

BASIC INFORMATION

1. Project Title

PWP Item 4272DS - Port Shelter Sewerage, Stage 2 Phase 2
Village Sewerage at Wong Chuk Wan and Environs to Sai Kung

2. Purpose and Nature of Project

The Port Shelter Sewerage Master Plan (SMP) Study completed in March 1991 identified that a number of existing private sewage disposal facilities leading to Port Shelter had design or operation problems. In order to improve the water quality of Port Shelter, the SMP recommended replacing these facilities by public sewerage systems in four stages. The proposed sewerage works under this project is the Stage 2 Phase 2 of the Port Shelter Sewerage works package. Currently, there is no public sewer in the areas of Wong Chuk Wan, Nam Shan, Kap Pin Long, Tai Shui Tseng, Po Lo Che, Pak Kong Au, Tai Ping Tsuen and Pak Kong. The existing sewerage facilities in these areas are private septic tanks. This sewerage project will provide a new sewerage system to convey sewage from households in these unsewered areas to the existing Sai Kung Sewage Treatment Works.

3. Name of Project Proponent

Drainage Services Department (DSD) is the works department.

4. Location and Scale of Project

The proposed sewerage works will be constructed along a section of Sai Sha Road and Tai Mong Tsai Road and in the villages of Wong Chuk Wan, Nam Shan, Kap Pin Long, Tai Shui Tseng, Po Lo Che, Pak Kong Au, Tai Ping Tsuen and Pak Kong as shown on the general alignment drawing nos. DDN/132DS/8874, 8875, 8876, 8877, 8878, 8879 and 8880 in Appendix I. The scope of works under this project includes the following: -

Construction of village sewerage at Wong Chuk Wan, Nam Shan, Kap Pin Long, Tai Shui Tseng, Po Lo Che, Pak Kong Au, Tai Ping Tsuen and Pak Kong. Approximately 6,330m gravity sewers and 160m rising mains will be laid in trench by open trench method along village access roads, footways, alleys and open space.

Construction of about 300m gravity sewers along Sai Sha Road and about 50m gravity sewers and 600m rising mains along Tai Mong Tsai Road. The gravity sewers/rising mains will be laid in trenches excavated by open trench method. The works along Sai Sha Road and Tai Mong Tsai Road will be carried out in stages with implementation of temporary traffic arrangement so as to minimize traffic impacts to these two roads. In this regard, a Traffic Impact Assessment (TIA) report had been submitted to Transport Department and the Commissioner of Police for their comment/approval. Measures will be implemented to satisfy the requirements imposed by these parties.

Approximately 160m long stream course at Nam Shan and 260m long stream course at Kap Pin Long will be engineered into concrete channels so as to facilitate the sewer laying works in the vicinity. To facilitate maintenance of the engineered channels, access road will be constructed alongside the channels. Details of the engineered channels are shown on drawing nos. DDN/132DS/8876 and 8877 in Appendix I.

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Construction of three sewage pumping stations and their associated rising mains at Wong Chuk Wan, Tai Mong Tsai Road and Tai Shui Tseng with their locations shown on drawing no. DDN/132DS/8817B in Appendix I. Each of these pumping stations will comprise an underground inlet chamber, a screening chamber and a wet well. Given the small size of these pumping station, SP/DSD will consult the future maintenance agent as to whether a superstructure is required for each of these pumping stations on a case-by-case basis. If the provision of a superstructure is found to be necessary for any particular pumping station, a single-storey superstructure will be provided.

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Upon the completion of the works, operation and maintenance of the gravity sewers, engineered channel, pumping stations and rising mains will be undertaken by DSD. Breakdowns of the proposed sewerage works are given as follows: -

Village Sewerage

Location	Length of gravity sewers(m)	Dia. of gravity sewers(mm)	Length of rising mains(m)	Dia. of rising mains(mm)
Wong Chuk Wan	600	225 to 300	100	150
Nam Shan	1100	225 to 300	-	-
Kap Pin Long	1750	225 to 300	-	-
Tai Shui Tseng	800	225 to 300	60	150
Po Lo Che	1100	225 to 300	-	-
Pak Kong Au	800	225 to 300	-	-
Tai Ping Tsuen	100	225 to 300	-	-
Pak Kong	80	225 to 300	-	-
Total	6,330		160	

Table 1 - A break down of village sewerage

Gravity Sewers/Rising Mains on Rural Roads

Location	Length of gravity sewers(m)	Dia. of gravity sewers(mm)	Length of rising mains(m)	Dia. of rising mains(mm)
Sai Sha Road	300	300 to 450	-	-
Tai Mong Tsai Rd.	50	300 to 450	600	200 to 300
Total	350		600	

Table 2 - A break down of gravity sewers/rising mains on rural roads

Engineered Channel

Location	Length of engineered channel(m)	Width of channel(m)
Nam Shan	160	2
Kap Pin Long	260	4
Total	420	

Table 3 - A break down of engineered channel

Sewage Pumping Stations

Pumping Station	Installed Capacity (m³/day)	Estimated Total Pumping Head (m)
Wong Chuk Wan Pumping Station	100	20
Tai Mong Tsai Road Pumping Station	730	20
Tai Shui Tseng Pumping Station	35	15

Table 4 - A break down of sewage pumping stations

5. Number and Types of Designated Projects to be covered by this Project Profile

Under category Q.1, Part I, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), a sewage pumping station shall be regarded as a Designated Project if it lies within an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage and a site of special scientific interest. Since the proposed location of Tai Shui Tseng Sewage Pumping Station will fall within a Conservation Area (CA), this pumping station shall be classified as a Designated Project and therefore an environmental permit is required for its construction and operation.

It should be noted that this project profile also covers other sewerage works such as gravity sewers, rising mains, engineered channels and the other two pumping stations which are not classified as Designated Project under the EIAO.

6. Name and Telephone Number of Contact Person

Engineer, Sewerage Projects Division, Drainage Services Department

OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

7. The planning, design, preparation of contract documents and tendering of this project will be undertaken by in-house staff of DSD while the construction works will be contracted out. Details of the tentative implementation programme are as follows: -

Planning and Design	06/1993 - 07/2000
Tender Stage	07/2000 - 12/2000
Construction and E&M Installation	12/2000 - 06/2003

App.II A copy of the tentative implementation programme is attached in Appendix II.

POSSIBLE IMPACT ON THE ENVIRONMENT

Construction Stage

8. Having considered all possible impacts on the environment as listed in Annex I of the Technical Memorandum on EIA Process (EIAO TM), possible environmental impacts that may be caused during the construction stage of the proposed sewerage works are described as follows: -

Construction Stage - Village Sewerage

- (a) Approximately 6,330m gravity sewers and 160m rising mains will be laid in trench by open trench method. Pneumatic breaker, backhoe, vibrating plate, concreting plant and the likes will be employed for trench excavation, pipe laying, backfilling, compaction and concrete casting. In the case of pipe laying along narrow alleys, the trenches will be excavated by hand. It is anticipated that only minor dust and noise nuisances will be caused. Appropriate environmental protection measures to be included in the contract are detailed in para. 13(a).
- (b) In narrow alleys, certain existing septic tanks may need to be decommissioned and demolished to make way for the proposed sewer pipeline. As such, odour problem may be caused during demolishing of septic tanks. Appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(b).
- (c) Traffic flow along certain village access roads will be affected by road opening for the construction of the proposed gravity sewers/rising mains. Appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(c).

Construction Stage - Gravity Sewers/Rising Mains on Rural Roads

- (d) Approximately 300m gravity sewers along Sai Sha Road and approximately 50m gravity sewers and 600m rising mains along Tai Mong Tsai Road will be laid in trench by open trench method. Pneumatic breaker, backhoe, vibrating plate, concreting plant and the likes will be employed for trench excavation, pipe laying, backfilling, compaction, concreting casting, etc. In the case where sheet piles are used as trench support, hydraulic vibrating hammer will be employed for installation of the sheet piles. It is anticipated that only minor dust and noise nuisances will be caused. Appropriate environmental protection measures to be included in the contract are detailed in para. 13(a).
- (e) The construction of the proposed gravity sewers/rising mains along Sai Sha Road and Tai Mong Tsai Road will involve road opening giving rise to potential impact to traffic

flow. Appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(d).

Construction Stage – Engineered Channel

- (f) A section of the existing stream course at Nam Shan (approximately 160m) and a section of the existing stream course at Kap Pin Long (approximately 260m) will be engineered into a concrete channel. Constructional plant including backhoe, excavator, vibrating hammer, concreting plant and the likes will be deployed for excavation, sheet piling, backfilling, concrete casting, etc. It is anticipated that minor dust and noise nuisances will be caused. Appropriate environmental protection measures to be included in the design and/or contract are given in para. 13(a).
- (g) In order to avoid contaminating the existing flow by the construction activities, the existing flow in the stream course will be temporarily diverted by using concrete pipes or ductile iron pipes linking the upstream section and the downstream section. Appropriate environmental protection measures to be included in the contract are given in para. 13(e).
- (h) During the course of excavation works, muddy underground water will be pumped away from the excavation pit into a silt removal facility before discharging into downstream stream course or water receiving bodies. If the underground water is found to be contaminated, appropriate environmental protection measures as detailed in para. 13(f) will be taken.
- (i) In order to assess the potential ecological impact arising from the proposed engineered channel works, Sewerage Projects Division of DSD (SP/DSD) conducted the field surveys on 28.4.1999 for the concerned sections of the stream courses at Nam Shan and Kap Pin Long. Drawing showing the locations of the concerned stream courses is given in Appendix III.

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For the stream course at Nam Shan (Sections 1 and 2)

For the purpose of the field survey, the 160m long stream course was divided into two consecutive sections, namely Sections 1 and 2. According to the field survey, characteristics of these two sections were found to be similar to each other. Both sections were gentle and meandering with an averaged width ranging from 0.8m to 1.4m and an averaged depth ranging from 0.6m to 1.0m. A concrete footway was found to be running alongside the stream course. The stream course was surrounded by abandoned field and grassland. The existing flow was found to be moderate and the catchment landform was plain. The embankment on the opposite side of the concrete footway was formed by stone and covered by trees, grasses and ferns. The stream course bed was formed by rubble and gravel where emergent aquatic vegetation was identified occasionally. As regards terrestrial and aquatic life inhabiting in the stream course, butterflies, dragonflies, amphibians, other insects and small fishes were identified occasionally. The existing flow was in yellow/brown colour, odourless and slightly silted. It appeared that the existing flow was polluted by wastewater discharged from the nearby village houses.

For the stream course at Kap Pin Long (Sections 3, 4 and 5)

For the purpose of the field survey, the 260m long stream course was divided into three consecutive sections, namely, Sections 3, 4 and 5. According to the field survey, characteristics of Sections 3 and 4 were found to be similar to each other. Both Sections 3 and 4 were gentle and meandering with an averaged width ranging from 1.2m to 1.8m and an averaged depth of 1.5m. A concrete footway was found to be running alongside all the three sections and the surrounding land uses were local village houses, woodland and grassland. For Sections 3 and 4, the embankment on the opposite side of the concrete footway was slumping and covered by vegetation including trees, grasses and ferns. The stream course bed was formed by rubble and gravel and overgrown by emergent vegetation. As regards terrestrial and aquatic life inhabiting in the stream course, birds, butterflies, dragonflies, amphibians, other insects and small fishes were identified occasionally. The existing flow was in yellow/brown colour, odourless and slightly silted. It appeared that the existing flow was polluted by wastewater discharged from the nearby village houses.

Section 5 was found to be an existing engineered channel with an average width and depth of 3.0m and 1.5m respectively. The channel was gentle and straight with slow flow and plain catchment landform. The channel bed was covered by boulders and the channel bank on the opposite side of the footway was covered by grasses and ferns. Algae were also found in the channel. As regards terrestrial and aquatic life inhabiting in the stream course, dragonflies, amphibians, other insects and small fishes were identified occasionally. The existing flow was in yellow/brown colour, odourless and slightly silted. It appeared that the existing flow was polluted by wastewater discharged from the nearby village houses. A copy of the relevant correspondence submitting the field survey results to the Director of Agriculture and Fisheries is attached in Appendix VIII.

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Based on the field survey results, it is considered that the conservation importance of the concerned stream courses is insignificant. It is anticipated that the proposed engineered channel works will not have significant ecological impact on the surrounding environment. Nonetheless, appropriate environmental protection measures detailed in para. 13(g) will also be incorporated into the design and/or the contract.

Construction Stage – Sewage Pumping Stations

- (j) Three sewage pumping stations will be constructed under this project, namely Wong Chuk Wan Sewage Pumping Station, Tai Mong Tsai Road Sewage Pumping Station and Tai Shui Tseng Sewage Pumping Station. Constructional plant including backhoe, excavator, vibrating hammer, concreting plant and the likes will be used for excavation, sheet piling, backfilling, concrete casting, etc. It is anticipated that minor dust and noise nuisances will be caused. Appropriate environmental protection measures to be included in contract are detailed in para. 13(a).
- (k) During construction, muddy underground water will be pumped away from the excavation pit into a silt removal facility before discharging into nearby stream-courses or water receiving bodies. If the underground water is found to be contaminated, appropriate environmental protection measures as detailed in para. 13(f) will be taken.

- (1) Tai Shui Tseng Sewage Pumping Station will lie within a conservation area. However, the area of the proposed site is only about 100m². Site inspections reveal that the proposed location of the pumping station is adjacent to an existing access road and on a flat land without much vegetation. As such, it is anticipated that the construction of this pumping station will not have any significant environmental impact to the conservation area. In addition, a s.16 application for planning permission will be submitted by SP/DSD to Town Planning Board for approval. Appropriate environmental protection measures to be included in contract are detailed in para. 13(h).

