
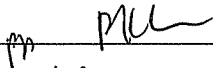



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Figure 1          General Layout of Hang Hau Tsuen Channel

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## **1. INTRODUCTION**

### **1.1 Background**

- 1.1.1 The squatter area in the vicinity of the existing Hang Hau Tsuen stream was cleared in 1997. The poor hydraulic performance of the Hang Hau Tsuen stream is attributed partly to the siltation of the watercourse by the remains of the former squatter structures, and also to the meandering watercourse and the presence of an under-sized box culvert at Deep Bay Road. Rapid developments in the North West New Territories and conversion of agricultural land to open storage sites and container yards leading to higher surface runoff has exacerbated the problem. A total of about 43 hectares of land is flood prone as a result of the inadequate drainage capacity of the Hang Hau Tsuen stream. To alleviate flooding in the catchment, the existing Hang Hau Tsuen stream between Deep Bay and Deep Bay Road will need to be improved to an engineered channel that will meet the required flood protection standards.
- 1.1.2 The project proponent, Civil Engineering and Development Department, will implement the improvement works under PWP Item No. 705CL – “Hang Hau Tsuen Channel at Lau Fau Shan” (hereafter referred to as “the Project”).
- 1.1.3 The Project is a designated project under the Environmental Impact Assessment Ordinance (EIAO) (Cap.499) by virtue of I.1(b) (vi) of Schedule 2, Part I of the EIAO. The Project will discharge into an area within 300 m from the nearest boundary of an existing Coastal Protection Area (CPA) land use zoning.
- 1.1.4 In accordance with the EIAO, an EIA report is required to be prepared to meet the requirements of the EIA Study Brief (ESB-167/2007) and the Technical Memorandum on EIA Process (EIAO-TM). An Environmental Permit will need to be obtained for the construction and operation of the Project under the EIAO.

## **2. PROJECT DESCRIPTION**

### **2.1 Description of the Project**

2.1.1 The Project is located in Hang Hau Tsuen at Lau Fau Shan, North West New Territories between Deep Bay Road and Deep Bay. The Project comprises the construction of the Hang Hau Tsuen Channel and associated works to improve the local drainage systems in the Hang Hau Tsuen area.

2.1.2 The Project comprises the following works:

- (i) Training of Hang Hau Tsuen stream including construction of a 370 m long drainage channel connecting to the downstream ends of Fung Kong Tsuen Channel and San Hing Tsuen Channel to Deep Bay.
- (ii) Construction of a 25 m long triple-cell box culvert 5.5 m (w) x 3 m (H) beneath the Deep Bay Road and 4 nos. of footbridges across the channel.
- (iii) Provision of a 3.5 m wide access road with passing bays along the northern bank of the channel, 3.5 m maintenance access road along the southern bank of the channel and 2.0 m wide footpath on both sides of the channel and ancillary works such as retaining walls, drainage and water works as well as associated landscaping works.

2.1.3 As requested by a Yuen Long District Council member, a viewing point and carpark will be provided at the downstream end of the proposed channel to allow visitors to enjoy the scenery of Deep Bay.

2.1.4 Details of the Project are shown in *Figure 1*.

### **2.2 Channel Design**

2.2.1 The proposed alignment generally follows the alignment of existing stream course to minimize resumption of existing village houses hence minimizing disturbance to the public.

2.2.2 Environmental benefits and dis-benefits of various alternative drainage design options along with various other constraints were carefully evaluated before deriving the proposed design.

2.2.3 The concepts of ‘avoidance’ and ‘minimisation’ have been incorporated into the design to protect the stream bed where established mangrove stands and

intertidal mudflat communities can be found. The stream bed for the downstream portion of the channel has been largely retained in-situ. A small portion of the mangroves will inevitably need to be removed. Other environmental friendly design includes the use of natural substrates as channel bed material which will encourage accumulation of sediments and eventually re-colonisation of the channel bed by benthic community as well as re-establishment of vegetation.

## **2.3 Justifications and Benefits of the Project**

- 2.3.1 The proposed Project is expected to contribute to the relief of the present drainage problems that have led to severe flooding in the study area resulting in danger to life, economic loss and disruption to everyday life.
- 2.3.2 The current standard of protection of the Hang Hau Tsuen stream is very low. Upon completion of the Project, the standard of protection will be increased to 1 in 50 years for village development.
- 2.3.3 The villagers of Hang Hau Tsuen at Lau Fau Shan will be directly benefited by the proposed Project.

