD**
Depth of Buckets (if any) :	1.00 **To** 10.00 **m bgl**	**Co-ordinates of Instrument :**	
	at 0.50 **m spacing**	**Easting:** 834469.22	**Northing:** 844433.27
Taken and Reported by :	**W H NG**	**Checked by :**	**T T FUNG**

Date & Time	Ground Water Level		Highest Bucket with Entrapped Water (if any)		Obtained Rainfall (mm) (Ta Kwu Ling)	Remarks
	Depth Below Pipe Top (m)	Elevation (mPD)	Depth Below Pipe Top (m)	Elevation (mPD)		
04/06/2012	1.29	+10.63			0.0	Bucket was installed at 17/07/2012
05/06/2012	1.32	+10.60			0.0	
06/06/2012	1.33	+10.59			0.0	
07/06/2012	1.33	+10.59			0.0	
08/06/2012	1.34	+10.58			0.0	
09/06/2012	1.33	+10.59			39.0	
11/06/2012	1.32	+10.60			15.5	
16/06/2012	1.06	+10.86			28.0	
18/06/2012	0.60	+11.32			16.0	
29/06/2012	1.27	+10.65			2.5	
03/07/2012	1.36	+10.56			0.0	
12/07/2012	1.40	+10.52			0.0	
27/07/2012	0.49	+11.43	1.00	+10.92	14.5	
02/08/2012	1.14	+10.78	1.00	+10.92	0.0	
09/08/2012	1.35	+10.57	1.00	+10.92	1.5	
14/08/2012	1.38	+10.54	1.00	+10.92	0.0	
20/08/2012	1.36	+10.56	1.00	+10.92	0.0	
27/08/2012	1.40	+10.52	2.00	+9.92	0.0	
04/09/2012	1.68	+10.24	1.50	+10.42	6.0	
14/09/2012	1.38	+10.54	1.50	+10.42	0.0	
21/09/2012	1.37	+10.55	1.50	+10.42	0.0	
29/09/2012	1.42	+10.50	1.50	+10.42	0.0	
06/10/2012	1.80	+10.12	2.00	+9.92	0.0	

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Gammon

STANDPIPE / PIEZOMETER MONITORING

CONTRACT NO. : CV/2011/03

HOLE No.

ADH115

Piezometer : P1

Project : Liantang / Heung Yuen Wai Boundary Control Point - Ground Investigation for Site Formation and Infrastructure Works

Project No. :	J3430	**Date of Installation :**	30/05/2012 **(Piezometer)**
Piezometer No. :	ADH115-P1	**Pipe Top Level (mPD) :**	+11.92 **mPD**
Base of Drillhole (mPD) :	-14.40 **mPD**	**Ground Level (mPD) :**	+11.87 **mPD**
Response Zone (m) :	16.80 **To** 19.80 **m**	**Tip Level (mPD) :**	-7.43 **mPD**
Depth of Buckets (if any) :	1.00 **To** 10.00 **m bgl**	**Co-ordinates of Instrument :**	
	at 0.50 **m spacing**	**Easting:** 834469.22	**Northing:** 844433.27
Taken and Reported by :	**W H NG**	**Checked by :**	**T T FUNG**

