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**Environmental Impact Assessment
Executive Summary**

**Territory Development Department
(Agreement No. CE34/93)**

**Yuen Long - Tuen Mun Corridor, Engineering Works
for Hung Shui Kiu**

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EIA-121.3/BC

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Ref.: R829-1.97
Date : August 1997

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1. INTRODUCTION

The North West New Territories Base Development Strategy, completed in 1983 and endorsed by the Land Development Policy Committee in February 1984, recommended to develop the Hung Shui Kiu Area into a District Centre with "Medium Density Urban Development" to serve the population of the Corridor. In recent years, several private residential buildings have already been developed in the area. A rural public housing estate has also been scheduled in Area 13 to be developed by the Housing Society. Hung Shui Kiu will also provide government, institution and community facilities for the population in the area. There is a vital need to provide infrastructural facilities to cope with the increasing demand from both existing and future developments in the area.

EHS Consultants Limited (EHS) was commissioned by the Hong Kong Government Territory Development Department (TDD) as sub-consultant to Ho Tin & Associates Consulting Engineers Limited (Ho Tin) to undertake an Environmental Impact Assessment (EIA) in relation to two proposed infrastructural development projects. These engineering works include :

- (i) "Yuen Long - Tuen Mun Corridor - Engineering Works for Commercial/ Residential Areas at Hung Shui Kiu, Stage II, Phase I" (PWP Item 225CL) as shown in *Figure A* to be undertaken by the Highways Department (HyD); and
- (ii) the proposed road works and site formation to be implemented under Agreement No. CE34/93: "Yuen Long - Tuen Mun Corridor - Engineering Works for Hung Shui Kiu" (PWP Items 225CL and 253CL) as shown in *Figure B*.

The former project has been scheduled to commence in early 1999 and finish in 2000, while the latter would commence in 2000 and finish in 2002. This Executive Summary presents a summary of the main findings and recommendations of the EIA Study which has been endorsed by the Study Management Group.

2. OBJECTIVE OF THE EIA

The main objective of the EIA Study was to assess the potential air quality and noise impacts associated with the construction and operation of the proposed projects as shown in Figures A and B. Particular attention was drawn to the potential traffic noise impact on both existing and future noise sensitive receivers (NSRs) situated along the proposed Road D1 (the improved Tin Ha Road) and Road D2 which have been predicted to carry relatively high traffic flows in the future. Practicable noise mitigation measures have been developed and evaluated against various site constraints and requirements. Air quality and noise impacts during the construction phase has also been assessed with practicable mitigation measures recommended.

3. PROJECT DESCRIPTION

The scope of the two engineering works is summarised as follows :

- (i) PWP Items 225CL and 253CL : "Yuen Long - Tuen Mun Corridor - Engineering Works for Hung Shui Kiu" to be carried out under agreement no. CE34/93 :
 - site formation of about 2.2 hectare of land for various government and public uses;
 - construction of about 3.4 km of access roads;
 - construction of cycle tracks and footpaths;
 - construction of road drainage, sewers and associated works; and
 - landscaping and any environmental impact abatement works.

- (ii) PWP Item 225CL : "Yuen Long - Tuen Mun Corridor - Engineering Works for Commercial/ Residential Areas at Hung Shui Kiu, Stage II, Phase I" to be undertaken by the HyD :
- construction of Road L1 and the associated cycle tracks and footpaths;
 - construction of the section of road L2 not covered under agreement no. CE34/93 and the associated cycle tracks and footpaths;
 - widening of a section of the existing Tin Ha Road and the construction of the associated cycle tracks and footpaths;
 - realignment of a small section of Tin Ha Road adjacent to Castle Peak Road; and
 - landscaping and any environmental impact abatement works.

For the purpose of the construction air quality and noise impact assessments, a tentative construction schedule and an equipment list were developed. Although the assumed schedule will be subject to change when it is to be carried out in the future, the assessments have enable a test on the surmountability of the environmental impacts and allowed appropriate and sufficient mitigation measures to be formulated accordingly.

