

Project Profile

for

Peng Chau Sewage Treatment Works Upgrade



**Drainage Services Department
The Government of the Hong Kong Special Administrative Region**

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1 BASIC INFORMATION

1.1 Project Title

The title of this Project is:

“Peng Chau Sewage Treatment Works Upgrade”.

1.2 Purpose and Nature of the Project

The main objective of the Project is to improve and protect water quality in the coastal waters of Peng Chau. The existing Peng Chau sewage treatment Works (STW) (i.e. rotating biological contactor (RBC) with chlorination disinfection) having a treatment capacity of 450 m³/day is insufficient to cater for additional sewage collected under the current Peng Chau sewerage scheme and future flows. Peng Chau STW will therefore be reconstructed as a biological treatment works incorporating nitrification, nitrogen removal and disinfection with a design capacity of about 3,250 m³/day on the existing site at Tai Lei Island.

The scope of the project comprises:

- i) Construction of a new STW adjacent to the existing STW comprising secondary treatment with nitrification, denitrification and disinfection;
- ii) Construction of submarine outfall and emergency overflow;
- iii) Provision of deodorization facilities;
- iv) Provision of associated sludge treatment facilities;
- v) Modified existing clarifiers to storm tanks;
- vi) Extend inlet pumping main; and
- vii) Demolish the existing RBC.

1.3 Name of the Project Proponent

Chief Engineer, Consultants Management Division, Drainage Services Department

1.4 Location and Scale of the Project

The proposed STW will be located within the existing Peng Chau STW site at Tai Lei Island. The existing STW falls within an area zoned “Other Specified Uses” (OU”) annotated “Sewage Treatment Works” on the draft Peng Chau OZP. The new biological treatment facilities will be sited on the remaining vacant space of the existing STW site. The preliminary and sludge treatment facilities and miscellaneous buildings will be sited on the eastern part of the existing STW site by demolishing/upgrading of the existing treatment facilities.

Taking into account the need to provide for much higher flows and to maintain the operation of the existing STW during construction of the new facilities, only a limited area of land could be made available within the existing STW site as a temporary works area during construction. An additional area of land for temporary works near the existing STW site is required to facilitate efficient construction of the new works and to minimise disruption to operation and maintenance of the existing treatment process.

The proposed submarine outfall will extend from the western boundary of the STW site a short distance offshore (i.e. about 40m).

1.5 Types of Designated Project Involved

According to Item F6, Part I, Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance, a submarine sewage outfall is a designated project. The project is therefore as designated project under the EIA Ordinance.

1.6 Name and Telephone Number of Contact Persons

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Implementation

The Project will be constructed by 2 phases. Phase 1 works include construction of new treatment units on the lands reserved for plant expansion as well as construction of a new submarine outfall and emergency overflow. Phase 2 works include demolition of existing plant and modification of existing clarifiers to storm tanks.

Construction works are scheduled to commence in February 2005 for phase 1 and phase 2 completions in January 2007 and January 2008 respectively.

2.2 Interactions with Other Projects

Peng Chau Village Sewerage Phase 1, which is one of the Outlying Islands Sewerage Stage 1 projects, is currently scheduled to commence in October 2002 for completion in April 2005. No significant cumulative impacts are expected during the construction of STW and village sewer considering the long distance between construction site and sensitive receivers.

The programme of the Peng Chau Development at the western coast of Peng Chau, proposed helipad at North Peng Chau and Penny's Bay reclamation might coincide with that of the marine outfall construction. No significant cumulative impact is expected because the scale of dredging works for outfall construction is relatively small (i.e. approx. 40m long outfall).

3 POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 Outline Process Involved

The treatment process is designed to provide a high quality effluent and a high degree of security without occupying a large area of lands. There are various feasible treatment configurations to provide nitrification, denitrification and disinfection and the preferred option will be determined in the subsequent design stage. A preliminary layout using continuous flow activated sludge treatment process incorporates the following units (Drawing No. DCM/2001/080):

- grit removal and fine screening
- biological treatment with nitrification and denitrification
- secondary clarification
- disinfection using chlorination, ultra-violet irradiation or other alternatives
- storm tanks to protect effluent quality in extreme storm conditions
- sludge thickening, digestion, dewatering and storage
- submarine outfall and emergency overflow pipe.

The alternative treatment process configurations would be slightly different from the configuration shown in Drawing No. DCM/2001/080. However, their potential environmental impacts during construction, operation and maintenance would be similar.

3.2 Possible Environmental Impacts During Construction of the Project

3.2.1 Introduction

This section and Section 3.3 describe the types of activities that could generate impact. The sensitive receivers are described in Section 4.

