

Legislative Council Panel on Transport

Subcommittee on matters relating to the implementation of railway development projects

MTR Penny's Bay Rail Link – Project Agreement

INTRODUCTION

At the special meeting of this subcommittee held on 9 July 2002, we briefed Members on the draft Penny's Bay Rail Link (PBRL) Project Agreement as approved by the Executive Council on the same day. Members requested additional information in relation to the Project Agreement and the funding arrangement of the PBRL project. The information is set out as follows :-

FINANCIAL ARRANGEMENTS

Need to Provide Financial Support to MTRCL

2. The \$798 million financial support to be provided to MTRCL in the form of waived dividends has been estimated based on a thorough check on MTRCL's assumptions. Patronage and cost items assumed are in line with our own forecast and MTRCL's historical trend. Our financial advisors also checked MTRCL's financial assumptions and advised that they are reasonable.

MTRCL as a Commercial Entity - Undertaking during the Initial Public Offering in 2000

3. When MTRCL was privatised in 2000, the Government undertook in the Initial Public Offering Prospectus for MTR Shares and in its Operating Agreement with MTRCL that the Government would not require the company to construct and operate any future railway project without its agreement. The Government also recognised that MTRCL would require an appropriate commercial rate of return on its investment in any new railway projects, which is considered to be between 1% and 3% above the estimated weighted average cost of capital (cost of capital) of the company. This undertaking is important in maintaining MTRCL's financial standing and prospects.

Assessment on the Financial Viability of PBRL

Methodology

4. A project is considered not financially viable if the present value of revenues net of operating expenditures falls short of the capital expenditures. For PBRL, all its revenues net of operating expenditures over the franchise period are estimated and then discounted to derive the present value and the estimated capital expenditure including asset replacement costs is then deducted from this present value. Because the capital expenditure is higher than the present value, the shortfall is regarded as a "funding gap" and it is estimated to be \$798 million.

Revenue Assumptions

5. MTRCL's patronage assumption is based on a projected attendance of around 5.5 million visitors to the Hong Kong Disneyland (HKD) in the first year of operation in 2005/06, a projected total market share of around 30-40%, and a one-way fare from Yam O to HKD which is assumed to be set at a competitive level of less than \$10. The financial assessment also takes into account extra fare revenue from increased patronage induced by the PBRL. Since patronage and revenue of the PBRL are commercially sensitive to MTRCL, we are unable to divulge more information. As a publicly-listed company on the Stock Exchange of Hong Kong, MTRCL has a duty to safeguard its commercial and financial information as its disclosure may prejudice MTRCL's position with third parties.

Capital Cost

6. As regards capital cost, the Government has through several rounds of negotiations with MTRCL successfully agreed a reduction from the initial estimate of \$2.6 billion to \$2.0 billion. This has taken into account the current economic situation, the recent deflationary trend, various cost-saving measures initiated by MTRCL and we are satisfied that it is a realistic estimate of the construction cost. The main categories of the capital costs are -

Cost Items	\$ (million) (money-of-the-day prices)
Capital Costs	1,872
Capitalised interest	106
Total	1,978

Estimated Project Internal Rate of Return

7. The project internal rate of return (PIRR) at 11.25% is pitched in the range between 1% and 3% above the cost of capital as mentioned in paragraph 3 above. This is estimated based on the weighted average of MTRCL's cost of debt and cost of equity, and is comparable with the PIRRs of other infrastructure projects such as toll tunnels.

8. Equity investors expect a commercially-run corporation such as MTRCL to earn a return that can at least cover its cost of capital. The cost of capital of a company is comprised of its cost of debt and cost of equity and is also affected by its capital structure, i.e. how much the company borrows in relation to its shareholder funds. The cost of borrowing is linked to the US Treasury bond yield plus a risk factor based on the company's credit ratings. If one compares the project return of 11.25% with this alone, one may conclude that the return is on the high side given the present low interest rate environment. This conclusion would be incorrect for two reasons, the first being that the current low-interest rate environment will not necessarily prevail through the life of the project. To complete the picture, one must also take into account the cost of equity in determining whether the return is reasonable. The cost of equity of a commercial entity is usually higher than the cost of debt. This reflects the risk of the stock market and also the risk of doing business. It is the return that an equity investor would expect to receive. It is not unilaterally set by anyone, but it depends very much on the stock market and how investors view a company. Over the past ten years, the return on equity on the Hang Seng Index has been on average around

13.5% per annum.