Date & Time	Ground Water Level		Highest Bucket with Entrapped Water (if any)		Obtained Rainfall (mm) (Ta Kwu Ling)	Remarks
	Depth Below Pipe Top (m)	Elevation (mPD)	Depth Below Pipe Top (m)	Elevation (mPD)		
11/10/2012	1.82	+10.10	2.00	+9.92	0.0	
17/10/2012	1.64	+10.28	2.00	+9.92	0.0	
26/10/2012	1.68	+10.24	2.00	+9.92	4.5	
03/11/2012	1.63	+10.29	2.00	+9.92	0.0	
10/11/2012	1.59	+10.33	2.00	+9.92	0.0	
16/11/2012	1.82	+10.10	2.00	+9.92	0.5	
23/11/2012	1.88	+10.04	2.00	+9.92	40.5	
30/11/2012	1.85	+10.07	2.00	+9.92	5.5	
06/12/2012	1.94	+9.98	2.00	+9.92	0.0	
20/12/2012	2.05	+9.87	2.00	+9.92	0.0	
29/12/2012	2.08	+9.84	2.00	+9.92	10.5	
04/01/2013	2.10	+9.82	2.00	+9.92	0.0	
10/01/2013	2.31	+9.61	2.00	+9.92	0.0	
18/01/2013	2.35	+9.57	2.00	+9.92	0.0	
25/01/2013	2.33	+9.59	2.50	+9.42	0.0	
02/02/2013	2.35	+9.57	2.50	+9.42	0.0	
08/02/2013	2.37	+9.55	2.00	+9.92	0.5	
23/02/2013	2.38	+9.54	2.00	+9.92	0.0	
02/03/2013	2.40	+9.52	2.00	+9.92	1.0	
05/03/2013	2.36	+9.56	2.00	+9.92	0.0	
14/03/2013	2.43	+9.49	2.00	+9.92	0.0	
18/03/2013	2.51	+9.41	2.00	+9.92	0.0	
25/03/2013	2.54	+9.38	2.00	+9.92	0.0#	

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Gammon

STANDPIPE / PIEZOMETER MONITORING

CONTRACT NO. : CV/2011/03

HOLE No.

ADH115

Piezometer : P1

Project : Liantang / Heung Yuen Wai Boundary Control Point - Ground Investigation for Site Formation and Infrastructure Works

Project No. :	J3430	**Date of Installation :**	30/05/2012 **(Piezometer)**
Piezometer No. :	ADH115-P1	**Pipe Top Level (mPD) :**	+11.92 **mPD**
Base of Drillhole (mPD) :	-14.40 **mPD**	**Ground Level (mPD) :**	+11.87 **mPD**
Response Zone (m) :	16.80 **To** 19.80 **m**	**Tip Level (mPD) :**	-7.43 **mPD**
Depth of Buckets (if any) :	1.00 **To** 10.00 **m bgl**	**Co-ordinates of Instrument :**	
	at 0.50 **m spacing**	**Easting:** 834469.22	**Northing:** 844433.27
Taken and Reported by :	**W H NG**	**Checked by :**	**T T FUNG**

Date & Time	Ground Water Level		Highest Bucket with Entrapped Water (if any)		Obtained Rainfall (mm) (Ta Kwu Ling)	Remarks
	Depth Below Pipe Top (m)	Elevation (mPD)	Depth Below Pipe Top (m)	Elevation (mPD)		
02/04/2013	2.48	+9.44	2.00	+9.92	13.3	
12/04/2013	2.32	+9.60	1.50	+10.42	2.1	
18/04/2013	2.31	+9.61	1.50	+10.42	8.2	

