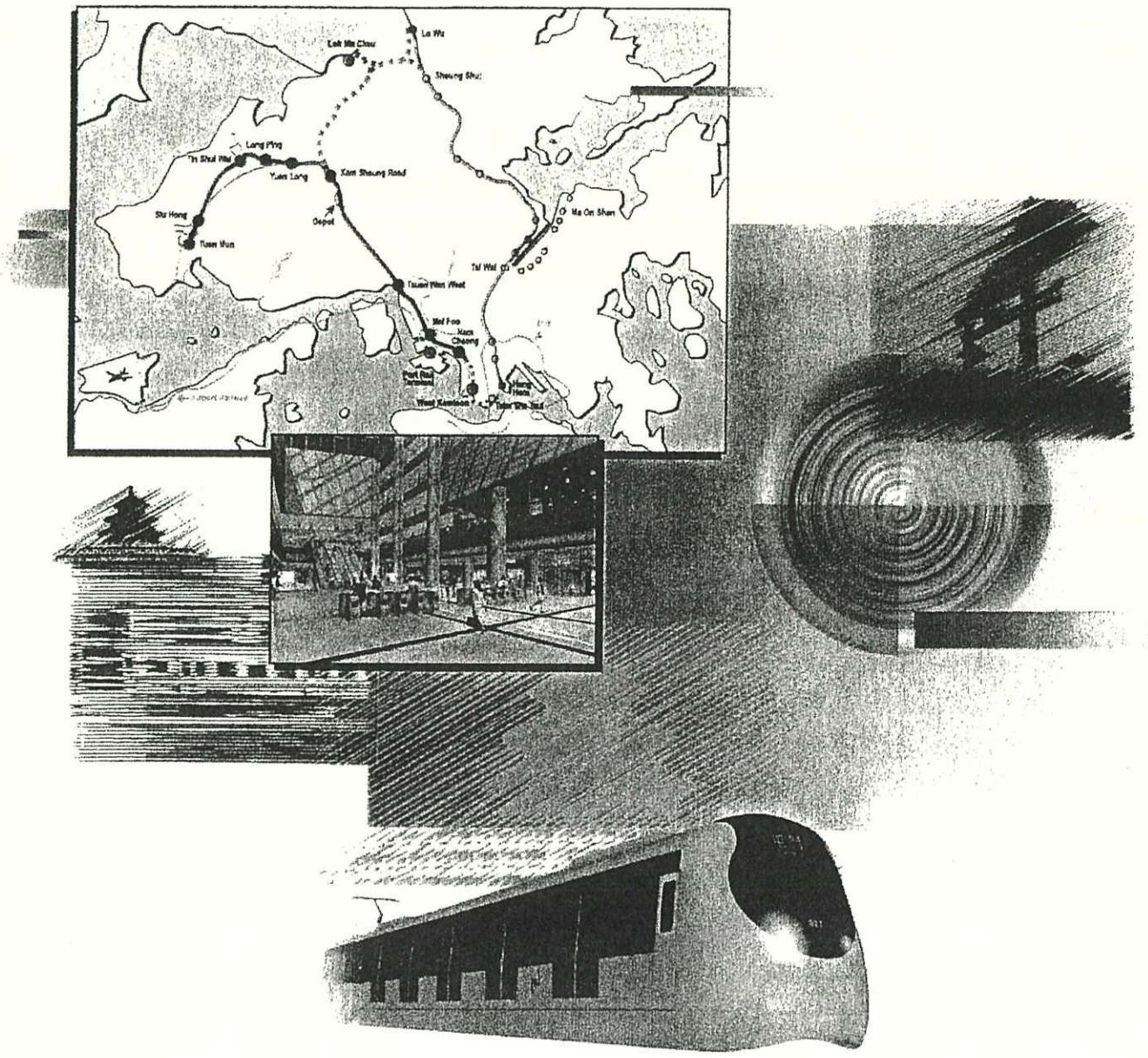
Kowloon-Canton Railway Corporation
West Rail



Pre-operation Environmental Audit Report
Revised Final Version

KCR 九廣鐵路

Pre-operation Environmental Audit Report

Revised Final Version

December 2003

This Document conforms to the findings of the West Rail EIA Report
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List of Abbreviation

ANL	Acceptable Noise Level
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EMU	Electric Multiple Unit
EP	Environmental Permit
EPD	Environmental Protection Department
FAR	Final Assessment Report
HCMP	Habitat Compensation and Management Plan
HKPSG	Hong Kong Planning Standards and Guidelines
IEC	Independent Environmental Checker
KCR	Kowloon Canton Railway
KSR	Kam Sheung Road Station
LOP	Long Ping Station
LRT	Light Rail Transit
MEF	Mei Foo Station
MTR	Mass Transit Railway
NAC	Nam Cheong Station
NCO	Noise Control Ordinance
NSR	Noise Sensitive Receiver
PHI	Potentially Hazardous Installation
PMC	Pat Heung Maintenance Centre
PTI	Public Transport Interchange
SIH	Siu Hong Station
TIS	Tin Shui Wai Station
TM	Technical Memorandum
TUM	Tuen Mun Station
TWW	Tseun Wan West Station
VSR	Visual Sensitive Receiver
WRB	West Rail Building
WPCO	Water Pollution Control Ordinance
WTW	Water Treatment Works
YUL	Yuen Long Station

1 INTRODUCTION

1.1 Background

An Environmental Impact Assessment (EIA) Study was conducted and completed for the West Rail Phase 1 in 1998. The study assessed the extent of all the potential environmental impacts associated with the construction and operation of the West Rail. It also provided recommendations on mitigation measures to ensure that impacts will be reduced to acceptable levels. All the findings and recommendations are presented in the Final Assessment Report (FAR) of the West Rail EIA Study (EIAO Register No. EIA-149/1998).

In accordance with Clause 5.10 of the Environmental Permit (EP) for the West Rail (EP No. EP-004/1998/F), an audit shall be carried out to confirm that all the environmental measures for the West Rail's operation have been fully implemented and the audit results shall be submitted to the Environmental Protection Department (EPD).

The purpose of this audit report is to present the recommended environmental measures for the operation of West Rail and the findings of the audits on the implementation status of the recommended measures.

1.2 Project Description

West Rail Phase 1 is a 30.5 km domestic passenger railway linking Sham Shui Po in West Kowloon with Tuen Mun. It passes through five districts: Sham Shui Po, Kwai Tsing, Tsuen Wan, Yuen Long and Tuen Mun and has nine stations, a depot, and a headquarters building. The alignment is shown in Figure 1 and described in detail in the following sections.

Southern Section
The route commences in the south at the Phase 1 terminus at Nam Cheong Station in Sham Shui Po. The alignment parallels the West Kowloon Expressway and runs to the northwest before curving northwards to Mei Foo Station. The entire Southern Section is at grade but enclosed and covered by landscaped earth mound.

Central Section
From Mei Foo the alignment continues through the Ha Kwai Chung Tunnel, under Kwai Chung Hospital and a portion of Kwai Fuk Road, and then through the Tsing Tsuen Tunnel before entering the Tsuen Wan West Station, which is situated on new reclamation in Tsuen Wan Bay. The tracks then continue northwestwards and enter the southern portal of the Tai Lam Tunnel at a point north of Tuen Mun Road at Tsuen Wan, gradually rising to the northern portal in Pat Heung, Yuen Long.

Northern Section
From the northern portal, the alignment continues into the Kam Tin valley where the Pat Heung Maintenance Centre (PMC) provides maintenance and stabling facilities for the entire West Rail fleet. The maintenance activities are carried out inside the enclosed EMU Maintenance Building. Leaving the Maintenance Centre, trains curve slightly to the west and enter the elevated Kam Sheung Road Station. The West Rail

Building (WRB) housing a central operations control centre is located in the vicinity of the Kam Sheung Road Station.

The alignment from Kam Sheung Road Station to Yuen Long Station is all on viaduct with an exception of a short tunnel section at Au Tau hill. After turning to the west at Au Tau, the railway crosses over Route 3 and Castle Peak Road to enter Yuen Long.

Western Section

The alignment continues westward with elevated stations in Yuen Long, Long Ping and Tin Shui Wai. From Tin Shui Wai, the alignment then turns south, heading for Siu Hong Station, and onward to the Tuen Mun Station terminus, with both stations built over the Tun Mun nullah. The section between Siu Hong and Tuen Mun Stations consists of both viaduct and at-grade sections.

In connection with the new stations of the West Rail, public transportation interchanges (PTI) are provided at Sham Shui Po, Tsuen Wan West, Kam Sheung Road, Yuen Long, Long Ping, Tin Shui Wai, Siu Hong and Tuen Mun Stations. All the PTIs are open except that the PTI at Tsuen Wan West and Yuen Long Stations are located under the station structure.

1.3 Approach of Audit for Operation

The West Rail, being 30.5km long, involves a number of construction contracts and the progress of each contract varies. In addition, the environmental mitigation measures have to be implemented at different stages, e.g. floating slabs are installed during the construction of the viaduct while the landscape works underneath are carried out during the planting season after the viaduct construction is completed. Therefore, audits have been conducted in phases between March and September 2003 on different sections of the alignment and on various aspects.

Prior to the audits being conducted on site, the Corporation's Environmental Team and the Independent Environmental Checker (IEC) conducted a thorough desk-top review to compile a set of environmental audit checklists which cover all the required environmental measures stated in the FAR, EP and in the subsequent variations of the EPs.

Based on the pre-set audit checklist, the Corporation's Environmental Team carried out the audits accordingly. The IEC also attended all the audits to verify the audit results. The Resident Site Staff and Contractors were invited to be present for the audits so that if any defects were observed, they could be advised of the issues and take immediate actions. Table 1 below shows the dates of the audits.

Table 1 Dates of Audits

Section	Date of Audit	Scope of Audit
Southern Section		
Tunnel – NAC to MEF Stations	24 June	1st Audit (on all aspects)
NAC Station	30 July	1st Audit (on all aspects)
	10 September	Re-audit outstanding landscape
MEF Station	29 July	1st Audit (on all aspects)
	19 September	Re-audit outstanding landscape
Central Section		
Kwai Tsing Tunnels	12 March	1st Audit (on all aspects)
Tai Lam Tunnels	29 March	1st Audit (on all aspects)
	30 July	Re-audit on outstanding landscape
TWW Station	30 July	1st Audit (on all aspects)
	19 September	Re-audit on outstanding landscape
Northern Section		
PMC	7 May	1st Audit (on noise, waste, water at the depot)
	13 May	2nd Audit (on landscape)
	22 May	3rd Audit (on noise, waste, water from the EMU Maintenance Building)
	29 August	Re-audit on noise barrier defect and outstanding landscape works
KSR Station & WRB	7 May	1st Audit (on all aspects)
Viaduct – KSR to YUL Stations	5 March	1st Audit (on noise)
	26 March	2nd Audit (on landscape)
	21 May	Re-audit on noise defect
	27 June	Re-audit on outstanding landscape works
West Rail Habitat Compensation	29 July	1st Audit (at Land Parcel A, B and D)
	8 September	2nd Audit (at Land Parcel C, E, F, G, H, I, J, K and L)

Section	Date of Audit	Scope of Audit
Western Section		
Viaduct –YUL to TIS Stations	5 & 13 March	1st Audit (on noise)
	13 March	2nd Audit (on landscape)
	21 & 22 May	Re-audits on noise defect
	27 July	Re-audit on outstanding landscape works
Viaduct – TIS to SIH Stations	5 March	1st Audit on noise at the section between Tin Shui Wai to Yick Yuen
	13 March	2nd Audit on noise at the remaining section and audit on landscaping work
Viaduct – SIH to TUM Stations	2 June	1st Audit (on noise)
	18 August	Re-audit on noise defect
YUL Station	16 June	1st Audit (on noise, water, waste)
	18 September	2nd Audit on noise at the acoustic louvers in Chiller plant room
LOP Station	16 June	1st Audit (on noise, water, waste)
	18 September	2nd Audit on noise at the acoustic louvers in Chiller plant room
TIS Station	19 May	1st Audit (on noise, water, waste)
SIH Station	25 June	1st Audit (on noise, water, waste)
	23 September	2nd Audit on noise at the acoustic louvers in Chiller plant room
TUM Station	25 June	1st Audit (on noise, water, waste)

1.4 Structure of Audit Report

The remainder of this report is set out as follows:

- **Chapter 2** provides a summary on the environmental issues identified in the FAR for the Southern Section, i.e. Nam Cheong (NAC) Station, Mei Foo (MEF) Station and the tunnel section between the two stations. The mitigation measures stipulated in the FAR and the EP for this section are listed and the audit findings against those required environmental measures are presented.

- **Chapter 3** provides a summary on the environmental issues identified in the FAR for the Central Section, i.e. Kwai Tsing Tunnel, Tai Lam Tunnel and Tsuen Wan West (TWW) Station. The mitigation measures stipulated in the

FAR and the EP for this section are listed and the audit findings against those required environmental measures are presented.

- **Chapter 4** provides a summary on the environmental issues identified in the FAR for Northern Section, i.e. Pat Heung Maintenance Centre (PMC), West Rail Building (WRB), Kam Sheung Road Station (KSR) and the viaduct section between Kam Sheung Road Station and Yuen Long Station. The mitigation measures stipulated in the FAR and the EP for this section are listed and the audit findings against those required environmental measures are presented.

- **Chapter 5** provides a summary on the environmental issues identified in the FAR for the Western Section, i.e. Yuen Long (YUL) Station, Long Ping (LOP) Station, Tin Shui Wai (TIS) Station, Siu Hong (SIU) Station, Tuen Mun (TUM) Station and the viaduct and at-grade sections between these stations. The mitigation measures stipulated in the FAR and the EP for this section are listed and the audit findings against those required environmental measures are presented.

2 SOUTHERN SECTION

2.1 Environmental Impacts and Mitigation Measures

2.1.1 Fixed Plant Noise

The railways in the Southern Section are built inside tunnels. Noise arising from the running trains during the operation is not considered to be a potential nuisance considering the entirely enclosed environment in tunnel. However, the EIA Study has identified that noise emitted from the fixed plant associated with the operation would be a potential source of noise impacts. The noise sources in the Southern Section include,

- a ventilation shaft at the southern end of the alignment;
- two groups of ventilation shafts at the southern and northern ends of NAC;
- Lai Wan chiller plant building; and
- ventilation shafts at the southern and northern ends of MEF.

The EIA Study has recommended appropriate mitigation measures for different kinds of fixed plant noise as follows,

Ventilation Fans, Vents buildings

- careful consideration of the fan positioning, avoiding areas where turbulence is likely to occur such as close to heaters/coolers or bends in the ductwork;
- minimise tonal noise by optimising the fan speed and pitch of the blades;
- select fan speeds to prevent low frequency noise being generated where more than one fan is used;
- reduce fan noise further by providing an acoustic enclosure and by fitting silencers;
- fitting attenuators;
- maintain all fans in good mechanical condition to prevent unnecessary noise such as the high frequency whine that can be generated by worn bearings.

Chiller Plant

- minimise chiller plant noise by enclosing the unit and fitting silencers to air inlets and outlets;
- maintain all equipment in good mechanical condition to prevent unnecessary noise which may result from loose panels or worn bearings.

2.1.2 Landscape and Visual

The tunnel section between Nam Cheong and Mei Foo Stations is under a landscaped earth mound. Also, Lai Chi Kok Park is re-designed to become a more interesting diverse recreational area. It was concluded in the EIA Study that there would be in general an overall positive improvement in the landscape quality of the environment within the Southern Section due to the increase extent of landscaped area.

The Landscape Design Strategy Report has proposed design principles for all landscape and visual aspects of West Rail as a guide to detailed design by all design consultants. The principle design recommendations that are applicable to the Southern Section are listed below,

- shape and plant earth mounds over box tunnels in order to integrate their landscape design with adjacent open spaces;
- site vent structures to minimise visual intrusion; and
- integrate design of vent structures with surrounding architecture and urban context.

2.1.3 Water Quality

The EIA Study identified that potential sources of impacts on water quality from the operation of the Southern Section are as follows,

- Runoff from rail track and operational tunnel drainage;
- Station runoff; and
- Sewage generation at the stations.

Rainwater runoff from the tunnel and station structures is expected to be clean and no impact is therefore anticipated.

Domestic sewage will be generated at the NAC and MEF. Toilet facilities will be provided for passengers and staff and the sewage will be directed to public sewers. The EIA Study concluded that no further deterioration of water quality in Victoria Harbour Water Control Zone would arise from operation provided that the qualities of sewage and drainage effluents comply with the TM Standards before discharge into foul sewers.

The following measures are recommended in the EIA Study for the Southern Section to mitigate the potential water quality impacts:

- A surface water drainage system should be provided to collect operational tunnel seepage. Where oils and lubricating fluids could be spilt, the operational tunnel discharge and track runoff should pass through the oil and grit/silt interceptors/chambers to remove oil, grease and sediment before being pumped into the public storm water drainage system via a rising main;
- Sewage effluents generated at the stations are required to meet the TM standards prior to discharge. Sewage should be directed to the public foul sewer system and sewage treatment facility for treatment;
- The efficiency of silt traps and oil interceptors is dependent on regular cleaning and maintenance. These installations should be regularly cleaned and maintained in good working order; and
- Oily contents of the oil interceptors should be collected for reuse, or transferred to an appropriated disposal facility.

2.1.4 Waste

The potential wastes generated during the operation stage for the Southern Section are identified as general refuse waste and industrial waste. In addition, there may be small quantities of chemical waste.

General refuse will arise from the public, station employees and commercial operators. The materials will include food-waste, wood, plastic, office wastes, old tins/ containers and cleaning materials etc.

Industrial waste will arise from maintenance activities of the tunnel and the two stations. The materials will include scrap materials from rail, used fluorescent tubes, spare parts of the machines or equipment and discarded electronic equipment.

Chemical wastes will arise from maintenance activities of the tunnel and stations. The waste may include lubricants, paints, used batteries, mineral oil, acids/alkaline, pesticides, coolants and solvents. Proper management of the wastes is essential to avoid environmental, health and safety problems.

The storage of general refuse may give rise to potential impacts which include odour if waste is not properly handled. Other problems including water quality pollution, visual impact and vermin problems will also be arising if the storage areas are not well maintained and cleaned regularly.

In order to minimise the waste impact, mitigation measures as follows are recommended in the EIA Study,

- Proper storage, collection and transport of waste, such as,
  - Handle and store wastes in a manner which ensures that they are held securely without loss or leakage, thereby minimising the potential for pollution;
  - Use waste hauliers authorised or licensed to collect the a specific category of waste;
  - Remove waste in a timely manner;
  - Maintain and clean waste storage areas regularly;
  - Minimise windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers;
  - Dispose of waste at licensed sites;
  - Maintain records of the quantities of wastes generated, recycled and disposed.
- Reuse of clean surplus materials rather than disposal,
- Employ reputable waste collector to remove general refuse and industrial waste from stations, separately from chemical wastes on daily basis to minimise odour, pest and litter impacts; and

- Handle and disposal of chemical waste in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

2.2 Audit Findings

2.2.1 *Fixed Plant* Noise

The fixed plant rooms at each of the stations in the Southern Section, namely Nam Cheong and Mei Foo stations and the tunnel section between two stations have been inspected during the site audits. The observations on the mitigation measures being implemented are summarised as below.

Nam Cheong Station

The chiller plant for Nam Cheong Station is located on the roof. There are silencers and acoustic panels installed above and on the sides of the plant. The chiller pumps are also located in the chiller pump room on the top floor of the station. No significant noise emanated from the pump room to the surrounding has been noticed. Other chiller systems include the Environmental Control System (ECS) are located in enclosed areas (See Photos 2.1-2.6 in Annex 2).

The tunnel ventilation fans are in enclosed areas. The ventilation fans are equipped with silencers. There is no equipment installed in the ventilation shaft (See Photos 2.7-2.9 in Annex 2).

The transformer rooms have been completed and are controlled by China Light Power. Inspection of the interior of the rooms cannot be performed during the audit since no access can be provided. By observation, the rooms are enclosed and no significant noise has been noticed from the exterior of the rooms (See Photo 2.10 in Annex 2).

The sump pump rooms including plain water pumps and sewage water pumps are all located in the basement of the station. The rooms are fully enclosed and no noise has been noticed during the audit (See Photos 2.11-2.12 in Annex 2).

Tunnel Section Between Mei Foo to Nam Cheong

Prince Edward Ventilation Building and Lai Wan Chiller Plant Building for the tunnel section between Mei Foo to Nam Cheong have been inspected. There is no noisy equipment neither installed nor operated in these areas (See Photos 2.13 – 2.23 in Annex 2).

Mei Foo Station

The chiller systems including the Environmental Control System (ECS) and fans are all installed in enclosed rooms. There are silencers installed together with the equipment. Since the equipment is protected with linings, it is unable to inspect the silencers. However, no noise has been noticed during the audit (See Photos 2.24-2.26 in Annex 2).

Remote radiator building contains radiators which are part of the chiller systems. The roof of the building is equipped with silencers. Silencers and acoustic louvers are also installed at the side of the building (See Photos 2.27-2.31 in Annex 2).

The transformer rooms have been completed. Since the rooms have been handed over to the CLP, no inspection has been conducted during the audit. By observation the rooms are enclosed and no noise has been noticed.

Tunnel ventilation rooms are located in the basement and on the platform levels of the station. The rooms are fully enclosed. There are silencers installed inside the ventilation fans. However, inspection of the silencers was not carried out since the ventilation fan was in operation during the audit.

The ventilation shafts are located above the roof of the station. There is no mechanical equipment inside the shafts. The structures are fully enclosed and there is no access for inspection. By observation, no noise has been noticed during the audit (See Photos 2.32-2.33 in Annex 2).

The sump pump rooms including plain water pumps and sewage water pumps are all located in the basement of the station. The rooms are fully enclosed and no noise has been noticed during the audit (See Photos 2.34 in Annex 2).

As observed during the audits, the mitigation measures recommended in the EIA Report, such as fitting of silencer, special orientation/position or enclosure have been applied.

In addition to the audits on physical measures, noise monitoring will be conducted as part of the operational EM&A manual to ensure the fixed plant noise arising from Nam Cheong Station, Mei Foo Stations and the tunnel section will comply with the relevant noise criteria. The EM&A Manual has been submitted to EPD on 9 October.

2.2.2 *Landscape and Visual*

- Landscape Master Plan and Detailed Landscape Drawings which incorporated the design principles proposed in the Landscape Design Strategy Report have been submitted to EPD and approved on 16 January 2003.

During the site audits taken for the stations in the Southern Section, namely Nam Cheong and Mei Foo stations and the tunnel section between two stations, the landscaping works on-site were inspected against the Detailed Landscaping Drawings. The observations on the landscaping works being implemented are summarised as below.

Nam Cheong Station

All vent structures are located on the roof of the station. The exterior of the shaft integrates with the station and the structures are sited without any visual intrusion to the surrounding community (See Photos 2.35—2.37 in Annex 2).

Some of the landscaping works at Nam Cheong Station were outstanding during the first audit. A re-audit on the outstanding works was conducted on 10 September 2003. As seen, some of the works were still ongoing. About 90% of the embankment along Road P1 were hydroseeded. Landscaping on external perimeter of the station along Sham Mong Road was ongoing, while the landscaping works in the middle and on the side of Sham Mong Road near the residential area was completed. The landscaping works in the west side of the station, Tonkin Street and Yen Chow Street West were ongoing. The remaining works will be finished by the end of October 2003 (See Photos 2.38—2.46 in Annex 2).

Tunnels between Nam Cheong to Mei Foo

Vent structure for the tunnel section at Prince Edward Roundabout are designed to integrate with surrounding environment. It blends with the landscape design of Nam Cheong Park which causes minimal visual intrusion (See Photos 2.47 in Annex 2).

Landscape works above the tunnel section between Nam Cheong and Mei Foo have been inspected. The tunnel is fully contained in a cut & cover tunnel structure and is covered by the landscaped earth mound. All landscaping works in Nam Cheong Park and Site 10 have been completed (See Photos 2.48– 2.60 in Annex 2).

Landscaping works at Lai Wan Interchange site is still outstanding since the works area is handed to the Route 9 Contractor. The Route 9 Contractor will be responsible for reinstatement of the landscape works after completion of their construction works (See Photo 2.61 in Annex 2).

Mei Foo Station

Vent structures for Mei Foo Station are located at the roof of the station which is part of the Lai Chi Kok Park. The structures are designed with similar features to the amenities of the Park. There is no visual intrusion to the surrounding environment (See Photo 2.62 in Annex 2).

Re-audit was conducted on 19 August 2003. Landscaping works at Mei Foo Station were still on-going. The landscaping works on the roof of MEF Station are anticipated to be completed by the end of October 2003, whereas works in the southern part of Lai Chi Kok Park are anticipated to be completed by the end of November 2003 (See Photos 2.63-2.69 in Annex 2).

As observed during the audits, the majority of landscaping works included in the Detailed Landscape Drawings have been implemented accordingly while some of the landscaping works were still on-going at Mei Foo station which was anticipated to be completed prior to the opening of West Rail.

2.2.3 *Water Quality*

During the site audits taken for the stations in the Southern Section, namely Nam Cheong and Mei Foo stations and the tunnel section between two stations, the drainage systems have been inspected. The observations on the drainage systems and the associated waste pollution control measures are summarised as below.

Nam Cheong Station

Sewage and plain water are collected in the sump pits located in the basement of the station before discharged to the public foul sewer and storm water drainage systems respectively. There are oil interceptors installed to treat water from the station, tunnels, and the surface runoff at the exterior of the station (See. Photos 2.70-2.72 in Annex 2).

Tunnel Section Between Mei Foo and Nam Cheong

Oil interceptors for the tunnels between Mei Foo and Nam Cheong have been inspected. The interceptors are located inside Lai Chi Kok Park, Nam Cheong Park, Area 10 and in the Emergency Vehicle Access near Price Edward Ventilation Building (see Photos 2.73-2.75 in Annex 2).

Mei Foo Station

Plain water, including rain water, and sewage are collected in the sump pits located in the basement of the station. After collection, the water is pumped to the public storm water drainage system and the foul sewer drainage for discharge. No oil interceptors have been installed in the station (see Photos 2.76-2.77 in Annex 2).

As seen during the audits, proper drainage systems have been provided to collect storm water and sewage effluents separately to comply with the EIA recommendations. Oil interceptors were also installed where oil/grease is anticipated.

2.2.4 *Waste*

General waste generated from the stations are to be stored at the refuse rooms for collection. (See photos 2.78 in Annex 2)

There will be no chemical waste will be generated in the Southern Section.

3 CENTRAL SECTION

3.1 Environmental Impacts and Mitigation Measures

3.1.1 Railway Noise

Majority of the alignment of the Central Section is built inside tunnels with the exception of a 250m length of railway to the north of the northern portal of Tai Lam Tunnel in Kam Tin which is open on ballast tracks. The EIA Study assessed the potential railway noise impact from the open section to the surrounding noise sensitive receivers and recommended erection of noise barriers. The locations of noise barriers are presented in the layout drawings submitted to EPD (see Figure 2).

3.1.2 Fixed Plant Noise

In general, the fixed plant noise sources are similar to those described earlier in the Southern Section. The alignment of the Central Section has a number of fixed plant facilities. They include,

- a ventilation building and power sub-station within Kwai Fong ancillary building,
- ventilation shafts at the southern and northern ends of TWW,
- a transformer house at the northern end of TWW,
- a cooling water station at the TWW reclamation area,
- ventilation buildings at the northern and southern portals of Tai Lam Tunnel.

Mitigation measures recommended in the EIA Study for the ventilation facilities have been summarised in the previous Chapter of the Southern Section and that for the transformer house and the cooling water station are as below,

Transformer House

- provide acoustic enclosures around transformer;
- ensure all equipment is maintained in good working condition.

Cooling Water Pumps

- install an acoustic enclosure with silencers fitted to air inlets and outlets;
- isolate the pump from any surface which may radiate noise;
- maintain equipment in good mechanical condition.

3.1.3 *Landscape and Visual*

Within the Central Section, West Rail is largely invisible during the operational phase. The only visible manifestations of the railway are the superstructures, such as Kwai Fong ancillary building, Tsuen Wan West Station and ventilation buildings at Tai Lam Tunnel portal. The landscaping and visual mitigation measures recommended in the EIA Study at these above ground structures include,

- Soft and hard landscape treatment around ventilation buildings and the tunnel portals;
- Reinstatement of planting and park facilities within Tsuen Wan District Open Space Area 35, Phase I;
- Reprovisioning of the waterfront promenade Phase 2 of the Open Space.

3.1.4 *Water Quality*

The EIA Study identified potential sources of impacts on water quality from the operation of the Central Section as follows,

- cooling water discharge from tunnels and the TWW;
- runoff from TWW; and
- sewage generated from the station.

Cooling water from tunnels and the TWW will be discharged directly to the Victoria Harbour. As the water discharged from the cooling facilities will be dispersed by tidal action in Tsuen Wan Bay, the assessment in the FAR concluded that the discharge would not lead to any unacceptable thermal impact on the local water.

Rainwater runoff from 'clean' station areas is not expected to have an adverse water quality impact. Discharge from rail tracks via the pumping stations is expected to contain limited amounts of oil and grease discharged to the existing public stormwater drain system.

Sewage effluents will be discharged directly to the existing sewerage infrastructure. EPD confirmed that there is sufficient spare capacity at local pumping stations to accommodate the additional flows from TWW.

The following measures were recommended in the FAR for implementation where appropriate:

- A surface water drainage system should be provided to collect operation tunnels seepage, tunnel drainage and track runoff. The discharge should pass through oil and grit interceptors/chambers to remove any oil, grease and sediment before being pumped to the public stormwater drainage system;
- Sewage effluents are required to meeting standards stipulated in the TM. Sewage should be direct to the public foul sewer and sewage treatment facilities for treatment;
- The efficiency of silt traps and oil interceptors is dependent on regular cleaning and maintenance. These installations should therefore be regularly cleaned and maintained in good working conditions; and
- Oily contents of the oil interceptors should be collected and reused, or transferred to an appropriate disposal facility.

3.1.5 Waste

The issues of waste generation and handling during the operation phase are similar to the Southern Section and the mitigation measures can be referred to in Section 2.1.4 of the Chapter on the Southern Section.

3.1.6 Hazard

A section of Kwai Tsing Tunnel passes within 250m of the former Gin Drinkers Bay Landfill Consultation Zone. The results of the EIA Study indicated that there would be potential landfill gas hazard from the Gin Drinkers Bay Landfill to the operations of West Rail. As a result, installation of a permanent gas monitoring system and early switching of tunnel ventilation fans before traffic starts were recommended in the EIA Study and required under the environmental permit.

However, monitoring of landfill gas has been conducted throughout the construction stage of Kwai Tsing Tunnels. The results show steadily nil or trace levels of gases far below the level that could pose a hazard. Based on the findings and the fact that the bored tunnels are not classified as a confined space, no permanent monitoring of gas was necessary to be installed inside the tunnels. Similarly, early switching of tunnel ventilation fans before traffic starts is considered unnecessary as no hazardous gases are present.

A variation of the environmental permit on these changes (VEP Application No. VEP-084/2003) has been applied on 24 January 2003 and approved on 20 February 2003. The revised mitigation measures required under the environmental permit are,

- Daily measurement of methane and carbon dioxide concentrations;
- Training of all maintenance personnel and station staff working within the tunnels; and
- Prohibit of smoking within the tunnels

Following the completion of the tunnel construction works, monitoring shall be carried out monthly or more frequently. For a period of not less than 7 days prior to commencement of operation of the Project, monitoring shall be carried out daily or more frequently. The actions detailed in Table 3.1 below shall be carried out in the event of gas trigger levels being breached.

Table 3.1. Actions to be carried out in the event of Landfill Gas Detection

Parameter	Measurement	Action
O_2	<19%	Increase ventilation to restore O_2 to >19 %
	<18%	Stop works
		Evacuate personnel
		Increase ventilation to restore O_2 to > 19%
CH_4	>10% LEL	Prohibit hot works
	>20% LEL	Increase ventilation to restore CH_4 to <10% LEL
		Stop works
		Evacuate personnel
		Increase ventilation to restore CH_4 Level to <10% LEL
CO_2	>0.5%	Increase ventilation to restore CO_2 to <0.5%
	>1.5%	Stop works
		Evacuate personnel
		Increase ventilation to restore CO_2 to 0.5%

3.2 Audit Findings

3.2.1 Railway Noise

The details of the barriers, namely locations, height and length were checked against the layout drawings submitted to EPD as per the West Rail Environmental Permit. It has been confirmed during the site audit in the presence of IEC that all the barriers are constructed as per the layout drawings (see Photos 3.1–3.6 in Annex 2).

3.2.2 Fixed Plant Noise

The fixed plant for the Kwai Tsing Tunnels, Tai Lam Tunnels and at Tsuen Wan West station in the Central Section have been inspected during the site audits. The observations on the mitigation measures being implemented are summarised as below.

Kwai Tsing Tunnels

Vent shafts and the associated fans enclosed inside the Kwai Fong Ancillary Building and the vent equipment were inspected. The inspections indicated that essential silencers were all installed and fitted to the vent fans. The vent openings are all facing away from NSRs (see Photos 3.7–3.10 in Annex 2).

The sub-station was completed and handed over to China Light & Power and as a result it could not be accessed. However, visual inspection of the transformers of the sub-station outside the fencing gates was possible. It was observed that the equipment was installed with dampers which can reduce the structure-borne vibrations. Since

the sub-station is located far away from NSRs, there is no potential noise impact anticipated (see Photos 3.11–3.13 in Annex 2).

In additional to the site inspection on the installation of acoustic treatment on the fixed plants, noise monitoring on the operation of the Central Section Ventilation Shaft was performed at the nearby NSRs – Kwai Fong Court and Clague Garden Estate in the midnight of 18 March 2003 and in the evening of 19 March 2003. The results of the monitoring show that the overall noise levels with the operation of the fixed plant increased by less than 1dB(A) as compared to the background noise levels and it is considered that no adverse noise impacts are introduced by these fixed plant. Details of the noise monitoring results are provided in Annex 3. In addition to these measurements, noise monitoring will be conducted as part of the operational EM&A to ensure the fixed plant noise arising from facilitates in the Central Section comply with the relevant noise criteria.

Tsuen Wan West Station

The chiller plant room and the ECS room of the station are located in enclosed areas on the platform areas (see Photos 3.14-3.15 & 3.17-3.18 in Annex 2). The cooling water station is located in a separate location in which the seawater cooling system is enclosed (see Photos 3.16 in Annex 2). No noticeable noise has been detected during the audit.

The transformer rooms have been completed and handed over to the China Light & Power. No access can be provided during the site audit for inspection. By observation, there is no noticeable noise detected from the exterior of the rooms (see Photos 3.19-3.20 in Annex 2).

The tunnel ventilation systems are installed in enclosed areas. Silencers are equipped inside the ventilation fans. There is no noisy equipment in the ventilation shaft (see Photos 3.21-3.24 in Annex 2).

Tai Lam Tunnels

Chiller systems for the vent buildings at the Tai Lam Tunnel northern portal are installed on the roof floor surrounded by solid fencing walls (see Photos 3.25–3.26 in Annex 2). There was no noticeable noise during the audits.

As seen during the site audits, the fixed plant have been either equipped with silencers or enclosed to mitigate the noise impact with respects to the EIA recommendations.

3.2.3 *Landscape and Visual*

Kwai Tsing Tunnels

Landscape Master Plan and Detailed Landscape Drawings incorporated with the design principles proposed in the Landscape Design Strategy Report have been submitted to EPD and approved on 16 January 2003.

The landscaping works as proposed in the approved Detailed Landscape Drawings have been audited at on-site. Landscaping and hydroseeding for the Kwai Tsing Tunnel was largely completed with minor outstanding works at several locations (see Photos 3.30-3.32 in Annex 2). Remaining works include tree planting at Area E and G10 (above the Kwai Tsing Tunnel) will commence once the approval from LCSD is obtained.

Tai Lam Tunnels

The landscaping works at and around the northern and southern portals of Tai Lam Tunnels and at the waterfront areas along Hoi On Road near the southern portal of Tai Lam Tunnel have been completed (see Photos 3.33-3.35 in Annex 2).

Tsuen Wan West Station

An audit on the landscaping works for Tsuen Wan Station was conducted on 19 September 2003 and it was observed that landscaping works outside the public transport interchange for Tsuen Wan West Station were completed (see Photos 3.36-3.37. The landscaping works at the Promenade and along Hoi Hing Road were also completed (see Photos 3.38-3.39). The works including Tsuen Wan District Open Space Area 35 and water front promenade Phase 2 were still under construction.

As observed during the audits, the majority of landscaping works included in the Detailed Landscape Drawings have been implemented accordingly while some of the landscaping works were still on-going at Tsuen Wan West station which was anticipated to be completed prior to the opening of West Rail.

3.2.4 *Water Quality*

During the site audits taken for the tunnels and station, the drainage systems have been inspected. Silt interceptors and oil interceptors were observed in Area E of Kwai Tsing Tunnel and at Tsuen Wan West Station were also inspected (see Photos 3.40-3.42, 3.42a, 3.42b in Annex 2).

3.2.5 *Waste*

Bins for the general refuse were in place at the associated area of Kwai Tsing and Tai Lam Tunnel. No chemical and industrial wastes will be generated at the vent buildings and sub-stations of Kwai Tsing Tunnel and Tai Lam Tunnel.

Refuse room is provided in Tsuen Wan West Station for general waste storage. (See Photo 3.43-3.44 in Annex 2)

3.2.6 Hazard

It is required that no smoking is allowed within the section of Kwai Ching Tunnels which fall inside the Consultation Zone. "NO SMOKING" reflective signs are posted along the tunnel sections at intervals of 100 m. (see Photos 3.45 in Annex 2)

DB320 Contractor, Dragages – Zen Pacific Joint Venture will continue to monitor the landfill gas in Kwai Tsing Tunnel during the operational phase of West Rail as per what they have been undertaking during the construction stage. The DB320 Contractor is required to monitoring methane, carbon dioxide and oxygen levels daily for the first six months.

4 NORTHERN SECTION

4.1 Environmental Impacts and Mitigation Measures

4.1.1 Railway Noise

In the Northern Section, the operation of the train is mainly on viaduct and on embankment through the depot. The EIA Study identified that the noise sensitive receivers in close proximity to the railway are potentially affected by noise from train operations. The noise impacts include the airborne noise derived from the wheel rail interaction and also the re-radiated noise induced from vibration on the viaduct section.

In order to achieve the noise standard specified in the Technical Memorandum under Noise Control Ordinance (NCO), the EIA Study has recommended trackside barriers within the depot and multi-plenum system for the viaduct section. The locations of the noise barriers within the depot and the multi-plenum system are shown in Figures 3 and 4 respectively. The multi-plenum system consists of the following features:

- Use of specified resilient rail baseplates with static stiffness of 15 kN/mm as specified for track on viaduct to reduce vibration transmission to the viaduct structure and thereby reduce re-radiated noise from the structure;
- Mounting the specified track on a floating slab system with dynamic bearing stiffness of 6.5 – 7.1kN/mm to further reduce vibration transmission to the viaduct structure;
- Creation of an under car acoustic plenum by installing skirts on the train and installation of noise absorption on the bottom side of the floor within two meters of the bolsters and on the interior facing of the skirts. The skirt extends to approximately 250mm above the derailment containment upstand on tangent track;
- Creation of second acoustic plenum on either side of the car, using walkways at the side of the track. Sound absorption is to be placed on the underside of the walkways. The width of walkway is 1600mm in order to achieve a gap of approximately 250mm between the edge of the walkway and the side of the train on tangent track; and
- Edge wall lined with specified sound absorptive material with absorptive coefficient as specified below. The walls can be increased in height with noise enclosure where necessary to further reduce airborne noise levels.

Sound Absorption Coefficient						
Octave Band Centre Frequency, Hz	125	250	500	1k	2k	4k
Absorption Coefficient	0.20	0.60	0.75	0.85	0.90	0.90

At points and crossings, the centre wall between the up and down track which forms the multi-plenum system cannot be installed such that the effectiveness of the multi-plenum system is reduced. Therefore, the EIA Final Assessment Report has

recommended full noise enclosure around the crossover which is in close proximity of noise sensitive receivers. On the Northern Section, there is a crossover near Pok Oi Hospital, where full noise enclosure is required. The locations of the switch and noise enclosure are shown on Figure 5.

Design of West Rail has been changed since completion of the West Rail Environmental Impact Assessment Final Assessment Report in 1998. The changes of the operational parameters for the Northern Section included:-

- Reduction of train length from 12 cars to 9 cars; and
- Increase in train frequency from 30 to 40 trains per hour during 0600 to 0700.

Subsequent to these changes, the location of noise enclosures recommended in the EIA study have changed. The location of the noise enclosure is slightly revised at Pok Oi Hospital. Application for the variation of the Environmental Permit (VEP-020/2000/A/EP-004) for these changes were made to EPD on 28 May 2001 and approved by EPD on 27 June 2001 and an Environmental Permit (EP-004/1998/B) was issued. The location of the noise enclosure is presented in the layout drawings submitted to EPD on 30 August 2001.

4.1.2 Fixed Plant Noise

Pat Heung Maintenance Centre

The majority of fixed noise sources along this section are located in the Pat Heung Maintenance Centre (PMC). Generally noise arising within the PMC can be categorised into train rolling noise and fixed noise sources.

Train rolling noise will be generated on both the main line and the siding areas. Trains travelling along the mainline will be at maximum speed of 130 kph while those travelling in the siding tracks will be at 25 kph. The FAR indicates that train rolling noise will dominate noise emissions from the PMC particularly at the early morning.

Fixed noise sources will include all other noise sources generated from within the PMC such as idling trains, noise from train washing, train mounted ancillary equipment e.g. air conditionings, noise emanating from train maintenance activities such as wheel lathes, from workshops and stores and from public address systems, human noise and train horns.

There are two sets of train wash facilities installed. One of them is located underneath the Ho Pui footbridge and the other is located approximately 50m east of the EMU Building. The train washing facilities near the Ho Pui footbridge is for cleaning of the train surface and the train washing facilities near the EMU Building is for cleaning of the interior of the trains which noise nuisance is not anticipated.

The FAR recommended mitigation measures to minimise noise impacts resulting from the operation of the PMC by provision of noise barriers. Locations and heights of the noise barriers have been optimised to mitigate the noise to the acceptable levels without impacting on railway operation. The details of the noise barriers are presented in the layout drawings submitted to EPD on 30 August 2001 (see Figure 4).

Kam Sheung Road Station and West Rail Building

The fixed noise sources at the Kam Sheung Road Station are of similar to those described at MEF and NAC in the Southern Section. The associated mitigation measures are also of the similar types including silencers, acoustic enclosures or good maintenance.

The West Rail Building (WRB) is designed to house a railway control centre with essential administration offices and facilities. Noise arising from the activities inside the WRB is not anticipated.

4.1.3 *Landscape and Visual*

The West Rail EIA Study has identified that the PMC on embankment would result in loss of some landscape resources and the viaduct structure would pose potential visual impact. Mitigation measures have, therefore, been recommended to the maximum extent possible to minimise potential visual and landscape impacts.

The landscaping and visual mitigation measures recommended in the EIA Study are as below,

PMC Area

- Create a coordinated design of all engineering structures including viaducts for railway and new roads, bridges catenary support systems, noise barriers, noise enclosures, trackside equipment etc. that adopt a rounded curvilinear form so as to create a modern streamlined image as well as minimising visual impacts;
- Soften and screen engineering structures with planting wherever possible;
- Plant embankments and cuttings of both the railway and the new roads with indigenous vegetation;
- Dense screen planting on both sides of the PMC;
- Columnar trees to be planted within PMC to screen views into the PMC from surrounding elevated land;
- Redirected drainage channels to adopt environment-friendly methods; and
- Lighting within the PMC to be as low as possible, with baffles to reduce overspill, located within the PMC and not along the perimeter and only in areas requiring night security.

Viaduct Section

- Application of hydroseed to all areas below the viaduct and within the West Rail gazettal boundary for northern section;
- Application of native whip mix in hydroseeding and shrub mix in most areas below the viaduct and within the West Rail gazettal boundary for northern section;
- Planting the of native climber along the viaduct supporting columns; and
- Revert temporarily occupy area to the land owners in its original condition.

4.1.4 *Water Quality*

Potential sources of impact on water quality from the operation of the Northern Section include the following:

- Runoff from rail track;
- Operational runoff from KSR and PMC;
- Sewage generation at KSR, WRB and PMC; and
- Wastewater from train cleaning, and heavy cleansing and maintenance facilities of PMC.

Of the above potential sources of impact, the sewage generation and the wastewater from the PMC will be the most significant.

Sewage will be generated at KSR Station, WRB and PMC. The EIA Study identified that uncontrolled discharge of sewage will cause unacceptable water quality impacts on the local water sensitive receivers, and ultimately the Deep Bay Water Control Zone. According to the progress of the Sewage Master Plan for Yuen Long and Kam Tin, trunk sewers, however, will not be provided to the areas until 2006. The sewage generated at the above premises will require a proper disposal plan before public sewers are ready.

Wastewater generated by train washing and effluents from maintenance works at the PMC have potential to be heavily contaminated with oils, greases and other hydrocarbon-based products. In addition, the washing of batteries during the maintenance process can produce an effluent contaminated with heavy metals, such as lead and nickel.

The EIA Study recommended the following mitigation measures:

- A surface water drainage system should be provided to collect track runoff;
- Sewage effluents generated at KSR, WRB and PMC must meet the standards stipulated in the TM prior to discharge. It has been decided that the sewage will be diverted and stored into two tanks temporarily. Licensed collector would be employed to collect the contents of the sewage tanks. This "Tankering Away" arrangement will be adopted until trunk sewers are available for collecting the sewage to local treatment plant;
- Silt traps, sediment basins and oil interceptors should be regularly cleaned and maintained in good working order. The efficiency of these installations is dependent on regular cleaning and maintenance. Oily contents of the oil interceptors should be collected for reuse, or transferred to an appropriate disposal facility;
- The acid washing facilities should be designed to achieve effective neutralisation of acids to TM requirements prior to discharge (e.g. neutralisation tanks). Prudent management practices should be adopted to minimise the amount of acid used;
- Any opportunities for the recycling of water within the automatic washing facilities should be sought to minimise discharge requirements. Bio-degradable detergents should be selected to minimise the impact on water quality and associated ecosystems of the receiving water bodies;

- Hard standing surfaces should be provided for areas which may potentially give rise to contamination of storm water by oil and grease;
- All plant maintenance areas should be bunded and constructed on a hard standing and provided with sediment traps and petrol interceptors. Traps and interceptors should be regularly cleaned and maintained, especially after any accidental spillages. Each petrol interceptor should have a bypass to prevent flushing during periods of heavy rains. Layers of sawdust, sand or equivalent material should be laid underneath and around any plant and equipment that may possibly leak oil; and
- An emergency spillage action plan should be developed for the PMC to ensure that any accidental spillage event is treated immediately and does not impact on any water bodies.

4.1.5 Waste

Similar to the Central and Southern Sections, the potential wastes generated during the operation stage for the Northern Section from the KSR, WRB and PMC are identified as general refuse waste, industrial waste and chemical waste whilst the quantities will be more. The EIA Study's recommended mitigation measures are as follows,

- Proper storage, collection and transport of waste, such as,
  - Handle and store wastes in a manner which ensures that they are held securely without loss or leakage, thereby minimising the potential for pollution;
  - Use waste hauliers authorised or licensed to collect the a specific category of waste;
  - Remove waste in a timely manner;
  - Maintain and clean waste storage areas regularly;
  - Minimise windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers;
  - Dispose of waste at licensed sites;
  - Maintain records of the quantities of wastes generated, recycled and disposed.
- Reuse of clean surplus materials rather than disposal,
- Employ reputable waste collector to remove general refuse and industrial waste from stations, separately from chemical wastes on daily basis to minimise odour, pest and litter impacts; and
- Handle and disposal of chemical waste in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

4.1.6 *Hazard*

Part of the alignment in the Northern Section falls within the Consultation Zone of the Au Tau Water Treatment Works (WTW) at where liquefied chlorine is stored. Chlorine is classified as a Potentially Hazardous Installation (PHI) and its presence imposes risks to the travelling public associated with the operation of the WR particularly at the Northern Section. As a result, a Hazard Assessment study has been conducted to assess the extent of risks and recommend necessary measures.

The EIA Study summarised the conclusion and recommendations of the Hazard Assessment. It identified that levels of individual and societal risk at WR due to operations at Au Tau WTW comply with the requirements of Hong Kong Planning Standards and Guidelines (HKPSG). Therefore, there is no constraint posed on the alignment of WR as a result of its proximity to Au Tau WTW and no mitigating measures need to be considered.

However, several recommendations were made to ensure that the risks to the WR users will be as low as reasonably practicable. Firstly the off-site Emergency Plan for the WTW should include arrangements for the external emergency services (in conjunction with KCRC) to stop trains from entering the affected area from either direction in the event of a chlorine release. Secondly, the following principles should be carried forward into the detailed design:

- Ventilation intakes for the station, shops and offices should be located at as high a level as reasonably practicable; and
- The station concourse, shops and offices should be substantially enclosed areas.

4.1.7 *Ecology*

Territory Development Department (TDD) proposed some drainage works for Drainage Services Department (DSD) in the Pat Heung and Kam Tin areas which affected some streams and ponds. It has been recommended in the EIA for the Main Drainage Channels (MDC) to reinstate some of the temporarily affected fish ponds and retain the unaffected meanders of Kam Tin River. Due to the West Rail, some of these fish ponds and meanders to be reinstated or retained by the MDC were affected. The impacts on these fish ponds and meanders have been taken into account in the West Rail EIA Study.

In additional to the impact by the West Rail on the fish ponds to be reinstated under the MDC, West Rail also affected some existing fish ponds and stream. The West Rail EIA study indicates that a total of 12 hectares of streams (1.8 hectares), fish ponds (10 hectares) and freshwater marsh (0.3 hectare) in the Kam Tin and Pat Heung areas are lost due to the West Rail. The affected areas provide breeding, foraging and roosting habitats for some rare or protected species are considered to be having high ecological value, such as ,

Invertebrates – Dragonflies (*Odonata*) and Butterflies (*Lepidoptera*)

Herpetofauna – Frogs (Narrow-Mouthed Frog-*Kalophrynus interlineatus;* Chinese Bull Frog-*Rana rugulosa;* Butler's Pygmy Frog-*Microhyla butleri)*

and Snake (Chinese Water Snake-*Enhydris chinensis*; Plumbeous Water Snake- *Enhydris plumbea*)

Avifauna – Birds (Egrets and Painted Snipe-*Rostratula benghalensis*)

Reprovisioning of 12 hectares similar habitat is, therefore, recommended to compensate the ecological loss.

Two broad areas of land in Kam Tin and Pat Heung which are located in the vicinity of the affected areas are identified for habitat reprovisioning. The locations of individual land parcels for habitat reprovisioning are shown on Figure 8. The range of habitats and ecological functions to be provided in order to compensate the affected habitats on a like-to-like basis have been established in the Habitat Creation and Management Plan (HCMP). They include ponds, seasonal/permanent marsh, grassland and terrestrial habitats.

Once the West Rail wetland construction works are completed, there will be a period of 12 months of Establishment Operations to be carried out by the wetland contractor. The contractor shall maintain the planting works, including the operation of water circulation and management system, drainage features and soiling works. After the Establishment Operation period, KCRC will undertake the responsibility for wetland management and maintenance of the compensatory habitat.

4.2 Audit Findings

4.2.1 Railway Noise

Facts and information were gathered in a prudent manner and technical knowledge was applied with the support from the Engineer to confirm the completion of the following mitigation measures to the satisfaction of Independent Environmental Checker:-

- Noise Barriers of specified heights recommended in the EIA or submissions under the Environmental Permit were inspected on 7th May 2003 on the main line within the depot area. All barriers were properly installed and no defects were observed (see Photos 4.1 - 4.6 in Annex 2).

- Installed the specified resilient rail baseplates in accordance with West Rail EIA's recommendation for track on viaduct to reduce vibration transmission to the viaduct structure and thereby reduce re-radiated noise from the viaduct structure between Kam Sheung Road Station and Yuen Long Station and within Kam Sheung Road Station (see Photos 4.10 & 4.35 in Annex 2);

- Mounted the specified track on a floating slab system baseplates in accordance with West Rail EIA's recommendation to further reduce vibration transmission to the viaduct structure between Kam Sheung Road Station and Yuen Long Station and within Kam Sheung Road Station (see Photos 4.11 & 4.35 in Annex 2);

- Created the undercar plenum by installing skirts on the train and absorptive lining on the skirt and within two meters of the bolster (see Photos 4.21a-4.21b in Annex 2);

- Created the second acoustic plenum on both side of the car, using walkway at the side of the track along the viaduct alignment between Kam Sheung Road Station and Yuen Long Station and lined absorptive material under the walkway (see Photos 4.12 in Annex 2).

- Regarding the second plenum within the station areas at the stations in the Northern Section, i.e. Kam Sheung Road Station, high-side wind shield with absorptive lining was erected along the station as a purpose-built construction/alternative arrangement (see Photos 4.32 & 4.34 in Annex 2). Whilst it is considered that the alternative design could mitigate the noise impact, the use of these measures is not strictly in compliance with the environmental permit condition as they are not second plenum. Therefore, it is necessary to apply for a Variation to Environmental Permit (VEP) to seek EPD's approval.

- 1.2m high noise barrier was erected and lined with sound absorptive material in accordance with West Rail EIA's recommendation onto the parapet walls along the viaduct structure between Kam Sheung Road Station and Yuen Long Station and within Kam Sheung Road Station (see Photos 4.12 – 4.13 & 4.34 in Annex 2). The Detailed Design Consultant has also indicated that the edge barrier can be extended on single track viaduct and to full noise enclosures on twin track viaduct with the exception of a few locations as a result of site constraints, e.g. long span over main drainage channel. The high barrier or full noise enclosure are omitted because the long span structure will be adversely affected by typhoon loading. Nevertheless, there are no turnouts (which is expected to be noisier and centre wall of the multi-plenum system cannot be implemented) or sensitive receivers now or in the future that adverse noise impact is not anticipated. Moreover, additional support to the viaduct for the future noise barrier/enclosure or enhancement to the multi-plenum system will be considered to mitigate noise impact at future developments where appropriate.

- Installed the noise enclosures to reduce the airborne noise radiated from crossover near Pok Oi Hospital (see Photos 4.14 – 4.15 in Annex 2) with the full length of 220m according to West Rail EIA's recommendation. In addition, acoustic panels are installed inside the noise enclosure (see Photo 4.15). However, observation was made by the IEC on the small gaps at the side (see Photo 4.16 in Annex 2) and at the roof in a size of approx. 5cm x 9cm (see Photo 4.18 in Annex 2) at the noise enclosure near Pok Oi Hospital.

An audit close-up meeting was held with IEC, Engineer & Contractor after the audit. Contractor was requested by IEC/Engineer to rectify the observations made during the audit.

A re-audit was undertaken by IEC, Engineer and KCRC Environmental Team on 22 May to confirm the rectification of the observations on noise enclosure made during the audit. During the audit, IEC has confirmed the gap identified in the noise enclosure at Pok Oi was mostly filled with acoustic material (see Photo 4.17 and 4.20

in Annex 2). However, IEC requested the Engineer to ensure more acoustic materials is to be applied and evidence shall be submitted to IEC to confirm the completion of the works. Engineer confirmed the completion of the remedial works on 29 May and the gap identified in Pok Oi noise enclosure was completely filled with acoustic materials (see Photo 4.20). No further action is therefore required.

In addition to the site inspection on the physical installation or implementation of the noise mitigation measures, such as baseplate, floating slab, vehicle skirt, walkway and absorptive panels, the quality of the materials, namely for the baseplate, bearing and absorptive lining have also been checked to ensure they meet the EIA requirements.

The EIA recommendations are incorporated into the contract specifications for contractors to comply with. Before the contractors start with the construction works, they have to submit proposals on the materials to be used for KCRC's approval. The proposals include details on the design, the laboratory qualification test reports, which were verified by an independent surveyor and witnessed by the specialist consultants showing the performance of the proposed materials, methodologies of installation/production/manufacturing/assembling and quality assurance plans. All the proposals were reviewed by qualified professional engineers and approved when the contract specifications were complied with. By reviewing the contract specifications, contractors' proposals and the approval documentations, it can confirm if the EIA recommendations are achieved.

In addition, throughout the construction period, testing of the materials were performed periodically in accordance with contract specification. Testing was conducted by an independent laboratory. In some cases when removal of the installed materials is not possible or impracticable, the quality of the works is ascertained by regular surveillance audits conducted by the contractors. The quality engineers will review the surveillance audit report submitted by the contractors. Moreover, the quality engineers will also conduct their own independent quality audits. The contractors will be required to carry out corrective and preventive action when defects are observed. With the implementation of such quality system, the quality of work provided by the contractors is secured.

IEC has inspected the relevant documents including the Contract Specifications, Contractor's Material Submission Forms, Method Statements, Approval Forms and Quality Audit Reports. It has been confirmed that the specified stiffness of baseplate and bearing, and the absorptive coefficients of the absorptive materials fully complied with the EIA recommendations.

Regarding the width of the walkway, the gaps between the vehicle skirt and derailment upstand and between the walkway and the train, it is impracticable to measure the dimension manually on-site considering the length of the viaduct section which is over 13km. As-built drawings have been reviewed. It has been measured that the distance between the centre of the track to the edge of the chequer plate of the walkway (i.e. excluded the nosing) on tangent track is about 1820mm. As the width of the car body is 3100mm, the gap between the edge of the chequer plate of the walkway and the car is about 270mm (1820mm – 3100mm/2 = 270mm). With the addition of the nosing of 50mm wide, the gap is reduced to about 220mm which is smaller than the EIA specification of 250mm.

Similar method is adopted for checking of the width of the walkway. It was measured from the as-built drawings that the distance from the centre of the track to the edge of the parapet wall is about 3500mm. While the distance between the centre of the track to the edge of the chequer plate of the walkway (i.e. excluded the nosing) on tangent track is about 1820mm, the width of walkway without nosing is 1680mm (3500mm – 1820mm = 1680mm). By adding the nosing, the overall width of the walkway is 17300mm (1680mm + 50mm), which is wider than the EIA specification of 1600mm.

For the gap between the vehicle shirt and the derailment upstand, the as-built drawings of the EMU and the trackform were inspected. From the as-built drawing of the trackform, the level of the derailment upstand is same as the level of the top of rail while from the drawing on the EMU, it was shown that the distance between the vehicle skirt to the top of rail is 300mm. It can be drawn a conclusion that the gap between the skirt and the derailment upstand is 300mm. Although the gap is slightly larger than the EIA recommendation of about 250mm, the design has been reviewed by the specialist acoustical sub-consultant of the West Rail EIA Study (TS900), Wilson, Ihrig & Associates, Inc who undertaken the noise assessment for West Rail. The consultant has confirmed on their correspondences and the technical specification that the gap of 300mm is acceptable with respect to the noise mitigation. Nevertheless, a VEP will be applied for this variation.

Moreover, to verify the noise level of the EMU that was assumed in the EIA Final Assessment Report, a separate performance test has been carried out by Wilson, Ihrig and Associates – Hong Kong, Limited on 26 June, and illustrated the 9-car disc braked EMU train achieved the specification of maximum level (Lmax) that is below 82.5 dB(A) at 130 kph at 25m from the at-grade ballasted tracks. A noise performance report has been submitted on 14 August according to clause 5.4 under Environmental Permit, EP-004/1998/F. Further to EPD's comment and revision, the revised noise performance report was approved on 9 September 2003.

4.2.2 Fixed Plant Noise

The fixed plant at Pat Heung Maintenance Centre, Kam Sheung Road Station and West Rail Building have been inspected during the site audits. The observations on the mitigation measures being implemented are summarised as below.

Pat Heung Maintenance Centre

An inspection audit was held on 29 August 2003. It was observed that all noise barriers are installed. The heights and locations of all the noise barriers are in accordance with the recommendations of the EIA study and the subsequent VEP application (See Photos 4.22-4.29 Annex 2).

Kam Sheung Road Station and West Rail Building

Chillers were installed at the roof floors of the KSR, the WRB and the PMC. It was found that the chillers are surrounded by solid walls (see Photos 4.30 - 4.31 in Annex 2).

Ventilation systems at the KSR and the PMC were also installed. All ventilation fans are equipped with appropriate silencers and the associated vent ducts are enclosed (see Photos 4.36 - 4.38 in Annex 2).

As observed during the site audits, the fixed plant have been either equipped with silencers, enclosed or screened off from the sensitive receivers by barriers to mitigate the noise impact according to the EIA recommendations.

In addition to the site inspection on the provision of the noise mitigation measures, noise monitoring will be conducted as part of the operational EM&A to ensure the fixed plant noise arising from facilitates in the Northern Section would comply with the relevant noise criteria.

4.2.3 Landscape and Visual

Landscape Master Plan and Detailed Landscape Drawings incorporated with the design principles proposed in the Landscape Design Report have been submitted to EPD and approved on 16 January 2003.

Facts and information were gathered in a prudent manner and technical knowledge was applied with the support from the Resident Landscape Architect to confirm the completion of the mitigation measures as required in the approved detailed landscape drawings to the satisfaction of Independent Environmental Checker:-

PMC Area

- Pat Heung Road is on viaduct. The parapet wall is in curvilinear form and all the support columns are rounded shape to create streamline image and minimise visual impact (see Photo 4.39 in Annex 2).

- The middle part of Pat Heung Road is above the main line and stabling tracks of West Rail such that planting is not possible. While the two ends of Pat Heung Road are on embankment with trees planted (see Photos 4.40 – 4.41 in Annex 2).

- The embankments and cuttings of both the railway and the new roads, namely Kam Hoi Road (formerly known as Western Perimeter Road) and Kam Po Road (formerly known as Eastern Perimeter Road) at two sides of PMC are planted with dense trees (see Photos 4.42 – 4.50 in Annex 2).

- Grasscrete has been installed inside the Main Drainage Channels as an environmental-friendly design (see Photos 4.51 -4.52 in Annex 2).

- Lighting at the depot is specially designed to light directly onto the ground (see Photo 4.53 in Annex 2);

- the areas of Public Transport Interchange and the Park and Ride areas near KSR (see Photo 4.54-4.55 in Annex 2).

The only outstanding landscaping works observed during the audit on 13 May are at two locations,

- along the road F100 adjacent to western side of the EMU Maintenance Building; and
- the open area at the eastern side of the main line just to the south of Kam Sheung Road Station.

The landscaping works in the Pat Heung and Kam Tin areas are ongoing and the Contractor has indicated in their works programme that the outstanding works will be completed prior to West Rail opening, scheduled before the end of 2003.

A site audit was conducted on 23 October 2003 and it was observed landscaping works along the road F100 adjacent to western side of the EMU Maintenance Building was also completed (see Photos 5.53a – 5.53c).

Viaduct Section

- Hydroseeding has been successfully applied to all areas below the viaduct and within the West Rail gazettal boundary during the first audit on landscape on 26 March (see Photos 4.58, 4.59, 4.60 & 4.63 in Annex 2);

- Native whip mix in hydroseeding and shrub mix has also been applied in most areas below the viaduct and within the West Rail gazettal boundary (see Photos 4.60 & 4.63 in Annex 2). While planting of seasonal native whip mix and shrub mix on the following areas below the viaduct would be completed in June:-

    - Kam Tin: Piers 242 to 250 to the north of MDC (see Photo 4.56)
    - Yuen Long: Piers 262 to 270 and 273 near Pok Oi Hospital (see Photos 4.57 & 4.61)

- Planting of the native climber along the viaduct supporting columns has commenced and would continue throughout the planting season.

A close-up meeting was held after the audit and the contractor was requested by IEC/Resident Landscape Architect to ensure the seasonal planting to be completed before the end of the planting season and to complete the reverting of temporarily occupied areas at Yuen Long and Kam Tin. As committed by the Contractor, these seasonal planting works would be completed by the end of May 2003 and the reverting works would be completed shortly.

A re-audit was undertaken by IEC on 27 June, to confirm the completion of the seasonal landscaping works and the reverting of the temporarily occupied area. IEC has confirmed the completion of the landscaping works at Yuen Long (Piers 262 to 270) (see Photos 4.62) and the reverting works near *Poon Uk Hakka Mansion* in Yuen Long back to the original condition (see Photo 4.65). Planting of the native climber along the viaduct supporting columns has also been completed. However, the minor reverting and landscaping works at Kam Tin near Piers 242 to 250 are still ongoing and would be completed by October 2003 towards the end of its leasing period. Therefore, as agreed by IEC, Engineer and Resident Landscape Architect, that contractor shall submit evident for verification upon the completion of these works at Kam Tin.

As observed during the audits, the majority of landscaping works included in the Detailed Landscape Drawings have been implemented accordingly while some minor landscaping works were still on-going at Pat Heung Maintenance Centre and at viaduct section between Pier 242 to 250. The contractors have committed to complete all the remaining works prior to West Rail Opening by end of 2003.

4.2.4 *Water Quality*

The facilities within the PMC have been inspected and the management procedures have been reviewed to check the compliance of the EIA recommendations regarding water quality control. The audit findings are as below,

- Wastewater produced from car and bogie wash will be treated before recycled and discharged. Wastewater produced at the Car Wash Facilities will be diverted to sedimentation tanks through surface drain. The primary-treated wastewater will be recycled for washing under-car surfaces and the wastewater produced at this stage will undergo biological treatment and partially discharged before recycling. Water used for washing bogie will be recycled. The pH value of consumed water will be checked before discharge and neutraliser will be added when needed. Sludge produced from the wastewater treatments will be collected by licensed waste collectors. (see Photos 4.67 – 4.71 in Annex 2)

- The "Tankering Away" arrangement has been adopted as a temporary arrangement for sewage disposal at KSR, WRB and PMC. Sewage from the three premises was pumped to store in two underground tanks. The tank number one is located adjacent to the section of the eastern perimeter road under Pak Heung Viaduct and the number 2 is located at the southern end of KSR. A licensed collector has been employed to empty the tanks regularly to ensure adequate space for sewage containment. During the audit, sewage pump trucks collecting sewage from the tanks were seen. Daily records of truck numbers serving the sewage disposal were checked. (see Photos 4.72 – 4.76 in Annex 2).

- Oil interceptors have been installed at the WRB and PMC. There is also a petrol interceptor at the petrol station. A licensed collector has been employed to clean the interceptors on a monthly basis and dispose of the oil contents properly. (see Photos 4.77 – 4.80 in Annex 2)

- Battery water will be collected in the neutralization tank. The pH value of the water will be checked and neutraliser will be added whenever necessary before discharge. (see Photo 4.81 in Annex 2)

- All the maintenance activities except train wash will be carried out within the EMU Building. The floor of EMU Building is hard standing surfaces (see Photo 4.82 in Annex 2)

- Environmental procedures have been established for various environmental issues. An environmental management instruction "Handling Spillage/Leakage of Chemical Waste" has been developed to define the actions to be taken by relevant personnel so as to ensure emergencies due to spillage, leakage or accidents arising from the handling and storage of chemical waste are properly dealt with.

As observed during the audits, the recommendations in the EIA regarding water pollution control and discharge have been implemented.

4.2.5 Waste

Procedures of the waste handling and disposal in the WRB was checked. The waste generated from the West Rail Building mainly includes papers and general wastes. Sorting the paper waste for recycle is encouraged and separate paper bins for recycle papers are provided in the office environment at WRB (see Photo 4.83 on recycle bin in Annex 2). Wastes generated from the WRB and PMC are daily assembled at designated collection points for further disposal by licensed collectors (see Photos 4.84 –4.85 in Annex 2).

Industrial wastes are also collected separately and are disposed of by the same way. These are of very insignificant amounts comparing with paper wastes.

All chemical wastes generated from the West Rail, including at stations, depot, tunnels and viaducts are stored at PMC only. A separate store room with essential protective facilities has been assigned for storage of chemical wastes. The facilities include a bund on the store ground, hard and impermeable layer on the standing ground, security with key control system for access of the store room (see Photo 4.86 in Annex 2). Same as that for paper wastes, disposal of the chemical wastes are carried out regularly by licensed collectors. The liquid chemical wastes are collected and disposed of by Enviropace Limited and the solid wastes, such as battery, used cleaning cloth are collected by another licensed contractor. A trip ticket system is in place for the operational phase.

4.2.6 Hazard

The positions of the ventilation intakes for the KSR were checked and it was found that the intakes are located high above the ground (see Photos 4.87 & 4.88 in Annex 2). The ground level of the KSR is the concourse area where shops and offices are located. The concourse area is well enclosed with transparent panels.

An Off-site Emergency Plan for Au Tau Water Treatment Works has been incorporated into the WR Contingency Plan. The WR Contingency Plan sets out the procedures to be adopted in case of an emergency to ensure the safety of passengers, members of the public, staff and emergency services. The relevant sections of the WR Contingency Plan were reviewed in Part 3 Section A of the plan which covers the actions to be taken when poisonous gas, including chlorine is detected.

4.2.7 Ecology

Audit on the wetland was undertaken by IEC, Engineer and KCRC Environmental Team on 29 July and 8 September 03. West Rail Habitat Compensation works were carried out in two stages. Stage I construction works consists of three land parcels, namely Land Parcels A, B and D. An audit on these land parcels was conducted on 29

July 03. The rest of the land parcels, Land Parcels C, E, F, G, H, I, J, K and L are Stage II works, the audit of these parcels has been conducted on 8 September 03. During the site audit on 29 July, it was observed that wetland creation was being implemented at all the land parcels totalling 12 hectares.

In general, the WR Habitat Compensation has created various suitable habitat conditions for the target species mention in section 4.1.7. Also different kinds of fruit bearing species have been planted in the wetland Parcel to provide food sources in the habitat. The details of the planting list is shown in Annex 4.

The approved HCMP suggested some possible wetland species for the compensatory habitat areas. The planting list in the contract was audited and it was noted that some of the species were deviated from the approved list. It has, therefore, been clarified with the wetland design team. The species mentioned in the HCMP were developed from the work at the TDD wetland at Tin Shui Wai. They were considered as suitable for the West Rail habitat creation at the time of preparation of the HCMP. Further to the completion of the HCMP, the wetland work progressed into the detailed design stage. During the detailed design stage, a trial on wetland planting was undertaken at the Tin Shui Wai wetland park. Subsequently, the West Rail wetland design has incorporated the interim findings of the trial at the Tin Shui Wai wetland park and the planting palette were modified slightly. However, the species used in the West Rail are largely drawn from the list in the HCMP and the spirit and overall intention of the list are followed.

In stage I, totally 5.2ha of wetland area has been created at Kam Tin Area nearby Cheung Chun San Tsuen (Buffalo Fields). The Land Parcels A, B and D are linked together as far as possible. Since there are water mains in the middle of Land Parcels B and D, a strip of land is reserved for the water mains to provide site access for maintenance. This strip of land is not taken into account of the 12 hectares. However, to maximise the ecological linkage between the wetland parcels, this area is grasscreted. Moreover, all wetland parcels are fenced off to demarcate as wetland area for the future management.

IEC has also inspected the wetland parcels individually. Parcel A has been maintained as a permanent pond and seasonal marsh area. The water source of Parcel A is dependent on the tide level of the Main Drainage Channel (see photos 4.89 in Annex 2). Various terrestrial plants are growing in the surroundings of the Parcel.

Land Parcel B and D are constructed as seasonal marsh under the West Rail viaduct section. Water sources for these parcels are the storm water collected from viaduct and rainfall. IEC checked the characteristics of the parcels. There are two big ponds located at the eastern and western side of the parcels with the irregular shape of the pond side (see photos 4.90 and 4.91 in Annex 2). Various shrubs, junior trees and aquatic plants are growing in the Parcels (see photos 4.92 to 4.99 in Annex 2). Most of the viaducts columns are inspected sitting on the small island and planted with the climbing plants under the column footing (see photos 4.100 in Annex 2). IEC commented that only the junior climbing plants were observed under the column footing. No bamboo trees were observed at Parcels B&D.

During the re-audit at Parcels B and D on 8 September, the bamboo trees were planted at various locations along the northern side of Stage I boundary (see photos 4.103 in Annex 2). Various species of junior climbing plants were also planted under the column. As the climbing plants were only planted for a short period of time, they were not fully grown on the column wall (see photos 4.101 and 4.102 in Annex 2).

Parcel C has been maintained as a permanent pond, the total area of this parcel is approx. 0.6ha (see photos 4.104 in Annex 2). The water source of this Parcel depended on the current course of Kam Tin River. This parcel was constructed as irregular shape, which located adjacent to the Northern part of Land Parcel J and enclosed with 3 pieces of small private land. The water sources of Parcels J and C are completely separated by the wall weir.

Parcels E and J are constructed as permanent marsh under the West Rail viaduct section. During the audit, IEC has verified that both parcels are created as the irregular shape with gentle banks and shallow open water. The water source of these two Parcels is supplied from the permanent water pond of Parcel F. At Parcel E, the total area is approx.1.2ha, most of the viaduct columns are sitting in shallow water and different kinds of shrubs, grass and aquatic plant species are growing in the parcel (see photos 4.105 and 4.106 in Annex 2). Parcel J is one of the largest permanent marshes, the total area is approx. 3ha, which lies between Main Drainage Channel (MDC) and the current river meander of Kam Tin River (see photos 4.116 in Annex 2). A portion of wetland area in Parcel J created under WR viaduct. During the audit, the shrubs are healthy growing underneath of the viaduct (see photos 4.117 & 118 in Annex 2).

Parcel F is designed as a permanent water pond, the total area is approx. 0.4ha (see photos 4.110 Annex 2). The water sources storage in Parcel F is pumped from up stream of MDC. During the audit, IEC observed the water storage in the Parcel F is clean.

Parcel G (0.1ha), H (0.4ha) and I (0.4ha) have been constructed as terrestrial habitat and seasonal marsh. The water source for these Land Parcels is from the rainfall. All planting works are completed in the mid of September 03 (see photos 4.111, 4.112, 4.113, 4.114 and 4.115 in Annex 2). IEC observed that a few small water ponds were constructed in the Parcels for storage water in the wet season, the water source of these Parcels is from the rainfall.

Two wetland Parcels K and L are located adjacent to the Tai Lam Tunnel. Parcel K has been created as seasonal and permanent marsh, the total area is approx. 0.5ha, which is formed by 3 portions (Ki, Kii and Kiii) (see photos 4.119, 4.120 and 4.121 in Annex 2). Parcel L is created as permanent marsh, the total area is approx. 0.2ha. The Parcel Ki and L would have clean permanent water supply from WSD and AFCD irrigation water respectively.

The Operational and Maintenance Manual for Wetland Parcels A, B and D was prepared by Contractor in February 03. The wetland Contractor has revised the manual that included the Stage I and II wetland works. The revised draft Operation and Maintenance Manual has been submitted on 18 September 2003. The monitoring of the Wetland compensation habitats has been conducted since August 02.

5 WESTERN SECTION

5.1 Environmental Impacts and Mitigation Measures

5.1.1 Railway Noise

Similar to the Northern Section, the operation of the train in the Western Section is mainly on viaduct. The EIA Study has recommended the use of the multi-plenum system and noise enclosure at point and crossing, i.e. at Lam Tei and Tuen Mun to mitigate the railway noise. In addition, additional heights of noise barriers were recommended in the Yick Yuen area.

Design of West Rail viaduct has been changed since completion of the West Rail EIA Study in 1998. The changes of the operational parameters for the Western Section included:-

- Reduction of train length from 12 cars to 9 cars; and
- Increase in train frequency from 30 to 40 trains per hour during 0600 to 0700.
- Maximum trains speed is reduced to 100km/hr between Tin Shui Wai and Siu Hong.

Subsequent to these changes, the location of noise enclosure at Lam Tei recommended in the EIA study has been changed slightly. In addition, the additional heights of noise barriers at Yick Yuen are not required due to the reduction of the train speed to 100km/hr. Application for the variation of the Environmental Permit (VEP-020/2000/A/EP-004) for these changes were made to EPD on 28 May 2001 and approved by EPD on 27 June 2001 and an Environmental Permit (EP-004/1998/B) was issued. The location of the noise enclosure is presented in the layout drawings submitted to EPD on 30 August 2001. For ease of reference, the location of the noise enclosure is also shown on Figure 6 annexed to this report.

In addition to the change in operational parameter, the design of the noise enclosure at Tuen Mun has also been changed in order to fulfil the Fire Services Department's requirement on fire safety. A section of the noise enclosure is changed to semi-noise enclosure where the openings are facing industrial area without noise sensitive receivers. A VEP application was submitted to EPD regarding this change and was approved on 8 July 2002. The layout drawing of the revised noise enclosure was submitted to EPD on 14 August 2002. For ease of reference, the location of the noise enclosure is also shown on Figure 7 annexed to this report.

5.1.2 Fixed Plant Noise

The fixed plant in the Western Section are mainly chiller plant for the stations. In addition, there is a sub-station located at the junction of Long Tin Road and Tin Fuk Road to the east of Tin Shui Wai Station.

The mitigation measures recommended in the EIA Study are,

Chiller Plant

- minimise chiller plant noise by enclosing the unit and fitting silencers to air inlets and outlets;
- maintain all equipment in good mechanical conditions to prevent unnecessary noise which may result from loose panels or worn bearings.

Sub-station

- provide acoustic enclosures around transformers;
- ensure all equipment is maintained in good working conditions.

5.1.3 Landscape and Visual

The landscape and visual impacts were assessed under the Environmental Impact Assessment Final Assessment Report for the Western Section. The West Rail EIA Study identified that the elevated viaduct would result in temporary loss of some landscape resources and the viaduct structure would pose potential visual impact.

Subsequent to the assessment of the landscape and visual impacts for the Western Section, design of West Rail viaduct has been modified since completion of the West Rail Environmental Impact Assessment Final Assessment Report (FAR) in 1998. This modification included the increase in the elevation of the viaduct by approximately 8m at Yick Yuen.

Although the changes in viaduct design would result in a moderate increase in the level of adverse impact for several Visual Sensitive Receivers (VSRs), however, with the implementation of the mitigation measures recommended in the West Rail EIA FAR, it is considered that the landscape and visual impacts are acceptable. Application for variation of the Environmental Permit (EP-004/1998/B) for this modification was made to EPD on 5 March 2002 and approved by EPD on 9 April 2002 and an Environmental Permit (EP-004/1998/C) was issued.

The Landscape Design Strategy Report proposed some design principles for all landscape and visual aspects to minimise negative impacts and create the potential for positive impacts. The landscape and visual mitigation measures relevant to the Western Section are,

- rounded form of the viaduct structure and curvature design of the overhead catenary system will minimise the visual impact;
- application of hydroseed to all areas below the viaduct and within the West Rail gazettal boundary for Western Section;
- application of native whip mix in hydroseeding and shrub mix in most areas below the viaduct and within the West Rail gazettal boundary for Western Section;
- planting of native climber along the viaduct supporting columns; and
- revert temporarily occupied area to the land owners in its original conditions.

In additional to the viaduct section, the five stations in the Western Section are also the principal element which may have potential landscape and visual impact. The Landscape Design Strategy Report recommended soft and hard landscape treatments for the stations to minimise the negative impacts that West Rail may have on the existing landscape and visual character. The recommended landscape treatments include,

- Adopt a rounded curvilinear form on engineering structures; and
- Soften and screen engineering structures with planting wherever possible.

5.1.4 Water Quality

In the Western Section, the water quality issue mainly arises from the discharge at the five stations, namely Yuen Long, Long Ping, Tin Shui Wai, Siu Hong and Tuen Mun Stations. It was concluded in the WR FAR that uncontrolled discharge of sewage would cause unacceptable water quality impacts on the water sensitive receivers (WSRs) at Yuen Long Creek and Tuen Mun River. Therefore, the FAR recommended the following mitigation measures to minimise the potential sources of pollution and to comply with the Water Pollution Control Ordinance (WPCO),

Station runoff

- Rainwater runoff from all stations (such as station roof) should be unpolluted and will have no adverse impact to the WSRs. This runoff should be discharged to the storm drainage system; and

- The wastewater or the oil spilt in plant rooms, refuse collection rooms, emergency generator rooms....etc at all of the stations should be collected and connected to the oil and grease interceptors before discharge to the sewage system.

Sewerage Generation at Stations

- Domestic sewage generated from all stations should be discharged into the existing sewer. The sewage effluents discharge from all stations should meet the TM standards; and

- Silt traps and oil interceptors should be regularly cleaned and maintained in good working conditions. The operation and maintenance team should keep regular inspection and to ensure all these facilities should functioning in high efficiency.

5.1.5 Waste

Similar to the Central and Southern Sections, the potential wastes generated during the operation stage for the Western Section from the viaduct and the five stations are identified as general refuse waste, industrial waste and small quantities of chemical waste. The EIA Study's recommended mitigation measures abstracted in Section 2.1.4 should be implemented for this Section.

5.1.6 Archaeological and Cultural Issues

Tsui Sing Lau Pagoda in Tin Shui Wai is a declared historical building under the Antiquities and Monuments Ordinance because it is the only surviving ancient pagoda in Hong Kong. In view of the high heritage importance, a condition survey prior to and following the completion of the works was recommended in the West Rail EIA to ensure no structural damage to the Pagoda.

5.2 Audit Findings

5.2.1 Railway Noise

Facts and information were gathered in a prudent manner and technical knowledge was applied with the support from the Engineer to confirm the completion of the following mitigation measures to the satisfaction of Independent Environmental Checker:-

- Installed the specified resilient rail baseplates according to West Rail EIA's recommendation and KCRC's specification for track on viaduct to reduce vibration transmission to the viaduct structure and thereby reduce re-radiated noise from the viaduct structure between Yuen Long Station and Tuen Mun Station and within Yuen Long, Long Ping, Tin Shui Wai, Siu Hong and Tuen Mun Stations of the Western Section (see photos 5.1, 5.4, 5.11, 5.12, 5.35, 5.38 & 5.39 in Annex 2). At western section all five stations from Yuen Long to Tuen Mun have been fitted with the baseplates along the up and down tracks at the stations section (see photos 5.56b, 5.67a, 5.76b, 5.96a and 5.104b in Annex 2);

- Mounted specified floating slab system on the track according to West Rail EIA's recommendation and KCRC's specification to further reduce vibration transmission to the viaduct structure between Yuen Long Station and Tuen Mun Station. The floating slabs installed on the viaduct section are shown in photos 5.2, 5.9, 5.15, 5.18, 5.36 & 5.40 in Annex 2. In the stations within the Western Section, the floating slab installed at the up track and down track is shown in Photos 5.56a, 5.67a, 5.76b, 5.96 and 5.104a in Annex 2;

- Created the undercar plenum by installing skirts on the train (see Photos 4.21a-4.21b in Annex 2);

- The second acoustic plenum viaduct outside stations on both sides of the car has been created using the walkway at the side of the track along the viaduct alignment between Yuen Long Station and Tuen Mun Station and lined absorptive material under the walkway (see photos 5.7, 5.8, 5.10, 5.33, 5.37 & 5.45 in Annex 2). However, observation for the acoustic plenums was made by the IEC with the following findings:

  - Small gap observed at the central plenum near chainage U9 28+925 (see photos 5.5 in Annex 2) near Tin Shui Wai;

- Acoustic panels on the walkway were not properly installed at CH35+218 (see photos 5.31 in Annex 2) between Siu Hong and Tuen Mun viaduct;
- A gap observed at the central plenum near Siu Hong Station at CH35+216 (see photos 5.34 in Annex 2)
- A hole observed between the concrete kerb and the metal stand at the central plenum of nosing bay at CH 36+965 and CH36+914 (see photos 5.41 and 5.43 in Annex 2) near Tuen Mun Station. Rubber band was also observed not installing underneath of the plenum at CH36+914.