9. Add the cost of equity to the cost of debt on a weighted basis and we get the cost of capital of a company. We should compare that cost of capital plus an appropriate risk factor having regard to the inherent business risks of such a project, with the project return. It is what the investment community does and it would only be meaningful to compare the 11.25% project return with this. Cost of capital is a commercially sensitive information to a listed company. Therefore, we are unable to divulge MTRCL's cost of capital here.

DIVIDEND WAIVER AS FUNDING SUPPORT : PRINCIPLES

10. The principle is that we should preserve the financial autonomy of MTRCL as a commercial entity. On this basis, we will not subsidise any railway project proposed by the two railway corporations which are run on commercial principles. Subsidy is a cost to the Government on which we may never see a return. Funding support through a dividend waiver, however, is different from subsidy. It is not a cost to the Government but should be treated as retention and enhancement in value of the Government's investment.

11. The Government will consider each request for funding support on its own merits and we would only provide this if we see substantial economic benefit. There is no "one-size fits all" solution. In this case, the PBRL is essential to the opening of the HKD as it will provide a principal gateway to the theme park, conveniently linked to other parts of

the territory. As estimated, the net economic benefit of the HKD to the whole economy is around \$148 billion.

12. We have considered the option of granting property development rights at Yam O to MTRCL as funding support. However, due to engineering, planning and other land use restrictions, this option is not feasible. Equity injection into MTRCL was considered but it was decided that this would not be useful given that any further equity injection into MTRCL will itself require a return and therefore not improve the project financial viability. This would adversely affect MTRCL's cost of doing business and its competitiveness. This leaves dividend waiver the most appropriate option.

13. As with granting property rights to MTRCL, the dividend waiver option can preserve MTRCL's financial autonomy. Property development is not without risks and it is not free. We demand land premiums at full market value from MTRCL. Dividend waiver bears resemblance to the grant of property development rights since the declaration of dividend, like property development, is under MTRCL's control. To bridge the funding gap, MTRCL is incentivised to deliver profits and hence declare dividend. In comparison, any capital grant by the Government will be viewed as subsidy and MTRCL will not be incentivised to perform since there is no need to repay the capital grant.

INFORMATION ON DIVIDENDS WAIVED IN THE PAST FOR OTHER GOVERNMENT-OWNED CORPORATIONS

14. Information on the declaration of dividends of the three major Government-owned corporations i.e. MTRCL, Kowloon-Canton Railway Corporation and the Airport Authority is attached at Annex A.

SUSTAINABILITY IMPACT ASSESSMENT REPORT OF PENNY'S BAY RAIL LINK

15. Sustainability assessment assesses the potential impact of the proposed rail link on the economic, environmental and social conditions of Hong Kong from a territory-wide perspective. A copy of the sustainability assessment report is attached at Annex B.

16. Since the rail link is an integral part of the overall Disney Park project, in conducting the sustainability assessment of the PBRL, the Administration took note of the fact that an Environmental Impact Assessment (EIA) study for the HKD and its associated infrastructure including the construction and operation of the PBRL was completed in March 2000. In essence, the EIA stated that all these works would meet the established environmental standards and legislation after the implementation of the recommended mitigation measures during the construction and operation stages. The EIA report was endorsed with conditions by the Advisory Council on the Environment on 17 April 2000 and approved by the Director of Environmental Protection on 28 April 2000 under the Environmental Impact Assessment Ordinance. MTRCL

will comply with all the conditions in the relevant environmental permits for the construction and operation of the PBRL. Environmental monitoring and audit programmes will be put in place.

17. Another important consideration is the economic significance of HKD. The PBRL is an essential element of the associated infrastructure in support of the HKD development which will provide an efficient and environmentally friendly means of transportation to and from HKD.