3.2.2 Noise Impact

Construction noise may arise from the rock excavation and non-percussive piling activities during construction of the Peng Chau STW.

3.2.3 Air Quality Impact

Dust emission could be generated from construction activities such as excavation, on site concrete mixing and site clearance at the STW site.

3.2.4 Water Quality Impact

Water quality impacts may arise during marine dredging for outfall construction. There is also a potential water quality impact from site discharges during construction.

3.2.5 Waste Impact

Wastes generated during the construction phase will include

- Waste spoil from site clearance, site preparation, excavation and earthworks;
- Waste material such as wood, metal scraps and concrete generated from the construction process and also from demolition of some existing structures;
- Workers generated general waste;
- Chemical wastes from maintenance of construction plant and equipment such as lubrication oil.

3.2.6 Landscape and Visual Impacts

The proposed STW upgrade would be carried out at the existing site. Construction activities will result in some visual impacts, but there will be no significant changes in landscape features.

3.2.7 Ecological Impact

Land is reserved at the existing STW site for expansion/upgrade and no loss of habitat would result from the proposed upgrade.

The types of activity that could cause ecological impacts during construction therefore relate to those that could affect marine water or sediment quality, such as dredging and construction of the short outfall.

3.2.8 Traffic Impact

Construction materials and wastes would be delivered to and transferred from the site by marine transport. The Peng Chau STW site is relatively far from the ferry piers, and the disruption to the regular ferry service would be minimal if careful route planning is achieved. However, the STW site is close to existing boat shelter and precautionary measures should be provided to ensure smooth marine traffic flow.

3.3 Possible Environmental Impacts During Operation of the Project

3.3.1 Noise Impact

Blowers, pumps/motors, ventilation equipment and other machinery are potential noise sources at the STW during operation, although most such equipment will be located inside buildings.

3.3.2 Air Quality Impact

Odour nuisance is an important factor to be addressed in the operation phase of the sewerage project.

The main source of odour for the plant is the inlet works (screens and grit removal, and the associated screenings and grit washing facilities). It is possible that hydrogen sulphide gas could be generated in the incoming sewage/inflow and that this could escape at the inlet works. Mectaptans, indoles and skatoles are other compounds often found in sewage, which can escape into the atmosphere and cause odour problems.

The main biological process is likely to be substantially odour free. The sludge treatment facilities are potential odour sources, although aerobic digestion is incorporated to stabilise the sludge.

3.3.3 Water Quality Impact

The existing Peng Chau sewerage system is a combined system collecting both stormwater and foul sewage flows. The proposed Peng Chau STW upgrade will need to treat some stormwater flow from the sewerage system before the combined system is completely separated. Storm tanks will be incorporated into the design as a preventive measure to protect effluent quality in extreme storm conditions. The storm tanks will store as much of the excess flow as possible, in particular the first flush. Allowance has been made for three storm tanks, which would fill

sequentially, not concurrently. As the first storm tank to come into use would store the first-flush, it would not have an outlet to the outfall as this portion of the flow must be returned for full treatment. The remaining tanks would allow for discharge to the outfall if the excess flow exceeds the storm tanks' capacity. After the storm has ended, screened sewage stored in the storm tanks will be returned to the main flow for full treatment.

It is conceivable that in extreme, long-duration storm events the excess flow could exceed the capacity of the storm tanks. In such cases the excess flow (after screening and grit removal) would not receive biological treatment prior to discharge via the outfall.

The STW will incorporate standby facilities. The potential emergency conditions that could result in discharges of untreated or partially treated sewage will need to be examined in the EIA and design stage.

3.3.4 Waste Impact

Waste generated in the operation phase will principally be gross solids and sludge from the STW. The sludge volume will be reduced by sludge dewatering and subsequently conveyed for disposal at landfill by barge via Peng Chau refuse transfer station, which is next to the STW.

3.3.5 Landscape and Visual Impacts

The above ground structures at Peng Chau STW may induce visual impacts to tourists/resident at Peng Chau. The structures will be restricted to 3 storeys (not greater than 15 m height). Although the number and scale of treatment process structures at the site will increase, limited landscaping will be provided within the STW site to alleviate the impact of the new structures, and there will be no significant changes in the overall landscape.

3.3.6 Ecological Impact

Potential ecological impacts during the operation phase are mainly secondary impacts caused by deterioration in the air or water quality during the infrequent and short duration of emergency bypass. Although the effluent would not breach the water quality criteria, it is still necessary to consider any potential effects on the local marine ecology such as the coral community (see Sections 4.1 and 5.2.6).

