

Contents

1	BASIC INFORMATION	1
1.1	Project Title	1
1.2	Purpose and Nature of the Project	1
1.3	Name of the Project Proponent	1
1.4	Location and Scale of the Project	1
1.5	Types of Designated Project Involved	2
1.6	Name and Telephone Number of Contact Persons	2
2	OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME	2
2.1	Project Implementation	2
2.2	Interactions with Other Projects	2
3	POSSIBLE IMPACT ON THE ENVIRONMENT	3
3.1	Outline Process Involved	3
3.2	Possible Environmental Impacts During Construction of the Project	3
3.2.1	Introduction	3
3.2.2	Noise	3
3.2.3	Air Quality Impacts	4
3.2.4	Water Quality Impacts	4
3.2.5	Waste Impacts	4
3.2.6	Visual Impacts	4
3.2.7	Ecological Impacts	4
3.2.8	Traffic Impacts	4
3.3	Possible Environmental Impacts During Operation of the Project	5
3.3.1	Noise	5
3.3.2	Air Quality Impacts	5
3.3.3	Water Quality Impacts	5
3.3.4	Waste Impacts	5
3.3.5	Visual Impacts	6
3.3.6	Ecological Impacts	6
3.3.7	Traffic Impacts	6
4	MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT	6
4.1	Existing and Planned Sensitive Receivers and Sensitive Parts of the Natural Environment	6
4.2	Major Elements of the Surrounding Environment which might affect the Area in which the Project is Located	7
5	ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED INTO THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS	7
5.1	Construction Stage	7
5.1.1	Noise Impacts	7
5.1.2	Air Quality Impacts	7
5.1.3	Water Quality Impacts	7
5.1.4	Waste Impacts	8
5.1.5	Visual Impacts	8
5.1.6	Ecological Impacts	8
5.1.7	Traffic Impacts	8
5.2	Operational Impacts	9
5.2.1	Noise	9
5.2.2	Air Quality	9
5.2.3	Water Quality	9
5.2.4	Waste Impacts	10
5.2.5	Visual Impacts	10
5.2.6	Ecological Impacts	10
5.2.7	Traffic Impacts	10
5.3	Conclusion	11

Annex A Implementation Programme

Annex B Figures

- B.1 – General Layout of Ngong Ping Sewerage Scheme
- B.2 – Ngong Ping STW Layout and Details of Treatment Units
- B.3 – Ngong Ping STW Layout (Main Treatment Area)
- B.4 – Ngong Ping Preliminary Effluent Export Route (sheet 1 of 9)
- B.5 – Ngong Ping Preliminary Effluent Export Route (sheet 2 of 9)
- B.6 – Ngong Ping Preliminary Effluent Export Route (sheet 3 of 9)
- B.7 – Ngong Ping Preliminary Effluent Export Route (sheet 4 of 9)
- B.8 – Ngong Ping Preliminary Effluent Export Route (sheet 5 of 9)
- B.9 – Ngong Ping Preliminary Effluent Export Route (sheet 6 of 9)
- B.10 – Ngong Ping Preliminary Effluent Export Route (sheet 7 of 9)
- B.11 – Ngong Ping Preliminary Effluent Export Route (sheet 8 of 9)
- B.12 – Ngong Ping Preliminary Effluent Export Route (sheet 9 of 9)
- B.13 – Ngong Ping village sewerage layout

Annex C Photographs

- C1: General View of Proposed Sewage Treatment Works Site
- C2: General View (1) of Proposed Temporary Works Area at south end of Sham Wat Road
- C3: General View (2) of Proposed Temporary Works Area at south end of Sham Wat Road

1 BASIC INFORMATION

1.1 Project Title

The title of this Project is:

“Ngong Ping Sewage Treatment Works and Sewerage”.

1.2 Purpose and Nature of the Project

The aim of the Project is to provide sewage infrastructure to serve the entire Ngong Ping area on Lantau Island to meet the demands of both the existing and future developments in the catchment. The key elements of the Project are:

- i) Construction of a sewage collection system at Ngong Ping;
- ii) Construction of a sewage treatment works (STW) to provide biological and tertiary treatment with disinfection;
- iii) Provision of sludge treatment and disposal facilities;
- iv) Construction of an effluent pipeline to convey the treated effluent from the STW to Tai O for discharge.

1.3 Name of the Project Proponent

Chief Engineer, Consultant Management Division, Drainage Services Department

1.4 Location and Scale of the Project

The sewerage network will serve all areas of Ngong Ping, including the village houses, youth hostel, monasteries, proposed cable car terminal and associated developments. The village sewers within Ngong Ping will be 150 mm or 225 mm diameter and will be constructed in trenches 700 mm wide. A small pump chamber, which will be required in the northern part of the village to lift flows from a low-lying area into the main gravity sewerage network, will be an enlarged manhole below ground. The main trunk sewer downstream of the existing public toilets and the proposed cable car terminal will be 500 mm diameter and will be constructed within a trench 1300 mm wide.

The STW will be located west of Ngong Ping, on the north side of Ngong Ping Road. The effluent pipeline, which will be 300 mm diameter and installed in a trench 800 mm wide, will be located within the two-lane road from Ngong Ping to Tai O. A monitoring and pumping station will be required east of Tai O, comprising below-ground facilities apart from an above-ground control panel kiosk. The discharge point will be near the bus terminus at Tai O, either via the existing flood control pumping station bypass culvert or alongside this culvert. The locations of these works are shown in Annex B.

The trunk sewers and effluent pipeline will be capable of conveying ultimate flows of up to 139 L/sec. The land allocation at the STW will also be sufficient for such flows.

The proposed site for the Ngong Ping STW is an undeveloped plot of land currently managed by DLO. The monitoring and pumping station will be within an existing lay-by. The proposed alignments of the effluent export pipeline, trunk sewer and the village sewers run along existing public roads or footpaths. The necessary temporary works areas for construction of the effluent pipeline will be located at an existing lay-by along Tai O Road and also on existing cleared land

at the south end of Sham Wat Road. Both of these areas have been used as temporary works areas for the construction of previous infrastructure projects.

1.5 Types of Designated Project Involved

Based on the definition as listed in Schedule 2 of the EIA Ordinance, the following work items are classified as designated projects:

- About 3 km of the Ngong Ping effluent export pipeline lies within the boundary of the North Lantau Country Park and is thus a designated project under Category Q.1;
- Part of the Ngong Ping village sewers will be laid within "Conservation Area" zone and is a designated project under Category Q.1.

1.6 Name and Telephone Number of Contact Persons

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Implementation

Site investigation, EIA, detailed design and construction supervision / contract administration of all packages will be carried out by consultants under the management of Drainage Services Department. The implementation programme is shown in Annex A.

The project is divided into the following three packages:

Package 1 – Ngong Ping STW

Package 2 – Ngong Ping main trunk sewer and effluent export pipeline

Package 3 – Ngong Ping village sewerage system.

The construction works of Packages 1 and 2 will be carried out under one single contract. The implementation of these packages simultaneously will ensure a close co-ordination among the works packages which are required to serve the cable car project and the main public toilets at Ngong Ping. The construction work for these packages will take place between late 2003 and early 2006.

Package 3 is also important to achieve the overall project objectives. This package is likely to be a separate contract, as it depends on progress with land acquisition. The construction work for this package will take place between late 2005 and early 2007.

2.2 Interactions with Other Projects

The Tung Chung-Ngong Ping cable car project is scheduled to be commissioned in early 2006. Hence, the construction of the sewerage and sewage treatment project will be in progress at the same time as construction of the cable car terminal. Also, WSD has proposed a project for the provision of water supply to Ngong Ping. A large section of the proposed water pipe alignment at Ngong Ping runs in parallel with the proposed village sewer alignment. The estimated completion date of the entire water pipeline is early 2006. The cumulative impacts on traffic and the environment will need to be considered.

3 POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 Outline Process Involved

The village sewerage system will operate almost entirely by gravity.

The treatment process is designed to provide a high quality effluent and a high degree of security without occupying a large area of land (Figures B2 and B3). The preliminary design incorporates the following units:

- inlet pumping station
- grit removal and fine screening
- biological treatment by an intermittent activated sludge process (requiring no primary sedimentation tanks or final clarifiers)
- tertiary treatment with gravity filters
- disinfection using ultra-violet irradiation
- sludge thickening, digestion, dewatering and storage.

A balancing tank will be incorporated upstream of the filters. In addition, an emergency storage tank will be constructed to allow for at least 48 hours storage of effluent at peak day flows in addition to the storage available in the balancing tank. The emergency storage tank would be used in the unlikely event of a major problem with the effluent pipeline.

The majority of the effluent pipeline will operate by gravity. An effluent pumping and monitoring station will be constructed east of Tai O. Flows monitored at this station will be compared with those monitored at the STW to check for any possible leakage from the effluent pipeline.

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 which could generate impact. The sensitive receivers are described in Section 4.

3.2.2 Noise

Rock blasting or breaking of boulders may be necessary during site formation stage. Construction noise may arise from the rock excavation and non-percussive piling activities during construction of the Ngong Ping STW. Noise generated from construction of village sewers may also have impacts to local village residents and tourists to the Po Lin Monastery and the Buddha Statue.

3.2.3 Air Quality Impacts

Dust emission could be generated from construction activities such as excavation and site preparation. This applies to the treatment works, village sewers and effluent pipeline.

3.2.4 Water Quality Impacts

The village sewers, treatment works and a large section of the effluent export pipeline will be constructed within sensitive areas. The water quality of local streams will need to be protected from impacts from site runoff and discharges of groundwater from excavations.

3.2.5 Waste Impacts

Wastes generated during the construction phase will include

- Waste spoil from site clearance, site preparation, excavation and earthworks;
- Waste construction material such as wood, metal scraps and concrete;
- Worker generated general waste;
- Chemical wastes from maintenance of plant and equipment.