- Regarding the second plenum within the station areas at the stations in the Western Section, namely Tuen Mun, Siu Hong, Tin shui Wai, Long Ping and Yuen Long stations, it was observed that alternative designs have been adopted with regard to the site constraints and station operational consideration. Details of the alternative design are described in the bullets below. Whilst it is considered that the alternative design could mitigate the noise impact, the use of these measures is not strictly in compliance with the environmental permit condition as they are not second plenum. Therefore, it is necessary to apply for a VEP to seek EPD's approval.

- Both up track and down track of Siu Hong Station and Tuen Mun Station and down track of Yuen Long Station are fully enclosed (see photos 5.96 and 5.104a in Annex 2).

- The trackside parapet walls at up track of Yuen Long Station, Long Ping Station and Tin Shui Wai Station are installed with sound absorption material in accordance with West Rail EIA's recommendation (see photos 5.56c, 5.67a and 5.76a in Annex 2).

- During the audit, Yuen Long Station, Long Ping Station and Tin Shui Wai Station has implemented the noise mitigation measures works at the open station platform as alternative arrangements (purpose-built construction); which are as below:

  - Up track of Yuen Long Station (southern side) –
    - Installed trackside advertising panels and wind shield separating the receiver and the source;
    - Installed acoustic panels from trackslab to underside of the advertising panels; and
    - Installed horizontal panels under the trackside advertising panels (see photos 5.56c, 5.56d, and 5.56e in Annex 2).

  - Up track of Long Ping Station (southern side) –
    - Installed trackside advertising panels and wind shield separating the receiver and the source;

- ❖ Applied acoustic material to the parapet inner face from trackslab to underside of the trackside advertising panels (see photos 5.67b, 5.67c and 5.67d in Annex 2); and
- ❖ Erected 2m high noise barriers on viaduct fronting Fu Loy Garden (see photos 5.67e and 5.67f in Annex 2).

➢ Down track of Tin Shui Wai (northern side) –

- ❖ Installed trackside advertising panels and wind shield separating the receiver and the source;
- ❖ Installed acoustic panels underneath advertising panels (see photos 5.76c and 5.76d in Annex 2);
- ❖ Applied acoustic material to the parapet inner face from trackslab to underside of the trackside advertising panels; and
- ❖ Installed acoustic panels to vertical wall beneath platform (see photos 5.76e and 5.76f in Annex 2).

- 1.2m high noise barrier was erected and lined with sound absorptive material onto the parapet walls along the viaduct structure according to West Rail EIA's recommendation from Yuen Long Station and Tuen Mun Station (see photos 5.3, 5.19, 5.28 & 5.40 in Annex 2). The Detailed Design Consultant has also indicated that the edge barrier can be extended on single track viaduct and to full noise enclosures on twin track viaduct with the exception of a few locations as a result of site constraints, e.g. long span over main drainage channel. The high barrier or full noise enclosure are omitted because the long span structure will be adversely affected by typhoon loading. Nevertheless, there are no turnouts (which is expected to be nosier and centre wall of the multi-plenum system cannot be implemented) or sensitive receivers now or in the future that adverse noise impact is not anticipated. Moreover, additional support to the viaduct for the future noise barrier/enclosure or enhancement to the multi-plenum system will be considered to mitigate noise impact at future developments where appropriate.

- 180m and 260m noise enclosures have been installed to reduce the airborne noise radiated from crossover near Lam Tei (see photos 5.20 & 5.25 in Annex 2) and near Tuen Mun Station (see photos 5.45, 5.46, 5.47 & 5.48 in Annex 2) in accordance with the EIA recommendation. In addition, acoustic panels are installed inside the noise enclosures (see Photos 5.20, 5.21, 5.47). However, observation was made by the IEC on four small gaps in a size of approx. 5cm x 9cm at the upper section (see photo 5.21 in Annex 2) and at the edge (see photo 5.23 in Annex 2) of the noise enclosure near Lam Tei. Similar situations were also observed in the noise enclosure in Tuen Mun; gaps were observed at the movement joint on the top between the parapet walls (see photo 5.49 in Annex 2), the sealant between parapets wall was damaged (see photo 5.51 in Annex 2) and gaps were found on the edge of the noise enclosure ceiling (see photo 5.52 in Annex 2).

An audit close-up meeting was held with IEC, Engineer & Contractor after the audit. Contractor was requested by IEC/Engineer to rectify the observations made during the audit.

A re-audit was undertaken by IEC, Engineer and KCRC Environmental Team on 22 May to confirm the rectification of the observations on central plenum and noise enclosure made during the audit at the section between Yuen Long and Siu Hong Stations. During the audit, IEC has confirmed the gap identified in the central plenum at chainage U9 28+925 (see photo 5.6 in Annex 2) and noise enclosure at Lam Tei was filled with acoustic material (see photos 5.22 & 5.24 in Annex 2). Therefore, no further action is required.

Between Siu Hong Station and Tuen Mun Station viaduct, the re-audit has been taken on 18 Aug 2003 to inspect the remedial works on central plenum and noise enclosure. Acoustic panels at CH35+218 on the walkway was replaced and installed properly (see photos 5.32 in Annex 2). IEC confirmed the gap identified in the central plenum at CH35+216 and the nosing bay at CH 36+965 and CH36+914 were filled with the acoustic panels (see photos 5.34a, 5.42 and 5.44 in Annex 2). The rubber band has been installed underneath of the plenum (see photo 5.33) The movement joint between the parapet walls in the noise enclosure was filled with acoustic material and sealed (see photos 5.50 in Annex 2). The gap on the edge of enclosure ceiling and between the parapets and noise barrier has been sealed (see photo 5.52a, 5.53 and 5.54 in Annex 2). Therefore, no further action is required.

In additional to the site inspection on the physical installation or implementation of the noise mitigation measures, similar to the audits conducted for the Northern Section, IEC has inspected a number of document, namely Contract Specifications, Contractor's Material Submission Forms, Method Statements, Approval Forms, Quality Audit Reports and as-built drawings. It is confirmed that the specified stiffness of baseplate and bearing, the absorptive coefficients of the absorptive materials, the width of the walkway, the gaps between the walkway and the train fully complied with the EIA recommendations. As the gap between the vehicle skirt and derailment upstand is slightly increased, a VEP to EPD will be applied.

5.2.2 Fixed Plant Noise

The key fixed plant at Yuen Long, Long Ping, Tin Shui Wai, Siu Hong and Tuen Mun stations are identified as chiller plant room and sub-station. The mitigation measures at the chiller plant and sub-station have been inspected during the site audits. The observations during the audits are summarised as below.

Chillers

In the Western section, the ventilation of the stations is controlled by Environmental Control System (ECS). The ECS consists of a number of Air-Handling Units (AHU) which supply fresh air to and extract exhaust air from the stations platform, concourse and station control rooms etc. The Air-Handling Units consist of ducting and fans to intake the fresh air or discharge the exhaust air through the louvers outside of the stations (see Photo 5.84 in Annex 2). They are also connected with chillers for cooling of the intake fresh air. All of the plant associated with the ECS, including the chillers and pumps are installed inside the plant rooms at the stations.

At YUL, LOP, TIS and SIH Stations (see Photo 5.55, 5.56, 5.67, 5.76 and 5.95 in Annex 2), the ECS plant are installed at both end of the stations at various levels. The exhaust duct outlets and the fresh air intake at YUL, LOP and TIS Stations are located at two ends of the stations on various floors (see Photos 5.61, 5.62, 5.73, 5.81, 5.82 and 5.83 in Annex 2). For SIH Station, two ventilation shafts for the fresh air intake and air exhaust are located on the "Kiss and Ride Area" at both end of the concourse level (see Photos 5.100 and 5.101 in Annex 2). At TUM Station (see Photo 5.104 in Annex 2), the ventilation plant are installed on the ground and roof level. The ventilation plant on the roof of TUM Station are installed in the plant rooms and covered by the louvers (see Photos 5.108 and 5.109 in Annex 2). The inspections indicate that the essential silencers are fitted inside the ventilation ducts at all stations (see Photos 5.63, 5.74, 5.75, 5.85, 5.86, 5.87, 5.102 and 5.110 in Annex 2).

The chillers at Yuen Long Station (YUL) and Siu Hong Station are installed on the ground level and concourse level respectively whilst the chillers at Long Ping Station (LOP), Tin Shui Wai Station (TIS) and Tuen Mun Station (TUM) are located on the platform floor (see Photos 5.57, 5.68, 5.77, 5.97 and 5.105 in Annex 2).

It is observed that the chillers and compressors of the chillers at TIS and TUM are enclosed in the plant rooms. The ceilings of the chiller plant rooms are installed with the acoustic louvers. The surrounding walls are either concrete walls or equipped with acoustic panel louvers. Moreover, acoustic panels are installed on top of chiller exhaust fans to minimise the noise impact (see Photos 5.78, 5.79, 5.80 and 5.106 in Annex 2).

In addition to enclosing the chillers inside plant rooms which are installed either with full height acoustic louvers or concrete wall, the chillers and water pumps for the cooling system are installed with spring system at the footing to minimise vibration noise (see Photos 5.59, 5.60, 5.71, 5.72, 5.77, 5.99 and 5.107 in Annex 2).

At YUL Station, a restaurant is proposed to be located on the concourse level. The chiller and the ventilation system of the restaurant will operate separately with the station. The air intake and exhaust louver of the restaurant plant room is facing to Long Yat Road. This would minimise the air and noise impact to Sun Yuen Long Centre (See Photo 5.64 in Annex 2). The ventilation system of the restaurant will be installed and operated by the restaurant operator.

The 2nd audit was undertaken by IEC, Engineer and KCRC Environmental Team on 18 September 2003 at Yuen Long and Long Ping Stations and on 23 September 2003 at Siu Hong Station. During the audit, the installation works of acoustic louvers on the top of the chillers and the ventilation louvers at the side of the chillers plant rooms have been completed (see Photos 5.58, 5.69, 5.70, 5.97 and 5.98 in Annex 2). Therefore, no further action is required.

Traction Power Feeder Substation

The traction power feeder substation at Tin Shui Wai was completed and handover to China Light & Power as a result it could not be accessed. However, visual inspection on the transformers of the sub-station outside the fencing gates was possible. The substation is located far away from the noise sensitive receivers. Tin Tsz Estate being

the nearest receiver is over 100m away. Moreover, the façades of substations facing Tin Tsz Estate are concrete walls (See Photos 5.90 - 5.94 in Annex 2). Three sets of transformers installed inside the substation are also under a roof cover formed by concrete. There is no potential noise impact anticipated.

Emergency Diesel Generator

The WR Stations at the Western section (YUL, LOP, TIS, SIH and TUM) are equipped with emergency diesel generators. There are two sets of generator installed at each station for electric backup system. The diesel generator rooms are located on the bottom level of station in the enclosed plant rooms. These diesel generators will only be operated during emergency and there will be regular test. The plant rooms have been installed with acoustic panel (See Photos 5.65, 5.66, 5.88, 5.89, 5.103, 5.111 and 5.112 in Annex 2) and the plant room doors will be closed during operation and testing.

In addition to the site inspection on the provision of noise mitigation measures, noise monitoring will be conducted as part of the operational EM&A to ensure the fixed plant noise arising from facilities in the Western Section would comply with the relevant noise criteria.

As observed during the audits, the mitigation measures recommended in the EIA Report, such as fitting of silencer, enclosure have been applied at the chiller plant and sub-station.

5.2.3 Landscape and Visual

Landscape Master Plan and Detailed Landscape Drawings incorporated with the design principles proposed in the Landscape Design Strategy Report have been submitted to EPD and approved on 16 January 2003.

Facts and information were gathered in a prudent manner and technical knowledge was applied with the support from the Resident Landscape Architect to confirm the completion of the mitigation measures as required under the approved Detailed Landscape Drawings to the satisfaction of Independent Environmental Checker.

Viaduct Section:

During the audit on 13 March, the followings were observed:-

- The parapet walls of the viaduct are in curve shape and the overhead catenary masts on the top of the parapet walls are also in round shape to match with the shape of the parapet walls;

- Hydroseeding has been successfully applied to all areas below the viaduct and within the West Rail gazettal boundary (see Photos 5.115 - 5.116 in Annex 2);

- Native whip mix in hydroseeding and shrub mix has been applied in most areas below the viaduct and within the West Rail gazettal boundary (see photos 5.113, 5.114, 5.118, 5.120, 5.122 – 5.129 in Annex 2). While planting of

seasonal native whip mix and shrub mix in the following areas below the viaduct would be completed in June:-

- Yuen Long: Piers 607-613, 617-624, 633-636 and EVA21;
- Tin Shui Wai: Piers 813-814, EVAs 23 & 24; and
- Yick Yuen : Piers 3-6 and 8-20.

- The planting of the native climber on the viaduct supporting columns has commenced and would continue throughout the planting season; and

- The temporarily occupied areas have reverted to the land owners in their original conditions.

A close-up meeting was held after the audit and the contractor was requested by IEC/Resident Landscape Architect to ensure the seasonal planting to be completed before the end of the planting season. As committed by the Contractor, these seasonal planting works would be completed by the end of May 2003.

A re-audit was undertaken by IEC on 27 June, to confirm the completion of the seasonal landscaping works. IEC has confirmed the completion of these works at Yuen Long (Piers 607-613, 617-624, 633-636 and EVA21), Tin Shui Wai (Piers 813-814, EVAs 23 & 24) and Yick Yuen (Piers 3-6 and 8-20) (see photo 5.130 –5.136) and completion of climber planting.

Stations:

The landscape works of planter along the new road of Long Yat Road L1 and L2 at Yuen Long Station has been completed (see photo 5.137 – 5.140 in Annex 2). Most of the landscape works at eastern side of Long Ping Station is completed. The planter between Wang Tat Road and Ma Wang Road was built (see photo 5.141-5.412 in Annex 2). The remaining landscape works of station are listed as below:

- To reinstate the car park at western side of the YUL at Wong Uk Tsuen and built the planter at Nam Pin Wai.
- To built the planters at the side of road junction Wang Tat Road and Long Yip Street at Long Ping
- To built a small park nearby Tai Kiu Tsuen and built the planter along On Lok Road at Long Ping.
- Some of the landscape works at Tin Shui Wai to build the planter along Ping Ha Road, Tin Fuk Road are still outstanding.
- The landscape at the Siu Hong Station under the Northern Access Ramp, Emergency Vehicle Access and Cycling track are not completed
- The landscape work of Amenity Structure between Tuen Mun and Siu Hong is still ongoing. Some of the planting work nearby Tuen Mun Hospital is planted (see photo 5.143 in Annex 2).

According to the schedule, the landscape works at all stations will be completed at the end of October 03.

As observed during the audits, the majority of landscaping works included in the Detailed Landscape Drawings have been implemented accordingly while some landscaping works were still on-going at the stations. The contractors have committed to complete all the remaining works prior to West Rail Opening by end of 2003.

5.2.4 *Water Quality*

The surface water from stations would directly discharge to public storm water drainage. For LOP the storm water would discharge to Yuen Long Creek through the box culvert (see Photos 5.197 in Annex 2). The storm water from SIH and TUM would discharge to Tuen Mun River Channel (see Photos 5.206 in Annex 2).

Domestic sewage generate from toilets, refuse collection rooms, battery rooms, plumbing pump rooms, ECS plant rooms, cleaner's rooms, building services rooms and corridors would discharge to the public sewage system through the terminal manhole foul (see Photos 5.190, 5.196, 5.201 and 5.203 in Annex 2).

Petrol / oil interceptors installed to treated water from the stations which have been inspected (see Photos 5.191, 5.198, 5.200, 5.202 and 5.204 in Annex 2). A licensed collector has been employed to clean the interceptors and dispose the oil contents properly. The locations of the interceptors are located as following areas:

At YUL station a grease trap was built for the restaurant sewage discharge, which has been inspected by auditing team (see Photos 5.192 in Annex 2). This grease trap will maintained by the restaurant owner.

As seen during the audits, proper drainage systems have been provided to collect storm water and sewage effluents separately to comply with the EIA recommendations. Oil interceptors were also installed where oil/grease is anticipated.

5.2.5 *Waste*

During the operation stage, waste generated from stations will mainly be papers and general refuse wastes from passengers and station staff, which will be collected by the standard steel rubbish bins (see Photos 5.193 and 5.194 in Annex 2). Wastes will be daily assembled at refuse collection room for further disposal by licensed collectors (see Photos 5.195, 5.199, 5.200, 5.205 and 5.208 in Annex 2). At all stations the refuse collection room will be cleaned regularly by fresh water supply to avoid the odour problem.

A restaurant will be located at YUL Station concourse level and food-waste will arise from there. All of these wastes will be handled by the renter and stored in the refuse collection room.

Industrial waste will arise from maintenance activities from the stations, which are collected separately from the general wastes. The industrial wastes collected at the stations will be delivered to the PMC for storage and disposal.

No chemical and industrial wastes will be generated from the stations of YUL, LOP, TIS, SIH and TUM.

5.2.6 *Archaeological and Cultural Issues*

The civil works surrounding of Tsui Sing Lau Pagoda in Tin Shui Wai has been completed. According to Condition 2.12 of the Environmental Permit (no. EP-004/1998/F), Condition Surveys for Tsui Sing Lau Pagoda have been conducted prior to and following the completion of works on 14 October 1998 and 16 April 2003. The survey reports were submitted to EPD on 20 September 1999 and 29 August 2003. Only a few numbers of minor defects such as hairline cracks and minor cracks of width below 2mm were identified. Most of the cracks are observed at the brick wall on ground floor and perimeter brick parapet. These cracks are identified before the commencement of the project. Details have been included in the pre- and post-condition survey reports. No major visible structural defect was identified in the survey (see Photos 5.209, 5.210 and 5.211 in Annex 2).

Annex 1
Audit Checklist

Southern Section:
Nam Cheong Station
Tunnel – Nam Cheong to Mei Foo
Mei Foo Station

Central Section:
Kwai Tsing Tunnel
Tsuen Wan West Station
Tai Lam Tunnel

Northern Section:
Kam Sheung Road Station, West Rail Building, Pat Heung Maintenance Centre
Wetland
Viaduct – Kam Tin to Yuen Long

Western Section:
Viaduct – Yuen Long to Siu Hong
Viaduct – Siu Hong to Tuen Mun
Yuen Long Station
Long Ping Station
Tin Shui Wai Station
Siu Hong Station
Tuen Mun Station

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	30-7-03	Time	10:00 a.m	Inspected By	IEC: T. Kong KCRC: N. Ip. RSS: H. Lo., T. Martin, Y. Leung Contractor: / K. T. Lee on 10/9/03
1st Reaudit Date	10-9-03		10:00 a.m.		
2nd Reaudit Date					

Section: Southern Site: Nam Cheong Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided to collect operational station/tunnel seepage?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☑	☐	☐	☐	
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Landscaping					
Are engineering structures softened and screened with planting wherever possible?	☐	☑	☑	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☑	☑	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawings?	☑	☐	☐	☐	
Is the railway at Southern Section fully contained in a box structure and covered by a landscaped earth mound?	☑	☐	☐	☐	
Noise					
Is noise from ventilation fans minimized by optimizing the fan speed?	☐	☐	☐	☐	In operational manual
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	☑	☐	☐	☐	
Are all fans maintained in good mechanical condition?	☑	☐	☐	☐	
Is chiller plant noise minimized by enclosing the unit and fitting silencers?	☑	☐	☐	☐	
Is chiller plant maintained in good mechanical condition?	☑	☐	☐	☐	
Is cooling water pumping station noise minimized by enclosure and silencers?	☐	☐	☐	☐	N/A
Is noise from traction sub-station minimized by enclosures?	☑	☐	☐	☐	
Is track sub-station maintained in good condition?	☑	☐	☐	☐	
Waste Management					
General refuse and industrial waste Accumulation avoided?	☐	☐	☑	☐	
Receptacles (e.g. enclosed bins or recycling bins) available?	☐	☐	☑	☐	
Disposed of regularly and properly?	☐	☐	☑	☐	
Collectors in place?	☐	☐	☑	☐	

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Recycled wherever practicable?	☐	☐	☑	☐	

Submissions/License

Have the following documents submitted or the following licenses applied?

Discharge Licence for the tunnel seepage	☐	☐	☐	☐	N/A
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

Remarks: 2nd Jul 03

(1) This audit included noise, water quality & air quality aspects. All the above items were mainly completed.

(2) Remaining Landscaping works were still on-going. Re-audit for this item would be rescheduled accordingly.

(3) Waste management aspect within the station would also be ~~re-audited~~ Terrace inspected in the next audit.

1st Reaudit: 10 Sep 03

(1) Following up the last audit, ~~R~~recycled bins were provided at the station. Refuse transfer room was also inspected. Wastes would be collected by the waste collectors during the operational phase.

(2) Landscaping works were still on-going during audit. Out standing landscaping works were observed at the West side of the station, the pavement near the station at Sham Mong Rd, Tonkin Street and Yen Chow street West (Bridge and under bridge). Completed landscaping was observed at Sham Mong Rd. (middle & pavement at the Residential area), the slope and the path between the station & site office (except vehicle access point behind site office).

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Irene Kong)	(Name: Natalie Yip)	(Name:)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jacky Kong)	(Name: VINCENT LEUNG)	(Name: K.T.LI)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	24/6/03	Time	9:45 a.m.	Inspected By	IEC: T. Kong KCRC: N, Ip, V. Tong RSS: J. Chan Contractor: /
1st Reaudit Date					
2nd Reaudit Date					

Section: Southern Site: Tunnel - Nam Cheong to Mei Foo

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided to collect operational tunnel seepage?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	N/A
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☑	☐	☐	☐	
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Landscaping					
Are engineering structures softened and screened with planting wherever possible?	☑	☐	☐	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☑	☐	☐	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawings?	☑	☐	☐	☐	
Is the railway at Southern Section fully contained in a box structure and covered by a landscaped earth mound?	☑	☐	☐	☐	
Noise					
Is noise from ventilation fans minimized by optimizing the fan speed?	☐	☐	☐	☐	No noisy equipment & fully enclosed
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	☐	☐	☐	☐	
Are all fans maintained in good mechanical condition?	☐	☐	☐	☐	
Is chiller plant noise minimized by enclosing the unit and fitting silencers?	☐	☐	☐	☐	N/A, no noisy equipment & fully enclosed.
Is chiller plant maintained in good mechanical condition?	☐	☐	☐	☐	
Is noise from traction sub-station minimized by enclosures?	☑	☐	☐	☐	
Is tract sub-station maintained in good condition?	☑	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Discharge Licence for the tunnel seepage	☐	☐	☐	☐	N/A
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

Remarks:

① All Landscaping works were mostly completed except the Lai Wan Interchange. Construction works were observed at the interchange by the Route 9 Contractor. The landscaping works at Lai Wan Interchange will be restored by the Route 9 Contractor and would be completed after the West Rail operation.

② Chiller Plant & the vent shafts were inspected, No noisy equipment was installed in the chiller plant & vent shafts and the area was fully enclosed.

③ Oil Interceptors at Lai Wan Interchange & Nam Cheong were also inspected.

④ Railway at CC-403 is fully contained in a cut & cover tunnel structure & covered by the landscaped earth mound.

IEC Auditor	Resident Site Staff	Contractor's Representative
Terena	[signature]	
(Name: Terena Kong)	(Name: JEFFREY CHAN)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	29/July/03	Time	10:00a.m.	Inspected By
1st Reaudit Date	19/9/03		10:01 a.m.	
2nd Reaudit Date				

Inspected By: IEC: T. Kong, YT Tang on 19/9/03; KCRC: N. Ip, V. Tang on 19/9/03; RSS: L. Yau, M. Kwan, E. Ng on 19/9/03; Contractor: Y. Gurney

Section: Southern Site: Mei Foo Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided to collect operational station/tunnel seepage?	✓				
Is the discharge pass through oil and grit/silt interceptors/chambers?					N/A
Are there any cleaning and maintenance records for silt traps and oil interceptors?					N/A
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?					N/A
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	✓				
Landscaping					
Are engineering structures softened and screened with planting wherever possible?			✓		
Is maintenance of landscape works carried out within the Gazettal boundary?			✓		
Is the landscape works implemented in according to the Detailed Landscape Drawings?			✓		
Is the railway built in a tunnel?			✓		
Noise					
Is noise from ventilation fans minimized by optimizing the fan speed?					
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	✓				
Are all fans maintained in good mechanical condition?	✓				
Is chiller plant noise minimized by enclosing the unit and fitting silencers?	✓				
Is chiller plant maintained in good mechanical condition?	✓				
Is cooling water pumping station noise minimized by enclosure and silencers?	✓				
Is noise from traction sub-station minimized by enclosures?	✓				
Is tract sub-station maintained in good condition?	✓				
Waste Management					
General refuse and industrial waste					
Accumulation avoided?	✓				
Receptacles (e.g. enclosed bins or recycling bins) available?	✓				
Disposed of regularly and properly?	✓				
Collectors in place?	✓				

KCRC - West Rail
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AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Recycled wherever practicable?	☑	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Discharge Licence for the tunnel seepage	☐	☐	☐	☐	NA
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

Remarks: (1st audit: 29 July 2003)

① First audit was carried out on 29 July 2003. This audit included the noise, water quality & waste management aspects. The above aspects were completed.

② Remaining landscaping works were still on-going. Reaudit for this aspect would be rescheduled accordingly.

(1st reaudit: 19 September 2003)

① Following up the previous audit, remaining landscaping works were still on-going in the month. The Contractor indicat[ed] that the landscaping works at northern section would completed by October 03 and southern section would be a bit lo[nger]. During this audit, part of the landscaping works at the top of the station within the northern section was completed.

IEC Auditor	Resident Site Staff	Contractor's Representative
[signature]	[signature]	[signature]
(Name: Terence Kong)	(Name: Lawrence Yam IOW (E&M))	(Name: Tom Cheung)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Terri Kong)	(Name: IP Natalie)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	12-Mar-03	Time	14:00	Inspected By	IEC: T. Kong KCRC: C.S. Chu RSS: M. Cheung, T.H. Chan Contractor:
1st Reaudit Date					
2nd Reaudit Date					

Section: Central Site: Kwai Tsing Tunnel

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided to collect operational tunnel seepage?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Is washing water from regular tunnel washing directed to foul sewers after pre-treatment?	(N/A, Tunnel cleaning will be used by Vacuum System)				
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	
Are the oily contents of the oil interceptors transferred to an appropriated disposal facility?	☐	☐	☐	☐	
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Landscaping					
Are engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	Remark ①
Is maintenance of landscape works carried out within the Gazetal boundary?	☑	☐	☐	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☑	☐	☐	☐	
Are Detailed Landscape Drawings for the landscaping works submitted?	☑	☐	☐	☐	
Noise					
Is floating slab track provided in Kwai Tsing Tunnel under the section of Kwai Tsing Theatre?	☑	☐	☐	☐	Remark ②
Is noise from ventilation fans minimized by optimizing the fan speed?	☐	☐	☐	☐	
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	☑	☐	☐	☐	
Is chiller plant noise minimized by enclosing the unit and fitting silencers?	☐	☐	☐	☐	N/A
Is noise from traction sub-station minimized by enclosures?	☐	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Discharge Licence for the tunnel seepage	☐	☐	☐	☐	N/A
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

provide details on why this is not applicable.

Others:

Remarks:

① For the landscaping, hydroseeded was mainly completed. The remaining works at Area D, E & G10 will be started during April or May 03. Reaudit will be scheduled accordingly.

② Floating slab track was also observed near Tuen Mun West station.

IEC Auditor	Resident Site Staff	Contractor's Representative
T. Kong		
(Name: Terence Kong)	(Name: MONTECHAUNAS)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	30-7-03	Time	1:15 p.m.	Inspected By	IEC: T. Kong, YT Tang on 19/9/03
1st Reaudit Date	19-9-03		2:00 p.m.		KCRC: N. Ip, M. Cheung, Y. Tang on 19/9/03
2nd Reaudit Date					RSS: E. Wong
					Contractor: J. Lee, T. Man

Section: Central Site: Tusen Wan West Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided to collect runoff?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☑	☐	☐	☐	
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Is adequate mechanical ventilation provided for Public Transport Interchanges?	☑	☐	☐	☐	
Landscaping					
Are engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☐	☐	☐	☐	
Are Detailed Landscape Drawings for the landscaping works submitted?	☑	☐	☐	☐	
Noise					
Is noise from ventilation fans minimized by optimizing the fan speed?	☐	☐	☐	☐	
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	☑	☐	☐	☐	
Is chiller plant noise minimized by enclosing the unit and fitting silencers?	☑	☐	☐	☐	
Is noise from traction sub-station minimized by enclosures?	☑	☐	☐	☐	
Is cooling water pumping station noise minimized by enclosure and silencers?	☑	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Discharge Licence for the seawater cooling system at Tuen Wan Station.	☐	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

KCRC - West Rail
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AUDIT CHECKLIST (OPERATIONAL PHASE)

Others:

Remarks: (1st audit = 30 July 2003)

① This audit included noise, water quality, air quality and waste management aspects within the station. All the above items were completed.

② Remaining landscaping works were still on-going. Re-audit for this item was rescheduled accordingly.

③ Discharge licence for seawater cooling system for Tsuen Wan Station will be given by KCRC later.

(1st Reaudit : 19 September 2003)

① Following up the previous audit, remaining landscaping works at CC-300 were still on-going. Landscaping works was completed at the east end of the station in the month. At most of the area

② Discharge licence for the seawater cooling system for Tsuen Wan Station was still awaited and would be given by KCRC.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Terence Kong)	(Name: Eric Wong. / MUNTE CHEUNG)	(Name: JOHN LEE)
1st Reaudit		
IEC Auditor	**Resident Site Staff**	**Contractor's Representative**
(Name: Terence Kong)	(Name: Natalie Pi)	(Name:)
2nd Reaudit		
IEC Auditor	**Resident Site Staff**	**Contractor's Representative**
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date: 12Mar03/21Apr03
1st Reaudit Date:
2nd Reaudit Date:

Time: 16:30/10:30 a.m.

Inspected By:
IEC: T. Koag
KCRC: C.S. Chu
RSS: M. Cheung
Contractor: P. Cheng only on 12Mar 2003

Section: Central
Site: Tai Lam Tunnel

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided to collect operational tunnel seepage?	☑	☐	☐	☐	Sump pits in Tunnel area
Is the discharge pass through oil and grit/silt interceptors/chambers?	☐	☐	☐	☐	N/A
Is washing water from regular tunnel washing directed to foul sewers after pre-treatment?	(N/A, Tunnel cleaning will be used by Vacuum System)				
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	N/A
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☐	☐	☐	☐	N/A
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Landscaping					
Are engineering structures softened and screened with planting wherever possible?	☑	☐	☐	☐	
Is the tunnel exit planted with vegetation?	☑	☐	☐	☐	
Is screen plant provided for vents of north and south portals in Tai Lam Country Park?	☑	☐	☐	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☑	☐	☐	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☑	☐	☐	☐	
Are Detailed Landscape Drawings for the landscaping works submitted?	☑	☐	☐	☐	
Noise					
Is the railway built in a tunnel except the 270m at the northern end?	☑	☐	☐	☐	
Is noise from ventilation fans minimized by optimizing the fan speed?	☐	☐	☐	☐	
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	☑	☐	☐	☐	
Is chiller plant noise minimized by enclosing the unit and fitting silencers?	☑	☐	☐	☐	
Is noise from traction sub-station minimized by enclosures?	☑	☐	☐	☐	Fitted with silencers
Submissions/License					
Have the following documents submitted or the following licenses applied?	☐	☐	☐	☐	N/A
Discharge Licence for the tunnel seepage					
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others: ① Noise barrier at the North portal was also inspected at 29 Apr 2003.

Remarks:
① This audit was mainly observed the surface water drainage system & the sump pit in Tai Lam Tunnel only.
② Audit was continued on 29 April 03. Landscaping was still on going at south portal. Hydroseeded were still outstanding near Hoi On Road. The contractor indicated landscaping would be completed by the Xtresplanting end of May 2003.
③ The landscaping work was completed & implemented according to Detailed Landscaping Drawing. The Wetland area was still in construction.
④ Gaps of the noise barrier were observed at two locations at North portal. The 1st location was next to the wheel washing facilities at North Portal. The 2nd location was at the eastern side near the footbridge No. 1. The Engineer was reminded to rectify the problem.

IEC Auditor	Resident Site Staff	Contractor's Representative
Terence Kong (Name: Terence Kong)	(Name: MONTE CHAN)	(Name: PETER CHOW) only on 12 Mar 2003
1st Reaudit		
IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)
2nd Reaudit		
IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
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AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	7/5/03	Time		Inspected By	IEC: Jacob Law, Terence Kong on 7/9/03
1st Reaudit Date	22/5/03				KCRC: Natalie, Viola
2nd Reaudit Date	29/8/03		2:00 p.m.		RSS: Y.M. Fung.
					Contractor:

Section: Northern and Depot Site: Kam Sheung Road Station, West Rail Building, Pat Heung Maintenance Centre and Associate Works

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is the wastewater and sewage arising from 1.Kam Sheung Road Station, 2.West Rail Building and 3.Pat Heung Maintenance centre redirected to discharge directly to the public sewer once public sewerage is available?	✓				Public Sewage not available
Is the discharge pass through oil and grit/silt interceptors/chambers?	✓				
Is a holding tank installed at Pat Heung Maintenance Centre?	✓				
Is tankering away contractor in place?	✓				Hin Tong Lit.
Is sewage effluent generated at the depot or station directed to the public foul sewer system and sewage treatment facility for treatment prior to discharge?	✓				
Are there any cleaning and maintenance records for silt traps and oil interceptors?					Not yet operate
Is the oily contents at the oil interceptors transferred to an appropriated disposal facility?					Not yet operate
Is hard standing surface provided for areas which may potentially give rise to contamination of storm water by oil and grease?	✓				
Is the acid washing facilities designed to achieve effective neutralization of acids prior to discharge?	✓				in PHMC
Is any recycling of water within the automatic washing facilities used?	✓				
Are biodegradable detergents used in the washing facilities?	✓				
Is there any segregation provided for the clean and contaminated effluent?	✓				
Is an emergency spillage action plan developed to ensure that any accidental apillage event is treated immediately and does not impact on any water bodies?	✓				In Operation manual
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	✓				
Landscaping					
Is design of all engineering structures (e.g. new roads, bridges, noise barriers, enclosures, etc.) adopted a rounded curvilinear form?	✓				
Is engineering structures softened and screened with planting wherever possible?	✓				

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☐	☐	☐	☐	Not yet Complete
Is dense screen planting provided on both sides of the Depot?	☐	☐	☐	☐	
Are columnar trees planted within Depot?	☐	☐	☐	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	
Is lighting within the Depot to be as low as possible?	☐	☐	☐	☐	
with baffles to reduce overspill?	☐	☐	☐	☐	
located within the depot and not along the perimeter?	☐	☐	☐	☐	
only in areas requiring night security?	☐	☐	☐	☐	
Are drainage channels redirected to adopt bio-engineering methods?	☐	☐	☐	☐	
Noise					
Is train length of maximum 9 cars ?	☑	☐	☐	☐	
Is train skirt with absorptive lining provided?	☑	☐	☐	☐	
Are noise barriers provided at Pat Heung Maintenance Centre?	☑	☐	☐	☐	Remarks.
Is noise from traction sub-station minimized by enclosures?	☑	☐	☐	☐	
Is all mechanical plants maintained in good condition?	☐	☐	☐	☐	Not yet fully operate
Waste/Chemical Management					
General refuse and industrial waste Accumulation avoided?	☑	☐	☐	☐	
Receptacles (e.g. enclosed bins or recycling bins) available?	☑	☐	☐	☐	
Disposed of regularly and properly?	☑	☐	☐	☐	
Collectors in place?	☑	☐	☐	☐	
Recycled wherever practicable?	☐	☐	☐	☐	Not yet operate
Hazard					
Are ventilation intakes for Kam Sheung Road Station located at as high a level as reasonably practicable?	☑	☐	☐	☐	
Is the off-site Emergency Plan for Au Tau Water Treatment Works worked out?	☑	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	~~(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)~~				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks

Others:

Remarks: (Audit : 7 & 22 May 2003)

- Gaps are observed between the noise barrier and the ground. Sound may escape from the gap.
- Door of noise enclosure on roof of westrail building was opened. KCRC was reminded to close the enclosure when the chiller system is fully operate.
- The mechanical plants were not fully operate during the audit time.

(1st reaudit = 29 August 2003) - mainly on the gap of the noise barriers.

① Gaps were still observed between the concrete footing and the ground at the following areas. It was recommended that these gaps should be sealed before the operation of the West Rail.

- Beside the Dangerous goods storage room.
- Downtrack of the main line near KSR station.
- main track (end of the Eastern Pedestrian Rd)
- Small gap was observed at one of noise barriers facing to Eastern Stabling Area.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Terence Law)	(Name: Natalie Ip)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Terence Kong)	(Name: Natalie Ip)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
SITE AUDIT CHECKLIST (OPERATIONAL PHASE)

Inspection Date	2/7/03	Time	1430	Inspected By	IEC: Isabel
Reaudit Date	8/9/03		0830		KCRC: Peter, Viola
Reaudit Date					RSS: Alex
Section	Northern	Site	Wetland		Contractor:

Weather

Condition: ☑ Sunny ☐ Fine ☐ Overcast ☐ Drizzle ☐ Rain ☐ Storm ☐ Hazy

Temperature: 30 °C Humidity: ☐ High ☐ Moderate ☐ Low

Wind: ☐ Calm ☑ Light ☐ Breeze ☐ Strong

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
General					
Have the broad guiding principles been met?					
Have variety of habitat conditions been created?	☑	☐	☐	☐	
Have fruit-bearing species been planted to provide alternative food sources in the habitat?	☑	☐	☐	☐	
Are wetland habitats linked as far as practicable?	☑	☐	☐	☐	
Are wetland habitats self-sustaining in terms of water regime?	☑	☐	☐	☐	
Is there a management plan to maintain the wetland?	☑	☐	☐	☐	
Has monitoring been conducted to optimise the wetland design and function?	☑	☐	☐	☐	
Have the specific guiding principles been met? (Also refer to the items for individual land parcel)					
Have trees and bamboo species been planted in the wetland to provide potential sites for egrets?	☑	☐	☐	☐	
Habitat Locations					
Has wetland of 12 ha been created?	☑	☐	☐	☐	
Have wetlands been constructed at the Northern Site Locations, i.e. the Land Parcels A, B, C, D, E, F, G, H, I and J specified in Section 3.1 of the approved HCMP?	☑	☐	☐	☐	
Have wetlands been constructed at the Southern Site Locations, i.e. the Land Parcels K and L specified in Section 3.2 of the HCMP?	☑	☐	☐	☐	
Habitat for Target Species					
Are habitats created for the target species of high conservation value including: Greater Painted Snipe (Marshland)	☑	☐	☐	☐	
Uncommon herpetofauna species (Marshland, Terrestrial habitats, pools, flooded field, shrubland, fish ponds, wet agricultural land, slow-flowing streams)	☑	☐	☐	☐	
Dragonflies (Habitat consists of both emergent and aquatic water plants and permanent ponds)	☑	☐	☐	☐	
Parcel A					
Has the Land Parcel A been maintained as a permanent pond and seasonal marsh to provide roosting, foraging and breeding habitat for Painted Snipe?	☑	☐	☐	☐	
Are there any terrestrial plants (include patches of grasses and shrubs) surrounding the seasonal marshes?	☑	☐	☐	☐	
Is the total area of permanent ponds greater than 400 m^2 with sloping sides?	☑	☐	☐	☐	
Is the depth of the permanent ponds no greater than 4 meters maximum?	☑	☐	☐	☐	

KCRC - West Rail
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SITE AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Parcel B					
Has the Land Parcel B been constructed as seasonal marsh to provide roosting, foraging and breeding habitat for Painted Snipe?	☑	☐	☐	☐	
Is there any clean water storage or source to supply for wetland use?	☑	☐	☐	☐	
Are the columns of viaduct planted the climbing plants to attract wildlife?	☐	☐	☑ N	☐	
Has the species composition at the Old School Marsh, e.g. Eragrotis atrovirens and Polygonum hydropiper been planted?	☐	☐	☐	☐	
Has the breeding habitat for Greater Painted Snipe, i.e. water depth of 5-20 cm a nd low herbaceous vegetation, 10-30 cm high been created?	☑	☐	☐	☐	
Has the marsh been constructed of variable size and irregular shape?	☑	☐	☐	☐	
Are there any terrestrial plants (include patches of grasses and shrubs) surrounding the seasonal marshes?	☑	☐	☐	☐	
Parcel C					
Has river meander in Land Parcel C been retained as permanent pond?	☐	☐	☑ Y	☐	
Are the permanent ponds constructed of irregular shape?	☐	☐	☑ Y	☐	
Is the total area of permanent ponds greater than 400m^2 with sloping sides?	☐	☐	☑ Y	☐	
Is the depth of the permanent ponds 4 meters at maximum?	☐	☐	☐	☐	Not confirmed
Parcel D					
Has Land Parcel D been constructed as seasonal marsh to provide roosting, foraging and breeding habitat for Painted Snipe?	☑	☐	☐	☐	
Is there any clean water storage or source to supply for wetland use?	☑	☐	☐	☐	
Are the columns of viaduct planted the climbing plants to attract wildlife?	☐	☐	☑ N	☐	
Has the species composition at the Old School Marsh, e.g. Eragrotis atrovirens and Polygonum hydropiper been planted?	☐	☐	☑ Y	☐	
Has the breeding habitat for Greater Painted Snipe, i.e. water depth of 5-20 cm and low herbaceous vegetation, 10-30 cm high been created?	☑	☐	☐	☐	
Is the marsh constructed of variable size and irregular shape?	☑	☐	☐	☐	
Are there any terrestrial plants (include patches of grasses and shrubs) surrounding the seasonal marshes?	☑	☐	☐	☐	
Parcel E					
Has Land Parcel E been constructed as permanent marsh to provide habitats for hepetofauna, dragonflies and foraging by the Painted Snipe?	☑	☐	☑ Y	☐	
Is there clean water storage for water supply for the wetland use?	☐	☐	☑ Y	☐	
Are the columns of viaduct planted with climbing plants to attract wildlife?	☐	☐	☑ N	☐	
Has the species composition at the Old School Marsh, e.g. Eragrotis atrovirens and Polygonum hydropiper been planted?	☐	☐	☑ Y	☐	
Have the permanent marshes of the irregular shape, with gentle banks and shallow open water been created (no more than 1.5m deep)?	☐	☐	☑ Y	☐	
Parcel F					
Has Land Parcel F beem constructed as permanent pond?	☐	☐	☑ Y	☐	

KCRC - West Rail
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SITE AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Is there any clean water storage or source to supply for wetland use?	☐	☐	☑ Y	☐	
Is the depth of the permanent pond 4 meters at maximum?	☐	☐	☑ Y	☐	
Parcel G					
Has Land Parcel G been constructed as terrestrial habitat and seasonal marsh?	☐	☐	☑ Y	☐	
Is there any clean water storage and source to supply for wetland use?	☐	☐	☑ Y	☐	
Are there any terrestrial plants (include patches of grasses and shrubs) surrounding the seasonal marshes?	☐	☐	☑ Y	☐	Not complete
Do the terrestrial habitats maintain the vegetation at subclimax level?	☐	☐	☑ Y	☐	
Parcel H					
Has Land Parcel H been constructed as terrestrial habitat and seasonal marsh?	☐	☐	☐	☐	
Is there any clean water storage or source to supply for wetland use?	☐	☐	☐	☐	Planting
Are there any terrestrial plants (include patches of grasses and shrubs) surrounding the seasonal marshes?	☐	☐	☐	☐	not yet complete
Do the terrestrial habitats maintain the vegetation at subclimax level?	☐	☐	☐	☐	
Parcel I					
Has Land Parcel I been constructed as constructed as terrestrial habitat and seasonal marsh?	☐	☐	☑ Y	☐	
Is there any clean water storage and source to supply for wetland use?	☐	☐	☐	☐	
Is there any water source from MDC to supply the wetland parcel?	☐	☐	☐	☐	Not available
Does the water quality standard meet the specific purposes?	☐	☐	☐	☐	
Are there any terrestrial plants (include patches of grasses and shrubs) surrounding the seasonal marshes?	☐	☐	☑ Y	☐	
Do the terrestrial habitats maintain the vegetation at subclimax level?	☐	☐	☑ Y	☐	
Parcel J					
Has Land Parcel J been constructed as constructed as permanent marsh?	☐	☐	☑ Y	☐	
Is there any clean water storage or source to supply for wetland use?	☐	☐	☑ Y	☐	
Are the columns of viaduct planted with climbing plants to attract wildlife?	☐	☑	☑ N	☐	
Are the permanent marshes created the irregular shape, with gentle banks and shallow open water (no more than 1.5 m deep)?	☐	☐	☑ Y	☐	
Parcel K					
Has Land Parcel K been constructed as constructed as seasonal and permanent marsh?					
Is there any clean water storage or source to supply for wetland use?	☐	☐	☑ Y	☐	
Are small seasonal pools incorporated into the wetland?	☐	☐	☑ Y	☐	
Are the seasonal pools less than 10 m^2 in size and reach a maximum of 1.5 m in depth?	☐	☐	☑ N	☐	K2 > 10 m^2
Are there any terrestrial plants (include patches of grasses and shrubs) surrounding the seasonal marshes?	☐	☐	☑ Y	☐	
Are the permanent marshes created of irregular shape, with gentle banks a nd shallow open water (no more than 1.5 m deep)?	☐	☐	☑ N	☐	K1 > 1.5m deep
Parcel L					
Has Land Parcel L been constructed as permanent marsh?	☐	☐	☑ Y	☐	

KCRC - West Rail
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SITE AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Is there any clean water storage or source to supply for wetland use?	☐	☐	☒	☐	Not yet operate
Are the permanent marshes created of irregular shape, with gentle banks and shallow open water (no more than 1.5 m deep)?	☐	☐	☒	☐	

Remarks:

Climbing plants were not observed on the column of viaduct during 1st audit. As informed by KCRC, all dead plants will be removed and replant by the landscape contractor within the contract period on monitoring.

Please refer to attached sheet for re-audit on 8/8/03

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jacky Law)	(Name: Alex MA.)	(Name:)

Comment of 1st re-audit on 8/9/03

Parcel A, B, D & E

Section 5.7.2 of the Habitat Creation & Management Plan (HCMP) states that land parcels A, B, D and E should be designed largely to accommodate Painted Snipe. It was noted that Parcels B & D contained large areas of deep (up to 1.5m), open water with no vegetative cover. Parcel A was hydrologically linked to the tidally influenced Kam Tin River.

Parcel C

The water depth of the permanent pond was 2-3 m. Section 5.4 of the HCMP states that permanent ponds should have a maximum depth of 4m.

Parcel K

The seasonal pool was estimated to be approximately $80m^2$ at the time of the site visit. Section 5.2 of the HCMP stated that pools in seasonal marshes should be less that $10m^2$.

The permanent marsh was estimated to be 3m deep. Section 5.3 of the HCMP states that areas of open water in permanent marshes should be no more than 1.5m deep.

Others

Viaduct columns in Parcels B, D, E, & J had not been planted with climbing plants. Section 2.2.4 of the HCMP states that supporting columns should be 'greened' by planting epiphyte or climbing plants.

The southern end of Parcel J was noted to be heavily shaded by the overhead railway. Careful attention should be paid during future monitoring/audit visits to ensure the vegetation in this section establish successfully.

Area of emergent planting in Parcel E were noted to have died back. Plants that have not established successfully should be replaced.

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

lit Date	5 & 26 Mar 2003	Time	12:00 p.m / 9:45 a.m.	Inspected By	IEC: T. Kong, J. Chan
Reaudit Date	22 May 2003		12:30 p.m		KCRC: H. Leung, Y. Tong
d Reaudit Date	27 June 2003		10:00 a.m		RSS: W. Wong, Y. M. Lau
					Contractor: W. Fasjardo / K. Kung (Certificate 26Mar03)

tion: Northern — Site: Viaduct - Kam Tin to Yuen Long

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
se					
e the following noise mitigation measures installed on viaducts?	✓				
Resilient baseplate	✓				
Floating slab track	✓				
Walkway and central plenum with acoustic lining	✓				[illegible]
Parapet wall with acoustic lining	✓				
ıoise enclosure built in according to the requirement under VEP (VEP-045/2001) the north of Kam Sheung Road Station near Pok Oi Hospital?	✓				Remark ②
ndscaping					
lesign of all engineering structures adopted a rounded curvilinear form?	✓			✓	
engineering structures softened and screened with planting wherever possible?	✓			✓	
he landscape works implemented in according to the Detailed Landscape Drawing?	✓			✓	Remark ④
maintenance of landscape works carried out within the Gazettal boundary?	✓			✓	
e Detailed Landscape Drawings for the landscaping works submitted?	✓			✓	
ızard					
e ventilation intakes for Kam Sheung Road Station located at high a level as reasonably practicable?	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
the off-site Emergency Plan for Au Tau Water Treatment Works worked out?					
ıbmissions/License					
ave the following documents submitted or the following licenses applied?					
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

thers:

Remarks: ① Noise aspect was included in this audit only.
② Small gap was observed at the upper part & the edge of the noise enclosure near Pok Oi Hospital.
③ Audit was continued on 26 Mar 03 on the landscaping works from Kam Tin to Yuen Long.
④ Most of the landscaping works were completed. Remaining seasonal landscaping works is still on going at the following area. Yuen Long: Pier 273, Pier 268-270, Pier 262-267, Kam Tin: Pier 242-250
⑤ The seasonal landscaping works will be expected to be completed by the end of May 03 and the reaudit will be scheduled accordingly.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Terence Kong)	(Name: Y.H. Law.)	(Name: W.K. Au Yeung) Ricky Kung

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Terence Kong)	(Name:)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
Terence Kong		R. Kung Ricky Kung.

1st reaudit: 22 May 2003
① Following up the previous audit, gap identified on item no. 2 above was mostly filled. However, the engineer was required to fill the gap completely. The engineer was requested to provide evidence upon completion of the remedial works.
② Seasonal landscaping works are still on-going. Reaudit is expected to be scheduled in early June 2003.

2nd reaudit: 27 June 2003
① Following up the previous audit, the remaining landscaping works of the area in item no. 4 were almost completed except the Kam Tin: Pier 242-250. The Contractor indicated that these works would be completed by the end of October 2003. Evidence should be provided after the area completes.
② All other aspects under this Contract were completed.

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	2 June 2003	Time	10:20am	Inspected By	IEC: T. Ling, Y.T. Tang KCRC: P. Choi, H. Leung, V. Tang RSS: C.S. Lau, S. Chan Contractor: —
1st Reaudit Date	18 Aug 2003		9:30a.m.		
2nd Reaudit Date					

Section: Western Site: Viaduct - Siu Hong to Tuen Mun

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Noise					
Are the following noise mitigation measures installed on viaducts?					
Resilient baseplate	✓		✓		
Floating slab track	✓		✓		
Walkway and central plenum with acoustic lining	✓		✓		
Parapet wall with acoustic lining			✓		
	✓		✓		
Is noise enclosure built in according to the requirement under (VEP-067/2002) at Tuen Mun?	☐	☐	✓	☐	
Is the rail track completed in the box section between Siu Hong and Tuen Mun?	✓	☐	✓	☐	
Landscaping					
Is design of all engineering structures adopted a rounded curvilinear form?	☐	☐	☐	☐	N/A landscaping inspection will be carried out with the stations. See Siu Hong & Tuen Mun audit checklist
Is engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☐	☐	☐	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	
Are Detailed Landscape Drawings for the landscaping works submitted?	☐	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Submission of Noise Performance Test of 9-car EMU train.					(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

KCRC - West Rail

Contract GSA-012, Independent Environmental Checker

AUDIT CHECKLIST (OPERATIONAL PHASE)

Remarks: 1st Audit (2 June 2003)

CC-212:

① Acoustic Panels were not installed properly at CH35218 & CH35345. The Engineer was reminded to rectify the problems.

② Small Gap was observed at the central plenum near Siu Hong Station (at Lam Tei End). The Engineer was reminded to rectify the problems.

CC-213:

③ Gaps were observed at the roofing (between the central plenum & the concrete block) CH 36914 & CH 36965. Rubber band was also observed not installing underneath the central plenum at CH36914. The Engineer was reminded to fill all the gaps in such circumstances.

④ Gaps were observed in Tuen Mun Noise Enclosures at the following locations
- Gaps between the parapet walls.
- some sealant between the parapet walls was damaged
- Gaps along the parapet wall & the enclosure.
- Gaps at the ceiling.

Engineer was reminded to rectify the above problems as soon as possible. Reaudit would be scheduled accordingly.

IEC Auditor	Resident Site Staff	Contractor's Representative
Terence Kong	ALAN YUEN	
(Name: Terence Kong)	(Name: ALAN YUEN)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
Terence Kong	ALAN YUEN	
(Name: Terence Kong)	(Name: ALAN YUEN)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

Reaudit (18 August 2003)

CC-212: ① Acoustic Panels at CH35218 & CH35345 were replaced and the small gap at the central plenum at Lam Tei End was also filled.

CC-213: ② Following up the previous audit, all the gaps observed at the viaduct were filled. Rubber band was also installed underneath the central plenum at CH36914.

③ Gaps & sealants observed at Tuen Mun Enclosure were filled & replaced. Works on the viaduct from Siu Hong to Tuen Mun were completed.

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	16/8/03	Time		Inspected By	IEC: Jack Law
1st Reaudit Date	18/9/03				KCRC: Peter Choi
2nd Reaudit Date					RSS:
					Contractor:

Section: Western Site: Yuen Long Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Is surface water directed to foul sewers after pre-treatment?	☐	☐	☐	☐	Oil & grit tray trap
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☑	☐	☐	Not yet operate
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☐	☐	☐	☐	
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☐	☐	☐	☐	
Is mechanical ventilation provided for Public Transport Interchanges?	☑	☐	☐	☐	
Landscaping					
Is design of all engineering structures adopted a rounded curvilinear form?	☐	☐	☐	☐	
Are engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawings?	☐	☐	☐	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	
Noise					
Is noise enclosure and noise barriers built according to environmental permit?	☐	☐	☐	☐	
Is noise from plant rooms reduced by providing fitting silencers?	☑	☐	☐	☐	
Are all fans maintained in good mechanical condition?	☐	☐	☐	☐	Not yet operate
Waste Management					
General refuse and industrial waste					
Accumulation avoided?	☐	☐	☐	☐	Not yet operate
Receptacles (e.g. enclosed bins or recycling bins) available?	☐	☐	☐	☐	
Disposed of regularly and properly?	☐	☐	☐	☐	
Collectors in place?	☑	☐	☐	☐	
Recycled wherever practicable?	☐	☐	☐	☐	

KCRC - West Rail
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	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Detailed Landscape Drawings for the landscaping works.	☐	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

Remarks:

- Silencer for chiller plant at 4/F not installed yet.
- Most mechanical plants were not in operation during audit.

During 1st re-audit, silencers were installed for chiller plant room. However, gaps were observed at door and ceiling.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jabil Law)	(Name: Wilson Kong)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jabil Law)	(Name: Wilson Kong)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	16/6/03	Time		Inspected By	IEC: Jabil
1st Reaudit Date	22/7/03				KCRC: Peter Chi
2nd Reaudit Date					RSS:
					Contractor:

Section: Western Site: Long Ping Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☐	☐	☐	☐	Not yet operate
Is surface water directed to foul sewers after pre-treatment?	☐	☐	☐	☐	"
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	"
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☐	☐	☐	☐	"
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Landscaping					
Is design of all engineering structures adopted a rounded curvilinear form?	☐	☐	☐	☐	Not yet Complete
Are engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	"
Are the landscape works implemeted in according to the Detailed Landscape Drawing?	☐	☐	☐	☐	"
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	"
Noise					
Is noise enclosure and noise barriers built according to environmental permit?	☑	☐	☐	☐	
Is noise from plant rooms reduced by providing fitting silencers?	☑	☐	☐	☐	
Are all fans maintained in good mechanical condition?	☐	☐	☐	☐	Not yet operate
Waste Management					
General refuse and industrial waste					
Accumulation avoided?	☑	☐	☐	☐	
Receptacles (e.g. enclosed bins or recycling bins) available?	☑	☐	☐	☐	
Disposed of regularly and properly?	☐	☐	☐	☐	Not yet operate
Collectors in place?	☑	☐	☐	☐	
Recycled wherever practicable?	☑	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

Remarks:

- Noise enclosure for chiller plant not yet installed (Roof)
- Most mechanical plants were not in operation during audit.

During 1st ~~re~~ re-audit, silencer were installed for the chiller plant on roof. However, openings (Ceiling panel) were not between silencer installed yet.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jabel La)	(Name: Wilson Kong)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jabel Lau)	(Name: Wilson Kong)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	11/5/03	Time		Inspected By	IEC: Isabel
1st Reaudit Date					KCRC: Peter Chu
2nd Reaudit Date					RSS: Anthony
					Contractor:

Section: Western Site: Tin Shui Wai Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Is surface water directed to foul sewers after pre-treatment?	☑	☐	☐	☐	
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	Not yet operate
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☐	☐	☐	☐	"
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Landscaping					
Is design of all engineering structures adopted a rounded curvilinear form?	☐	☐	☐	☐	Not yet complete
Are engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	"
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☐	☐	☐	☐	"
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	"
Noise					
Are ventilation fans minimized by careful consideration of the fan positioning?	☑	☐	☐	☐	
Is noise from traction sub-station reduced by providing an acoustic enclosure and by fitting silencers?	☑	☐	☐	☐	
Are all fans maintained in good mechanical condition?	☐	☐	☐	☐	Not yet fully operate.
Waste Management					
General refuse and industrial waste					
Accumulation avoided?	☑	☐	☐	☐	
Receptacles (e.g. enclosed bins or recycling bins) available?	☑	☐	☐	☐	
Disposed of regularly and properly?	☑	☐	☐	☐	
Collectors in place?	☑	☐	☐	☐	
Recycled wherever practicable?	☑	☐	☐	☐	
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Tsui Shing Lau Pagoda Conditional Survey Report	☐	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

Remarks:

Most mechanical plants were not in operation during the audit time.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jabil Law)	(Name:)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jabil Law)	(Name:)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	25/6/03	Time		Inspected By	IEC: Jowel
1st Reaudit Date	24/9/03				KCRC: Peter Choi
2nd Reaudit Date					RSS: Higgins Wong.
					Contractor:

Section: Western Site: Siu Hong Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Is surface water directed to foul sewers after pre-treatment?	☑	☐	☐	☐	
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	Not yet operate
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☑	☐	☐	☐	
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	☑	☐	☐	☐	
Landscaping					
Is design of all engineering structures adopted a rounded curvilinear form?	☐	☐	☐	☐	Not yet completed
Are engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	"
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☐	☐	☐	☐	"
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	"
Noise					
Is noise from ventilation fans minimized by optimizing the fan speed?	☐	☐	☐	☐	Not yet operate
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	☐	☐	☐	☐	Not complete
Are all fans maintained in good mechanical condition?	☐	☐	☐	☐	Not yet operate
Is chiller plant maintained in good mechanical condition?	☐	☐	☐	☐	"
Waste Management					
General refuse and industrial waste					
Accumulation avoided?	☑	☐	☐	☐	
Receptacles (e.g. enclosed bins or recycling bins) available?	☑	☐	☐	☐	
Disposed of regularly and properly?	☐	☐	☐	☐	Not yet operate
Collectors in place?	☑	☐	☐	☐	
Recycled wherever practicable?	☑	☐	☐	☐	

KCRC - West Rail
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	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					—

Others:

Remarks:

- Silencers for chillers on roof top have not been installed yet during the time of audit.
- The exhaust of the emergency generator was facing Sin Hang Court.

During 1st re-audit, silencers for chiller plant were installed.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jacky Lau)	(Name: Maggie Wong)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jacky Lau)	(Name: Maggie Wong)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

KCRC - West Rail
Contract GSA-012, Independent Environmental Checker
AUDIT CHECKLIST (OPERATIONAL PHASE)

Audit Date	25/6/03	Time		Inspected By	IEC: Joel
1st Reaudit Date					KCRC: Peter Chan
2nd Reaudit Date					RSS: Ken Yuen
					Contractor:

Section: Western Site: Tuen Mun Station

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Water Quality					
Is surface water drainage system provided?	☑	☐	☐	☐	
Is the discharge pass through oil and grit/silt interceptors/chambers?	☑	☐	☐	☐	
Is surface water directed to foul sewers after pre-treatment?	☑	☐	☐	☐	
Are there any cleaning and maintenance records for silt traps and oil interceptors?	☐	☐	☐	☐	Not yet operate
Are the oily contents at the oil interceptors transferred to an appropriated disposal facility?	☐	☐	☐	☐	"
Air Quality					
Are ventilation systems designed such that discharges are directed away from nearby sensitive receivers to avoid nuisance?	.	☐	☐	☐	Remark
Landscaping					
Is design of all engineering structures adopted a rounded curvilinear form?	☐	☐	☐	☐	Not yet complete
Is engineering structures softened and screened with planting wherever possible?	☐	☐	☐	☐	
Is the landscape works implemented in according to the Detailed Landscape Drawing?	☐	☐	☐	☐	
Is maintenance of landscape works carried out within the Gazettal boundary?	☐	☐	☐	☐	
Noise					
According to the VEP are noise enclosures provided at Tuen Mun?	☑	☐	☐	☐	
Are ventilation fans minimized by careful consideration of the fan positioning?	☑	☐	☐	☐	
Is fan noise reduced by providing an acoustic enclosure and by fitting silencers?	☑	☐	☐	☐	Remark
Are all fans maintained in good mechanical condition?	.	☐	☐	☐	Not yet operate.
Is chiller plant maintained in good mechanical condition?	☐	☐	☐	☐	"
Waste Management					
General refuse and industrial waste					
Accumulation avoided?	☑	☐	☐	☐	
Receptacles (e.g. enclosed bins or recycling bins) available?	☑	☐	☐	☐	
Disposed of regularly and properly?	☐	☐	☐	☐	Not yet operate
Collectors in place?	☑	☐	☐	☐	
Recycled wherever practicable?	☑	☐	☐	☐	

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AUDIT CHECKLIST (OPERATIONAL PHASE)

	Yes	No	Y/N 1st reaudit	Y/N 2nd reaudit	Photo/Remarks
Submissions/License					
Have the following documents submitted or the following licenses applied?					
Detailed Landscape Drawings for the landscaping works.	☑	☐	☐	☐	
Submission of Noise Performance Test of 9-car EMU train.	(To be covered in Northern - Pat Heung Maintenance Centre & Kam Sheung Road Station audit checklist)				
Submission of a report on the Noise Performance Test of 9-car EMU train.					
Noise permit for the maintenance of the railway.					

Others:

Remarks:

Most mechanical plants were not fully operate or in operate during the audit time.

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name: Jack Lee)	(Name: ALAN YUEN)	(Name:)

1st Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

2nd Reaudit

IEC Auditor	Resident Site Staff	Contractor's Representative
(Name:)	(Name:)	(Name:)

Annex 2
Photographs

Southern Section -- Fixed Plant Noise

Nam Cheong Station

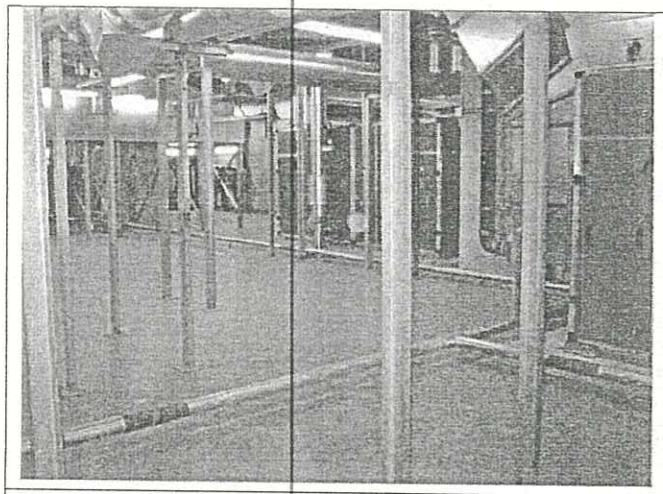


Photo 2.1: ECS Room

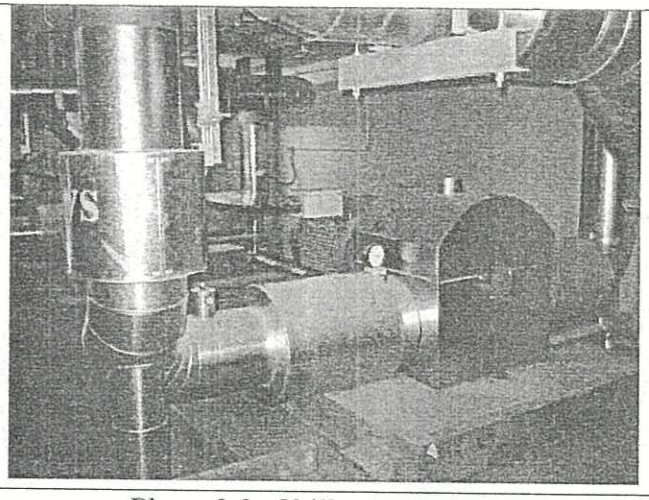


Photo 2.2: Chiller Pump Room

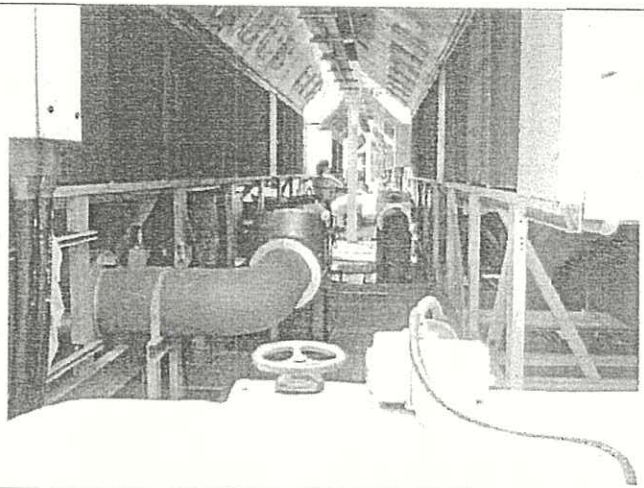


Photo 2.3: Chiller Plant

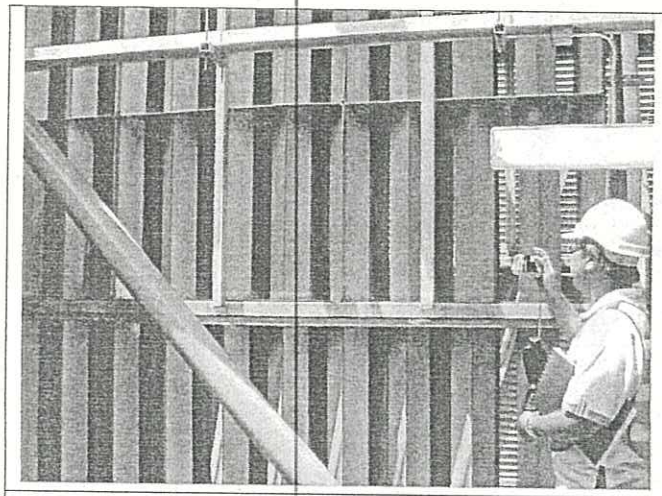


Photo 2.4: Silencers for the Chiller Plant

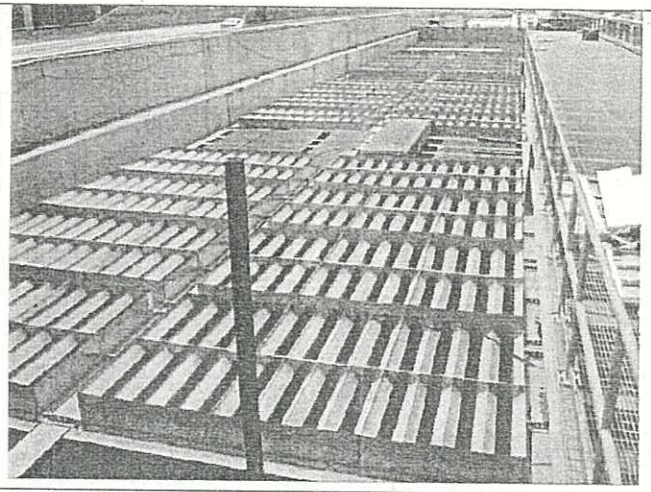


Photo 2.5: Silencers on the top of the Chiller Plant

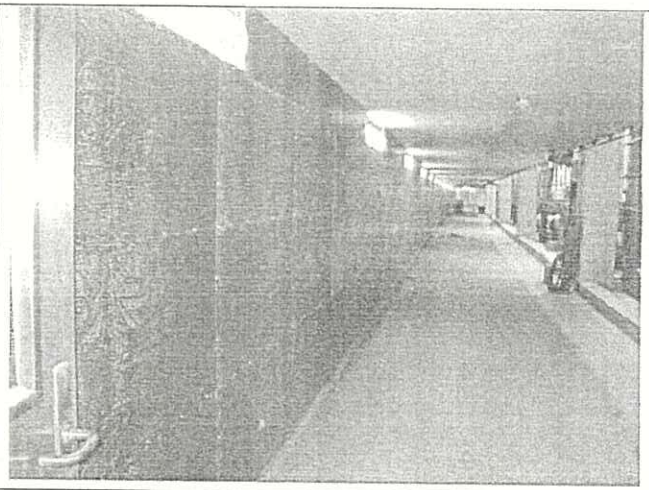


Photo 2.6: Acoustic panels alongside of the Chiller plant Room

Southern Section -- Fixed Plant Noise

Nam Cheong Station

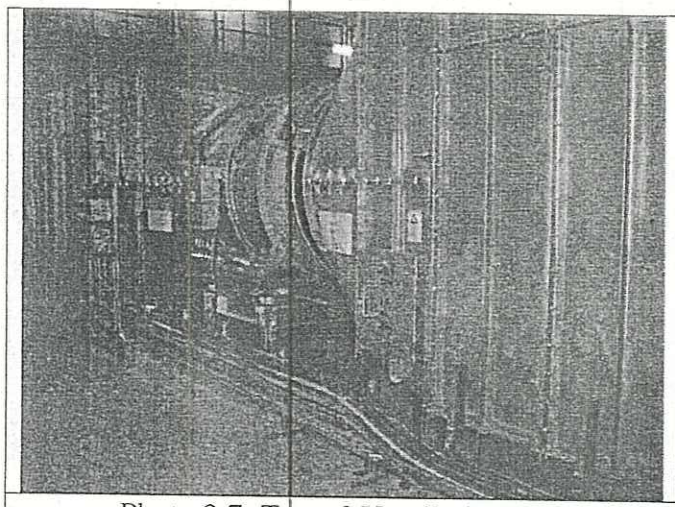


Photo 2.7: Tunnel Ventilation Fan

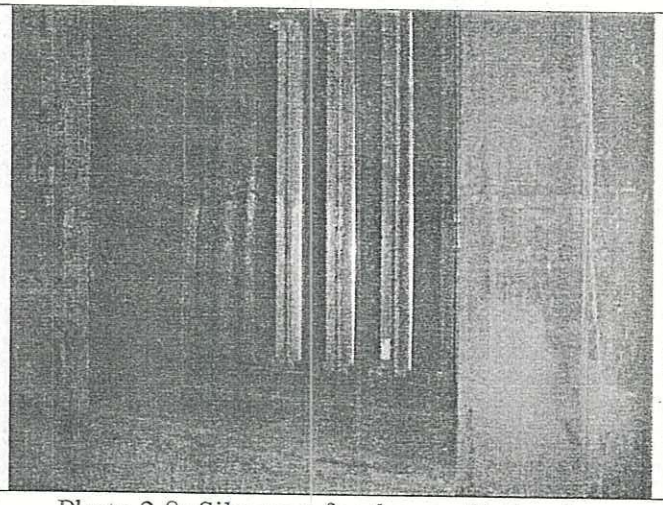


Photo 2.8: Silencers for the ventilation fan

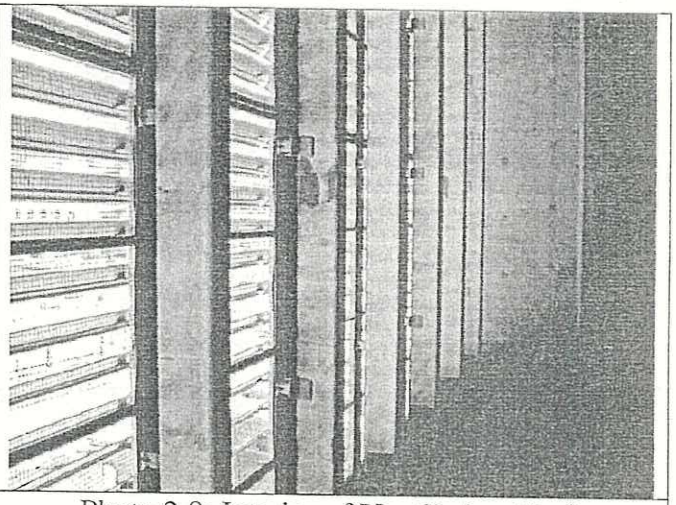


Photo 2.9: Interior of Ventilation Shaft

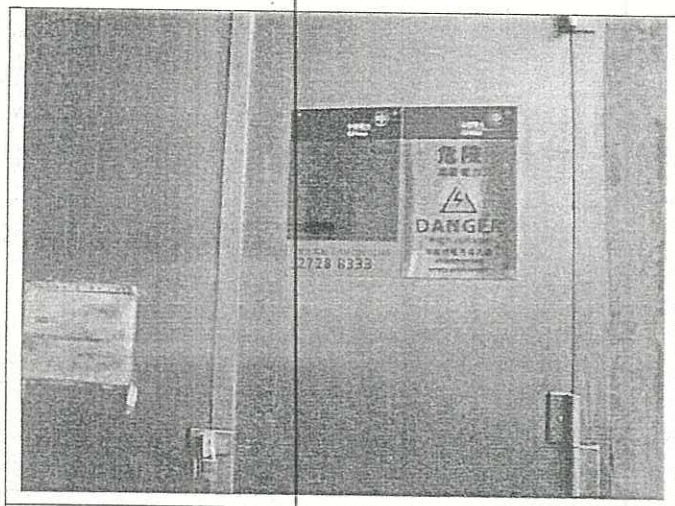


Photo 2.10: Transformer Room

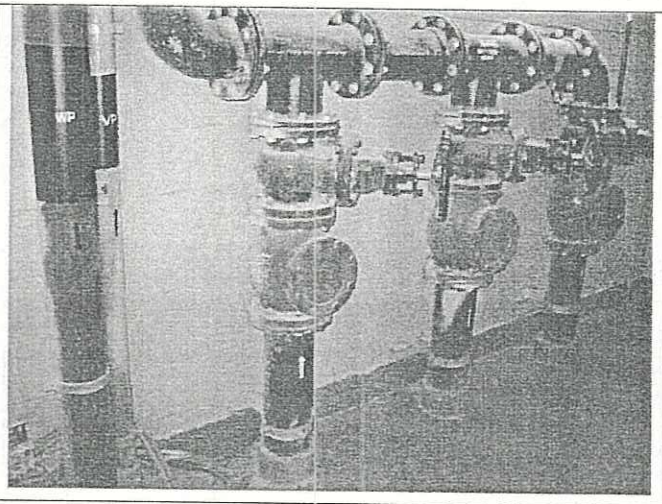


Photo 2.11 Sump pump for Foul Sewage

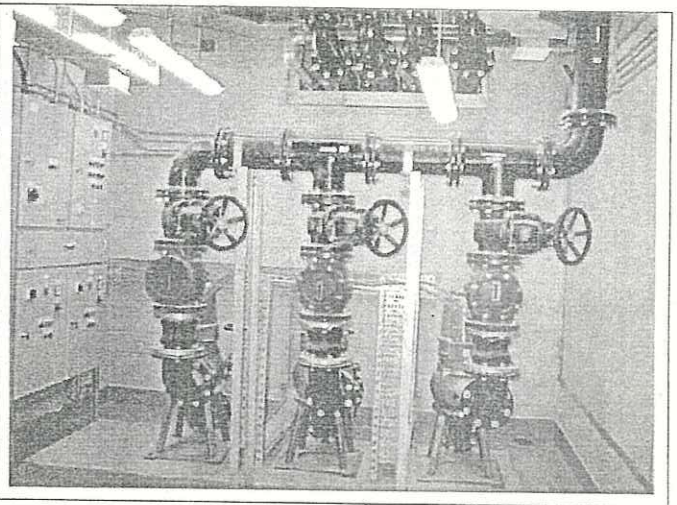


Photo 2.12 Sump pump for foul sewage

Southern Section – Fixed Plant Noise

Tunnel Section Between Mei Foo and Nam Cheong

Photo 2.13: Lai Wan Chiller Plant Building

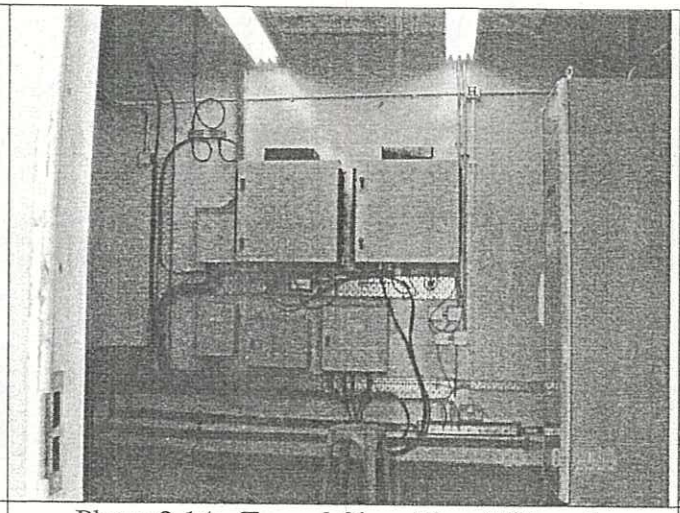


Photo 2.14: Tunnel Signalling (TS) and Telecommunication Equipment Room (TER)