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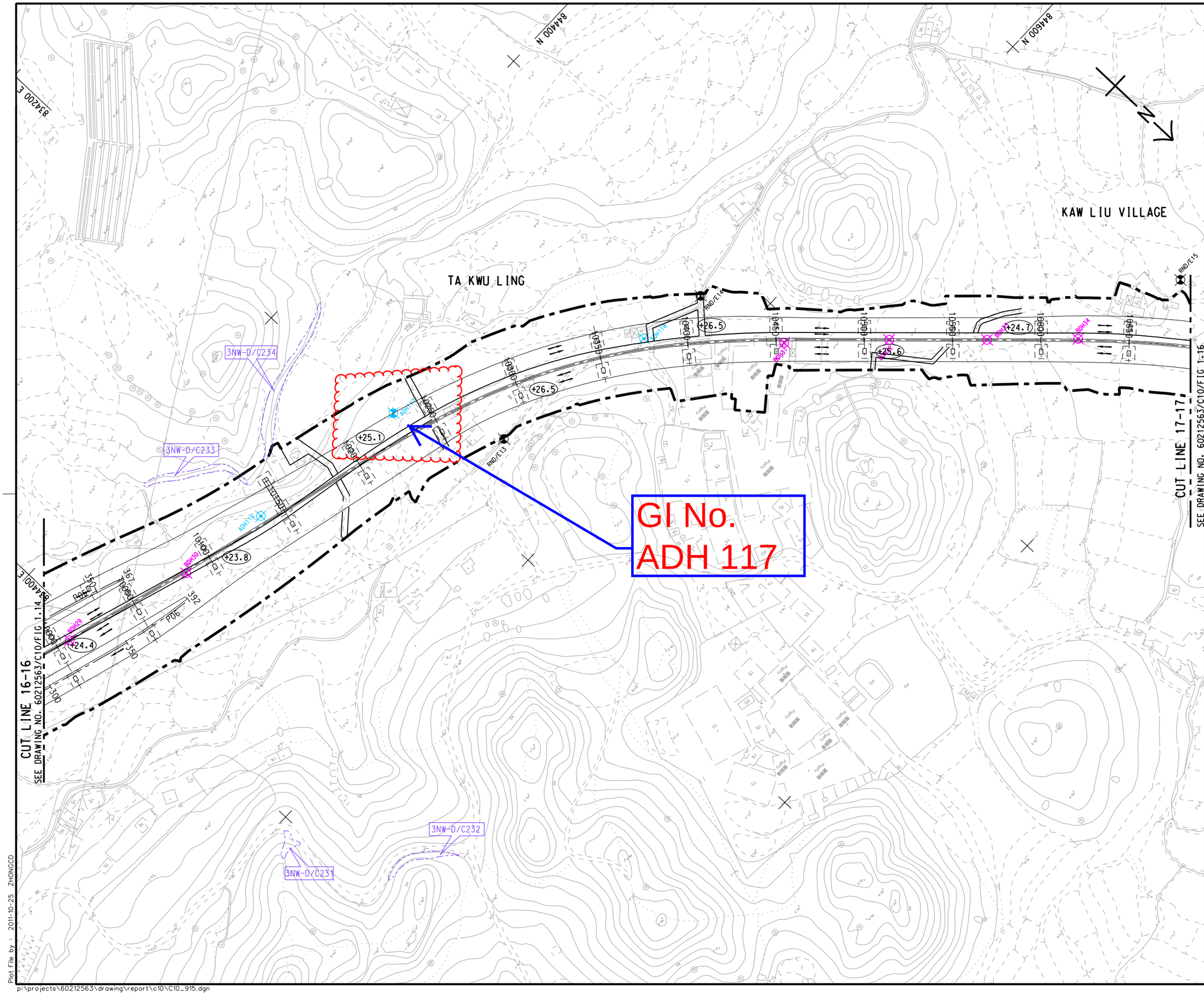

NOTE:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60212563/C10/FIG 1.1.

REV. 修訂	DESCRIPTION 內容摘要	D.E. P.E. CHECKED 核對	DATE 日期

CEDD 土木工程拓展署 Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

GENERAL LAYOUT

SHEET 15 OF 18

AECOM

DRG.NO. 圖紙編號 60212563/C10/FIG 1.15

CHECK BY 設計 –	CONTRACT NO. 合約編號 –	P. Dir. APPROVED 負責人 –
DRAWN BY 繪圖 ZCD	STATUS 階段	
SCALE 比例 A1 1 : 1000		
DIMENSIONS ARE IN 尺寸單位 METRES	© COPYRIGHT RESERVED 版 權 所 有	

Plot File by : 2011-10-25 ZHONGCD

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Gammon

STANDPIPE / PIEZOMETER MONITORING

CONTRACT NO. : CV/2011/03

HOLE No.

ADH117

Piezometer : P1

Project : Liantang / Heung Yuen Wai Boundary Control Point - Ground Investigation for Site Formation and Infrastructure Works

Project No. :	J3430	**Date of Installation :**	10/04/2012 **(Piezometer)**
Piezometer No. :	ADH117-P1	**Pipe Top Level (mPD) :**	+12.41 **mPD**
Base of Drillhole (mPD) :	-10.94 **mPD**	**Ground Level (mPD) :**	+12.36 **mPD**
Response Zone (m) :	12.00 **To** 17.00 **m**	**Tip Level (mPD) :**	-4.14 **mPD**
Depth of Buckets (if any) :	1.00 **To** 6.50 **m bgl**	**Co-ordinates of Instrument :**	
	at 0.50 **m spacing**	**Easting:** 834189.39	**Northing:** 844483.55
Taken and Reported by :	**T K HO**	**Checked by :**	**T T FUNG**

