



HIGHWAYS DEPARTMENT
HIGHWAYS (KOWLOON) REGION

HUNG HOM BY-PASS
AND
PRINCESS MARGARET ROAD LINK

ENVIRONMENTAL ASSESSMENT STUDY
EXECUTIVE SUMMARY



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Synopsis

The executive summary describes the environmental impact assessment study of the proposed Hung Hom By-Pass and Princess Margaret Road Link to existing sensitive receivers as well as to the proposed development in the Hung Hom Bay Reclamation. The assessment has been separated into 2 different phases - during construction and during operation phases. The assessment has been carried out under the main consideration of noise, air, visual and landscape impact. Conclusions and recommendations as to the necessary mitigation options are also included in the executive summary.

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1. INTRODUCTION

Highways Asia (a joint venture between Harris & Sutherland (Far East), Binnie Consultants Limited, and Wilbur Smith Associates) was commissioned in August 1992 to undertake the Preliminary Report Stage for the Hung Hom By-pass (HHB) and the Princess Margaret Road Link (PML).

The Hung Hom By-Pass is a 1.2 kilometre dual - two carriageway connecting East Tsim Sha Tsui to the west and Hung Hom to the east. The Princess Margaret Road Link is a 1.3 kilometre dual-two carriageway linking East Tsim Sha Tsui to its south and Princess Margaret Road to its north.

The Hung Hom By-Pass is part of a proposed route called the North-South Highway which will eventually link East Tsim Sha Tsui with To Kwa Wan, Kowloon City and Kowloon Bay. Part of this route, Hung Hom Road, has already been constructed in conjunction with the Whampoa Garden Development in Hung Hom as a dual two-lane primary distributor road with provision for widening to dual three-lane. The Princess Margaret Road Link would form a necessary part of the primary road system serving Hung Hom Bay, in particular, for the relief it will bring to the Chatham Road South Corridor in Tsim Sha Tsui.

The majority of the alignment of the highways is elevated over existing roads, the sea and Kowloon Canton Railway Corporation existing and proposed freight yards and operational areas. The visual impact of these elevated roads, and the noise and air quality impacts of traffic on both existing and planned sensitive receivers in the area, have been examined and are summarised below.

2. LAND USE

As shown in Figure 1, reclaimed land in Hung Hom Bay will be used for commercial, residential, educational, open space, government, and institutional and community uses. The following sensitive land uses are identified:

- *Comprehensive Development Area (CDA)* is located adjacent to the PML and is sensitive to noise and fumes from road traffic.
- *Primary School Site (E)* is approximately 100m from the PML and 160m from the HHB. In the absence of screening elements, the site will be affected by traffic noise and fumes from both road sources.
- *Private Sector Participation Scheme Housing Area (PSPS)* is situated at the central part of the Reclamation and is bisected by the HHB. A deck is expected to be constructed over the HHB carriageway to bridge the two housing sites; this deck will effectively shield PSPS residents from the noise of Bypass traffic.
- *Residential Zone 1 (R1)* is located along the waterfront, and includes bus, taxi and coach terminuses. The site is 260m from the PML and 100m from the HHB. It is sensitive to both noise and air quality impacts from the roads.
- *Hotel/Service Apartments (C)* lie west of the R1 site at the waterfront. The site is about 20m from the HHB, and is sensitive to traffic noise and fumes.
- *Government Use (G)* sites are expected to house a magistracy, clinic and community centre; all are sensitive to vehicle fumes.
- *Open Space (District and Local)* is not classified by the Hong Kong Planning Standards and Guidelines (HKPSG) as a noise sensitive use. However, the Director of Urban Services would like open space to be quiet for the enjoyment of users. Both passive and active recreation uses are permitted on open space at distances beyond 20m from a primary distributor road.

At Tsim Sha Tsui East, existing sensitive buildings can be identified:

- *Hong Kong Polytechnic (E)*, at the junction of Cheung Wan Road and Hong Chong Road, is sensitive to noise and air quality impacts. However, as the institution has been sound-insulated, traffic noise is unlikely to be a key issue.
- *Fire Services Headquarters* could be used for staff accommodation and is therefore considered sensitive to noise and air quality impacts.

- *Polytechnic Staff Quarters (R)*: A senior staff quarters building is located at Hong Chong Road, near the Cross Harbour Tunnel Portal. It is affected by traffic noise and vehicle fumes from the tunnel portal. A minor staff quarters building is located near the junction of Hong Chong Road and Chatham Road South, and is significantly affected by noise and air quality impacts from the nearby high-volume roadways.

3. ENVIRONMENTAL IMPACT ASSESSMENT DURING OPERATIONAL PHASE

3.1 NOISE ASSESSMENT

3.1.1 Assessment Methodology and Criteria

In order to determine the constraints imposed on noise sensitive development on the new reclamation, L_{10} (1-hr.) noise levels have been calculated, based on traffic on the HHB, PML, and associated slip roads. Worst facade orientations on the Reclamation have been assumed.

Results are obtained for facades at a height of 80m P.D. Low-level facades may be exposed to noise levels 1 to 2 dB(A) higher than the corresponding high-level receivers within about 40m of the highways. Further away, high- and low-level facades should be more or less equally exposed, assuming no intervening structures. High-level receivers are generally less protected by noise barriers at the road edge, and therefore are of major concern in this study.

Potential impacts from road traffic noise have been assessed by comparing the predicted noise levels with the HKPSG criteria. According to the HKPSG, the recommended maximum road traffic noise level is 70 dB(A) L_{10} (1-hr) at sensitive facades of new dwellings, hotels, and apartments, and 65 dB(A) L_{10} (1-hr) at sensitive facades of new schools.

3.1.2 No Mitigation Measures

L_{10} noise contours for the worst facade orientations at 80m PD, resulting from predicted traffic flows on the HHB and PML, are shown in Figure 2.

Lands within the 70 dB(A) noise contour (i.e., experiencing noise levels greater than 70 dB(A)) would be sterilised in the absence of mitigating effects. Based on these noise contours, the buffer distances required to meet the HKPSG criteria for unmitigated road traffic noise are as summarized in Table 1:

Table 1 Buffer Distances Required to Satisfy HKPSG Criteria for Unmitigated Road Traffic Noise

Road	Buffer Distance 70 dB(A) L_{10} (1-hr)
HHB (Between Salisbury Road and Hung Hom Interchange)	160-180 m
HHB (Between Hung Hom Interchange and PSPS Site)	160-200 m
PML	160 m

Figure 2 and Table 1 show that the operation of the HHB and PML will impose severe constraints on the development potential of the Hung Hom Reclamation. Noise mitigation will be required in order to accommodate noise sensitive development in the reclamation.

The noise impact at 1.5 m above ground on the Reclamation open space is shown in Figure 3. Although there is presently no noise guideline for open space used as a park or passive recreation ground, the noise contours shown in Figure 3 indicate that open space on the reclamation will be subject to road traffic noise from the section of HHB on structure.

Figure 4 shows the predicted L_{10} noise levels due to Bypass traffic at 30m P.D. at the built-up area in East Tsim Sha Tsui and at the Hong Kong Polytechnic. Although high facade noise levels are predicted at Hotel Nikko and the Holiday Inn Harbour View Hotel, occupants in these hotels are unlikely to be adversely affected by traffic noise since the envelopes of the two buildings have been sound-insulated. Indoor noise levels are expected to remain below 55 dB(A).

Fire Services Headquarters and the Senior Polytechnic Staff Quarters are less exposed to Bypass traffic. As a result, noise levels from the Bypass are expected to be under 70 dB(A) at these receivers.

Most of the Hong Kong Polytechnic buildings are expected to be adequately screened from PML traffic by existing and planned buildings. Moreover, all Polytechnic facades facing Hong Chong Road have been sound-insulated. Therefore, no adverse noise impact from the planned roads is anticipated for this receiver. However, the uninsulated Polytechnic minor staff quarters building near Chatham Road South is exposed to traffic noise. Nevertheless, the noise generated by additional traffic on the PML off-ramp by the Hong Kong Polytechnic Minor Staff Quarters is expected to be significantly less than that generated by Chatham Road South traffic. Evening peak-hour flows at the Minor Staff Quarters facade is currently 80dB(A), while future ramp flows are expected to generate 73dB(A).

Noise from the HHB and PML is not expected to affect sensitive facades in Whampoa Gardens. The section of HHB near Whampoa Garden will be decked over so that the noise will be enclosed. However, these new roads will attract additional traffic that will use existing Hung Hom Road, which passes through Whampoa Gardens. Currently, Hung Hom Road serves only local traffic, and flows are comparatively low. Future noise from the additional Bypass traffic along Hung Hom Road is expected to slightly exceed 70 dB(A) at sensitive facades overlooking the roadway. Nevertheless, it should be noted that the current noise level at the northeast corner of Hung Hom Road and Hung Hom South Road on the side facing Hung Hom South Road is much higher at 78 dB(A) during evening peak period.

3.1.3 Noise Mitigation Measures

Traffic noise can be mitigated at source, in its propagation path, or at receivers. Various practical options for mitigating road traffic noise in the Hung Hom Reclamation have been evaluated below.

Friction Course

A practical mitigation option at source is application of a friction course on the road surface, which reduces the noise from tires on the road.

The noise-reduction benefit of a layer of friction course on the HHB/PML carriageway and ramp surfaces can be visualised in Figure 5.

Setback distances are generally reduced to about 60 to 90 m from the edge of the road, as compared to 160 to 200 m if noise is unmitigated. With the adoption of friction course all the present land use proposals within the reclamation, with the exception of the school site and the CDA site, will be within acceptable limits.

The school site would be exposed to a worst facade noise level of about 68 dB(A). However, with the "flexi" school building, it is possible to achieve a further 3 dB(A) noise reduction by orienting the sensitive facade at 90 degrees to the highways to within acceptable limits of 65 dB(A) for new schools.

Although half of the CDA site is within the 70 dB(A) contour line, noise levels at the most exposed facades of the proposed buildings in the CDA site are predicted to be no higher than 71 dB(A), due to setback from the PML. Nevertheless, in planning the development of the western end of the CDA site, it should be allocated to noise-tolerant uses to permit the residential usage of the eastern end.

Barriers

Noise-tolerant developments, such as a multi-storey carpark, squash courts or other indoor recreational facilities, or noise-tolerant G/IC facilities, could be located adjacent to the PML to act as a barrier for the noise-sensitive buildings on the CDA site. The presence of such barrier developments would reduce PML traffic noise levels at the upper facades of the CDA buildings to 71-73 dB(A), as shown in Figure 6.

Purpose-built 3 m noise barriers have been considered for the section of the adjacent to the proposed CDA development, as well as 2.5 m barriers adjacent to the minor staff quarters building. No substantial improvement in the noise levels at upper storeys at either site is obtained.

There is presently no noise guideline for open space used as a park or passive recreation ground. Nevertheless, a slight improvement in the noise environment on the DO site can be achieved by erecting a 1.5m barrier flanking the road on embankment. Figure 7 shows the free field noise contours 1.5 m above ground with the noise barriers. However, it is noted that the presence of the noise barrier would impede the pedestrian movement to the Hung Hom Bay waterfront promenade. In addition, the barrier would result in a negative impact on the visual impact.

Total Enclosure

As a possible option, the proposed multi-storey carpark adjacent to the CDA site (see Figure 6) could be extended to form an enclosure for the elevated roads. A total

enclosure would be effective for shielding both low- and high-rise receivers. The resulting noise contours at 80m P.D., shown in Figure 8, reveal that the CDA site can be adequately protected with a full enclosure.

Other Considerations

Measures to mitigate noise from Hung Hom Road traffic in the existing Whampoa Garden are constrained by the degree of development already present in the area and the fact that the existing roads are not designed for such measures. Although noise generated on completion of the Hung Hom By-Pass is estimated to be slightly above 70dB(A), the presence of the Hung Hom Road/Tak Man Street will reduce speed of traffic from the By-Pass and hence the noise generated. It should be noted that the present noise level at the corner of Hung Hom Road and Hung Hom South Road is already 78dB(A) and therefore the new traffic noise level will not pose additional noise levels to the area.

Elsewhere along Hung Hom South Road the Hung Hom By-Pass and Princess Margaret Road Link are not expected to generate noise level above 70dB(A) if a layer of friction course is laid over the roads.

3.2 AIR QUALITY ASSESSMENT

3.2.1 Assessment Methodology and Criteria

The main source of air pollution during the operation phase will be vehicle emissions. Principal components in Hong Kong include carbon monoxide (CO), nitrogen oxides (NO_x, mainly nitrogen oxide (NO) and nitrogen dioxide (NO₂)), and total suspended particulates (TSP). The Hong Kong Air Quality Objectives (AQO) stipulate maximum acceptable concentrations of these pollutants.

Impacts from vehicle emissions will depend primarily on the rates of emission, traffic volumes, and the dispersion potential of the air and wind.

3.2.2 Impact Assessment

Air quality modelling results have shown that the hourly concentrations of the air pollutants due to HHB traffic during the peak hour in 2011 are no higher than 2500 µg/m³ for CO, 200 µg/m³ for NO₂, and 100 µg/m³ for TSP.

Comparison with the AQO shows that it is likely that no buffer distance from the road will be required to maintain acceptable air quality. However, for use of open space, the HKPSG recommends a 20m buffer distance for active and passive recreational uses adjacent to a primary distributor road. This applies to the DO sites on both sides of the HHB.