A summary of possible environmental impacts that may be caused during construction of the proposed sewerage works and the standard/specific environmental protection measures are given below: -

Works	Possible Environmental Impacts	Standard/Specific Environmental Protection Measures
Village Sewerage	- minor dust, noise and odour nuisances, - traffic impact on village access roads.	See para. 13(a), (b) & (c)
Gravity Sewers/ Rising Mains on Rural Roads	- minor dust and noise nuisances, - traffic impact on rural roads.	See para. 13(a) & 13(d)
Engineered Channel	- minor dust and noise nuisances, - contamination of existing flow by construction activities, - discharge of underground water into nearby stream-courses, - insignificant ecological impact.	See para. 13(a), (e), (f) & (g)
Sewage Pumping Stations	- minor dust and noise nuisances, - discharge of underground water into nearby stream-courses, - insignificant environmental impact of the Tai Shui Tseng Sewage Pumping Station to the conservation area.	See para. 13(a), (f) & (h)

Table 5 - Possible Environmental Impacts may be caused during Construction

Operational Stage

9. During the operational stage, sewage collected from Wong Chuk Wan will be pumped/gravitated to the existing Sai Kung Sewerage System at Tai Wan via Wong Chuk Wan Sewage Pumping Station and subsequent Tai Mong Tsai Pumping Station. Sewage collected from Nam Shan and Kap Pin Long will be gravitated to the existing sewerage system at Po Tung Road. Sewage collected from Tai Shui Tseng and Pak Kong Au Tai Ping Tsuen will be pumped/gravitated to the existing sewerage system at Po Lo Che Road. Sewage collected from Pak Kong will be conveyed to the existing sewerage system at Wu Lei Tau.

Having considered all possible impacts on the environment as listed in Annex I of the EIAO TM, possible environmental impacts that may be caused during the operational stage of the proposed sewerage works are described as follows: -

Operational Stage – Village Sewerage

- (a) Since the gravity sewers are buried underground and their basic function is to convey sewage instead of for storage or treatment, no environmental impact is envisaged during operation and hence no mitigation measure will be required.

Operational Stage – Gravity Sewers/Rising Mains on Rural Roads

- (b) Since the gravity sewers and rising mains are buried underground and their basic function is to convey sewage instead of for storage or treatment, no environmental impact is envisaged during operation and hence no mitigation measure will be required.

Operational Stage – Engineered Channel

- (c) As the engineered channels are to convey the existing stormwater flow to the downstream water receiving body, no environmental impact is envisaged during operation and hence no mitigation measure will be required.

Operational Stage – Sewage Pumping Stations

- (d) Sewage enters a pumping station will first pass through a screening chamber where a screen will be installed to remove large objects in the sewage. The screened sewage will then enter into a wet well where the sewage will be pumped by centrifugal pumps out the pumping station to its designated location via a rising main. It is identified that noise generated from the sewage pumps, odour released from the sewage inside the wet well, and visual impact of the superstructures could be possible impacts on the environment. Appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(j).

A summary of possible environmental impacts that may be caused during operation of the proposed sewerage works and the standard/specific environmental protection measures are given below: -

Works	Possible Environmental Impacts	Standard/Specific Environmental Protection Measures
Village Sewerage	No environmental impact	Not Required
Gravity Sewers/Rising Mains on Rural Roads	No environmental impact	Not Required
Engineered Channel	No environmental impact	Not Required
Sewage Pumping Stations	Noise, Odour and Visual impacts	See para. 13(j)

Table 6 – Possible Environmental Impacts may be caused during Operation

Maintenance Stage

10. Maintenance of gravity sewers and rising mains involves mainly CCTV inspection, clearance of blockage and repair of damaged or collapsed sewers/rising mains. Having considered all possible impacts on the environment as listed in Annex I of the EIAO TM, possible environmental impacts that may be caused during the maintenance stage of the proposed sewerage works are described as follows: -

Maintenance Stage – Village Sewerage

- (a) It is anticipated that only minor and short-term noise and odour nuisances may arise but the impact will be insignificant and within established standards and guidelines. Nonetheless, appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(k).

Maintenance Stage – Gravity Sewers/Rising Mains on Rural Roads

- (b) It is anticipated that only minor and short-term noise and odour nuisances may arise but the impact will be insignificant and within established standards and guidelines. Nonetheless, appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(k).

Maintenance Stage – Engineered Channel

- (c) Regular desilting works will be carried out at the engineered channels. It is anticipated that only minor and short-term noise nuisance may arise but the impact will be insignificant and within established standards and guidelines. Nonetheless, appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(k).

Maintenance Stage – Sewage Pumping Stations

- (d) The well wet, screening chamber and inlet chamber of the pumping stations will be underground structures and most E&M equipment will be installed inside the pumping station under an enclosed condition. As such, maintenance of the pumping stations will not cause any detrimental impact on the environment. However, in the cases of power failure, breakdown of rising main or major E&M equipment, normal operation of the pumping station could be affected leading to emergency sewage bypass into nearby stream-courses. For Tai Mong Tsai Road Sewage Pumping Station, sewage will be bypassed to the nearby stormwater drains at Tai Mong Tsai Road. For Wong Chuk Wan Sewage Pumping Station and Tai Shui Tseng Sewage Pumping Station, sewage will be bypassed to nearby stream courses. Appropriate environmental protection measures to be included in the design and/or contract are detailed in para. 13(l). Proposed locations of the emergency overflow bypass outlets of these three pumping stations are shown on sketch nos. 1 to 3 in Appendix IV.

- (e) As requested by the Director of Agriculture and Fisheries, a field survey was carried out on 28.5.99 to investigate the existing conditions of the stream courses to which the emergency sewage bypass will be connected. Based on the survey results, the concerned stream courses at Wong Chuk Wan and Tai Shui Tseng were found to be natural streams with slow flow. Since adequate provisions as detailed in para. 13(l) will be incorporated into the design/contract, both the risk and environmental and ecological impact of the emergency sewage bypass will be greatly reduced.

A summary of possible environmental impacts that may be caused during maintenance of the proposed sewerage works and the standard/specific environmental protection measures are given below: -

Works	Possible Environmental Impacts	Standard/Specific Environmental Protection Measures
Village Sewerage	Minor and short-term noise and odour nuisances	See para. 13(k)
Gravity Sewers/Rising Mains on Rural Roads	Minor and short-term noise and odour nuisances	See para. 13(k)
Engineered Channel	Minor and short-term noise nuisance Minor and short term water quality impact	See para. 13(k)
Sewage Pumping Stations	Emergency overflow bypass	See para. 13(l)

Table 7 – Possible Environmental Impacts may be caused during Maintenance

MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

Sensitive Receivers

11. Based on the draft Outline Development Plan no. D/SK-TMT/A and the approved Outline Zoning Plan no. S/SK-PK/2 and site inspections, all major elements of the surrounding environment listed in Annex I of EIAO TM had been checked. Sensitive receivers which might be affected by this project are described as follows: -

Village Sewerage

- (a) The gravity sewers/rising mains will be laid in trench along village access roads, footways, alleys and open space. Sensitive receivers that might be affected are nearby village houses/residents.

Gravity Sewers/Rising Mains on Rural Roads

- (b) The gravity sewers/rising mains will be laid in trench along Sai Sha Road and Tai Mong Tsai Road. Sensitive receivers that might be affected are nearby village houses/residents.

Sewage Pumping Stations

App.IV

- (c) For Wong Chuk Wan Sewage Pumping Station, it will fall within a proposed "Countryside Conservation Area" (CCA) zone which is designated under the draft Tai Mong Tsai and Tsam Chuk Outline Development Plan (ODP). Sensitive receivers of this pumping station are nearby village houses and stream-courses as shown on sketch no. 1 in Appendix IV.

App.IV

- (d) For Tai Mong Tsai Pumping Station, it will fall within a proposed CCA zone which is designated under the draft Tai Mong Tsai and Tsam Chuk ODP. Sensitive receivers of this pumping station are nearby village houses and stream-courses as shown on sketch no. 2 in Appendix IV.

App.IV

- (e) For Tai Shui Tseng Sewage Pumping Station, it will fall within a "Conservation Area" (CA) zone which is designated under the approved Pak Kong and Sha Kok Mei Outline Zoning Plan (OZP) No. S/SK-PK/2. Sensitive receivers of this pumping station are nearby village houses and stream-courses as shown on sketch no. 3 in Appendix IV.

Sensitive Part of Natural Environment

App.V

12. Based on the draft Outline Development Plan (ODP) no. D/SK-TMT/A and the approved Pak Kong and Sha Kok Mei Outline Zoning Plan (OZP) no. S/SK-PK/2 and repeated site inspections, the proposed sewerage works under this project including (i) village sewerage, (ii) gravity sewers/rising mains on rural roads and (iii) the Wong Chuk Wan Sewage Pumping Station and Tai Mong Tsai Road Sewage Pumping Station will not lie within any Country Parks, Special Areas, Marine Reserves, Marine Parks, Ramsar Site, Sites of Special Scientific Interest, ecologically significant area or Sites of cultural heritage. Therefore, no sensitive part of the natural environment will be affected by these work. Confirmations from relevant authorities in relation to the parks/sites/areas set out under category Q.1, Part 1, Schedule 2 of the EIAO are attached in Appendix V.

As advised by DPO/SK&I, the Tai Shui Tseng Sewage Pumping Station will lie within a conservation area. Under the EIAO, this pumping station shall be classified as a Designated Project and therefore an environmental permit is required for its construction and operation. However, this pumping station is actually a small pumping station serving a population of only about 200 persons with an Average Dry Weather Flow (ADWF) of about 48 cu.m/d. In this regard, a s.16 application for planning permission will be submitted by SP/DSD to the Town Planning Board for approval.

App.VI

A copy of sketch nos. 1 and 2 showing the zoning information extracted from the Outline Development Plan no. D/SK-TMT/1A and the approved Outline Zoning Plan no. S/SK-PK/2 is attached in Appendix VI.

A summary of sensitive receivers and sensitive parts of the natural environment that might be affected by the project is given below: -

Proposed Sewerage Work	Sensitive Receiver	Sensitive Part of Natural Environment
Village Sewerage	Nearby village houses	Nil
Gravity Sewers/Rising Mains on Rural Roads	Nearby village houses	Nil
Engineered Channels	Nearby village houses	Nil
Sewage Pumping Stations:-		
i) Wong Chuk Wan	Nearby village houses & stream courses	Nil
ii) Tai Mong Tsai Road	Nearby village houses & stream courses	Nil
iii) Tai Shui Tseng	Nearby village houses & stream courses	Conservation Area

Table 8 – Sensitive Part of Natural Environment might be affected

STANDARD / SPECIFIC ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN

13. Having considered the possible environmental impacts identified in para. 8, 9 and 10 above and possible environmental protection measures listed in Annex 1 of the EIAO TM, standard/specific environmental protection measures to be incorporated in the design are described as follows: -

Construction Stage

- (a) Referring to the possible minor noise and dust impacts mentioned in para. 8(a), 8(d), 8(f) and 8(j) above, environmental protection measures to be included in the design are as follows: -

Noise - Relevant pollution control clauses will be included in the construction contract so as to minimize environmental nuisance to nearby sensitive receivers. The contractor will be required to comply with the Noise Control Ordinance and its subsidiary regulations in force as well as other non-statutory noise control.

Dust - Relevant pollution control clauses will be included in the construction contract under which the contractor will be required to prevent dust nuisance during construction.

- (b) Referring to the possible odour impact mentioned in para. 8(b) above, the contractor will be required to demolish septic tanks in accordance with the following sequence of working sequence: Pumping out sewage/sludge from the septic tank, diversion of sewage from the house, breaking up the septic tank, laying of sewer and backfilling. Since all sewage/sludge will be pumped out from the septic tank, odour problem to be encountered during subsequent demolition of the septic tank will be minor and acceptable.

- (c) Referring to the possible traffic impact on village access roads mentioned in para. 8(c) above, certain village access roads may need to be temporarily closed for a few hours during daytime to facilitate the laying of gravity sewers/rising mains. However, a thoroughfare of 3.5m wide shall be maintained for emergency vehicular access (EVA) during the construction stage. It was proposed that if certain village access roads are too narrow that this minimum thoroughfare cannot be achieved, the opened trenches will be decked over immediately or alternatively filled up with sand bags immediately for the emergency passage of fire appliance when it is necessary. Sufficient stockpile of steel plates and/or sand bags will be kept adjacent to the opened trenches.
- (d) Referring to the possible traffic impact on rural roads mentioned in para. 8(e) above, the proposed gravity sewers/rising mains will be laid in trenches excavated by open trench method. The construction of sewers along Sai Sha Road and Tai Mong Tsai Road will be carried out in stages with implementation of temporary traffic arrangement so as to minimize traffic impacts. In addition, since Sai Sha Road and Tai Mong Tsai Road have been regarded as traffic sensitive routes, a TIA report had been submitted by the Sewerage Projects Division of DSD, to Transport Department and the Commissioner of Police for approval. Under close supervision by DSD, the contractor will be responsible for the temporary traffic management on site and for obtaining necessary approvals from relevant authorities.
- (e) Referring to the possible water quality impact mentioned in para. 8(g) above, the contractor will be required under appropriate contractual provisions to design and implement a temporary diversion scheme before excavation works in the stream course so as to avoid contaminating the existing flow during the course of construction.
- (f) Referring to the possible water quality impact mentioned in para. 8(h) and 8(k) above, the contractor will be required to provide, where necessary, a silt removal facility on site so as to remove the silt before discharging the underground water into nearby stream courses or water receiving bodies. Such a silt removal facility will be provided by the contractor on site before commencement of excavation. If the underground water is found to be contaminated, the contractor will be required under appropriate contractual provisions to dispose of the contaminated underground water at an approved site.
- (g) Referring to the proposed engineered channel works mentioned in para. 8(i), although it was anticipated from the field surveys that the proposed works will not have significant ecological impact on the concerned stream courses, the contractor will be required to preserve the adjacent grassland and woodland which fall outside the works limit of this project. Furthermore, relevant site runoff control clauses will be included in the contract so as to avoid possible water quality impact to the stream courses during the construction stage.
- (h) Referring to the possible environmental impact to the conservation area mentioned in para. 8(l) above, the layout of the pumping station will be carefully designed to minimize tree felling. Appropriate contractual provisions will also be included in the contract to require the contractor to preserve the existing trees in the vicinity of the proposed pumping station.

Operational Stage

- (i) Referring to para. 9(a), 9(b) and 9(c) above, no environmental impact is envisaged during the operation of the village sewerage, gravity sewers and rising mains. Therefore, no specific environmental measure is required.
- (j) Referring to the possible noise, odour and visual impacts of the sewage pumping stations mentioned in para. 9(d) above, environmental protection measures to be included in the design of the pumping stations are as follows: -

Noise - The proposed pumping stations will be designed and operated by DSD to meet the noise criteria stipulated in Hong Kong Planning Standards and Guidelines (HKPSG) and Noise Control Ordinance (NCO) such that the expected noise level measured at the nearest sensitive receiver will not exceed the acceptable noise levels stipulated in the "Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites". In order to reduce noise from the moving parts of the E&M equipment that is considered the major sources of noise, submersible pumps, where appropriate, will be used. In addition, most of the E&M equipment will be installed inside the pumping station and therefore will operated under an enclosed condition such that potential noise nuisance to nearby village houses can be reduced to an acceptable level.

