DRAINAGE DIVERSION WORKS FOR THE COMPREHENSIVE RESIDENTIAL DEVELOPMENT AT VARIOUS LOTS IN DD 227 & DD 229, TAI PO TSAI, SAI KUNG
- PROJECT PROFILE (Issue No.: 1)

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Allied Environmental Consultants Ltd.

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1. BASIC INFORMATION

1.1 Project title

Drainage diversion works for the comprehensive residential development at various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung.

1.2 Purpose and nature of project

This project involves diversion works of existing stream courses within the subject site into an underground channel, which will receive runoff from the surrounding sub-catchments and effluent from sewage treatment plant at the future development, and discharge to Pak Shui Wun.

1.3 Name of project proponent

Addlight Investments Limited

1.4 Location and scale of project (include plans) and history of site

- The subject site is located at the southern side of University Road and is adjoining with the Tai Po Tsai Village and Clear Water Bay Road along its western boundary. This subject site is zoned as "Comprehensive Development Area" in the Outline Zoning Plan. A large part of the application site was previously used as golf driving range which was vacated a few years ago. Majority of the area is grossly vegetated, mixed with overgrown and climbers. Figure 1.1 shows the location of the subject site and its surrounding environment.

- A few stream courses flow through the site originating on the south-east slopes of Razor Hill and the promontory occupied by TV City in the south. North of the Site the main stream course joins others flowing east and north to Port Shelter in a steep ravine above Pak Shui Wan beach.

- The subject site covers an area of 6.68 ha. A total of 939 residential units will be provided. Since an existing stream is running across a substantial part of the site, it is proposed that the section of stream within the subject site will be diverted into an underground channel to receive runoff from the surrounding sub-catchments. This work involves the diversion of approximately 600m of the existing stream channel. Figure 1.2 shows the master layout plan of the proposed residential development in relation to the existing stream and the proposed box culvert. Figure 1.3 shows the existing stream course system and Figure 1.4 shows the location of the existing stream course and the proposed drainage diversion.

1.5 Evaluation of Drainage Diversion Design Options

For the proposed drainage diversion works, two selected design options are considered in details and a brief evaluation of these options is given below.

Option 1 – Open Channel

- By adopting an open channel with natural bottom design, the potential ecological impact associated with the drainage works is reduced. The natural bottom channel would provide habitat for native species if properly set up and maintained.

- However, the existing stream collects sewage discharge from Tai Po Tsai Village as well as contaminated surface run off. An open channel poses potential hygienic and environmental problems. It also may cause unpleasant odour and visual impact on the neighbourhood as well as the proposed development.

- In view of the linear shape of the subject site, there is insufficient space to accommodate an open channel design with provision of an 8.5m utility and drainage reserve, a reserve for utility and an access road, which allows for easier maintenance by DSD as well as Utility undertakers.

- The open channel scheme would also inevitably pose an unjustifiable risk to fall at height, with consideration to the level difference of the formed ground and channel invert. Therefore, after accommodating an open channel at the subject site, there would be insufficient space to locate the access road and utility reserve required for the operation of the development. The entire 8.5m wide utility and drainage reserve will have to be fenced off for safety reasons.

- In response to Planning Department's comment to encourage more area should be used for landscaping, a substantial landscape master plan has been proposed for the subject site. After accommodating an open channel, the area available for landscaping is significantly reduced. This would jeopardize the provision of compensationary planting proposal (with 1229 trees need to be planted within the site in the approved Landscape Master Plan).

Option 2 – Underground Box Culvert

- For effective gravity flow, the alignment of the proposed drainage diversion should follow the lower topography of the site in lieu of climbing uphill along the eastern boundary of the site. A route along the eastern boundary of the site would require a deep drainage channel of approximately 9m depths, which is not acceptable from maintenance point of view. This drainage channel will also need to intercept flows originated from Razor Hill to the west of the site, therefore, having drainage route locating on a high terrain causes difficulty for connections and possibility of backflow. The underground box culvert design, which is not constrained by topography, can provide a comprehensive solution to address these issues.

- By adopting the underground box culvert design, the potential environmental nuisance associated with open channel flow that may be caused to the neighborhood and the proposed development is alleviated.

- The underground box culvert design also can prevent direct contamination of the stream course, including the downstream Conservation Area and Coastal Protection Area, from unexpected human activities and surface run-off from the subject development.

- The underground box culvert scheme has the benefit of incorporating the required utility and drainage reserve and complies with the Utility Undertakers statutory requirements.

- By adopting the underground box culvert design, there would be minimal impact on the implementation of landscape master plan.

  In view of the above, the underground box culvert option is considered more suitable for the subject site from both engineering and environmental point of view. Figure 1.5a and 1.5b illustrate schematic sections of the proposed drainage diversion works. The works area plan and proposed sequence of drainage diversion works are given in Appendix B.

1.6 Number and types of designated projects to be covered by the project profile

The diverted stream will discharge into an area that is less than 300m from the nearest boundary of an existing Conservation Area and Coastal Protection Area. The proposed diversion works constitutes a Designated Project of type I.1(b) in Schedule 2 of the EIAO.

1.7 Name and telephone number of contact person(s):

- Project Proponent: Addlight Investments Limited, Ms. Viola Cheng (Tel. No.:2844 3291)
- Environmental Consultant: Allied Environmental Consultants Limited, Ms. Grace Kwok (Tel. No.: 2815 7028)

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

The drainage diversion is being planned and designed by Addlight Investments Limited and their appointed Consultants. It is proposed that the works will commence in mid late of 2005 for approximately 18 months. Tentative development programme of the entire residential projects is presented in Appendix A, while a detailed breakdown of the 18-month duration of the proposed drainage diversion work is shown in Table 2.1 below:

Table 2.1 Construction Sequence and Duration

Major construction activities	**Duration (months)**
Mobilization and sheet piling installation	2.5
Grout curtain and pumping test	2
Test report and consent application	1.5
Excavation and construction of box culvert	9
Connection works and diversion	1.5
Backfilling and compaction	1.5
Total	**18**

The following is a brief description of the construction sequence for the drainage diversion works at the conceptual design stage. Appendix B illustrates sequence of the drainage diversion works. A detailed sequence of works shall be proposed by the Main Contractor prior to the actual commencement of works.

Stage 1

1. Mobilization of plants for the drainage diversion works.

2. Install sheet piles to the required depths.

Stage 2

3. Excavate to the proposed final excavation level for box culvert and pipe laying works. Suitable excavated soils should be stored temporarily at the designated areas on site with protective measures for future backfilling works.

4. Temporarily divert the portion of the existing stream, which overlaps with the proposed box culvert and pipe drainage line, within the proposed works area.

5. Deliver precast concrete box culvert and pipe sections to site.

6. Place and connect box culvert and pipe sections along the proposed drainage line.

Stage 3

7. Construct drainage facilities such as sand traps and catch pits at intersections between the proposed drainage line and existing sideline streams.

8. Divert water from existing streams to the proposed drainage line.

Stage 4

9. Backfill the cut slopes around the proposed drainage line to the required level for protection of the completed drainage system and safety reasons.

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

- The subject site is surrounded by village houses and University staff housing. HKUST and TV city are situated to the east and to the south of the subject site respectively.

- Sensitive receivers which are located within 500m of the site includes:
  - Coastal protection area in Pak Shui Wan;
  - Conservation area located at the north of the subject site;
  - Residential buildings: Pik Shui Sun Tsuen and university staff housing to the north of the site, Tai Po Tsai Tsuen to the west of the site, and TVB staff hostel to the south of the site.
  - Educational Institutions: Clearwater Bay School and HKUST to the south and to the east of the subject site.

- The local traffic network such as the Clear Water Bay Road and University Road are considered to be the dominant air pollution and noise pollution sources in the study area. No industrial uses are located within the area.

- According to the Clear Water Bay Peninsula North Development Permission Area Plan No. DPA/SK-CWBN/2, the subject site is known as CDA(1). Another CDA located south of the subject site which is intended for the redevelopment of the Shaw Brothers' Studio is known as CDA(2). Pursuant to the Town Planning Ordinance, development/redevelopment within the CDA zone is subject to the approval of the Town Planning Board (TPB). Planning approval to the residential development on the subject development site (CDA(1)) has been obtained from the TPB on 28.6.2002. The concerned developer of the CDA(2) site has yet to obtain any planning approval from the TPB. Even when planning approval is obtained, it would usually require one to two years to fulfill a list of approval conditions and deposit the Master Layout Plan in the Land Registry before the construction works could be commenced. Since the subject site (CDA(1)) and the nearby CDA(2) site are at different development stages, it is anticipated that there shall be no concurrent construction works at the two. Besides, the CDA(1) construction works will not overlap with the proposed drainage diversion works in this study.

- A Preliminary Ecological Review Report has been conducted by China-Hong Kong Ecology Consultants Company. The report concluded that the existing habitat quality of the stream and riparian habitats within the project site is considered low as a result of poor aquatic fauna and human disturbance. A Preliminary Ecological Review Report detailing the findings of the study is attached in Appendix C.

- A freshwater fish investigation has been conducted by Ichthyology. The survey results indicated that the water quality of the existing stream is stressed through the effect of pollution from various human activities in the past such as farming and construction works. Existing water pollution sources generally related to the domestic effluents generated in the surrounding area. There was no native fish individuals found in the entire target stream course except for a few introduced fish species. A Freshwater Fish Investigation Survey Report is attached in Appendix D.

4. POSSIBLE IMPACT ON THE ENVIRONMENT

4.1 Introduction

The potential environmental impacts associated with the proposed drainage diversion works are assessed according to the criteria given in the Technical Memorandum on Environmental Impact Assessment Process (TMEIA). The potential impacts during the construction and operation phases of the drainage diversion works are shown in Table 4.1 and Table 4.2 respectively.

Table 4.1 Potential Environmental Impacts during Construction Phase of the Proposed Drainage Diversion Works

Environmental Issues	Construction Phase Possible Impact
Gaseous emissions	Unlikely to cause impact

Environmental Issues	Construction Phase Possible Impact
Dust	Fugitive dust emissions from site clearance, rock-breaking, excavation and vehicle movement on unpaved road
Odour	Unlikely to generate odour
Noisy operations	Noise from operation of PME and prescribed construction works such as handling of steel bars, hammering and formworks
Night-time operation	No construction activities will be carried out during night-time
Traffic generation	Heavy vehicles for transportation of construction material may slightly increase the traffic flow in the vicinity
Liquid effluents, discharges, or contaminated runoff	Surface runoff and wastewater generation from construction activities.
Generation of waste or by-products	Construction waste, such as wood boards and excavated soil
Dangerous goods, hazardous material or wastes	Unlikely to store dangerous goods, or generate hazardous materials or wastes
Risk of accidents	Unlikely to cause risk of accidents which would result in pollution or hazard
Disposal of spoil material	Unlikely to cause impact
Disruption of water movement or bottom sediment	Unlikely to cause disruption of water movement or bottom sediment
Dredging of stream sediment	Unlikely to cause impact
Unsightly visual appearance	Unlikely to cause long term impact as the construction works only last for about 18 months
Ecological impacts	Impacts on fauna and flora

Table 4.2 Potential Environmental Impacts during Operational Phase of the Proposed Drainage Diversion Works

Environmental Issues	Operational Phase Potential Impacts
Gaseous emissions	No chimney or gaseous emissions installation
Dust	Unlikely to cause impact
Odour	Unlikely to cause impact
Noisy operations	Unlikely to cause impact
Night-time operation	Unlikely to occur
Traffic generation	Unlikely to occur

Environmental Issues	Operational Phase Potential Impacts
Liquid effluents, discharges, or contaminated runoff	Unlikely to cause impact
Generation of waste or by-products	Unlikely to cause impact
Dangerous goods, hazardous material or wastes	Unlikely to store dangerous goods, generate hazardous materials or wastes
Risk of accidents	Unlikely to cause risk of accidents which would result in pollution or hazard
Disposal of spoil material	Unlikely to occur
Disruption of water movement or bottom sediment	Unlikely to occur
Dredging of stream sediment	Unlikely to occur
Unsightly visual appearance	Unlikely to occur as the diverted channel is located at underground level
Ecological impacts	Impacts on fauna

In summary, the potential impacts associated with the proposed drainage diversion works include dust emission, noise impact, wastewater generation, waste generation and ecological impact during construction phase as well as ecological impact during operational phase. These potential impacts have been assessed and the findings are detailed in the following sections.

4.2 Air Quality

The construction activities that have the potential to generate dust include material handling, rock breaking, excavation, wind erosion and truck haulage on unpaved roads. Exhaust emissions of SO_2 and NO_2 from diesel-powered mechanical equipment will also be generated. The extent of impacts depend on the distances between the work sites and the identified Air Sensitive Receivers (ASRs), the construction methods employed, the number of plants used and frequency of vehicle movements.

Information on the representative ASRs identified in the vicinity of the subject site is presented in Table 4.3. Location of the representative ASRs is illustrated in Figure 4.1. The worst-case concentrations of dust emission from the construction works are predicted at elevations of 1.5m above the ground floor and 2nd floor level of the representative ASRs identified.

Table 4.3 Representative Air Sensitive Receivers

ASR ID	Description	Sensitive Uses	Distance from Work Site Boundary (m)
A1	Tai Po Tsai Tsuen	Domestic Premises	170
A2	Staff Housing	Hostel	231

ASR ID	Description	Sensitive Uses	Distance from Work Site Boundary (m)
	(Block A)		
A3	Staff Housing (Apartment 1-12)	Hostel	158
A4	Principal Housing	Hostel	210
A5	HKUST	Educational Institution	194
A6	TVB Staff Quarter	Hostel	320
A7	Clearwater Bay School	Educational Institution	199
A8	Tai Po Tsai Tsuen	Domestic Premises	12
A9	Tai Po Tsai Tsuen	Domestic Premises	13
A10	Tai Po Tsai Tsuen	Domestic Premises	64

Air Quality Objectives (AQO) have been set by the Hong Kong Environmental Protection Department (EPD) for seven main urban air pollutants including the pollutant of concern in this project, Total Suspended Particulates (TSP) and Respirable Suspended Particulates (RSP). The 24-hour AQO for TSP and RSP are 260μg/m^3 and 180μg/m^3 respectively, which should not be exceeded more than once per year. The 1-hour TSP criteria for construction dust as specified in the Technical Memorandum on Environmental Impact Assessment Process (TMEIA) is 500μg/m^3.

In order to evaluate the potential air quality impacts on the neighbouring ASRs during the construction phase of the drainage diversion works, the dust emissions, measurable as Total Suspended Particulates (TSP) and Respirable Suspended Particulates (RSP), from various on-site construction activities are assessed under the worst-case scenario. The dust emission rates are estimated based on the emission factors compiled in the AP-42[1] and other available data. Detailed calculation of the emission factors adopted in the dust modelling is presented in Appendix E. Table 4.4 gives the dust emission rates adopted in the modelling.

Table 4.4 Dust Emission Rates for Various Construction Activities – Without Mitigation

Activities	Dust Emission Rates		Remarks
	TSP	RSP	
(1) Material Handling	4.33 x 10^{-3} g s^{-1}	2.05 x 10^{-3} g s^{-1}	Based on USEPA AP-42 Vol. 1 5th Edition, Section 13.2.4.3
(2) Rock Breaking	3.69 x 10^{-6} g s^{-1}	1.92 x 10^{-6} g s^{-1}	Based on USEPA AP-42 Vol. 1 5th Edition, Table 11.9-4, Equation (1)
(3) Excavation	1.16 x 10^{-2} g s^{-1}	5.47 x 10^{-3} g s^{-1}	Based on USEPA AP-42 Vol. 1 5th Edition, Section 13.2.4.3
(4) Vehicle Movements on Unpaved Site Roads	1.15 g s^{-1}	3.12 x 10^{-1} g s^{-1}	Based on USEPA AP-42 Vol. 1 5th Edition, Section 13.2.2
(5) Wind Erosion	2.695 x 10^{-6} g $s^{-1}m^{-2}$	1.348 x 10^{-6} g $s^{-1}m^{-2}$	Based on USEPA AP-42 Vol. 1 5th Edition, Table

[1] Compilation of Air Pollution emission Factors, AP-42, 5th Edition, United States Environmental Protection Agency, January 1995

Activities	Dust Emission Rates		Remarks
	TSP	RSP	
			11.9-4
Total Emission	6.12 x 10^{-5} g $s^{-1}m^{-2}$	1.73 x 10^{-5} g $s^{-1}m^{-2}$	= (1)+(2)+(3)+(4)+(5) / Total site area

The assessment is carried out using the dispersion model Industrial Source Complex Short Term (ISCST3). The basis of the model is the linear, steady-state Gaussian plume equation. The 2001 meteorological data (full year), as monitored by the Hong Kong Observatory at the Sai Kung Weather Station, is used as model input parameter. The average background levels of 83.6μg/m^3 for TSP and 54.4μg/m^3 for RSP from Kwun Tong Air Quality Monitoring Station from Year 1997 to Year 2001 are incorporated into the modelled results.

The maximum predicted hourly and daily TSP levels, and daily RSP at 1.5m above local ground level and 2nd floor level at the identified ASRs are shown in Table 4.5 below. Sample output files of the ISCST3 model are given in Appendix F. It should be noted that these worst-case prediction results represent the highest dust concentrations predicted to occur in a year under particular weather conditions. The dust concentrations at other times could be far less than these values.

Table 4.5 Maximum Predicted TSP and RSP Concentrations – Without Mitigation

ASR ID	1- hour Averaged TSP Concentration, μg/m^3		24-hour Averaged TSP Concentration, μg/m^3		24-hour Averaged RSP Concentration, μg/m^3	
	G/F	*2/F*	*G/F*	*2/F*	*G/F*	*2/F*
A1	***921.80***	420.17	***264.21***	147.13	105.45	72.36
A2	***646.49***	454.45	195.35	144.30	85.99	71.56
A3	***1000.94***	***645.32***	***294.05***	176.58	113.89	80.68
A4	***672.10***	372.19	246.94	173.83	100.57	79.91
A5	***946.71***	388.50	***279.43***	173.95	109.76	79.94
A6	***735.56***	427.83	242.70	173.42	99.37	79.79
A7	***974.96***	409.90	***318.06***	181.80	120.68	82.16
A8	***2377.62***	***531.30***	***823.29***	209.44	***263.49***	89.97
A9	***2018.94***	***582.99***	***750.93***	213.56	***243.04***	91.14
A10	***1090.70***	497.38	***391.15***	169.80	141.34	78.77

Remarks:
Results include annual TSP background level of 83.6μg/m^3.
TSP – recommended 1-hour TSP criterion (500μg/m^3) and AQO for 24-hour TSP (260μg/m^3)
Results include annual RSP background level of 54.4μg/m^3.
RSP - AQO for 24-hour RSP (180μg/m^3)
Bold and italic figures indicate exceedance of respective air quality criteria

The worst-case prediction results indicate that without mitigation, the hourly TSP criterion is likely to be exceeded at ground floor level of the ASRs. Whereas at the 2nd floor, exceedance of the hourly TSP criterion occurs at A3 (Staff Housing Apartment), A8 (Tai Po Tsai Tsuen) and A9 (Tai Po Tsai Tsuen). The AQO for daily TSP is likely to be exceeded at ground floor level of most of the ASRs except A2 (Staff Housing), A4 (Principal Housing) and A6 (TVB Staff Quarter), whereas no exceedance of the AQO for daily TSP is predicted at the 2nd floor of all ASRs. The AQO for daily RSP is likely to be exceeded at the ground floor of A8 (Tai Po Tsai Tsuen) and A9 (Tai Po Tsai Tsuen), whereas no exceedance is predicted at the 2nd floor of the ASRs. Therefore, the assessment

results show that dust control measures will be required to ensure compliance with the hourly TSP criterion and the AQOs for TSP and RSP.

Since only limited number of construction equipment will be used on-site during the construction of the drainage diversion, the overall exhaust emission from diesel-powered mechanical equipment of these plants is expected to be insignificant and unlikely to cause adverse air quality impact.
No operational phase air quality impact as a result of the proposed drainage diversion is anticipated.

4.3 Noise

Noise impacts arising from construction of the proposed drainage diversion are mainly due to the use of powered mechanical equipment (PME) for various construction activities, including site clearance, sheet piling, excavation, connection works and backfilling. The construction period is estimated to last for about 18 months. It is anticipated that construction work shall only be carried out during daytime. The potential noise impact during the construction phase of the proposed drainage diversion is assessed quantitatively.

Information on the representative Noise Sensitive Receivers (NSRs) identified within 300m radius of the subject site is presented in Table 4.6. Location of the representative NSRs is illustrated in Figure 4.2. The worst-case construction noise levels during different work stages are predicted at the representative NSRs identified.

Table 4.6 Representative Noise Sensitive Receiver

NSR ID	Description	Sensitive Uses	Slant Distance Between Centre of Site Section and NSR (m)
N1	HKUST Staff Quarter	Hostel	222
N2	HKUST Staff Residence (Apartment 1-12)	Hostel	162
N3	Tai Po Tsai Village	Domestic Premises	75
N4	Tai Po Tsai Village	Domestic Premises	48
N5	Tai Po Tsai Village	Domestic Premises	21
N6	Tai Po Tsai Village	Domestic Premises	46
N7	HKUST	Educational Institution	206
N8	Tai Po Tsai Village	Domestic Premises	84
N9	Tai Po Tsai Village	Domestic Premises	101
N10	Clearwater Bay School	Educational Institution	250

There is no statutory control on construction activities during non-restricted hours in daytime. However, construction noise criteria of $L_{Aeq(30min)}$ 75dB(A) and 70dB(A), respectively for dwellings and schools are recommended in ProPECC PN2/93 and commonly used as noise assessment criteria for daytime construction works.

In order to evaluate the potential noise impacts associated with the construction of the drainage diversion works during different work stages, the construction noise levels are predicted at the neighbouring NSRs under the worst-case scenario of assuming all construction plants in full operation. The construction noise assessment is conducted in accordance with the method prescribed in the "Technical Memorandum on Noise from Construction Work other than Percussive Piling". Derived from a preliminary construction work schedule, an assumed plant inventory as shown in Table 4.7 has been adopted as the basis of the noise assessment.

Table 4.7 Assumed Plant Inventory

Work Stage	Reference code in TM	PME	No. of items	SWL, dB(A) per item
1. Mobilization and sheet piling installation #	102	Generator, silenced	2	100
	081	Excavator	2	112
2. Excavation construction of box culvert	001	Air compressor	1	100
	102	Generator, silenced	2	100
	081	Excavator	3	112
	141	Lorry	3	112
	170	Poker, vibratory, hand-held	2	113
	186	Roller, vibratory	2	108
	048	Mobile crane (diesel)	2	112
3. Connection works & diversion	001	Air compressor	1	100
	102	Generator, silenced	1	100
	048	Mobile crane (diesel)	1	112
	081	Excavator	1	112
	141	Lorry	1	112
	044	Concrete lorry mixer	1	109
	047	Concrete pump	1	109
	050	Compactor, vibratory	2	105
4. Backfilling & compaction	001	Air compressor	1	100
	102	Generator, silenced	1	100
	081	Excavator	3	112
	141	Lorry	3	112
	186	Roller, vibratory	2	108

#Remark: Sheet piling installation shall be carried out using hydraulic type percussive piling method. Since noise generated through percussive piling is controlled under the Noise Control Ordinance, construction noise permit shall be applied by the Contractor before commencement of piling work.

The maximum predicted unmitigated construction noise levels at the representative NSRs are summarized in Table 4.8 below.

Table 4.8 Maximum Predicted Unmitigated Construction Noise Levels

Receiver ID	Noise criteria	Predicted Noise level, $L_{eq\ (30min)}$, dB(A)

		Stage 1	Stage 2	Stage 3	Stage 4
N1	75	63	71	67	68
N2	75	66	74	70	71
N3	75	72	***80***	***76***	***77***
N4	75	***76***	***84***	***80***	***81***
N5	75	***84***	***92***	***88***	***89***
N6	75	***77***	***85***	***81***	***82***
N7	70	64	***72***	68	69
N8	75	71	***79***	75	***76***
N9	75	70	***78***	74	75
N10	70	62	70	66	67

Remarks:
Construction noise criteria for dwellings and schools are $L_{Aeq(30min)}$ 75dB(A) and 70dB(A) respectively.
Bold and italic figures indicate exceedance of noise criteria.

The prediction results indicate that without mitigation, the construction activities associated with the proposed drainage diversion works are likely to give rise to noise levels that exceed the recommended noise criteria at most of the nearby NSRs. The maximum construction noise level of 92dB(A) is predicted during the stage of excavation and construction of box culvert at N5, which is potentially the worst-affected location due to its close proximity to the work site. Detailed worksheet of construction noise calculation is given in Appendix G. Noise mitigation measures are therefore required to reduce the potential noise impacts to acceptable levels during the construction of the drainage diversion works.

No operational phase noise impact as a result of the proposed drainage diversion is anticipated.

4.4 Ecology

4.4.1 Terrestrial Ecological Impacts

The potential terrestrial ecological impacts arising from the construction activities generally include direct impacts due to habitat loss and indirect impacts due to construction activities such as increased human activities or disturbance.

A Preliminary field surveys on riparian vegetation, mammals, birds, reptiles, amphibians, dragonflies and butterflies were undertaken in August and September 2003 to study the potential impact of the proposed project on other fauna groups (e.g. birds and dragonfly) and the riparian vegetation along the stream course. A Preliminary Ecological Review Report detailing the findings of the study is attached in Appendix C.

The findings of the field surveys are summarized as follows:

- There was no rare or protected plant within the subject site. Most common riparian and plants at the surveyed area were mixture of native and exotic or introduced species. In addition, no rare or protected plants were recorded from the stream bed. Common species of birds, amphibians and reptiles which are widely distributed in similar habitats in the New Territories were recorded.

- Dragonflies were found common at the site as the stream and riparian habitats provided feeding and foraging ground for the animals. All those recorded species were either common or very common species in Hong Kong.

- Butterflies species recorded at the site are also widely distributed and commonly found in Hong Kong.

- As the site is human disturbed, mammals was scarce, with only feral dogs, cats and common bat encountered at the site.

Ecological evaluation of stream and riparian habitats are summarized in Table 4.9

Table 4.9 Ecological evaluation of stream and riparian habitats

Criteria	Evaluation
Naturalness	• Most of stream and its riparian habitats were human disturbed due to past and existing land uses including residents, plant nursery, car park and other commercial and infrastructure facilities in the vicinity. The stream received domestic discharge from nearby developments and steam water was apparently polluted.
Size	• Low to Medium (~600m in length) comparing to approximately 2.5km total length of the stream.
Diversity	• Diversity of aquatic life (fish and invertebrate) is low. Plant diversity is also low and no rare or protected plants were recorded within the site. The site was heavily vegetated by exotic plants such as *Mikania micrantha.* About 10 species of Odonata species were recorded from the site, within indicated that the habitat support medium diversity of the aquatic fauna (though some species may come from outside habitats).
Rarity	• Species of fauna and flora recorded were common species. The habitat was common.
Re-creatability	• Constrained by land availability
Fragmentation	• Fragmented as a result of stream side development in the past
Ecological Linkage	• Linked with down and upper stream riparian habitats
Potential Value	• Potential habitat for a small number of freshwater fish, amphibians, dragonflies and other fauna • Feeding ground for some common birds
Nursery/breeding ground	• Potentially for some common fauna
Age	• Not determined
Abundance/richness wildlife	• Low

Criteria	Evaluation
Ecological value of the habitat	• Existing ecological value was considered low. While aquatic fauna could be colonized at the habitat if the discharge of domestic sewage and other non-point source water pollutant into the stream could be eliminated.

Construction Phase Impacts

The proposed drainage diversion would involve diverting the section of stream within the subject site into an underground channel, resulting in the loss of some 600 meters of open stream channel habitat. The whole stream was estimated to be approximately 2.5 km in length. About one quarter of the stream course was potentially affected by the proposed drainage diversion. The severity of the potential impact associated with direct loss of open stream habitat is somewhat lessened by the fact that the stream and riparian habitats do not support protected flora and fauna and its small scale.

Given the surrounding land uses, commercial facilities and village house development in the catchment, the proposed site is largely with low ecological value. Loss of the open feature of the affected stream section would only affect some exotic fish species and other common fauna in localized area. As the affected stream section is human disturbed and receives sewage discharge from nearby developments, there is little potential for recolonization and rehabitation of the polluted stream section given the current development conditions in the vicinity. The impacts associated with the loss of this section of the stream was considered limited.

Impacts on stream fauna may arise from any of the following sources: Sedimentation of streams by construction activities and runoff or dust; pollution of streams by spilled construction materials; culverting of streams and filing of stream meander. Sedimentation of streams by runoff from construction sites would occur if not controlled. Heavy sedimentation may cause temporal de-fauna of the stream and may affect feeding and breeding habitats for aquatic insects, crustaceans, fishes and frogs. If the conditions were severe, the lower stream course, which flows through the Conservation Area and discharges to the Coastal Protection Area at Pak Shui Wan, outside the subject site, may also be affected by sedimentation of uncontrolled discharge or run-off from the construction site.

During the proposed drainage diversion works, the water flow at the existing stream section within the subject site shall be maintained until the construction of the new drainage channel is completed and ready for diversion. Therefore, the proposed drainage diversion would not introduce significant changes in hydrological characteristic in upper and lower stream course during both construction and operational phases. The potential sedimentation impact during the construction phase would be temporal and could be minimised when appropriate measures are adopted at the construction site. The likely affected habitat would be re-colonised by aquatic organisms during post project period.

The proposed drainage diversion would modify open stream course within the subject site to covered channel, which would affect animals using the riparian vegetation, open stream course, and those feeding on epilithic algae on rock surface of the stream bottom. The ecological impact is considered not significant given the low ecological value of the existing fauna and flora in the affected stream section and riparian habitats. There are similar habitat features exist at some sections of the lower and upper stream course. Some

of the affected stream fish and other fauna including bird within the application site could potentially use those habitats. When the water quality in the catchment improved, some more aquatic organisms are expected to colonise the upper and down stream.

According to the development proposal previously approved by the Planning Department, all of the approximately 83 existing trees within the development site would be retained in-situ and no additional trees would be felled as a result of the proposed residential development and the drainage diversion works.

Operational Phase Impacts

Disposal of Domestic Effluent: Discharge of untreated or partially treated effluent from the development has the potential to cause pollution and eutrophication of aquatic environment. For this reason, the domestic effluent will be collected for proper treatment and disposal in accordance with EPD's requirements. Under the previously approved planning application, the developer has committed to provide a private sewage treatment plant within the subject site since there is no public sewerage system existing in the area for the time being. The sewage arising from the development will be treated to a standard acceptable to EPD and discharged to the proposed drainage system along the access road. With adequate treatment of domestic effluent, it should be possible to eliminate any potential pollution and eutrophication that may be caused to the lower stream course. Therefore, impacts of operation phase to stream and nearby wildlife would not be significant.

Predicted Residual Impacts

Predicted residual impacts are those impacts expected to remain after mitigation. Based on the assumption that effective and appropriate mitigation measures will be incorporated during the construction and operation of the proposed development, residual impacts for habitat loss predicted "minor". Potential construction phase impact on the lower stream course, the Conservation Area and the Coastal Protection Area at Pak Shui Wan, are temporal and could be minimized with the adoption of appropriate mitigation measures.

4.4.2 Aquatic Ecological Impacts

Fish surveys were undertaken in areas between the HKUST and Tai Po Tsai of Sai Kung during daytime and evening on 8th and 20th July 2003. Night survey was also undertaken from 6 p.m. – 2 a.m. on 11th – 12th July 2003. A Freshwater Fish Investigation Survey Report is attached in Appendix D.

A total of 83 fish individuals (including 39 captured individuals) were recorded in the upper-mid to middle course. None of the native fish individuals was seen within the survey areas (upper to middle course). All recorded individuals belong to introduced fish species. The absence of native fish individuals in the entire target stream course may be due to unsuitable condition of the habitats, including heavily modified environment and discharge of polluted water that led to intolerable worsened water quality especially in the dry season.

The water quality of the existing stream is stressed through the effect of pollution from various human activities in the past such as farming and construction works. Existing water pollution sources generally relate to the domestic effluents generated in the surrounding area.

For the existing aquatic ecological value is low, it is anticipated that the construction work of the proposed drainage diversion will be unlikely to pose adverse impact on the stream. During operation phase, there will be a loss of habitat in the section of the stream to be diverted to underground drainage.

4.5 Waste

The types of wastes which are likely to be generated during the construction of the stream course diversion include the following:

- Construction and Demolition (C&D) material
- Chemical wastes
- Excavated materials
- Municipal wastes

The contractor undertaking the drainage diversion works shall be required to prepare a waste management plan and implement good practices to ensure proper handling and disposal of the construction waste.

4.5.1 Construction and demolition materials

The C&D materials will arise from a number of activities during site clearance, excavation and sheet piling construction and typically could be divided into two categories according to whether they are inert or non-inert. Inert material such as debris, rubble, earth and concrete shall be disposed of at public fill. The remaining C&D material contains mainly non-inert materials such as bamboo, timber, vegetation, packaging waste and other organic material shall be disposed of at designated landfill site. The anticipated C&D materials arising from this project are:

- Wood from formwork and falsework;
- Scrap metals from off-cuts, re-bar, steel pipes and packaging
- Plastic and paper from per-formed products and packaging.
- Unstable/surplus concrete/grout; and
- Damaged/contaminated construction materials.