## **2.4 Continuous Public Involvement**

- 2.4.1 Public consultation with the Green Groups, Ha Tsuen Rural Committee, Yuen Long District Council and oyster farmers association of Lau Fau Shan were undertaken during the course of the EIA study. Overall, there were no objections to the final design of the Project.

## **2.5 Project Programme**

- 2.5.1 The construction programme of the Project will likely commence in end 2009 for completion by end 2012.

### **3. SUMMARY OF THE EIA STUDY**

#### **3.1 Key Environmental Issues**

3.1.1 Construction activities for the Project involve site clearance in the works areas, excavation to formation levels of the channel, construction of channel structures / linings and ancillary structures, and landscaping works. Small scale routine maintenance would be necessary during the operation of the proposed channel to remove excessive silts, vegetation, debris and obstructions in order to maintain its hydraulic performance and structural integrity. The proposed viewing point and carpark would likely introduce road traffic along the access road. All these activities have the potential to impact on the existing environment.

3.1.2 The key environmental issues assessed in the EIA Report are:

- Air Quality;
- Noise;
- Water Quality;
- Waste Management;
- Ecological Impact;
- Fisheries Impact; and
- Landscape and Visual.

#### **3.2 Air Quality Impact**

3.2.1 The construction dust impact assessment has identified Air Sensitive Receivers (ASR) within the Study Area. Potential works that may cause potential construction dust nuisance is also identified. Mitigation measures, as required by Air Pollution Control (Construction Dust) Regulation, are also highlighted. With the implementation of the recommended mitigation measures, residual construction dust impact at nearby air sensitive receivers is expected to comply with the Air Quality Objectives and EIAO-TM.

3.2.2 Air quality monitoring is recommended at selected air sensitive receivers during the construction period to check for compliance with the permissible dust levels and effectiveness of the proposed mitigation measures.

3.2.3 During the operation phase of the Project, given the low volume of vehicles expected to use the access road, vehicular emission impact from the proposed access road upon the nearby air sensitive receivers is not expected. Maintenance of the channel is also unlikely to cause any adverse impact during operational phase.

### **3.3 Noise Impact**

- 3.3.1 The use of powered mechanical equipment during the construction phase of the Project is expected to create noise nuisance, due to the close proximity between the works areas and noise sensitive receivers. Assessment indicates that such noise impact can be mitigated to acceptable levels by appropriate measures, including the use of quiet plant, temporary noise barriers, restricting concurrent usage of equipment and the implementation of good site practices. The Contractor will be required to implement these measures when powered mechanical equipment is used during the construction phase. With these measures in place, residual noise impact would not be expected from the construction works and will comply with the EIAO-TM daytime construction noise standard.
- 3.3.2 Noise monitoring is recommended at selected noise sensitive receivers during the construction period to check for compliance with permissible noise standards and effectiveness of the proposed mitigation measures.
- 3.3.3 The operation phase of the Project, in terms of road traffic noise and during maintenance of the channel, is not expected to pose any noise impact to the surrounding area.

### **3.4 Water Quality Impact**

- 3.4.1 The current condition of the Hang Hau Tsuen stream and Deep Bay in the Study Area is relatively poor as these waterbodies receive a variety of polluting inputs including domestic wastewater from unsewered villages and effluent from open storage sites and container yards.
- 3.4.2 The construction of the channel could adversely impact the water bodies through silt-laden site runoff, disturbance of stream sediment during excavation, concreting works, runoff from workshops & depot and increased sewage and wastewater resulting from the additional workforce on site. These impacts can be readily mitigated through the construction of a suitable drainage system with silt traps, good site management practices, careful working practices during excavation of the stream and proper sewage collection and disposal system. With the implementation of these measures, no adverse residual water quality impact from construction work is expected.
- 3.4.3 The Project will not generate any new pollution loading to Deep Bay. Provision of catchpits with sand traps will remove some of the pollutants from the surface runoff at Hang Hau Tsuen before being discharged into Deep Bay. The impact

can be further mitigated through the incorporation of vegetated areas into the drainage channel design. The re-established vegetation can act as a natural pollutant trap and filter. The proposed channel will require regular maintenance to ensure effective functioning and prevent the unacceptable built-up of sediments. The routine maintenance of the channel may pose potential impacts if it is not properly executed. By following the recommended good practice guides during maintenance works, no adverse impacts are expected.