4. CONSTRUCTION PHASE IMPACT

4.1 Air Quality

The potential air quality impact resulted from the construction phase of the proposed projects is related to dust nuisance, which arise mainly from excavation or earthworks for road alignment and site formation, vehicle movement on unpaved haul roads, and material handling. Computer modelling of the worst case scenario indicated that air sensitive receivers (ASRs) situated in close proximity to the proposed road alignments and site formation area would be subjected to dust impact up to an hourly and daily dust level of $1100\mu\text{g}/\text{m}^3$ and $400\mu\text{g}/\text{m}^3$ respectively. This exceeds EPD's recommended TSP hourly guideline of $500\mu\text{g}/\text{m}^3$ and the Air Quality Objectives (AQOs) of $260\mu\text{g}/\text{m}^3$ specified for daily Total Suspended Particulate (TSP) in the Hong Kong Planning Standards and Guidelines (HKPSG). However, with the implementation of standard dust suppression measures, which shall be incorporated into contract documents and checked by Environmental Monitoring and Audit (EM&A) procedures, the dust criteria will be satisfied at the ASRs.

4.2 Noise

It is not envisaged that construction works during the restricted hours (i.e. between 19:00 to 07:00 hours the next day for Mondays to Saturdays and any time for Sundays and public holidays) would be required. The assessment of noise from construction works other than percussive piling has therefore been conducted based on the non-statutory limits recommended for daytime construction activities (i.e. 75dB(A) for residential premises, and 70dB(A) for schools which is lowered to 65dB(A) during students examination periods).

Based upon a reasonably assumed construction schedule and equipment inventory, the construction noise impact has been assessed with a conservative approach. Noise modelling has revealed that unmitigated construction activities will result in high noise levels of up to 92dB(A). Adequate mitigation measures will be required to reduce noise impact on Noise Sensitive Receivers (NSRs). Even with the use of silenced equipment and mobile barriers/ enclosure as mitigation, it is predicted that noise impact at some NSRs would still be exceeding the noise guidelines for construction works during the non-restricted hours for a short duration (i.e. within a few days). Additional mitigation measures such as, avoidance of simultaneous noisy activities,

reduction in numbers of plants operating in critical areas close to NSRs, noise insulation for the affected educational premises, and good site practice have been recommended. These mitigation measures should be implemented through contract clauses with their effectiveness monitored by a EM&A programme throughout the construction period.

Percussive piling will be required at the two nullah crossings. Based on the noise levels predicted at the worst-impacted NSRs, the appropriate permitted hours for percussive piling operation was determined for reference (i.e. 0800 to 9300 AND 1200 to 1400 AND 1630 to 1800 on any day not being a general holiday). A Construction Noise Permit (CNP) should be obtained from the Authority who will specify the permitted hours for percussive piling activities.

5. OPERATIONAL PHASE IMPACT

5.1 Vehicular Emission

Potential vehicular emission impact associated with future traffic flows on the proposed road carriageways was assessed using an air dispersion computer model, based on the emission factors provided by EPD and the worst case traffic forecasts for the year 2011. Modelling results revealed that the statutory Air Quality Objectives (AQOs) will be complied at all Air Sensitive Receivers (ASRs) situated along various road alignments.

5.2 Traffic Noise

Traffic noise impact arising from future traffic flows on the proposed road carriageways has been predicted with a noise model for the worst case scenario in year 2011. The modelling results indicated that the noise criteria as stipulated in the HKPSG can be satisfied at most of the existing and future NSRs located along the proposed road carriageways. Exceptions include the existing NSRs and potentially affected future noise sensitive land use zonings situated along Road D1 (improved Tin Ha Road) and Road D2, the existing kindergarten lying along Road D1 in Tin Sum Tsuen, the proposed nursery (one element of a planned Area Community Centre), school and clinic to be constructed along Road L1 in Areas 6, 7 and 8 respectively, as well as an existing kindergarten situated near the junction of Roads L1 and L2.

