1. BASIC INFORMATION

1.1 Project Title

Route 16 Investigation Assignment

Alternative Alignment Study

1.2 Project Proponent

Highways Department, Major Works Project Management Office

1.3 Contact Person

1.4 Purpose and Nature of the Project

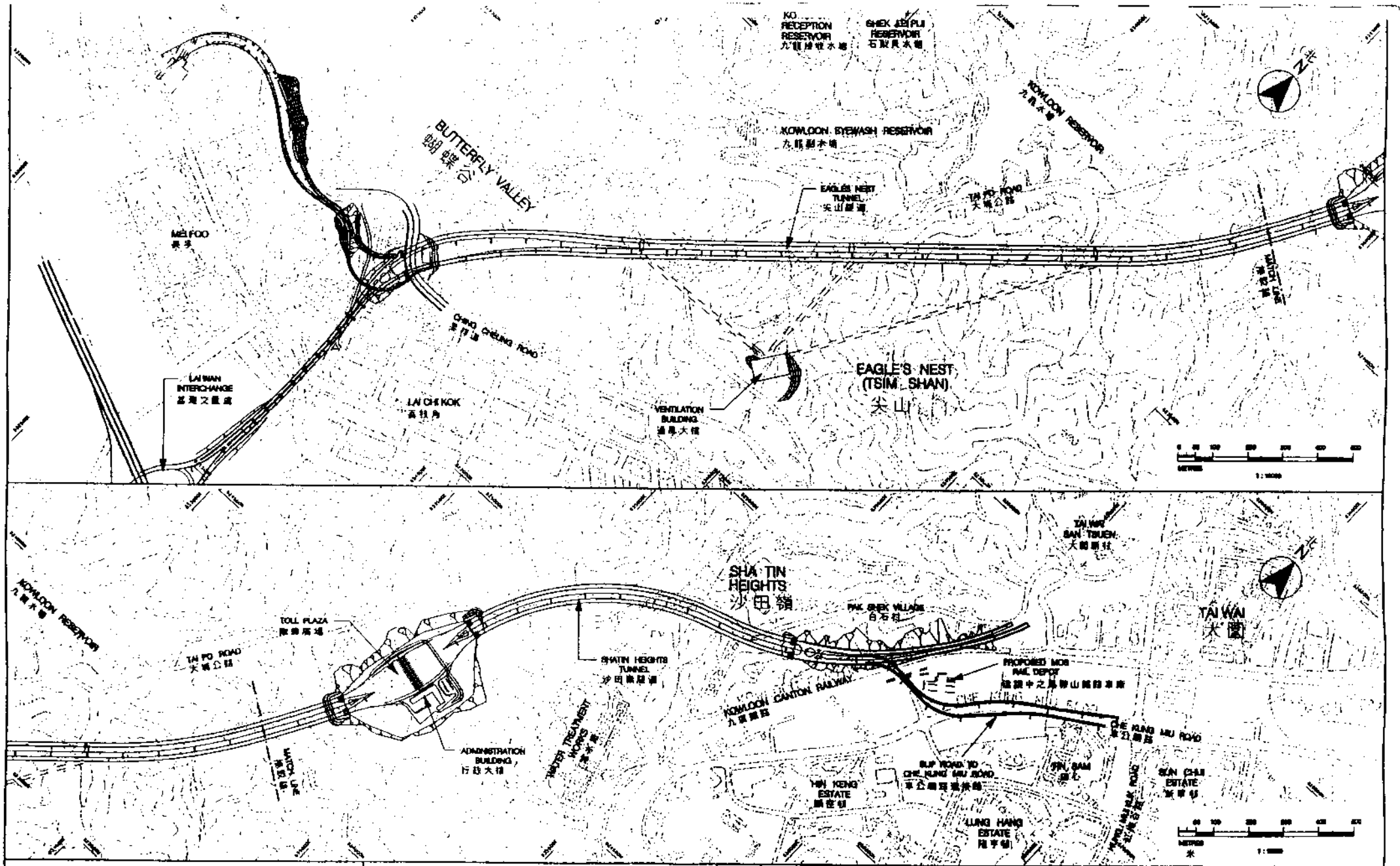
The need for Route 16 was established in the Updating of the Second Comprehensive Transport Study to overcome anticipated traffic problems at Lion Rock Tunnel, Tate's Cairn Tunnel and Tai Po Road, and has been committed in the Sha Tin Outline Zoning Plan (S/ST/6). The Route 16 will connect the Lai Wan Interchange in West Kowloon to the future Trunk Road T3 and Che Kung Miu Road in Shatin (see Figure 1.4a).

In April 1997, the Route 16 Design Team was commissioned to carry out the Route 16 Investigation Assignment to produce a technically sound and optimum preliminary design for the dual-3-lane scheme. The route alignment was designated as the Conforming Alignment. An Environmental Impact Assessment was carried out during the Investigation Assignment to identify the environmental acceptability of the Conforming Alignment. The EIA report was endorsed by the Government in February 1998 (EIAO register reference number: EIA-135/BC) and the findings of the EIA have been agreed by:

- the Shum Shui Po District Board on 15 January 1998;
- the EIA subcommittee of the Advisory Council on the Environment on 9 February 1998; and
- the Sha Tin District Board on 27 March 1998.

Early in the Investigation Assignment, the Route 16 Design Team had come up with an Alternative Alignment option for the Kowloon end, which had benefits in traffic operation and a reduced construction cost. However, due to programming difficulties in meeting the scheduled road completion date in 2004, the Alternative Alignment option was dropped from further consideration at that time.

In February 1998, a request was received from Transport Department to investigate the feasibility of widening the Lai Chi Kok Viaduct at the Kowloon approach to dual-3-lane, and of providing a direct connection with Route 9 at the southern end. Highways Department (HyD) decided to utilize the same programme slot to carry out a preliminary feasibility study on the Alternative Alignment option. Subsequently, the Route 16 Design Team was instructed by HyD to carry out an additional assignment for the study on the Alternative Alignment, the widening of the Lai Chi Kok Viaduct and the direct connection with Route 9.



Government of Hong Kong Highways Department Scott Wilson - Parsons Brinckerhoff In Association with M.V.A. Asia ERM Hong Kong	Route 16 CONTRACT CE 42/96 WEST KOWLOON TO SHATIN	DRAWN / CHECKED DATE SCALE	ROUTE 16 FROM WEST KOWLOON TO SHA TIN 1 6 號幹線由西九龍至沙田段 DRG. TITLE: GENERAL LAYOUT PLAN 總發展藍圖 DRG NO: FIGURE 1.4a REV

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1.5 Location and Scale of Project

1.5.1 Conforming Alignment

Figure 1.5a show the general layout of the Route 16 Conforming Alignment.

