

9. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

9.1 Preamble

9.1.1 DRU Landscape Ltd conducted a landscape and visual impact assessment (LVIA) of the alternative Route 16 alternative alignment in February and March 1999. This LVIA updates the findings of the Previous LVIA (January 1998), which was based on the conforming alignment. Relevant findings of the Previous LVIA are presented in *Annex 9A* and have been incorporated into this section. This section summarizes the assessment findings.

9.2 LVIA Study Area

9.2.1 The Study Area boundary for the LVIA was 500 m either side and along the full length of the proposed alignment (see *Figure 9.1a*) for the assessment of landscape impacts. No boundary was set for the assessment of visual impacts.

9.3 Objectives of the LVIA

9.3.1 The objectives of the LVIA are to:

- assess the potential landscape and visual impacts associated with the construction and operation of the alternative alignment;
- recommend mitigation measures for incorporation into the design to minimize potential impacts and to meet the Hong Kong Government's environmental planning intentions and the Hong Kong Planning Standards and Guidelines (HKPSG).;
- evaluate residual landscape and visual impacts assuming landscape mitigation measures are incorporated into the Alternative alignment;
- identify key urban and landscape planning issues which should be examined in further detail during detailed design.

9.4 Structure of the LVIA section

9.4.1 After this introductory section, the remainder of the LVIA is arranged as follows:

- *Section 9.5* presents the methodology of the LVIA, a glossary of technical terms and a description of the Project in terms of appearance and design;
- *Section 9.6* presents the results of a baseline study;
- *Section 9.7* outlines the planning and development control framework as it relates to urban and landscape planning;
- *Section 9.8* assesses the landscape and visual impacts likely to occur during the construction and operation phases, together with appropriate recommendations for their mitigation;
- *Section 9.9* presents an overall conclusion of this report and recommends key urban and landscape planning issues that should be examined during detailed design.

9.5 LVIA Methodology, Glossary and Project Description

Methodology

9.5.1 The LVIA methodology is in accordance with the Project Brief and Annex 18 of the EIAO-TM. The main stages of the LVIA are follows:

- baseline study of landscape and visual resources;
- review of planning and development control framework;
- landscape impact assessment during construction and operation;
- visual impact assessment during construction and operation;
- recommendations for landscape mitigation design measures.

9.5.2 The *baseline study* identified and examined the existing landscape and visual resources within the study area. Reference is made to the Previous LVIA, specifically the assessment of the existing landscape and visual resources between the Lai Chi Kok (LCK) Interchange and Ching Cheung Road. A supplementary baseline study was made of Butterfly Valley north of Ching Cheung Road. Conclusions were drawn on quality, sensitivity and the ability of the Butterfly Valley to accommodate change. A *visual envelope* was established which effectively defined the extent of visual influence of the alternative alignment and, therefore, of the potential visual impacts. Definition of the extent of the visual envelope was based on desktop study and site investigation. Sensitive visual receivers (SVRs) likely to be affected by the Project were identified within the visual envelope.

9.5.3 The next stage was a *review of the planning and development control framework*. This information was mapped and analyzed to provide an insight to the future outlook of the area affected and the way the Project would fit into its wider context. This information reviewed included:

- land with landscape related zoning on the Outline Zoning Plan (OZP);
- landscape planning and visual guidelines already established within the Metroplan and other planning documents.

9.5.4 The following stage was to *assess impacts* on the landscape and visual resources during construction and at Day 1 and Year 10 of operation. These were qualified in terms of the local and wider level of disturbance. The use of computer simulations and montages of the site from four sensitive visual receivers illustrate the visual impacts of the alternative alignment. Computer perspectives illustrating the appearance of the proposed road in rendered or wireframe form supplement the montages. The impact assessment allows predictions to be made about the likely levels of landscape and visual impacts. The *level* of visual impact is judged using the following criteria:

- the proximity of the SVRs to the study area;
- the number of people normally present at a SVR location;
- the activity of the SVRs (for example, resident, working, studying, etc);
- the frequency and length of the view of the proposed scheme;
- the quality and sensitivity of the landscape and its ability to absorb change;
- the scale or visual obstruction of the proposed scheme in relation to the overall view, i.e., the impact would be low if a scheme occupied a background location in a small sector of a wide panoramic view, and high if it occupied a wide angle of view in the immediate foreground.

9.5.5 *Landscape mitigation measures* were devised to preserve and conserve the existing landscape where possible, and mitigate the visual impact on views from SVRs

- 9.5.6 Finally, the residual impacts of the Project assuming the landscape mitigation measures are incorporated into the design were assessed. The significance of the residual impacts was evaluated based on the principles of Annex 10 of the EIAO-TM, but using technical terms as described in the following paragraphs.

Glossary of technical terms

- 9.5.7 *Landscape and visual impact assessment* is a design and assessment tool used by landscape architects to find the best and most sustainable environmental fit for a proposed development from an urban and landscape planning standpoint. Research has shown that conserving rural landscapes and levels of greenspace in urban areas has beneficial physical and psychological effects on people, as well as fulfilling environmental imperatives. Research has also indicated that groups of people affected by new development are not solely concerned with protecting 'visual beauty' but rather object to a loss of control over their environment in which they live and work. A LVIA is a useful tool for planning changes to conserve, protect and enhance urban areas and rural landscapes, reducing impact on local communities.
- 9.5.8 The following paragraphs define the main technical terms used in the LVIA. The differing levels of impact are illustrated by examples shown on Figures 9.3(a-c).
- 9.5.9 *Landscape impact* is a direct physical change to existing landscape resources. Landscape resources are elements such as vegetation, topography, open space and recreation facilities as well as buildings and structures. By mapping the extent and location of these features, any loss or change can be objectively assessed and, where possible, re-provisioned or compensated by landscape mitigation measures incorporated into a Project.
- 9.5.10 *Visual impact* is a change to the appearance of the study area that affects individuals or groups of people. Visual impact can vary in significance from overall improvement to degradation. Its assessment relies on a professional understanding of aesthetic principles, the design and function of cityscapes and landscapes, and the characteristics of human perception. Permanent and adverse levels of visual impact can lead to the blighting of urban and rural areas, resulting in a long-term decline in the quality of an environment and a subsequent loss in socio-economic vitality. Visual impact may also have a direct impact on the value of property.
- 9.5.11 *Severe impact* is a negative change to the landscape and to views from sensitive visual receivers that is extensive and potentially adverse. Normally this occurs when a sensitive landscape of regional or district-wide value is permanently lost, or if new development in the foreground completely dominates views from sensitive visual receivers. Where effective mitigation measures are incorporated into a development, a severe impact can be reduced to a high, medium or low impact.
- 9.5.12 *High impact* is a negative change to the landscape and to views from sensitive visual receivers that is also extensive and potentially adverse. It would occur when a landscape character of high local value is permanently lost or affected, or if new development in the foreground or middleground occupies a conspicuous part of the available views from sensitive visual receivers. Where effective mitigation measures are incorporated into a development, a high impact can be reduced to a medium or low impact.
- 9.5.13 *Medium impact* is a limited negative change to the landscape and to views from sensitive visual receivers. It would occur when a landscape character of local value is permanently lost or temporarily affected, or if new development is a noticeable element in the middleground in views from sensitive visual receivers. Where effective mitigation measures are incorporated into a development, a medium impact can be reduced to a low impact.

- 9.5.14 *Low impact* is a negligible change to the landscape and to views from sensitive visual receivers. It would occur when a landscape character of low local value is permanently lost or affected, or if new development is a perceptible but insignificant element in the background in views from sensitive visual receivers.
- 9.5.15 *Low gain* is a small positive change to the landscape and to views from sensitive visual receivers. It would occur when a landscape of low local value is conserved or improved, or when the screening or removal of blight enhances background views from sensitive visual receivers.
- 9.5.16 *Medium gain* is a limited positive change to the landscape and to views from sensitive visual receivers. It would occur when a landscape of local value is conserved or improved, or when the screening or removal of blight enhances middleground views from sensitive visual receivers.
- 9.5.17 *High gain* is a positive change to the landscape and to views from sensitive visual receivers. It would occur when a landscape of high local value is conserved or improved, or when the screening or removal of blight enhances foreground views from sensitive visual receivers.
- 9.5.18 *Substantial gain* is a conspicuous positive change to the landscape and to views from sensitive visual receivers. It would occur when a landscape of regional or district-wide value is enhanced, or when the screening or removal of dominating and obstructing blight enhances foreground views from sensitive visual receivers.
- 9.5.19 *Sensitive visual receivers* are individuals or groups of who are sensitive to changes in the visual environment. The Environmental Guidelines for Planning in Hong Kong defines sensitive users as "land uses which, by virtue of the nature of the activities thereon...are susceptible to the influence of residual or physical changes generated by polluting uses". For example, local residents whose views are extensively and permanently obstructed by views of a new development from a close range would be considered as SVRs. Neighbouring groups of people who would have no views of the new development would not be considered as SVRs.

Project description

- 9.5.20 The alternative alignment is described in detail in Section 2. There are a number of proposed elements which are particularly relevant to the LVIA (refer to Figures 9.1 and 9.2):
- a high level Dual-3 viaduct approximately 1350 metres long and 32 metres wide from Lai Wan Interchange to Butterfly Valley, with piers at approximately 40 metre centres (refer to typical cross-section shown on Figure 9.2a);
 - a Dual-3 road on embankment approximately 500 metres long within Butterfly Valley (refer to typical cross-section shown on Figure 9.2b);
 - high level slip roads connecting the Dual-3 viaduct with Ching Cheung Road;
 - a partial noise enclosure approximately 200 metres long within Butterfly Valley (refer to typical cross-section shown on Figure 9.2c);
 - a tunnel portal and ventilation building;
 - cut and fill slopes including drainage and slope stabilization works;
 - the viaducts and portal and ventilation building will be constructed in concrete, while noise structures will be structural steel with absorptive panels.

Re-zoning Arrangement

- 9.5.21 This project will be gazetted under the Roads (Works, Use and Compensation) Ordinance upon the completion of the EIA process. According to Section 13A of the Town Planning Ordinance, any works or use authorized under the Roads (Works, Use and Compensation) Ordinance shall be deemed to be approved under the Town Planning Ordinance. Hence, separate arrangement will not be necessary.

Management and Maintenance of Landscape Works

- 9.5.22 Highways Department will be responsible for the funding and implementation of the mitigation measures proposed in this project. Management and maintenance of the proposed mitigation measures will be carried out in accordance with the *Works Branch Technical Circular No. 18/94 - Management and Maintenance of both Natural Vegetation and Landscape Works*.

9.6 Baseline Study

Kowloon Section

LCK Interchange to Ching Cheung Road

- 9.6.1 The Previous LVIA undertook a baseline study of the Kowloon and Shatin sections of the conforming alignment. The study area was divided into zones with homogeneous characteristics, called landscape character areas (LCAs), in order to ascertain the structure and likely sensitivity of the land uses and user groups. The Kowloon section of the Previous LVIA is pertinent to this LVIA between the LCK Interchange and Ching Cheung Road and summarized below (refer to Figures 9.5a to 9.5b for boundaries of LCAs and Figure 9.6 a to 9.6c for photographs):

- this area is characterized by the urban build-up of LCK, bordered by the West Kowloon Reclamation and the wooded slopes of Eagle's Nest. It comprises a number of LCAs of contrasting urban character, including road corridors, village areas, industrial and storage areas and government and institutional buildings;
- the area north of Ching Cheung Road is predominantly hill slopes covered by secondary woodland, providing a natural green backdrop to the urban area;
- the urban fabric of LCK is considered to be generally low in architectural and visual interest, with a confused townscape and little apparent structure dominated by roadside-related structures and slope works.

- 9.6.2 Since the Previous LVIA, amenity areas associated with the LCK interchange have been completed, which have made an important contribution to improving the low quality of the LCK urban fabric. However, the conclusion of the Previous LVIA concerning the baseline quality of this part of the study area remains accurate.

- 9.6.3 A number of SVRs were identified in the Previous LVIA within the visual catchment between LCK Interchange and Ching Cheung Road (refer to Figure 9.4):

- residents of Mei Foo Sun Chuen Estate (North) (SVR identification number KV4);
- motorists and pedestrians using Ching Cheung Road (KV5) and Butterfly Valley Road (KV6);
- residents of LCK Reception Centre low-rise staff quarters (KV9).

- 9.6.4 Residents living in Wai Man Tsuen would be relocated to new housing and therefore were not considered as SVRs.

Butterfly Valley Section

- 9.6.5 The Previous LVIA did not assess the study area north of Ching Cheung Road in Butterfly Valley as it would not have been affected by the conforming alignment. Therefore, a supplementary baseline study was conducted as part of this LVIA. The findings are summarized below and illustrated on Figure 9.5b to 9.5c and 9.6d to 9.6e:

- Butterfly Valley is a narrow valley enclosed by wooded hill slopes, villages and associated plantations and orchards and shrubland. Its landform is formed by a number of hill summits linked by ridges and saddles, incised by watercourses and punctuated by rock outcrops.
- At the foot of the valley north of Ching Cheung Road, a dam and water tunnel system is being constructed by Water Services Department, resulting in extensive temporary disruption to the existing landscape;
- The shrubland was found in the northern parts of the valley and comprises similar species to the woodland, but only 1.5 to 3 metres in height;
- The valley is heavily vegetated by woodland trees ranging between 6 – 12 metres in height, which the ecological assessment has described as a typical young secondary woodland common in Hong Kong. The tree species include many common Hong Kong woodland species (see Section 7 for species list);
- Three species of significance were found in Butterfly Valley. *Artocarpus hypargyrea* is a listed China Plant Red Data Book species in danger of extinction, although it is common in Hong Kong. *Hemmiogramma decurrens* is rare in Hong Kong but not protected. One sapling of *Ailanthus fordii* was found which is protected and rare in Hong Kong. These species would not be affected by the alternative alignment.

There are a few fast running tributaries receiving water from the Kam Shan Country Park 0.5km away, flowing into the main stream (refer to Figure 9.5c) within Butterfly Valley. The tributaries were seasonal as they were observed with limited flow during dry season surveys. The upper stream section of the main stream at Butterfly Valley, which is located to the north of the Study Area, is open in nature and the water quality is relatively good without traces of pollution. However, the naturalness of the southern lower stream and tributaries within the Study Area have been altered as a result of close proximity to several villages within the valley. The Ecological Assessment found that the main stream through Butterfly Valley is relatively natural, while the lower sections have been heavily modified and are observed to be polluted. While the diversity and rarity of the upper stream is considered to be low, however the potential value for habitat is moderate.

In general, a site inspection of Butterfly Valley revealed that it is visually isolated from the surrounding area and that it is difficult to see the whole valley from any one public viewpoint. However, people living at a number of private residences and using institutional buildings would have views of the Alternative alignment and are therefore classified as SVRs. They are:

Table 9.1 – Sensitive Visual Receivers

SVR number	Location	Type of viewer	Distance to nearest works area boundary	Type of view
BVR1	Sir Robert Black College of Education	Currently staff and students. Site will be redeveloped for residential use.	Approximately 70 metres	Unobstructed overview of road in the foreground
BVR2	No. 10 Caldecott Road	Residents	Approximately 70 metres	Unobstructed overview of road in the foreground
BVR3	Village houses overlooking Butterfly Valley	Village residents	Varies	Unobstructed overview of road in the foreground
KV5	Ching Cheung Road	Motorists and pedestrians	Varies as road passes through study area	Transitory from background to foreground as vehicles move towards and under viaduct
KV9	LCK Reception Centre low-rise staff quarters	Resident staff	Immediately adjacent	Immediate foreground
KVX1	Site 10 Residential Development, West Kowloon Reclamation	Residents	Two blocks approximately 50 to 60 metres away.	Immediate foreground to middle distance

9.6.6 SVRs KV5 Ching Cheung Road and KV9 were included in the list of SVRs as they would be affected by the alternative alignment. The remaining SVRs in the LCK section of the study area were not classified, as they would not have views of the alternative alignment north of Ching Cheung Road.

9.6.7 The Study Brief required that a typical location with view from Lion Rock Country Park be classified as a SVR. A number of locations in Kam Shan Country Parks may also have views of the alternative alignment, although site inspections proved inconclusive owing to distance to Butterfly Valley. To verify that the Alternative Alignment would not be seen from the above mentioned Country Parks, a computer analysis was also undertaken (refer to Figure 9.4b). It was concluded that intervening landform and vegetation, the visually enclosing topography of Butterfly Valley, and the low level of the alignment would combine to screen views of the proposed scheme. It was further concluded that viewpoints in the Country Parks have panoramic views over West Kowloon, and if glimpses of the Project were available, they would only be seen by a small number of people in transit occupying a very small part of the scenery.

9.6.8 A number of existing houses in Butterfly Valley are present within the alternative alignment. The residents at these locations would need to be relocated for construction purposes, and therefore they are not classified as SVRs. However, there are a number of village-type houses overlooking the valley, and these are included as an SVR (BVR3).

Landscape and visual analysis of baseline condition

9.6.9 There is an abrupt change between the landscape character of Butterfly Valley and the area south of Ching Cheung Road. Butterfly Valley is an enclosed heavily vegetated valley relatively unaffected by the nearby urbanized areas of Lai Chi Kok. It has a tranquil rural setting characterized by the absence of urbanization, other than a high-voltage power line and the construction of the WSD construction site at the foot of the valley. Despite these elements, the rural character remains the dominant landscape characteristic. South of Ching Cheung Road, the Previous LVIA found that the character

is low in architectural and visual interest, with a confused townscape and little apparent structure. A conspicuous feature of the baseline condition is that two such contrasting landscapes exist in such proximity. The proximity of Butterfly Valley and its rural character to Lai Chi Kok increases its desirability and importance in landscape terms and is therefore considered to be a sensitive landscape of district-wide value. Owing to its enclosed nature, Butterfly Valley is also considered to be unable to accommodate substantial change. This contrasts with Lai Chi Kok, which, owing to its unstructured townscape, is less sensitive and capable of accommodating substantial change.

9.7 Review of planning and development control framework

9.7.1 The starting point for the review of the planning and development control framework was the Outline Zoning Plans for Kwai Chung, Lai Chi Kok and Cheung Sha Wan. These plans are the statutory basis for the control of the use of land, and are insight into the future pattern of development. In summary, the land use zones relevant to the LVIA are as follows (refer to Figure 9.8):

- The study area north of Ching Cheung Road is zoned as Green Belt. The primary planning intention of the Green Belt zoning is to provide for the conservation of prominent and high value landscape features and the limiting of expansion of urban areas into rural areas. The explanatory statement to the OZP states there is a presumption against development in this zoning;
- The slopes south of Ching Cheung Road are also zoned Green Belt;
- An area of land at the intersection of Butterfly Valley Road and King Lam Street is zoned Open Space. The primary planning intention of the Open Space zoning is to provide land for active and passive recreational land use.

9.7.2 The next document reviewed was the planning framework recommended in Metroplan. While this document is not statutorily binding, it represents a body of useful information on Hong Kong's urban areas. One of Metroplan's aims is to conserve and enhance Hong Kong's major landscape attributes and important heritage features. The Urban Design and Landscape Framework and Open Space Framework in Metroplan were devised to:

- protect and conserve prominent ridgelines, peaks and hill slopes;
- provide a green backdrop to the city;
- link up where possible the main open space network within the urban fabric.