Various direct technical remedies, which include the alternative alignment of Roads D1 and D2, paving road surface with open texture, and partial or full enclosure of the roads, have been considered in the EIA but are considered to be impracticable. Besides, taking into consideration various site constraints such as traffic and engineering requirements, safety and particularly, the presence of numerous existing run-ins/ accesses along the existing Tin Ha Road, it is considered that the erection of noise barriers along the improved Tin Ha Road (Road D1) is not a feasible noise mitigation measure.

With a consideration of similar site factors, a direct noise mitigation package comprising 2m, 3m and 5m high roadside noise barriers has been developed for Roads D2 and L1 and recommended for implementation to protect affected existing and future NSRs situated along these planned road carriageways. Locations of the proposed noise barriers are presented in Figure C.

After the implementation of all identified direct noise mitigation measures, it is predicted that there would still be residual noise impacts at some of the existing and future NSRs. Residual noise impacts at the affected existing NSRs have been tested for eligibility for indirect measures in form of acoustic insulation as a "last resort". The assessment result indicated that the existing kindergarten situated near the junction of Roads L1 and L2 will qualify for noise insulation and provision of air conditioners. Regarding the future NSRs at which the mitigated noise levels will still exceed the HKPSG noise criteria, constraints in terms of the need to provide receiver mitigation measures have been identified. Possible noise mitigation measures that can be implemented at receivers include building design and orientation, use of extended podium, setback of buildings, and erection of solid fence wall at site boundary, etc.