3.3.7 Traffic Impact

The sludge and other solids produced in the STW will be barged away for off-site disposal. However, the barging of sludge will be an infrequent exercise. The impacts to traffic flow, if any, would be evaluated in the traffic impact assessment (TIA).

4 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

4.1 Existing and Planned Sensitive Receivers and Sensitive Parts of the Natural Environment

Residents of Sea Crest Villa are about 250 m away from the STW. The effects of construction noise and dust on these sensitive receivers will need to be assessed. The longer-term visual impacts of the project on residents of Sea Crest Villa and other residential areas in the north-west Peng Chau, such as Kam Peng Estate and Peng Lai Court, will need to be examined.

Infrequent sightings of Chinese White Dolphins have been reported in the East Lantau area near Peng Chau.

According to the "Reconnaissance Dive Survey (Western Waters of Hong Kong) - Tai Lei Island, Peng Chau", coral communities were recently found around the north, east and west of Tai Lei Island. However, the only areas of live coral are at the east coast of Tai Lei Island. Those at the north, north-east and west of Tai Lei Island are scattered and dead.

4.2 Major Elements of the Surrounding Environment which might affect the Area in which the Project is Located

The Project area is rural. There are no industrial activities or noisy commercial activities, and no potentially hazardous installations. However, the programme of the existing and planned reclamation works including Peng Chau Development at the western coast of Peng Chau, proposed helipad at North Peng Chau and Penny's Bay reclamation may coincide with the outfall construction, which could lead to cumulative impacts which will need to be examined.

5 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED INTO THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 Construction Stage

5.1.1 Noise Impact

For rock blasting, breaking of boulders and non-percussive piling activities, the Contractor will need to comply with the provisions of the Noise Control Ordinance. No influencing factor is identified in area near Peng Chau STW and the Area Sensitivity Rating (ASR) is classified as A. Preliminary assessment in accordance with the Technical Memorandum (TM) indicates noise at the nearest Noise Sensitive Receivers (NSRs) of Sea Crest Villa due to rock excavation and non-percussive piling will be within the day time limit.

5.1.2 Air Quality Impact

Dust emission is unlikely to be a major concern for construction of the treatment works due to the limited extent of the construction works and in view of the relatively long distances from the existing sensitive receivers.

Nevertheless, mitigation measures should be adopted to control dust emissions. The contractor(s) will be required to abide by the relevant provisions of the Air Pollution Control Ordinance and its subsidiary legislation, including the Construction Dust Regulations.

5.1.3 Water Quality Impact

The scale of the dredging works for outfall construction will be small. An assessment will be required of the necessary mitigation measures to ensure that the Water Quality Objectives (WQOs) and marine environment would not be jeopardised by the construction of the outfall and associated dredging work, or the disposal of contaminated and/or uncontaminated mud. Provided that such measures are taken, the impacts to water quality are not likely to be significant. Regular water quality monitoring at adjacent waters should be arranged to ensure that the WQOs are not jeopardised by the dredging works.

Construction site discharges to storm drains or sewers are controlled under the Water Pollution Control Ordinance (WPCO). The potential water quality impacts during construction should thus be evaluated against the effluent standards stipulated in the TM on Effluent Standards. In addition, the guidelines in EPD Practice Note on Construction Site Drainage (ProPECC PN 1/94) should be strictly followed to control potential pollution problems.

5.1.4 Waste Impact

Appropriate measures should be considered to minimise the generation of construction and demolition material. On-site or off-site re-use and recycling of waste should be carried out prior to disposal as far as possible. The construction waste should be properly disposed of in accordance with the Waste Disposal Ordinance. Chemical wastes such as lubrication oil generated during the construction phase due to maintenance of plant and equipment should be disposed as chemical wastes in compliance with the Waste Disposal (Chemical Waste) (General) Regulations.

5.1.5 Visual Impact

Key potential viewpoints during construction will be Sea Crest Villa and the western coast of Peng Chau (Kam Peng Estate, Peng Lai Court). Specifying suitable site boundary hoarding or screen would help to mitigate the impact to local resident/tourist.

5.1.6 Ecological Impact

As noted in Section 4.1, the only live coral areas are at the east coast of Tai Lei Island, whereas the outfall will be constructed from the south-western side of the island.

A detailed assessment of the potential impact on marine ecology during construction of both STW and submarine outfall should include recommendations on mitigation measures to prevent disturbed silt from affecting the live coral areas or other marine life such as Chinese White Dolphins.

5.1.7 Traffic Impact

Careful route planning of the transport for construction materials and waste should be required to avoid disruption to the regular ferry service.

5.2 Operational Impacts

5.2.1 Noise

All pumps, motors, blowers and other mechanical equipment will be located inside buildings at Peng Chau STW. Thus any potential noise impacts can be readily mitigated.