9.7.3 Metroplan designates the study area north of Ching Cheung Road in Butterfly Valley as a Landscape Protection Area (LPA) and a site suitable for eventual development as an urban fringe park. The LPA designation is intended to protect important ridgelines and scenic backdrops. The designation of urban fringe parks is one of Metroplan's most significant concepts and is intended to offer a wide range of recreational facilities not available in a traditional urban or country park in sites that are close to and easily accessible from congested urban districts. The proposals for Butterfly Valley Urban Fringe Park include hiking trails, barbecue and picnic areas, camping areas and two specialist sports centres for rural adventure sports and water sports.

9.7.4 Between the LCK Interchange and Ching Cheung Road, the alternative alignment is considered to be compatible with the statutory planning intentions of the OZPs for Kwai Chung, Lai Chi Kok and Cheung Sha Wan. The land zoned open space on Butterfly Valley Road will need to be reprovisioned. North of Ching Cheung Road in Butterfly Valley, the alternative alignment is considered to be incompatible with the Metroplan's LPA and urban fringe park designations. As discussed in para. 9.5.21, this project will

be gazetted under the Roads (Works, Use and Compensation) Ordinance upon the completion of the EIA process. Hence, no follow up action is considered necessary.

9.8 Assessment of landscape and visual impacts

Kowloon Section

LCK Interchange to Ching Cheung Road

- 9.8.1 The landscape and visual impacts of the Alternative alignment between LCK Interchange and Ching Cheung Road during construction and operation would remain concordant with the impacts resulting from the conforming alignment. The Previous LVIA concluded that (refer to Figure 9.7a to 9.7c):
- the new road would result in a severe construction landscape impacts owing to the works areas needed to build a high level viaduct in a dense urban area;
 - the new road would result low operation landscape impacts, as the urban form is dominated by highway structures able to accommodate change;
 - the loss of mature trees along Butterfly Valley Road would be a severe construction landscape impact;
 - the scale and height of the viaduct traversing the area occupied by Wai Man Tsuen (refer to typical cross-section shown on Figure 9.2a) will be in sharp contrast to the existing topography, resulting in a moderate landscape impact at Day 1 of the operational period attenuating to a low impact after 10 years of operation;
 - visual impact on views from the LCK Reception Centre high-rise staff quarters (KV8) would be low during construction and operation, owing to distance from the quarters to the new viaduct;
 - visual impact on views from the LCK Reception Centre low-rise staff quarters (KV9) would be severe during construction and operation, owing to the proximity of the quarters next to the new viaduct;
 - motorists and pedestrians using Ching Cheung Road (KV5) and Butterfly Valley Road (KV6) would receive moderate visual impact between construction and Day 1 of operation, attenuating to low visual impact by Year 10, owing to the temporary and transitory nature of the views.

Butterfly Valley Section

- 9.8.2 From Ching Cheung Road north through Butterfly Valley the existing sensitive baseline condition is unable to accommodate substantial change. As a result, the severity of the landscape and visual impacts of the Alternative alignment would be of a higher magnitude than those south of Ching Cheung Road.
- 9.8.3 Generally, the presence of a Dual-3 road on viaduct and embankment (refer to typical cross-sections shown on Figure 9.2b-c) extensive slope and drainage works within Butterfly Valley and the new tunnel portal will result in a severe level of landscape impact during the construction period (refer to Figure 9.7d to 9.7e) owing to the permanent loss of extensive areas of secondary woodland and shrubland. When combined with the landscape impact of the existing WSD construction works, the cumulative effect would be an extensive change from the original baseline condition. From Day 1 to Year 10 and beyond, the scale and mass of the new road formation and associated earthworks, combined with the WSD reservoir will contrast considerably with existing landform, substantially decreasing its desirability and importance in landscape terms from high to negligible local value.

- 9.8.4 The alternative alignment would also result in the loss of the natural stream in Butterfly Valley, which is considered to have moderate value for aquatic and terrestrial habitats. This loss is considered to be a substantial and permanent change to an important landscape element.
- 9.8.5 The alternative alignment would also substantially and permanently change the appearance of Butterfly Valley. Its character would be transformed from a tranquil rural setting characterized by the absence of urbanization to a transport corridor with large embankments, tunnel portal, partial or full noise enclosures and ancillary elements such as drainage, lighting and signage systems. However, the substantial levels of visual impact would be experienced by relatively few numbers of people, owing to the visual isolation of the Valley. The visual impacts are summarized in Table 9.2.

Table 9.2 – Summary of Visual Impacts

SVR number	Location	Type of viewer	Visual impact during construction	Visual impact at Day 1	Visual impact at Year 10
BVR1	a) Sir Robert Black College of Education	Staff and students	High	Not relevant	Not relevant
BVR1	b) Sir Robert Black College of Education redeveloped as housing	Residents	Not relevant	High	Moderate
BVR2	No. 10 Caldecott Road	Residents	Severe	High	Moderate
BVR3	Small villages overlooking Butterfly Valley	Residents	Severe	High	High
KV5	Ching Cheung Road	Motorists and pedestrians	Moderate	Moderate	Low
KV9	LCK Reception Centre low-rise staff quarters	Resident staff	Severe	Severe	Severe
KVX1	Site 10, West Kowloon Reclamation	Residents	Not relevant	Moderate	Moderate

- 9.8.6 It is expected that the Sir Robert Black College of Education College (BVR1) will be redeveloped for residential uses before the operation of the Alternative Alignment, however at present the programming is not determined. Assuming that the College is still operating during the construction period, staff and students would have transitory but unobstructed overviews of the road, noise enclosure and ancillary systems which would be conspicuous elements in the foreground. They would see the alternative alignment only while in attendance during college hours, which has a bearing on the level of visual impact. The changes to baseline condition would be high during the construction period, as an extensive area of the foreground view would change to a construction site. From Day 1 to Year 10 and beyond, the SVR will be road scheme would eventually become an accepted part of the view, attenuating from a moderate to a low level visual impact.
- 9.8.7 Assuming that the College has been redeveloped as housing by Day 1 of operation, the residents would have unobstructed overviews of the road, noise enclosure and ancillary systems which would be conspicuous elements in the foreground. The visual impact on views would be high. From Day 1 to Year 10 and beyond, the SVR will be road scheme would eventually become an accepted part of the view, attenuating from a high to a moderate level visual impact (refer to Photomontage on Figure 9.9c).

- 9.8.8 Some residents at No 10 Caldecott Road (BVR2) would have permanent and unobstructed overviews of the road, noise enclosure and ancillary systems which would be conspicuous elements in the foreground. The changes to baseline condition would be high during the construction period, as an extensive area of the foreground view would change to a construction site. From Day 1 to Year 10 and beyond, the level of visual impact would remain high owing to the sensitive nature and proximity of the SVR (refer to photomontage on Figure 9.9c).
- 9.8.9 Residents of the small villages in Butterfly Valley (BVR3) whose residences are not resumed would have permanent and unobstructed views of the road, noise enclosure and ancillary systems which would be dominating and conspicuous elements in the immediate foreground. The changes to baseline condition would be severe during the construction period, as an extensive area of the foreground view would change to a construction site. From Day 1 to Year 10 and beyond, the level of visual impact would remain high owing to the sensitive nature and proximity of the SVR (refer to photomontage on Figure 9.10e).
- 9.8.10 All drivers and pedestrians using Ching Cheung Road (KV5) would have brief transitory views of the high level viaduct as they move towards and under it, changing from a background to a foreground view. The changes to baseline condition would be moderate from the construction period to Year 10 and beyond (refer to photomontage on Figure 9.10c).
- 9.8.11 Some residents at the LCK Reception Centre low-rise Staff Quarters (KV9) would have unobstructed views of the adjacent road, noise enclosures and ancillary systems. The Alternative alignment would be a conspicuous element completely dominating the immediate foreground. The changes to baseline condition would be severe during the construction period, as an extensive area of the foreground to background view would change to a construction site. From Day 1 to Year 10 and beyond, it is likely that the level of visual impact will remain severe, owing to the residential nature of the SVRs and the proximity of the road (refer to photomontage on Figure 9.10b).
- 9.8.12 Owing to the construction programming, Route 16 will be most likely already be in construction when the Site 10 housing is completed. Future residents facing south-west in two out of the twelve proposed buildings will see and accept the viaducts as an existing element in the landscape. Owing to the proximity of the scheme to the housing development and the fact that the future residents will have unobstructed views overlooking the adjacent road, noise barriers and ancillary systems, the visual impacts are considered to be moderate during the operation period (refer to photomontage on Figure 9.10d for birds-eye view of proposed scheme in relation to Site 10).

Mid Ventilation Building

- 9.8.13 The preliminary design of the mid ventilation building has been previously presented to and subsequently endorsed by ACABAS. The findings of the previous assessment and recommendations are summarised in the paragraph 9.8.14.
- 9.8.14 The ventilation building will be located just above Lai Chi Kok on the Tai Po Road at the foothills just below the country park. The building was tucked into a small valley. The intention was to place part of the building deep inside the slope so that the mass of the building could be partially hidden. The lower half of the building would be clad in granite similar to retaining walls in the rural area. The upper half would be treated as domestic style by using patterned concrete making it look like small blocks of flats above a retaining wall. The whole building, except the upper part, would not be visible prominently from any direction. It was considered that a domestic scale architecture would be in context with the other residential blocks along Tai Po Road.

Recommended landscape mitigation measures

- 9.8.15 The assessment predicts a number of high level landscape and visual impacts, which are summarized in Table 9.3 and illustrated on Figures 9.9(a-c). In order to mitigate these impacts, a number of landscape mitigation measures are recommended for incorporation into the Alternative alignment, subject further studies during detailed design. The mitigation measures are summarized in the following paragraphs in addition to the likely funding, implementation, management and maintenance agencies and will be in accordance with Appendix A to Works Branch Circular No 18/94, Management And Maintenance of Both Natural Vegetation And Landscape Works. No off-site mitigation measures are proposed.
- 9.8.16 **Landscape mitigation measure 1 (LMM1) – Construction programming and management.** The construction programme for the Project should be reduced to the shortest possible period, particularly in those locations where severe or high landscape and visual impacts are expected, e.g., LCK Reception Centre low-rise staff quarters (KV9) and Butterfly Valley. Additionally, the periphery of the works areas at street level should be managed so that they do not appear cluttered, untidy and unattractive and inconvenient to pedestrians. For example, all hoarding should be colorfully designed with interesting motifs demonstrating the work of Highways Department. Hoardings with bland colours should be avoided.
- Funding: Highways Department (HyD);
Implementation, management and maintenance: Contractor.
- 9.8.17 **Landscape mitigation measure 2 (LMM2) - Advanced planting and erosion control works.** Where possible, the transplantation of existing valuable trees, the stockpiling of topsoil, new planting and erosion control works should be carried out as early as possible in the construction period instead of at the end. This will assist in maximizing the time for carrying out transplantation and new planting, resulting in a higher success rate for the survival of transplanted trees and the establishment of new screen trees. Excavated topsoil will be stockpiled for re-use on site if possible. During detailed design, the issue of stockpiling of topsoil in a manner that would avoid washing into the drainage scheme should be examined comprehensively..
- Funding: HyD;
Implementation: Contractor
Management and maintenance during construction: Contractor;
Management during operation: USD within five metres of kerbs, Agricultural and Fisheries Department (AFD) outside five metres of kerbs;
Maintenance during operation: USD within five metres of kerbs, Agricultural and Fisheries Department (AFD) outside five metres of kerbs.
- 9.8.18 **Landscape mitigation measure 3 (LMM3) – Maximization of amenity planting in road corridor.** Opportunities to incorporate amenity areas along the alignment should be maximized to provide visual relief in an otherwise congested urban area.
- Funding: HyD;
Implementation: Contractor
Management and maintenance during construction: Contractor;
Management during operation: USD;
Maintenance during operation: USD.
- 9.8.19 **Landscape mitigation measure 4 (LMM4) –Design, materials and finishes of engineering structures.** The quality of the design of all engineering structures, which will include viaducts, parapets, piers, slip roads, noise barriers, noise enclosures and drainage systems are an important consideration. They should be designed in accordance within HyD's guidelines, but equally attention should be given to design

modern and attractive structures. On-deck planting should be provided for wherever possible and USD consulted about maintenance requirements. Correctional Services Department should be consulted about the design of an architectural screen adjacent to its low rise staff quarters.

Funding: HyD;
Implementation: Contractor
Management and maintenance during construction: Contractor;
Management during operation: HyD;
Maintenance during operation: HyD.

- 9.8.20 **Landscape mitigation measure 5 (LMM5)** – Rural area under-viaduct soft landscape works. Where viaducts result in sterilized space under viaducts in Butterfly Valley, compensatory landscape works should be provided to enhance and restore the function of the land. Access to these areas could be provided for visual inspections of the viaducts and for maintenance. Water could be provided by installing holding tanks which can collect surface water run-off from neighboring streams.

Funding: HyD;
Implementation: Contractor
Management and maintenance during construction: Contractor;
Management during operation: HyD under viaducts, USD within five metres of kerbs, Agricultural and Fisheries Department (AFD) outside five metres of kerbs;
Maintenance during operation: USD under viaducts and within five metres of kerbs, Agricultural and Fisheries Department (AFD) outside five metres of kerbs.

- 9.8.21 **Landscape mitigation measure 6 (LMM6)** – Planting on rock berms. Where rock is exposed by earthworks, planting will be implemented by constructing stone walls on berms and backfilling behind them with topsoil.

Funding: HyD;
Implementation: Contractor
Management and maintenance during construction: Contractor;
Management during operation: Geotechnical Department (GEO);
Maintenance during operation: USD.

- 9.8.22 **Landscape mitigation measure 7 (LMM7)** – Environmental design at focal points. At important vehicular and pedestrian junctions, specially designed features such as sculptures, and ornamental paving should be incorporated.

Funding: HyD;
Implementation: Contractor
Management and maintenance during construction: Contractor;
Management during operation: HyD or USD if in an opens space;
Maintenance during operation: HyD or Architectural Services Department (ArchSD) if in an allocated area.

- 9.8.23 **Landscape mitigation measure 8 (LMM8)** – Maximization of woodland planting on disturbed land. All land disturbed by construction should be restored to an equivalent standard or higher. All felled mature trees which are considered to be high in environmental amenity, a replacement of a similar size should be planted. Where except where slope or ground conditions prevent the planting of mature trees, other locations as close as possible to the location of the felled tree within the works area should be used. Existing woodland cleared by construction activity will also be replaced at a ratio of at least twenty trees planted for every tree felled. All planting on slopes should be in accordance with Works Branch Technical Circular 25/93. Figures 9.9(a-c)

illustrate a potential cut and cover tunnel approach to the alignment in Butterfly Valley whereby woodland planting could be possible over the road. This may increase the area available for compensatory planting.

Funding: HyD;
Implementation: Contractor
Management and maintenance during construction:
Contractor;
Management during operation: USD within five metres of kerbs, AFD outside five metres of kerbs;
Maintenance during operation: USD within five metres of kerbs, AFD outside five metres of kerbs.

- 9.8.24 ***Landscape mitigation measure 9 (LMM9)*** – *Urban area under-viaduct hard and soft landscape works.* Where viaducts result in sterilized space under viaducts, extensive hard and soft landscape works should be provided to enhance and restore the function of the land, including creepers and climbers on retaining walls and supporting columns.

Funding: HyD;
Implementation: Contractor
Management and maintenance during construction and operation in accordance with Appendix A to WBTC18/94.

- 9.8.25 ***Landscape mitigation measure 10 (LMM10)*** – *Re-creation of stream in Butterfly Valley.* The existing stream should be recreated adjacent to the fill slope in Butterfly Valley (see Figure 9.9a and 9.9b for details).

Funding: HyD;
Implementation: Contractor
Management and maintenance during construction: Contractor
Management and maintenance during operation: DSD and AFD

- 9.8.26 In order to support the objectives of LMMs 2,3,5,8 and 9, a comprehensive tree survey in accordance with WBTC 24/94 should be carried out during the detailed landscape design stage.

- 9.8.27 The detailed landscape design should also be issued to all management and maintenance agencies, particularly USD, for approval prior to implementation. In particular, the following design parameters should be observed:

- Proper and adequate automatic irrigation systems and lockable water points are required to planting locations which are difficult to access or are considered feature planting areas.
- Adequate, safe and convenient accesses / lay-bys to soft landscaping areas for maintenance vehicles should be provided.
- Planter beds should be of good drainage with minimum soil depth of 1,200 mm for trees and 600 mm for shrubs, etc.
- Planter beds are preferably placed under direct sunlight. Sufficient illumination for plant growth should also be provided.
- The minimum headroom for planting areas under flyovers is 2,000 mm unless such areas are less than 2,000 mm in width and situated adjacent to access paths.

- Planter beds should preferably be in continuous form with an internal width of at least 750 mm.
- Planter beds within central dividers or elevated roads' decks should have a minimum internal width of 1,000 mm.

9.9 Residual impacts of the Alternative Alignment

- 9.9.1 Tables 9.4a and 9.4b on the following pages summarizes the predicted residual landscape and visual impacts assuming the landscape mitigation measures are incorporated into the alternative alignment.
- 9.9.2 The tables indicate that in general the proposed landscape mitigation measures would reduce the levels of landscape and visual impacts to some extent. The proposed mitigation measures to reduce landscape impacts will be particularly effective at Year 10 of operation onwards, although the residual impacts in Butterfly valley will remain severe to high during construction and Year 1 of operation.
- 9.9.3 The effectiveness of landscape mitigation measures to reduce visual impacts will vary according to the SVR locations. The SVRs where the visual impacts will remain severe to high from construction through to operation are generally in proximity to the proposed alignment such as the LCK Reception low rise staff quarters (KV9), residents at No 10 Caldecott Road (BVR2) and residents overlooking Butterfly Valley (BVR3). The remaining SVRs will receive moderate to low levels of residual visual impact.
- 9.9.4 Table 9.3 and Figures 9.5(d-f) quantifies the extent of landscape impact and proposed mitigation.