3.3 VISUAL AND LANDSCAPE ASSESSMENT

For visual and landscape assessment, the study area can be divided into four distinct parts, each with its own visual and landscape character and quality:

- *Tsim Sha Tsui East* is a prestigious, high-profile commercial/hotel area. With its significant amenity planting and a waterfront promenade, it has a high visual and landscape quality.
- *KCRC Kowloon Station and Cross Harbour Tunnel area* has an inhibiting character, dominated by heavy traffic flows (particularly around the Tunnel toll plaza) and movement. It is dominated by large structures: the Coliseum, KCRC Station/carpark, and International Mail Centre. With little planting and very little open space for public use, it has a low visual and landscape quality.
- *Hung Hom Interchange and Railway Lands* are located amidst ample open space with abundant good-quality vegetation. There are few pedestrians or buildings. This area has a high-medium visual and landscape quality.
- *Hung Hom Bay Reclamation* is expected to be developed along the lines of a new town, with mixed-use tower blocks and a possible Skyrail link. Along the proposed HHB alignment, significant amenity planting and open spaces are planned; this will give the area a high-medium visual and landscape quality. Along the proposed PML alignment, dense commercial development with no open space is anticipated, resulting in a low-medium visual and landscape quality.

3.3.1 Visual Sensitivity

The purpose of establishing the sensitivity of an area is to determine its vulnerability to change or modification. Figure 9 illustrates prominent lines of vision, and delineates visual cones where the alignment exerts an influence.

Tsim Sha Tsui East is expected to have a high sensitivity; views from the hotels and waterfront promenade will be greatly affected by the appearance of the new Bypass. *Hung Hom Bay Reclamation* along the proposed HHB alignment is an area of medium-high sensitivity. Areas of medium sensitivity include those around the Tunnel toll plaza, the KCRC Station, *Hung Hom Interchange* and along the railway lands. Along the PML alignment, the *Hung Hom Bay Reclamation* has a low sensitivity to visual intrusion and obstruction.

3.3.2 Project Characteristics

The visual attributes of the alignment which will exert a visual influence on the surrounding area are shown in Figures 10 and 11. They include elevated ramps and roads, abutment walls at the ramps, possible noise barriers or total enclosures, reduction in vegetation and open space, and changes to existing footbridges and at-grade roadways.

3.3.3 Visual and Landscape Impact

- Along the East *Tsim Sha Tsui* waterfront, the proposed highway alignment will reduce the visual and landscape quality of East *Tsim Sha Tsui*.

The proposed alignment will have an adverse impact on existing and planned open space, in terms of both area reduction and obstruction of harbour views. The elevated structure will form a psychological and physical barrier from the north side of Salisbury Road to the existing and proposed open space, and will inhibit pedestrian movement and enjoyment of the open space network in East Tsim Sha Tsui. In combination with the widening of Salisbury Road, the Bypass will change the character of the area.

- Around the Hung Hom Interchange and Railway Lands, the impact of the HHB/PML is considered medium-high. Proposed ramps will reduce the existing open space, and will require removal of many existing semi-mature trees, affecting adjacent areas of vegetation.
- In the Hung Hom Bay Reclamation (HHB Section), the Bypass runs on an elevated structure through a District open space, physically and visually separating it. As a result, the HHB has a high impact, and, because it inhibits activities under and near it, lowers the amenity value of the open space. Where the Bypass is decked over (through the PSPS site), it has very little impact.
- In the Hung Hom Bay Reclamation (PML Section), where visual quality and sensitivity are not high, the impact of multiple layers of ramps is considered medium.

3.3.4 Mitigation Measures: Landscape Strategy

Measures may be taken to ameliorate some of the visual and landscape impacts described above. Figures 12 to 14 illustrate these measures and the impacts which they mitigate.

Along the waterfront, an integrated design approach is strongly recommended for the treatment of ramps, elevated structure, and associated spaces in East Tsim Sha Tsui. Spatial relations and visual links are essential and should be established between both sides of the ramp. Treatment of the areas below elevated structures is particularly important. Variety and interest can be achieved by careful detailing of hardworks and by incorporation of sculptural elements. Banners, wire sculptures, water, and especially lighting add visual interest and enliven otherwise dark expanses beneath elevated structures. Conceptual ideas based on this integrated design approach are shown in Figures 15 and 16.

The over-water section presents an opportunity to create a landmark and improve the existing urban form. The bridge structure could incorporate a sculptural engineering form, such as a bridge tower or a delicate tracery of suspension wires, or a feature such as water curtains on the sides of the bridge structure.

Pedestrian footbridges between the HHB and waterfront promenade will be located along the elevated road section. Design options for the footbridges are presented in Figures 17 and 18, and emphasize visually "light" elements that effectively screen the road from the walkway. The footbridges should provide both a physical and visual link across Salisbury Road.

On the Reclamation, various treatments are required. Where the Bypass runs through open space, placing the carriageway on an embankment would both provide a medium for amenity planting and eliminate the undesirable area below an elevated structure. The areas underneath the overhead structure near the PML may be used for parking and storage.

The significant loss of vegetation near the Hung Hom Interchange and Railway Lands will require mitigation by a programme of post-construction replanting (both amenity and woodland species).

It is recommended that the Landscape Strategy should be executed to ameliorate the adverse visual and landscape impact. The recommended works would include:

- i) Details of hard and soft landscape treatment along Tsim Sha Tsui East including suggestion for special features.
- ii) Details of hard and soft landscape treatment underneath highway structures.
- iii) Proposals for roadside planting on the Hung Hom reclamation.
- iv) Guidelines for tree felling, transplanting and protection of existing trees.
- v) Detailed survey of trees likely to be affected by the construction.
- vi) Input into the appearance of highway structures and pedestrian bridges including proposals for colour schemes.

The overall strategy is summarised in Figure 19.

4. ENVIRONMENTAL IMPACT ASSESSMENT DURING CONSTRUCTION PHASE

The construction of the Hung Hom Bypass and Princess Margaret Road Link is expected to take approximately 30 months. The initial six months will be used for site clearance, setting up the casting yard, and beginning work on piling and support construction. In the following 24 months, construction of supports will continue, along with construction and paving of the superstructure and ground-level roads, and completion of finishes. Some nightworks are anticipated.

Two structural options -- precast segmental and cast in-situ -- are being considered. Precast segmental construction requires a shorter construction period and would result in less traffic disruption. Neither method has a clear advantage in cost or appearance. This assessment has assumed the use of the precast segmental method.

4.1 NOISE ASSESSMENT

4.1.1 Construction Noise Assessment

Construction noise will be generated by powered mechanical equipment to be used on site for the construction of the Hung Hom Bypass and the Princess Margaret Road Link. This could have significant noise impacts on the East Tsim Sha Tsui hotels, the Hong Kong Polytechnic, and the dwellings in the neighbourhood of the site. In addition, the waterfront promenade in East Tsim Sha Tsui could be exposed to high levels of noise during construction of nearby road segments.

There is currently no applicable standard in the Noise Control Ordinance (NCO) for daytime operations (7.00 to 19.00). However, 75 dB(A) L_{eq} (5 min) is an appropriate noise limit for daytime activities in the urban study area. At night (19.00 to 7.00) and on holidays, the NCO controls the use of powered mechanical equipment, and stipulates Acceptable Noise Levels (ANL). All construction work carried out between 7.00 p.m. and 7.00 a.m. on weekdays, and on Sundays and general holidays, requires a Construction Noise Permit that requires compliance with ANLs.

Impact of Day Works (Construction Noise)

Because of the proximity of sensitive facades to the HHB alignment, some facades can expect to be exposed to construction noise levels significantly exceeding 75 dB(A) for limited periods of time.

Impact of Night Works (Construction Noise)

It is expected that night works will be required only for placement of precast superstructure segments. It is likely that evening deck placement (7.00 p.m. to 11.00 p.m.), using an electric hydraulic launching girder, would be permitted at all locations without exceeding ANLs. However, noise reduction of up to 10 dB(A) would be required for night-time deck placement (11.00 p.m. to 7.00 a.m.) at some locations in East Tsim Sha Tsui and Hung Hom, and at the Hong Kong Polytechnic Minor Staff Quarters building.

4.1.2 Construction Noise Mitigation Measures

Options for mitigating construction noise include scheduling activities to avoid parallel operation of several pieces of equipment, using silenced equipment, reducing the numbers of operating items of powered mechanical equipment, siting equipment as far as practical from sensitive receivers, using temporary noise barriers or earth bunds to screen specific receivers, scheduling noisy operations for periods with high background noise, properly maintaining and operating construction plant, and turning off idling equipment.

While it is not feasible to dictate the methods of construction to be employed by the contractor, noise control requirements can be incorporated in the tender/contract documents, specifying the noise standards to be met and any noise monitoring to be carried out by the contractor.

4.1.3 Compliance Monitoring (Construction Noise)

The primary purpose of the construction phase noise monitoring and auditing programme is to establish compliance with the terms and conditions set out in the Construction Noise Permits and with any daytime noise criteria contained in the contract documents.

It is recommended that target, trigger, and action levels for construction noise should be incorporated into the contract document.

4.2 AIR QUALITY ASSESSMENT

4.2.1 Construction Dust Assessment

Construction dust will be emitted from extensive earth-moving activities, concrete batching, aggregate stockpiling, and haulage over unpaved roads during the construction of the Hung Hom Bypass and Princess Margaret Road Link. This will have a detrimental effect on the air quality and may cause dust nuisance to the sensitive receivers along the planned alignment.

Calculations show that concrete batching and aggregate handling are unlikely to result in a significant dust impact on sensitive receivers. However, dust concentrations from use of unpaved roads on the reclamation could significantly exceed acceptable levels.

4.2.2 Construction Dust Mitigation Measures

Mitigation measures are necessary for the benefit of receivers affected by dust from unpaved haul roads. Haul road emissions can be controlled by hard-surfacing the haul roads, and keeping the surface clean with frequent water spraying. Other measures to control dust include limiting vehicle speeds, providing wheel-washing for vehicles leaving the site, covering and wetting stockpiles, and properly handling and covering lorry loads. Dust control and mitigation measures should be incorporated into the construction contracts wherever appropriate and practical.

4.2.3 Compliance Monitoring (Construction Dust)

Impact monitoring of TSP (total suspended particulate) and RSP (respirable suspended particulate) levels should be carried out at all dust sensitive receivers and at the site boundary whenever works generating dust are being carried out.

It is recommended that target, trigger, and action levels for construction dust should be incorporated into the contract document.

4.3 VISUAL ASSESSMENT

4.3.1 Construction Visual Impact

To mitigate the visual impact of construction, advance planting should be carried out where possible. This will enable some form of screening to unsightly works associated with the construction of the project. For example, planting proposals identified for the affected areas of the Hung Hom Interchange could be prepared and carried out prior to the commencement of the actual construction of the elevated structures. This would allow the vegetation screening to establish itself and be effective when construction begins.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Noise Assessment

The operation of the HHB and PML will impose constraints on the development potential of the Hung Hom Bay Reclamation unless noise mitigation measures are adopted. With the adoption of friction course, the noise levels for present Reclamation land use proposals, with the exception of the CDA, will be within acceptable limits. With friction course, there will still be a requirement to plan the CDA development to take account of predicted noise levels.

Existing sensitive receivers will be affected by HHB/PML traffic flows. These receivers are either already subject to high traffic noise levels (e.g., Hong Kong Polytechnic minor staff quarters) or are already insulated against external noise (e.g., East Tsim Sha Tsui hotels). Receivers in Whampoa Gardens will be affected by traffic accessing the Bypass along existing Hung Hom Road. Nevertheless, existing sensitive receivers at Whampoa Gardens are exposed to noise levels of 78 dB(A). The predicted noise levels of marginally above 70 dB(A) from HHB would not increase the noise levels of the area.

Noise from construction activities, and dust from use of unpaved haul roads, are likely to affect sensitive receivers in the study area. Measures are suggested to alleviate the impact.

5.2 AIR QUALITY ASSESSMENT

The HHB and PML are unlikely to adversely affect air quality on Hung Hom Bay Reclamation.

5.3 VISUAL AND LANDSCAPE ASSESSMENT

The visual and landscape impacts of the proposed road alignments will be high. The most sensitive areas are East Tsim Sha Tsui and its waterfront, and Hung Hom Bay Reclamation along the Bypass alignment.

The waterfront area in East Tsim Sha Tsui offers an opportunity to create a significant and striking feature using the proposed road structure linked to associated walkway and open spaces.

The greatest impact on existing vegetation is in the area of the Hung Hom Interchange and Rail Lands.

Landscape Strategy is recommended for inclusion into the Project to ameliorate the adverse visual and landscape impact.