3.2.6 Visual Impacts

The proposed STW site would not require the felling of trees, and no streams cross the STW site. The visual impact of the STW during construction will need to be reviewed in detail in the EIA. The construction of the Ngong Ping village sewers, trunk sewer and effluent export pipeline would also induce temporary visual impacts which could affect the scenic value of the area.

3.2.7 Ecological Impacts

The STW site is situated in a low scrub area mainly covered with grass with occasional shrubs (Figure C1). Construction of the STW will entail minimal clearance of such shrubs.

Water quality, dust and noise impacts need to be controlled to protect the sensitive ecology of the area, particularly for certain parts of the village sewerage and effluent export pipeline routes (see Section 5). All the sewers, pipelines and pumping/monitoring facilities will be located in existing carriageways, lay-bys or footpaths, and one of the temporary works areas will also be located in an existing lay-by. The other temporary works area will use land previously used for a similar purpose at the south end of Sham Wat Road (Figures C2 and C3). None of these construction and temporary works areas will be on previously undisturbed land.

3.2.8 Traffic Impacts

Construction materials for the STW, village sewers and effluent pipeline will need to be delivered to the site and the temporary storage areas. Spoil and waste materials will need to be removed via the same two-lane roads. Temporary closure of one lane would be required during pipeline construction.

3.3 Possible Environmental Impacts During Operation of the Project

3.3.1 Noise

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.

Noise will also be generated by occasional site traffic for materials deliveries and collection of residuals.

Noise from the small pump chamber in Ngong Ping village and the pumping/monitoring station east of Tai O should also be considered, although these are small facilities which will utilise submersible pumps.

3.3.2 Air Quality Impacts

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 (pumping station, screens and grit removal, and the associated screenings and grit washing facilities). The raw sewage is likely to be of relatively high strength but will be relatively 'fresh'. Nevertheless, it is possible that hydrogen sulphide gas could escape at the inlet works. Mercaptans, indoles and skatoles are other compounds often found in sewage which can escape into the atmosphere and cause odour problems. The sludge treatment facilities are also potential odour sources, although aerobic digestion is incorporated to stabilise the sludge.

The main biological and tertiary processes are likely to be substantially odour free, but this also needs to be examined in more detail in relation to the sensitivity of the site location.

3.3.3 Water Quality Impacts

Under normal flow conditions, the sewage collected by the village sewers would first pass through the preliminary treatment units at the STW. The screened sewage then receives secondary treatment before flowing into the flow balancing tanks, which would even out the hydraulic peaks to ensure satisfactory performance of downstream units. The treated effluent would then be filtered, disinfected and discharged via the effluent pipeline at the western mouth of the Tai O creek.

Initial conclusions that the effluent discharge will be acceptable have been based on available survey data, some of which has been extrapolated. Confirmation is required based on a more detailed quantitative water quality assessment.

Impacts could also occur as a result of unusual circumstances such as interruption of power supply or damage to the effluent pipeline.

3.3.4 Waste Impacts

Waste generated in the operation phase will principally be gross solids (screenings and grit) and sludge from the STW. The disposal route could utilise South Lantau Road and Tung Chung Road or alternatively the wastes could be conveyed via the refuse transfer station at Mui Wo.

Impacts could also occur as a result of unusual circumstances such as interruption of the disposal route due to landslides.

3.3.5 Visual Impacts

The above ground structures at Ngong Ping STW may induce visual impacts. The STW will not incorporate any tall structures, but the exact profile of the STW remains to be determined.

A small above ground structure will also be required at the monitoring/pumping station near Tai O.

3.3.6 Ecological Impacts

Pipe leakage could potentially affect water quality and hence local sensitive ecology.

3.3.7 Traffic Impacts

The delivery of materials and the removal of sludge will be an infrequent exercise which could have a minor impact on traffic flow.

4 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

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

The existing and planned sensitive receivers which may be affected by the various packages of the project include:

- a) **Local village residents and visitors to the youth hostel or the Po Lin Monastery** may experience some construction noise, dust and visual pollution problems, as well as limited access to the village houses.
- b) **Visitors to the Big Buddha** may experience adverse visual impacts during the construction of the STW and the village sewers.
- c) **The proposed cable car terminal developments** are within 250m from the STW and may be affected by odour problems during the STW operation. The exact location and extent of the terminal are not known at present. The STW and sewers and the cable car terminal will be under construction at the same time, so the cable car terminal is not considered to be a sensitive receiver during the construction stage.
- d) **The Ngong Ping Site of Special Scientific Interest (SSSI)** is close to the proposed alignment of one section of village sewers and may be affected by pollution problems during sewer construction.
- e) Part of the village sewers will be laid within the “**Conservation Area**” zone as defined in the Development Permission Area Plan (DPA/I-NP/1) issued in 1999.
- f) A large section of the effluent export pipeline is within the **North Lantau Country Park**. Visitors to the Country Park, including its barbecue sites, could be affected by the construction works.
- g) A large section of the effluent export pipeline is within the **Water Gathering Ground of Shek Pik Reservoir**.
- h) At the downstream end of the effluent export pipeline, the pipeline will be laid close to an existing **mangrove marsh** to the east of Lung Tin Estate.
- i) The effluent pipeline will be constructed along the main access road into Tai O and alongside the bus terminus. **Users of the road and visitors to Tai O** could experience some delays, noise and dust during construction.
- j) part of the effluent export pipeline will be laid within the **Tai O Archaeological Site**.

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 construction of the cable car terminal and a water supply pipeline at the same time as the construction of this Project 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 Impacts

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 the Ngong Ping area and along the potential export route and the ASR is classified as A. Preliminary assessment in accordance with the TM indicates noise at the nearest NSRs of Buddha Statue and buildings 160 m north of the STW sites due to rock excavation and non-percussive piling will be within the day time limit.

Along the effluent export pipeline alignment, country park users at barbecue sites and other leisure areas may be affected by noise from road breaking. Mitigation measures should be developed to limit the construction noise within statutory requirements.

5.1.2 Air Quality Impacts

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 such as village houses, the Po Lin Monastery, the Ngong Ping Youth Hostel, and the Big Buddha.

Mitigation measures will be required to reduce the dust emissions, particularly within Ngong Ping and close to barbecue sites. 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 Impacts

The village sewers, treatment works and a large section of the effluent export pipeline will be constructed within the water gathering ground. The contractor will be required to comply with conditions laid down by WSD for protection of the water quality in the area. Special requirements will also be specified for protection of the SSSI.

5.1.4 Waste Impacts

Waste generated in the construction stage will be properly disposed of in accordance with the Waste Disposal Ordinance. Chemical wastes 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 Impacts

Key potential viewpoints during construction will be Ngong Ping Road and the podium of the Big Buddha. Setting the treatment facilities back from the road and specifying suitable site boundary hoardings would help to mitigate the impact to road users. The impact from the podium of the Big Buddha would be more difficult to mitigate, particularly in view of the likelihood that construction of the nearby cable car terminal would be in progress at the same time. Visual impact during construction will therefore need to be reviewed in detail in the EIA.

Construction of the Ngong Ping village sewers and trunk sewer would induce visual impacts to key viewpoints. The trench for effluent export pipeline construction would also induce visual impacts to coach visitors to Ngong Ping and Tai O. Mitigation measures are required to preserve the scenery at Ngong Ping and surrounding areas during construction phase, including close control over the number and length of trench excavations which shall be permitted at any one time.

5.1.6 Ecological Impacts

There is a Site of Special Scientific Interest (SSSI) south of the monastery. Romer's tree frogs are identified living along the stream flowing through this SSSI. Several upstream sections of the village sewers are immediately adjacent to the SSSI. Appropriate mitigation measures for noise and dust control should be provided. In addition, the particular specification should contain requirements to ensure that dewatering of excavations for construction of the nearby sewers does not affect the stream in the SSSI. The possibility of scheduling works outside the breeding season of the Romer's tree frogs to further reduce the potential impacts should also be investigated.

At the downstream end of the effluent export pipeline, the pipeline will be laid close to an existing mangrove marsh to the east of Lung Tin Estate. Appropriate mitigation measures would be required to protect the mangroves during construction.

5.1.7 Traffic Impacts

The roads affected by excavation for pipeline installation are double-lane roads. Temporary closure of one lane would be required during pipeline construction. This is unlikely to cause unacceptable inconvenience if appropriate traffic management schemes are implemented as traffic flows are expected to remain light and at least one lane will be open to traffic at all times.

For access from further afield, it is noted that Tung Chung Road is narrow, with steep gradients, and is subject to restricted access/prohibitions, in particular for vehicles over 5.5 tonnes. Consideration could be given to delivery of certain construction materials by sea for onward transfer to Ngong Ping.

5.2 Operational Impacts

5.2.1 Noise

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

Noise from the small pump chamber in Ngong Ping village and the pumping/monitoring station east of Tai O is unlikely to cause problems as these are small facilities which will utilise submersible pumps.

5.2.2 Air Quality

No long pumping mains will be required in the upstream sewerage system, and the gravity sewerage will be designed with adequate gradients and low residence time. Therefore, it is not expected that the levels of hydrogen sulphide generated will be high enough to cause significant odour problems in the sewerage system.

Furthermore, the effluent will be of high quality and low in oxygen demand, and the majority of the effluent pipeline will operate by gravity. Therefore, no odour problems are expected in the operation of the effluent pipeline.

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. Given the sensitivity of the STW location, it is important that deodorization facilities are designed to avoid secondary impacts such as unsightly appearance.

5.2.3 Water Quality

Under normal flow conditions, the effluent will be of high quality and the impacts on Tai O creek and Tai O Bay are expected to be acceptable.

The discharge location is not far from the boundary of Hong Kong SAR. However, based on the available information and the proposed level of treatment, the impact of the discharge is expected to be undetectable in Mainland waters.

