

5. DESCRIPTION OF THE ENVIRONMENT

5.1 Noise / Air Sensitive Receivers

- 5.1.1 In accordance with the Study Brief, noise sensitive receivers (NSRs) and air sensitive receivers (ASRs) within 300 m and 500m, respectively, of the proposed road alignment have been identified for impact assessment. Site surveys reveal that the existing NSRs in the Study Area are mainly high-rise residential developments and educational institutions, and the local ground levels of these NSRs are mostly located below the junction level except for Hong Sing Garden, Haven of Hope Sanatorium and a church located up on the hill to the west of the junction. Representative NSRs and ASRs have been identified within the Study Area and are described below and depicted in Figure 4-1 and Figure 4-2, respectively.

Existing Receivers

- Area 5 - Hong Sing Garden Neighbourhood (HS1-HS4)

Hong Sing Garden is comprised of five high-rise PSPS blocks located up on the hill adjacent to Po Lam Road North overlooking Tseung Kwan O Tunnel Road. The orientation of Blocks 4 and 5 will be potentially affected by this project.

- Area 19 - Verbena Heights & Metro City Neighbourhood (VH1-VH4, MC1-MC5)

Verbena Heights is comprised of two irregular shaped residential tower blocks located at the R(A) site in Area 19 facing Po Hong Road and Tseung Kwan O Tunnel Road. Due to its location in close proximity of high-traffic roads (i.e. Tseung Kwan O Tunnel Road), the design had already incorporated the use of podium and blank facades at its end walls. The residential towers range from 10-50 storeys high.

Metro City Phase I, a private development comprising 7 residential tower blocks atop a 15m podium, is located south of Verbena Heights at the corner lot surrounded by Po Hong Road, Wan Hang Road and Mau Yip Road. Each of the residential towers is about 40 storeys high.

- Areas 23, 24 & 25 - King Lam Estate Neighbourhood (KL1-KL8, SC1-SC3, SC11, R1-R6, OS1, OS2 & OS7)

King Lam Estate is comprised of high-rise and medium-rise residential tower blocks located north of the works junction adjacent to the northbound lane of Po Lam Road North. The primary school, community centre and carpark also form a part of the estate. The sensitive facades facing Po Shun Road and the junction will be adversely affected by this Project.

To the west of King Lam Estate, four more schools are identified adjacent to Mau Yip Road and Wan Lung Road, and a Sandwich Class Housing site consisting of four residential blocks is located in the midst of these schools.

A long strip of land about 40m wide separating King Lam Estate and the schools together with the Sandwich Class Housing site is designated as 'OU' (Other Use). Based on the Outline Zoning Plan No. S/TKO/6, the strip of land is reserved for a MTR station and landscaped deck.

Another large strip of land located between Wan Lung Road and Po Hong Road has been designated as open space area, which are currently used for children playground, outdoor sports ground, sitting-out areas and other recreational uses. This area is considered air-sensitive and thus has been taken into account in the assessment.

A district library, indoor recreation centre, and several outdoor swimming pools are planned for the open space area in Area 24. All of these above-mentioned uses in the designated open space area are considered air-sensitive only. Since the district library will be centrally air-conditioned and not rely on open windows for ventilation, the building is considered noise tolerant.

- Area 27 - Outlying Sensitive Receivers (H1-H3 & CH2)

There are few scattered sensitive receivers including Haven of Hope Sanatorium, a nursing home, a church and a few low-rise dwellings up on the hill to the west of the junction.

- Area 37 - C/R Site & Adjacent Neighbourhood (CR1-CR3, CH1, SC4)

The C/R site, comprising of 5 residential towers atop a 2-storey podium, is located at the western edge of our project limit facing Road P1. Noise mitigating measures such as the use of blank walls, architectural fins, bay windows and balconies have already been incorporated in the design of these towers, and thus, the non-sensitive facades will not be included in this assessment.

The site is also bounded by two schools one on each side and a self-protective church next to one of the two schools.

- Area 40 - On Ning Garden Neighbourhood (ON1-ON9, OS5-OS6)

On Ning Garden is a Private Sector Participation Scheme (PSPS) development, comprising of six blocks of 40-storeys high residential towers, is located to the east of the works junction. The sensitive facades facing Po Shun Road and Wan Po Road will be adversely affected by traffic noise.

In front of On Ning Garden facing Road P1, two outdoor gateball courts, toddlers' play area and some sitting-out areas are currently under construction. These uses are considered air-sensitive and noise-tolerant.