5.2.2 Air Quality

Potential sources of odour at the STW are described in Section 3.3.2. These components of the treatment process require careful design, and the need, space and cost requirements for covering the facilities and for ventilation and deodorization have to be considered. It is also important that deodorization facilities are designed to avoid secondary impacts such as unsightly appearance.

5.2.3 Water Quality

In normal operation, the STW will produce a high quality effluent. Even during major storms, all flows should pass through the preliminary treatment units and disinfection facilities prior discharge in order to ensure no significant water pollution impacts. In addition, storm tanks, standby units and dual power supply or automatic-operated emergency generator have been allowed for in the Peng Chau STW design to minimise the need for untreated or partially treated discharges in extreme or emergency conditions.

5.2.4 Waste

Waste generated in the operation phase will comprise gross solids and sludge from the STW. Sludge will be thickened in gravity thickeners and then aerobically digested. After digestion, the sludge volume will be reduced by dewatering and subsequently transferred for disposal at landfill. The total quantities will be very small compared to those from the major treatment works in Hong Kong, and have been allowed for in the overall waste disposal plans.

5.2.5 Landscape and Visual

The above ground structures at Peng Chau STW will be restricted to 3 storeys (not greater than 15m height) to minimise visual impacts to tourists/resident at Peng Chau.

Landscaping features along the boundary of the STW will be required to minimise environmental impacts and to shield the STW from view. The northern, western and southern sides of Peng Chau STW are surrounded by green belt. Landscaping features will be required along the eastern boundary of the STW. Sufficient space must be allowed in the layout of the STW for such landscaping.

5.2.6 Ecological

The potential effects of an effluent outfall on coral growth are mainly related to sedimentation, other effects that could cause a change in light penetration, and the concentration of nutrients. The upgraded Peng Chau STW will have biological treatment incorporating a high degree of removal of suspended solids, nitrification and nitrogen removal. Any remaining solids in the effluent would be extremely fine and would not settle to the seabed in the vicinity of Tai Lei Island. Nutrient concentrations would also be low, and the outfall would be designed so that the effluent plume will not affect the live coral areas. Thus, no significant impact on the nearby coral community is expected during operation of the outfall.

Disinfection of the effluent will provide protection to marine mammals such as dolphins.

The only aspect of concern during operation would be the possibility of effluent discharged in adverse or emergency conditions. The mitigation measures described in Section 5.2.3 are relevant.

5.2.7 Traffic

The residuals (screenings, grit, sludge) produced in the STW will be trucked away to the adjacent refuse transfer station, and then barged away for disposal at landfill.

The delivery of materials and the removal of sludge will be an infrequent exercise (at most once a day). The impacts to traffic flow, if any, would be small and will be evaluated in the TIA.