Table 9.3 Summary of Landscape Loss and Compensation

<i>Description and Location of Loss</i>	<i>Area (Ha)</i>	<i>Location of compensatory woodland and amenity planting / re-created natural stream</i>	<i>Area of compensatory planting (Ha)</i>
Secondary woodland in Butterfly Valley	3	Cut and fill slopes adjacent to proposed road and under viaducts	3
Amenity planting at Lai Chi Kok Interchange	Approx 0.5	Under and adjacent to proposed viaducts	2
Tree planting along Butterfly Valley Road	Approx 0.1	Under and adjacent to proposed viaducts (subject to preparation of a draft OZP for Wai Man Tsuen in detailed design stage)	0.1
Total Area	3.6	Total Area (assuming draft OZP for Wan Man Tsuen does not provide for amenity areas under viaducts)	5.1
		Potential Total Area (assuming draft OZP for Wain Man Tsuen provides for amenity areas under viaducts)	6.9
		Potential Total Area (assuming planting area is available over road in Butterfly Valley (subject to detailed design)).	7.6
Freshwater stream in Butterfly Valley	650m	Re-created natural stream along the bottom of new fill slope	450m

Table 9.4a Summary of Landscape Impacts and Recommended Mitigation Measures

Location	<ul style="list-style-type: none"> ▪ Landscape character area ▪ Sensitivity to change 	Level of landscape impact	Unmitigated Landscape Impacts				Mitigated Landscape Impacts				
			Landscape impact during construction	Landscape impact at Day 1	Landscape impact at Year 10	Recommended landscape mitigation measures	Residual Landscape impact during construction	Residual landscape impact at Day 1	Residual Landscape impact at Year 10		
LCK Interchange to Ching Cheung Road	<ul style="list-style-type: none"> ▪ Urbanized ▪ Low 	Severe	✓			LMMs 3, 4, 7,					
		High		✓			✓				
		Moderate						✓			
		Low			✓					✓	
Butterfly Valley	<ul style="list-style-type: none"> ▪ Rural ▪ High 	Severe	✓			LMMs 1, 2, 4, 5, 6, 8, 10	✓				
		High		✓				✓		✓	
		Moderate							✓		✓
		Low									
Loss of trees along Butterfly Valley Road	<ul style="list-style-type: none"> ▪ Urbanized ▪ Low 	Severe	✓			LMMs 2, 5, 8, 9	✓				
		High									
		Moderate		✓							
		Low			✓				✓		✓
Scale and height of viaduct across Wai Man Tsuen	<ul style="list-style-type: none"> ▪ Urbanized ▪ Low 	Severe				LMMs 3, 4, 8,					
		High	✓					✓			
		Moderate									
		Low			✓				✓		✓

Table 9.4b Summary of Visual Impacts and Recommended Mitigation Measures

SVR ID Number	Location	Landscape character area		Level of visual impact	Visual impact during construction	Visual impact Day 1	Visual impact at Year 10	Mitigated Visual Impacts					
		▪ Rural	▪ High					Recommended landscape mitigation measures	Residual visual impact during construction	Residual visual impact at Day 1	Residual visual impact at Year 10		
BVR1	a) Staff and students at Sir Robert Black College of Education	▪ Rural	▪ High	Severe	✓			LMMs 1, 2, 4, 6, 8, 9,					
				Moderate					✓				
				Low									
				Severe									
BVR1	b) Residents at redeveloped Sir Robert Black College of Education	▪ Rural	▪ High	Severe		✓		LMMs 1, 2, 4, 6, 8, 9,					
				High									
				Moderate			✓				✓	✓	
				Low									
BVR2	Residents at No. 10 Caldecott Road	▪ Rural	▪ High	Severe	✓			LMMs 1, 2, 4, 6, 8, 9					
				High		✓			✓				
				Moderate							✓	✓	
				Low									
BVR3	Residents at small villages along Butterfly Valley	▪ Rural	▪ High	Severe	✓			LMMs 1, 2, 4, 6, 8,					
				High		✓			✓				
				Moderate							✓	✓	
				Low									
KV5	Ching Cheung Road	▪ Urbanized		Severe				LMMs 3, 4, 7					
		▪ Low		High									

SVR ID Number	Location	<ul style="list-style-type: none"> ▪ <u>Landscape character area</u> ▪ <u>Sensitivity to change</u> 	Level of visual impact	Unmitigated Visual Impacts				Mitigated Visual Impacts						
				Visual impact during construction	Visual impact at Day 1	Visual impact at Year 10	Recommended landscape mitigation measures	Residual visual impact during construction	Residual visual impact at Day 1	Residual visual impact at Year 10				
KV5	Continued from prev. page		Moderate	✓	✓									
KV6	Butterfly Valley Road	<ul style="list-style-type: none"> ▪ <u>Urbanized</u> ▪ <u>Low</u> 	Severe			✓				✓			✓	
			High											
			Moderate	✓	✓			✓						
			Low			✓								✓
KV8	LCK Reception Centre high-rise staff quarters	<ul style="list-style-type: none"> ▪ <u>Urbanized</u> ▪ <u>Low</u> 	Severe											
			High											
			Moderate											
			Low	✓	✓			✓				✓		✓
KV9	LCK Reception Centre low-rise staff quarters	<ul style="list-style-type: none"> ▪ <u>Urbanized</u> ▪ <u>Low</u> 	Severe	✓	✓					✓				
			High											
			Moderate											
			Low											
KVX1	Site 10 Residential Development, West Kowloon Reclamation	<ul style="list-style-type: none"> ▪ <u>Urbanized</u> ▪ <u>Low</u> 	Severe											
			High											
			Moderate		✓						✓			
			Low											✓

9.10 Conclusions and recommendations

9.10.1 The main landscape and visual impacts of the proposed alignment of the Alternative alignment are summarized as follows:

- South of Ching Cheung Road in Lai Chi Kok, the proposed alternative is considered to be compatible with the Government's statutory planning framework;
- North of Ching Cheung Road in Butterfly Valley, the proposed alternative is considered to be incompatible with the Government's statutory planning framework and its urban design and landscape planning intentions for the area. Significant adverse and permanent landscape impacts would occur in Butterfly Valley, resulting in the loss of a landscape character of district-wide importance;
- Significant visual impact would occur at a small number of SVRs, particularly residents at No 10 Caldecott Road and the LCK Reception Centre low-rise staff quarters, which will remain high for the lifecycle of the project despite the incorporation of landscape mitigation measures.
- Metroplan's designation of Butterfly Valley as a Landscape Protection Area and an urban fringe park would be significantly affected by the alternative alignment. A further planning review should be undertaken to determine if alternative sites are available for future designation by Planning Department;
- The incorporation of landscape and visual mitigation measures into the alternative alignment scheme will reduce some of the more severe landscape and visual impacts.

9.10.2 The level of significance of the landscape and visual impacts of the alternative alignment is classified in accordance with Annex 10 of the TM/EIAO. Based on the criteria in Annex 10, the landscape and visual impacts of the alternative alignment in the Kowloon Section are considered to be acceptable with mitigation measures. The visual impact of the alternative alignment in Butterfly Valley is considered to be acceptable subject to the incorporation of mitigation measures. The landscape impact of the alternative alignment in Butterfly Valley is considered to be undetermined. Significant adverse effects are likely on the landscape in Butterfly Valley but the extent to which the proposed mitigation measures can reduce the impact to the level where it is acceptable will be dependant on the final detailed design.



FIGURE 9.1

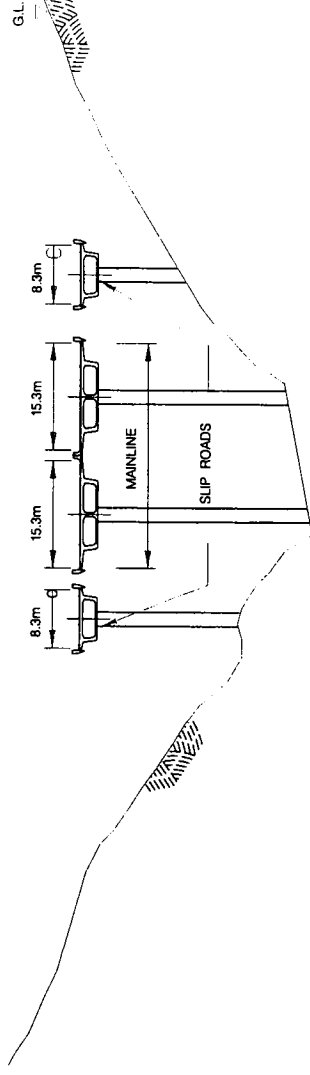
GENERAL ALIGNMENT OF ALTERNATIVE
ALIGNMENT AND LANDSCAPE IMPACT
ASSESSMENT STUDY AREA

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DATE: 11 MARCH 1999

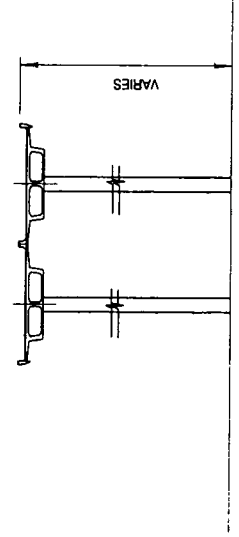
SCALE 1:5000

Environmental
Resources
Management





TYPICAL CROSS SECTION OF VIADUCT BETWEEN CHING CHEUNG ROAD AND NORTH OF CHING CHEUNG ROAD



TYPICAL CROSS SECTION OF VIADUCT BETWEEN LAI CHI KOK INTERCHANGE AND CHING CHEUNG ROAD

FIGURE 9.2(a)

ROUTE 16
TYPICAL CROSS SECTIONS THROUGH
ALTERNATIVE ALIGNMENT ON VIADUCT

URTN FILE : 362 DRAWINGS CURRENT PROSADON
DATE : 11 MARCH 1999

Environmental
Resources
Management



SCALE: N.T.S.

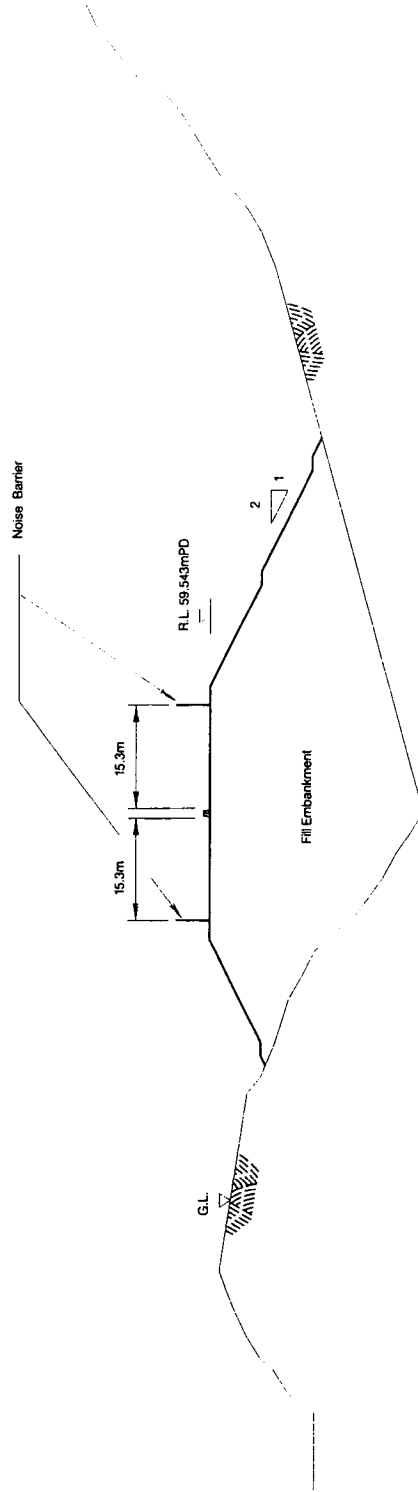


FIGURE 9.2(b)

ROUTE 16
 TYPICAL CROSS SECTION ALTERNATIVE
 ALIGNMENT ON EMBANKMENT
 SHEET 2 OF 3

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 DATE : 11 MARCH 1999

Environmental
 Resources
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SCALE N.T.S.

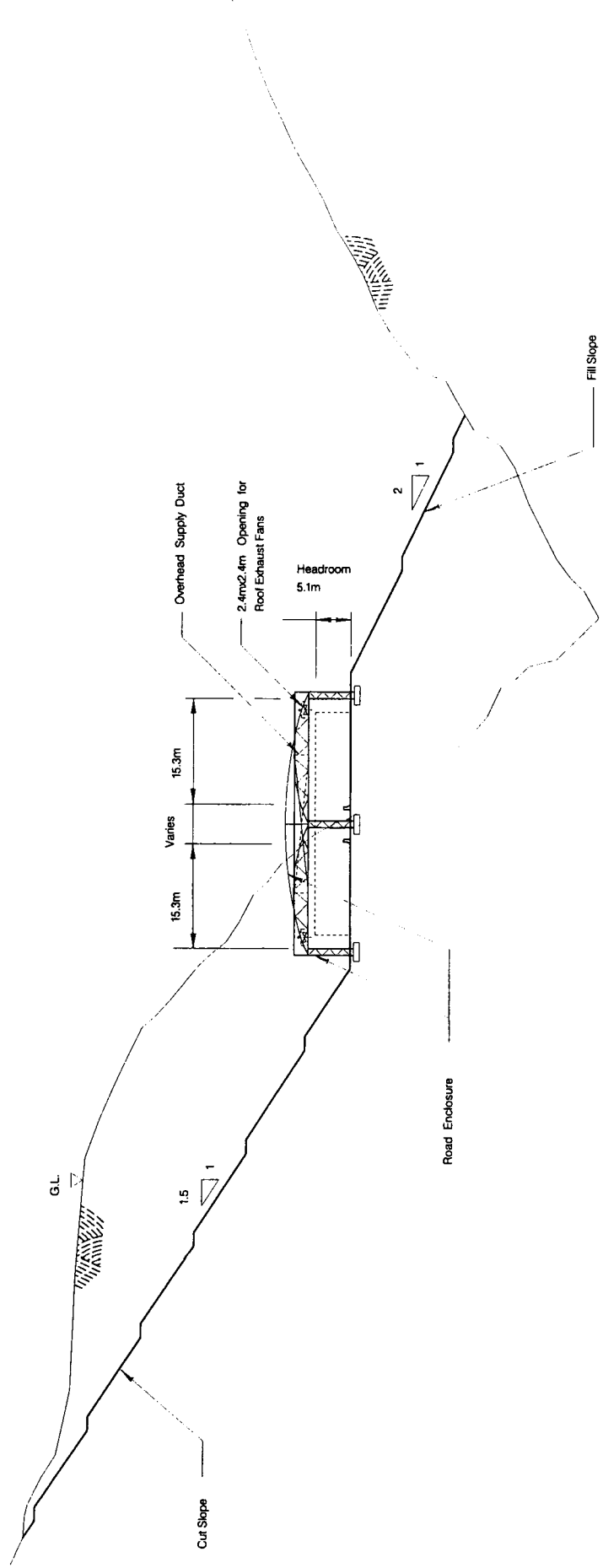


FIGURE 9.2 (c)

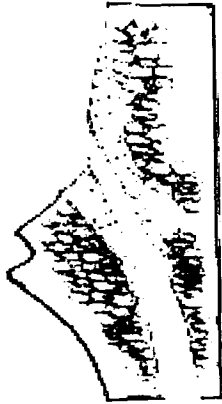
ROUTE 16
 TYPICAL CROSS SECTION ALTERNATIVE
 ALIGNMENT ON EMBANKMENT
 AND IN NOISE ENCLOSURE
 SHEET 3 OF 3

Environmental
 Resources
 Management





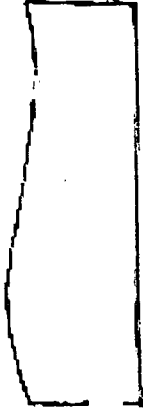
SEVERE LANDSCAPE IMPACT
 1. Adverse, extensive, negative change.
 2. Sensitive regional or district-wide landscape permanently lost.



HIGH LANDSCAPE IMPACT
 1. Adverse, extensive, negative change.
 2. Sensitive landscape of high local value permanently lost.



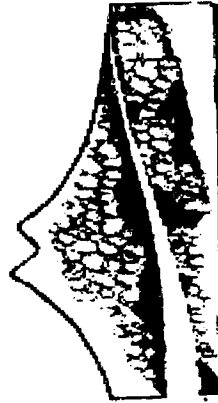
MEDIUM LANDSCAPE IMPACT
 1. Limited negative change.
 2. Landscape of local value permanently lost or affected.



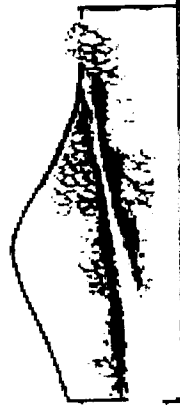
LOW LANDSCAPE IMPACT
 1. Negligible change.
 2. Landscape of low local value permanently lost or affected.



SUBSTANTIAL GAIN
 1. Conspicuous positive change to a sensitive regional or district-wide landscape, e.g. New roadside planting within a country park or existing mature woodland conserved and enhanced.



HIGH GAIN
 1. Positive change to a landscape of high local value, e.g. Roadside woodland conserved and enhanced.



MEDIUM GAIN
 1. Positive change to a landscape of local value, e.g. Roadside woodland conserved and enhanced or new planting next to existing road..



LOW GAIN
 1. Small positive change to a landscape of local value. e.g. New planting next to an existing road.

Figure 9.3(a) - ILLUSTRATIONS OF LANDSCAPE IMPACT DEFINITIONS
 Sheet 1 of 2



SEVERE VISUAL IMPACT

1. Adverse, extensive negative change.
- New development in the foreground completely dominates views from a sensitive visual receiver, eg residential building.



HIGH VISUAL IMPACT.

1. Adverse, extensive negative change.
2. New development in the foreground or middleground occupies a conspicuous part of the views from a sensitive visual receiver.



MEDIUM VISUAL IMPACT.

1. Limited negative change
2. New development in the middleground is a noticeable element in views from a sensitive visual receiver.



LOW VISUAL IMPACT.

1. Negligible change
2. New development in the background is a perceptible but insignificant element in views from a sensitive visual receiver.



SUBSTANTIAL GAIN

- Conspicuous positive change by the removal or screening of dominating and obstructing blight in the foreground when viewed from a sensitive visual receiver within a sensitive landscape of district-wide or regional value.



HIGH GAIN

1. Positive change by the removal or screening of conspicuous blight in the foreground.



MEDIUM GAIN

1. Positive change by the removal or screening of blight in the middleground.

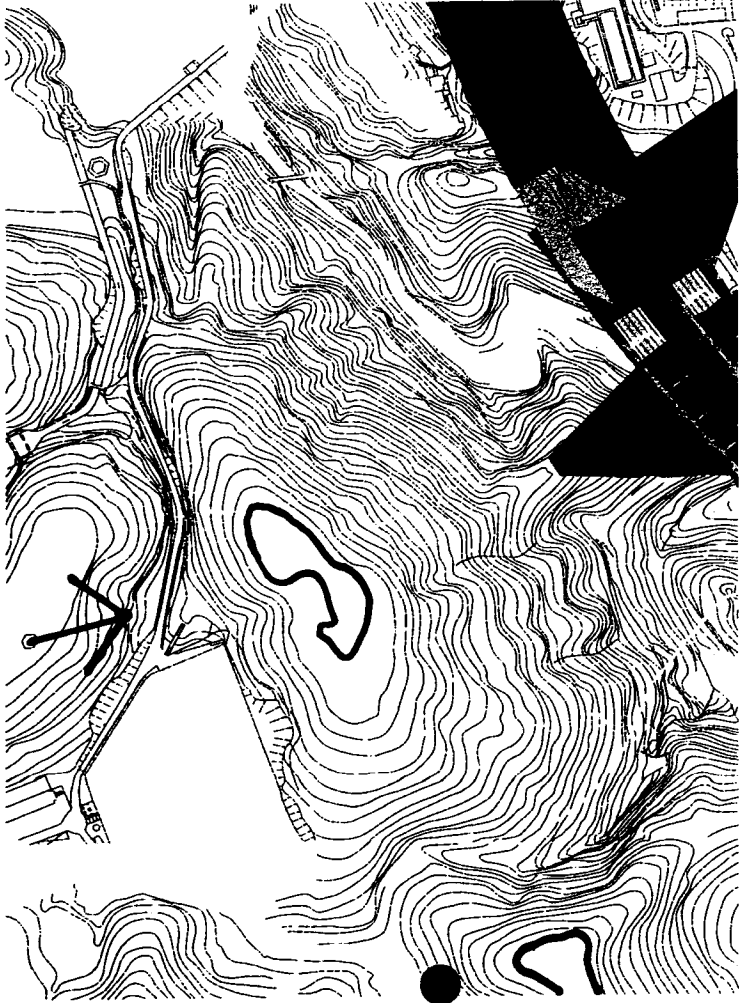


LOW GAIN

1. Small positive change by the removal or screening of blight in the foreground.

Figure 9.3(b) - ILLUSTRATIONS OF VISUAL IMPACT DEFINITIONS
Sheet 2 of 2

Viewpoint is a BBQ area in Lion Rock Country Park as close as possible to the alternative alignment. Red contour represents intermediate landform blocking views of the proposed road.