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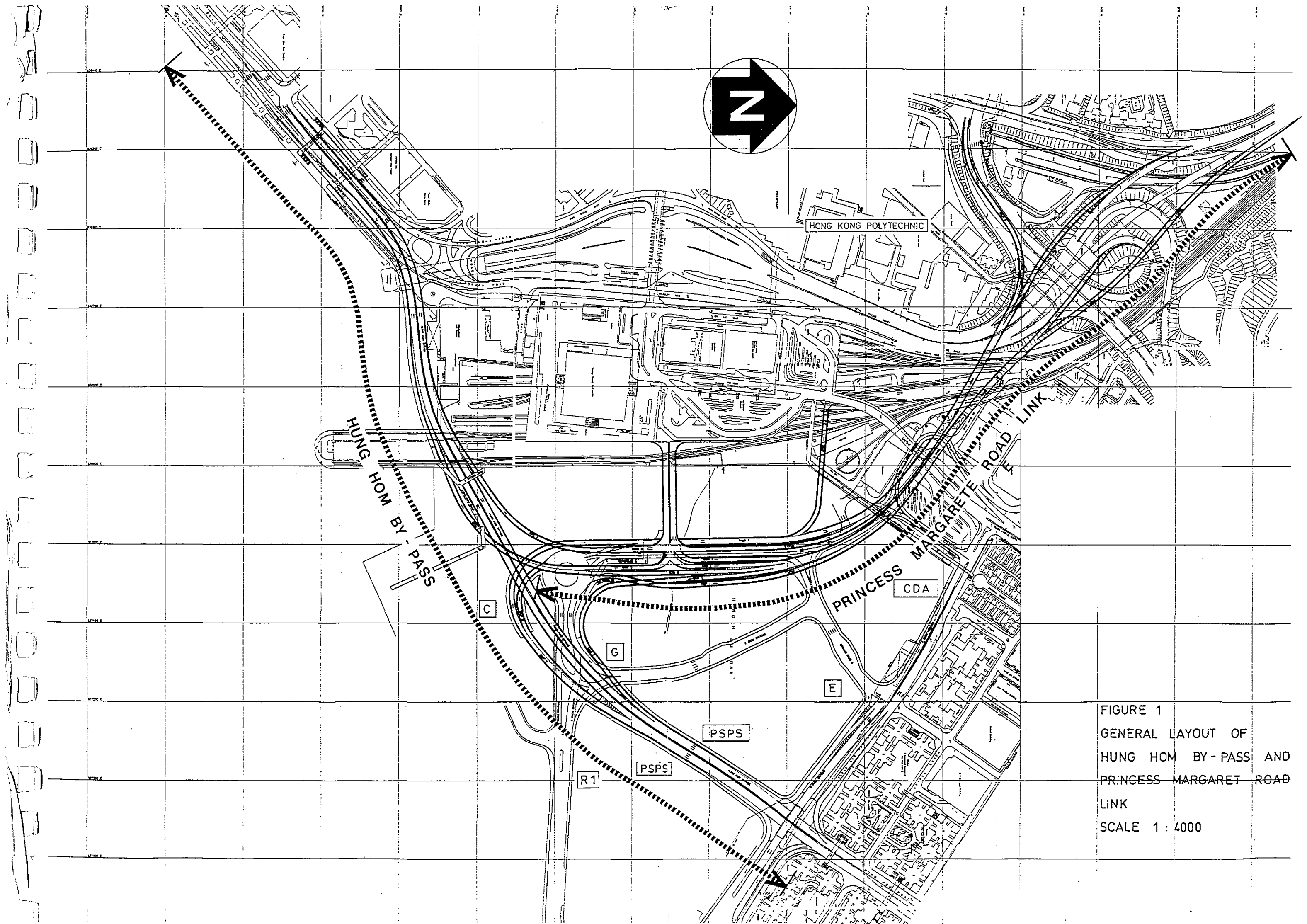
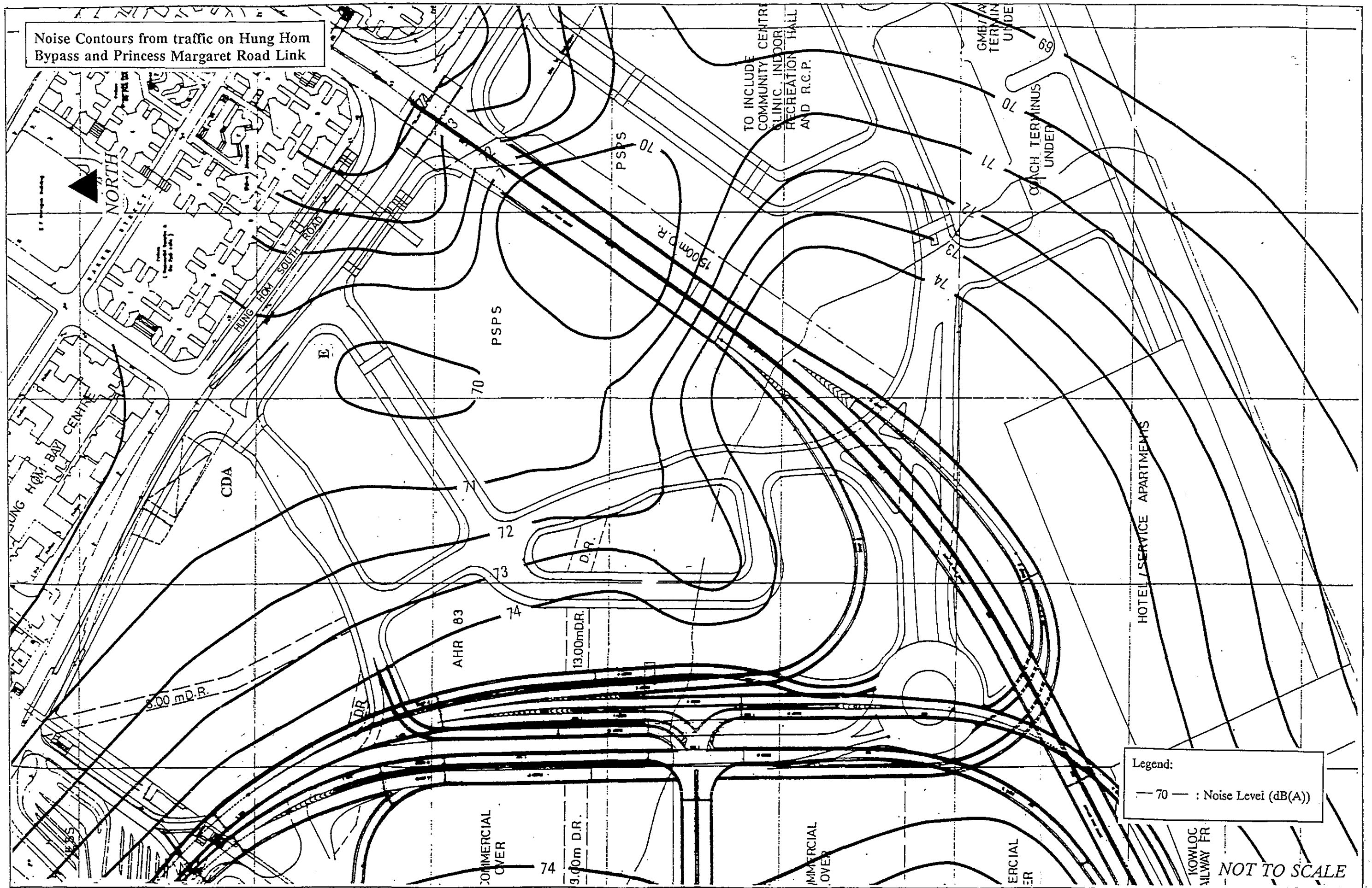
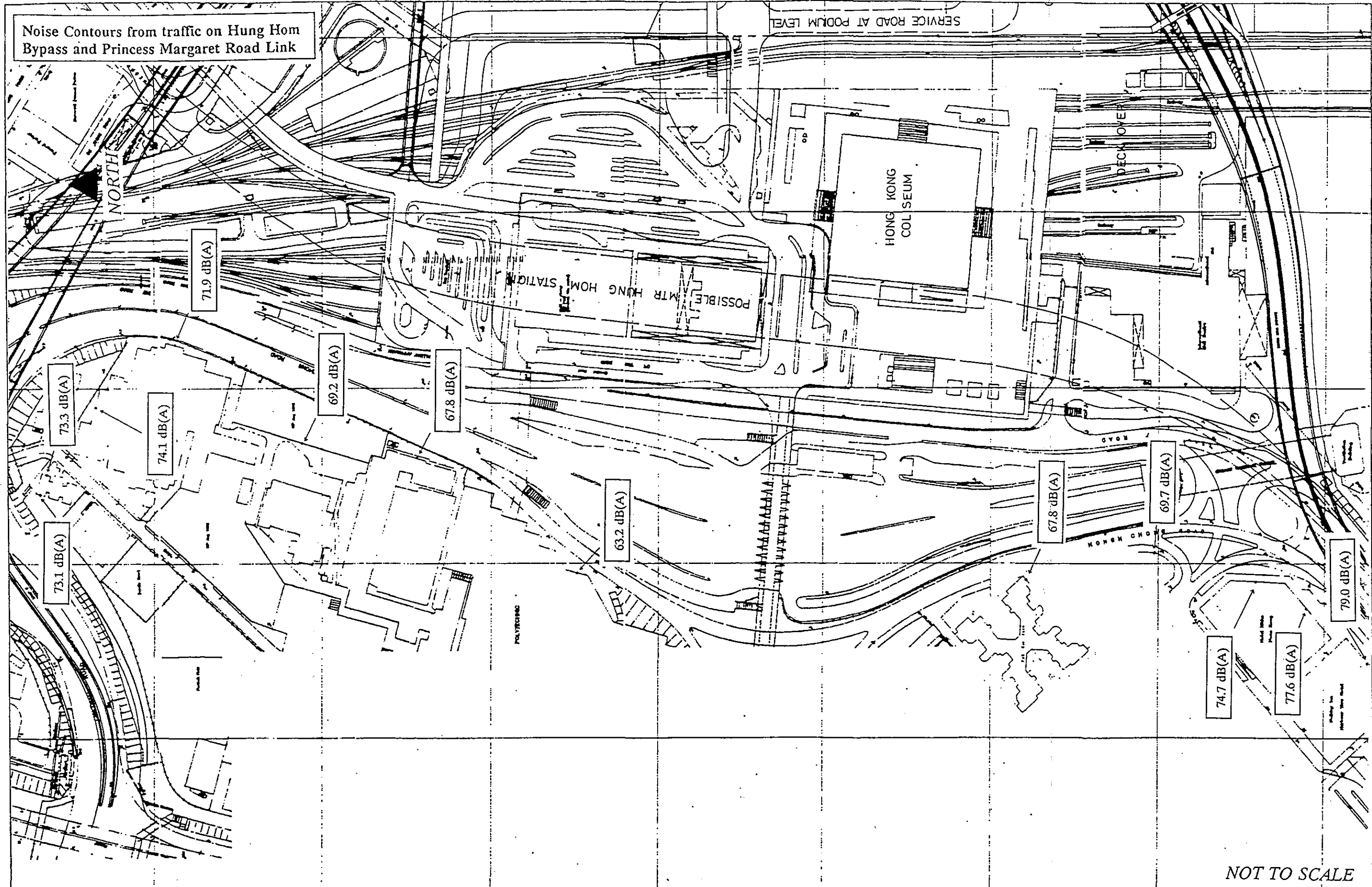


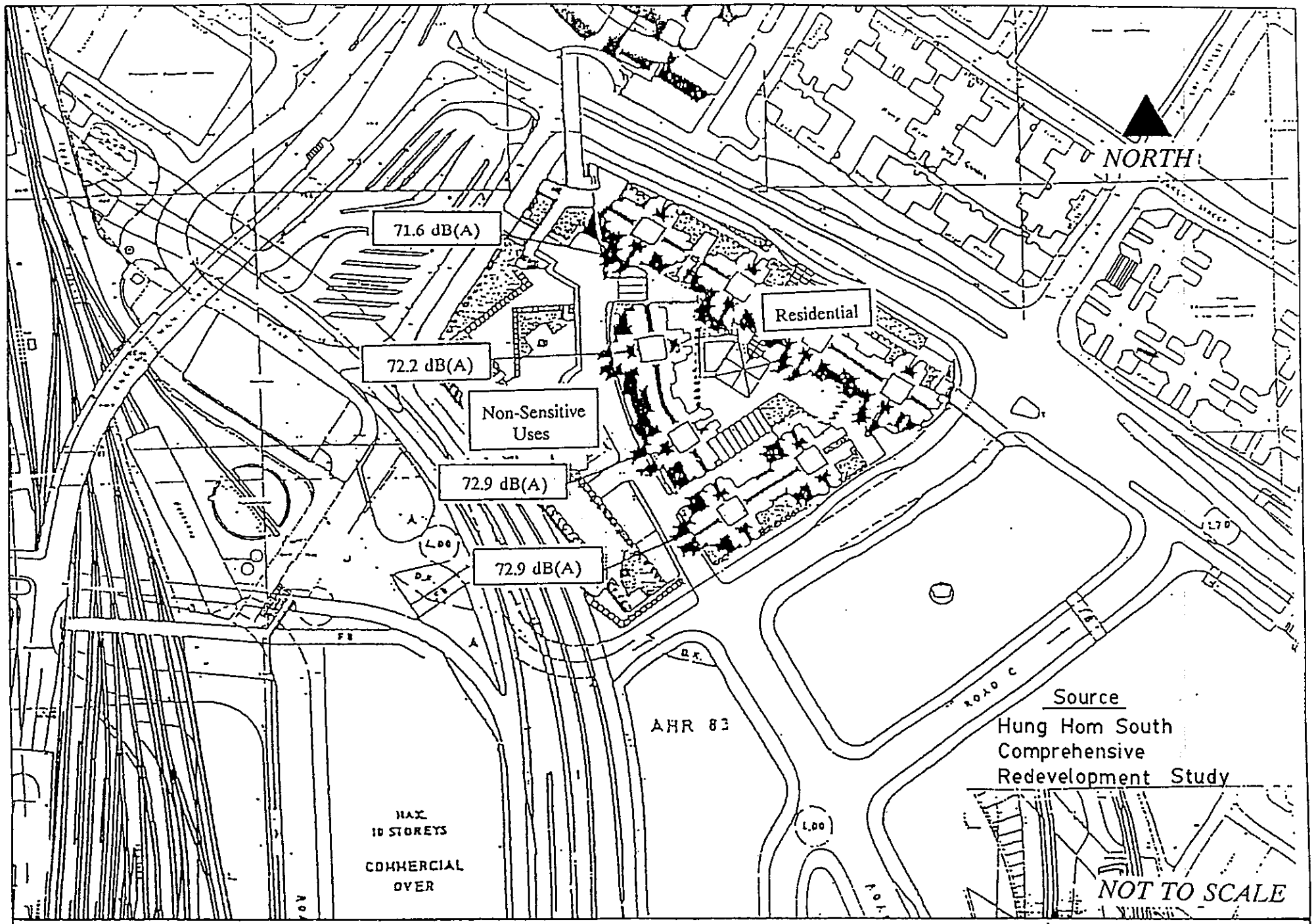
FIGURE 1
 GENERAL LAYOUT OF
 HUNG HOM BY-PASS AND
 PRINCESS MARGARET ROAD
 LINK
 SCALE 1 : 4000