Odour - The wet well, inlet chamber and screening chamber will be underground structure and fully enclosed. The estimated odour level in terms of H₂S concentration in the wet well of the pumping station will normally less than 10 ppm. In order to remove odour from the air, a deodorizer will be provided, operated and maintained by DSD in each of the pumping stations such that the odour level measured at the nearest receiver will not exceed 5 odour units. The deodorizers may be placed inside or outside the pumping stations depending on availability of space. Care will be taken by the Operations and Maintenance Teams of DSD during removal of screening to avoid causing odour nuisance.

Landscape and Visual impact –

Both Wong Chuk Wan Sewage Pumping Station and Tai Mong Tsai Road Sewage Pumping Station are designed to serve a population of about 500 persons while the Tai Shui Tseng Sewage Pumping Station is designed to serve a population of only 200 persons. All of these three sewage pumping stations are actually small pumping stations and therefore superstructures may not be necessary. A photograph showing the typical outlooks of a small sewage pumping station without superstructure is attached in Appendix VII. However, if the provision of superstructures is found to be necessary, the potential visual impact of the superstructures will be minimized by a principle that structures above ground level will be blended well with the surrounding environment. Colour schemes, types of external finishing and layout of the pumping stations will be carefully designed taking into account the surrounding land features and buildings. Also, the superstructures will be designed to be a compact plant room so as to minimize their size. Depending on the availability of land, plantation

App.VII

will be provided at the boundary of the pumping stations. A photograph showing the typical outlook of a sewage pumping station with a superstructure is attached in Appendix VII. In order to produce the professional architectural and landscaping design for pumping stations, colour scheme, types of finishing, landscaping works and general layout of the pumping stations will be carefully designed to minimize their visual impact. For the Tai Shui Tseng Sewage Pumping Station which will fall within a conservation area, advice on the landscaping design from Architectural Services Department and Landscape Unit of Highways Department will be sought as appropriate. In addition, s.16 application for planning permission will be submitted by SP/DSD to Town Planning Board for approval. The appearance of this pumping station will be designed to meet the requirements of Town Planning Board, if any.

Maintenance Stage

- (k) Referring to the para. 10(a) 10(b) and 10(c) above, only minor and short-term noise and odour nuisances are anticipated during maintenance of the village sewerage, gravity sewers, rising mains and engineered channels. Due care will be taken by the Operations and Maintenance Teams of DSD during maintenance to further minimize these minor nuisances.
- (l) Referring to the possible water quality impact by the emergency overflow bypass mentioned in para. 10(d) above, each of the pumping stations will have an emergency overflow pipe such that sewage overflow bypass can be discharged into nearby stream-courses in emergency only. In order to reduce substantially the chance of emergency overflow bypass, the following environmental protection measures will be incorporated by DSD in the design of the pumping stations:
- Standby pump and standby screen will be provided in each of the pumping stations to facilitate routine maintenance and repairing of equipment.
 - The installed capacity (ADWF) of the pumping stations will not more than 1500 cu m/day. A two-hour storage capacity for incoming sewage at 1xADWF will be incorporated in the design volume of the wet well to account for emergency uses such as temporary power failure.
 - A telemetry system will be installed in the pumping station for sending all signals showing irregularity or any operation problem of the pumping station to the existing Sai Kung Sewage Treatment Works such that necessary actions could be taken promptly.

With these environmental protection measures incorporated in the design, emergency overflow bypass will occur only in very extreme cases. Nonetheless, in order to minimize further the impact on the environment when emergency overflow bypass does occur, the following additional measures will also be incorporated in the design :

- A bar screen will be installed in each pumping station to prevent the discharge of large floating solids into the stream-courses.

- The discharge point of overflow/bypass will be kept below the low water mark level where applicable.
- The discharge point of overflow/bypass will be kept away from sensitive receivers including gazetted beaches, mariculture zones, seawater intakes, stream with water for human consumption, typhoon shelter, etc.

OTHER ENVIRONMENTAL EFFECT

14. Upon completion of the works, sewage from the currently unsewered areas of Wong Chuk Wan, Nam Shan, Kap Pin Long, Tai Shui Tseng, Po Lo Che, Pak Kong Au, Tai Ping Tsuen and Pak Kong will be collected and conveyed to the new sewerage system leading to the existing Sai Kung Sewerage System. As a result, water quality of Port Shelter including the stream courses at Nam Shan and Kap Pin Long will be greatly improved.

PUBLIC CONSULTATION

15. Public consultation with District Board and village representatives had been carried out in 1994 and 1995 respectively. In this regard, no objection has been received.
16. The general layout drawings of this project had been circulated to relevant Government Departments and utility undertakings for comments and no major objection has been received. A copy of the relevant correspondence ref. (35) in SP/6/20/18 dated 2.2.94 showing the Government Departments and the utility undertakers to whom the drawings had been circulated is attached in Appendix VIII. An Environmental Review on this project had also been conducted by EPD. DEP advised vide his memo ref. (13) in EP2/N8/29 II dated 5.5.94 shown in Appendix VIII that no Environmental Impact Assessment (EIA) was required. As a result, no EIA study had been conducted for this project. A copy of the relevant correspondence from DEP is also attached in Appendix VIII.

App.VIII

App.VIII

SCHEDULE OF RECOMMENDED MITIGATION MEASURES

17. All the above-mentioned mitigation measures for activities in the construction stage, operational stage and maintenance stage will be in place before actual commencement of the corresponding activities.

Village Sewerage, Gravity Sewers/Rising Mains on Rural Roads

- (a) Based on the above assessment, no significant long-term environmental impacts would be caused during the construction stage, the operational stage, and the maintenance stage of the proposed village sewerage, and gravity sewers/rising mains on rural roads. As regards short-term environmental impacts that may be caused, DSD/DSD's contractor will implement standard/appropriate environmental pollution measures to control the noise, dust, and site runoff to within established guidelines and standards. As such, no environmental permit condition is required for the construction, operation and maintenance of these sewerage works.

Engineered Channel

- (b) Based on the above assessment, no significant long-term environmental impacts would be caused during the construction stage, operational stage, and maintenance stage of the proposed engineered channel. As regards short-term environmental impacts that may be caused, DSD/DSD's contractor will implement standard/appropriate environmental pollution measures to control the noise, dust, and site runoff to within established guidelines and standards. As such, no environmental permit condition is required for the construction, operation and maintenance of these works.

Wong Chuk Wan Sewage Pumping Station & Tai Mong Tsai Road Sewage Pumping Station

- (c) Both these pumping stations are not Designated Project under the EIAO as their installed capacities are less than 2,000 cu.m/day. Based on the above assessment, no significant long-term environmental impact would be caused during the construction stage, operational stage, and maintenance stage of these two small pumping stations. As regards short-term environmental impacts that may be caused, DSD/DSD's contractor will implement standard/appropriate environmental pollution measures to control the noise, dust, and site runoff to within established guidelines and standards. Therefore, no environmental permit condition is required for the construction, operation and maintenance of these two pumping stations.

Tai Shui Tseng Sewage Pumping Station

- (d) Short-term environmental impact during construction stage - DSD will implement standard/ appropriate environmental pollution measures to control the noise, dust, and site runoff to within established guidelines and standards.
- (e) Long-term environmental impact during operation and maintenance stages – The installed capacity of this pumping station is less than 2,000 cu.m/day. However, it will fall within a conservation area and therefore shall be classified as a Designated Project under the EIAO. A schedule of the recommended specific mitigation measures to control its long-term environmental impacts is given as follow: -

Environmental Impact – Noise

Recommended Mitigation Measures	<ul style="list-style-type: none">- The inlet chamber, screening chamber and wet well of the pumping station will be underground and fully enclosed. The submersible sewage pumps will be installed inside the wet well- Most E&M equipment will be housed inside the pumping station.
--	---

Requirements to be achieved by Mitigation Measures	Noise criteria stipulated in Hong Kong Planning Standards and Guidelines and Noise Control Ordinance – Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites.
Where Mitigation Measures to be installed	At the location of Tai Shui Tseng Sewage Pumping Station
When Mitigation Measures to be implemented	Before commissioning of Tai Shui Tseng Sewage Pumping Station
Parties Responsible for implementation of Mitigation Measures	DSD/DSD's Contractor

Environmental Impact - Emergency Overflow Bypass

Recommended Mitigation Measures	<ul style="list-style-type: none"> - A standby pump and a standby screen will be provided to facilitate maintenance - A two-hour storage capacity for incoming sewage at 1xADWF will be incorporated. - A telemetry system will be provided for sending all signals showing irregularly or any operation problem of the pumping station to the existing Sai Kung Sewage Treatment Works. - A bar screen will be installed to prevent the discharge of large floating solids into the stream-course. - The discharge point of overflow/bypass will be kept below the low water mark level where applicable. - The discharge point of overflow/bypass will be kept away from sensitive receivers including gazetted beaches, mariculture zones, seawater intakes, stream with water for human consumption, typhoon shelter, etc.
Requirements to be achieved by Mitigation Measures	To minimize the chance of emergency overflow bypass as far as practicable.
Where Mitigation Measures to be installed	At the location of Tai Shui Tseng Sewage Pumping Station.
When Mitigation Measures to be implemented	Before commissioning of Tai Shui Tseng Sewage Pumping Station.
Parties Responsible for implementation of Mitigation Measures	DSD/DSD's Contractor

Environmental Impact – Odour

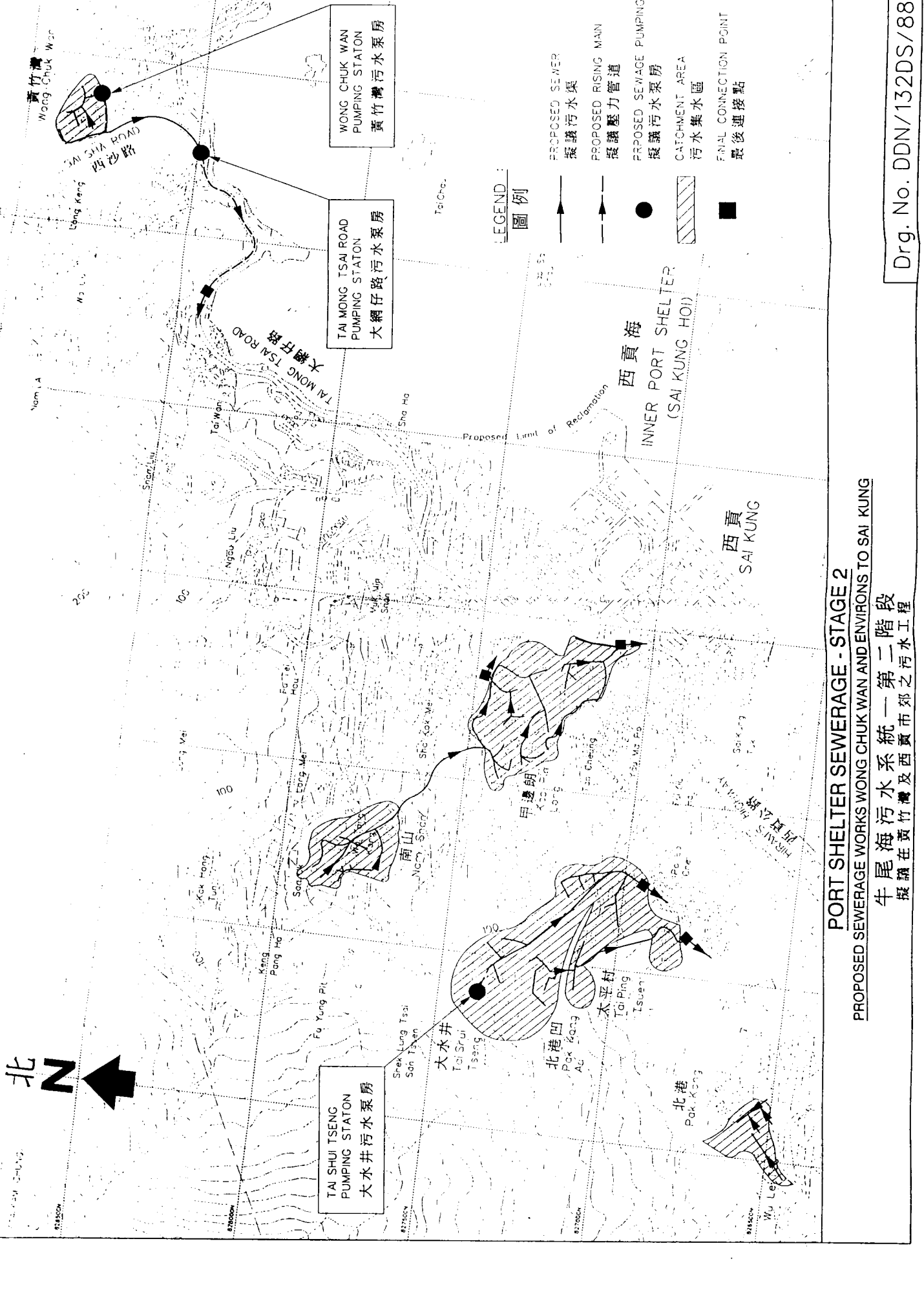
Recommended Mitigation Measures	<ul style="list-style-type: none"> - The inlet chamber, screening chamber and wet well of the pumping station will be underground and fully enclosed. - A deodourizer will be installed to remove odour from the air.
Requirements to be achieved by Mitigation Measures	Odour level measured at the nearest receiver of the pumping station shall not exceed 5 odour units.
Where Mitigation Measures to be installed	Deodourizer shall be installed inside or outside the pumping station depending on availability of space.
When Mitigation Measures to be implemented	Before commissioning of Tai Shui Tseng Sewage Pumping Station.
Parties Responsible for implementation of Mitigation Measures	DSD/DSD's Contractor