On the other side of On Ning Garden facing Po Shun Road, the area in front of the tower blocks is designated as a District Open Space area according to Plan No. S/TKO/6; however, the lot is currently used as a carpark/storage area.

- Area 41 - Chung Ming Court Neighbourhood (CM1-CM9, SC5)

Five HOS blocks of 35-storeys high are located in the 'R1' site between Po Shun Road and Sheung Ning Road. These contiguous tower blocks form a physical barrier screening traffic noise for the sensitive receivers (i.e. Hau Tak Estate and Catholic Ming Yuen Middle School) in the rear. However, Po Leung Kuk Tseung Kwan O Primary School located behind Fai Ming Court and Yin Ming Court is not fully protected as the sensitive facades can be seen through the crack in between buildings. A children' playground and sitting-out areas are located in front of the school in between Fai Ming Court and Yin Ming Court.

- Area 59 - Sheung Tak Estate Neighbourhood (ST1-ST9, SC6-SC10)

Sheung Tak Estate consists of nine rental blocks, one Annex block and seven HOS blocks and a commercial centre together with three schools, a Neighbourhood Community Centre (NCC) and a Home for Senior Citizens (HSC) along Road P2, which are noise sensitive with the exception of the commercial centre and NCC. According to the EIA Report for Tseung Kwan O Development, TKO Town Centre North - Roads, Bridge & Subways completed in May 1995 under Contract No. TK39/93, all noise sensitive uses such as bedrooms and living rooms in the HSC are to be located away from the adjacent highways and therefore this building is considered self-protective in this Study.

Future Receivers

According to the Outline Zoning Plan No. S/TKO/6, the study area at the T1/P1/P2 junction is zoned for residential, government/institutional, commercial as well as open-space uses. For the purpose of this EIA study, the latest available building layouts have been obtained and consolidated from relevant previous studies and government departments. Future and planned receivers include a Commercial/ Residential 'C/R' site in Site 38b (381 & 382) that are sensitive to noise and air quality, and a DO and G/IC site in Area 45 (OS3-OS4), which is only air-sensitive. Figures 4-1 and 4-2 also show the future and planned noise and air sensitive receivers.

5.2 Baseline Environmental Conditions

5.2.1 The prevailing noise environment in the vicinity of the proposed project is mainly dominated by the road traffic along Tseung Kwan O Tunnel Road, Roads P1 and P2. The prevailing road traffic noise levels at the identified NSRs in year 2000 are shown in Appendix A. About 23 percent of the representative NSRs, or approximately 1590 dwellings and 135 classrooms, in the vicinity of the Project limit are predicted to be exposed to noise levels exceeding the noise limit by 1-13 dB(A). The highest overall noise level of 83 dB(A) is predicted at HS4, a sensitive facade overlooking two heavy trafficked roads (i.e. Po Lam Road North and Tseung Kwan O Tunnel Road) in Hong Sing Garden. NSR SC11, a school currently under construction at the corner of Wan Hang Road and Wan Lung Road, is also expected to experience high noise levels in the order of 73-74 dB(A) in 2000. High noise levels in excess of the noise limit by 14-17 dB(A) are also predicted at the Haven of Hope Hospital, the nursing home and the church up on the hill. These high noise levels are predominately contributed by the existing Po Hong Road, Po Shun Road, Roads T1, P2 and D1.

5.2.2 The existing air quality in the study area is predominately attributed to vehicle emissions from the nearby roads. As there is no operating monitoring station in Tseung Kwan O), EPD advised to use the annual average of daily hourly maximum values in 1996 for the rural/new development areas as follows:

$$\text{RSP} = 51 \mu\text{g}/\text{m}^3$$

$$\text{NO}_2 = 39 \mu\text{g}/\text{m}^3$$

$$\text{O}_3 = 57 \mu\text{g}/\text{m}^3$$

5.2.3 As the background pollutant concentration for TSP is not available by the same source, the latest available data of $77 \mu\text{g}/\text{m}^3$ from Junk Bay station has been adopted from *Air Quality in Hong Kong, 1993*.