Noise Contours of L10(1-hr.) in dB(A) for the Worst Facade Orientations at 80m PD (No Mitigation Measures)

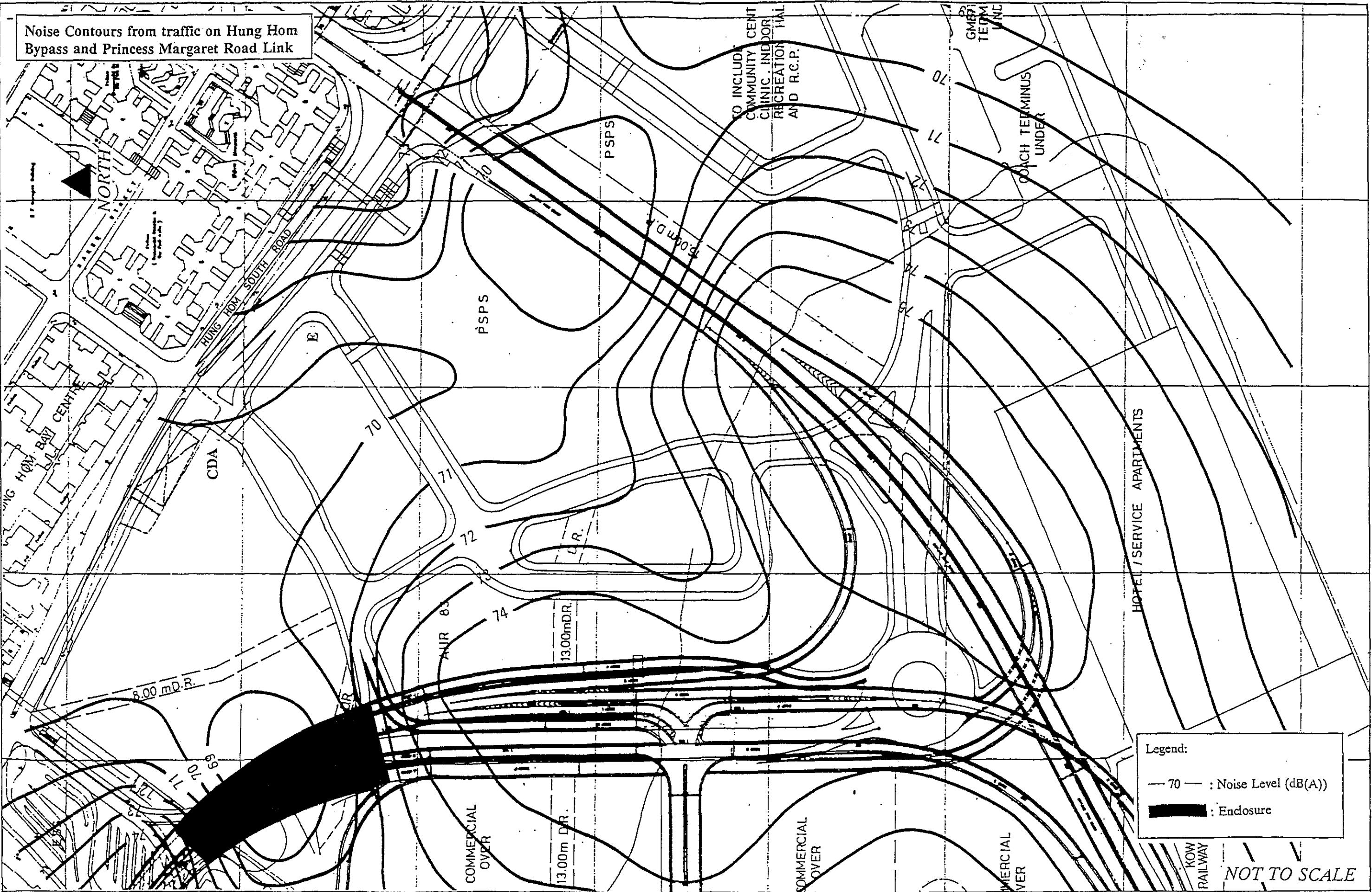


Predicted Facade Noise Levels at the Built-up Area in Tsim Sha Tsui East and Hong Kong Polytechnic (No Mitigation Measures)



Predicted Facade Noise Levels at Proposed CDA Development (Assumes Barrier Development On Western Site)

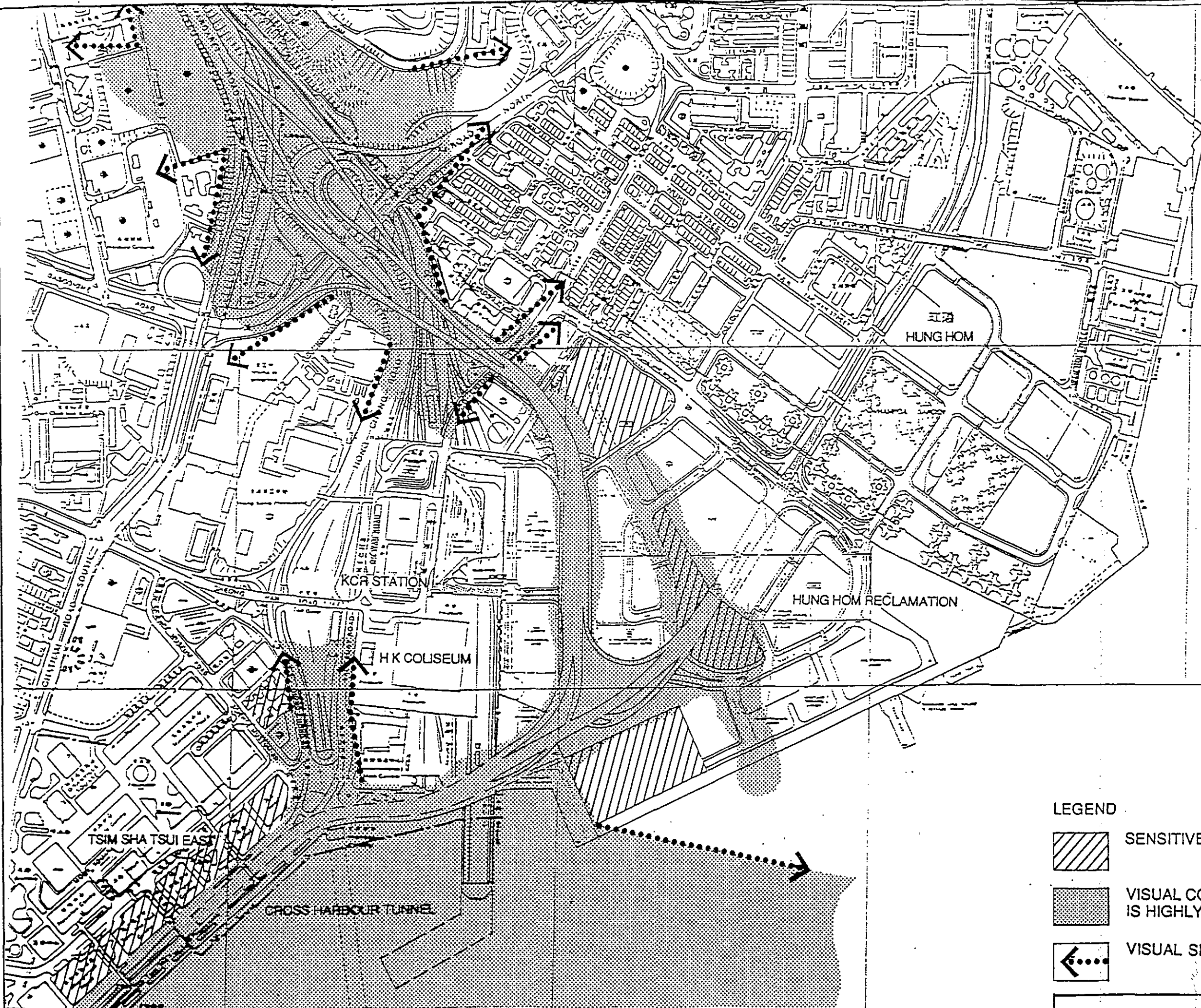
Noise Contours from traffic on Hung Hom Bypass and Princess Margaret Road Link





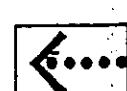
Noise Contours of L10(1-hr.) in dB(A) for the Worst Facade Orientations at 80m PD with Total Enclosure for a Section of the PMRL