The Project will yield high benefits for water quality in the Ngong Ping area and protect the quality of water diverted from the catchment to Shek Pik reservoir.

In view of the sensitivity of the area, several special precautionary measures will be adopted:

- Ductile iron pipe will be used for all the Ngong Ping village sewers and effluent pipeline for its robustness, because the area is within the water gathering ground.
- The maximum distance between manholes would be limited to 40 m to facilitate over-pumping operations during sewer inspection or maintenance.
- Standby units, emergency power generation and emergency storage facilities will be provided at Ngong Ping STW to avoid the need for emergency discharges.
- The effluent will be treated to tertiary standard such that the impact to local water quality in the unlikely event of pipe leakage will be small. As a result of the high quality effluent and steep gradient, there would be minimal chance of effluent pipeline blockage.

Nevertheless, careful monitoring of the export pipeline would still be necessary to protect the highly sensitive environment at Ngong Ping. Routine flow monitoring will be carried out at both the upstream end (STW) and downstream of the water gathering ground and country park (monitoring/pumping station) to ensure early detection of any major leakage. An Action Plan should be prepared and should be followed in the event that pipe leakage is suspected or identified. Temporary diversion of effluent to the emergency storage tank at the STW could be arranged to provide a no-flow condition for the repair of the effluent pipeline.

5.2.4 Waste Impacts

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 trucked away for disposal at landfill. The project is unlikely to create local waste problems if properly managed. 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 Visual Impacts

Key potential viewpoints include the Ngong Ping Road, the proposed cable car and terminal and the podium of the Big Buddha.

A low profile STW could be considered to limit the potential visual impacts, but this could increase construction costs and noise generated by excavation in rock. An alternative which may be preferable would be to enclose the main treatment units in buildings, the exterior appearance of which would be designed to be in keeping with the surroundings.

Setting the treatment facilities back from the road would help to mitigate the impact to road users. Suitable buffer and landscaping features along the boundary of the STW will be required to minimise environmental impacts and to shield the STW from view. Such features will be required along several boundaries. Sufficient space must be allowed in the layout of the STW for such landscaping. The layout may need to be adapted to suit these requirements once the extent of the proposed cable car terminal is known.

The monitoring/pumping station east of Tai O will comprise mostly underground facilities, but an above ground control cabinet will be visible.

5.2.6 Ecological Impacts

The only aspect of concern during operation would be the possibility of sewer or effluent pipe leakage. The measures described in Section 5.2.3 are relevant.

5.2.7 Traffic Impacts

The residuals (screenings, grit, sludge) produced in the STW will be trucked away for off-site disposal. Treatment residuals could be transported via South Lantau Road and Tung Chung Road or alternatively to Mui Wo for onward transfer together with residuals from Mui Wo STW or via the nearby refuse transfer station.

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 detailed 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. Particular aspects to be followed up in the EIA were identified, including the cumulative impacts of the construction of this Project at the same time as the cable car and water supply pipeline projects. Mitigation measures will be required and have been suggested to ensure that impacts will be within acceptable limits.

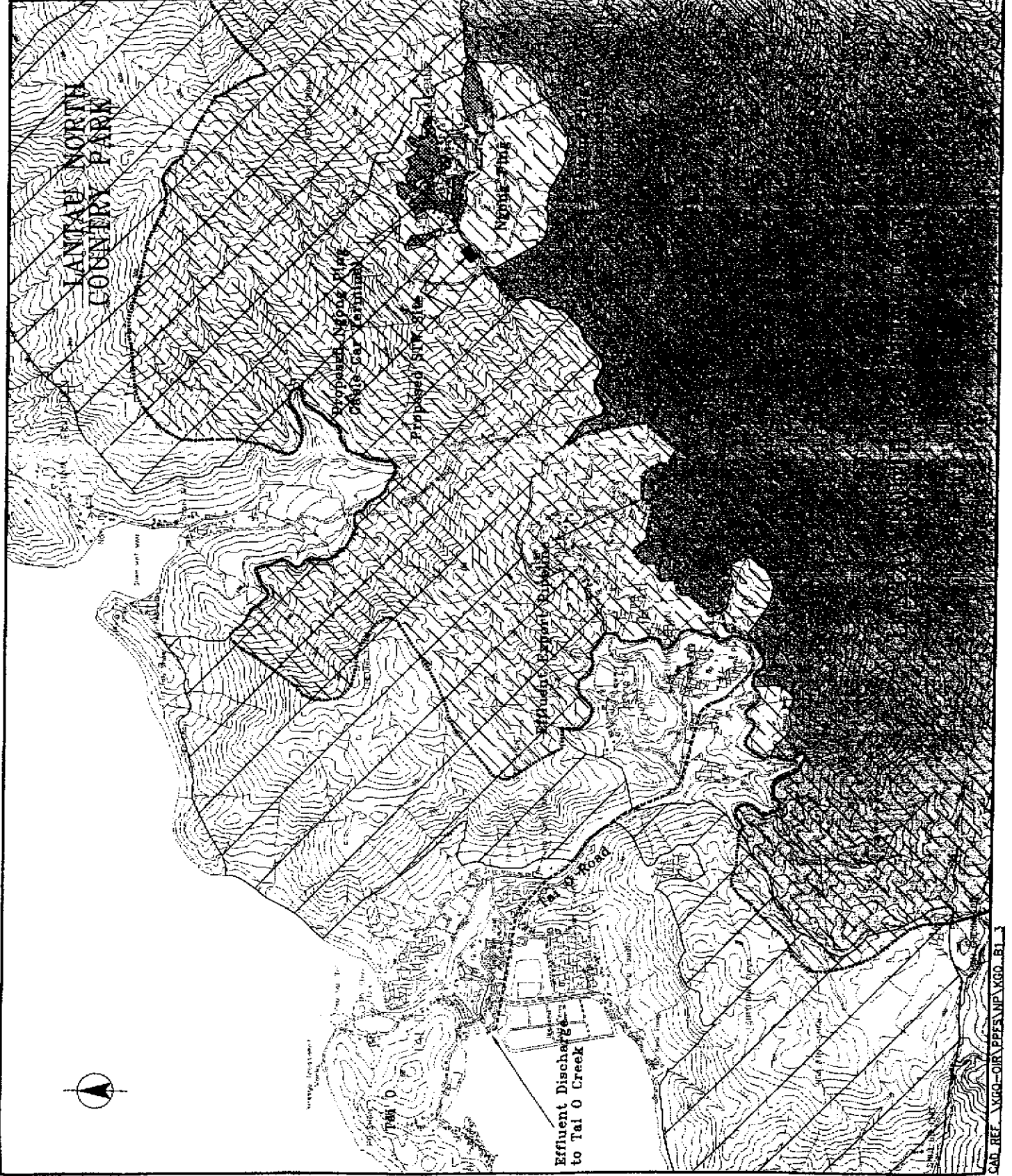
Annex A

Implementation Programme

Annex B

Figures

Figure B1
 Ngong Ping Sewage
 Collection and
 Treatment



LEGEND

----- Effluent Export Pipeline

Village Sewerage Catchment Area

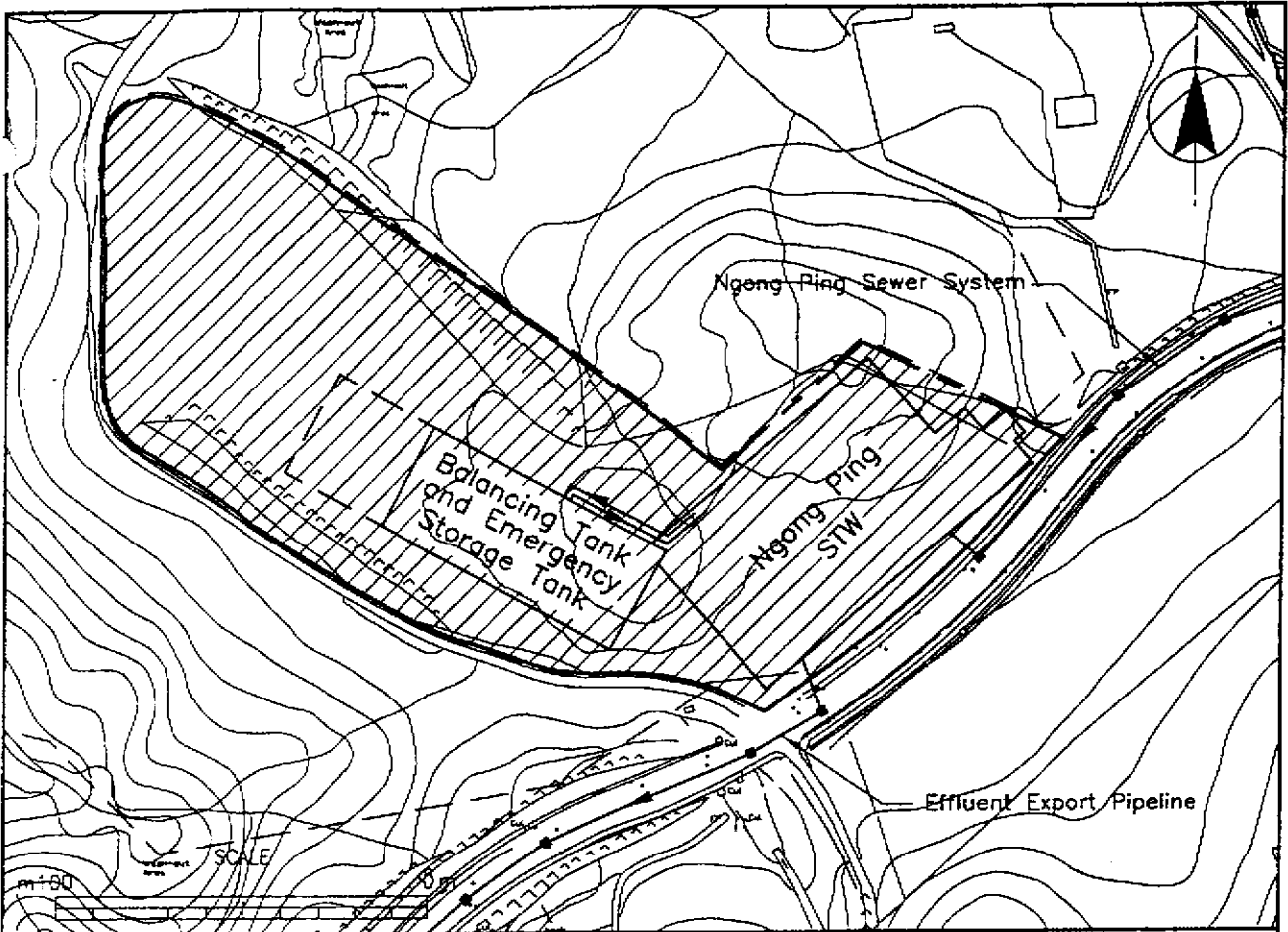
Lantau North Country Park

Lantau South Country Park

Water Gathering Ground

0 m
 1000 m
 SCALE





Legend

- Proposed pipeline and manhole
- - - - Existing licensed land
- ▨ Land Allocation Boundary