- 3.4.4 The provision of the access road, viewing point and carpark would have minimal impact during operation with the incorporation of gullies and silt / grit traps in the road drainage design.
- 3.4.5 Water quality monitoring is recommended during the construction period to check for compliance with permissible water quality limit levels and effectiveness of the proposed mitigation measures.
- 3.4.6 Overall, the residual water quality impacts during construction and operation phases of the Project are considered acceptable with respect to the EIAO-TM and Water Pollution Control Ordinance.

### **3.5 Waste Management**

- 3.5.1 Construction and demolition materials will inevitably be produced during the construction phase of the Project. Waste generated during construction works includes site clearance / demolition materials, excavated materials, chemical waste and general works waste. Waste types, quantities and timing have been estimated as far as possible and mitigation measures have been proposed in terms of avoidance-minimisation-reuse-recycling-disposal hierarchy.
- 3.5.2 Potential for reuse of inert construction & demolition material (public fill) within the Project will be rigorously explored throughout the course of the Project in an effort to minimise off-site disposal.
- 3.5.3 A small quantity of contaminated stream sediment will be excavated and need to be disposed offsite in designated marine disposal sites. Potential for reuse of uncontaminated sediment as channel bed material will be maximized as far as practicable. Provided that there is strict control of construction and demolition materials generated from construction works and that all sediments generated are stored, handled, transported and disposed of in accordance with the recommended mitigation measures, potential impact is not expected. The recommended mitigation measures can be enforced by incorporating them into the waste management requirements as part of the Environmental Management Plan. Environmental audit would be necessary to ensure the implementation of

proper waste management practices during construction.

- 3.5.4 Waste generated during operation and maintenance of the Project is expected to be minimal. Proper waste management practices have been recommended.
- 3.5.5 Overall, the residual waste impacts of the Project are considered acceptable with respect to the EIAO-TM and Waste Disposal Ordinance.

### **3.6 Ecological Impact**

- 3.6.1 The Project has avoided and minimised much of the environmental and ecological impacts by adopting the preferred option. The habitats to be lost would be small in size and not of high ecological value. Compensatory landscape tree planting consisting mostly of native species and compensatory mangrove planting will be provided to mitigate the loss. Ecological monitoring is proposed to monitor the survival and growth of the mangrove planting during operation phase.
- 3.6.2 With the implementation of the recommended mitigation measures, the ecological impacts resulting from the proposed works during construction and operation phases are considered to be acceptable.

### **3.7 Fisheries Impact**

- 3.7.1 Literature review and field visits have been conducted to establish the fisheries baseline condition of the assessment area and assessment of potential impacts conducted in accordance with the EIAO-TM requirements. The Project would affect a small area of an abandoned fishpond. Potential impacts on capture fisheries, oyster farming and pond culture in Lau Fau Shan and Inner Deep Bay are considered insignificant. No mitigation is required and the residual impact is acceptable. Other than the water quality monitoring programme, no specific fisheries EM&A programme would be required.

### **3.8 Landscape and Visual Impact**

- 3.8.1 The landscape and visual impact assessment indicated that moderate to slight adverse impact will occur during the construction stage and moderate to slight beneficial impact during operational stage. The landscape mitigation measure will minimize the adverse impact of the disturbance to existing trees from moderate adverse to moderate beneficial in the long term. Adverse visual impact, which is in a local context, will be minimized with the incorporation of mitigation measures.



- 3.8.2 The Project would result in the loss of 16 nos. of trees. Compensatory tree planting will comprise about 114 nos. of native trees in attempt to restore the loss of greenery and to enhance the overall landscape quality. In addition, native shrub species will be planted.
- 3.8.3 Apart from the slight adverse impact on the elimination of small portion of residential area and fishpond within the site area, it is predicted that the proposed Project will have negligible adverse landscape impact and moderate beneficial visual impacts during the operation stage. In conclusion, the landscape and visual impacts in the construction and operation phases will be “acceptable with mitigation measures”.