Date & Time	Ground Water Level		Highest Bucket with Entrapped Water (if any)		Obtained Rainfall (mm) (Ta Kwu Ling)	Remarks
	Depth Below Pipe Top (m)	Elevation (mPD)	Depth Below Pipe Top (m)	Elevation (mPD)		
12/04/2012	3.27	+9.14			-	Buckets was installed at 05/05/2012
13/04/2012	3.28	+9.13			2.5	
14/04/2012	3.26	+9.15			-	
16/04/2012	3.27	+9.14			7.0	
17/04/2012	3.25	+9.16			11.5	
18/04/2012	3.26	+9.15			-	
19/04/2012	3.27	+9.14			44.5	
27/04/2012	3.18	+9.23			38.5	
05/05/2012	2.31	+10.10	2.00	+10.41	10.5	
12/05/2012	2.15	+10.26	2.00	+10.41	0.0	
19/05/2012	2.15	+10.26	2.00	+10.41	33.5	
25/05/2012	2.18	+10.23	2.50	+9.91	0.5	
01/06/2012	2.30	+10.11	2.50	+9.91	0.0	
07/06/2012	2.35	+10.06	2.50	+9.91	0.0	
16/06/2012	2.10	+10.31	2.00	+10.41	28.0	
18/06/2012	1.63	+10.78	1.50	+10.91	16.0	
28/06/2012	2.15	+10.26	1.50	+10.91	0.5	
03/07/2012	2.17	+10.24	2.50	+9.91	0.0	
12/07/2012	2.40	+10.01	2.50	+9.91	0.0	
23/07/2012	1.57	+10.84	1.50	+10.91	107.5	
02/08/2012	1.63	+10.78	1.50	+10.91	0.0	
09/08/2012	1.69	+10.72	1.50	+10.91	1.5	
13/08/2012	1.89	+10.52	1.00	+11.41	10.5	

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Gammon

STANDPIPE / PIEZOMETER MONITORING

CONTRACT NO. : CV/2011/03

HOLE No.

ADH117

Piezometer : P1

Project : Liantang / Heung Yuen Wai Boundary Control Point - Ground Investigation for Site Formation and Infrastructure Works

Project No. :	J3430	**Date of Installation :**	10/04/2012 **(Piezometer)**
Piezometer No. :	ADH117-P1	**Pipe Top Level (mPD) :**	+12.41 **mPD**
Base of Drillhole (mPD) :	-10.94 **mPD**	**Ground Level (mPD) :**	+12.36 **mPD**
Response Zone (m) :	12.00 **To** 17.00 **m**	**Tip Level (mPD) :**	-4.14 **mPD**
Depth of Buckets (if any) :	1.00 **To** 6.50 **m bgl**	**Co-ordinates of Instrument :**	
	at 0.50 **m spacing**	**Easting:** 834189.39	**Northing:** 844483.55
Taken and Reported by :	**T K HO**	**Checked by :**	**T T FUNG**