Environment, Transport and Works Bureau
12 July 2002

Annex A

Cash dividend received from MTR Corporation Limited or Mass Transit Railway Corporation

Dividend for year	Amount of Dividends (\$ million)
Prior to 1996	Nil
1996	647
1997	1,252
1998	Nil
1999	Nil
2000	153
2001	688

Cash dividend received from Kowloon-Canton Railway Corporation

Dividend for year	Amount of Dividends (\$ million)
1990	125
1991	140
1992	150
1993	160
1994	Nil
1995	Nil
1996	300
1997	Nil
1998	Nil
1999	Nil
2000	Nil
2001	Nil

Cash dividend received from Airport Authority

Dividend for year	Amount of Dividends (\$ million)
1998-99	Nil
1999-2000	Nil
2000-01	Nil
2001-02	Nil

Report on Sustainability Assessment

MTR Penny's Bay Rail Link Project Agreement

Introduction

The sustainability assessment of the project was conducted in June 2002 using the 'computer aided sustainability evaluation tool' (CASET). Prescribed questions were answered to reveal the affected indicators and input was then given to explain the likely impact of the project on each affected indicator from a territory-wide perspective. The scope of the sustainability assessment included impacts on the economy, health and hygiene, natural resources, environmental quality, mobility etc.

This report sets out the objectives and assumptions of the project and its sustainability impacts.

Objective

To develop the Penny's Bay Rail Link (PBRL) to connect Yam O to Penny's Bay.

The 3.5km long railway link will provide a rail shuttle service between the Hong Kong Disneyland (HKD) and the planned station to be built on the existing Tung Chung Line at Yam O.

Scenario Considered

The PBRL will be constructed between mid 2002 to mid 2005 and will commence operating in year 2005.

Assumption Made

(a) GDP growth rate at 3% per annum (Source: Government Economist).

Affected Indicators

After responding to the prescribed questions, 9 indicators have been revealed and confirmed as 'affected indicators'.

Economy

Affected indicator: Unemployment, fixed capital, cost benefit

The unemployment rate is expected to decrease though the impact should not be significant. Jobs will be created during construction period and afterwards. According to the estimate of MTRCL, 1,100 job opportunities will be generated during the peak construction period. Estimates are as follows :

Time	No of Jobs to be created
2002 (2 nd half)	380
2003 (1 st half)	630
2003 (2 nd half)	850
2004 (1 st half)	1150
2004 (2 nd half)	900
2005 (1 st half)	500

The Corporation is still reviewing the staffing level for operation of the PBRL.

Fixed capital will increase as the rail itself is a fixed capital.

On a standalone basis, the project will generate a less than commercial rate of return. However, the project is an essential element of the associated infrastructure in support of the HKD development which is expected to generate net economic benefits of up to \$148 billion (in present value) over 40 years. About 18,400 jobs will be created directly and indirectly upon opening of HKD and over 5 million visitors are expected at HKD in its first year of operation. Timely completion of the

PBRL will greatly facilitate access to the theme park upon its opening. During construction of the rail link, an additional 1,100 jobs will be created.

Environmental Quality

Affected indicators: carbon dioxide emitted per year; criteria air pollutants

The railway project will result in less road traffic (as compared with other transport modes) which will in turn result in reduction in emissions of carbon dioxide and criteria air pollutants. It is estimated that about 600 tonnes of carbon dioxide and 5 tonnes of criteria air pollutants from road transport will be avoided from being emitted.

As the scale of the rail project is small, it is understandable that its effect on the territory wide air quality is not significant.

In fact, an Environmental Impact Assessment (EIA) of the PBRL has been conducted and included in the EIA report for the Construction of an International Theme Park at Penny's Bay of North Lantau and its Essential Associated Infrastructures, which was approved by the Director of Environmental Protection in April 2000. A copy of the Executive Summary of the EIA report of the PBRL is attached.

Mobility

Affected indicators: travel speed

While the distance of travel by rail from Yam O to Penny's Bay will be more or less the same as that of road based transport, rail passenger will travel at a higher average speed though the impact on the overall traffic condition of Hong Kong should be minimal. The journey time of PBRL is estimated to be 3.5 minutes which is equivalent to an average speed of 60km/hr. In comparison, the normal average speed of franchised buses in non-urban area is less than 30km/hr, taking into account longer bus boarding and alighting activities and waiting time at road junctions.