Environmental Impact – Landscaping and Visual

Recommended Mitigation Measures	<ul style="list-style-type: none"> - Colour scheme, types of external finishing and layout of the pumping station will be carefully designed taking into account the surrounding land features and buildings. - Depending on the availability of land, plantation will be provided at the boundary of pumping station.
Requirements to be achieved by Mitigation Measures	The pumping station will be blended well with the surrounding environment to minimize visual impact on the conservation area.
Where Mitigation Measures to be installed	At the location of Tai Shui Tseng Sewage Pumping Station
When Mitigation Measures to be implemented	Before construction of Tai Shui Tseng Sewage Pumping Station
Parties Responsible for implementation of Mitigation Measures	DSD/DSD's Contractor

*** END ***

APPENDIX I



LEGEND
圖例

- PROPOSED SEWER
擬議污水渠
- PROPOSED RISING MAIN
擬議壓力管道
- PROPOSED SEWAGE PUMPING STATION
擬議污水泵房
- CATCHMENT AREA
污水集水區
- FINAL CONNECTION POINT
最後連接點

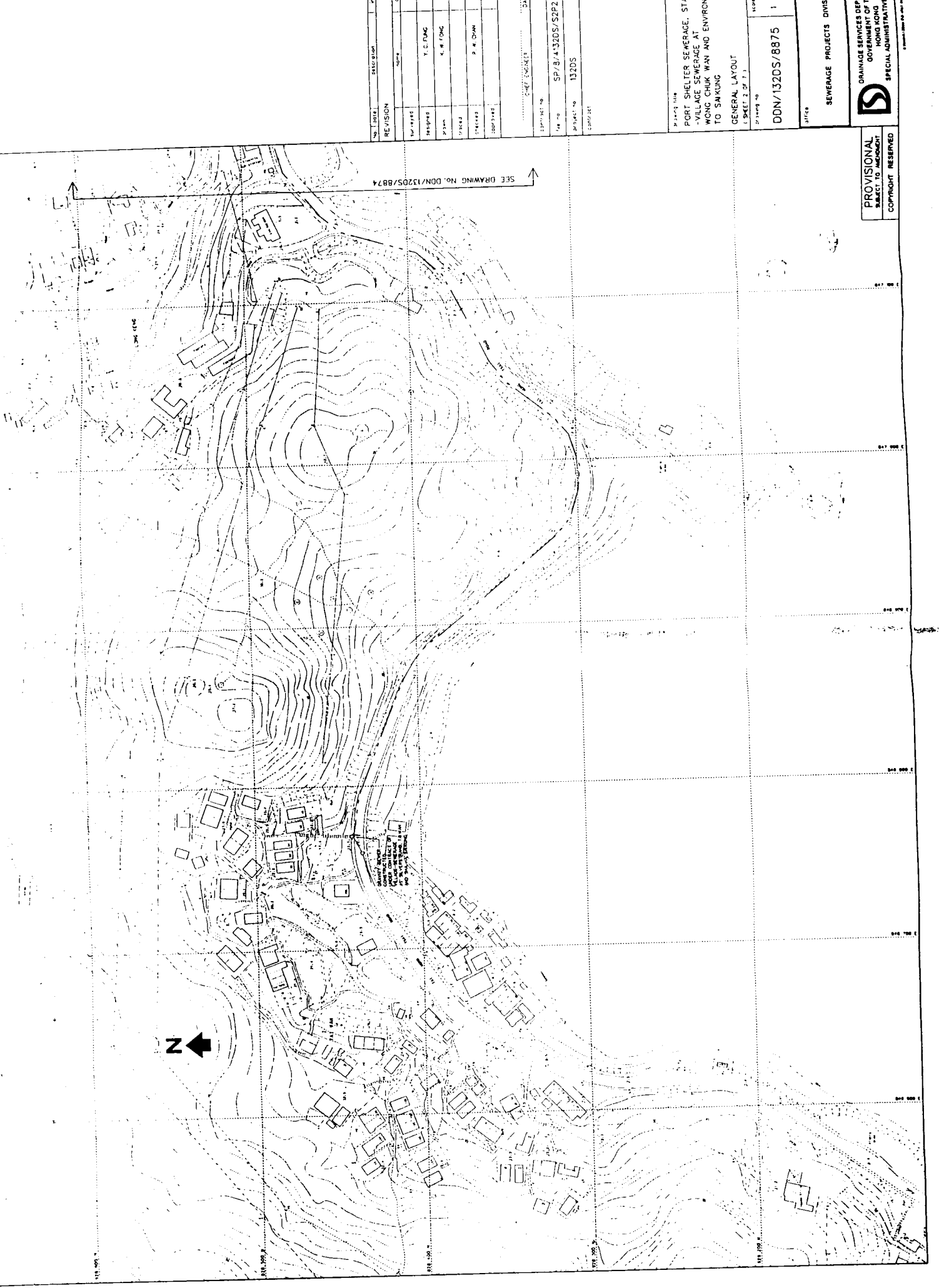
PORT SHELTER SEWERAGE - STAGE 2

PROPOSED SEWERAGE WORKS WONG CHUK WAN AND ENVIRONS TO SAI KUNG

牛尾海污水系統—第二階段
擬議在黃竹灣及西貢市郊之污水工程

Dr. No. DDN/132DS/8817B

SCALE 1:1000



SEE DRAWING No. DDN/1320S/8874



NO.	DATE	REVISION	BY	CHKD.
1		DESIGNED	T. C. FONG	
2		CHKD.	K. H. FONG	
3		DESIGNED	P. H. CHAN	
4		CHKD.		

PROJECT NO. SP/B/4/320S/S2P2
 PROJECT NO. 1320S
 SHEET NO. 1320S

PROJECT TITLE
 PORT SHELTER SEWERAGE, STAGE
 -VILLAGE SEWERAGE AT
 WONG CHUK WAI AND ENVIRONS
 TO SANKUNG
 GENERAL LAYOUT
 SHEET 2 OF 7

DRAWING NO. DDN/1320S/8875
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APPENDIX

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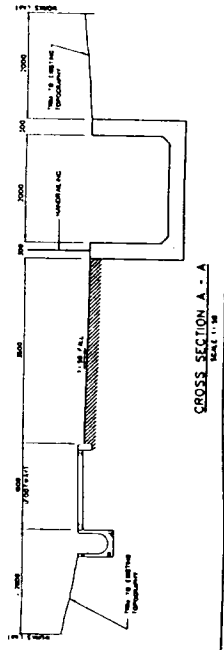
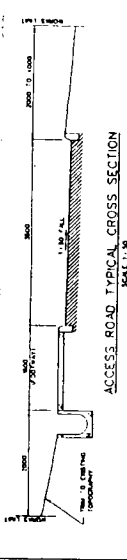
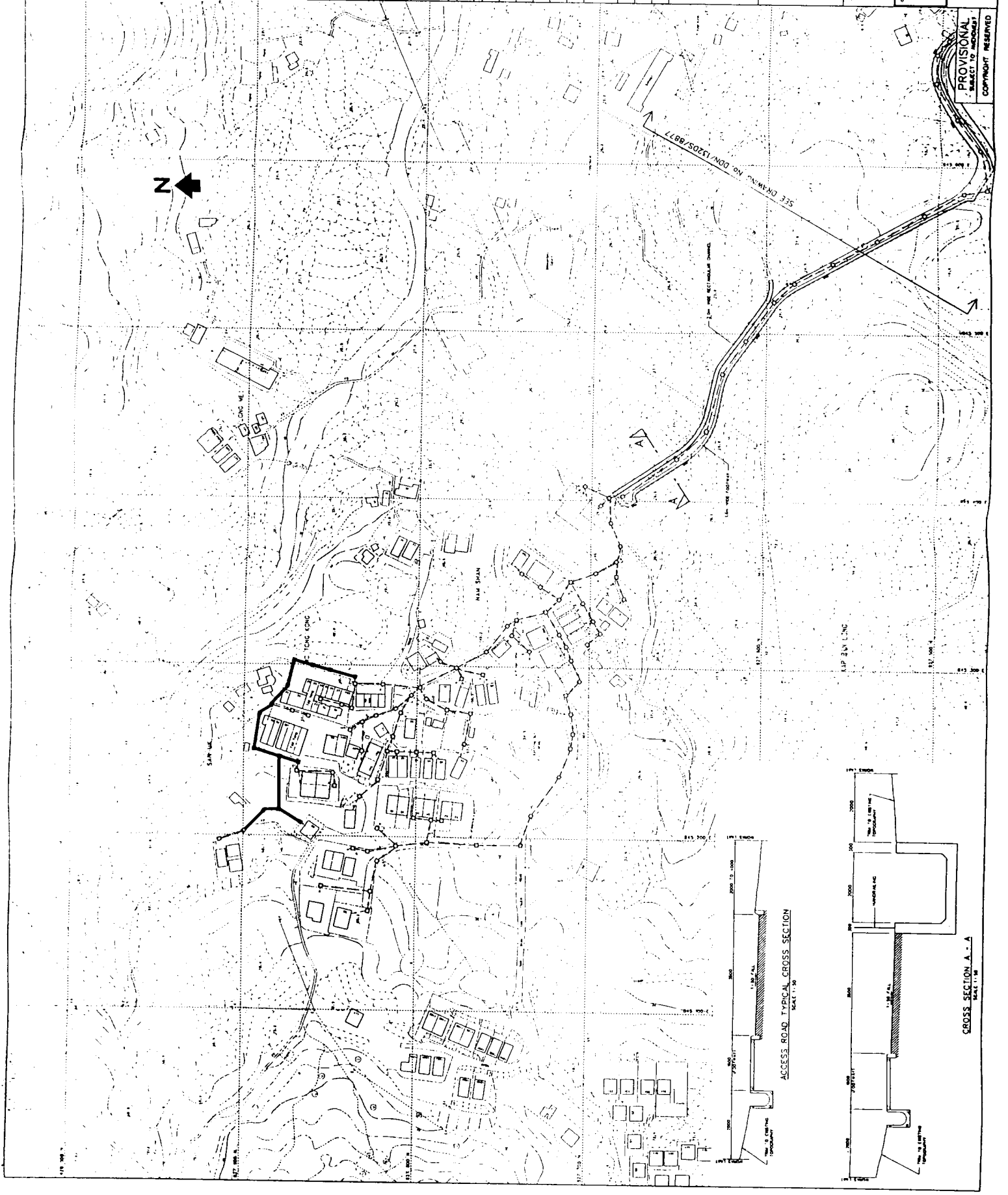
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 PACKAGE NO: 1320S
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PROJECT TITLE:
 PORT SHELTER SEWERAGE, STAGE 2
 - VILLAGE SEWERAGE AT
 WING CHUK WAN AND ENVRONS
 TO SAIKUNG
 GENERAL LAYOUT
 SHEET 3 OF 7

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2	1988.01.15	REVISED TO SHOW AS SHOWN