The Construction and demolition materials arising from the construction of the drainage diversion are expected to be minimal with the adoption of good waste management practices.

4.5.2 Excavated materials

It is anticipated that approximately 36,000m^3 of excavated materials will be removed for the proposed drainage diversion, of which 90% will be soil, and 10% will be rock material. It is the intention to reuse as much of the material as possible on site. About 80% (~29,000m^3) of excavated material will be stockpiled for reuse at backfilling of the proposed underground drainage or the existing stream during site formation at a later stage.

The remaining unsuitable material, 20% (~7,000m^3) of the excavated material, will be transported off-site to a public fill facility in Tseung Kwan O.

4.5.3 Chemical wastes

Construction plant and vehicle servicing will likely be the primary source of chemical wastes during the construction period. The major chemical waste arising from the construction sites are likely to be oils, lubricants, and solvents. Oil waste may be in the form of raw waste, or as sundries such as spent oil filters, or materials used to absorb oil leaks. Lubricant wastes are likely to be generated from the maintenance of vehicles and mechanical equipment. The amount of chemical waste is estimated to be less than $1m^3$ per month.

Based on the Waste Disposal (Chemical Waste) (General) Regulation, chemical waste should be stored in a locked, fully bunded area which is impermeable to both water and the waste being stored. The waste storage area should also be covered to prevent rainfall from accumulating by volume of the chemical waste stored in that area. Appropriate spill absorption material should be stored near the storage area in order to clean up any minor spill events.

If chemical wastes are to be generated, the contractor will need to register with EPD as a chemical waste producer and observe the requirements for chemical waste storage, labelling, transportation and disposal. The contractor should follow the requirements and recommendations given in "A Guide to Chemical Waste Control Scheme: A Guide to the Registration of Chemical Waste Producers" and the "Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes". All chemical wastes should be collected from site by a licensed chemical waste collector and disposed of at an appropriate disposal facility, namely the Chemical Waste Treatment Centre (CWTC) at Tsing Yi.

4.5.4 Municipal Waste

Workers will generate municipal wastes such as food wastes, packaging and wastepaper. For estimating the quantity of municipal wastes, EPD's average value 1.07kg/employee/day has been adopted (Monitoring of Municipal Solid Waste 1996, EPD (1997) Hong Kong Government). The total volume of waste generated depends on the number of workers to be employed on site.

It is anticipated that the number of workers and site staff to be employed at peak times is less than 20. Considering 6 working days per week, the amount of municipal waste generated will be around 128.4kg/week (maximum). Disposal will be the responsibility of the Contractor who shall, in accordance with general avoidance of nuisances measures (required under the Contract), remove material at such a frequency to avoid nuisance.

The estimated sewage arising from the workforce during the construction phase is estimated to be $6.0m^3$/day according to the Sewerage Manual (Part 1), DSD, 1995. Facilities such as mulching or chemical toilets (disposal off-site) shall be provided especially to ensure that no sewage is discharged directly into receiving environment. With the provision of such sanitary facilities and implementation of proper management and cleaning procedure, no adverse impact is anticipated on receiving environment.

A temporary refuse collection facility should be set-up by the contractor and wastes should be stored in appropriate containers prior to collection and disposal.

4.6 Water

Existing pollution sources within the subject site are generally related to the domestic effluents generated by Tai Po Tsai Tsuen and associated village houses. The proposed drainage diversion involves various activities which potentially affect the water quality and impact on the water sensitive receivers. These are primarily:

- the excavation works that may lead to sedimentation and reduced water quality;
- the construction works which have the potential to cause spillages into the receiving waters during construction;
- maintenance issues including disposal of silt from the streambed;
- wash water from vehicles and equipment and dust suppression;
- sewage generated due to site workers; and
- run-off from site surfaces, material stock piles and drainage channels.

As toilets will be provided for workforce and pollution control measures will be in place to avoid off-site run-off, the generation of waste-water is anticipated to be minimal and controlled during construction and the impact are considered to be minor.

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

5.1 Air Quality

In order to ensure that the potential dust emission impact during the construction phase of the proposed drainage diversion works is minimised, the following dust control measures, as stipulated in the Air Pollution Control (Construction Dust) Regulation, should be implemented during the construction of the development.

- The area in which excavation takes place should be sprayed with water immediately prior to, during and immediately after the excavation to minimise dust generation.

- Any debris from the construction should be covered entirely by impervious sheeting or stored in a sheltered debris collection area.

- Any dusty material remaining after a stockpile of cement or other materials is removed should be wetted and removed from the surface of roads.

- Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting or placed in a sheltered area.

- Cement bags or any other dusty materials collected during the work should be disposed of in totally enclosed containers.

- All dusty materials should be sprayed with water immediately prior to any loading, unloading or transfer operation so as to minimise the emission of dust.

- Every belt-conveyor used for the transfer of dusty materials should be covered. Every transfer point between any two belt-conveyors should be totally enclosed.

- Any skip hoist for the transport of construction wastes should be properly enclosed.

- Vehicle washing facilities, including a high-pressure water jet, should be provided at the designated vehicle exit point. Every vehicle should be washed immediately before leaving the construction site to remove any dust materials from its wheels and body.

- The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point, as well as the main haul road to the construction site should be paved with concrete, bituminous materials, hardcore or metal plates and kept clear of dusty materials.

- The main haul road to the site should be paved or sprayed with water frequently to keep the entire road surface wet and to minimise dust generation.

Through the implementation of the above control measure, dust levels will be reduced. The mitigated emission factors are given in Table 5.1. The maximum predicted mitigated suspended particulate concentrations at the representative ASRs are presented in Tables 5.2.

Table 5.1 Emission Factors for Various Construction Activities – With Mitigation

Activities	Emission Factors		Remarks
	TSP	RSP	
(1) Material Handling	2.17×10^{-3} g s^{-1}	1.03×10^{-3} g s^{-1}	With 50% reduction of unmitigated emission rate by frequent water suppression
(2) Rock Breaking	1.84×10^{-6} g s^{-1}	9.59×10^{-7} g s^{-1}	With 50% reduction of unmitigated emission rate by frequent water suppression
(3) Excavation	5.78×10^{-3} g s^{-1}	2.73×10^{-3} g s^{-1}	With 50% reduction of unmitigated emission rate by frequent water suppression
(4) Vehicle Movements on Unpaved Site Roads	1.73×10^{-1} g s^{-1}	4.68×10^{-2} g s^{-1}	With 85% reduction of unmitigated emission rate by frequent water suppression or using paved road
(5) Wind Erosion	1.348×10^{-6} g $s^{-1}m^{-2}$	6.74×10^{-7} g $s^{-1}m^{-2}$	With 50% reduction of unmitigated emission rate by frequent water suppression
Total Emission	1.04×10^{-5} g $s^{-1}m^{-2}$	3.20×10^{-6} g $s^{-1}m^{-2}$	$= \frac{(1)+(2)+(3)+(4)}{\text{Total site area}} + (5)$

Table 5.2 Maximum Predicted TSP and RSP Concentrations – With Mitigation

ASR ID	1- hour Averaged TSP Concentration, μg/m³		24-hour Averaged TSP Concentration, μg/m³		24-hour Averaged RSP Concentration, μg/m³	
	G/F	*2/F*	*G/F*	*2/F*	*G/F*	*2/F*
A1	226.04	140.80	114.29	94.40	63.84	57.72
A2	179.25	146.62	102.59	93.91	60.24	57.57
A3	239.49	179.06	119.36	99.40	65.40	59.26
A4	183.61	132.64	111.36	98.93	62.94	59.12
A5	230.27	135.41	116.88	98.95	64.64	59.12
A6	194.39	142.10	110.64	98.86	62.72	59.10
A7	235.07	139.05	123.44	100.29	66.66	59.53
A8	473.43	159.68	209.30	104.94	93.08	60.98
A9	412.48	168.46	197.00	105.68	89.29	61.20
A10	254.74	153.92	135.86	98.25	70.48	58.91

Remarks:
Results include annual TSP background level of 83.6μg/m³.
TSP – recommended 1-hour TSP criterion (500μg/m³) and AQO for 24-hour TSP (260μg/m³)
Results include annual RSP background level of 54.4μg/m³.
RSP - AQO for 24-hour RSP (180μg/m³)

The assessment results indicated that the recommended hourly TSP criterion and the respective AQOs for TSP and RSP will not be exceeded at any of the representative ASRs with the implementation of the proposed dust control measures. Therefore, it is anticipated that with the adoption of appropriate mitigation measures, the construction of proposed drainage diversion works would not cause any adverse air quality impacts on nearby sensitive receivers. The isopleths of maximum hourly TSP and daily RSP at ground floor after mitigation are illustrated in Figure 4.3 and 4.4.

5.2 Noise

To minimise the construction noise impact on the NSRs, the following mitigation measures are recommended during the construction phase of the proposed drainage diversion works:

i) Use of quiet alternative plant and working methods:

The use of quiet plant as an at-source mitigation measures can result in a significant reduction of noise levels generated by the construction works. The degree of reduction achieved is dependent on actual construction method and work schedule. The Sound Power Levels of the recommended quiet plant for the drainage diversion works as adapted from the British Standard, BS 5228:Part 1:1997, are given in Table 5.3.

Table 5.3 Sound Power Levels of Quiet PME

Reference number on BS5228 Part 1: 1997	Quiet Equipment	Sound Power Level (dBA)
C3-97	Excavator	105
C9-27	Lorry	105
C6-32	Poker	100
C7-118	Mobile Crane	99
C6-35	Concrete lorry mixer	100

ii) Use of purpose-built noise barrier:

To ensure that the construction noise impacts on nearby NSRs are mitigated to acceptable levels, purpose-built noise barrier shall be installed along the portion of the site boundary between the works area and the adjacent Tai Po Tsai Village. Heights of the noise barriers shall range from around 4.4 to 5.6m. In addition, it is recommended that movable barrier set up around noise sources shall be used to provide screening effect wherever practicable. Appendix H shows the location of the proposed purpose-built noise barrier along portion of the site boundary.

In view of the fact that the plant inventory and construction sequence proposed by the Contractor may differ from the assumptions adopted in the assessment, detailed design of appropriate noise mitigation measures should be proposed by the Contractor prior to the commencement of work in order to ensure the potential construction noise impacts on nearby sensitive receivers are reduced to acceptable levels.

iii) Scheduling of work

Scheduling of work can reduce the noise impact on the NSRs. Good scheduling of works shall include minimising noisy operations; avoiding simultaneous operation of noisy equipment; making use of the existing physical barrier. Ensure works will only be carried out within non-restrictive hours.

iv) Sitting of facilities

PME should be sited as far as practicable from noise sensitive receivers. Consideration should also be given to using structures such as site offices and stores as noise barriers.

With the implementation of the above mitigation measures, the potential construction noise impacts on the NSRs will be significantly alleviated. Calculation of mitigated construction noise levels are detailed in Appendix G. The maximum predicted mitigated noise levels at the representative NSRs are summarised in Table 5.4.

Table 5.4 Maximum Predicted Mitigated Construction Noise Levels

Receiver ID	**Noise criteria $L_{eq\ (30min)}$, dB(A)**	**Predicted Noise level, $L_{eq\ (30min)}$, dB(A)**			
		Stage 1	Stage 2	Stage 3	Stage 4
N1	75	57	64	62	63
N2	75	60	67	65	66
N3	75	66	73	71	72
N4*	75	68	75	73	74
N5*	75	68	75	73	74
N6*	75	68	75	73	74
N7	70	58	65	63	64
N8	75	65	72	70	71
N9	75	64	71	69	70
N10	70	56	63	61	62

** The predicted noise levels after the use of purpose-built noise barrier*

The construction noise assessment results indicate that with the use of quiet plants and purpose-built noise barriers, the maximum predicted noise levels at all NSRs are in compliance with the daytime construction noise criteria. Therefore, it is anticipated that with the adoption of appropriate mitigation measures, the construction of proposed drainage diversion works would not cause any adverse noise impacts on nearby sensitive receivers.

5.3 Ecology

To minimise sedimentation and possible induced impacts on filling of stream meander, landform and filling engineering activities shall preferably be performed in dry seasons. It is recommended to build temporary sediment pool or install other appropriate sedimentation facility to treat water runoff from the construction site before discharge to down stream.

If land formation works could not be avoided in wet seasons, it is recommend to implement appropriate mitigation measures, such as installing silt traps, to reduce the potential impact due to sedimentation. Also, EPD's guidelines to control construction site runoff shall be followed and potential soil erosion problem in the affected stream course shall be monitored during the construction works.

Loss of vegetation due to this proposed development will be compensated by the proposed landscaping scheme which would maximise plantation of trees and shrubs onsite. According to the proposed landscape master plan, all of the approximately 83 existing trees would be retained in-situ and approximately 1229 heavy standard trees would be planted on site and within 5m outside the eastern boundary of the site. Figure 1.2 shows the landscape master plan. Other practicable mitigation measures to minimise the potential impact on flora species include:

- To avoid removing existing native trees in the riparian habitat habitats;
- Protection of trees identified for preservation through the use of protective fencing around the Condon Area (area designed to protect the tree root zone, trunk and crown from damage during the construction phase) and measures to prevent runoff from the construction site entering the preserved root zone; and
- The health and condition of retained trees, and the condition of the tree protection measures to be regularly monitored throughout the construction phase.

The proposed tree planting would include native species as part of the project's landscape proposals. A list of recommended species is provided in the table below. It is suggested that about 10 species of trees to be selected from the list according to availability of the nursery source. The recommended plant species would have certain ecological value in terms of plant ecology and the associated wildlife including birds. Detailed selection of the plant species shall be subject to agreement with relevant government departments.

Table 5.5 Recommended Plant Species To Be Planted For Landscaping Purpose

Tree species	
Common Name	**Latin Name**
Camphor tree	*Cinnamomum camphora*
Chestnut oak	*Castanopsis fissa*

Chinese alangium	*Alanglum chinense*
Chinese aralia	*Aralia chinensis*
Chinese banyan	*Ficus microcarpa*
Chinese hackberry	*Celtis sinensis*
Evodia	*Evodia lepta*
Ivy tree	*Schefflera octophylla*
Microcos	*Microcos paniculata*
Pond spice	*Litsea glutinosa*
Prickly ash	*zanthoxylum avicennae*
Rough-leaved stem fig	*Ficus hispida*
Red machilus	*Machilus thunbergil*
Superb fig	*Ficus superba*
Scarlet sterculia	*Sterculla lanceolata*
Tallow tree	*Sapium sebiferum*
Turn-in-the-wind	*Mallotus paniculatus*

To adopt a more sustainable approach to development, the design of the landscaped areas adjacent to the proposed residential blocks will incorporate ecologically beneficial features wherever possible. This approach is adopted in the design of the proposed water pond on the eastern periphery of the site. This constructed and managed water pond would be inhabited by some stream fauna found in the area including species such as dragonflies, fishes and maybe amphibians. To improve habitat quality of the constructed pond habitat, some aquatic plants including submerged, floating, emergent and marginal plants, will be planted (refer to Landscape Plan for detailed species selection). Conceptual design of the water pond is given in Appendix I.

By creating pond habitat and introducing more native plants to the site, some wildlife such as birds, bats, and insects would be attracted to feed on, and the ecological value of the site would be enhanced.

To enhance the faunal diversity and ecological stability of the environment, it has been proposed in the Freshwater Fish Investigation Survey Report to restore the underground channel with irregular shaped substrata such as coarse sand and rocks along the bottom as an alternative to standard drainage design. Since the channel will eventually be handover to Drainage Services Department (DSD) for maintenance in the operational phase, the channel design shall be subject to DSD's acceptance.

5.4 Waste

Good waste management practices will be implemented on site, including proper waste handling within the site, removal of waste material generated from the construction works, and implementation of any mitigation measures to avoid or minimize potential adverse impacts associated with waste arising from the construction of the drainage diversion works. In addition, waste minimisation and recycling practices will be employed wherever practicable on site to reduce generation of construction wastes. Disposal of waste shall be on a regular basis to avoid accumulation on site. Location of waste storage points shall be away from the existing dwellings and other municipal facilities where possible.

The various waste management options can be categorized in terms of preference from an environmental viewpoint. The options considered to be more preferable have the least impacts and are more sustainable in the long term. Hence, the hierarchy is as follows:

- avoidance and minimization, i.e. not generating waste through changing or improving practices and design;
- reuse of materials, thus avoiding disposal (generally with only limited reprocessing);
- recovery and recycling, thus avoiding disposal (although reprocessing may be required);
- treatment and disposal, according to relevant laws, guidelines and good practice; and
- disposal, the release of wastes to air, water, or land in properly controlled or safe ways or so as to render them harmless.

5.4.1 Construction and Demolition (C&D) Material

The Contractor shall recycle C&D material on-site wherever practical. Proper segregation of wastes on site will increase the feasibility for recycling certain components of the waste stream by the recycling contractors.

The use of wooden hoardings shall not be allowed except where noise barriers are needed, and then these shall be of 20mm thick wood/ply. For elsewhere, alternative materials which can be reused or recycled, such as metal (aluminium, alloy, etc) hoarding, shall be used.

Different areas of the worksite shall be designated for such waste segregation and storage wherever site conditions permit.

Trip-ticket system should be established to monitor the disposal of C&D material and solid wastes at public filling facilities and landfills, in order to control fly-tipping.

5.4.2 Chemical Waste

For chemical waste produced from a process, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, a 'Chemical Waste Producer' register should be made with EPD.

Chemical waste will be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste. Some requirements of the Code of Practice are outlined as follows.

Containers used for the storage of chemical waste will:

(i) be suitable for the substance they are holding, resistant to corrosion, maintained in good condition, and securely closed;
(ii) have a capacity of less than 450 litres unless the specification have been approved by the EPD; and
(iii) display a label in English and Chinese in accordance with instruction prescribed in Schedule 2 of the Regulations.

The storage area for chemical wastes will:

(i) be clearly labeled and used solely for the storage of chemical waste;
(ii) be enclosed on at least three sides;
(iii) have an impermeable floor and bunding, 110% capacity of the largest container or 20% of the storage capacity, whichever is the greatest;

(iv) have adequate ventilation;
(v) be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and
(vi) be arranged so that incompatible materials are adequately separated.

Chemical waste will be disposed:
(i) via a licensed waste collector; and
(ii) to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility; or
(iii) to a reuser of the waste, under the approval from the EPD.

5.4.3 General refuse

General refuse including food wastes, such as lunch box, and domestic wastes generated on-site will be stored in enclosed bins or compaction units separate from construction and chemical wastes. A waste collector listed in the Environmental Protection Department's waste collectors directory will be employed to remove general refuse from the site, separately from construction and chemical wastes, on a daily or every second day basis to minimize odour, pest and litter impacts. No burning of refuse on site will be permitted.

A co-ordinator for the implementation of above waste management practices should be identified in the Waste Management Plan prepared for the construction of the drainage diversion works.

5.5 Water

To reduce the generation of silt-laden discharge and prevent uncontrolled runoff from the construction site, the following recommended mitigation measures shall be implemented on site during the construction of the proposed drainage diversion works:

- U-channel should be installed along the low end of the boundary of the site as necessary to collect all surface runoff within the site and divert the run off to sump pits to be pumped to desilting tanks;
- Wheels of all vehicles and plants will be washed before they leave the site to prevent deposition of mud, debris, etc. on roads by them. Water used for wheel washing shall be recycled. Thus, the wastewater can be reused.
- If possible, excavation works shall be planned to avoid rainy season so as to minimise the runoff and reduce the amount of soil that could be carried off site.
- The site shall be kept clean and tidy to avoid construction material and waste being washed off site.
- The hoarding gaps shall be tightly sealed to avoid the seepage of wastewater to outside the site.
- Perimeter channels shall be provided at site boundaries (where necessary) to intercept storm-water runoff from outside the site so that it does not wash across the site.
- Silt trap design shall conform to the guidelines laid down in Appendix A1 of ProPECC PN 1/94[2].

[2] Practice Note For Professional Persons: Construction Site Drainage, Professional Persons Consultative Committee, 1994.

- Temporarily exposed slope surfaces and construction material stockpiles shall be covered with tarpaulin or similar fabric to prevent erosion.
- Wastewater likely to be contaminated with oil or grease shall be passed through an oil separator or grease trap before entering the site drainage system.
- Wastewater from toilets, kitchen, etc., if any, shall be discharged into a foul sewer or a sewage treatment facility. Alternatively, chemical toilets may be used for reducing wastewater discharge.
- Any special works areas which may be provided for material storage should be surrounded by bunds.
- Reduce the amount of water used to dampen any surfaces or stockpiles.

During the operational phase, wastewater generated from the residential development will be collected by properly designed on-site drainage system and transferred to a package treatment plant prior to discharge. This would ensure that the wastewater shall not cause any adverse impact on the water quality of the stream as well as the Conservation Area and Coastal Protection Area, where it passes through and finally discharges to.

6. ENVIRONMENTAL MONITORING AND AUDIT

6.1 Air

Monitoring and audit of the Total Suspended Particulates (TSP) levels should be carried out by the Contractor during the construction of the proposed drainage diversion works to ensure that any deteriorating air quality is readily detected and timely action is taken to rectify the situation.

For regular impact monitoring, the sampling frequency of at least once in every six-days, shall be strictly observed at the monitoring station for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs.

The 1-hour and 24-hour TSP levels should be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B.

HOKLAS accredited analytical laboratory shall be engaged to carry out the analysis of the used filters generated through the 1-hour and 24-hour TSP monitoring.

The 24-hour AQO for TSP is 260μg/m^3, which should not be exceeded more than once per year. The 1-hour TSP criteria for construction dust as specified in the Technical Memorandum on Environmental Impact Assessment Process (TMEIA) is 500μg/m^3.

6.2 Noise

Construction noise levels should be monitored in terms of thirty minutes A-weighted equivalent continuous sound pressure level ($L_{eq(30min)}$) during 0700-1900hrs on a weekly basis. The sound level meter should be mounted on a tripod at a height of 1.2m and the

microphone should be positioned at 1m away from the building façade of the noise sensitive receiver facing the construction site.

An integrated sound level meter and calibrator will be used for noise monitoring which should comply with the International Electrotechnical Commission (IEC) Publication 804:1985 (Type 1). The sound level meter will be used with the manufacturer recommended wind shield.

The construction noise level at the noise sensitive receiver should not exceed the recommended noise criteria of 75 dB(A).

6.3 Ecology

Construction of the proposed drainage diversion works must be conducted in an appropriately ecologically sensitive manner, with particular attention given to avoidance or minimization of disturbance through appropriate works scheduling and responsible works area maintenance.

Mitigation measures should be undertaken to reduce potential impacts associated with the proposed works. Careful monitoring of the proposed mitigation measures by an Environmental Specialist who is preferably be a member of the Hong Kong Institute of Environmental Impact Assessment with a minimum of 5 years experience of work in Hong Kong and preferably has a suitable background in natural history and a professional qualification in terrestrial ecology, is required to assess the effectiveness of mitigation measures.

6.4 Waste

The Contractor is required to prepare a comprehensive Waste Management Plan and a Waste Disposal Plan detailing recycling, storage, transportation and disposal strategy for the proposed drainage diversion works. Waste shall be reused on site as far as practicable in order to minimize waste generation and the associated impacts of waste disposal. It is anticipated that the majority of excavated material shall be reused on site or stockpiled for use during the construction of the proposed drainage diversion or for backfilling of the existing stream during site formation at a later stage. Excavated material shall be sorted on site, soil shall be used for landscaping. Detailed records of waste produced shall be kept in order to monitor disposal, and these records shall be audited. Regular site inspections shall be carried out to ensure effective implementation of the waste management practices.

6.5 Water

Potential water quality impacts associated with sedimentation of untreated site runoff during the construction of the proposed drainage diversion are the main concern. Since substantial site runoff usually occurs during heavy rainfall events, it is recommended that the excavation works should, if possible, preferably take place during dry seasons. The contractor shall implement the mitigation measures as detailed in Section 5.5 in order to minimize any potential impacts on water quality as a result of the proposed drainage diversion works.

Environmental monitoring shall be carried out, including inspections of stream courses and drains, to ensure effective implementation of mitigation measures during construction.

7. USE OF PREVIOUS APPROVED EIA REPORTS

No previous EIA report has been approved or submitted for the subject development.

8. CONCLUSIONS

8.1 Air

Without mitigation measures, air quality impacts associated with the construction of the drainage diversion works are predicted to exceed the air quality criteria at some of the nearby air sensitive receivers under the worst-case scenario. With the implementation of appropriate mitigation measures such as frequent water suppression and the use of paved roads, the potential construction air quality impacts are reduced to acceptable levels within the air quality criteria. It is anticipated that the short term impacts associated with fugitive dusts during the construction phase will not pose any adverse air quality impact on nearby sensitive receivers with the application of proper mitigation measures.

No operational phase air quality impact as a result of the proposed drainage diversion is anticipated.

8.2 Noise

Without mitigation measures, noise impacts associated with the construction of the drainage diversion works are predicted to exceed the noise criteria at some of the nearby sensitive receivers under the worst-case scenario. With the implementation of appropriate mitigation measures, including the use of quiet construction plant and erection of purpose-built noise barrier, the potential construction noise impacts are reduced to acceptable levels within the noise criteria. It is anticipated that the short term impacts associated with the construction activities will not pose any adverse noise impact on nearby sensitive receivers with the application of proper mitigation measures.

No operational phase noise impact as a result of the proposed drainage diversion is anticipated.

8.3 Ecology

The water quality of the existing stream within the subject site is stressed through the effect of pollution from various human activities in the past such as farming and construction works. Existing water pollution sources that are affecting the stream generally relate to the domestic effluents generated in the surrounding area.

Findings of preliminary ecological review and freshwater fish investigation survey indicate that the existing terrestrial and aquatic environment of the stream section within the subject site is of a low ecological value and do not support rare or protected species.

During the proposed drainage diversion works, water flow in the existing stream section within the site shall be maintained until the construction of the new drainage channel is completed and ready for diversion. Therefore, the proposed drainage diversion would not introduce significant changes in hydrological characteristic in upper and lower stream course during both construction and operational phases.

After implementing appropriate mitigation measures, including installation of appropriate sedimentation facility and silt traps during the construction phase, tree planting and creating pond habitat at the future development, there shall be no adverse ecological impact associated with the proposed drainage diversion works.

8.4 Waste

The wastes which are likely to be generated during the construction of the drainage diversion are mainly Construction and Demolition (C&D) wastes and excavated materials. Majority of the excavated material shall be reused onsite for the construction of the proposed drainage diversion or backfilling the existing stream during site formation at a later stage.

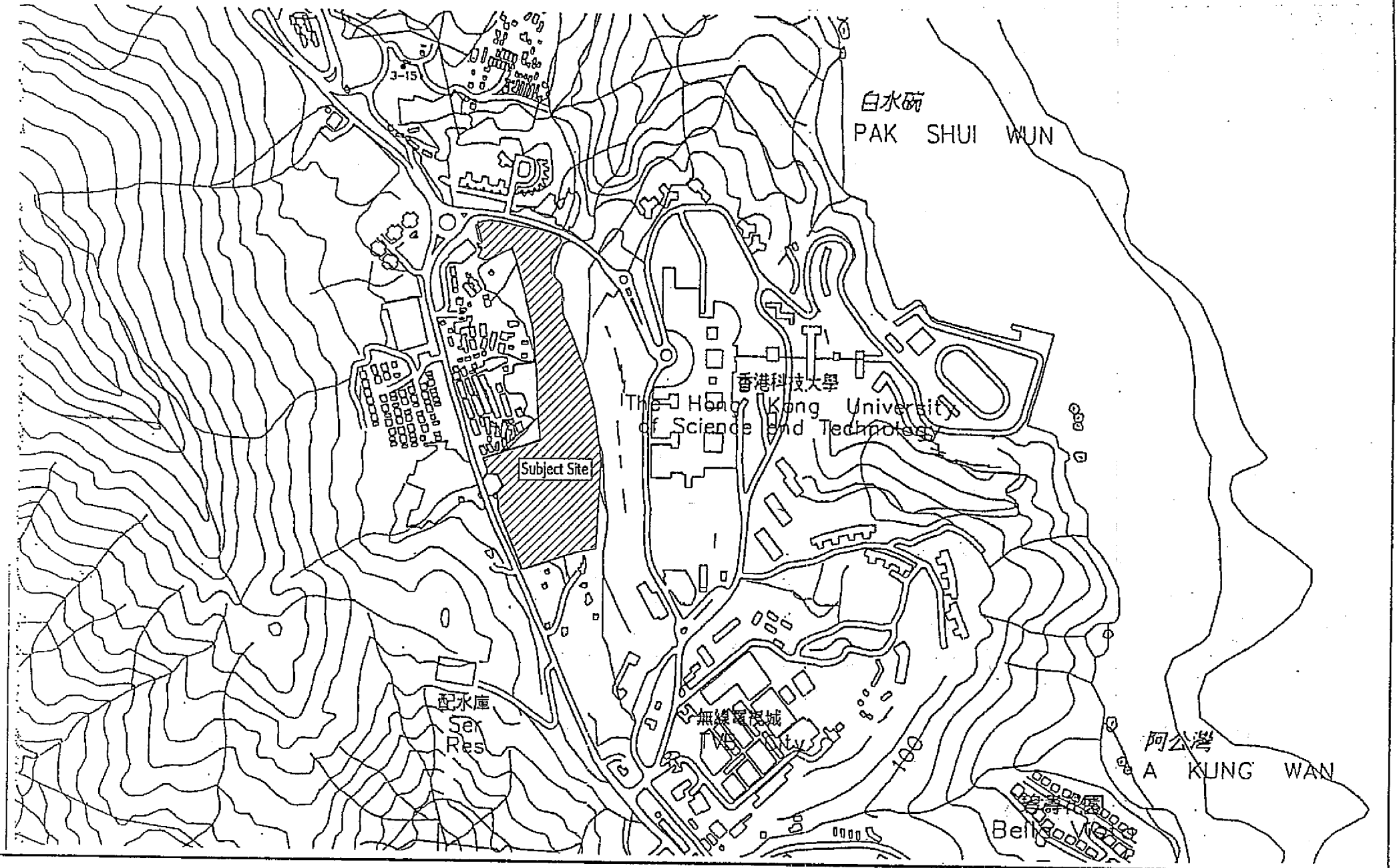
Good waste management practice will be implemented on the site, including waste control within the site, removal of waste material generated due to the construction works, and implementation of any mitigation measures to avoid or minimize potential adverse impacts associated with waste arising from the drainage diversion works. In addition, waste minimisation and recycling practices will be employed wherever applicable on the site to reduce waste generation. Disposal of waste shall be on a regular basis to avoid accumulation on site. Locate waste storage points shall be away from existing dwelling and facilities where possible.

No operational phase waste impact as a result of the proposed drainage diversion is anticipated.

8.5 Water

Water pollution sources affecting the existing stream section within the subject site are generally related to the domestic effluents generated by the village houses at Tai Po Tsai Tsuen and other development upstream.