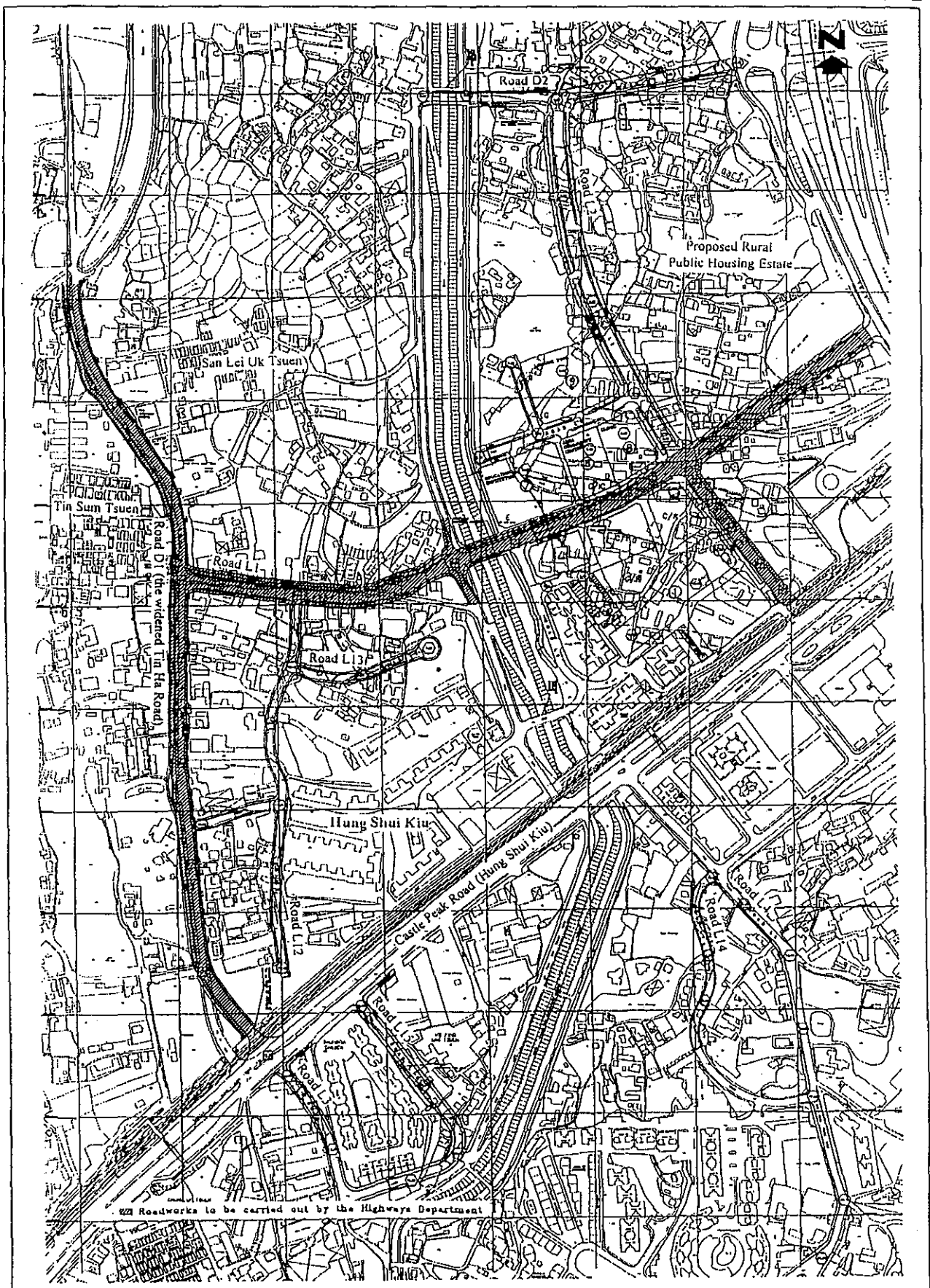
6. CONCLUSION


The EIA study has assessed the potential environmental impacts associated with the construction and operation of the two proposed engineering works to be undertaken by the Highways Department and under agreement no. CE34/93.