DESIGNED BY
Y. C. CHANG

PROJECT NO.
K. W. 2742

DATE PREPARED
2. 8. 1988

SCALE
AS SHOWN

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SP/B/4132DS/S2P2

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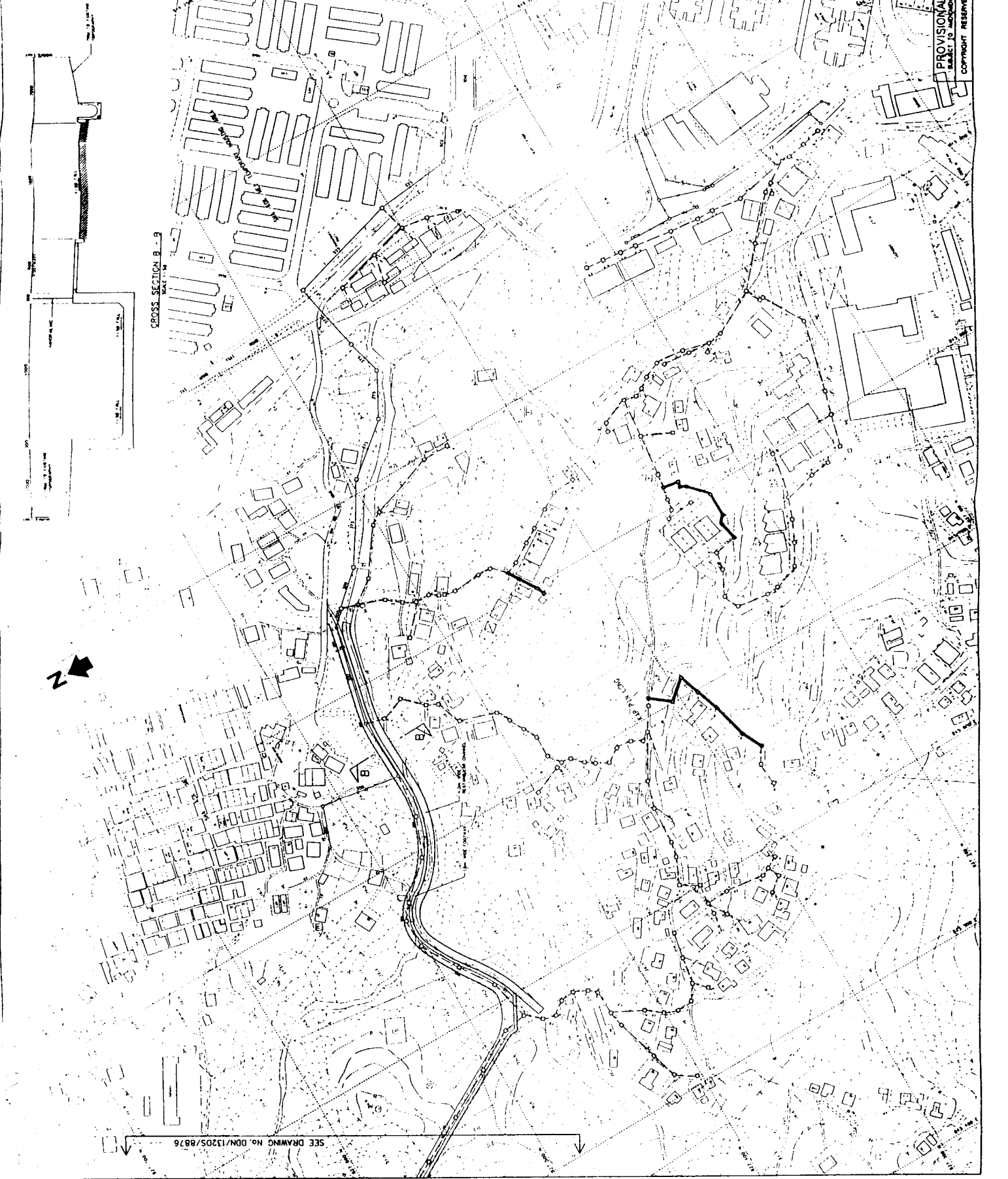
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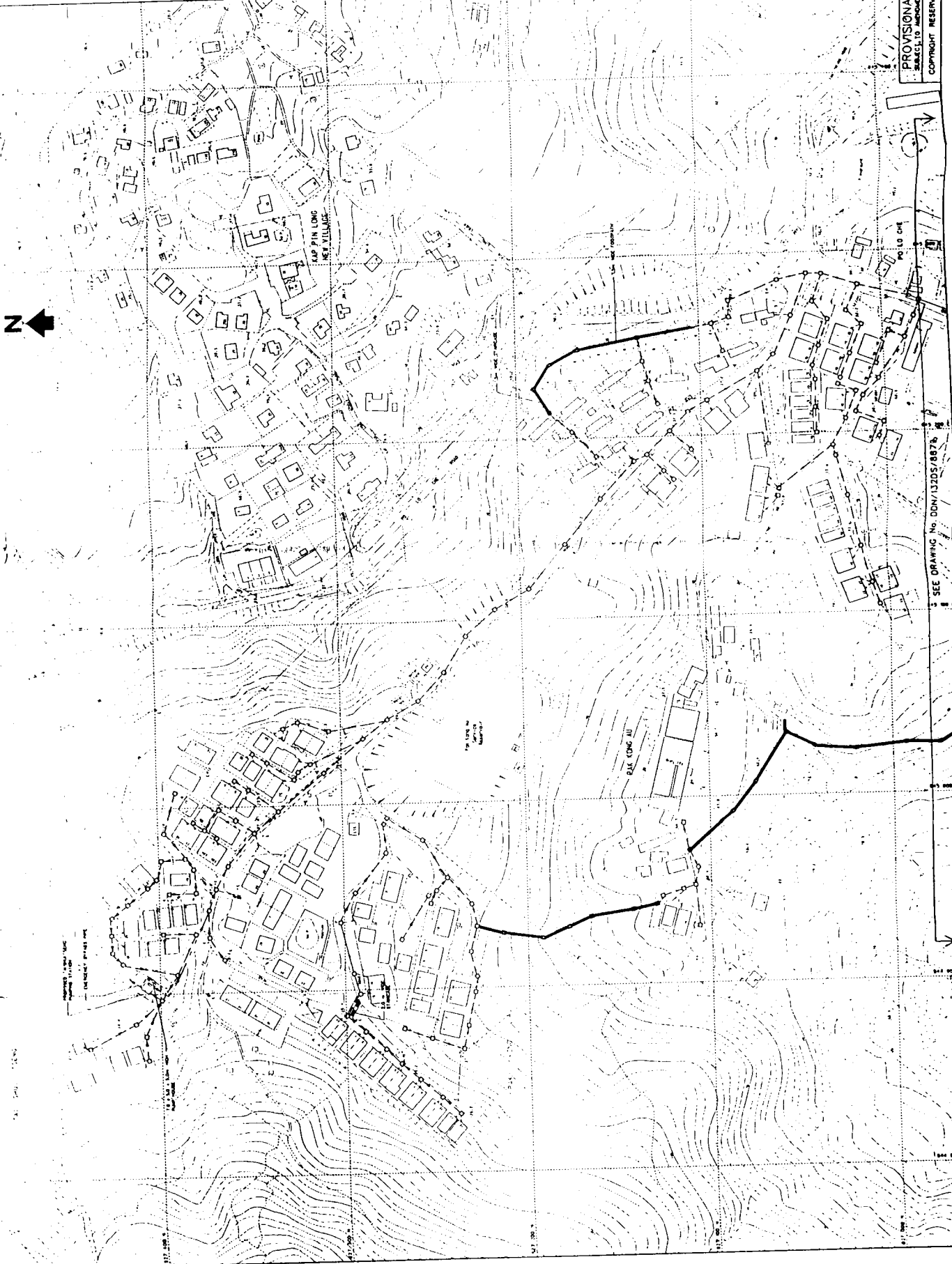
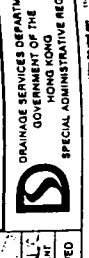
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CONTRACT NO. SP/8/4/132DS/52P2
PROJECT NO. 132DS
CONTRACT

Drawing title
PORT SHELTER SEWERAGE, STAGE 2
-VILLAGE SEWERAGE AT
WONG CHUK WAN AND ENVIRONS
TO SAIKUNG
GENERAL LAYOUT
(SHEET 3 OF 7)

Drawing No. DDN/132DS/8878
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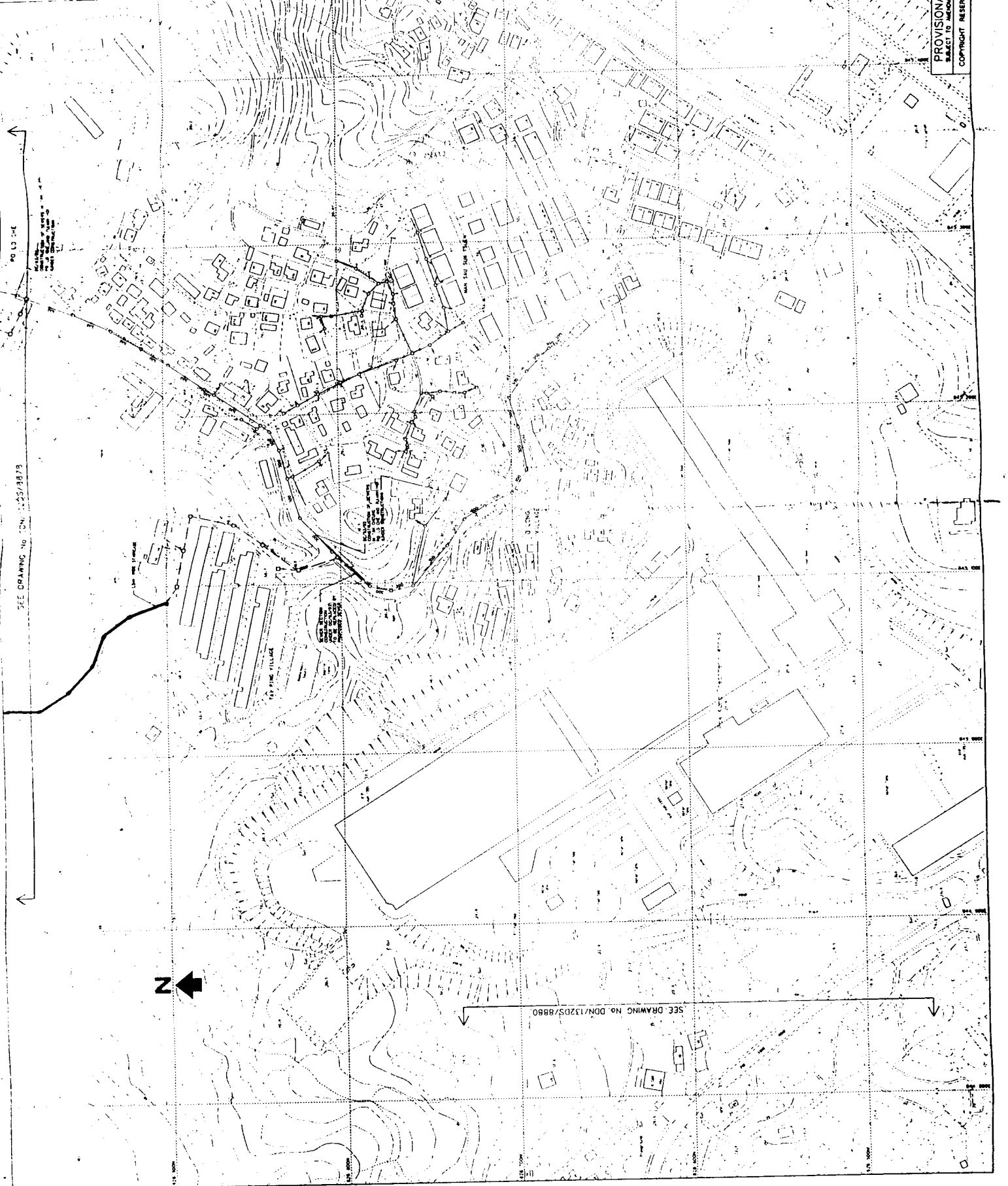
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 THE HONG KONG WATER SUPPLY AND SEWERAGE DEPARTMENT



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DESIGNED BY: Y. C. FUNG
 CHECKED BY: W. H. FUNG
 DRAWN BY: P. H. CHAN
 DATE: 1988

PROJECT NO: SP/8/132DS/S2P2
 SHEET NO: 132DS
 CONTRACT: 132DS

DRAWING TITLE: PORT SHELTER SEWERAGE, STAGE 2
 VILLAGE SEWERAGE AT
 WONG CHUK WAN AND ENVIRONS
 TO SAIKUNG
 GENERAL LAYOUT
 (SHEET 8 OF 7)

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 DRAWING NO: DDN/132DS/8879

TITLE: SEWERAGE PROJECTS DIVISION

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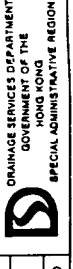
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 CONTRACT NO. 132DS

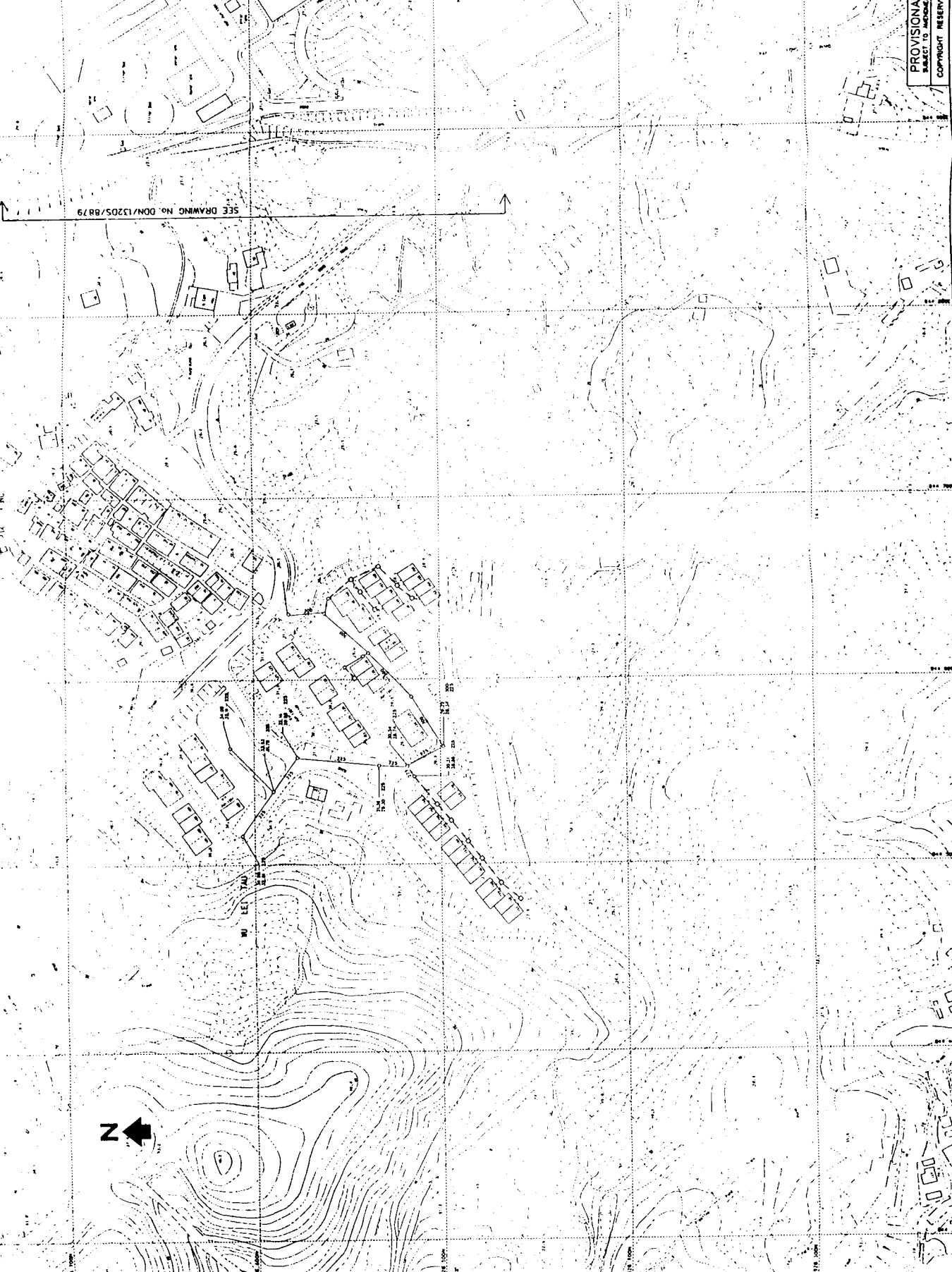
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 (SHEET 7 OF 7)