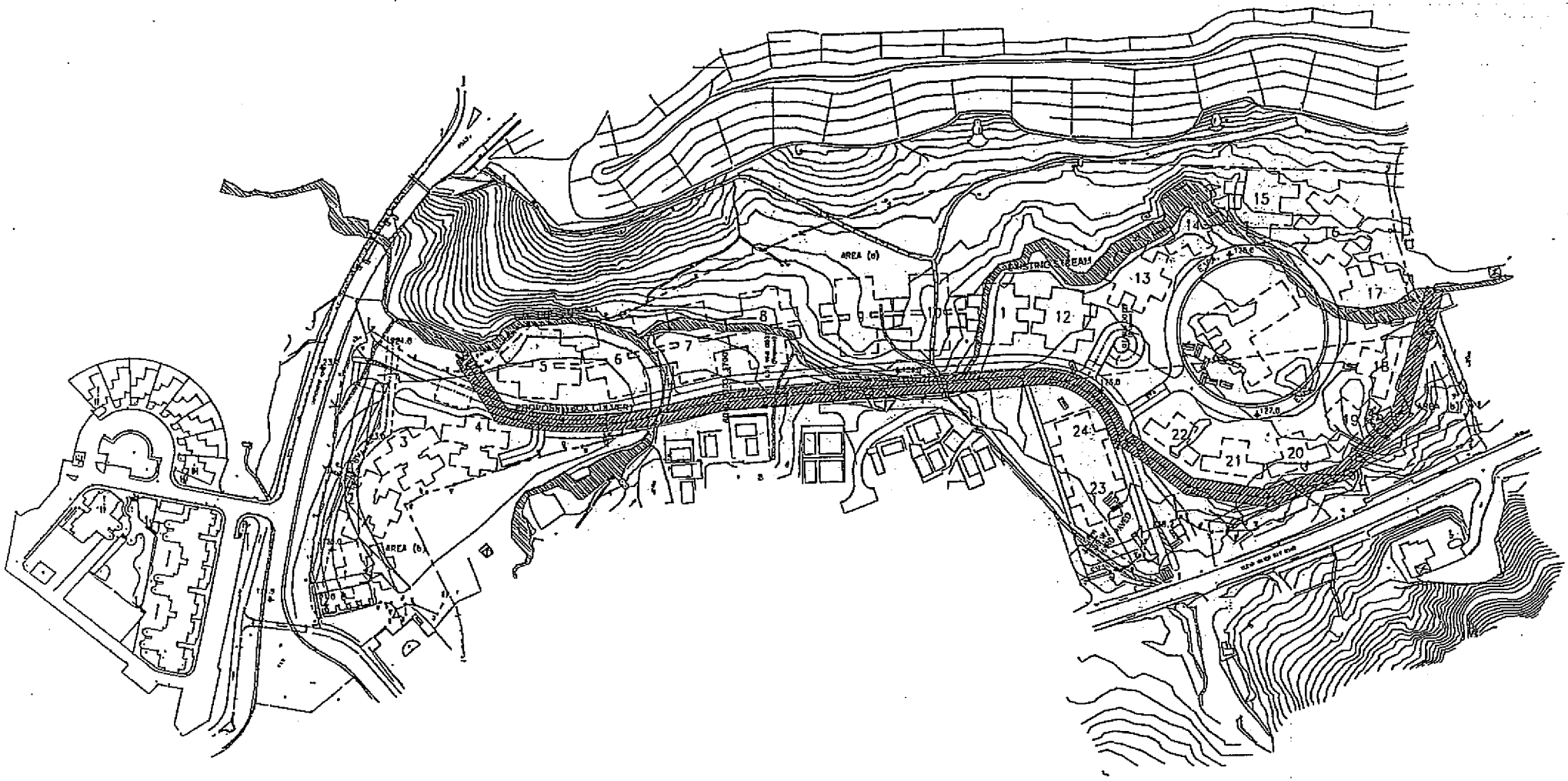
After implementing mitigation such as the provision of toilets, installation of appropriate wastewater treatment facility and other pollution control measures suggested in the content, the proposed drainage diversion works shall not cause any adverse impact on the water quality of the stream as well as the Conservation Area and Coastal Protection Area, where it passes through and finally discharges to.



Drainage Diversion Works for Comprehensive Residential Development Various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung

Site Location Plan

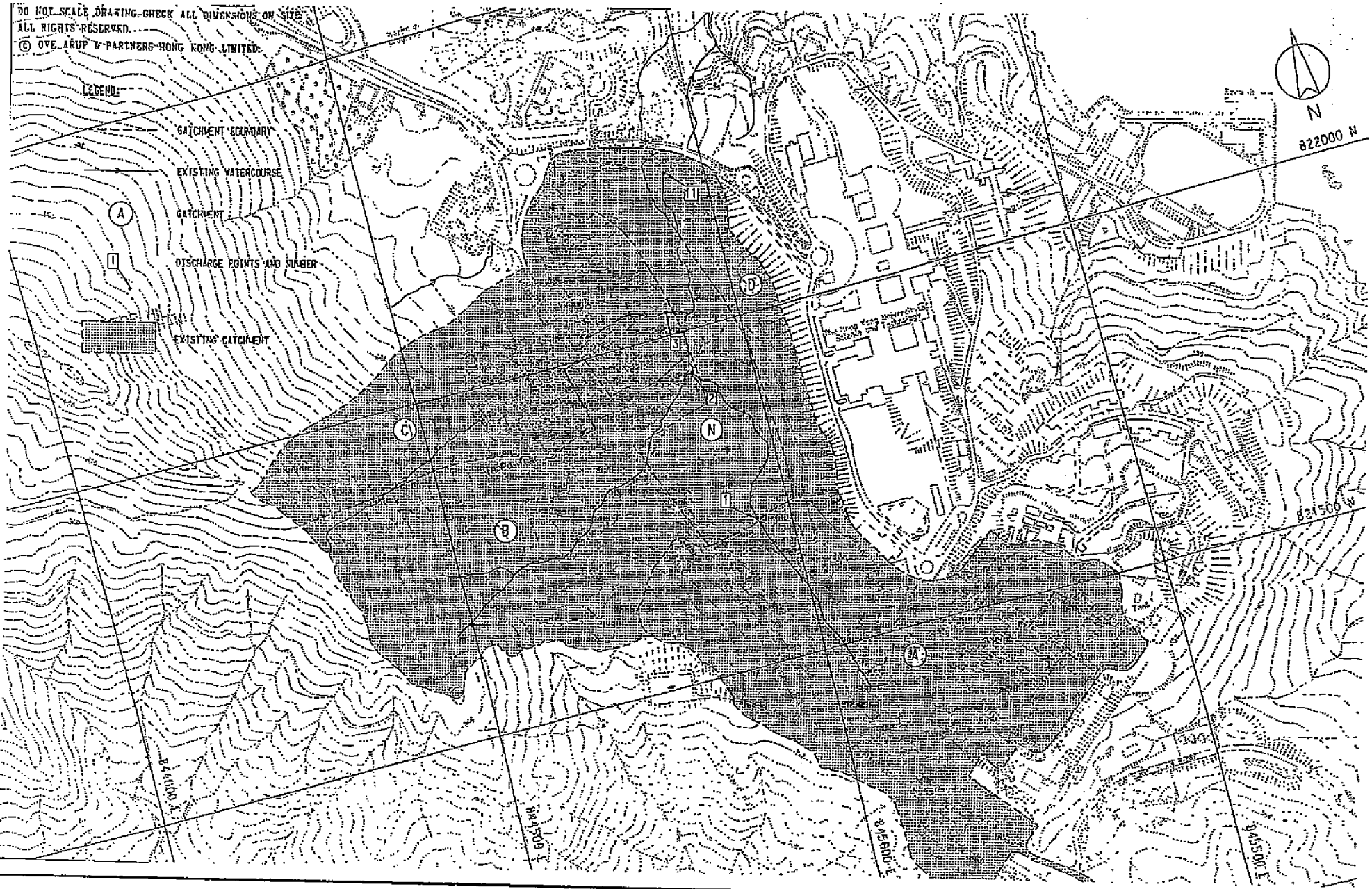
Figure No.	Page No.
1.1	
Scale: NTS	Date: 08/04



Drainage Diversion Works for Comprehensive Residential Development Various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung

Master Layout Plan

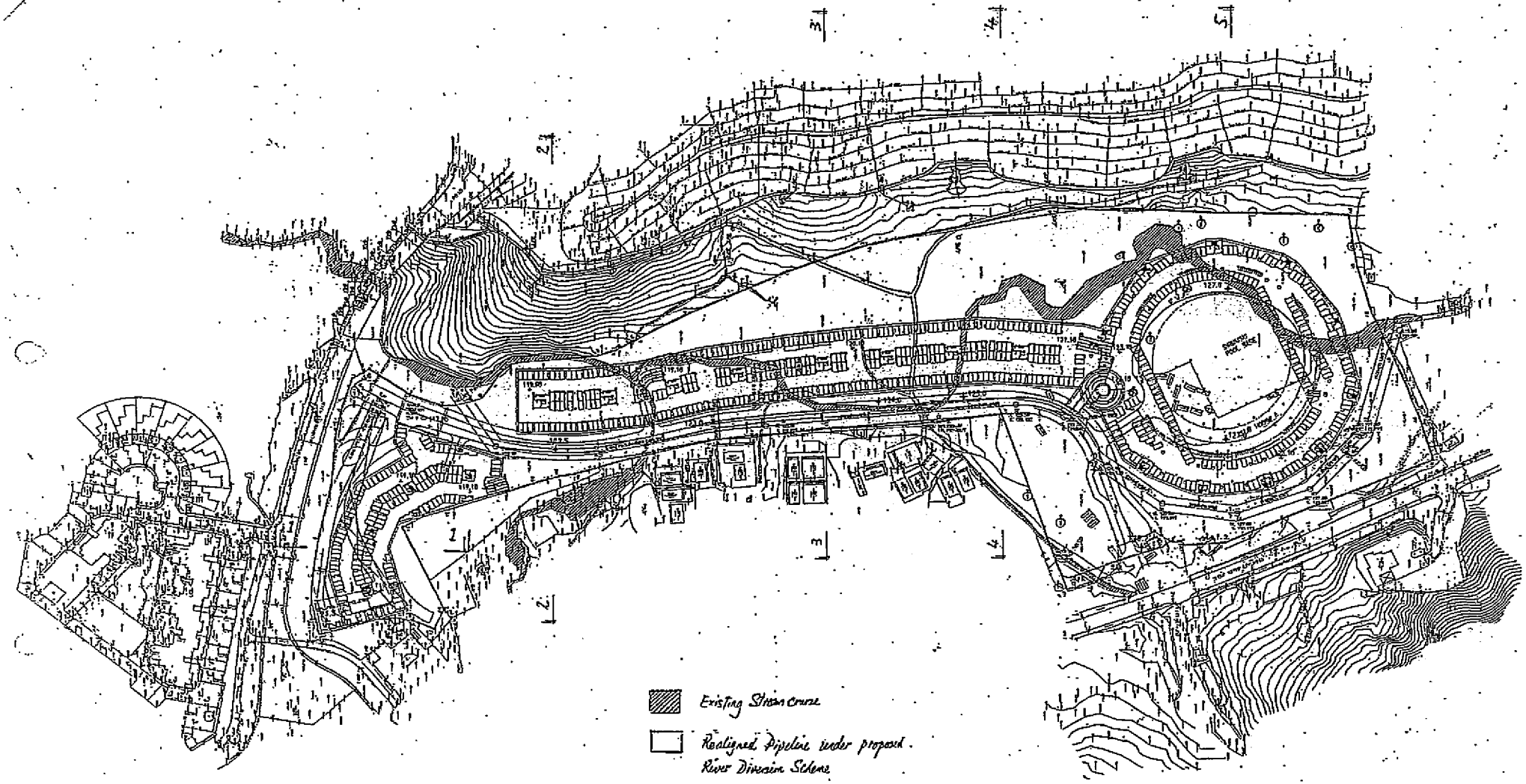
Figure No.	Page No.
1.2	
Scale: NTS	Date: 08/04



Drainage Diversion Works for Comprehensive Residential Development Various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung

Existing Stream Course System

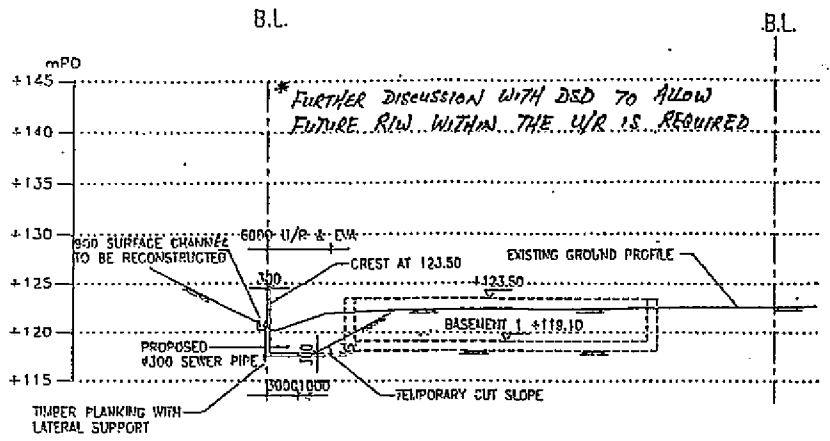
Figure No.	Page No.
1.3	
Scale: NTS	Date: 08/04



Drainage Diversion Works for Comprehensive Residential Development Various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung

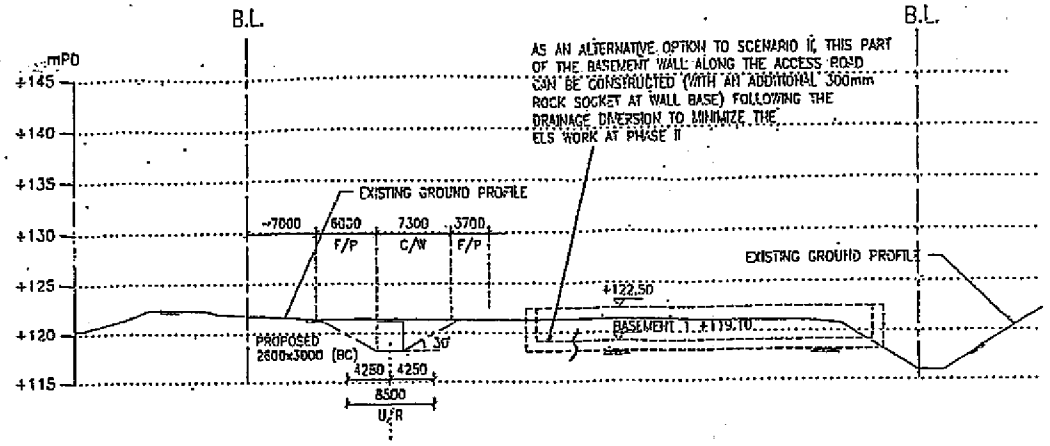
Layout of Existing Stream Course and Proposed Drainage Diversion

Figure No.	Page No.
1.4	
Scale: NTS	Date: 08/04

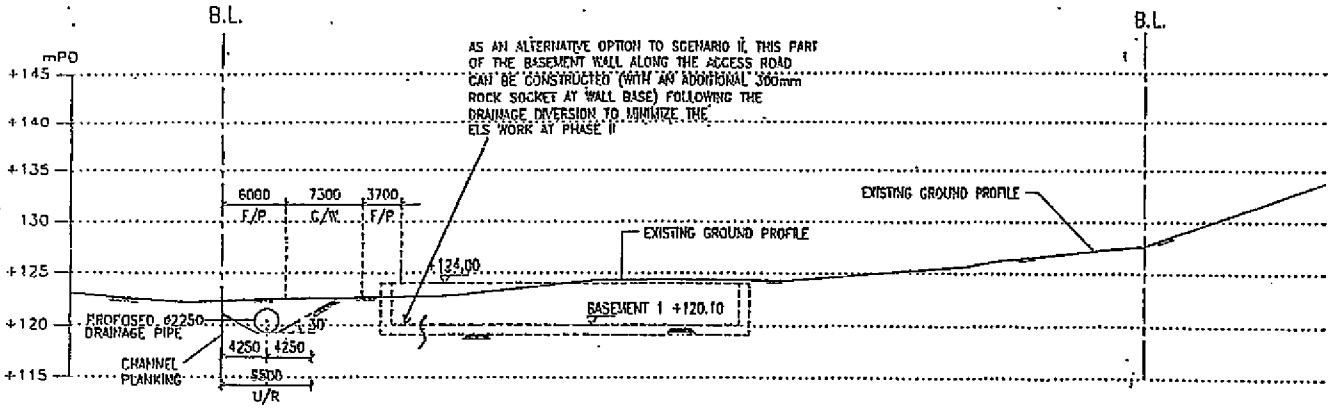


SECTION 1-1 (OPTIONAL)

* This can be carried out in Stage 3 (Phase II Development) to avoid early investment



SECTION 2-2



SECTION 3-3

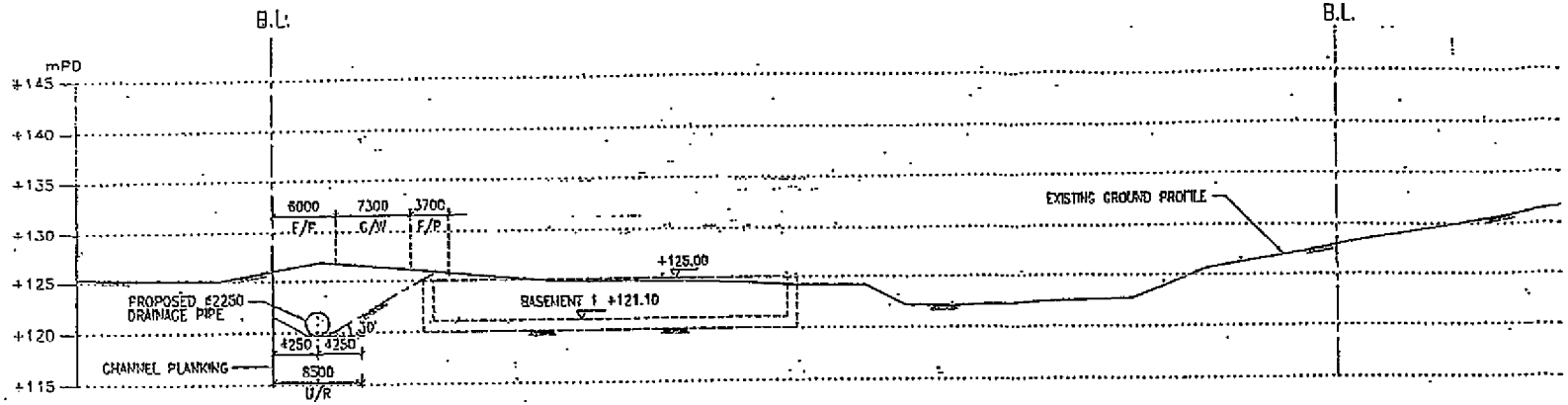
NOTES:

1. EXCAVATION TO BE CARRIED OUT FOR THE DRAINAGE DIVERSION WORKS ARE BASED ON THE ALIGNMENT SHOWN IN THE MASTER LAYOUT PLAN S48-19
2. IN VIEW OF THE UNAVAILABILITY OF GROUND INFORMATION AT THE PRESENT STAGE, THE ROCKHEAD LEVEL IS ASSUMED TO BE BELOW THE BOTTOM OF THE BASEMENT.

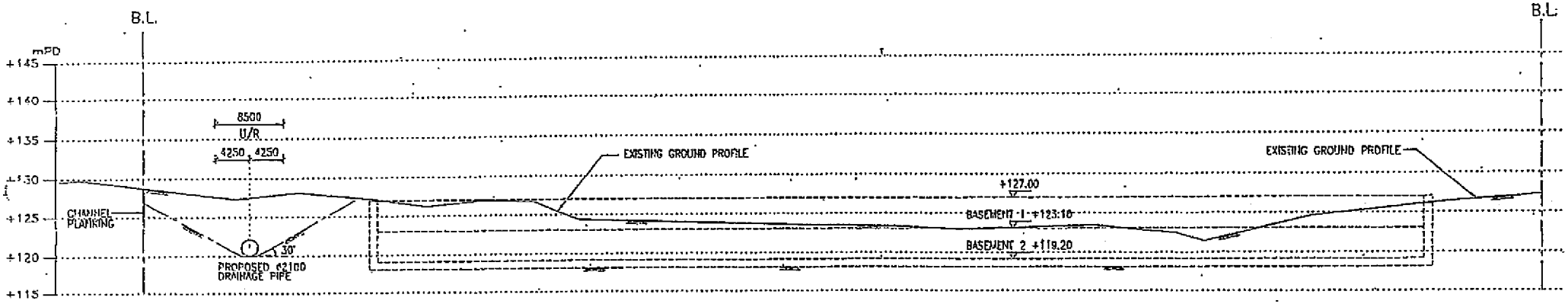
Drainage Diversion Works for Comprehensive Residential Development Various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung

Schematic Section of Proposed Drainage Diversion Works

Figure No.	Page No.
1.5a	
Scale: NTS	Date: 08/04



SECTION 4-4

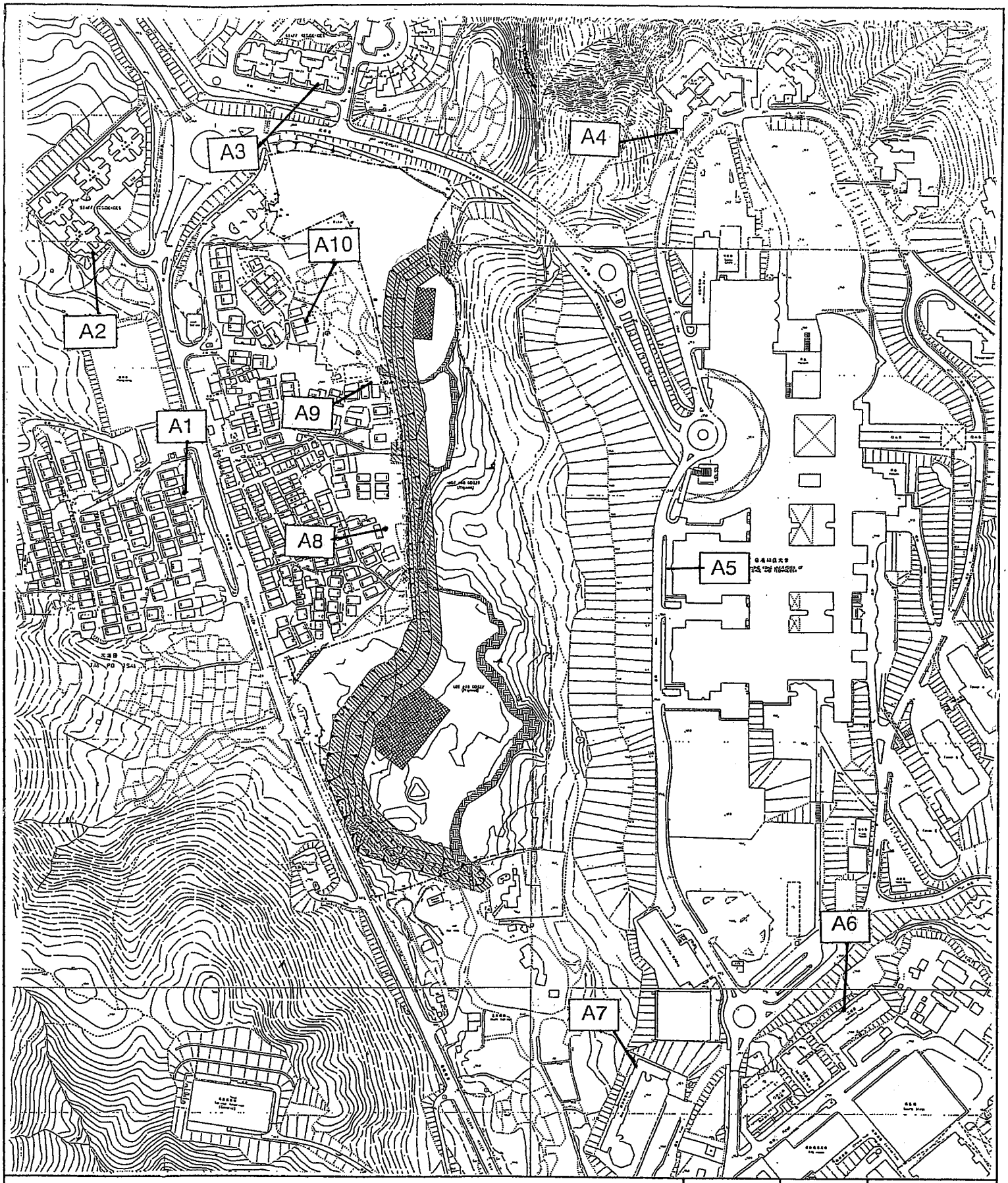


SECTION 5-5

Drainage Diversion Works for Comprehensive Residential Development Various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung

Schematic Section of Proposed Drainage Diversion Works

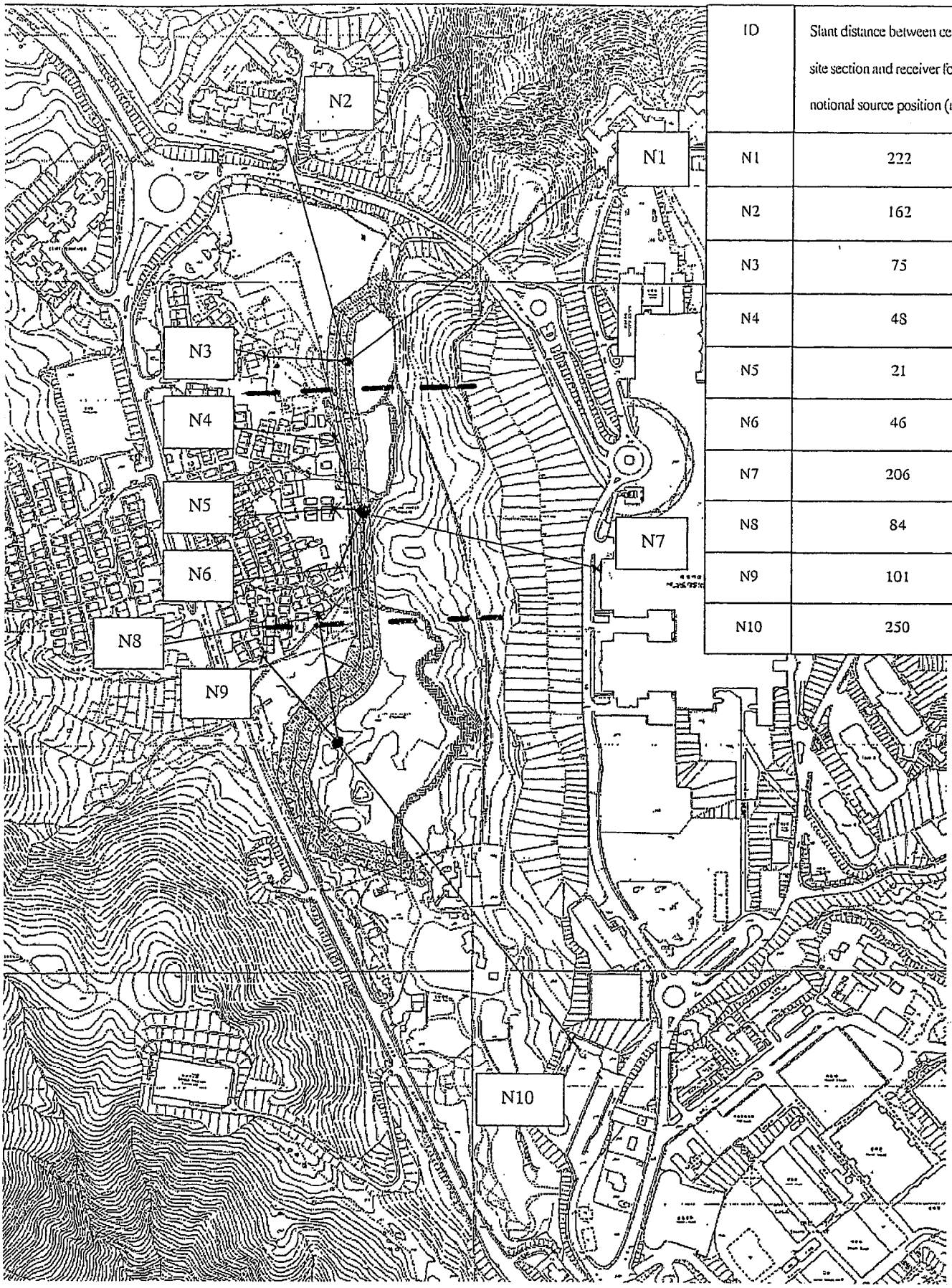
Figure No.	Page No.
1.5b	
Scale: NTS	Date: 08/04



Drainage Diversion Works for Comprehensive Residential Development Various Lots in DD227 & DD229, Tai Po Tsai, Sai Kung

Location of Representative Air Sensitive Receivers

Figure No.	Page No.
4.1	
Scale	Date
~ 1:4000	08/04

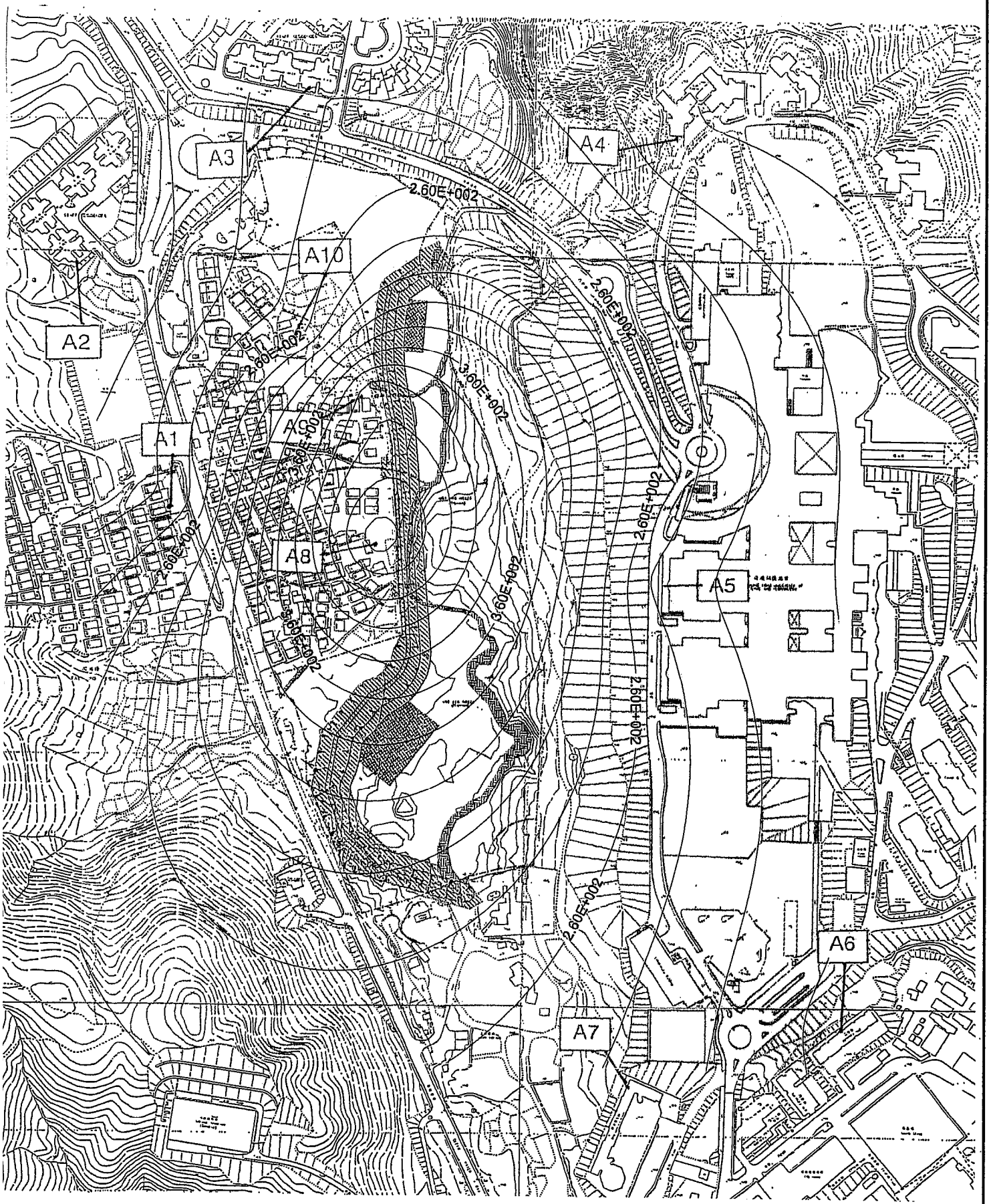


ID	Slant distance between center of site section and receiver for single notional source position (m)
N1	222
N2	162
N3	75
N4	48
N5	21
N6	46
N7	206
N8	84
N9	101
N10	250

Drainage Diversion Works for Comprehensive Residential Development
Various Lots in DD227 and DD229, Tai Po Tasi, Sai Kung
Location of Representative Noise Sensitive Receivers

Figure No.	Page No.
4.2	
Scale	Date
~1:4500	09/04

AEC



Drainage Diversion Works for Comprehensive Residential Development
Various Lots in DD227 and DD229, Tai Po Tasi, Sai Kung
Isopleths of Maximum hourly TSP concentration at ground floor after mitigation