Dimensions of major sewage treatment units

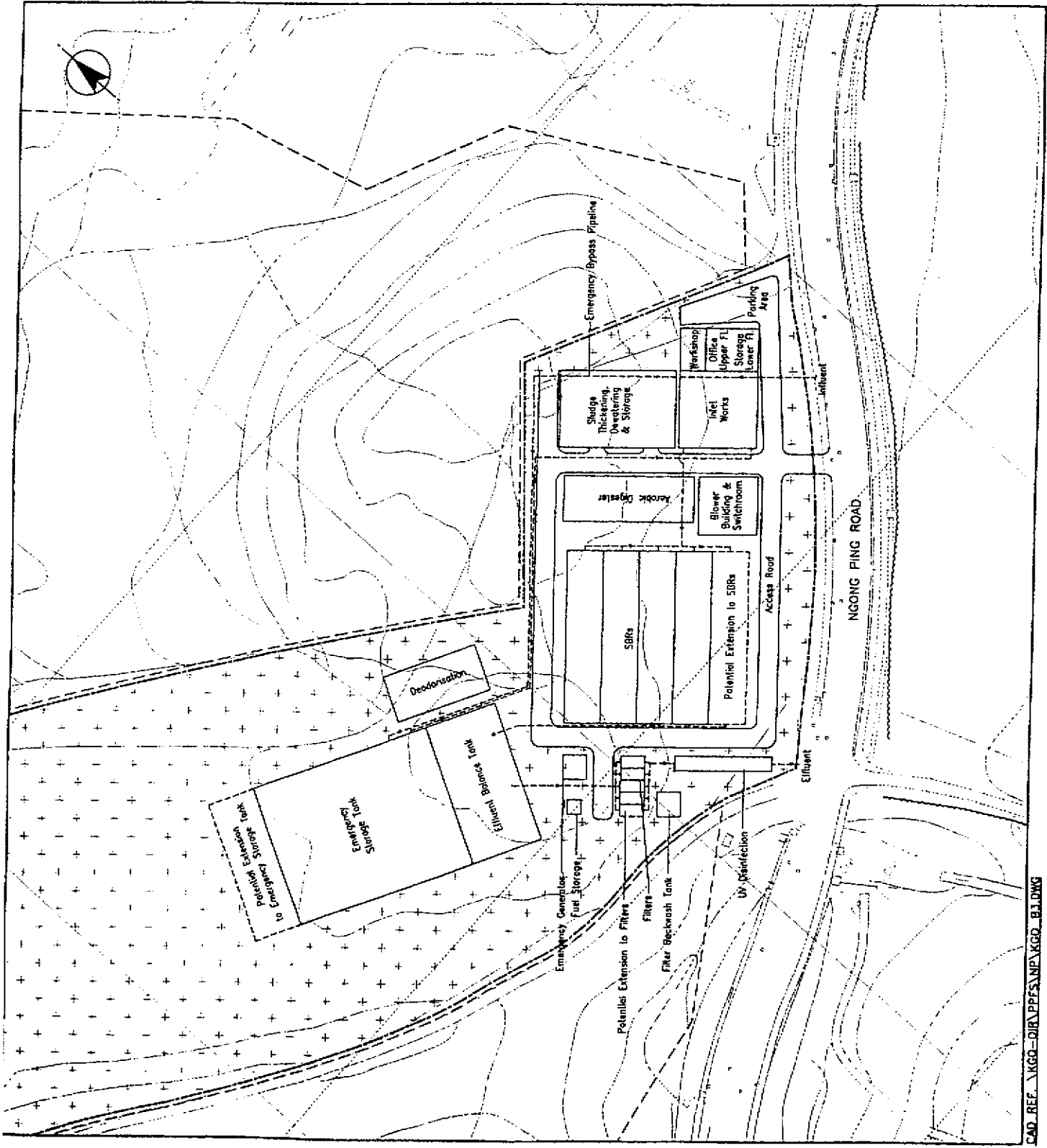
Design flow = 2889m³/d (ADWF, peak day)
 = 102 l/s (peak flow)
 Design load = 1271 kg BOD/day (peak day)

- Inlet Works : 16m(L)x16m(W)x5m(D)
- Submersible Sewage Pump : 2/1S @ 60L/s, 10m head
- Fine Screens : 10/1S @ 140L/s, capacity
- Detritor : 10/1S @ 3m diameter (capacity=100L/s)
- SBR : 3/1S @ 36m(L)x7.5m(W)x4m(D)
- Sludge Thickener : 10/1S @ 4m diameter, 3.5m (nominal depth)
- Aerobic Digester : 10 @ 28m(L)x8.4m(W)x4m(D)
- Sludge Dewatering House : 1 @ 24m(L)x16m(W)x6m(D)
- Dewatering Facility : 10/1S filter press
- Tertiary Filters : 40 @ 3.8m(L)x2.1m(W)x2.5m(D)
- Backwash Supply Tank : 10 @ 5m(L)x4m(W)x2.5m(D)
- Disinfection Facility : 1 channel with 10/1S banks @ 12 lamps (Capacity=3xDWF)
- Emergency Storage Tank : 1S @ 48m(L)x30m(W)x4m(D)
- Flow balancing portion : 10 @ 30m(L)x15m(W)x2.5m(D) (6-hour retention)
- Deodorisation Building : 1 @ 20m(L)x10m(W)x2.5m(D)

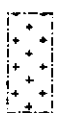
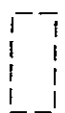

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Figure No. B.2 Ngong Ping STW Layout and Details of Treatment Units