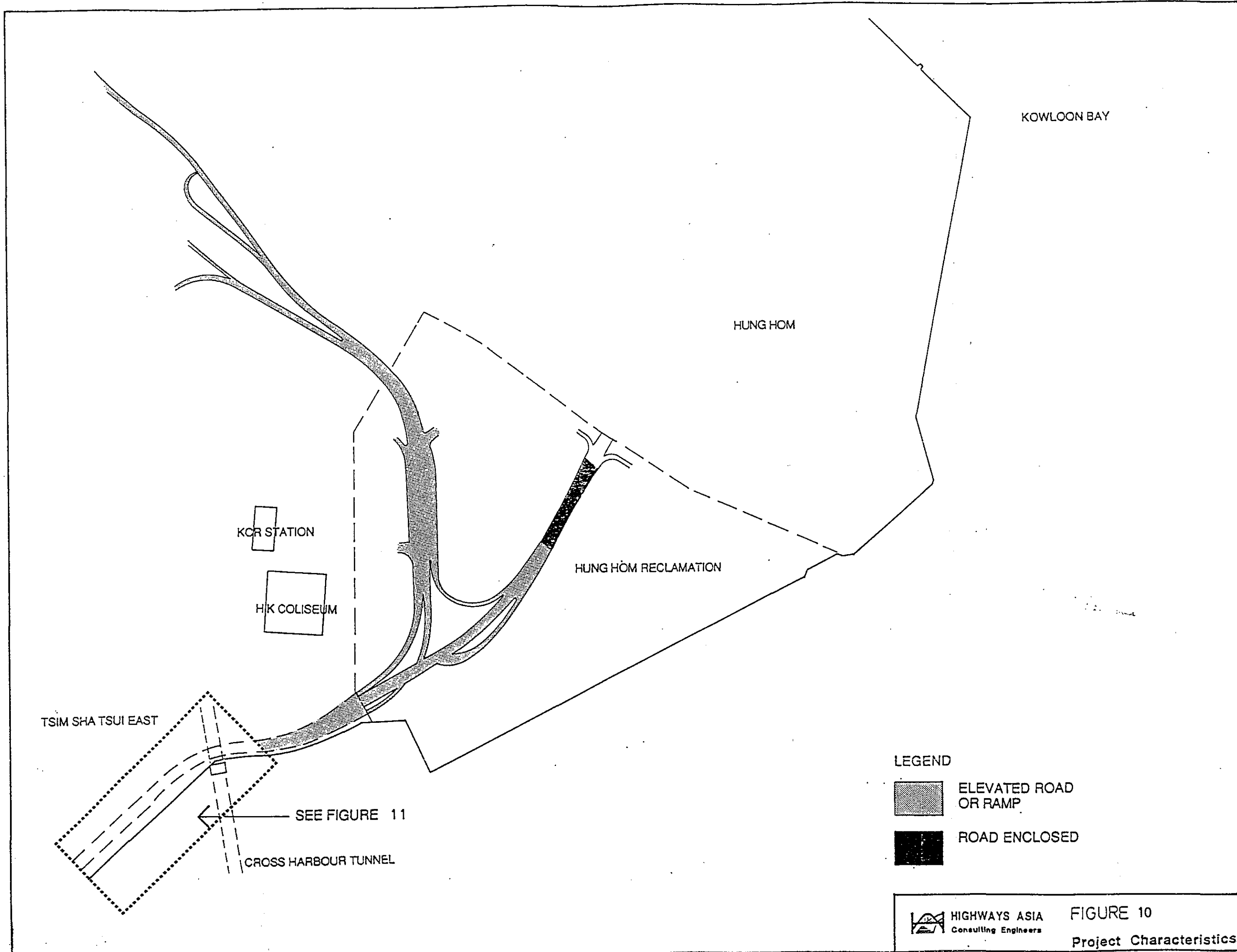
九龍灣

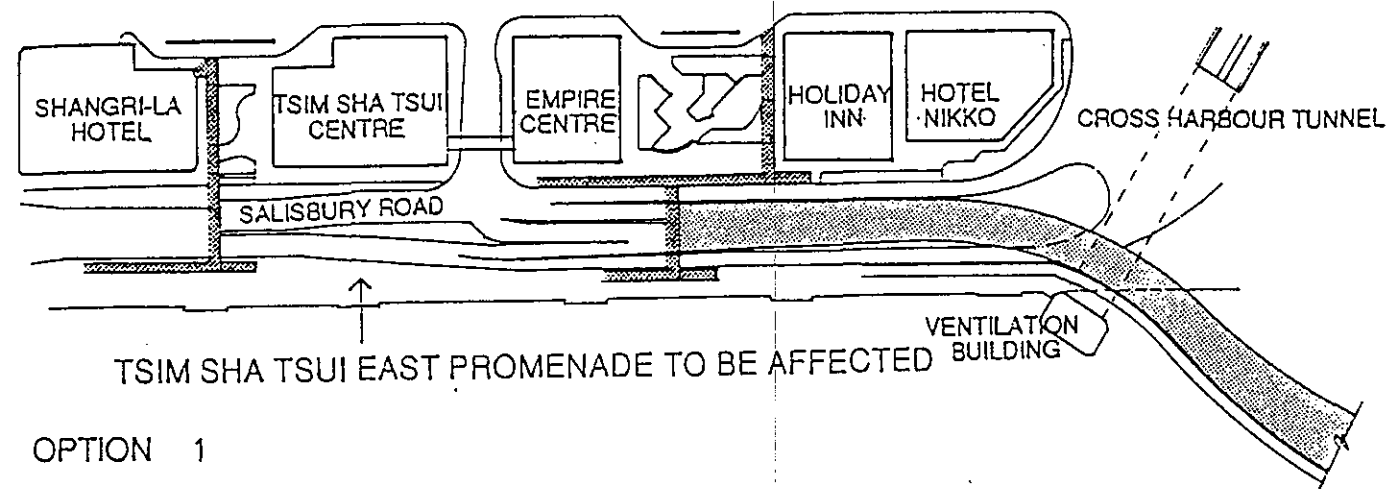
KOWLOON BAY



LEGEND


-  SENSITIVE RECEIVERS
-  VISUAL CONE IN WHICH THE ALIGNMENT IS HIGHLY VISIBLE
-  VISUAL SHED





LEGEND

 ELEVATED ROAD OR RAMP

 PROPOSED FOOTBRIDGE

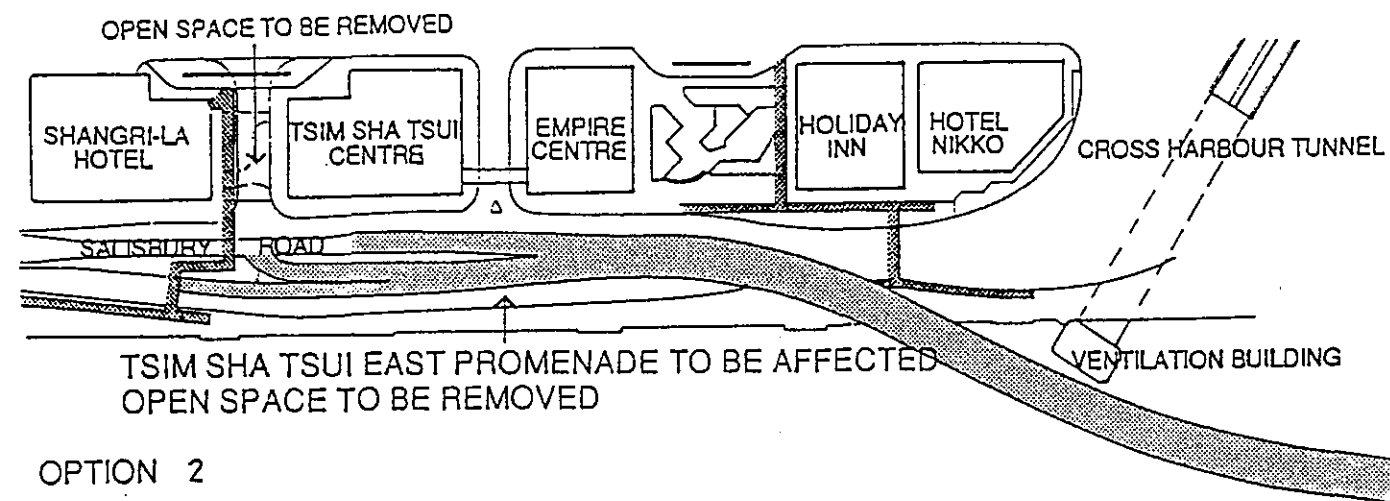
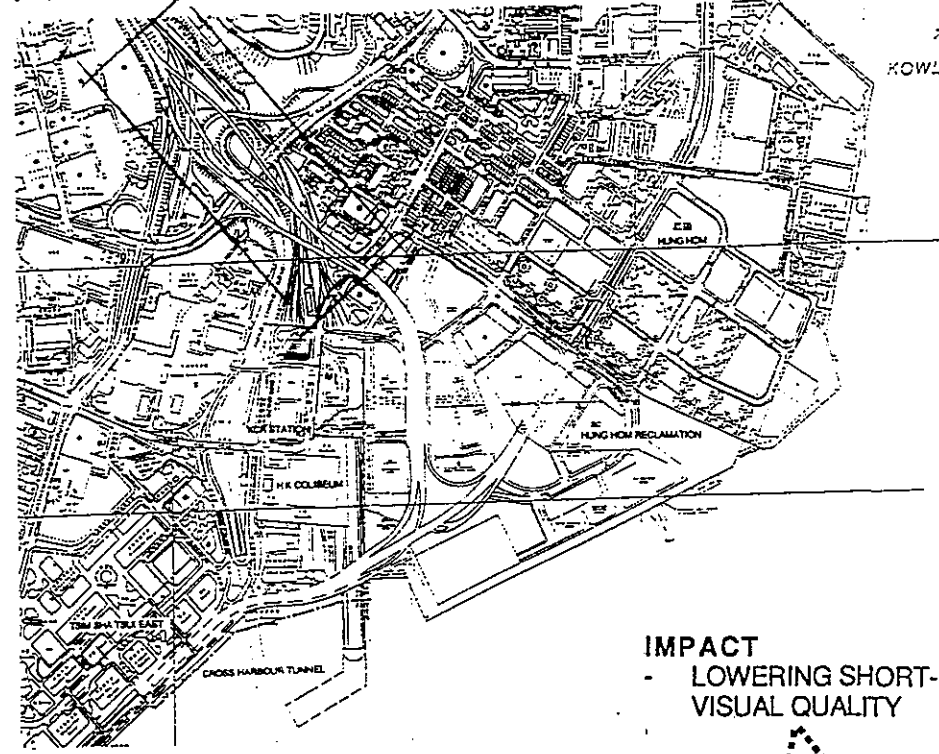


FIGURE 11

Project Characteristics
(Waterfront Section)

HUNG HOM BYPASS AND PRINCESS MARGARET ROAD LINK

九龍灣
KOWLOON BAY



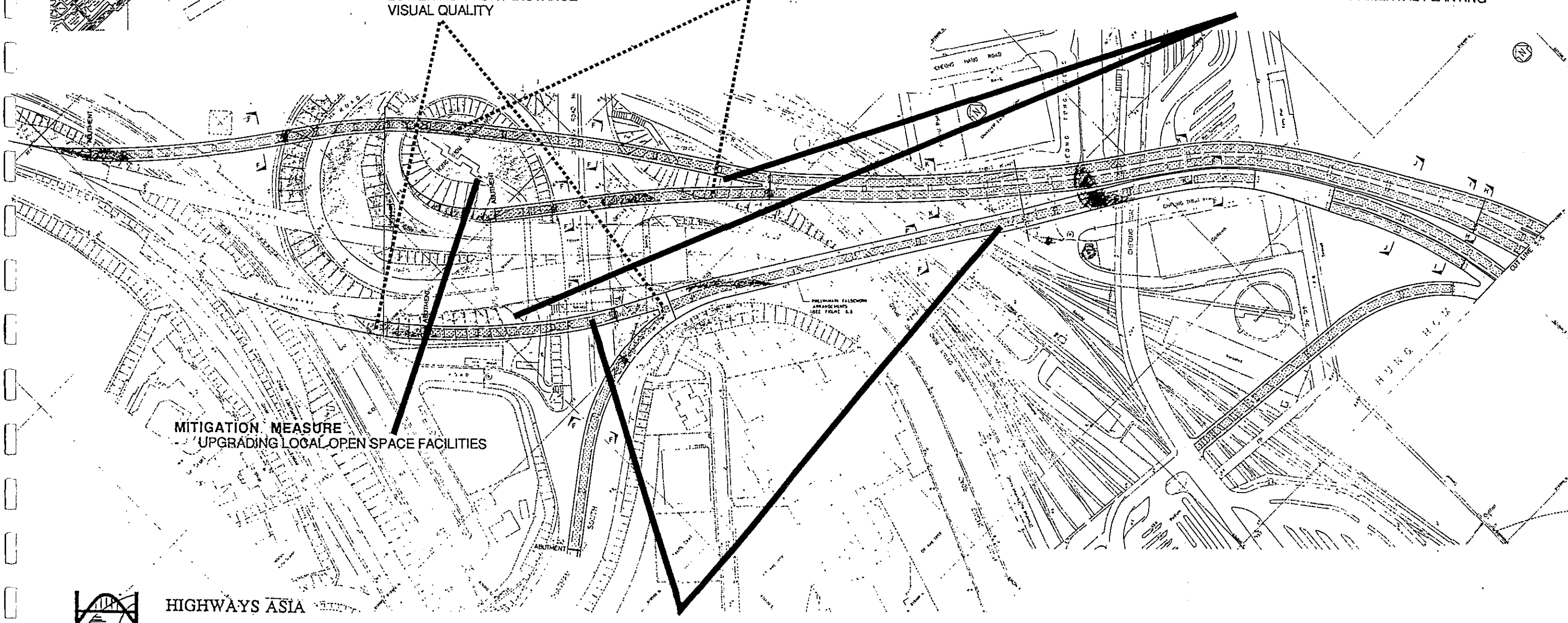
IMPACT
- LOWERING SHORT-DISTANCE VISUAL QUALITY

IMPACT
- VEGETATION REMOVAL

MITIGATION MEASURE
- REINSTATEMENT OF ORNAMENTAL PLANTING

MITIGATION MEASURE
- UPGRADING LOCAL OPEN SPACE FACILITIES

MITIGATION MEASURE
- LANDSCAPE HARDWORKS TREATMENT ON AND BENEATH STRUCTURE



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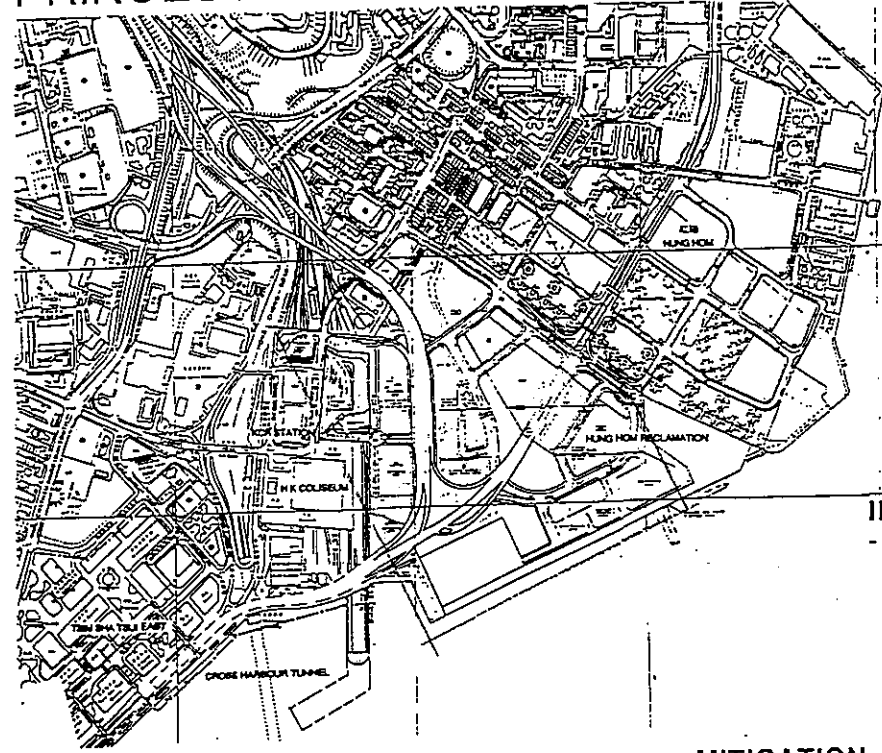


LANDSCAPE STRATEGY 2

FIGURE 13

HUNG HOM BYPASS AND PRINCESS MARGARET ROAD LINK

九龍灣
KOWLOON BA:



LIST OF USES BENEATH FLYOVERS / FOOTBRIDGES

PERMITTED USES

- 1 Amenity areas
- 2 Public latrines
- 3 Pedestrian ways or footways along or across the space below the flyover
- 4 Small car parks (with motor cycle parking spaces where appropriate)
- 5 Lorry parking spaces
- 6 Taxi stands
- 7 Bus stations and concourses (not bus depot) and overnight bus parking
- 8 Bus termini
- 9 Police reporting centres (mobile/fixe)
- 10 One or two storey Government office buildings
- 11 Government vehicles detention pounds
- 12 Offices of voluntary agencies and associations

TOLERATED USES

- 1 Local open spaces for passive use
- 2 Indoor recreation facilities
- 3 Tram depots
- 4 Mobile clinics
- 5 Permanent/temporary refuse collection points
- 6 Government departmental storerooms for non-inflammable, non-volatile goods
- 7 Police, ambulance or fire stations (preferably one storey)
- 8 Sewage screening plants
- 9 Temporary markets and hawker bazaars/stalls (excluding cooked food stalls or cooked food centres)
- 10 Mobile libraries and exhibition centres
- 11 Temporary works areas
- 12 Electric sub-stations/transformer houses

IMPACT
- VISUAL INTRUSION

IMPACT
- LORRY PARKING BENEATH ELEVATED STRUCTURE

MITIGATION MEASURE
- AMENITY PLANTING/HARDWORKS AROUND LORRY PARKING

MITIGATION MEASURE
WOODLAND BUFFER PLANTING COMBINED WITH CLEAR VISUAL AND PHYSICAL CONNECTIONS TO INTEGRATE THE TWO SIDES OF THE OPEN SPACE

