

Territory Development Department 拓展署



NT EAST DEVELOPMENT OFFICE

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Tseung Kwan O Development
TKO Town Centre North - Roads, Bridge & Subways
Contract No. TK 39/93

Environmental Impact Assessment

Executive Summary

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CONTENTS

	Page
Background	1
Road Traffic Noise Impact	1
Construction Noise Impact	3
Impact of Road Traffic on Air Quality	3
Impact on Air Quality During Construction	3
Conclusions & Recommendations	4
Drawing 60493/04/ES1A	

目 錄

背景	一
道路交通噪音之影響	一
建築噪音之影響	二
道路交通對空氣質素之影響	三
建築期間之空氣質素影響	三
結論和建議	四
圖紙編號60493/04/ES1A	

EXECUTIVE SUMMARY

Background

Tseung Kwan O Development Contract No. TK 39/93 will create the road network to serve the area to the north of the proposed town centre. The area will primarily be occupied with residential development, housing a population of around 56,000 persons, with ancillary developments including schools, commercial centres and GIC uses. The general layout of the area is shown on Drawing 60493/04/ES1A.

This Environmental Impact Assessment updates the EIA studies conducted as part of the TKO Feasibility Study of Opportunities for Further Development in 1990. Since these studies there have been no significant changes which would adversely affect environmental conditions in the TKO Town Centre North area nor will the development of the area lead to adverse environmental conditions in adjacent areas.

The environmental impact assessment has therefore focused on the noise and air quality impacts during the construction and operational stages. Road traffic will increase as development proceeds within Tseung Kwan O. The assessments have been based on traffic forecasts for 2011 which are considered to be representative of Tseung Kwan O being fully developed.

Road Traffic Noise Impact

The impact of road traffic noise primarily affects buildings around the perimeter of developments. The impact at buildings located within developments will be considerably lower as they will be shielded and are located further away from the roads.

Predictions of future traffic noise levels show that without any mitigating measures, noise levels at residential dwellings and schools facing onto Road P2 and Road D1 would exceed the criteria laid down in planning standards. Likewise, noise levels at schools on the local road network will be higher than those recommended in planning standards. Mitigatory measures capable of reducing the adverse impact of road traffic noise to acceptable levels have been investigated and the most suitable proposals were recommended for implementation.

In general, open texture road surfacing applied to the roads surrounding Area 59 will reduce noise generated by road traffic and result in a quieter environment. The reduction of noise at source will minimise the need for barriers to protect residential dwellings.

Along Road P2 in Area 59, noise barriers will be required in addition to the use of open texture surfacing to meet the required noise standards. It was found that a noise barrier with general heights of 6 metres and 6.5 metres in the vicinity of the northernmost school in Area 59 would be sufficient to reduce noise levels at sensitive facades to acceptable levels. A section of 6.5 metres high noise barrier was also found to be necessary around the slip road carrying traffic between Road P2 and Road D1.

The investigation of alternative noise mitigatory measures concluded that without open texture surfacing a 9 metre high noise barrier would be required to protect the schools and residential properties facing Road P2. Alternative layouts for the schools were also evaluated and although re-orientating the schools was shown to have a beneficial effect, and would reduce the height of barrier required, it was not considered feasible to adopt a different layout for the schools.

Future noise levels at the residential developments proposed in Area 57 were found to exceed the recommended criteria. A 2 metre high barrier erected on the proposed flyover at the junction of Road P2 and Road D8 would minimise the impact of noise at the affected facades to acceptable levels.

Residential developments are also planned for Area 55 but detailed layouts have not yet been prepared. The study has identified that buildings which directly face Road D1 will be adversely affected by road traffic noise. Measures to minimise the impact of road traffic noise will need to be included in the development. Such proposals include orientating buildings and windows away from the road traffic noise and the use of podiums and buildings with non sensitive facades to screen other more sensitive buildings.

Area 74, southwest of the junction of Road P2 and Road D8, is also zoned for residential development. The proposed housing layout plan will need to take into consideration the noise impact from Road P2 and it is recommended that a separate impact assessment should be carried out in conjunction with the preparation of the master layout plan to establish mitigatory measures required at an early stage.

Several schools in Areas 55, 56 and 57 will be subject to road traffic noise impacts generated from Roads L461, L462, L463 and L464. In general the use of boundary walls within their sites will reduce noise levels to acceptable limits. Alternatively, the use of open texture surfacing on the local roads should be considered.