Figure No.	Page No.
4.3	
Scale	Date
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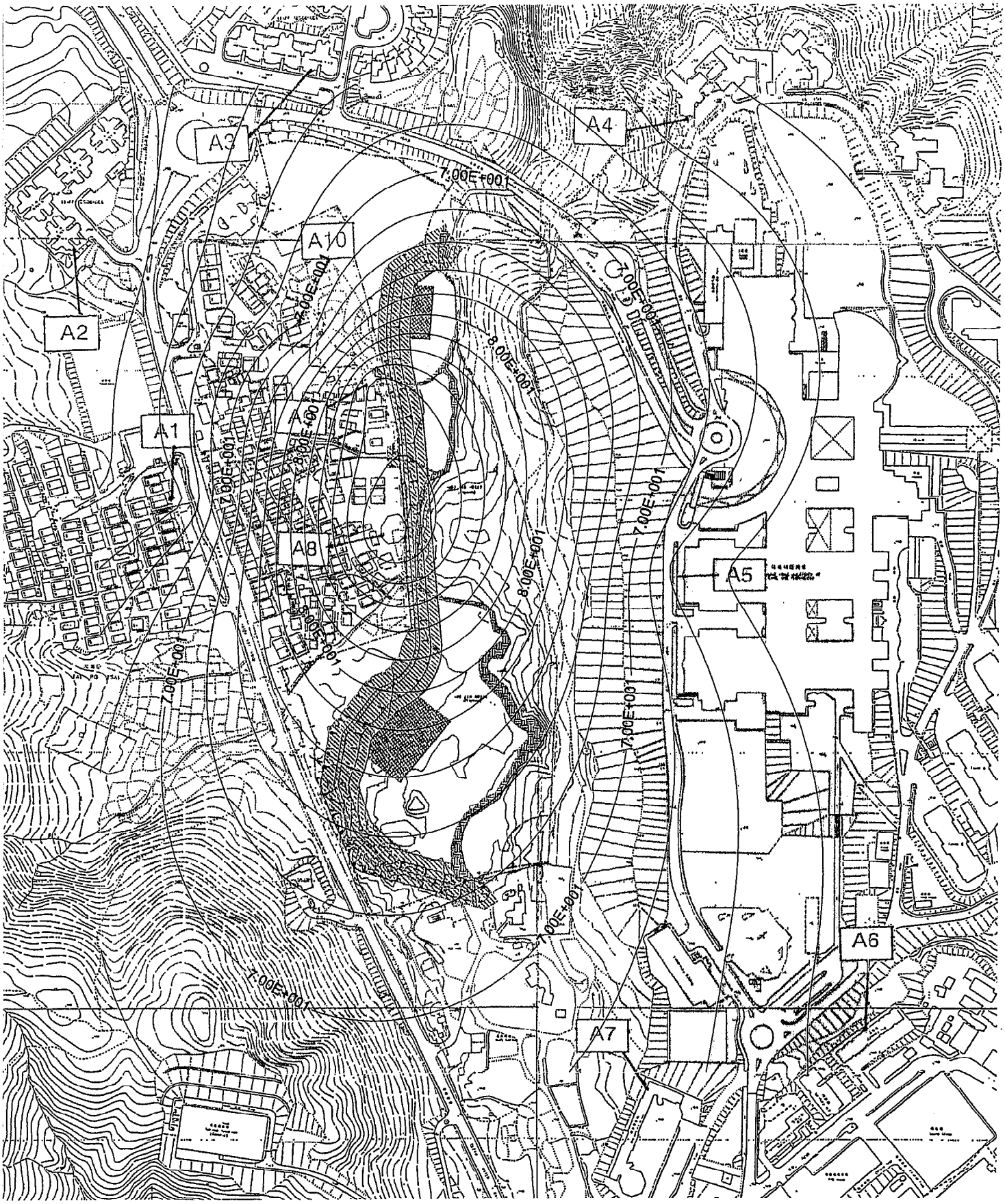
AEC



Drainage Diversion Works for Comprehensive Residential Development
Various Lots in DD227 and DD229, Tai Po Tasi, Sai Kung
Isopleths of Maximum daily RSP concentration at ground floor after mitigation

Figure No.	Page No.
4.4	
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AEC

Appendix A

Tentative Development Programme for the Proposed Residential Development at Tai Po Tsai, Sai Kung

PRELIMINARY DEVELOPMENT PROGRAMME

PROGRAMME	PROJECT : PROPOSED RESIDENTIAL DEVELOPMENT AT TAI PO TSAI, SAI KUNG	JOB NO. J246	DWG. NO PR-10a	DATE : 23-07-04

WORKS	YEAR	YEAR 1 / 2004	YEAR 2 / 2005	YEAR 3 / 2006	YEAR 4 / 2007	YEAR 5 / 2008	YEAR 6 / 2009	YEAR 7 / 2010	YEAR 8 / 2011
	MONTH	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
LAND MATTER / LEASE / EXECUTION OF LEASE		LAND EXCHANGE							
MLP / LANDSCAPE PLAN / DDH UNDER LEASE									
BUILDING PLAN SUBMISSION									
DRAINAGE CONSTRUCTION									
BUILDING WORKS					PHASE I COMPLETION			PHASE II COMPLETION	

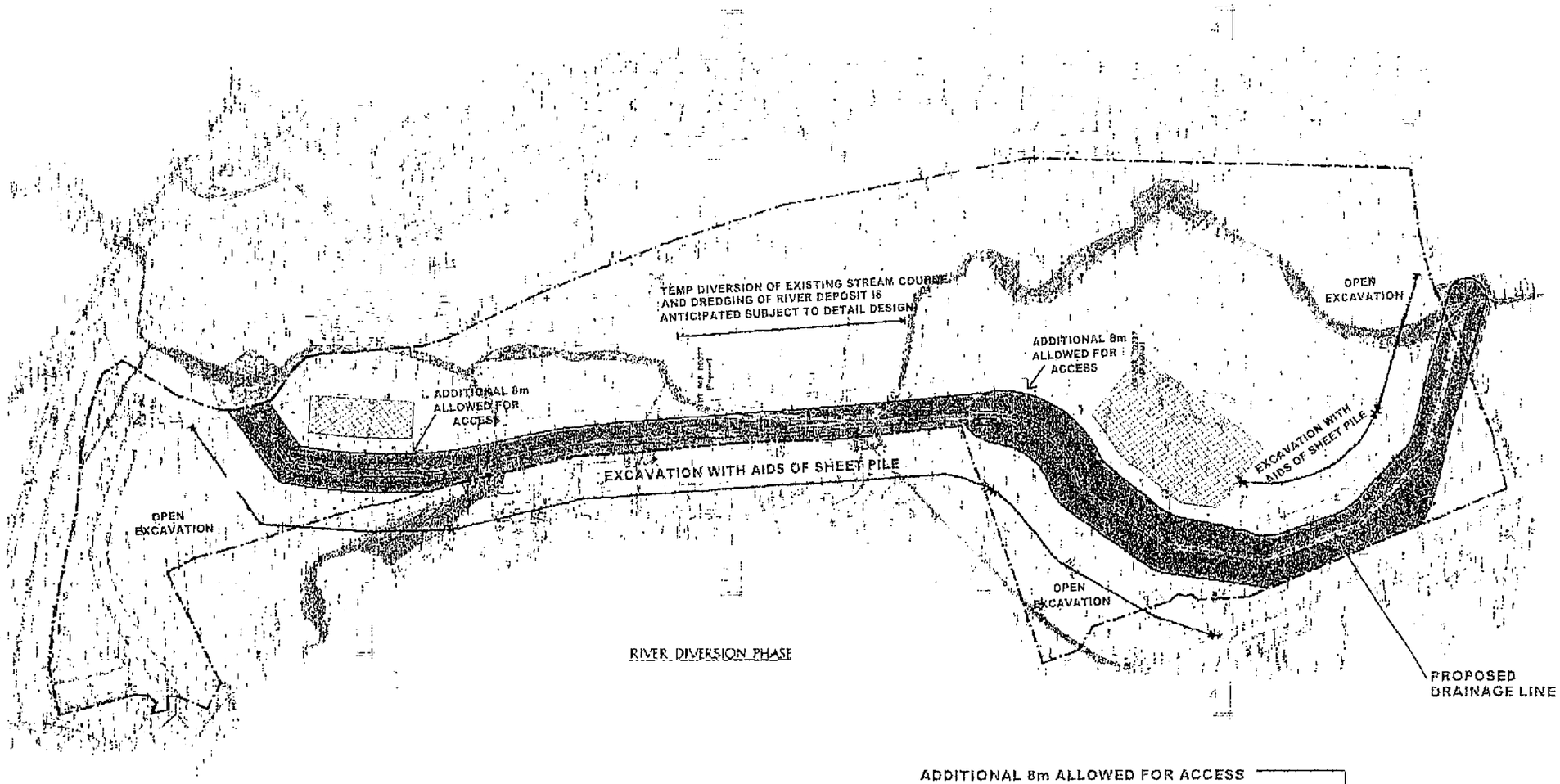
SIMON KWAN & ASSOCIATES LTD. Architects, Planners & Designers
關善明建築師事務所有限公司

S - SUBMISSION
A - APPROVAL
C - COMMENT

CAD REF: C:\J246\S43\PROGRAM\PROG19.DGN

Appendix B

Works Area Plan & Proposed Sequence of Drainage Diversion Works



RIVER DIVERSION PHASE

SITE BOUNDARY

EXISTING STREAM COURSE

ADDITIONAL 8m ALLOWED FOR ACCESS

PROPOSED DRAINAGE LINE

EXCAVATION AREA

ADDITIONAL AREA FOR CONNECTION WORK

PROPOSED TEMPORARY MATERIAL AND EXCAVATED SOIL STOCKPILE LOCATIONS

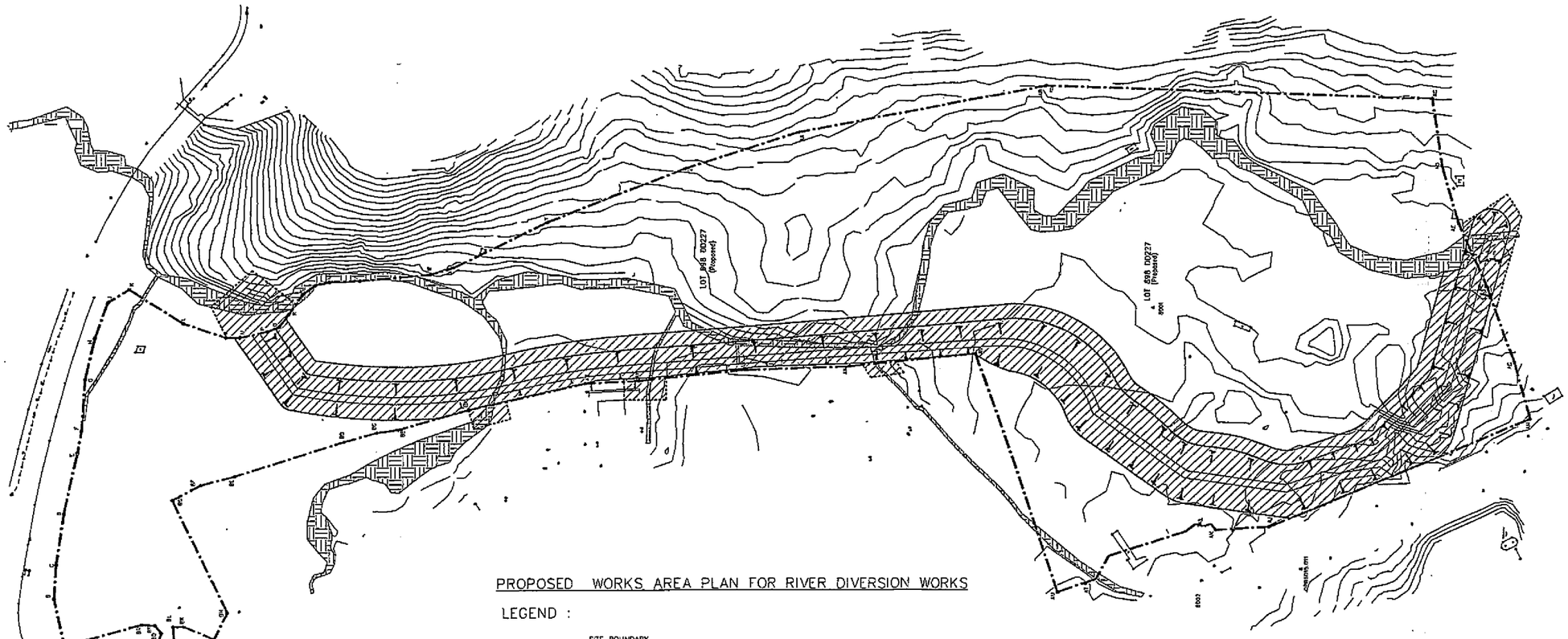
WORKS AREA REQUIRED FOR RIVER DIVERSION WORKS

SCALE:
SCALE: 1 : 2000
METRES 20 10 0 20 40 60 80 100 120 140 160 180 200

PROPOSED RESIDENTIAL DEVELOPMENT AT TAI PO TSAI, SAI KUNG

RIVER DIVERSION PHASE

563/97/01 (P)



PROPOSED WORKS AREA PLAN FOR RIVER DIVERSION WORKS

LEGEND :

SITE BOUNDARY

EXISTING STREAM COURSE

WORKS AREA FOR RIVER DIVERSION WORKS

B.D. REF. NO.

F.S.D. REF. NO.

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT SPECIFICATIONS, CONDITIONS OF CONTRACT AND OTHER RELATED DRAWINGS. ANY DISCREPANCY FOUND THEREON SHALL BE NOTIFIED TO THE AUTHORIZED PERSON/REGISTERED STRUCTURAL ENGINEER IMMEDIATELY.
2. DO NOT SCALE THE DETAILS. USE WRITTEN DIMENSIONS.
3. MEASUREMENTS TO EXISTING WORKS TO BE VERIFIED ON SITE.
4. THE DESIGN AND DETAILS ON THIS DRAWING ARE COPY RIGHT OF THE AUTHORIZED PERSON/REGISTERED STRUCTURAL ENGINEER. NO PORTION MAY BE REPRODUCED WITHOUT HIS WRITTEN PERMISSION.
5. THIS DRAWING IS NOT VALID FOR CONSTRUCTION OR OTHER PURPOSES UNLESS SIGNED BY AUTHORIZED PERSON/REGISTERED STRUCTURAL ENGINEER OF THIS OFFICE.

REVISIONS	DATE	CHECKED
1ST SUBMISSION		

	SUBMISSION DATE	APPROVAL DATE

PROJECT

PROPOSED RESIDENTIAL DEVELOPMENT AT TAI PO TSAI, SAI KUNG

PLAN

WORKS AREA FOR RIVER DIVERSION WORKS

SCALE 1 : 1000 (A3)
1 : 2000 (A3)

SIGNATURE

P.L.WONG M.Sc. C.Eng. F.I.Struct.E. M.A.S.C.E. F.H.K.I.E.
Authorized Person Registered Structural Engineer

B.D. APPROVAL CHOP

DRAWN	DATE
DESIGNED	DATE
CHECKED	DATE
APPROVED	DATE
JOB. NO.	
DWG. NO.	523/DD/02 (P)

Appendix C
Preliminary Ecological Review Report

Drainage Diversion Works for Comprehensive Residential Development at Various Lots in DD 227 & DD 229, Tai Po Tsai, Sai Kung

Preliminary Ecological Review

China-Hong Kong Ecology Consultants Co

1 Introduction

1.1 This report presents an ecological review for the proposed Drainage Diversion Works for the Comprehensive Residential Development at Various Lots in DD 227 & DD 229, Tai Po Tsai, Sai Kung. The Review was undertaken in response to comments from the AFCD regarding to the captioned project after delivery of a stream fish survey report by the client. AFCD were concerned that the potential impact of the proposed project on other fauna groups (e.g. birds and dragonfly) and the riparian vegetation along the stream course.

1.2 Supplementary field surveys on riparian vegetation, mammals, birds, reptiles, amphibians, dragonflies and butterflies were undertaken in August and September 2003. This report presents survey methods and findings of the field surveys and an ecological review of the concerned habitat based on the findings of the recent field surveys.

2 Methods

2.1 The purpose of the survey was to collect ecological baseline data particularly the stream course and its riparian habitats within the project site and immediate down stream course. Attention was paid to the following items during the field surveys:

- Riparian plants and surrounding vegetation
- Birds
- Large insects (dragonfly and butterfly)
- Amphibian and reptile
- Mammals

2.2 Plants survey was carried out by walking through stream course and recording plant species encountered. Relative onsite abundance was estimated. Attention was paid to whether there is any protected plant species at the site.

2.3 Birds were surveyed during three field trips on the 7th, 11th and 21st September 2003 and species seen or heard at the site were recorded. A night survey for amphibians and mammals were undertaken on the 16th September 2003. The faunal groups including mammals, reptiles, dragonfly and butterfly were surveyed by direct observation and insect net was used to catch dragonfly and butterfly specimens for identification purpose.

2.4 Photo records of habitat, some large invertebrates (e.g. butterflies, dragonflies), amphibian and birds were also undertaken at the field.

3 Survey Results

3.1 The exiting stream originated from the nearby Razor Hill passes through the proposed project site where the land users are comprised of plant nursery, car park, residential buildings and fringe of vegetated area (Photo 01), small restaurants and private run leisure ground (Photo 02). The stream course within the project site is generally human modified as a result of past and existing land uses. The stream bank naturally covered with grasses, climbers, shrubs and some small trees (Photos 03 and 04).

3.2 Vegetation recorded from the riparian habitat was given in the Table 1. No rare or protected plant was recorded within the project site. Most common riparian plants recorded at the site include *Mikania micrantha*, *Alocasia macrorrhiza*, and *Microstegium ciliatum*. Riparian habitat on the east side of the stream was young woodland comprised of planted and self-seeded trees. The planted tree species refer to some exotic tree species established initially by plantation and normally with high density and excluding to some other species. Common planted trees at the site include *Acacia confusa*, *Acacia mangium*, *Acacia auriculiformis*, *Dimocarpus longan* and *Lophostemon confertus*. Natural seeded trees recorded at the site were mainly comprised of *Machilus spp.*, *Cinnamomum camphora*, *Leucaeana leucocephala*, *Ficus spp.*, *Sterculia lanceolata*, *Celtis sinensis*, *Alangium chinense*, *Rhus succedanea* and *Schefflera octophylla*. The natural seeded tree species refer to species with low density, sparsely distributed trees and the species known not being planted in the past. Native tree *Aquilaria sinensis*, *Cinnamomum camphora* and *Antirhea chinensis* were occasionally seen in the woodland, which were protected tree species in China or Guangdong. The *A. sinensis*, *C. camphora* and *A. chinensis* are common in Hong Kong and do not have protection status. Generally, plants at the surveyed area were mixture of native and exotic or introduced species.

3.3 A few protected shrub *Pavetta hongkongensis* (Photos 5 and 6) were found at the woodland fringe area near the down stream course (outside the project site). The plants would unlikely be affected by the project as they are outside the works area.

3.4 No rare or protected plants were recorded from the stream bed. Common weed species, *Colocasia esculenta, Commelina nudiflora, Eupatorium catarium* and *Microstegium ciliatum* were grown at the water margin of the stream channel. As the down stream (outside project area) may be affected by sedimentation during construction period, vegetation in the down stream course was also checked where access is possible. Much of the down stream course is featured by water fall (photo 7) and runs through deep valley and the stream finally discharged to the sea. Plants at the stream mouth (photo 8) were comprised of typical shore species, such as *Hibiscus tiliaceus, Excoecaria agallocha, Scaevola sericea, Vitex rotundifolia* and *Ipomoea brasiliensis.*

3.5 Avi-fauna: Birds at the site were surveyed in September 2003 and species recorded were given in Table 2. In total, 17 species of birds was recorded during three field surveys. Results indicted that the site supports an avi-fauna typically of abandoned agricultural land and urban fringe habitats. The Chinese Pond Heron and Wagtail seen at the site are associated with the stream habitat. Other common birds recorded include Tree Sparrows, Spotted Doves, Chinese Bulbuls, Crested Bulbuls, Crested Myna, Japanese White Eyes and Black-necked Starlings (Photos 9-12).

3.6 Amphibians and reptiles: A night survey for amphibians and reptiles was conducted on 16th September 2003 (Photo 13). Juvenile and adult of the Asia Common Toad *Bufo melanostictus* was found common at the site (Photo 14). Gunthers Frog *Rana guentheri,* were also commonly seen at the stream side including juveniles and an adult specimen (Photos 15-16). The recorded species were common species and widely distributed in similar habitat in the New Territories. No reptile was recorded during the night survey, while a common Changeable Lizard *Calotes versicolor* was seen at the roadside during daytime survey at the site.

3.7 Dragonfly: Dragonflies were found common at the site as the stream and riparian habitats provided feeding and foraging ground for the animals. Four species of dragonfly species were recorded i.e. *Orthetrum chrysis* (Photo 17), *Orthetrum glaucum* (Photo 18), *Orthetrum sabina sabina* (Photo 19) and as well as the most common dragonfly *Pantala flavescens.* Damselflies was occasionally found at the stream site. One common damselfly *Agriocnemis femina oryzae* was recorded at the stream habitat (Photo 20). A few other dragonfly species were recorded at the site by AFCD's staff in August 2003, which included *Brachydiplax chalybea flavovittata, Ceriagrion auranticum ryukyuanum, Lyriothemis elegantissima, Orthetrum pruinosum neglectum* and *Trithemis festiva.* All those recorded species were either common or very common species in Hong Kong according to Wilson et al. (2003).

3.8 Butterfly species was surveyed at the project site and six species were recorded from the site as listed in the table below (Photos 21 & 22). All recorded species are widely distributed and commonly found in Hong Kong.

Common Name	Latin Name
Hong Kong Fritillary	*Argyreus hyperbius*
Blue Tiger	*Tirumala limniace*
Great Egg Fly	*Hypolimnas bolina*
Common Mapwing	*Cyrestis thyodamas*
Common Hedge Blue	*Acytolepis puspa*
Common Grass Yellow	*Eurema hecabe*

3.9 Mammals: As the site is human disturbed, mammals was scarce. Feral dogs and cats were often encountered at the site during field surveys. A common bat, probably Japanese Pipistrille *Pipistrellus abramus*, was seen foraging at the site during night survey. No nesting site of bat was found within the project site.

4 Ecological Evaluation and Impact Assessment of the stream habitat

4.1 Ecological evaluation of stream and riparian habitats

Criteria	Evaluation
Naturalness	• Most of stream and its riparian habitats were human disturbed due to past and existing land uses including residents, plant nursery, car park and other commercial and infrastructure facilities in the vicinity. The stream received domestic discharge from nearby developments and steam water was apparently polluted.
Size	• Low to Medium (~600m in length) comparing to approximately 2.5km total length of the stream.
Diversity	• Diversity of aquatic life (fish and invertebrate) is low. Plant diversity is also low and no rare or protected plants were recorded within the site. The site was heavily vegetation by exotic plants such as *Mikania micrantha*. About 10 species of Odonata species were recorded from the site, within indicated that the habitat support medium diversity of the aquatic fauna (though some species may come from outside habitats).
Rarity	• Species of fauna and flora recorded were common species. The habitat was common.
Re-creatability	• Constrained by land availability
Fragmentation	• Fragmented as a result of stream side development in the past

Ecological Linkage	• Linked with down and upper stream riparian habitats
Potential Value	• Potential habitat for a small number of freshwater fish, amphibians, dragonflies and other fauna • Feeding ground for some common birds
Nursery/breeding ground	• Potentially for some common fauna
Age	• Not determined
Abundance/richness wildlife	• Low
Ecological value of the habitat	**Existing ecological value was considered low. While aquatic fauna could be colonized at the habitat if the discharge of domestic sewage and other non-point source water pollutant into the stream could be eliminated.**

4.2 Construction Phase Ecological Impact Assessment

4.2.1 Habitat Loss: The proposed development at the site would require the formation of land and construction of residential buildings. The stream course would be culverted within the project site. The severity of the potential impact associated with direct loss of open stream habitat is somewhat lessened by the fact that the stream and riparian habitats do not support protected flora and fauna and its small scale. Given the surrounding land uses, commercial facilities and village house development in the catchment, the proposed site is largely with low ecological value.

4.2.2 Impacts on stream fauna may arise from any of the following sources: Sedimentation of streams by construction activities and runoff or dust; pollution of streams by spilled construction materials; culverting of streams and filing of stream meander. Sedimentation of streams by runoff from construction sites would occur if not controlled as the stream course will be re-channelised. Heavy sedimentation would cause temporal de-fauna of the stream. Feeding and breeding habitats for aquatic insects, crustaceans, fishes and frogs would be affected. The proposed development would not introduce significant changes in hydrological characteristic in upper and lower stream course. The potential sedimentation impact would be temporal and could be minmised when appropriate measures are adopted at the construction site. The likely affected habitat would be re-colonised by aquatic organisms during post project period.

4.2.3 Modification of stream course: The stream through the site would need to be box-culverted to facilitate the proposed development, resulting in the loss of some 600 meters of open stream channel habitat. The whole stream was estimated to be approximately 2.5 km in length. About one quarter of the stream course was potentially affected by the proposed development. As the

affected stream section is human disturbed and receives sewage discharge from nearby developments, there is little potential for recolonization and rehabitation of the polluted stream section given the current development conditions in the vicinity. Loss of the open feature of the affected stream section would only affect some exotic fish species and other common fauna in localized area. The impacts associated with the loss of this section of the stream was considered limited. The lower stream course outside the development site would be affected by sedimentation if uncontrolled during construction period. The proposed project would modify open stream course to covered channel, which would affect animals using the riparian vegetation, open stream course, and those feeding on epilithic algae on rock surface of the stream bottom. The ecological impact is considered not significant given the low ecological value of the existing fauna and flora in the affected stream section and riparian habitats. There are similar habitat features exist at some sections of the lower and upper stream course. Some of the affected stream fish and other fauna including bird within the application site could potentially use those habitats. When the water quality in the catchment improved, some more aquatic organisms are expected to colonise the upper and down stream.

4.3 Operational Phase Impacts

Disposal of Domestic Effluent: Discharge of untreated or partially treated effluent from the development has the potential to cause pollution and eutrophication of aquatic environment. For this reason, the domestic effluent will be collected for proper treatment and disposal in accordance with EPD's requirements. Under the previously approved planning application, the developer has committed to provide a private sewage treatment plant within the subject site since there is no public sewerage system existing in the area for the time being. The sewage arising from the development will be treated to a standard acceptable to EPD and discharged to the proposed drainage system along the access road. With adequate treatment of domestic effluent, it should be possible to eliminate any potential pollution and eutrophication that may be caused to the lower stream course. Therefore, impacts of operation phase to stream and nearby wildlife would not be significant.

4.4 Predicted Residual Impacts

Predicted residual impacts are those impacts expected to remain after mitigation. Based on the assumption that reasonable and appropriate mitigation measures will be incorporated during the construction and operation of the proposed development, residual impacts for habitat loss and impact on the lower stream course are predicted "minor".

5 Mitigation and Recommendation

5.1 To minimise sedimentation and filing of stream meander induced impacts, landform and filing engineering activities shall preferably be performed in dry seasons. It is recommended to build temporary sediment pool or install other appropriate sedimentation facility to treat water runoff from the construction site before discharge to down stream.

5.2 If land formation works could not be avoided in wet seasons, it is recommend to implement appropriate mitigation measures, such as installing silt traps, to reduce the potential impact due to sedimentation. Also, EPD's guidelines to control construction site runoff shall be followed and potential soil erosion problem in the affected stream course shall be monitored during the construction works.

5.3 Loss of vegetation due to this proposed development will be compensated by the proposed landscaping scheme which would maximise plantation of trees and shrubs onsite. According to the proposed landscape master plan, all of the approximately 83 existing trees would be retained in-situ and approximately 1229 heavy standard trees would be planted on site and within 5m outside the eastern boundary of the site. Other practicable mitigation measures to minimise the potential impact on flora species include:

- To avoid removing existing native trees in the riparian habitat habitats.
- To protect adjacent woodland trees by using temporary barricades during construction to reduce damage to trunk and tree canopy.

5.4 Some native trees are recommended to be planted for landscaping purpose of the project. Recommended list of species are given in the table below. It is suggested that about 10 species of trees to be selected from the list according to availability of the nursery source. The recommended plant species would have certain ecological value in terms of plant ecology and the associated wildlife including birds. Detailed selection of the plant species shall be subject to agreement with relevant government departments.

Tree species	
Common Name	**Latin Name**
Camphor tree	*Cinnamomum camphora*
Chestnut oak	*Castanopsis fissa*
Chinese alangium	*Alanglum chinense*
Chinese aralia	*Aralia chinensis*
Chinese banyan	*Ficus microcarpa*

Chinese hackberry	*Celtis sinensis*
Evodia	*Evodia lepta*
Ivy tree	*Schefflera octophylla*
Microcos	*Microcos paniculata*
Pond spice	*Litsea glutinosa*
Prickly ash	*zanthoxylum avicennae*
Rough-leaved stem fig	*Ficus hispida*
Red machilus	*Machilus thunbergil*
Superb fig	*Ficus superba*
Scarlet sterculia	*Sterculla lanceolata*
Tallow tree	*Saplum sebiferum*
Turn-in-the-wind	*Mallotus paniculatus*

5.5 To adopt a more sustainable approach to development, the design of the landscaped areas adjacent to the proposed residential blocks will incorporate ecologically beneficial features wherever possible. This approach is adopted in the design of the proposed water pond on the eastern periphery of the site. This constructed and managed water pond would be inhabited by some stream fauna found in the area including species such as dragonflies, fishes and maybe amphibians. To improve habitat quality of the constructed pond habitat, some aquatic plants including submerged, floating, emergent and marginal plants, will be planted (refer to Landscape Plan for detailed species selection).

5.6 By creating pond habitat and introducing more native plants to the site, some wildlife such as birds, bats, and insects would be attracted to feed on, and the ecological value of the site would be enhanced.

6 Conclusion

6.1 The existing habitat quality of the stream and riparian habitats within the project site was considered low as a result of poor aquatic fauna and human disturbance. The downstream site (outside project site) is considered with some ecological interest for its naturalness, undisturbed riparian vegetation and the potential associated fauna. Measures to control sedimentation and pollution during construction period should be undertaken to minimize potential adverse impact on the down stream habitats.

6.2 The ecological impacts associated with the proposed project on the stream is considered not significant given the low ecological value and biodiversity of the existing stream and riparian habitats within the project site.

6.3 With the implementation of the proposed landscaping master plan including provision of constructed pond habitat, on-site wastewater treatment facilities and introduction of native flora, the ecological impact to surrounding area

would be minimized and ecological value of the project site would be enhanced.

7 Reference

Wilson, K.D.P., T.W. Tam, B.S.P. Kwan, K.K.Y. Wu, B.S.F. Wong and J.K. Wong, 2003, Field Guide to the Dragonflies of Hong Kong. AFCD, Friends of Country Park and Cosmos Books Ltd. Hong Kong.

Table 1. Plant species recorded along stream side at Tai Po Tsai, Sai Kung.

		Within Project Site			Outside Project Site	
Family 科名	Species 种名	Tree	Shrub	Herb / climber	Down stream	Stream mouth
Alangiaceae	*Alangium chinense*	+				
Amaranthaceae	*Alternanthera philoxeroider*			+		+
Anacardiaceae	*Rhus hypoleuca*		+			
Anacardiaceae	*Rhus succedanea*	+			+	
Aquilariaceae	*Aquilaria sinensis #*	+				
Araceae	*Alocasia macrorrhiza*		++		+	
Araceae	*Colocasia esculenta*			+	+	
Araliaceae	*Schefflera octophylla*	+				
Arecaceae (Palmae)	*Chrysalidocarpus lutescens*		+			
Arecaceae (Palmae)	*Livistona chinensis*	+				
Caesalpiniaceae	*Bauhinia purpurea!*	+				
Clusiaceae	*Garcinia oblongifolia*		+			
Commelinaceae	*Commelina nudiflora*			+	++	
Compositae	*Bidens alba*			+		
Compositae	*Eupatorium catarium*			++	+	
Compositae	*Mikania micrantha*			++	+	+
Compositae	*Wedelia chinensis*			+	+	
Convolvulaceae	*Ipomoea brasiliensis*					++
Convolvulaceae	*Ipomoea cairica*			++		
Ebenaceae	*Diospyros morrisiana*	+				
Elaeocarpaceae	*Elacocarpus sylvestris*	+				
Escalloniaceae	*Itea chinensis*		+			
Euphorbiaceae	*Aporusa dioica*		+			
Euphorbiaceae	*Breynia fruticosa*		+			
Euphorbiaceae	*Bridelia tomentosa*	+				
Euphorbiaceae	*Endospermum chinense*				+	
Euphorbiaceae	*Excoecaria agallocha*					++
Euphorbiaceae	*Macaranga tanarius*	+				
Euphorbiaceae	*Mallotus paniculatus*	+				
Euphorbiaceae	*Bischofia trifoliata*		+			
Gnetaceae	*Gnetum parvifolium*			+		
Goodeniaceae	*Scaevola sericea*					+
Gramineae	*Bambusa mutabilis*		+			

Gramineae	*Bambusa sinospinosa*		+			
Gramineae	*Bambusa vulgaris*		+			
Gramineae	*Eleusine indica*			+		
Gramineae	*Microstegium ciliatum*			++		
Gramineae	*Miscanthus floridulus*			+		
Gramineae	*Miscanthus sinensis*			+	+	
Lauraceae	*Cinnamomum camphora #*	+				
Lauraceae	*Litsea cubeba*	+				
Lauraceae	*Litsea rotundifolia*		++			
Lauraceae	*Machilus breviflora*	+			+	
Lauraceae	*Machilus chekiangensis*	+				
Lauraceae	*Machilus chinensis*	+			+	
Lauraceae	*Machilus velutina*	+				
Malvaceae	*Hibiscus tiliaceus*					++
Mimosaceae	*Acacia auriculiformis*	+				
Mimosaceae	*Acacia confusa*	++				
Mimosaceae	*Acacia mangium*	+				
Mimosaceae	*Leucaena leucocephala*	+				
Mimosaceae	*Mimosa pudica*		+			
Moraceae	*Ficus benjamina*	+				
Moraceae	*Ficus hispida*	+				
Moraceae	*Ficus microcarpa*	+			+	
Moraceae	*Ficus variegata*	+			+	
Moraceae	*Ficus virens*	+				
Musaceae	*Musa x paradisiaca*	+				
Myrtaceae	*Cleistocalyx operculata*				+	
Myrtaceae	*Lophostemon confertus*	++				
Papilionaceae	*Millettia dielsiana*			+		
Pteridaceae	*Cibotium barometz*			+		
Rhamnaceae	*Berchemia racemosa*			+		
Rhamnaceae	*Paliurus ramosissimus*				+	
Rhamnaceae	*Sageretia theezans*			+		
Rubiaceae	*Adina pilulifera*				+	
Rubiaceae	*Antirhea chinensis #*				+	
Rubiaceae	*Paveita hongkongensis#*		+		+	
Sapindaceae	*Dimocarpus longan*	+				
Smilacaceae	*smilax glabra*			+		
Solanaceae	*Solanum torvum*		+			

Sterculiaceae	*Reevesia thyrsoidea*	+				
Sterculiaceae	*Sterculia lanceolata*	+			+	
Symplocaceae	*Symplocos glauca*		+		+	
Tiliaceae	*Byttneria aspera*			+		
Ulmaceae	*Celtis sinensis*	++				
Ulmaceae	*Trema orientalis*		+			
Urticaceae	*Boehmeria nivea*		+		+	
Verbenaceae	*Lantana camara*		++			
Verbenaceae	*Vitex rotundifolia*					++

Note: * Protected species in Hong Kong

Protected plant species in China

Relative abundance: +, Occasional seen; ++, commonly seen

Table 2. Bird species recorded along stream side at Tai Po Tsai, Sai Kung.