SPECIAL LANDSCAPE HARDWORKS TREATMENT USING COLOUR, LIGHT AND OTHER FEATURES ON AND BENEATH THE ELEVATED STRUCTURE

MITIGATION MEASURE
- LANDSCAPE HARDWORKS TREATMENT ON AND BENEATH STRUCTURE

IMPACT
VISUAL INTRUSION TO PROPOSED DISTRICT OPEN SPACE, DIVIDING THE OPEN SPACE INTO TWO PARTS

LANDSCAPE STRATEGY 3

FIGURE 14



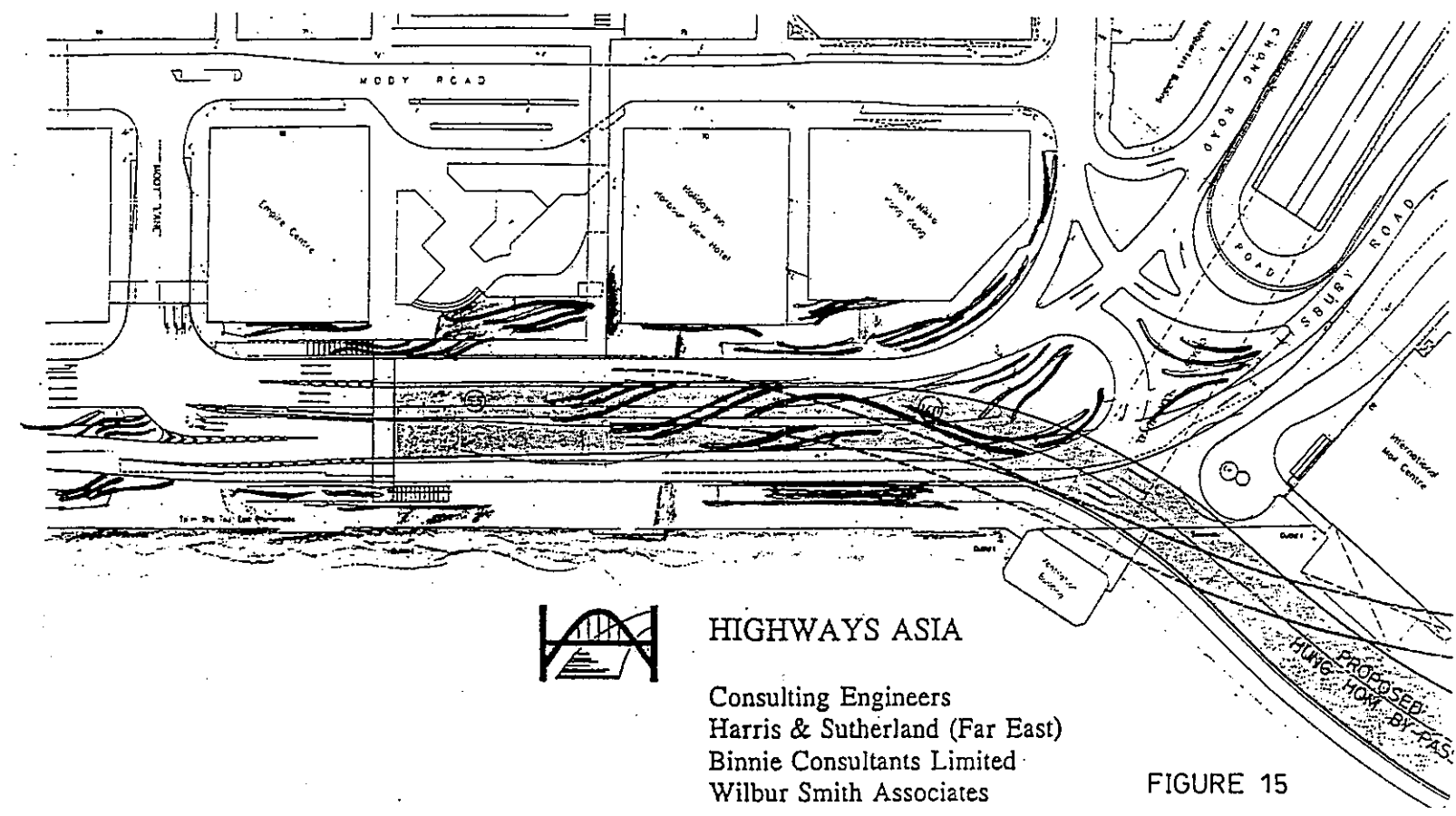
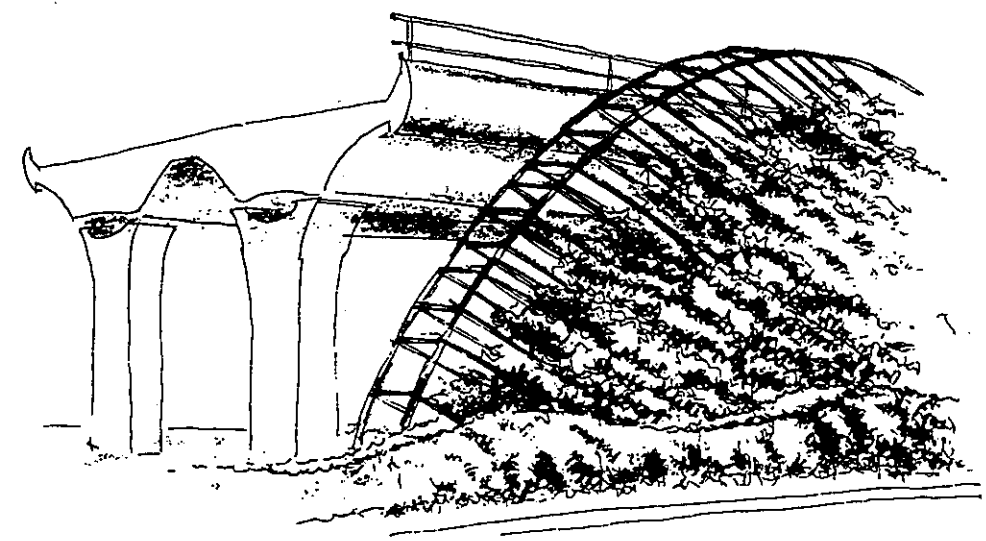
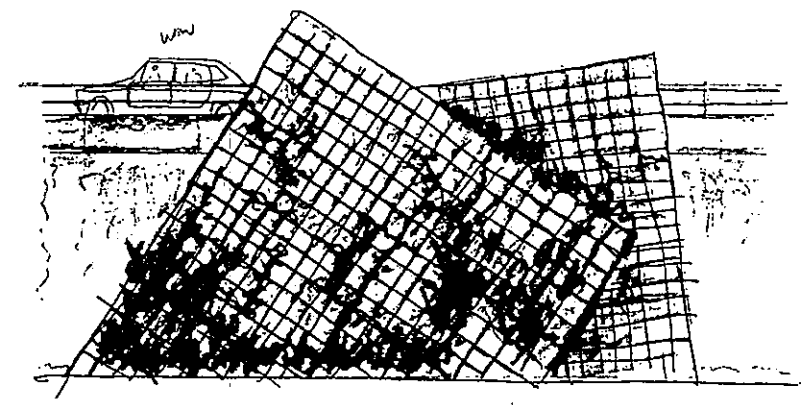
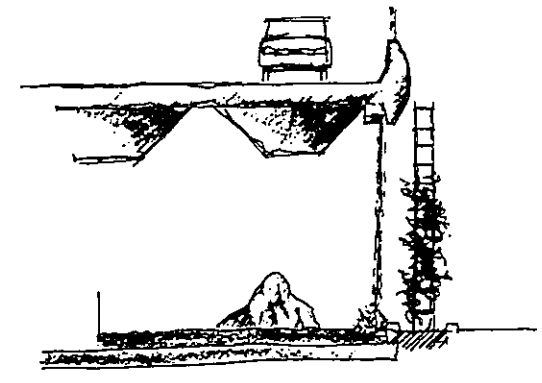
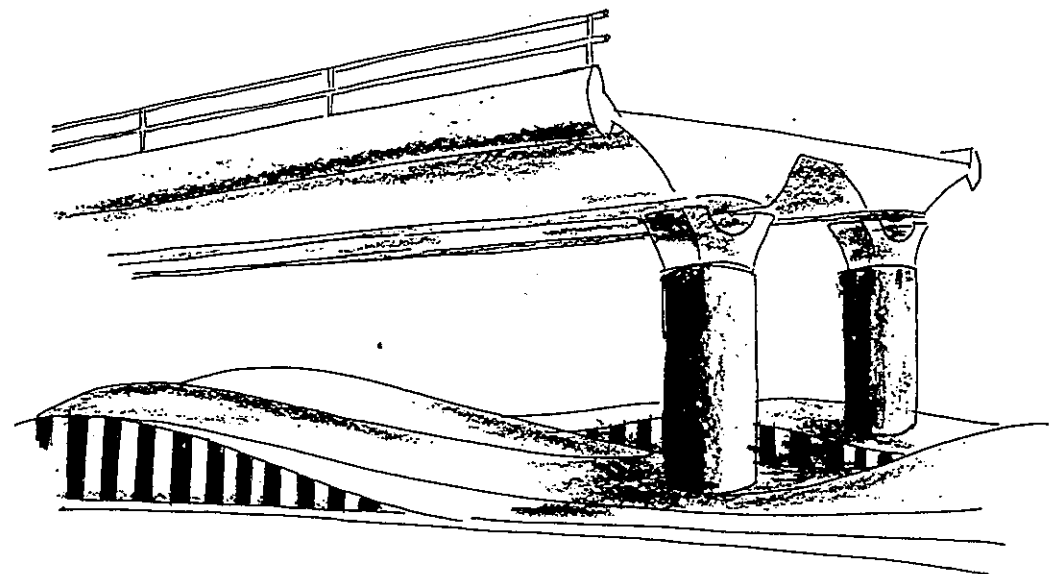