At the West Kowloon end, the main alignment starts at Lai Wan Interchange and rises up over the elevated structure at Lai Chi Kok Interchange, continues alongside Butterfly Valley Road and the carriageway separate before passing into Eagle's Nest Tunnel under Ching Cheung Road. There are slip road connections to Ching Cheung Road, Castle Peak Road and Butterfly Valley Road on the western side of the Butterfly Valley.

The main tunnel section (Eagle's Nest Tunnel), approximately 2700 m long, runs underneath the Lion Rock Country Park and surfaces at the western end of Shatin. After emerging from tunnel the route continues on an open section approximately 500m long, where the toll plaza will be positioned, before entering into a second tunnel.

The second tunnel (Shatin Heights Tunnel) is approximately 950 m long and passes beneath Tai Po Road and emerging close to the valley floor just beyond Keng Hau Road. Approaching the Trunk Road T3 interchange, the alignment rises pass over Chik Wan Street and ties to the redesigned Tai Po Road at Trunk Road T3. Two slip roads branch out over Hong Kong School of Motoring and join with Che Kung Miu Road.

1.5.2 Alternative Alignment

Figure 1.5b show the general layout of the Route 16 Alternative Alignment.

The mainline structure passes over Wai Man Tsuen at high level, and a filled embankment of the Conforming Scheme is no longer required. The viaduct continues through Butterfly Valley to an abutment located on the earthworks platform approximately 250m north of Ching Cheung Road. At about 400m after crossing over Ching Cheung Road, the mainline carriageways begin to separate before joining the tunnel section, at which the northbound and southbound bores are approximately 30m apart. The crossover will be provided after the slip roads completely merge/diverge with the mainline. This arrangement will provide better traffic operation and control than that of the Conforming Scheme.

The at-grade section of the mainline will involve cutting or filling works in certain part of Butterfly Valley, together with the associated slope stabilisation measures. The use of soil nails as stabilisation or soil-nailed concrete berm stepped walls may be required.

The tunnel portal is located near the Tai Po Road Water Treatment Works where a portal building will be located at the front end (see *Figure 1.5b*). To overcome the potential chlorine hazard from the Tai Po Road and Shek Lei Pui WTWs, and to eliminate the noise impact to the affected areas alongside the mainline section, a road enclosure extending for a length of 400m from the south tunnel portal is proposed to be constructed above the road.

Similar slip road connections will be provided for the Alternative Alignment. The slip road scheme presented in *Figure 1.5b* is expected to be one of the probable option that is subjected to further study and development.

The main tunnel section (Eagle's Nest Tunnel), approximately 2000 m long, runs underneath the Lion Rock Country Park and surfaces at the western end of Shatin. After emerging from tunnel the route follows closely that of the Conforming Scheme.

1.5.3 Widening of Lai Chi Kok Viaduct and Direct Connection with Route 9

South of Ching Cheung Road, the horizontal alignment of the Alternative Alignment follows closely that of the Conforming Scheme except that the alignment will be widened from Dual-2 to Dual-3 carriageway. In addition, a direct connection with Route 9 will be provided at the