Alternative alignment on embankment

Alternative alignment in tunnel.



● Wireframe computer perspective demonstrating that the road alignment (illustrated in grey) is below the level of intermediate landform (shown as a red contour, see map above for location).

Figure 9.4 VISUAL ANALYSIS OF VIEWS FROM LION ROCK COUNTRY PARK

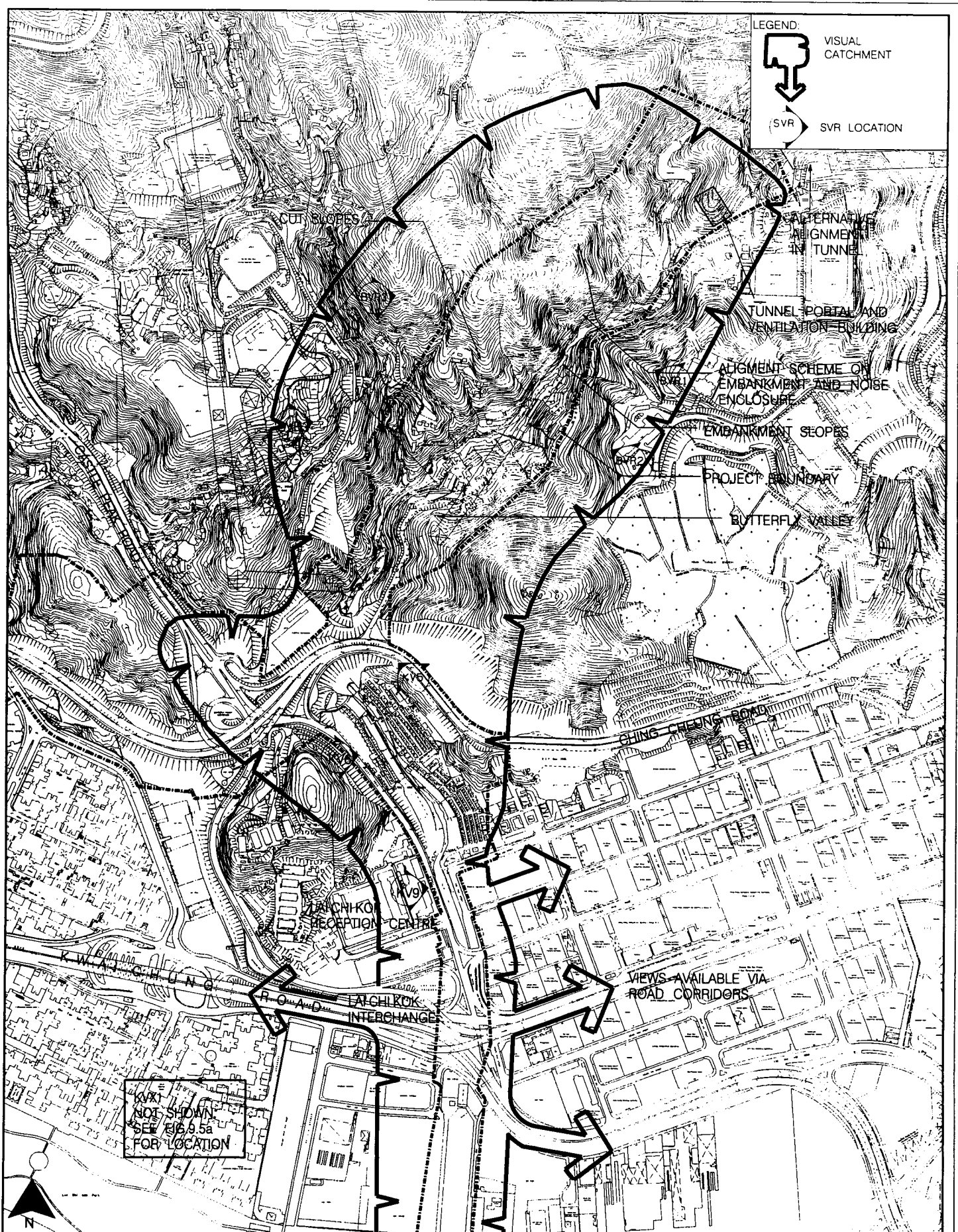
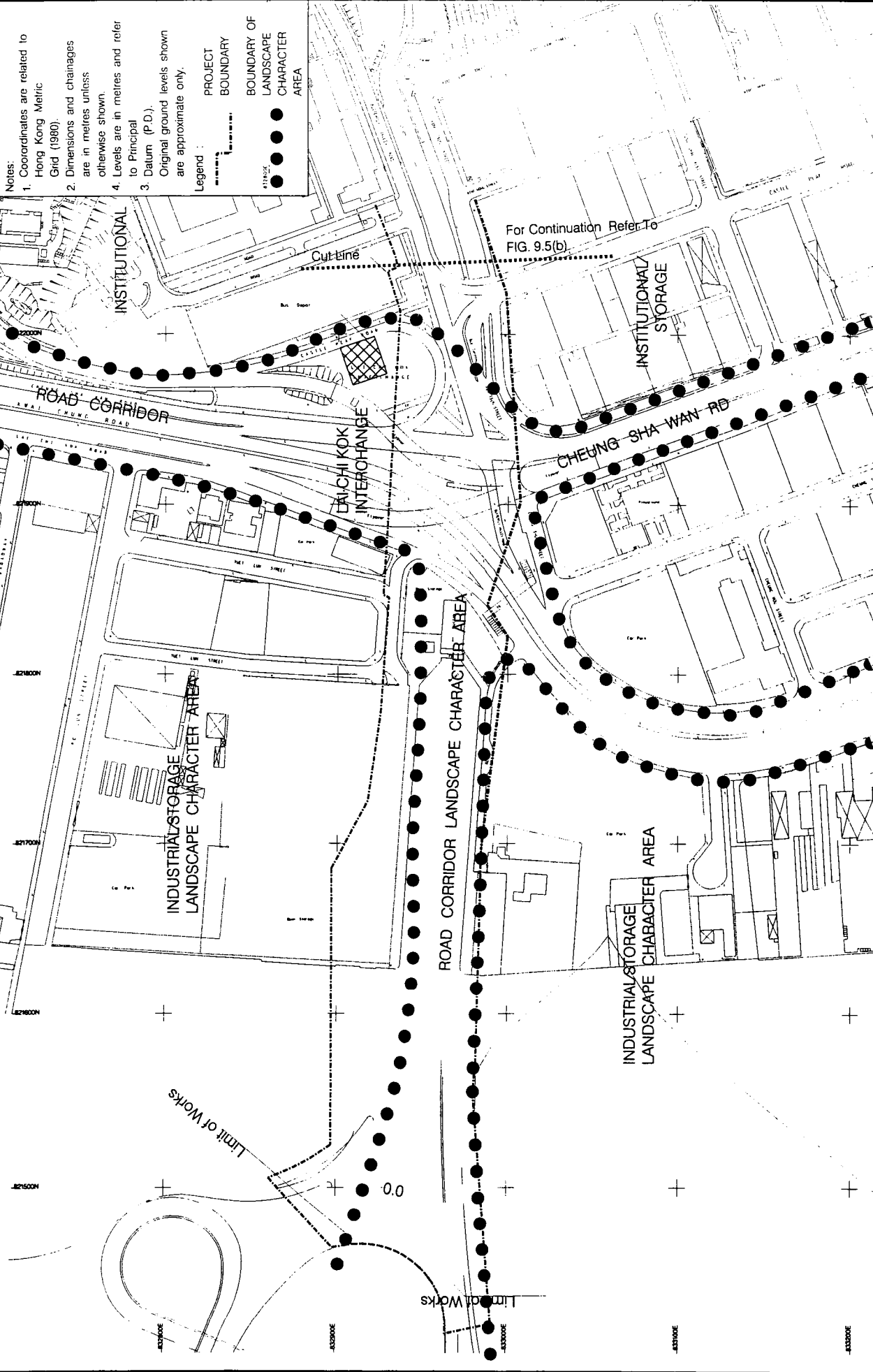


FIGURE 9.4(a)

LOCATIONS OF SENSITIVE VISUAL RECEIVERS AND VISUAL CATCHMENT

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Notes:

1. Coordinates are related to Hong Kong Metric Grid (1980).
2. Dimensions and chainages are in metres unless otherwise shown.
3. Levels are in metres and refer to Principal Datum (P.D.).
4. Original ground levels shown are approximate only.

Legend:

- PROJECT BOUNDARY (dashed line)
- BOUNDARY OF LANDSCAPE CHARACTER AREA (dotted line)
- STREET (solid line)

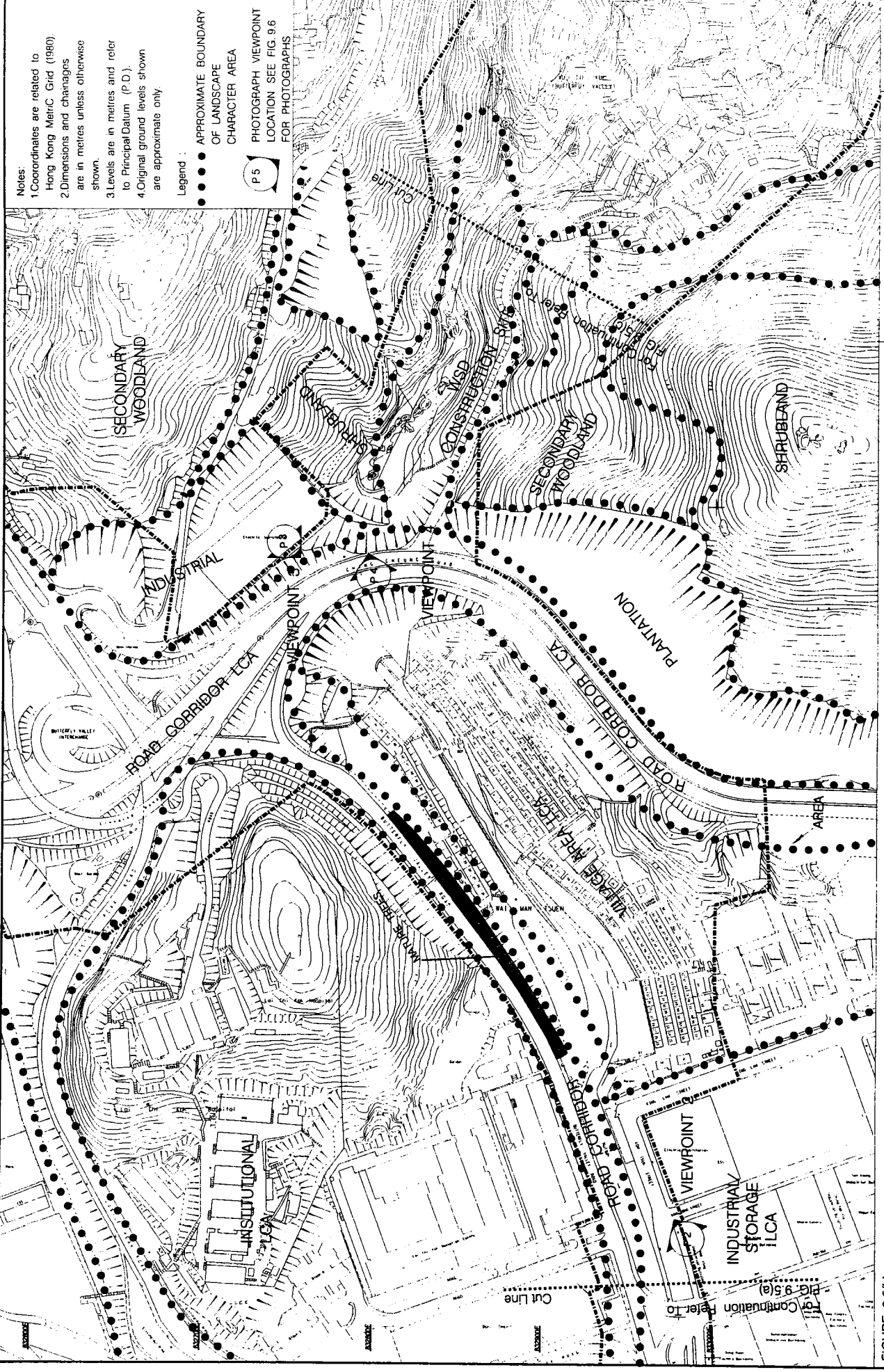
Environmental Resources Management



ROUTE 16 ALTERNATIVE ALIGNMENT
 BASELINE STUDY - KOWLOON SECTION
 SHEET 1 OF 3

FIGURE 9.5 (a)

SCALE 1:2000



- Notes:
1. Coordinates are related to Hong Kong Metric Grid (1980)
 2. Dimensions and changes are in metres unless otherwise shown.
 3. Levels are in metres and refer to Principal Datum (P.D.).
 4. Original ground levels shown are approximate only.

- Legend:
- APPROXIMATE BOUNDARY OF LANDSCAPE CHARACTER AREA
 - P.5 PHOTOGRAPH VIEWPOINT LOCATION SEE FIG. 9.6 FOR PHOTOGRAPHS

ROUTE 16 ALTERNATIVE ALIGNMENT
BASELINE STUDY - KOWLOON SECTION
SHEET 2 OF 3

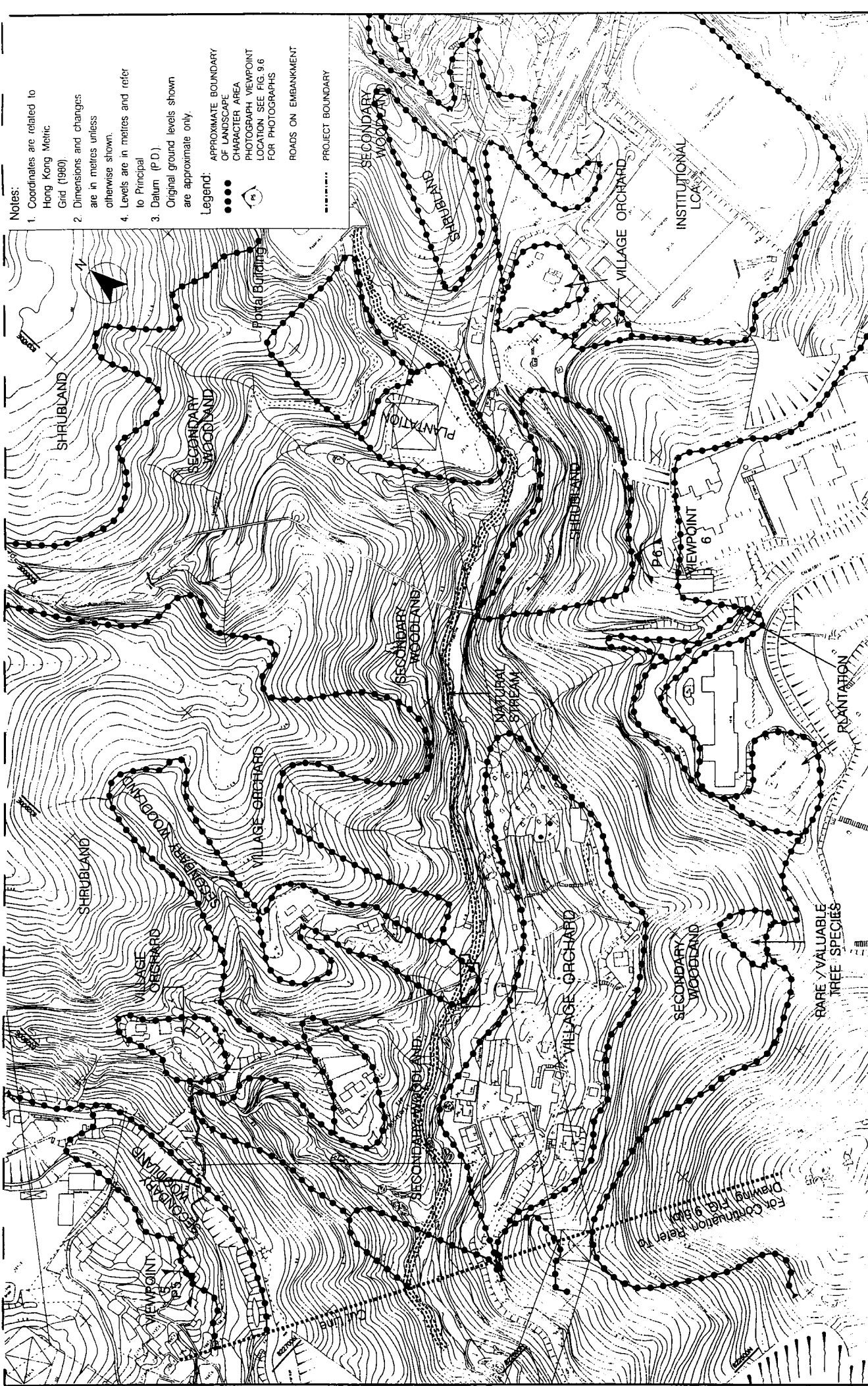
SCALE 1:2000

ERM
Environmental Resources Management

DRU
Design & Research Unit

FIGURE 9.5(b)

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DATE : 17 MARCH 1998



Notes:

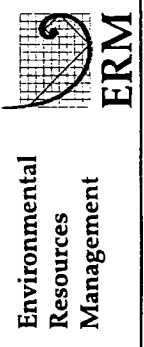
1. Coordinates are related to Hong Kong Metric Grid (1980).
2. Dimensions and changes are in metres unless otherwise shown.
4. Levels are in metres and refer to Principal Datum (P.D.)
3. Original ground levels shown are approximate only.

Legend:

- APPROXIMATE BOUNDARY OF LANDSCAPE CHARACTER AREA
- PHOTOGRAPH VIEWPOINT LOCATION SEE FIG. 9.6 FOR PHOTOGRAPHS
- ROADS ON EMBANKMENT
- PROJECT BOUNDARY

FIGURE 9.5 (c)

ROUTE 16 ALTERNATIVE ALIGNMENT
BASELINE STUDY - KOWLOON SECTION
SHEET 3 OF 3



Lai Chi Kok Interchange and amenity areas

Lai Chi Kok Reception Centre

Kwai Chung Road

Butterfly Valley Road



View of Butterfly Valley Road looking north from Lai Chi Kok Interchange.