Common Name	Scientific Name	Chinese Name	Survey Date		
			7/9/03	11/9/03	21/9/03
Black faced Laughing Thrush	*Garrulax perspicillatus*	黑臉噪□	3		2
Black Kite	*Milvus lineatus*	麻鷹	1	1	
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	2		
Chinese Bulbul	*Pycnonotus sinensis*	白頭鵯	3	4	1
Chinese Pond Heron	*Ardeola bacchus*	池鷺	1	1	
Crested Myna	*Acridotheres cristatellus*	八哥		1	2
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	1	1	1
Crested bulbul	*Pycnonotus jocosus*	紅耳鵯	4	3	3
Domestic pigeon	*Columba sp.*	鴿			1
Great Tit	*Parus major(commixtus)*	大山雀		2	
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥(相思)		4	5
Magpie Robin	*Copsychus saularis*	鵲鴝		1	
Plain Prinia	*Prinia inornata*	褐頭鷦鶯		1	
Rufous-backed Shrike	*Lanius schach*	棕背伯勞		1	
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩		2	3
Tree Sparrow	*Passer montanus*	麻雀	5		3
White Wagtail	*Motacilla alba*	白鶺鴒		1	
Number of birds			20	23	21
No. of species			8	13	9

Photo 1. Car park

Photo 2. Leisure ground

Photo 3. Stream

Photo 4. Stream

Photo 5. *Pavetta hongkongensis*

Photo 6. *Pavetta hongkongensis*

Photo 7. Waterfall

Photo 8. Stream moth or estuarine

Photo 9. Rufous-backed Shrike

Photo 10. Crested Myna

Photo 11. Black-necked Starling

Photo 12. Spotted Dove

Photo 13. Performing night survey

Photo 14. Common toad

Photo 15. Gunther's frog

Photo 16. Gunther's frog

Photo 17. Dragonfly
Orthethrum chrysis

Photo 18. Dragonfly
Orthethrum glaucum

Photo 19. Dragonfly
Orthethrum sabina Sabina

Photo 20. Damselfly
Agriocnemis femina oryzae

Photo 21. Butterfly
Common HedgeBlue (*Acytolepis puspa*)

Photo 22. Butterfly
Common Mapwing (*Cyrestis thyodamas*)

Appendix D

Freshwater Fish Investigation Survey Report

Comprehensive Residential Development,
Various Lots in DD 227 and DD 229, Tai Po Tsai, Sai Kung
(Application No. A/DPA/SK-CWBN/2)

Freshwater fish investigation at the streamcourse in the vicinity of Tai Po Tsai Village, Sai Kung

Survey Report

by

Chong Dee Hwa

Ichthyology
GPO Box 12262, Hong Kong

July 2003

1. *Baseline Conditions of Survey Areas*

Fish surveys were undertaken in areas between the Hong Kong University of Science and Technology (HKUST) and Tai Po Tsai of Sai Kung (Site Photo Sets I ~ V). The target stream was the main stream of Tai Po Tsai, which originated from the southern end of the eastern hill slope of Che Kwu Shan (Razor Hill). The stream stretched from the northern side of the "Film Studio", running through the valley of Tai Po Tsai (0013-0014, Site Photo Set II), and was connected to the beach of Pak Shui Wan. The area was highly disturbed in nature by various human activities in the past such as farming and construction works, and the condition of this main stream course (especially the water quality) would no longer be able to support any species of native freshwater fishes.

The populations of native freshwater fishes were therefore believed to be now extinct, or restricted to the upper part of the tributaries of this stream course which were located within the relatively undisturbed areas (the eastern slope of Che Kwu Shan) behind Tai Po Tsai Village.

The origin of this main stream course (in the past) was located within a garden which appeared to be a private property (Site Photo Sets I, II). The water source of the stream was no longer natural but partially artificial due to the discharge of wastewater via the channel connected to the head of this stream (0062, 0063, 0064, Site Photo Set I). Most of the streambed was sandy in nature with some coarse granite (0059, 0060, Site Photo Set I). The entire environment has once been completely modified (0061, Site Photo Set I; 0047, 0048, 0049, 0050, Site Photo Set II).

The upper-mid course was located between the end of the garden and Tai Po Tsai Village (0040, Site Photo Set III). The land along this part of stream course has once been modified as agricultural fields which appeared to be now abandoned. Most of the streambed was muddy in nature, with heavily or moderately polluted organic matters accumulated (0034, 0054, Site Photo Set III). No extremely large or deep pools were found except some at certain locations up to about 1 meter in depth (0001-0002, 0004, Site Photo Set IV).

The middle course was located the end of the agricultural fields beside Tai Po Tsai Village near the bridge of the University Road (0013-0014, 0015, 0016, Site Photo Set V). The site was characterized by a distinct change in the volume and current of the

water due to the combination of the discharges supplied by the tributaries and the sewage released from the village (right side of 0013-0014, Site Photo Set V). The stream environment contained some deep pools more than 1.5m in depth.

II. *Methodology*

Fish surveys were conducted by direct observation and active sampling. Both methods were alternatively used in the entire stream course, e.g. active sampling was not possible at some locations due to the water depth, and direct observation (with or without diving mask) was not possible at some locations covered by dense vegetation or due to water condition. Active sampling using hand nets was carried out for the upper and middle parts of stream beside Ta Po Tsai village (0054, Site Photo Set III; 0015-0018, Site Photo Set IV).

In order to avoid the underestimation of fish species in the stream course surveyed, "night observation" was also carried out for recording those fish with special behaviors such as nocturnal species.

All fish recorded were identified in the field, and the number of individuals seen was also noted. Particular note was made of any distinct large population in specific portion of the stream course.

III. *Results*

Fish surveys were undertaken during both daytime and evening on 8th and 20th July 2003. Night survey was also undertaken from 6 p.m ~ 2 a.m on 11th – 12th July 2003. A total of 83 fish individuals (including 39 captured individuals) were recorded in the upper-mid to middle course. Results are summarized in Table 1.

Reference Site	Individuals Recorded		Abundance
	Scientific Name	Chinese Name	
Upper	*Gambusia affinis* (Baird & Girard, 1853)	食蚊魚	+
Upper	*Xiphophorus helleri* Heckel, 1848	劍尾魚	+
Middle	*Clarias fuscus* (Lacepede, 1803)	[illegible]	+
Middle	*Channa asiatica* (Linnaeus, 1758)	[illegible]	+

+ = less than 5 individuals; ++ = 5-10 individuals; +++ = more than 10 individuals

Upper = Stream beside agricultral fields A, N1, N2; Middle =N3, N4,

Table 1. Fish individuals recorded from all reference sites.

None of the native fish individuals was seen within the survey areas (upper to middle course). All recorded individuals belong to introduced fish species.

IV. *Conclusion*

The absence (extinction) of native fish individuals in the entire target stream course may be due to unsuitable condition of the habitats, including heavily modified environment and discharge of polluted water that led to intolerable worsened water quality especially in the dry season.

The 2 species, *Gambusia affinis* and *Xiphophorus hellerii*, are both omnivorous fish originated in Central America. The former species (0058, Site Photo Set II) was introduced for the control of mosquitoes, and the latter was one of the most popular aquarium fish. The dominance of the population of *Gambusia affinis* may be due to the species' small size, fast growing habit, higher tolerance towards polluted environment, and lack of competitors in the habitat. These 2 species successfully and effectively filled the niche of the native freshwater fish species that inhabited the stream in the past, and now served to help in maintaining the balance of the whole ecosystem of the stream (by grazing the surface of substrata, controlling the population size of other aquatic animals).

The other 2 species, *Clarias fuscus* and *Channa asiatica*, are carnivorous fish widely distributed in Southeast Asia including mainland China. They are known as popular edible fishes and are therefore commonly introduced in local fish ponds and reservoirs. Similar to the former 2 species, the presence of these 2 species may due to their higher tolerance towards polluted environment, and lack of competitors in the habitats. These 2 species successfully and effectively filled the niche of the native predatory freshwater fish species, and served to control the population size of other relatively large aquatic animals including the former 2 species or even native fish species.

The number of fish individuals collected at the upper to middle course showed that the populations of the first 2 species (*Gambusia affinis* and *Xiphophorus hellerii*) were distinctly much more abundant in the upper course of the stream (0058, Site Photo Set II). On the contrary, the latter 2 species (*Clarias fuscus* and *Channa asiatica*) were only found from the middle (beside the Tai Po Tsai Village, 0001-0002, 0004,0025-0027, Site Photo Set IV) to the end of the middle course (beside the bridge of the University Road, 0015, 0016, Site Photo Set V) of the stream. Therefore, the distribution of the fish populations was more or less biased to the lower (middle) and upper course of the study site. Results of the survey showed that the population size of the latter 2 species (*Clarias fuscus* and *Channa asiatica*) may be due to the larger size of the habitat in the middle course.

Having compared with observations in the past, the present survey clearly showed quite a serious reduction in the suitable habitat for the native fish species in the Tai Po Tsai stream system over time. The objectives of any mitigation measures with respect to fish fauna should hence focus on the prevention of sewage discharge (0062, 0063, 0064, Site Photo Set I; 0034, Site Photo Set III; 0004, Site Photo Set IV) and restoration of more natural habitats (i.e. increasing habitat heterogeneity; e.g. restoring irregular-shaped substrata as coarse sand and rocks along the bottom of channelized stream course) to enhance the faunal diversity and ecological stability of the environment.

V. *References*

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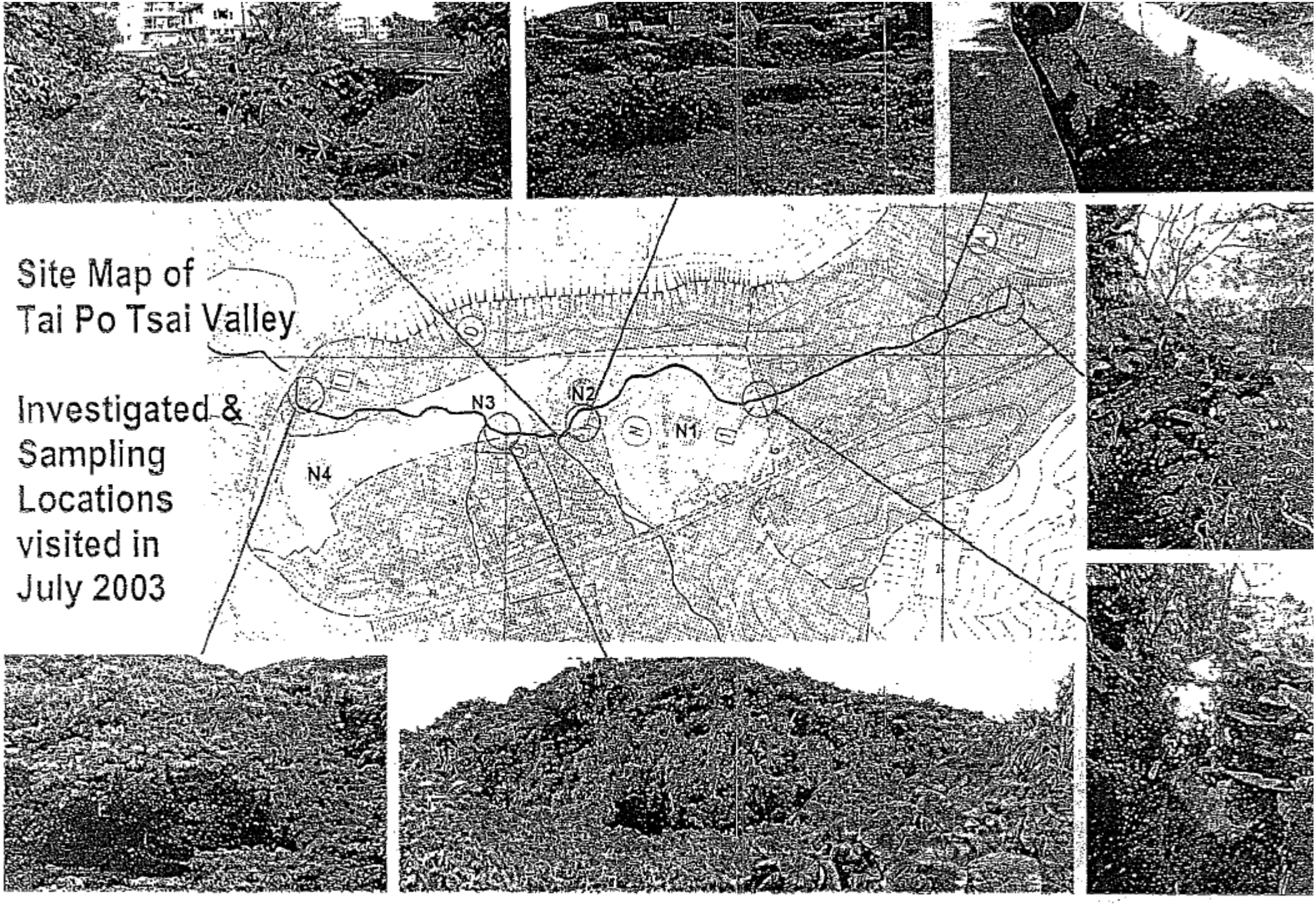
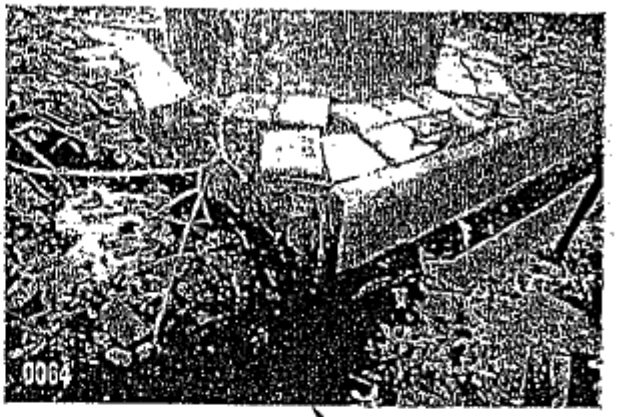
Dudgeon D. & R. Corlett. 1994. Hills and Streams: An Ecology of Hong Kong. Hong Kong University Press. XV+234 pp.

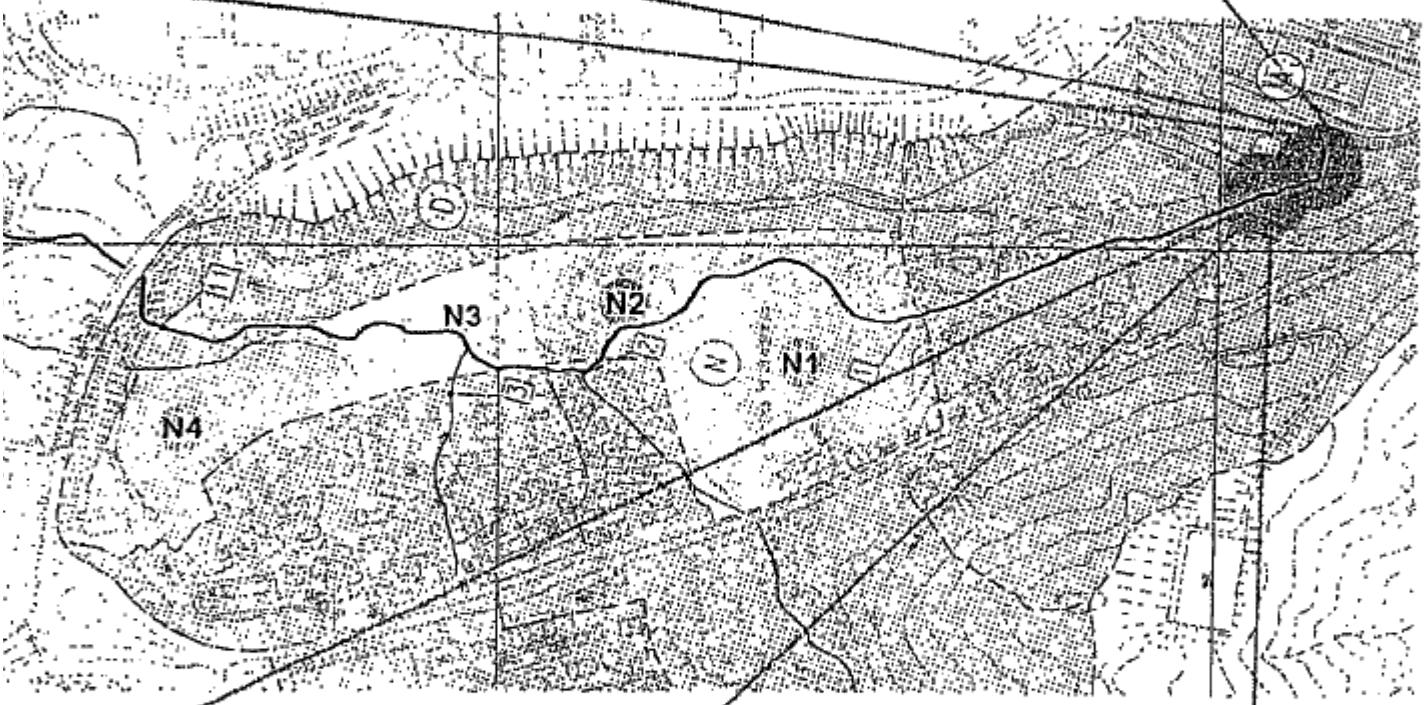
Environmental Protection Department. 1997. Technical Memorandum on Environmental Impact Assessment Process. Annexes 8 and 16.

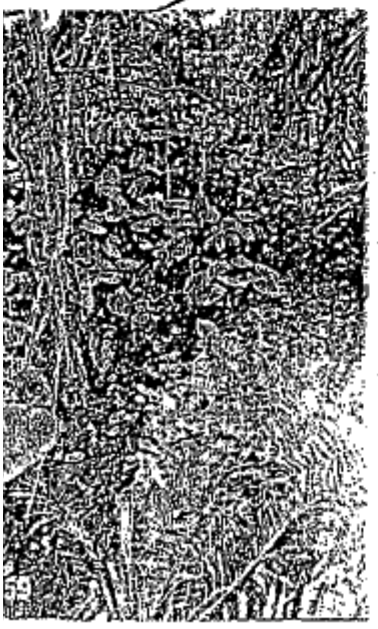
H.L. Wu, K.T. Shao and C. F. Lai. 1999. Latin-Chinese Dictionary of Fishes Names. Shuichan Press. 1028 pp.

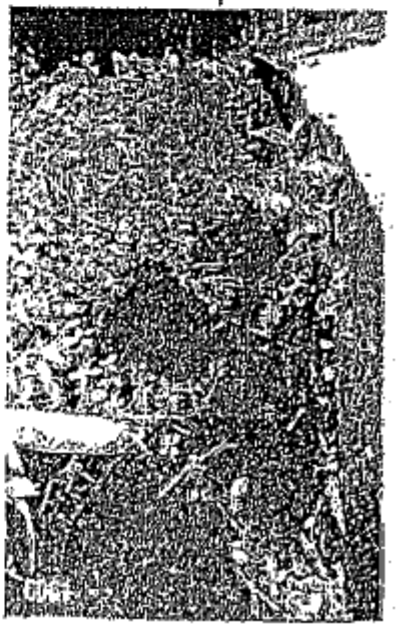

Site Map of
Tai Po Tsai Valley
Investigated &
Sampling
Locations
visited in
July 2003
N1
N2
N3
N4

ite Photo Set - I. (Zone A)

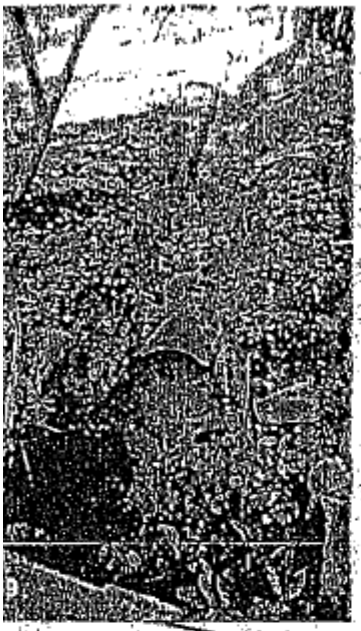


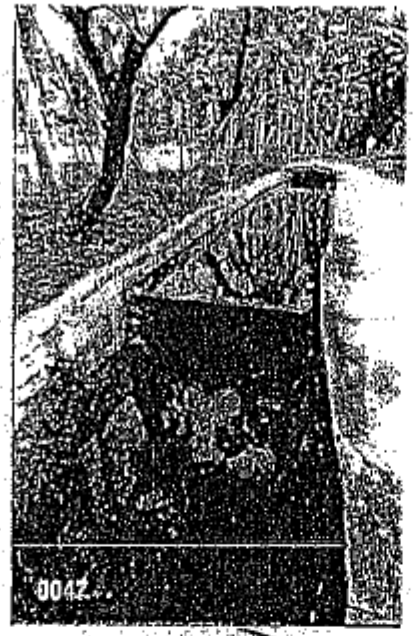


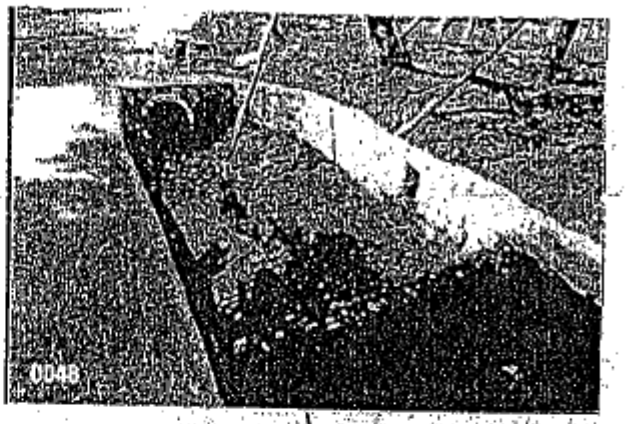


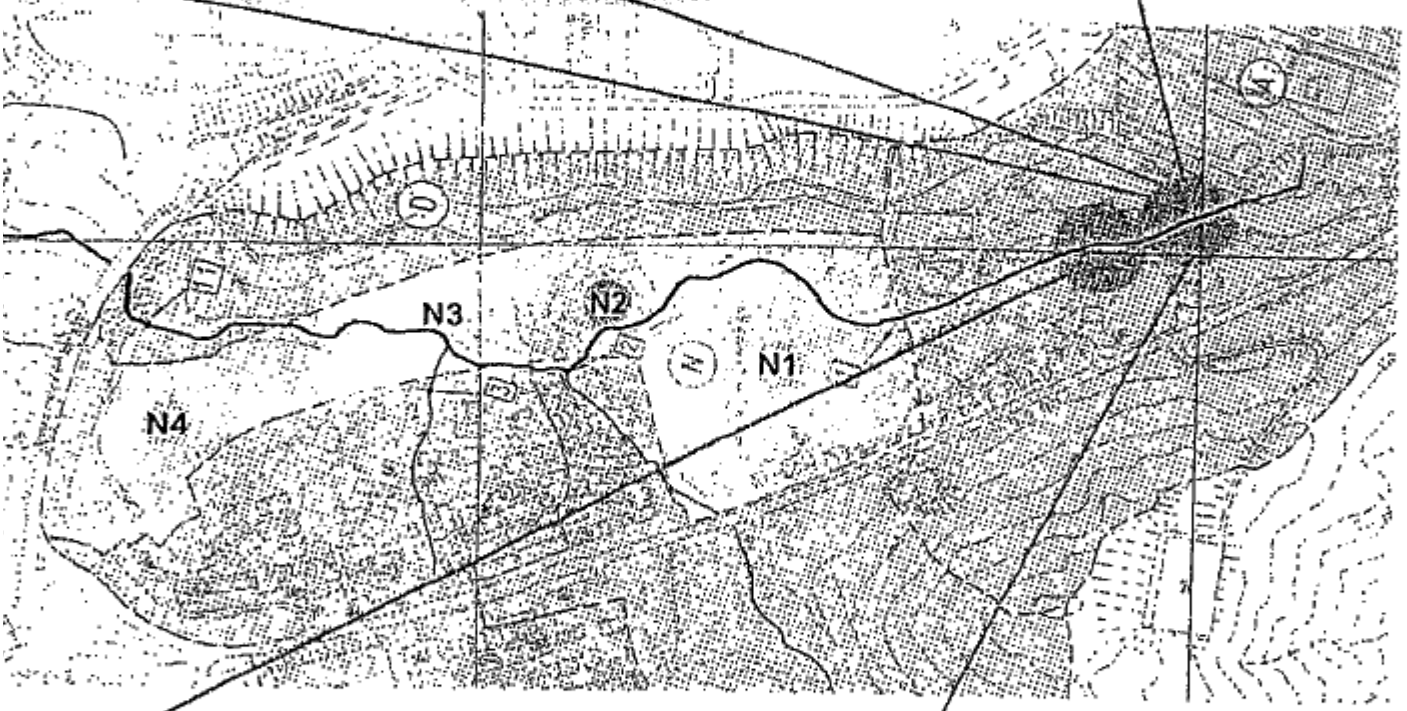


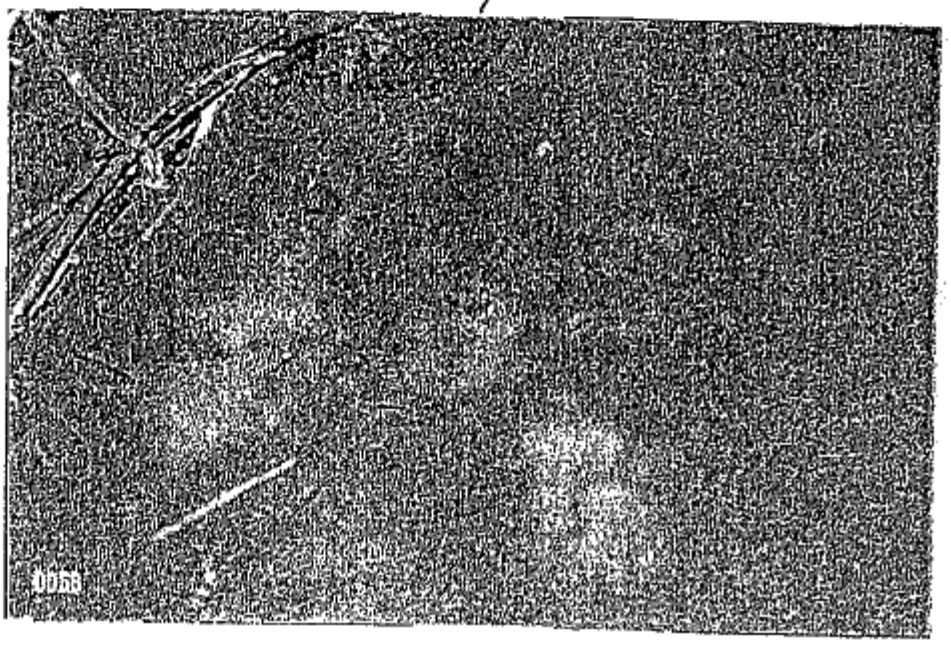
te Photo Set - II. (Zone A - N1)