5.3 Conclusion

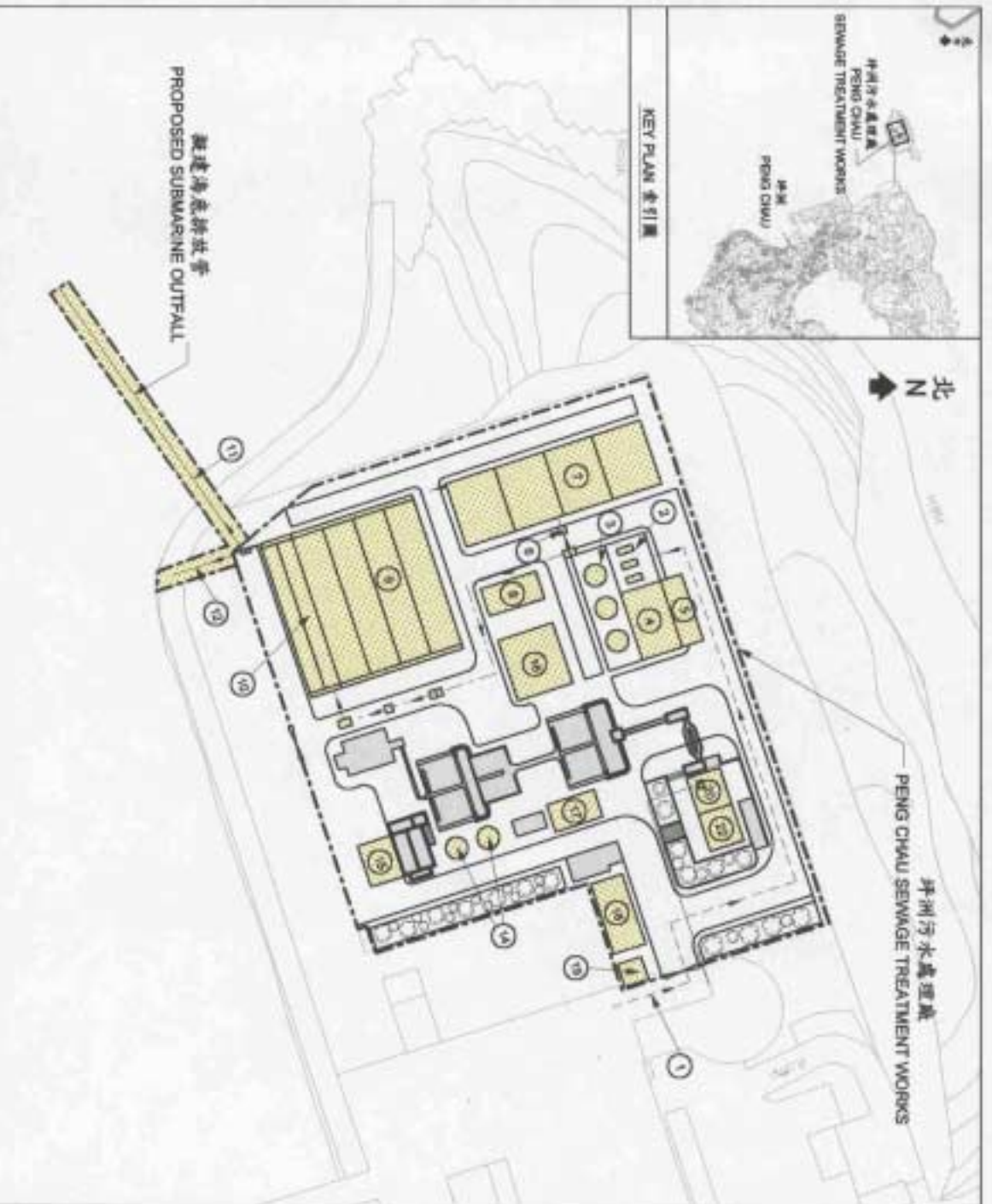
The environmental review carried out in the “Outlying Islands Sewerage Master Plan Stage 2 Review”, based on a largely qualitative assessment, identified no insurmountable environmental impacts due to construction and operation of the Project.

The particular environmental concerns to be addressed in the EIA study should include:

- A quantitative assessment of the odour impacts with recommendations for appropriate deodorization measures and confirmation of which facilities should be completely covered;
- A detailed assessment of the contingency measures in the unlikely scenario of complete failure of the STW;
- An assessment of the mitigation measures required to ensure that the WQOs and marine environment would not be jeopardised by the construction of the outfall and associated dredging work, or the disposal of contaminated and/or uncontaminated mud;
- A more detailed quantitative water quality assessment on the impacts of the discharge of treated effluent and of the mitigation measures to prevent emergency discharges;
- A detailed assessment of the potential impact on marine ecology (including local coral communities) during construction and during operation of STW and outfall. As part of the assessment, mitigation measures to prevent silt from affecting the live coral areas should be studied;
- A quantitative assessment of the noise impacts during construction of the STW with recommendations for appropriate noise mitigation measures;
- A detailed evaluation on the phasing of works for the STW upgrade and the village sewerage construction to minimise the overall environmental impacts;
- A traffic impact assessment on the impacts to marine traffic flows and appropriate traffic management schemes during the construction of the STW;
- An assessment of the landscape and visual impacts of the proposed additional structures at the sewage treatment works and any mitigation measures that would be desirable; and
- A detailed study of the opportunities for reducing waste generation, on-site or off-site re-use and recycling during construction of STW.



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坪洲污水處理廠
PENG CHAU SEWAGE TREATMENT WORKS

擬建海底排污水管
PROPOSED SUBMARINE OUTFALL

圖則名稱 drawing title
 離島污水系統第1階段第2期K項工程
 -坪洲污水處理廠改善工程-第一期工程完成後可能的藍圖
 OUTLYING ISLANDS SEWERAGE STAGE 1 PHASE 2 PACKAGE K -
 PENG CHAU SEWAGE TREATMENT WORKS UPGRADE -
 POTENTIAL LAYOUT FOR PHASE 1 COMPLETION

繪圖日期 drawing date	Original Signed	C.W. CHAN	日期 date	22-11-2001
校對日期 checked	Original Signed	K.C. KWOK	日期 date	22-11-2001
批准日期 approved	Original Signed	S.K. WONG	日期 date	22-11-2001