In addition, most of the PBRL passengers will interchange with the Tung

Chung Line and other railway lines. Hence the new rail link will also encourage the use of other rail links with the effect of further increasing the travel speed from home to Penny's Bay.

Health and Hygiene

Affected indicators: respiratory diseases

As compared with other transport modes, respiratory diseases are expected to be reduced as the PBRL would result in less emission of carbon dioxide and criteria pollutants. The extent of impact on the overall situation of Hong Kong, though not quantifiable, is not expected to be significant.

Natural Resources

Affected Indicators: energy consumption, waste disposal

Energy consumption is expected to be less as compared with other transport modes, because rail is more energy efficient than road transport.

The total quantity of excavated materials to be generated from the construction of the PBRL will be small, in the order of 86500 m³. All of the excavated material will be re-usable. Rock from the tunnel will be sold, soil excavated from the railway alignment will be re-used elsewhere in the reclamation. Adverse environmental impacts are not anticipated if mitigation measures relating to good practice which have been recommended in the EIA report of the PBRL are followed.

Other major Considerations: Non-quantifiable indicators

Two non-quantifiable considerations should be taken into account: Government's undertaking in the development of HKD and public reaction. Government undertook in 1999 to procure a rail shuttle service between HKD and Yam O to be operating before the opening of HKD.

The community is likely to welcome the signing of the Project Agreement as the PBRL is a vital link to HKD.

Analysis and Evaluation

SA diagram attached.

Recommendation

The Scenario considered is recommended as it will:

- (a) provide a rail shuttle service to the HKD at Penny's Bay;
- (b) have slight positive impact on most indicators; and
- (c) entail minimal adverse impact on waste disposal.

Attachment

The SA diagram

Executive Summary of the EIA report of the PBRL

Transport Bureau

June 2002

PBRL Project
(Assessment Year: 2005)

Indicator	Variation 1
Carbon dioxide emitted per year	☑
Cost-Benefit	☑
Criteria air pollutants	☑
Energy consumption	☑
Fixed capital	☑☑
Respiratory diseases	☑
Travel speed	☑☑
Unemployment Rate	☑
Waste disposal	○

Legends

○ Annotates no change to the current baseline situation

	Very Small	Small	Moderate	Moderate to Large	Large	Very Large
Improvement	☑	☑☑	☑☑☑	☑☑☑☑	☑☑☑☑☑	☑☑☑☑☑☑
Deterioration	○	○○	○○○	○○○○	○○○○○	○○○○○○

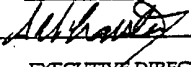
EXECUTIVE SUMMARY

Mass Transit Railway Corporation

Penny's Bay Rail Link:
Executive Summary

February 2000

Reference C1937

For and on behalf of Environmental Resources Management
Approved by: <u>STEVE LAISTER</u>
Signed: <u></u>
Position: <u>EXECUTIVE DIRECTOR</u>
Date: <u>25 February 2000</u>

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1. INTRODUCTION

This executive summary presents the key findings resulting from the Environmental Impact Assessment (EIA) of the proposed Penny's Bay Rail Link (PBRL). The EIA has considered the impacts associated with the construction and operation of the railway, and the principal findings are set out below.

1.1 SCOPE OF THE STUDY

ERM-Hong Kong Ltd. has been commissioned to undertake an Environmental Impact Assessment (EIA) of the *Penny's Bay Rail Link* (PBRL) for the Mass Transit Railway Corporation (MTRC) in accordance with the requirements of the *Environmental Impact Assessment Study Brief No. ESB - 043/1999 for Construction of An International Theme Park in Penny's Bay of North Lantau and Its Essential Associated Infrastructures*. ERM-Hong Kong Ltd. is supported by Urbis Limited in undertaking specialist study of landscape and visual impacts.