BASELINE CONDITION:

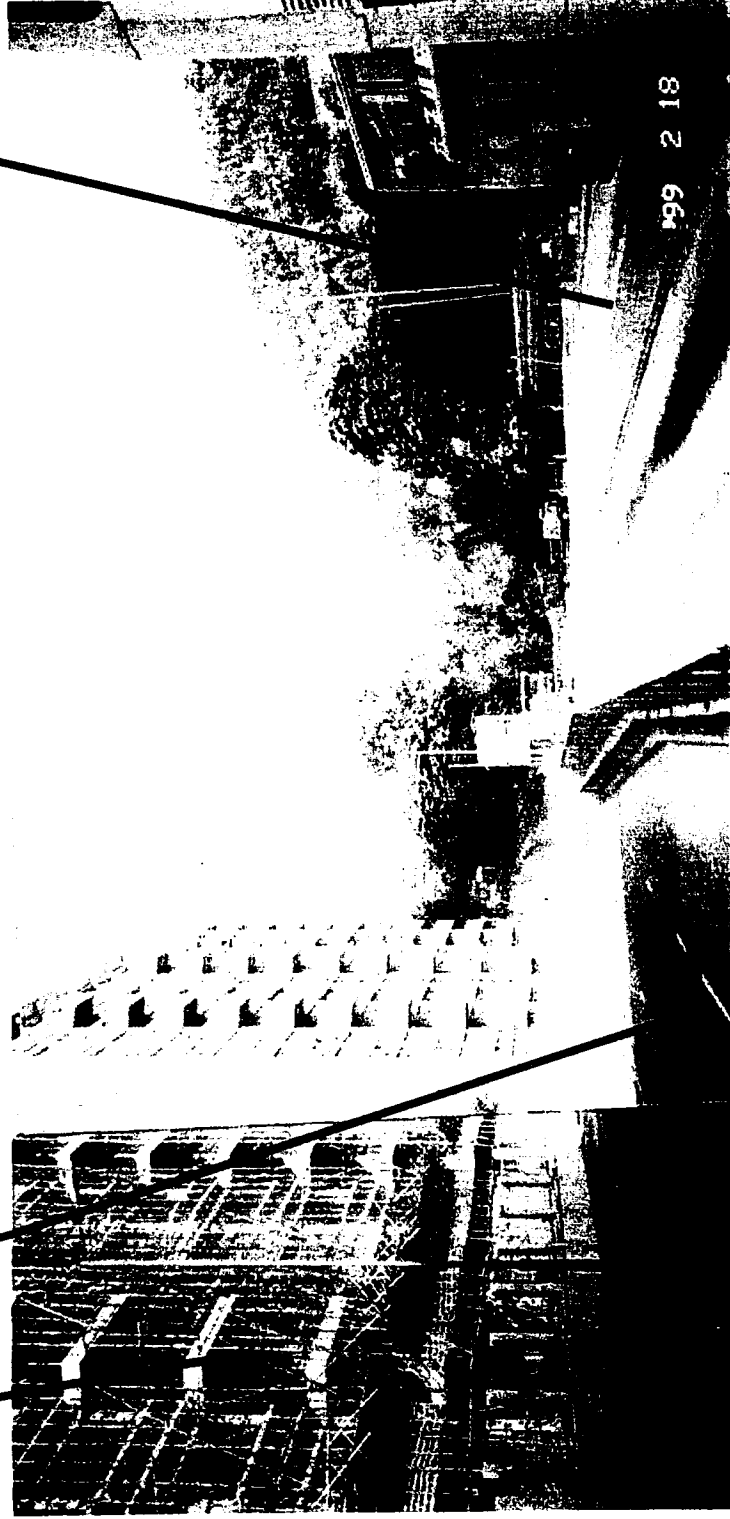
- urban build-up of road corridors, industrial and storage areas
- generally low in architectural and visual interest
- confused townscape, with little apparent structure

Figure 9.6(a) BASELINE STUDY - PHOTOGRAPHS OF LANDSCAPE CHARACTER AREAS
VIEWPOINT 1

Lai Chi Kok Reception Centre
low-rise staff quarters.

Butterfly Valley Road

Public Transport Interchange



BASELINE ASSESSMENT:

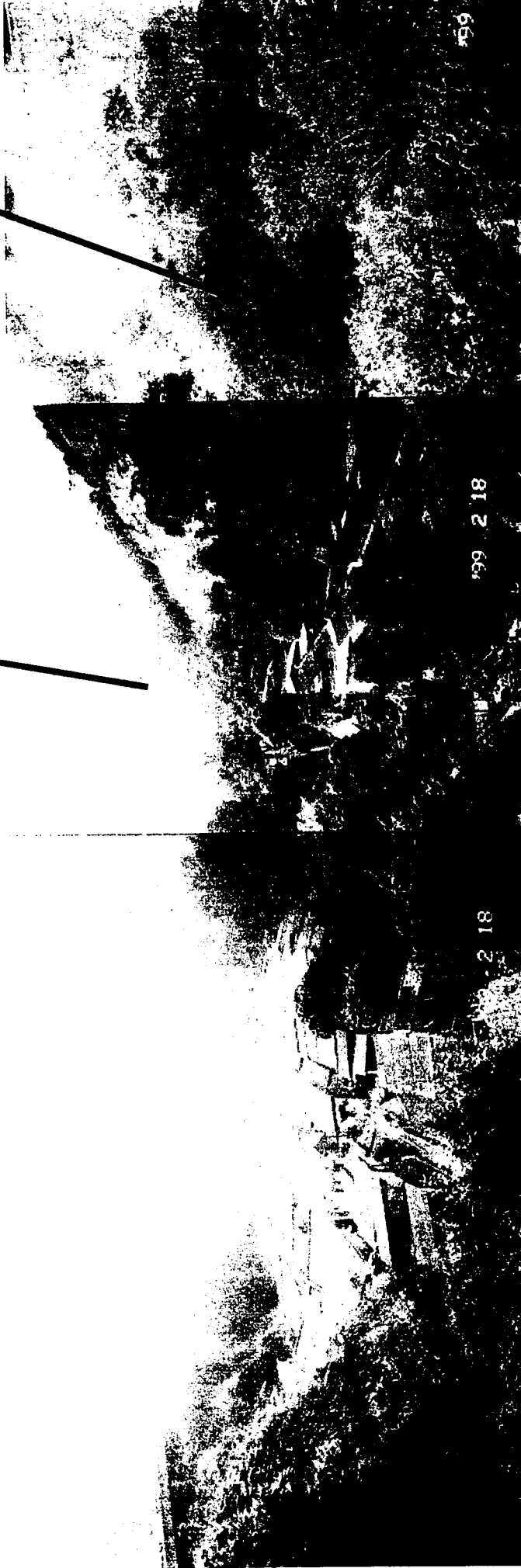
- urban build-up of road corridors
- natural green backdrop of Eagle's Nest hillslopes

View of Butterfly Valley Road looking north next to
Lai Chi Kok Reception Centre low-rise staff quarters
(VSR KV9).

Figure 9.6(b) BASELINE STUDY- PHOTOGRAPHS OF LANDSCAPE CHARACTER AREAS
VIEWPOINT 2

Lai Chi Kok Reception Centre
low-rise staff quarters.

Butterfly Valley Road



View over Wai Man Tsuen looking south from Ching Cheung Road.

BASELINE STUDY:

- urban fabric is generally low in architectural and visual interest
- dominated by roadside related structures and slope improvements

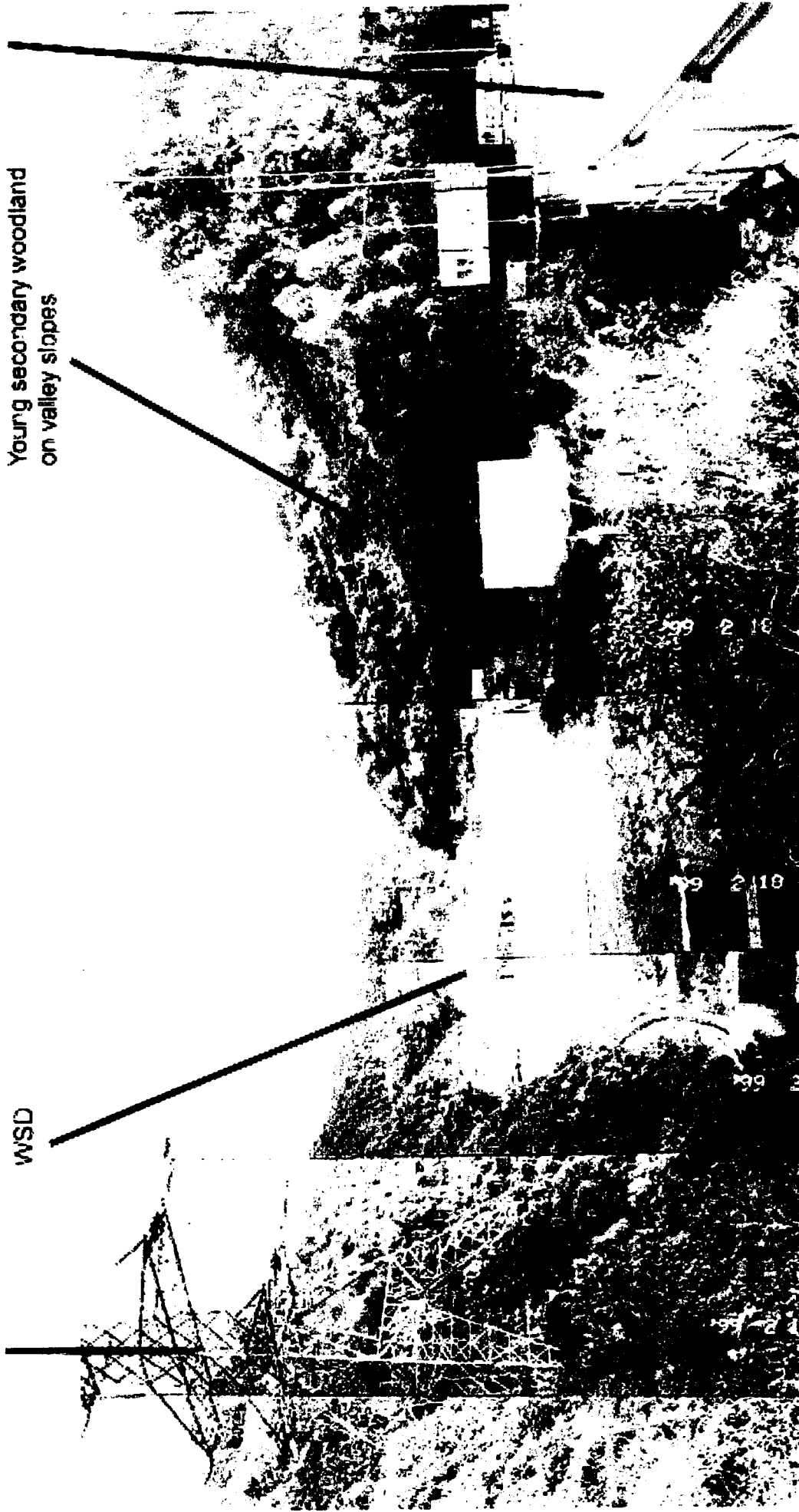
**Figure 9.6(c) BASELINE STUDY-PHOTOGRAPHS OF LANDSCAPE CHARACTER AREAS
VIEWPOINT 3**

High voltage power lines

WSD

Ching Cheung Road USB KV

Young secondary woodland
on valley slopes



BASELINE CONDITION:

- narrow valley enclosed by wooded hillslopes
- landform of hill summits linked by ridges and saddles
- heavily vegetated by secondary woodland

View of Butterfly Valley looking north from Ching Cheung Road.

Figure 9.6(d) BASELINE STUDY-PHOTOGRAPHS OF LANDSCAPE CHARACTER AREAS
VIEWPOINT 4

Sir Robert Black
College of Education

No 10 Caldecott Road
USR BVR1

Young secondary woodland on
valley hill slopes

Eag's Nest



View of Butterfly Valley looking east from Chung Hang Road.

Figure 9.6(a) BASELINE STUDY-PHOTOGRAPHS OF LANDSCAPE CHARACTER AREAS
VIEWPOINT 5

BASELINE CONDITION

- narrow enclosed valley
- heavily vegetated by woodland trees

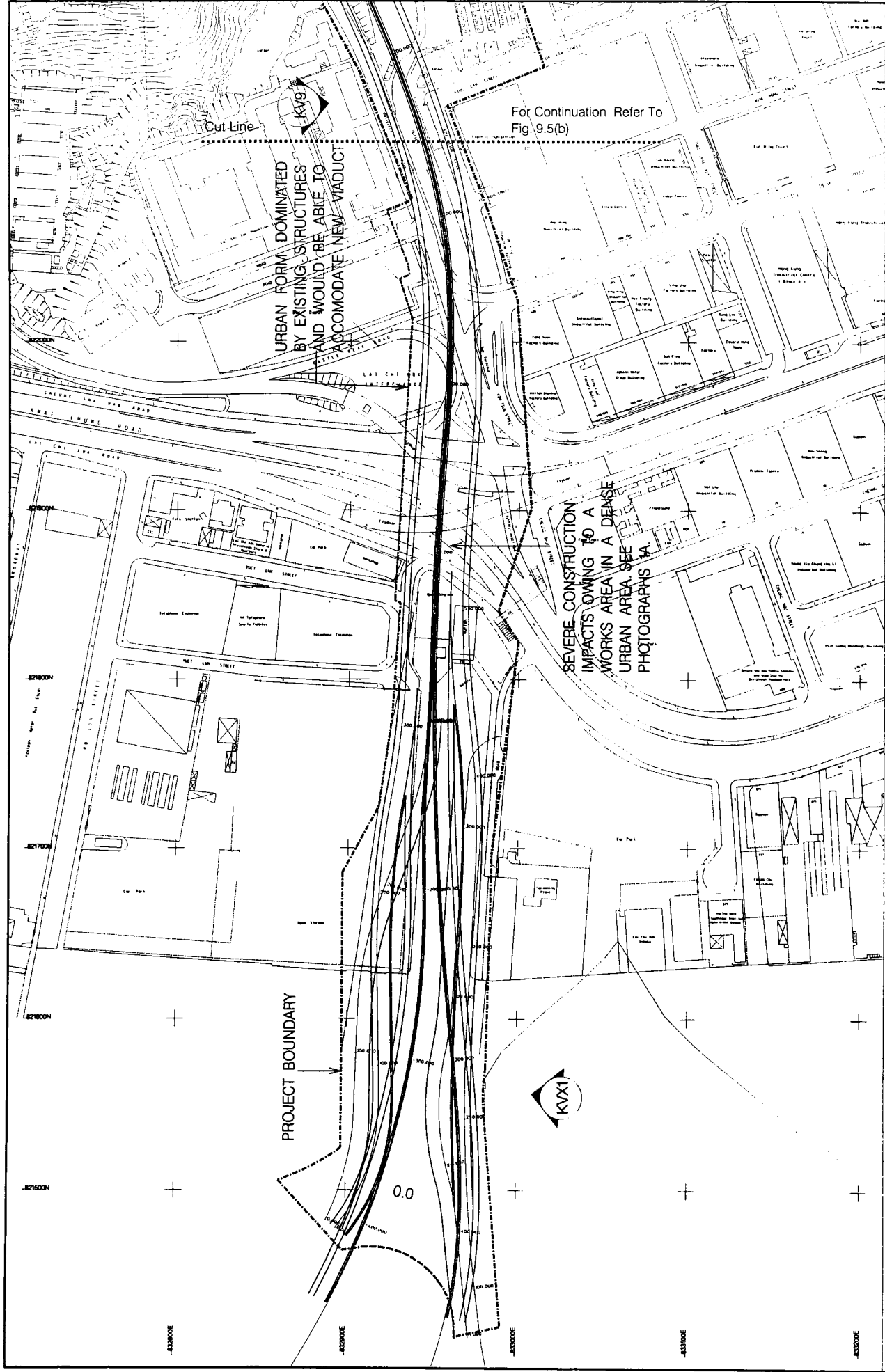


FIGURE 9.7 (a)

ROUTE 16 ALTERNATIVE ALIGNMENT
IMPACT ASSESSMENT PLAN
SHEET 1 OF 3

LISTY, P.L.E. 1888 GARDINERS CURVE/ST/10/1/001
DATE: 11 MARCH 1999

Environmental Resources Management

SCALE 1:2000



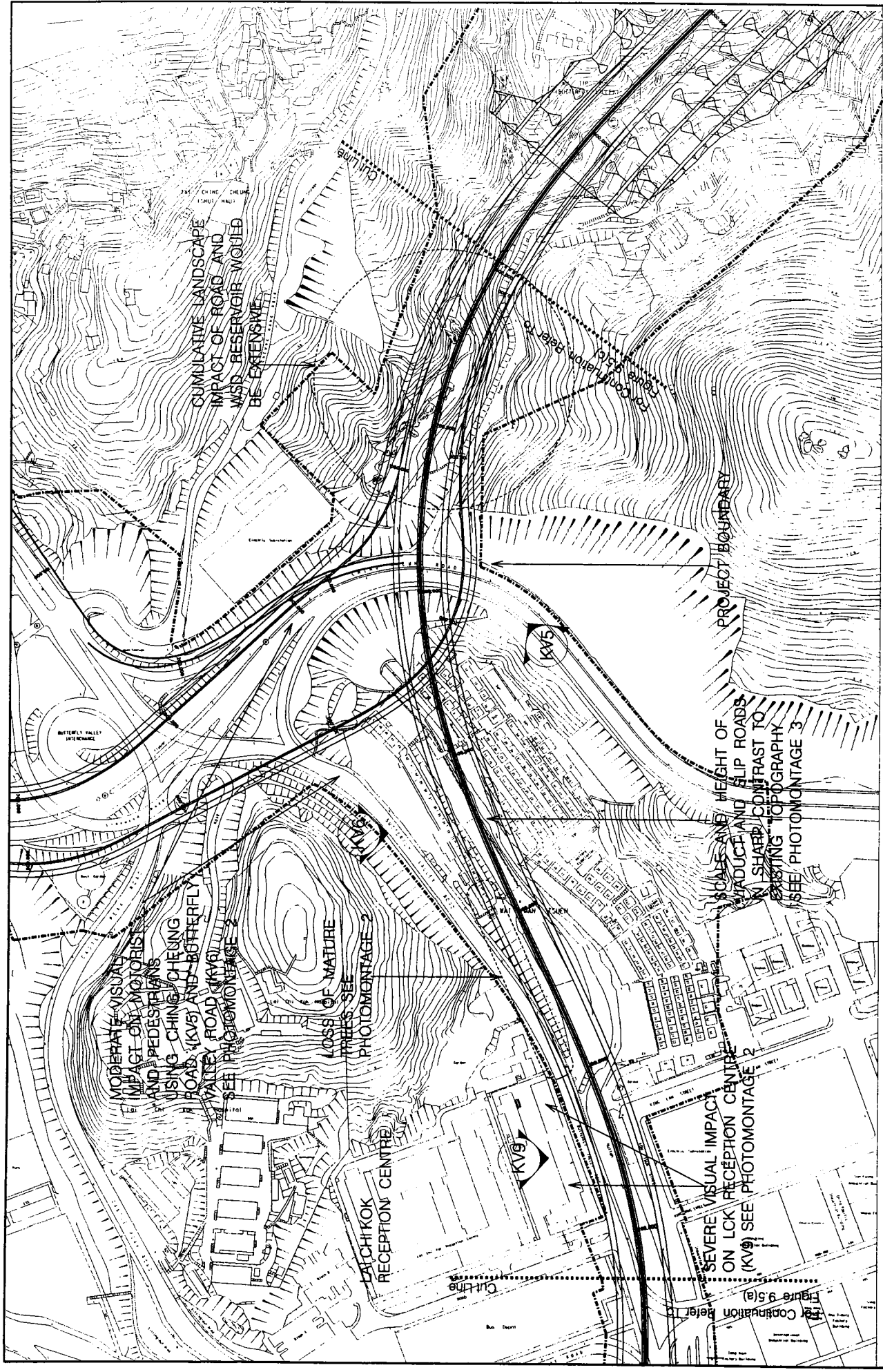


FIGURE 9.7(b)