圖則編號 drawing no.	DCM/2001/081	比例 scale	N.T.S.
項目名稱 PROJECT	離島污水系統第1階段第2期K項工程 OUTLYING ISLANDS SEWERAGE STAGE 1 PHASE 2 PACKAGE K - PENG CHAU SEWAGE TREATMENT WORKS UPGRADE		
項目編號 PROJECT NO.	CON/01/01/001		
項目地點 PROJECT LOCATION	坪洲 PENG CHAU		
項目負責人 PROJECT MANAGER	李國強 LEE GUO KONG		
項目經理 PROJECT SUPERVISOR	李國強 LEE GUO KONG		
項目工程師 PROJECT ENGINEER	李國強 LEE GUO KONG		
項目主任 PROJECT CHIEF	李國強 LEE GUO KONG		
項目副主任 PROJECT DEPUTY CHIEF	李國強 LEE GUO KONG		
項目助理 PROJECT ASSISTANT	李國強 LEE GUO KONG		
項目秘書 PROJECT SECRETARY	李國強 LEE GUO KONG		
項目文書 PROJECT CLERK	李國強 LEE GUO KONG		
項目司機 PROJECT DRIVER	李國強 LEE GUO KONG		
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項目問題 PROJECT PROBLEM	李國強 LEE GUO KONG		
項目解決 PROJECT SOLUTION	李國強 LEE GUO KONG		
項目成功 PROJECT SUCCESS	李國強 LEE GUO KONG		
項目失敗 PROJECT FAILURE	李國強 LEE GUO KONG		
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項目教訓 PROJECT LESSON	李國強 LEE GUO KONG		
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項目資料 PROJECT MATERIAL	李國強 LEE GUO KONG		
項目設備 PROJECT EQUIPMENT	李國強 LEE GUO KONG		
項目工具 PROJECT TOOL	李國強 LEE GUO KONG		
項目材料 PROJECT MATERIAL	李國強 LEE GUO KONG		
項目零件 PROJECT PART	李國強 LEE GUO KONG		
項目組件 PROJECT COMPONENT	李國強 LEE GUO KONG		
項目系統 PROJECT SYSTEM	李國強 LEE GUO KONG		
項目網絡 PROJECT NETWORK	李國強 LEE GUO KONG		
項目數據 PROJECT DATA	李國強 LEE GUO KONG		
項目信息 PROJECT INFORMATION	李國強 LEE GUO KONG		
項目知識 PROJECT KNOWLEDGE	李國強 LEE GUO KONG		
項目技能 PROJECT SKILL	李國強 LEE GUO KONG		
項目能力 PROJECT CAPABILITY	李國強 LEE GUO KONG		
項目潛力 PROJECT POTENTIAL	李國強 LEE GUO KONG		

- 圖例 LEGEND:
- 1 工地範圍 Site Boundary
 - 2 正管污水流向 Normal Flow Paths
 - 3 暴雨時污水流向 Storm Flow Paths
 - 4 入水口泵喉 Inlet Pumping Main
 - 5 初步篩選 Fine Screening
 - 6 砂礫去除 Grit Removal
 - 7 初步及砂礫收集 Screening & Grit Collection
 - 8 臭味控制設施 Odour Control Facility
 - 9 流量量度 Flow Measurement
 - 10 生物處理 Biological Treatment
 - 11 鼓風機房 Blower House
 - 12 二級沉澱池 Secondary Sedimentation Tanks
 - 13 消毒設施 Disinfection Facility
 - 14 海底排污水管 Submarine Outfall
 - 15 緊急溢流管 Emergency Overflow
 - 16 污泥濃縮池 Sludge Thickeners
 - 17 污泥消化池 Sludge Digester
 - 18 污泥脫水房 Sludge Dewatering House
 - 19 化學品調控設施 Chemical Dosing Facility
 - 20 電力供應 Power Supply
 - 21 危險品貯存 Dangerous Goods Storage
 - 22 行政樓 Administration / Control Building
 - 23 員工宿舍 Staff Quarters
 - 24 第一期完成工程 Works Completed under Phase 1
 - 25 第一期完成工程後保留的現有坪洲污水處理廠設施 Units of Existing Peng Chau STW to be retained during construction of Phase 1

圖則編號 drawing no. DCM/2001/081 比例 scale N.T.S.