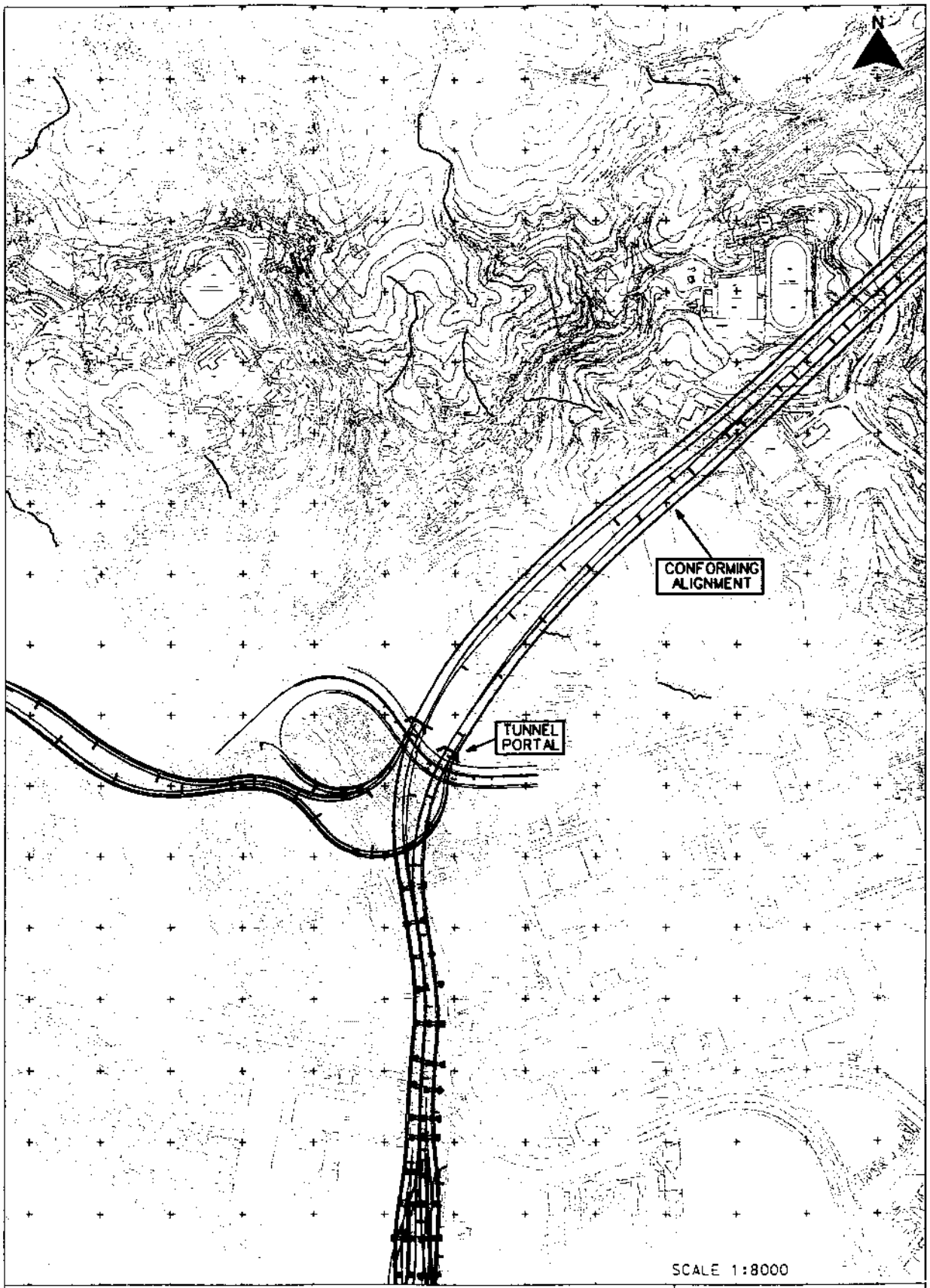

FIGURE 1.5A

GENERAL LAYOUT -
CONFORMING ALIGNMENT

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DATE: 10/98

Environmental Resources Management

ERM

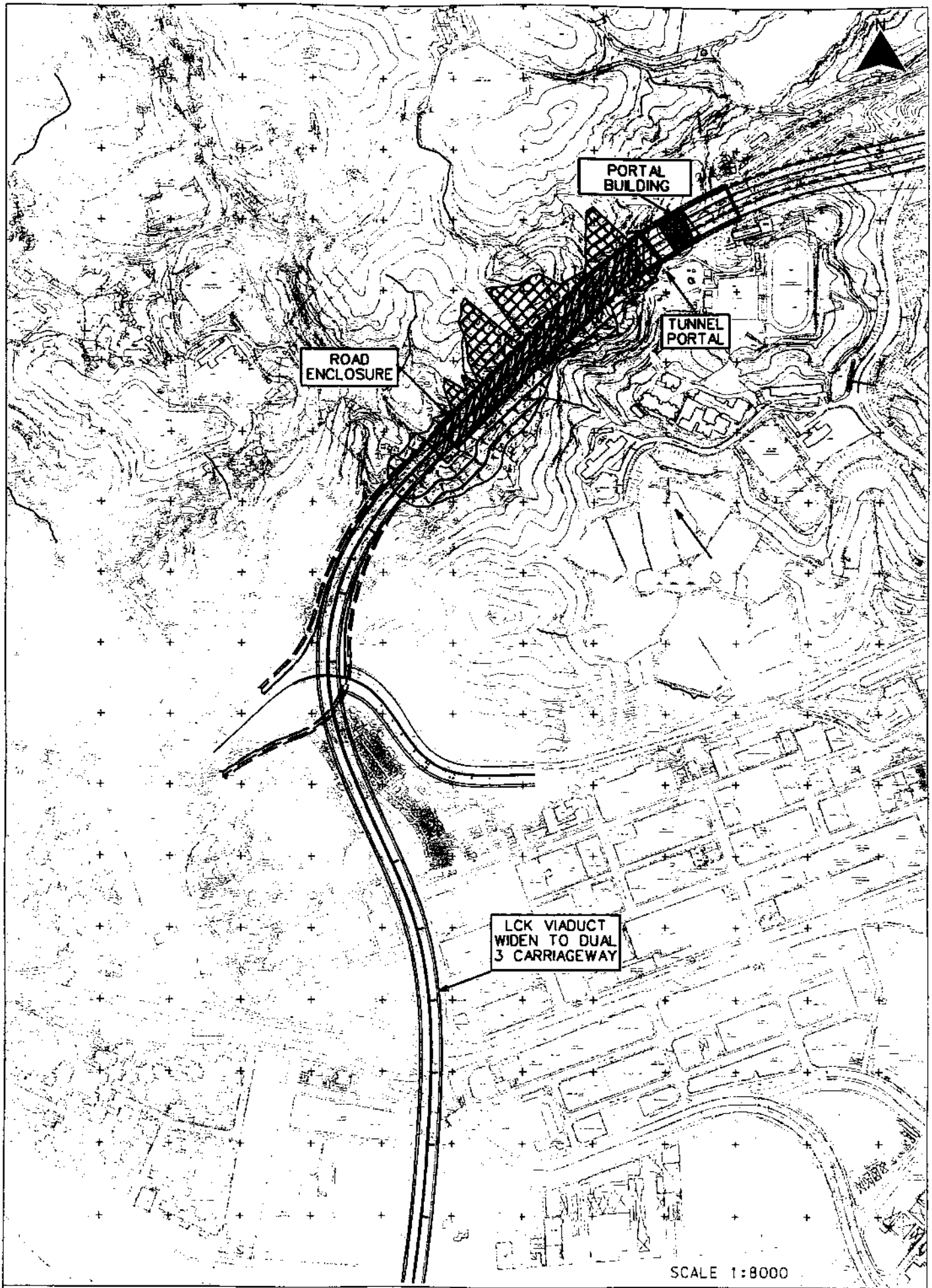

FIGURE 1.5B

GENERAL LAYOUT -
ALTERNATIVE ALIGNMENT

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DATE: 10/98

Environmental Resources Management

ERM

southern end. Similar to the Conforming Alignment, the roadway takes the form of an elevated viaduct.

1.5.4 Proposed Alternation

The main difference between the Alternative and the Conforming Alignment is that instead of entering into a tunnel portal below Ching Cheung Road, the mainline alignment of the Alternative Alignment will run on viaduct passing through the southern part of Butterfly Valley before entering to an 400m long enclosure adjoining to the new portal; and the widening of the Lai Chi Kok Viaduct from Dual-2 to Dual-3. There are two other differences including higher elevation of the viaduct and different slip road connections to and from Ching Cheung Road. The differences between the Alternative and Conforming Alignment are summarised in *Table 1.5a.*

Table 1.5a Proposed Alternation

Location	Dual-2 Conforming Alignment	Alternative Alignment & Widening of LCK Viaduct
From Lai Wan Interchange to south of Wai Man Tsuen	Approximately 700 m long viaduct passing over existing Lai Chi Kok Interchange.	Similar alignment, but with viaduct widening from Dual 2 to Dual 3.
Wai Man Tsuen to Eagle's Nest Tunnel Portal	Alignment on embankment and the carriageway separate before passing into the tunnel under Ching Cheung Road	Approximately 650 m long viaduct passing over existing Ching Cheung Road and Wai Man Tsuen. Alignment on embankment passes through Butterfly Valley before entering to the new portal located near Tai Po Road WTW.
Eagle's Nest Tunnel	Approximately 2700 m long, Dual-3 tunnel.	Approximately 2000 m long, Dual-3 tunnel.
Toll Plaza	Position between the Eagle's Nest and Shatin Height Tunnels	Same location and size.
Shatin Heights Tunnel	Approximately 950 m long, Dual-3 tunnel.	Same.
Section after the northern portals of Shatin Height Tunnel	The route passes along the side of the Shatin valley on embankments with retaining structures before connecting to Trunk Road T3.	Same.
Tunnel Ventilation	A ventilation building at Tai Po Road	Similar location, but smaller.
Worst case peak hour traffic forecasts on Route 16 mainline	Approximately 9200 vehicles/hr by 2019	Approximately 8950 vehicles/hr by 2019 [1].
Worst case peak hour traffic forecasts on Lai Chi Kok Viaduct	Approximately 6300 vehicles/hr by 2019	Approximately 7520 vehicles/hr by 2019 [1].
Worst case peak hour traffic forecasts on Route 16 mainline - Shatin Section	Approximately 6430 vehicles/hr by 2019	Same.