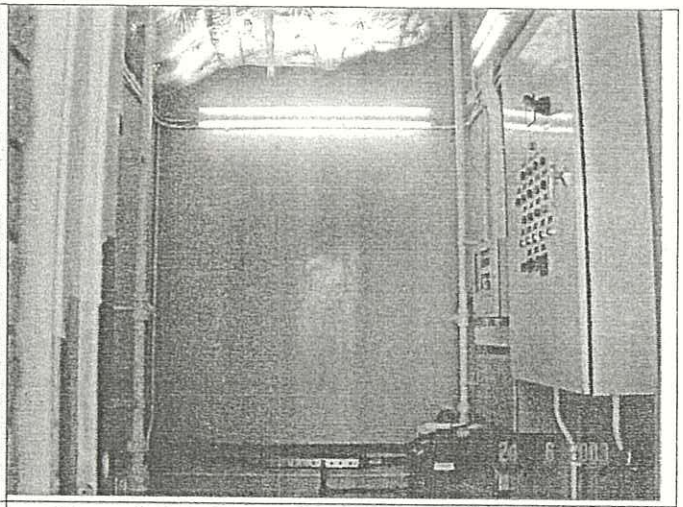


Photo 2.15: Control Room for TS, TER and battery room

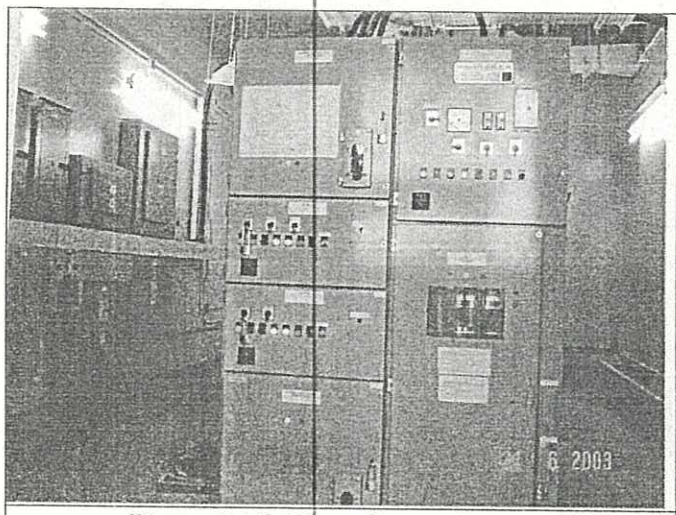


Photo 2.16: Transformer Room

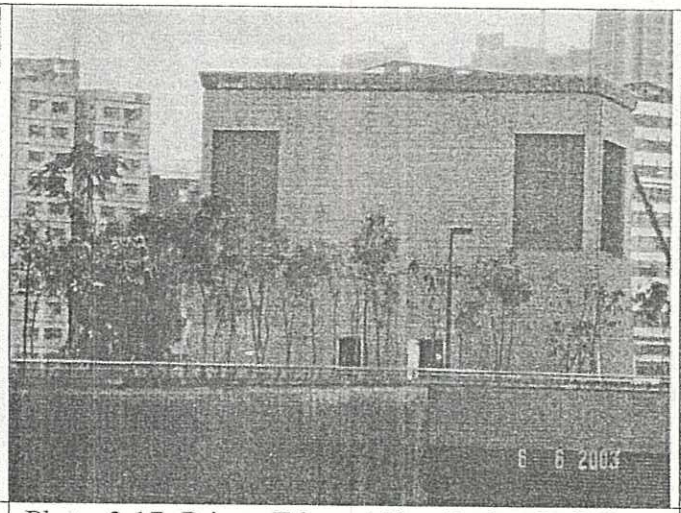


Photo 2.17: Prince Edward Ventilation Building

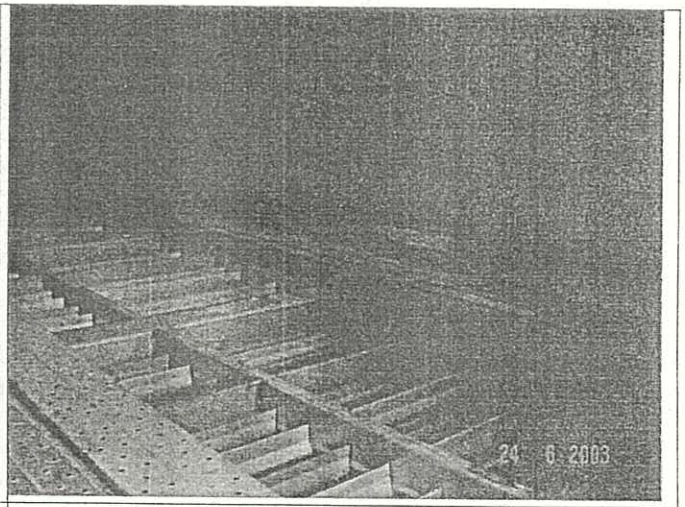


Photo 2.18: Vent Shaft

Southern Section – Fixed Plant Noise

Tunnel Section Between Mei Foo and Nam Cheong

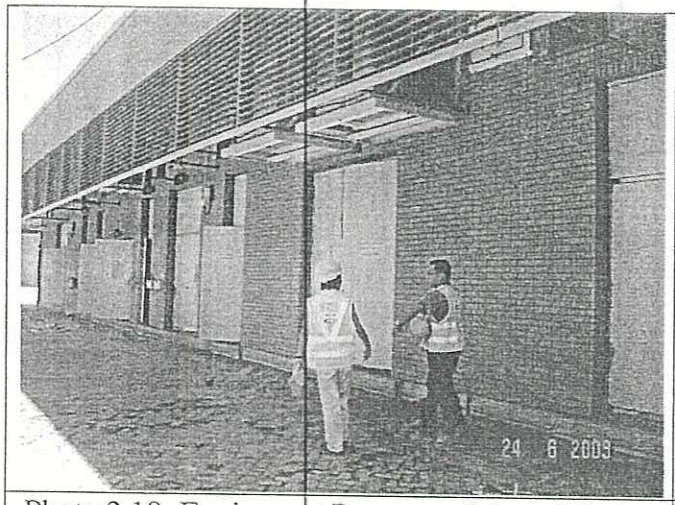


Photo 2.19: Equipment Rooms at Prince Edward Ventilation Building

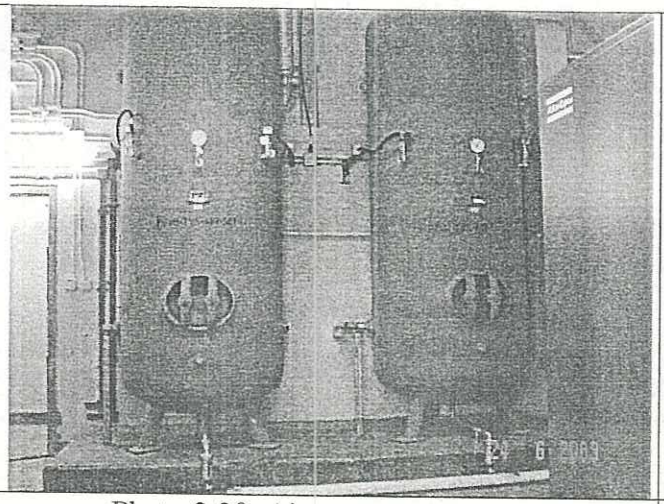


Photo 2.20: Air compressor room

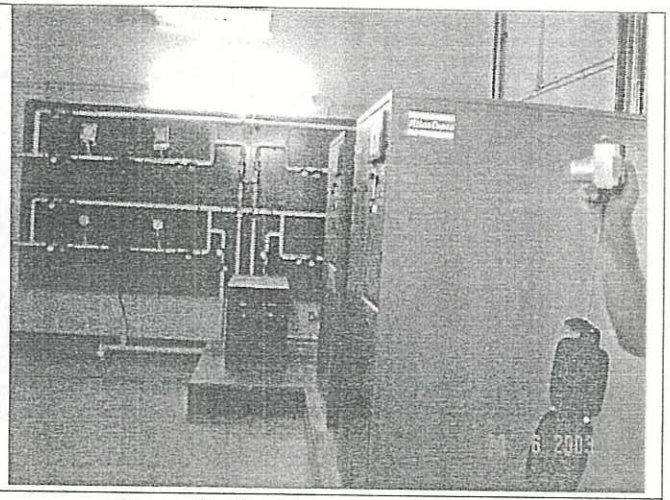


Photo 2.21: Air compressor room

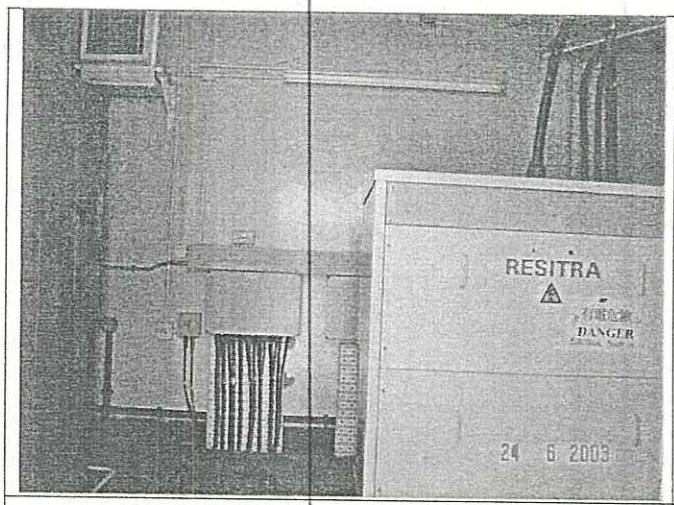


Photo 2.22: Transformer Room

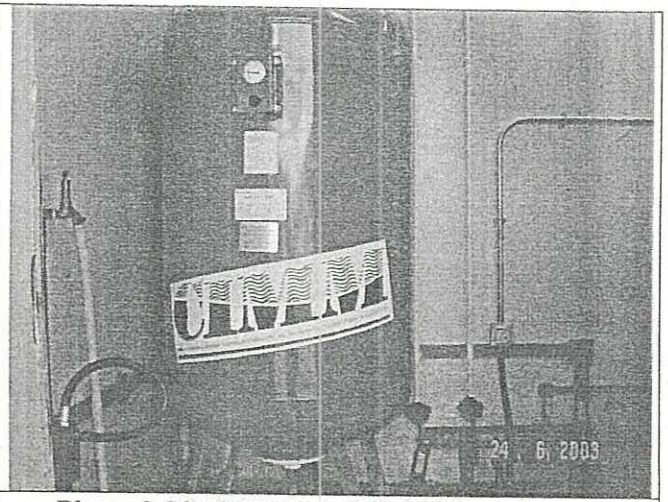


Photo 2.23: Cleansing Water Pump Room

Southern Section – Fixed Plant Noise

Mei Foo Station

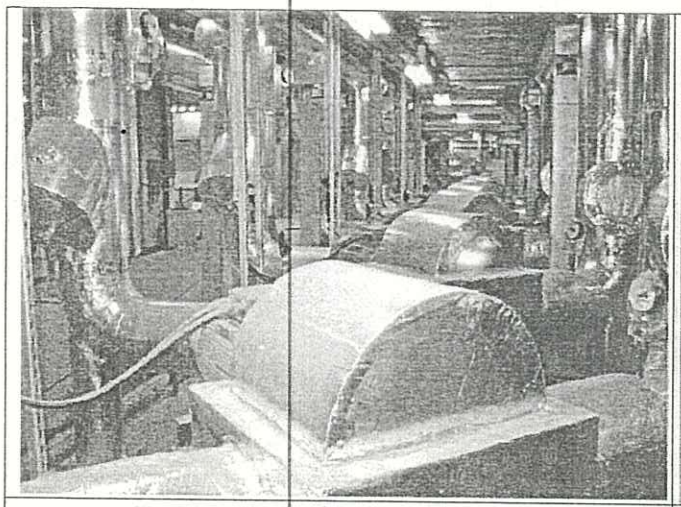


Photo 2.24: Chiller pump room

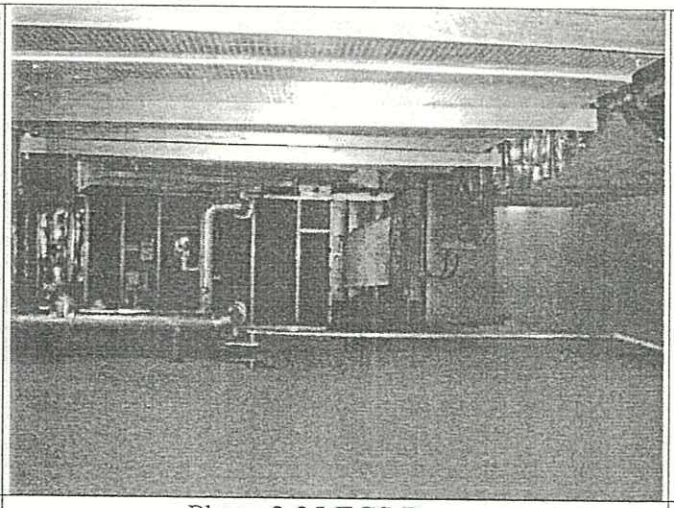


Photo 2.25 ECS Room

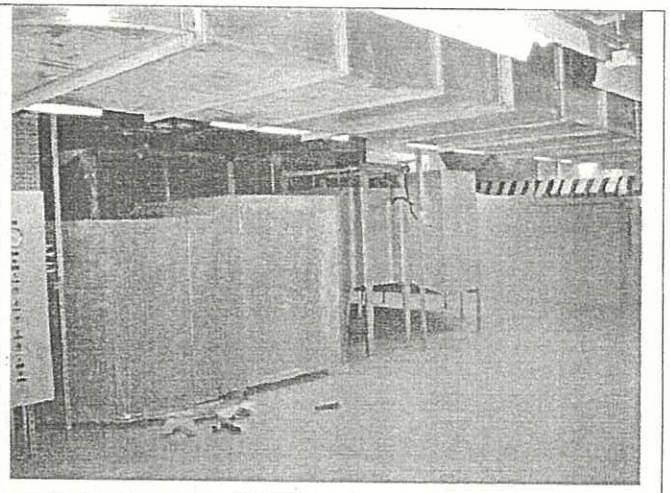


Photo 2.26: ECS Room

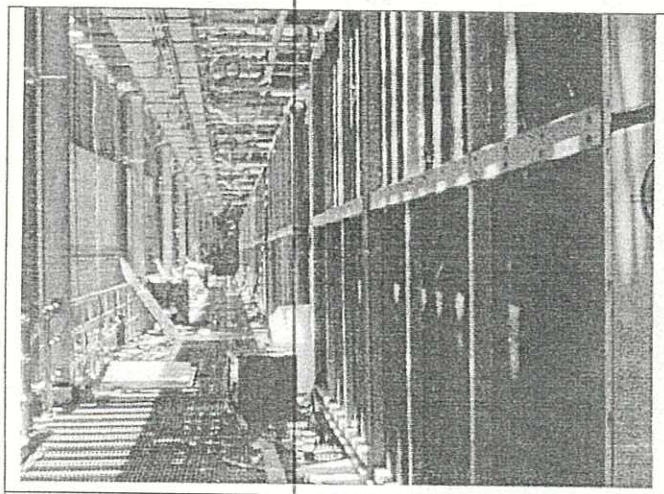


Photo 2.27: Radiator

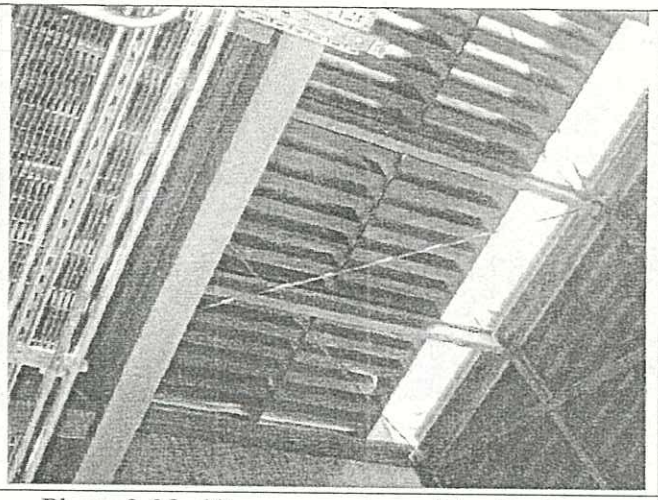


Photo 2.28: Silencers on top of the Radiator Building

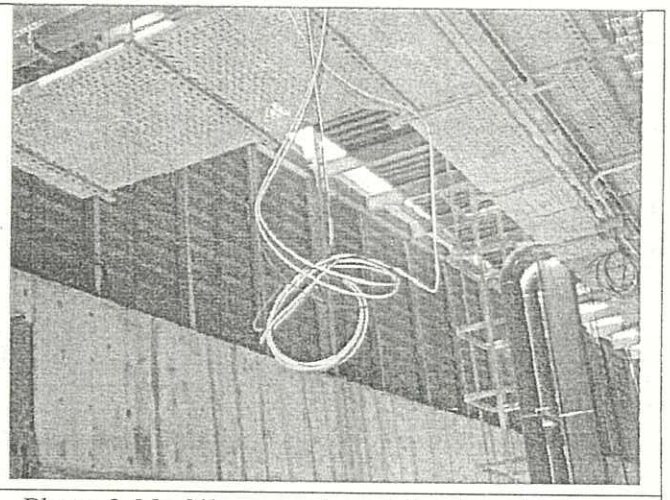


Photo 2.29: Silencers alongside of the Radiator Building

Southern Section – Fixed Plant Noise

Mei Foo Station

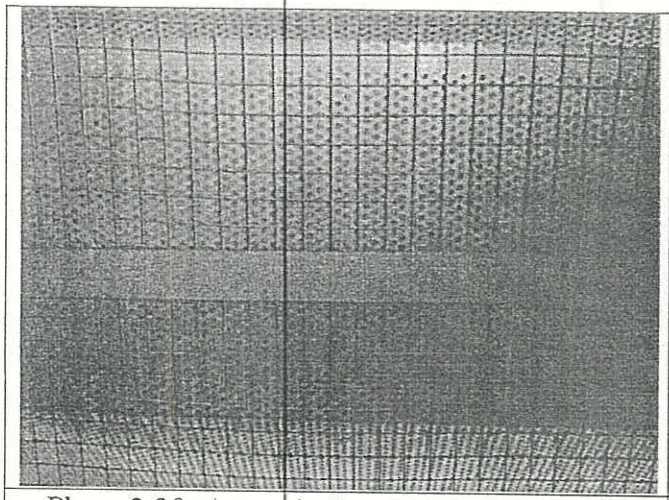


Photo 2.30: Acoustic Panels for the Radiator Building

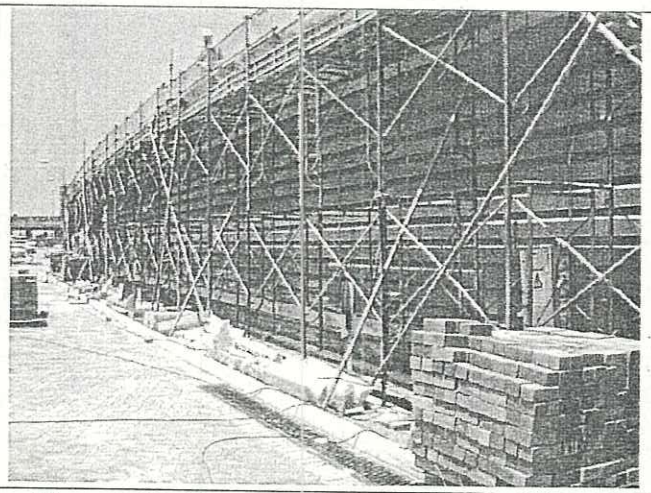


Photo 2.31: Exterior of the Radiator Building

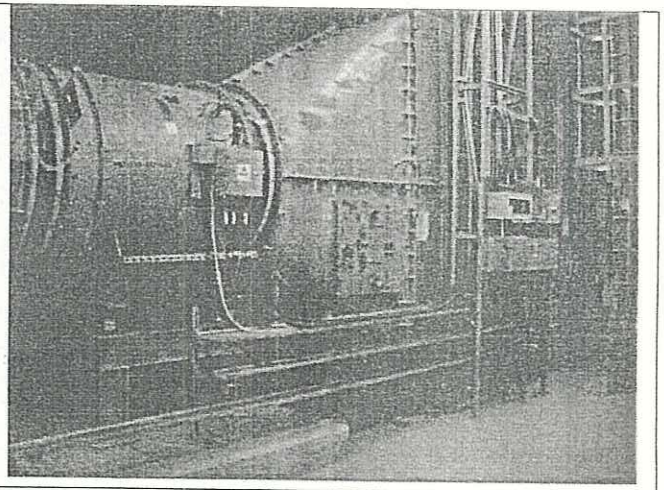


Photo 2.32: Tunnel Ventilation Fan

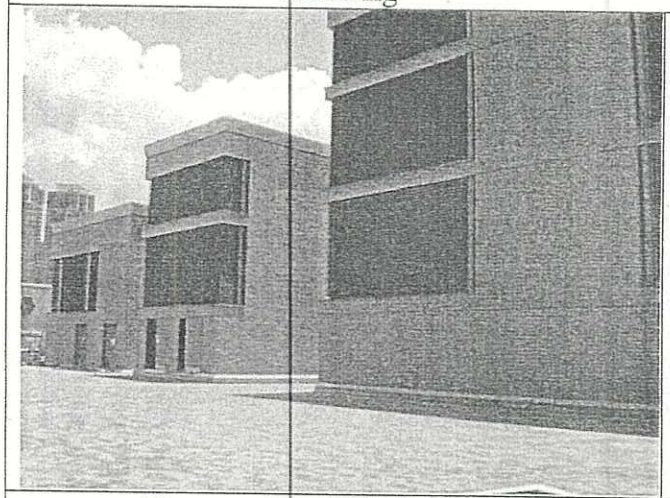


Photo 2.33: Ventilation Shaft

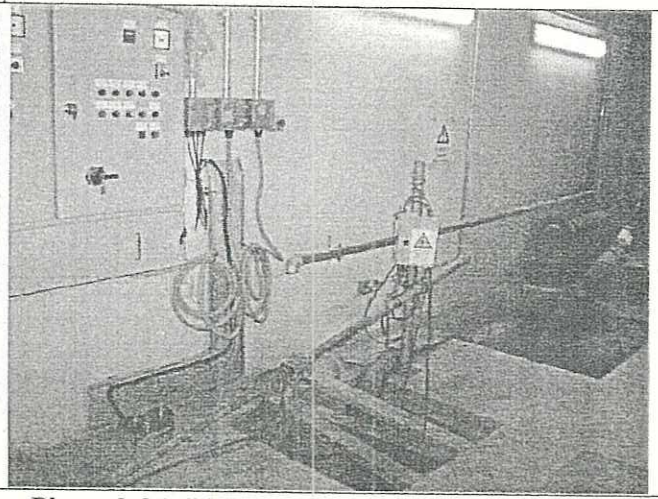


Photo 2.34: Plain water and foul sewage sump pump rooms

Southern Section-- Landscape

Nam Cheong Station

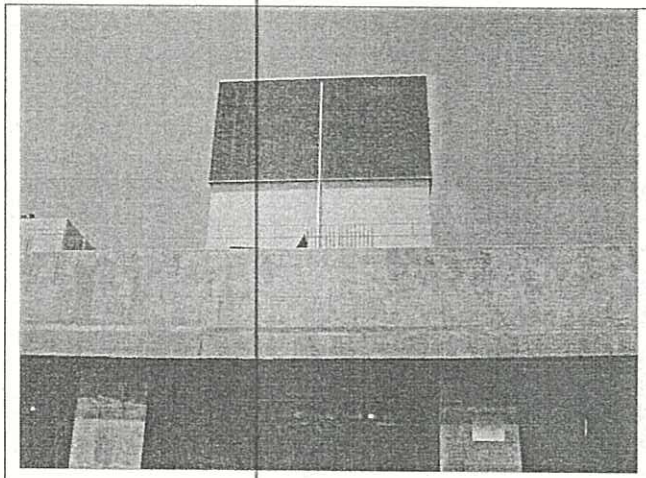


Photo 2.35: Vent Shaft of Nam Cheong Station

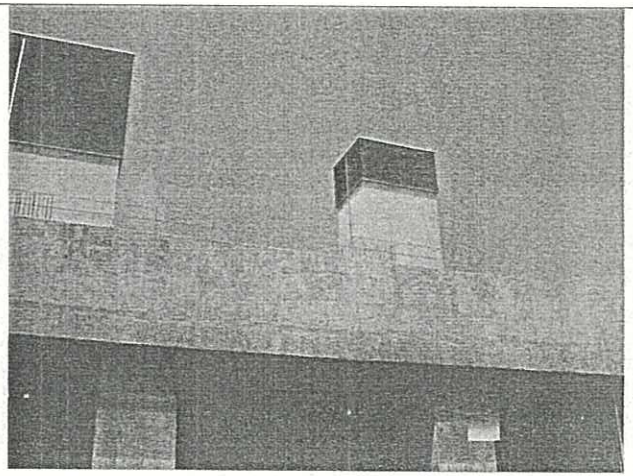


Photo 2.36: Vent Shafts of Nam Cheong Station

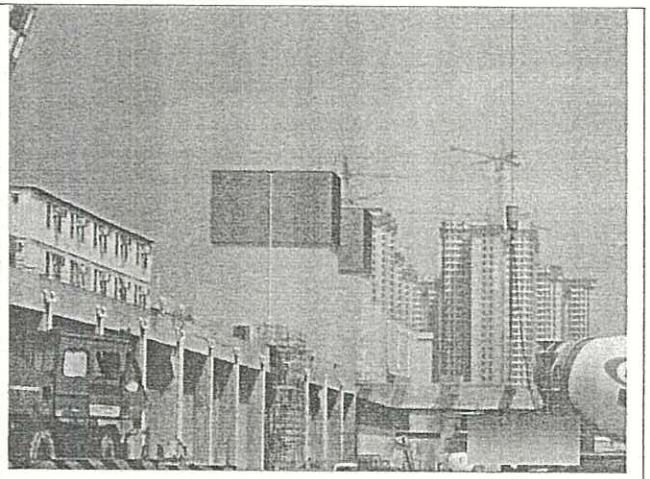


Photo 2.37: Vent shaft structures of Nam Cheong Station

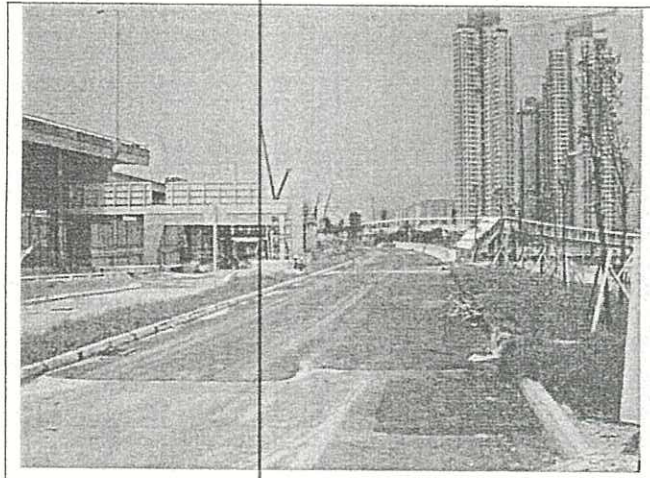


Photo 2.38: Hydroseeding along the Road P1

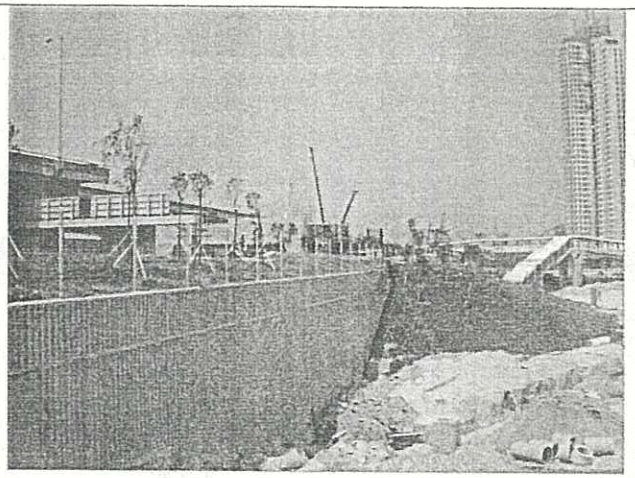


Photo 2.39: Hydroseeding on slope along Road P1

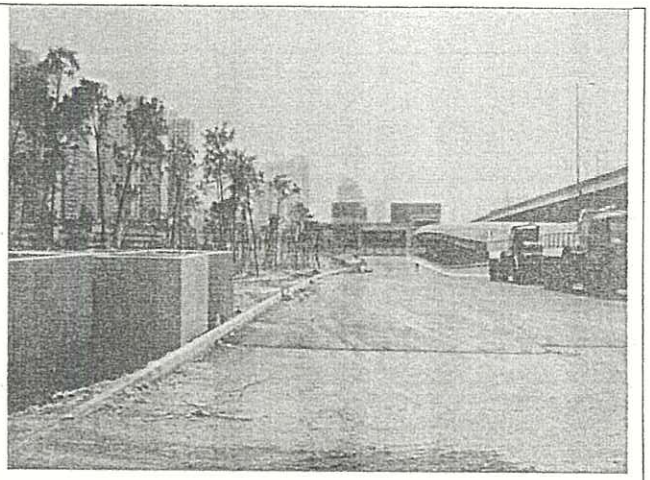


Photo 2.40: Tree planting along Road P1

Southern Section-- Landscape

Nam Cheong Station

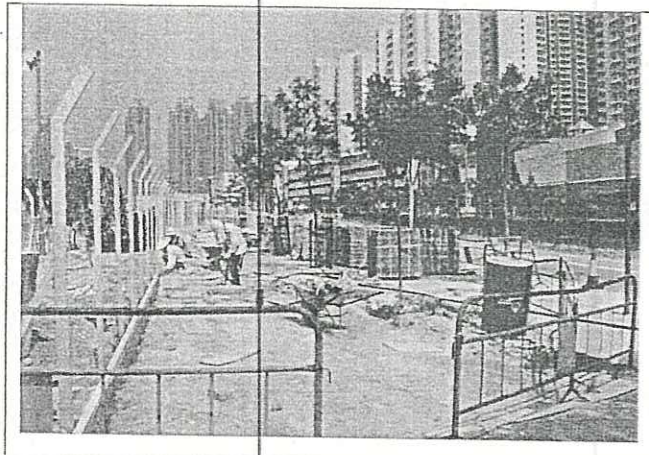


Photo 2.41: Ongoing paving works on the pavement near the station at Sham Mong Road

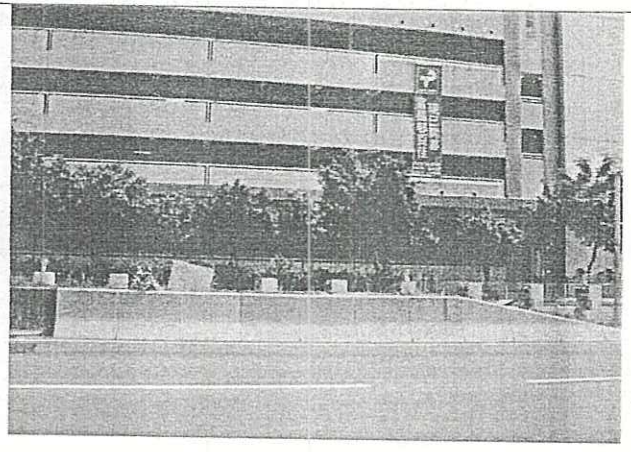


Photo 2.42: Completed landscaping works along the pavement near the residential area of Sham Mong Road

Photo 2.43: Completed landscaping works along the middle of Sham Mong Road

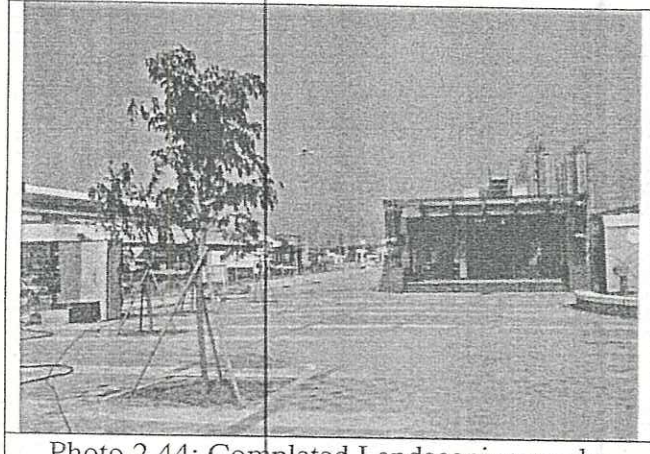


Photo 2.44: Completed Landscaping works outside the Western Exit of NAC Station (Near the Fish Wholesale Market)

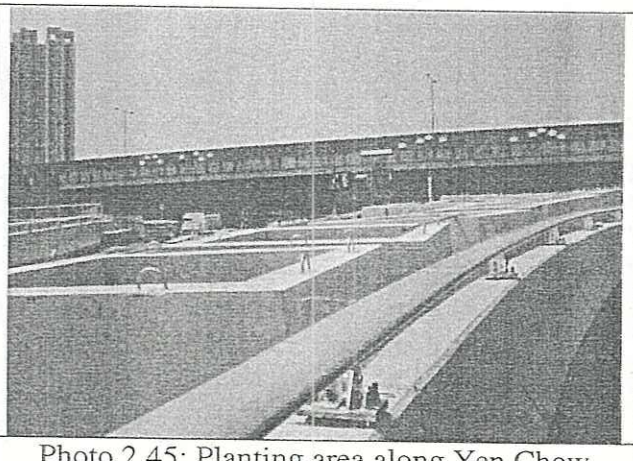


Photo 2.45: Planting area along Yen Chow Street West

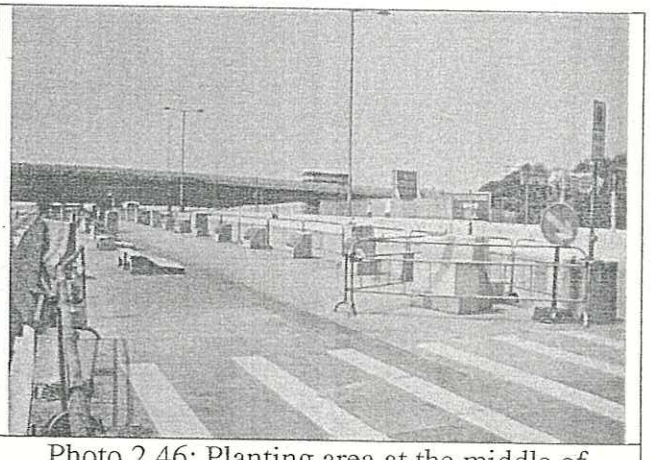


Photo 2.46: Planting area at the middle of Tonkin Street

Southern Section – Landscape

Tunnel Section Between Mei Foo to Nam Cheong

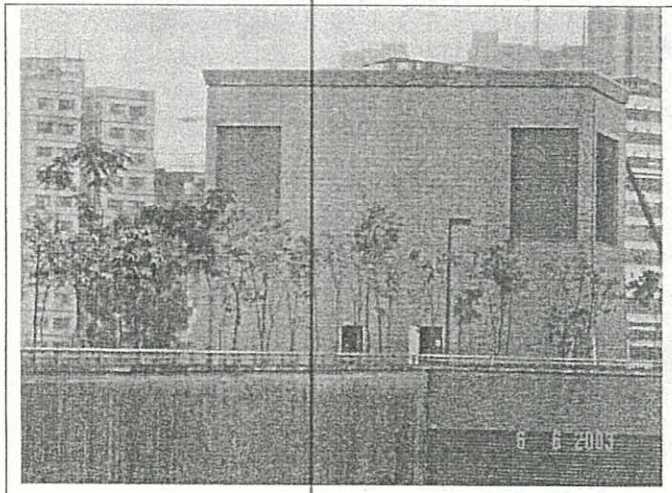


Photo 2.47: Vent shaft structure at Prince Edward Roundabout.

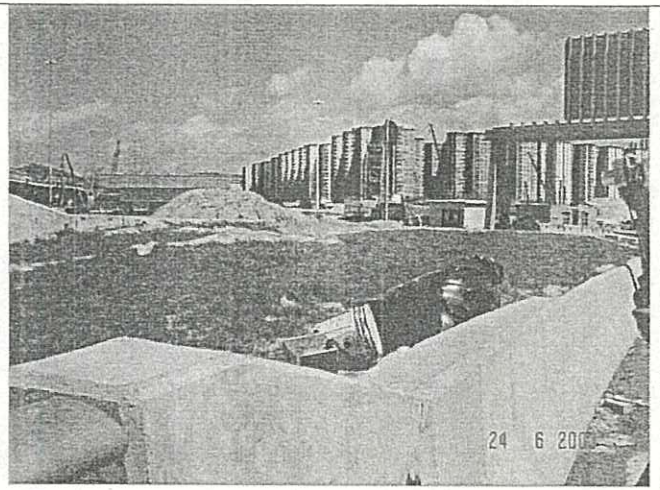


Photo 2.48: Landscape works at Area 10

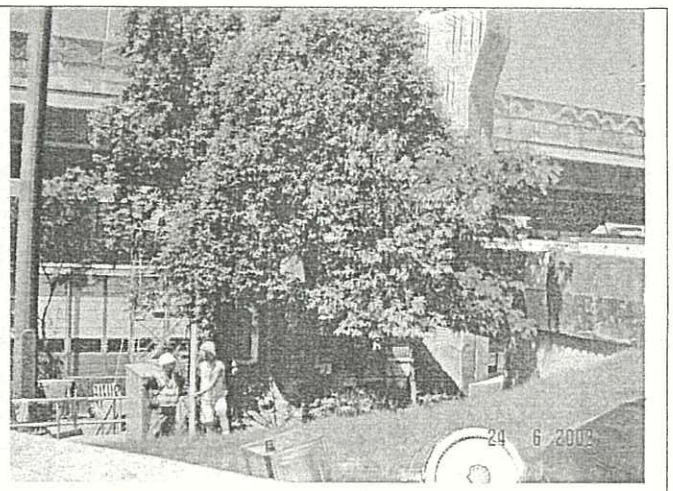


Photo 2.49: Landscape at Area 10

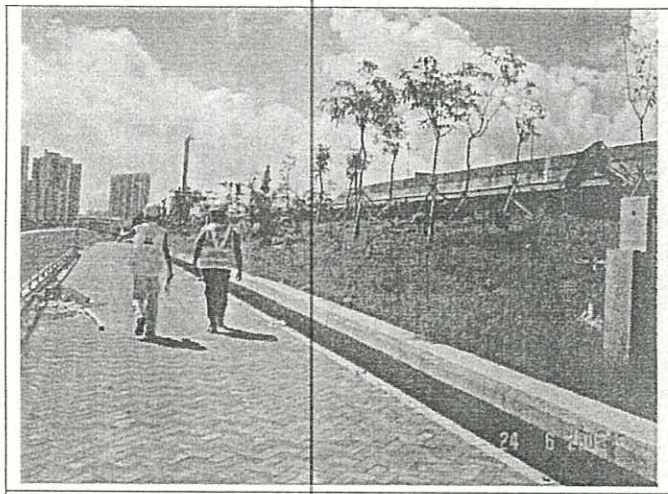


Photo 2.50: Landscape at Area 10

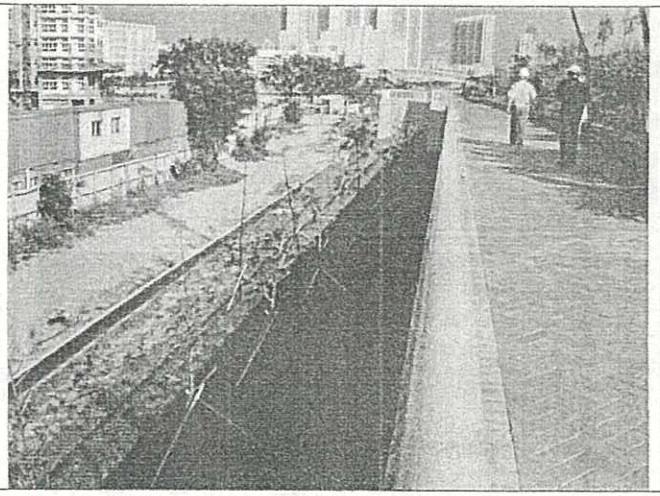


Photo 2.51: Landscape at Area 10

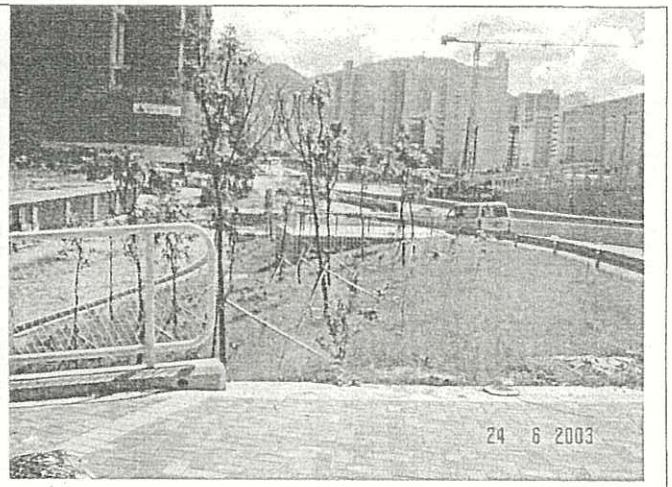


Photo 2.52: Landscape at Area 10 along Road D5

Southern Section – Landscape

Tunnel Section Between Mei Foo to Nam Cheong

Photo 2.53: Landscape at Road D5

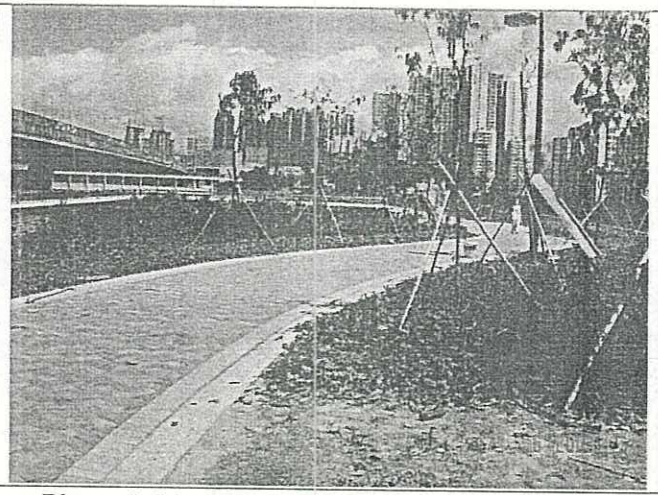


Photo 2.54: Landscape at Nam Cheong Park

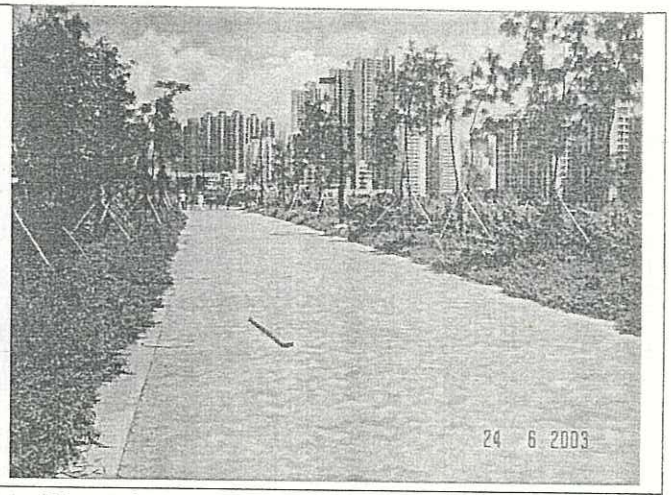


Photo 2.55: Landscape at Nam Cheong Park

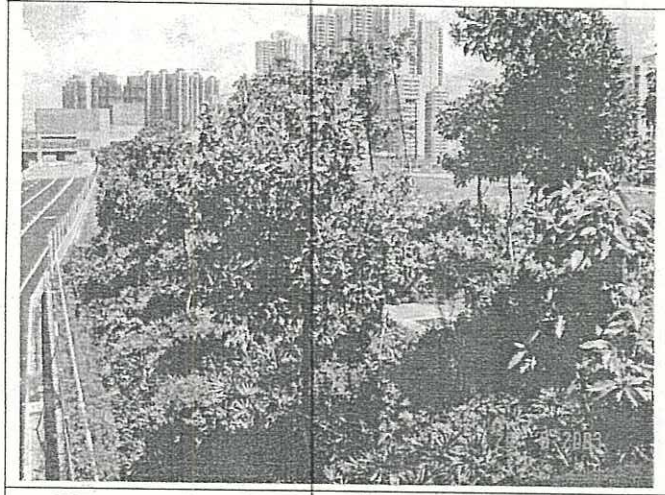


Photo 2.56: Landscape at Nam Cheong Park along Route 9.

Photo 2.57: Landscape at Nam Cheong Park

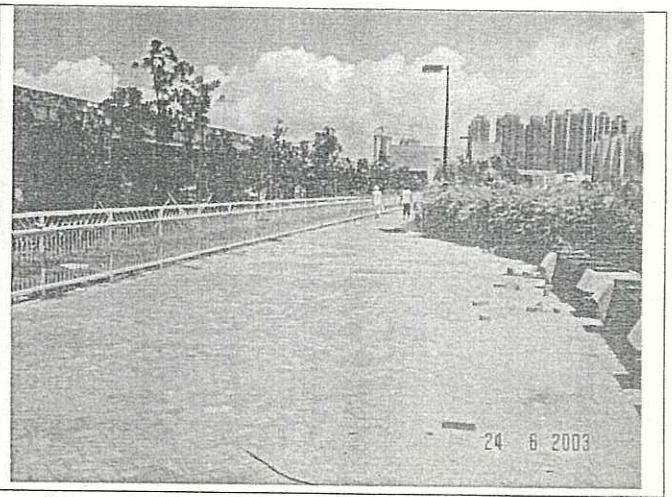


Photo 2.58: Landscape at Nam Cheong Park

Southern Section – Landscape

Tunnel Section Between Mei Foo to Nam Cheong

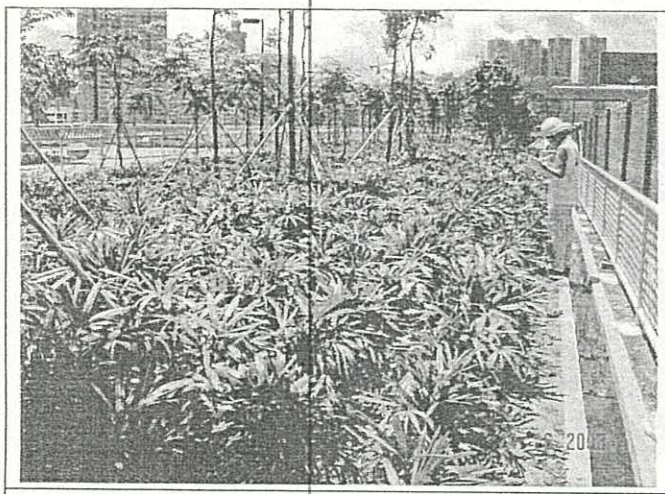
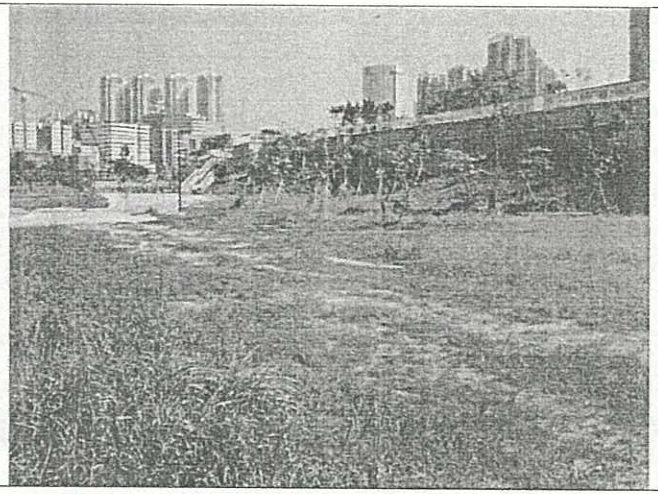
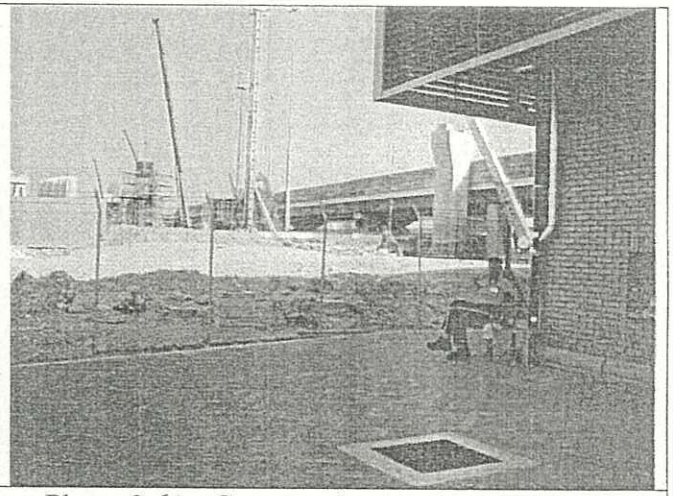
		

Photo 2.59: Landscape at Nam Cheong Park	Photo 2.60: Hydroseeding and wood mix planting at Nam Cheong Park.	Photo 2.61: Construction works at Lai Wan Chiller Plant Building undertaken by Route 9 Contractors. Landscape works will resume afterwards.

Southern Section- Landscape

Mei Foo Station

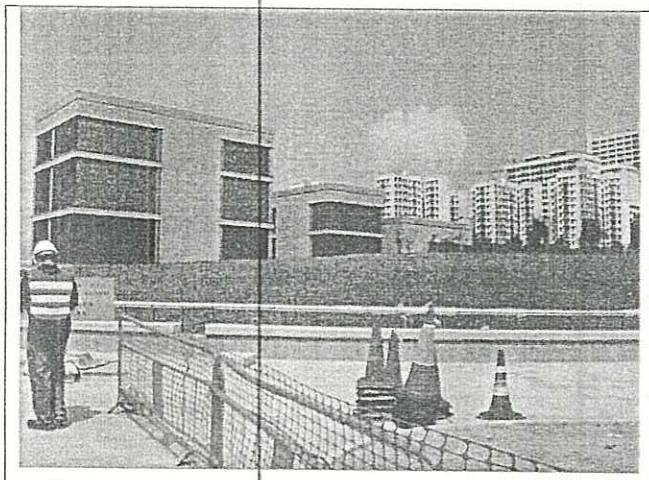


Photo 2.62: Vent shaft structures of Mei Foo Station

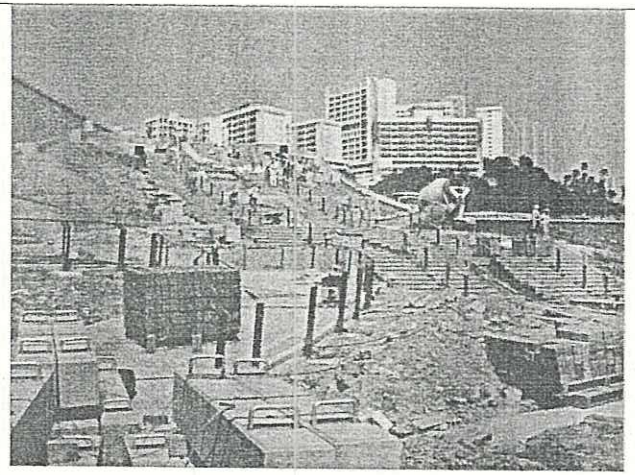


Photo 2.63: Ongoing landscaping works at the Northern end of MEF Station.

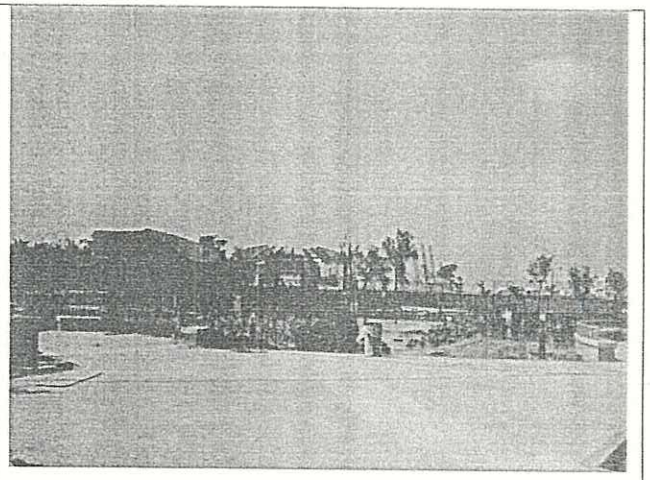


Photo 2.64: Part of Lai Chi Kok Park on the roof of MEF Station

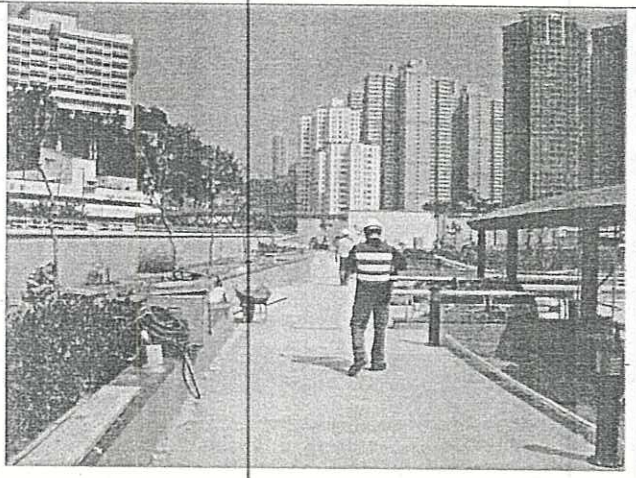


Photo 2.65: Landscaping works in Lai Chi Kok Park

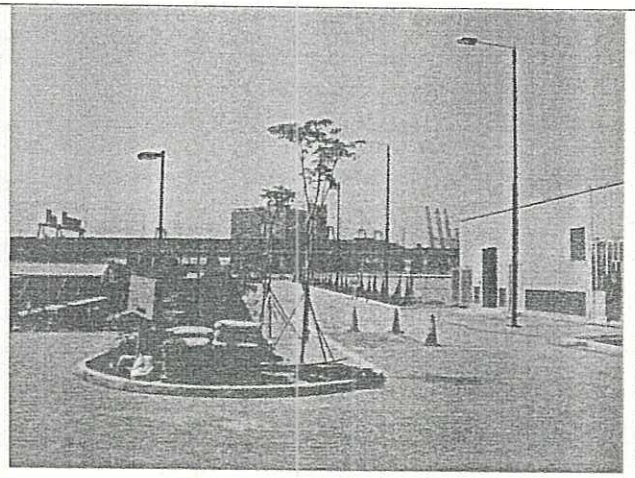


Photo 2.66: Landscaping works in Lai Chi Kok Park

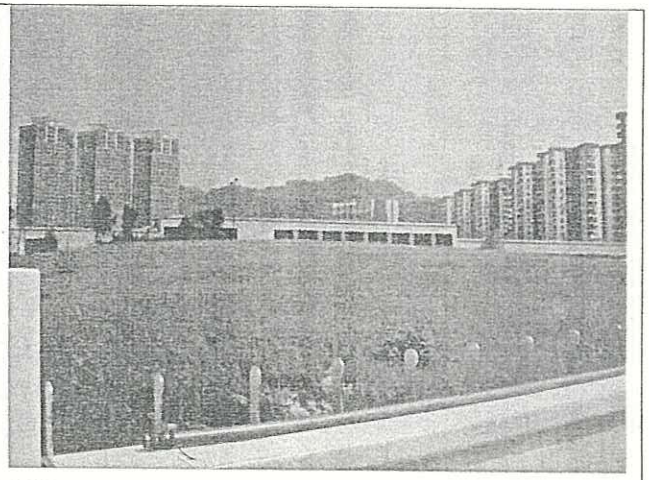


Photo 2.67: Completed hydroseeding in Lai Chi Kok Park

Southern Section- Landscape

Mei Foo Station

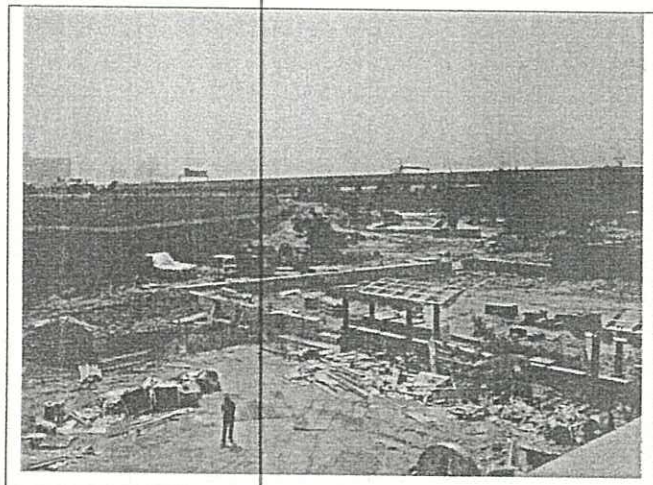
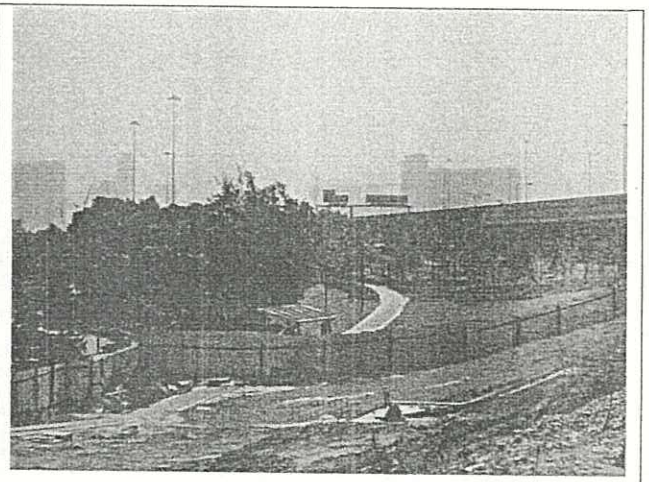
	

Photo 2.68 Ongoing works of Lai Chi Kok Park recreation area	Photo 2.69 Completed landscaping works in Lai Chi Kok Park

Southern Section—Water Quality

Nam Cheong Station

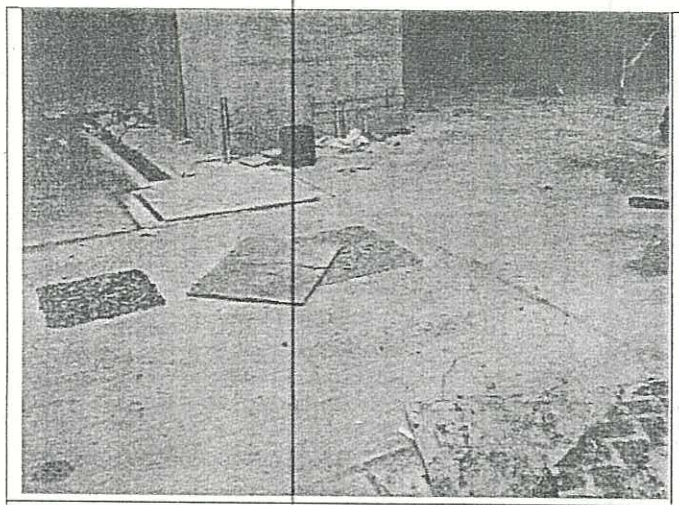


Photo 2.70 Oil interceptor outside the station

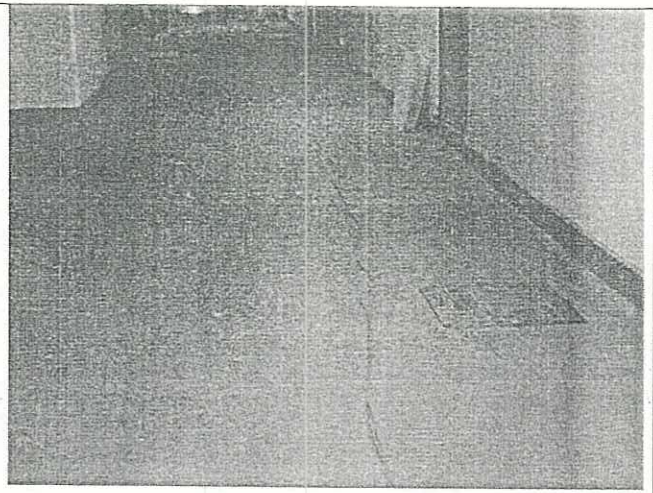


Photo 2.71: Oil interceptors inside the station

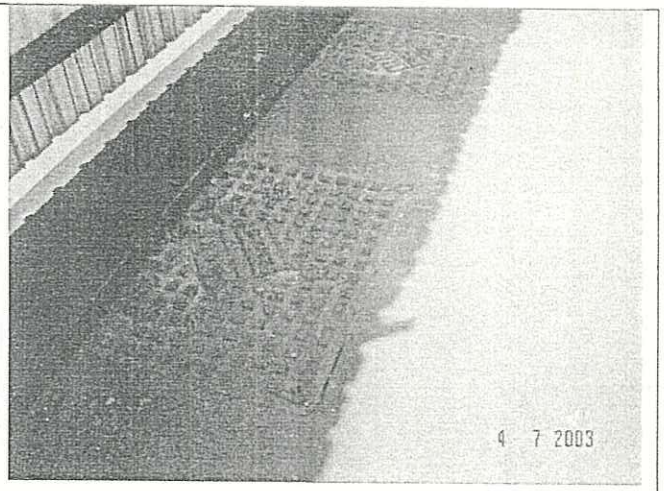


Photo 2.72: Oil interceptors for the tunnel box

Southern Section – Water Quality

Tunnel Section Between Mei Foo to Nam Cheong

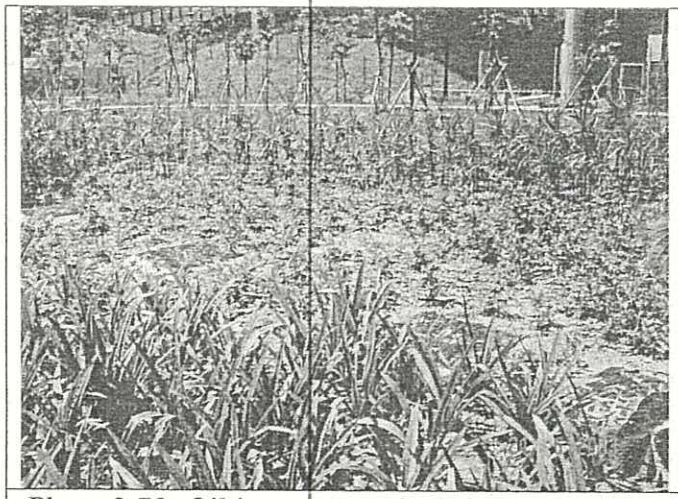
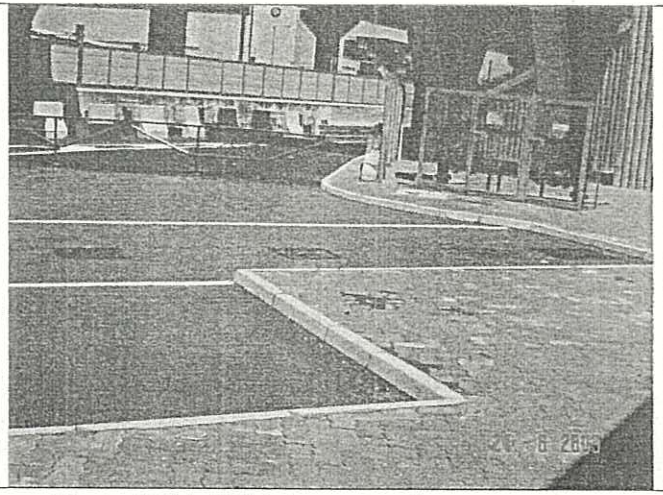
	

Photo 2.73: Oil interceptors in Lai Chi Kok Park	Photo 2.74: Oil interceptor for pump sump located in the tunnel section near Prince Edward Ventilation Building	Photo 2.75: Oil interceptor for pump sump in the tunnel, located in Nam Cheong Park.

Mei Foo Station

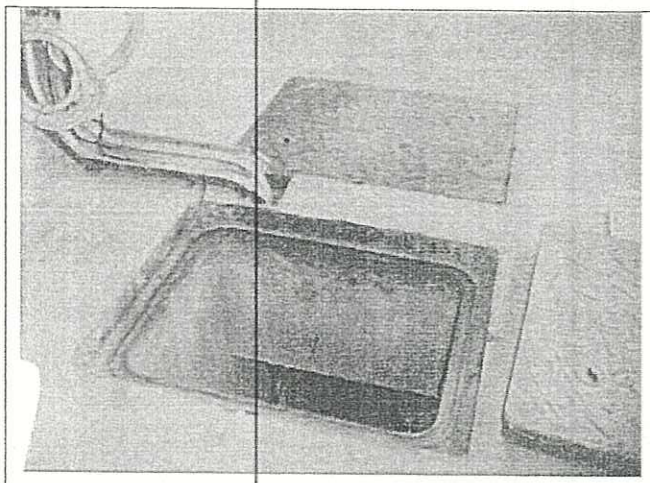


Photo 2.76 Plain water and sewage sump pit

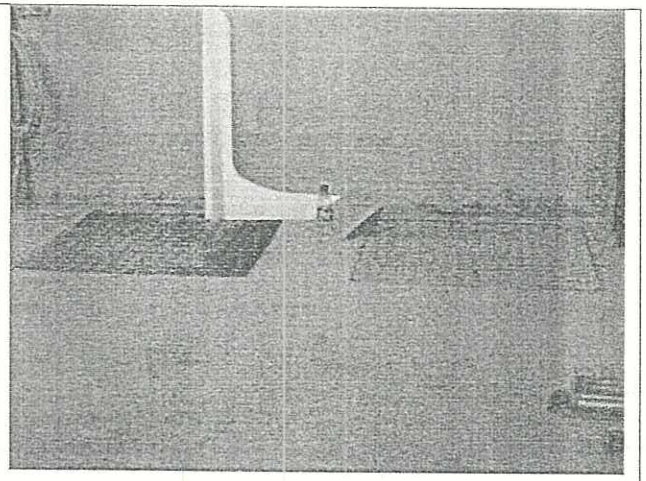


Photo 2.77: Plain water and sewage sump pit

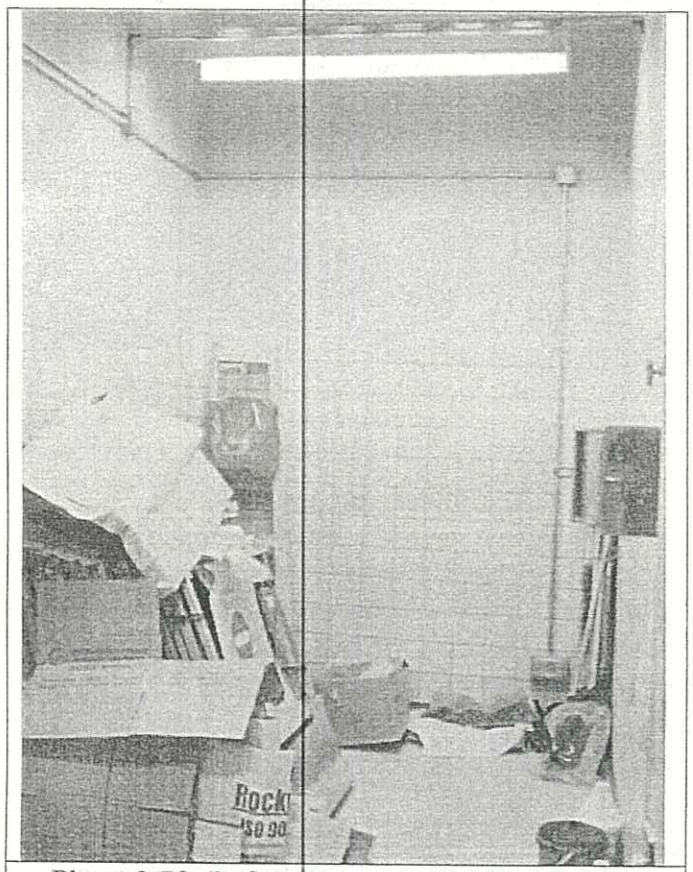


Photo 2.78: Refuse Room at Mei Foo Station

Central Section—Railway Noise

Tai Lam Tunnels

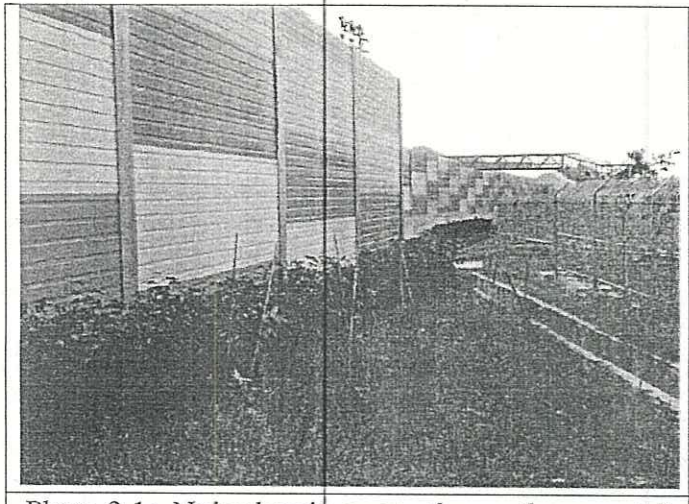


Photo 3.1: Noise barriers near the northern portal of Tai Lam Tunnel

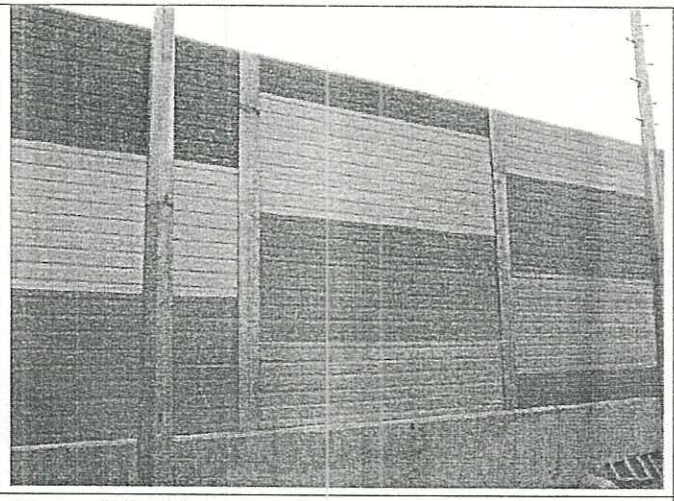


Photo 3.2: Noise barriers near the northern portal of Tai Lam Tunnel

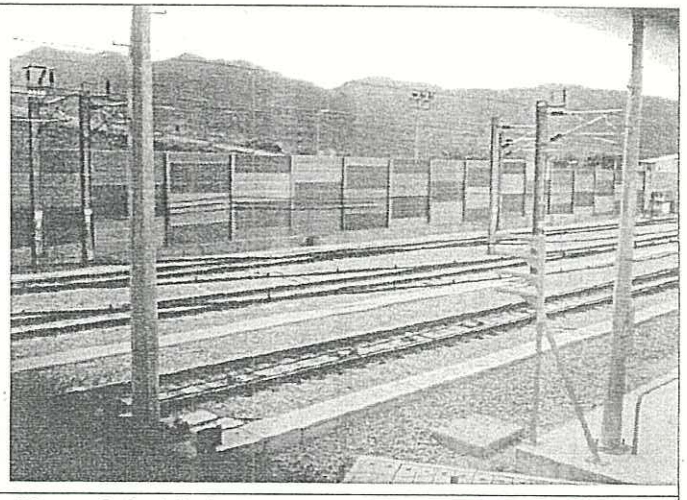


Photo 3.3: Noise barriers near the northern portal of Tai Lam Tunnel

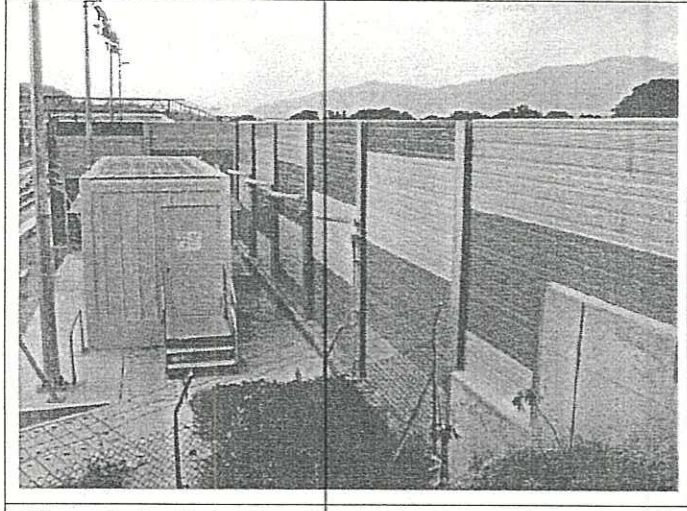


Photo 3.4: Noise barriers near the northern portal of Tai Lam Tunnel

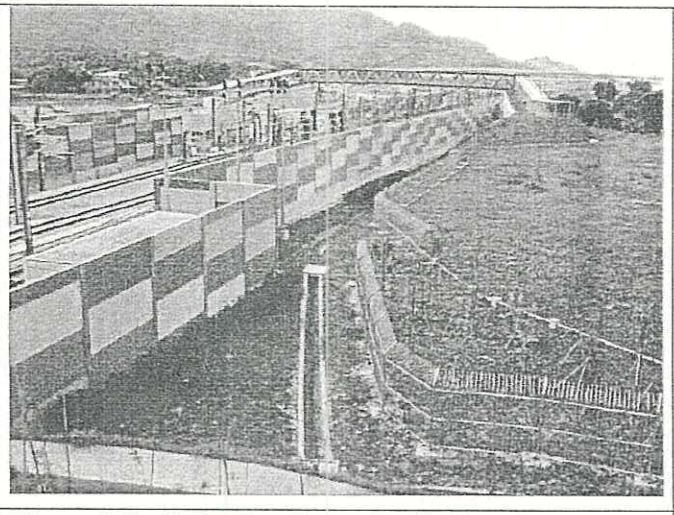


Photo 3.5: Noise barriers near the northern portal of Tai Lam Tunnel

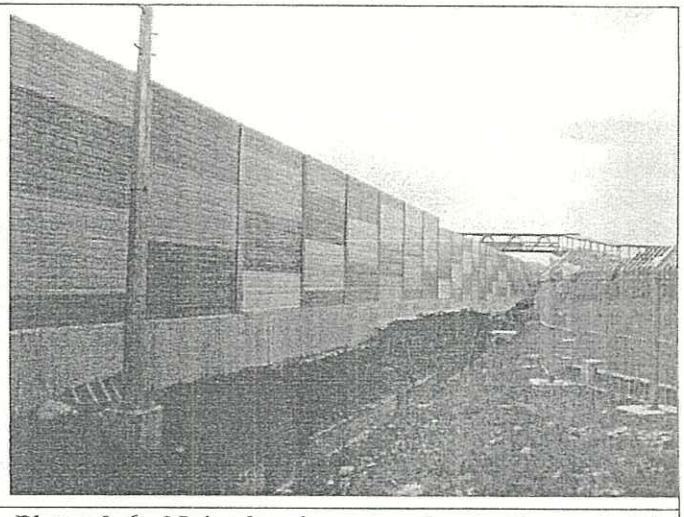


Photo 3.6: Noise barriers near the northern portal of Tai Lam Tunnel

Central Section –Fixed Plant Noise

Kwai Tsing Tunnel

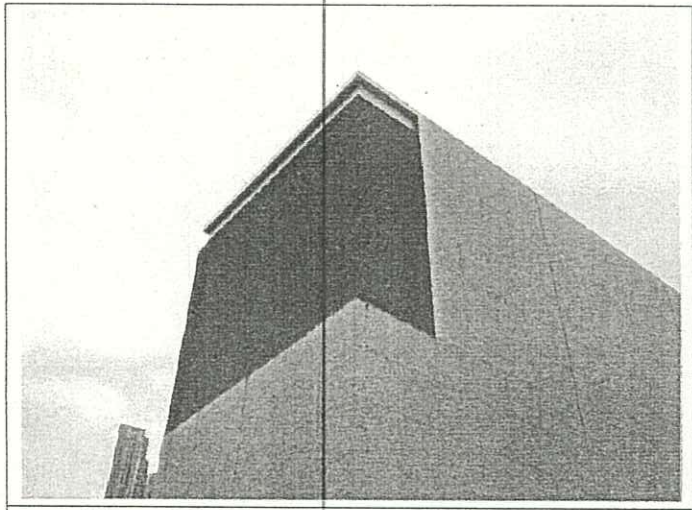


Photo 3.7: Kwai Fong Ancillary Building (ventilation outlet)

Photo 3.8: Ventilation outlet away from sensitive receivers

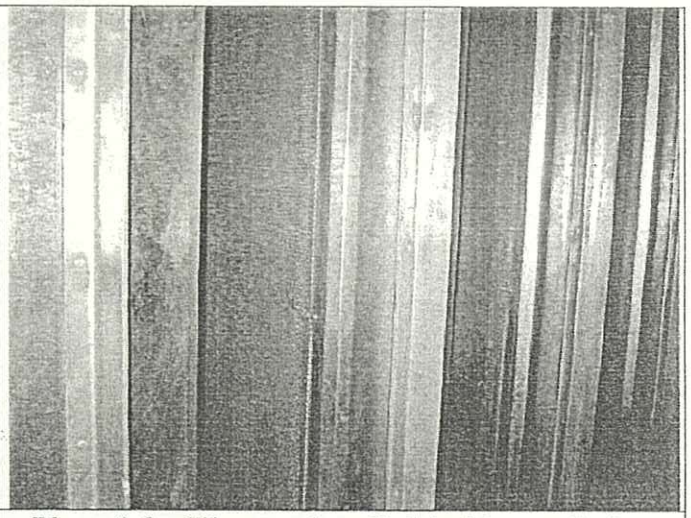


Photo 3.9: Silencers installed inside ventilation systems

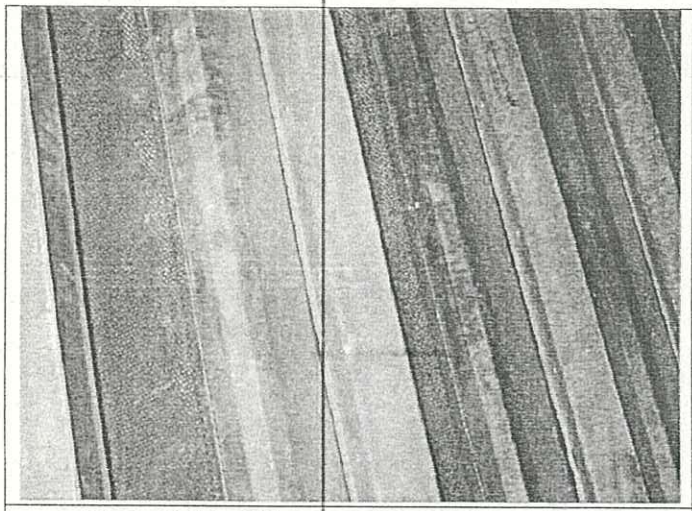


Photo 3.10: Silencers installed inside the ventilation systems

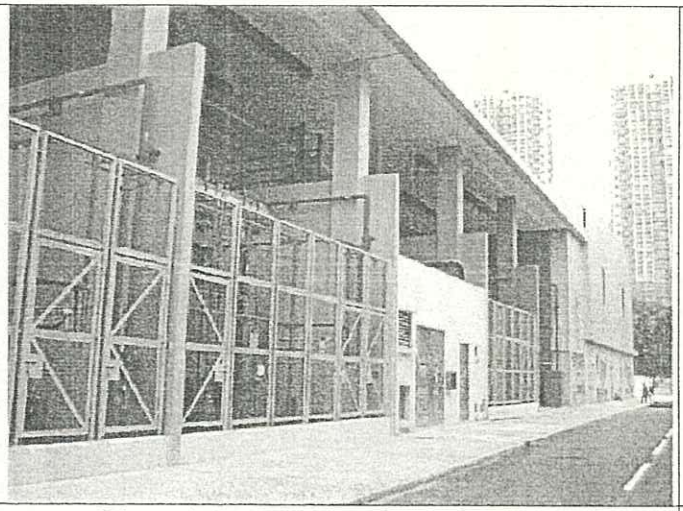


Photo 3.11: CLP Traction substation

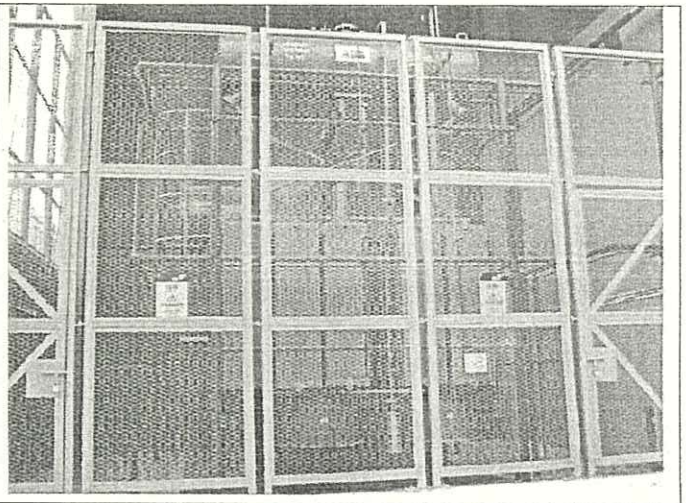


Photo 3.12 CLP Traction substation

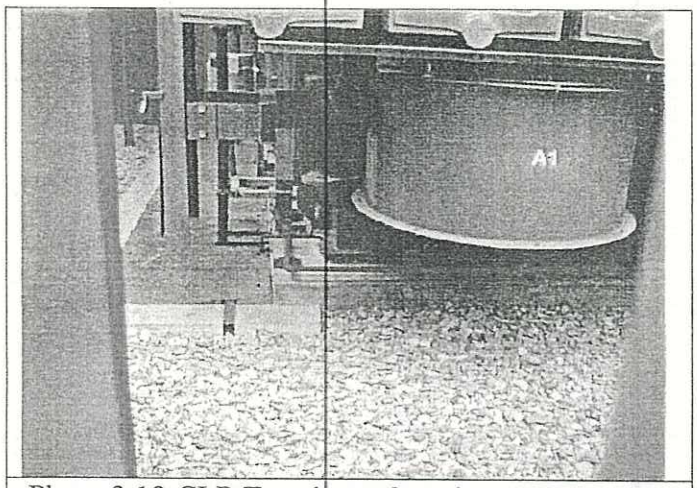


Photo 3.13 CLP Traction substation – close-up of the damper system

Central Section—Fixed Plant Noise

Tsuen Wan West Station

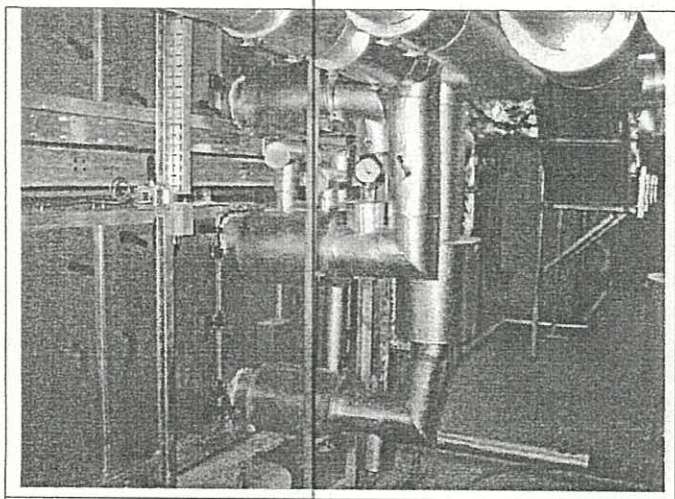


Figure 3.14 ECS Room

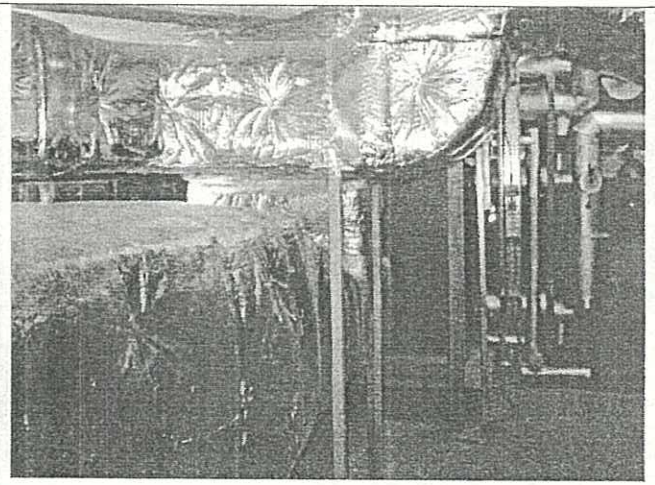


Figure 3.15 ECS Room

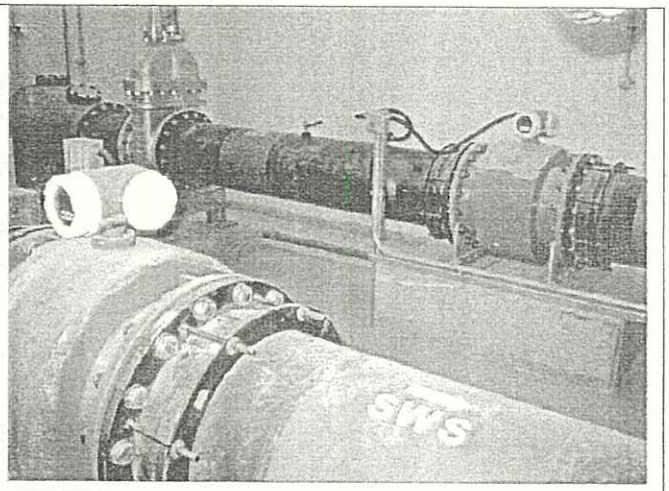


Figure 3.16 Cooling Water Plant Room

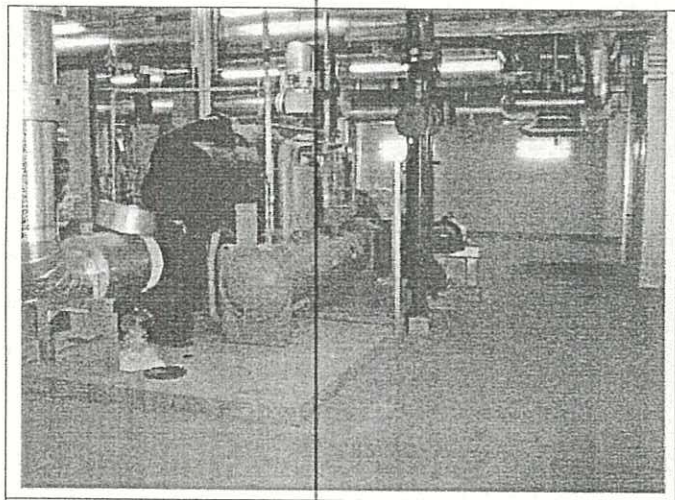


Figure 3.17 Chiller Plant Room

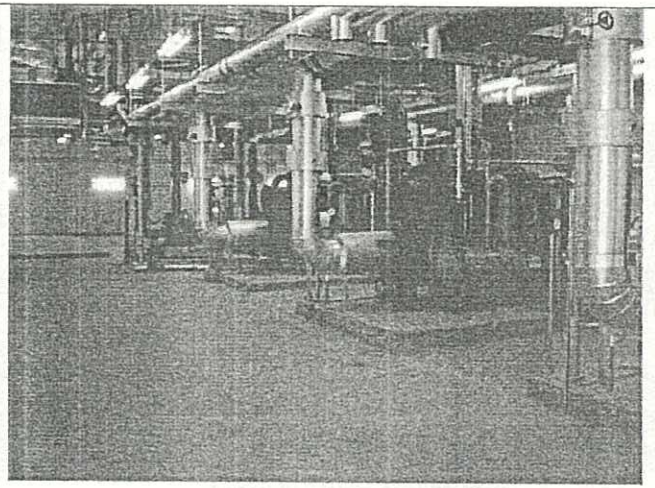


Figure 3.18 Chiller Plant Room

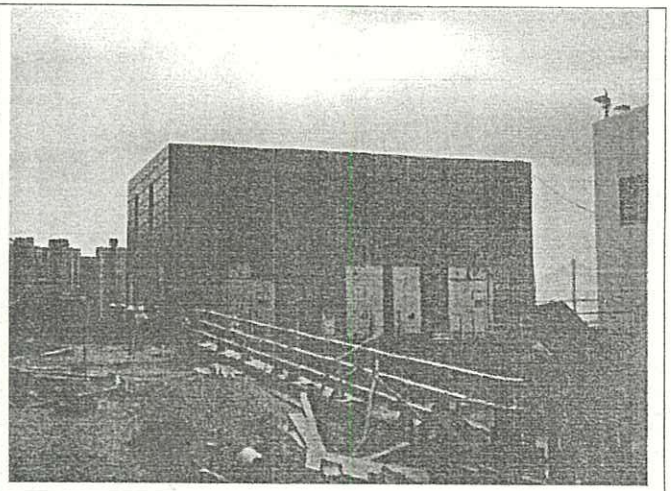


Figure 3.19 Transformer Room

Central Section—Fixed Plant Noise

Tsuen Wan West Station

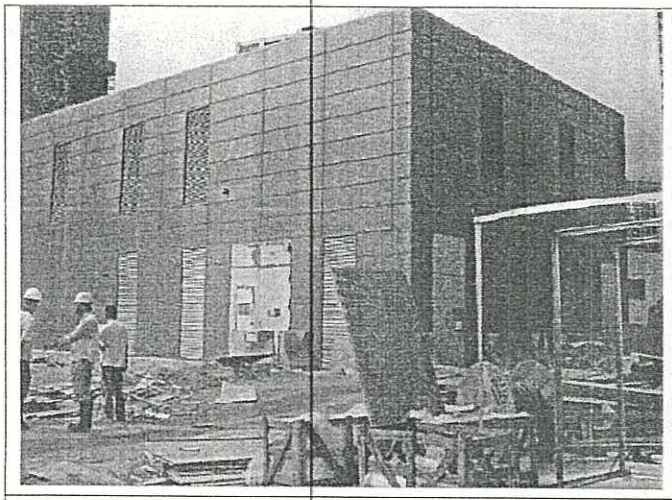


Figure 3.20 Transformer room

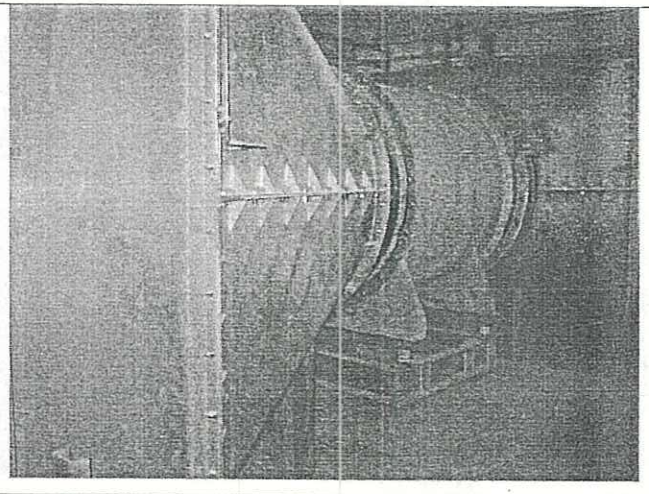


Figure 3.21 Tunnel Ventilation Fan

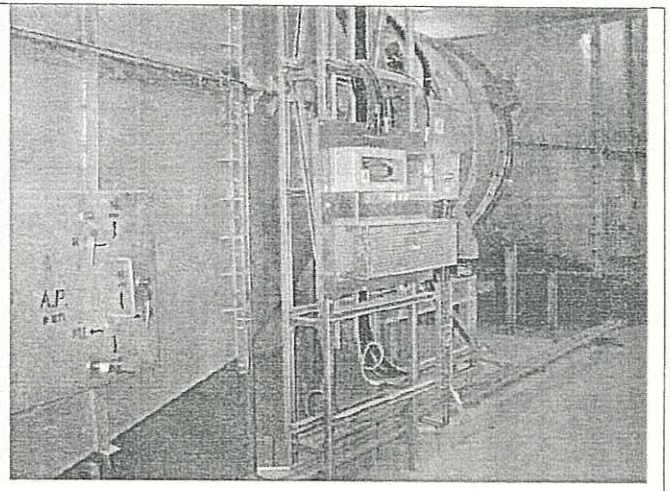


Figure 3.22 Tunnel Ventilation Fan

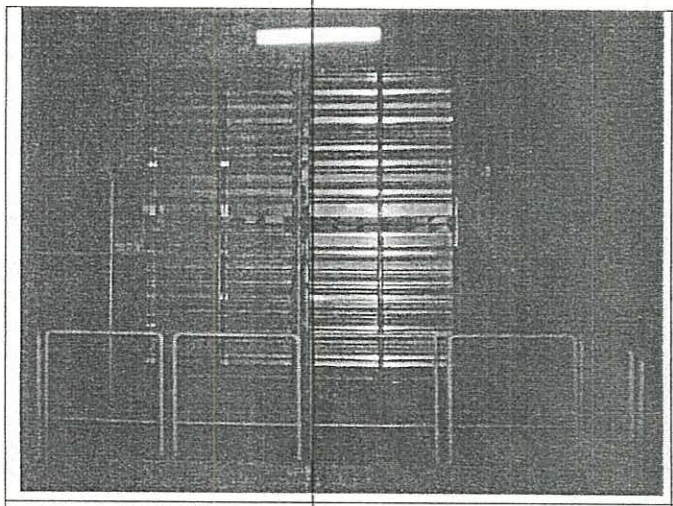


Figure 3.23 Plenum of the tunnel ventilation fan with silencers equipped inside

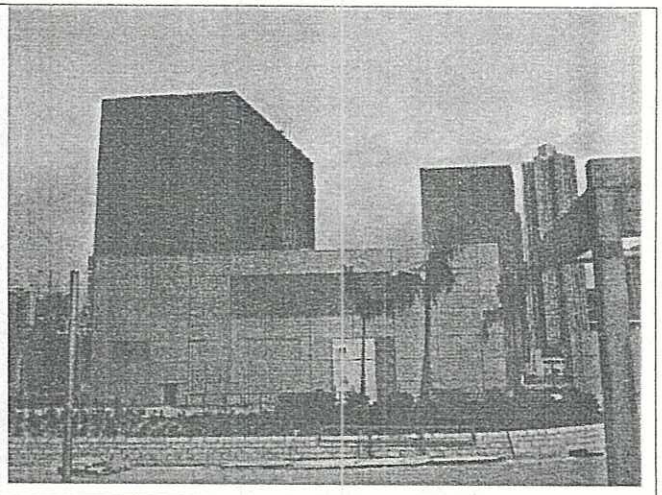


Figure 3.24 Tunnel ventilation Shaft

Central Section—Fixed Plant Noise

Tai Lam Tunnels

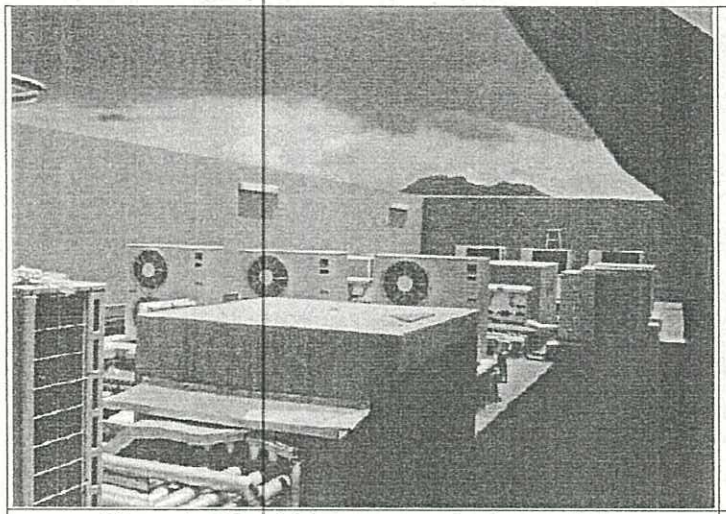


Photo 3.25: chiller system in form of air conditioning at the vent building of the north portal of Tai Lam Tunnel