Figur B3
 Potencial Layout
 for Ngong Ping STW

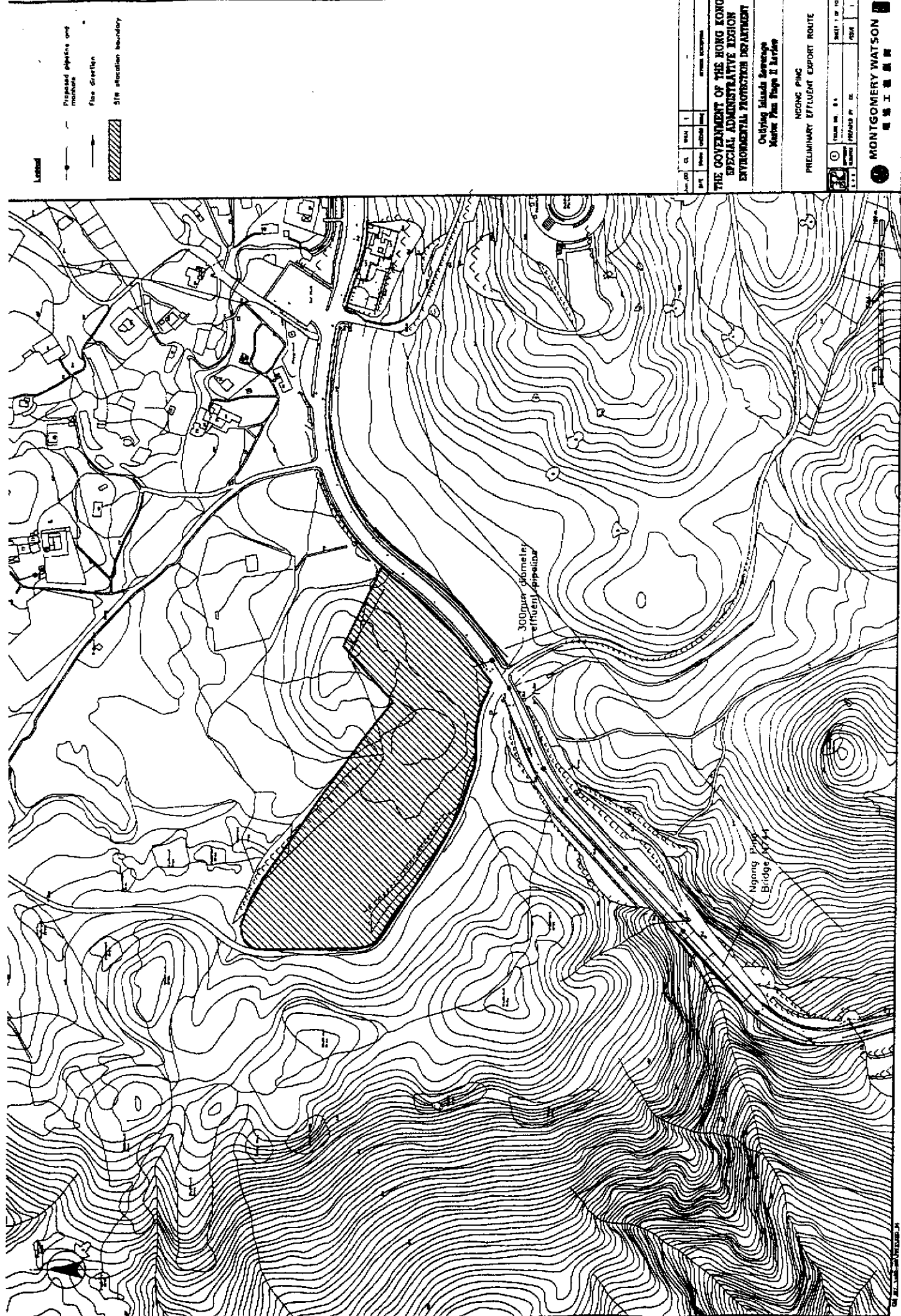


LEGEND

-  Landscaping
-  Licensed Land Boundary
-  Land Allocation Boundary



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 蒙 特 工 務 有 限 公 司



Legend

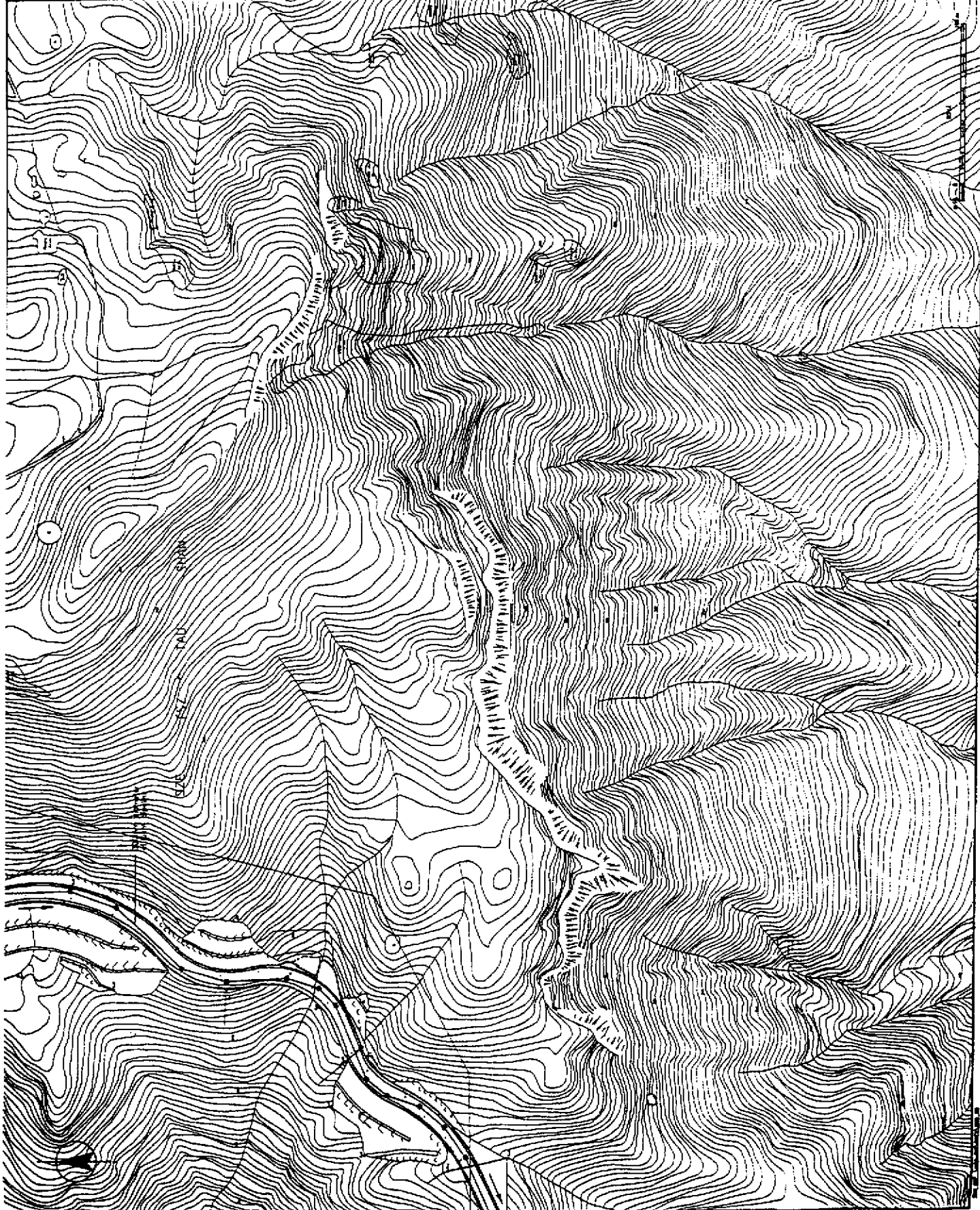
- Proposed pipelines and mainline
- Site boundary
- Proposed pipelines and mainline
- Site boundary

NOONG PING
 PRELIMINARY EFFLUENT EXPORT ROUTE
 Outlying Islands Sewerage
 Master Plan Stage II Land

THE GOVERNMENT OF THE HONG KONG
 SPECIAL ADMINISTRATIVE REGION
 ENVIRONMENTAL PROTECTION DEPARTMENT

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NOONG PING	NOONG PING	NOONG PING	NOONG PING
NOONG PING	NOONG PING	NOONG PING	NOONG PING
NOONG PING	NOONG PING	NOONG PING	NOONG PING

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Legend

- Proposed effluent route
- Flow direction

SHEET INFORMATION	
NO. OF SHEETS	1
SHEET NO.	1
DATE	

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ENVIRONMENTAL PROTECTION DEPARTMENT

Outlying Islands Sewerage
Master Plan Stage II Service

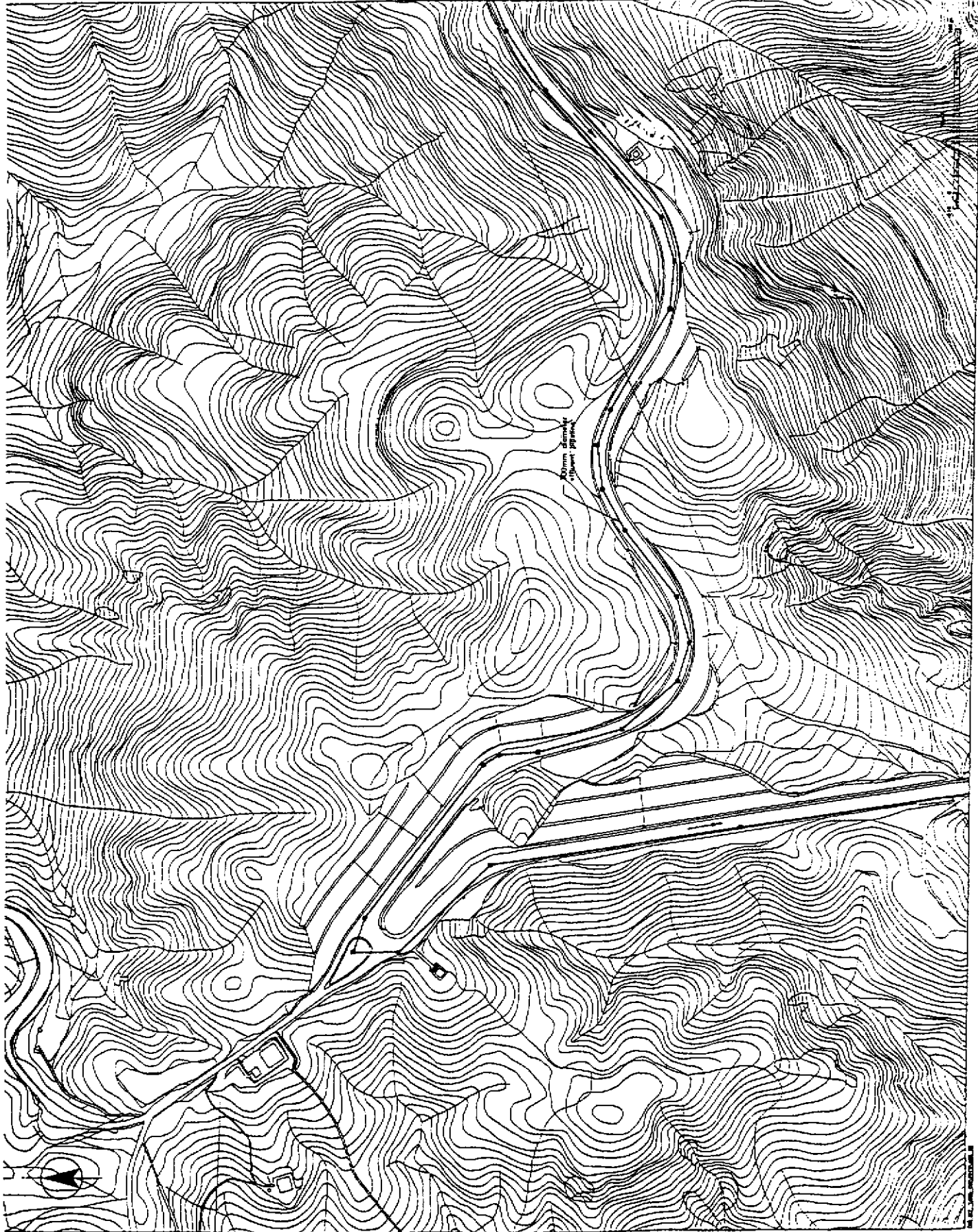
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PRELIMINARY EFFLUENT EXPORT ROUTE

SCALE	1:10,000
DATE	1987.10.10
PROJECT NO.	100/87
DRAWN BY	1
CHECKED BY	1

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Legend

- Proposed pipeline
- The location



Scale	1:50,000	1:25,000	1:10,000	1:5,000
Scale	1:50,000	1:25,000	1:10,000	1:5,000

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SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