ROUTE 16 ALTERNATIVE ALIGNMENT
IMPACT ASSESSMENT PLAN
SHEET 2 OF 3

UTRN FILE : 302 JONNINGS CURRENT (JOB 178)
DATE : 11 MARCH 1998

SCALE 1:2000



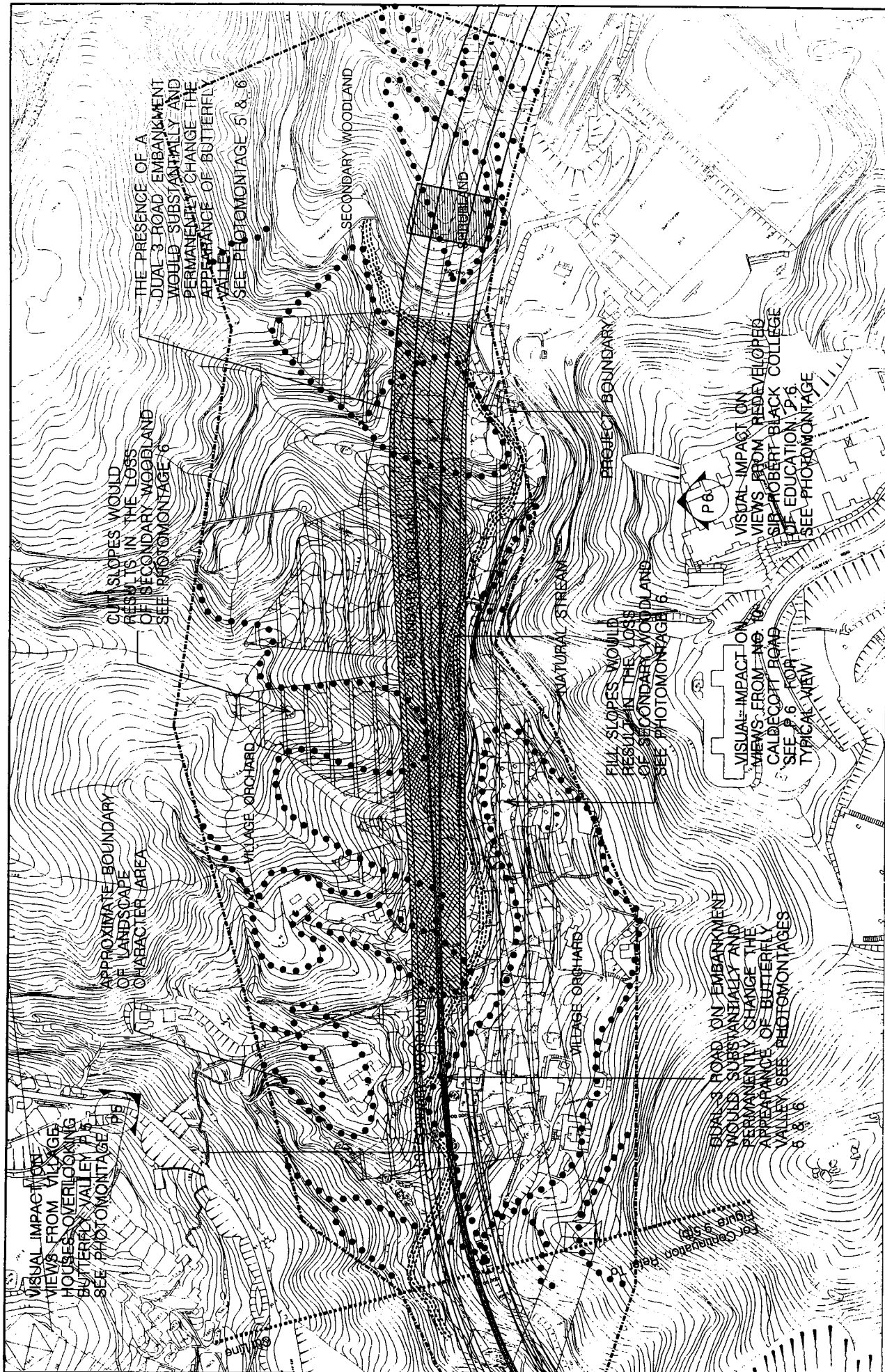
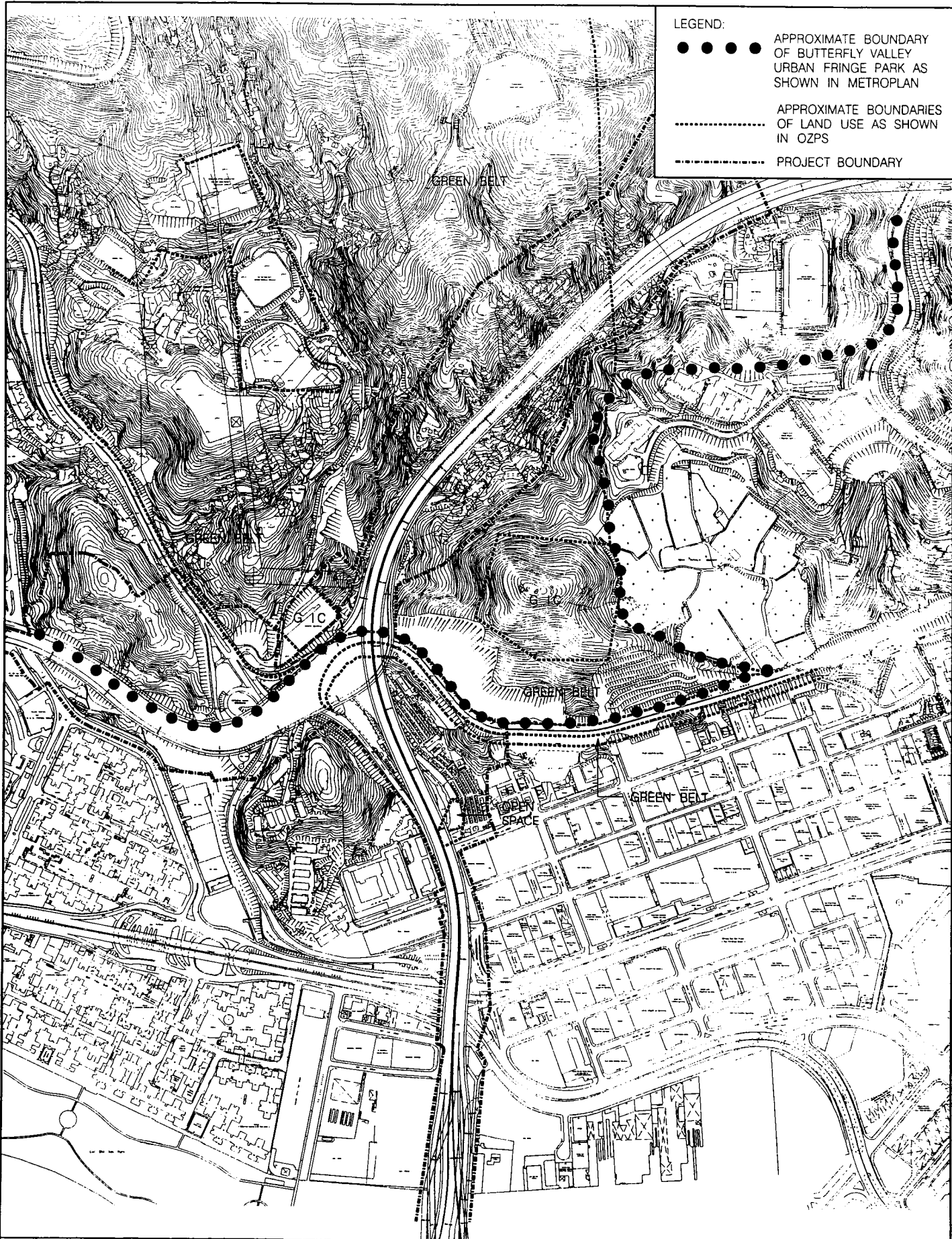


FIGURE 9.7 (c)

ROUTE 16 ALTERNATIVE ALIGNMENT
 IMPACT ASSESSMENT PLAN
 SHEET 3 OF 3



SCALE 1:2000



LEGEND:

- ● ● ● APPROXIMATE BOUNDARY OF BUTTERFLY VALLEY URBAN FRINGE PARK AS SHOWN IN METROPLAN
- APPROXIMATE BOUNDARIES OF LAND USE AS SHOWN IN OZPS
- - - - - PROJECT BOUNDARY

FIGURE 9.8

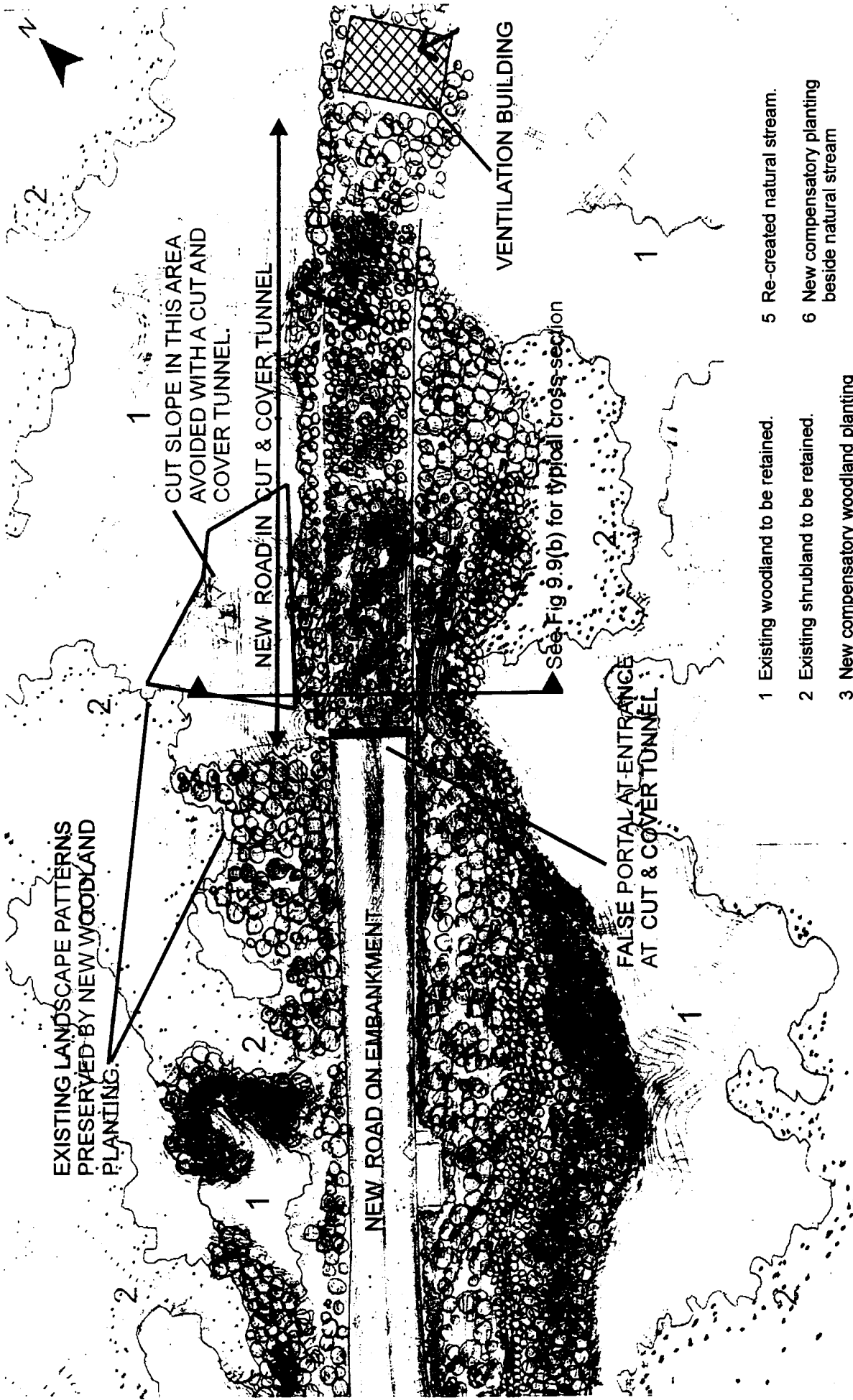
ROUTE 16 ALTERNATIVE ALIGNMENT
 PLANNING AND DEVELOPMENT CONTROL
 FRAMEWORK IN STUDY AREA

USTN FILE 3502 / DRAWINGS / CURRENT / PROBLDN
 DATE: 11 MARCH 1999

SCALE 1:5000

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- 1 Existing woodland to be retained.
- 2 Existing shrubland to be retained.
- 3 New compensatory woodland planting on new cut and fill slopes
- 4 New compensatory planting in disused villages areas
- 5 Re-created natural stream.
- 6 New compensatory planting beside natural stream
- 7 New compensatory planting on cut and cover tunnel.

Figure 9.9(a) Typical Landscape Mitigation Measures in Butterfly Valley

At detailed design, a cut and cover tunnel should be considered in order to maximize the area of compensatory planting, and to minimize the area of land disturbed by site formation (see Figure 9.9(a) for the location of this cross-section).

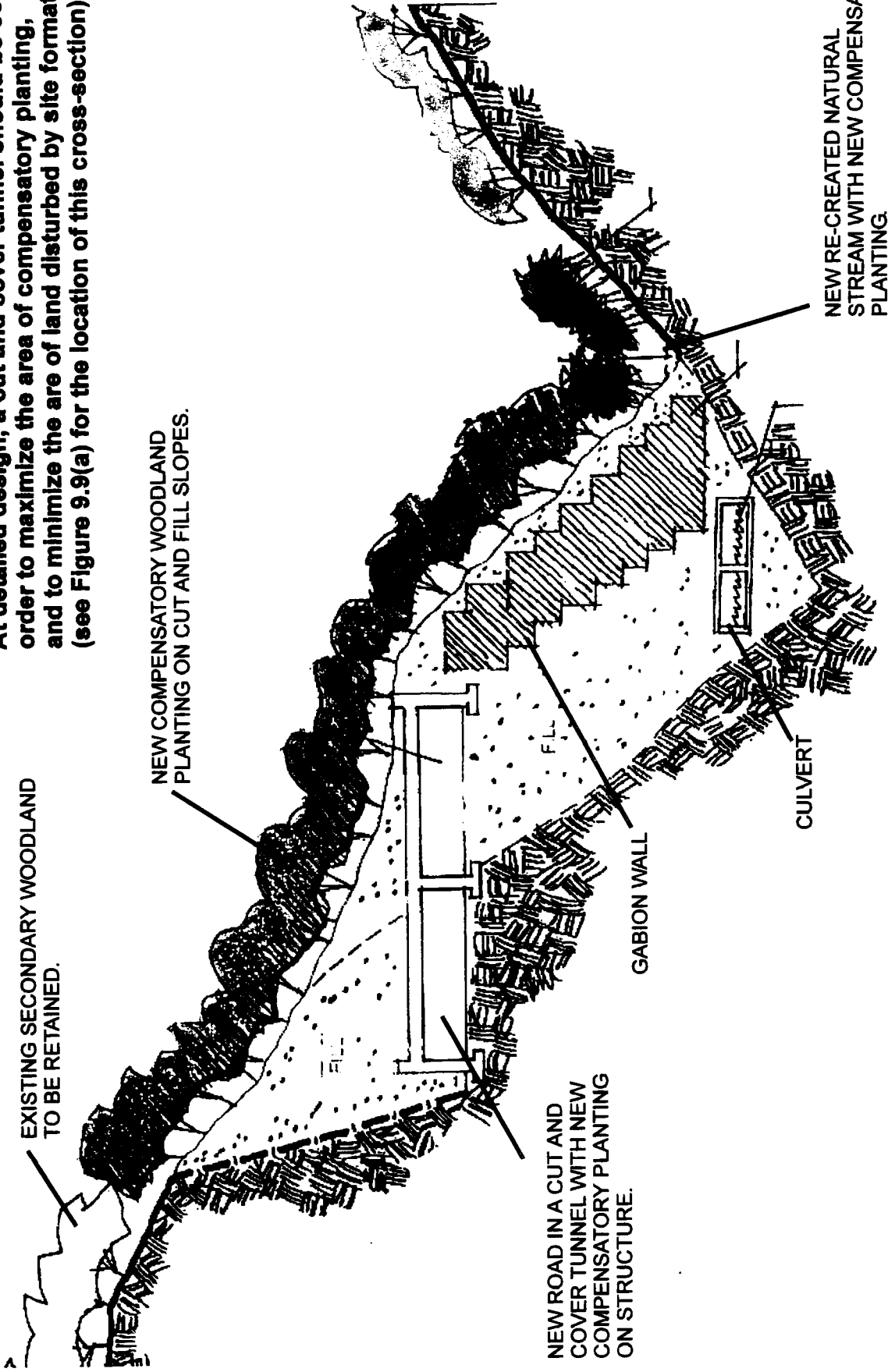


Figure 9.9(b) Typical Landscape Mitigation Measures in Butterfly Valley Landscape Mitigation Measure 9

Maximize woodland planting on disturbed land



EXISTING VIEW OF BUTTERFLY VALLEY

PHOTO MONTAGE OF THE BENEFITS OF A CUT AND COVER TUNNEL IN BUTTERFLY VALLEY.

EXISTING SECONDARY WOODLAND TO BE RETAINED.