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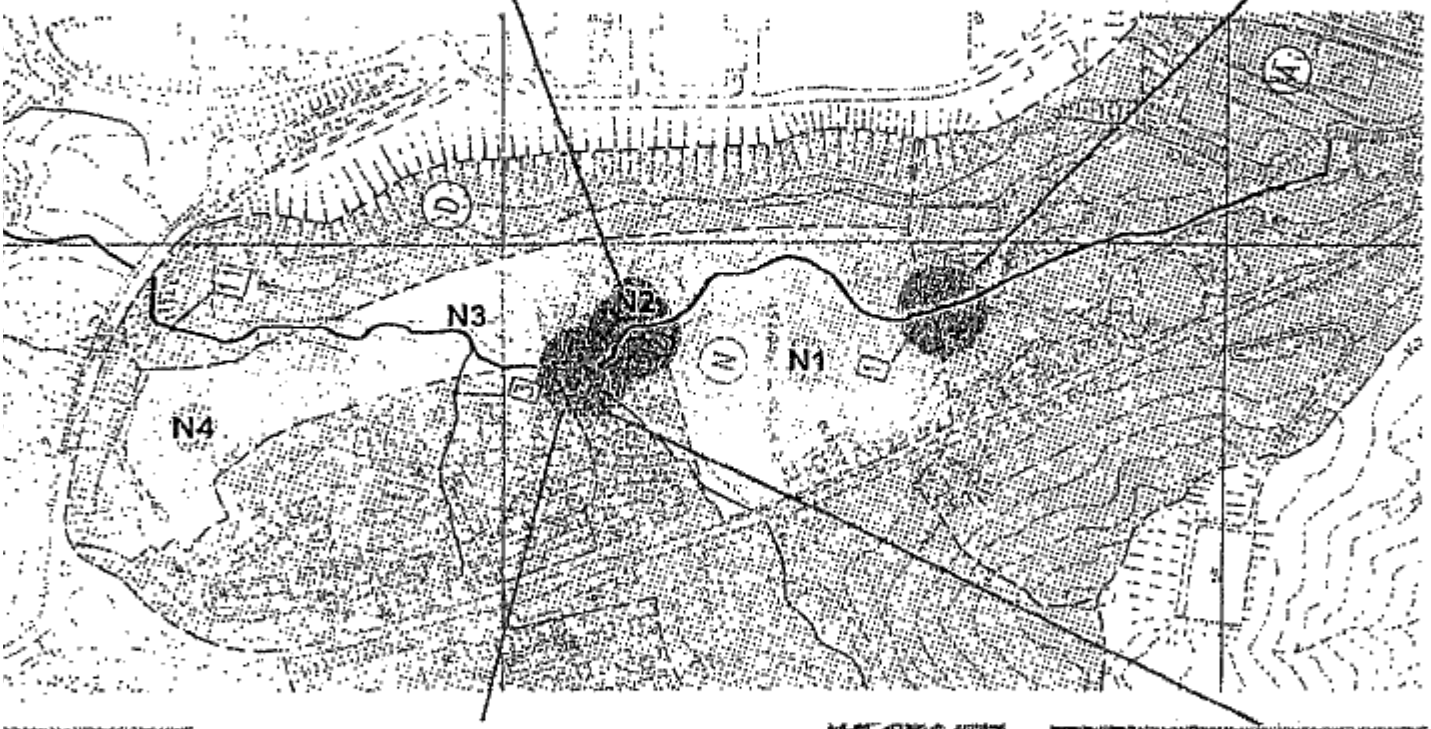
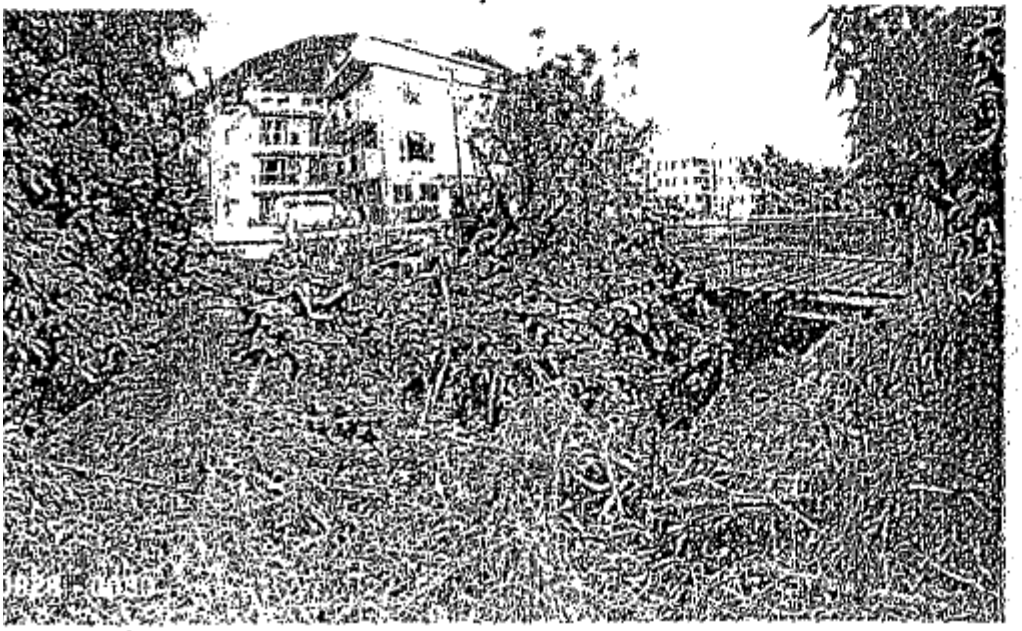
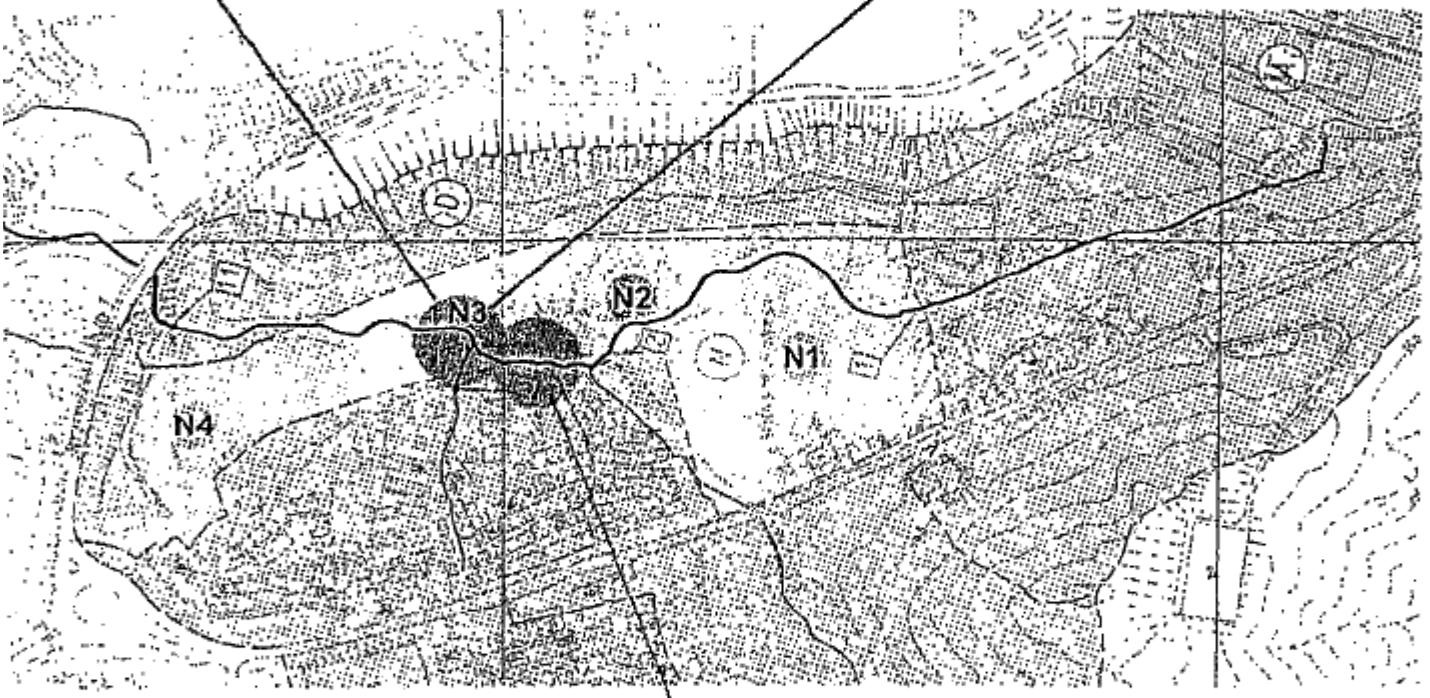
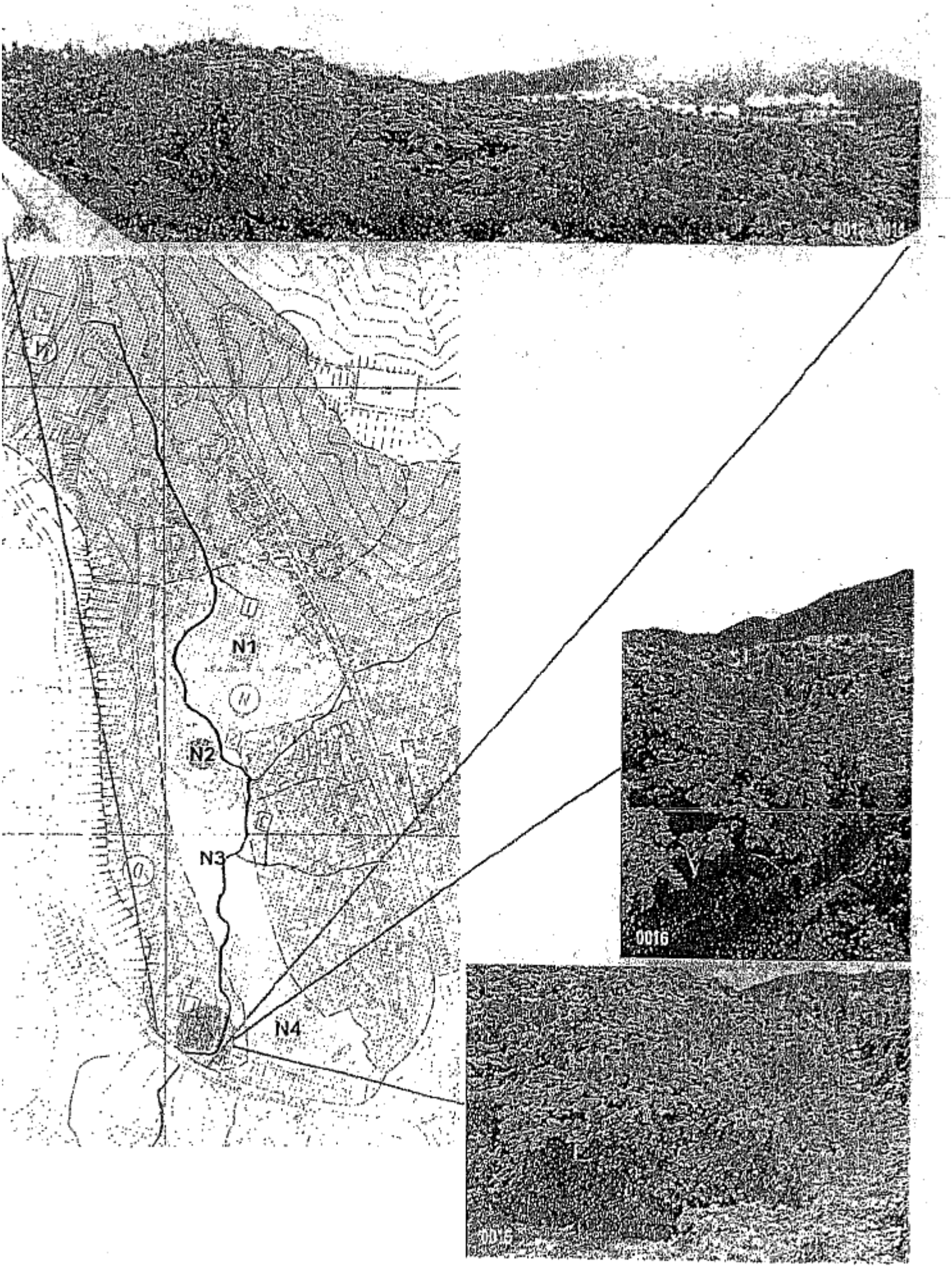


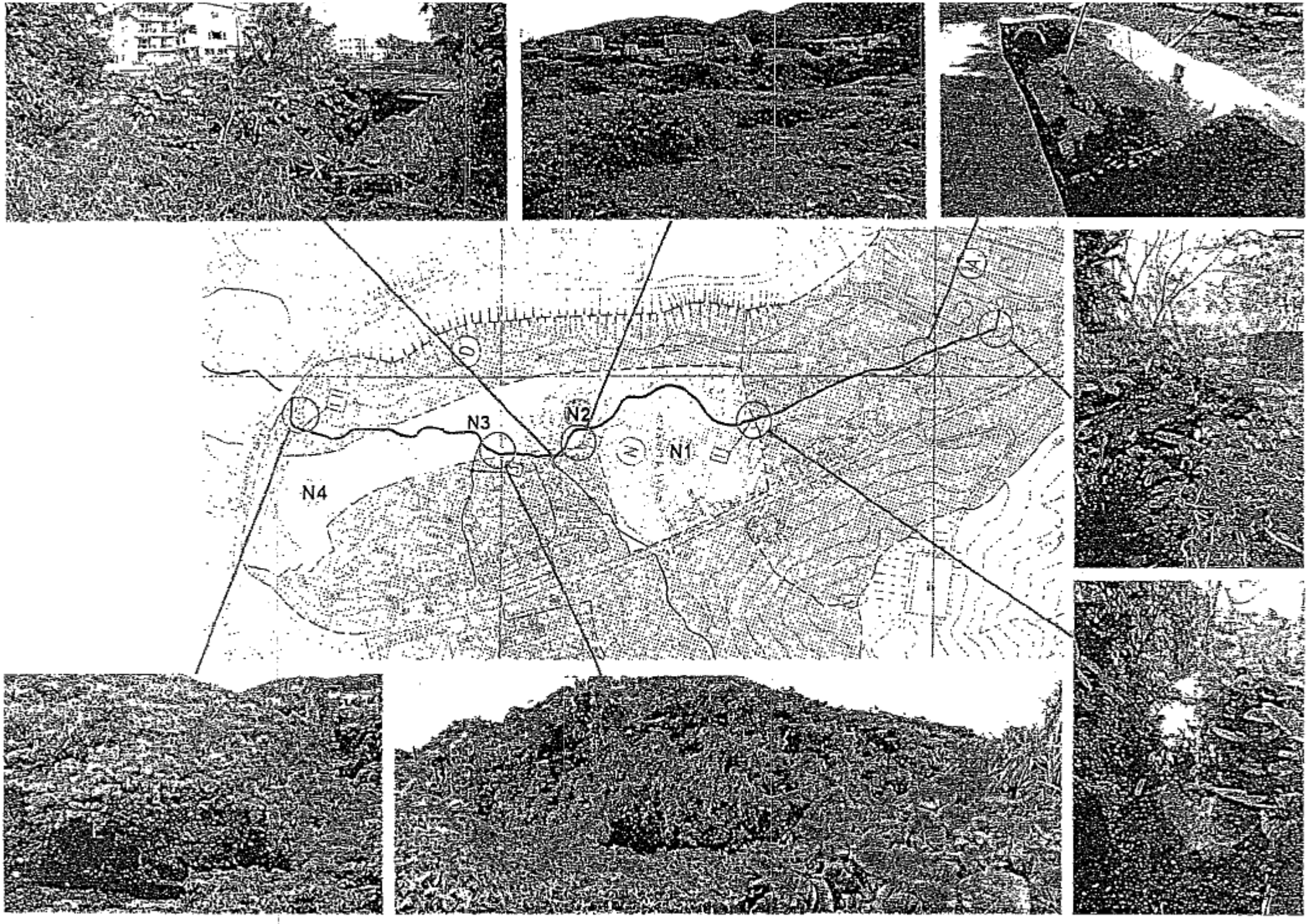


te Photo Set - IV. (Zone N3)



te Photo Set - V. (Zone N4)




N1
N2
N3
N4

Appendix E

Calculation Sheet of Emission Factors for Construction Dust Emission

Project : Proposed Residential Development at Tai Po Tsai Lot No. 898
Subject: Construction Dust Emission Assessment

DETAILED CALCULATIONS OF CONSTRUCTION DUST EMISSION FACTORS

Construction Activity :
(1) Material Handling
(2) Rock Breaking
(3) Excavation
(4) Vehicle movements on Unpaved Site Roads
(5) Wind Erosion

CALCULATION OF EMISSION FACTORS
- According to U.S. EPA, *Compilation of Air Pollutant Emission Factors*, AP-42

(1) Material Handling (Based on USEPA AP-42 Vol. 1 5th Edition, Section 13.2.4.3)

	particle size multiplier (k)	mean wind speed (U), m/s	material moisture content (M),%	Emission factor (E), kg/Mg
TSP	0.74	3.00	4.8	5.20E-04
RSP	0.35	3.00	4.8	2.46E-04

** Equation 1 : E = k (0.0016) x (U/2.2)^1.3 / (M/2)^1.4
Mean wind speed 2001 data at Sai Kung Station
Moisture for soil and rock (M) = 4.8% (the maximum valid levels)

Volume of soil to be handled daily, m^3: 150
Soil Density, kg/m^3: 2,000
Working hours per day : 10
Amount of material to be handled per hour (R), kg/hr
= Volume of soil X Density / number of operation hour : 30000

Emission Rate, g/s: Emission Factor X Amount of material to be handled per hour

	Unmitigated
TSP	**4.33E-03**
RSP	**2.05E-03**

(2) Rock Breaking (Based on USEPA AP-42 Vol. 1 5th Edition, Section 11.9-2, Equation(1))

	Volume of material (V)	Horizontal area (A)	Working hours per day (H)	Emission Factor (E), g/s
TSP	15	0.71	10	**3.69E-06**
RSP	Multiply TSP by 0.52 = RSP			**1.92E-06**

** Equation 2 : E = $0.00022 \times (A)^{1.5}$
= $0.00022 \times [(V/21)^{1.5} / V] \times V/H$

Assumption:

A (Horizontal area, m^2, with blasting depth <=21m. Not for vertical face of a bench = 0.71

V (Volume of material produced from rock breaking per day, m^3) = 15

(3) Excavation (Based on USEPA AP-42 Vol. 1 5th Edition, Section 13.2.4.3)

	particle size multiplier (k)	mean wind speed (U), m/s	material moisture content (M),%	Emission factor (E), kg/Mg
TSP	0.74	3.00	4.8	5.20E-04
RSP	0.35	3.00	4.8	2.46E-04

** Equation 1 : E = k (0.0016) x (U/2.2)^1.3 / (M/2)^1.4

Mean wind speed 2001 data at Sai Kung Station

Moisture for soil and rock (M) = 4.8% (the maximum valid levels)

Volume of soil to be excavated daily, m^3 : 400

Soil Density, kg/m^3 : 2,000

Working hours per day : 10

Amount of material to be handled per hour (R), kg/hr
= Volume of soil X Density / number of operation hour : 80000

Emission Rate, g/s: Emission Factor X Amount of material to be handled per hour

	Unmitigated
TSP	**1.16E-02**
RSP	**5.47E-03**

(4) Vehicule movements on unpaved site roads (Based on USEPA AP-42 Vol. 1 5th Edition, Section 13.2.2)

For concrete lorry mixer & dump truck (24ton)

	mean vehicle speed(S), mph	surface material silt content (s), %	mean vehicle weight (W), tons	material moisture content (M_{dry}),%	Emission factor (E), lb/VMT
TSP	5.0	4.3	24	2.4	1.535
RSP	5.0	4.3	24	2.4	0.416

Constants for Equation 1

	k (lb/VMT)	a	b	c
TSP	10	0.8	0.5	0.4
RSP	2.6	0.8	0.4	0.3

** Equation 1 : $E = \frac{k\,(s/12)^a \times (W/3)^b}{(M_{dry}/0.2)^c} \times (S/15)$

(In case of a mean vehicle speed (S) less than 15mph, Equation 1 is recommended to be multiplied by (S/15))

surface material silt content (s) of 4.3% (mean value from AP-42 Table 11.9-3 for haul truck)

surface material moisture content (M_{dry}) of 2.4% (mean value from AP-42 Table 11.9-3 for haul truck)

Conversion of Emission Factor from lb/VMT to g/VKT : 1 lb/VMT = 281.9 g/VKT

TSP	**4.33E+02**	g/VKT
RSP	**1.17E+02**	g/VKT

Assumption:

Truck Flow, veh/hr = 12

Average two-way travel distance within site, km = 0.8

Emission rate, g/s: Emission Factor X distance travelled per hour

	Unmitigated
TSP	**1.15E+00**
RSP	**3.12E-01**

(5) Wind Erosion (Based on USEPA AP-42 Vol. 1 5th Edition, Section 11.9-4)

	Emission rate, Mg/hectare/year	Emission rate, g/s/m^2
TSP	0.85	**2.695E-06**
RSP	*Assume half of TSP=RSP	**1.348E-06**

TOTAL EMISSION RATES

Total daytime dust emission = $\frac{[(1) + (2) + (3) + (4)]}{\text{Total Site Area}}$ + 5

Total Site Area, m2 = 20000

TSP emission	Unmitigated	Mitigated	Unit
(1) Material Handing	4.33E-03	2.17E-03	g/s
(2) Rock Breaking	3.69E-06	1.84E-06	g/s
(3) Excavation	1.16E-02	5.78E-03	g/s
(4) Unpaved Road	1.15E+00	1.73E-01	g/s
(5) Wind Erosion	2.70E-06	1.35E-06	g/s/m2
TSP emission	6.120E-05	1.04E-05	g/s/m2

RSP emission	Unmitigated	Mitigated	Unit
(1) Material Handing	2.05E-03	1.03E-03	g/s
(2) Rock Breaking	1.92E-06	9.59E-07	g/s
(3) Excavation	5.47E-03	2.73E-03	g/s
(4) Unpaved Road	3.12E-01	4.68E-02	g/s
(5) Wind Erosion	1.35E-06	6.74E-07	g/s/m2
RSP emission	1.735E-05	3.20E-06	g/s/m2

Note:
Reference to Compilation of Air Pollutant Emission Factors, USEPA (AP-42), 5th Edition
Mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation has been adopted

Appendix F

Sample Output Files of ISCST3 Model for Construction Dust Emission

ISCST3X PC (32 BIT) VERSION 4.0.1

Run Began on 9/01/2004 at 17:14:48

```
** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\tsp-gd.dat
** Trinity Consultants


CO STARTING
CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
CO TITLETWO  Construction Dust Impact Assessment
CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
CO AVERTIME  1  24
CO POLLUTID  TSP
CO TERRHGTS  ELEV
CO FLAGPOLE  1.5
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
SO SRCPARAM  SRC9  6.120000E-05  0    11    0
SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
SO SRCPARAM  SRC10  6.120000E-05  0    13    0
SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
SO AREAVERT  SRC10    844886.5  821861.5
SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE ELEVUNIT  METERS
RE DISCCART  844720.0  821999.4  134.2  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844652.0  822189.7  135.4  1.5
** RCPDESCR  Staff Housing (A-D)
RE DISCCART  844825.6  822323.3  124.7  1.5
** RCPDESCR  staff Housing Apartm
RE DISCCART  845111.0  822291.7  100  1.5
** RCPDESCR  Principal Houseing
RE DISCCART  845109.4  821944.0  132.4  1.5
** RCPDESCR  HKUST
RE DISCCART  845250.8  821585.7  143.4  1.5
** RCPDESCR  TVB
RE DISCCART  845096.9  821547.0  130.4  1.5
** RCPDESCR  Clear Water Bay PS
RE DISCCART  844881.7  821972.2  120.6  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844872.8  822089.5  123.4  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844818.3  822137.7  124  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE FINISHED

ME STARTING
ME INPUTFIL  N:\TPT\SKG01.MET
ME ANEMHGHT  31.2  METERS
ME SURFDATA  00000  201
ME UAIRDATA  11111  201
ME STARTEND  0201  01  01  1  0201  12  31  24
ME FINISHED

OU STARTING
OU RECTABLE  1  FIRST
OU RECTABLE  ALLAVE  FIRST
OU FINISHED

** PROJECTN  0 104 7 -177 0 0.9996 500000 0
** IMAGE2  N:\TPT\SCAN-56.TAB
** OUTFILE  N:\tpt\tsp-gd.lst
** RAWFILE  N:\tpt\tsp-gd.RAW
** RAWFMT  2
** HILLBOUN  0 0 0 0


**********
*** SETUP Finishes Successfully ***
**********
```

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 2 Short Term Average(s) of: 1-HR 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor =
0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\TSP-GD.DAT
**Output Print File: N:\TPT\TSP-GD.LST

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.61200E-04	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.61200E-04	844886.5	821865.7	123.0	0.00	13	0.00	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

ALL SRC9 , SRC10 ,

1 *** ISCST3 - VERSION 02035 *** *** Residential Development at Tai Po Tsai - Drainage Diversion ***
09/01/04
*** Construction Dust Impact Assessment ***
17:14:48
**MODELOPTs:
PAGE 4
CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

```
( 844720.0,  821999.4,    134.2,      1.5);        ( 844652.0,  822189.7,    135.4,      1.5);

( 844825.6,  822323.3,    124.7,      1.5);        ( 845111.0,  822291.7,    100.0,      1.5);
( 845109.4,  821944.0,    132.4,      1.5);        ( 845250.8,  821585.7,    143.4,      1.5);
( 845096.9,  821547.0,    130.4,      1.5);        ( 844881.7,  821972.2,    120.6,      1.5);
( 844872.8,  822089.5,    123.4,      1.5);        ( 844818.3,  822137.7,    124.0,      1.5);
```

1 *** ISCST3 - VERSION 02035 *** *** Residential Development at Tai Po Tsai - Drainage Diversion ***
09/01/04
*** Construction Dust Impact Assessment ***
17:14:48
**MODELOPTs:
PAGE 5
CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 201 1 1 1
AND END DATE: 201 12 31 24

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 201 YEAR: 201

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	838.19763	(01010218)	844652.00	822189.69	562.88507	(01010218)
844825.62	822323.31	917.33801	(01010718)	845111.00	822291.69	588.50427	(01011821)
845109.38	821944.00	863.10541	(01011821)	845250.81	821585.69	651.95679	(01010102)

```
       845096.88    821547.00      891.35883  (01010105)              844881.69    821972.19     2294.02026
(01011020)
       844872.81    822089.50     1935.33984  (01012004)              844818.31    822137.69     1007.10297
(01010319)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion        ***
09/01/04
                                    ***  Construction Dust Impact Assessment                               ***
17:14:48
 **MODELOPTs:
PAGE   8
 CONC                   RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                              *** THE   1ST HIGHEST 24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL
***
                                 INCLUDING SOURCE(S):      SRC9    , SRC10   ,

                                         *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                       ** CONC OF TSP      IN MICROGRAMS/M**3                            **

      X-COORD (M)  Y-COORD (M)        CONC      (YYMMDDHH)             X-COORD (M)  Y-COORD (M)        CONC
(YYMMDDHH)
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -
       844720.00    821999.38      180.60609m (01042124)              844652.00    822189.69      111.74699m
(01042124)
       844825.62    822323.31      210.45322b (01022324)              845111.00    822291.69      163.34447m
(01073124)
       845109.38    821944.00      195.83292b (01071124)              845250.81    821585.69      159.09854m
(01010124)
       845096.88    821547.00      234.46362b (01123024)              844881.69    821972.19      739.68561b
(01090924)
       844872.81    822089.50      667.33350b (01051424)              844818.31    822137.69      307.54846m
(01042124)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion        ***
09/01/04
                                    ***  Construction Dust Impact Assessment                               ***
17:14:48
 **MODELOPTs:
PAGE   9
 CONC                   RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                                         *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***

                                       ** CONC OF TSP      IN MICROGRAMS/M**3                            **

                                                DATE
NETWORK
 GROUP ID                       AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF
TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS    2294.02026  ON 01011020: AT (  844881.69,   821972.19,    120.60,      1.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
                       BD = BOUNDARY
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion        ***
09/01/04
                                    ***  Construction Dust Impact Assessment                               ***
17:14:48
 **MODELOPTs:
PAGE  10
 CONC                   RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                                         *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                       ** CONC OF TSP      IN MICROGRAMS/M**3                            **

                                                DATE
NETWORK
 GROUP ID                       AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF
TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS     739.68561b ON 01090924: AT (  844881.69,   821972.19,    120.60,      1.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
```

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

```
            ISCST3X  PC (32 BIT) VERSION  4.0.1
           (C) COPYRIGHT 1991-2002, Trinity Consultants

 Run Began on  9/01/2004 at 17:20:05

 ** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\tsp-2f.dat
 ** Trinity Consultants


 CO STARTING
 CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
 CO TITLETWO  Construction Dust Impact Assessment
 CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
 CO AVERTIME  1  24
 CO POLLUTID  TSP
 CO TERRHGTS  ELEV
 CO FLAGPOLE  7.5
 CO RUNORNOT  RUN
 CO FINISHED

 SO STARTING
 SO ELEVUNIT  METERS
 SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
 SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
 SO SRCPARAM  SRC9  6.120000E-05  0    11    0
 SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
 SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
 SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
 SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
 SO SRCPARAM  SRC10  6.120000E-05  0    13    0
 SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
 SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
 SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
 SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
 SO AREAVERT  SRC10    844886.5  821861.5
 SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
 SO SRCGROUP  ALL
 SO FINISHED

 RE STARTING
 RE ELEVUNIT  METERS
 RE DISCCART  844720.0  821999.4  134.2  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE DISCCART  844652.0  822189.7  135.4  7.5
 ** RCPDESCR  Staff Housing (A-D)
 RE DISCCART  844825.6  822323.3  124.7  7.5
 ** RCPDESCR  staff Housing Apartm
 RE DISCCART  845111.0  822291.7  100  7.5
 ** RCPDESCR  Principal Houseing
 RE DISCCART  845109.4  821944.0  132.4  7.5
 ** RCPDESCR  HKUST
 RE DISCCART  845250.8  821585.7  143.4  7.5
 ** RCPDESCR  TVB
 RE DISCCART  845096.9  821547.0  130.4  7.5
 ** RCPDESCR  Clear Water Bay PS
 RE DISCCART  844881.7  821972.2  120.6  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE DISCCART  844872.8  822089.5  123.4  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE DISCCART  844818.3  822137.7  124  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE FINISHED

 ME STARTING
 ME INPUTFIL  N:\TPT\SKG01.MET
 ME ANEMHGHT  31.2  METERS
 ME SURFDATA  00000  2001
 ME UAIRDATA  11111  2001
 ME STARTEND  2001  01  01  1  2001  12  31  24
 ME FINISHED

 OU STARTING
 OU RECTABLE  1  FIRST
 OU RECTABLE  ALLAVE  FIRST
 OU FINISHED

 ** PROJECTN  0 104 7 -177 0 0.9996 500000 0
 ** IMAGE2  N:\TPT\SCAN-56.TAB
 ** OUTFILE  N:\tpt\tsp-2f.lst
 ** RAWFILE  N:\tpt\tsp-2f.RAW
 ** RAWFMT  2
 ** HILLBOUN  0 0 0 0


 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************
```

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 2 Short Term Average(s) of: 1-HR 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\TSP-2F.DAT
**Output Print File: N:\TPT\TSP-2F.LST

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.61200E-04	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.61200E-04	844886.5	821865.7	123.0	0.00	13	0.00	

```
                                   *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                        SOURCE IDs


 ALL       SRC9    , SRC10   ,
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion          ***
09/01/04
                                    ***  Construction Dust Impact Assessment                                  ***
17:20:05
 **MODELOPTs:
PAGE   4
 CONC                     RURAL ELEV  FLGPOL        GRDRIS                    MSGPRO


                                        *** DISCRETE CARTESIAN RECEPTORS ***
                                         (X-COORD, Y-COORD, ZELEV, ZFLAG)
                                                    (METERS)

    ( 844720.0,  821999.4,     134.2,       7.5);          ( 844652.0,  822189.7,     135.4,       7.5);

    ( 844825.6,  822323.3,     124.7,       7.5);          ( 845111.0,  822291.7,     100.0,       7.5);
    ( 845109.4,  821944.0,     132.4,       7.5);          ( 845250.8,  821585.7,     143.4,       7.5);
    ( 845096.9,  821547.0,     130.4,       7.5);          ( 844881.7,  821972.2,     120.6,       7.5);
    ( 844872.8,  822089.5,     123.4,       7.5);          ( 844818.3,  822137.7,     124.0,       7.5);
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion          ***
09/01/04
                                    ***  Construction Dust Impact Assessment                                  ***
17:20:05
 **MODELOPTs:
PAGE   5
 CONC                     RURAL ELEV  FLGPOL        GRDRIS                    MSGPRO


                                       *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                     (1=YES; 0=NO)

           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

                     METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2001   1  1  1
                                                     AND END DATE: 2001  12 31 24

              NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA
FILE.


                              *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                   (METERS/SEC)

                                        1.54,   3.09,   5.14,   8.23,  10.80,


                                           *** WIND PROFILE EXPONENTS ***


              STABILITY                          WIND SPEED CATEGORY
              CATEGORY          1            2            3            4            5            6
                 A         .70000E-01   .70000E-01   .70000E-01   .70000E-01   .70000E-01   .70000E-
01
                 B         .70000E-01   .70000E-01   .70000E-01   .70000E-01   .70000E-01   .70000E-
01
                 C         .10000E+00   .10000E+00   .10000E+00   .10000E+00   .10000E+00   .10000E+
00
                 D         .15000E+00   .15000E+00   .15000E+00   .15000E+00   .15000E+00   .15000E+
00
                 E         .35000E+00   .35000E+00   .35000E+00   .35000E+00   .35000E+00   .35000E+
00
                 F         .55000E+00   .55000E+00   .55000E+00   .55000E+00   .55000E+00   .55000E+
00


                                   *** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
                                              (DEGREES KELVIN PER METER)
```

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 2001 YEAR: 2001

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	336.57245	(01010218)	844652.00	822189.69	370.84628	(01010218)
844825.62	822323.31	561.71899	(01010718)	845111.00	822291.69	288.58893	(01010219)
845109.38	821944.00	304.89517	(01012209)	845250.81	821585.69	344.23050	(01010102)

```
       845096.88    821547.00      326.29599  (01010105)              844881.69    821972.19      447.69760
(01022209)
       844872.81    822089.50      499.39001  (01012521)              844818.31    822137.69      413.78366
(01010718)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/01/04
                                    ***  Construction Dust Impact Assessment                                 ***
17:20:05
 **MODELOPTs:
PAGE   8
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                              *** THE   1ST HIGHEST 24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL
***
                                 INCLUDING SOURCE(S):      SRC9    , SRC10   ,

                                          *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                        ** CONC OF TSP     IN MICROGRAMS/M**3                              **

     X-COORD (M)  Y-COORD (M)        CONC      (YYMMDDHH)             X-COORD (M)  Y-COORD (M)        CONC
(YYMMDDHH)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - -
       844720.00    821999.38       63.53206m (01040624)              844652.00    822189.69       60.69928m
(01042124)
       844825.62    822323.31       92.97945m (01031924)              845111.00    822291.69       90.22589m
(01073124)
       845109.38    821944.00       90.34846b (01071124)              845250.81    821585.69       89.81737m
(01010124)
       845096.88    821547.00       98.20104b (01102724)              844881.69    821972.19      125.84458m
(01042824)
       844872.81    822089.50      129.95833  (01083124)              844818.31    822137.69       86.19570m
(01031924)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/01/04
                                    ***  Construction Dust Impact Assessment                                 ***
17:20:05
 **MODELOPTs:
PAGE   9
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                                          *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                        ** CONC OF TSP      IN MICROGRAMS/M**3                              **

                                                 DATE
NETWORK
 GROUP ID                        AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF
TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS     561.71899  ON 01010718: AT (  844825.62,   822323.31,    124.70,      7.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
                       BD = BOUNDARY
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/01/04
                                    ***  Construction Dust Impact Assessment                                 ***
17:20:05
 **MODELOPTs:
PAGE  10
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                                          *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***


                                        ** CONC OF TSP      IN MICROGRAMS/M**3                              **

                                                 DATE
NETWORK
 GROUP ID                        AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF
TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS     129.95833  ON 01083124: AT (  844872.81,   822089.50,    123.40,      7.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
```