The PBRL EIA forms part of a wider EIA for the theme park, essential infrastructures including road works, water supplies, stormwater drains, a multi-purpose lake and various other utilities being developed by Civil Engineering Department (CED). The assessment of PBRL is part of this wider study but, as required by the EIA applicant, CED, is provided by MTRC as a standalone EIA to be included as an Appendix to CED's submission under the EIA Study Brief and in accordance with the *Technical Memorandum on the Environmental Impact Assessment Ordinance* (EIAO).

The EIA Report includes a detailed assessment of the environmental impacts arising from the construction and operation of the PBRL and identifies potential impacts relating to air quality, noise, water quality, waste management, and landscape and visual resources.

1.2 PROJECT DESCRIPTION

The proposed Penny' Bay Rail Link(PBRL) comprises a new 3.6 km link from the existing Tung Chung Line at Yam O to the Penny's Bay site of the proposed new Disney Theme Park as shown by *Figure 1.2a*.

A new Yam O Station will be constructed along the existing Tung Chung Line and will have two platforms, for the Tung Chung Line services between Hong Kong and Tung Chung, and an additional, third platform dedicated to the PBRL service. Concourses will be constructed above the three platforms and connected by overhead link bridges.

The PBRL will comprise a single track which will run parallel to the Tung Chung line before passing under the existing Tung Chung and Airport Express formation and the North Lantau Highway and into a 100 m length of cut and cover tunnel. The PBRL then enters the 750 m single cell horse-shoe tunnel to pass below the central hills of North Lantau to emerge to the north of Penny's Bay. A passing loop will be constructed to the south of the portal before the PBRL enters the new Disneyland Station. This station will be built on Penny's Bay Reclamation and will comprise a single platform.

Much of the PBRL is to be constructed at grade. However, portions of the track will be in cutting in the vicinity of Yam O Station, so as to gain sufficient headroom to pass underneath the existing viaducts of the North Lantau Highway, and on the approaches to the Disneyland Station will remain in cutting to minimise visual impacts.

1.3 CONSIDERATION OF ALTERNATIVES AND "DO NOTHING" SCENARIO

Within the Yam O site, the alignment is constrained by the existing and proposed highways, the existing Lantau Airport Railway (LAR), an existing MTR traction substation and the close proximity of the sea wall. Together with the need for the PBRL platform to be parallel with the existing LAR lines, the alignment is essentially predetermined to fit the existing infrastructure. Other options have been examined but these involve only minor deviation in the vicinity of Yam O Station according to platform and connection details.

These constraints determine the alignment to the east and then south, in tunnel through the hill to Penny's Bay, continuing towards the Theme Park site on land to be reclaimed by CED. The layout within the Penny's Bay reclamation is determined by the planning layout of the intended landuses for the platform. Given the proposed arrangement of the landuse in Penny's Bay, there are no other conceivable and practical alignments between Yam O Station and Disneyland Station that would ameliorate environmental impacts, including noise and those to landscape and visual resources.

The existing LAR tracks at Yam O are at approximately +6.2 mPD and the PBRL will be at the same level with a horizontal profile extending from the LAR tracks to the tunnel portal. Throughout the tunnel section, the vertical alignment follows a slight up gradient towards the Penny's Bay reclamation, designed to match with the Government's highway proposals at that portal, then trending downwards to Disneyland Station, where it is at a level of approximately +2.0mPD, which in conjunction with earth bunds, serves to mask train operations from the Theme Park.

While the above constraints allow no alternative alignment, a "Do Nothing" scenario is considered briefly here. The PBRL is proposed in order to improve transport communications for the users of the Theme Park and other new sites proposed on the Penny's Bay reclamation and Northshore Lantau Development. In environmental terms, the projected ridership levels indicate

that the proposed railway will carry up to 30,000 passengers per hour. If the PBRL was not constructed, the travellers to the proposed new land uses would need to find alternative means of transport. It is most likely that the alternative transport options would comprise car and bus journeys. As a consequence, there would be an increased level of vehicles on the road networks in the surrounding areas which would give rise to increased levels of vehicular air pollutants and noise.

1.4 CUMULATIVE IMPACTS

The potential for cumulative impacts will be fully considered by the Theme Park EIA based upon the impact assessment information provided by the PBRL EIA as, for the exception of the rail noise, common environmental issues are assessed in the wider context of the Theme Park EIA Study's assessment area.