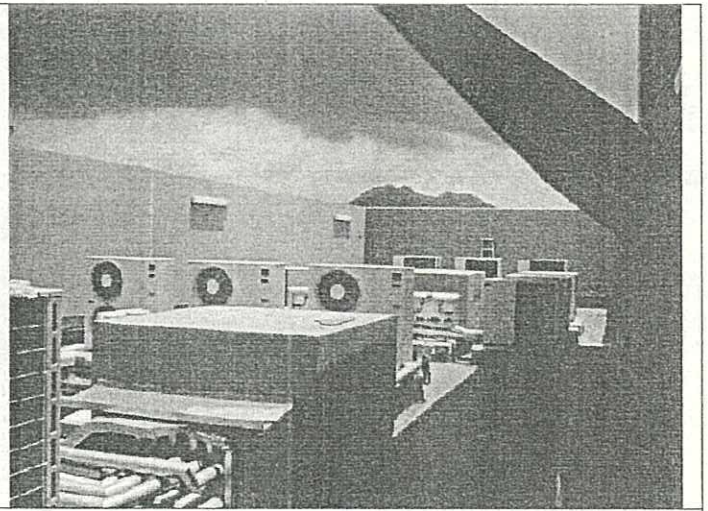


Photo 3.26: chiller system at the vent building of the Tai Lam Tunnel north portal

Central Section – Landscape

Kwai Tsing Tunnel and Tai Lam Tunnel

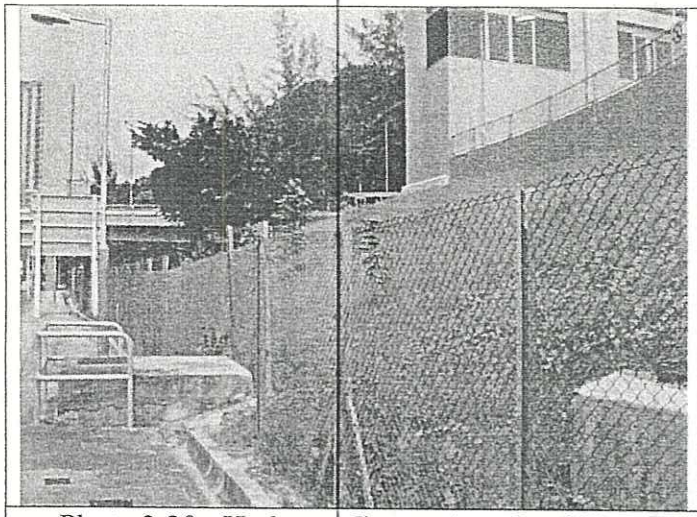


Photo 3.30: Hydroseeding at Area D of Kwai Tsing Tunnel

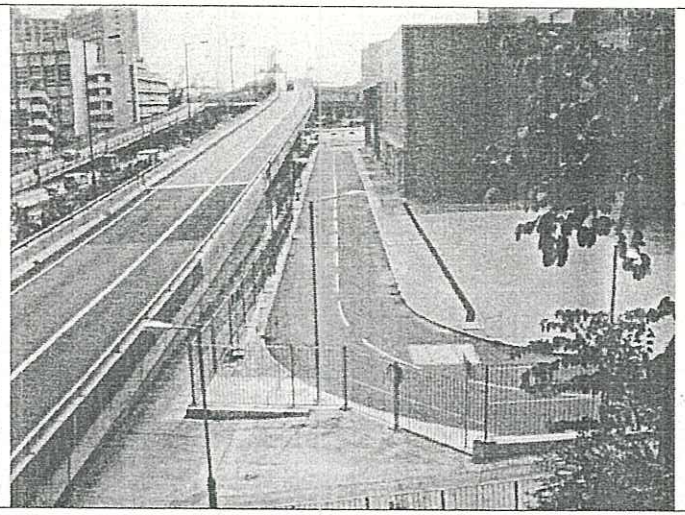


Photo 3.31: Outstanding landscaping works area at Area E of Kwai Tsing Tunnel

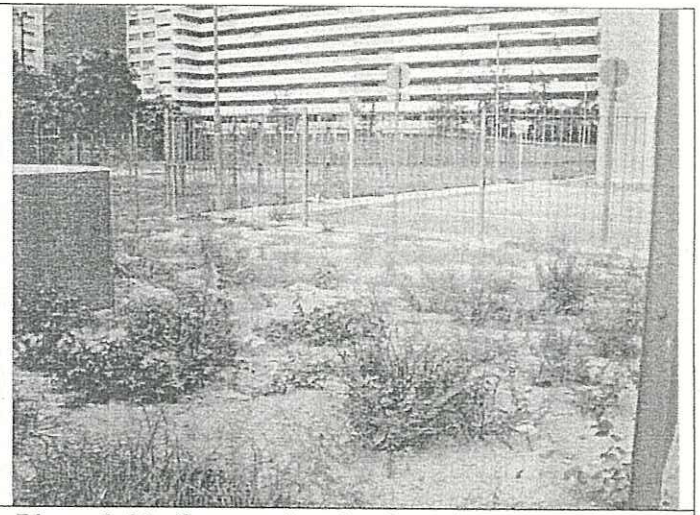


Photo 3.32: Outstanding landscaping works area at Area G10 of Kwai Tsing Tunnel

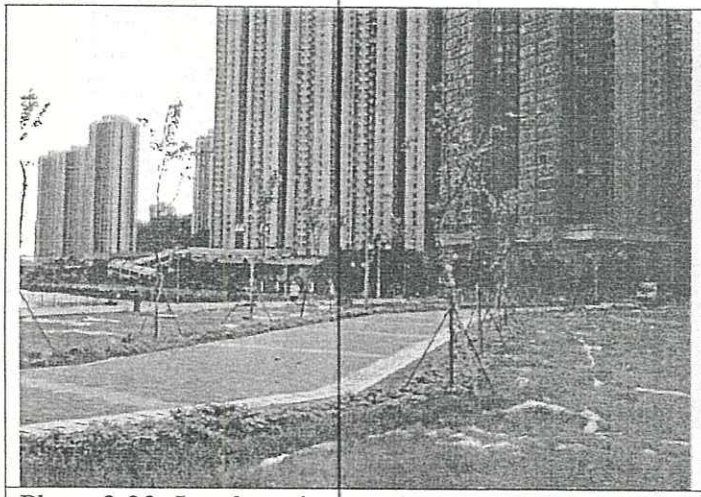


Photo 3.33: Landscaping work at the south portal of Tai Lam Tunnel

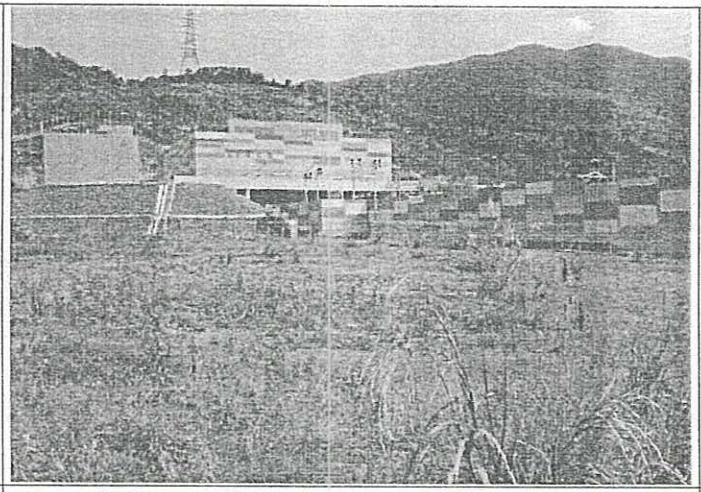


Photo 3.34: Landscaping work at the north portal of Tai Lam Tunnel

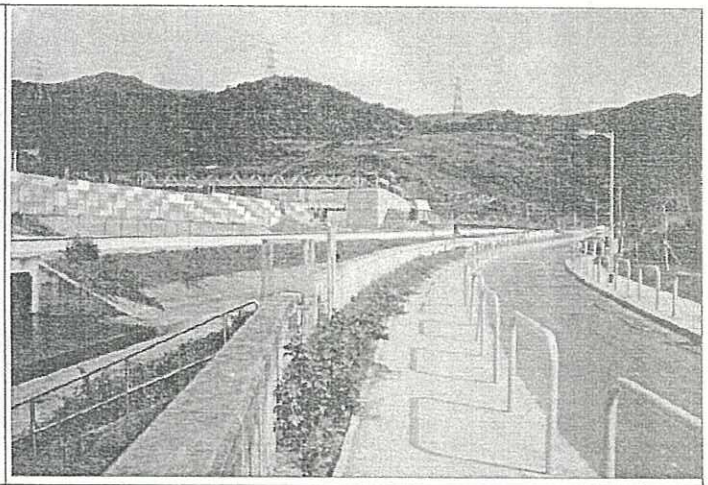


Photo 3.35: Landscaping work at the north portal of Tai Lam Tunnel

Central Section – Landscape

Tsuen Wan West Station

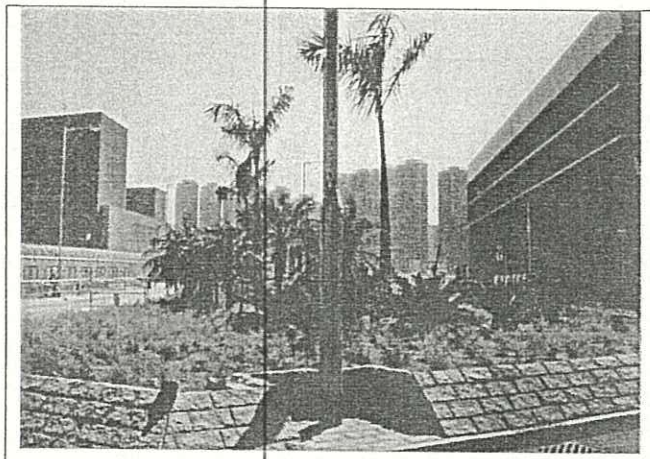


Photo 3.36: Landscaping outside the PTI

Photo 3.37: Landscaping outside the PTI

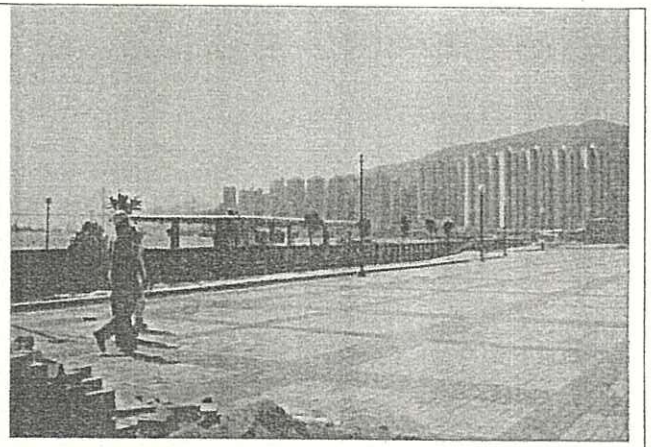


Photo 3.38: Completed landscaping works at the Promenade.

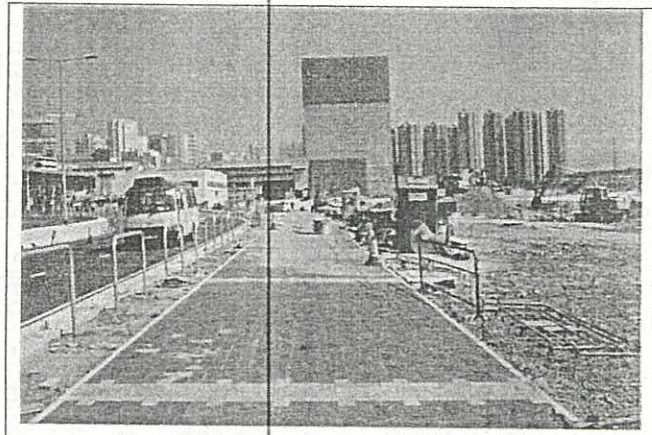


Photo 3.39: Landscaping works on Hoi Hing Road

Central Section – Water Quality

Kwai Tsing Tunnel and Tai Lam Tunnel

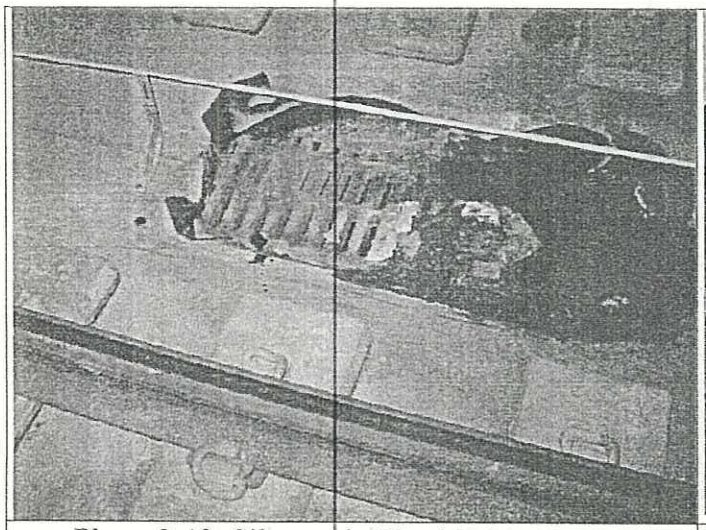


Photo 3.40: Silt trap in Kwai Tsing Tunnel

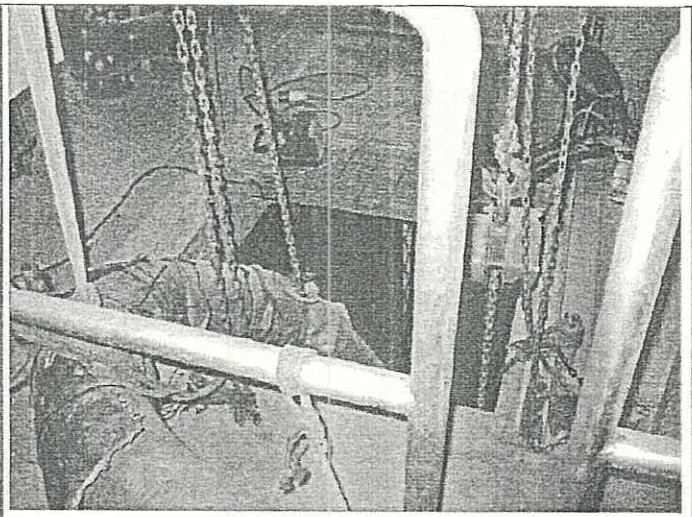


Photo 3.41: Sump pit inside Tai Lam Tunnel to collect tunnel seepage

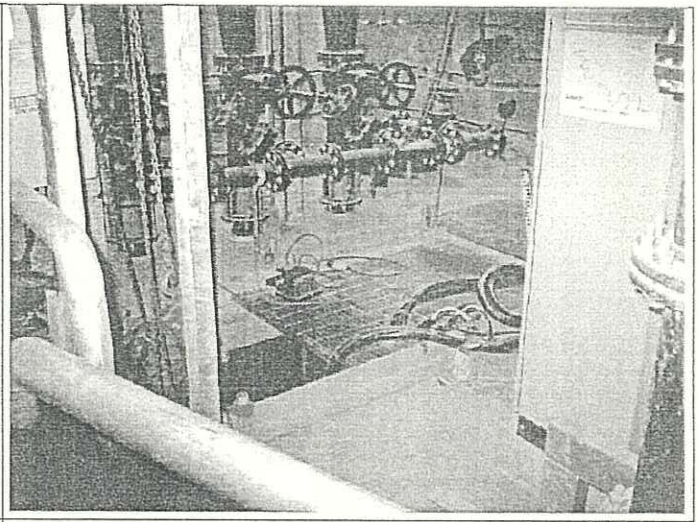


Photo 3.42: Sump pit and the associated pumping pipes inside Tai Lam Tunnel

Tsuen Wan West Station

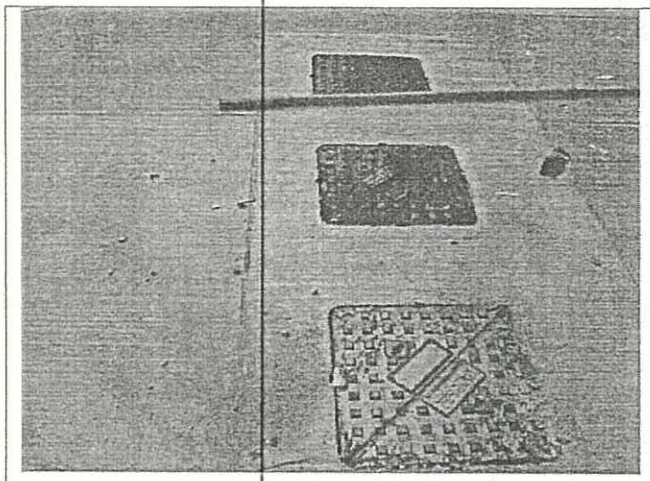


Figure 4.42a Oil interceptors for the station

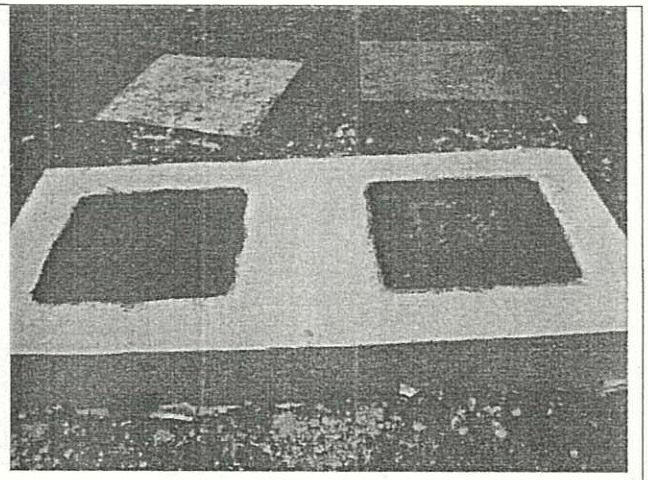


Figure 4.42b Oil interceptors for the station

Central Section—Waste

Tsuen Wan West Station

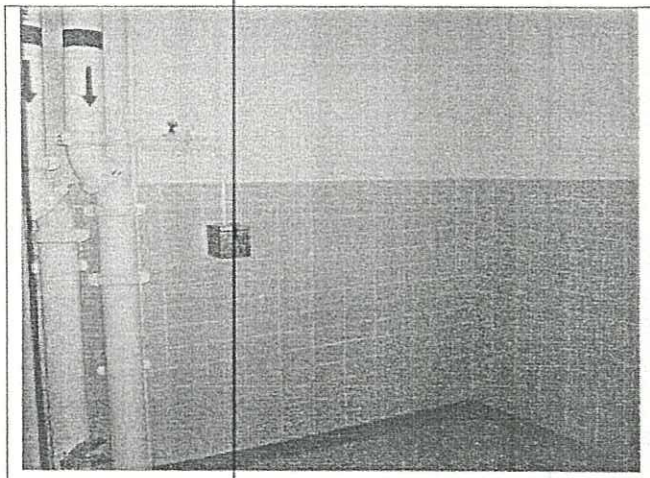


Figure 3.43 Refuse room

Figure 3.44 Refuse Room

Figure 3.45 "No Smoking" reflective sign in Kwai Tsing Tunnel

Northern Section – Railway Noise

Viaduct Section between Kam Tin and Yuen Long

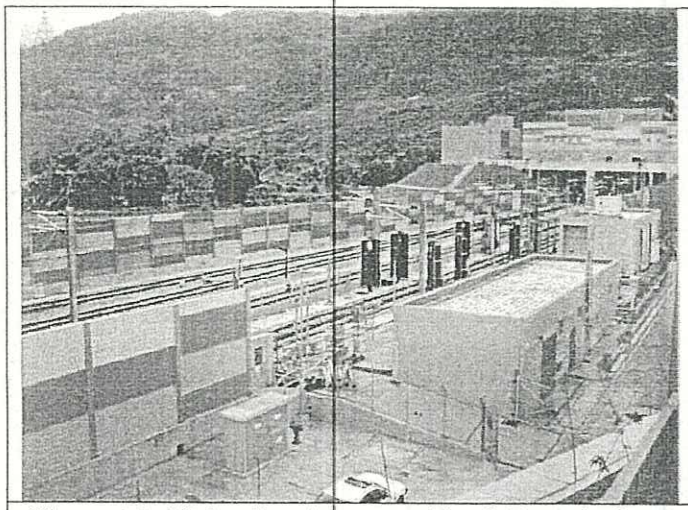


Photo 4.1: Noise Barriers near North Portal of Tai Lam Tunnels and Car Wash Plant

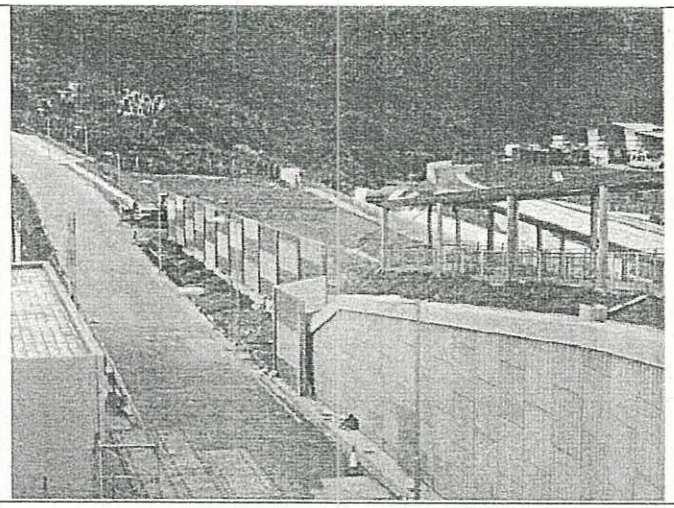


Photo 4.2: Noise Barriers near Car Wash Plant

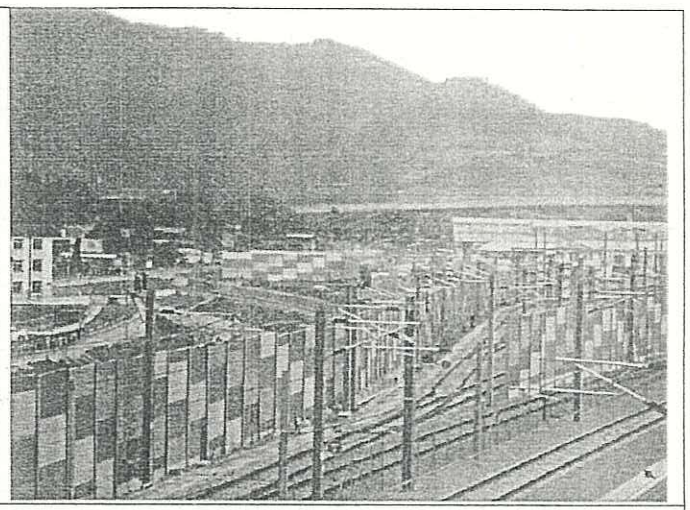


Photo 4.3: Noise Barriers for main lines and stabling areas

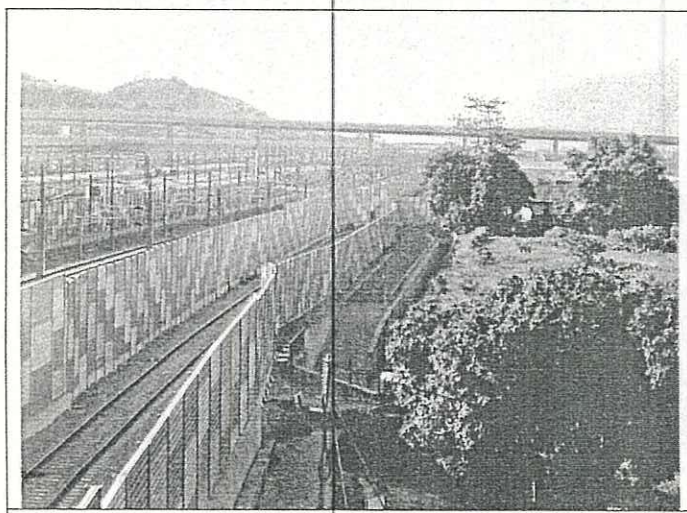


Photo 4.4: Noise barriers along the stabling area

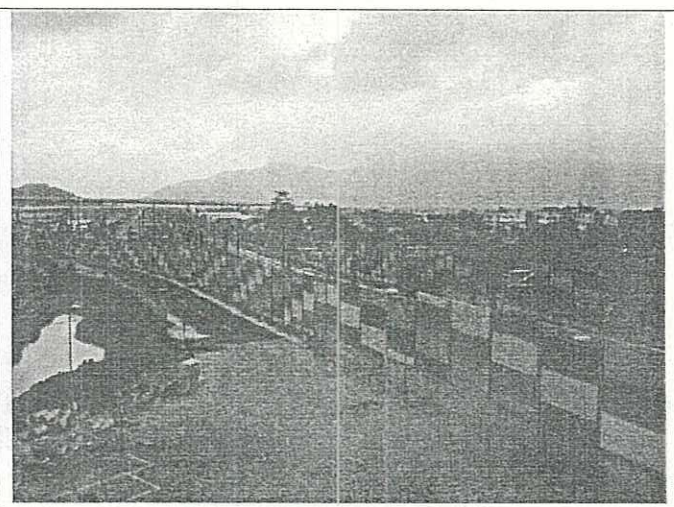


Photo 4.5: Noise Barriers

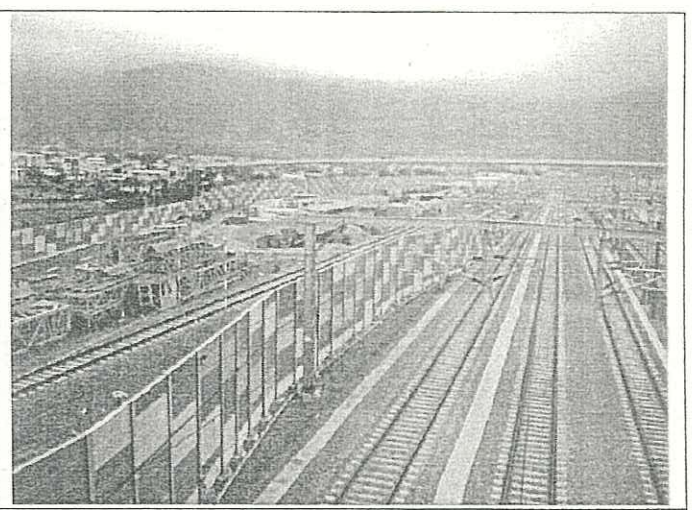


Photo 4.6: Noise Barriers alongside the main line

Northern Section – Railway Noise

Viaduct Section between Kam Tin and Yuen Long

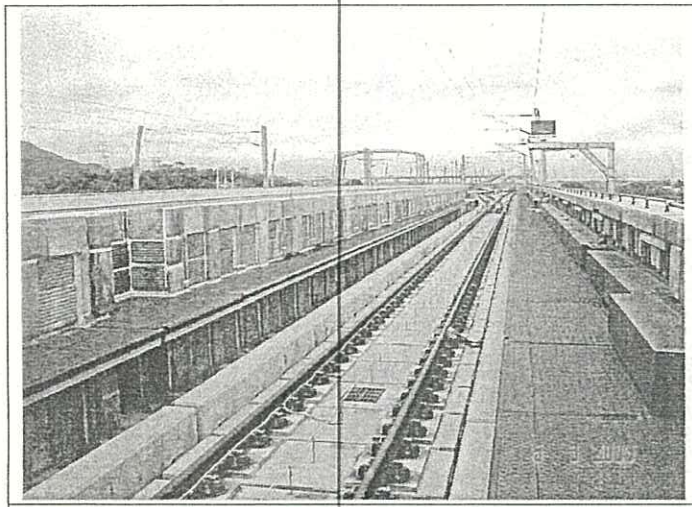


Photo 4.7: General View of Multi-Plenum System (MPS)

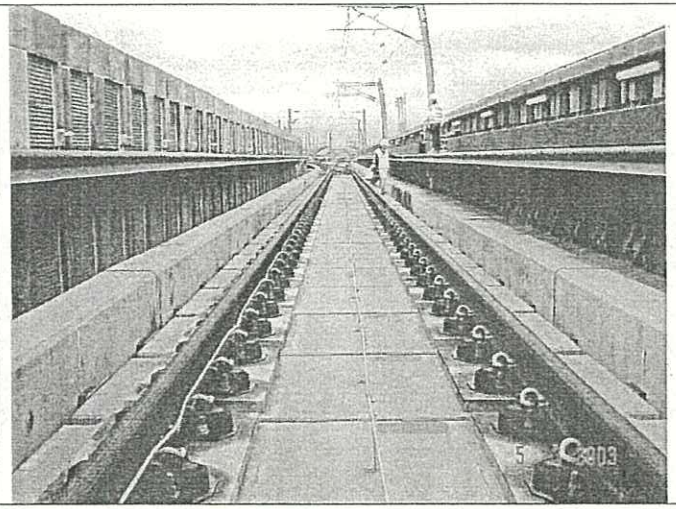


Photo 4.8: MPS on Single Viaduct

Photo 4.9: MPS on Twins Viaduct

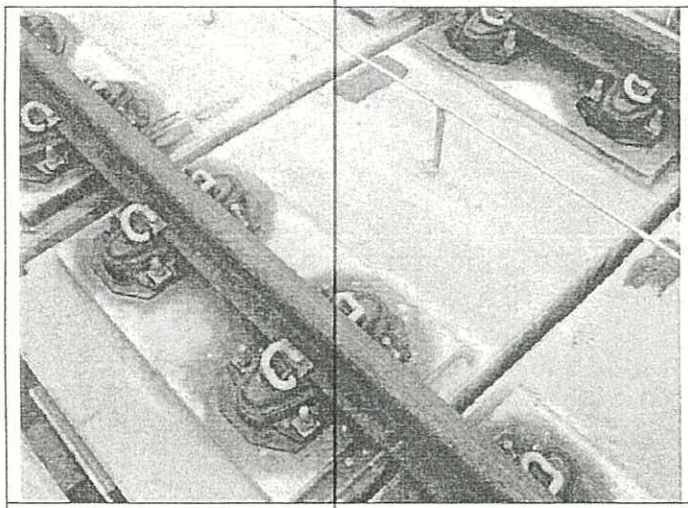


Photo 4.10: Rail Mounted on Baseplate at Floating Slab

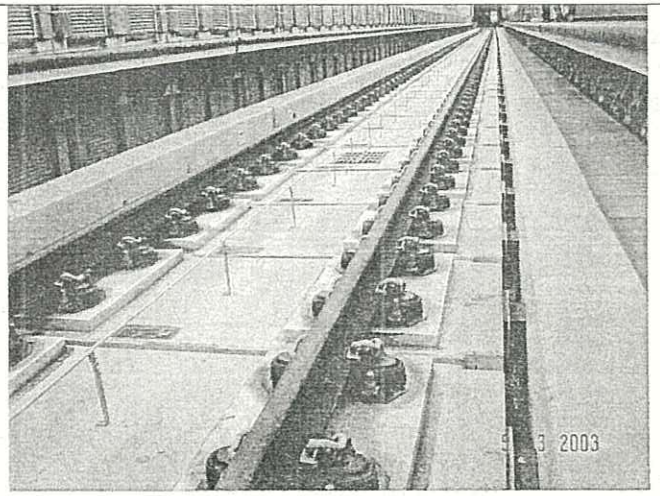


Photo 4.11: Rail Mounted on Baseplate at Floating Slab

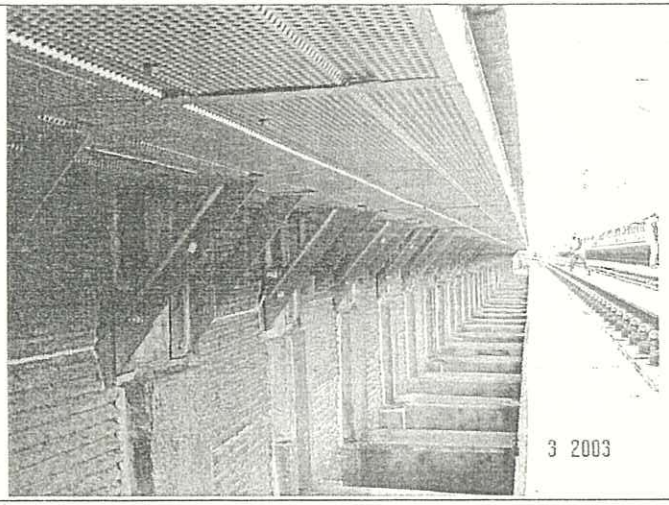


Photo 4.12: SAM on Parapet (Lower Section) & Below Walkway

Northern Section – Railway Noise

Viaduct Section between Kam Tin and Yuen Long

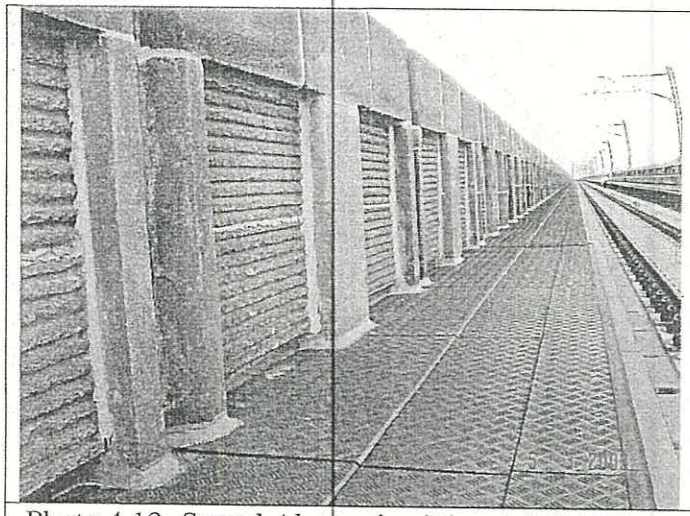


Photo 4.13: Sound Absorptive Material (SAM) on Parapet Wall

Photo 4.14: MPS & Noise Enclosure at Pok Oi Hospital

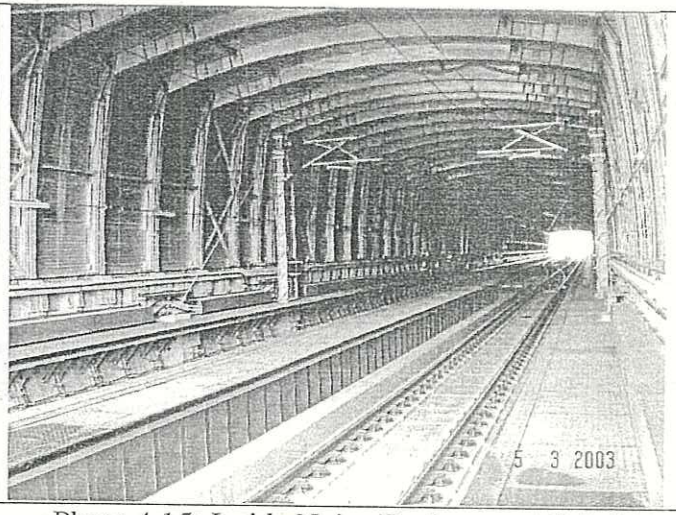


Photo 4.15: Inside Noise Enclosure at Pok Oi Hospital

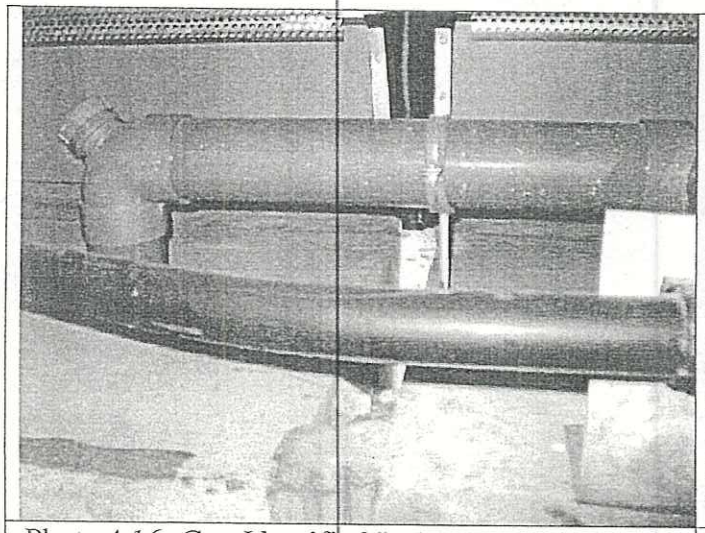


Photo 4.16: Gap Identified Inside Noise Enclosure (Side) at Pok Oi

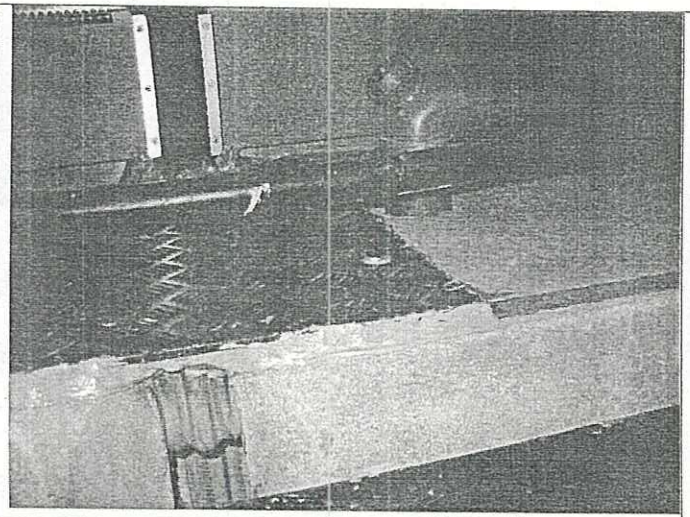


Photo 4.17: Gap Filled Inside Noise Enclosure (Side) at Pok Oi

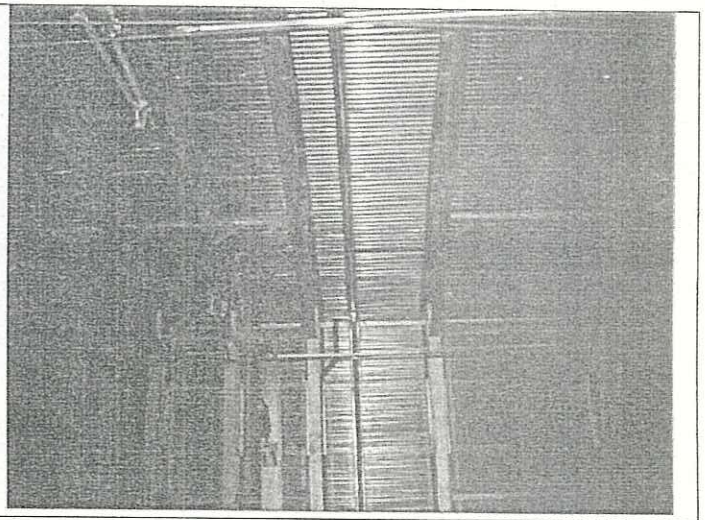


Photo 4.18: Gap Identified Inside Noise Enclosure (Roof) at Pok Oi

Northern Section – Railway Noise

Viaduct Section between Kam Tin and Yuen Long

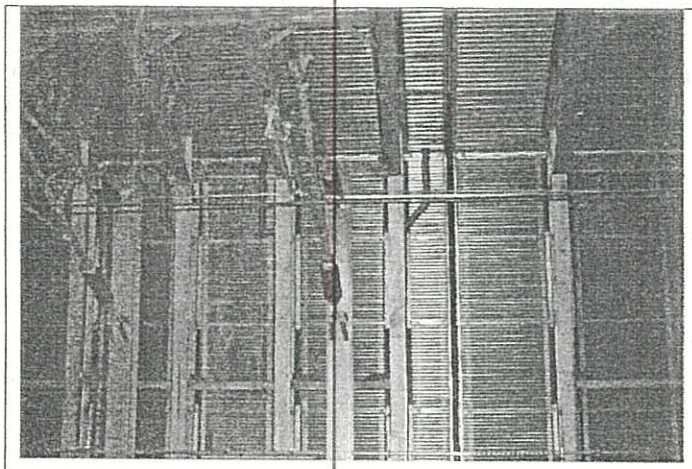


Photo 4.19: Gap was Filled But Further Filling is Required to Completely Seal the Gap

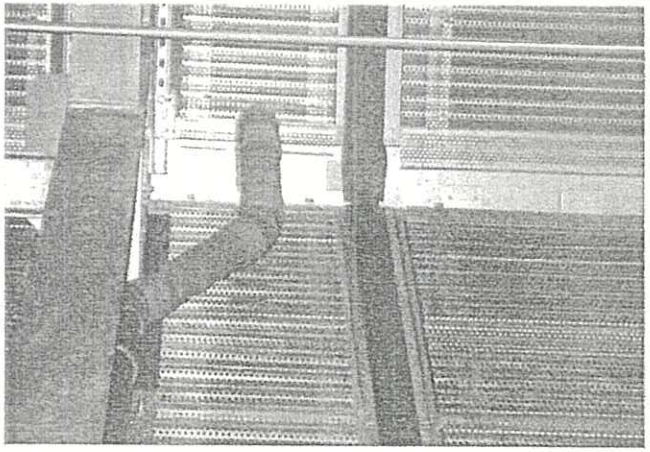


Photo 4.20: Gap was Completely Filled with Acoustic Material

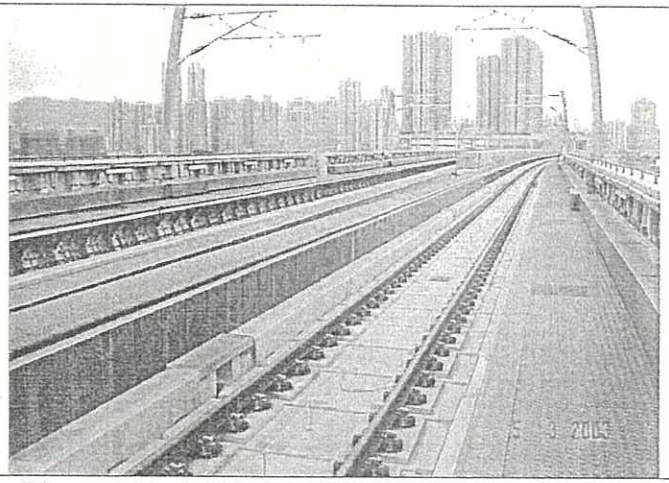


Photo 4.21: MPS on Twins Viaduct Approaching Yuen Long

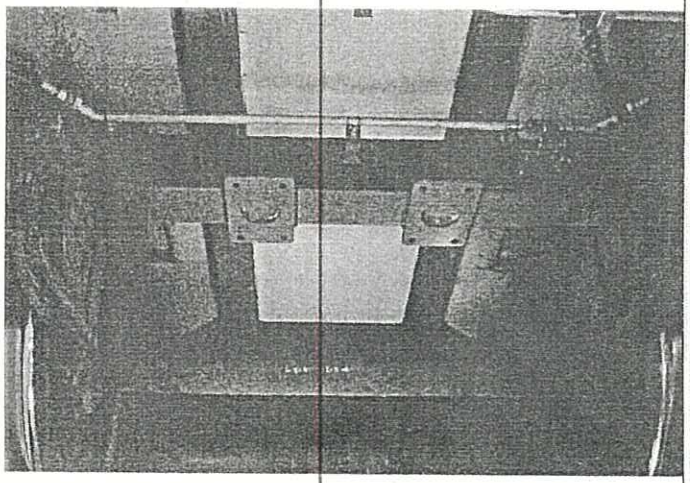


Photo 4.21: Absorptive lining under car

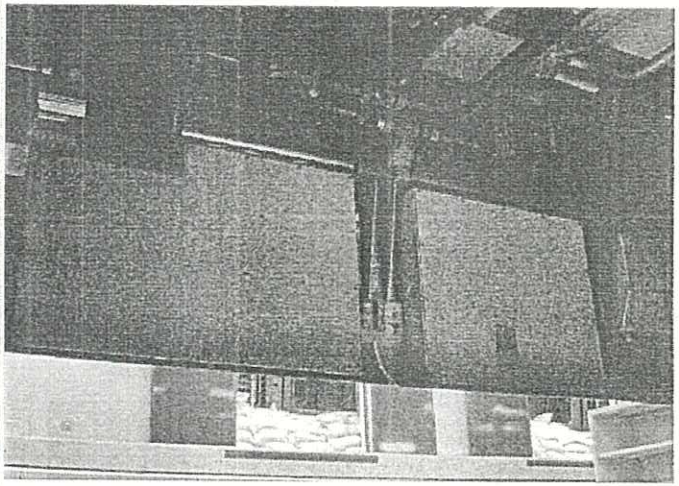


Photo 4.21b: Vehicle skirt with absorptive lining

Northern Section – Fixed Plant Noise

Pat Heung Maintenance Centre (PMC) and West Rail Building (WRB)

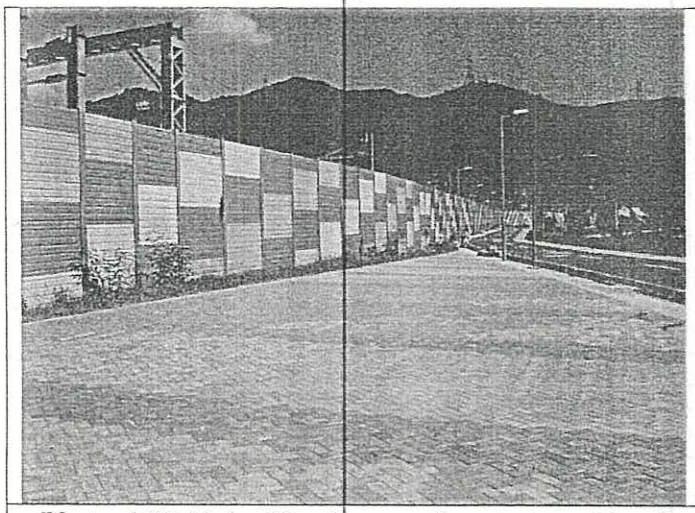


Photo 4.22 Noise Barriers on the western side of the Depot.

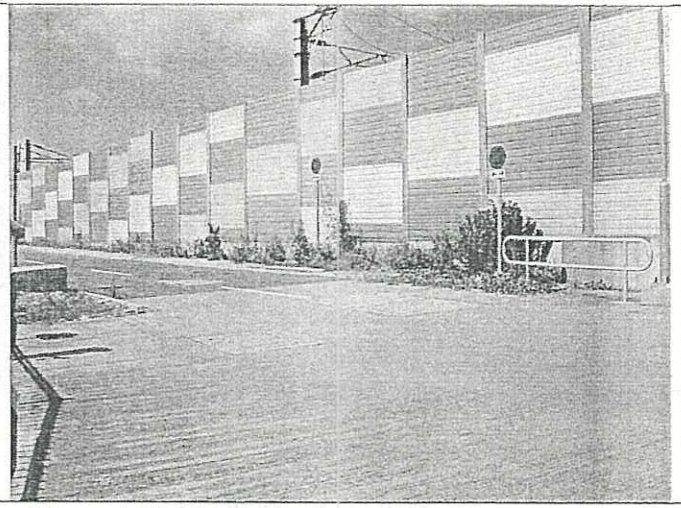


Photo 4.23 Noise Barriers on the western side of the Depot

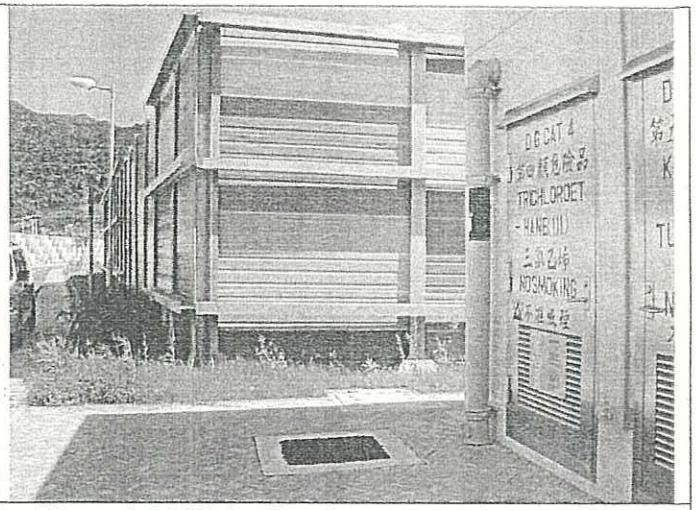


Photo 4.24 Noise Barriers near Tai Kek Village

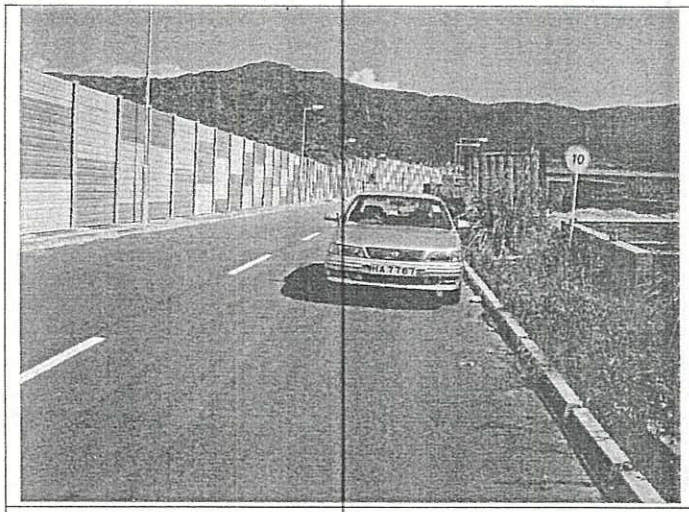


Photo 4.25 Noise Barriers along the Eastern Perimeter Road

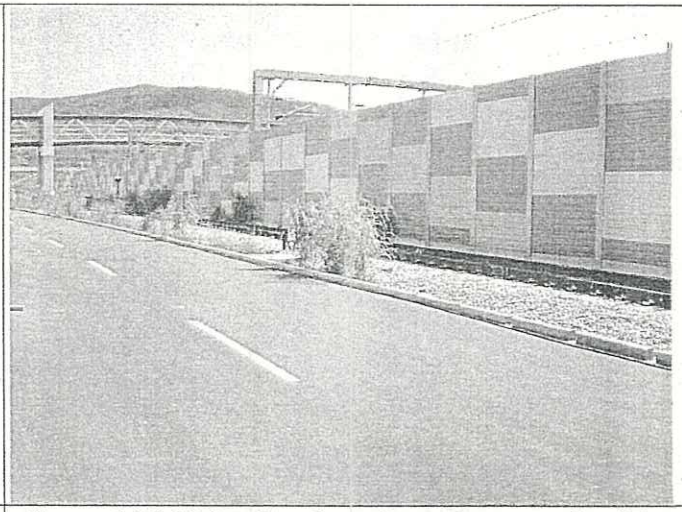


Photo 4.26 Noise Barriers along the uptrack of the West Rail, adjacent to the Eastern Perimeter Road

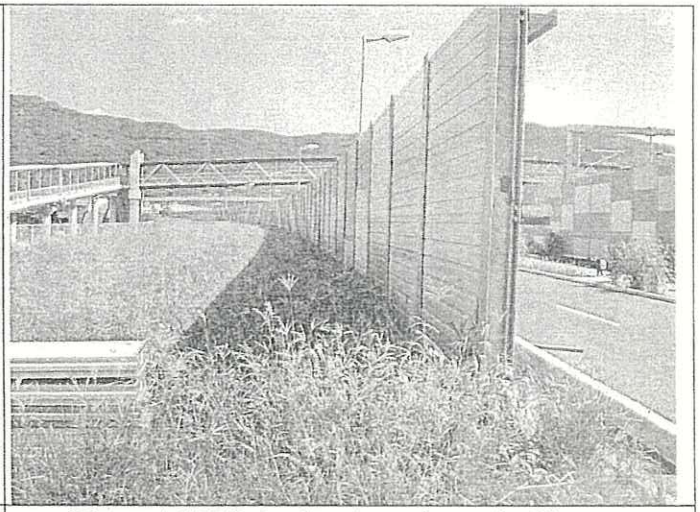


Photo 4.27 Noise barriers along the Eastern Perimeter Road

Northern Section – Fixed Plant Noise

Pat Heung Maintenance Centre (PMC) and West Rail Building (WRB)

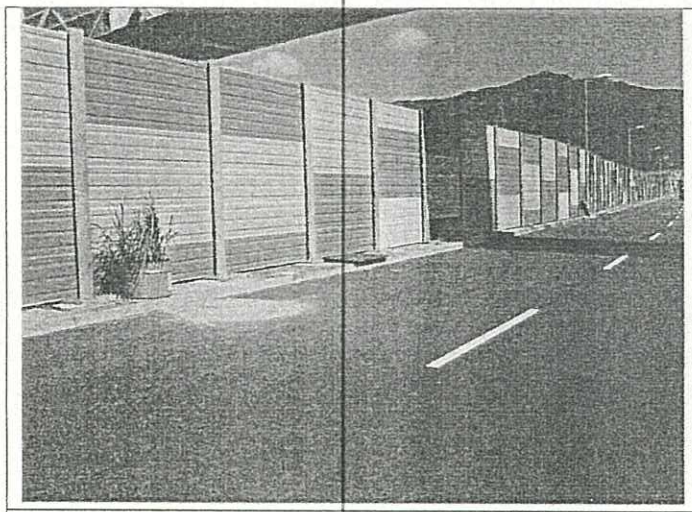


Photo 4.28 Noise barriers along the Eastern Perimeter Road

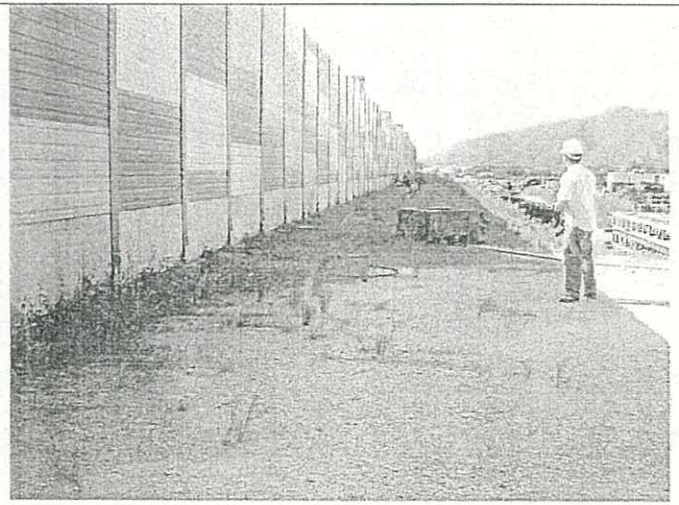


Photo 4.29 Noise Barriers along the Uptrack of the WR, between Depot and KSR Station

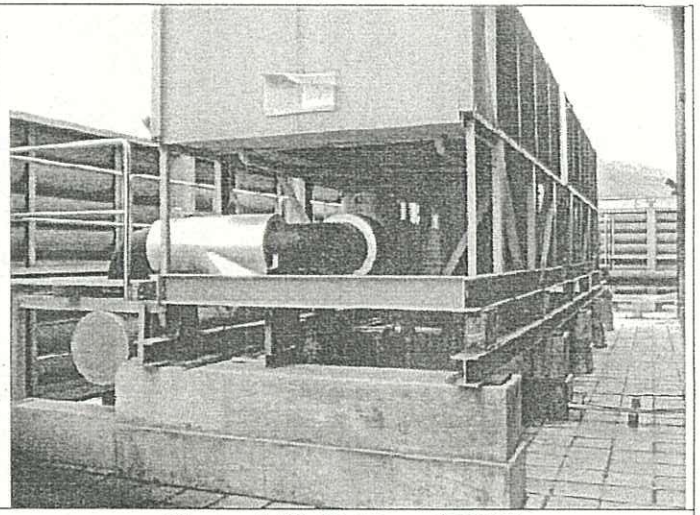


Photo 4.30 Chiller of WRB

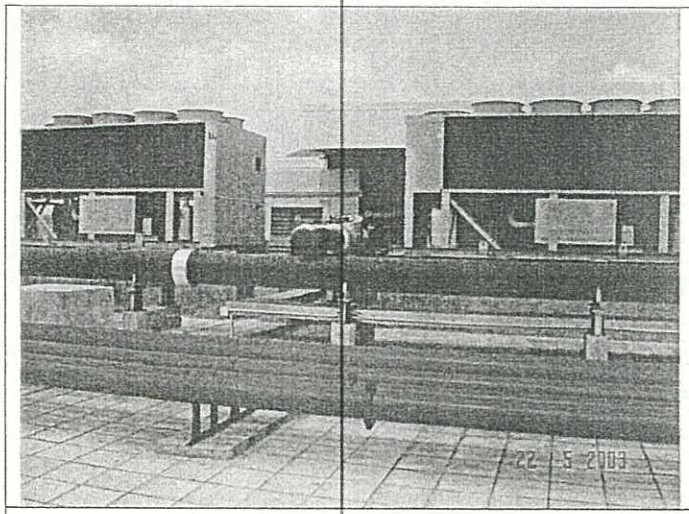


Photo 4.31 Chillers of PMC

Northern Section – Railway and Fixed Plant Noise

Kam Sheung Road Station

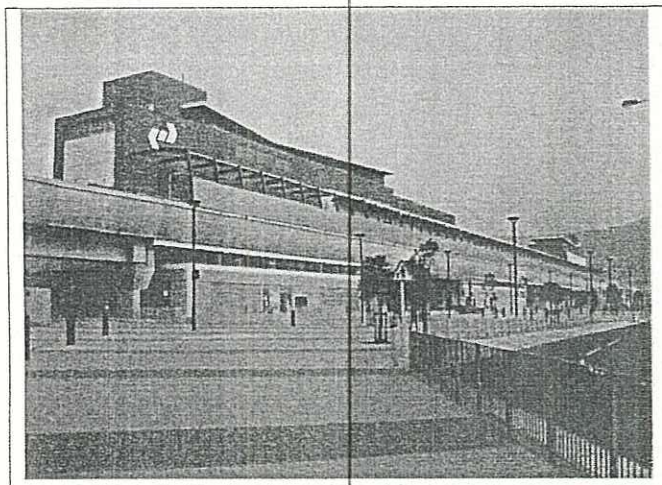


Photo 4.32 Wind shield along KSR

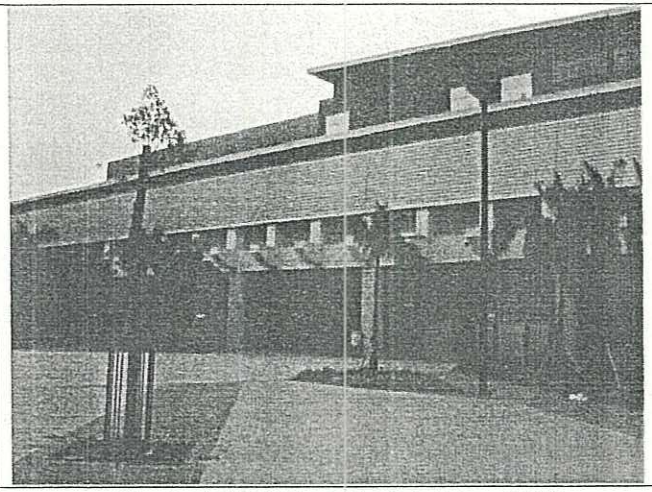


Photo 4.33 Wind shield along KSR

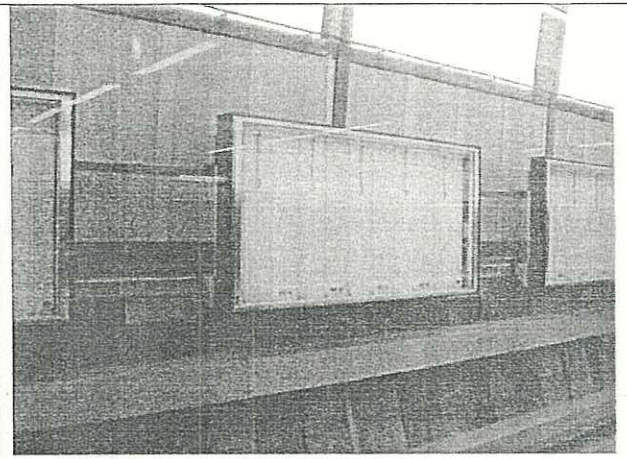


Photo 4.34 Wind shield along and absorptive parapet wall at KSR

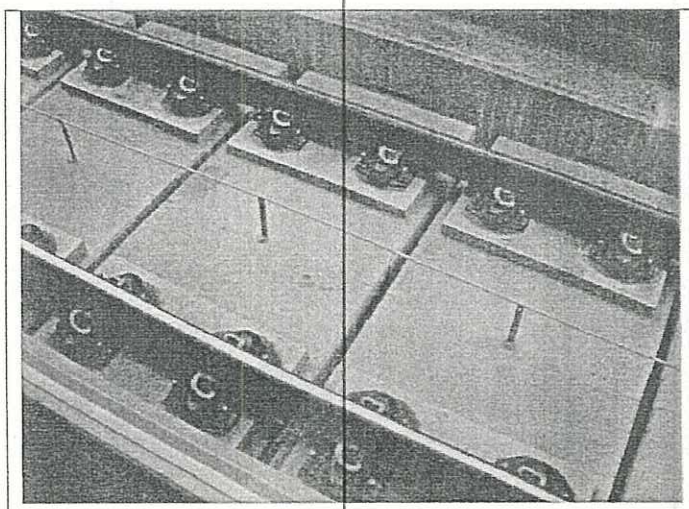


Photo 4.35 Floating slab and resilient baseplate at KSR

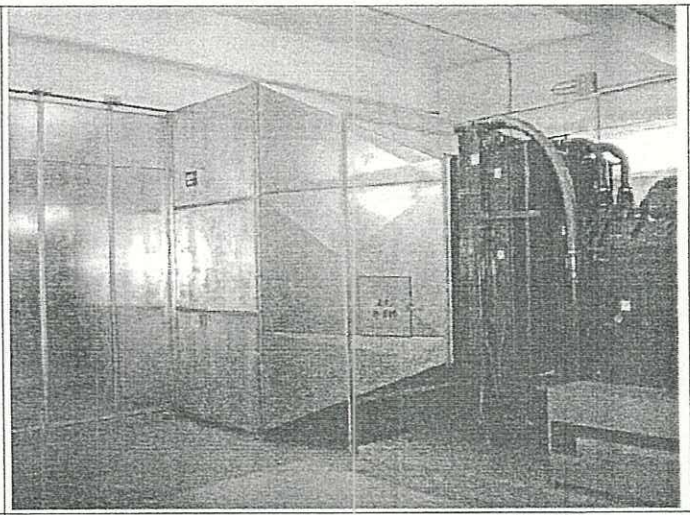


Photo 4.36 Ventilation system of KSR

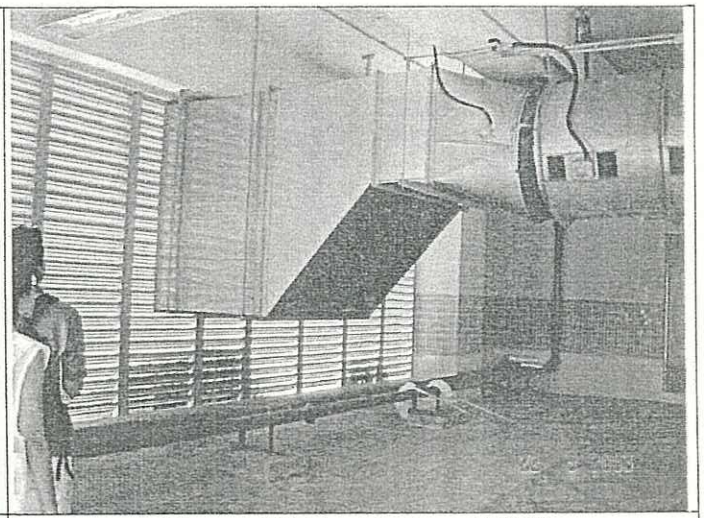


Photo 4.37 Ventilation of KSR

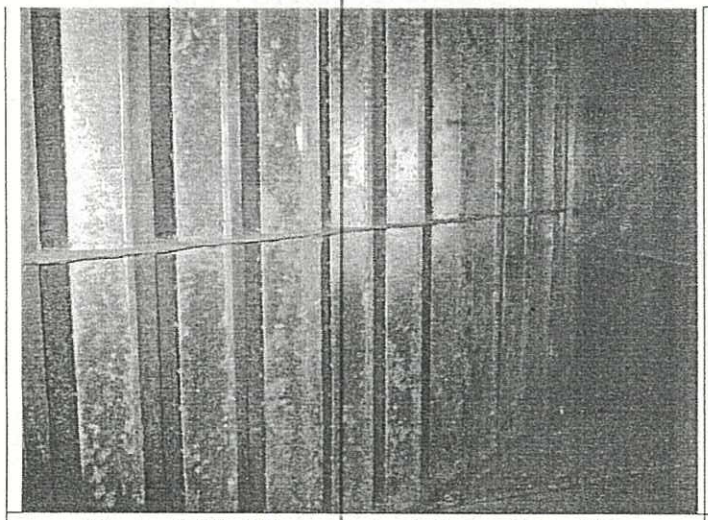


Photo 4.38: Silencers installed within the ventilation system		

Northern Section – Landscape

Pat Heung Maintenance Centre (PMC), West Rail Building (WRB) and Kam Sheung Road Station (KSR)

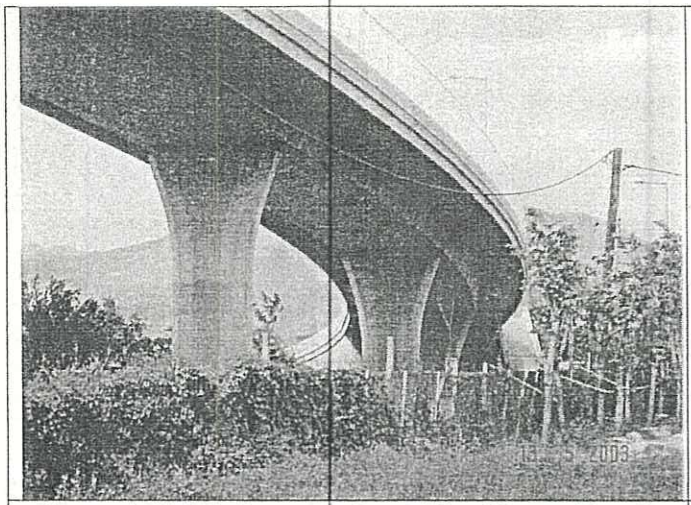


Photo 4.39 Viaduct section of Pat Heung Road.

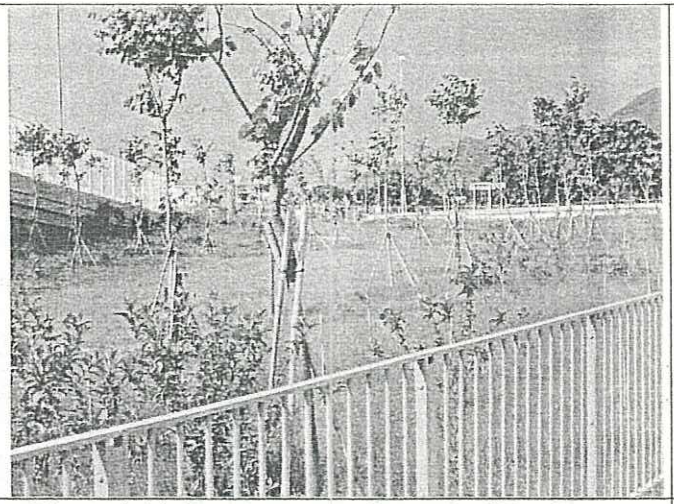


Photo 4.40: Landscape at the end of Pat Heung Road

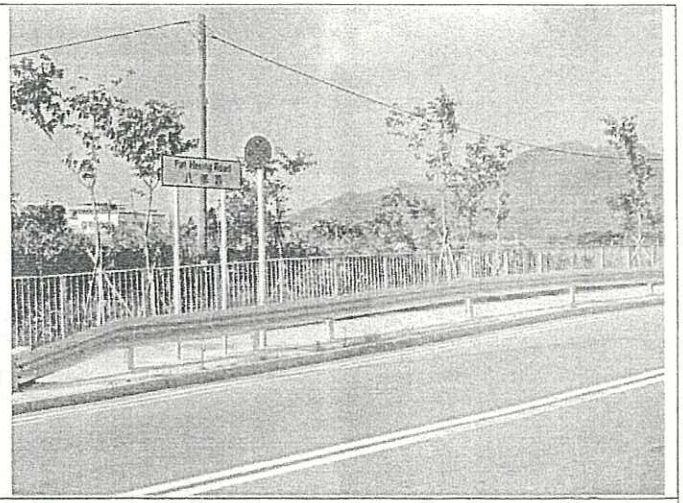


Photo 4.41: Landscape along Pat Heung Road.