5.3 Overview of Relevant Studies

5.3.1 Various planning studies have been conducted for the new TKO Town Centre since the late eighties to determine the potential noise impacts from road traffic noise and the need for noise mitigation measures. While some of the findings have been overtaken by events, the committed provisions subsequent to some of these studies have formed the basis for the Do-Nothing Scenario as described below. The following is an overview of some of the major studies, together with the key findings:

5.3.2 *Tseung Kwan O Feasibility Study of Opportunities for Further Development (TKOOFD)*

As part of the *Tseung Kwan O Feasibility Study of Opportunities for Further Development (TKOOFD)* completed in May 1990, a comprehensive noise impact assessment was carried out for various planning areas in the new town and concluded in general terms that the following direct technical measures would be required for effective noise control in year 2011:

- Four sections of noise canopies along Road P2 to protect the residential blocks in Area 59;
- A roadside barrier along Road D1 to protect the residential blocks in Area 59;
- Four sections of noise canopies to protect the residential blocks along Road D4 in Site 55a, 55b, 65a, 65b, 57a, 57b, Areas 67 and 74;
- Three sections of noise canopies to protect the residential blocks along Road D8 in Area 74;
- Pervious macadam road surfacing for sections of Roads D1 and P2;
- Protection given by the use of podium in Areas 55 and 57;
- The use of acoustic insulation for residential blocks in Area 65b.

5.3.3 Subsequent to this study, there have been various revisions to the land use proposals, and the building layouts in most of the planning areas have been substantially modified. Therefore, reference has been made to those recommended mitigation measures in relevant previous studies within 300m of the Project Limit.

5.3.4 *Tseung Kwan O Development, TKO Town Centre North - Roads, Bridge & Subway*

The EIA for *Tseung Kwan O Development, TKO Town Centre North - Roads, Bridge & Subway* completed in May 1995 under Contract No. TK39/93 concludes that the following technical remedies should be required in order to mitigate the potential noise impact:

- 2m high noise barrier on top of the edge parapet along the southbound lane of Road P2 flyover to the south of the roundabout at Roads P2 and L463;
- 6m/6.5m high barrier along Road P2 and the slip road;
- Open texture surfacing on all roads surrounding Area 59, including Roads P2, D1 and L463.

5.3.5 *Noise Impact Assessment for the Provision of Road P1 in Tseung Kwan O New Town*

The *Noise Impact Assessment (NIA) for the Provision of Road P1 in Tseung Kwan O New Town* completed in May 1996 under Contract No. TK37/93, concludes, among others, that open texture pavement should be applied to the road surface and that a 4m plain barrier should be erected along the southbound carriageway of Road P1 in front of On Ning Garden. It is understood that the above noise barrier is under construction at the time of preparation of this report. Also, a 1.8m noise barrier has been proposed for the flyover as a part of the road scheme for Tseung Kwan O Town Centre subject to the subsequent assessment in the *Widening of Wan Po Road - EIA Study*.

5.3.6 *Widening of Wan Po Road - Environmental Impact Assessment Study*

Widening of Wan Po Road - EIA Study, a follow-up study of the *NIA Study of Road P1* completed in June 1997 under Contract No. TK43/96. The study concludes that the 4m plain barrier in front of On Ning Garden should be further extended to the beginning of the southbound slip road towards the roundabout at Chiu Shun Road, and a 4m high plain barrier should be erected on the southbound side of the flyover along Road P1.

5.3.7 *Noise Assessment for Junk Bay Head of Bay Stage II Engineering Works & Eastern Approaches - Stage I*

The study completed in 1985 under Contract No. JB19/85 recommended a 2m/2.5m noise barrier along the southbound of Tseung Kwan O Tunnel Road shielding traffic noise for Verbena Heights and others.

5.4 **Landscape and Visual Context**

5.4.1 The existing landscape and visual context of the study area includes substantial areas of land which are proposed for future development but which are currently either unused, and have formed areas of rough grassland, or are being used as temporary storage sites for the ongoing development of other areas of TKO. These areas will be considered in terms of their future development and planned proposals.

5.4.2 There are a number of such sites closely adjacent to the proposed scheme and which will be affected by it. These include:

- indoor swimming pool and indoor recreation centre under construction on Area 24 north of the interchange by the elevated slip roads, retaining walls and slope embankments,
- planned open space on Area 40 between On Ning Garden residential estate and the interchange, this will be impacted on by the introduction of elevated slip roads with noise barriers,
- planned sportsground, town park and indoor recreation centre on Area 45, and by the introduction of slip road D and associated slopes and retaining wall;
- Sheung Tak Estate, nearing completion, to the south of the interchange by the road widening and slope works.