For the assessment of cumulative railway noise, the PBRL EIA assesses the cumulative impact of the Lantau Airport Railway (both Tung Chung Line and Airport Express Services) and PBRL noise.

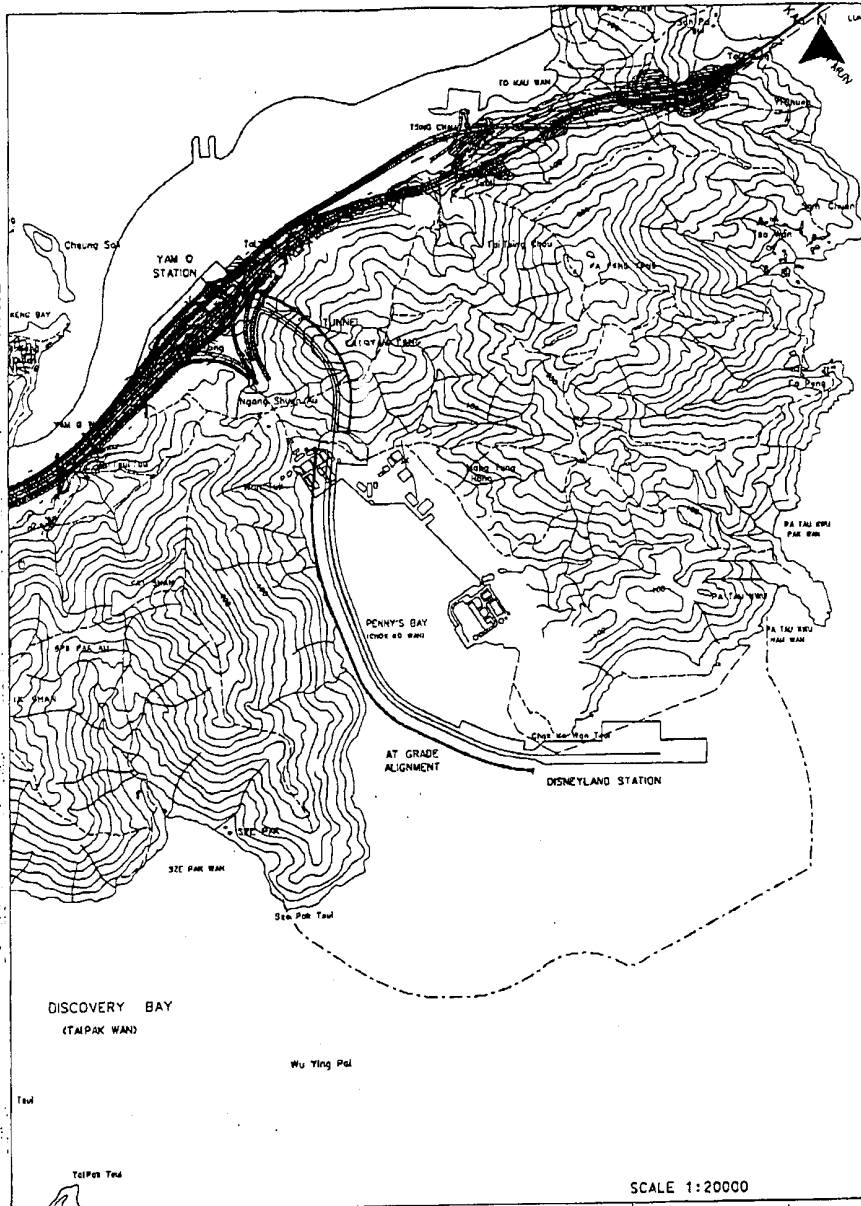


FIGURE 1.20

PROJECT AREA & ROUTE OF PBRL

SCALE 1:20000

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2 KEY ENVIRONMENTAL ISSUES

2.1.1 Introduction

A number of key impacts and issues were identified during the course of the EIA Study. These included impacts that were significant because of their nature or scale. The findings of the EIA in relation to these issues are summarised below.