Date & Time	Ground Water Level		Highest Bucket with Entrapped Water (if any)		Obtained Rainfall (mm) (Ta Kwu Ling)	Remarks
	Depth Below Pipe Top (m)	Elevation (mPD)	Depth Below Pipe Top (m)	Elevation (mPD)		
20/08/2012	2.68	+9.73	2.00	+10.41	0.0	
27/08/2012	3.17	+9.24	3.00	+9.41	0.0	
04/09/2012	3.49	+8.92	3.50	+8.91	6.0	
14/09/2012	3.28	+9.13	3.50	+8.91	0.0	
21/09/2012	3.29	+9.12	3.50	+8.91	0.0	
29/09/2012	3.30	+9.11	3.50	+8.91	0.0	
05/10/2012	3.35	+9.06	3.50	+8.91	0.0	
12/10/2012	3.38	+9.03	3.50	+8.91	0.0	
20/10/2012	3.31	+9.10	3.50	+8.91	0.0	
27/10/2012	3.36	+9.05	3.50	+8.91	5.5	
03/11/2012	3.30	+9.11	3.50	+8.91	0.0	
10/11/2012	3.25	+9.16	3.50	+8.91	0.0	
16/11/2012	3.51	+8.90	3.50	+8.91	0.5	
21/11/2012	3.58	+8.83	3.50	+8.91	0.5	
30/11/2012	3.53	+8.88	3.50	+8.91	5.5	
06/12/2012	3.58	+8.83	3.50	+8.91	0.0	
22/12/2012	3.27	+9.14	3.50	+8.91	0.0	
28/12/2012	3.30	+9.11	3.50	+8.91	0.0	
05/01/2013	3.32	+9.09	3.50	+8.91	0.0	
11/01/2013	3.60	+8.81	3.00	+9.41	0.0	
18/01/2013	3.63	+8.78	3.00	+9.41	0.0	
23/01/2013	3.65	+8.76	4.00	+8.41	0.0	
01/02/2013	3.68	+8.73	4.00	+8.41	0.0	

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Gammon

STANDPIPE / PIEZOMETER MONITORING

CONTRACT NO. : CV/2011/03

HOLE No.

ADH117

Piezometer : P1

Project : Liantang / Heung Yuen Wai Boundary Control Point - Ground Investigation for Site Formation and Infrastructure Works

Project No. :	J3430	**Date of Installation :**	10/04/2012 **(Piezometer)**
Piezometer No. :	ADH117-P1	**Pipe Top Level (mPD) :**	+12.41 **mPD**
Base of Drillhole (mPD) :	-10.94 **mPD**	**Ground Level (mPD) :**	+12.36 **mPD**
Response Zone (m) :	12.00 **To** 17.00 **m**	**Tip Level (mPD) :**	-4.14 **mPD**
Depth of Buckets (if any) :	1.00 **To** 6.50 **m bgl**	**Co-ordinates of Instrument :**	
	at 0.50 **m spacing**	**Easting:** 834189.39	**Northing:** 844483.55
Taken and Reported by :	**T K HO**	**Checked by :**	**T T FUNG**

Date & Time	Ground Water Level		Highest Bucket with Entrapped Water (if any)		Obtained Rainfall (mm) (Ta Kwu Ling)	Remarks
	Depth Below Pipe Top (m)	Elevation (mPD)	Depth Below Pipe Top (m)	Elevation (mPD)		
08/02/2013	3.65	+8.76	3.00	+9.41	0.5	
21/02/2013	3.68	+8.73	3.00	+9.41	0.0	
02/03/2013	3.70	+8.71	3.00	+9.41	1.0	
08/03/2013	3.54	+8.87	3.00	+9.41	0.0	
14/03/2013	3.51	+8.90	3.00	+9.41	0.0	
18/03/2013	3.53	+8.88	3.00	+9.41	0.0	
25/03/2013	3.79	+8.62	4.00	+8.41	0.0#	
02/04/2013	3.57	+8.84	3.50	+8.91	13.3	
12/04/2013	3.49	+8.92	3.00	+9.41	2.1	
18/04/2013	3.46	+8.95	3.00	+9.41	8.2	

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Appendix 2 - Wetland Compensation Area - Site Photos