- 5.4.3 Tseung Kwan O is currently undergoing major development to create the TKO New Town, resulting in the landscape and visual context of the study area being relatively simple. There are areas of existing new and future high-rise residential areas, low-rise village areas, public parks, sports facilities, and natural and manmade hill slopes. The topography of the site is simple with much of the study area being low-lying and flat. There are two hillsides, one to the west and one to the north-east, which comprise steep slopes rising upto +220mPD and +150mPD respectively.
- 5.4.4 The transport corridors of TKO New Town are a major feature within the landscape of the locality. They comprise major roads, the proposed extension to the MTR line and stations, and a planned bus station adjacent to the T1/P1/P2 interchange. The roads include:
- Road T1 (TKO Tunnel Road),
 - Road P1,
 - Road P2,
 - Road D2,
 - Po Lam Road North, and;
 - Po Ning Road.
- 5.4.5 These form a major part of the landscape character of the site as they are all multi-lane dual carriageways. This, together with large sections of the roads being elevated or on embankments has resulted in many parts of the study area being adjacent to a major road. The roadside landscape of these corridors varies from the tree lined amenity strips of Po Lam Road North and Po Ning Roads to the recently planted slopes adjacent to the remaining roads and their junctions. This dominance by the infrastructure will be extenuated by the introduction of the local MTR, which has been allocated on site and currently is rough grassland. There will be two temporary works sites situated at Area 27 and Area 56. The sites are currently fenced off with paved ground and with no landscape feature.

5.5 Existing Land Uses

- 5.5.1 In general, the boundary of the "Study Area" for the purpose of this land use impact assessment is 300m from either side and along the full stretch of the proposed road alignment.
- 5.5.2 The Study Area is located in Tseung Kwan O (TKO) New Town Area which is covered by the approved TKO Outline Zoning Plan, Plan No.: S/TKO/6, adopted TKO Outline Development Plan, Plan No.: D/TKO/1C. In addition, the Study Area is also covered by departmental layout plans namely TKO Town Centre layout plan L/TKO-66/E, Hang Hau South layout plan L/TKO-38/2G and Po Lam East layout plan L/TKO-17/1C.
- 5.5.3 The Study Area comprises Tseung Kwan O Planning Areas 23, 24, 25, 26, 27, 37, 38, 39, 40, 41, 45, 59 and 111.
- 5.5.4 Tseung Kwan O (TKO) was developed as a New Town under the Tseung Kwan O New Town Programme since early eighties. During the New Town development, a majority of building sites have been developed into private and public housing and community facilities which are intended to serve the local population. The major access to the Study Area is Tseung Kwan O Tunnel Road, Po Lam Road and Hang Hau Road.
- 5.5.5 The Study Area comprises mainly three development area cells, each of which will be served by a MTR station. The three development cells comprise lands that are already developed and lands reserved for planned / future development (refer to Figure 8-1). The development cell located to the north of Road P2 was developed on reclaimed land at the head of the former TKO bay. The two development cells to the south forming the central area of the New Town was also reclaimed with fill materials from the hill in Area 111 which was now zoned as the green belt area.

- 5.5.6 Development Area A is served by Po Hong Road, Po Fung Road and Po Lam North Road. It comprises the proposed MTR station in the centre, private and public housing, namely Yan Ming Court and King Lam Estate. The proposed bus depot, the proposed swimming pool complex, district library and recreation centre at Area 24 and the existing Po Hong Park in Area 25 are also located in this area.
- 5.5.7 Development Area B is served by Po Ning Road, Chiu Shun Road and Road P1. It comprises mainly residential developments, with four housing estates, namely Chung Ming Court, Yu Ming Court, Hau Tak Estates and On Ning Garden, each served by community facilities.
- 5.5.8 Development Area C is served by Road P1, P2 and D4. The new residential development, the Town Centre, the proposed Town Park and indoor recreation centre in Area 45 are situated in this area.
- 5.5.9 To the east of King Lam Estate passes Po Ning Road is the Green Belt Area. To the west of the development Area A is also situated a Green Belt area with the Haven of Hope Hospital next to it. Figure 8-1 shows the detail of existing and planned / future land use in the Study Area.
- 5.5.10 Four broad land uses (housing areas, G/IC facilities and open space and green belt area) have been identified in the TKO Study Area as follows (refer to Figure 8-2):

- Housing Area

The Study Area comprises the major types of residential land use in the TKO Area. It covers land reserved for public rental housing estates, Home Ownership Scheme (HOS), Sandwich Class Housing (SCH) and private residential development.

Existing public rental housing estates include King Lam Estate in Area 23 and Hau Tak Estate in Area 39 with 5500 and 4300 flats respectively. In addition, 4 HOS namely Ho Ming Court in Area 23 with 800 flats, Yu Ming Court in Area 39 with 1200 flats as well as 1 PSPS namely On Ning Garden in Area 40 with 2300 flats and an estimate population of 8300 in 1997-2001 have also been completed. Within these estates, there are adequate provision of commercial and community facilities such as local open space, schools and retail shops.