2.2 NOISE ISSUES

2.2.1 Baseline Conditions

The existing ambient noise levels are mainly affected by the traffic on North Lantau Highway and railway noise from Airport Express Line and Tung Chung Line. Noise emission from the nearby Penny's Bay Power Station also contributes to the background noise level of the area. In the future, the planned Chok Ko Wan Link Road and Route 10 will be new sources of noise directly affecting the area.

The nearest potential sensitive receivers are village type developments located in Luk Keng Tsuen, while the nearest densely populated areas are Discovery Bay and Peng Chau which are more distant from the site. As all the sensitive uses are over 300 m away from PBRL, noise impacts on these NSRs are not expected.

2.2.2 Construction Noise Impacts

The source of noise during each construction stage of the Project is mainly from the use of PME on site. The works will require a number of noisy activities including the use of heavy plant for excavation, filling, concreting, tunnelling and station construction.

As the nearest NSR is more than 300 m away from construction site boundaries, noise impacts associated with the construction activities during daytime are not expected. Noise nuisance from site traffic would also be unlikely given the limited traffic on site. Specific noise mitigation measures are therefore not required. However, the Contractor will be responsible for adopting good site practice and maintaining proper on-site management in order to ensure the environmental performance of the works.

2.2.3 Operational Noise Impacts

In view of the setback distance and the operational characteristics of the trains, no noise impacts are anticipated during the operational phase. Accordingly, no mitigation measures will be required and no cumulative impacts with existing sources of railway noise will arise. Fixed plant noise is

also not an issue and can satisfy the EIAO noise limit provided that the recommended good engineering practice noise limit is implemented.

2.3 AIR QUALITY

2.3.1 Baseline Conditions

The main sources of air pollution in Penny's Bay is from vehicle emissions arising from the North Lantau Highway and air emissions from the China Light & Power Ltd (CLP) Penny's Bay Gas Turbine Power Station. Air quality monitoring data provided by CLP indicates that the background pollutant levels for the area are low, with EPD having classified the study area as being rural in character, with the ambient air quality being generally good with low pollutant levels.

The nearest potential sensitive receivers are the village type developments located close to the shore line, Luk Keng Tsuen. Although Penny's Bay Gas Turbine Power Station itself is a pollution source, offices and accommodations within the station are potential sensitive receivers.

2.3.2 Construction Air Quality

The potential air quality impacts arising from the construction of PBRL are likely to be fugitive dust emissions and gaseous emissions from construction plant, construction activities and vehicle movements within the site. These activities are not expected to cause any exceedance of *Air Quality Objectives* due to given the limited number of plant, vehicle movements and the buffer distance from the ASRs. However, it is the responsibility of the Contractor to implement appropriate site management practices and those measures detailed in *Air Pollution Control (Construction Dust) Regulations* in order to ensure the environmental performance of the works.

For the blasting works within the rock tunnel between Yam O and Penny's Bay and the hydraulic breaking activities required inside the cut and cover tunnel at Yam O, the Contractor will be required to adopt the best practical means and measures in undertaking these kinds of works, such as the measures required by the Mines & Quarries Division of the Civil Engineering Department. The outbreak of dust from these activities will be carefully controlled and will not cause dust impacts on the ASRs.

2.3.3 Operational Air Quality

Potential air quality impacts during the operation of PBRL will be limited since electric trains will be used and no air emissions will be produced. However, low levels of dust may be generated by the abrasion and wear of track, electrical pick-up gear and rolling stock during normal operation and from maintenance activities. Ozone will also be generated due to arcing between the power rail and train pick-ups. The amount of air pollutant

generated from such activities will be limited and will have a negligible impact on the ASRs.

2.4 WATER QUALITY ISSUES

2.4.1 Baseline Conditions

The Study Area covers the north-eastern part of Lantau Island which is directly influenced by the main channel flows passing around Ma Wan Island, into and out of the Western Harbour and Victoria Harbour. Any impacts from the construction and operation of the PBRL will occur within two *Water Control Zones*, the North Western and Southern. In 1997, the water quality in the vicinity of the Study Area is generally good, achieving compliance with all *Water Quality Objectives*, except Total Inorganic Nitrogen (TIN), with the data showing that the study area is somewhat influenced by sewage discharges. The influence of sewage discharges in the North Lantau area likely to increase in the future due to increasing flows through the Siu Ho Wan outfall.