It is predicted that recommended noise levels at the single storey ward building, located in the north part of the Haven of Hope Sanatorium site, will be exceeded. This is mainly due to the quiet environment which is set for hospital buildings. The Sanatorium is currently undergoing re-development and it is understood that the ward will be vacated upon completion of a new fully air conditioned hospital building.

Construction Noise Impact

Buildings within the Haven of Hope Sanatorium site are the only premises in the vicinity to be affected by noise arising from the construction of the works covered by Contract No. TK 39/93. None of the development proposed in the Town Centre North area will be occupied before the Contract works are completed. No other buildings are located close enough to the proposed works to be affected.

The construction works could generate high levels of construction noise at the Haven of Hope Sanatorium. However, no percussive piling will be required and bored pile foundations are proposed for the Road D1 bridge across the proposed Road P2 and the Road P2 flyover at the junction of Road P2 and Road D8.

The Study has identified that noise levels at the sensitive facades of buildings within the Sanatorium site will need to be monitored to ensure that permitted noise levels are not breached. With use of appropriate plant and programming of works the works can be constructed without exceeding the permitted noise levels at the sensitive facades.

Impact of Road Traffic on Air Quality

The impact of road traffic on air quality was found to be minimal. There will be no buildings at which vehicle emissions will cause air quality standards to be exceeded. Likewise pollutant levels on the land adjacent to the carriageways will not exceed air quality standards.

The assessments have shown that air quality standards at a distance of 5 metres from the roads will not be exceeded. It is recommended however that the 20 metre wide buffer, specified in the Hong Kong Planning and Standards Guidelines, should be maintained. This will minimise the likelihood of adverse impacts arising from higher traffic flows after 2011.

The noise barriers erected adjacent to carriageways result in higher concentrations of pollutants close to the barriers. Air sensitive uses in Area 59, Tseung Kwan O which are situated along Road P2 are not located within the zone of higher pollutant concentrations behind the barrier and provision of noise barrier will reduce the pollutant levels at them. Hence, provision of noise barrier will not cause higher pollutant concentrations at the air sensitive uses in Area 59, Tseung Kwan O which are situated along Road P2.

Impact on Air Quality During Construction

Dust arising from construction activity is not likely to cause a nuisance. The developments proposed in the immediate vicinity of the works are programmed to be occupied after completion of the road construction works. The Haven of Hope Sanatorium will be the only existing buildings in the locality of the Contract and the distance from the works will minimise any impact.

An assessment of the impact of dust emissions from construction activities was undertaken and it was found that total suspended particulates (TSP) could exceed the permissible limit at the Sanatorium under a worst case assessment scenario. Dust emissions can be readily reduced by good working practices and need not impose constraints on the Contractor's method of working. Monitoring of dust levels at the Sanatorium is advised to ensure that the required standards are not exceeded.

Conclusions and Recommendations

In general, road traffic noise will have the most pronounced impact in the area. Measures capable of satisfactorily mitigating the impact of noise have been developed. Subject to the implementation of these measures the environmental impact of the roads to be constructed under Contract No. TK 39/93 will not be significant.

The full environmental impacts are not expected to materialise for several years. They will only occur when the road network is completed and developments in the area are occupied. The greatest impacts are generated by the highest traffic flows and these are predicted to occur on Road P2. The volume of traffic using the District Distributor Road (Road D1) and the local road network will be less but will still have an impact at some buildings.

The main conclusions and recommendations are summarised as follows :

- Open texture road surfacing applied to all roads surrounding Area 59 will reduce road traffic noise to acceptable levels at the residential units without the need for barriers.
- Barriers will be required additionally along Road P2 to protect the adjacent school buildings.
- The school layout proposed for Area 59 will require a 6 metre high barrier along Road P2 to reduce noise levels to permitted levels. A 6.5 metre high barrier will be required in front of School PS2 and it will need to be extended around the Road P2 to Road D1 slip road.
- A 2 metre high noise barrier has been recommended for inclusion at the edge parapet on the proposed Road P2 flyover to protect the proposed housing blocks in Area 57.
- The residential developments in Area 55 will need to be designed to minimise noise levels at sensitive receivers. Detailed layout of the residential development in Area 55 has not yet been prepared but the use of design techniques to reduce the anticipated noise impact will not impose undue constraints on the development of the site.