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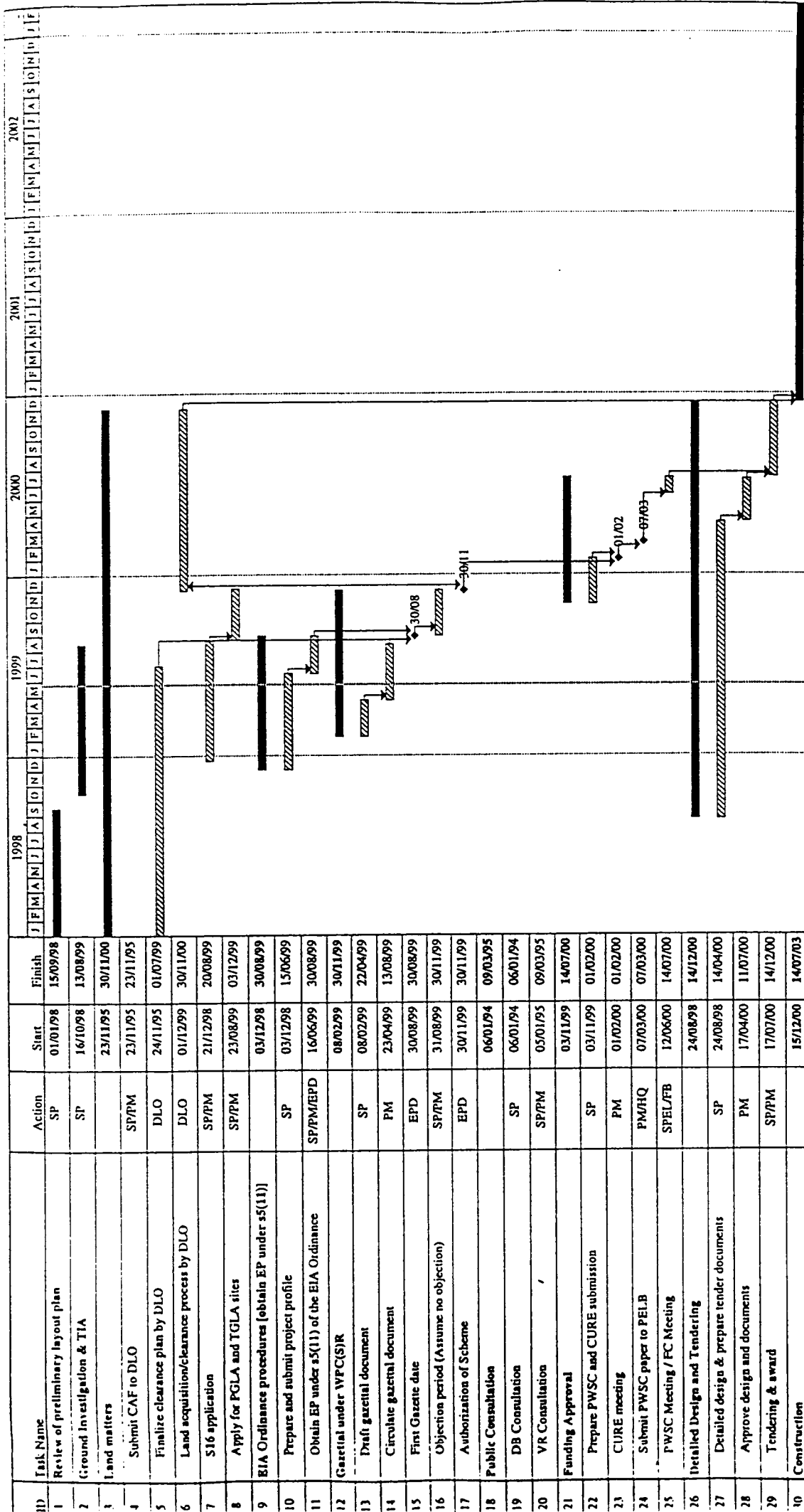


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APPENDIX II

4272DS - Port Shelter Sewerage, Stage 2 - Village Sewerage at Wong Chuk Wan & Environs to Sai Kung



(1) First Gazette date deferred by 6 months to reflect DLO's time requirement for preparing land resumption plans. (2) Additional time allowed for resolving objections and land clearance by DLO. (3) Assume no objection received.

APPENDIX III

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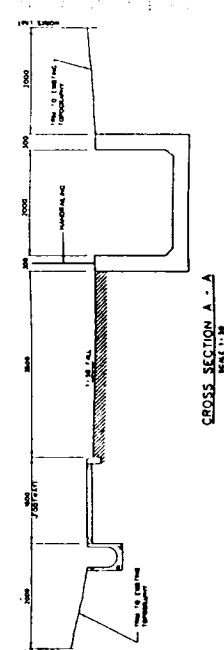
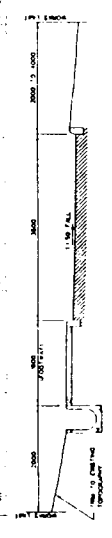
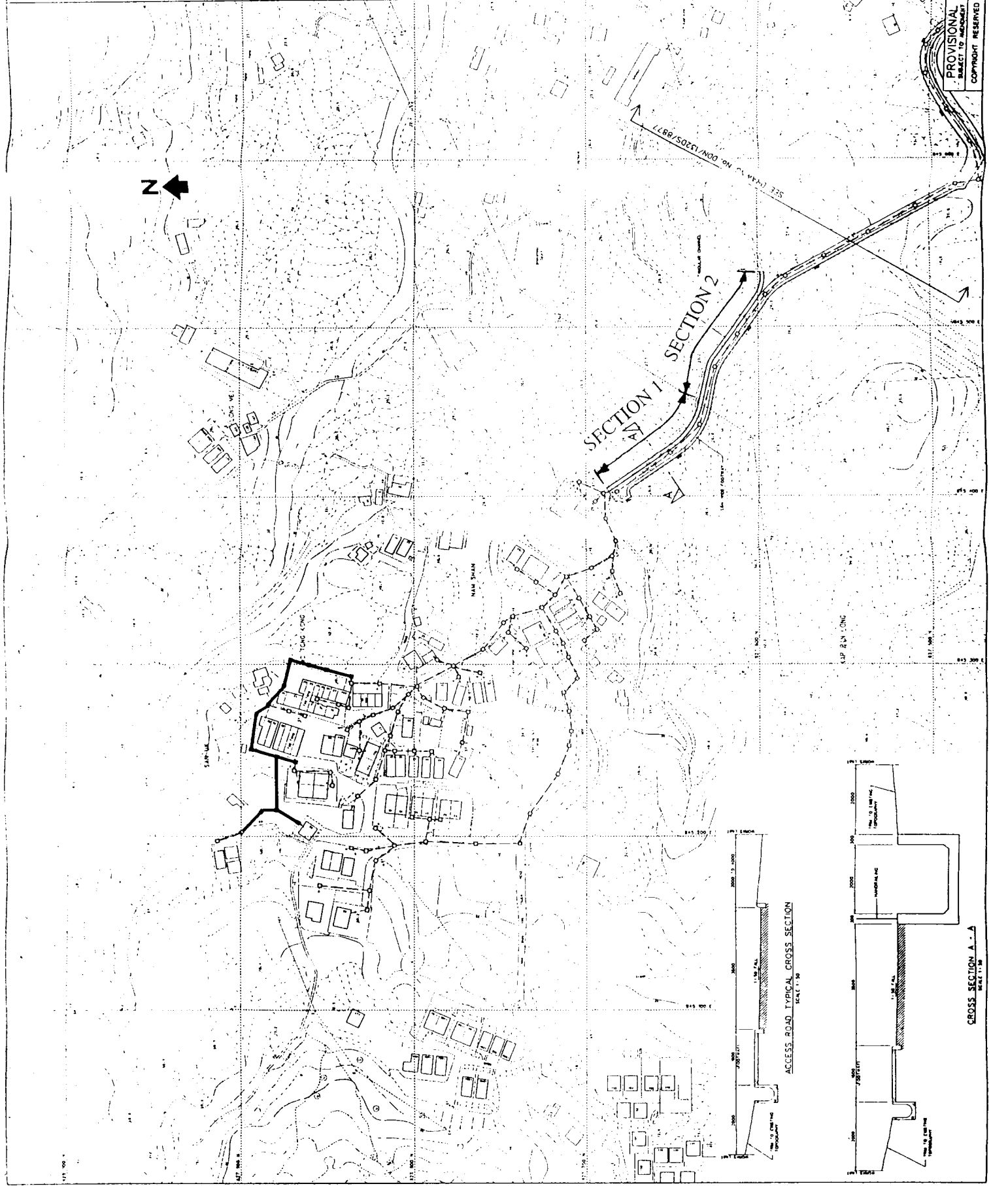
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 SP/B/41320S/S2P2

DATE
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NOTES
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NO. / DATE	DESCRIPTION	SCALE
REVISION		
SURVEYED	DATE	
DESIGNED	Y. C. FANG	
DRAWN	K. W. FONG	
CHECKED	P. A. CHAN	
APPROVED		

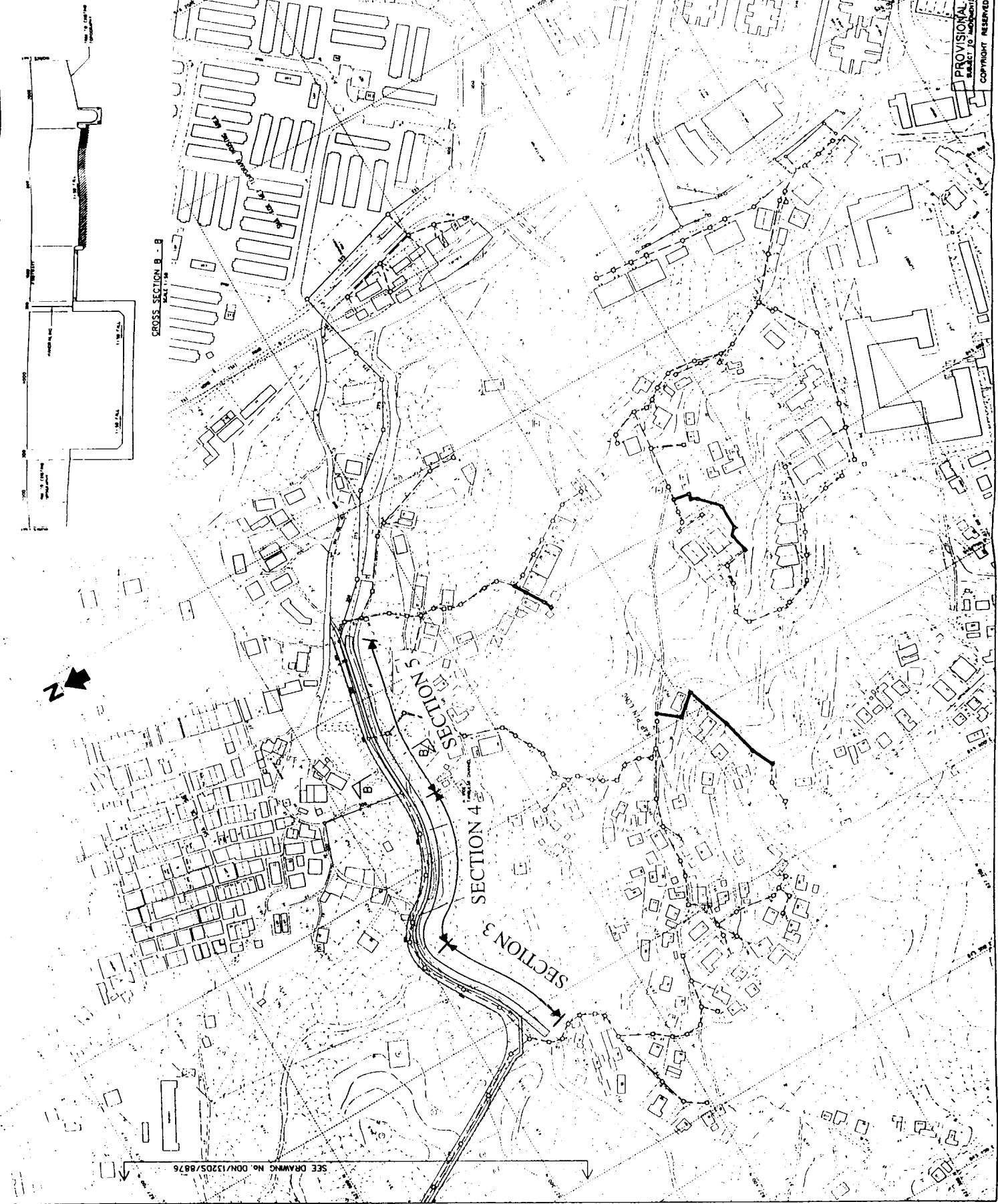
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 VILLAGE SEWERAGE AT ENVIRONS
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 TO SAKUNG
 GENERAL LAYOUT