Location	Dual-2 Conforming Alignment	Alternative Alignment & Widening of LCK Viaduct
Worst case peak hour traffic forecasts on Route 16 Che Kung Miu Slip Roads connection - Shatin Section	Approximately 2650 vehicles/hr by 2019	Same.

(1): Traffic figures will be reviewed and agreed with TD and EPD before the EIA commence.

1.6 Number and Types of Designated Project

"Route 16 Investigation Assignment: Alternative Alignment Study" is the only project covered by this project profile. The project is classified as Category A.1 under Part 1 of Schedule 2 of the EIA Ordinance.

2. OUTLINE OF THE PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

It is proposed to implement the project by employing consultants to undertake the investigation study, detailed design and the supervision for the construction phase of the project.

2.2 Project Timetable

According to the project programme (see *Table 2.2a*), a consultant will be appointed in November 1998 to undertake the EIA study for the project. It is anticipated that the commencement of the project construction will be in mid 2001 and completion by early 2005.

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Existing and Planned Sensitive Receivers

The West Kowloon area surrounding the Route 16 alignment consists of both residential and industrial buildings with the main residential building complex and industrial buildings located on the western and eastern side of the alignment respectively. The Butterfly Valley Cottage Area (Wai Man Tsuen), mainly consist of one to two storey high village type housing is located east of Butterfly Valley Road, with a number of existing industries and godowns located on the far eastern part of the Valley. To the west of Wai Man Tsuen, an existing knoll, the Lai Chi Kok Hospital and Lai Chi Kok Reception Centre and its Staff Quarters are located west of Butterfly Valley. In addition, a planned housing site, Site 10, located to the north east of Lai Wan Interchange has been identified.

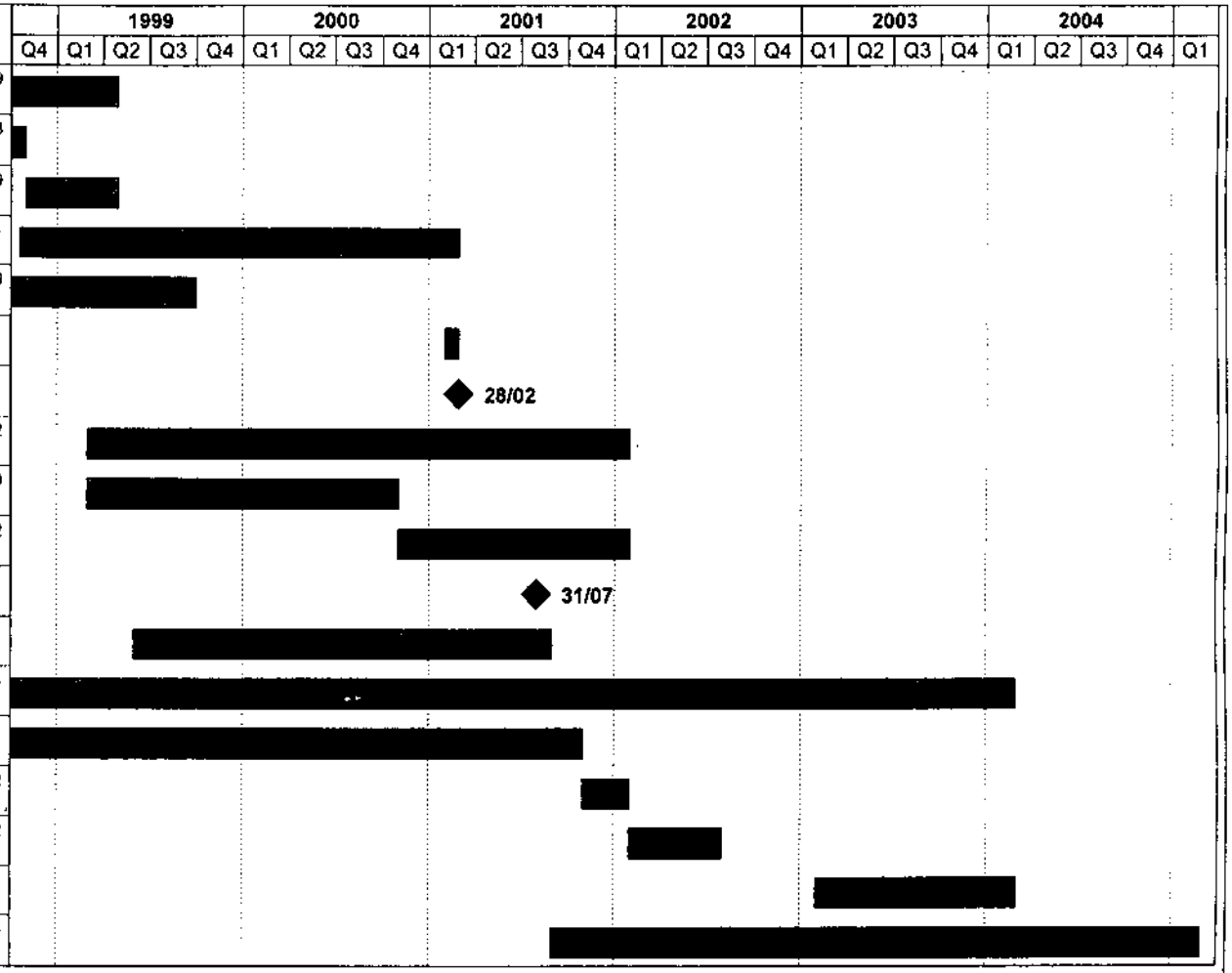
Three main habitat types have been identified along the Route 16 alignment including; urbanized area, secondary woodland and stream habitat. There are no existing or proposed Sites of Special Scientific Interest or Special Areas within the study area. The alignment passes under the Lion Rock Country Park in tunnel.

In addition, the major water bodies along the alignment of Route 16 include:

- Victoria Harbour in the West Kowloon Section; and
- a number of small natural streams running through Butterfly Valley;

The existing and planned sensitive receivers along the section of the Kowloon Route 16 are shown in *Figures 3.1a & b*.