Existing Island Sewerage
Master Plan Stage II Review

HONGKONG P&O
PRELIMINARY EFFLUENT EXPORT ROUTE

Project No.	11	Scale	1:50,000
Sheet No.	11	Revision	1
Drawn by	11	Checked by	11

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MONTGOMERY WATSON

Legend

Proposed pipeline

Flow direction

NO.	DATE	BY	REVISION

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SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

City/ing Waste Sewerage
Mokou Tsan Hoys II Surface

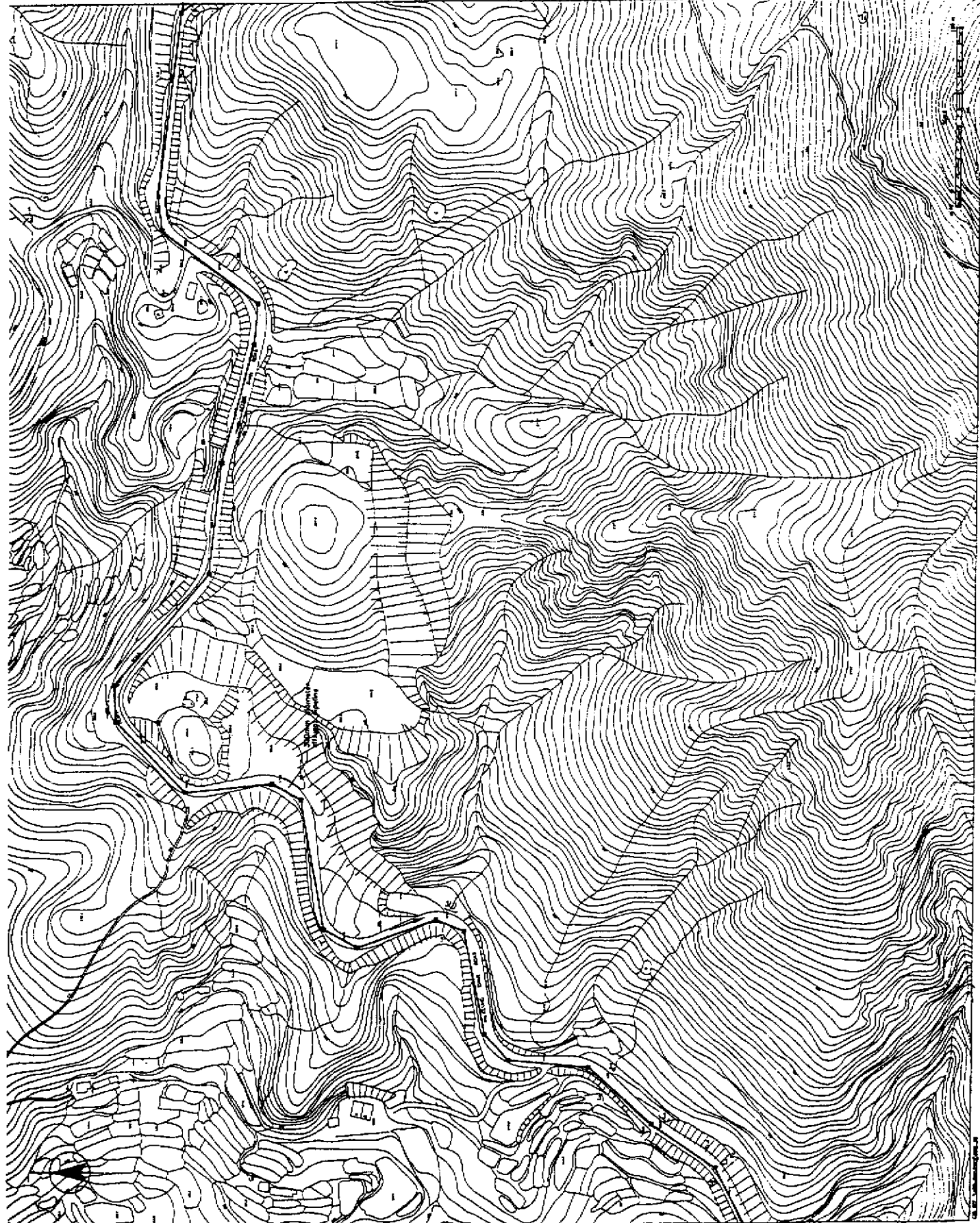
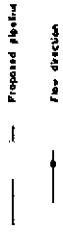
HONG KONG
PRELIMINARY EFFLUENT EXPORT ROUTE

PROJECT NO.	81	DATE	1/10/78
PROJECT BY	DC	SCALE	1

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工程顧問



Legend



Scale		Vertical Datum	
Horizontal	Vertical	Mean Sea Level	Mean High Water
1:10,000	1:10,000	MSL	MHW

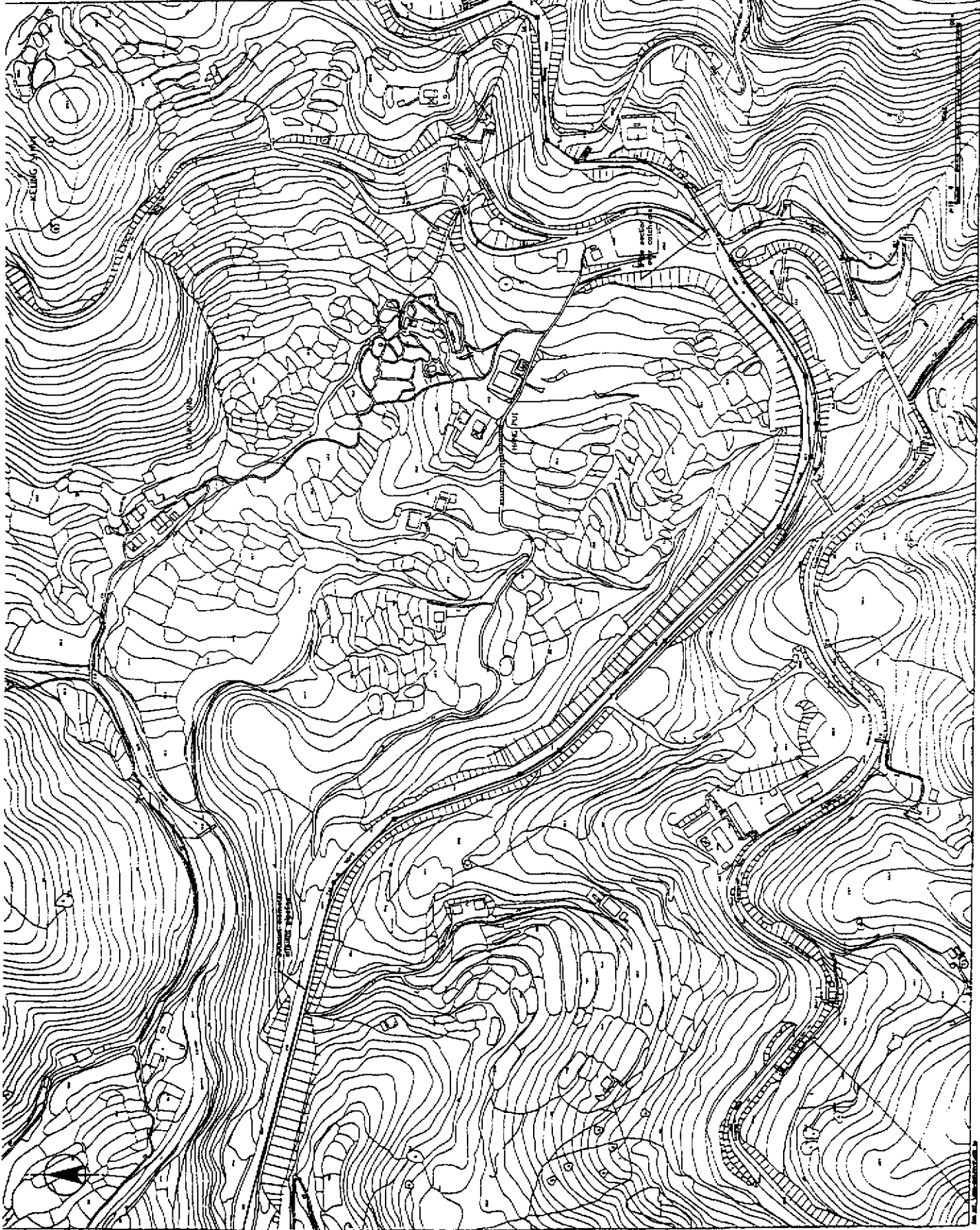
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SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

Drinking Water Services
Water Plus Stage II Review

HONGKONG PING
PRELIMINARY EFFLUENT EXPORT ROUTE

Project No.	819	Scale 1 of 10	Sheet 1
Revision No.	01	Project No.	819

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Proposed profile
 Flow direction
 Pipe-in-Pipe Arrangement

Sheet No.	Scale	Sheet Size	Sheet No.	Scale	Sheet Size
1	1:10,000	A4	1	1:10,000	A4

THE GOVERNMENT OF THE HONG KONG
 SPECIAL ADMINISTRATIVE REGION
 ENVIRONMENTAL PROTECTION DEPARTMENT

Outlying Islands Sewerage
 Market Plus Stage II Interim

HONG KONG
 PRELIMINARY EFFLUENT EXPORT ROUTE

PROJECT NO.	87
DATE 1/10/10	
DESIGNED BY	DC
DRAWN BY	1

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 蒙格士 顧問

Legend

Proposed pipeline
flow direction



NO.	DATE	BY	REVISION
1			

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SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