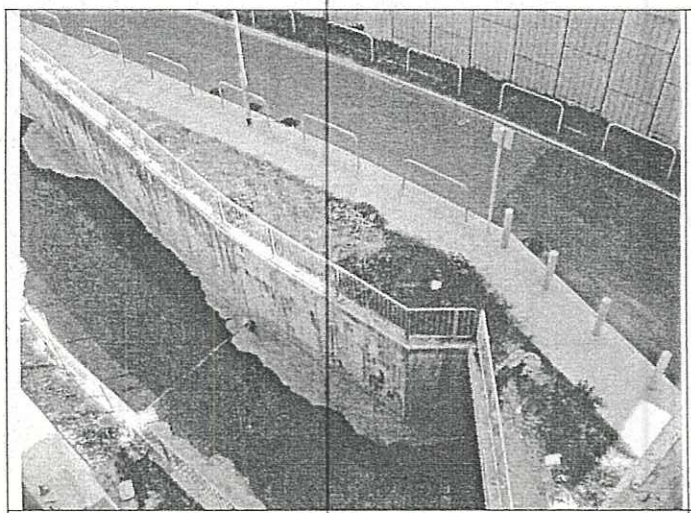


Photo 4.42: Kam Po Road

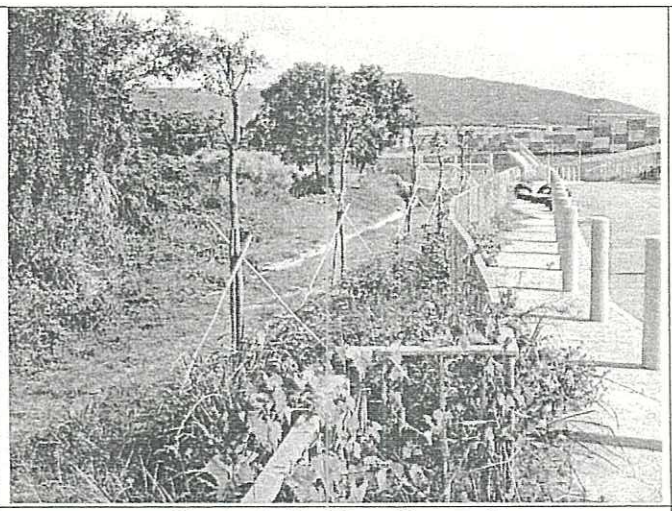


Photo 4.43: Kam Po road

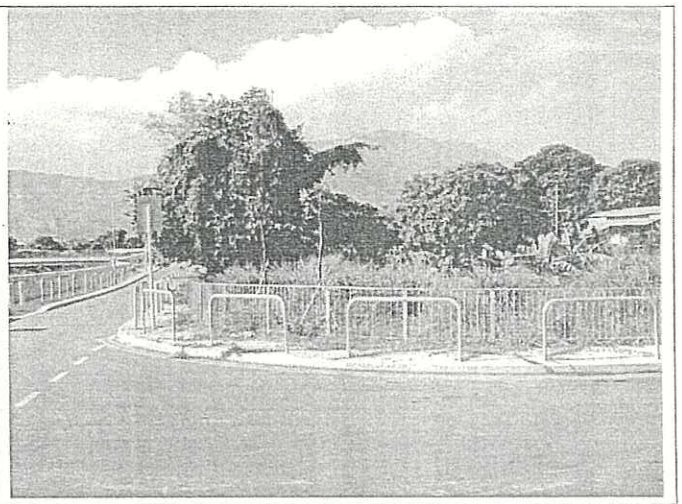


Photo 4.44: Kam Po Road

Pat Heung Maintenance Centre (PMC), West Rail Building (WRB) and Kam Sheung Road Station (KSR)

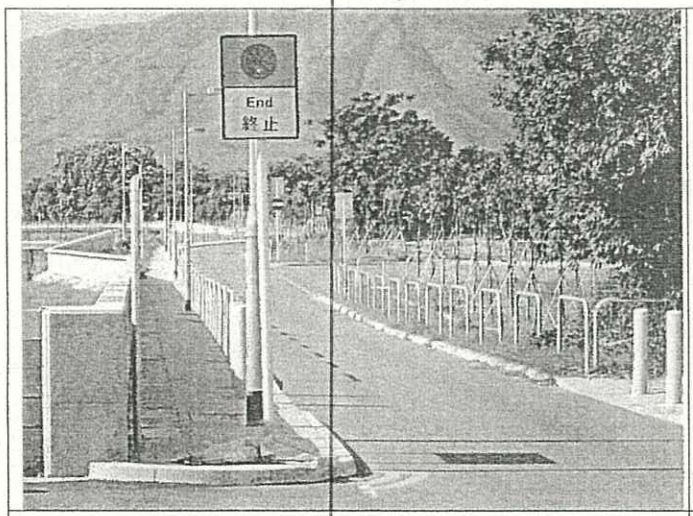


Photo 4.45: Kam Po Road

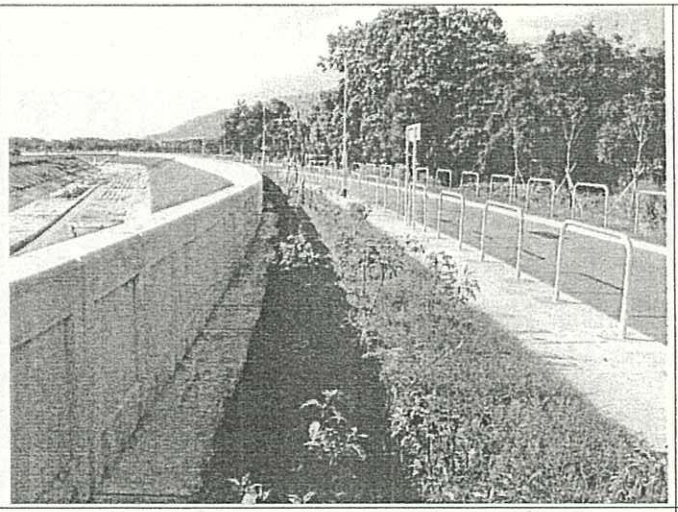


Photo 4.46: Kam Po Road

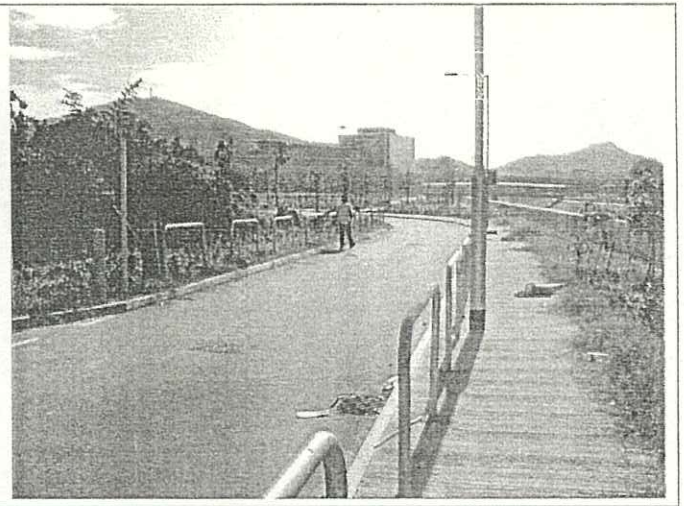


Photo 4.47: Kam Po Road

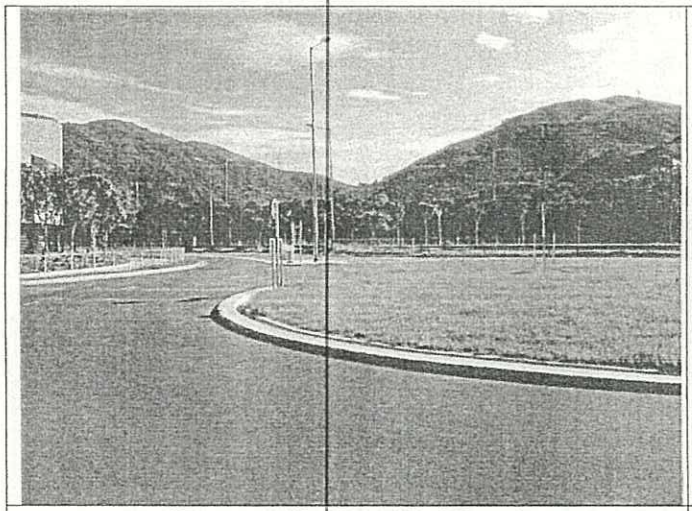


Photo 4.48: Kam Hoi Road

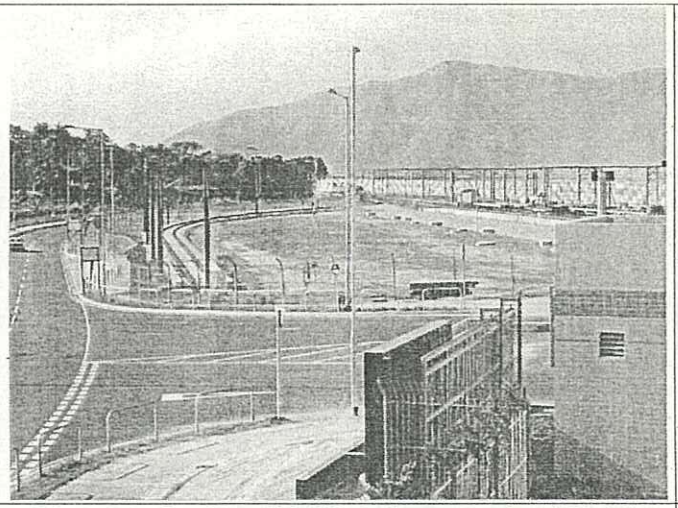


Photo 4.49: Kam Hoi Road, near exit of PMC

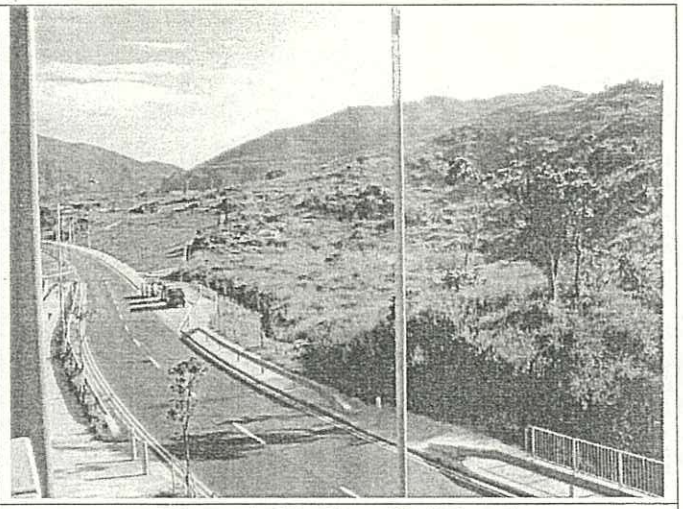


Photo 4.50: Kam Hoi Road

Northern Section – Landscape

Pat Heung Maintenance Centre (PMC), West Rail Building (WRB) and Kam Sheung Road Station (KSR)

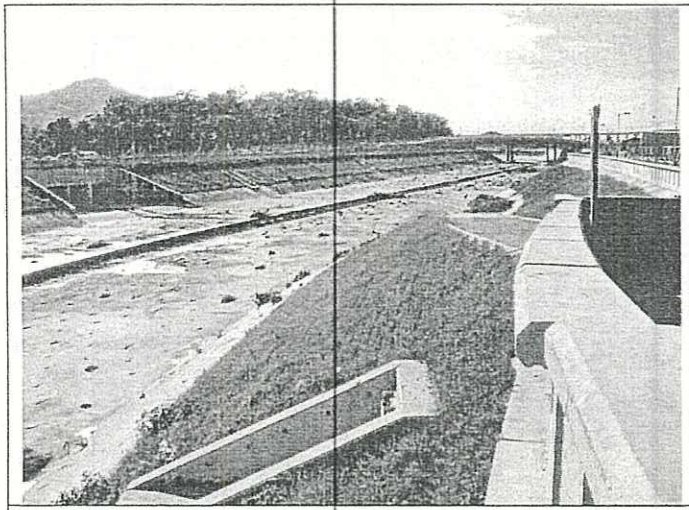


Photo 4.51: Grasscrete along the MDC.

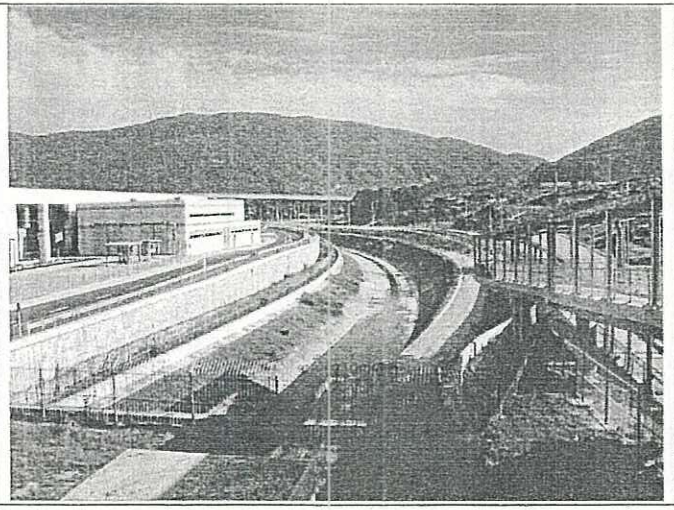


Photo 4.52: Grasscrete along the MDC

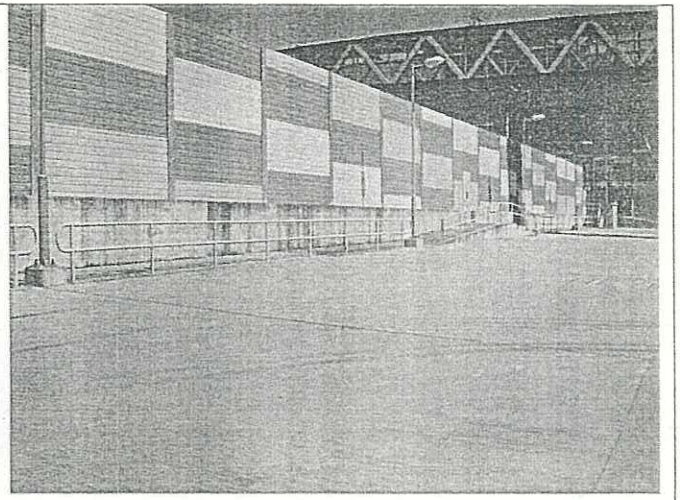


Photo 4.53: Lighting at Depot

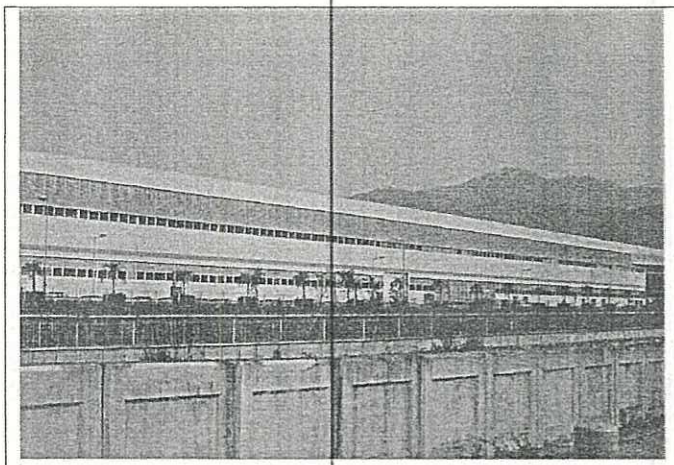


Photo 4.53a:.Planting along F100 Road adjacent to EMU Building

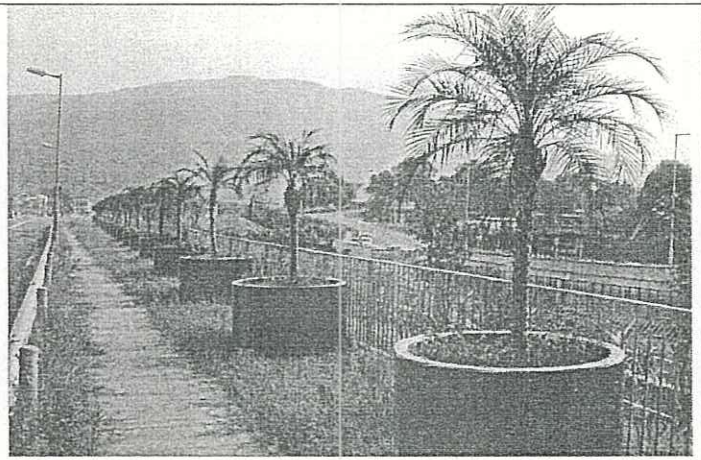


Photo 4.53b: Planting along F100 Road

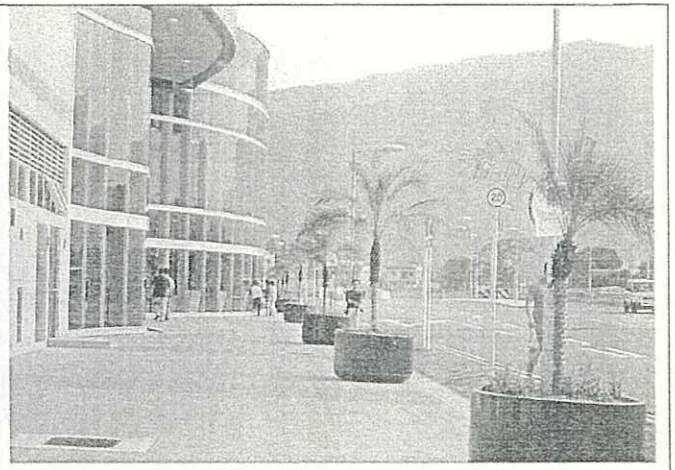


Photo 4.53c: Planting at the front door of EMU Building

Pat Heung Maintenance Centre (PMC), West Rail Building (WRB) and Kam Sheung Road Station (KSR)

Photo 4.54: Eastern PTI of KSR

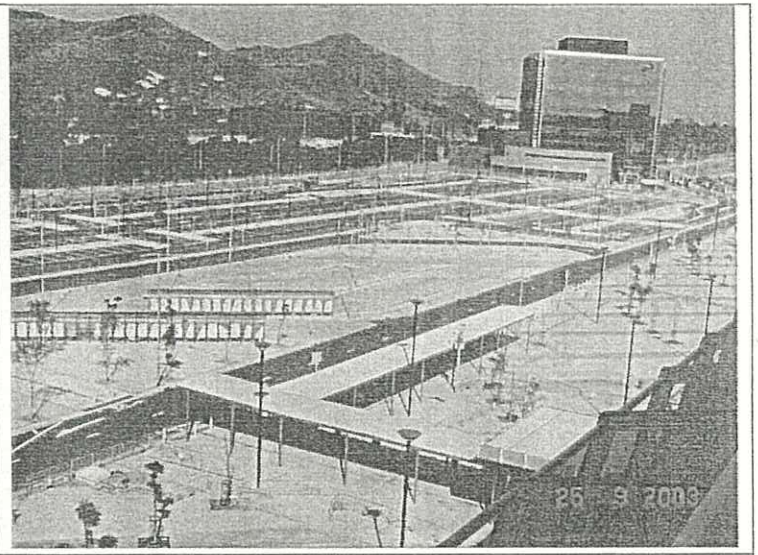


Photo 4.55: Western PTI and Park and Ride area

Northern Section – Landscape

Viaduct Section between Kam Tin and Yuen Long

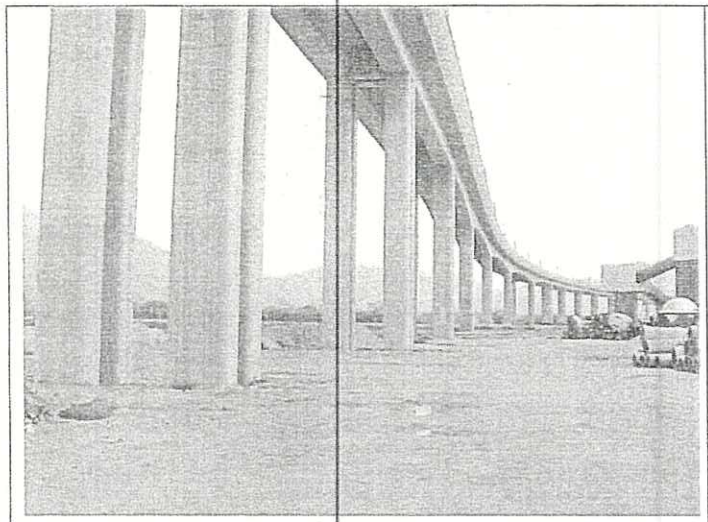


Photo 4.56: Ongoing Landscaping Works at Kam Tin (Piers 242-250)

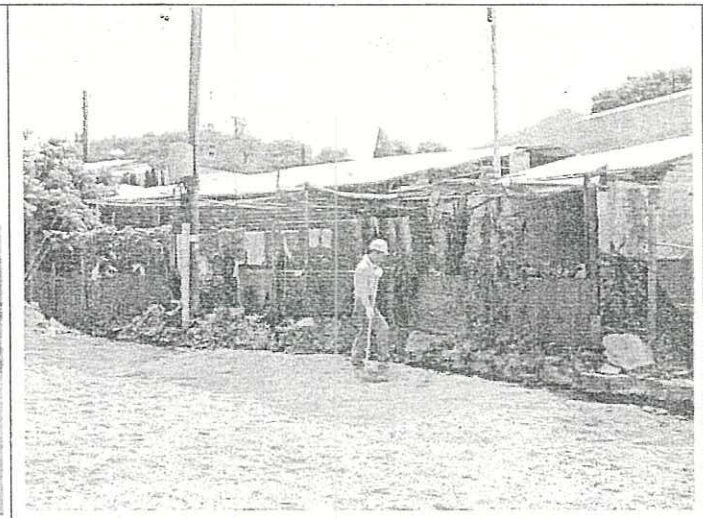


Photo 4.57: Preparation Works for Planting of Seasonal Native Whip Mix near Tung Shing Lei

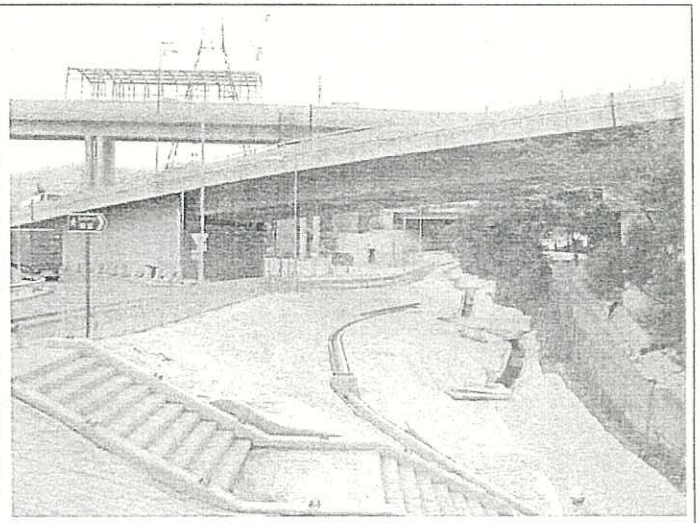


Photo 4.58: Landscape Planting at EVA16

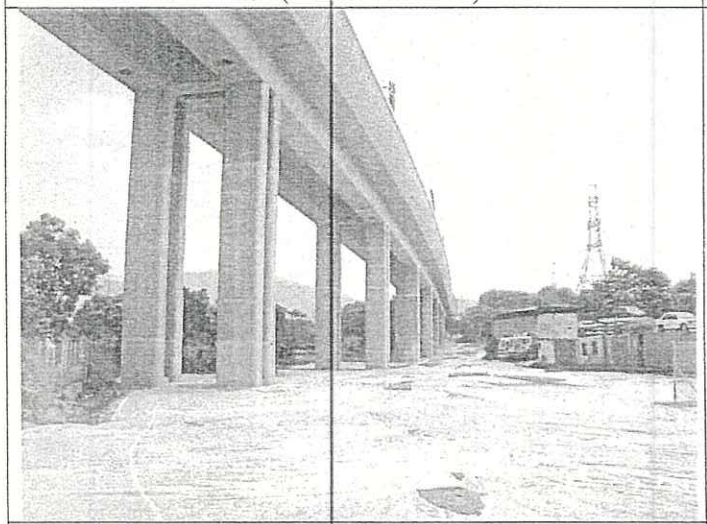


Photo 4.59: Landscape Planting at Tung Shing Lei (Piers 256-261)

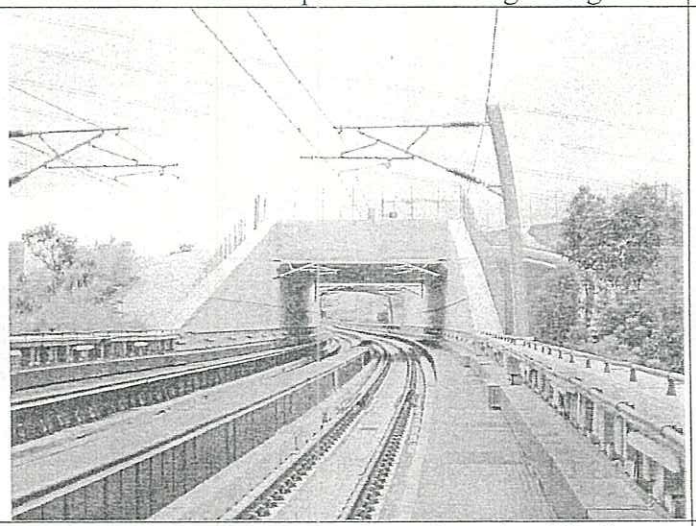


Photo 4.60: Completion of Landscaping Works at Au Tau

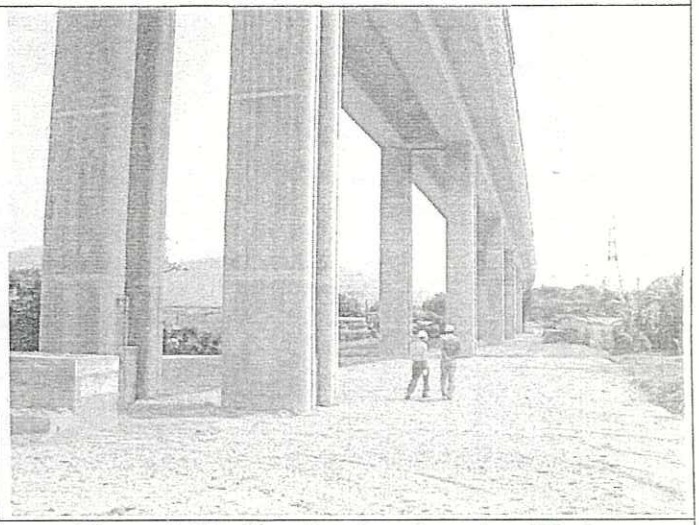


Photo 4.61: Ongoing Landscaping Works at Pok Oi (Piers 262-265)

Northern Section – Landscape

Viaduct Section between Kam Tin and Yuen Long

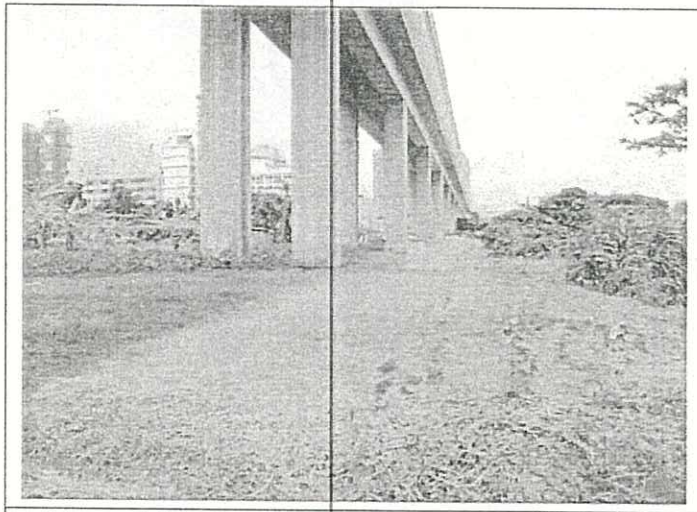


Photo 4.62: Completion of Landscaping Works at Pok Oi (Piers 262-265)

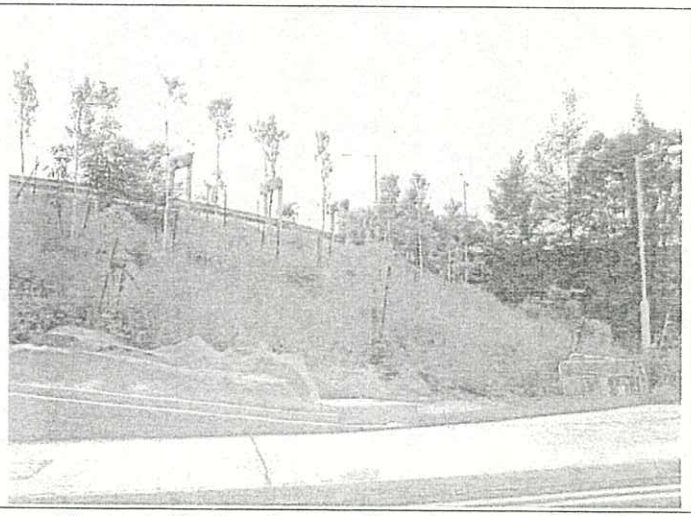


Photo 4.63: Landscape Planting near Pok Oi

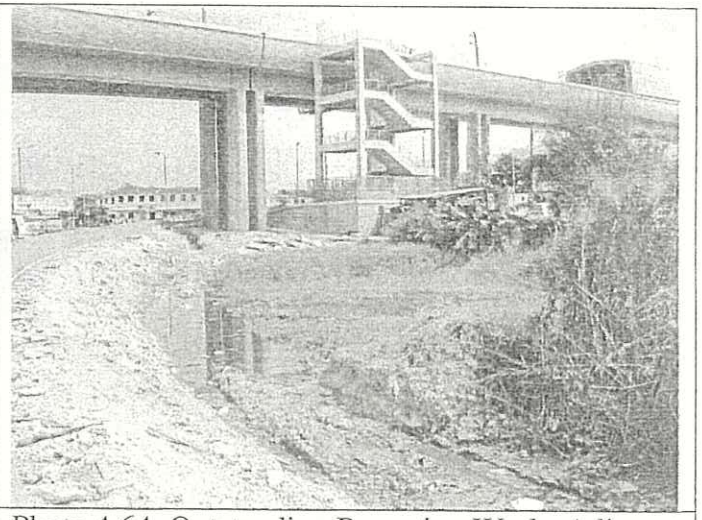


Photo 4.64: Outstanding Reverting Works Adjacent to Poon Uk Hakka Mansion Temporarily Occupied Area (TOA) near EVA17

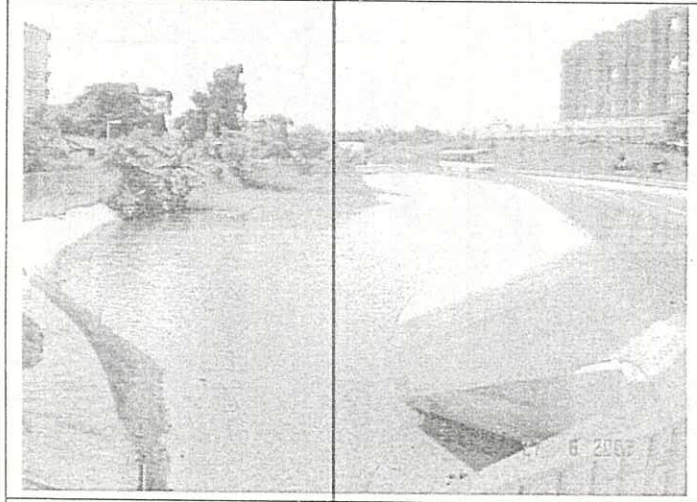


Photo 4.65: Completion of Reverting Works Adjacent to Poon Uk Hakka Mansion TOA near EVA17

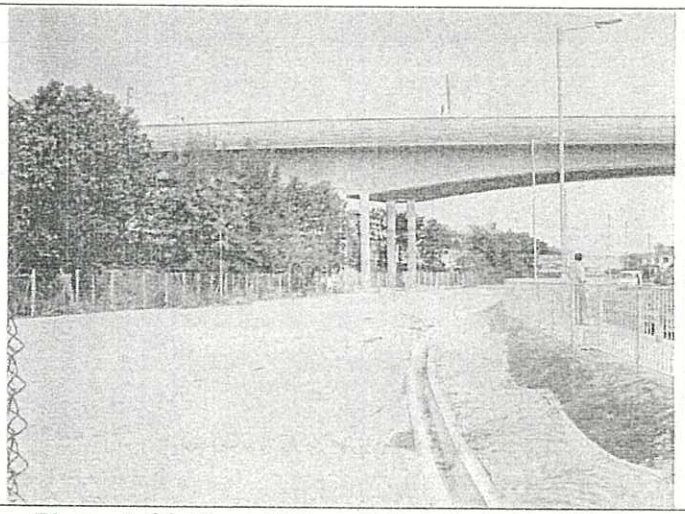


Photo 4.66: Completion of Landscaping Works near Small Trader New Village

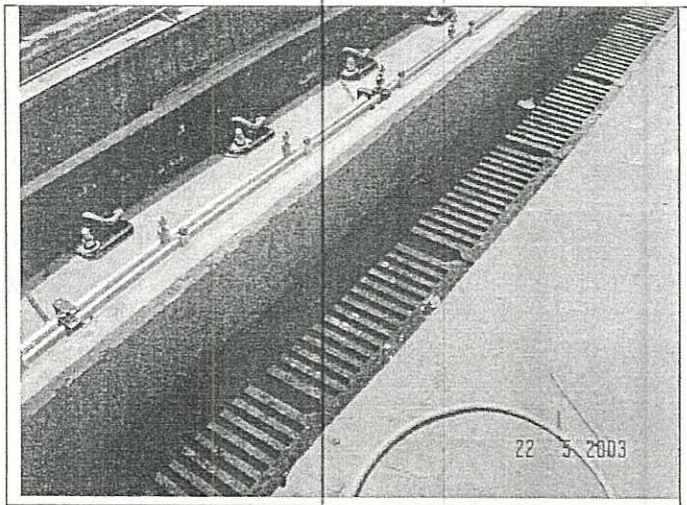


Photo 4.67: Surface drainage for trackside run-off at Car Wash Facilities.

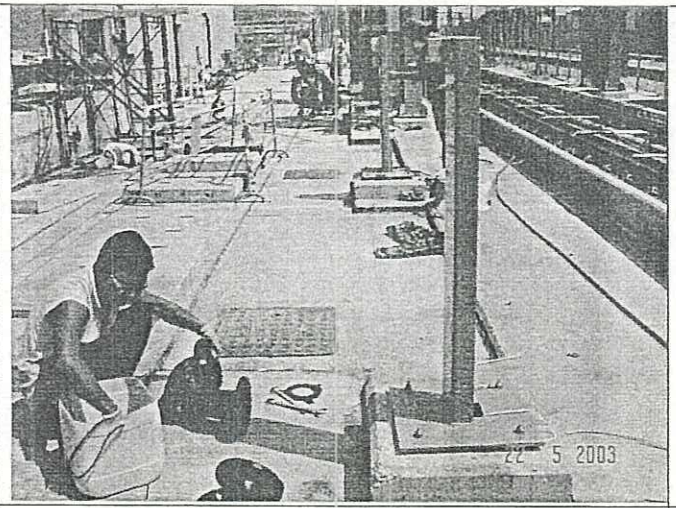


Photo 4.68: Oil interceptor for Car Wash Facilities

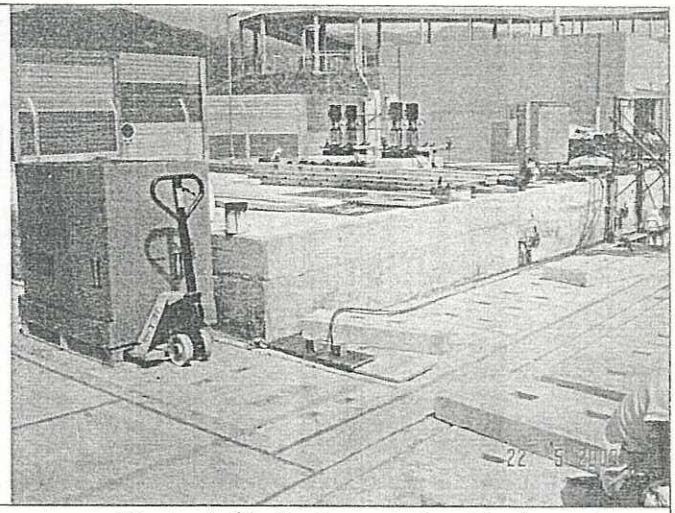


Photo 4.69: Sedimentation Tanks

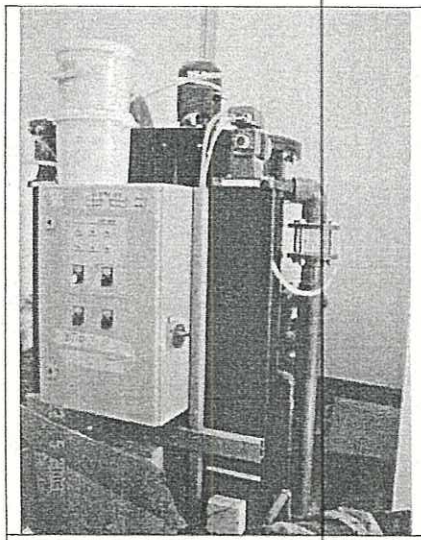


Photo 4.70: Biological Filter

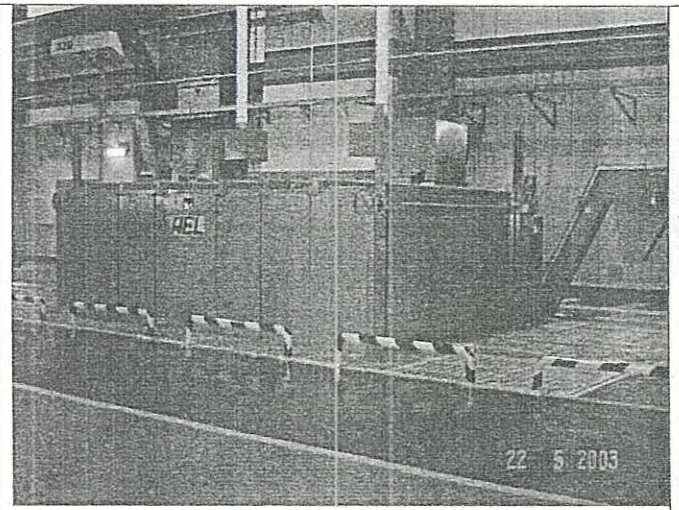


Photo 4.71: Bogie Wash

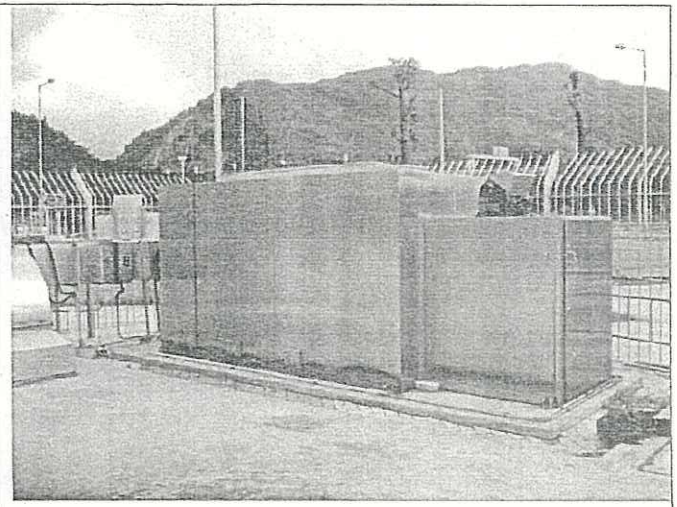


Photo 4.72: Deodorizer

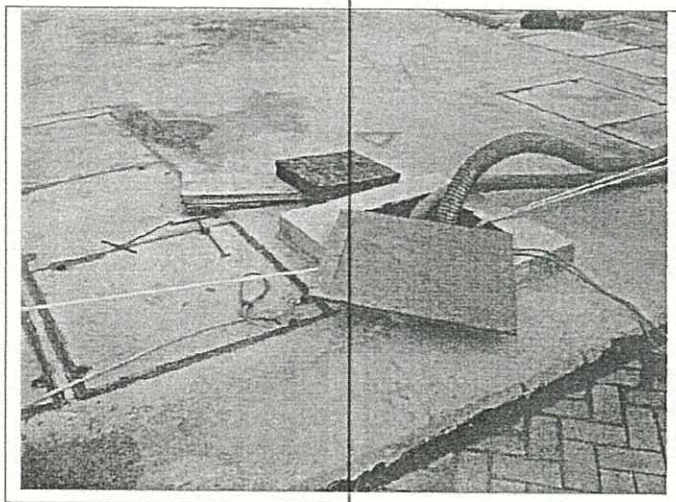


Photo 4.73: Underground sewage storage tank for KSR and WRB

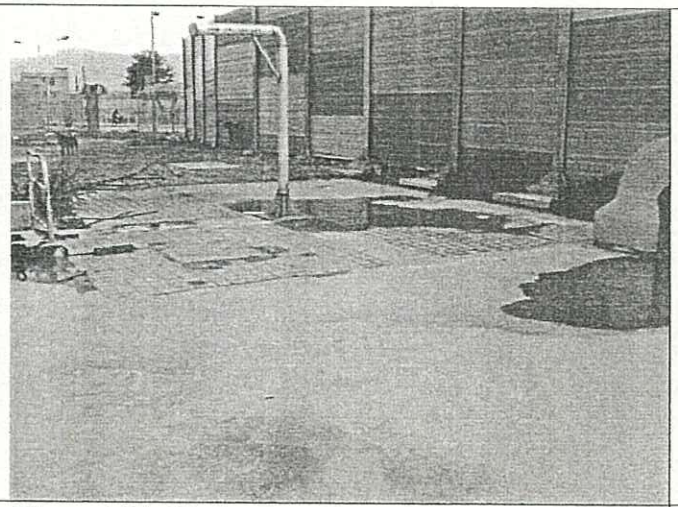


Photo 4.74: Underground sewage storage area for PMC

Photo 4.75: Sewage collection.

Photo 4.76: Sewage collector

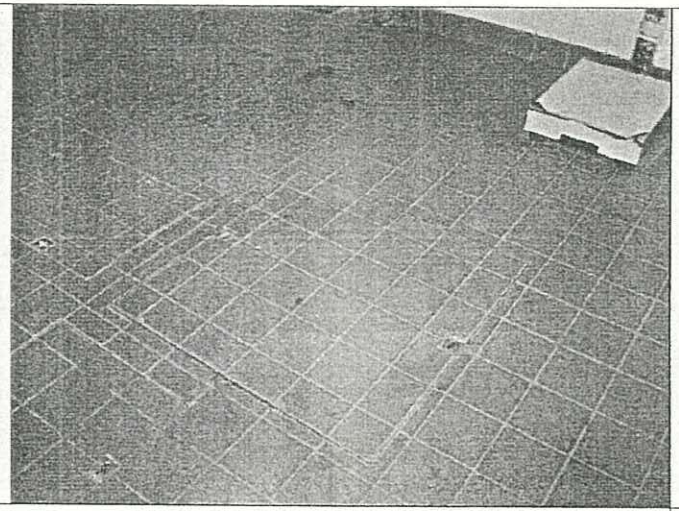


Photo 4.77: Oil interceptor for kitchen in WRB.

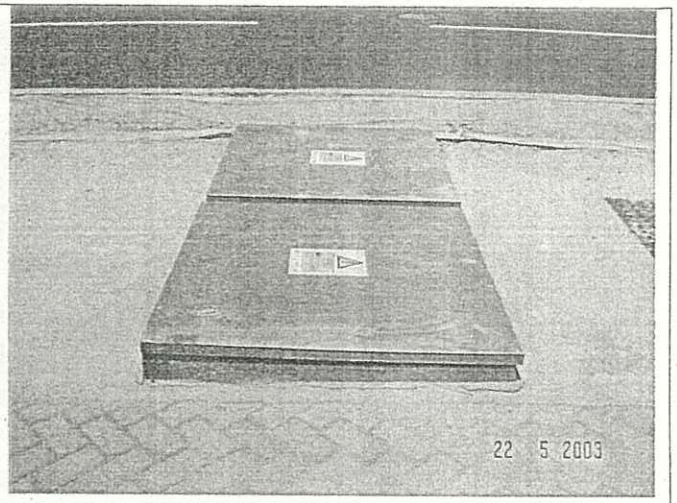


Photo 4.78: Oil interceptors for PMC.

Pat Heung Maintenance Centre (PMC), West Rail Building (WRB) and Kam Sheung Road Station (KSR)

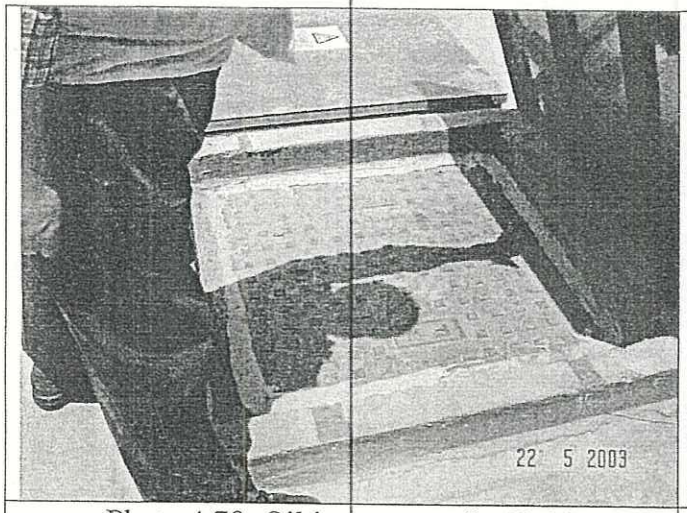


Photo 4.79: Oil interceptor for PMC

Photo 4.80: Oil interceptor for Petrol Station.

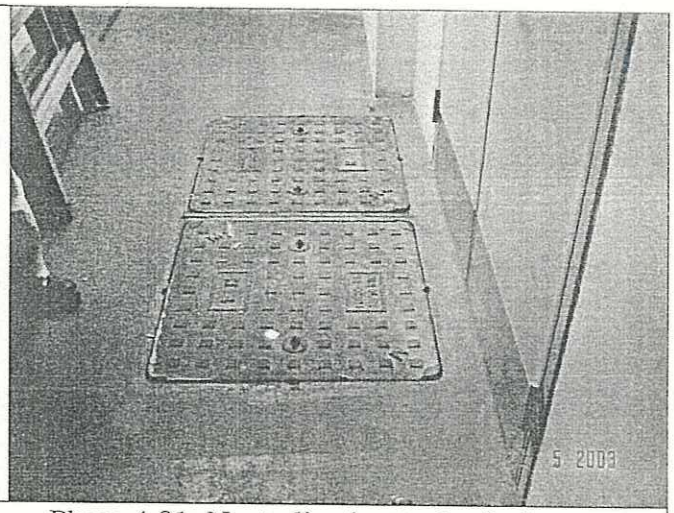


Photo 4.81: Neutralization tanks for battery water.

Photo 4.82: Floor of PMC is hard standing surface

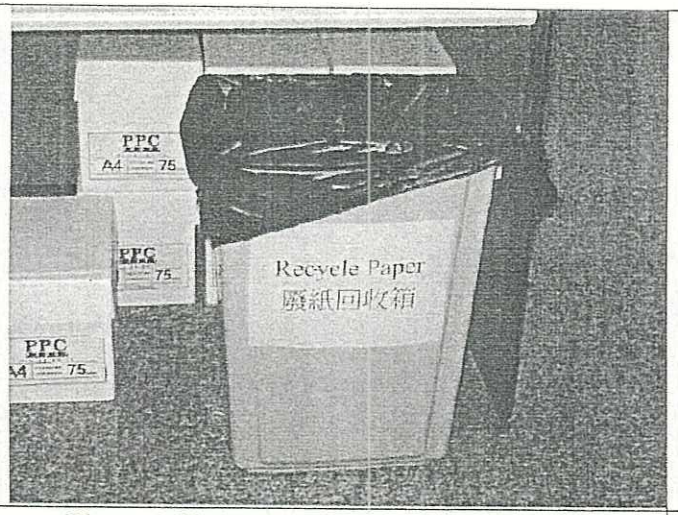


Photo 4.83: Paper Recycle Bin for WRB.

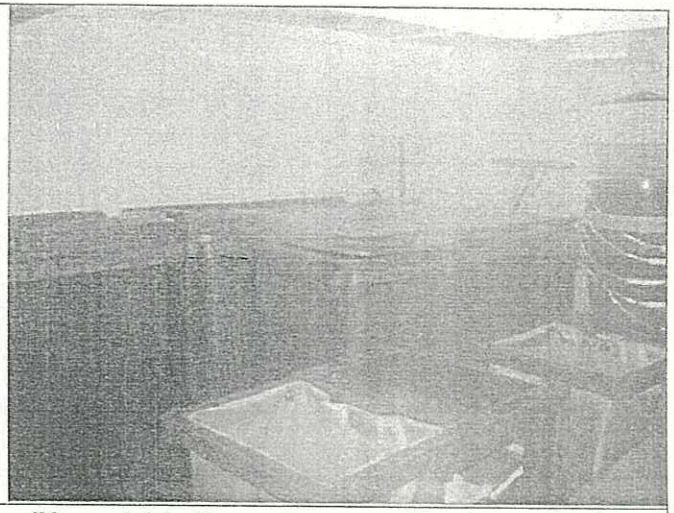


Photo 4.84: General waste collection point for WRB.

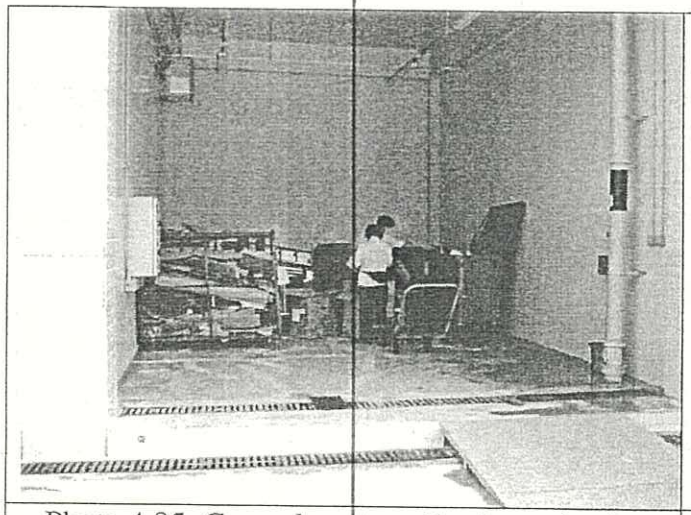


Photo 4.85: General waste collection point for PMC.

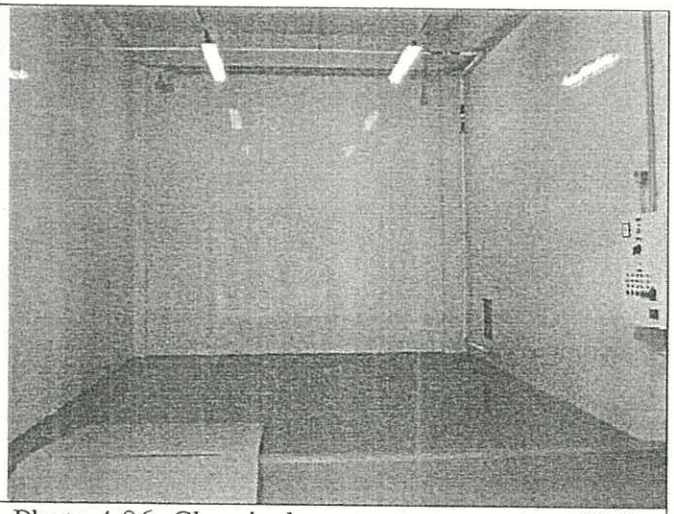


Photo 4.86: Chemical waste storage area at PMC

Northern Section – Hazard

Kam Sheung Road Station

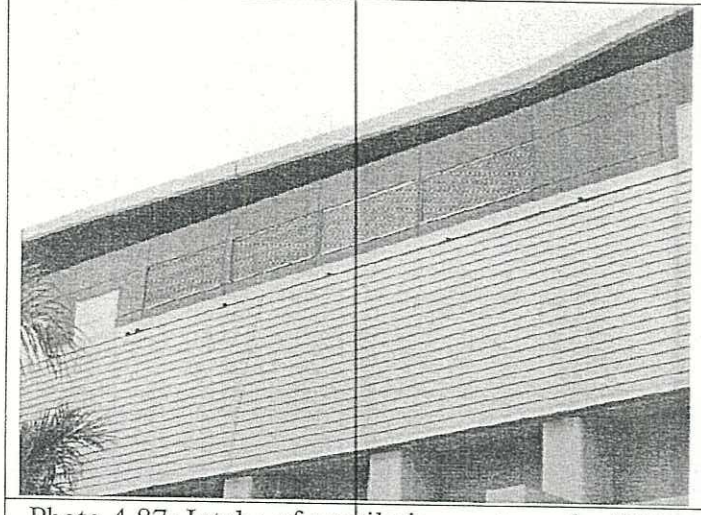


Photo 4.87: Intake of ventilation systems for KSR.

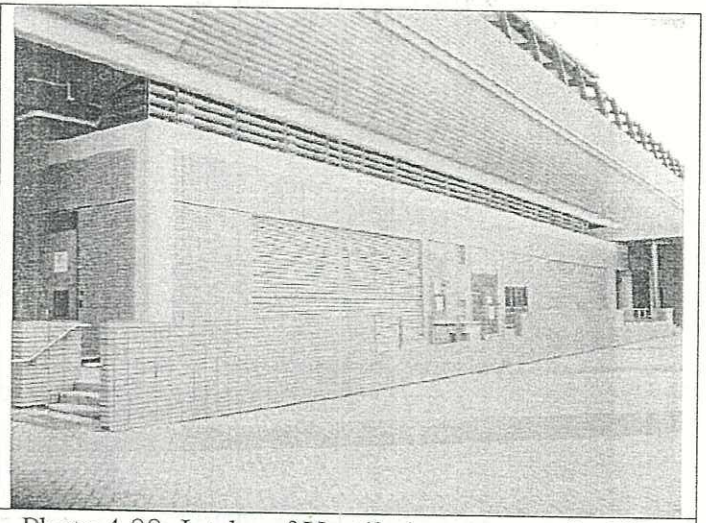


Photo 4.88: Intake of Ventilation systems for KSR

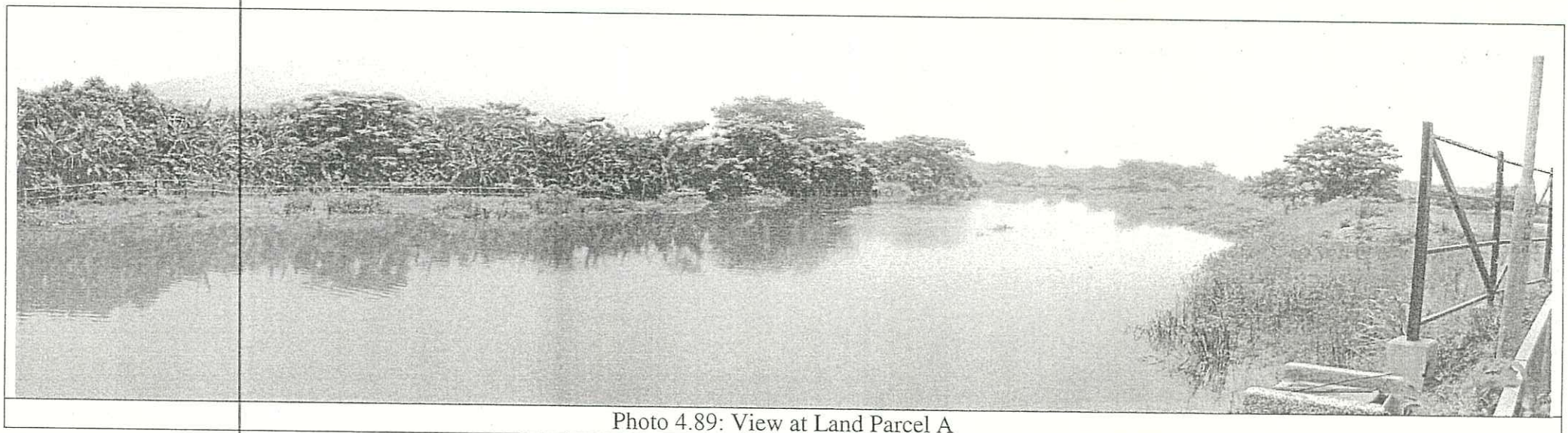


Photo 4.89: View at Land Parcel A

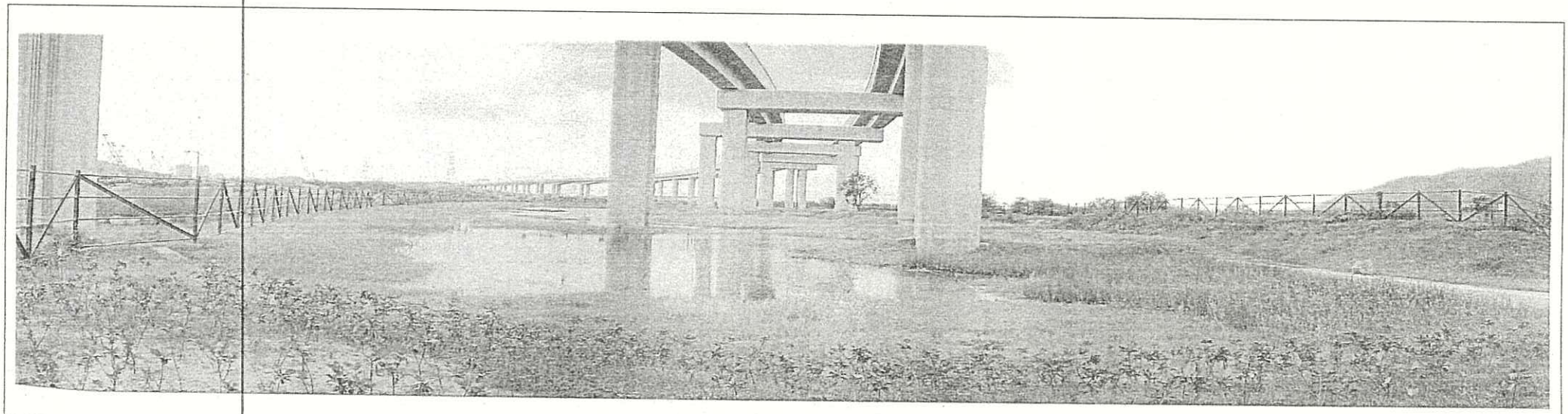


Photo 4.90: Western Side of Land Parcels B and D

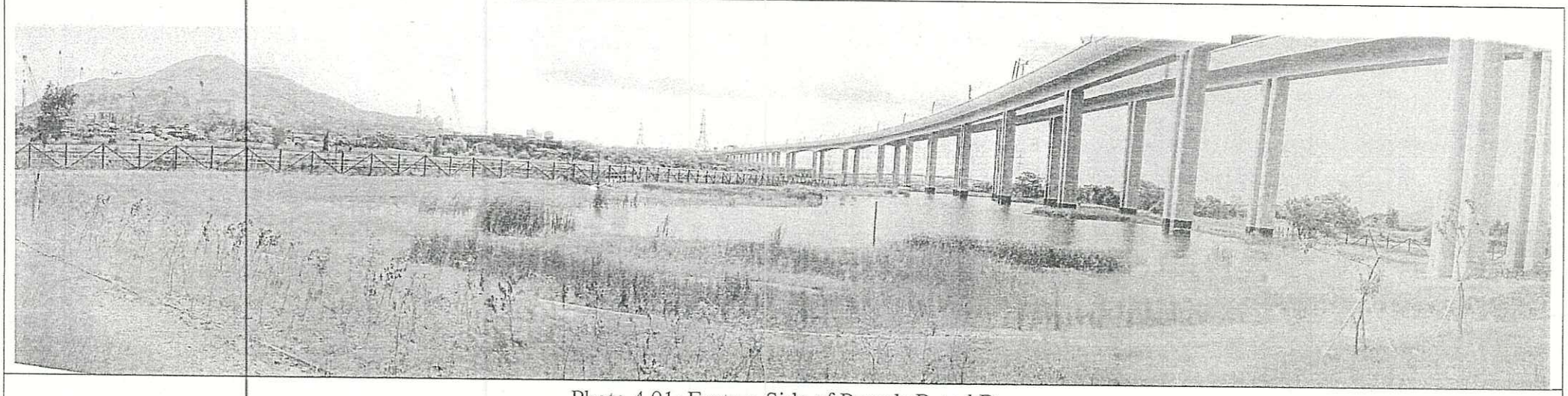


Photo 4.91: Eastern Side of Parcels B and D

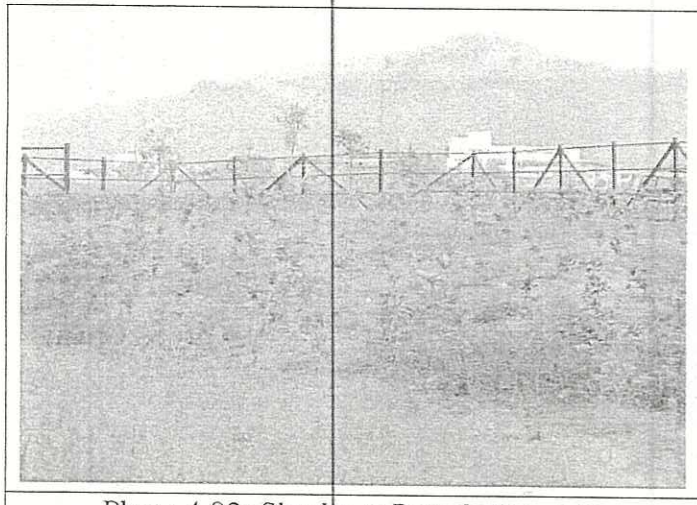


Photo 4.92: Shrubs at Parcels B and D

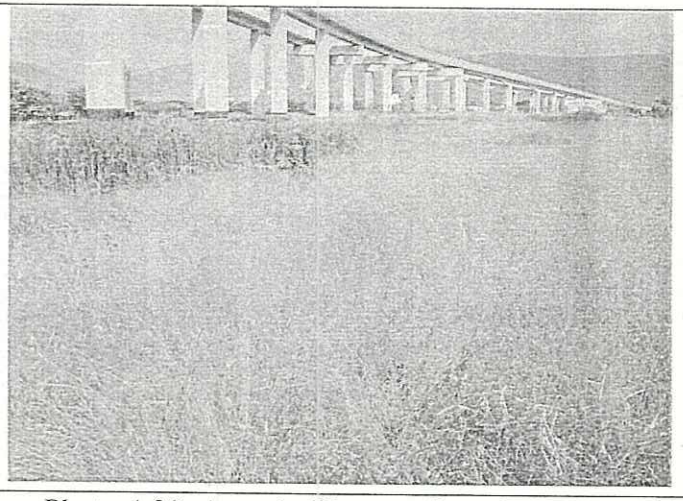


Photo 4.93: Aquatic Plants at Parcels B and D

Photo 4.94: Shrubs at Parcels B and D

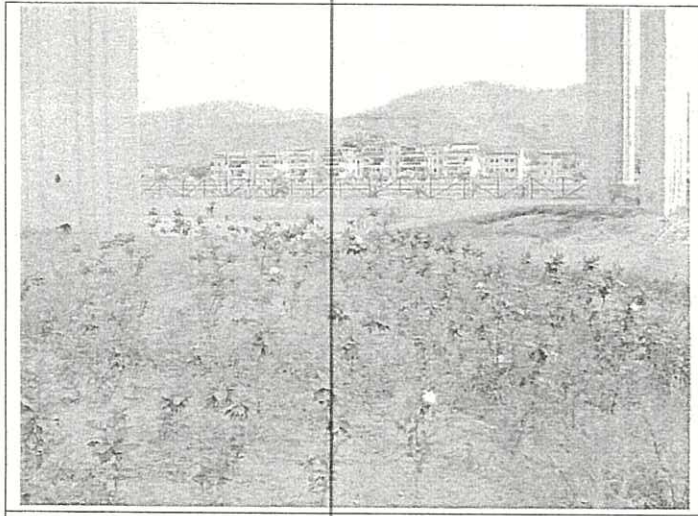


Photo 4.95: Shrubs at Parcels B and D

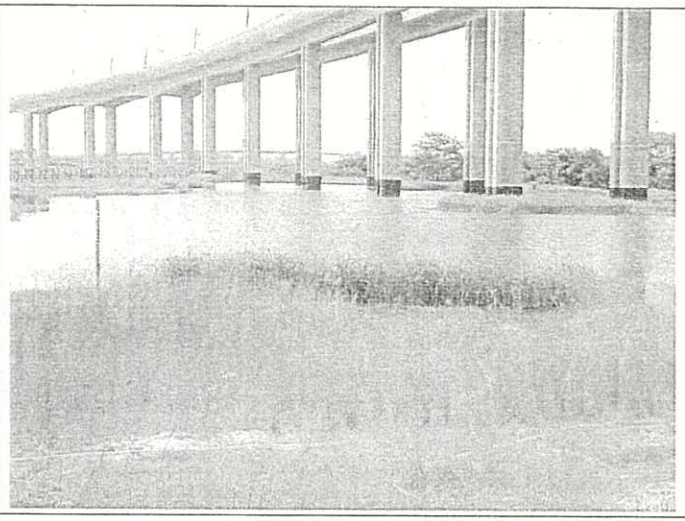


Photo 4.96: Aquatic Plant at Parcels B and D

Photo 4.97: Shrubs at Parcels B and D

Photo 4.98: Tree at Parcels B and D

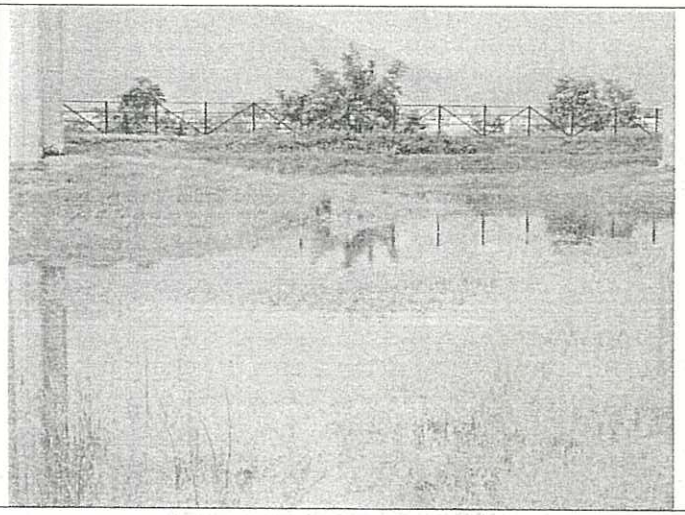


Photo 4.99: Aquatic Plants at Parcels B and D

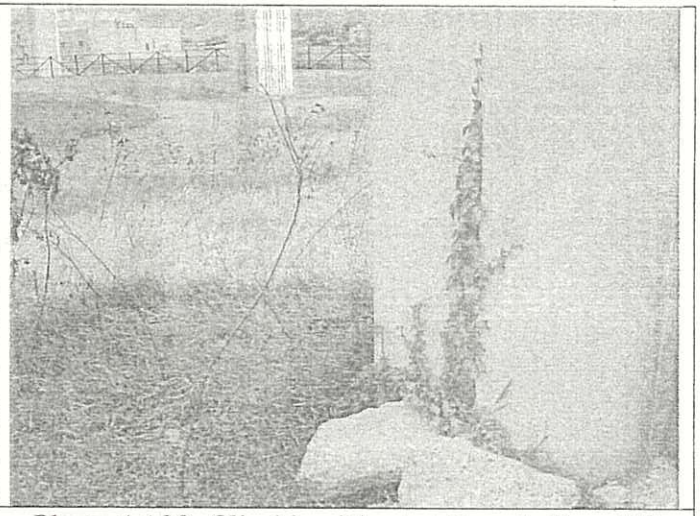


Photo 4.100: Climbing Plant at Parcels B and D under the Viaduct Column

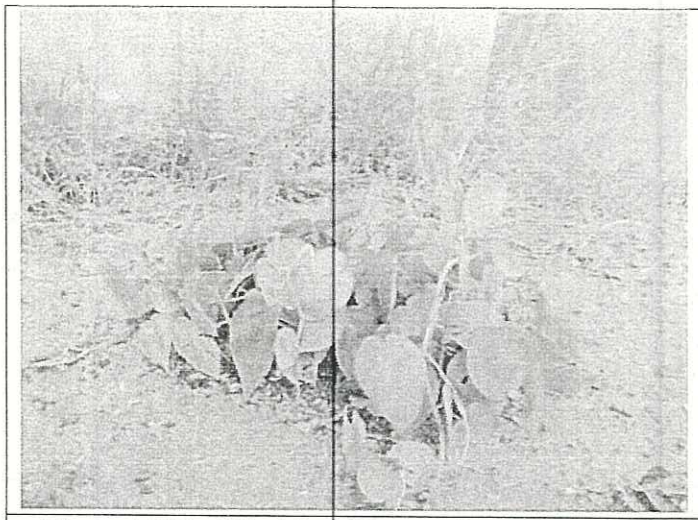


Photo 4.101: Climbing Plant at Parcels B and D under the Viaduct Column

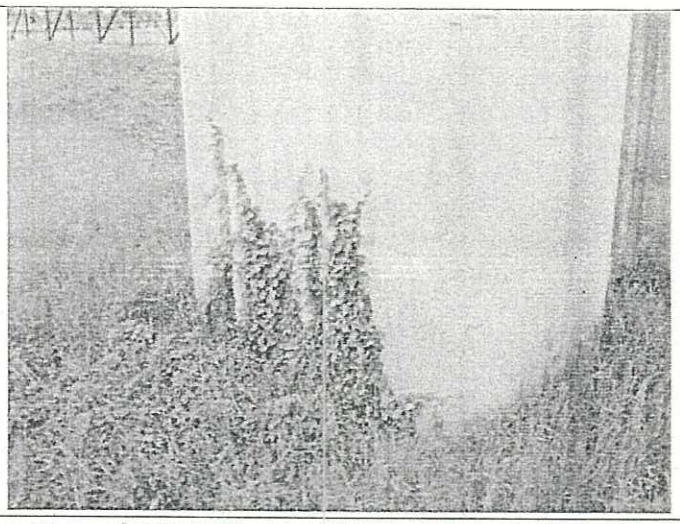


Photo 4.102: Climbing Plant at Parcels B and D under the Viaduct Column

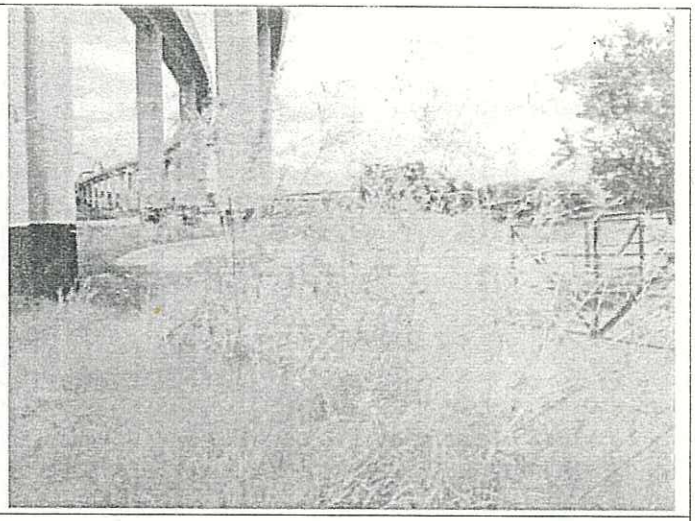


Photo 4.103: Bamboo at Parcels B and D

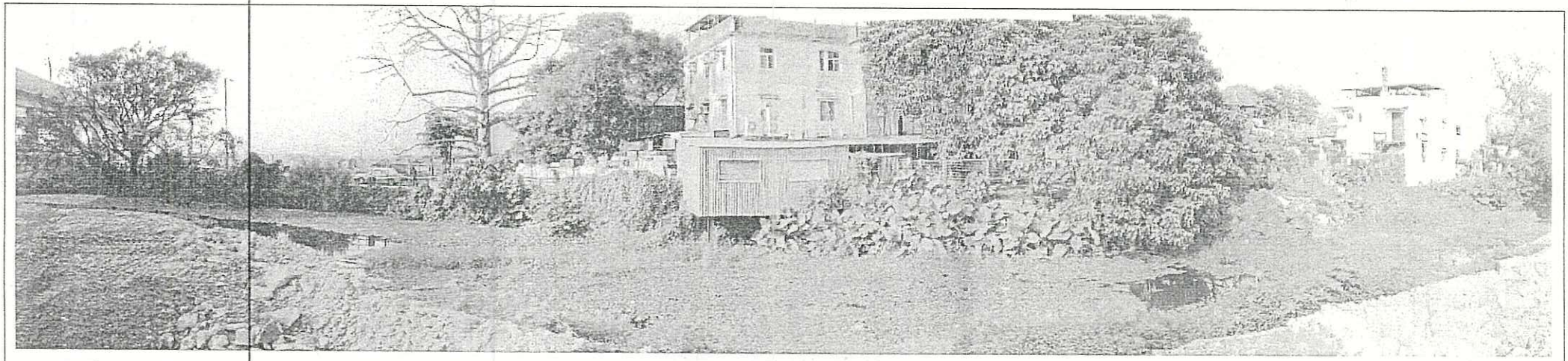


Photo 4.104: View at Land Parcel C

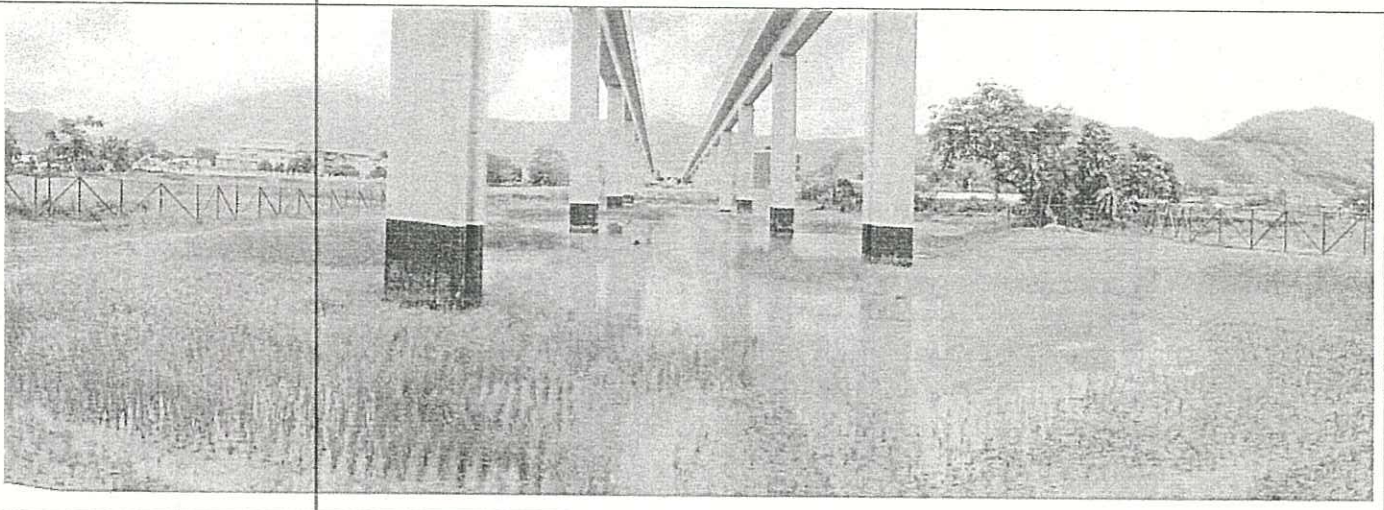


Photo 4.105: View at Land Parcel E

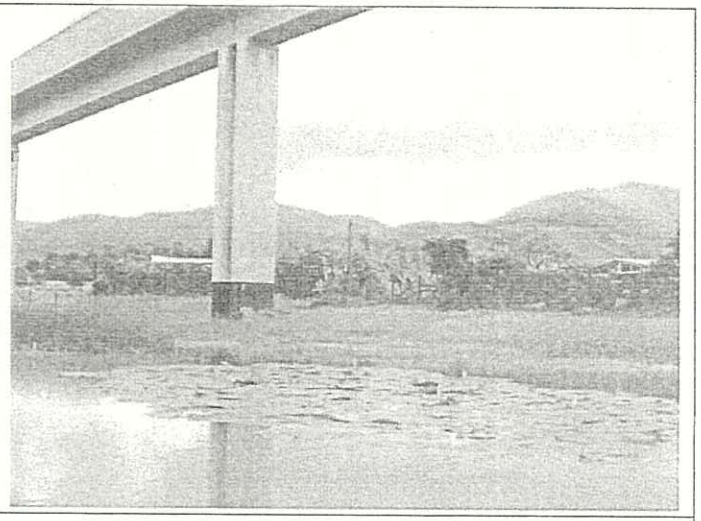


Photo 4.106: Aquatic Plants at Parcels E

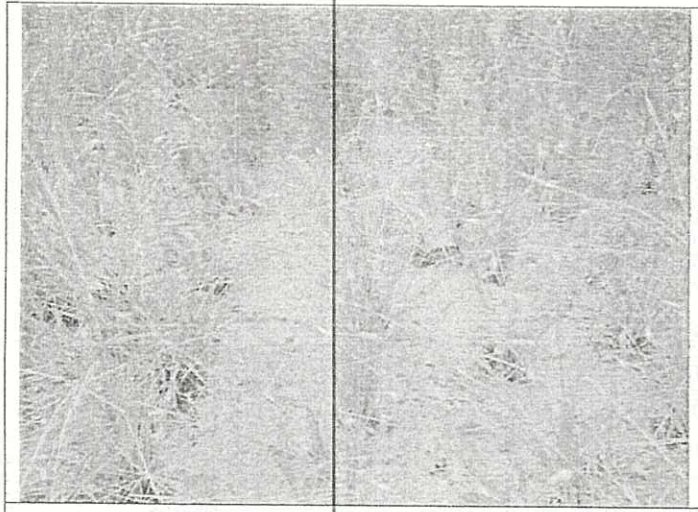


Photo 4.107: Grass at Parcels E

Photo 4.108: Aquatic Plants at Parcels E

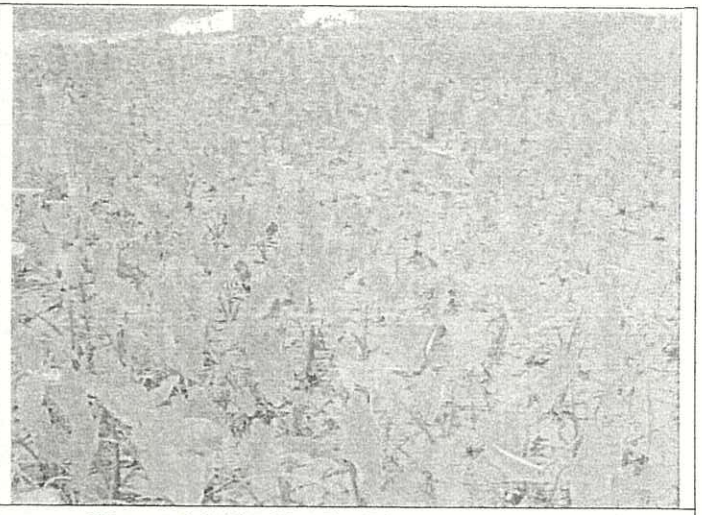


Photo 4.109: Shrubs Plants at Parcels E

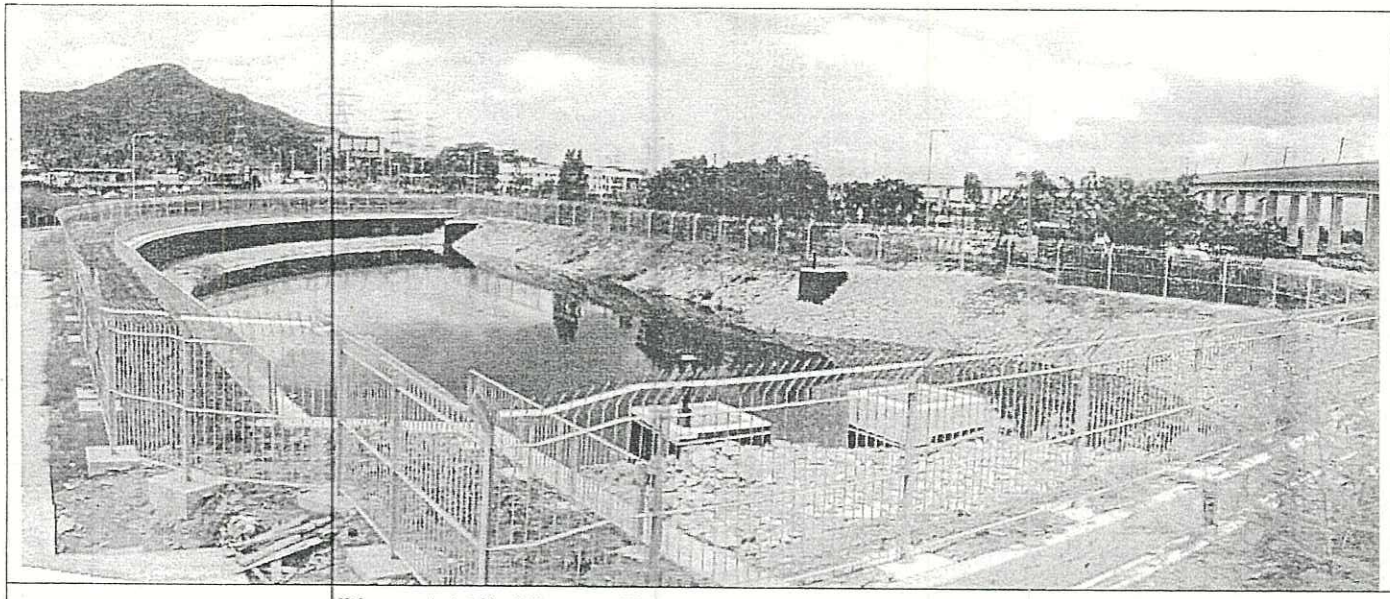


Photo 4.110: View at Water Storage Pond Land Parcel F

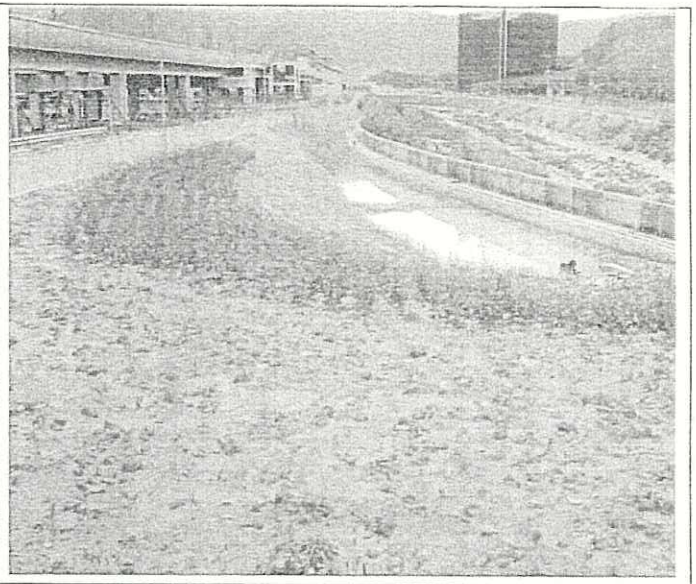


Photo 4.111: View at Land Parcel G

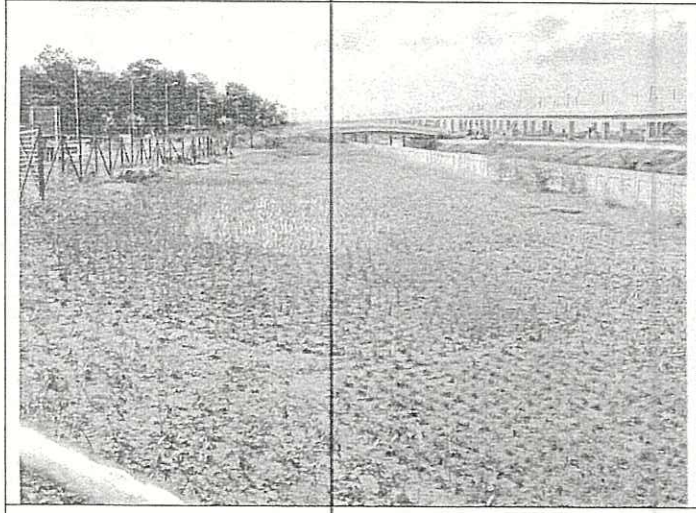


Photo 4.112: Northern Side of Parcel H

Photo 4.113: Southern Side of Parcel H

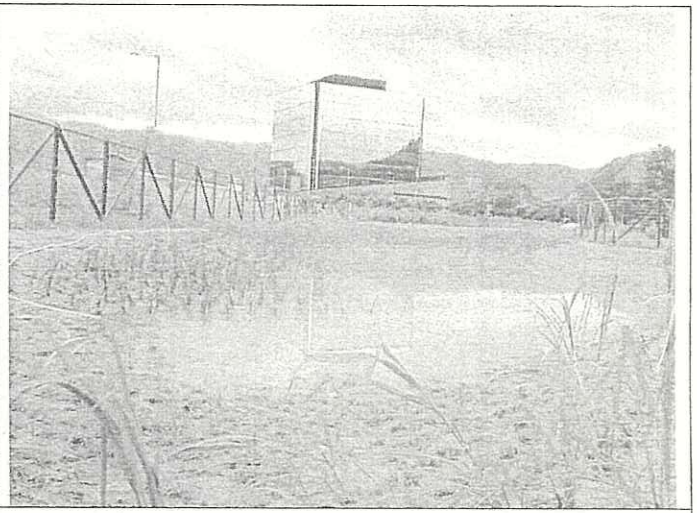


Photo 4.114: Southern side of Parcel I

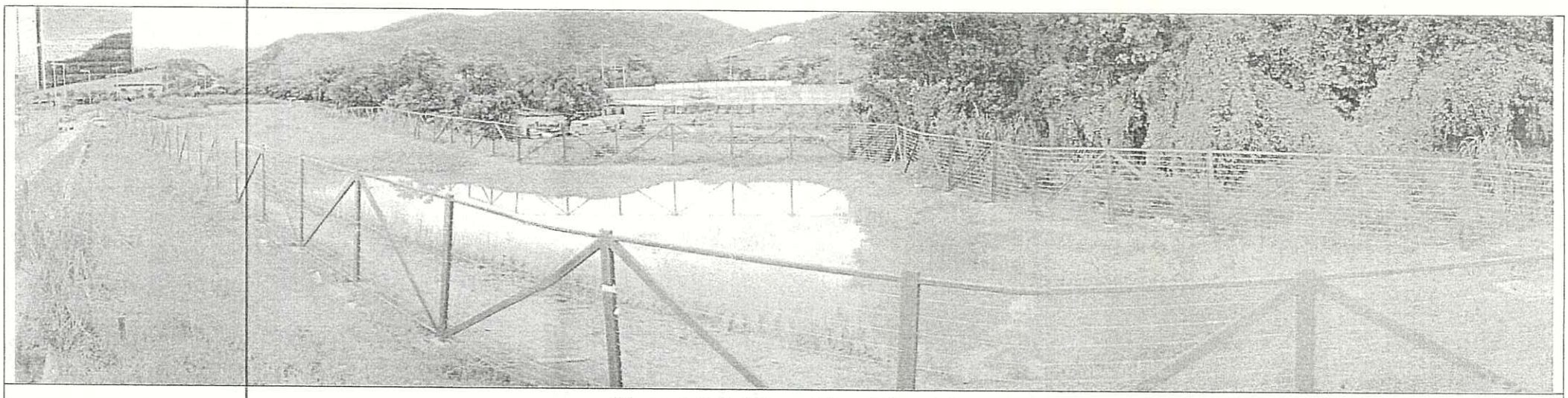


Photo 4.115: View at Land Parcel I

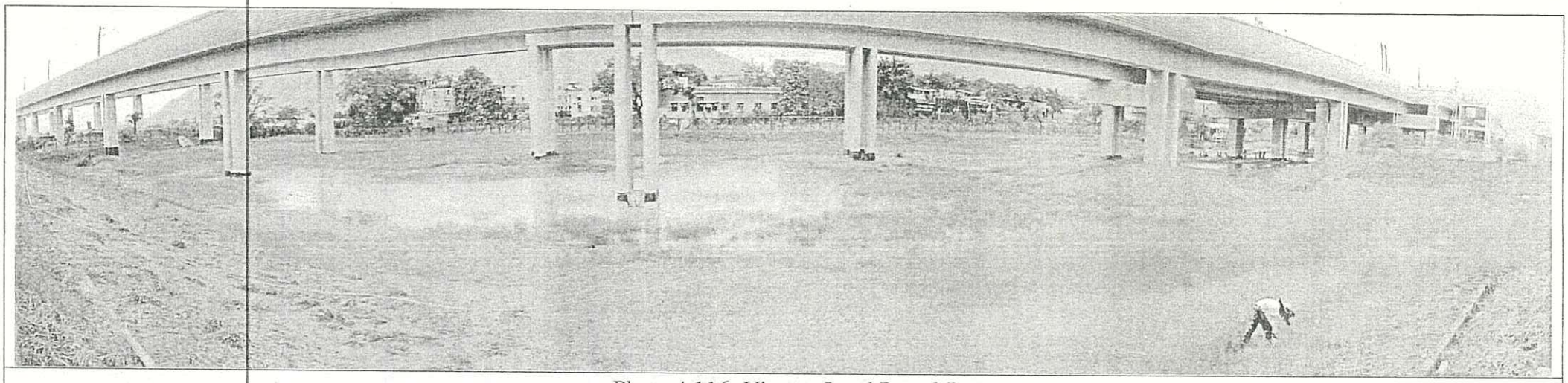


Photo 4.116: View at Land Parcel J

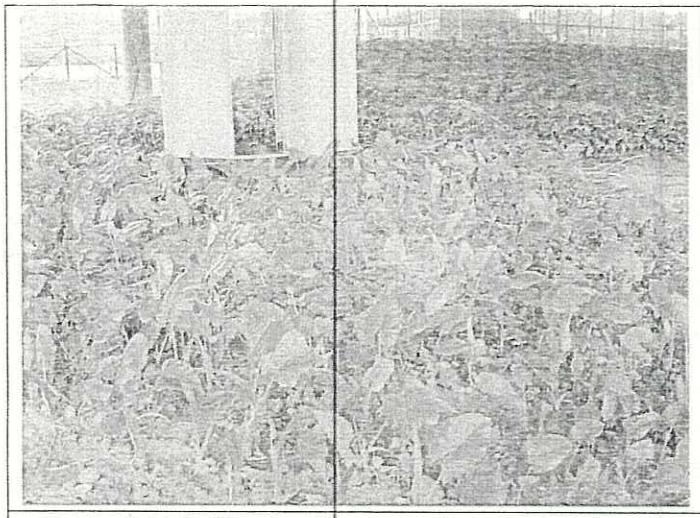


Photo 4.117: Shrubs Plants at Parcels J under the WR Viaduct

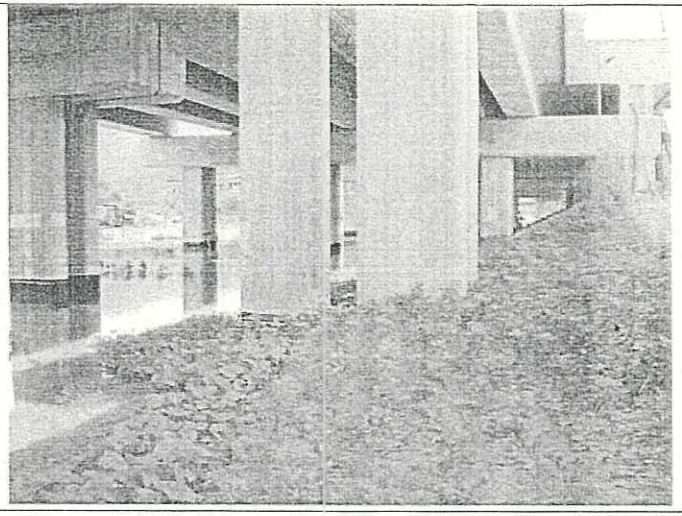


Photo 4.118: Shrubs Plants at Parcels J under the WR Viaduct

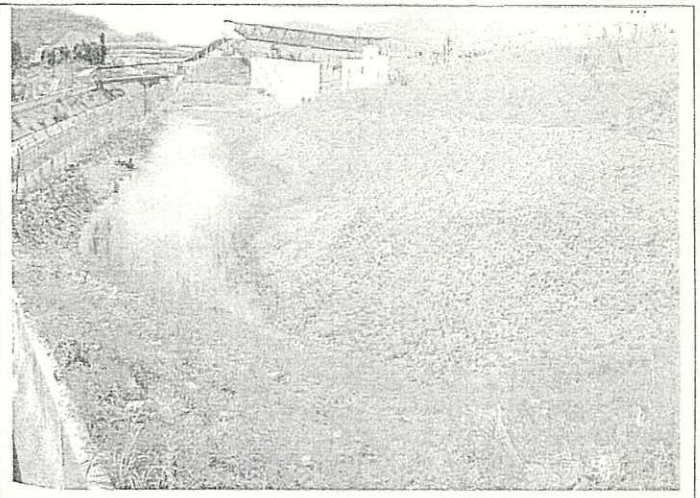


Photo 4.119: View at Land Parcel K (i)