- The planning of Area 74 will also require a layout which minimises the impact of road traffic noise.
- In Areas 55, 56 and 57, noise barriers in the form of boundary walls should be provided within their site as alternatives to the application of open texture pavement on local roads to protect school sites.
- Only one sensitive receiver, within the Haven of Hope Sanatorium, is likely to be affected by noise from construction activity. Selective use of plant and methods will allow the works to be carried out without permitted noise levels being exceeded.
- The impact of traffic pollution on air quality will be minimal. None of the existing or proposed buildings in the area will experience pollutant levels which exceed the Hong Kong Air Quality Objective values.
- The Haven of Hope Sanatorium is the only property likely to be affected by diminished air quality during construction and good working practices combined with adequate site supervision will avoid localised dust emissions exceeding required standards.

It is concluded that the environmental impact of the roads proposed under Contract No. TK 39/93 will not be significant subject to the implementation of the proposed mitigatory measures. The Haven of Hope Sanatorium is the only existing property likely to be affected during the construction period. Monitoring and auditing procedures, of both noise and dust from construction activity, are recommended. Local monitoring, combined with good working practices will ensure that acceptable conditions are not breached at the Sanatorium buildings.

摘要

背景

政府擬定將軍澳發展工程合約編號TK39/93興建有關道路網絡，以應將來市中心北面之發展需要。此區將會以住屋發展為主，容納大約伍萬六千人。其輔助發展包括學校、商業中心、政府、團體和社區用途。此區之平面佈置已在圖紙編號60493/04/ES1A裏顯示。

本環境影響評估將會修訂在一九九零年進行之將軍澳再發展可行性研究中之環境影響評估。自那可行性研究後，現時的发展規劃將沒有重大的改變，會為市中心北面帶來有壞的環境影響，在市中心北面之發展亦不會為附近區域帶來有壞的環境影響。

因此，這環境影響評估主要集中在建築期間和道路啓用後的噪音和空氣質素影響。道路交通流量將會跟隨將軍澳發展而增加。此評估是基於將軍澳在二零一一年全面發展時的交通流量預測而作出。

道路交通噪音之影響

道路交通之噪音主要影響在發展區邊緣的建築物。在發展區內圍的建築物，由於已被外圍建築物阻擋和比較遠離道路，它們所受之影響會大幅減少。

將來交通噪音之估計顯示若沒有任何緩和措施，面向P2路和D1路之住宅樓宇和學校會受到高於規劃標準釐定準則之噪音水平。同樣地，在地方支路旁的學校，噪音水平將高於規劃標準的建議界限。因此對用來減低影響至可接受水平之緩和措施經已作出探研，而對最適合的建議已作出推薦，以予實行。

普遍而言，在環繞第59區之道路舖上吸音路面，可以減低道路交通所產生之噪音及形成一個較寧靜的環境。在音源減低噪音可以減少用隔音屏障來保護住宅樓宇之需要。

為全面減低第59區內之噪音水平達致需要的標準，除採用吸音路面外，須沿P2路旁加設隔音屏障。一個由六米高而升至在最北的學校旁為六米半高的隔音屏障，將可以減低噪音致接受水平。這段六米半高之隔音屏障需伸延致連接P2路和D1路之道路上。

在探研其他緩和噪音措施時，發覺若沒有吸音路面，一個九米高的隔音屏障是需要用來保護面向P2路的住宅樓宇和學校。一個新的學校平面佈局亦已被考慮和評價，雖然改變學校的座向是有效的和可減低所需隔音屏障之高度，但是採用這個不同的學校佈局已被認為是不可行的。

將來，在第57區內住宅樓宇之噪音，將超出建議標準。需要安裝一個兩米高的屏障在橫跨P2路和D8路交匯處的天橋上，以減少噪音影響致可接受水平。

第55區亦計劃用作居住發展用途，但是詳細的佈局仍未確立。此研究指出直接面向D1路的樓宇將受到道路交通噪音之影響。減低道路交通噪音之措施將需要包括在發展計劃內。這些方法包括設計樓宇座向將窗戶遠離道路交通噪音和利用平台和非噪音敏感建築物，以阻擋比較敏感的建築物。

在P2路和D8路交匯處西南之第74區亦計劃為住宅用地。在設計樓宇之佈局時，需要考慮來自P2路噪音之影響。建議在確立主佈局圖時，同時進行一個獨立的影響評估，以盡早確定所需要之緩和措施。

在第55、56和57區內，數幢學校將受到區內支路：L461路、L462路、L463路和L464路上交通噪音之影響。在學校周邊築起圍牆可將噪音水平減致可接受界限。亦可在支路上採用吸音路面，作為一個代替的方法。

在靈實醫院北部之一層高病房樓宇，預測噪音將超越建議水平。這是主要因為醫院要求的環境比較寧靜。這醫院現正進行重建。據了解，這病房樓宇將在新落成之空調醫院大樓啓用後空置。