Wetland Area

Wetland Compensation Area – Site Photos taken on 7 July 2015

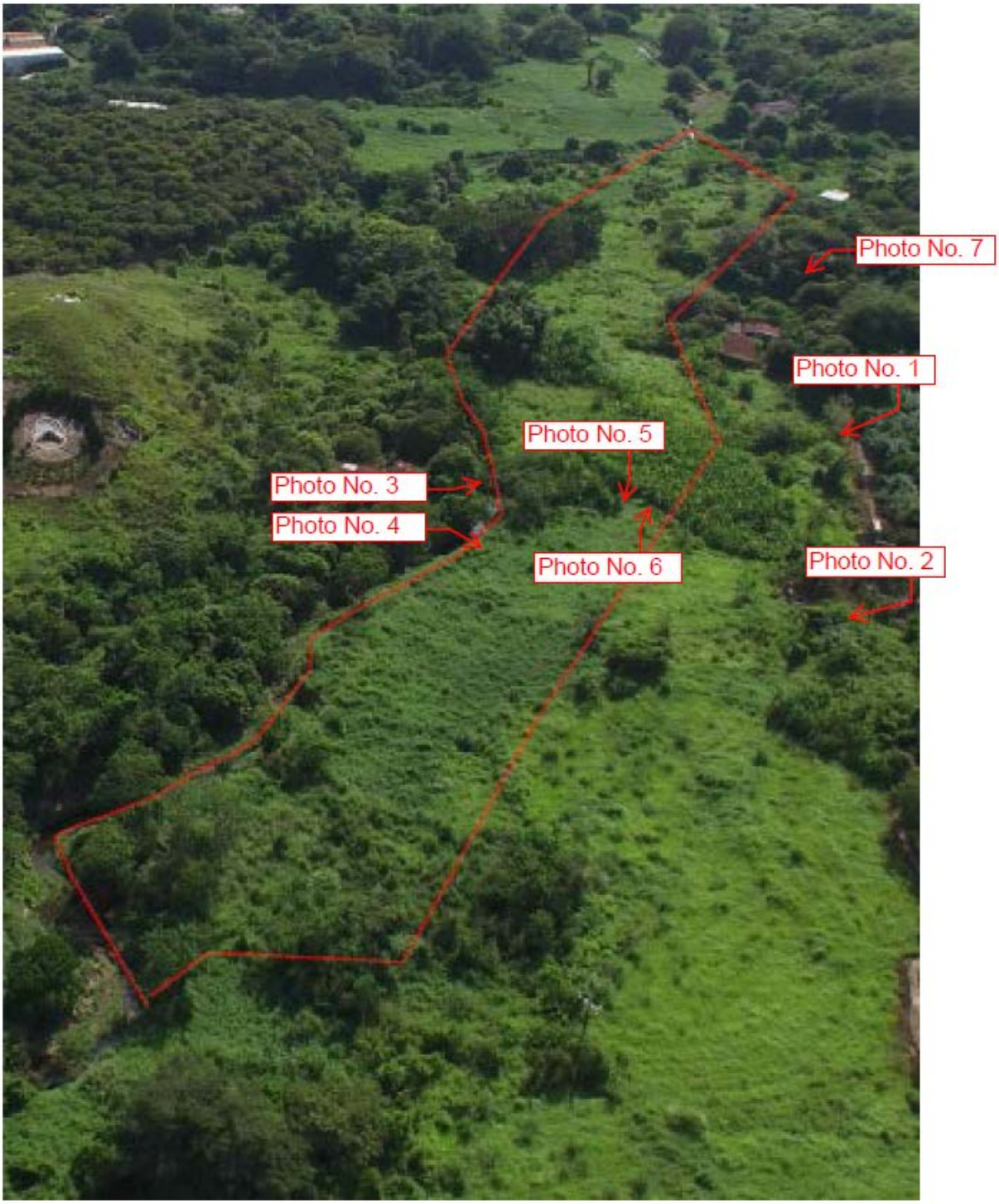

Photo No. 1

Photo No. 2

Photo No. 3

Photo No. 4

Photo No. 5

Photo No. 6

Photo No. 7

Appendix 3 Flora Species Recorded within Site Boundary

Flora Species Recorded within Site Boundary

Common Name	Scientific Name	中文名	Abundance
Big-leaved Acacia	*Acacia mangium*	大葉相思	+
Lebbeck Tree	*Albizia lebbeck*	大葉合歡	+
Giant Alocasia	*Alocasia macrorrhizos*	海芋	++
Water Hyssop (1)	*Bacopa monnieri*	假馬齒莧	++
-	*Bidens alba*	白花鬼針草	++
Blunt Signal-grass (1)	*Brachiaria mutica*	巴拉草, 爬拉草	+++
Pop-gun Seed	*Bridelia tomentosa*	土蜜樹, 逼迫仔	++
Paper Mulberry	*Broussonetia papyrifera*	構, 楮桑	+
Corniculate Cayratia	*Cayratia corniculata*	角花烏蘞莓	+
Chinese Hackberry	*Celtis sinensis*	朴樹	+
Pummelo	*Citrus maxima*	柚	+
Mandarin	*Citrus reticulata*	柑橘	+
Wampi	*Clausena lansium*	黃皮	+
Taro (1)	*Colocasia esculenta*	芋	++
Diffuse Day-flower (1)	*Commelina diffusa*	節節草	+++
Wood-fern	*Cyclosorus parasiticus*	華南毛蕨, 密毛小毛蕨	++
Laxspiculate Galingale (1)	*Cyperus distans*	疏穗莎草, 疏穎莎草	+
Umbrella Plant (1)	*Cyperus involucratus Rottb*	風車草	++
Dianella	*Dianella ensifolia*	山菅蘭	+
Longan	*Dimocarpus longan*	龍眼	+
India-rubber Tree	*Ficus elastica*	印度榕 , 印度橡樹	+
Opposite-leaved Fig	*Ficus hispida*	對葉榕 , 牛乳樹	++
Chinese Banyan	*Ficus microcarpa*	榕樹 , 細葉榕	+
Creeping Fig	*Ficus pumila*	薜荔 , 文頭郎	+
Annual Bluegrass , Imperial Japanese Morning Glory	*Ipomoea cairica*	五爪金龍	+
-	*Ipomoea obscura*	小心葉薯 , 紫心牽牛	++