ID	Task Name	Duratio	Start	Finish
1	INVESTIGATION ASSIGNMENT FOR A	212d	01/10/98	30/04/99
2	Funding for Investigation Assignment	31d	01/10/98	31/10/98
3	Investigation Consultancy	181d	01/11/98	30/04/99
4	ENVIRONMENTAL ISSUES	862d	21/10/98	28/02/01
5	Approval of EIA	365d	01/10/98	30/09/99
6	Application of Environmental Permit	28d	01/02/01	28/02/01
7	Issurance of Environmental Permit	0d	28/02/01	28/02/01
8	AUTHORISATION & LAND MATTERS	1068d	01/03/99	31/01/02
9	Roads Ordinance Procedure	611d	01/03/99	31/10/00
10	Land Clearance	457d	01/11/00	31/01/02
11	Availability of Site (Gov't Land)	0d	31/07/01	31/07/01
12	D & C CONSULTANCY	823d	01/06/99	31/08/01
13	CLP PYLON AND OHL RELOCATION	1978d	01/10/98	29/02/04
14	Statutory & Land Procedure	1127d	01/10/98	31/10/01
15	Tender for Construction	92d	01/11/01	31/01/02
16	Construction of Pylons	181d	01/02/02	31/07/02
17	OHL Relocation	394d	01/02/03	29/02/04
18	ROUTE 16 CONSTRUCTION	1277d	01/09/01	28/02/05



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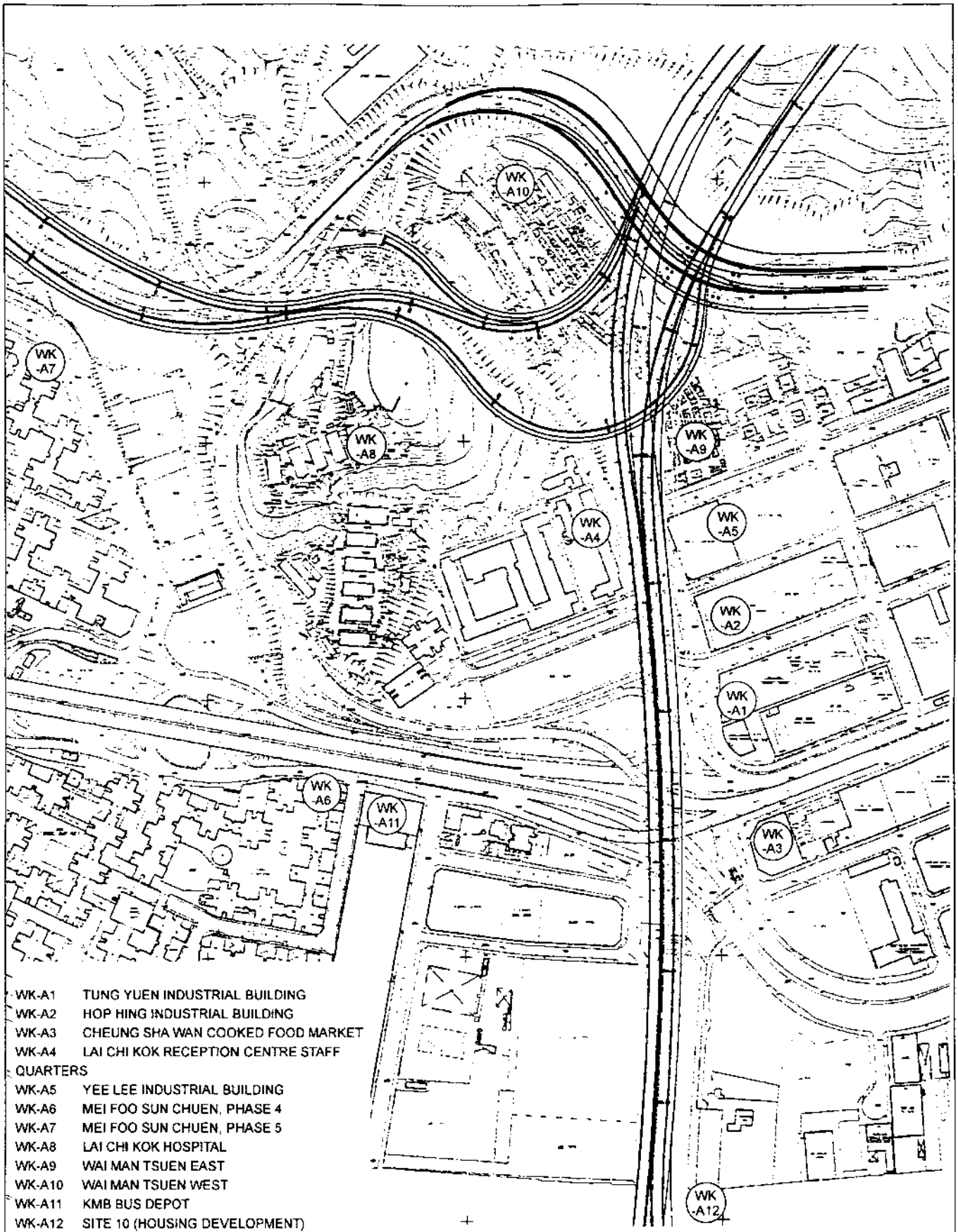
Date: 29/09/98

Summary Bar ▬ Milestone ◆

Table 2.2a - Project Programme



WK-A1 TUNG YUEN INDUSTRIAL BUILDING
WK-A2 HOP HING INDUSTRIAL BUILDING
WK-A3 CHEUNG SHA WAN COOKED FOOD MARKET
WK-A4 LAI CHI KOK RECEPTION CENTRE STAFF QUARTERS
WK-A5 YEE LEE INDUSTRIAL BUILDING
WK-A6 MEI FOO SUN CHUEN, PHASE 4
WK-A7 MEI FOO SUN CHUEN, PHASE 5
WK-A8 LAI CHI KOK HOSPITAL
WK-A9 WAI MAN TSUEN EAST
WK-A10 WAI MAN TSUEN WEST
WK-A11 KMB BUS DEPOT
WK-A12 SITE 10 (HOUSING DEVELOPMENT)

FIGURE 3.1a - LOCATION OF ENVIRONMENTAL SENSITIVE RECEIVERS (WEST KOWLOON)

Environmental Resources Management
6th Floor
Hecny Tower
9 Chatham Road
Tsimshatsui, Kowloon
Hong Kong
ERM