建築噪音之影響

靈實醫院是唯一受到合約編號TK39/93工程建築時噪音影響之附近建築物。在市中心北面所建議之發展將不會在本合約工程完成前啓用。沒有其他建築物，由於太接近此區，而受到影響。

建築施工將可能會在靈實醫院產生過多的建築噪音。但是，撞擊的打樁方法將不需要。在橫跨P2路的D1路橋和在P2路和D8路交界的P2路橋，都會採用鉗孔式方法建造地基。

此研究指出在靈實醫院需進行監察，以確保噪音水平不會超過標準。利用適當的工具和進程，工程將可展開，而不會超越標準噪音水平。

道路交通對空氣質素之影響

道路交通影響空氣質素之情況已估計為輕微，沒有一座建築物會受到由汽車排出廢氣而引致空氣質素低於標準。同樣地，在道路旁邊，空氣污染水平將不會超出空氣質素標準。

此評估顯示在道路旁5米，空氣質素將不會低於標準。但是建議仍採用在香港規劃及標準指南內定下之20米緩衝地帶。這樣會減低由二零一一年後較高之交通流量所帶來的影響之可能性。

在路旁樹立的隔音屏障會造成在屏障附近有較高空氣污染水平。在P2路旁，第59區之對好的空氣質素有要求的建築物，都不是處於隔音屏障後的較高污染濃度區域，而設置這隔音屏障將會減低在這些建築物的污染水平。所以，這隔音屏障將不會導致增加在這些建築物的空氣污染水平。

建築期間之空氣質素影響

建築施工所產生之塵埃將不會構成滋擾。在工程範圍附近之發展會依進程在此項工程完成後才入伙或啓用。靈實醫院是唯一在此工程所涉及地區周邊的現有建築物，但仍由於距離較遠，而所受之任何影響將會減細。

由建築施工帶來塵埃之影響已被估計，結果顯示在一個假設的最壞環境下，在靈實醫院之總懸浮物可能會超過容許界限。良好的工作方法將容易地減少塵埃之擴散，而不會加添限制於建築商之工作方法上。建議在靈實醫院進行塵埃水平監察，以確保所需標準不會被超越。

結論和建議

此區最大的影響將是道路交通噪音。已建議一些能完滿減輕噪音影響之措施。若能實行此等措施，工程合約編號TK39/93所包括道路所帶來之環境影響將不大。

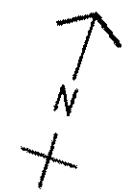
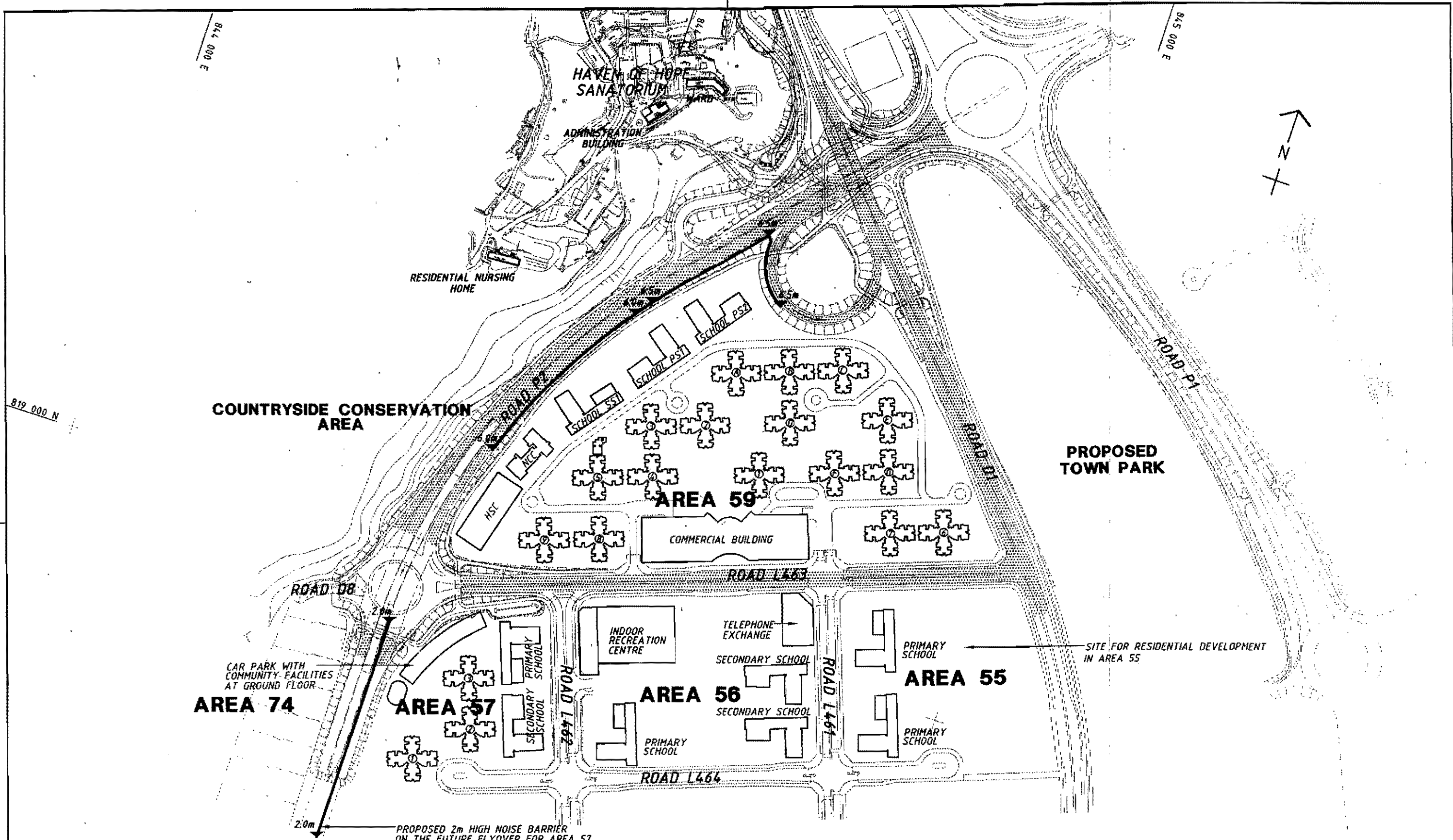
全面的環境影響將不會在未來數年出現，只會在所有有關道路網完成和區內建築物啓用後才發生。最高交通量預測將會在P2路上，而相對之環境影響亦為最大。在區域分支道路(如D1路)和地方支路網上的交通流量比較少，但仍對一些建築物有一定之影響。