項目名稱 PROJECT 離島污水系統第1階段第2期K項工程
OUTLYING ISLANDS SEWERAGE STAGE 1 PHASE 2 PACKAGE K -
PENG CHAU SEWAGE TREATMENT WORKS UPGRADE

項目編號 PROJECT NO. CON/01/01/001

項目地點 PROJECT LOCATION 坪洲 PENG CHAU

項目負責人 PROJECT MANAGER 李國強 LEE GUO KONG

項目經理 PROJECT SUPERVISOR 李國強 LEE GUO KONG

項目工程師 PROJECT ENGINEER 李國強 LEE GUO KONG

項目主任 PROJECT CHIEF 李國強 LEE GUO KONG

項目副主任 PROJECT DEPUTY CHIEF 李國強 LEE GUO KONG

項目助理 PROJECT ASSISTANT 李國強 LEE GUO KONG

項目秘書 PROJECT SECRETARY 李國強 LEE GUO KONG

項目司機 PROJECT DRIVER 李國強 LEE GUO KONG

項目保安 PROJECT SECURITY 李國強 LEE GUO KONG

項目清潔 PROJECT CLEANING 李國強 LEE GUO KONG

項目維修 PROJECT MAINTENANCE 李國強 LEE GUO KONG

項目保養 PROJECT CARE 李國強 LEE GUO KONG

項目管理 PROJECT MANAGEMENT 李國強 LEE GUO KONG

項目監督 PROJECT SUPERVISION 李國強 LEE GUO KONG

項目控制 PROJECT CONTROL 李國強 LEE GUO KONG

項目協調 PROJECT COORDINATION 李國強 LEE GUO KONG

項目溝通 PROJECT COMMUNICATION 李國強 LEE GUO KONG

項目合作 PROJECT COOPERATION 李國強 LEE GUO KONG

項目支持 PROJECT SUPPORT 李國強 LEE GUO KONG

項目協助 PROJECT ASSISTANCE 李國強 LEE GUO KONG

項目服務 PROJECT SERVICE 李國強 LEE GUO KONG

項目保障 PROJECT GUARANTEE 李國強 LEE GUO KONG

項目承諾 PROJECT COMMITMENT 李國強 LEE GUO KONG

項目責任 PROJECT RESPONSIBILITY 李國強 LEE GUO KONG

項目義務 PROJECT DUTY 李國強 LEE GUO KONG

項目權利 PROJECT RIGHT 李國強 LEE GUO KONG

項目利益 PROJECT INTEREST 李國強 LEE GUO KONG

項目損失 PROJECT LOSS 李國強 LEE GUO KONG

項目風險 PROJECT RISK 李國強 LEE GUO KONG

項目機會 PROJECT OPPORTUNITY 李國強 LEE GUO KONG

項目挑戰 PROJECT CHALLENGE 李國強 LEE GUO KONG

項目障礙 PROJECT OBSTACLE 李國強 LEE GUO KONG

項目困難 PROJECT DIFFICULTY 李國強 LEE GUO KONG

項目問題 PROJECT PROBLEM 李國強 LEE GUO KONG

項目解決 PROJECT SOLUTION 李國強 LEE GUO KONG

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項目網絡 PROJECT NETWORK 李國強 LEE GUO KONG

項目數據 PROJECT DATA 李國強 LEE GUO KONG

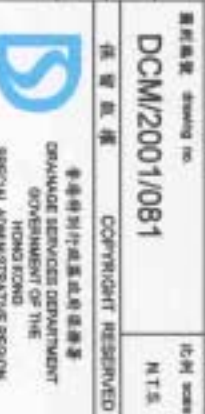
項目信息 PROJECT INFORMATION 李國強 LEE GUO KONG