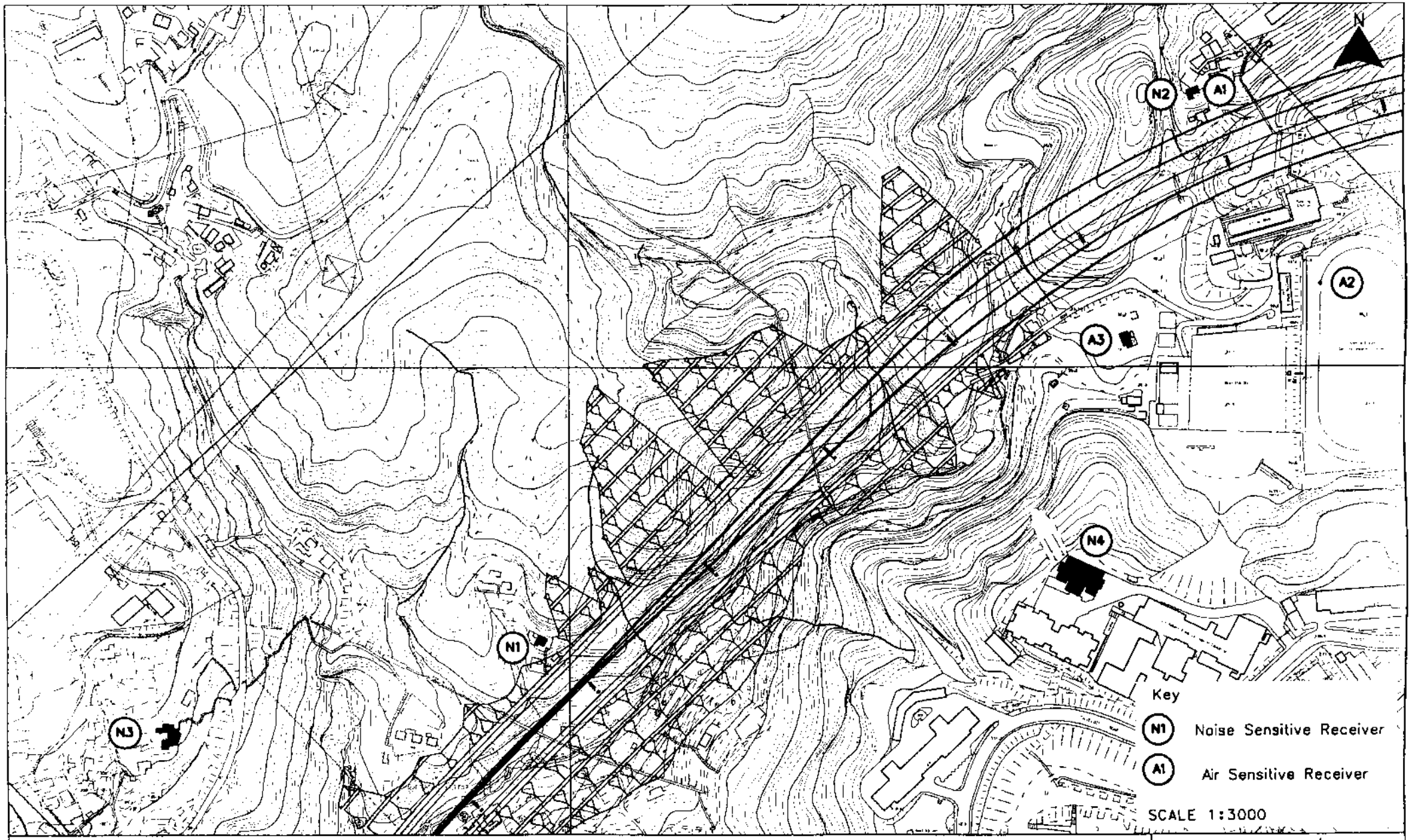


FIGURE 3.1b

LOCATION OF NOISE AND AIR SENSITIVE RECEIVERS

Environmental Resources Management

ERM

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The Shatin area surrounding the western end of the alignment is currently rural in nature with scattered low rise residential buildings along Tai Po Road (Woodcrest Hill, Shatin Heights) and Keug Hau Road. To the eastern end of the alignment, there are high rise residential developments along Che Kung Miu Road (Grandway Gardens, Holford Gardens, Hing Keng Estate, Carado Gardens and Sun Chiu Estate). A number of educational and recreational facilities are also identified in the vicinity of the alignment including Christian Alliance Cheng Wing Chee School, Lau Pak Lok Secondary School, Carmel Alison Lam Primary School, Shatin Riding School, Chik Wan Street Rest Garden, Tai Wai Swimming Pool, Che Kung Miu Road Playground, Hin Tin Playground and Hung Mui Kuk Road Playground. In addition, the temporary bicycle park and Hong Kong School of Monitoring sites have been zoned as Other Specified Uses (OU) for "Possible Railway Depot with Commercial/Residential Development above" (Pak Shek Layout Plan L/ST 17/ 1C and Sha Tin OZP). In addition, Tolo Harbour, Shing Mun River and a number of small streams at the Pak Shek village in the Shatin section are identified as the major water bodies along the alignment. Further details could be referred to the previous EIA Study. The existing sensitive receivers along the Kowloon section of the Route 16 are shown in *Figure 3.1c.*

The proposed road layout at the Sha Tin Section will not be changed when compared with the Conforming Alignment, which the previous EIA has already assumed a worst scenario. Hence, the environmental impact at Sha Tin Section is not expected to be different despite of the consequent change at the Kowloon end.

3.2 Major Element of Surrounding Environment

The existing noise environment of the southern end is dominated by road traffic and industrial activities. Two trunk roads, Kwai Chung Road and Ching Cheung Road, are the major traffic noise sources. The Cheung Sha Wan industrial area also have considerable noise impact upon the area. Similarly, for the Shatin section, traffic is the major noise source, with Tai Po Road and Che Kung Miu Road being the major roads within the Study Area. In addition, train noise from KCRC railway also contributes to the ambient noise environment.

The existing air quality of the West Kowloon area is considered poor mainly attributed to the industrial emissions from Cheung Sha Wan and vehicle emissions from Ching Cheung Road, Kwai Ching Road, Lai Chi Kok Road and associated network. Vehicle exhausts are the dominating pollutants in the Shatin area.

The alignment of Route 16 passes within the Consultation Zone of three water treatment works (WTW) including Tai Po Road WTW, Shek Lei Pui WTW and Sha Tin WTW which are classified as Potentially Hazardous Installations (PHIs) on account of storing and using liquefied chlorine in 1 tonne drums. Risks posed by these WTWs to the transient population of the Route 16 is a constraint of the alignment.