Outlying Islands Sewerage
Mushu Tsau Range II Jarvey

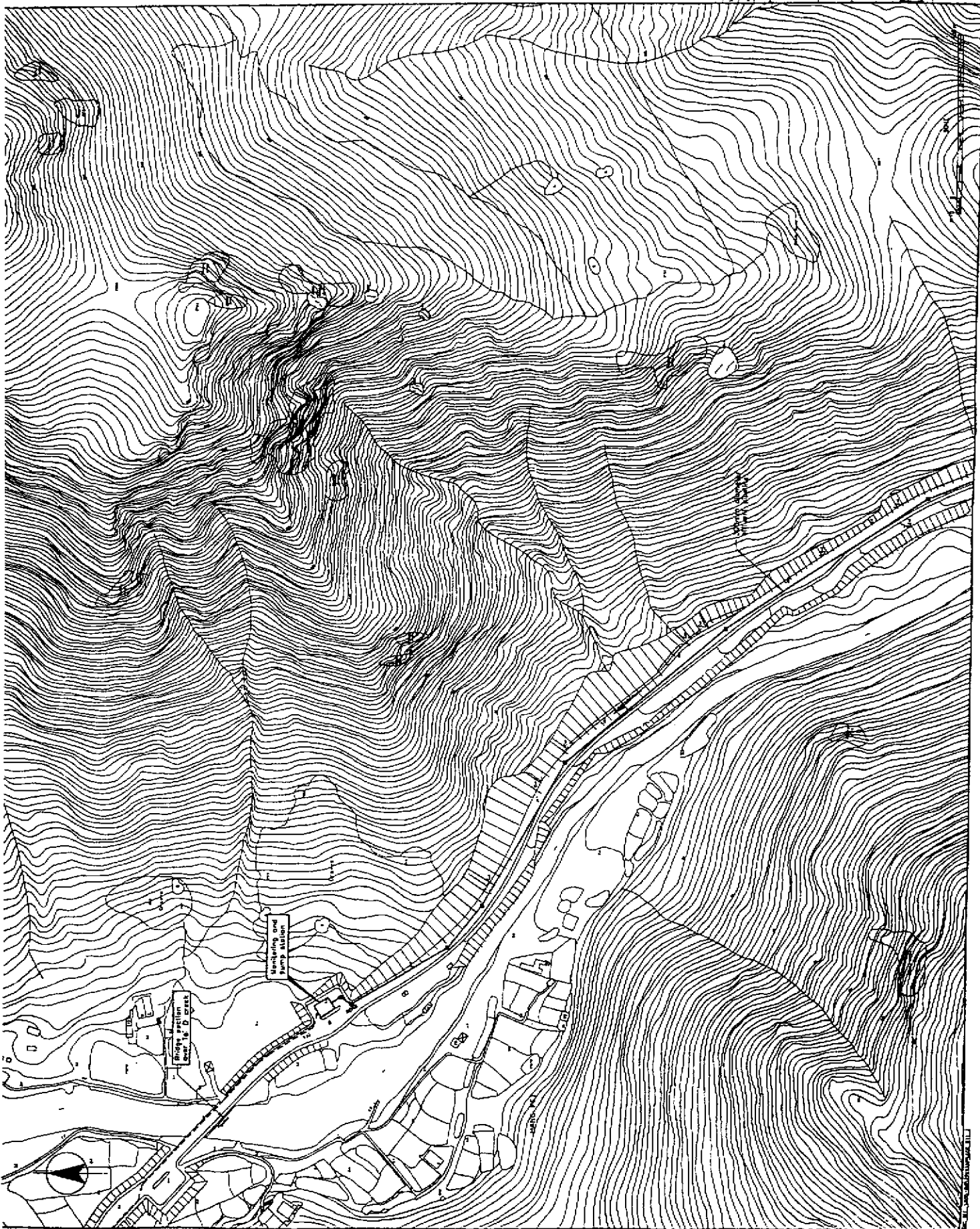
HONG KONG
PRELIMINARY EFFLUENT EXPORT ROUTE

PROJECT NO.	DATE	SCALE
PREPARED BY	DATE	NO.

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Legend

- Prepared layout map
- Proposed gravity pipeline
- flow direction



Scale	1:10,000
Sheet No.	811
Project No.	100/100/100
Sheet No.	100/100/100
Scale	1:10,000

THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

Outfalling Island Sewerage
Master Plan Stage II Review

NINGONG PING
PRELIMINARY EFFLUENT EXPORT ROUTE

Scale	1:10,000
Sheet No.	811
Project No.	100/100/100
Sheet No.	100/100/100
Scale	1:10,000

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LEGEND

- Proposed pump main
- Proposed pipe
- Proposed pipe
- Flow direction



NO.	DATE	BY	FOR
1	10/11/10
2
3
4
5

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SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

Outlying Islands Sewerage
Master Plan Stage II Review

NGONG PING
PRELIMINARY EFFLUENT EXPORT ROUTE

PROJECT NO.	8-11
DATE	...
SCALE	...
PROJECT BY	...
DATE	...
NO.	...

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蒙工 建築 顧問



Legend

- Lot Boundary
- Licensed Land Boundary
- Site of Special Scientific Interest
- Proposed Sewer and Manhole
- STW Inlet Pumping Station

NO.	CL.	DATE	BY	REVISION
1	CL	1/1/00	WSP	ISSUED FOR PERMIT
2	CL	1/1/00	WSP	ISSUED FOR PERMIT

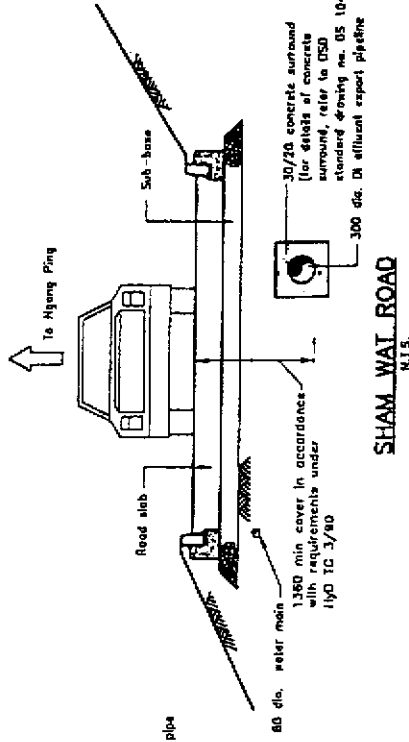
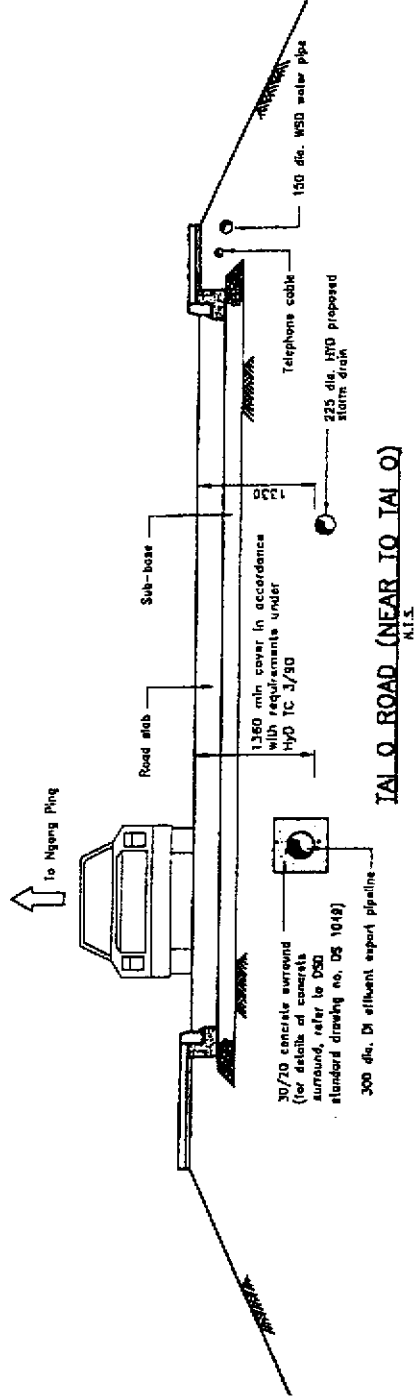
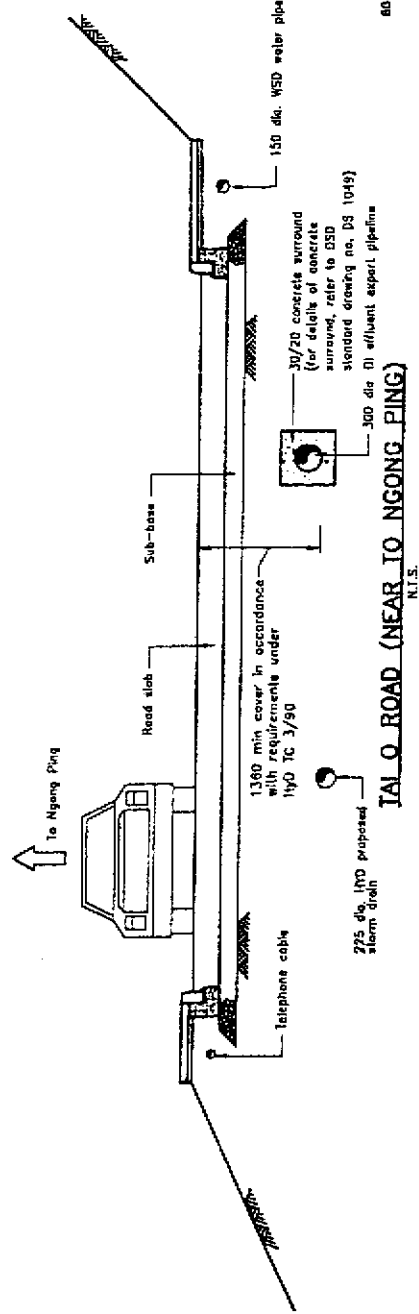
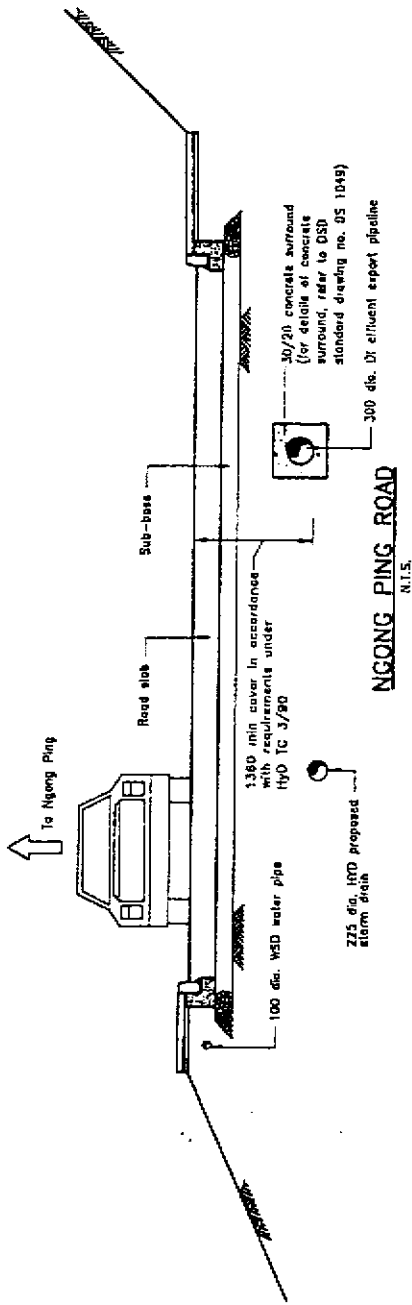
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Outlying Islands Sewerage
Master Plan Stage II Review