#### **4. ENVIRONMENTAL MONITORING AND AUDIT**










- 4.1.1 Mitigation measures have been recommended in the EIA Report to mitigate potential adverse impacts from the construction and operation phases of the Project. Based on these recommendations, Environmental Monitoring and Audit (EM&A) requirements have been established.
- 4.1.2 An EM&A programme will be setup and implemented to ensure compliance with the mitigation measures recommended in the EIA Report, to assess the effectiveness of the recommended mitigation measures, and to identify any further need for additional mitigation measures or remedial measures.
- 4.1.3 To ensure that the environmental performance of the works meets all relevant legal and contractual requirements, the Contractor will be required to prepare and implement an Environmental Management Plan, which details the approach that Contractor is to adopt in managing and controlling potential environmental impact from construction activities for this Project.

**5. OVERALL CONCLUSIONS**

- 5.1.1 The main objective of the Project is to alleviate the potential flooding problems in Hang Hau Tsuen at Lau Fau Shan.
- 5.1.2 Based on the findings of the EIA Study, the Project would not cause any adverse environmental impacts to the concerned Coastal Protection Area, the ecology of Deep Bay and other sensitive receivers in the Study Area. The residual construction phase and operation phase impacts are considered acceptable with respect to EIAO-TM and relevant ordinance requirements.
- 5.1.3 Overall this EIA concludes that there are no unacceptable environmental impacts associated with the construction and operation of the Project provided that all the legislation, guidelines and recommended mitigation measures are followed. The EIA has fully met the requirements of the Technical Memorandum on EIA Process and the EIA Study Brief.

**END OF TEXT**

圖例 LEGEND:

-  地盤界線  
SITE BOUNDARY
-  保留現有河道  
EXISTING RIVER TO BE RETAINED
-  擬建旱流排水渠  
PROPOSED LOW FLOW CHANNEL
-  填平及環境美化部分河道  
EXISTING SECTION OF STREAM TO BE FILLED AND LANDSCAPED
-  保留紅樹林  
EXISTING MANGROVES TO BE RETAINED
-  擬加種紅樹林  
POTENTIAL COMPENSATION SITE FOR MANGROVES
-  維修道路  
MAINTENANCE ACCESS
-  原用自然河床物料  
ORIGINAL RIVER BED MATERIAL
-  混凝土草格  
CAST-IN-SITU GRASSCRETE

Revision	Date	EPD'S COMMENT	KSL	
		Description	Initial	Checked
Initial	MC	WKC	JT	PKL
Date	11/08	11/08	11/08	11/08