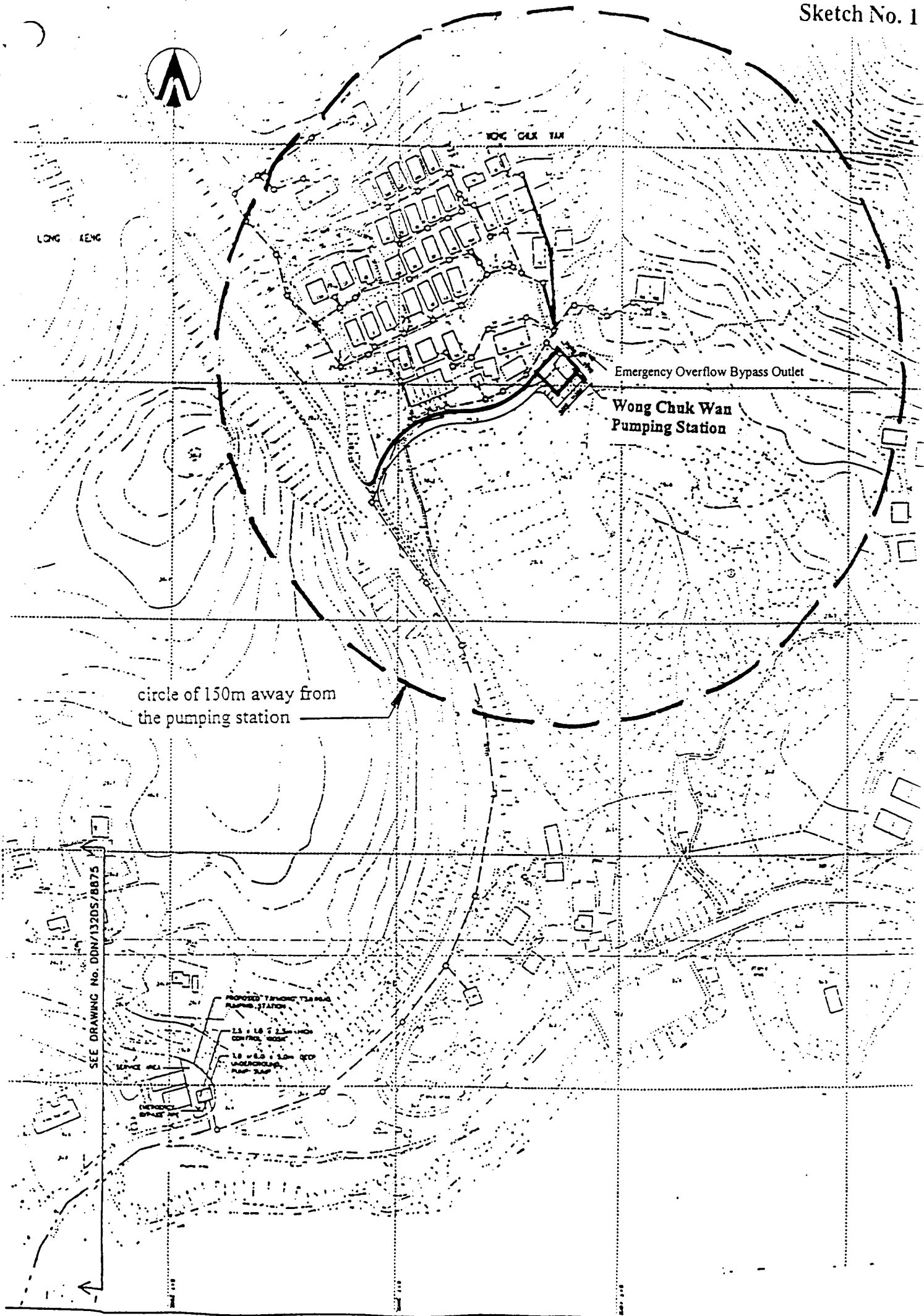
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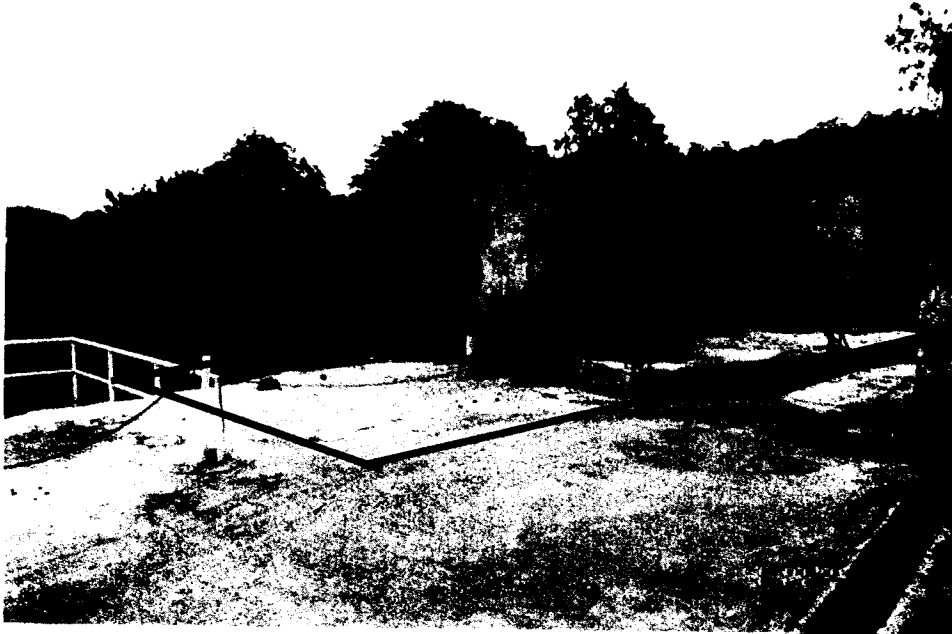
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APPENDIX IV



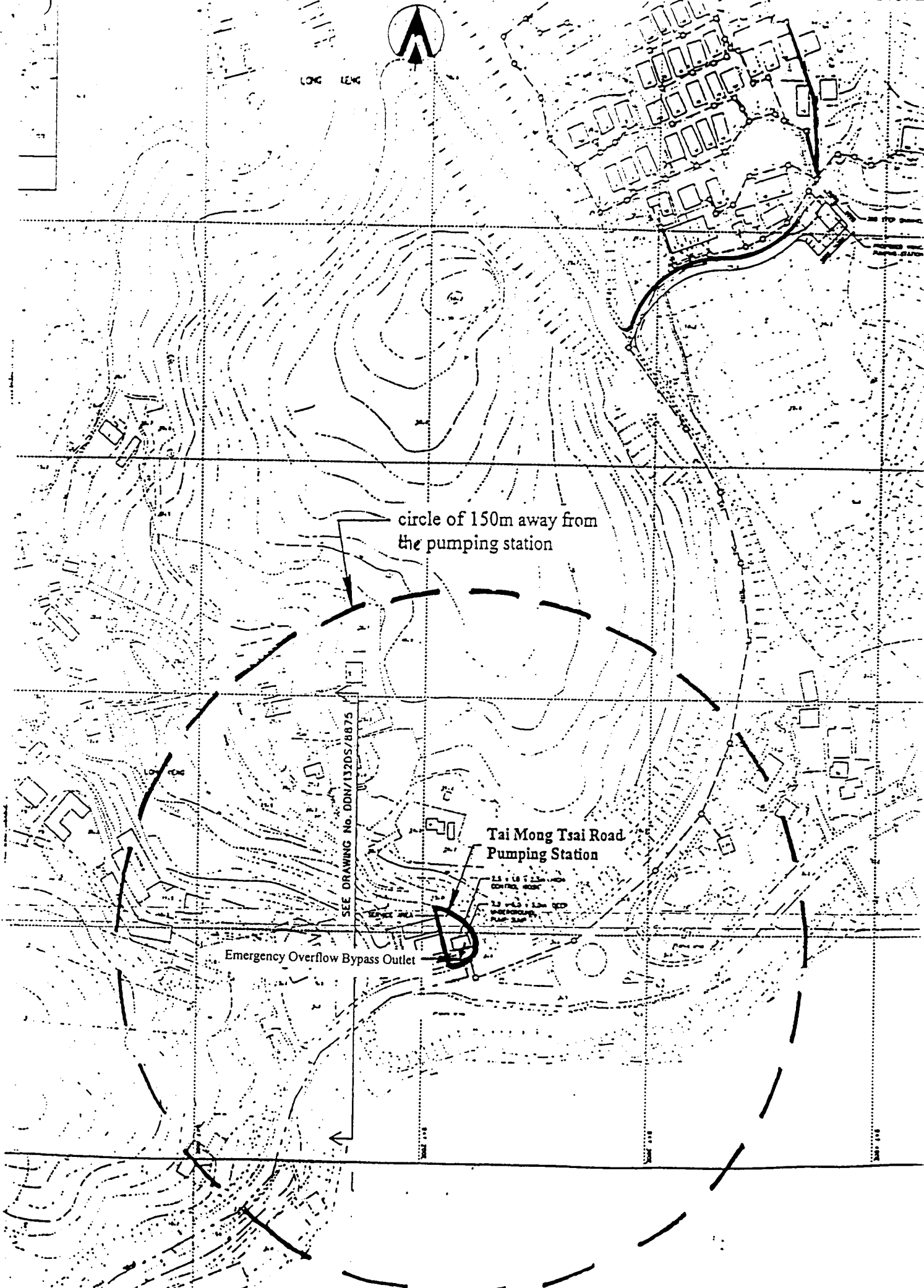


Existing site condition of Wong Chuk Wan Pumping Station

Legend



Proposed location of
Wong Chuk wan Pumping Station



circle of 150m away from
the pumping station

Tai Mong Tsai Road
Pumping Station

Emergency Overflow Bypass Outlet

SEE DRAWING No. DDN/132DS/8875

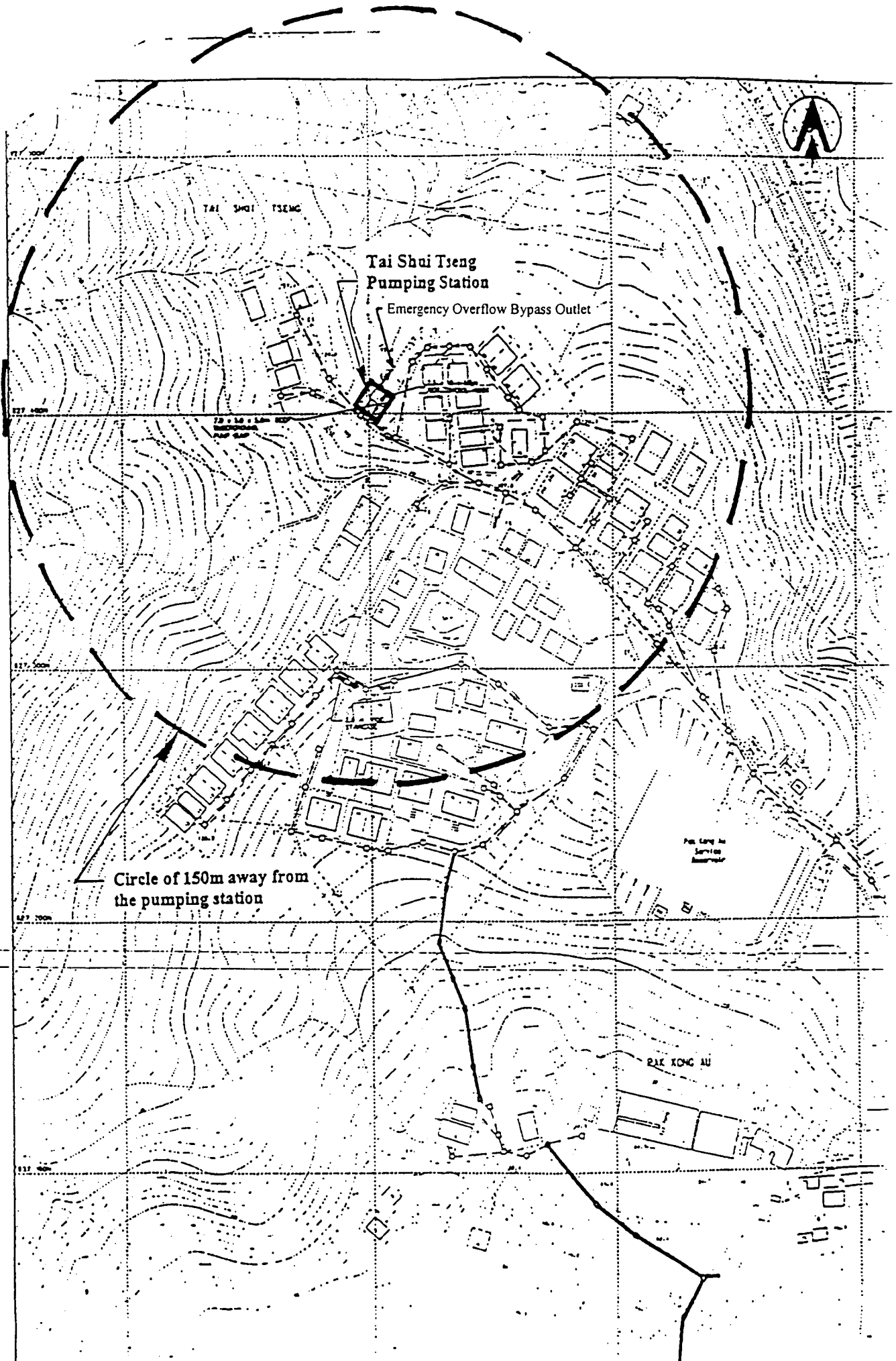


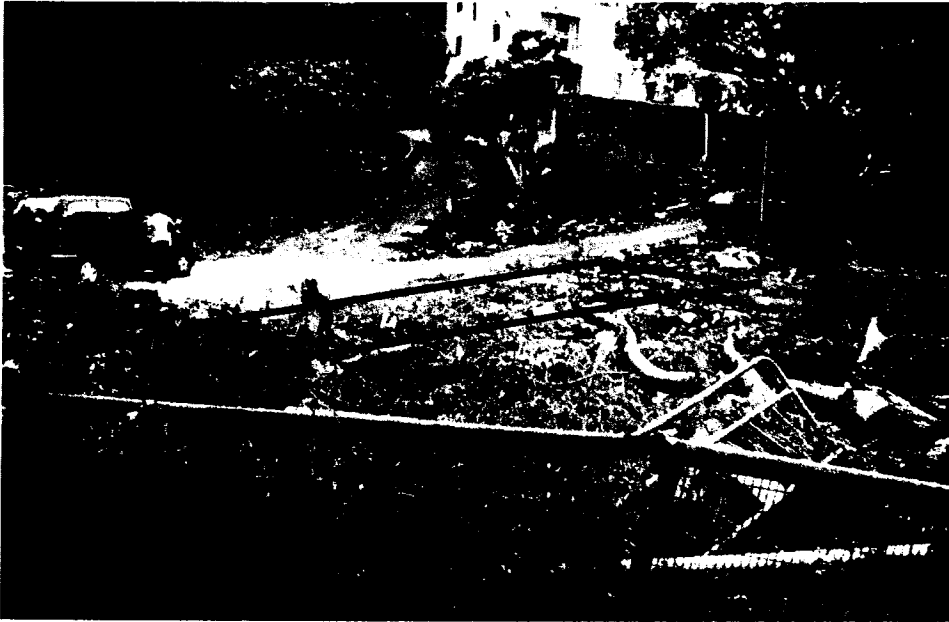
Existing site condition of Tai Mong Tsai Road Pumping Station