**PROPOSED NGONG PING VILLAGE
SEWERAGE LAYOUT**

PROJECT NO.	8/13	SHEET 1 OF 1
DATE	1/1/00	SCALE
DESIGNER	WSP	NO.
DATE	1/1/00	NO.

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Check Point

Checked By:	
Drawn By:	
Weather plate:	Yes / No

Rev.	CL	NO.	DATE	BY	REASON FOR CHANGE

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ENVIRONMENTAL PROTECTION DEPARTMENT

Outlying Islands Sewerage Master Plan Page II Review

TYPICAL PIPE DETAILS.

PROJECT NO.	BL14	SHEET NO.	14
DATE		SCALE	

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Legend

- R(C) Research (Group U)
- V Village type Development
- C/IC Government, Institution or Community
- O Open Space
- U Undetermined
- CB Green Belt
- CA Conservation Area
- SSSI Site of Special Scientific Interest

Scale	Sheet	Grid	Scale
1:50,000	1	1	1:50,000

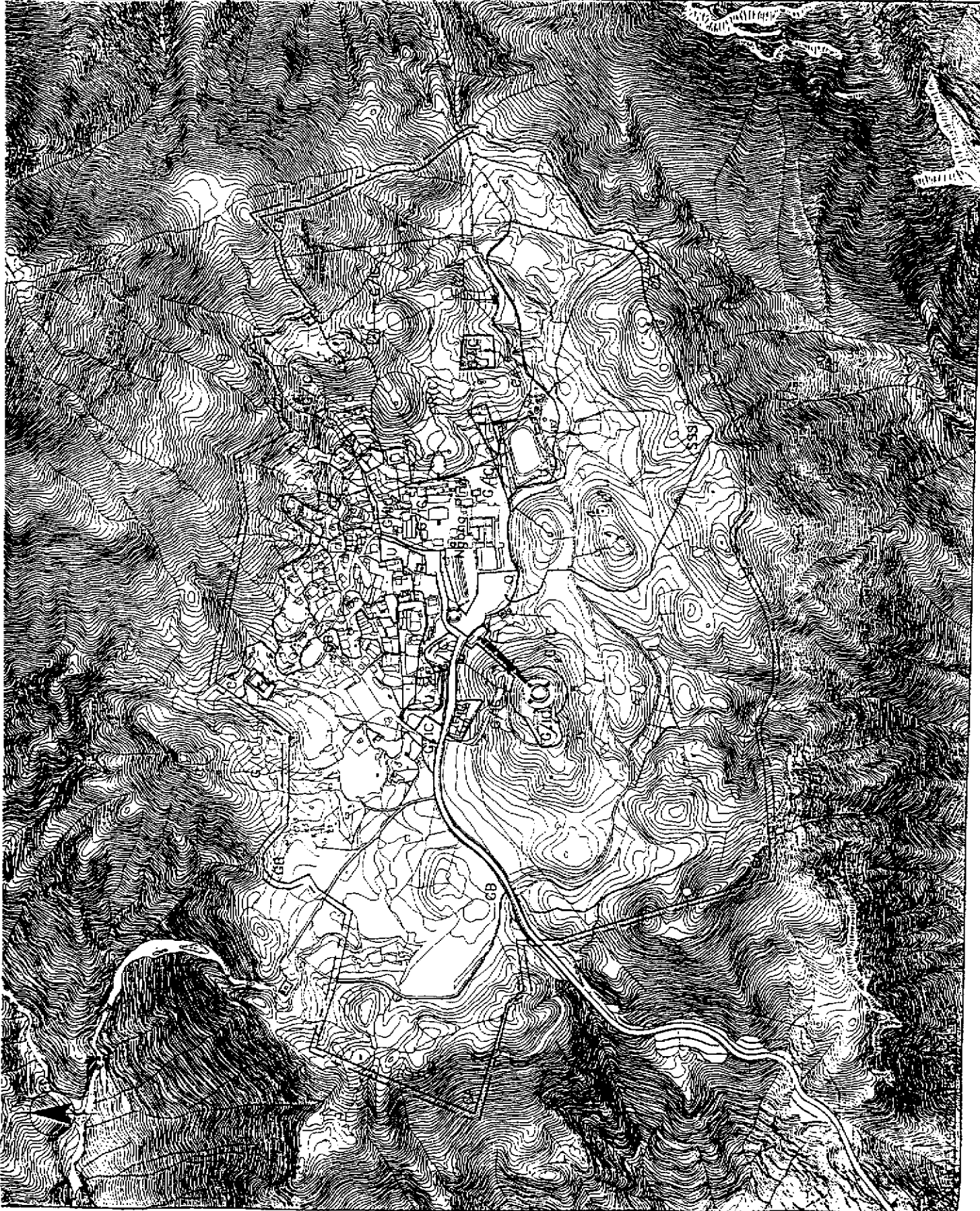
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SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

Outlying Islands Sewerage
Master Plan Stage II Review

EXTRACT OF RICHING BANG
DEVELOPMENT PERMISSION AREA PLAN

Scale	1:50,000
Sheet	1
Grid	1

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Annex C

Photographs



Figure C1: General View of Proposed Sewage Treatment Works Site

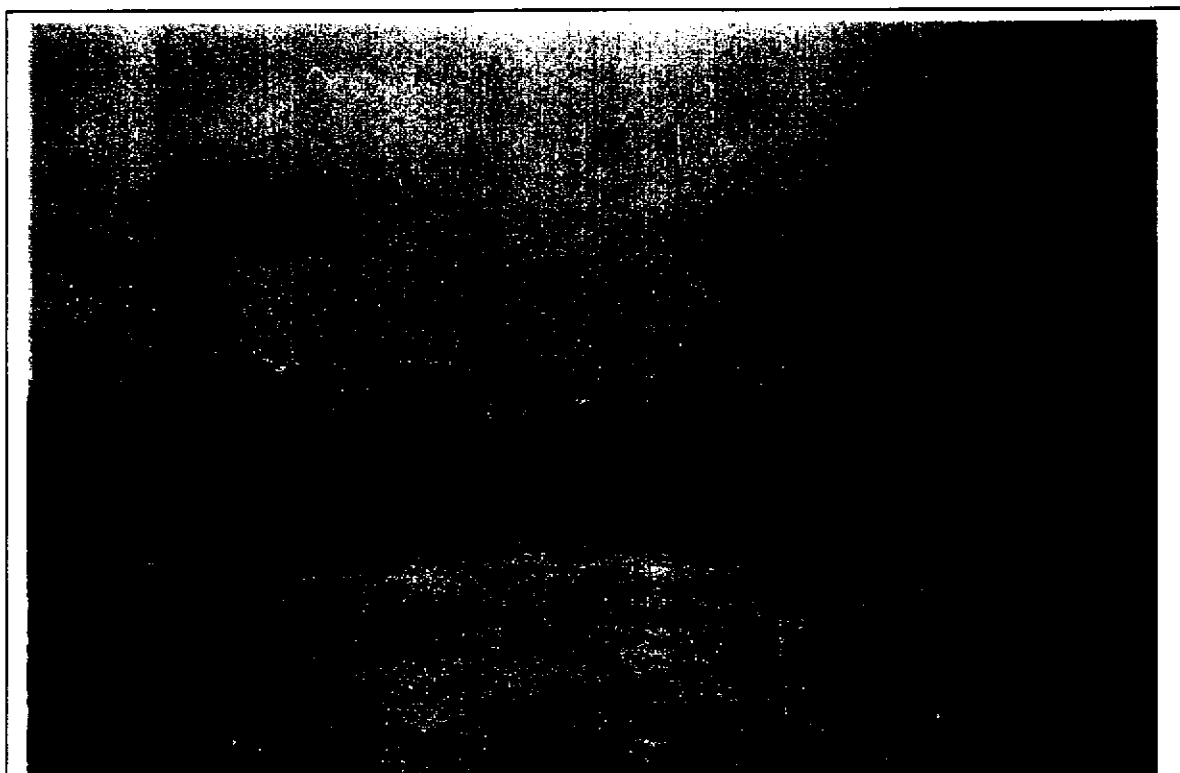


Figure C2: General View (1) of Proposed Temporary Works Area at south end of Sham Wat Road



Figure C3: General View (2) of Proposed Temporary Works Area at south end of Sham Wat Road