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

---------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

ISCST3X PC (32 BIT) VERSION 4.0.1

Run Began on 9/01/2004 at 17:22:40

** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\Rsp-gd.dat
** Trinity Consultants

```
CO STARTING
CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
CO TITLETWO  Construction Dust Impact Assessment
CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
CO AVERTIME  24
CO POLLUTID  TSP
CO TERRHGTS  ELEV
CO FLAGPOLE  1.5
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
SO SRCPARAM  SRC9  1.730000E-05  0    11    0
SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
SO SRCPARAM  SRC10  1.730000E-05  0    13    0
SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
SO AREAVERT  SRC10    844886.5  821861.5
SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE ELEVUNIT  METERS
RE DISCCART  844720.0  821999.4  134.2  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844652.0  822189.7  135.4  1.5
** RCPDESCR  Staff Housing (A-D)
RE DISCCART  844825.6  822323.3  124.7  1.5
** RCPDESCR  staff Housing Apartm
RE DISCCART  845111.0  822291.7  100  1.5
** RCPDESCR  Principal Houseing
RE DISCCART  845109.4  821944.0  132.4  1.5
** RCPDESCR  HKUST
RE DISCCART  845250.8  821585.7  143.4  1.5
** RCPDESCR  TVB
RE DISCCART  845096.9  821547.0  130.4  1.5
** RCPDESCR  Clear Water Bay PS
RE DISCCART  844881.7  821972.2  120.6  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844872.8  822089.5  123.4  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844818.3  822137.7  124  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE FINISHED

ME STARTING
ME INPUTFIL  N:\TPT\SKG01.MET
ME ANEMHGHT  31.2  METERS
ME SURFDATA  00000  2001
ME UAIRDATA  11111  2001
ME STARTEND  2001  01  01  1  2001  12  31  24
ME FINISHED

OU STARTING
OU RECTABLE  24  FIRST
OU FINISHED

** PROJECTN  0 104 7 -177 0 0.9996 500000 0
** IMAGE2  N:\TPT\SCAN-56.TAB
** OUTFILE  N:\tpt\Rsp-gd.lst
** RAWFILE  N:\tpt\Rsp-gd.RAW
** RAWFMT  2
** HILLBOUN  0 0 0 0


**********
*** SETUP Finishes Successfully ***
**********
```

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\RSP-GD.DAT
**Output Print File: N:\TPT\RSP-GD.LST

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.17300E-04	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.17300E-04	844886.5	821865.7	123.0	0.00	13	0.00	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID   SOURCE IDs

ALL   SRC9   , SRC10   ,

1 *** ISCST3 - VERSION 02035 ***   *** Residential Development at Tai Po Tsai - Drainage Diversion   ***
09/01/04
*** Construction Dust Impact Assessment   ***
17:22:41
**MODELOPTs:
PAGE   4
CONC   RURAL ELEV FLGPOL   GRDRIS   MSGPRO

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(844720.0,	821999.4,	134.2,	1.5);	(844652.0,	822189.7,	135.4,	1.5);
(844825.6,	822323.3,	124.7,	1.5);	(845111.0,	822291.7,	100.0,	1.5);
(845109.4,	821944.0,	132.4,	1.5);	(845250.8,	821585.7,	143.4,	1.5);
(845096.9,	821547.0,	130.4,	1.5);	(844881.7,	821972.2,	120.6,	1.5);
(844872.8,	822089.5,	123.4,	1.5);	(844818.3,	822137.7,	124.0,	1.5);

1 *** ISCST3 - VERSION 02035 ***   *** Residential Development at Tai Po Tsai - Drainage Diversion   ***
09/01/04
*** Construction Dust Impact Assessment   ***
17:22:41
**MODELOPTs:
PAGE   5
CONC   RURAL ELEV FLGPOL   GRDRIS   MSGPRO

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2001   1 1 1
AND END DATE: 2001   12 31 24

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA
FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23,   10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY   WIND SPEED CATEGORY

CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 2001 YEAR: 2001

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	51.05368m	(01042124)	844652.00	822189.69	31.58861m	(01042124)
844825.62	822323.31	59.49086b	(01022324)	845111.00	822291.69	46.17418m	(01073124)
845109.38	821944.00	55.35800b	(01071124)	845250.81	821585.69	44.97393m	(01010124)
845096.88	821547.00	66.27812b	(01123024)	844881.69	821972.19	209.09412b	

(01090924)
844872.81 822089.50 188.64166b (01051424) 844818.31 822137.69 86.93771m
(01042124)

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

NETWORK GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	209.09412b ON 01090924:	AT (844881.69, 821972.19, 120.60, 1.50)	DC NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

ISCST3X PC (32 BIT) VERSION 4.0.1

Run Began on 9/01/2004 at 17:25:20

```
** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\Rsp-2f.dat
** Trinity Consultants


CO STARTING
CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
CO TITLETWO  Construction Dust Impact Assessment
CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
CO AVERTIME  24
CO POLLUTID  TSP
CO TERRHGTS  ELEV
CO FLAGPOLE  7.5
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
SO SRCPARAM  SRC9  1.730000E-05  0    11    0
SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
SO SRCPARAM  SRC10  1.730000E-05  0    13    0
SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
SO AREAVERT  SRC10    844886.5  821861.5
SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE ELEVUNIT  METERS
RE DISCCART  844720.0  821999.4  134.2  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844652.0  822189.7  135.4  7.5
** RCPDESCR  Staff Housing (A-D)
RE DISCCART  844825.6  822323.3  124.7  7.5
** RCPDESCR  staff Housing Apartm
RE DISCCART  845111.0  822291.7  100  7.5
** RCPDESCR  Principal Houseing
RE DISCCART  845109.4  821944.0  132.4  7.5
** RCPDESCR  HKUST
RE DISCCART  845250.8  821585.7  143.4  7.5
** RCPDESCR  TVB
RE DISCCART  845096.9  821547.0  130.4  7.5
** RCPDESCR  Clear Water Bay PS
RE DISCCART  844881.7  821972.2  120.6  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844872.8  822089.5  123.4  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844818.3  822137.7  124  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE FINISHED

ME STARTING
ME INPUTFIL  N:\TPT\SKG01.MET
ME ANEMHGHT  31.2  METERS
ME SURFDATA  00000  2001
ME UAIRDATA  11111  2001
ME STARTEND  2001  01  01  1  2001  12  31  24
ME FINISHED

OU STARTING
OU RECTABLE  24  FIRST
OU FINISHED

** PROJECTN  0 104 7 -177 0 0.9996 500000 0
** IMAGE2  N:\TPT\SCAN-56.TAB
** OUTFILE  N:\tpt\Rsp-2f.lst
** RAWFILE  N:\tpt\Rsp-2f.RAW
** RAWFMT  2
** HILLBOUN  0 0 0 0


**********************************
*** SETUP Finishes Successfully ***
**********************************
```

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\RSP-2F.DAT
**Output Print File: N:\TPT\RSP-2F.LST

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.17300E-04	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.17300E-04	844886.5	821865.7	123.0	0.00	13	0.00	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

```
 GROUP ID                                                   SOURCE IDs


  ALL       SRC9     , SRC10    ,
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion          ***
09/01/04
                                    ***  Construction Dust Impact Assessment                                  ***
17:25:20
 **MODELOPTs:
PAGE   4
 CONC                     RURAL ELEV  FLGPOL       GRDRIS                     MSGPRO


                                               *** DISCRETE CARTESIAN RECEPTORS ***
                                                (X-COORD, Y-COORD, ZELEV, ZFLAG)
                                                           (METERS)

     ( 844720.0,  821999.4,     134.2,       7.5);          ( 844652.0,  822189.7,     135.4,       7.5);

     ( 844825.6,  822323.3,     124.7,       7.5);          ( 845111.0,  822291.7,     100.0,       7.5);
     ( 845109.4,  821944.0,     132.4,       7.5);          ( 845250.8,  821585.7,     143.4,       7.5);
     ( 845096.9,  821547.0,     130.4,       7.5);          ( 844881.7,  821972.2,     120.6,       7.5);
     ( 844872.8,  822089.5,     123.4,       7.5);          ( 844818.3,  822137.7,     124.0,       7.5);
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion          ***
09/01/04
                                    ***  Construction Dust Impact Assessment                                  ***
17:25:20
 **MODELOPTs:
PAGE   5
 CONC                     RURAL ELEV  FLGPOL       GRDRIS                     MSGPRO


                                              *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                              (1=YES; 0=NO)

            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

                          METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2001   1  1  1
                                                            AND END DATE: 2001  12 31 24

                   NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA
FILE.


                                       *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                             (METERS/SEC)

                                                    1.54,   3.09,   5.14,   8.23,  10.80,


                                                      *** WIND PROFILE EXPONENTS ***


                   STABILITY                            WIND SPEED CATEGORY
                   CATEGORY        1              2              3              4              5              6
                      A        .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-
01
                      B        .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-
01
                      C        .10000E+00     .10000E+00     .10000E+00     .10000E+00     .10000E+00     .10000E+
00
                      D        .15000E+00     .15000E+00     .15000E+00     .15000E+00     .15000E+00     .15000E+
00
                      E        .35000E+00     .35000E+00     .35000E+00     .35000E+00     .35000E+00     .35000E+
00
                      F        .55000E+00     .55000E+00     .55000E+00     .55000E+00     .55000E+00     .55000E+
00


                                             *** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
                                                       (DEGREES KELVIN PER METER)


                   STABILITY                            WIND SPEED CATEGORY
```

CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 2001 YEAR: 2001

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	17.95923m	(01040624)	844652.00	822189.69	17.15846m	(01042124)
844825.62	822323.31	26.28341m	(01031924)	845111.00	822291.69	25.50503m	(01073124)
845109.38	821944.00	25.53968b	(01071124)	845250.81	821585.69	25.38955m	(01010124)
845096.88	821547.00	27.75945b	(01102724)	844881.69	821972.19	35.57371m	

(01042824)
844872.81 822089.50 36.73659 (01083124) 844818.31 822137.69 24.36578m
(01031924)

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

NETWORK GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	36.73659	ON 01083124: AT (844872.81, 822089.50, 123.40, 7.50)	DC NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

ISCST3X PC (32 BIT) VERSION 4.0.1

Run Began on 9/02/2004 at 15:12:42

```
** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\tsp-gd mitigated.dat
** Trinity Consultants


CO STARTING
CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
CO TITLETWO  Construction Dust Impact Assessment
CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
CO AVERTIME  1  24
CO POLLUTID  TSP
CO TERRHGTS  ELEV
CO FLAGPOLE  1.5
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
SO SRCPARAM  SRC9  1.040000E-05  0    11    0
SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
SO SRCPARAM  SRC10  1.040000E-05  0    13    0
SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
SO AREAVERT  SRC10    844886.5  821861.5
SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE ELEVUNIT  METERS
RE DISCCART  844720.0  821999.4  134.2  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844652.0  822189.7  135.4  1.5
** RCPDESCR  Staff Housing (A-D)
RE DISCCART  844825.6  822323.3  124.7  1.5
** RCPDESCR  staff Housing Apartm
RE DISCCART  845111.0  822291.7  100  1.5
** RCPDESCR  Principal Houseing
RE DISCCART  845109.4  821944.0  132.4  1.5
** RCPDESCR  HKUST
RE DISCCART  845250.8  821585.7  143.4  1.5
** RCPDESCR  TVB
RE DISCCART  845096.9  821547.0  130.4  1.5
** RCPDESCR  Clear Water Bay PS
RE DISCCART  844881.7  821972.2  120.6  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844872.8  822089.5  123.4  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844818.3  822137.7  124  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE FINISHED

ME STARTING
ME INPUTFIL  N:\TPT\SKG01.MET
ME ANEMHGHT  31.2  METERS
ME SURFDATA  00000  2001
ME UAIRDATA  11111  2001
ME STARTEND  2001  01  01  1  2001  12  31  24
ME FINISHED

OU STARTING
OU RECTABLE  1  FIRST
OU RECTABLE  ALLAVE  FIRST
OU FINISHED

** PROJECTN  0 104 7 -177 0 0.9996 500000 0
** IMAGE2  N:\TPT\SCAN-56.TAB
** OUTFILE  "N:\tpt\tsp-gd mitigated.lst"
** RAWFILE  "N:\tpt\tsp-gd mitigated.RAW"
** RAWFMT  2
** HILLBOUN  0 0 0 0


**********************************
*** SETUP Finishes Successfully ***
**********************************
```

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 2 Short Term Average(s) of: 1-HR 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor =
0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\TSP-GD MITIGATED.DAT
**Output Print File: N:\TPT\TSP-GD MITIGATED.LST

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.10400E-04	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.10400E-04	844886.5	821865.7	123.0	0.00	13	0.00	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID   SOURCE IDs

ALL   SRC9   , SRC10   ,

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

```
( 844720.0,  821999.4,    134.2,     1.5);     ( 844652.0,  822189.7,    135.4,     1.5);

( 844825.6,  822323.3,    124.7,     1.5);     ( 845111.0,  822291.7,    100.0,     1.5);
( 845109.4,  821944.0,    132.4,     1.5);     ( 845250.8,  821585.7,    143.4,     1.5);
( 845096.9,  821547.0,    130.4,     1.5);     ( 844881.7,  821972.2,    120.6,     1.5);
( 844872.8,  822089.5,    123.4,     1.5);     ( 844818.3,  822137.7,    124.0,     1.5);
```


*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2001 1 1 1
AND END DATE: 2001 12 31 24

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 2001 YEAR: 2001

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	142.43881	(01010218)	844652.00	822189.69	95.65367	(01010218)
844825.62	822323.31	155.88750	(01010718)	845111.00	822291.69	100.00726	(01011821)
845109.38	821944.00	146.67151	(01011821)	845250.81	821585.69	110.79004	(01010102)

```
       845096.88    821547.00      151.47275  (01010105)              844881.69    821972.19      389.83350
(01011020)
       844872.81    822089.50      328.88129  (01012004)              844818.31    822137.69      171.14168
(01010319)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/02/04
                                    ***  Construction Dust Impact Assessment                                 ***
15:12:42
 **MODELOPTs:
PAGE   8
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                              *** THE   1ST HIGHEST 24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL
***
                                 INCLUDING SOURCE(S):      SRC9    , SRC10   ,

                                          *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                       ** CONC OF TSP      IN MICROGRAMS/M**3                              **

     X-COORD (M)  Y-COORD (M)        CONC      (YYMMDDHH)             X-COORD (M)  Y-COORD (M)        CONC
(YYMMDDHH)
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -
       844720.00    821999.38       30.69123m (01042124)              844652.00    822189.69       18.98969m
(01042124)
       844825.62    822323.31       35.76329b (01022324)              845111.00    822291.69       27.75788m
(01073124)
       845109.38    821944.00       33.27879b (01071124)              845250.81    821585.69       27.03635m
(01010124)
       845096.88    821547.00       39.84349b (01123024)              844881.69    821972.19      125.69820b
(01090924)
       844872.81    822089.50      113.40308b (01051424)              844818.31    822137.69       52.26315m
(01042124)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/02/04
                                    ***  Construction Dust Impact Assessment                                 ***
15:12:42
 **MODELOPTs:
PAGE   9
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                                          *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                       ** CONC OF TSP      IN MICROGRAMS/M**3                              **

                                                DATE
NETWORK
 GROUP ID                        AVERAGE CONC      (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZFLAG)      OF
TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS     389.83350  ON 01011020: AT (  844881.69,   821972.19,    120.60,      1.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
                       BD = BOUNDARY
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/02/04
                                    ***  Construction Dust Impact Assessment                                 ***
15:12:42
 **MODELOPTs:
PAGE  10
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                      MSGPRO

                                          *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***


                                       ** CONC OF TSP      IN MICROGRAMS/M**3                              **

                                                DATE
NETWORK
 GROUP ID                        AVERAGE CONC      (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZFLAG)      OF
TYPE  GRID-ID
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS     125.69820b ON 01090924: AT (  844881.69,   821972.19,    120.60,      1.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
```

**MODELOPTs:

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

```
                    ISCST3 - (DATED 02035)

             ISCST3X  PC (32 BIT) VERSION  4.0.1
            (C) COPYRIGHT 1991-2002, Trinity Consultants

 Run Began on  9/02/2004 at 14:41:03

 ** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\tsp-2f mitigated.dat
 ** Trinity Consultants


 CO STARTING
 CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
 CO TITLETWO  Construction Dust Impact Assessment
 CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
 CO AVERTIME  1  24
 CO POLLUTID  TSP
 CO TERRHGTS  ELEV
 CO FLAGPOLE  7.5
 CO RUNORNOT  RUN
 CO FINISHED

 SO STARTING
 SO ELEVUNIT  METERS
 SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
 SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
 SO SRCPARAM  SRC9  1.040000E-05  0    11    0
 SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
 SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
 SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
 SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
 SO SRCPARAM  SRC10  1.040000E-05  0    13    0
 SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
 SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
 SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
 SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
 SO AREAVERT  SRC10    844886.5  821861.5
 SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
 SO SRCGROUP  ALL
 SO FINISHED

 RE STARTING
 RE ELEVUNIT  METERS
 RE DISCCART  844720.0  821999.4  134.2  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE DISCCART  844652.0  822189.7  135.4  7.5
 ** RCPDESCR  Staff Housing (A-D)
 RE DISCCART  844825.6  822323.3  124.7  7.5
 ** RCPDESCR  staff Housing Apartm
 RE DISCCART  845111.0  822291.7  100  7.5
 ** RCPDESCR  Principal Houseing
 RE DISCCART  845109.4  821944.0  132.4  7.5
 ** RCPDESCR  HKUST
 RE DISCCART  845250.8  821585.7  143.4  7.5
 ** RCPDESCR  TVB
 RE DISCCART  845096.9  821547.0  130.4  7.5
 ** RCPDESCR  Clear Water Bay PS
 RE DISCCART  844881.7  821972.2  120.6  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE DISCCART  844872.8  822089.5  123.4  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE DISCCART  844818.3  822137.7  124  7.5
 ** RCPDESCR  Tai Po Tsai Tsuen
 RE FINISHED

 ME STARTING
 ME INPUTFIL  N:\TPT\SKG01.MET
 ME ANEMHGHT  31.2  METERS
 ME SURFDATA  00000  2001
 ME UAIRDATA  11111  2001
 ME STARTEND  2001  01  01  1  2001  12  31  24
 ME FINISHED

 OU STARTING
 OU RECTABLE  1  FIRST
 OU RECTABLE  ALLAVE  FIRST
 OU FINISHED

 ** PROJECTN  0 104 7 -177 0 0.9996 500000 0
 ** IMAGE2  N:\TPT\SCAN-56.TAB
 ** OUTFILE  "N:\tpt\tsp-2f mitigated.lst"
 ** RAWFILE  "N:\tpt\tsp-2f mitigated.RAW"
 ** RAWFMT  2
 ** HILLBOUN  0 0 0 0


 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************
```

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 2 Short Term Average(s) of: 1-HR 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\TSP-2F MITIGATED.DAT
**Output Print File: N:\TPT\TSP-2F MITIGATED.LST

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.10400E-04	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.10400E-04	844886.5	821865.7	123.0	0.00	13	0.00	

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID   SOURCE IDs

ALL   SRC9   , SRC10   ,

1 *** ISCST3 - VERSION 02035 ***   *** Residential Development at Tai Po Tsai - Drainage Diversion   ***
09/02/04
*** Construction Dust Impact Assessment   ***
14:41:03
**MODELOPTs:
PAGE 4
CONC   RURAL ELEV FLGPOL   GRDRIS   MSGPRO

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

```
( 844720.0,  821999.4,    134.2,      7.5);        ( 844652.0,  822189.7,    135.4,      7.5);

( 844825.6,  822323.3,    124.7,      7.5);        ( 845111.0,  822291.7,    100.0,      7.5);
( 845109.4,  821944.0,    132.4,      7.5);        ( 845250.8,  821585.7,    143.4,      7.5);
( 845096.9,  821547.0,    130.4,      7.5);        ( 844881.7,  821972.2,    120.6,      7.5);
( 844872.8,  822089.5,    123.4,      7.5);        ( 844818.3,  822137.7,    124.0,      7.5);
```

1 *** ISCST3 - VERSION 02035 ***   *** Residential Development at Tai Po Tsai - Drainage Diversion   ***
09/02/04
*** Construction Dust Impact Assessment   ***
14:41:03
**MODELOPTs:
PAGE 5
CONC   RURAL ELEV FLGPOL   GRDRIS   MSGPRO

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2001   1 1 1
AND END DATE: 2001 12 31 24

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 2001 YEAR: 2001

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	57.19532	(01010218)	844652.00	822189.69	63.01963	(01010218)
844825.62	822323.31	95.45552	(01010718)	845111.00	822291.69	49.04126	(01010219)
845109.38	821944.00	51.81225	(01012209)	845250.81	821585.69	58.49669	(01010102)

```
       845096.88    821547.00       55.44899  (01010105)               844881.69    821972.19       76.07934
(01022209)
       844872.81    822089.50       84.86366  (01012521)               844818.31    822137.69       70.31618
(01010718)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/02/04
                                    ***  Construction Dust Impact Assessment                                 ***
14:41:03
 **MODELOPTs:
PAGE   8
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                        MSGPRO

                              *** THE   1ST HIGHEST 24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL
***
                                  INCLUDING SOURCE(S):      SRC9    , SRC10   ,

                                           *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                        ** CONC OF TSP      IN MICROGRAMS/M**3                              **

     X-COORD (M)  Y-COORD (M)        CONC      (YYMMDDHH)              X-COORD (M)  Y-COORD (M)        CONC
(YYMMDDHH)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -
       844720.00    821999.38       10.79630m (01040624)               844652.00    822189.69       10.31491m
(01042124)
       844825.62    822323.31       15.80043m (01031924)               845111.00    822291.69       15.33250m
(01073124)
       845109.38    821944.00       15.35333b (01071124)               845250.81    821585.69       15.26308m
(01010124)
       845096.88    821547.00       16.68776b (01102724)               844881.69    821972.19       21.38535m
(01042824)
       844872.81    822089.50       22.08442  (01083124)               844818.31    822137.69       14.64764m
(01031924)
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/02/04
                                    ***  Construction Dust Impact Assessment                                 ***
14:41:03
 **MODELOPTs:
PAGE   9
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                        MSGPRO

                                        *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                     ** CONC OF TSP      IN MICROGRAMS/M**3                              **

                                                 DATE
NETWORK
 GROUP ID                       AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF
TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS      95.45552  ON 01010718: AT (  844825.62,   822323.31,    124.70,      7.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
                       BD = BOUNDARY
1 *** ISCST3 - VERSION 02035 ***    ***  Residential Development at Tai Po Tsai - Drainage Diversion         ***
09/02/04
                                    ***  Construction Dust Impact Assessment                                 ***
14:41:03
 **MODELOPTs:
PAGE  10
 CONC                    RURAL ELEV  FLGPOL        GRDRIS                        MSGPRO

                                        *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***


                                     ** CONC OF TSP      IN MICROGRAMS/M**3                              **

                                                 DATE
NETWORK
 GROUP ID                       AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF
TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - -

 ALL      HIGH  1ST HIGH VALUE IS      22.08442  ON 01083124: AT (  844872.81,   822089.50,    123.40,      7.50)
DC      NA


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
```

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

ISCST3X PC (32 BIT) VERSION 4.0.1

Run Began on 9/02/2004 at 14:28:15

```
** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\Rsp-gd mitigated.dat
** Trinity Consultants


CO STARTING
CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
CO TITLETWO  Construction Dust Impact Assessment
CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
CO AVERTIME  24
CO POLLUTID  TSP
CO TERRHGTS  ELEV
CO FLAGPOLE  1.5
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
SO SRCPARAM  SRC9  3.200000E-06  0    11    0
SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
SO SRCPARAM  SRC10  3.200000E-06  0    13    0
SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
SO AREAVERT  SRC10    844886.5  821861.5
SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE ELEVUNIT  METERS
RE DISCCART  844720.0  821999.4  134.2  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844652.0  822189.7  135.4  1.5
** RCPDESCR  Staff Housing (A-D)
RE DISCCART  844825.6  822323.3  124.7  1.5
** RCPDESCR  staff Housing Apartm
RE DISCCART  845111.0  822291.7  100  1.5
** RCPDESCR  Principal Houseing
RE DISCCART  845109.4  821944.0  132.4  1.5
** RCPDESCR  HKUST
RE DISCCART  845250.8  821585.7  143.4  1.5
** RCPDESCR  TVB
RE DISCCART  845096.9  821547.0  130.4  1.5
** RCPDESCR  Clear Water Bay PS
RE DISCCART  844881.7  821972.2  120.6  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844872.8  822089.5  123.4  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844818.3  822137.7  124  1.5
** RCPDESCR  Tai Po Tsai Tsuen
RE FINISHED

ME STARTING
ME INPUTFIL  N:\TPT\SKG01.MET
ME ANEMHGHT  31.2  METERS
ME SURFDATA  00000  2001
ME UAIRDATA  11111  2001
ME STARTEND  2001  01  01  1  2001  12  31  24
ME FINISHED

OU STARTING
OU RECTABLE  24  FIRST
OU FINISHED

** PROJECTN  0 104 7 -177 0 0.9996 500000 0
** IMAGE2  N:\TPT\SCAN-56.TAB
** OUTFILE  "N:\tpt\Rsp-gd mitigated.lst"
** RAWFILE  "N:\tpt\Rsp-gd mitigated.RAW"
** RAWFMT  2
** HILLBOUN  0 0 0 0


**********************************
*** SETUP Finishes Successfully ***
**********************************
```

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\RSP-GD MITIGATED.DAT
**Output Print File: N:\TPT\RSP-GD MITIGATED.LST

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.32000E-05	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.32000E-05	844886.5	821865.7	123.0	0.00	13	0.00	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

ALL SRC9 , SRC10 ,

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

```
( 844720.0,  821999.4,     134.2,       1.5);          ( 844652.0,  822189.7,     135.4,       1.5);

( 844825.6,  822323.3,     124.7,       1.5);          ( 845111.0,  822291.7,     100.0,       1.5);
( 845109.4,  821944.0,     132.4,       1.5);          ( 845250.8,  821585.7,     143.4,       1.5);
( 845096.9,  821547.0,     130.4,       1.5);          ( 844881.7,  821972.2,     120.6,       1.5);
( 844872.8,  822089.5,     123.4,       1.5);          ( 844818.3,  822137.7,     124.0,       1.5);
```


CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1
1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2001 1 1 1
AND END DATE: 2001 12 31 24

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY WIND SPEED CATEGORY

CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 2001 YEAR: 2001

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	9.44346m	(01042124)	844652.00	822189.69	5.84298m	(01042124)
844825.62	822323.31	11.00409b	(01022324)	845111.00	822291.69	8.54089m	(01073124)
845109.38	821944.00	10.23963b	(01071124)	845250.81	821585.69	8.31888m	(01010124)
845096.88	821547.00	12.25954b	(01123024)	844881.69	821972.19	38.67638b	

(01090924)
844872.81 822089.50 34.89326b (01051424) 844818.31 822137.69 16.08097m
(01042124)

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

NETWORK GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	38.67638b	ON 01090924: AT (844881.69, 821972.19, 120.60, 1.50)	DC NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

ISCST3X PC (32 BIT) VERSION 4.0.1

Run Began on 9/02/2004 at 14:42:24

```
** BREEZE ISC GIS Pro v4.0.13 - N:\tpt\Rsp-2f mitigated.dat
** Trinity Consultants


CO STARTING
CO TITLEONE  Residential Development at Tai Po Tsai - Drainage Diversion
CO TITLETWO  Construction Dust Impact Assessment
CO MODELOPT  CONC  RURAL  GRDRIS  MSGPRO
CO AVERTIME  24
CO POLLUTID  TSP
CO TERRHGTS  ELEV
CO FLAGPOLE  7.5
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC9  AREAPOLY  844932.8  822213.9  123
SO LOCATION  SRC10  AREAPOLY  844886.5  821865.7  123
SO SRCPARAM  SRC9  3.200000E-06  0    11    0
SO AREAVERT  SRC9    844932.8  822213.9  844882.3  822181.6  844878.1  822110.0
SO AREAVERT  SRC9    844903.4  821898.0  844886.5  821865.7  844908.9  821843.3
SO AREAVERT  SRC9    844931.5  821874.2  844903.4  822124.0  844917.4  822125.4
SO AREAVERT  SRC9    844914.6  822171.8  844942.7  822191.4
SO SRCPARAM  SRC10  3.200000E-06  0    13    0
SO AREAVERT  SRC10    844886.5  821865.7  844843.0  821815.2  844836.0  821780.1
SO AREAVERT  SRC10    844862.6  821708.6  844962.3  821679.1  844970.7  821680.5
SO AREAVERT  SRC10    844958.1  821709.9  844906.1  821721.2  844873.8  821752.1
SO AREAVERT  SRC10    844873.8  821794.2  844894.9  821774.5  844935.7  821823.6
SO AREAVERT  SRC10    844886.5  821861.5
SO EMISUNIT  1.0E+06  GRAMS/SEC  MICROGRAMS/M**3
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE ELEVUNIT  METERS
RE DISCCART  844720.0  821999.4  134.2  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844652.0  822189.7  135.4  7.5
** RCPDESCR  Staff Housing (A-D)
RE DISCCART  844825.6  822323.3  124.7  7.5
** RCPDESCR  staff Housing Apartm
RE DISCCART  845111.0  822291.7  100  7.5
** RCPDESCR  Principal Houseing
RE DISCCART  845109.4  821944.0  132.4  7.5
** RCPDESCR  HKUST
RE DISCCART  845250.8  821585.7  143.4  7.5
** RCPDESCR  TVB
RE DISCCART  845096.9  821547.0  130.4  7.5
** RCPDESCR  Clear Water Bay PS
RE DISCCART  844881.7  821972.2  120.6  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844872.8  822089.5  123.4  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE DISCCART  844818.3  822137.7  124  7.5
** RCPDESCR  Tai Po Tsai Tsuen
RE FINISHED

ME STARTING
ME INPUTFIL  N:\TPT\SKG01.MET
ME ANEMHGHT  31.2  METERS
ME SURFDATA  00000  2001
ME UAIRDATA  11111  2001
ME STARTEND  2001  01  01  1  2001  12  31  24
ME FINISHED

OU STARTING
OU RECTABLE  24  FIRST
OU FINISHED

** PROJECTN  0 104 7 -177 0 0.9996 500000 0
** IMAGE2  N:\TPT\SCAN-56.TAB
** OUTFILE  "N:\tpt\Rsp-2f mitigated.lst"
** RAWFILE  "N:\tpt\Rsp-2f mitigated.RAW"
** RAWFMT  2
** HILLBOUN  0 0 0 0


**********************************
*** SETUP Finishes Successfully ***
**********************************
```

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION. DDPLETE = F
**Model Uses NO WET DEPLETION. WDPLETE = F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses User-Specified Options:
1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 24-HR

**This Run Includes: 2 Source(s); 1 Source Group(s); and 10 Receptor(s)

**The Model Assumes A Pollutant Type of: TSP

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 31.20 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: N:\TPT\RSP-2F MITIGATED.DAT
**Output Print File: N:\TPT\RSP-2F MITIGATED.LST

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
SRC9	0	0.32000E-05	844932.8	822213.9	123.0	0.00	11	0.00	
SRC10	0	0.32000E-05	844886.5	821865.7	123.0	0.00	13	0.00	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID   SOURCE IDs

ALL   SRC9   , SRC10   ,

CONC   RURAL ELEV FLGPOL   GRDRIS   MSGPRO

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(844720.0, 821999.4,   134.2,   7.5);   (844652.0, 822189.7,   135.4,   7.5);

(844825.6, 822323.3,   124.7,   7.5);   (845111.0, 822291.7,   100.0,   7.5);
(845109.4, 821944.0,   132.4,   7.5);   (845250.8, 821585.7,   143.4,   7.5);
(845096.9, 821547.0,   130.4,   7.5);   (844881.7, 821972.2,   120.6,   7.5);
(844872.8, 822089.5,   123.4,   7.5);   (844818.3, 822137.7,   124.0,   7.5);

CONC   RURAL ELEV FLGPOL   GRDRIS   MSGPRO

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2001   1 1 1
AND END DATE: 2001 12 31 24

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA
FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY   WIND SPEED CATEGORY

CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: N:\TPT\SKG01.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 0 UPPER AIR STATION NO.: 11111
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 2001 YEAR: 2001

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
01	01	01	01	180.0	3.00	286.6	5	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	02	110.0	1.10	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	03	170.0	0.90	285.9	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	04	120.0	0.80	285.4	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	05	130.0	1.00	285.6	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	06	130.0	1.50	285.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	07	170.0	2.60	286.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	08	170.0	2.10	287.0	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	09	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	10	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	11	999.9	999.90	999.9	9	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	12	210.0	3.50	289.4	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	13	230.0	2.10	289.8	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	14	280.0	0.90	289.8	1	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	15	270.0	3.00	290.0	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	16	280.0	3.00	289.9	2	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	17	240.0	4.90	289.6	4	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	18	260.0	1.30	289.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	19	100.0	0.40	288.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	20	110.0	1.00	287.7	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	21	999.9	0.10	287.3	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	22	220.0	0.50	287.1	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	23	120.0	1.00	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00
01	01	01	24	110.0	0.70	286.8	6	1258.0	1274.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): SRC9 , SRC10 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
844720.00	821999.38	3.32194m	(01040624)	844652.00	822189.69	3.17382m	(01042124)
844825.62	822323.31	4.86167m	(01031924)	845111.00	822291.69	4.71769m	(01073124)
845109.38	821944.00	4.72410b	(01071124)	845250.81	821585.69	4.69633m	(01010124)
845096.88	821547.00	5.13470b	(01102724)	844881.69	821972.19	6.58011m	

(01042824)
844872.81 822089.50 6.79521 (01083124) 844818.31 822137.69 4.50696m
(01031924)

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

NETWORK GROUP ID TYPE	GRID-ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF
ALL	HIGH 1ST HIGH VALUE IS	6.79521	ON 01083124:	AT (844872.81, 822089.50, 123.40, 7.50)	
DC	NA				

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

CONC RURAL ELEV FLGPOL GRDRIS MSGPRO

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 800 Warning Message(s)
A Total of 1099 Informational Message(s)

A Total of 374 Calm Hours Identified

A Total of 725 Missing Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

Appendix G
Worksheet of Construction Noise Prediction

PART A - Unmitigated Construction Noise Level from the Use of Powered Mechanical Equipment for Construction Work other than Percussive Piling

Site Reference: 600

Site Reference: Proposed Residential Development at Lot No.898 in D.D. 227, Tai Po Tsai, Sai Kung

STEP									UNITS
1	NSR	NSR as marked on attached plan NSR type NSR location / address Indicate by ticking the critical NSRs to be assessed in details				Domestic Premises	University Staff Quarter A1	University Staff Residence A2	Tai Po Tsai village A3	
2	Distance	Slant distance between source and receiver for single notional source position					A1 222	A2 162	A3 75	m
3	CNP		PME Item							
		Activity	Code	Description	No. of items	dB(A) per iten	Log sum			
	1	Mobilization and sheet piling installation#	102 081	Generator, slienced Excavator	2 2	100 112	115			
	2	Excavation & Construction of box culvert	001 102 081 141 170 186 048	Air compressor Generator, slienced Excavator Lorry Poker, vibratory, hand-held Roller, vibratory Mobile crane (diesel)	1 2 3 3 2 2 2	100 100 112 112 113 108 112	123			
	3	Connection works and diversion	001 102 048 081 141 044 047 050	Air compressor Generator, slienced Mobile crane (diesel) Excavator Lorry Concrete Lorry Mixer Concrete pump Concrete vibrator	1 1 1 1 1 1 1 2	100 100 112 112 112 109 109 105	119			
	4	Backfilling & compaction	001 102 081 141 186	Air compressor Generator, slienced Excavator Lorry Roller, vibratory	1 1 3 3 2	100 100 112 112 108	120			dB(A)
4	PNL	(a) Distance attenuation correction factor from Step 2 & Table 5 of TM					A1 55	A2 52	A3 46	dB(A)
		(b) PNL from Step 3 & the above distance correction			1 2 3 4		60 68 64 65	63 71 67 68	69 77 73 74	dB(A)
5	Acoustic reflection correction	Details: facade effect				3				dB(A)
6	CNL	(4b) + (5) =			1 2 3 4		63 71 67 68	66 74 70 71	72 80 76 77	dB(A)
7	Criterion						75	75	75	dB(A)

#Remark: Sheet piling installation shall be carried out by using hydraulic type percussive piling method. Since noise produced by percussive piling is controlled under the Noise Control Ordinance, construction noise permit shall be applied by the contractor before commencement of work.