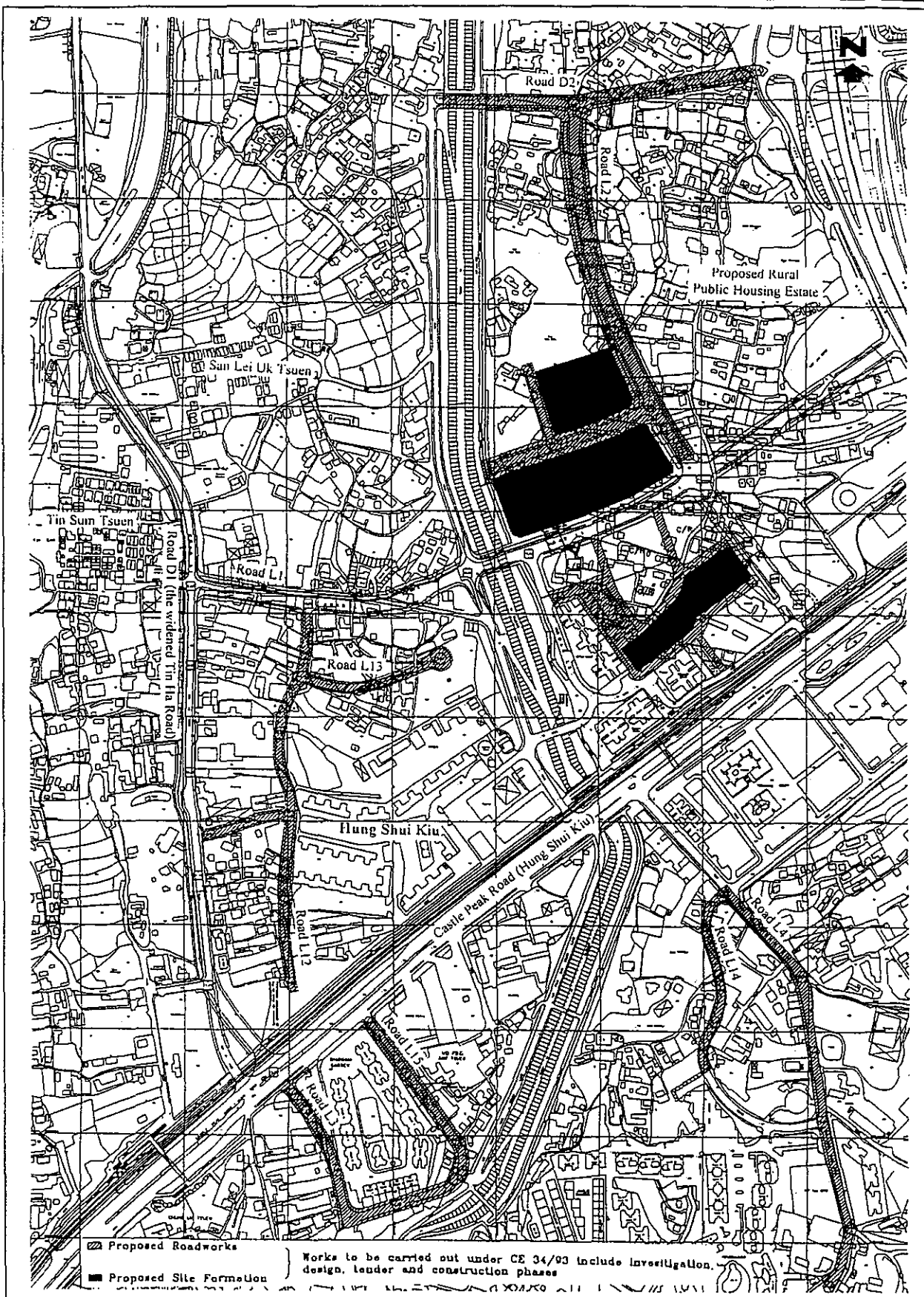
Construction activities are expected to result in exceedances of the noise and dust criteria at certain sensitive receivers. The recommended dust and noise control measures shall be implemented through contract clauses, which shall be checked by Environmental Monitoring and Audit procedures detailed in the Environmental Schedule, to reduce environmental impacts on sensitive receivers to acceptable levels.

Modelling of the future traffic noise impact indicated that affected existing and future NSRs are situated along Road D1 (the improved Tin Ha Road), Road D2 and Road L1. A direct noise mitigation package comprising 2m, 3m and 5m high roadside noise barriers has been developed after taking into consideration of various site constraints. The resultant noise mitigation proposal is therefore considered practicable. After the implementation of the identified direct noise mitigation measures, there would be residual noise impact at some existing and future NSRs. Residual noise impacts at the affected existing NSRs have been tested for eligibility for acoustic insulation. Constraints on affected future NSRs are specified.

Air quality modeling indicates that air pollutant levels at Air Sensitive Receivers generated from future vehicular emissions will comply with the Air Quality Objectives.



TITLE : Proposed roadworks to be undertaken by the Highways Department (PWP Item 225CL)		
PROJECT : Proposed Engineering Works at Hung Shui Kiu Executive Summary of EIA		
Figure : A	Scale : ---	
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TITLE	: Proposed roadworks and site formation to be carried out under agreement no. CE34/93 (PWP Items 225CL & 253CL)
PROJECT	: Proposed Engineering Works at Hung Shui Kiu Executive Summary of EIA
Figure	: B