Area 55 and 59 are new residential area. Area 55 are public estate (HOS) with 4000 flats and the Shueng Tak Estate located in Area 59 are public rental estate and HOS / PSPS with 5300 / 5800 flats respectively. The Town Centre and commercial centre are also located in Area 59.

- G/IC Facilities

The Study Area has a wide range of government, institution and community (G/IC) facilities to meet the needs of the residents in the area and local demands. A wide range of community facilities such as town hall, library, indoor recreation centre, schools, community centre and religious institution are available in various areas. At present, existing primary and secondary schools are distributed in various areas. The Haven of Hope Hospital is situated in Area 27. A electric substation in Area 24 and telephone service is available through the telephone exchange in Area 26.

- Open Space

The Town Park which is proposed in Area 45 which will comprise a variety of active and passive recreational facilities. District open spaces are also planned in Area 24, 25, 37 and 40 to provide recreational outlets for the immediate residential neighbourhood. At present, Area 25 is the existing Po Hong Park.

- Green Belt

One major existing Green Belt is located at the area across Po Ning Road and Po Lam Road North in Planning Area 111. The Green Belt area has been designed to promote conservation of the natural environment, to safeguard it from the encroachment by the surrounding urban type development, and to provide additional outlets for passive recreational uses.

5.5.11 Cultural Heritage Study

The Study reveals that architectural, historic buildings or archaeological remains are not present within the Study Area. Mitigation measures to conserve buildings of architectural and historic interests and archaeological remains are not necessary.

5.6 Planned Land Uses

5.6.1 The planned / future land use are shown in Figure 8-3 and 8-4.

- Proposed Town Park and Recreational Facilities

The Regional Services Department (RSD) has proposed a new Town Park and an indoor recreation centre in TKO Area 45 which will start works in 2001 and is proposed to be finished in two to three years. Also, an open space, swimming pool complex and a district library is proposed in TKO Area 24, also by the RSD, which have commenced works in 1997 and proposed to be finished by end 1999.

- Planned Development

There is also a proposed commercial / residential development with public transport interchange on sites in Area 17, 38 and 56 and a proposed bus depot in Area 26.

- New Housing Development

A number of new housing development are proposed in the Tseung Kwan O New Town area to cope with the population increase in the next few years. This will include public rental estate, HOS and PSPS development in various areas.

- Mass Transit Railway (MTR) Station

Apart from the Tseung Kwan O Tunnel and Western Coast Road, external access will be complemented by an extension of the MTR from Lam Tin in East Kowloon to Tseung Kwan O. A strip of land is reserved for the proposed MTR (Po Lam and Tseung Kwan O) network extension. The proposed MTR station with public transport interchange is located in TKO Area 17, 38 and 56. The proposed MTR extension is intended to serve the local population. As indicated on the TKO Outline Zoning Plan S/TKO/6, the proposed MTR tracks and stations are primarily underground except for the section in Area 17, which will be at grade and enclosed by structure with a landscape deck on top to eliminate any noise impact caused by MTR operation on the adjacent residential area.

Table 5.1: Summary of Land Use

Development Cell	Planning Area	Land Use	Estate	Population		Community Facilities
				1997-2001	2007-2011	
A	17	Other uses				Proposed MTR station (public transport interchange)
	21	Residential	Yan Ming Court (HOS)	6,200	5,600	
	23	Residential	Ho Min Court (HOS)	2,800	2,500	
			King Lam Court (PRE)	19,000	16,500	
	24	G / IC				
	25	Open Space				Existing Po Hong Park, proposed bus depot and existing public utilities
26	Other uses					
B	34	Residential	Ming Tak Estate (PRE)	4,900	4,700	
			Yuk Ming Court (HOS/PSPS)	8,600	8,100	
	38	G/IC and other uses				Proposed MTR station (public transport interchange)
	38	Commercial/Residential		5,970	10,700	
	39	Residential	Yu Ming Court (HOS)	3,800	3,600	
			Hau Tak Tsuen (PRE)	12,700	11,500	
	40	Residential	On Ning Court (PSPS)	8,400	7,700	
40	Open Space				Open space area	
41	Residential	Chung Ming Court (HOS / PSPS)	6,100	5,600		
C	45	Open Space				Proposed Town Park and the indoor recreation centre
	55	Residential	PSPS	12,900	12,500	
	56	G / IC and other uses				Proposed commercial development with public transport interchange
	59	Residential	Sheung Tak Estate (PRE)	18,200	16,800	
(HOS)			18,700	18,100		