PART B - Unmitigated Construction Noise Level from the Use of Powered Mechanical Equipment for Construction Work other than Percussive Piling

Site Reference: 600

Site Reference: Proposed Residential Development at Lot No.898 in D.D. 227, Tai Po Tsai, Sai Kung

STEP									UNITS
1	NSR	NSR as marked on attached plan NSR type NSR location / address Indicate by ticking the critical NSRs to be assessed in details				Domestic Premises Tai Po Tsai village B4	Tai Po Tsai village B5	Tai Po Tsai village B6	HKUST B7	
2	Distance	Slant distance between source and receiver for single notional source position				B4 48	B5 21	B6 46	B7 206	m
3	CNP	PME Item								
		Activity	Code	Description	No. of items	dB(A) per item	Log sum			
	1	Mobilization and sheet piling installation#	102	Generator, slienced	2	100	115			
			081	Excavator	2	112				
	2	Excavation & Construction of box culvert	001	Air compressor	1	100	123			
			102	Generator, slienced	2	100				
			081	Excavator	3	112				
			141	Lorry	3	112				
			170	Poker, vibratory, hand-held	2	113				
			186	Roller, vibratory	2	108				
			048	Mobile crane (diesel)	2	112				
	3	Connection works and diversion	001	Air compressor	1	100	119			
			102	Generator, slienced	1	100				
			048	Mobile crane (diesel)	1	112				
			081	Excavator	1	112				
			141	Lorry	1	112				
			044	Concrete Lorry Mixer	1	109				
			047	Concrete pump	1	109				
			050	Concrete vibrator	2	105				
	4	Backfilling & compaction	001	Air compressor	1	100	120			
			102	Generator, slienced	1	100				
			081	Excavator	3	112				
			141	Lorry	3	112				
			186	Roller, vibratory	2	108				dB(A)
4	PNL	(a) Distance attenuation correction factor from Step 2 & Table 5 of TM					B4 42	B5 34	B6 41	B7 54	dB(A)
		(b) PNL from Step 3 & the above distance correction			1		73	81	74	61	dB(A)
					2		81	89	82	69	
					3		77	85	78	65	
					4		78	86	79	66	
5	Acoustic reflection correction	Details: facade effect				3					dB(A)
6	CNL	(4b) + (5) =			1		76	84	77	64	dB(A)
					2		84	92	85	72	
					3		80	88	81	68	
					4		81	89	82	69	
7	Criterion						75	75	75	70	dB(A)

#Remark: Sheet piling installation shall be carried out by using hydraulic type percussive piling method. Since noise produced by percussive piling is controlled under the Noise Control Ordinance, construction noise permit shall be applied by the contractor before commencement of work.

PART C - Unmitigated Construction Noise Level from the Use of Powered Mechanical Equipment for Construction Work other than Percussive Piling

Site Reference: 600

Site Reference: Proposed Residential Development at Lot No.898 in D.D. 227, Tai Po Tsai, Sai Kung

STEP								UNITS
1	NSR	NSR as marked on attached plan NSR type NSR location / address Indicate by ticking the critical NSRs to be assessed in details				Domestic Premises Tai Po Tsai village C8	Tai Po Tsai village C9	Clearwater Bay school C10	
2	Distance	Slant distance between source and receiver for single notional source position				C8 84	C9 101	C10 250	m
3	CNP	PME Item							
		Activity	Code	Description	No. of items	dB(A) per item	Log sum		
	1	Mobilization and sheet piling installation#	102	Generator, slienced	2	100	115		
			081	Excavator	2	112			
	2	Excavation & Construction of box culvert	001	Air compressor	1	100	123		
			102	Generator, slienced	2	100			
			081	Excavator	3	112			
			141	Lorry	3	112			
			170	Poker, vibratory, hand-held	2	113			
			186	Roller, vibratory	2	108			
			048	Mobile crane (diesel)	2	112			
	3	Connection works and diversion	001	Air compressor	1	100	119		
			102	Generator, slienced	1	100			
			048	Mobile crane (diesel)	1	112			
			081	Excavator	1	112			
			141	Lorry	1	112			
			044	Concrete Lorry Mixer	1	109			
			047	Concrete pump	1	109			
			050	Concrete vibrator	2	105			
	4	Backfilling & compaction	001	Air compressor	1	100	120		
			102	Generator, slienced	1	100			
			081	Excavator	3	112			
			141	Lorry	3	112			
			186	Roller, vibratory	2	108			dB(A)
4	PNL	(a) Distance attenuation correction factor from Step 2 & Table 5 of TM					C8 47	C9 48	C10 56	dB(A)
		(b) PNL from Step 3 & the above distance correction			1		68	67	59	dB(A)
					2		76	75	67	
					3		72	71	63	
					4		73	72	64	
5	Acoustic reflection correction	Details: facade effect				3				dB(A)
6	CNL	(4b) + (5) =			1		71	70	62	dB(A)
					2		79	78	70	
					3		75	74	66	
					4		76	75	67	
7	Criterion						75	75	70	dB(A)

#Remark: Sheet piling installation shall be carried out by using hydraulic type percussive piling method. Since noise produced by percussive piling is controlled under the Noise Control Ordinance, construction noise permit shall be applied by the contractor before commencement of work.

PART A - Mitigated Construction Noise Level from the Use of Quiet Powered Mechanical Equipment for Construction Work other than Percussive Piling

Site Reference: 600

Site Reference: Proposed Residential Development at Lot No.898 in D.D. 227, Tai Po Tsai, Sai Kung

STEP								UNITS
1	NSR	NSR as marked on attached plan NSR type NSR location / address Indicate by ticking the critical NSRs to be assessed in details				Domestic Premises University Staff Quarter A1	University Staff Residence A2	Tai Po Tsai village A3	
2	Distance	Slant distance between source and receiver for single notional source position				A1 222	A2 162	A3 75	m
3	CNP	PME Item							
		Activity	Code	Description	No. of items	dB(A) per item	Log sum		
	1	Mobilization and sheet piling installation#	102	Generator, silenced	2	100	109		
			C3-97	Excavator *	2	105			
	2	Excavation & Construction of box culvert	001	Air compressor	1	100	116		
			102	Generator, silenced	2	100			
			C3-97	Excavator *	3	105			
			C9-27	Lorry *	3	105			
			C6-32	Poker *	2	100			
			186	Roller, vibratory	2	108			
			C7-118	Mobile crane *	2	99			
	3	Connection works and diversion	001	Air compressor	1	100	114		
			102	Generator, silenced	1	100			
			C7-118	Mobile crane *	1	99			
			C3-97	Excavator *	1	105			
			C9-27	Lorry *	1	105			
			C6-35	Concrete Lorry Mixer *	1	100			
			047	Concrete pump	1	109			
			050	Concrete vibrator	2	105			
	4	Backfilling & compaction	001	Air compressor	1	100	115		
			102	Generator, silenced	1	100			
			C3-97	Excavator *	3	105			
			C9-27	Lorry *	3	105			
			186	Roller, vibratory	2	108			
						* Sound Power Levels of quiet PME based on the BS 5228 : Part 1 : 1997.			dB(A)
4	PNL	(a) Distance attenuation correction factor from Step 2 & Table 5 of TM					A1 55	A2 52	A3 46	dB(A)
		(b) PNL from Step 3 & the above distance correction			1		54	57	63	dB(A)
					2		61	64	70	
					3		59	62	68	
					4		60	63	69	
5	Acoustic reflection correction	Details: facade effect				3				dB(A)
6	CNL	(4b) + (5) =			1		57	60	66	dB(A)
					2		64	67	73	
					3		62	65	71	
					4		63	66	72	
7	Criterion						75	75	75	dB(A)

#Remark: Sheet piling installation shall be carried out by using hydraulic type percussive piling method. Since noise produced by percussive piling is controlled under the Noise Control Ordinance, construction noise permit shall be applied by the contractor before commencement of work.

PART B - Mitigated Construction Noise Level from the Use of Quiet Powered Mechanical Equipment and noise barrier for Construction Work other than Percussive Piling

Site Reference: 600

Site Reference: Proposed Residential Development at Lot No.898 in D.D. 227, Tai Po Tsai, Sai Kung

STEP										UNITS
1	NSR	NSR as marked on attached plan NSR type NSR location / address Indicate by ticking the critical NSRs to be assessed in details				Domestic Premises Tai Po Tsai village B4	Tai Po Tsai village B5	Tai Po Tsai village B6	HKUST B7	
2	Distance	Slant distance between source and receiver for single notional source position				B4 48	B5 21	B6 46	B7 206	m
3	CNP		PME Item							
		Activity	Code	Description	No. of items	dB(A) per item	Log sum			
	1	Mobilization and sheet piling installation#	102	Generator, silenced	2	100	109			
			C3-97	Excavator *	2	105				
	2	Excavation & Construction of box culvert	001	Air compressor	1	100	116			
			102	Generator, silenced	2	100				
			C3-97	Excavator *	3	105				
			C9-27	Lorry *	3	105				
			C6-32	Poker *	2	100				
			186	Roller, vibratory	2	108				
			C7-118	Mobile crane *	2	99				
	3	Connection works and diversion	001	Air compressor	1	100	114			
			102	Generator, silenced	1	100				
			C7-118	Mobile crane *	1	99				
			C3-97	Excavator *	1	105				
			C9-27	Lorry *	1	105				
			C6-35	Concrete Lorry Mixer *	1	100				
			047	Concrete pump	1	109				
			050	Concrete vibrator	2	105				
	4	Backfilling & compaction	001	Air compressor	1	100	115			
			102	Generator, silenced	1	100				
			C3-97	Excavator *	3	105				
			C9-27	Lorry *	3	105				
			186	Roller, vibratory	2	108				
						* Sound Power Levels of quiet PME based on the BS 5228 : Part 1 : 1997.				dB(A)
4	PNL	(a) Distance attenuation correction factor from Step 2 & Table 5 of TM				B4 42	B5 34	B6 41	B7 54	dB(A)
		(b) PNL from Step 3 & the above distance correction			1	67	75	68	55	dB(A)
					2	74	82	75	62	
					3	72	80	73	60	
					4	73	81	74	61	
5	Temporary Noise Barrier	Height of Effective Noise Barrier				4.4	5.6	5	0	m
		Noise Barrier Effect				2	10	3.3	0	dB(A)
6	Acoustic reflection correction	Details: facade effect				3				dB(A)
7	CNL	(4b) - (5) + (6) =			1	68	68	68	58	dB(A)
					2	75	75	75	65	
					3	73	73	73	63	
					4	74	74	74	64	
8	Criterion					75	75	75	70	dB(A)

#Remark: Sheet piling installation shall be carried out by using hydraulic type percussive piling method. Since noise produced by percussive piling is controlled under the Noise Control Ordinance, construction noise permit shall be applied by the contractor before commencement of work.

PART C - Mitigated Construction Noise Level from the Use of Quiet Powered Mechanical Equipment for Construction Work other than Percussive Piling

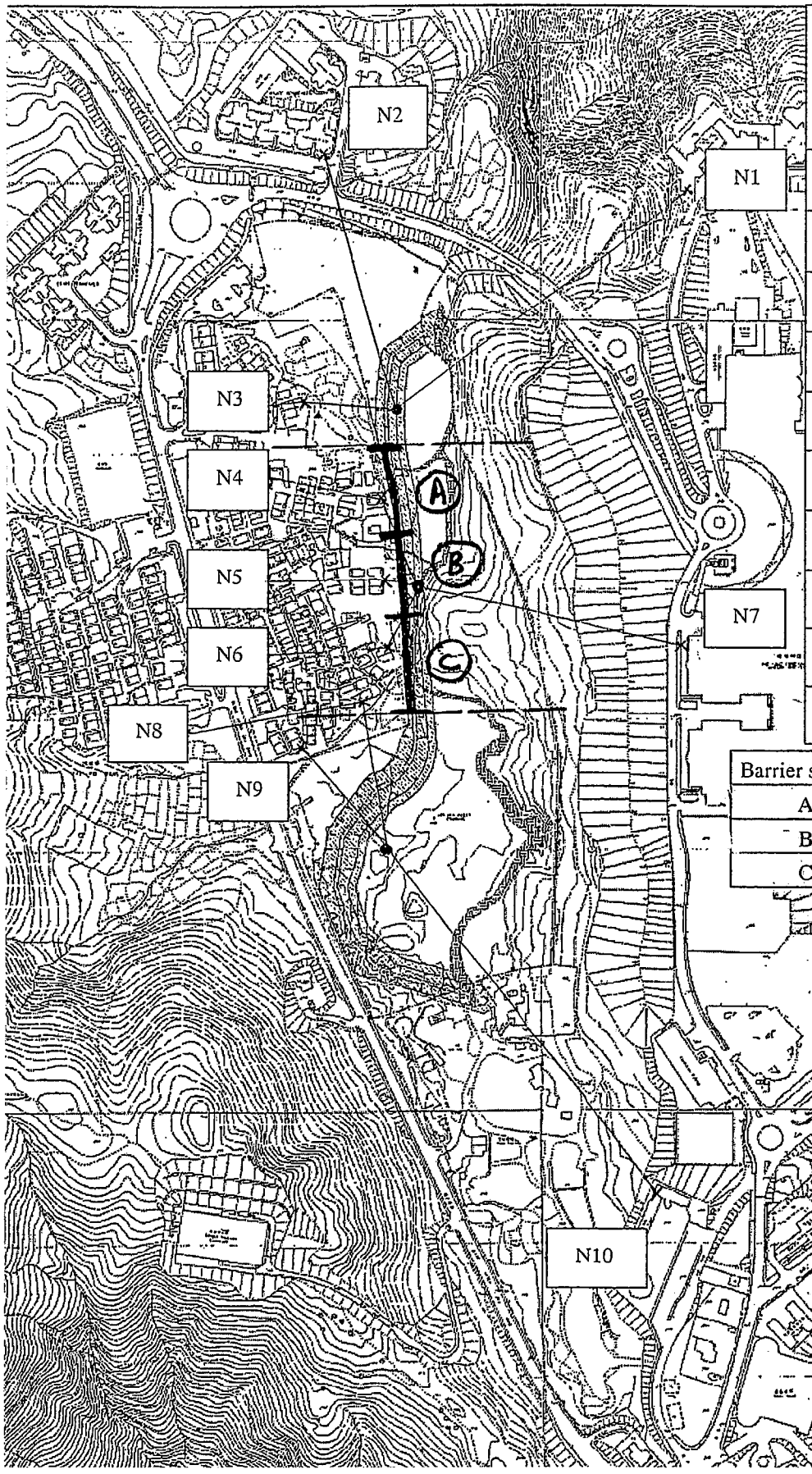
Site Reference: 600

Site Reference: Proposed Residential Development at Lot No.898 in D.D. 227, Tai Po Tsai, Sai Kung

STEP									UNITS
1	NSR	NSR as marked on attached plan NSR type NSR location / address Indicate by ticking the critical NSRs to be assessed in details				Domestic Premises Tai Po Tsai village C8	Tai Po Tsai village C9	Clearwater Bay school C10	
2	Distance	Slant distance between source and receiver for single notional source position				C8 84	C9 101	C10 250	m
3	CNP		PME Item						
		Activity	Code	Description	No. of items	dB(A) per item	Log sum		
	1	Mobilization and sheet piling installation#	102	Generator, silenced	2	100	109		
			C3-97	Excavator *	2	105			
	2	Excavation & Construction of box culvert	001	Air compressor	1	100	116		
			102	Generator, silenced	2	100			
			C3-97	Excavator *	3	105			
			C9-27	Lorry *	3	105			
			C6-32	Poker *	2	100			
			186	Roller, vibratory	2	108			
			C7-118	Mobile crane *	2	99			
	3	Connection works and diversion	001	Air compressor	1	100	114		
			102	Generator, silenced	1	100			
			C7-118	Mobile crane *	1	99			
			C3-97	Excavator *	1	105			
			C9-27	Lorry *	1	105			
			C6-35	Concrete Lorry Mixer *	1	100			
			047	Concrete pump	1	109			
			050	Concrete vibrator	2	105			
	4	Backfilling & compaction	001	Air compressor	1	100	115		
			102	Generator, silenced	1	100			
			C3-97	Excavator *	3	105			
			C9-27	Lorry *	3	105			
			186	Roller, vibratory	2	108			
						* Sound Power Levels of quiet PME based on the BS 5228 : Part 1 : 1997.			dB(A)
4	PNL	(a) Distance attenuation correction factor from Step 2 & Table 5 of TM					C8 47	C9 48	C10 56	dB(A)
		(b) PNL from Step 3 & the above distance correction			1		62	61	53	dB(A)
					2		69	68	60	
					3		67	66	58	
					4		68	67	59	
5	Acoustic reflection correction	Details: facade effect				3				dB(A)
6	CNL	(4b) + (5) =			1		65	64	56	dB(A)
					2		72	71	63	
					3		70	69	61	
					4		71	70	62	
7	Criterion						75	75	70	dB(A)

Appendix H

Proposed Purpose-built Noise Barrier with the Application of Quiet PME



ID	Slant distance between center of site section and receiver for single notional source position (m)
N1	222
N2	162
N3	75
N4	48
N5	21
N6	46
N7	206
N8	84
N9	101
N10	250

Barrier section	Height above ground level (m)
A	4.4
B	5.6
C	5.0

Drainage Diversion Works for Comprehensive Residential Development
Various Lots in DD227 and DD229, Tai Po Tasi, Sai Kung

Location of Noise Sensitive Receivers and the Proposed Purpose-built Noise Barrier

Appendix H	
Scale ~1:4500	Date 09/04

AEC

Appendix I

Landscape Master Plan and Conceptual Design of Dragonfly Pond

A	General Revision	SSL	02 APR 03	TEL	CCH
B	General Revision	SSL	10 JUL 03	TEL	CCH
C	General Revision	SSL	23 OCT 03	CJF	CCH
D	General Revision	JAS	11 NOV 03	CJF	CCH

PROPOSED RESIDENTIAL DEVELOPMENT AT TAI PO TSAI, SAI KUNG

LANDSCAPE MASTER PLAN

1:2000

29 OCT 2002

D

AI3/LMP-C

SSL

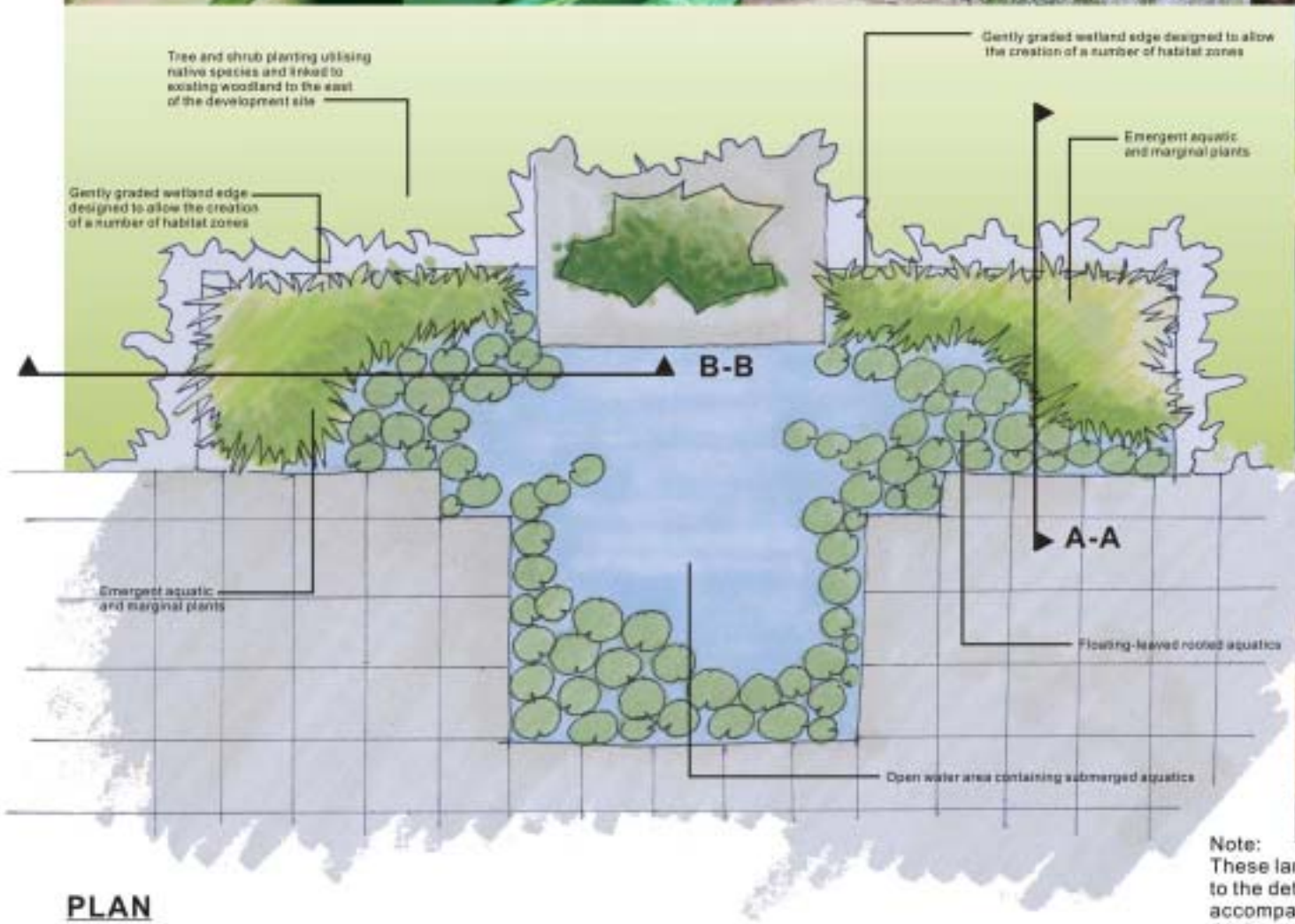
SSL

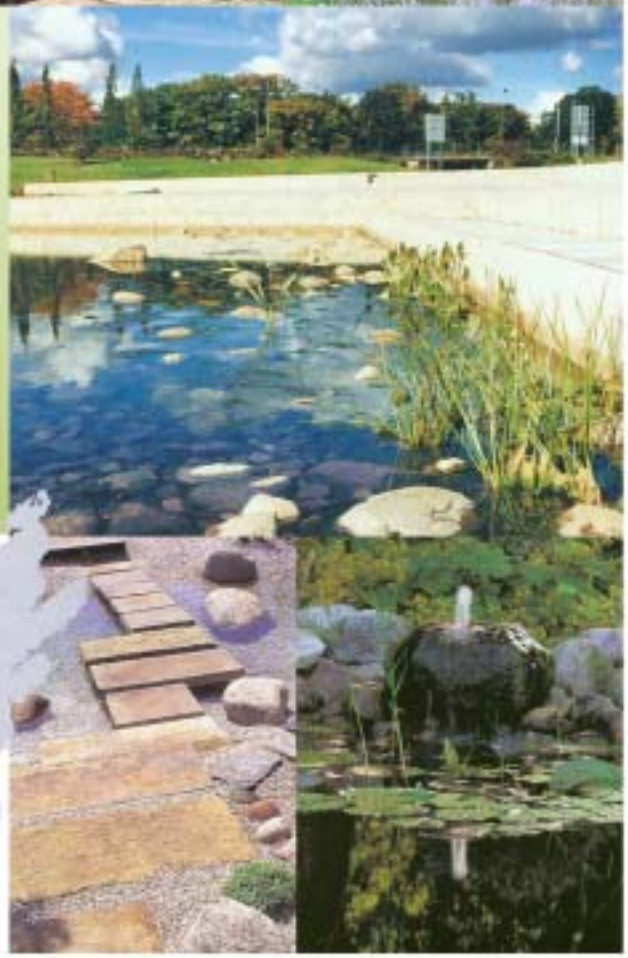
CJF

CCH

ADI

LMP1C-C.cdr





PLAN

Note:
These landscape design proposals are indicative and subject to the detailed design process. The sketch plan and the accompanying sections are intended to establish the general design principles of the proposed wetland

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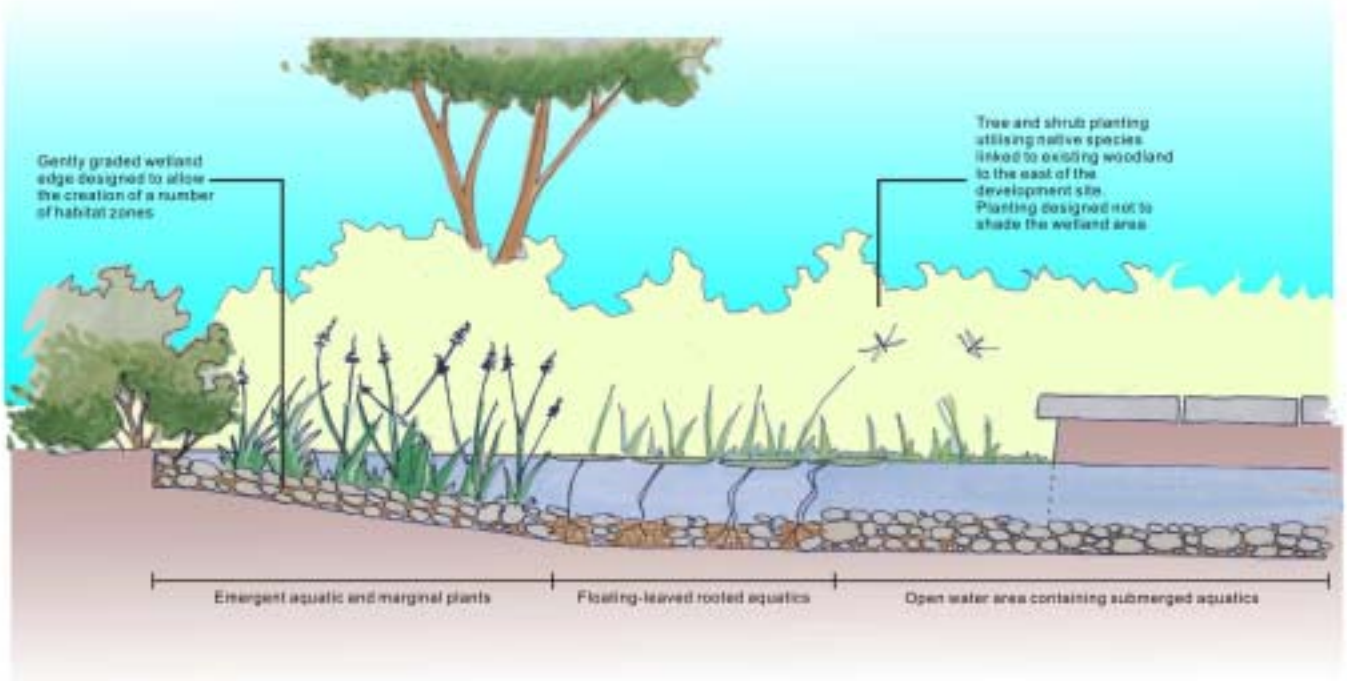
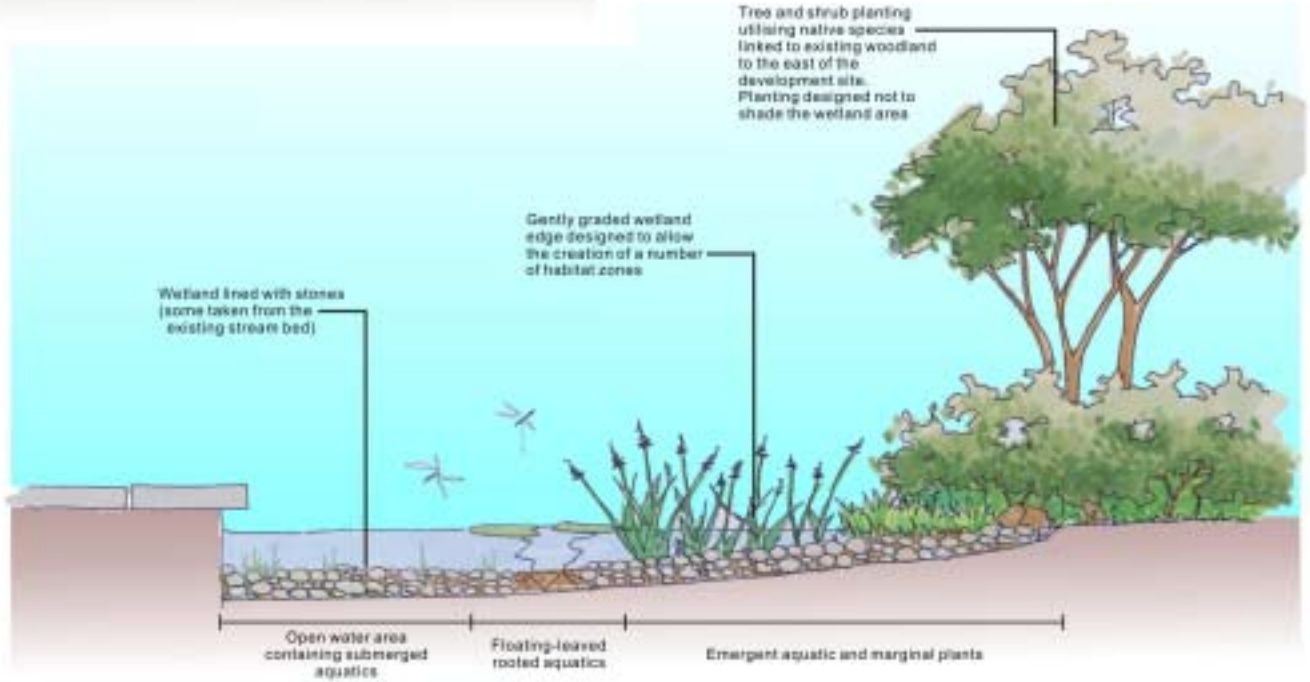
PROPOSED RESIDENTIAL DEVELOPMENT AT TAI PO TSAI, SAI KUNG

Conceptual Wetland Design

SCALE	N.T.S.	DATE	13 NOV 2020
CHECKED	CJP	DRAWN	JAS
FIGURE NO.			REV



Section A-A



Section B-B

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PROPOSED RESIDENTIAL DEVELOPMENT AT TAI PO TSAI, SAI KUNG

Section A-A, B-B

SCALE	N.T.S	DATE	13 NOV 2003
CHECKED	CJF	DRAWN	JAS
FIGURE NO.	HKLS2A/EM/02		REV -