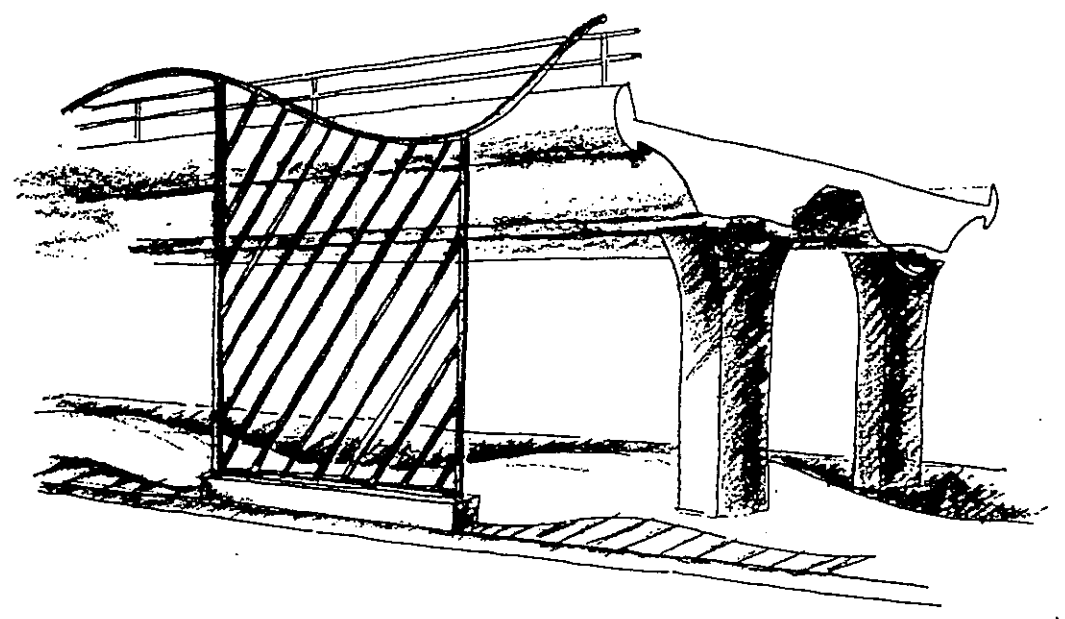
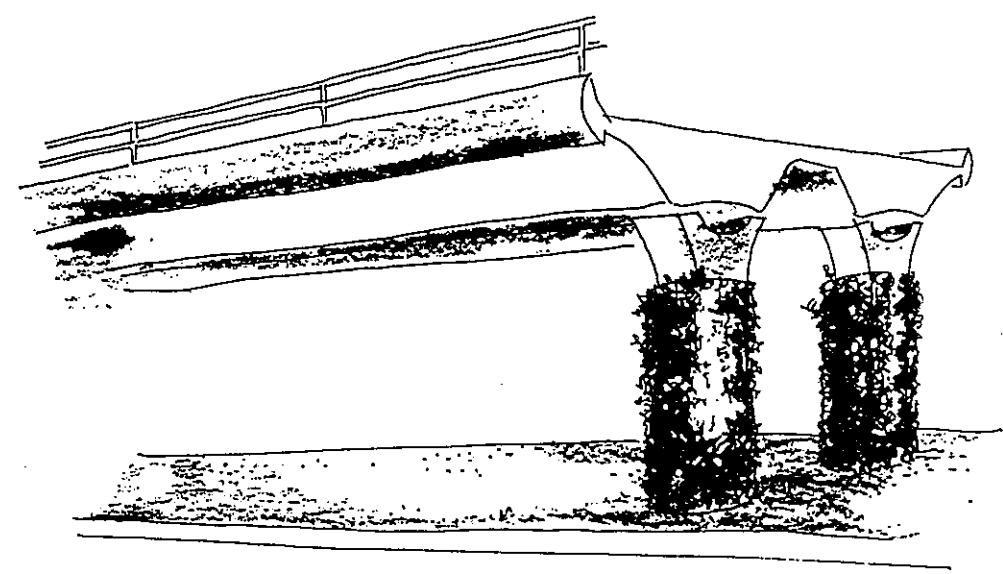
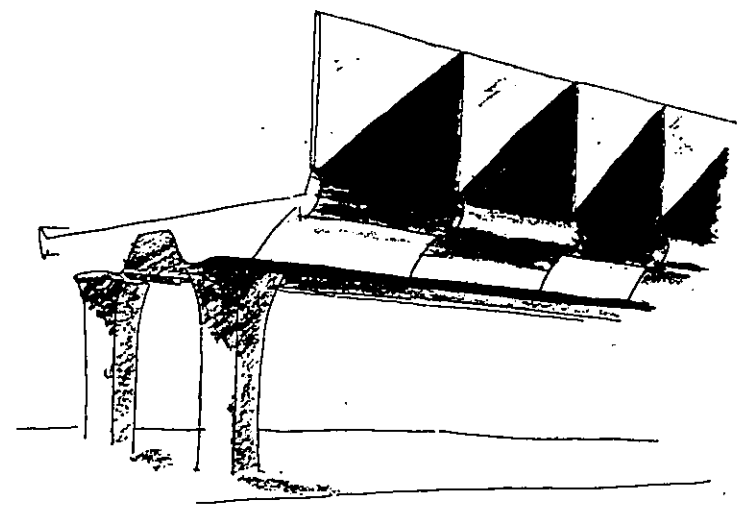
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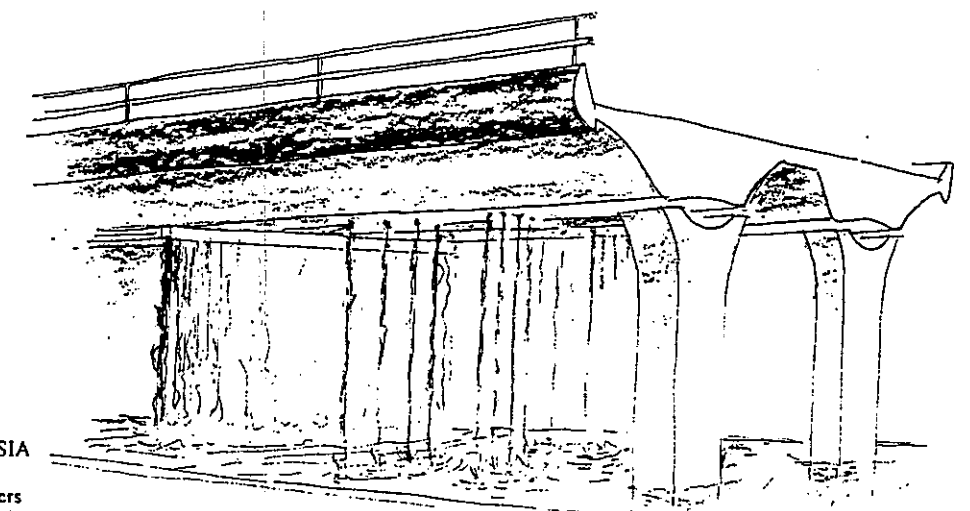
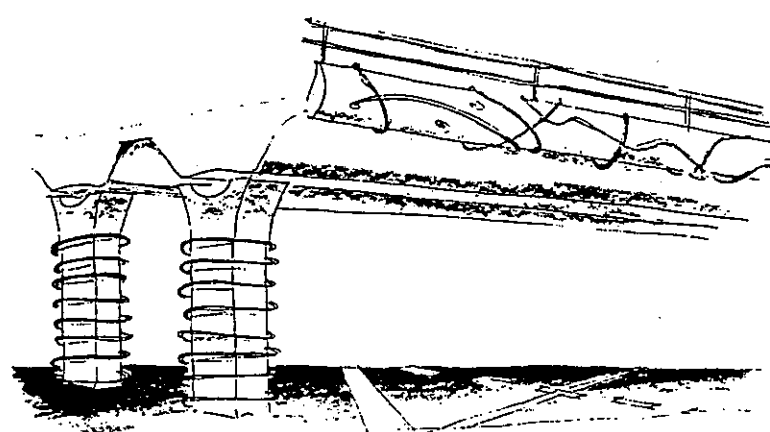
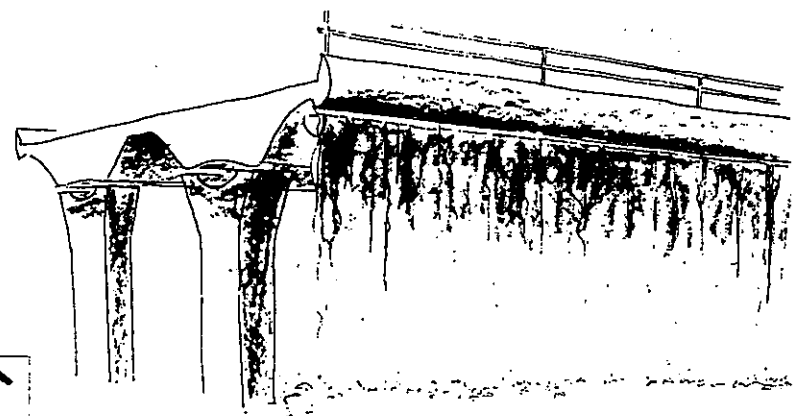
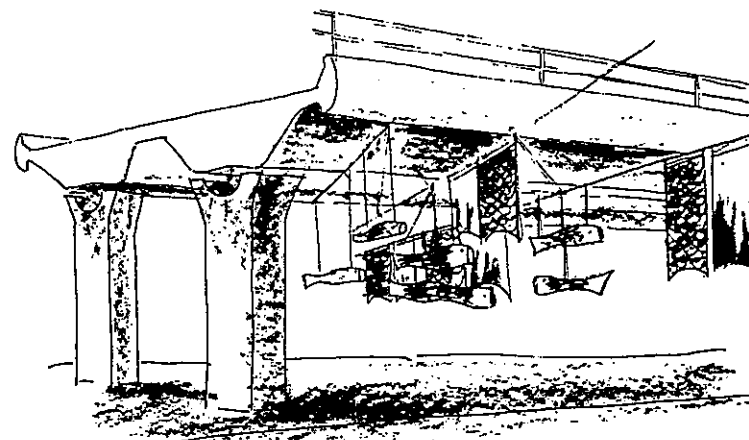
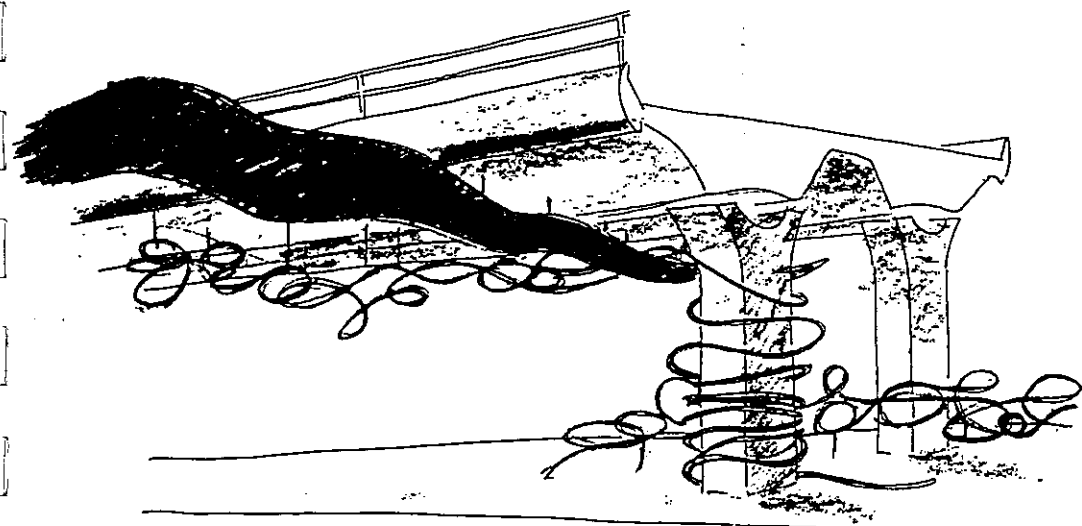
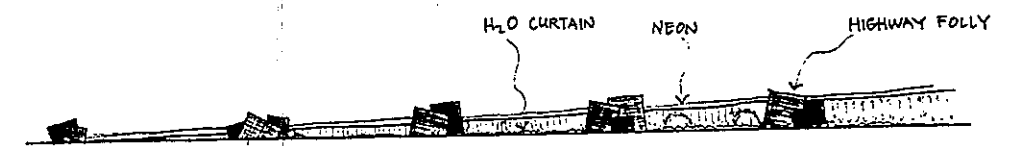
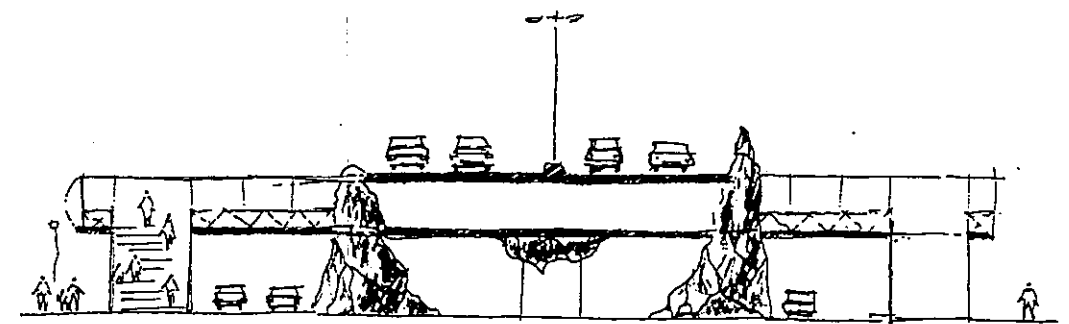
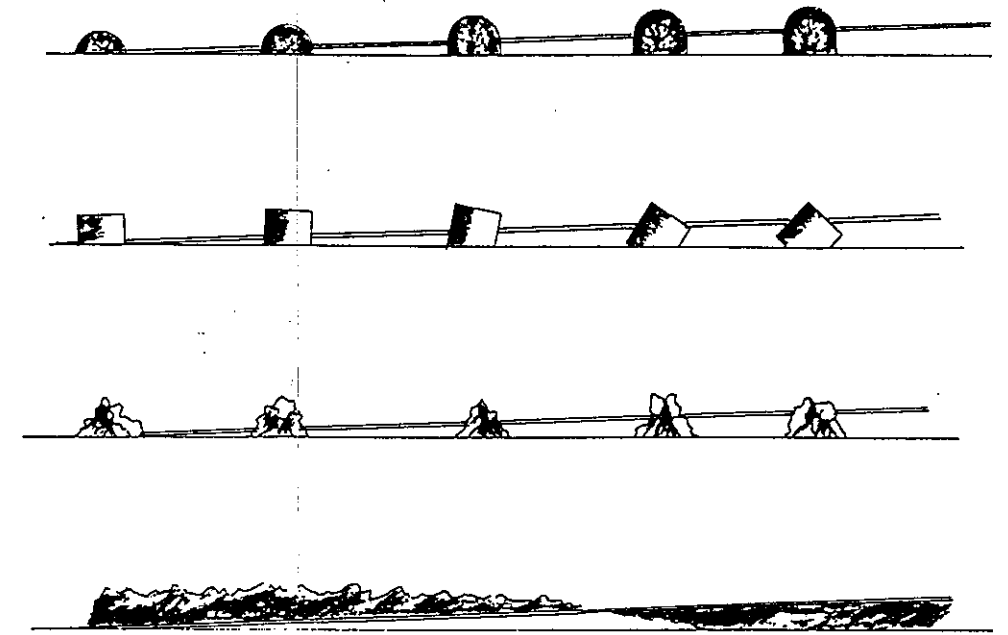
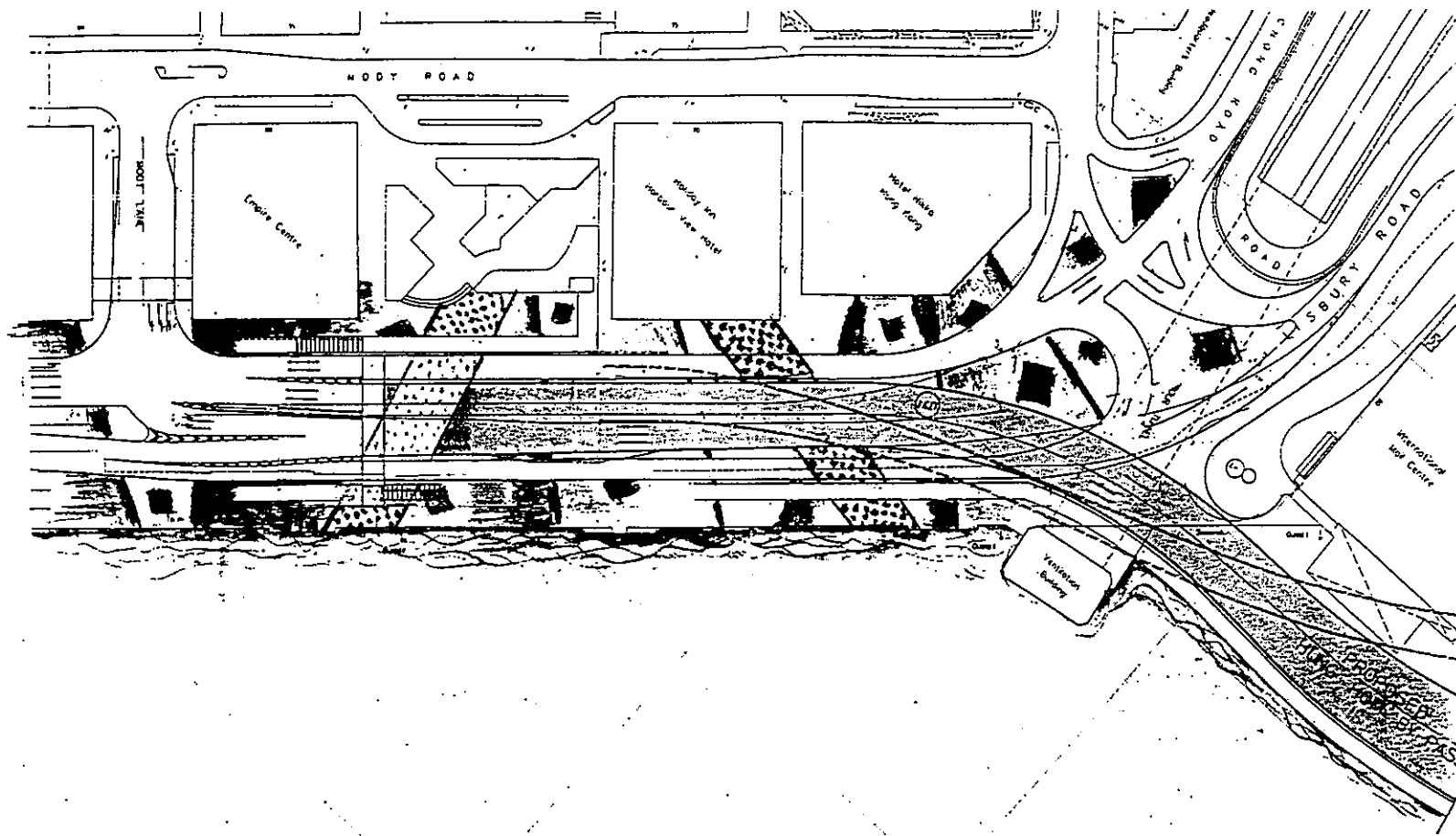