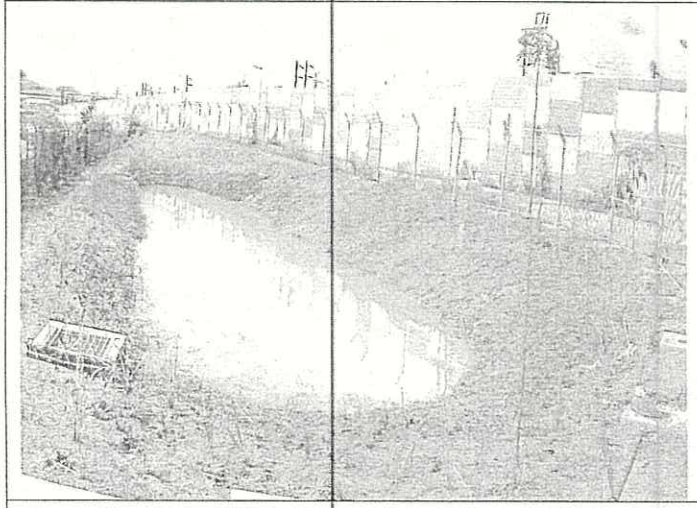


Photo 4.120: View at Land Parcel K(ii)

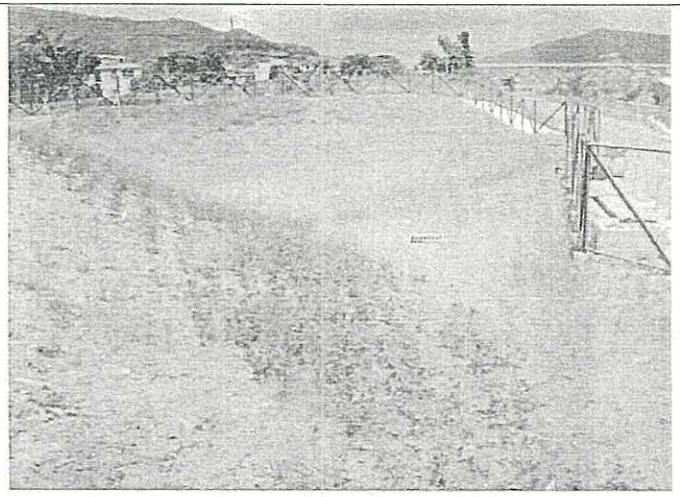


Photo 4.121: View at Land Parcel L

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

Photo 5.1: MPS Outside Yuen Long Station

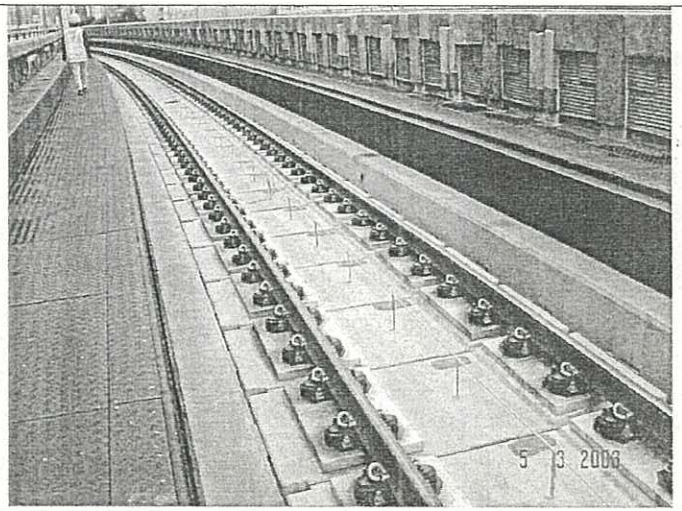


Photo 5.2: Rail Mounted on Baseplate of Floating Slab

Photo 5.3: MPS at Long Ping

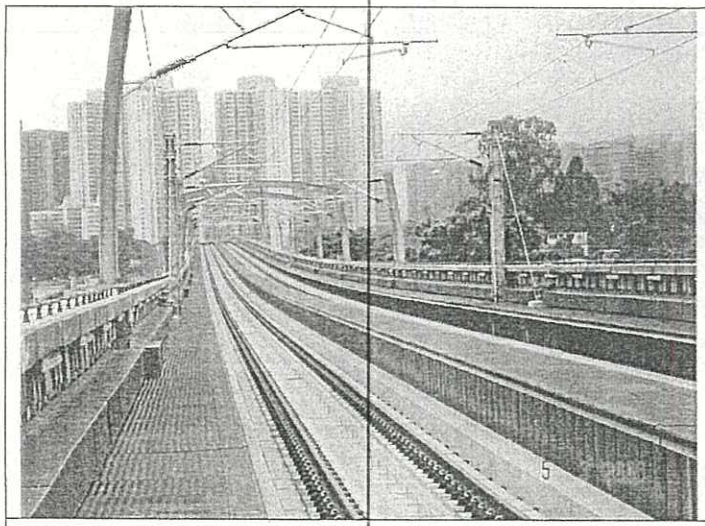


Photo 5.4: MPS from Long Ping to Tin Shui Wai

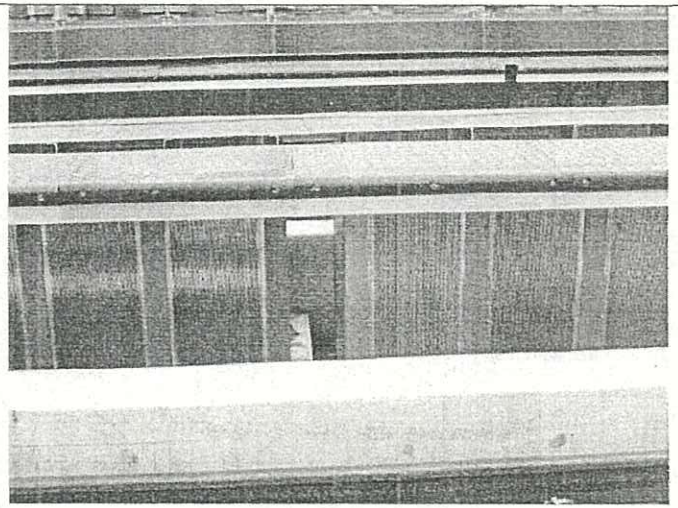


Photo 5.5: Gap Identified at Central Plenum (U9 28+925)

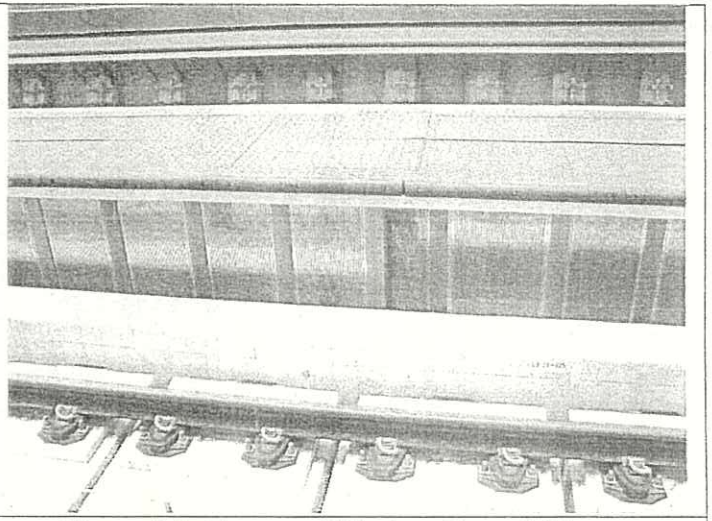


Photo 5.6: Gap was Filled at Central Plenum (U9 28+925)

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

Photo 5.7: MPS at Section Approaching Tin Shui Wai

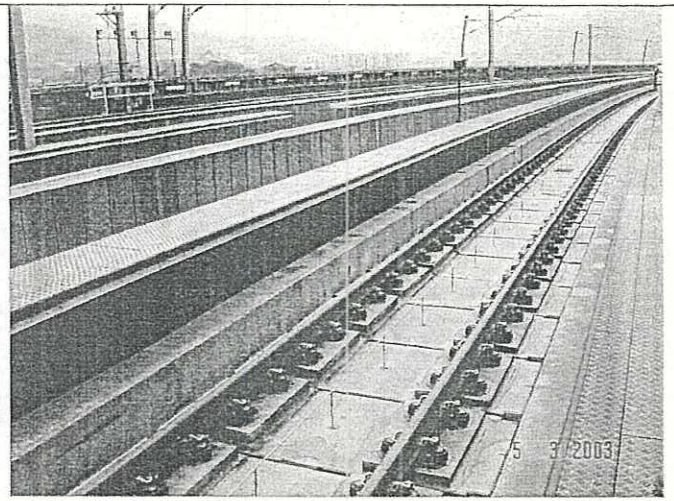


Photo 5.8: General View of MPS

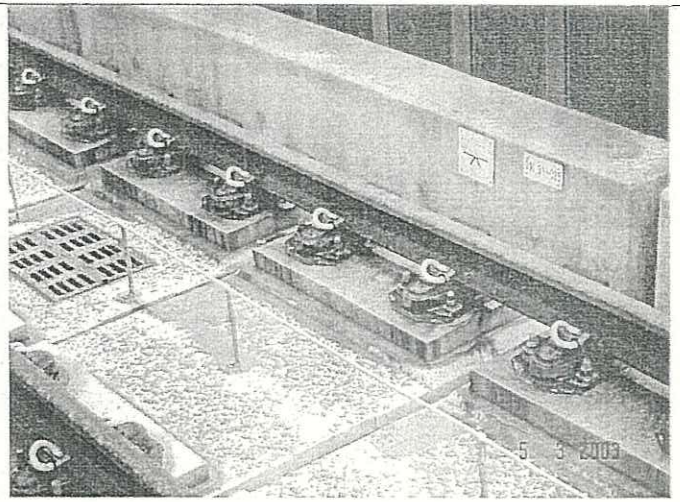


Photo 5.9: General View of Floating Slab Track

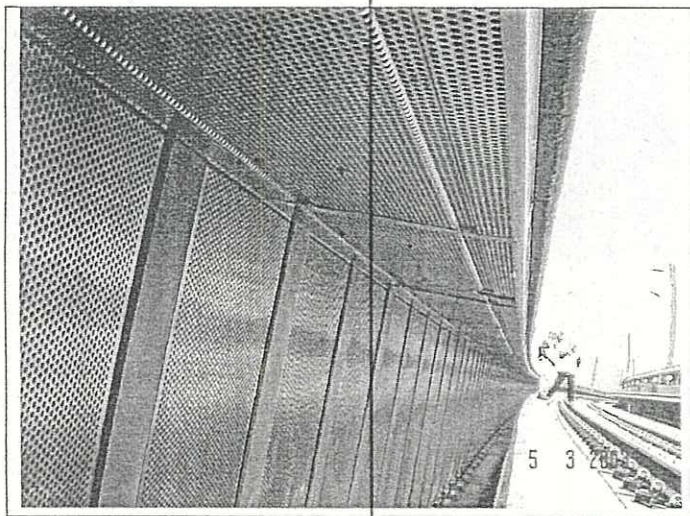


Photo 5.10: Typical SAM on Central Plenum

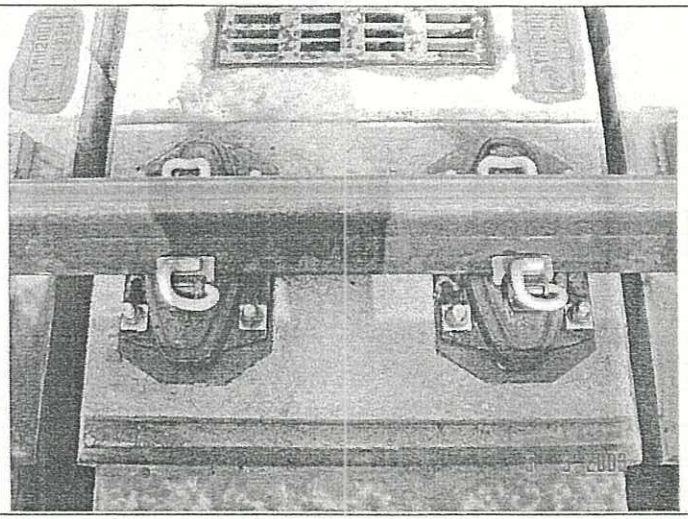


Photo 5.11: General View of Baseplate

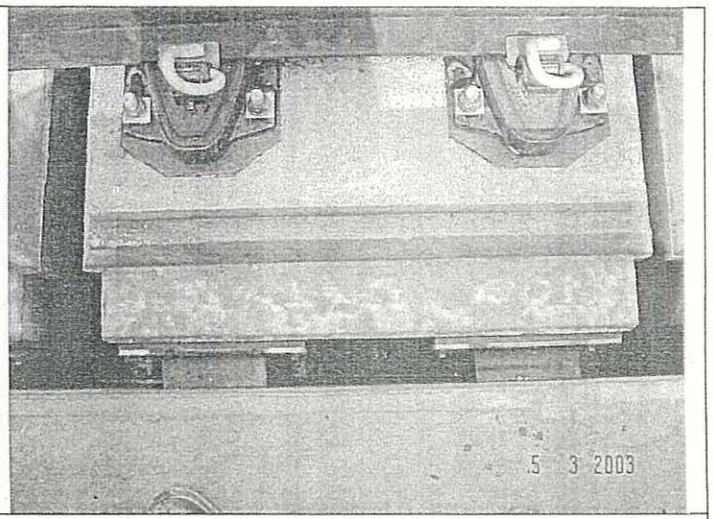


Photo 5.12: Typical Side Baring of Baseplate

Viaduct Section between Yuen Long and Tuen Mun

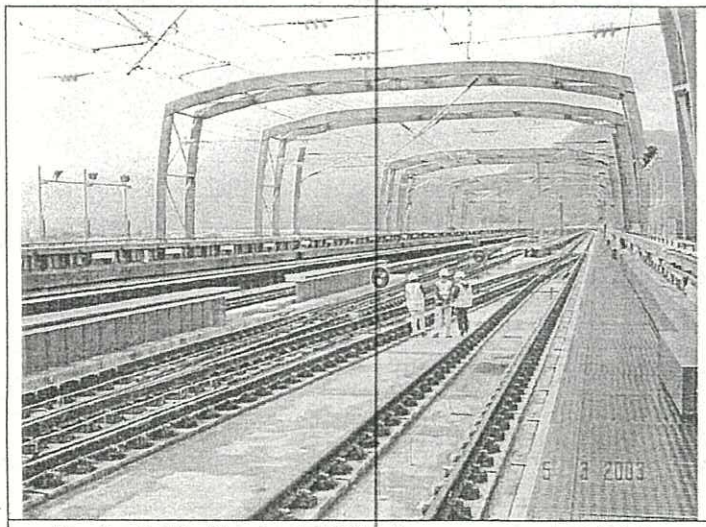


Photo 5.13: Typical MPS Arrangement at Major Turnout

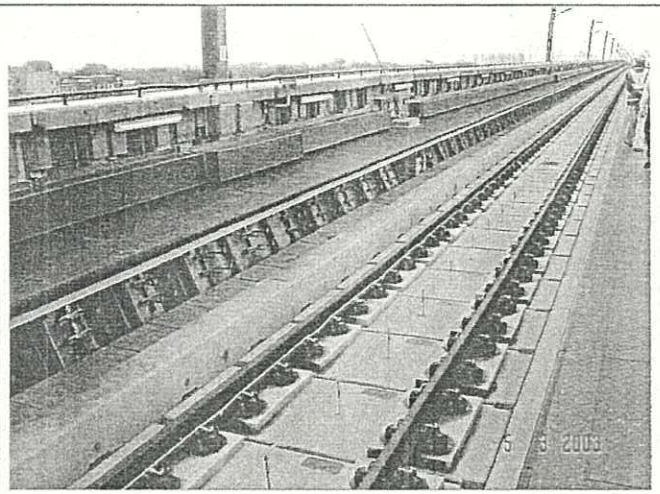


Photo 5.14: Floating Slab Trackform to Yick Yuen

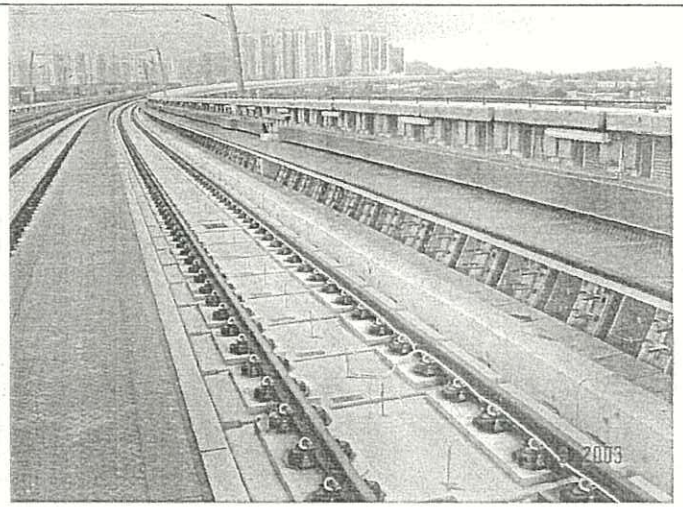


Photo 5.15: Floating Slab Trackform(FST) from Tin Shui Wai

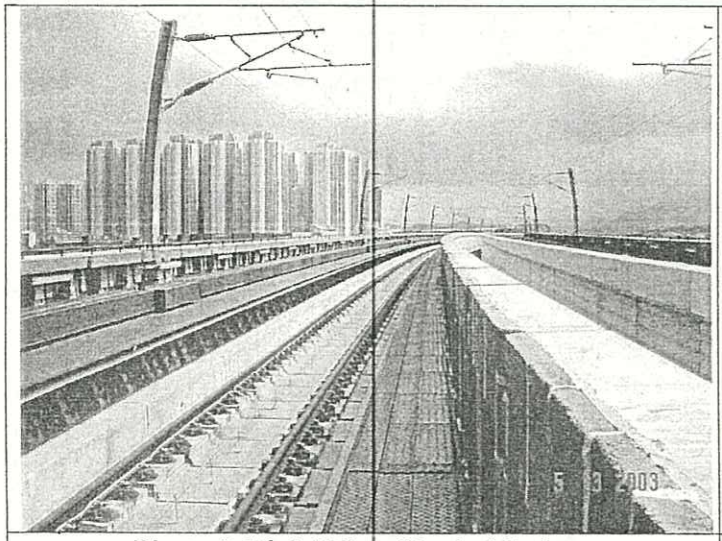


Photo 5.16: MPS at Single Viaduct

Photo 5.17: MPS at Twin Viaduct near Tin Shui Wai

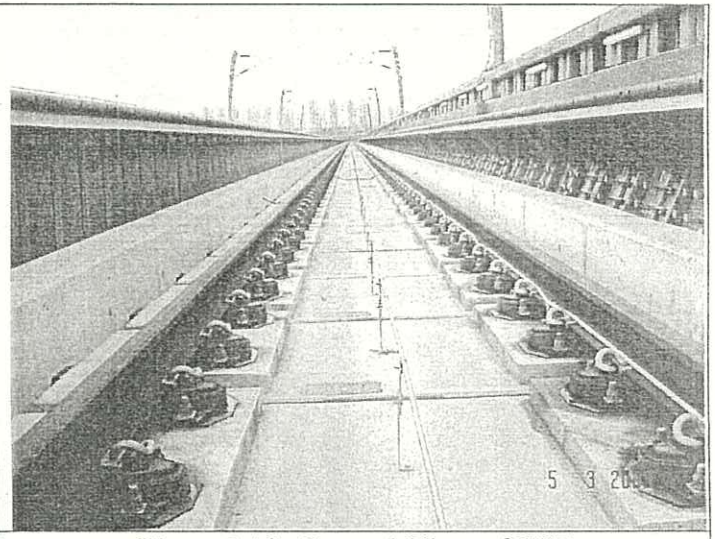


Photo 5.18: General View of FST

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

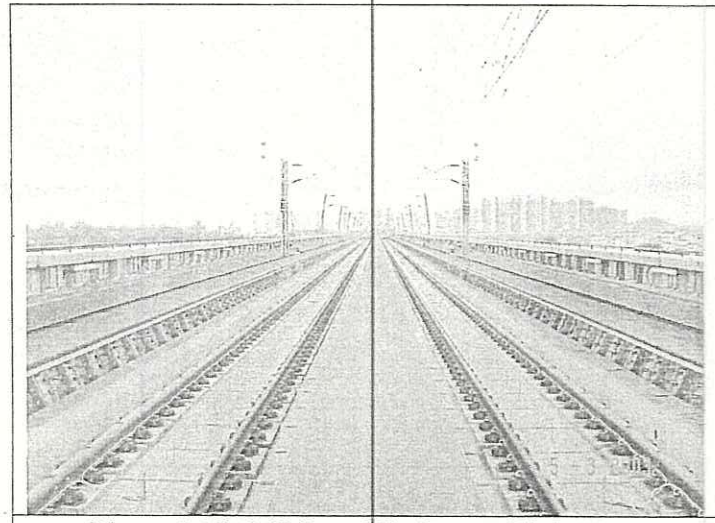


Photo 5.19: MPS on Viaduct at Yick Yuen

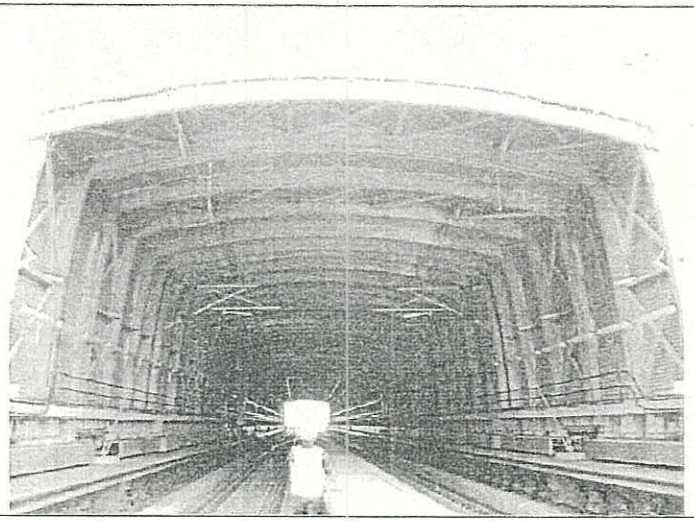


Photo 5.20: Noise Enclosure at Lam Tei

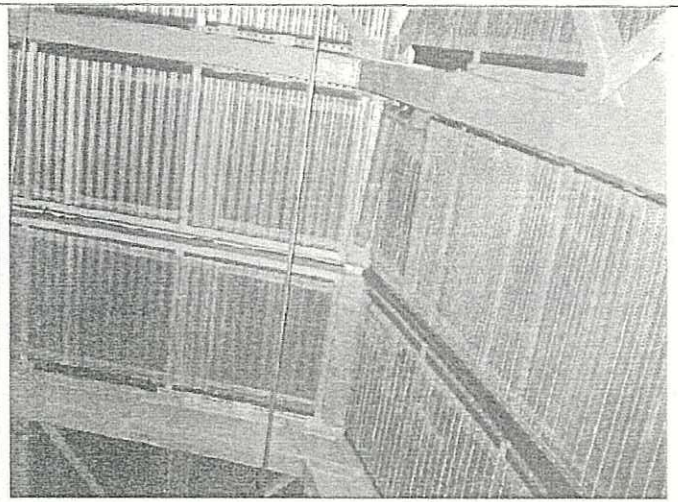


Photo 5.21: Gap Identified Inside Enclosure (Roof)

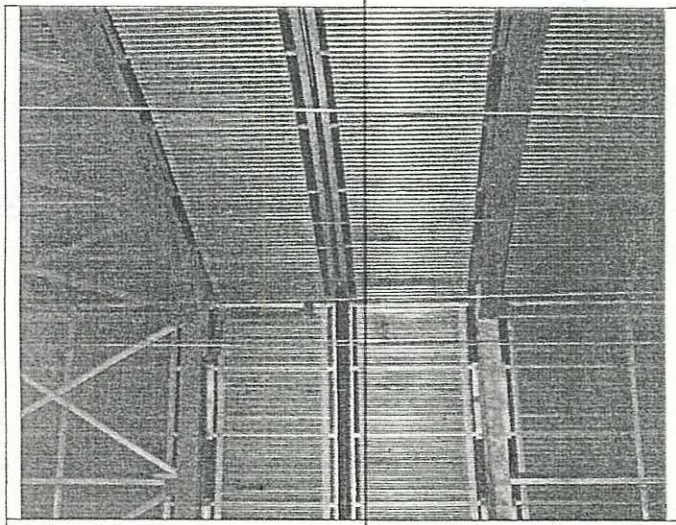


Photo 5.22: Gap was Filled Inside Enclosure (Roof)

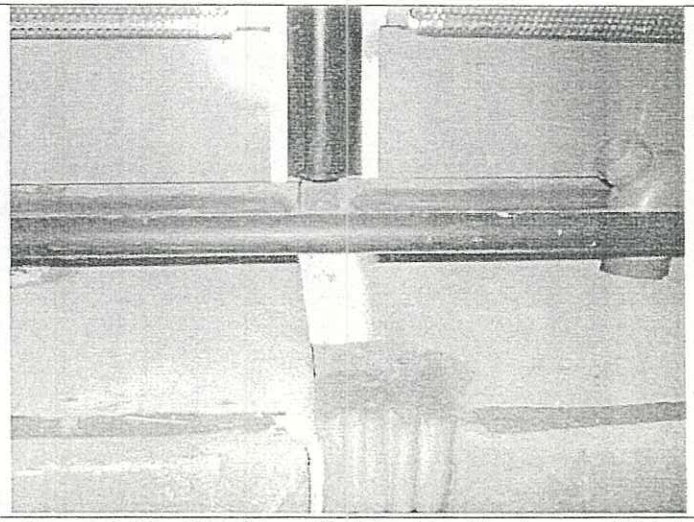


Photo 5.23: Gap Identified Insider Enclosure (Side)

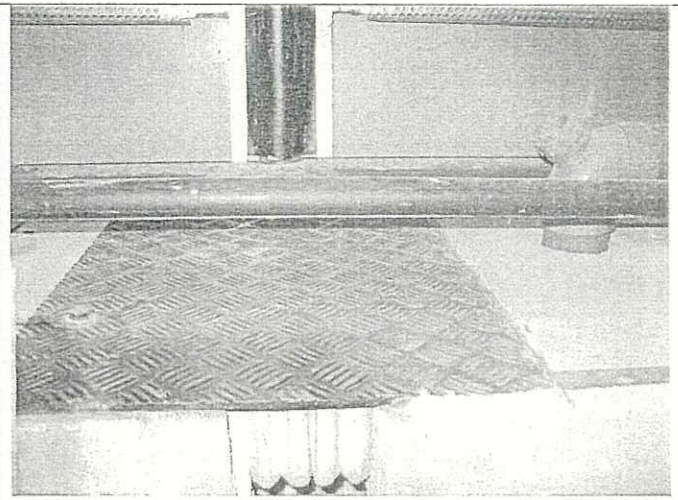


Photo 5.24: Gap was Filled Insider Enclosure (Side)

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

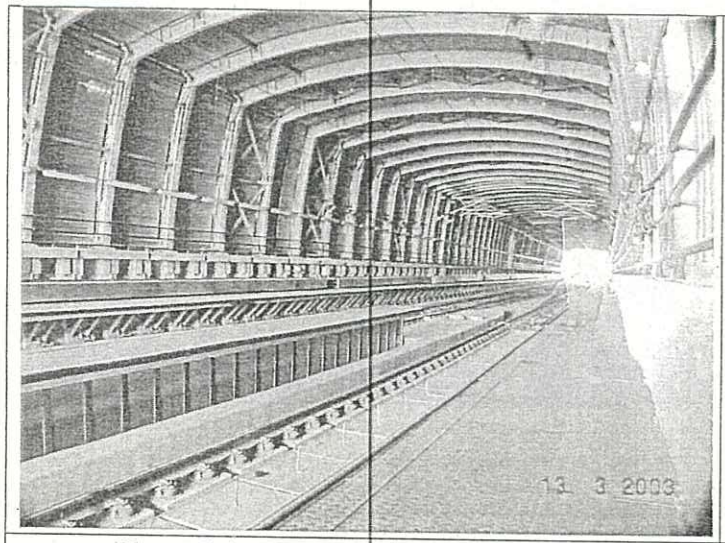


Photo 5.25: Inside of Noise Enclosure

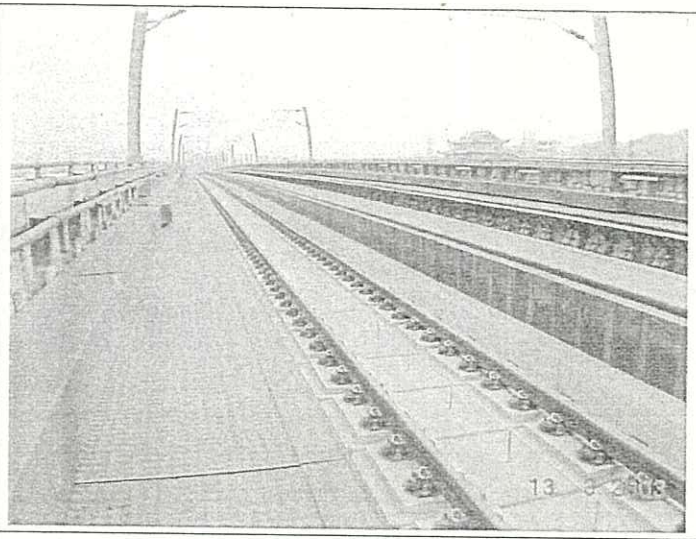


Photo 5.26: MPS at Lam Tei

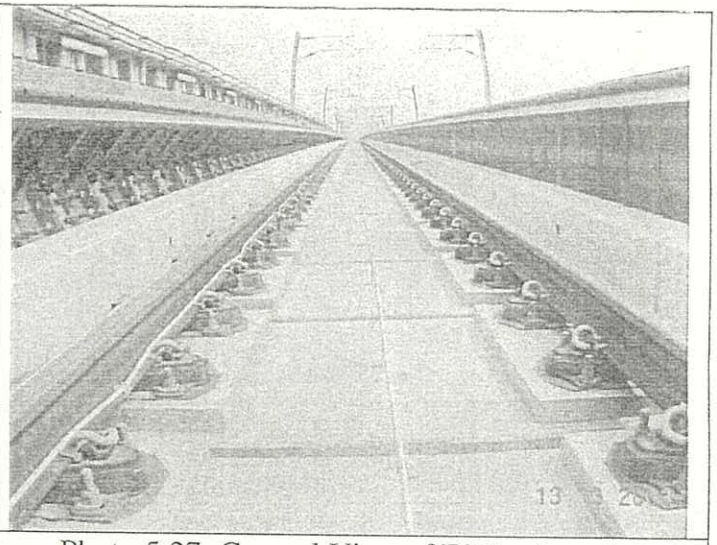


Photo 5.27: General View of FST at Lam Tei

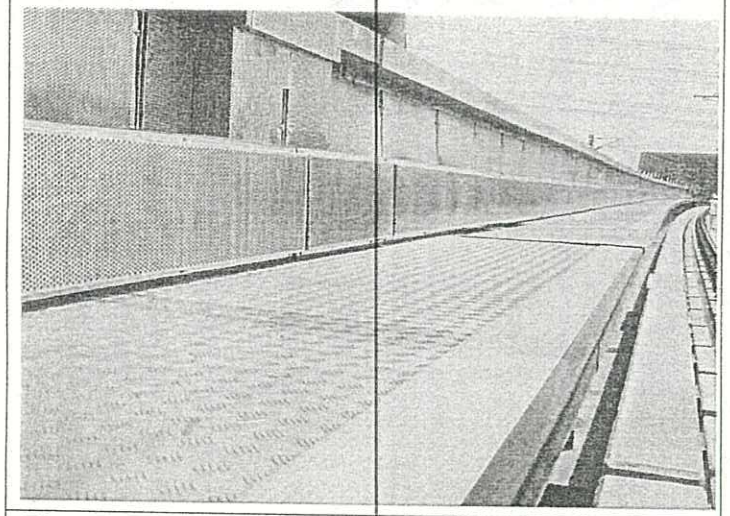


Photo 5.28: Acoustic Plenum at Siu Hong Walkway

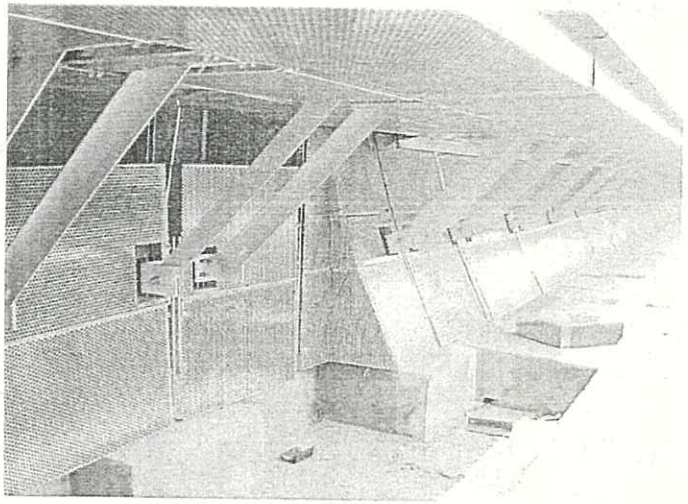


Photo 5.29: Acoustic Plenum Underneath Walkway at Siu Hong

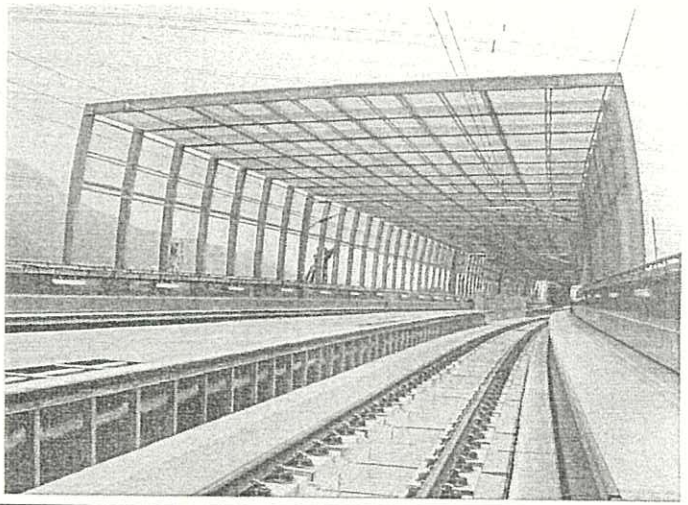


Photo 5.30: MPS Outside Siu Hong Station

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

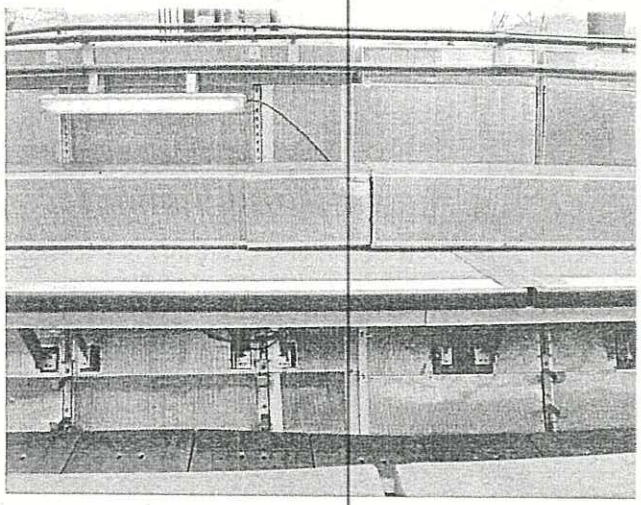


Photo 5.31: Acoustic Panels were not properly installed at CH35+218

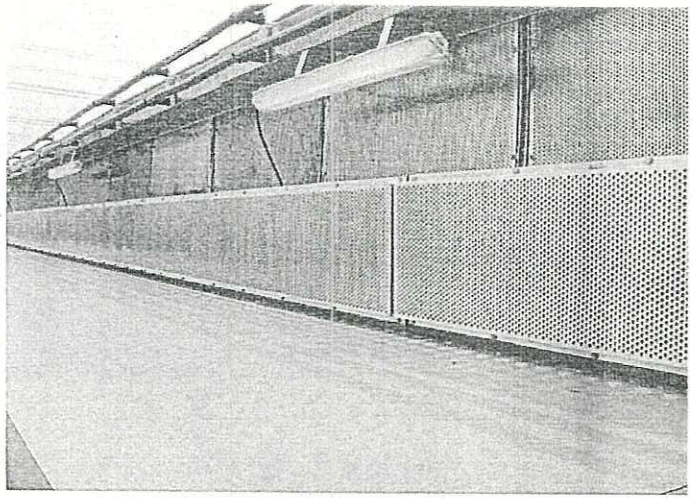


Photo 5.32: Acoustic Panels at CH35+218 was Repaired

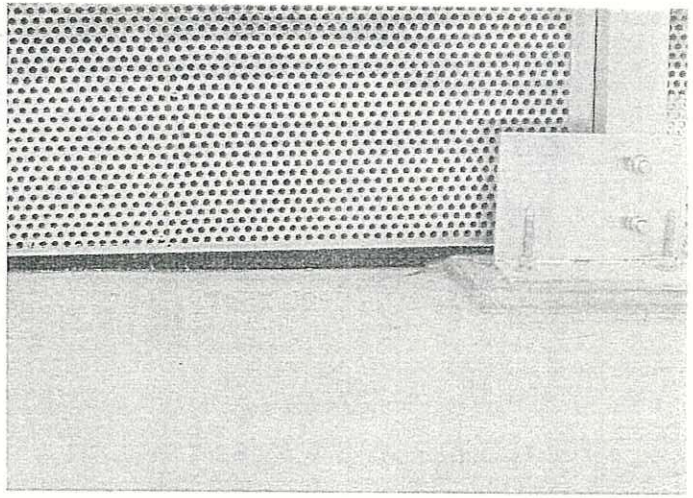


Photo 5.33: Rubber Band Installed underneath of Noise Plenum

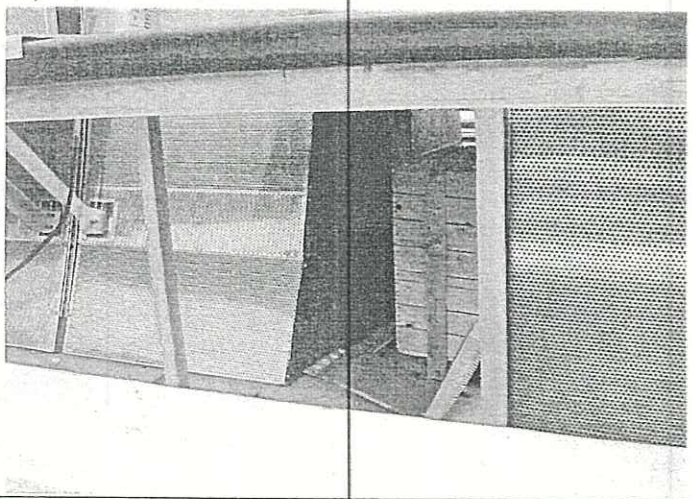


Photo 5.34: Gap observed at the Central Pleum near SIH at CH35+216

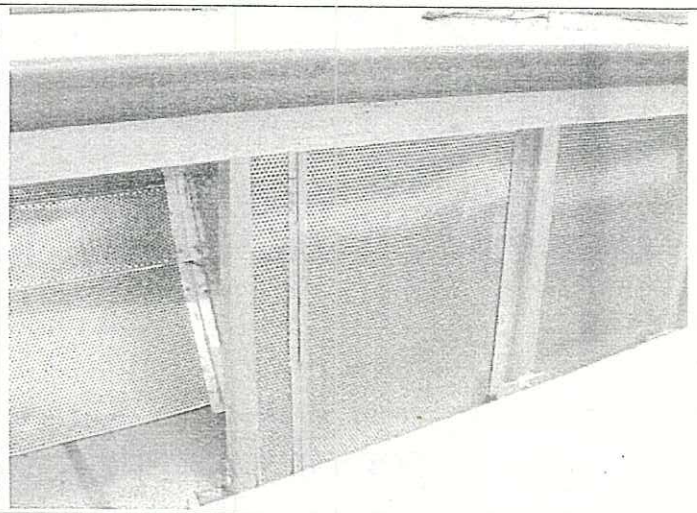


Photo 5.34: Acoustic Panel was installed at the Central Pleum near SIH at CH35+216

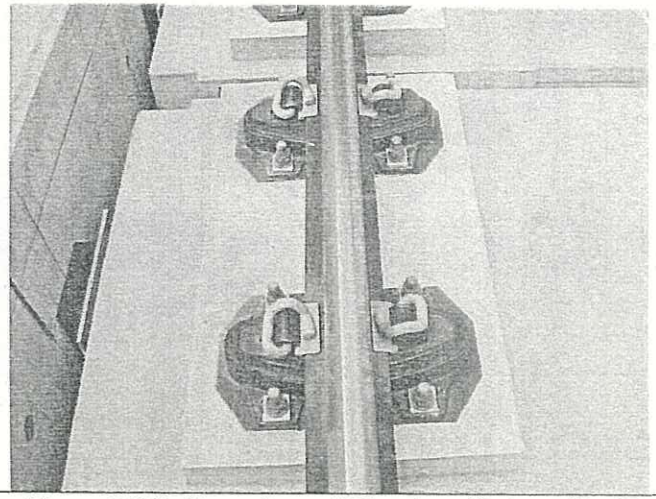


Photo 5.35: Baseplate of Floating Slab at Siu Hong Station

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

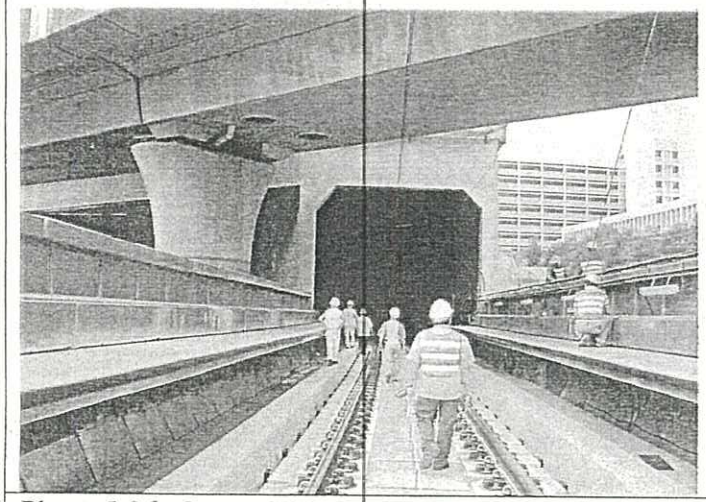


Photo 5.36: General View of MPS nearby Tuen Mun Hospital

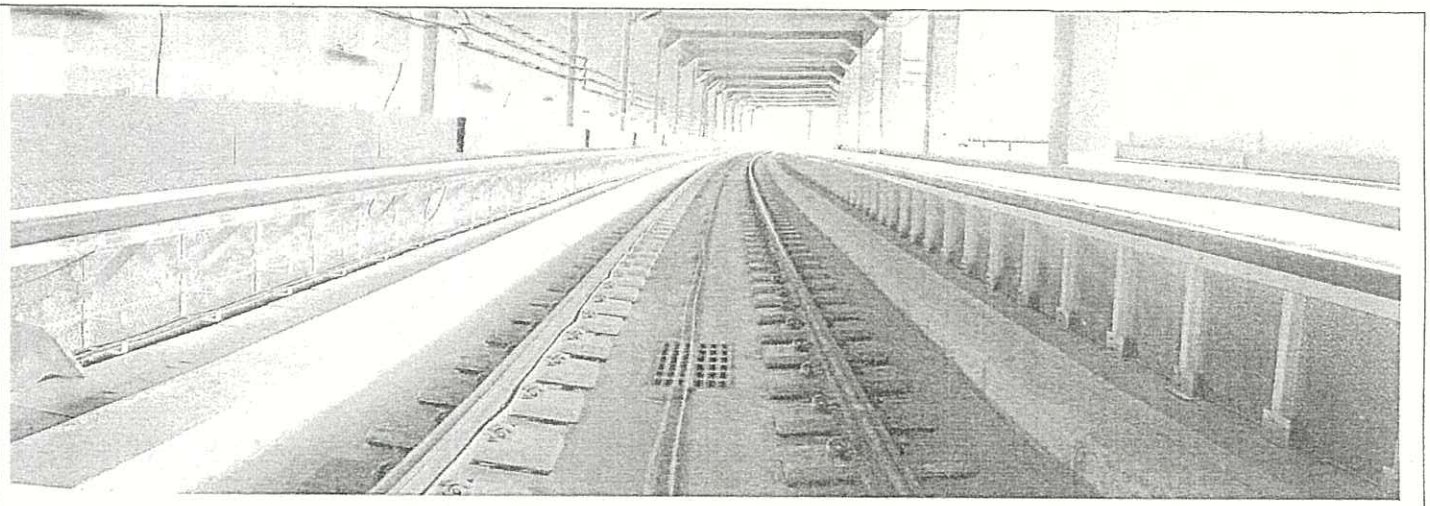


Photo 5.37: General View of Central Plenum at Tuen Mun Amenity Structure

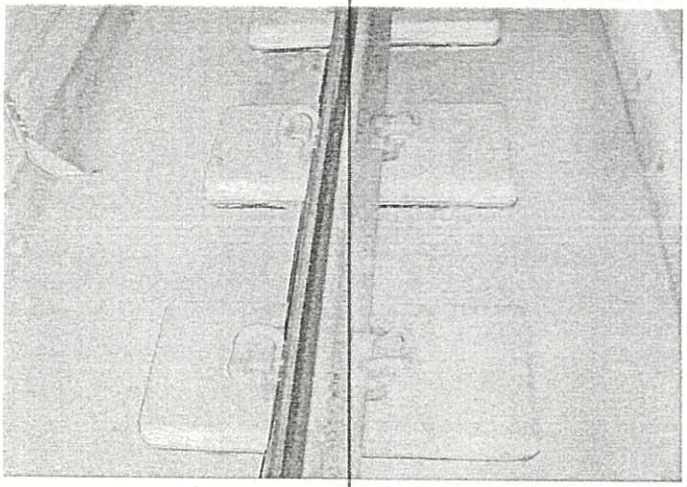


Photo 5.38: General View of Baseplate at Tuen Mun Amenity Structure

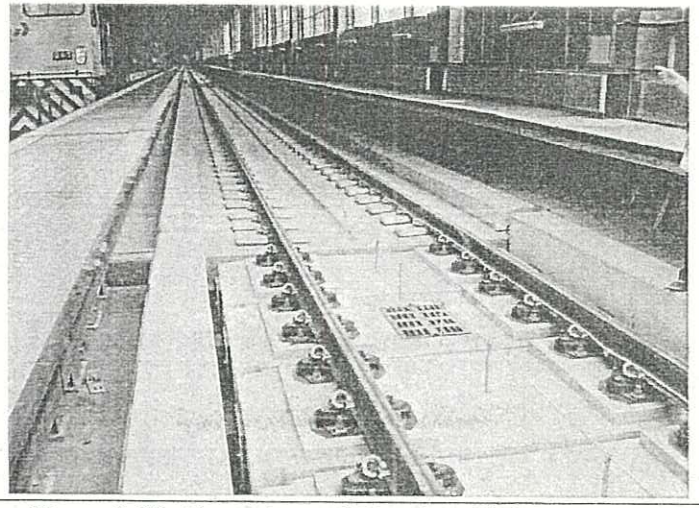


Photo 5.39: Baseplate of Floating Slab between at Tuen Mun at Grade and Viaduct Section

Photo 5.40: MPS at TUM Chelsea Heights

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

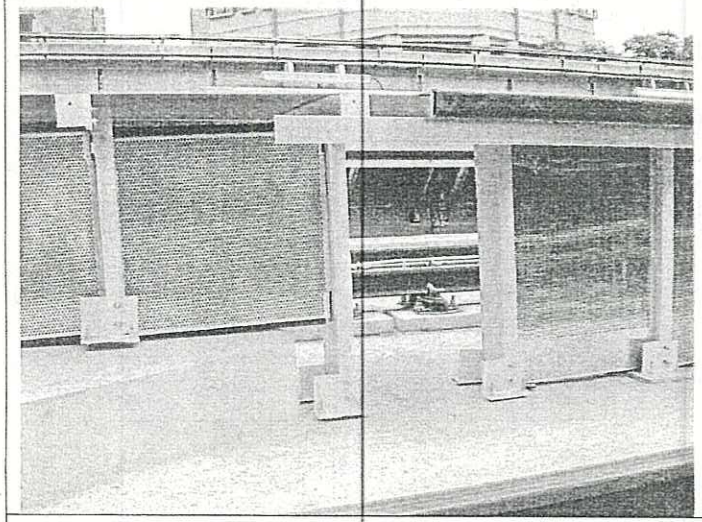


Photo 5.41: Hole Identified at Nosing bay CH36+965

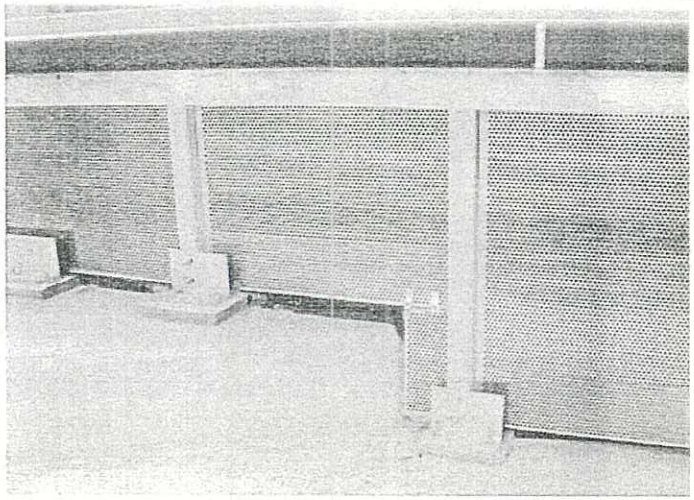


Photo 5.43: Hole at Nosing Bay CH36+965 was Filled with Acoustic Panel

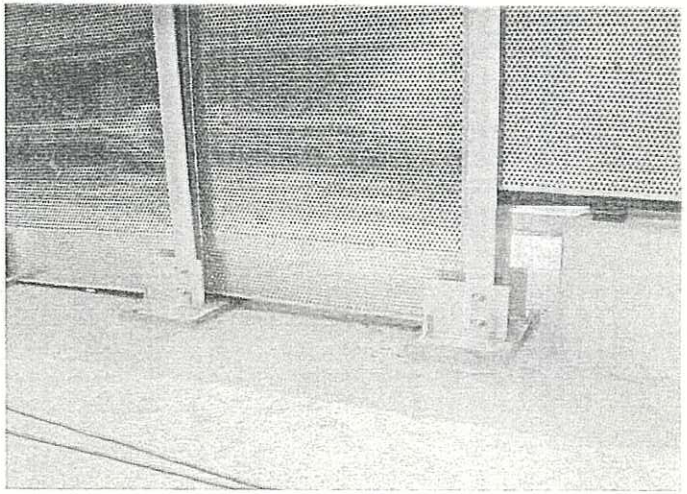


Photo 5.42: Hole Identified at Nosing bay CH36+914

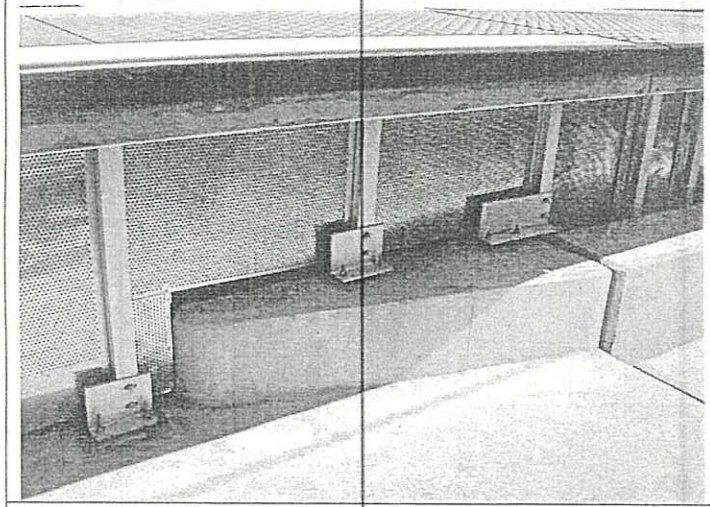


Photo 5.44: Hole at Nosing Bay CH36+914 was Filled with Acoustic Panel

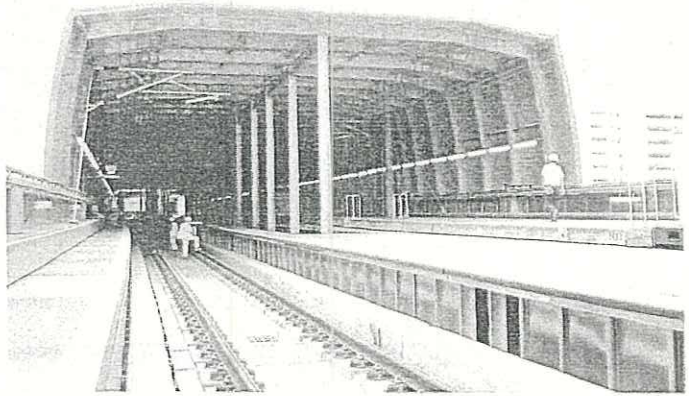


Photo 5.45: General View of MPS outside of TUM Enclosure

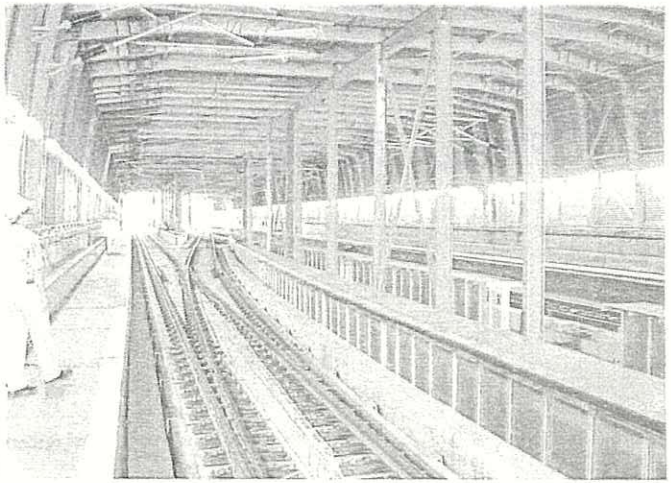


Photo 5.46: Crossover in Tuen Mun Noise Enclosure

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

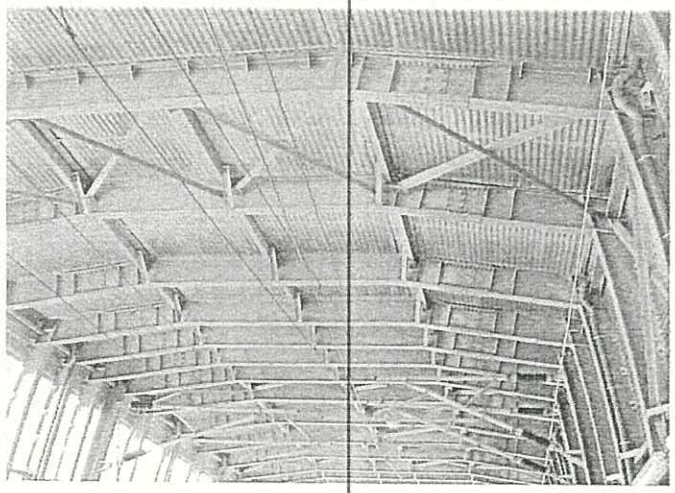


Photo 5.47: Semi-enclosure section at TUM Noise Enclosure

Photo 5.48: General View of TUM Noise Enclosure

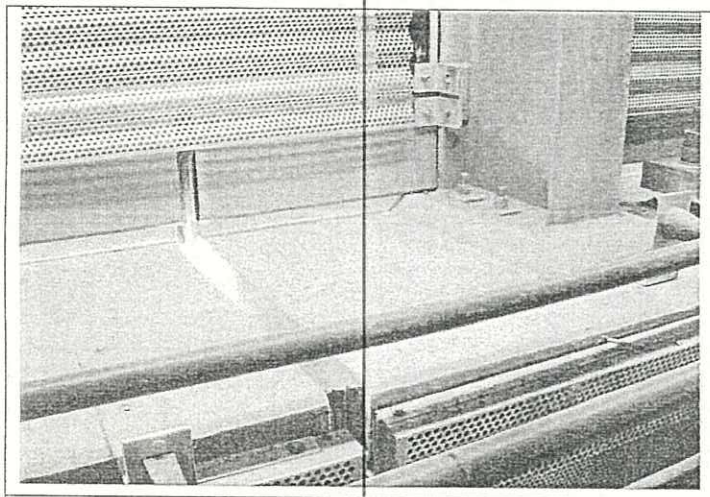


Photo 5.49: Gap Identified Insider at TUM Enclosure

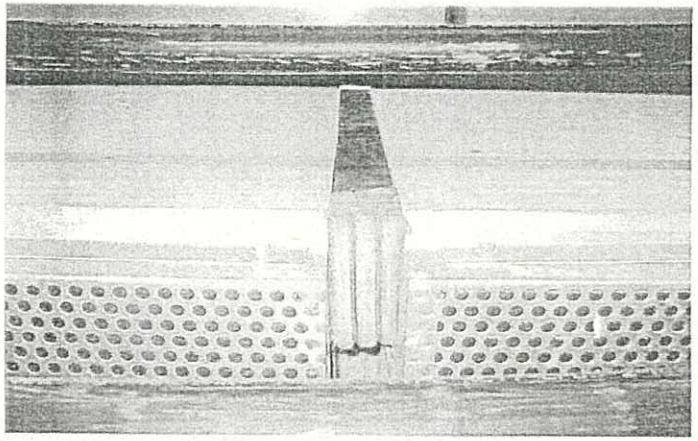


Photo 5.50: Gap was Filled Insider Enclosure

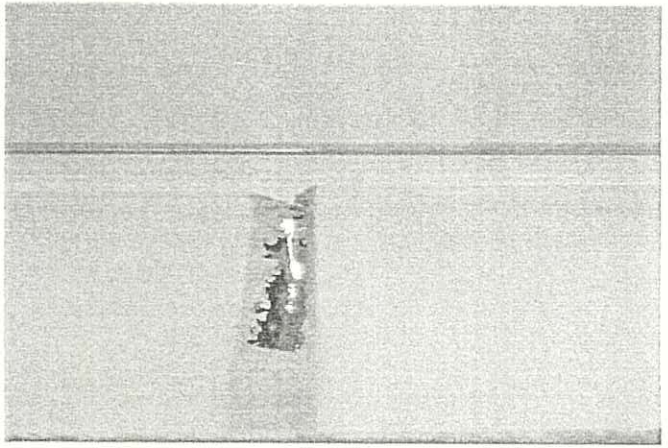


Photo 5.51: Some Sealent between the Parapet Walls was Damaged

Western Section – Railway Noise

Viaduct Section between Yuen Long and Tuen Mun

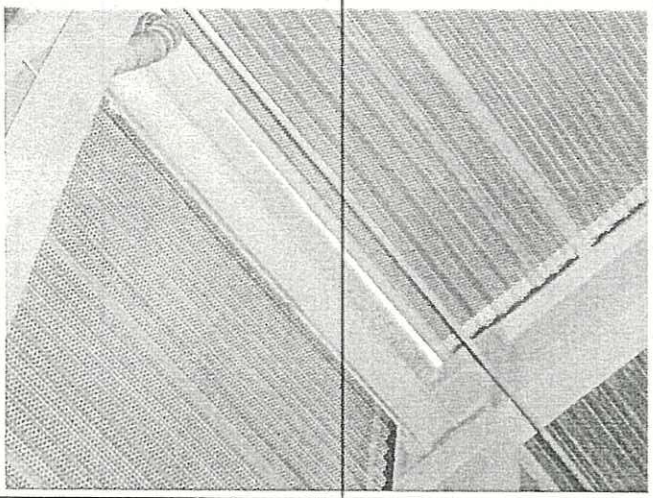


Photo 5.52: Gaps Identified Insider of the TUM Noise Enclosure Ceiling.

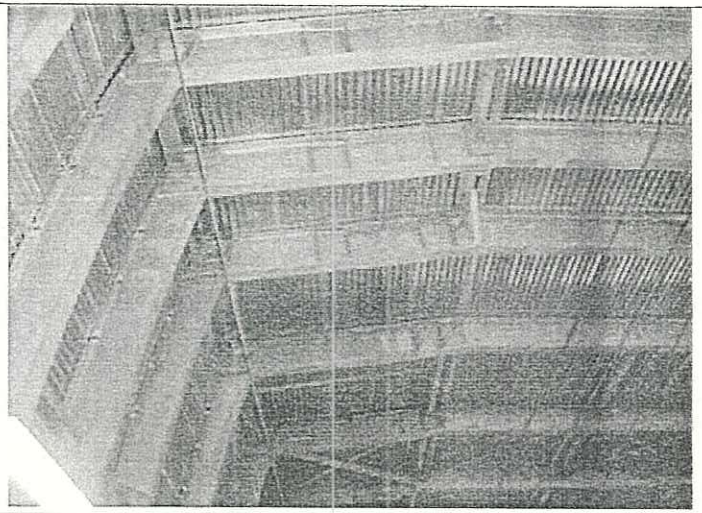


Photo 5.52a: Gaps Identified Insider of the TUM Noise Enclosure Ceiling was sealed.

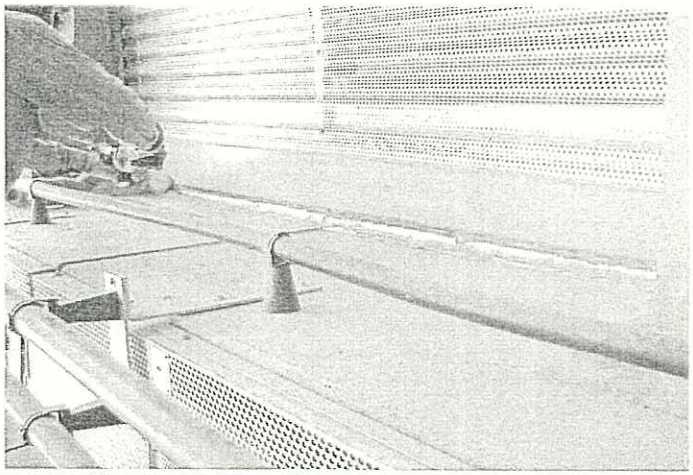


Photo 5.53: Gap was Sealed with Joint Sealant

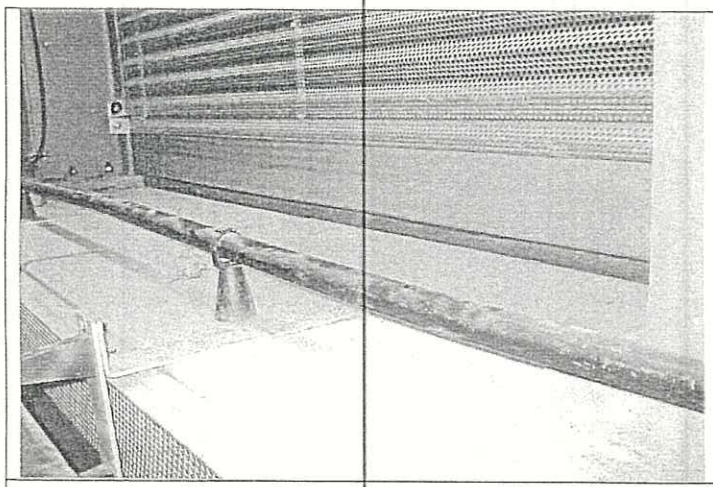


Photo 5.54: Gap was sealed

Northern Section – Hazard

Kam Sheung Road Station

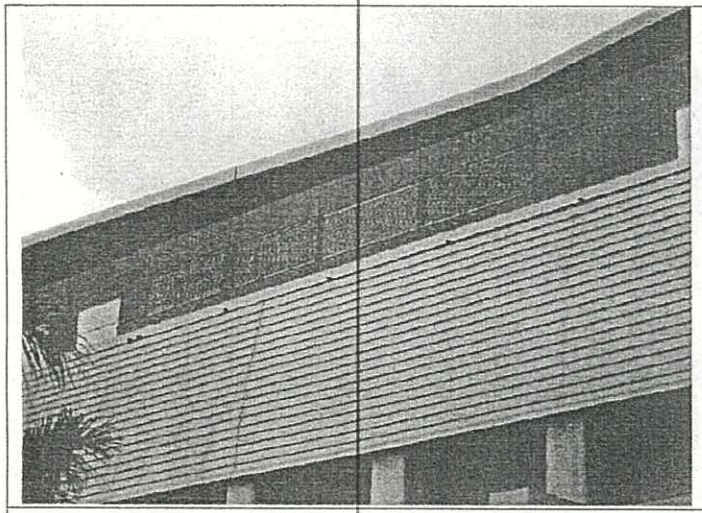


Photo 4.87: Intake of ventilation systems for KSR.