主要的結論和建議現摘要如下：

- 在圍繞第59區的道路上加鋪吸音路面，以減低區內住宅單位之交通噪音達致可接受水平，而無需隔音屏障。
- 沿P2路，將額外需要隔音屏障，以保護附近之學校。
- 在第59區內之學校，是需要一個六米高之隔音屏障在P2路旁，以減少噪音水平。而PS2學校更需要一個六米半高之屏障，伸延至連接P2路和D1路之道路上。
- 建議加設一個兩米高的隔音屏障在將來P2路天橋之邊欄上，以保護第57區之住宅樓宇。
- 第55區之住宅發展的詳細佈局還未完成，但需考慮減少所受到噪音之影響。採用減低噪音之設計技術，將不會為發展帶來不必要的限制。
- 第74區之規劃需要一個可以減低道路噪音影響之設計。
- 若不在第55、56和57區的地方支路上加鋪吸音路面，需利用學校之圍牆作為隔音之用，以保護這些區內之學校。
- 靈實醫院是唯一受到建築施工所影響之地方。選擇適當的工具和方法將可讓工程進行，而不會引致大於標準之噪音。

- 道路交通影響空氣質素之情況為輕微，沒有一座建築物會受到由汽車排出廢氣而引致空氣質素低於標準。
- 在建築期間，靈實醫院是唯一受到改變的空氣質素影響之建築物。良好的工作方法加上足夠的地盆監管將可避免大於標準之塵埃擴散。

若能實踐建議的緩和措施，工程合約編號TK39/93所包括之道路所帶來的環境影響將不會嚴重。靈實醫院是唯一在建築期間受到影響之建築物。建議進行監察和稽核由建築活動所帶來之噪音和塵埃。實地的監察加上良好的工作方式將確保在醫院的可接受情況不會被破壞。



LEGEND:

- 6.0m 6.0m PROPOSED NOISE BARRIER AND HEIGHT
- LOW NOISE ROAD SURFACING

PROPOSED 2m HIGH NOISE BARRIER ON THE FUTURE FLYOVER FOR AREA 57.

Maunsell
茂盛(亞洲)工程顧問有限公司

TSEUNG KWAN O DEVELOPMENT

TKO DEVELOPMENT CONTRACT NO. 39/93
ENVIRONMENTAL IMPACT ASSESSMENT

RECOMMENDED NOISE MITIGATORY MEASURES

DRAWING NO.
60493/04/ES1A