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FIGURE 15



JUNG HOM BYPASS AND PRINCESS MARGARET ROAD LINK

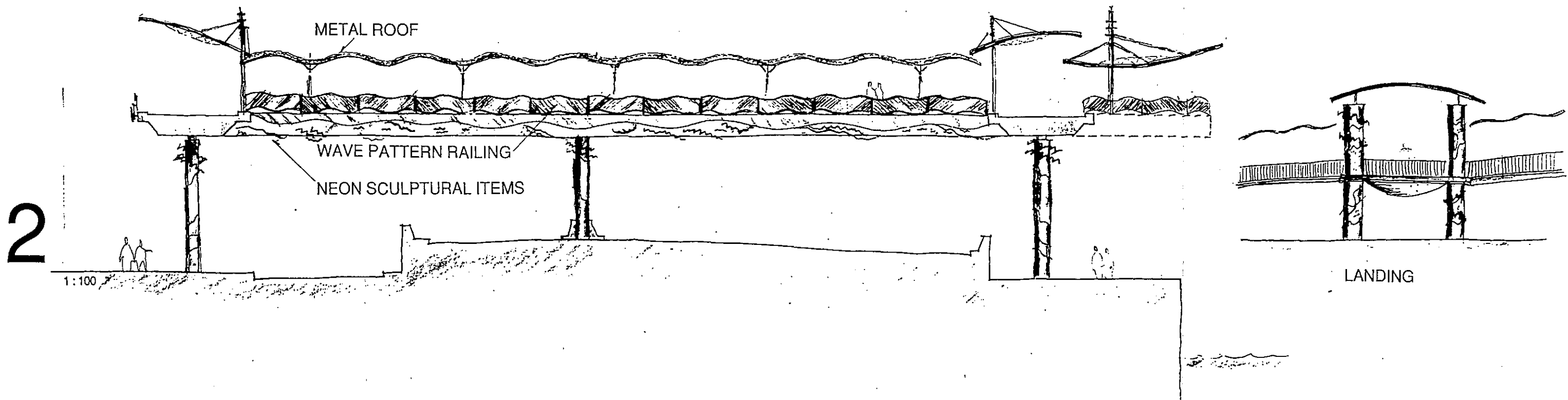
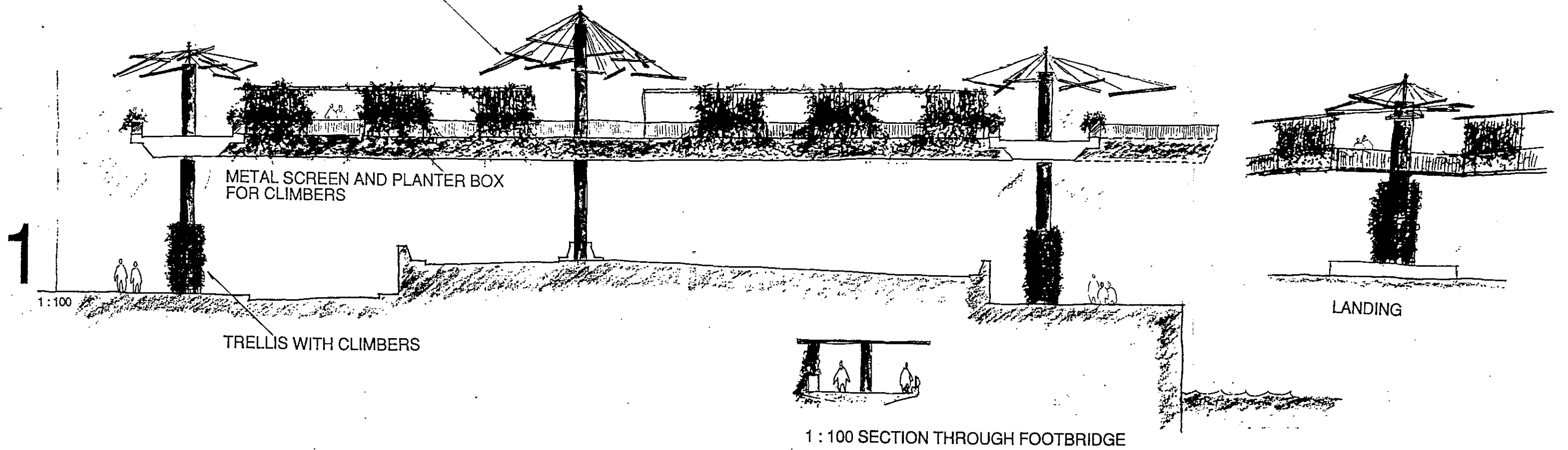


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FIGURE 16

HUNG HOM BYPASS AND PRINCESS MARGARET ROAD LINK

SUSPENDED COLOURED TRANSPARENT PLANES



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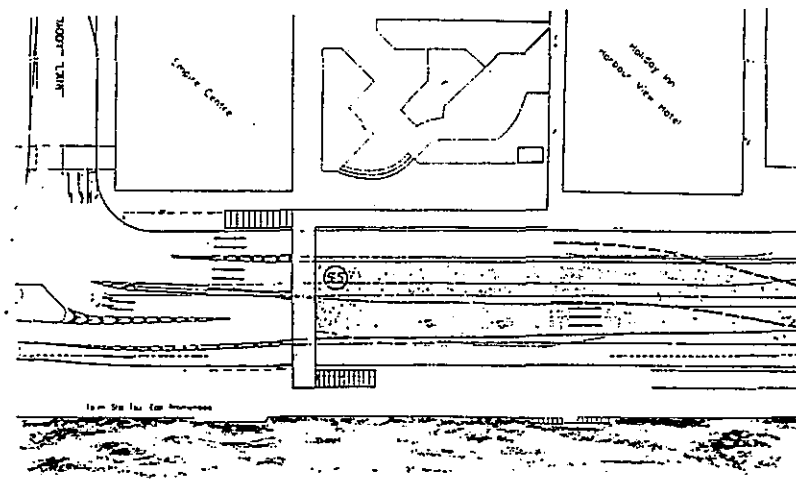
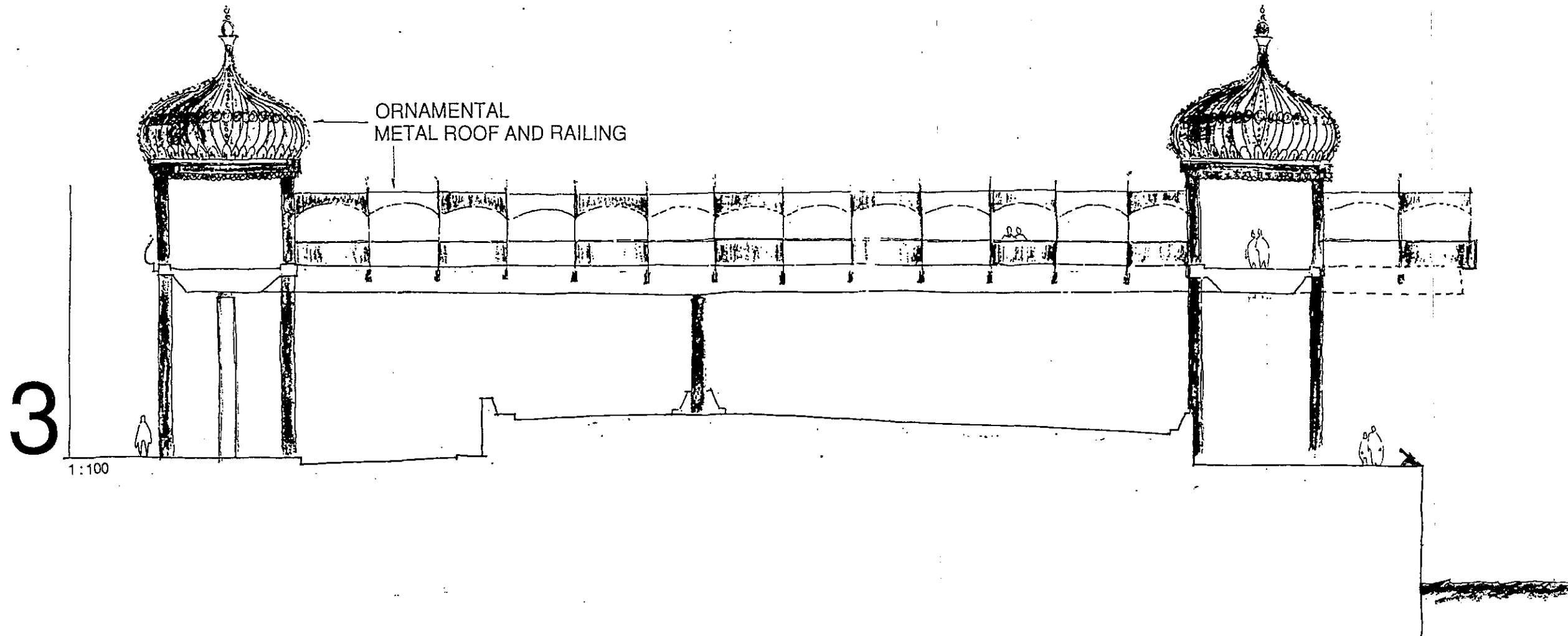


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CLOUSTON

FIGURE 17-

HUNG HOM BYPASS AND PRINCESS MARGARET ROAD LINK



FOOTBRIDGE LOCATION PLAN



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CLOUSTON

ROADSIDE AND MEDIAN ORNAMENTAL PLANTING AT TSIM SHA TSUI EAST
(A) NEW
(B) REINSTATEMENT

REINSTATEMENT OF ORNAMENTAL PLANTING IN PAVEMENT AT TSIM SHA TSUI EAST PROMENADE

FEATURE LANDSCAPE HARDWORKS TREATMENTS FOR THE ELEVATED STRUCTURE AND THE SPACE BENEATH (E.G. CLADDING, LIGHTING, BANNERS, FOUNTAINS, CASCADE BUT EXCLUDING SPECIAL SCULPTURES) AT TSIM SHA TSUI EAST

FEATURE LANDSCAPE HARDWORKS TREATMENTS (E.G. PAVING, LIGHTING, FOUNTAINS, SITTING OUT FACILITIES BUT EXCLUDING SPECIAL SCULPTURES) AT TSIM SHA TSUI EAST PROMENADE (HIGH PROFILE)

REINSTATEMENT OF EXISTING (A) ORNAMENTAL AND (B) AMENITY WOODLAND PLANTING (INCLUDES TRANSPLANTING OF EXISTING TREES AND NEW AMENITY/WOODLAND PLANTING IN AREA AFFECTED BY THE ALIGNMENT) AT HUNG HOM INTERCHANGE AND RAILWAY LANDS

UPGRADING OF AMENITY HARDWORKS (INCLUDES PAVING, SITTING-OUT FACILITIES AND LIGHTING) AT HUNG HOM INTERCHANGE AND RAILWAY LANDS (LOW PROFILE)

- (A) TREE PLANTING ON AMENITY STRIPS ON LOCAL ROADS ON HUNG HOM RECLAMATION, WHERE POSSIBLE
- (B) LANDSCAPE TREATMENT OF TRAFFIC ISLANDS, MEDIAN STRIPS AND UNDERNEATH ELEVATION STRUCTURES ON HUNG HOM RECLAMATION

FEATURE LANDSCAPE HARDWORK TREATMENTS FOR THE REST OF THE ALIGNMENT (E.G. CLADDING, LIGHTING AND FEATURE MOTIFS) ON HUNG HOM RECLAMATION, HUNG HOM INTERCHANGE AND RAILWAY LANDS

PROPOSED LANDSCAPE WORKS