Scale : ---



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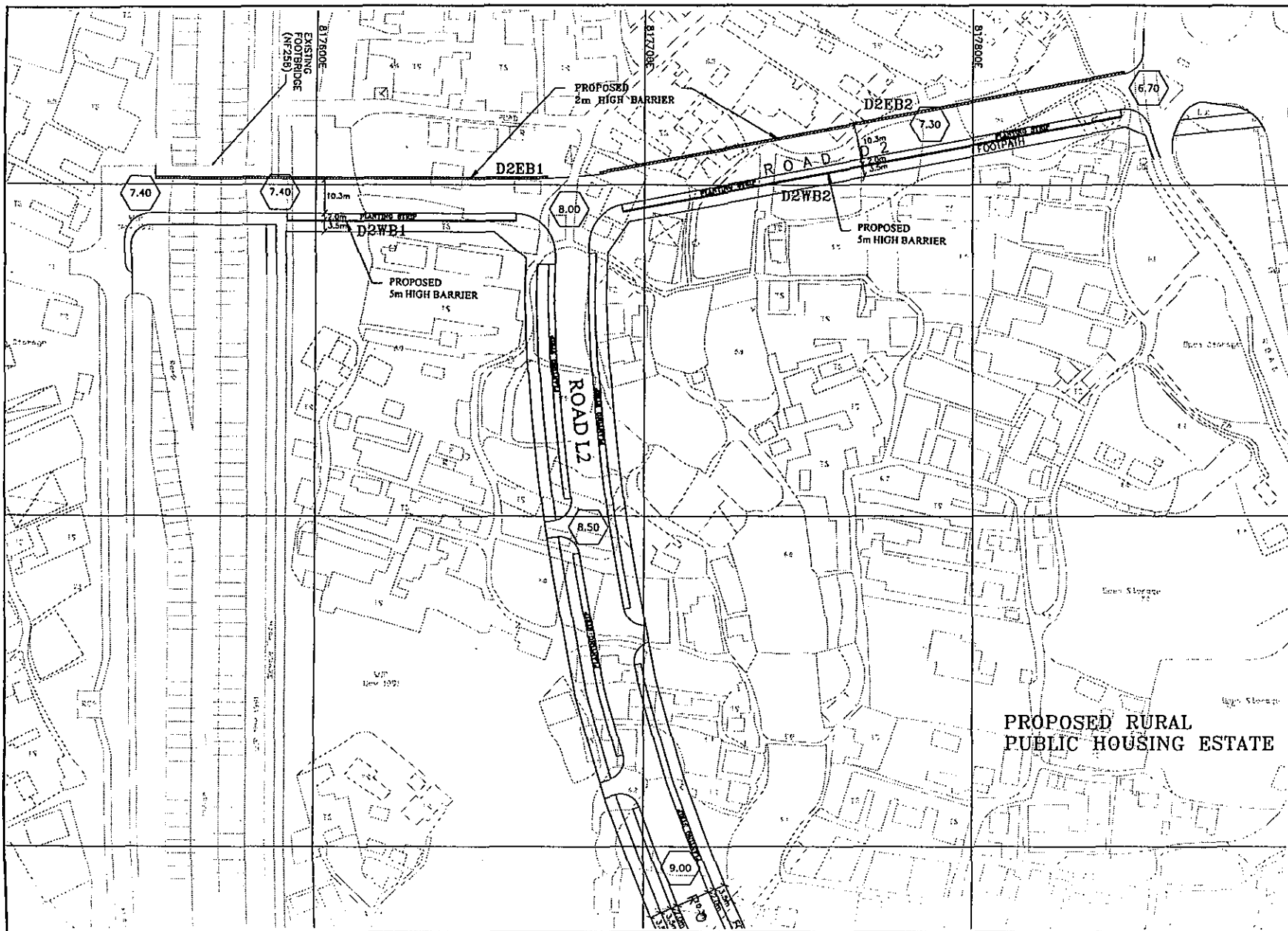