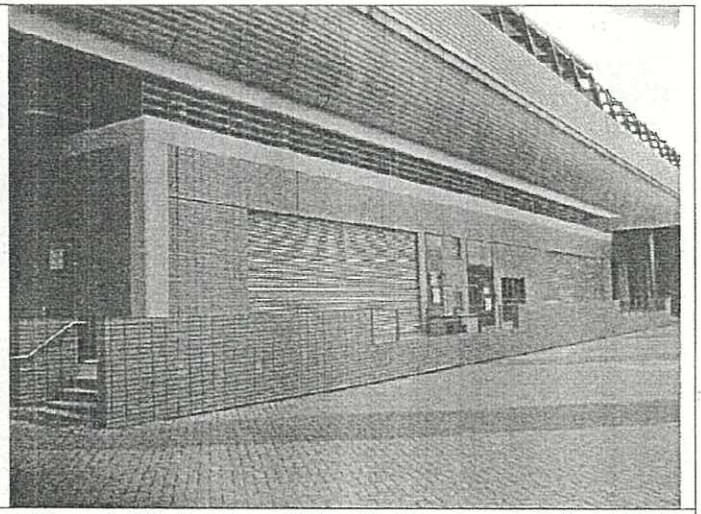


Photo 4.88: Intake of Ventilation systems for KSR

Western Section – Railway and Fixed Plant Noise

Yuen Long Station

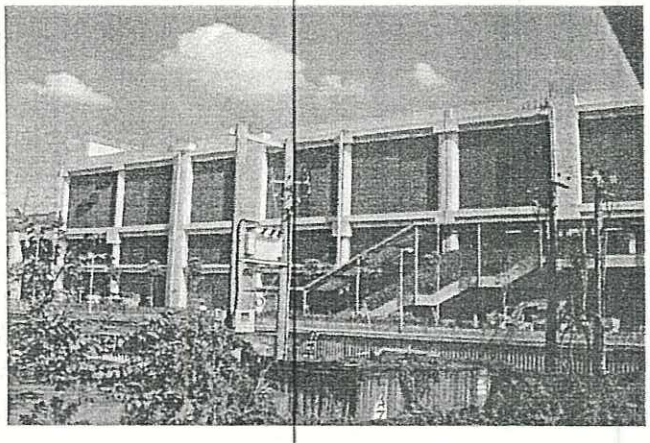


Photo 5.55 West of Yuen Long Station (YUL)

Photo 5.56 East of YUL Station

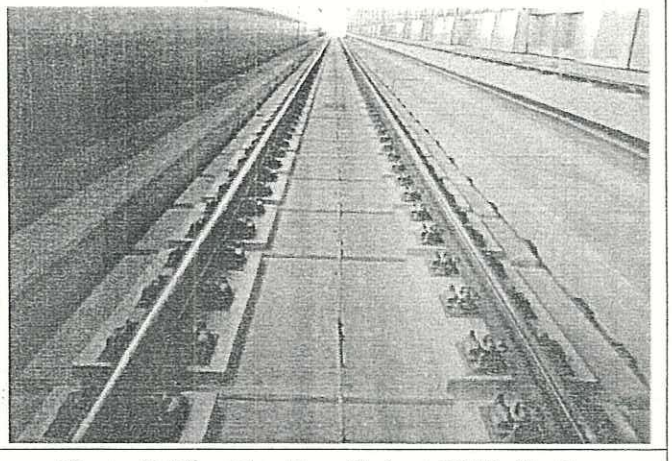


Photo 5.56a: Floating Slab at YUL Station

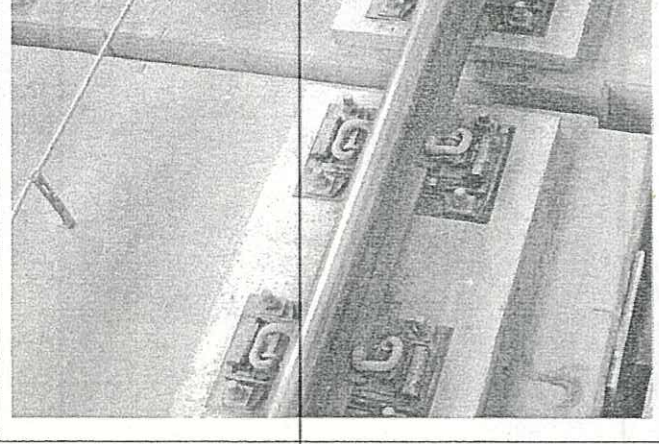


Photo 5.56b: Baseplates of Floating Slab at YUL

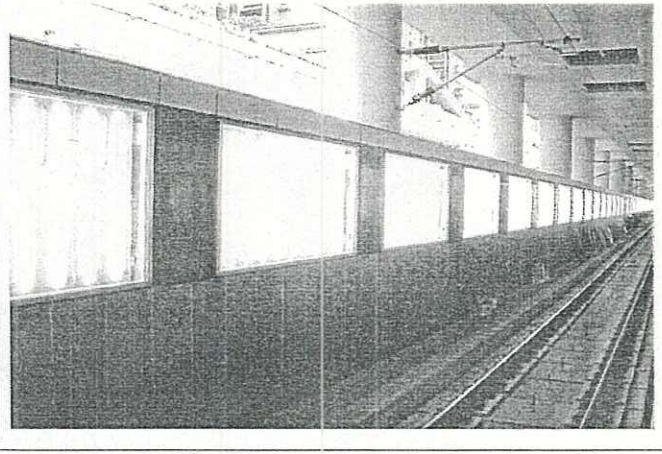


Photo 5.56c: Trackside Noise Barrier with Advertising Panel at YUL

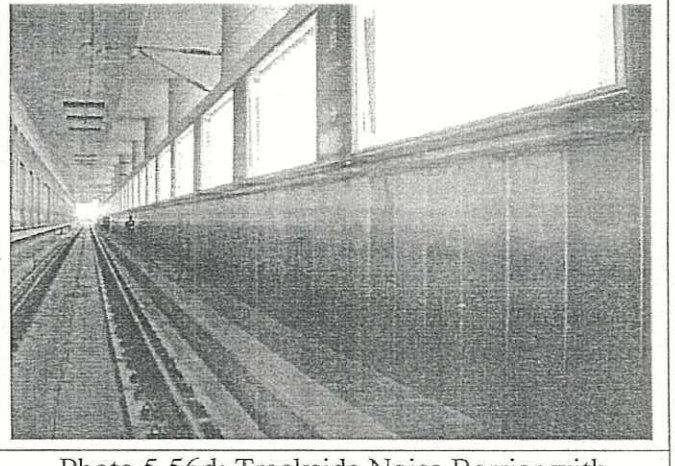


Photo 5.56d: Trackside Noise Barrier with Advertising Panel at YUL

Yuen Long Station

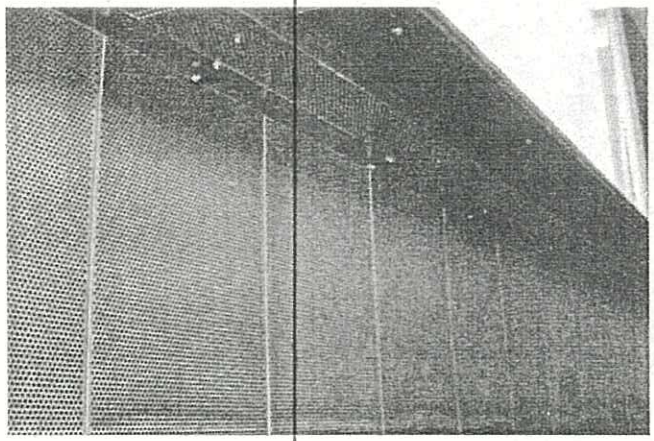


Photo 5.56e: All gap under the Advertising Panel was sealed

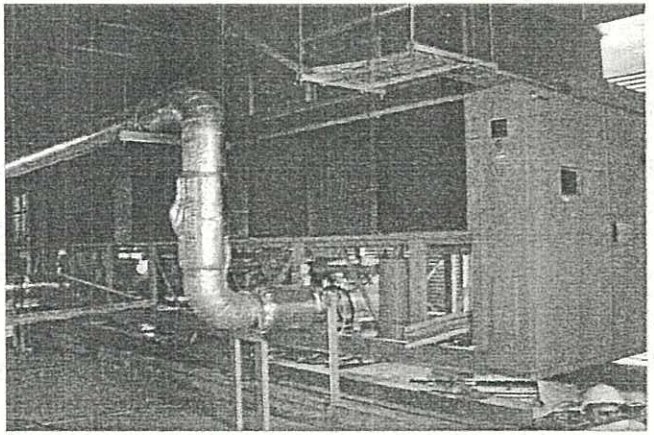


Photo 5.57: Chiller of YUL

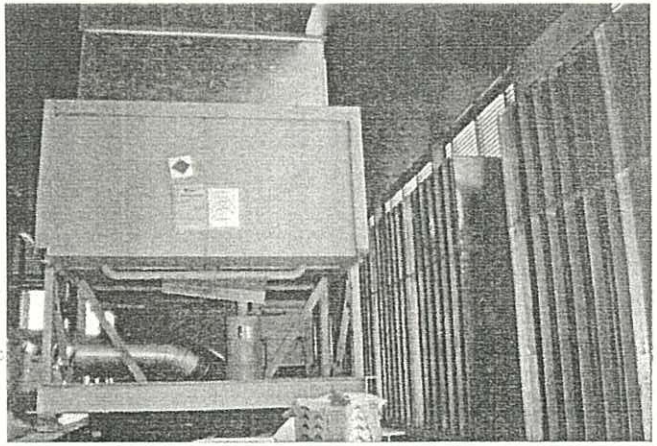


Photo 5.58: Noise Acoustic Louvers in YUL Chiller Plant Room

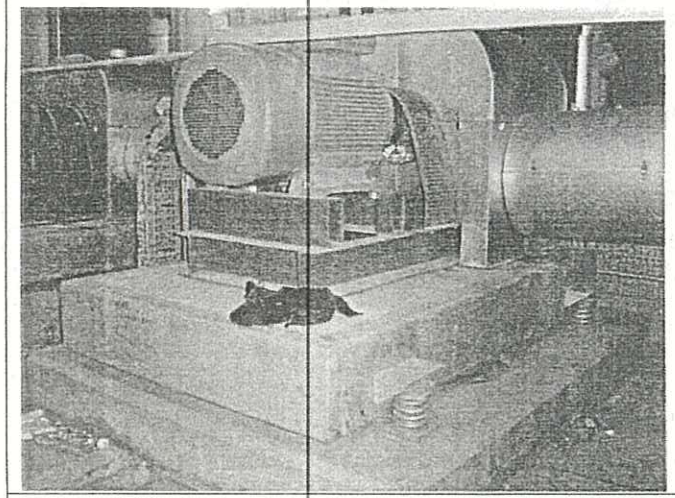


Photo 5.59: Vibration Absorption Spring of YUL Chiller Water Pump

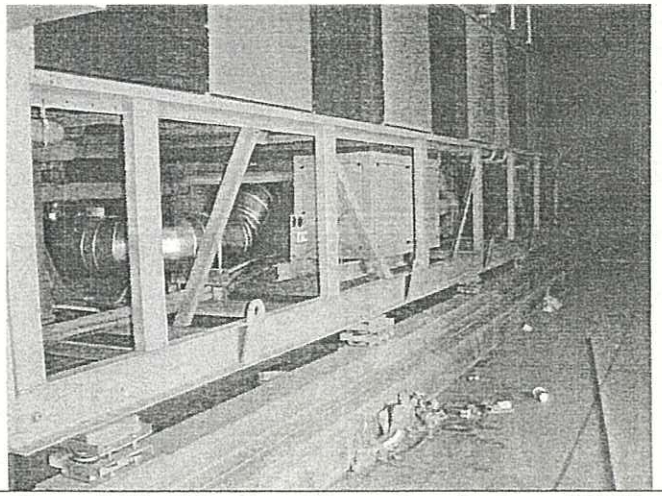


Photo 5.60: Vibration Absorption Spring of YUL Chillers

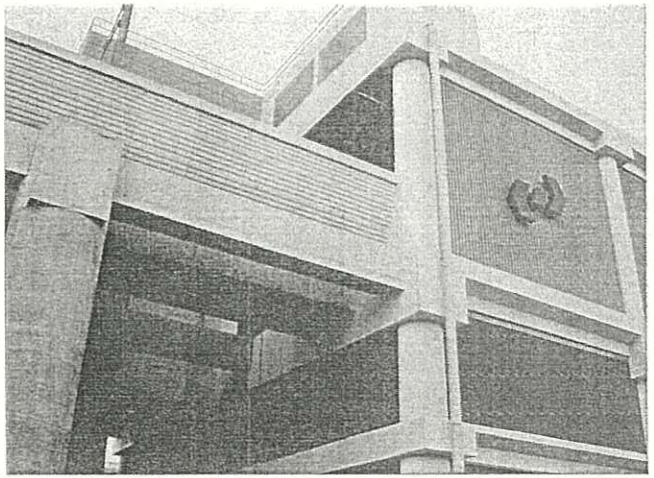


Photo 5.61 Ventilation Intake and Exhaust Louvers at YUL

Yuen Long Station

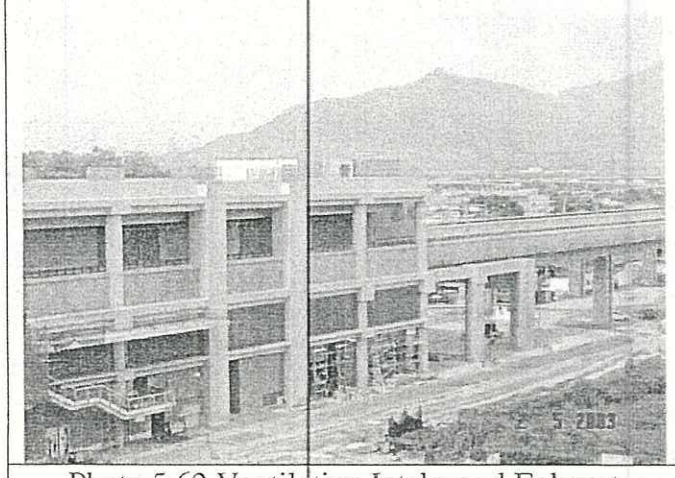


Photo 5.62 Ventilation Intake and Exhaust Louvers at YUL

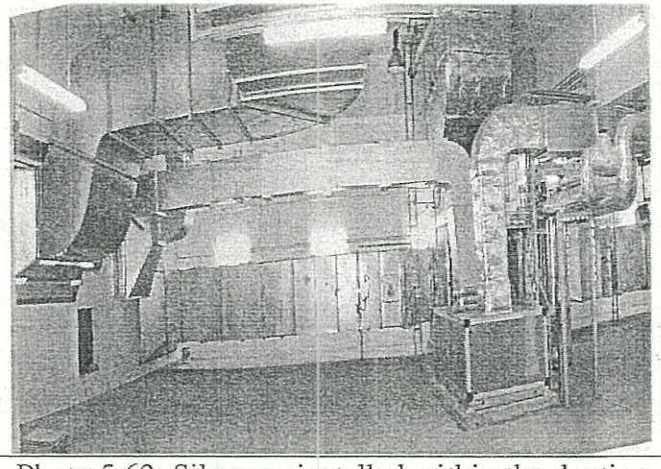


Photo 5.63: Silencers installed within the ducting of ECS at YUL

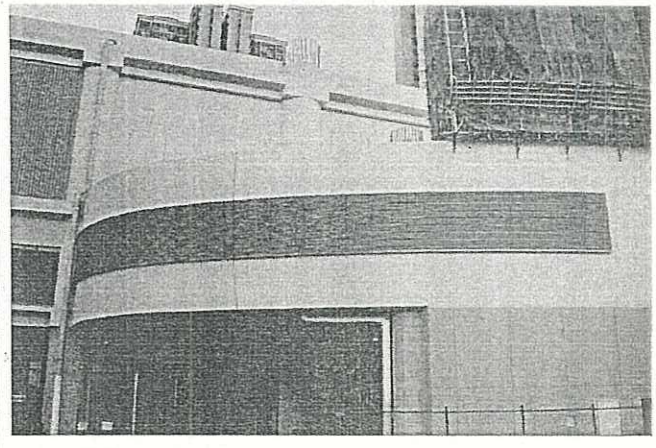


Photo 5.64: Ventilation Exhaust of the YUL Restaurant

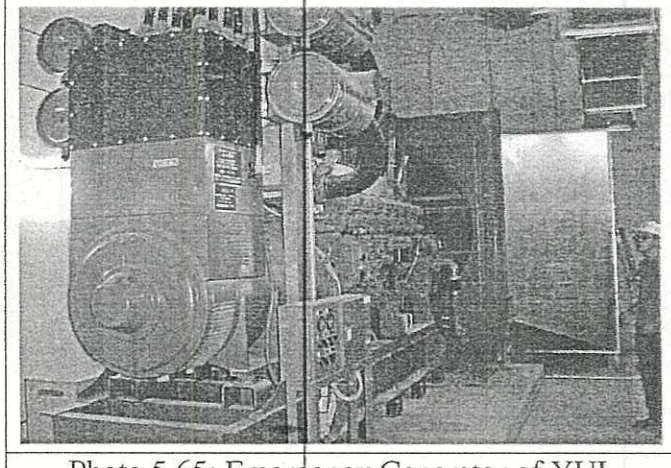


Photo 5.65: Emergency Generator of YUL

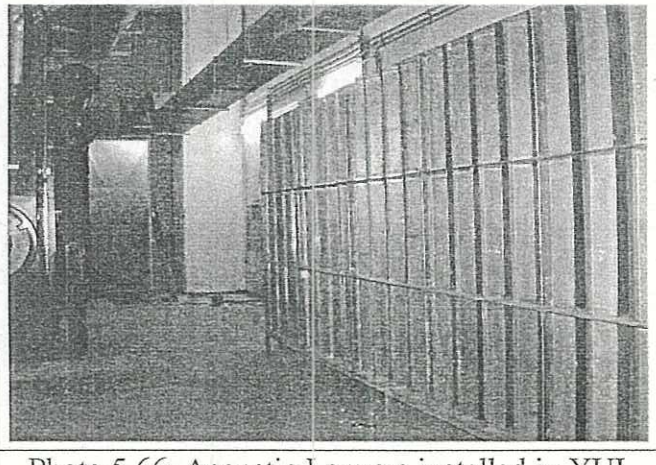


Photo 5.66: Acoustic Louvers installed in YUL Emergency Generator Rooms

Western Section – Railway and Fixed Plant Noise

Long Ping Station

Photo 5.67 Overview of Long Ping Station (LOP)

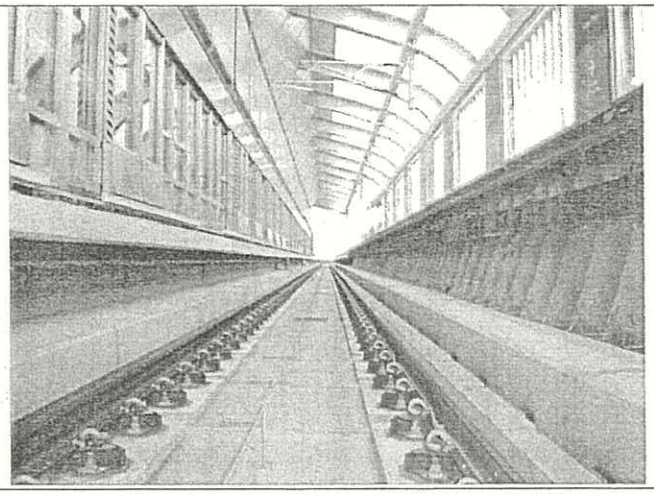


Photo 5.67a Floating Slab at LOP

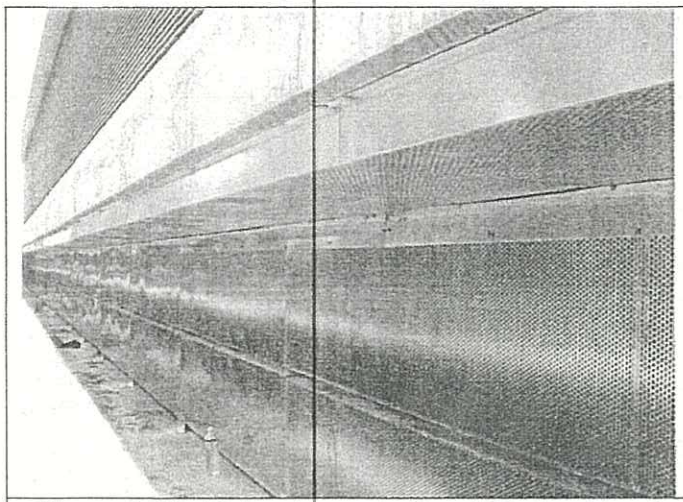


Photo 5.67b Noise Acoustic Panel Underside of Station Walkway at LOP

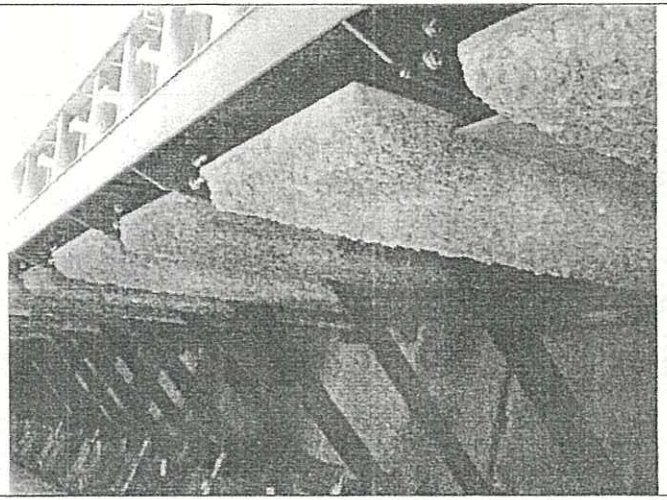


Photo 5.67c Acoustic panel at trackside walkway

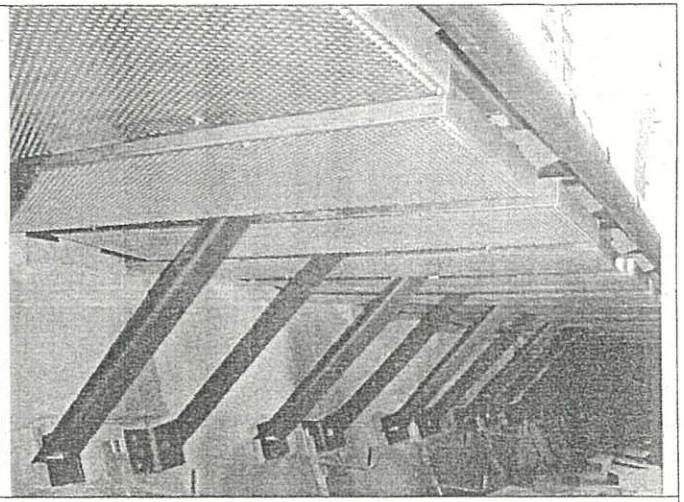


Photo 5.67d Acoustic Panels at trackside walkway

Long Ping Station

Photo 5.67e Noise Barriers installed above the Parapet Wall at LOP

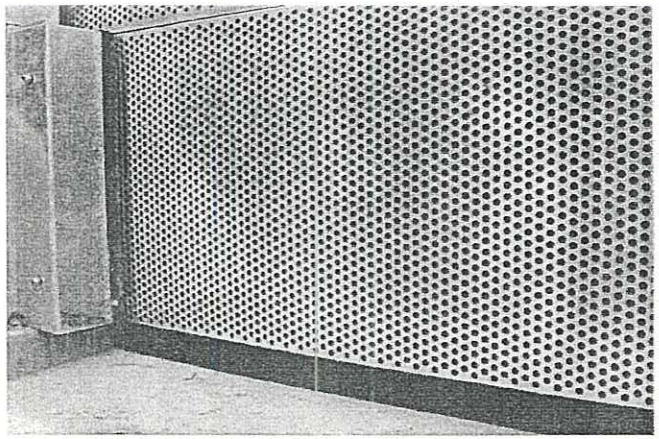


Photo 5.67f Noise Barriers installed above the Parapet Wall at LOP

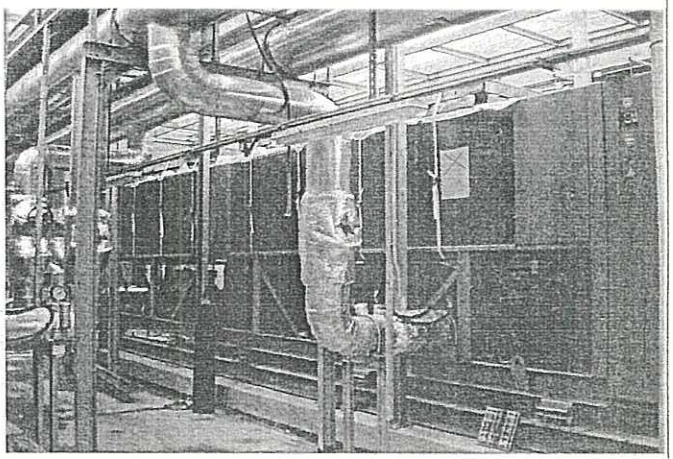


Photo 5.68: Chiller of LOP

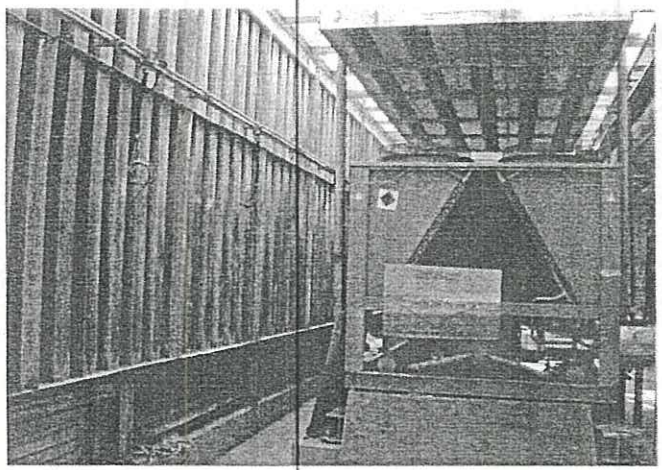


Photo 5.69: Noise Acoustic Louvers installed in LOP Chiller Plant Room

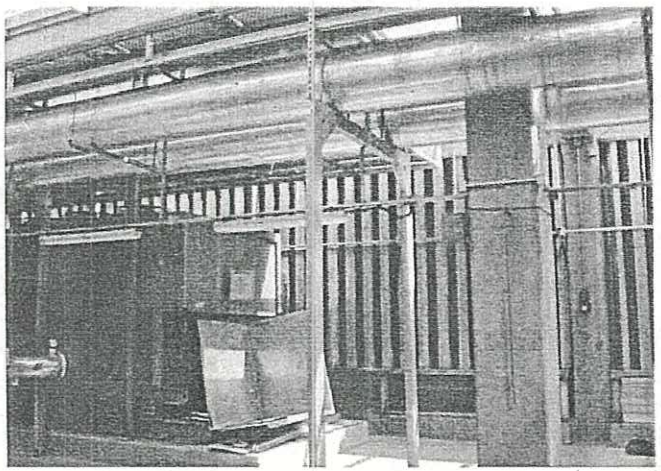


Photo 5.70: Noise Acoustic Louvers installed in LOP Chiller Plant Room

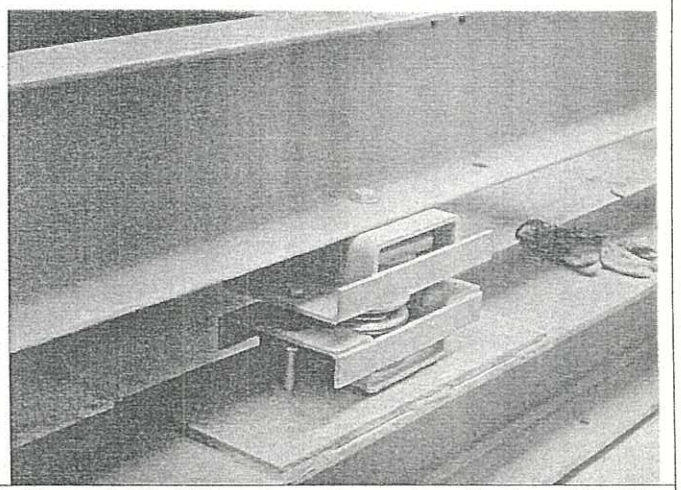


Photo 5.71: Vibration Absorption Spring of LOP Chillers

Long Ping Station

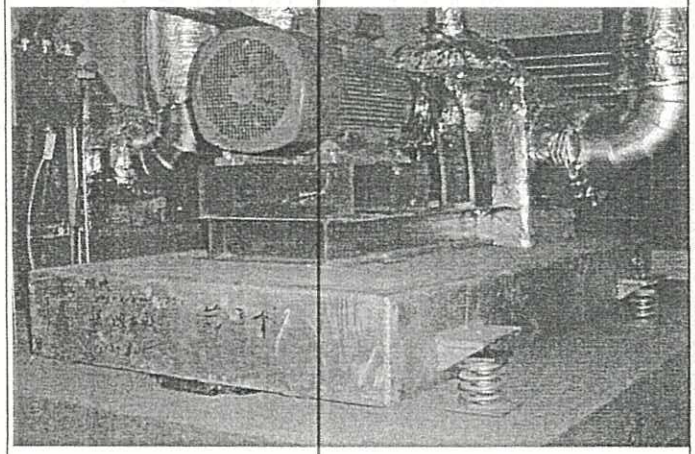


Photo 5.72: Vibration Absorption Spring of LOP Chiller Water Pump

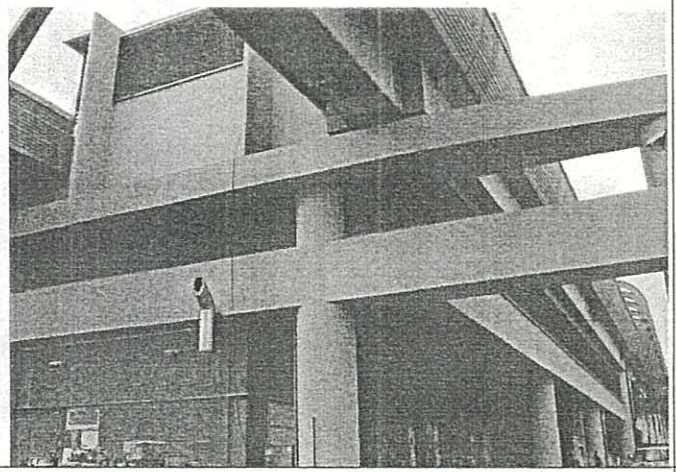


Photo 5.73 Ventilation Intake and Exhaust Louvers at LOP

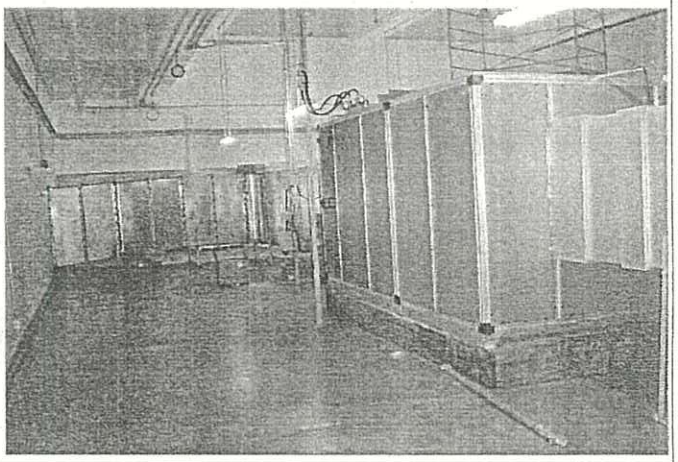


Photo 5.74: Silencers installed within the ducting of ECS at LOP

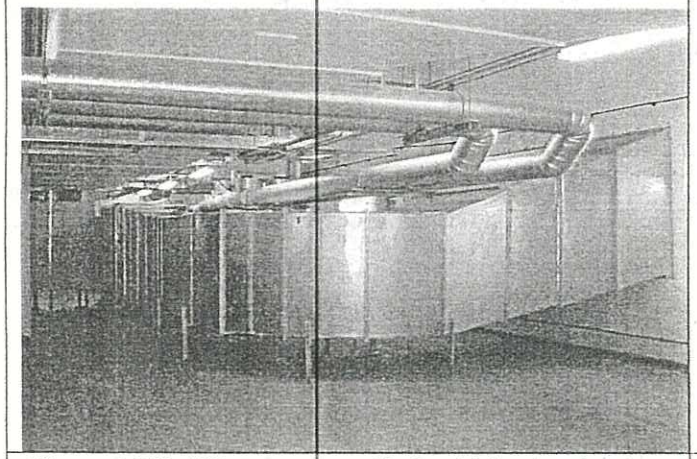


Photo 5.75: Silencers installed within the ducting of ECS at LOP

Western Section – Railway and Fixed Plant Noise

Tin Shui Wai Station

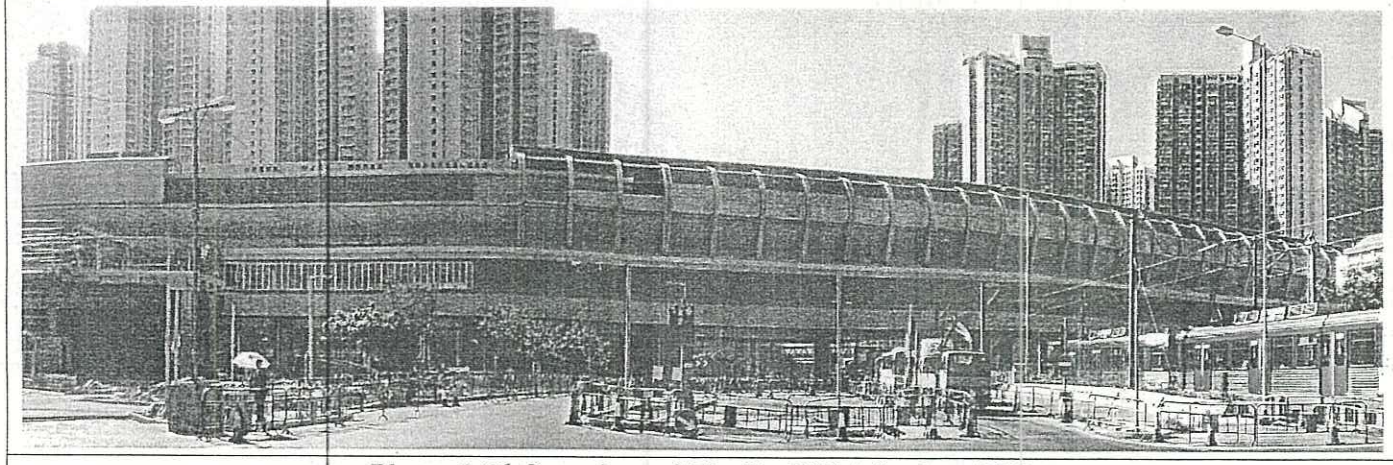


Photo 5.76 Overview of Tin Shui Wai Station (TIS)

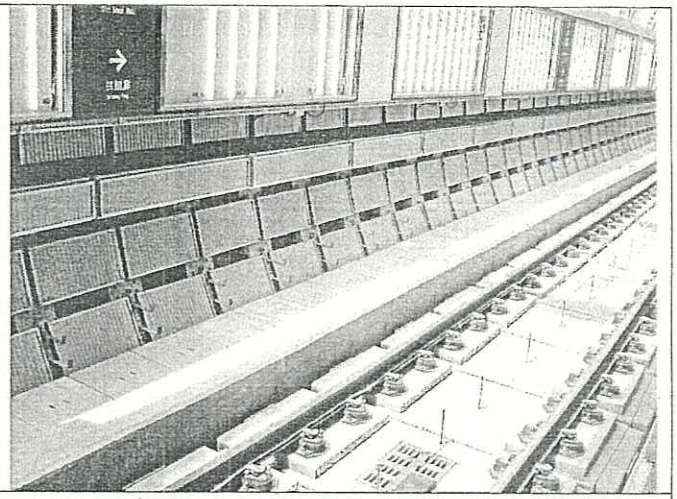


Photo 5.76a Floating Slab and Parapet Wall at TIS

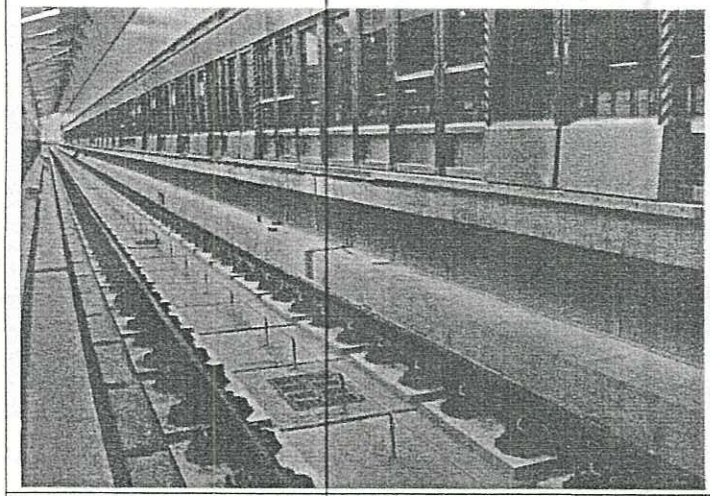


Photo 5.76b Floating Slab at Trackside Station Platform

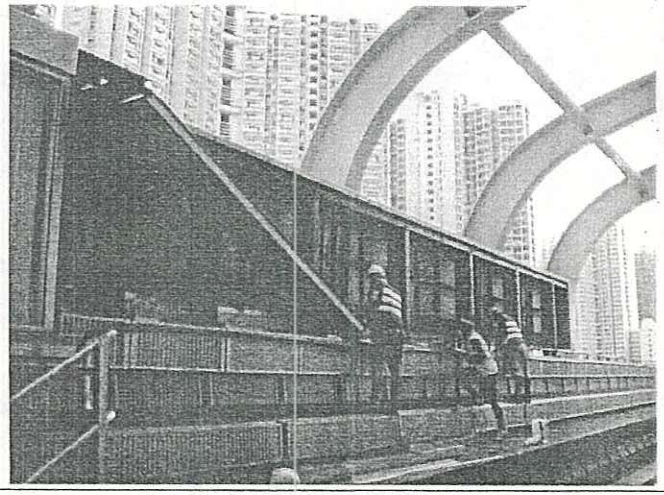


Photo 5.76c Advertising Panel and Wind Shield at TIS

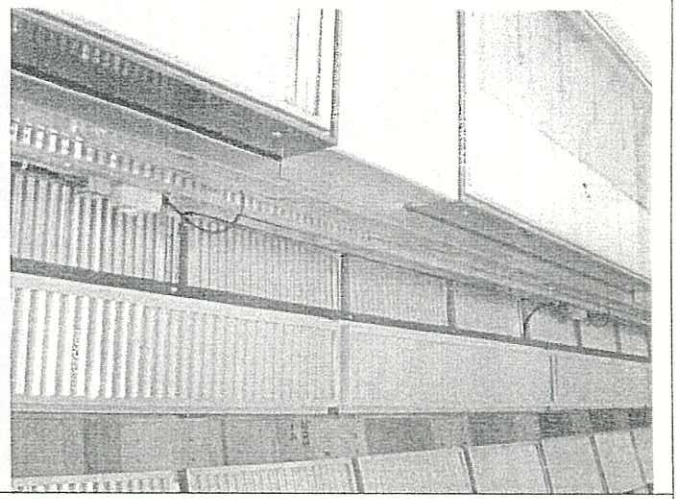


Photo 5.76d Gap under the Advertising Panels was sealed

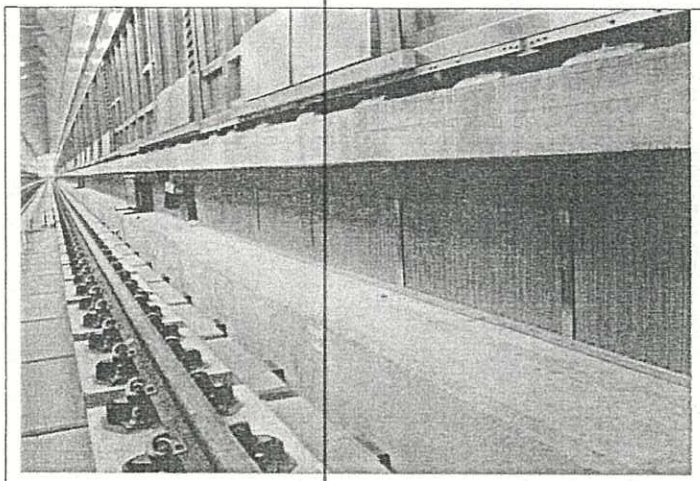


Photo 5.76e Acoustic Panels Installed Underside of the Station Platform at TIS

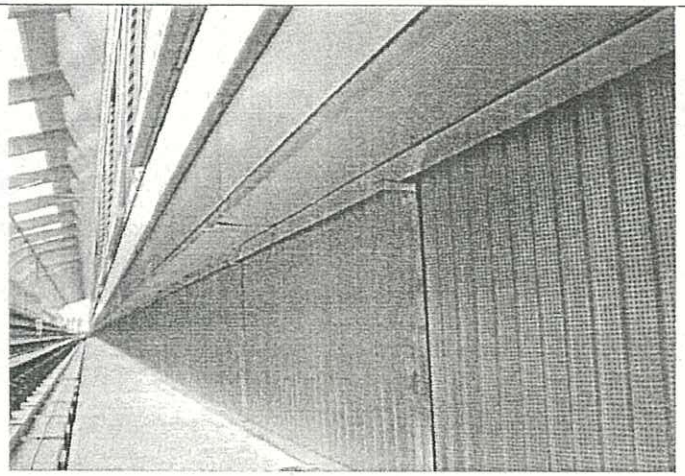


Photo 5.76f Acoustic Panels Installed Underside of the Station Platform at TIS

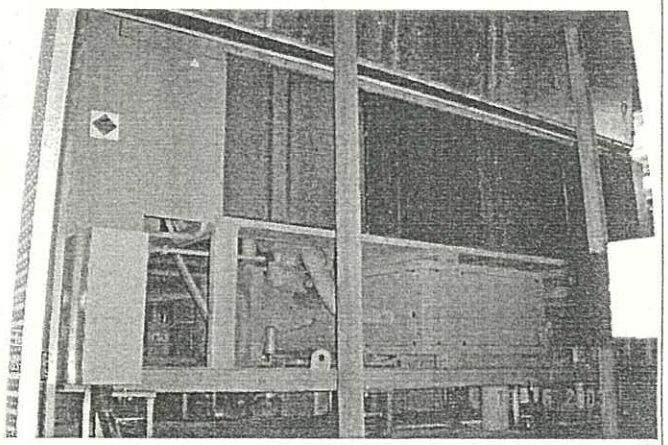


Photo 5.77 Chiller of TIS

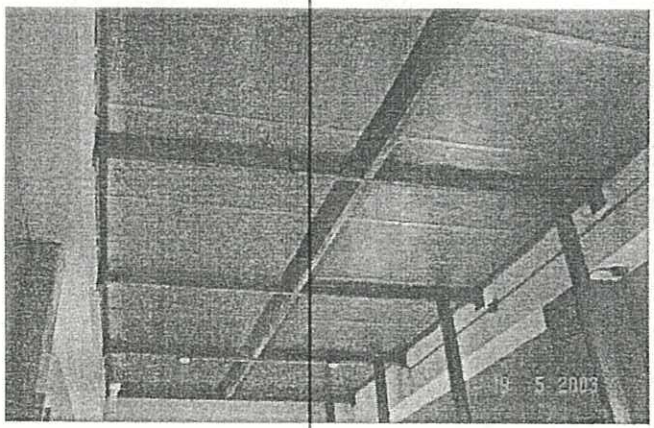


Photo 5.78: Noise Acoustic Panel Installed on Ceiling in TIS Chiller Plant Room

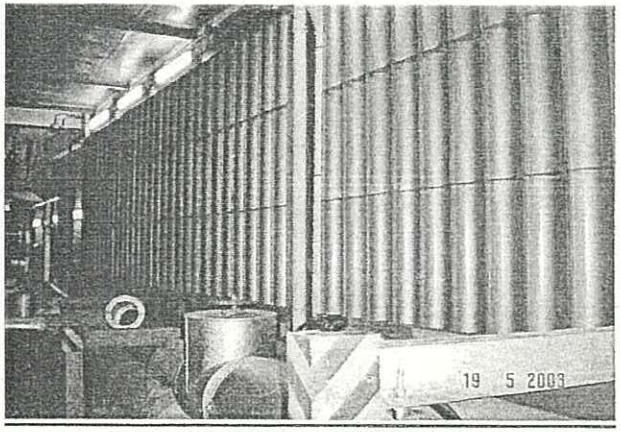


Photo 5.79: Acoustic Louvers Installed in TIS Chiller Plant Room

Photo 5.80: Acoustic Panel Installed on the Top of TIS Chillers

Tin Shui Wai Station

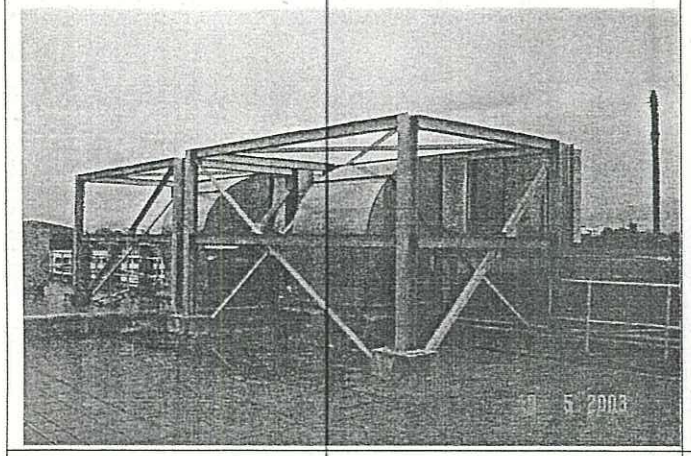


Photo 5.81: Roof Floor Exhaust Louver of TIS

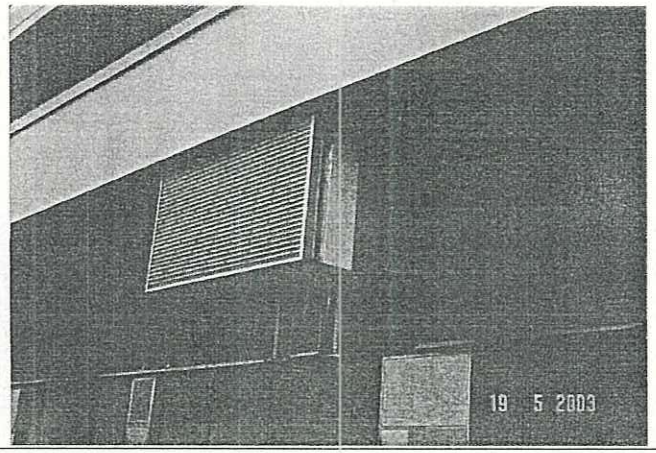


Photo 5.82: Ground floor Exhaust Louver of TIS

Photo 5.83: Intake Air Louver of ECS at TIS

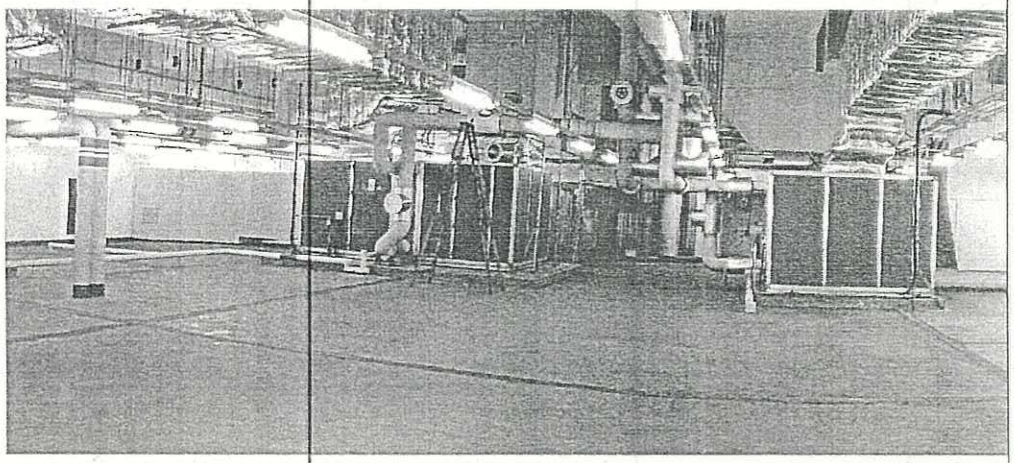


Photo 5.84: Environmental Control System (ECS) of TIS

Photo 5.85: Fresh Air Supply Duct with Silencer to TIS

Tin Shui Wai Station

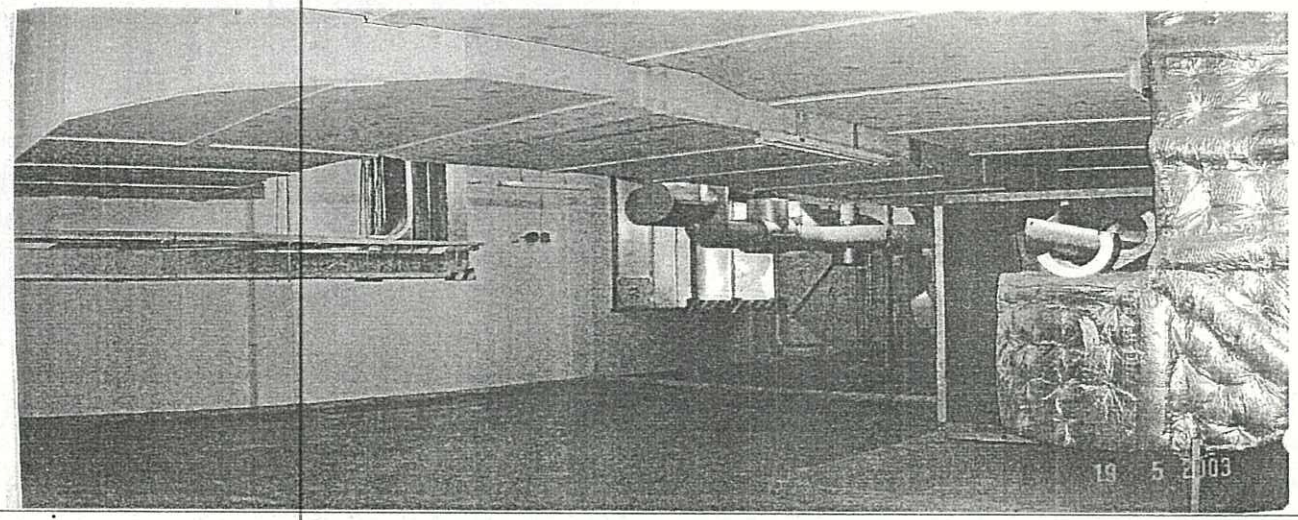


Photo 5.86: Fresh Air Supply Duct with Silencer to TIS

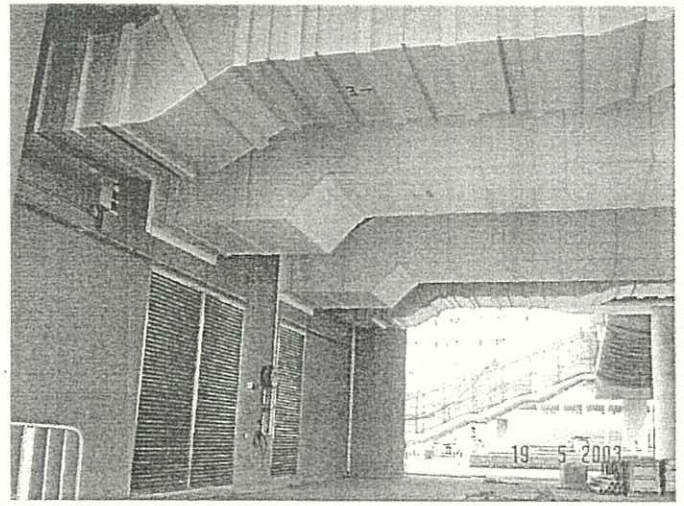


Photo 5.87: Fresh Air Supply Duct with Silencer to TIS

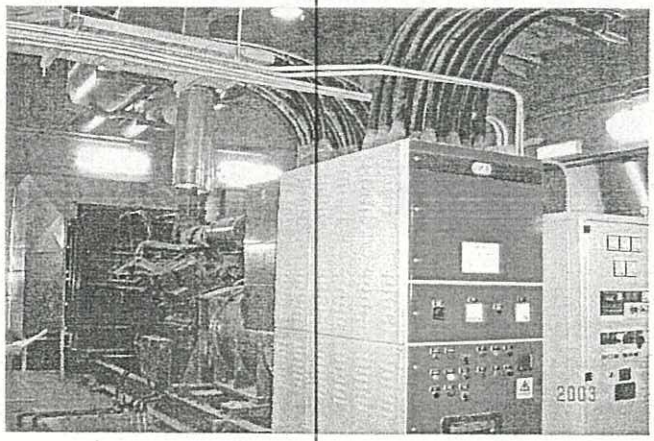


Photo 5.88: Silencers Installed Within the Emergency Generator Room at TIS

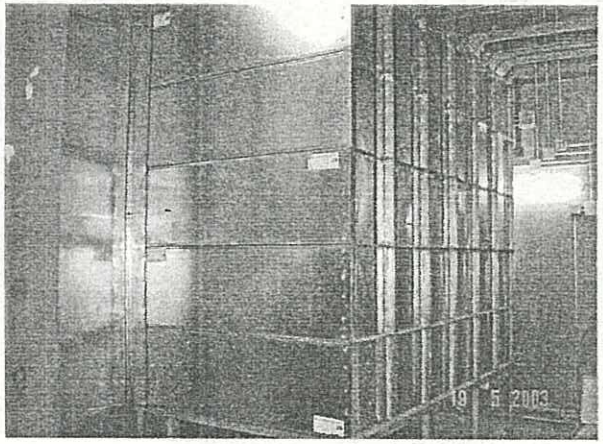


Photo 5.89: Acoustic Louver Installed at TIS Emergency Generator Room

Photo 5.90: Concrete Wall of TIS Feeder Substation

Tin Shui Wai Station

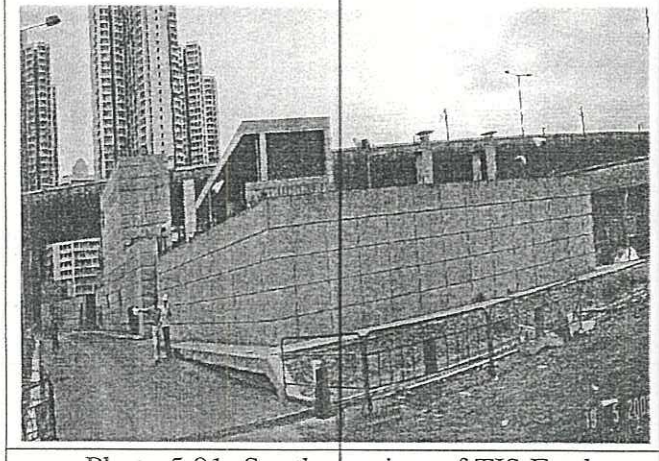


Photo 5.91: Southern view of TIS Feeder Substation

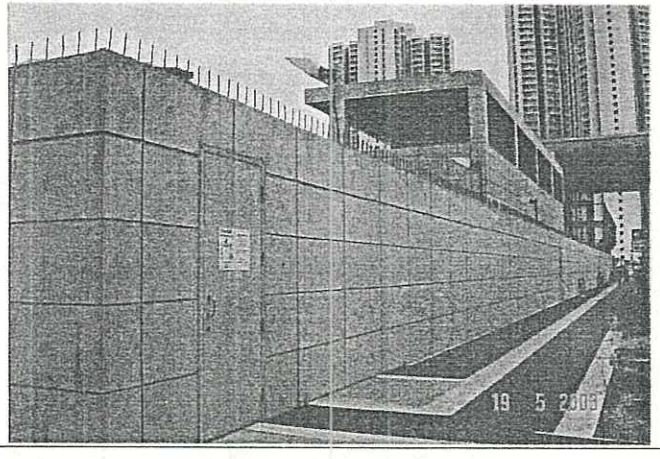


Photo 5.92: Eastern view of TIS Feeder Substation

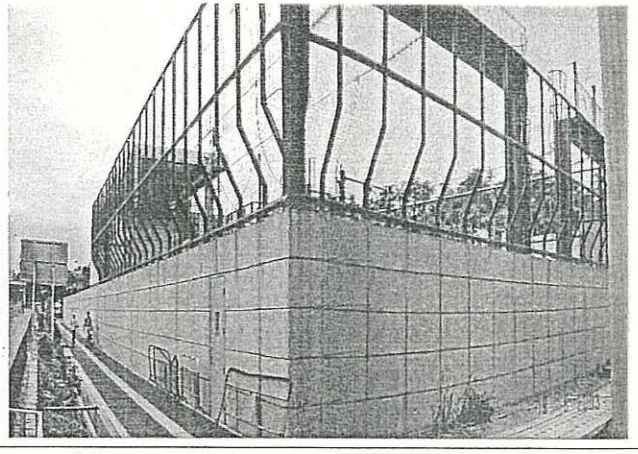


Photo 5.93: Northern view of TIS Feeder Substation

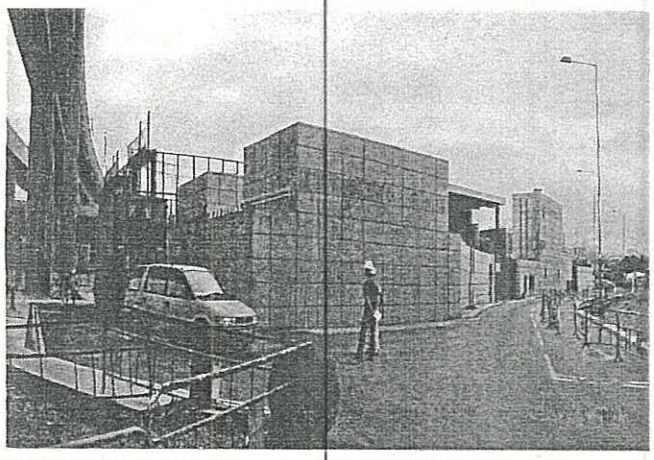


Photo 5.94: Western view of TIS Feeder Substation

Western Section – Railway and Fixed Plant Noise

Siu Hong Station

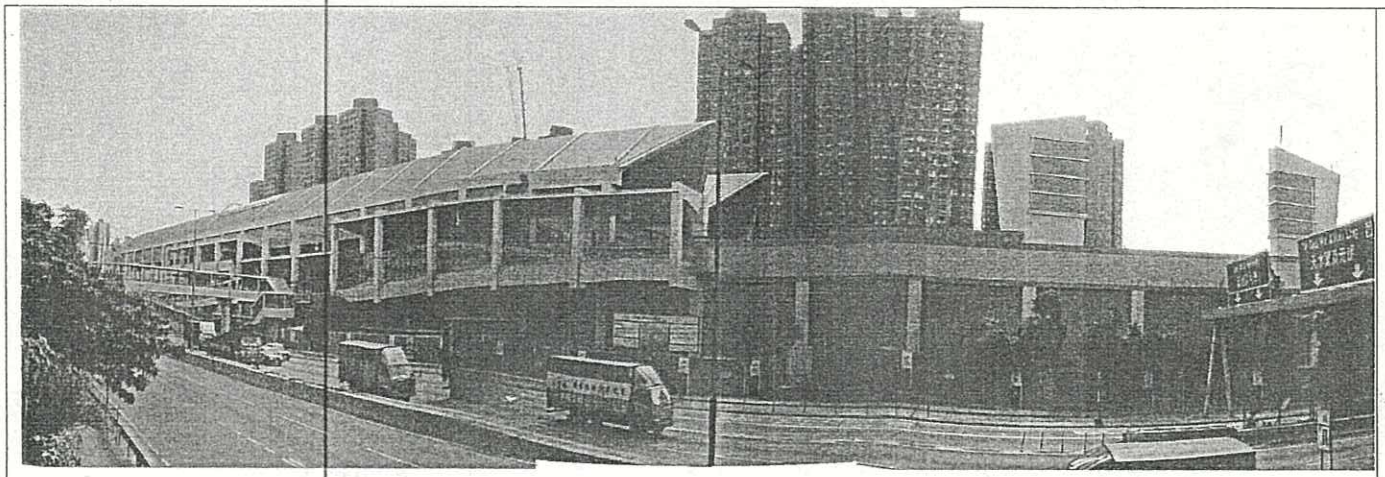


Photo 5.95 Overview of Siu Hong Station (SIH)

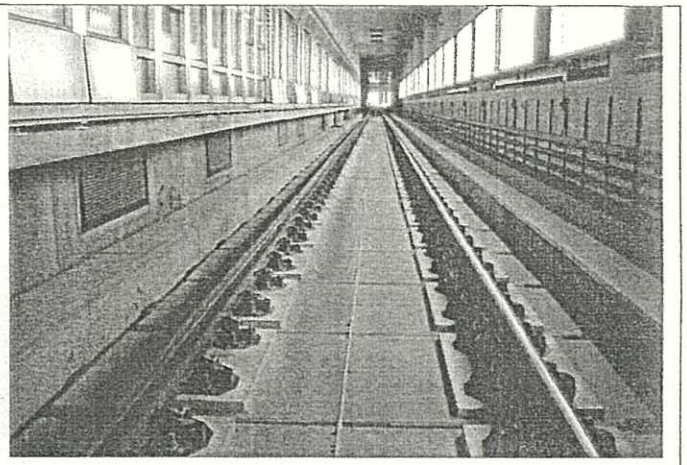


Photo 5.96 Floating Slab at SIH Station Trackside

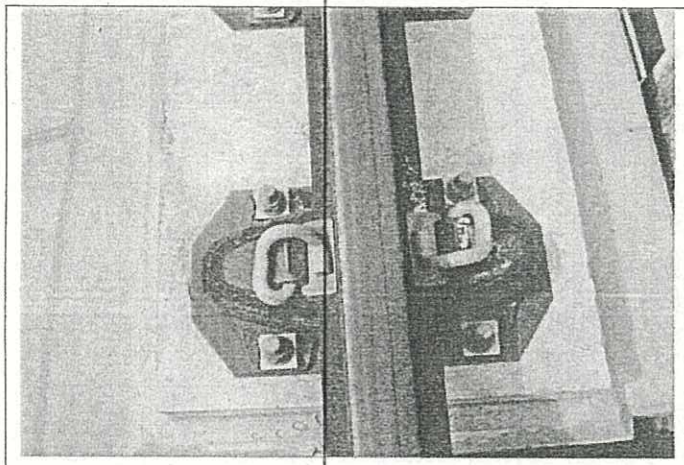


Photo 5.96a Baseplate of Floating Slab at SIH

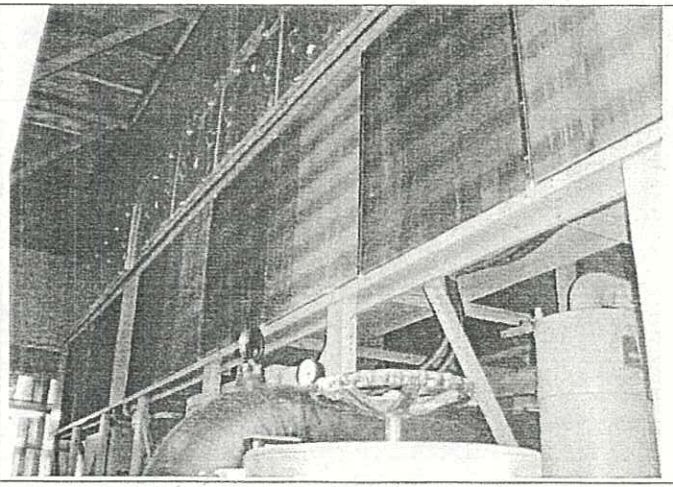


Photo 5.97 Noise Acoustic Panel installed on Ceiling in SIH Chiller Plant Room

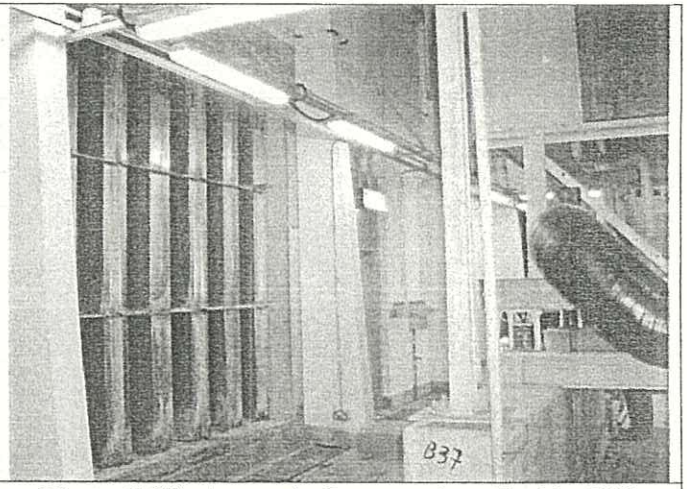


Photo 5.98: Acoustic Louvers installed in SIH Chiller Plant Room

Siu Hong Station

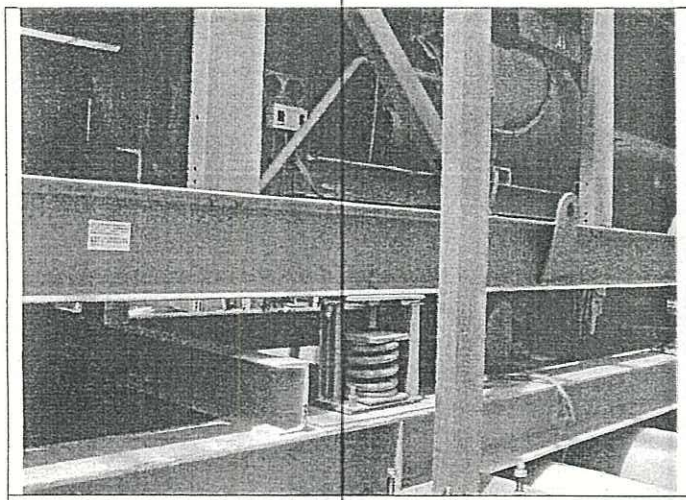


Photo 5.99: Vibration Absorption Spring of SIH Chillers

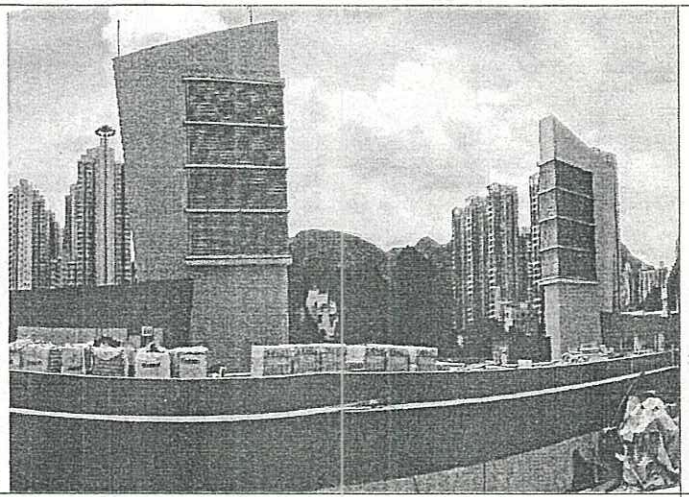


Photo 5.100: Ventilation Intake and Exhaust Shaft at Northern SIH

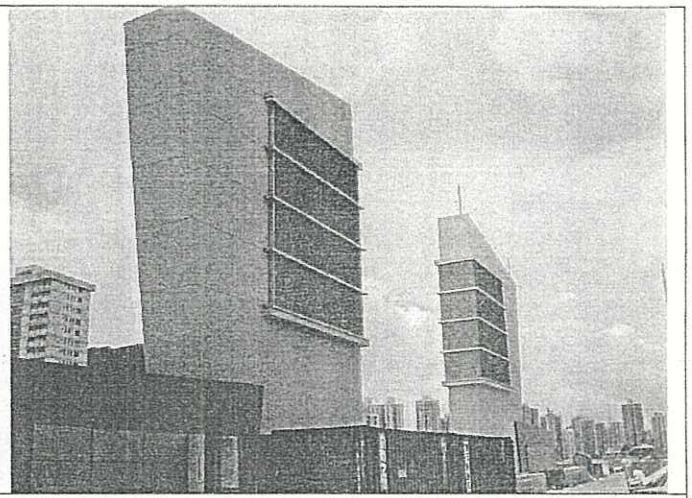


Photo 5.101: Ventilation Intake and Exhaust Shaft at Southern SIH

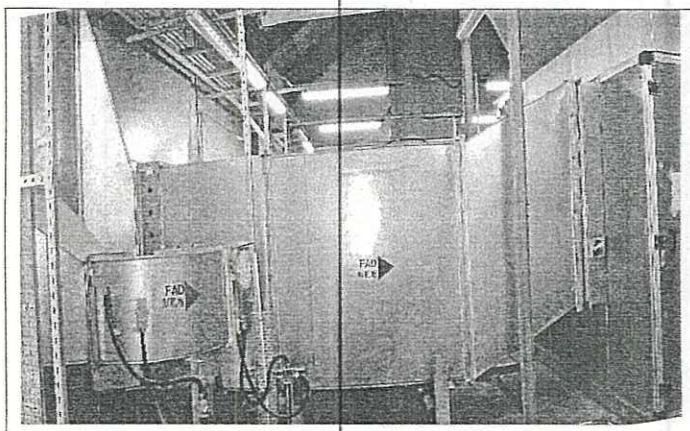


Photo 5.102: Silencers installed within the ducting of ECS at SIH

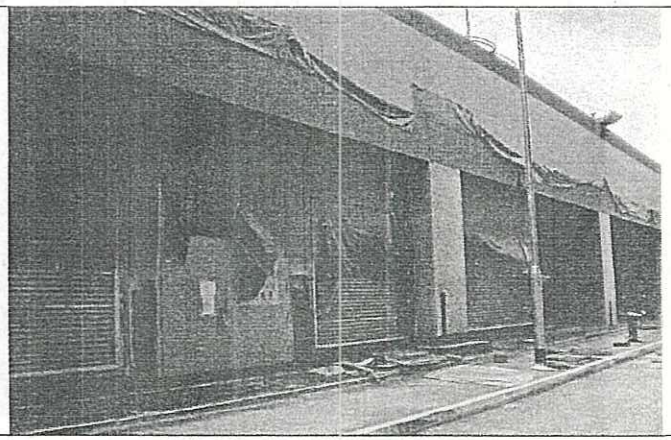


Photo 5.103: Acoustic Louver Installed at SIH Emergency Generator Room

Western Section – Railway and Fixed Plant Noise

Tuen Mun Station

Photo 5.104 Overview of Tuen Mun Station (TUM)

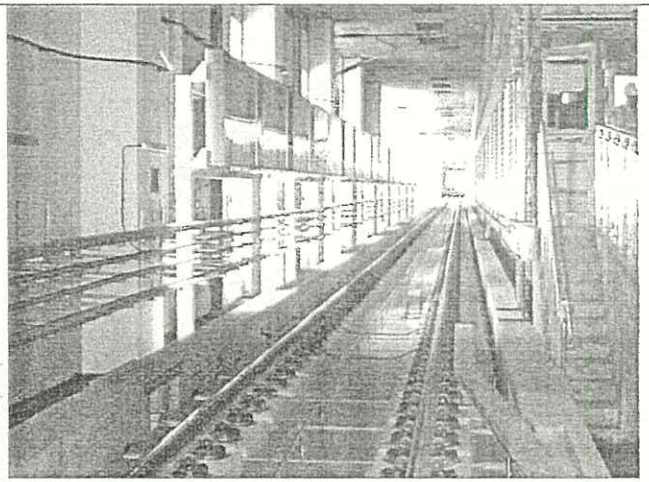


Photo 5.104a Floating Slab at TUM Trackside

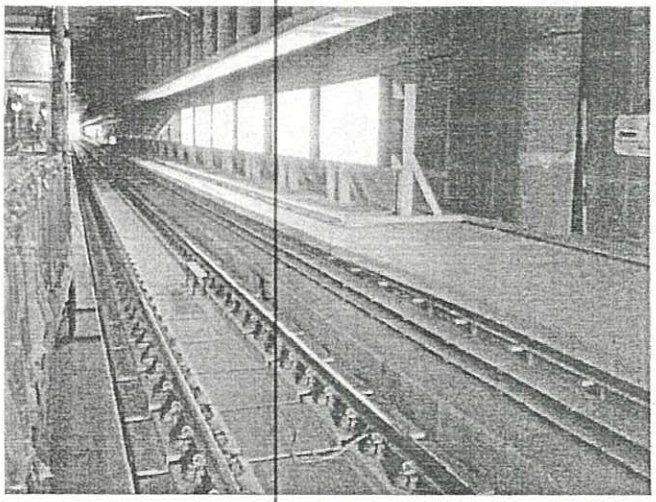


Photo 5.104b Floating Slab at TUM Trackside

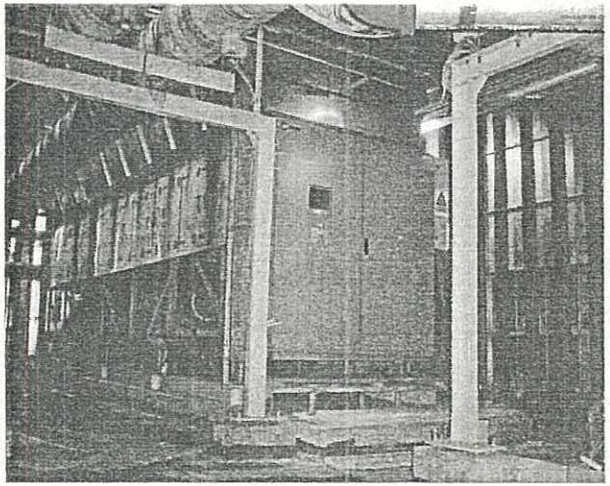


Photo 5.105 Chiller of TUM

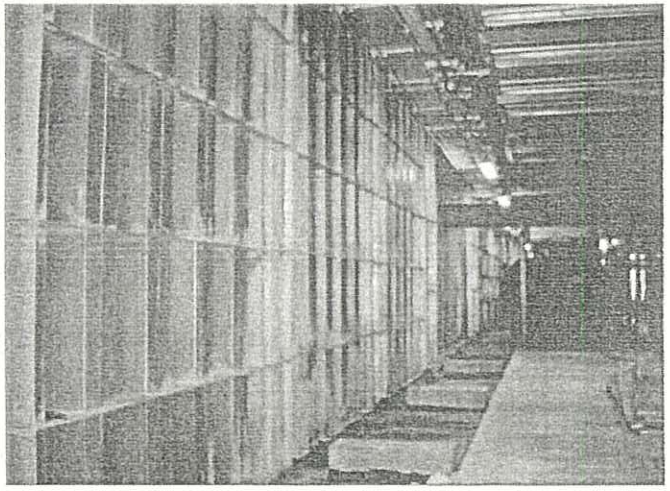


Photo 5.106: Noise Acoustic Louvers installed in TUM Chiller Plant Room

Tuen Mun Station

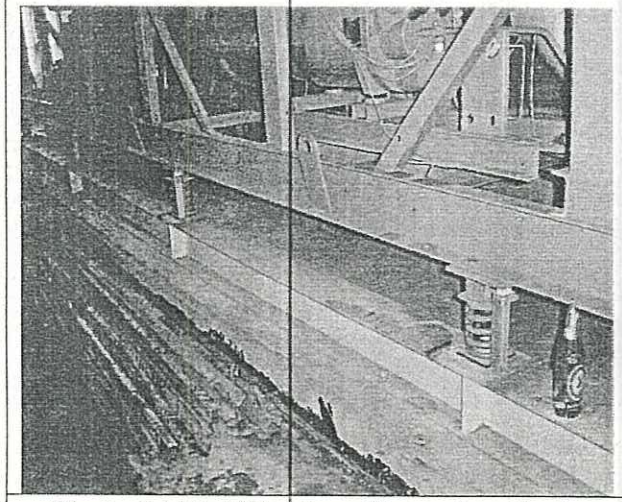


Photo 5.107: Vibration Absorption Spring of TUM Chillers

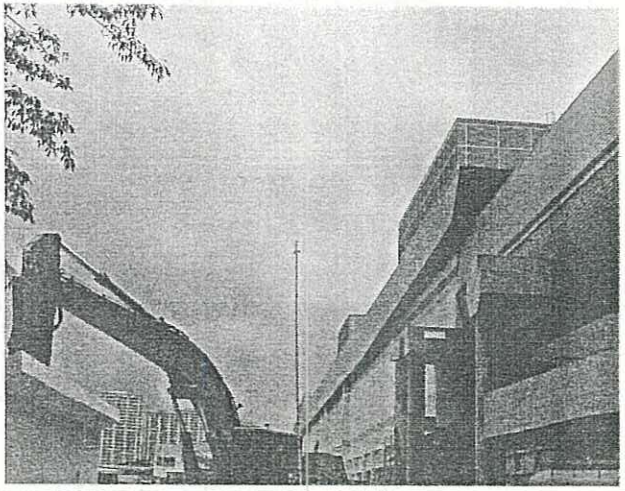


Photo 5.108: Ventilation Intake and Exhaust Louvers on TOP of TUM Station

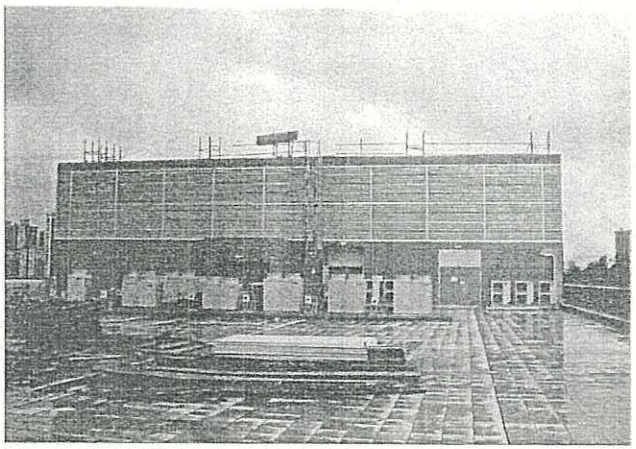


Photo 5.109: Ventilation Intake and Exhaust Louvers at TUM

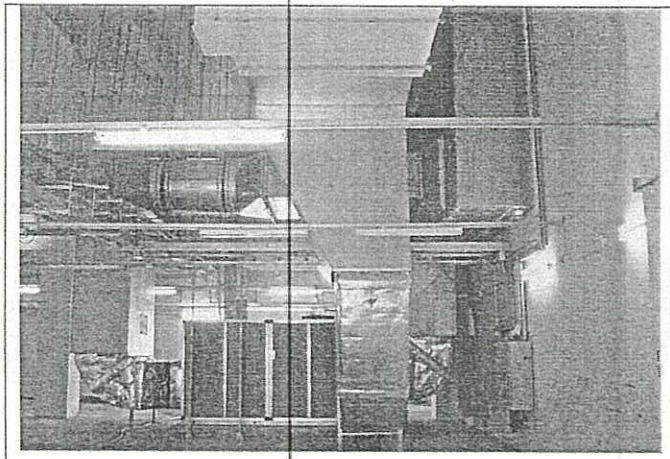


Photo 5.110: Silencers installed within the ducting of ECS at TUM

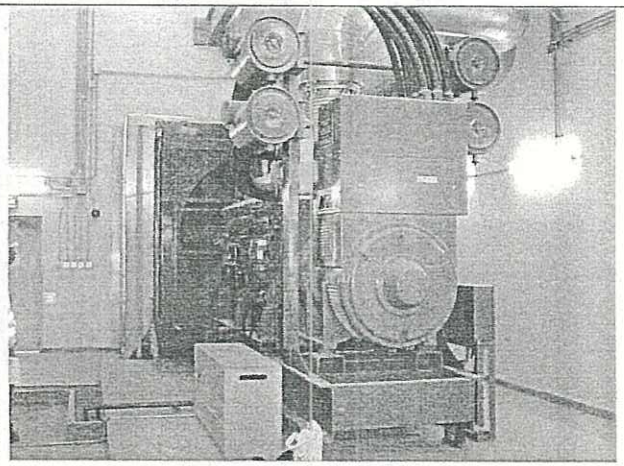


Photo 5.111: Emergency Generator of TUM

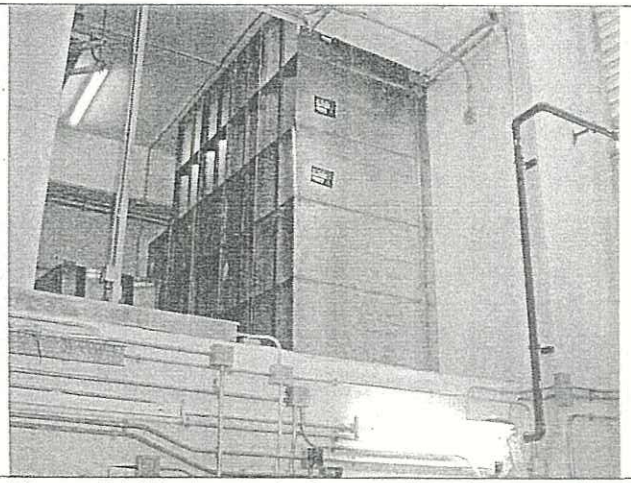


Photo 5.112: Acoustic Louver Installed at TUM Emergency Generator Room

Western Section – Landscape

Viaduct Section between Yuen Long and Tuen Mun

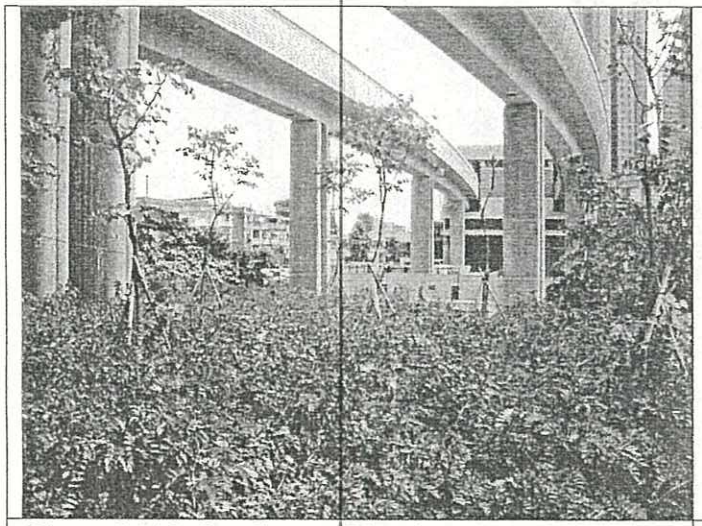


Photo 5.113: Landscape Planting at Nam Pin Wai (Piers 401-405)

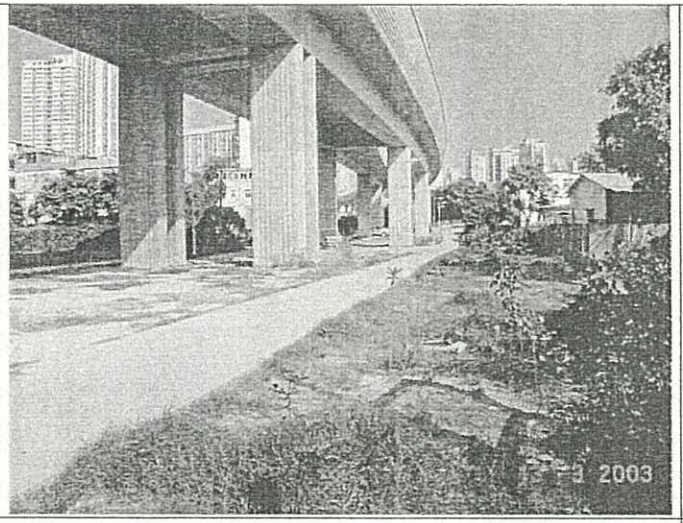


Photo 5.114: Landscape Planting at Fung Chi Tsuen (Piers 607-614)

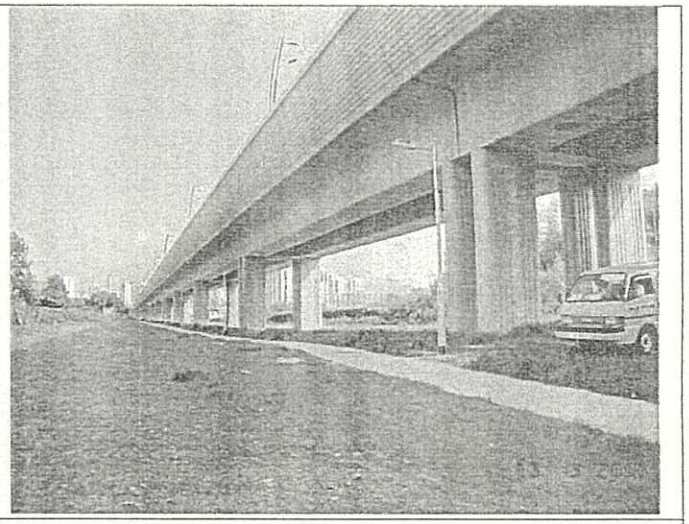


Photo 5.115: Landscape Planting at Wing Ning Tsuen (Piers 622-628)

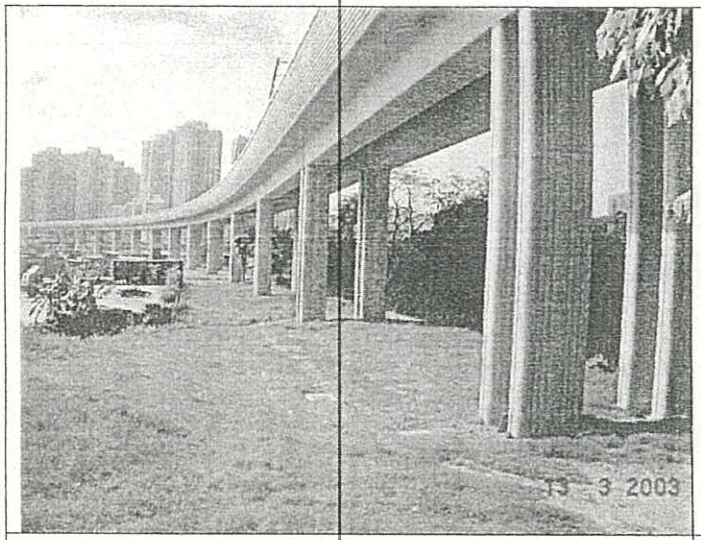


Photo 5.116: Landscape Planting at Ha Mei San Tsuen (Piers 630-636)

Photo 5.117: Landscape Planting at EVA23

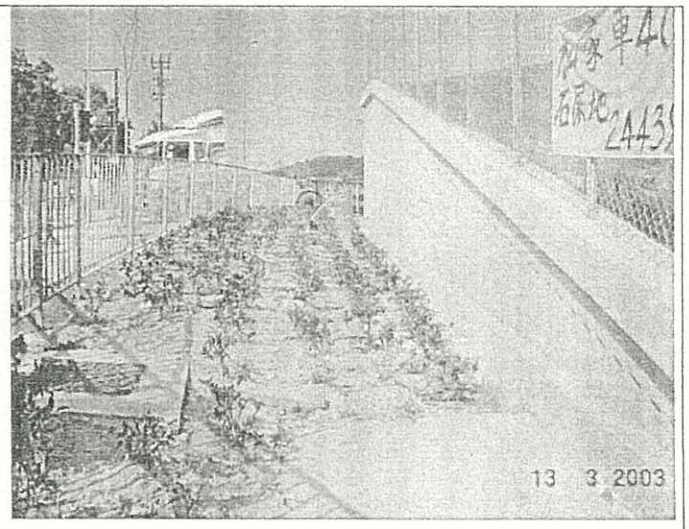


Photo 5.118: Landscape Planting at EVA23

Western Section – Landscape

Viaduct Section between Yuen Long and Tuen Mun

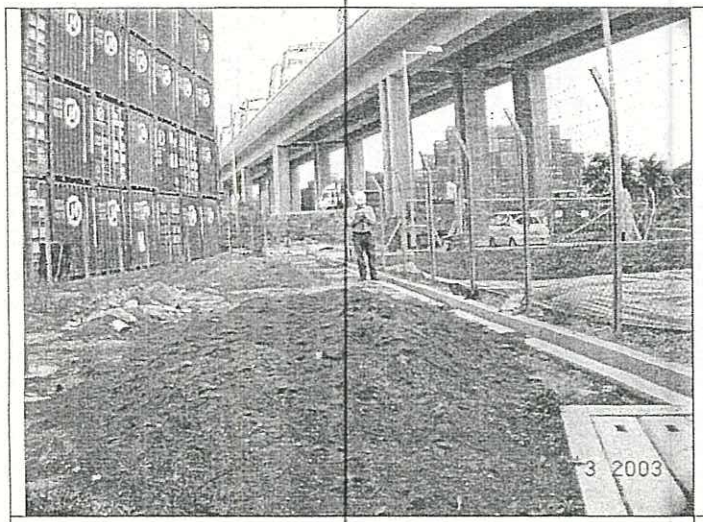


Photo 5.119: Ongoing Landscaping Works at EVA24

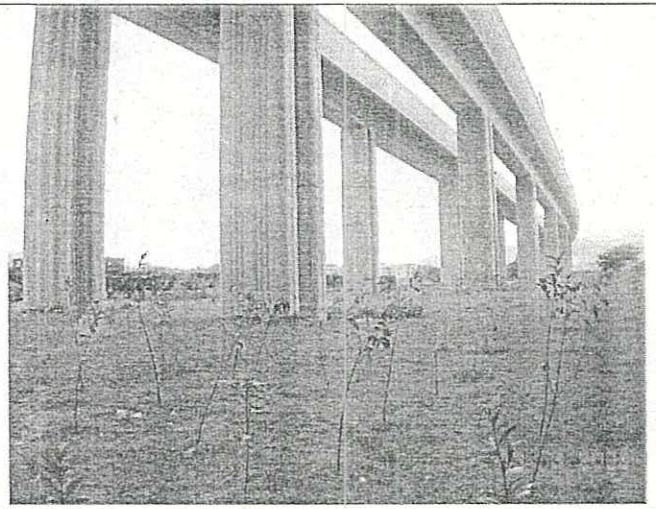


Photo 5.120: Landscape Planting between Tin Shui Wai & Shek Po Tsuen (Piers 826-826)

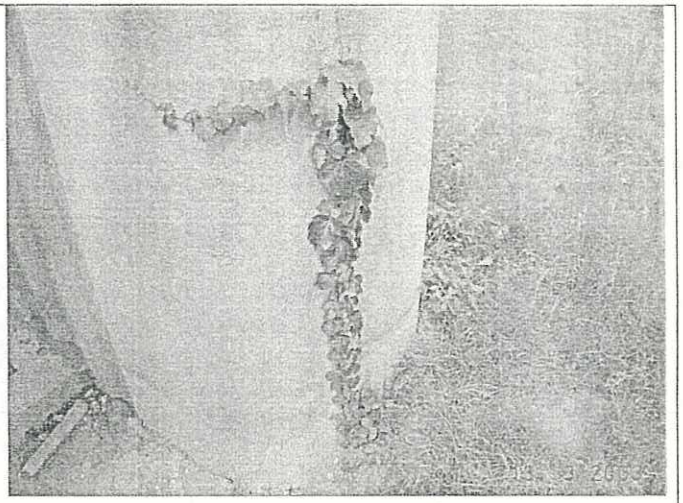


Photo 5.121: Typical Native Climber Planting on Viaduct Column

Photo 5.122: Typical Native Shrub Mix

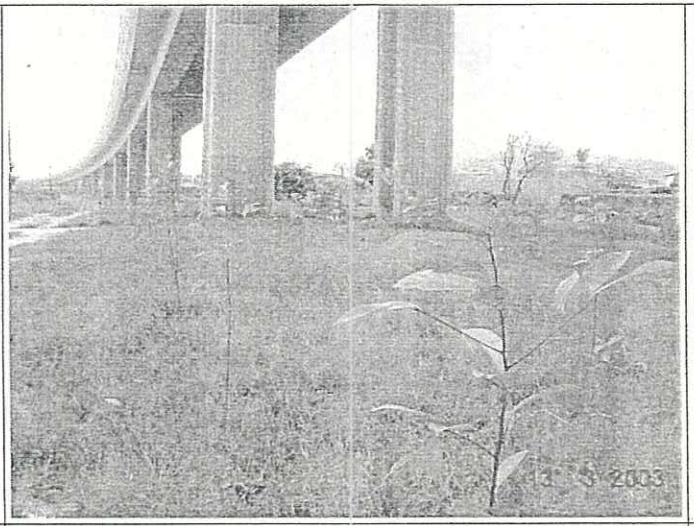


Photo 5.123: Typical Native Whip Mix

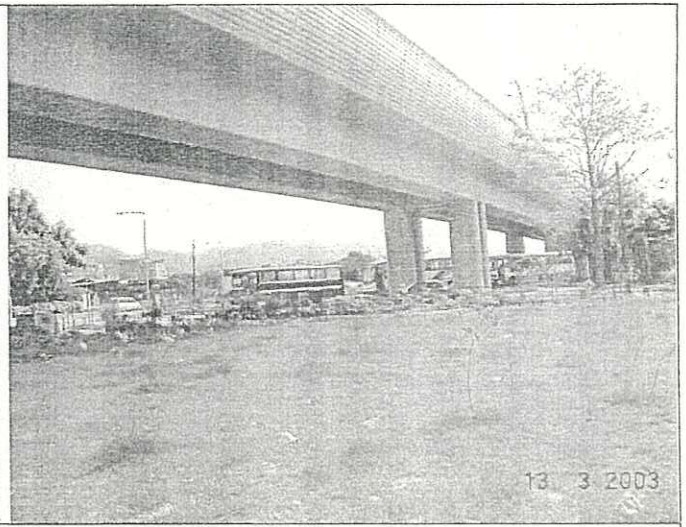


Photo 5.124: Landscape Planting at Tin Sum Tsuen (Piers 848-852)

Western Section – Landscape

Viaduct Section between Yuen Long and Tuen Mun

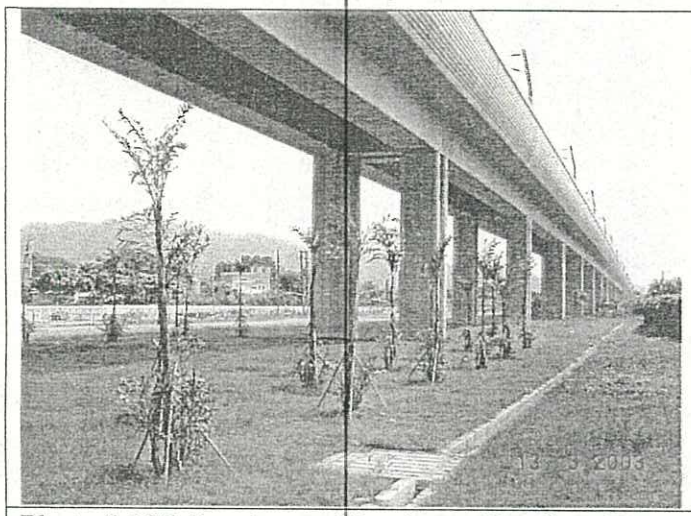


Photo 5.125: Landscape Planting at Tin Sum Tsuen (Piers 1-6)