項目知識 PROJECT KNOWLEDGE 李國強 LEE GUO KONG

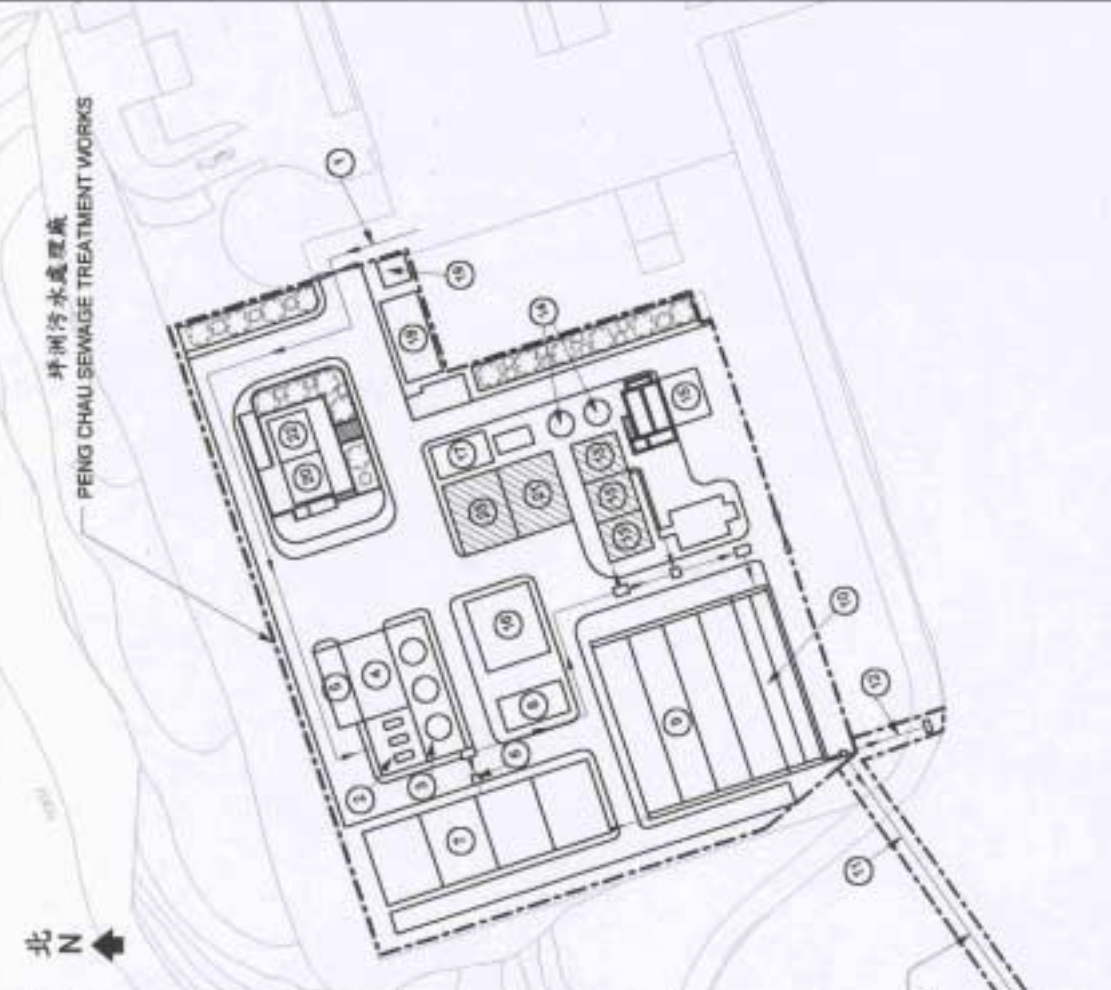
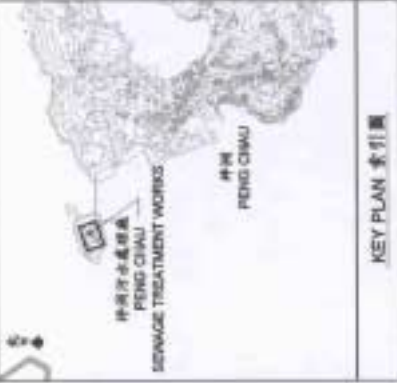
項目技能 PROJECT SKILL 李國強 LEE GUO KONG

項目能力 PROJECT CAPABILITY 李國強 LEE GUO KONG

項目潛力 PROJECT POTENTIAL 李國強 LEE GUO KONG



香港特別行政區政府
DEPARTMENT OF THE SPECIAL ADMINISTRATIVE REGION



圖例
LEGEND:

- 1 工地範圍 Site Boundary
- 2 入水口泵喉 Inlet Pumping Main
- 3 幼砂過濾 Fine Screening
- 4 砂礫去除 Grit Removal
- 5 幼砂及砂礫收集 Screening & Grit Collection
- 6 臭味控制設施 Odour Control Facility
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- 19 電力供應 Power Supply
- 20 危險品貯存 Dangerous Goods Storage
- 21 行政樓 Administration / Control Building
- 22 工場 Workshop
- 23 員工宿舍 Staff Quarters
- 24 污泥餅貯存 Sludge Cake Storage
- 25 第二期完成工程 Works Completed under Phase 2

圖則名稱 Drawing No.	DCM/2001/080			比例 Scale	N.T.S.
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繪圖者 Drawn	C.W. CHAN	日期 Date	22-11-2001	香港特別行政區政府康樂署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION	
	核對者 Checked	K.C. KWOK	日期 Date		22-11-2001
批准者 Approved	S.K. WONG	日期 Date	22-11-2001		
部門 Office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION				

離島污水系統第1階段第2期工程
- 坪洲污水處理廠改善工程 - 第二期工程完成後可能的藍圖
OUTLYING ISLANDS SEWERAGE STAGE 1 PHASE 2 PACKAGE K -
PENG CHAU SEWAGE TREATMENT WORKS UPGRADE -
POTENTIAL LAYOUT FOR PHASE 2 COMPLETION