Figure : C-1

Scale : ---

PROPOSED RURAL
PUBLIC HOUSING ESTATE



TITLE : Location of the Proposed Roadside Barriers

PROJECT : Proposed Engineering Works at Hung Shui Kiu
Executive Summary of EIA

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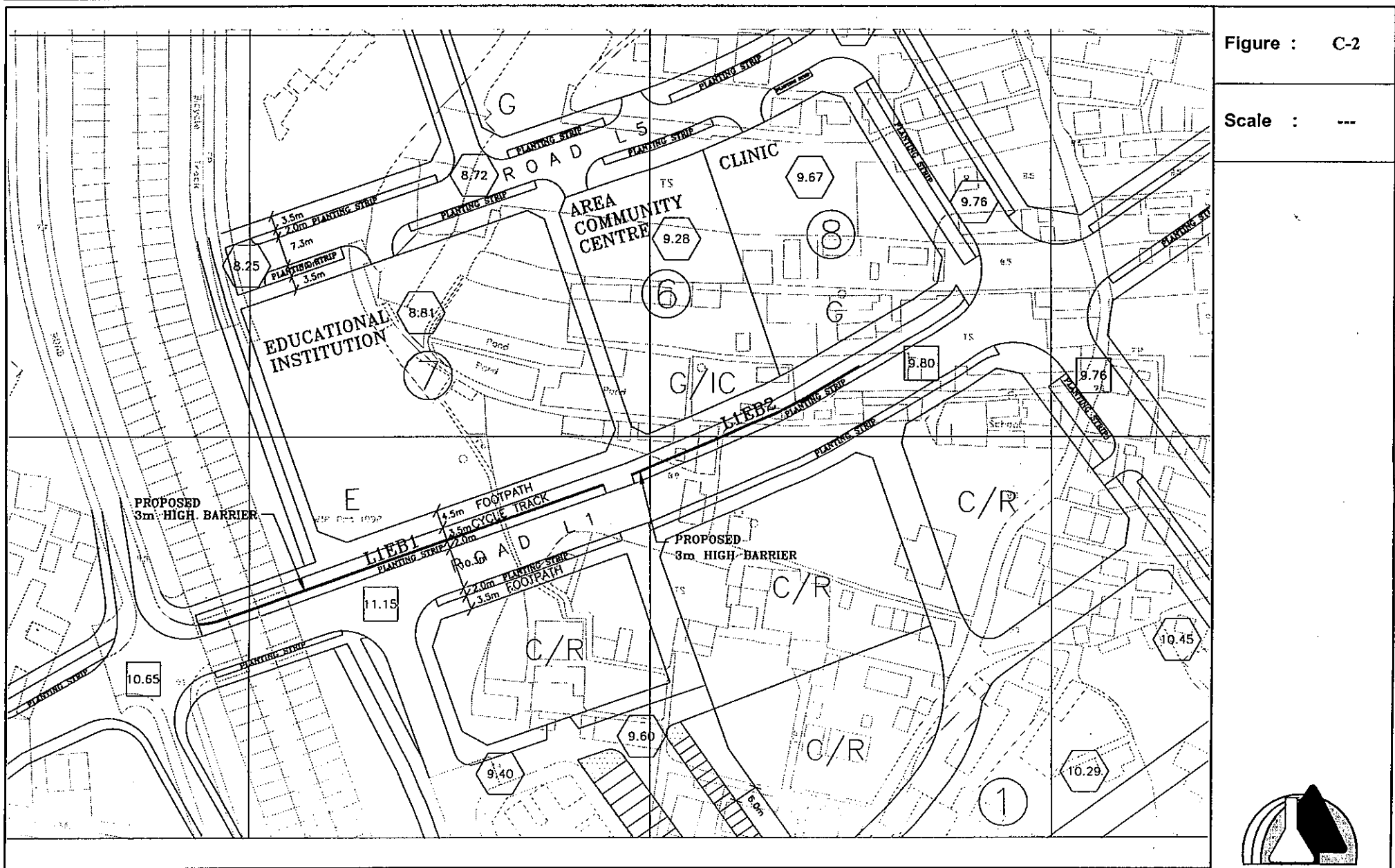


Figure : C-2

Scale : ---

TITLE : Location of the Proposed Roadside Barriers

PROJECT : Proposed Engineering Works at Hung Shui Kiu
Executive Summary of EIA

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