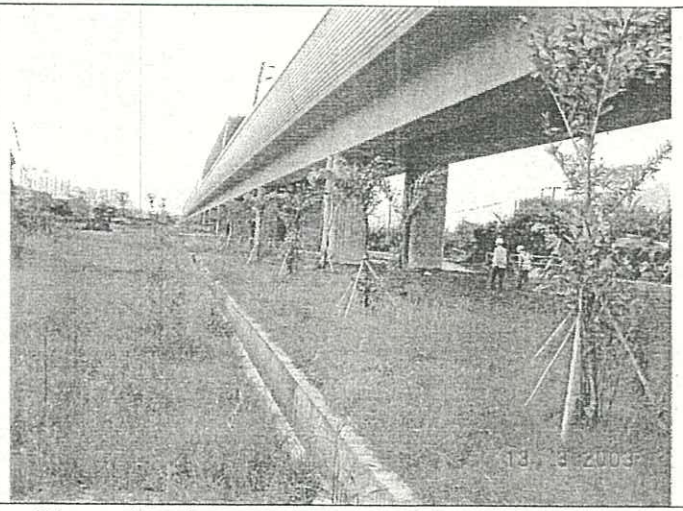


Photo 5.126: Landscape Planting at Yick Yuen (Piers 22-28)

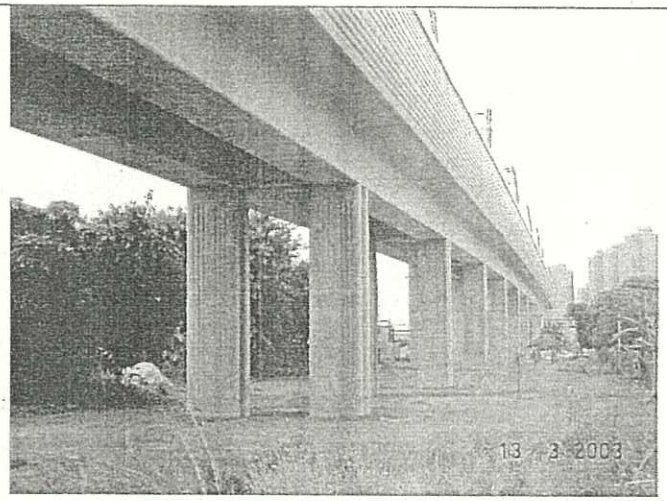


Photo 5.127: Landscape Planting near Tsing Chuen Wai (Piers 40-46)

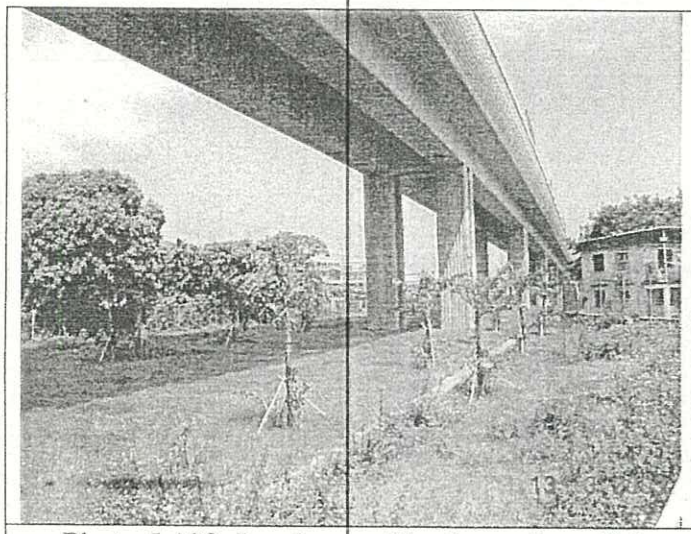


Photo 5.128: Landscape Planting at Lam Tei (Piers 49-52)

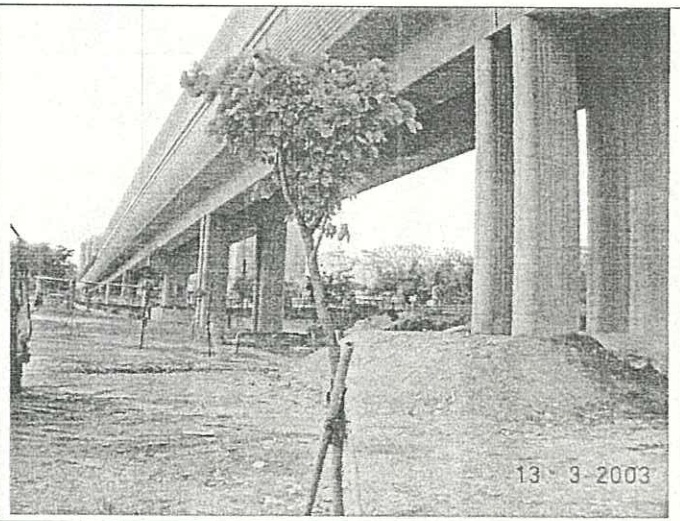


Photo 5.129: Landscape Planting at Lam Tei (Piers 67-70)

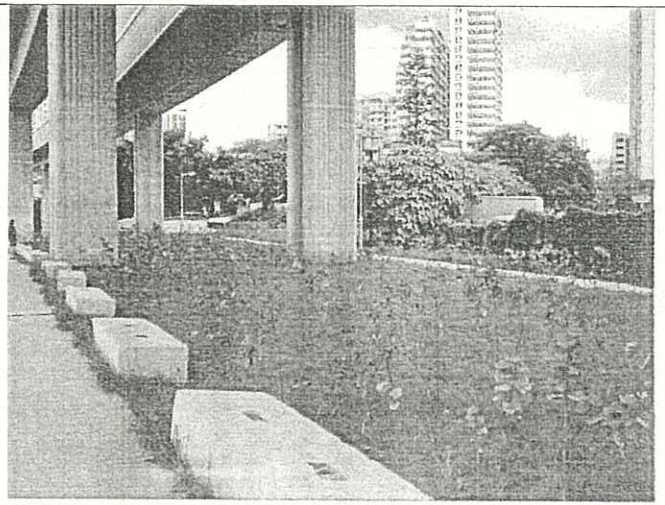


Photo 5.130: Completion of Seasonal Landscaping works at Yuen Long (Piers 607 - 613)

Western Section – Landscape

Viaduct Section between Yuen Long and Tuen Mun

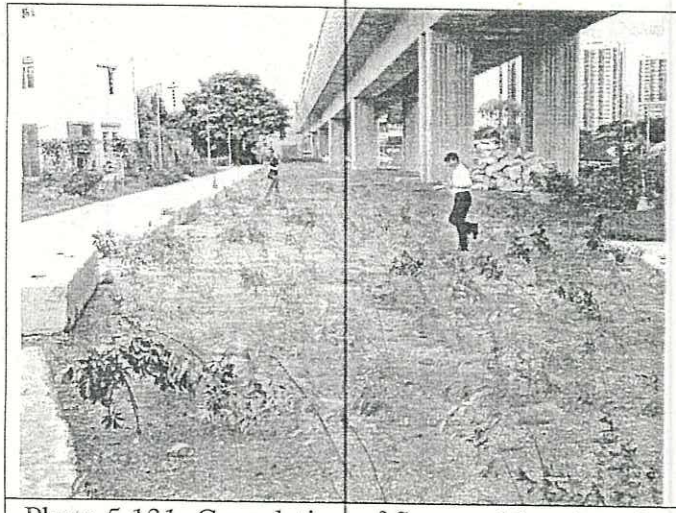


Photo 5.131: Completion of Seasonal Landscaping Works at Wing Ning Tsuen (Piers 617 – 624)

Photo 5.132: Completion of Seasonal Landscaping Works at EVA21 (Ha Mei San Tsuen)

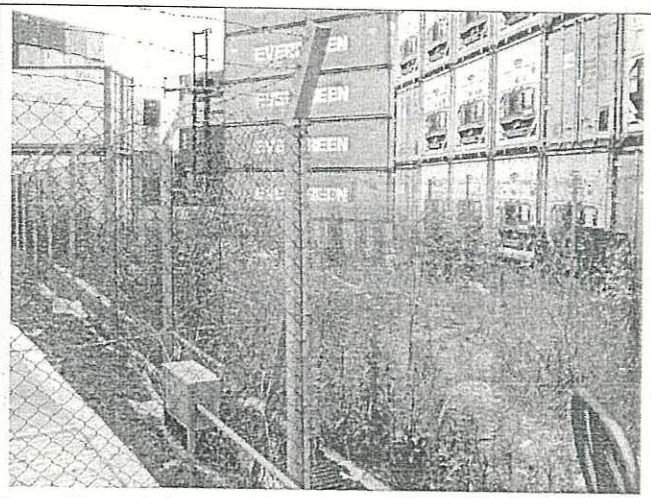


Photo 5.133: Completion of Seasonal Landscaping Works at EVA23 (Hung Tin Road)

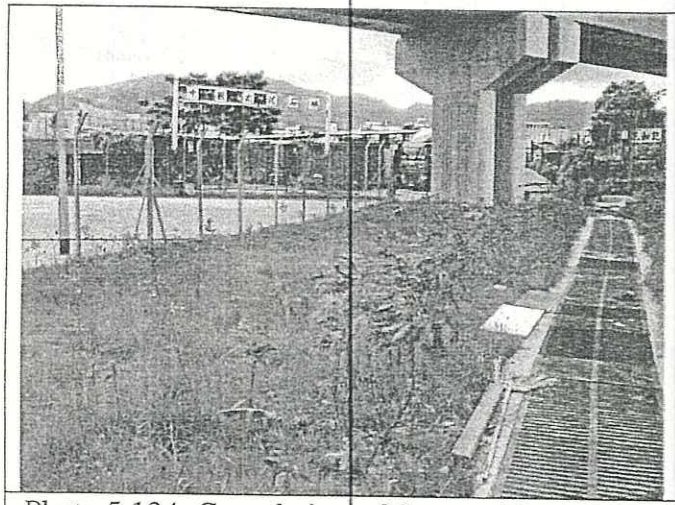


Photo 5.134: Completion of Seasonal Landscaping Works at EVA24 (Tin Ha Road)

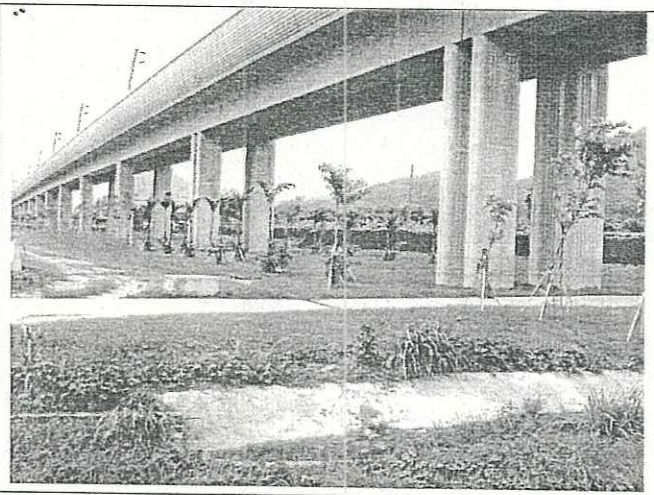


Photo: 5.135: Completion of Seasonal Landscaping Works at Piers 3 –6 (at Tin Sam Tsuen)

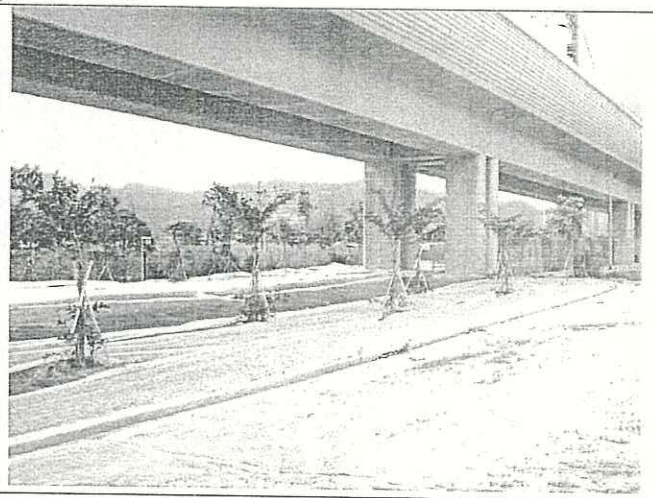


Photo 5.136: Completion of Seasonal Landscaping Works at Piers 8 – 20 (Yick Yuen)

Stations at Section between Yuen Long and Tuen Mun

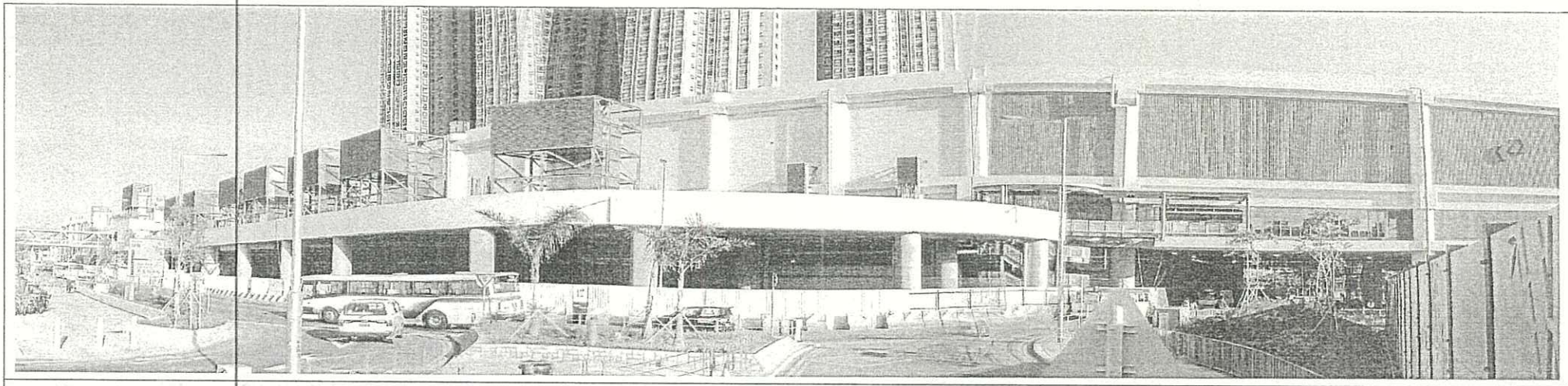


Photo 5.137: Completion of Landscaping Works at New Road Long Yat Road (YUL)

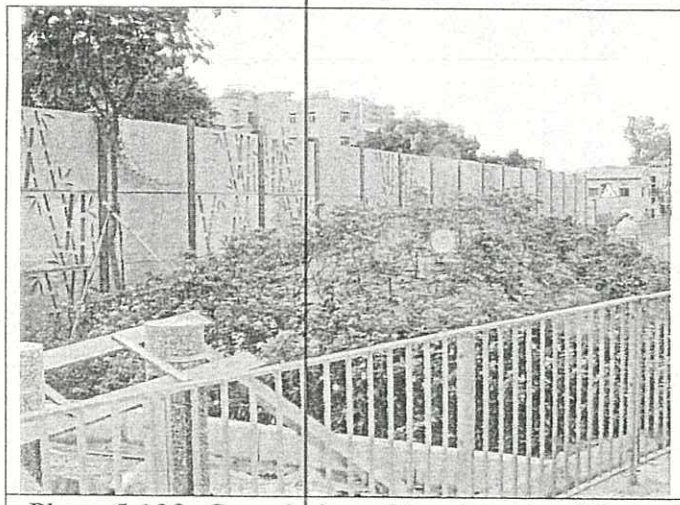


Photo 5.138: Completion of Landscaping Works at New Road L1 of Long Yat Road (YUL)

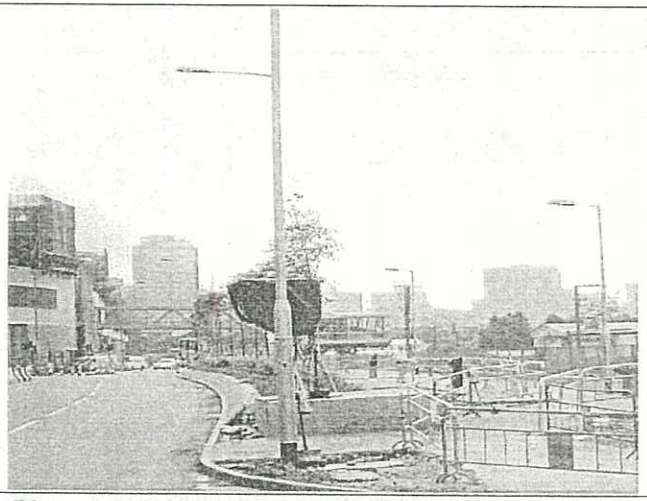


Photo: 5.139: Completion of Landscaping Works at New Road L2 of Long Yat Road (YUL)

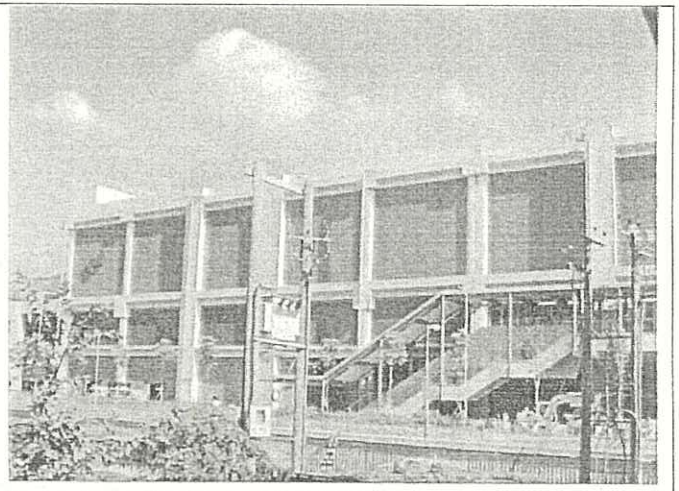


Photo 5.140: Completion of Landscaping Works at New Road L2 of Long Yat Road (YUL)

Stations at Section between Yuen Long and Tuen Mun

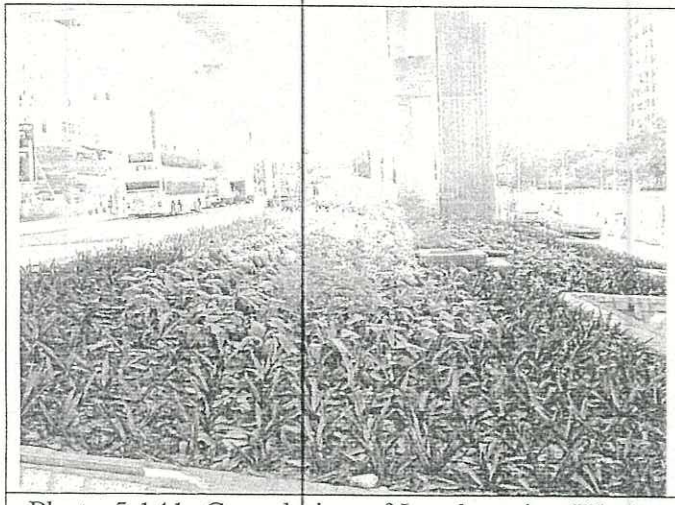


Photo 5.141: Completion of Landscaping Works nearby Long Ping Estate (at east of LOP)

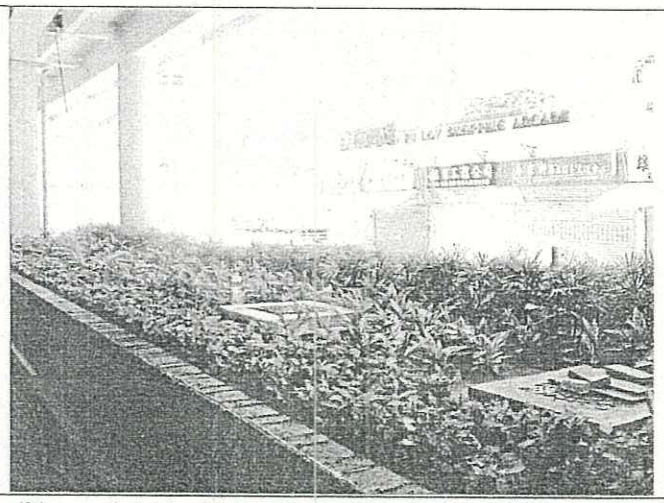


Photo 5.142: Completion of Landscaping Works nearby Fu Loy Garden (at south of LOP)

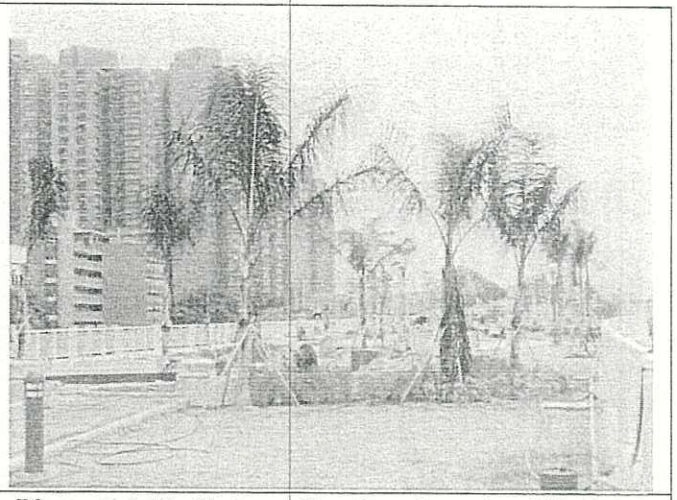


Photo 5.143: Outstanding Landscaping Works at Amenity Structure (at TUM)

Yuen Long (YUL) Station

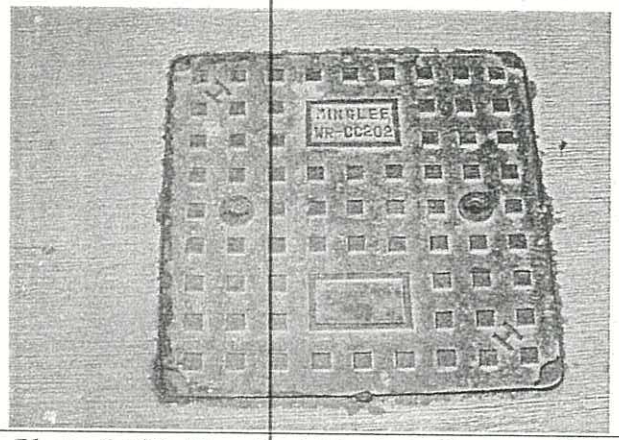


Photo 5.190: Terminal Manhole Foul at YUL nearby the Sun Yuen Long Centre

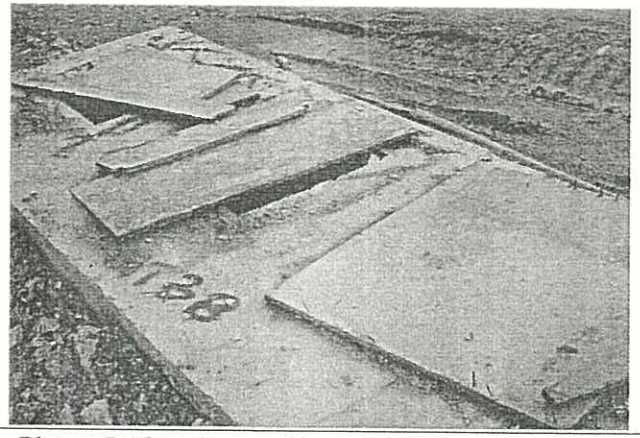


Photo 5.191: Grease Trap at YUL nearby Nam Pin Wai

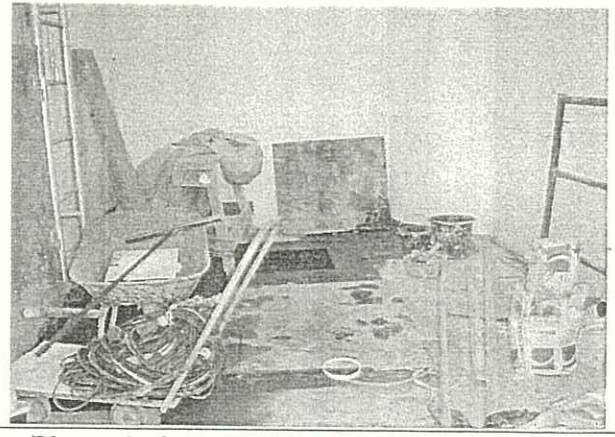


Photo 5.192: Grease Trap for YUL Station Restaurant

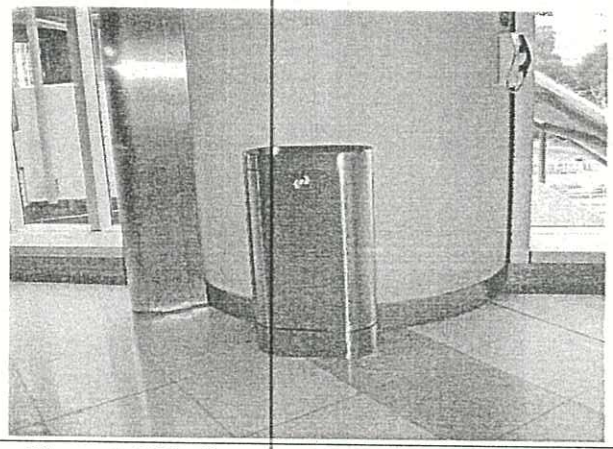


Photo 5.193: Standard Rubbish Bin in WR Stations

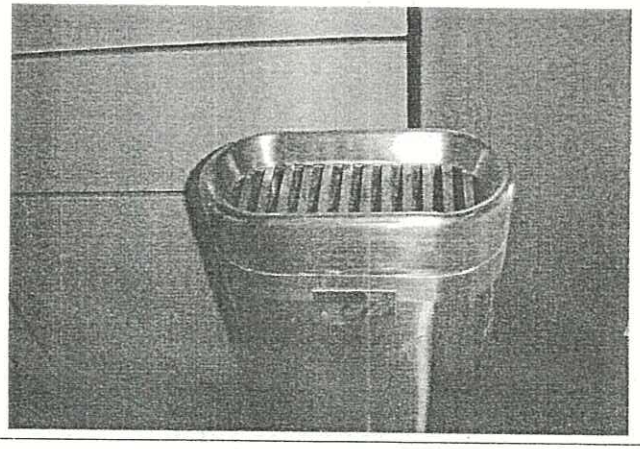


Photo 5.194: Standard Ash-Tray in WR Stations

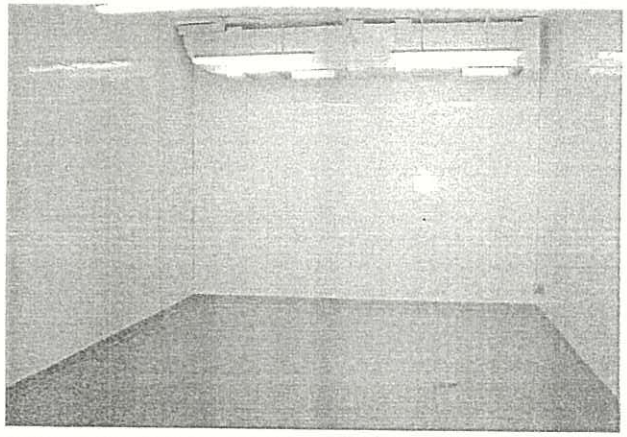


Photo 5.195: Refuse Collection of YUL

Western Section – Water Quality and Waste

Long Ping (LOP) Station

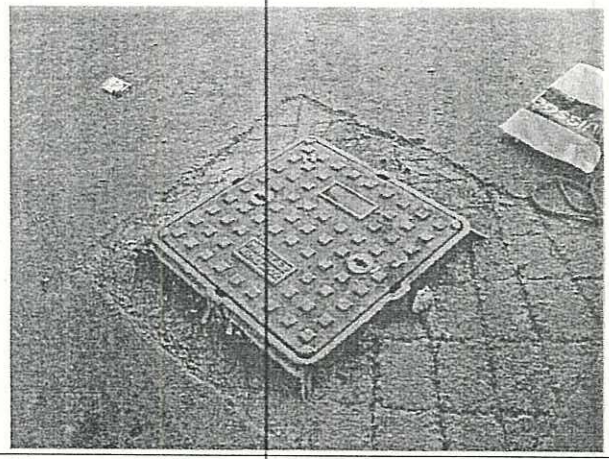


Photo 5.196: Terminal Manhole Foul at LOP - Ma Wang Road

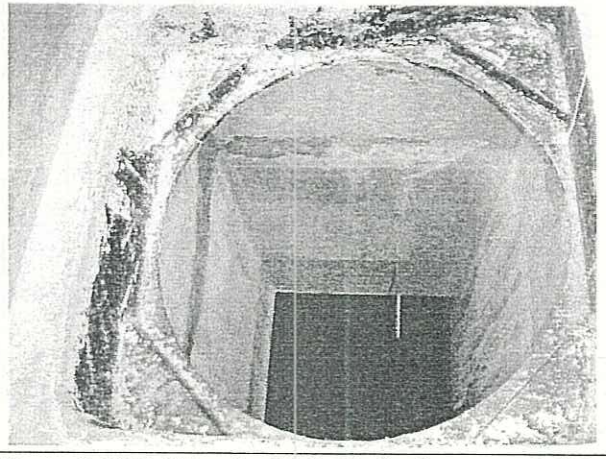


Photo 5.197: Terminal Manhole Storm at LOP - Ma Wang Road

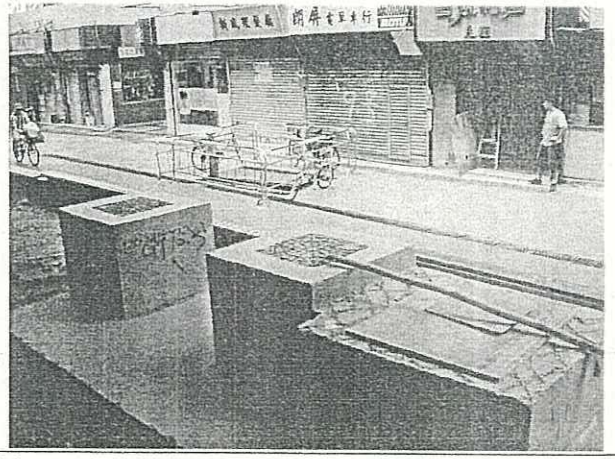


Photo 5.198: Grease Trap at LOP nearby the Ma Wang Road

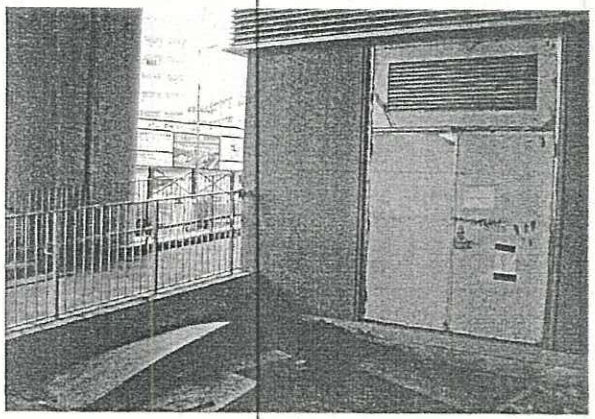


Photo 5.199: Refuse Collection Room at LOP

Western Section – Water Quality and Waste

Tin Shui Wai (TIS) Station

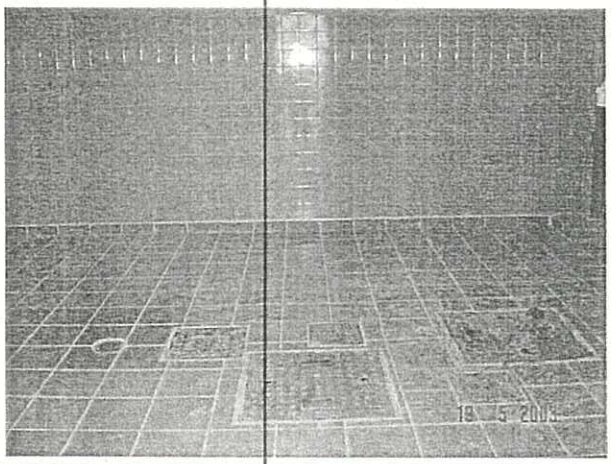


Photo 5.200: Grease Trap at TIS Refuse Collection Room	Photo 5.201: Terminal Manhole Foul at TIS	Photo 5.202: Grease Trap adjacent to the LRT track under TIS Station

Siu Hong (SIH) Station

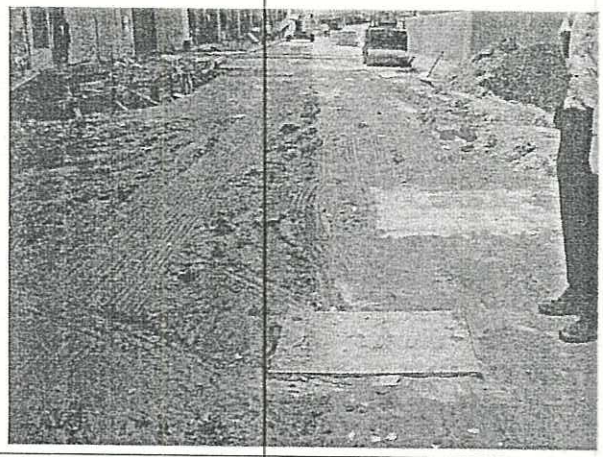


Photo 5.203: Terminal Manhole Foul at SIH EVA

Photo 5.204: Petrol Interceptor at SIH Service Road

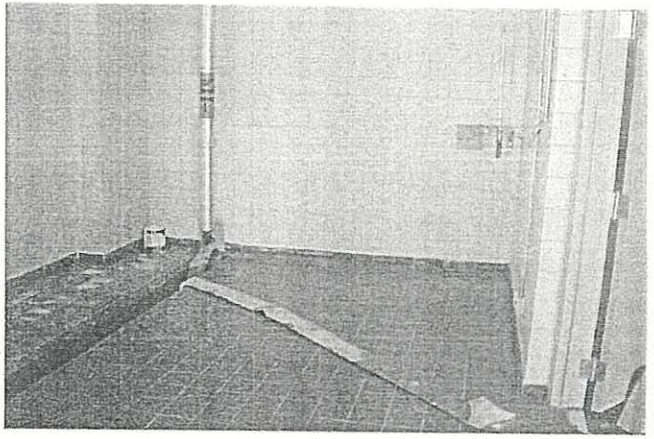


Photo 5.205: Refuse Collection Room of SIH

Tuen Mun (TUM) Station

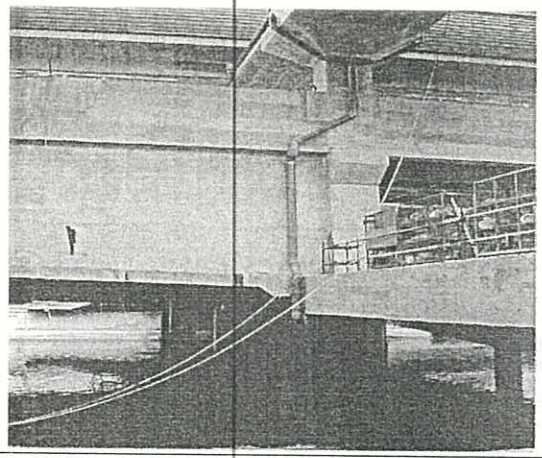
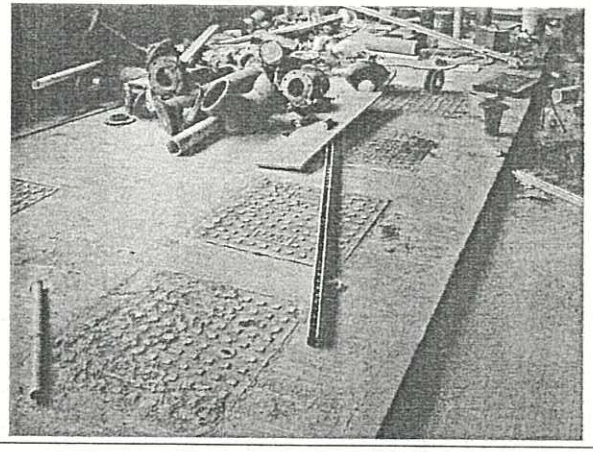
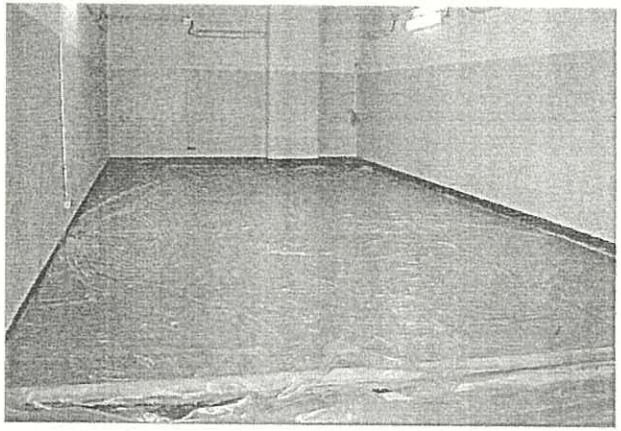
		

Photo 5.206: Surface Water directly Discharge to TUM River from TUM Station and Viaduct	Photo 5.207: Petrol Interceptor at TUM	Photo 5.208: Refuse Collection Room at TUM

Tin Shui Wai Pagoda

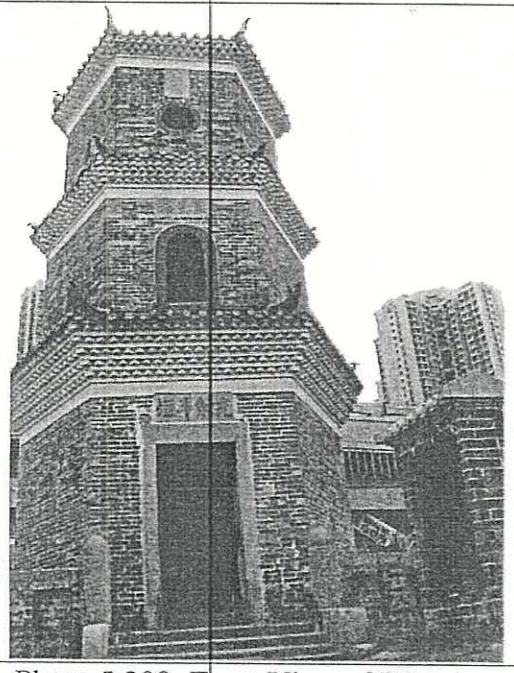


Photo 5.209: Front View of Pagoda

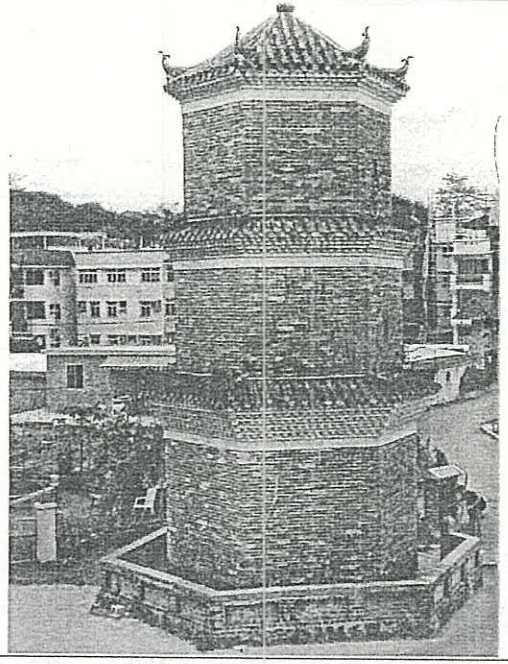


Photo 5.210: Rear View of Pagoda

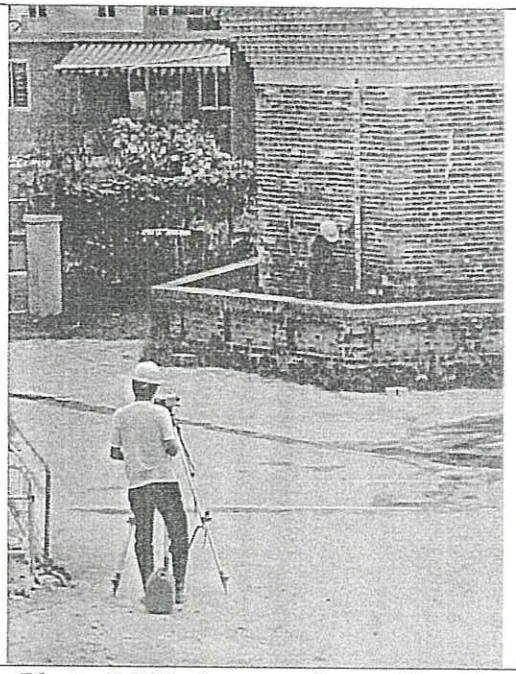


Photo 5.211: Survey taken at Pagoda

Annex 3
Fixed Plant Noise Monitoring Results

1. Location: 15/F., Nam Cheong Estate

Potential noise source: Ventilation shaft at platform ends of Nam Cheong Station

Measurement date: 19/3/2003

Time	Leq, dB(A)	Activity
2241-2311	57.7	Ventilation shaft operation
2312-2326	56.7	Background

Remarks: The southern end of station could be seen.

2. Location: Podium of Fu Cheong Estate

Potential noise source: Ventilation shaft at platform ends of Nam Cheong Station

Measurement date: 19/3/2003

Time	Leq, dB(A)	Activity
2238-2308	64.5	Ventilation shaft operation
2309-2326	63.7	Background

Remarks: The northern end of station was viewed.

3. Location: Roof of Mei Foo Sun Chuen Blk 2

Potential noise source: Ventilation shaft at platform ends of Mei Foo Station

Measurement date: 19/3/2003

Time	Leq, dB(A)	Activity
2111-2129	66.2	Background
2130-2201	66.1	Ventilation shaft operation

Remarks: Traffic noise from Kwai Chung Road was dominant.

4. Location: Roof of Ching Lai Court

Potential noise source: Ventilation shaft at platform ends of Mei Foo Station

Measurement date: 19/3/2003

Time	Leq, dB(A)	Activity
2101-2129	68.5	Background
2130-2159	68.0	Ventilation shaft operation

Remarks: Traffic noise from Lung Cheung Road was dominant.

5. Location: Podium of Kwai Fong Terrace

Potential noise source: Kwai Fong Ancillary Building

Measurement date: 19/3/2003

Time	Leq, dB(A)	Activity
2053-2134	69.3	Background
2135-2201	68.8	Ventilation shaft operation

Remarks: Noise from Kwai Chung Road and basketball court was noticed.

6. Location: 7/F., Carpark near Clague Garden

Potential noise source: Ventilation shaft at Northern and Southern End of Tsuen Wan West Station

Measurement date: 18/3/2003

Time	Leq, dB(A)	Activity
1135-1149	76.1	Background
1150-1218	75.5	Ventilation shaft operation

Remarks: The noise measurements were taken at the car park at Hoi Kwai Road due to the access problem at Clague Garden. This monitoring location is closer to Tsuen Wan West Station and Tsuen Wan Road. As Clague Garden is further away, it is anticipated that the noise level would be lower. Traffic noise from Tsuen Wan Road was the major noise source.

7. Location: Village house of Cheung Po Tsuen

Potential noise source: Ventilation shaft at the north portal of Tai Lam Tunnel

Measurement date: 18/3/2003

Time	Leq, dB(A)	Activity
2104-2137	44.1	Background
2138-2210	45.0	Ventilation shaft operation

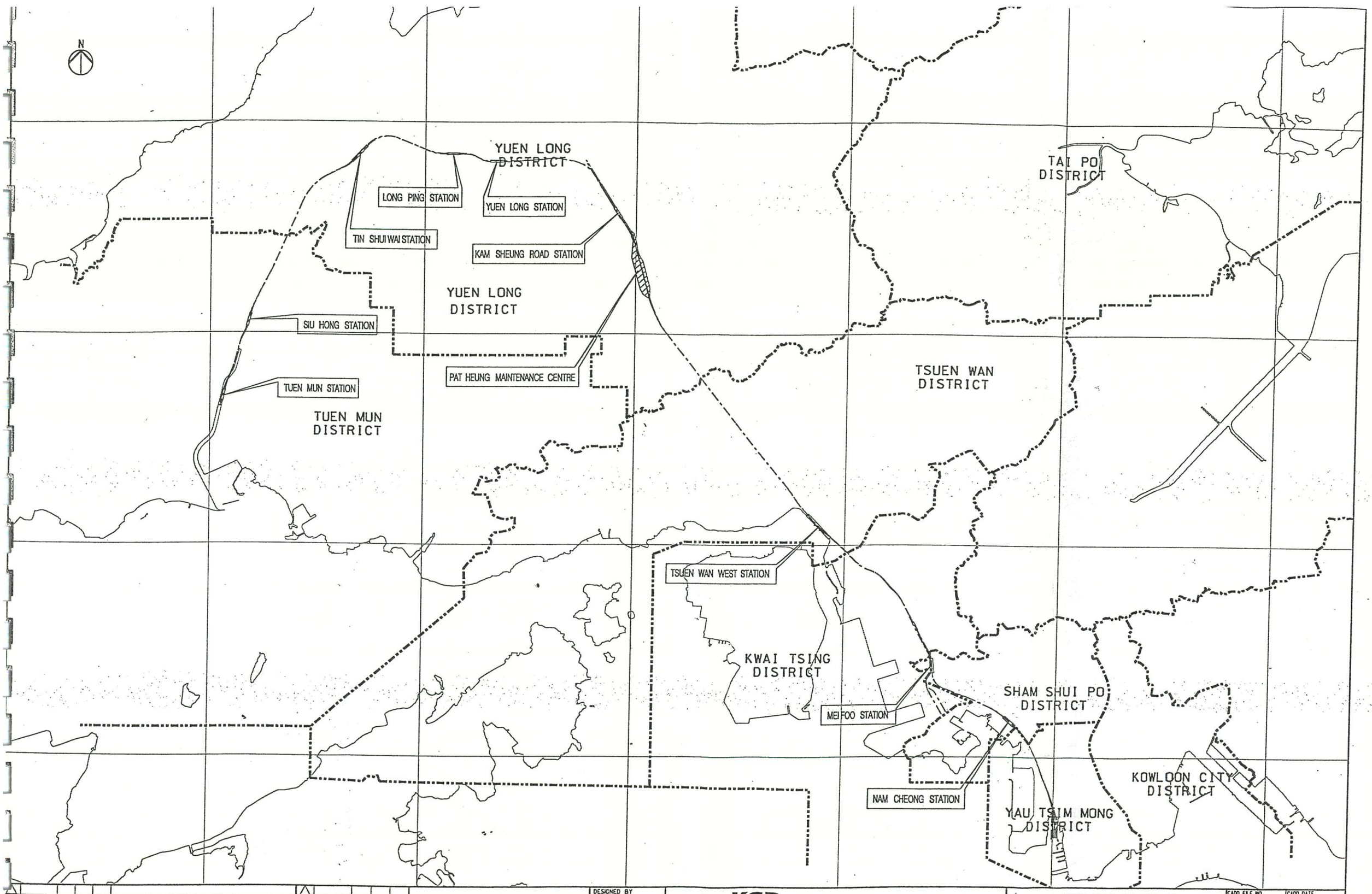
Remarks: Noise from Insects and dogs barking were noticed during ventilation operation period.

Annex 4
Wetland Plant List

West Rail Wetland Plant List

	ABB	SCIENTIFIC NAME
TREE		
	Fic mic.	*Ficus microcarpa*
	Gly pen.	*Glyptostrobus pensilis*
	Mel aze.	*Melia azedarach*
	Sap dis.	*Sapium discolor*
	Sch oct.	*Schefflera octophylla*
	Cel tet	*Celtis tetradrana*
SHRUB		
		Schefflera
	Cam ole	*Camellia Oleifera*
	Rho tom	*Rhodomrytus tomentosa*
	Evo lep.	*Evodia lepta*
	Fic pum.	*Ficus pumila*
	Gar jas.	*Gardenia jasminodes*
	Ile asp	*Ilex asprella*
	Lit cub.	*Litsea cubeba*
	Lit rot.	*Litsea rotundifolia*
	Rha ind.	*Rhaphiolepis indica*
	Rho sim.	*Rhododendron simsii*
Climber		
	Par him.	*Parthenocissus himalayana*
	Phi cor.	*Philodendron cordatum*
Grass/sedges		
		Panicum maxima
		Digitaria chinensis
		Carex chinensis
Bamboo		
		Bambusa vulgaris

	ABB	SCIENTIFIC NAME
AQUATIC PLANT		
	Alo esc.	*Alocasia esculanta*
	Era atr.	*Eragrostis atrovirens*
	Pas dis.	*Paspalum distichum*
	Pol bar.	*Polygonum barbatum*
	Ran scl.	*Ranunculus scleratus*
	Rum mar.	*Rumex maritimus*
	Bac mon.	*Bacopa monnieri*
	Col esc.	*Colocasia esculenta*
	Com dif.	*Commelina diffusa*
	Cur aro.	*Curcuma aromatica*
	Cyp mal.	*Cyperus malaccensis*
	Alo mac	*Alocacsia macrorrhiza*
	Ele dul.	*Eleocharis dulcis*
	Ele spi.	*Eleocharis spiralis*
	Nym spp	Nymphoea Spp.
	Ele tet.	*Eleocharis tetraquetra*
	Era atr.	*Eragrostis atrovirens*
	Fim com.	*Fimbristylis complanata*
	Pol hyd	*Polygonum hydropiper*
	Fui umb.	*Fuirena umbellata*
	Jun eff.	*Juncus effusus*
	Lee hex.	*Leersia hexandra*
	Lep art.	*Lepironia articulata*
	Lud asc.	*Ludwigia ascendens*
	Mel can.	*Melastoma candidum*
	Phr aus.	*Phragmites australis*
	Ror nas.	*Rorippa nasturtium-aquaticum*
	Sag tri.	*Sagittaria trifolia*
	Sau chi.	*Saururus chinensis*
	Sch lit.	*Schoenoplectus littoralis*
	Sch muc.	*Schoenoplectus mucronatus*



V	DATE	BY	SUB	APP	DESCRIPTION

REV	DATE	BY	SUB	APP	DESCRIPTION
A	AUG2003	VT			AUDIT REPORT FOR EPD SUBMISSION

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CHECKED BY	V TONG
IN CHARGE	R KWAN
DATE	13AUG2003

KCR 九廣鐵路 西鐵 West Rail

WEST RAIL (PHASE 1)

FIGURE 1
WEST RAIL ALIGNMENT

CADD FILE NO	01C01177.DGN
CADD DATE	18AUG2003
SCALE	1 : 80000 @ A3
DRAWING NUMBER	WR/01/C01/177
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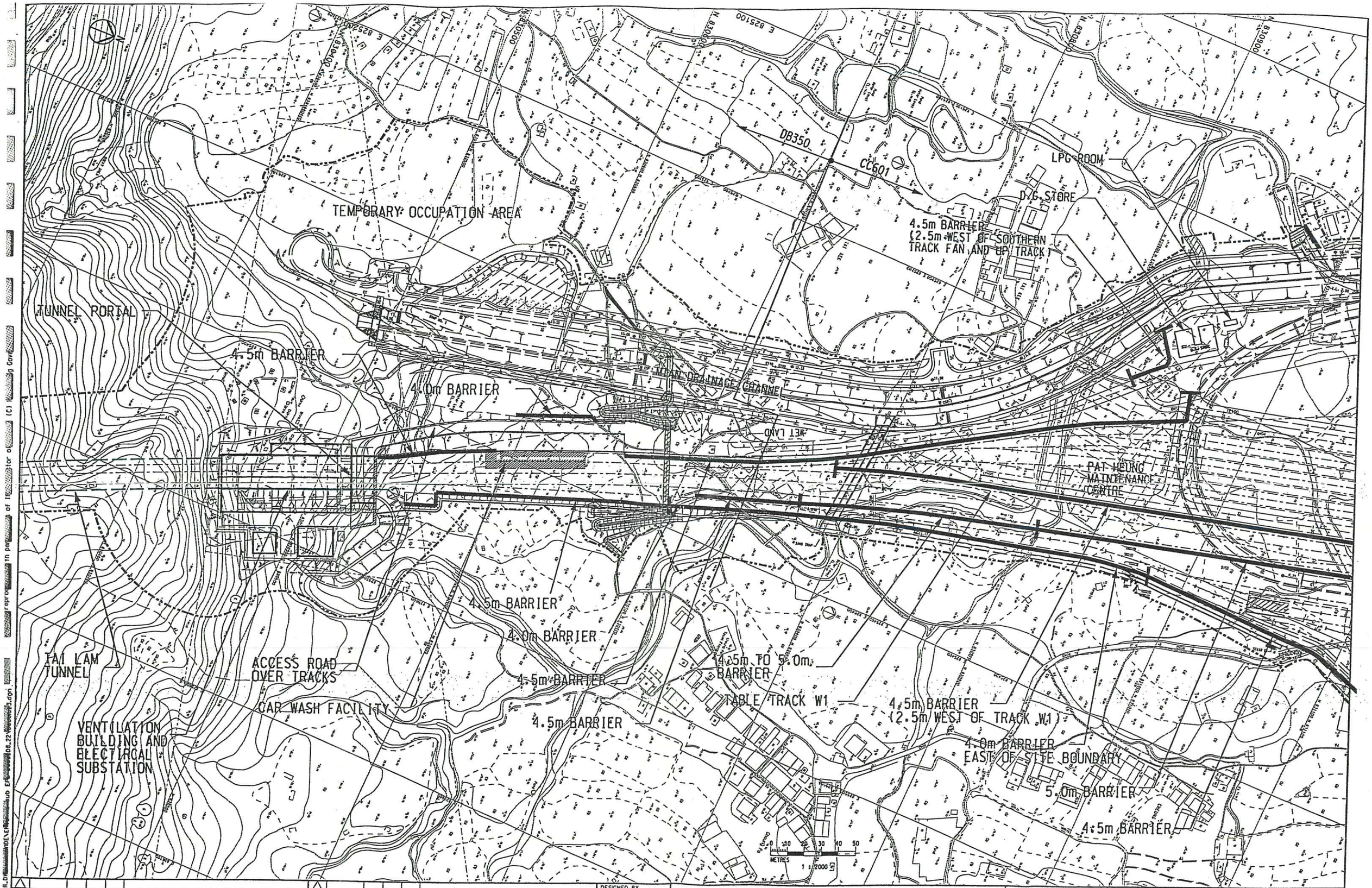
REV	A



REV	DATE	BY	SUB	APP	DESCRIPTION
A	AUG2003	VT			AUDIT REPORT FOR EPD SUBMISSION

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DATE AUG2003

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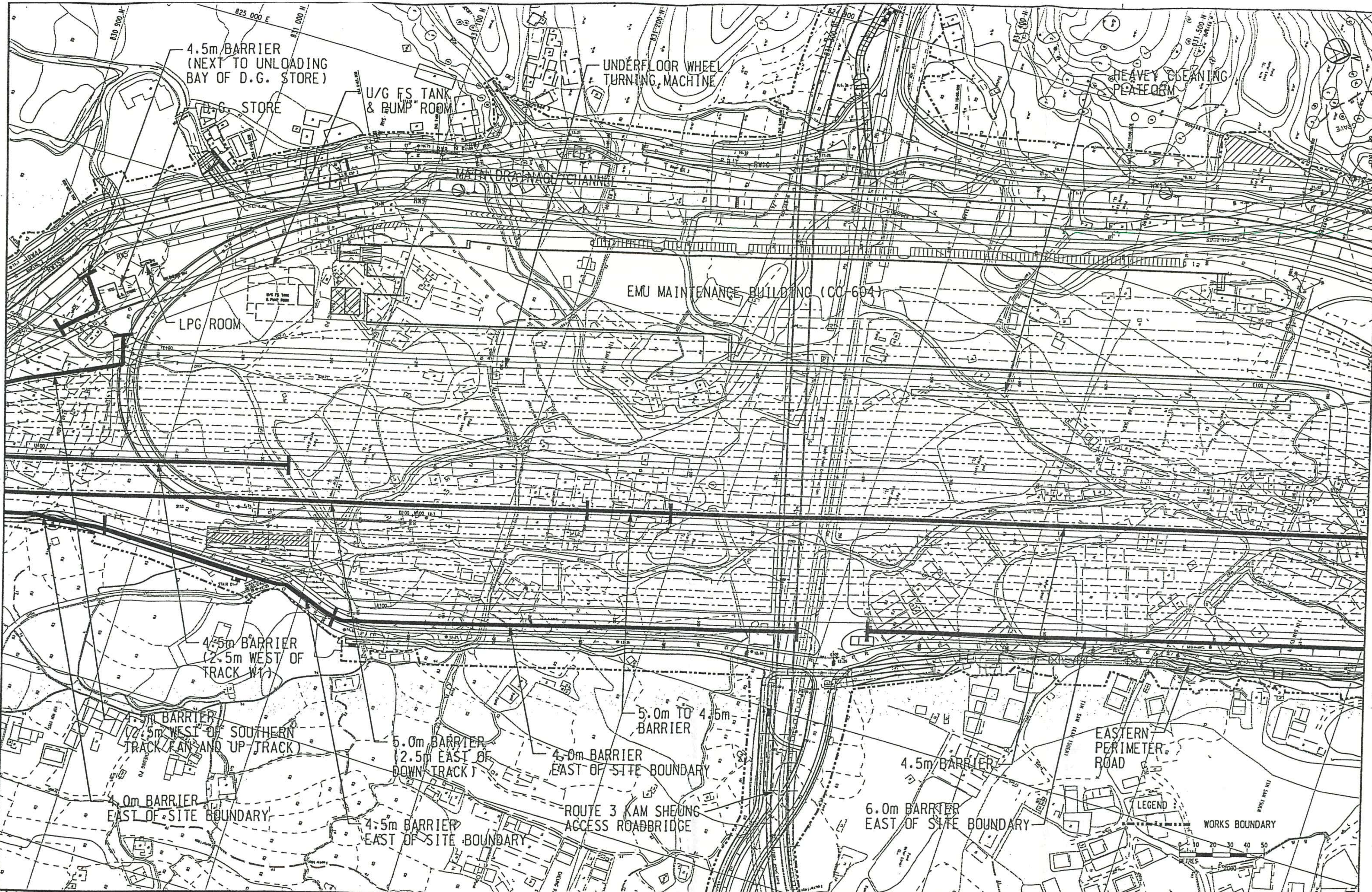
CENTRAL SECTION

FIGURE 2
LOCATIONS OF NOISE BARRIERS AT THE NORTHERN PORTAL

CADD FILE NO 06C01023.DGN
CADD DATE 18AUG2003
SCALE 1 : 2000 @ A3
DRAWING NUMBER WR/06/C01/023
SHEET NO
STAGE CODE B
REV A



4.5m BARRIER (NEXT TO UNLOADING BAY OF D.G. STORE)
D.G. STORE
U/G FS TANK & PUMP ROOM
UNDERFLOOR WHEEL TURNING MACHINE
HEAVEY CLEANING PLATFORM
MAIN DRAINAGE CHANNEL
EMU MAINTENANCE BUILDING (CC-604)
LPG ROOM
4.5m BARRIER (2.5m WEST OF TRACK W1)
4.5m BARRIER (2.5m WEST OF SOUTHERN TRACK FAN AND UP TRACK)
5.0m BARRIER (2.5m EAST OF DOWN TRACK)
5.0m TO 4.5m BARRIER
4.0m BARRIER EAST OF SITE BOUNDARY
4.0m BARRIER EAST OF SITE BOUNDARY
4.5m BARRIER EAST OF SITE BOUNDARY
ROUTE 3 KAM SHEUNG ACCESS ROADBRIDGE
4.5m BARRIER
6.0m BARRIER EAST OF SITE BOUNDARY
EASTERN PERIMETER ROAD
LEGEND
WORKS BOUNDARY
METRES
825 000 E
831 000 N

REV	DATE	BY	SUB	APP	DESCRIPTION	REV	DATE	BY	SUB	APP	DESCRIPTION
						0		VT			AUDIT REPORT FOR EPD SUBMISSION

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DATE AUG2003

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NOETHERN SECTION

FIGURE 3A
LOCATIONS OF NOISE BARRIERS AT PMC (1)

CADD FILE NO 06C01002.DGN
CADD DATE 18AUG2003
SCALE 1 : 2000 @ A3
DRAWING NUMBER WR/06/C01/002
SHEET NO
STAGE CODE
REV 0

FULL SIZE A1

AUXILIARY VEHICLE MAINTENANCE BUILDING

WESTERN PERIMETER ROAD

UNDERGROUND FUEL TANKS

GATE HOUSE

PUBLIC FOOTBRIDGE OVER DEPOT

WR DEPOT MAIN ENTRANCE

4.5m BARRIER (2.5m WEST OF TRACK W2)

6.0m BARRIER EAST OF STE BOUNDARY

5.0m TO 5.0m BARRIER EAST OF STE BOUNDARY

6.0m TO 5.0m BARRIER EAST OF STE BOUNDARY

5.0m BARRIER EAST OF STE BOUNDARY

4.5m BARRIER (2.5m EAST OF DOWN TRACK)

4.5m BARRIER (2.5m EAST OF DOWN TRACK)

EASTERN PERIMETER ROAD

LEGEND

WORKS BOUNDARY

0 20 40 60 80 100

METRES

1 : 2000

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A		VT			AUDIT REPORT FOR EPD SUBMISSION

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DATE	AUG 2003

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NORTHERN SECTION

FIGURE 3B
LOCATIONS OF NOISE BARRIERS AT PMC(2)

CADD FILE NO	06C01025.DGN
CADD DATE	18AUG2003
SCALE	1 : 2000 @ A3
DRAWING NUMBER	WR/06/C01/025
SHEET NO	
STAGE CODE	B
REV	A

REV	DATE	BY	SUB	APP	DESCRIPTION
A		VT			AUDIT REPORT FOR EPD SUBMISSION

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NORTHERN SECTION

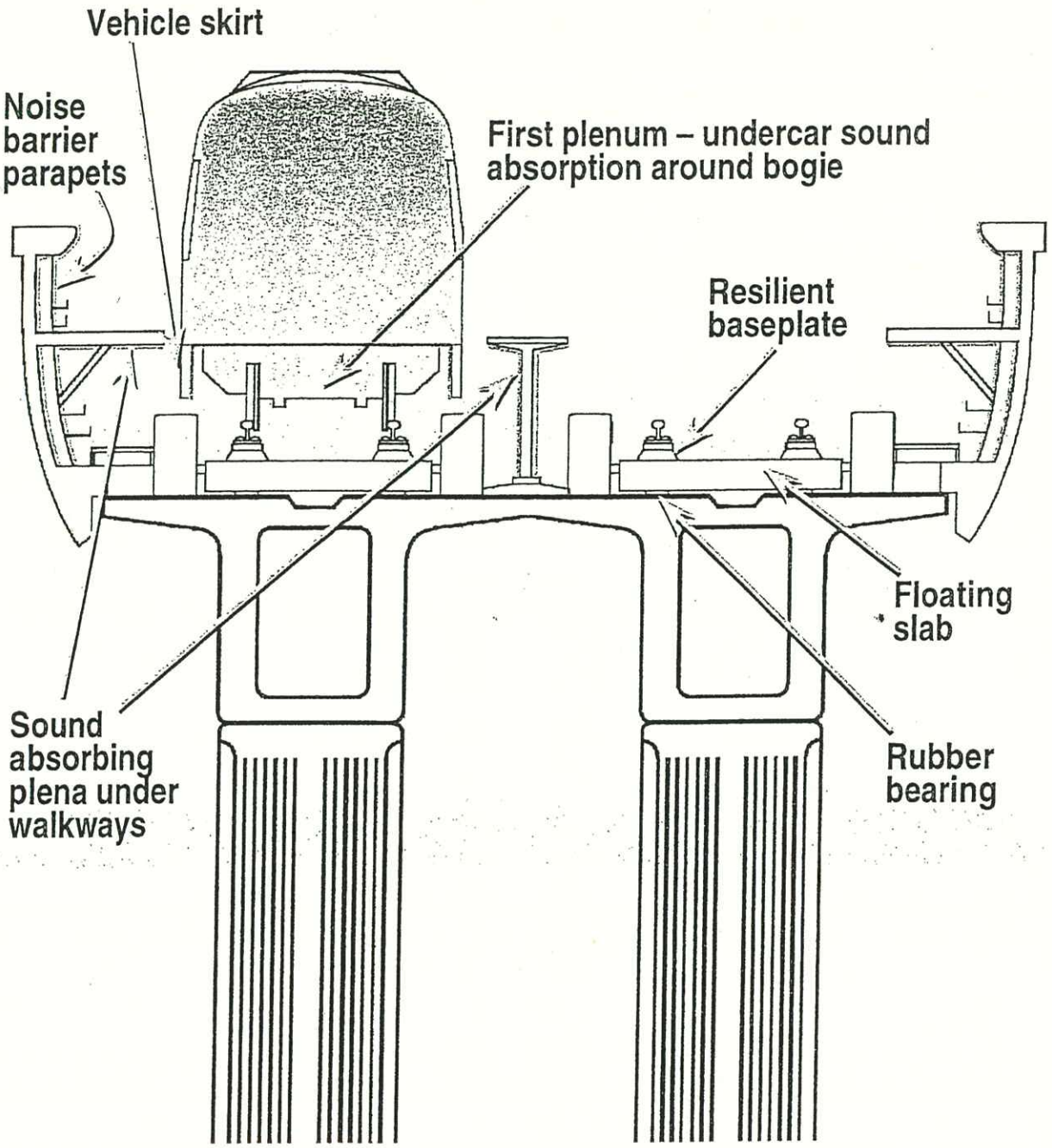
FIGURE 3C
LOCATIONS OF NOISE BARRIERS AT PMC (3)

CADD FILE NO: N
CADD DATE: 18AUG2003
SCALE: 1 : 2000 @ A3
DRAWING NUMBER: WR/06/C01/026
STAGE CODE: B
REV: A

Figure 4

Multi-Plenum System

(Typical tangent section outside of stations)



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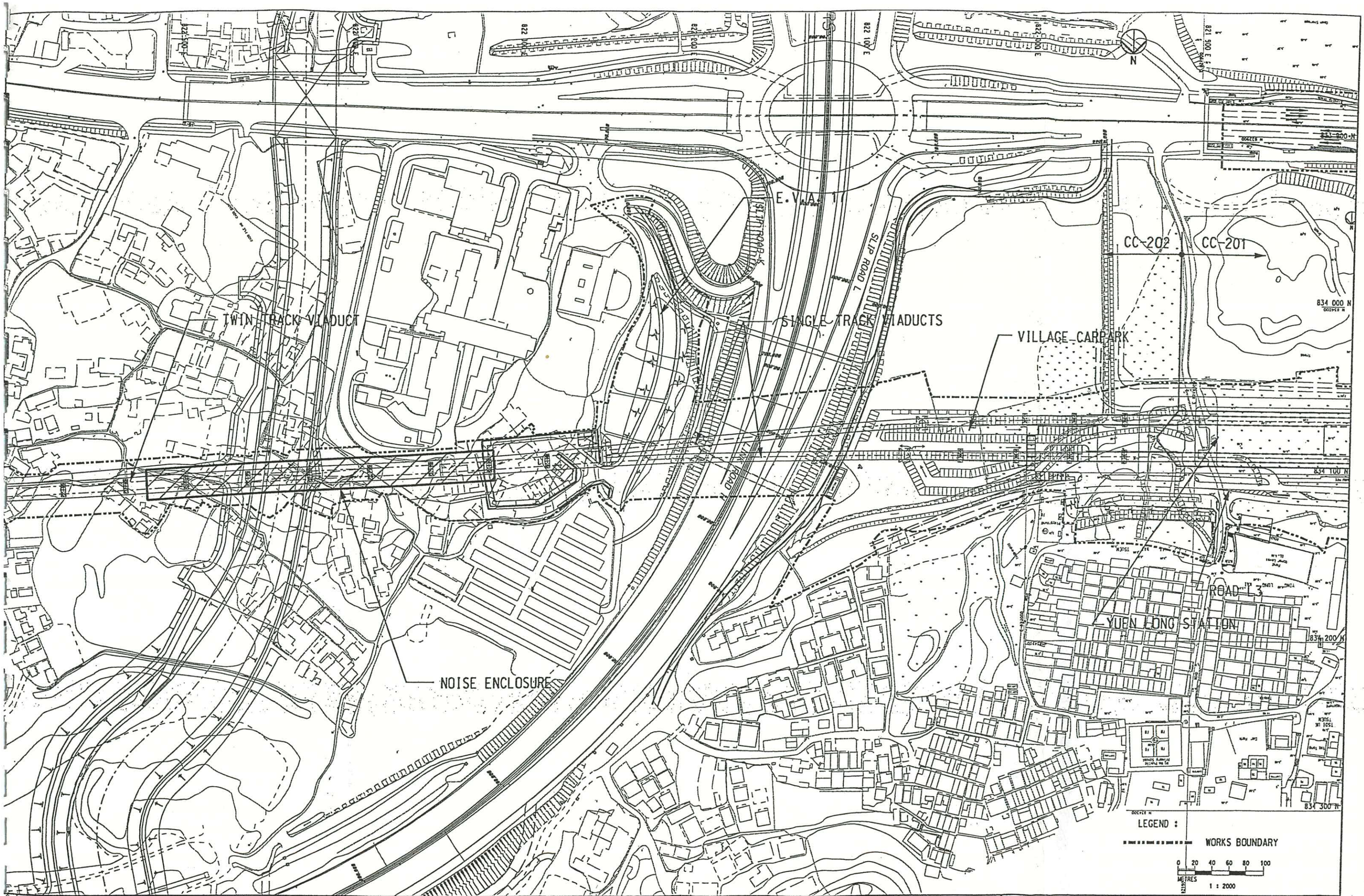

REV	DATE	BY	SUB	APP	DESCRIPTION
A	VT				AUDIT REPORT FOR EDP SUBMISSION

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DRAWN BY	D LEUNG
CHECKED BY	V TONG
IN CHARGE	R KWAN
DATE	AUG 2003

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NORTHERN SECTION

FIGURE 5
LOCATION OF NOISE ENCLOSURE - POK OI HOSPITAL

CADD FILE NO	CADD DATE
02C01015.DGN	18AUG2003
SCALE	1 : 2000 @ A3
DRAWING NUMBER	WR/02/C01/015
SHEET NO	STAGE CODE / REV
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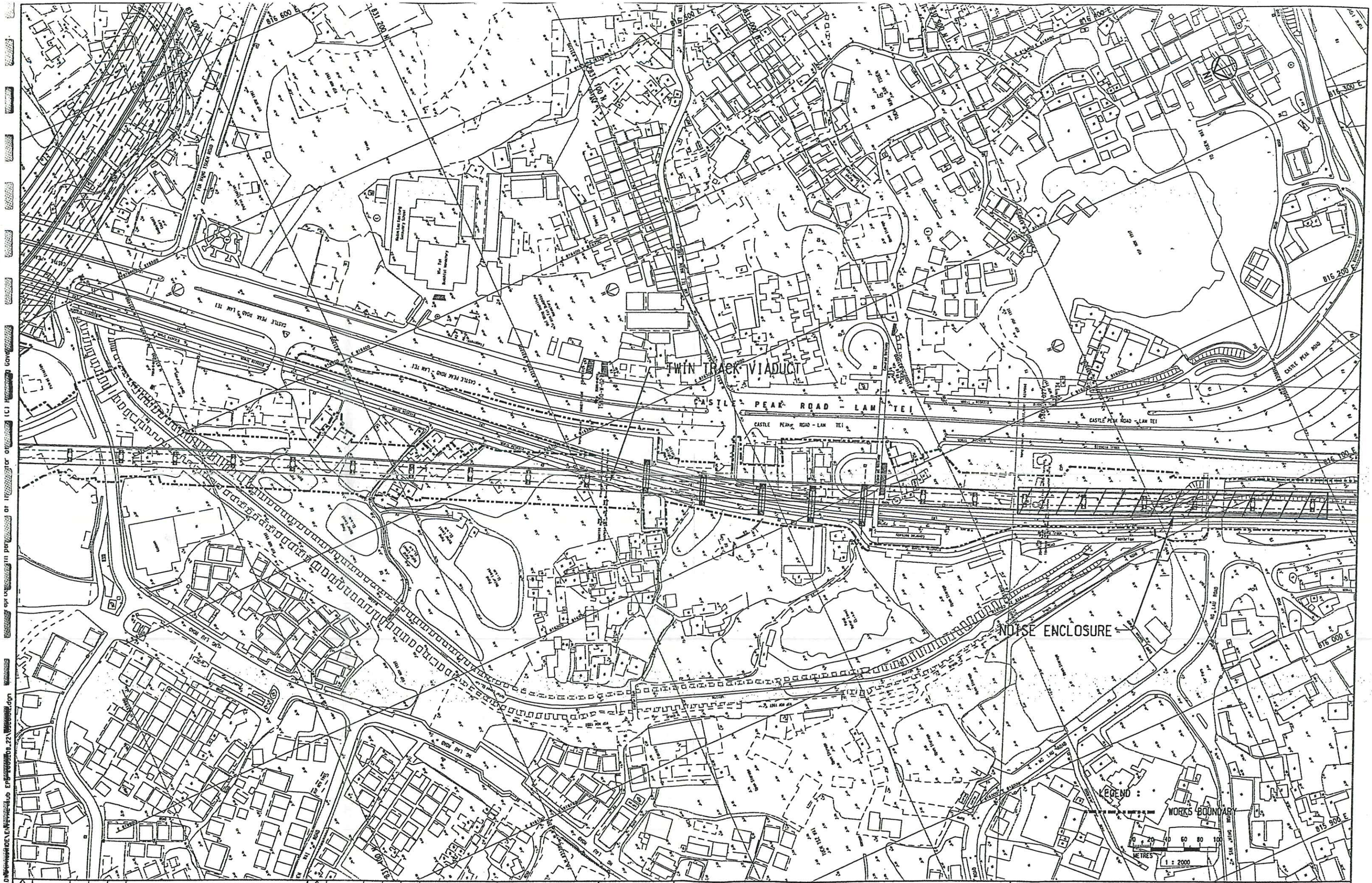

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A		VT			AUDIT REPORT FOR EPD SUBMISSION

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DATE	AUG2003

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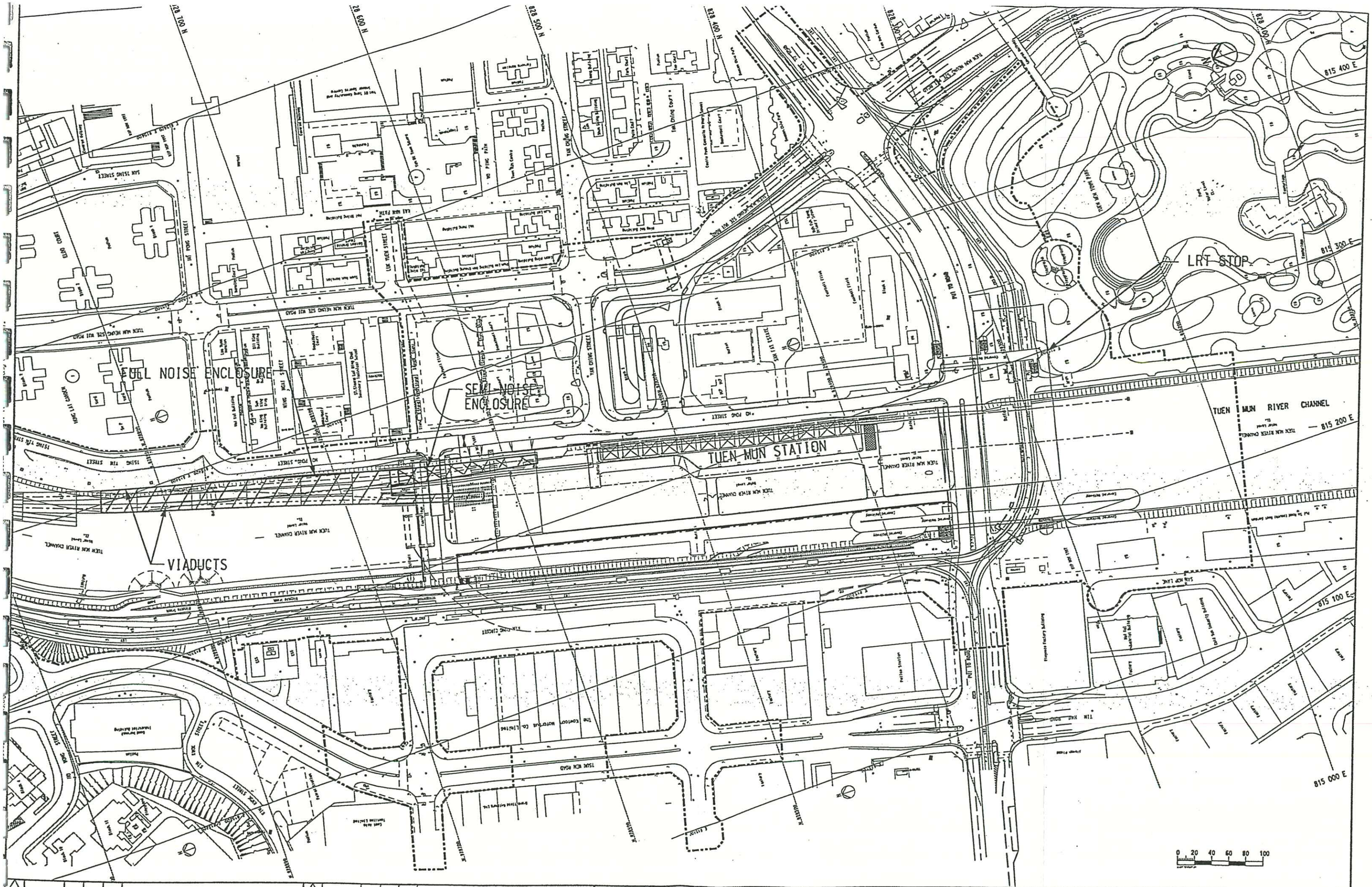
WESTERN SECTION

FIGURE 6
LOCATION OF NOISE ENCLOSURE - LAM TEI

CADD FILE NO	03C01012.DGN
CADD DATE	18AUG2003
SCALE	1 : 2000 @ A3
DRAWING NUMBER	WR/03/C01/012
SHEET NO	
STAGE CODE	B
REV	A



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WESTERN SECTION

FIGURE 7
LOCATION OF NOISE ENCLOSURE - TUEN MUN

CADD FILE NO	CADD DATE
03C01013.DGN	18AUG2003
SCALE	1 : 2000 @ A3
DRAWING NUMBER	WR/03C/01/013
SHEET NO	STAGE CODE / REV
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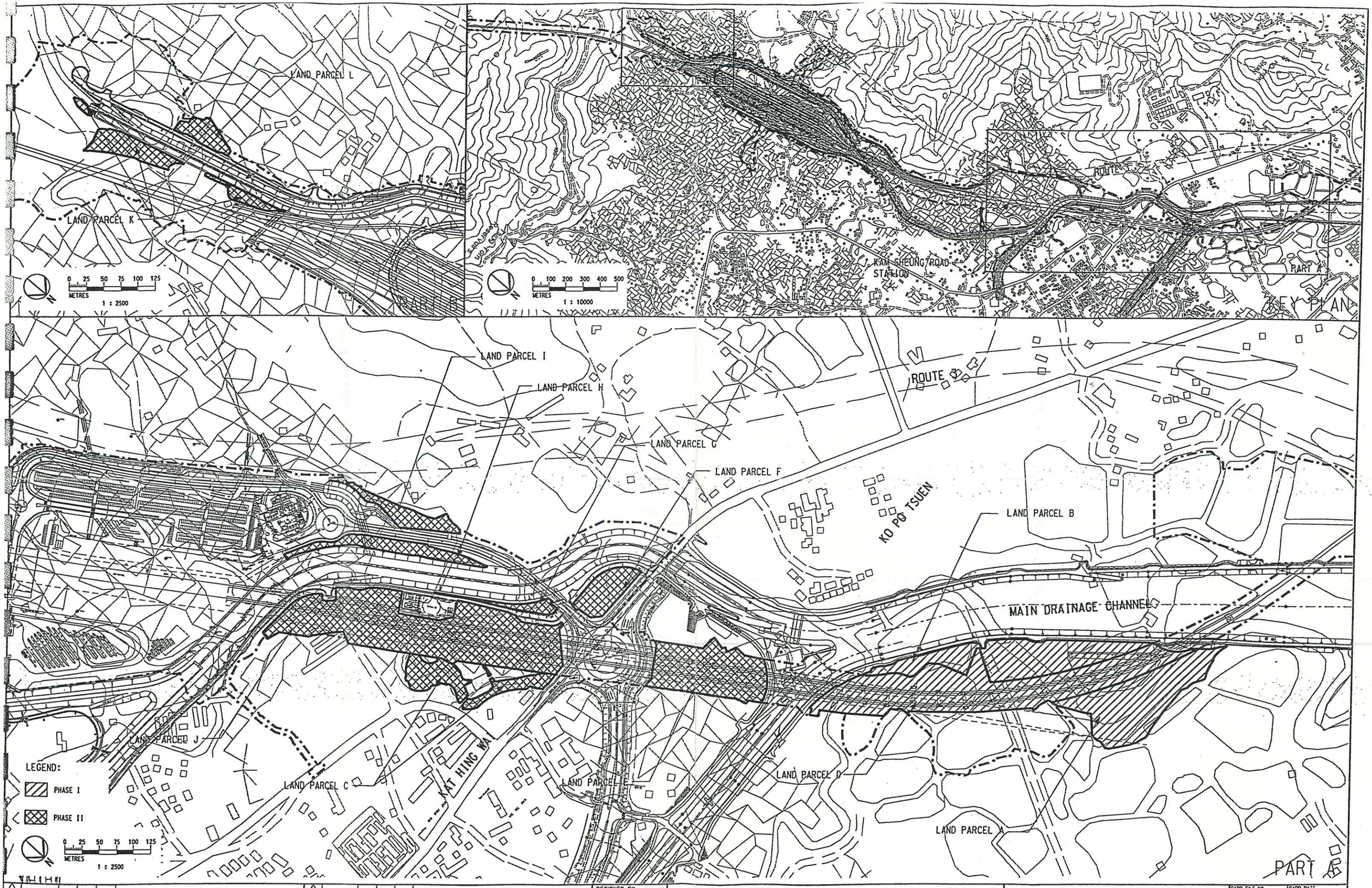

REV	DATE	BY	SUB	APP	DESCRIPTION

REV	DATE	BY	VT SUB	APP	AUDIT REPORT FOR EPD SUBMISSION DESCRIPTION
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DATE	AUG2003

KCR 九廣鐵路 西鐵 West Rail

WEST RAIL (PHASE I)

FIGURE 8
LOCATIONS OF HABITAT
COMPENSTATION OF LAND PARCELS

CADD FILE NO	CADD DATE
01C01178.DGN	18AUG2003
SCALE	AS SHOWN
DRAWING NUMBER	WR/01/C01/178
SHEET NO	STAGE CODE / REV
	B / A