4. POSSIBLE IMPACT ON THE ENVIRONMENT

Table 4.1a is a checklist prepared with reference to observations during site visits in June and July 1998 and the survey map in the study area. It is expected that the environmental impacts associated with the Alternative Alignment beyond the Eagle's Nest tunnel portal will be similar to the Conforming Alignment as there are no changes for this section of the alignment. As discussed in Section 1.5, the main difference between the Alternative and the Conforming Alignment is that there is an additional open road section passing over Ching Cheung Road and through the southern part of Butterfly Valley before entering into the enclosure adjoining the Eagle's Nest tunnel portal. In addition, the Lai Chi Kok Viaduct will be widened from Dual-2 to Dual-3 lane.

Table 4.1a Possible Sources of Environmental Impact

Type of potential impact	Construction	Operation
Gaseous emissions	✗	✓
Dust	✓	✗
Odour	✗	✗
Noisy operations	✓	✓
Night-time operations	✗	✓
Traffic generation	✓	✓
Liquid effluents, discharges, or contaminated runoff	✓	✓
Generation of waste or by-products	✗	✗
Manufacture, storage, use, handling, transport, or disposal of dangerous goods, hazardous materials or wastes	✗	✗
Risk of accidents which would result in pollution or hazard	✓	✓
Disposal of spoil material, including potentially contaminated material	✓	✗
Disruption of water movement or bottom sediment	✓	✗
Unsightly visual appearance	✓	✓
Ecological impacts	✓	✓

✓ possible ✗ not expected

The key environmental impacts associated with the Alternative Alignment are considered to be as follows:

- noise impact (construction & operational phase)
- air quality impact (construction & operational phase)
- water quality impact (construction & operational phase)
- ecological impact (construction & operational phase)
- construction waste
- hazard (construction & operational phase)
- landscape and visual impact (construction & operational phase)

The proposed Alternative Alignment will be subject to an Environmental Impact Assessment (EIA) under the EIA Ordinance to assess the potential impacts in detail, and to identify specific environmental mitigation measures for incorporation into the preliminary design of the scheme to ensure that the scheme will be implemented to meet the current Government environmental requirements. The key environmental issues are summarised in the following paragraphs.

Noise

Construction Phase

The main noisy construction activities associated with the Alternative Alignment are portal construction, earthwork excavation, viaduct construction and removal of spoil. As there are no changes to the Shatin section, the construction method proposed in the previous EIA report are unchanged.

For the widening of the Lai Chi Kok Viaduct, the construction method associated with the construction of the Dual 3 Viaduct are expected to be similar to the previously assessed Dual 2 Viaduct. Therefore, the potential construction noise impacts affecting nearby NSRs namely Haking Wong TT, Mei Foo Sun Tsuen and LCK reception centre will be similar to the previous EIA report.

The potential construction noise impacts in the area surrounding the new alignment section (north of Ching Cheung Road to new tunnel portal area) is considered a potential concern. Unmitigated construction activities such as earthwork excavation, portal construction, piling of viaduct foundations and road pavement are expected to cause exceedances of the daytime construction criterion of $L_{eq, 30 min}$ 75 dB(A) at the nearby NSRs (refer to Section 1 of *Annex A*).

Operational Phase

While there are a number of NSRs in the vicinity of the Route 16 Lai Chi Kok Viaduct; with reference to the previous EIA report, the worst affected NSR would be the Lai Chi Kok Reception Centre Staff Quarters. In addition, a planned housing site, Site 10, located to the north east of Lai Wan Interchange has been identified. It is anticipated that this site could potentially be affected by road traffic noise arises from the Route 16 Alignment (refer to Section 1 of *Annex A*).

Air Quality

Construction Phase

The potential air quality impact from the construction of Route 16 is related to dust generated from construction activities including excavation and blasting, cutting and filling, materials handling and haulage of truck over unpaved haul road. It is expected that the potential construction dust impacts will be similar to that of the Previous EIA with the exception of area surrounding the new alignment section. New air sensitive receivers expected to be affected by construction activities associated with the alternative alignment include village area to the north of Tai Po Road WTW, sports ground near Tai Po Road and facilities at the Tai Po Road WTW. Without mitigation measures, the Air Quality Objectives (AQO) dust criteria are expected at these ASRs. Therefore dust control measures as part of good construction practices such as the use of water sprays, covering stockpiles and wheel wash facilities should be implemented to minimise the potential dust nuisance (refer to Section 2 of *Annex A*).

Operational Phase

Vehicle emissions from Route 16 main line and Lai Chi Kok viaduct section would be a potential source of impact to the identified ASRs. It is anticipated that the air quality impacts at those receivers near Lai Chi Kok viaduct would be increased.

Vehicular emissions from open section of the road and emissions from tunnel portal are the major air pollutant sources of Route 16 alternative alignment. The potential air quality impacts in the area surrounding the new alignment section is a potential concern. It is expected that the pollutants levels at the nearby ASRs, including village area to the north of Tai Po Road WTW, sports ground near Tai Po Road and facilities at the Tai Po Road WTW, would be high, attributed to the open section of the road and tunnel emissions (refer to Section 2 of *Annex A*).

Hazard

Construction workers working near to Tai Po Road and Shek Lei Pui WTWs may in itself recreate an unacceptable risk. Measures such as emergency plan, site alarm, escape respirators and training on emergency procedures, could be implemented to reduce risks levels (refer to Section 3 of *Annex A*).

The proposed Alternative Alignment of Route 16 passes within approximately 100m of the chlorine store at Tai Po Road Water Treatment Works (WTW) and within 350 m of the chlorine store at Shek Lei Pui WTW. Both of these installations store chlorine in 1 tonne drums and are classified as Potentially Hazardous Installations (PHIs) under the Hong Kong Planning Standards and Guidelines (HKPSG). Due to the proximity of the Route 16 portal to both WTWs, the risk to the alternative alignment are likely, at best, to be in the As Low As Reasonably Practicable (ALARP) region of the Government Risk Guidelines or, at worst, possibly in the unacceptable region. It is considered that significant mitigation measures such as further distancing of the tunnel portal by the use of a 400m long air tight enclosure may be required to reduce risks to levels which would meet Government Risk Guidelines (refer to Section 3 of *Annex A*).

Water Quality

Potential water quality impacts from the Route 16 Alternative Alignment construction activities will be from typically land based construction activities involving: construction runoff and drainage; litter and debris; liquid spillages; and diversion of existing streams or watercourses. With the implementation of proper site management and good construction practices such as the use of sediment traps and oil interceptors, it is unlikely that construction activities would result in incompliances with the Water Quality Objectives (WQO) (refer to Section 4 of *Annex A*).