Approved 批准

Agreement No. 協議編號

Project Title 工程名稱  
流浮山坑口村排水道工程  
HANG HAU TSUEN CHANNEL AT LAU FAU SHAN

Plan Title 圖則名稱  
坑口村排水道工程位置圖  
GENERAL LAYOUT OF HANG HAU TSUEN CHANNEL

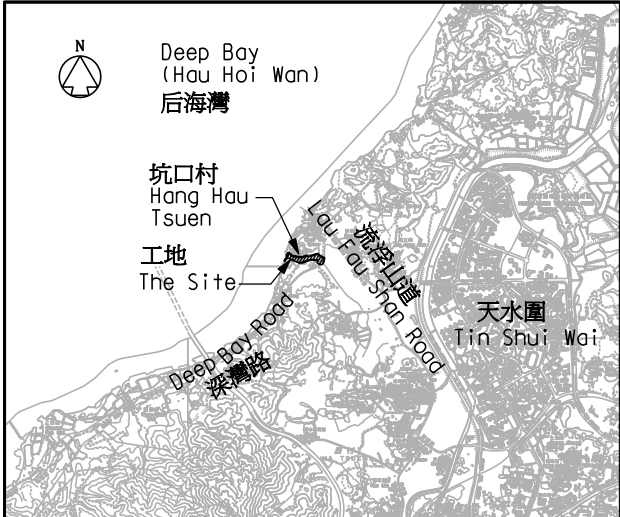
Plan No. 圖號  
圖 ES-1

Revision 修訂  
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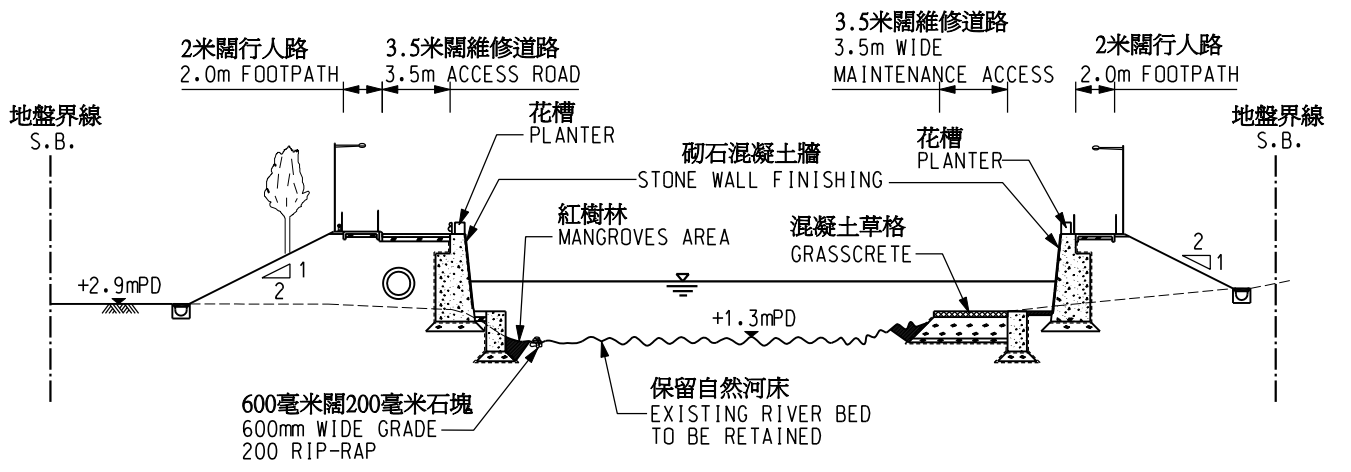
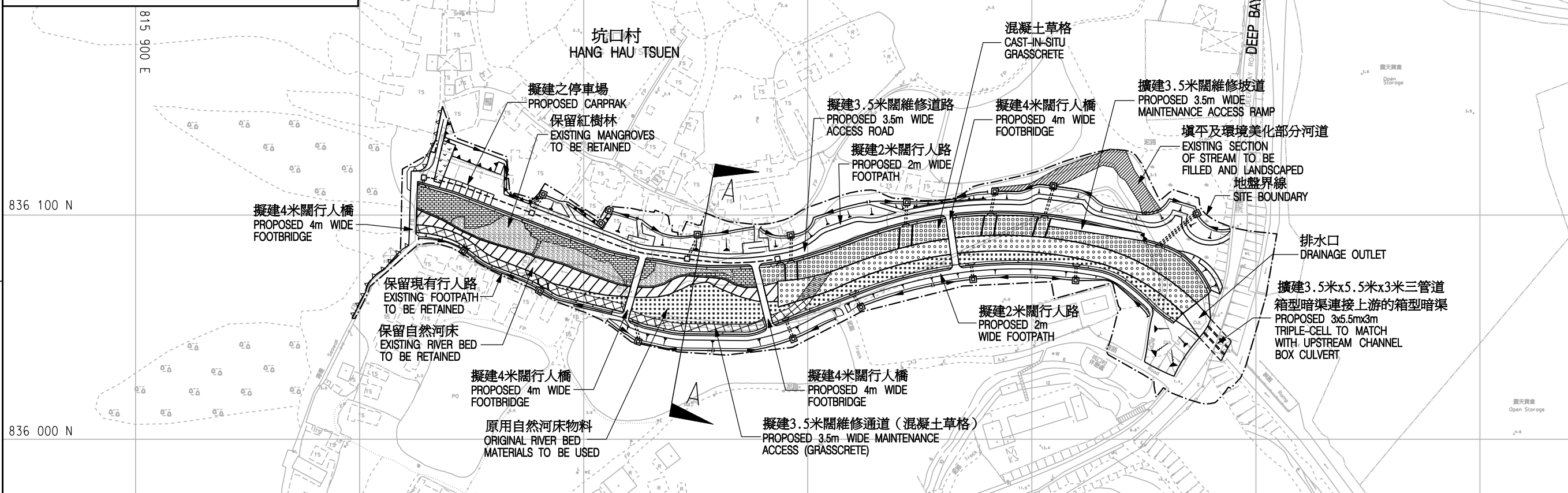
Scale 比例  
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土木工程拓展署  
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED  
博威工程顧問有限公司



索引圖  
LOCATION PLAN  
1 : 80000



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SECTION A-A  
1:400