2.4.2 Water Quality Impacts

Water quality impacts during the construction of PBRL may be associated with discharges of surface waters and collected groundwater from the various construction sites, and sewage from construction workers. However, it is anticipated that there will be no insurmountable residual impacts on water quality, provided that the recommended mitigation measures are effectively implemented and so all the construction site/works area discharges will comply with effluent discharge standards.

With the implementation of all the proposed mitigation measures, there are not predicted to be any potential water quality impacts arising from the operation of the proposed rail development.

2.5 WASTE MANAGEMENT ISSUES

The construction activities will result in the generation of a variety of wastes including excavated material, construction and demolition waste, chemical waste and general refuse. Adherence to the recommended mitigation measures relating to good practice will ensure that adverse impacts are prevented and that the opportunities for waste minimisation and reuse are taken.

The amount of general refuse, industrial and chemical wastes arising from the operation of the PBRL is expected to be small.

The implementation of appropriate mitigation measures will reduce the potential environmental impacts associated with the storage, handling, collection, transport, and disposal of wastes arising from the construction and operation of the PBRL will meet the criteria specified in the *EIAO* and no unacceptable environmental impacts are anticipated.

2.6 LANDSCAPE AND VISUAL ISSUES

2.6.1 Baseline Conditions

The existing environment is rural in nature, with Penny's Bay located between two upland areas of Fa Peng Teng and Tai Shan and the low-lying saddle at Ta Shui Wan. The landscape comprises of smooth undulating hillsides with small areas of shrub and woodland on the lower slopes.

The views from the study area are restricted by the eastern and western hillsides, with views on a clear day to the south showing Peng Chau, Siu Kau Yi Chau and Kau Yi Chau and in the far distance Lamma Island and Hong Kong Island. Within Penny's Bay, extensive rock-cut slopes have been formed behind, to the south of Penny's Bay Power Station and Cheoy Lee Shipyard, and these create an unattractive visual impact on the surrounding areas.

2.6.2 Landscape and Visual Impacts

The assessment has indicated that the most significant impacts during the construction phase would be visual impacts caused by the construction of the cut and cover tunnel and slope stabilisation works at the north portal and the temporary works area and slope stabilisation works at the south portal. However, with the implementation of the proposed mitigation works, it is anticipated that the residual impacts would be reduced to slight significance.

During the operational phase, the most significant impacts would be the landscape and visual impacts associated with the southern tunnel portal and vent structure and associated geotechnical slope stabilisation works, and the section of the at-grade railway that curves around the edge of the Water Recreation Centre. However, if the proposed mitigation measures are adopted, the residual impacts would be reduced to slight significance. With regard to the Water Recreation Centre, the railway would be clearly visible to users of the Centre who would subsequently suffer residual adverse impacts of moderate significance. However, it would be quite possible for the designers of the Centre (which will be built concurrently with the railway) to provide berming and screening with the Centre to screen the railway if so desired.

Overall, it is considered that, the landscape and visual impacts are acceptable with the implementation of the recommended mitigation measures.

3 FUTURE REQUIREMENTS

3.1 ENVIRONMENTAL MONITORING AND AUDIT

To ensure that the mitigation measures recommended within the EIA Report are carried forward and implemented at the appropriate stage of the project, an Implementation Schedule has been produced. For each of the mitigation measures the Implementation Schedule defines the stage and location at which the measure should be implemented together with the responsible agent. An Environmental Management System has also been proposed as a means of ensuring the full implementation of the mitigation measures.

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4 OVERALL CONCLUSIONS

The implementation of the recommended mitigation measures will ensure that there are no residual environmental impacts from the construction or operation of the PBRL.

The mitigation measures recommended in the EIA represent accepted measures which may be employed to ensure compliance with statutory requirements, Government guidelines and other environmental standards agreed with the EPD. The Environmental Monitoring and Audit programme which will be adopted during the construction of the PBRL will also help ensure compliance with statutory and recommended criteria.

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