Waste

The key issues related to solid waste handling and disposal identified in the previous EIA will be applicable to the Alternative Alignment scheme. However, additional waste implications are expected at the new alignment section (north of Ching Cheung Road to new tunnel portal). Demolition waste arises from clearance of Mui Kong Tsuen village area is anticipated, but the quantity is not expected to be significant. Formation of site will also require excavation to form cut slope. However, it is anticipated that all excavated material will be re-used on-site for the fill area and the quantity of surplus excavated material, if any, to be disposed off-site should be minimal. It is considered that adverse impacts upon the environment from the storage, handling, collection, transport and disposal of wastes from the construction of Route 16 alternative alignment will be negligible (refer to Section 5 of *Annex A*).

Ecology

The loss of secondary woodland and the stream habitats due to the landtaking for the construction of the alignment will be the key ecological issues. Although plant species within the new alignment section recorded during the field surveys are well-represented elsewhere in Hong Kong, the dense vegetation cover may provide habitats to different wildlife. The good ecological condition of the upper-stream inside the valley may also provide good habitats for wildlife. Hence, any impact on these two habitats may result in considerable ecological impact, subject to further survey and assessment at the EIA stage (refer to Section 6 of *Annex A*).

Land Use, Cultural, Landscape and Visual

The proposed site in Butterfly Valley is currently surrounded by natural slope and occupied by some village houses in Mui Kong Tsuen. The main planning issues in the new alignment section relates to the land clearance and resumption at the Valley where currently occupied by scattered village houses. Based on the preliminary assessment, known heritage site at butterfly valley along the propose alternative alignment has not been identified.

Key landscape impact relates to significant loss of woodland and scrubland areas, replaced by the proposed highway scheme. It is expected that the impact could be minimised by extensive re-planting and sensitive landscape treatment. As the highway scheme is located in a valley, key visual impact would be restricted to visually sensitive receivers nearby. The mitigation measures for the landscape impact, as well as sensitive architectural design and treatment to ventilation buildings such as minimisation of building height and use of recessive colour schemes, would minimise the potential visual impact (refer to *Section 7* of *Annex A*).

5. DESCRIPTION OF MITIGATION MEASURES

As discussed in Section 1.5, there are no changes for the Alternative Alignment beyond the Eagle's Nest tunnel portal when compared with the Conforming Alignment with the exception of possible traffic increase. It is expected that the environmental impacts for the Shatin section of the alignment is similar to the previous endorsed EIA report. Hence, the mitigation measures proposed for the Shatin section will remain unchange.

The change to the proposed mitigation measures to reduce the impacts associated with the Alternative Alignment are outlined in Sections 1 to 7 of *Annex A*. A summary of the proposed mitigation measures for the Alternative Alignment are presented in *Table 5.1a*.

Table 5.1a Proposed Mitigation Measures

Environmental Issues	Location	Proposed Mitigation Measures
Construction Noise	Within the works boundary	Environmental pollution control measures such as the use of quiet PME, reducing the number of PME operating concurrently and the use of movable noise barriers
Road traffic noise	All open new roads	Low noise road surfacing
Road traffic noise	Opposite Lai Chi Kok Reception Centre Staff Quarters	5m high plain barrier on western side of northbound carriageway and 3m to 5m high absorptive barrier on western side of southbound carriageway
Road traffic noise & Hazard	Butterfly Valley near Tai Po Road WTW	400m long enclosure
Road traffic noise	Southern part of Butterfly Valley	3m to 5m high noise barrier
Road traffic noise	Opposite the planned housing site, Site 10	5m plain or cantilevered barrier along the eastern side of the southbound carriageway
Construction dust	Within the works boundary	Environmental pollution control measures such as the use of water splays, wheel wash facilities, covering stockpiles and controlling the dropping heights from unloading
Ecology	Within the works boundary at Butterfly Valley	Minimisation of landtake, native woodland replanting and re-creation on-site

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

Environmental impacts of the Route 16 Conforming Scheme were assessed in the Route 16 Investigation Assignment EIA Study. Findings and recommendations of the EIA report for the unchanged area (ie Shatin section) are still applicable to this Project:

Title: Agreement No CE 42/96 Route 16 Investigation Assignment from West Kowloon to Sha Tin - Environmental Impact Assessment: Final Assessment Report, Environmental Monitoring and Audit Manual
EIAO register reference number: EIA-135/BC

Time of Approval: 9 February 1998

Approved by: Advisory Council on the Environment

Environmental Aspects Addressed:

- Noise impacts
- Air quality impacts
- Water quality impacts
- Ecological impacts
- Construction wastes disposal
- Landscape and visual impact
- Landuse and cultural

Findings on Environmental Impacts:

The findings of the report indicate that with the implementation of the recommended mitigation measures, the Route 16 Conforming Alignment will comply with the Government environmental criteria.

Recommendations:

Table 6.1a below presents the recommendation identified in the EIA Final Assessment Report.

Table 6.1a Recommended Environmental Mitigation Measures

Location	Recommendation
Within the works boundary	Environmental pollution control measures for minimizing construction impacts
All open new roads	Low noise road surface
Shatin main alignment - western sides of northbound carriageway	7m high reinforced earth embankments + 2m fence wall
Shatin main alignment - western sides of southbound carriageway	7m high reinforced earth embankments
Shatin main alignment - eastern sides of northbound and southbound carriageways	4m high plain barriers
Che Kung Miu Road slip roads - both sides	3m high absorptive barriers
Shatin Heights	Detailed Noise Insulation Works Study
Eligible dwellings at Shatin Heights	Window insulation with air-conditioning
Within the works boundary	Tree Survey

Location	Recommendation
Within the project boundary at Pak Shek village area, Wai Man Tsuen area and area to the north of Butterfly Interchange	Woodland planting
Proposed DSD maintenance Depot	Fresh air intakes outside the AQO exceedance region
Toll plaza and ventilation building	Design measures to reduce the area of landtaking
Ventilation building	Design of ventilation building (including the use of silencer) to mitigate the noise impact
Ventilation System	Design of ventilation system to maintain air quality within the tunnels in accordance with the Tunnel Air Quality Guidelines
MOS Railway Depot CDA Site	Take account of traffic noise constraints and incorporate mitigation measures to design against road traffic noise
Within the works boundary	Landscaping works

Annex A

Possible Impacts on the Environment

Note: This **Annex A** is NOT available at this website, please visit other locations as stated in the advertisement notice for information.