Legend



Proposed location of
Tai Mong Tsai Road Pumping Station





Existing site condition of Tai Shui Tseng Pumping Station

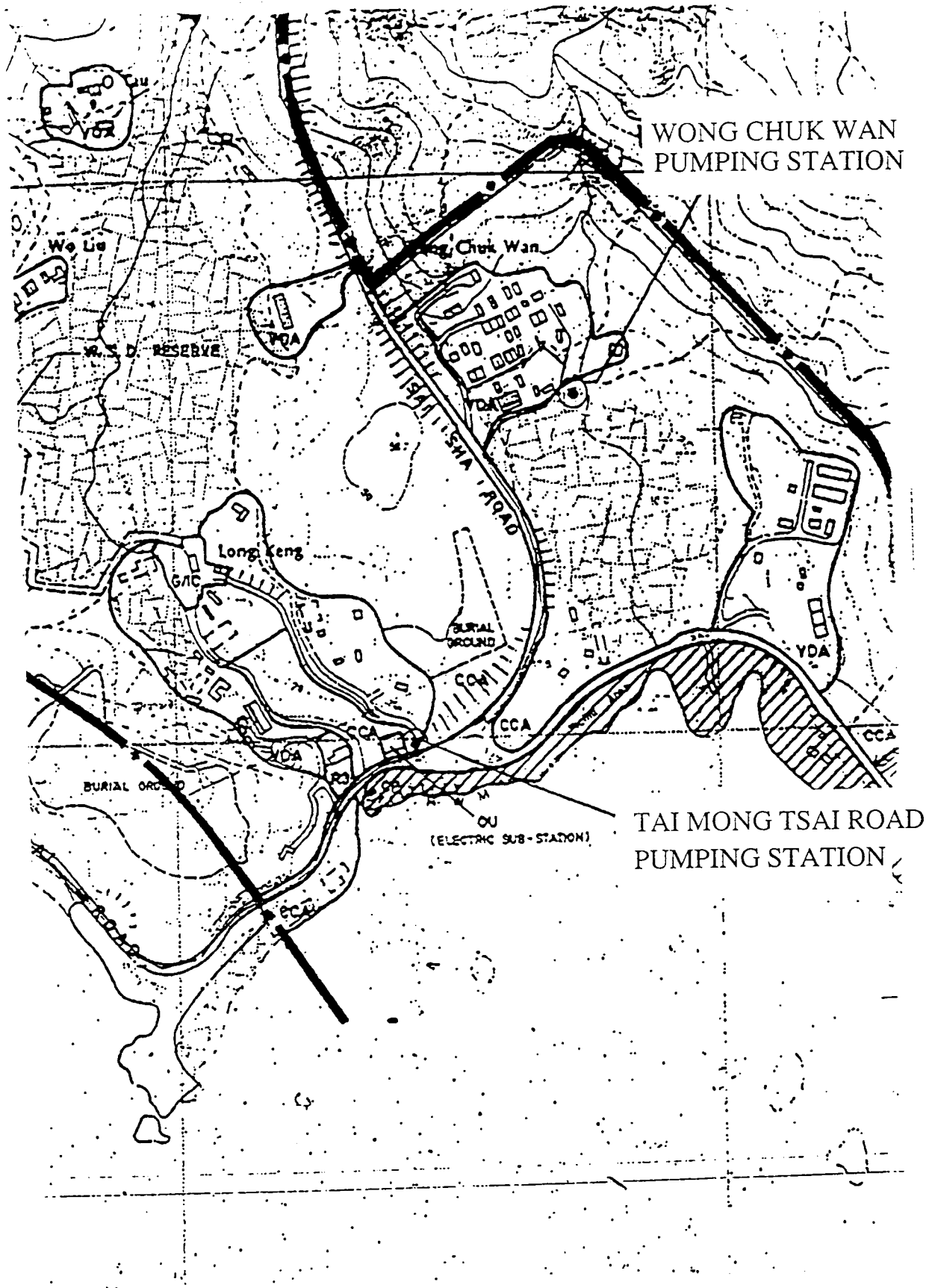
Legend



Proposed location of
Tai Shui Tseng Pumping Station

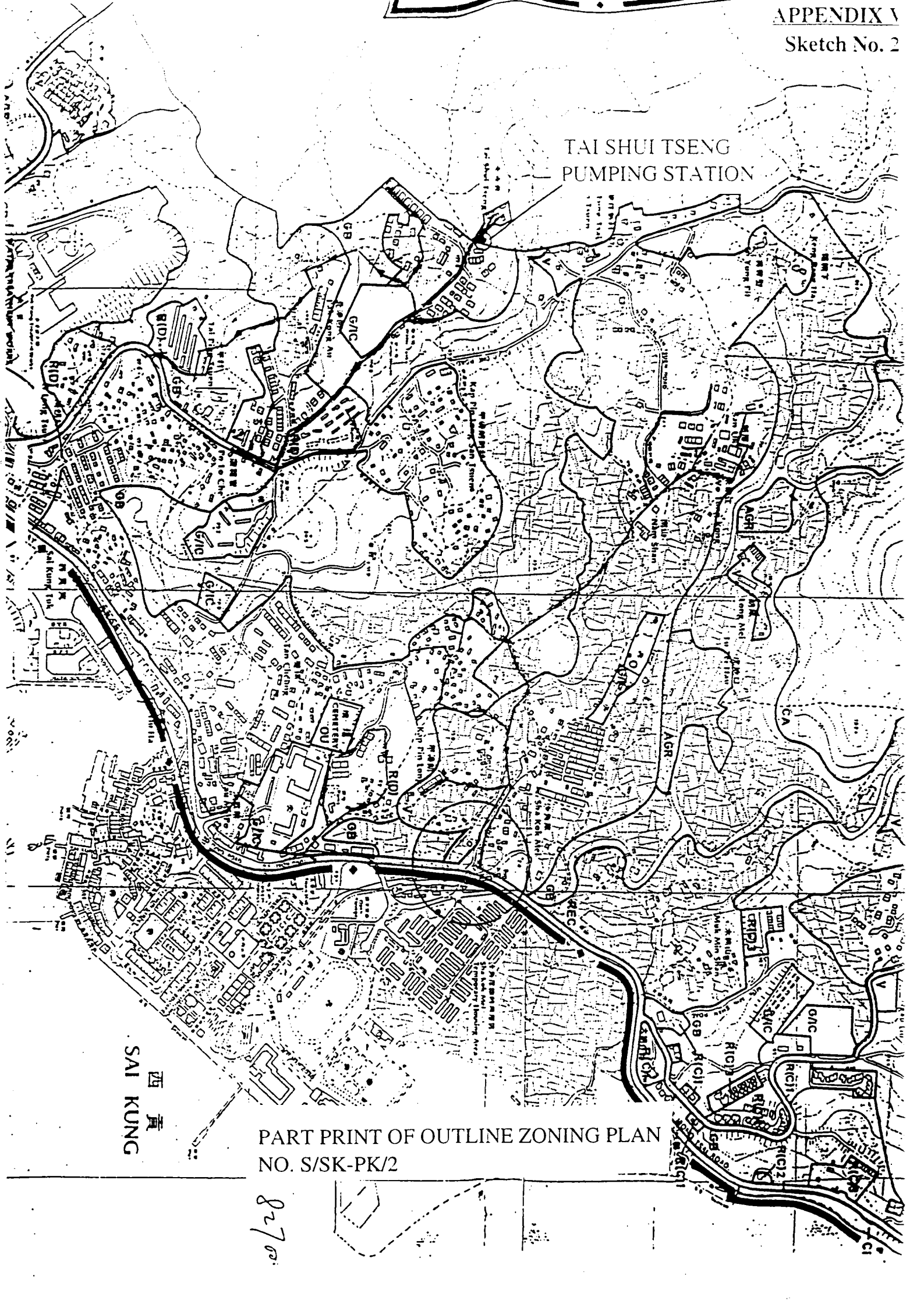
APPENDIX VI

APPENDIX VI



PART PRINT OF OUTLINE DEVELOPMENT
PLAN NO. D/SK-TMT/1A

TAI SHUI TSENG
PUMPING STATION



西貢
SAI KUNG

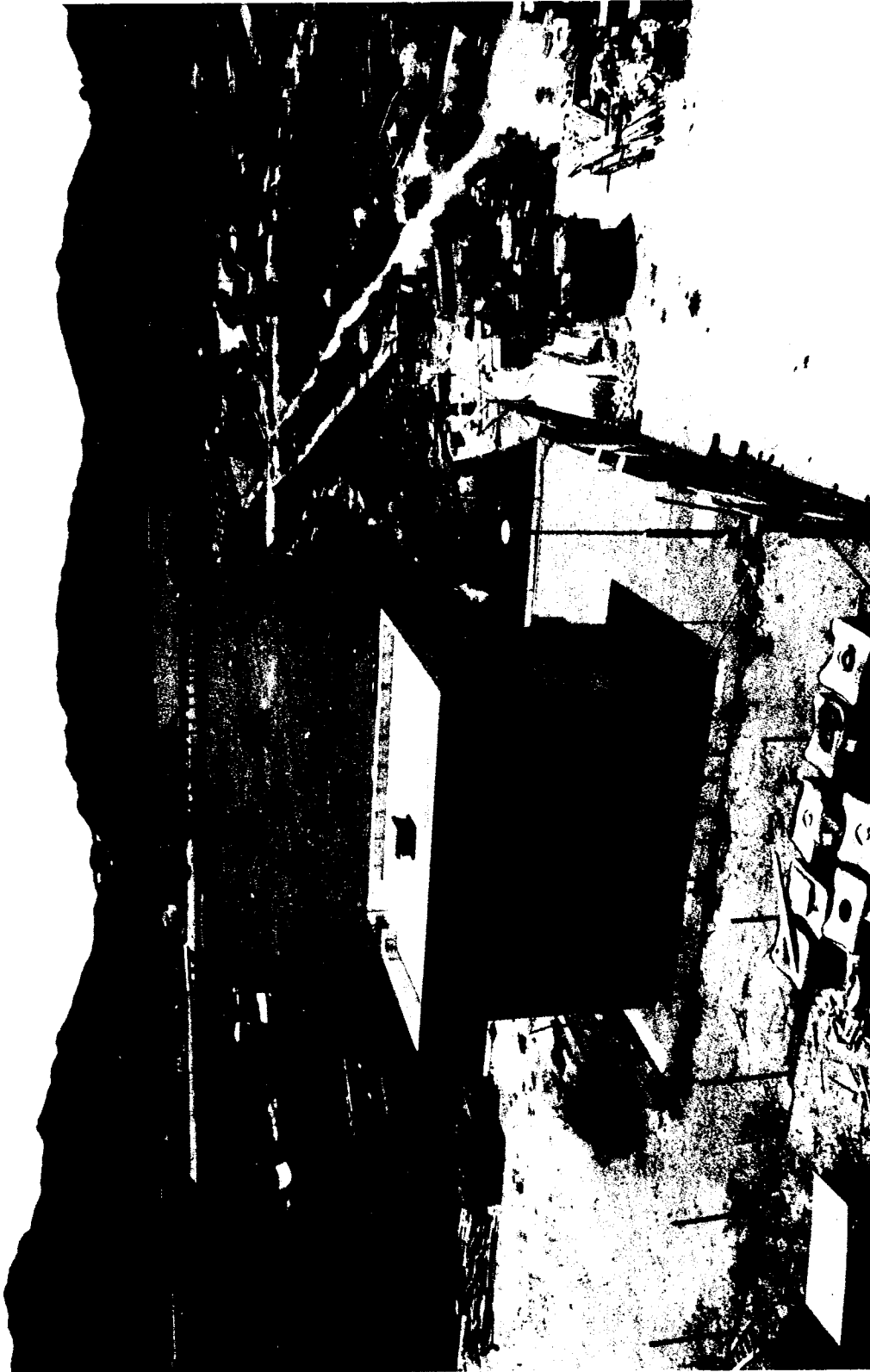
PART PRINT OF OUTLINE ZONING PLAN
NO. S/SK-PK/2

8270

APPENDIX VII



Outlook of Small Sewage Pumping Station Comprised of Underground Inlet Chamber, Screening Chamber and Wet Well without Superstructure



Typical Outlook of Large Sewage Pumping Station with Superstructure Designed by DSD

APPENDIX VIII

Para. 8(i) extracted from the Project Profile of Port Shelter Sewerage Stage 2 Phase 2 project
"Village Sewerage at Wong Chuk Wan and Environs to Sai Kung"

Construction Stage – Engineered Channel

- 8(i) In order to assess the potential ecological impact arising from the proposed engineered channel works. Sewerage Projects Division of DSD (SP/DSD) conducted the field surveys on 28.4.1999 on the concerned sections of the stream courses at Nam Shan and Kap Pin Long. Drawing showing the location of the concerned sections of the existing stream courses is given in Appendix III.

For the stream course at Nam Shan (Sections 1 and 2)

For the purpose of the field survey, the 160m long stream course was divided into two consecutive sections, namely Sections 1 and 2. According to the field survey, characteristics of these two sections were found to be similar to each other. Both sections were gentle and meandering with an averaged width ranging from 0.8m to 1.4m and an averaged depth ranging from 0.6m to 1.0m. A concrete footway was found to be running alongside the stream course. The stream course was surrounded by abandoned field and grassland. The existing flow was found to be moderate and the catchment landform was plain. The embankment on the opposite side of the concrete footway was formed by stone and covered by trees, grasses and ferns. The stream course bed was formed by rubble and gravel where emergent aquatic vegetation was identified occasionally. As regards terrestrial and aquatic life inhabiting in the stream course, butterflies, dragonflies, amphibians, other insects and small fishes were identified occasionally. The existing flow was in yellow/brown colour, odourless and slightly silted. It appeared that the existing flow was polluted by wastewater discharged from the nearby village houses.

For the stream course at Kap Pin Long (Sections 3, 4 and 5)

For the purpose of the field survey, the 260m long stream course was divided into three consecutive sections, namely, Sections 3, 4 and 5. According to the field survey, characteristics of Sections 3 and 4 were found to be similar to each other. Both Sections 3 and 4 were gentle and meandering with an averaged width ranging from 1.2m to 1.8m and an averaged depth of 1.5m. A concrete footway was found to be running alongside all the three sections and the surrounding land uses were local village houses, woodland and grassland. For Sections 3 and 4, the embankment on the opposite side of the concrete footway was slumping and covered by vegetation including trees, grasses and ferns. The stream course bed was formed by rubble and gravel and overgrown by emergent vegetation. As regards terrestrial and aquatic life inhabiting in the stream course, birds, butterflies, dragonflies, amphibians, other insects and small fishes were identified occasionally. The existing flow was in yellow/brown colour, odourless and slightly silted. It appeared that the existing flow was polluted by wastewater discharged from the nearby village houses.

Section 5 was found to be an existing engineered channel with an average width and depth of 3.0m and 1.5m respectively. The channel was gentle and straight with slow flow and plain catchment landform. The channel bed was covered by boulders and the channel bank on the opposite side of the footway was covered by grasses and ferns. Algae were also found in the channel. As regards terrestrial and aquatic life inhabiting in the stream course,

dragonflies, amphibians, other insects and small fishes were identified occasionally. The existing flow was in yellow/brown colour, odourless and slightly silted. It appeared that the existing flow was polluted by wastewater discharged from the nearby village houses.

Based on the field survey results, it is considered that the conservation importance of the concerned stream courses is insignificant. It is anticipated that the proposed engineered channel works will not have significant ecological impact on the surrounding environment. Nonetheless, appropriate environmental protection measures detailed in para. 13(g) will be incorporated into the design and/or the contract.