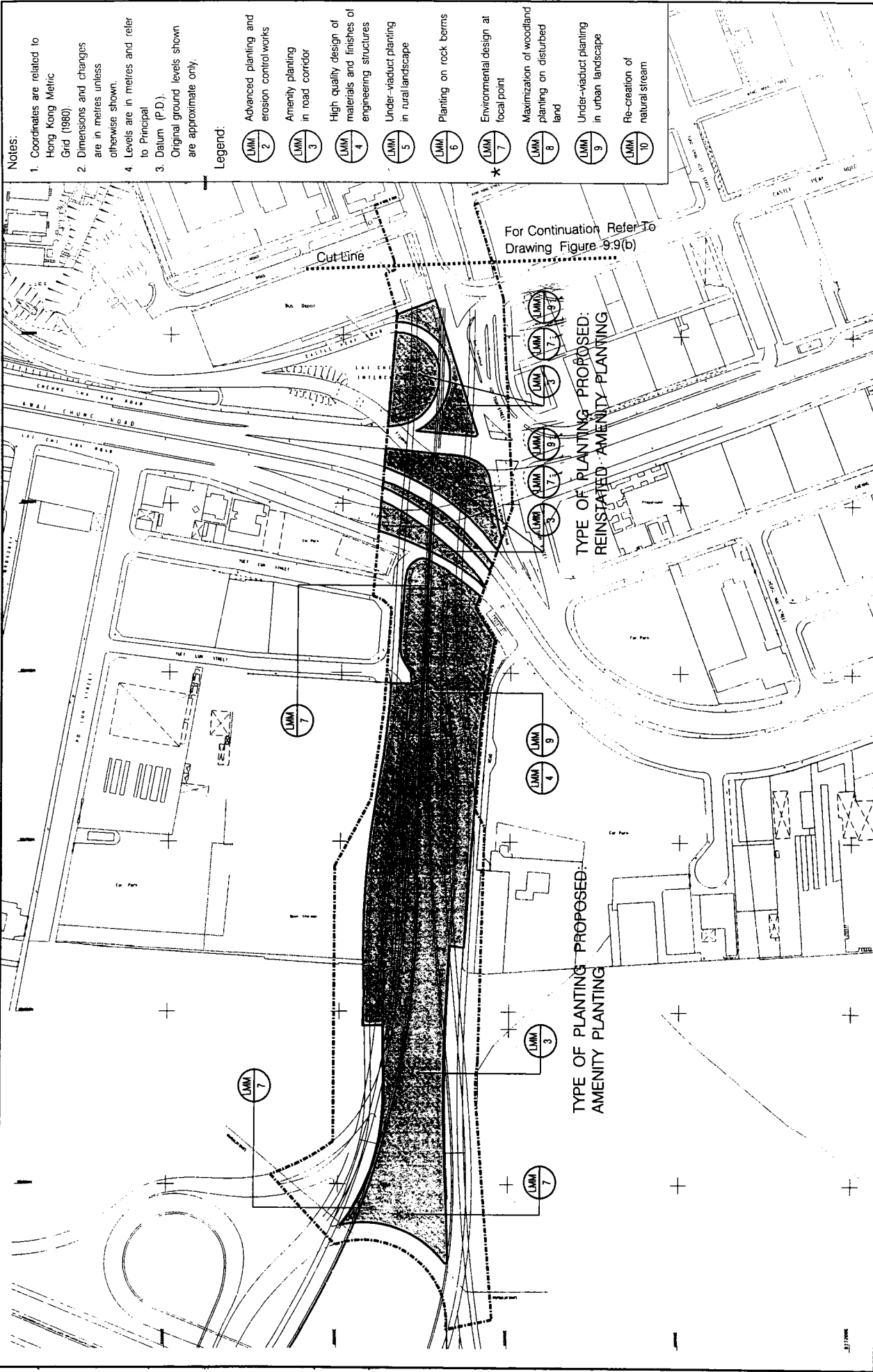


NEW PLANTING ON CUT SLOPES.

PHOTOMONTAGE

CUT AND COVER TUNNEL.

Figure 9.9(c) Typical Landscape Mitigation Measures in Butterfly Valley



Notes:

- Coordinates are related to Hong Kong Metric Grid (1980).
- Dimensions and changes are in metres unless otherwise shown.
- Levels are in metres and refer to Principal Datum (P.D.).
- Original ground levels shown are approximate only.

- Legend:
- LMM 2: Advanced planting and erosion control works
 - LMM 3: Amenity planting in road corridor
 - LMM 4: High quality design of materials and finishes of engineering structures
 - LMM 5: Under-viaduct planting in rural landscape
 - LMM 6: Planting on rock berms
 - LMM 7: Environmental design at focal point
 - LMM 8: Maximization of woodland planting on disturbed land
 - LMM 9: Under-viaduct planting in urban landscape
 - LMM 10: Re-creation of natural stream

Environmental Resources Management
 Environmental Resources Management
 SCALE 1:2000
 ROUTE 16 ALTERNATIVE ALIGNMENT
 PROPOSED LANDSCAPE MITIGATION MEASURES
 KOWLOON SECTION
 SHEET 1 OF 3

LHM FILE : 3002_07A/ANALYSIS_CURRENT_A/FORMO.DGN
 DATE : 08 AUGUST 1999

- Notes:
1. Coordinates are related to Hong Kong Metric Grid (1980).
 2. Dimensions and changes are in metres unless otherwise shown.
 3. Levels are in metres and refer to Principal Datum (P.D.). Original ground levels shown are approximate only.

- Legend:
- LMM 2: Advanced planting and erosion control works
 - LMM 3: Amenity planting in road corridor
 - LMM 4: High quality design of materials and finishes of engineering structures
 - LMM 5: Under-viaduct planting in rural landscape
 - LMM 6: Planting on rock berms
 - LMM 7: Environmental design at focal point
 - LMM 8: Maximization of woodland planting on disturbed land
 - LMM 9: Under-viaduct planting in urban landscape
 - LMM 10: Re-creation of natural stream

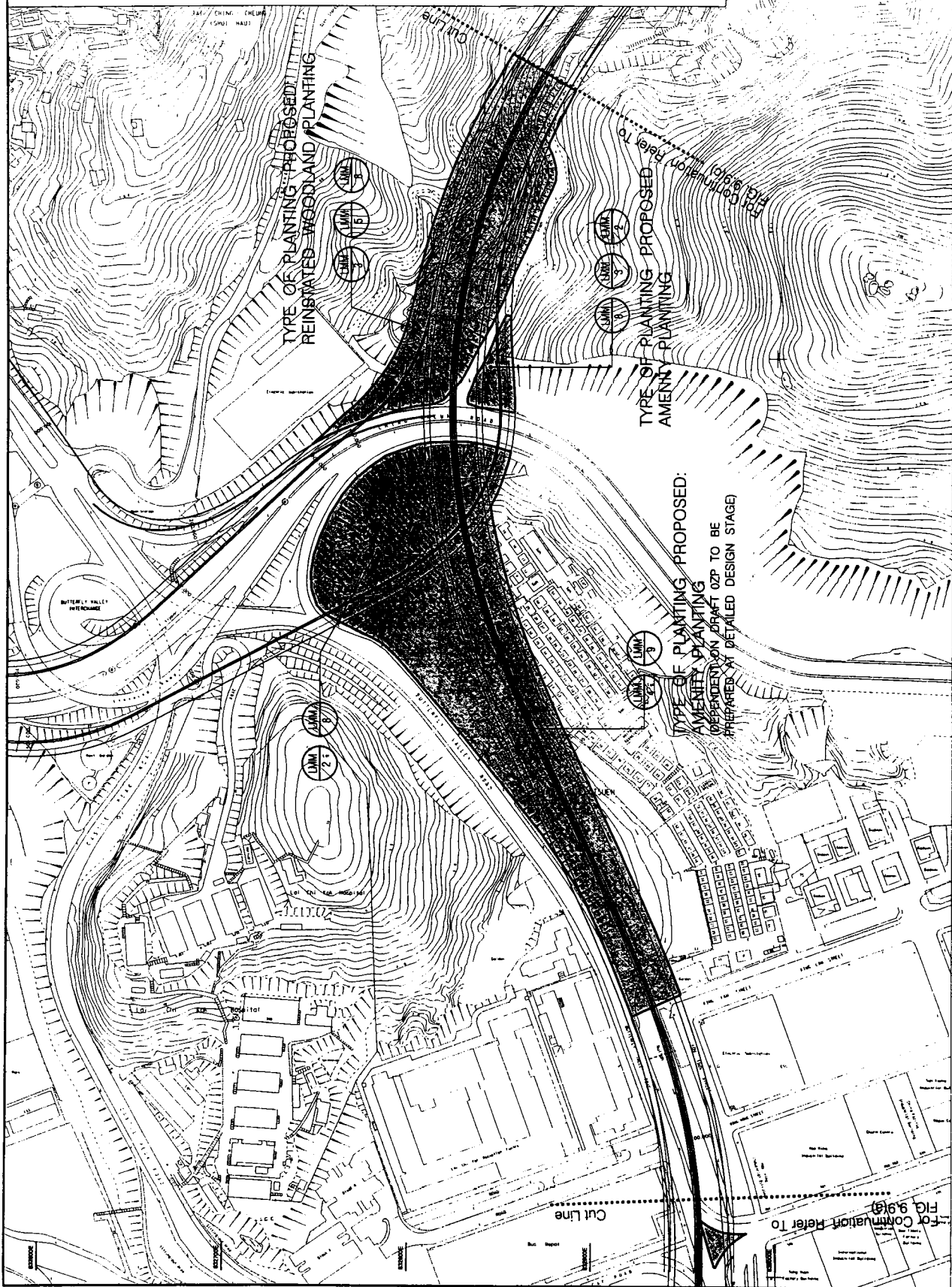


FIGURE 9.9(e)

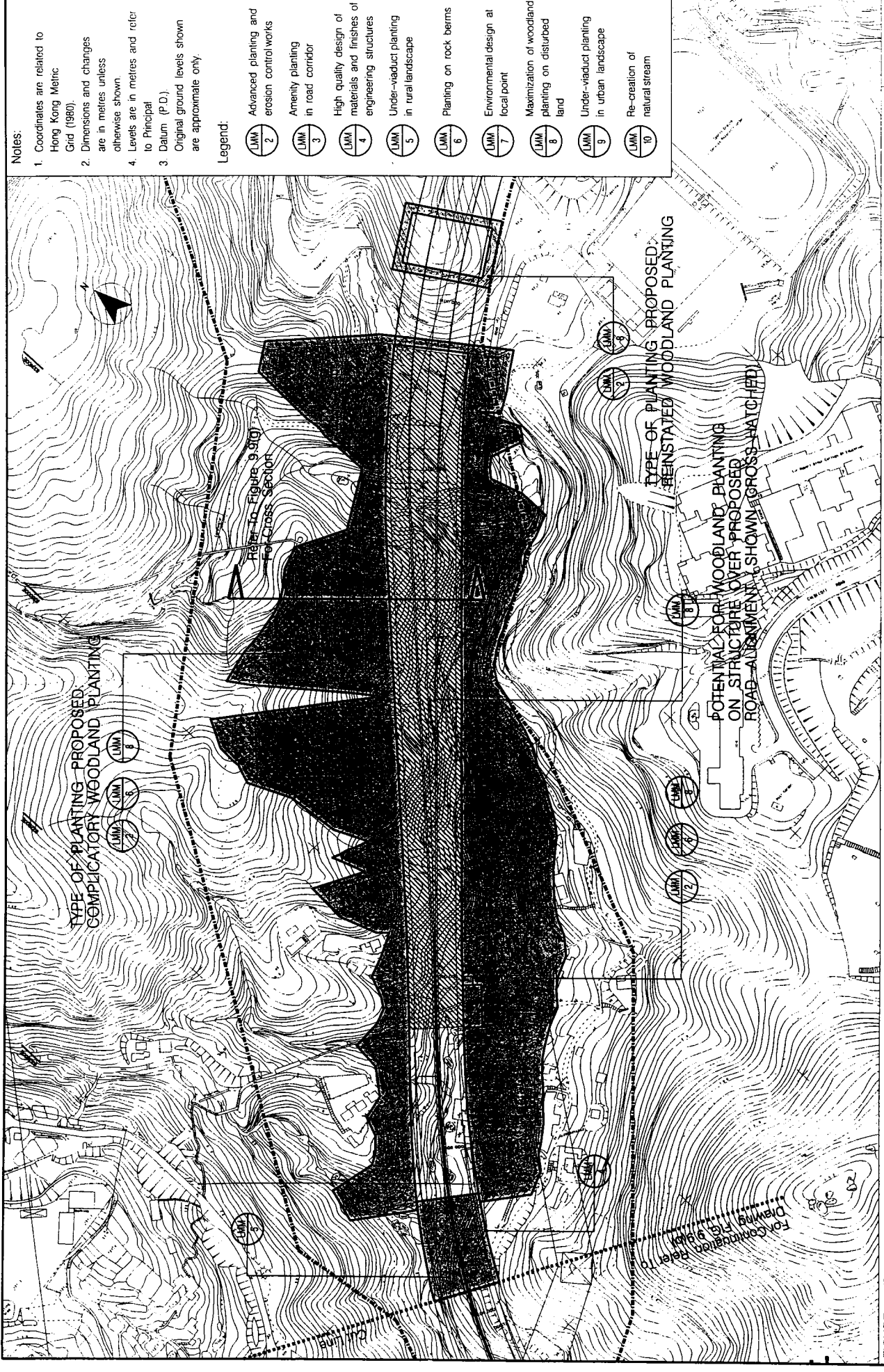
ROUTE 16 ALTERNATIVE ALIGNMENT
 PROPOSED LANDSCAPE MITIGATION MEASURES
 KOWLOON SECTION
 SHEET 2 OF 3

NOTE: FILE SIZE DRAWINGS CURRENT /FORME.DWG
 DATE: 08 /AUGUST /2008

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SCALE : 1:2000



Notes:

1. Coordinates are related to Hong Kong Metric Grid (1980).
2. Dimensions and changes are in metres unless otherwise shown.
4. Levels are in metres and refer to Principal Datum (P.D.).
3. Original ground levels shown are approximate only.

Legend:

- LMM 2: Advanced planting and erosion control works
- LMM 3: Amenity planting in road corridor
- LMM 4: High quality design of materials and finishes of engineering structures
- LMM 5: Under-vegetation planting in rural landscape
- LMM 6: Planting on rock berms
- LMM 7: Environmental design at focal point
- LMM 8: Maximization of woodland planting on disturbed land
- LMM 9: Under-vegetation planting in urban landscape
- LMM 10: Re-creation of natural stream

FIGURE 9.9(f)

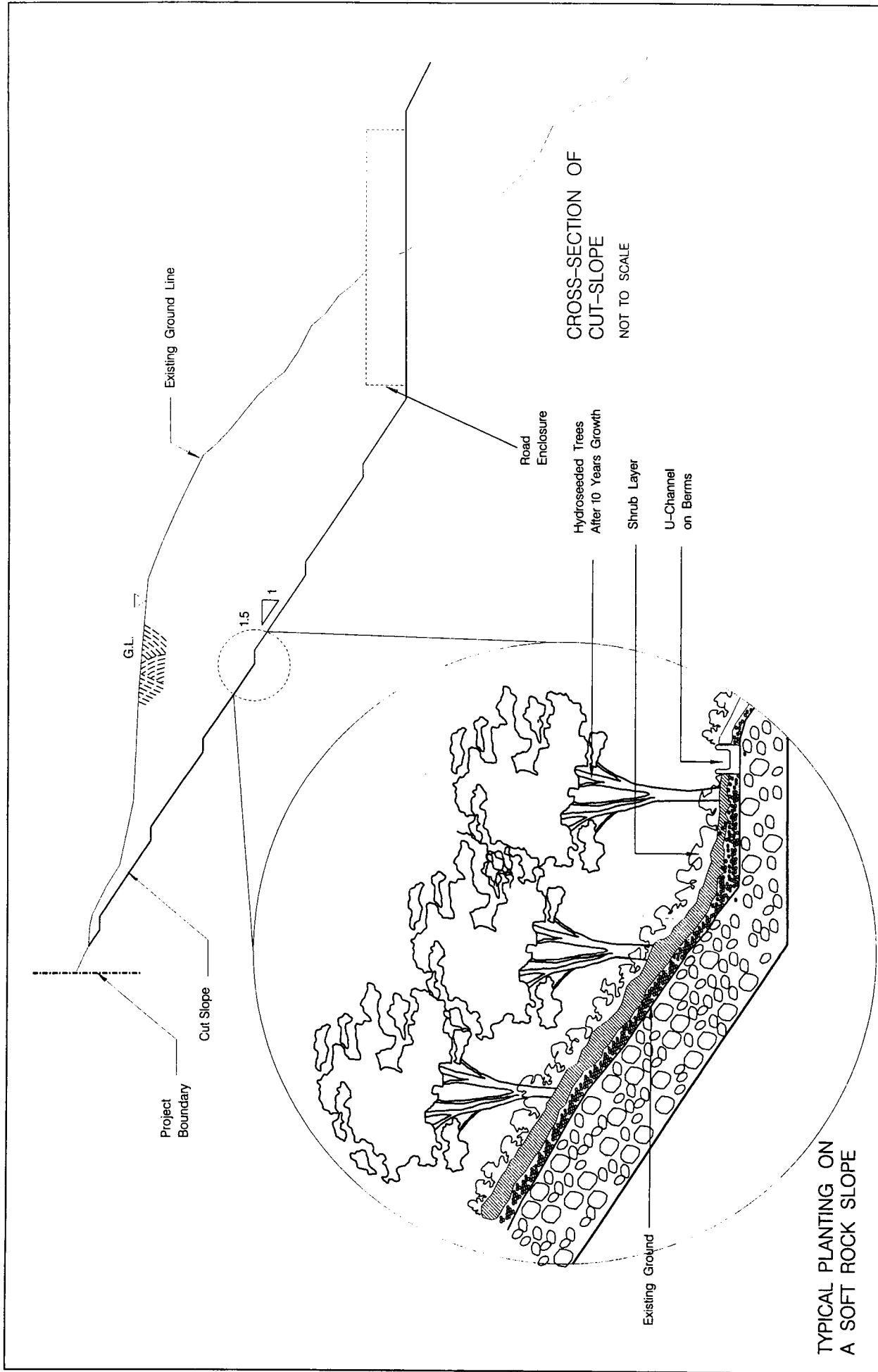
ROUTE 16 ALTERNATIVE ALIGNMENT
 PROPOSED LANDSCAPE MITIGATION MEASURES
 BUTTERFLY VALLEY SECTION
 SHEET 3 OF 3

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 DATE 02 AUGUST 1998

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SCALE 1:2000



CROSS-SECTION OF CUT-SLOPE
NOT TO SCALE

TYPICAL PLANTING ON A SOFT ROCK SLOPE

FIGURE 9.9 (g)