Short-leaved Kyllinga (1)	*Kyllinga brevifolia*	短葉水蜈蚣	++
Lantana	*Lantana camara*	馬纓丹	++
White Popinac	*Leucaena leucocephala*	銀合歡	+++
Chinese Privet	*Ligustrum sinense*	山指甲	+
Lychee	*Litchi chinensis*	荔枝	+
Climbing Fern	*Lygodium japonicum*	海金沙 , 羅網藤	+
Elephant's Ear	*Macaranga tanarius*	血桐	++
Turn-in-the-wind	*Mallotus paniculatus*	白楸	+
China-berry	*Melia azedarach*	楝 , 苦楝, 森樹	+
Mile-a-minute Weed	*Mikania micrantha*	薇甘菊	++
-	*Mimosa diplotricha*	巴西含羞草	++
Common Banana	*Musa* x paradisiaca	大蕉, 甘蕉	++++
Guinea Grass	*Panicum maximum*	大黍	++++

Hilo Grass	*Paspalum conjugatum*	兩耳草	++
Hairy Knotweed (1)	*Polygonum barbatum*	毛蓼	++
Chinese Knotweed	*Polygonum chinense*	火炭母, 五毒草	+
Guava	*Psidium guajava*	番石榴	++
Bracken Fern	*Pteridium aquilinum* Kuhn var. *latiusculum*	蕨	+++
Wild Kudzu Vine	*Pueraria phaseoloides*	三裂葉野葛	++
Sumac	*Rhus hypoleuca*	白背鹽膚木, 白背漆	+
Reed-like Sugarcane	*Saccharum arundinaceum*	斑茅, 大密	+
-	*Wedelia trilobata*	三裂葉蟛蜞菊	++
Indian Wikstroemia	*Wikstroemia indica*	了哥王, 山雁皮	+
Shiny-leaved Prickly Ash	*Zanthoxylum nitidum*	兩面針, 入地金牛	+
Weaver's Bamboo	*Bambusa textilis*	青皮竹	++

Notes:
(1) Wetland dependent species.
[The wetland dependent species was assessed with reference to Yip, Y., Yip, K. L., Liu, K. U., Ngar Y. N. and Lai, C. C. (2010). *A Floristic Survey of Marshes in Hong Kong.* Hong Kong Biodiversity. Agriculture, Fisheries and Conservation Department Newsletter Issue No. 19.]
Code for Abundance: +++++=dominant; ++++=abundant; +++=frequent; ++=occasional; +=scarce