ROUTE 16
TYPICAL LANDSCAPE MITIGATION MEASURES IN BUTTERFLY VALLEY
WOODLAND PLANTING ON CUT SLOPES

UTV FILE : 302 ORANGE CURRENT PROJ.DWG
DATE : 11 MARCH 1998



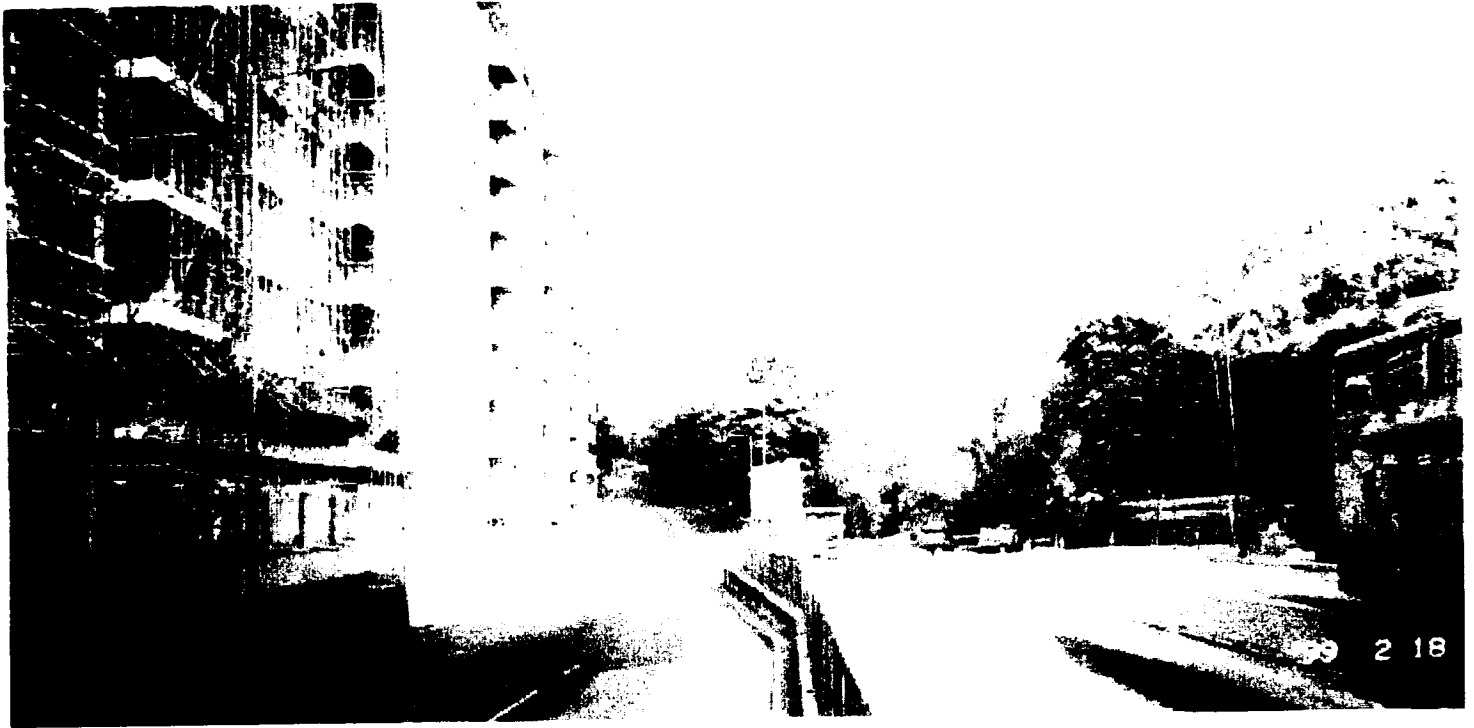
EXISTING VIEW



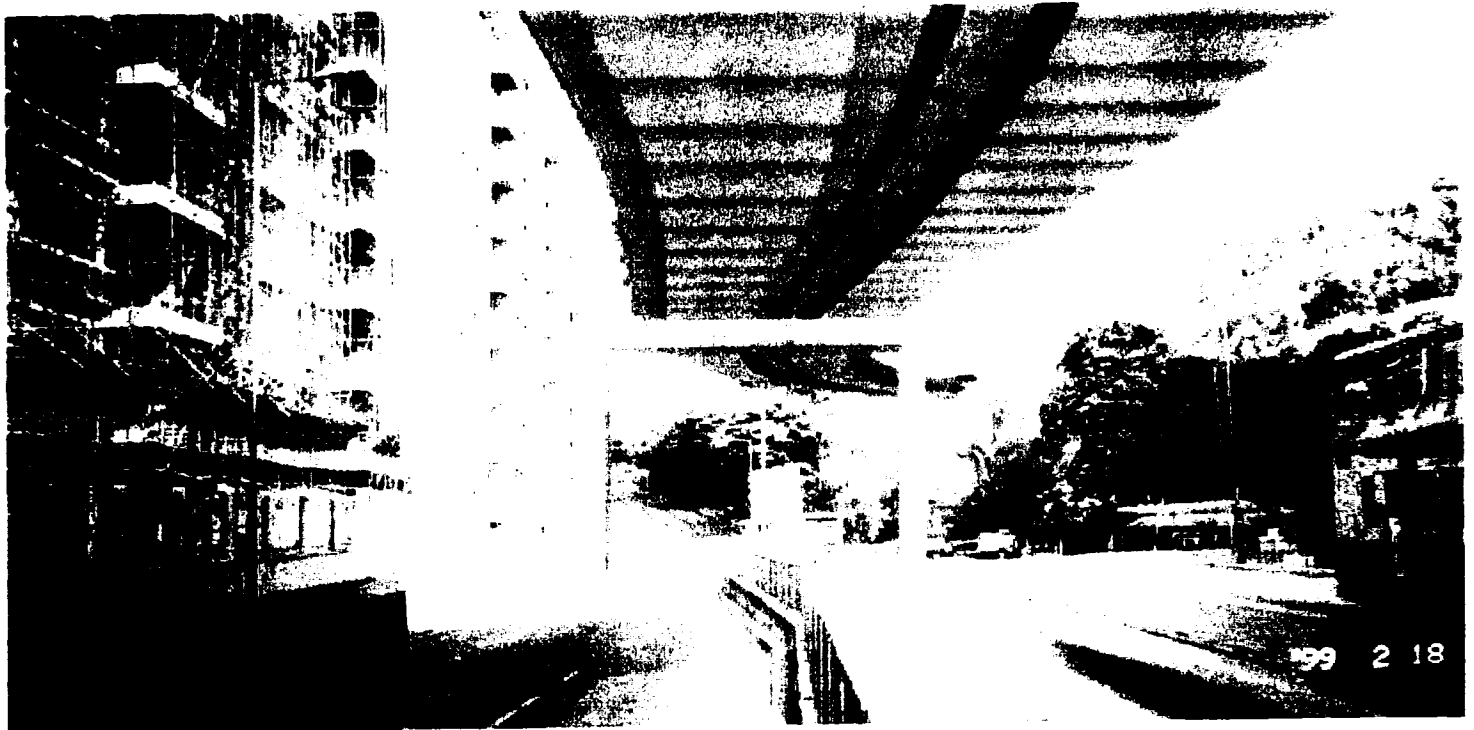
VIEW WITH PROPOSED BRIDGE

View of Butterfly Valley Road looking north from
Lai Chi Kok Interchange

Figure 9.10 (a)



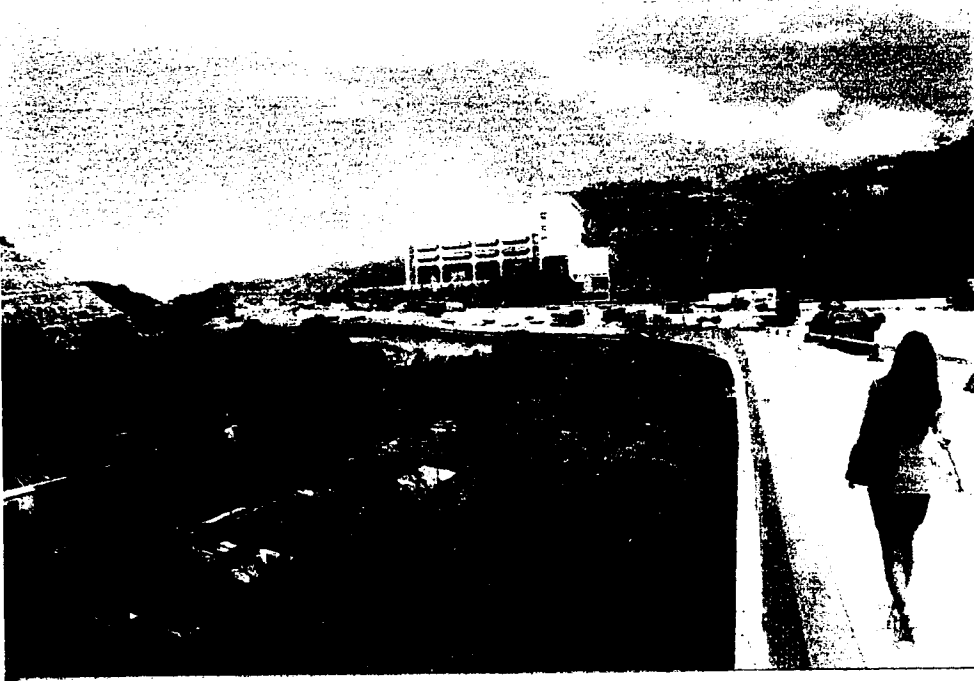
EXISTING VIEW



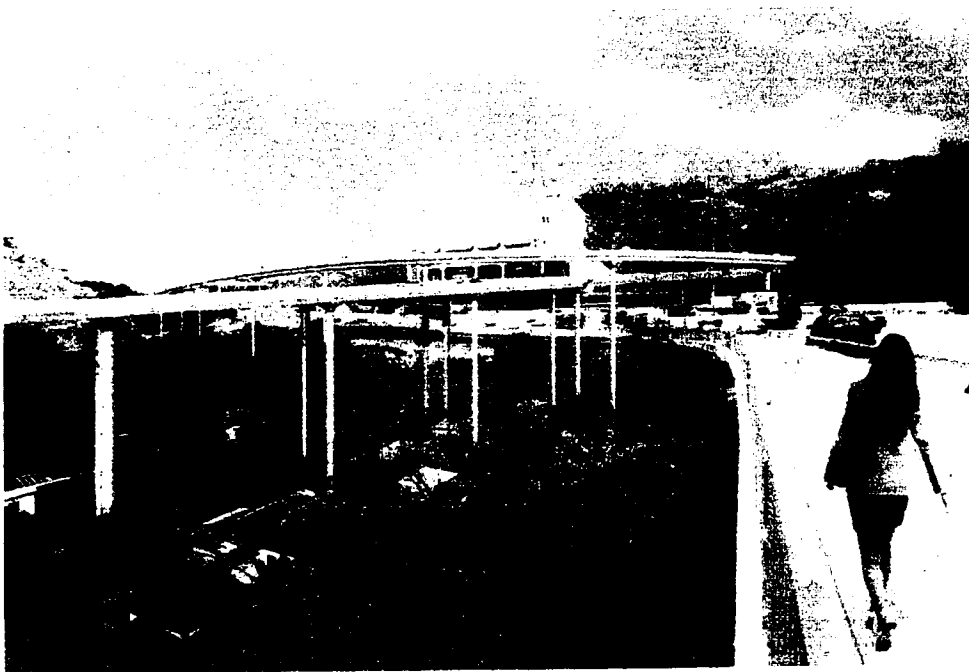
VIEW AT DAY 1 OF OPERATION

View of Butterfly Valley Road looking north next to Lai Chi Kok Reception Centre low-rise staff quarters (VSR KV9).

Figure 9 10(b) PHOTMONTAGE FROM VIEWPOINT 2



EXISTING VIEW



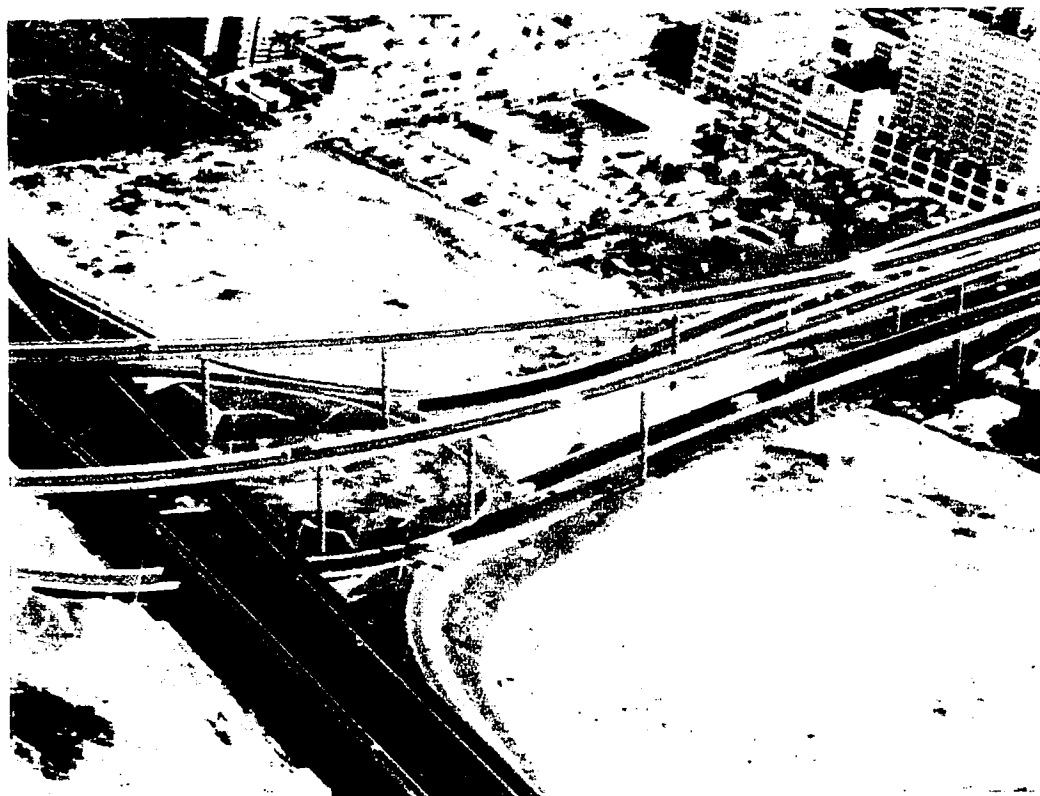
VIEW AT DAY 1 OF OPERATION

**VIEW FROM CHING CHEUNG ROAD OVERLOOKING
WAI MAN TSUEN VILLAGE**

Figure 9.10(c) PHOTOMONTAGE 3



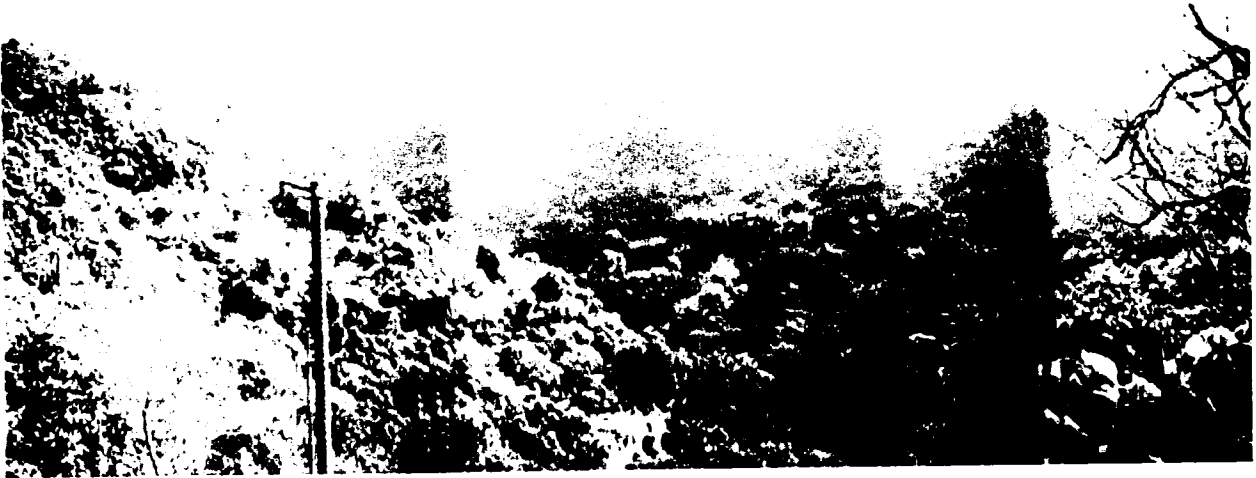
EXISTING VIEW



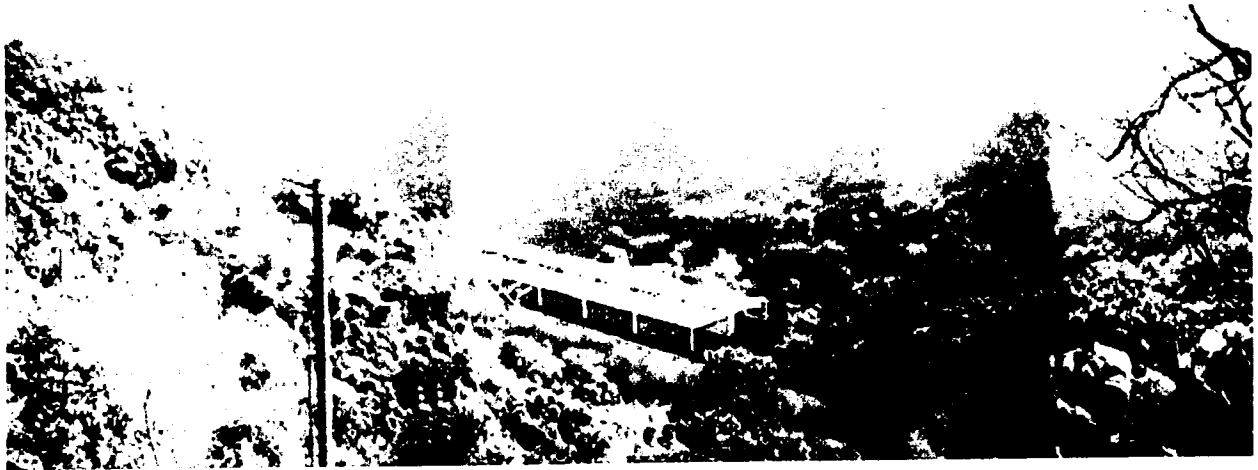
VIEW AT DAY 1 OF OPERATION

VIEW OF ELEVATED SLIP ROADS AT LAI WAN
Refer to Figure 9.7(a) for layout and location

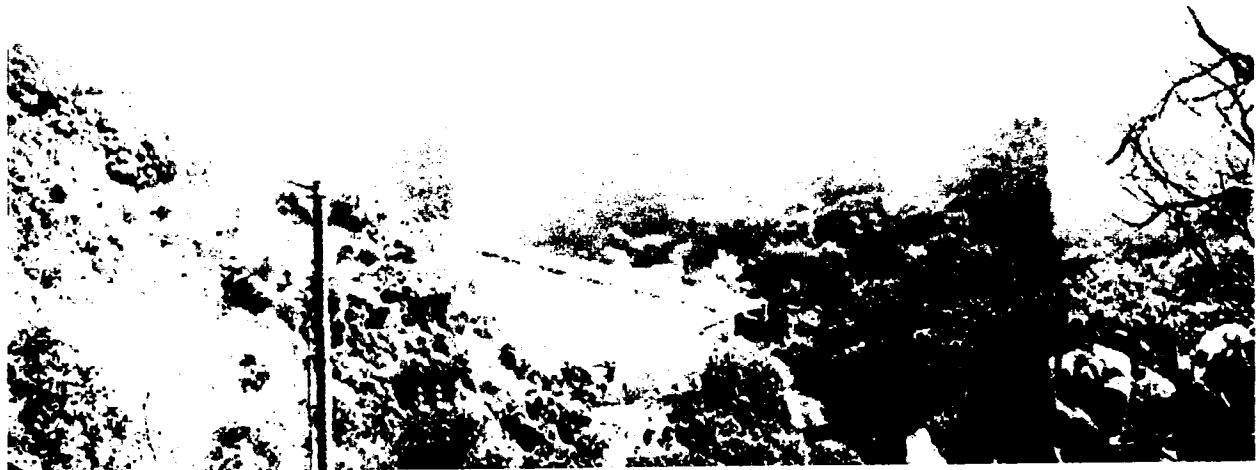
Figure 9.10(d) PHOTOMONTAGE 4



EXISTING VIEW



VIEW AT DAY 1 OF OPERATION



VIEW AT YEAR 10 OF OPERATION

View of Butterfly Valley looking east from Chung Hang Road.

Figure 9.10(e) PHOTOMONTAGE FROM VIEWPOINT 5.