

▪ report

Harbour Bridge to City Project - Assessment of Environmental Effects

Volume 2

▪ report

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Volume 2

Prepared for
Transit New Zealand

By
Beca Infrastructure Ltd

October 2005

Auckland City Council
Private Bag 92516
Wellesley Street
AUCKLAND CITY

28 October 2005
Our Ref: 3120457
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Attention: Earl Brookbanks

Dear Sir

Harbour Bridge to City Project - Assessment of Environmental Effects

On behalf of Transit New Zealand (Transit) and in relation to the Harbour Bridge to City (HBTC) project, please find **enclosed** for lodgement, two copies of 5 Notices of Requirement (pursuant to s168(2) and s181(1) Resource Management Act 1991).

The notices of requirement and alterations to existing designations for the HBTC Project are contained in the document entitled:

- HBTC Project – Overview, Notices of Requirement and Attachments – Volume 1

Also **enclosed** are two sets of the documentation listed below. These documents (including an Assessment of Environmental Effects) have been prepared as supporting documentation for the Notices of Requirement and alterations to existing designations are:

- HBTC Project – Assessment of Environmental Effects (AEE) – Volume 2
- HBTC Project – Technical Appendices – Volume 3
- HBTC Project – A3 Plans – Volume 4

We will provide you with further copies of the documentation early next week.

Yours faithfully

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on behalf of

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Action	Name	Signed	Date
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on behalf of	Beca Infrastructure Ltd		

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Appendix 2	Options Identification and Evaluation (March 2002)
Appendix 3	Preliminary Geotechnical Appraisal Report
Appendix 4	Preliminary Environmental Assessment
Appendix 4a	Addendum to Preliminary Environmental Assessment
Appendix 5	Initial Environmental Investigation
Appendix 6	Assessment of Land Disturbing Activities
Appendix 7	Visual and Landscape Effects Assessment (LA4 Architects)
Appendix 8	Draft Environmental Management Plan
Appendix 9	Environmental Monitoring Guidelines
Appendix 10	Noise Report (Marshall Day Acoustics)
Appendix 11	Air Quality Review (Holmes Consulting)
Appendix 12	Tree Report (The Specimen Tree Company)
Appendix 13	Stakeholder and Community Consultation (Phase 1- July 2002)
Appendix 13a	Stakeholder and Community Consultation Volume 2
Appendix 14	The Birdcage Tavern Conservation Plan (Matthews and Matthews Architects, January 2003)
Appendix 15	Campbell Free Kindergarten (February 2003)
Appendix 16	Heritage Assessment (Clough and Associates)
Appendix 17	CMI Urban Design Framework (Transit NZ, September 2001)

Note: All reports by Beca and prepared in October 2005, unless noted

Glossary

ACC	Auckland City Council
AEE	Assessment of Environmental Effects
AHB	Auckland Harbour Bridge
ARC	Auckland Regional Council
ARTA	Auckland Regional Transport Authority
ASHS	Auckland State Highway Strategy (2000)
ATMS	Advanced Traffic Management Systems
Beca	Beca Infrastructure Limited
CBD	Central Business District
Central Area Plan	Auckland City District Plan – Central Area Section – Operative 2004
CMI	Central Motorway Improvements
CMJ	Central Motorway Junction
DoC	Department of Conservation
DRLTS	Draft Regional Land Transport Strategy 2005
EMG	Environmental Monitoring Guidelines
EMP	Environmental Management Plan
GGP	Grafton Gully Project
HBTC	Harbour Bridge to City
Isthmus Plan	Auckland City District Plan – Isthmus Section – Operative 1999
LGA	Local Government Act 2002
LGAAA	Local Government (Auckland) Amendment Act 2004
LTMA	Land Transport Management Act 2003
MLB	Moveable Lane Barrier
NBT	North Bound Tunnel
NSB	North Shore Busway
NZHPT	New Zealand Historic Places Trust
POAL	Ports of Auckland Limited
Project Objectives	HBTC Objectives outlined in 2.3.1 of the AEE
RLTS	Regional Land Transport Strategy 2003
RMA	Resource Management Act 1991
SCPA	Sediment Control Protection Area
SH1	State Highway 1
SMB	St Mary's Bay
SMBA	St Mary's Bay Association

Transit	Transit New Zealand
UDP	Urban Design Plan
VPR	Victoria Park Reserve
VPV	Victoria Park Viaduct

1 Introduction

1.1 Purpose of the Assessment of Environmental Effects

Transit New Zealand (Transit) submits this Assessment of Effects on the Environment (AEE), in support of the Notices of Requirement served, pursuant to Section 168(2) and section 181(1) of the Resource Management Act 1991 (RMA), to designate land in order to construct, operate and maintain motorway, road and ancillary activities, in the general vicinity of the existing section of State Highway 1 (SH1), known as the Harbour Bridge to City (HBTC) Corridor.

1.2 Supporting Information and Technical Input

The notices of requirement and alterations to existing designations for the HBTC Project are contained in the document entitled:

- HBTC Project – Overview, Notices of Requirement and Attachments – Volume 1

The following documents (including this AEE) have been prepared as supporting documentation for the Notices of Requirement and alterations to existing designations applications:

- HBTC Project – Assessment of Environmental Effects (AEE) – Volume 2
- HBTC Project – Technical Appendices – Volume 3
- HBTC Project – A3 Plans – Volume 4

The relationship between these documents and the list of the technical appendices is provided in the HBTC Project – Overview, Notices of Requirement and Attachments.

The following report:

- provides a description of the existing HBTC Corridor;
- describes the details of the proposed works;
- outlines alternatives considered;
- provides an assessment against relevant statutory and non-statutory documents;
- presents an assessment of the actual and potential effects of the proposed works;
- identifies measures, which will be implemented in order to mitigate potential adverse effects; and
- details consultation undertaken and proposed

1.3 The Harbour Bridge To City Project

1.3.1 Existing HBTC Corridor

The HBTC Corridor extends from the southern side of the Auckland Harbour Bridge (AHB), through St Mary's Bay (SMB) and across the Victoria Park Viaduct (VPV) to the Wellington Street over-bridge. The corridor includes connections at the Shelly Beach Road off-ramp, Curran Street on-ramp, Fanshawe Street on and off-ramps, Cook Street off-ramp

and the Wellington Street on-ramp. Figure 1.1 shows the existing corridor with the proposed changes.

The existing corridor comprises 4 lanes at grade in each direction through St Mary's Bay and 2 lanes in each direction across the VPV.

1.3.2 Objectives of the HBTC Project

The HBTC project is part of Transit's overall objective to operate the State highway system in a way that contributes to an integrated, safe, responsive and sustainable land transport system.

Primary Objectives

Transit's primary objectives for the HBTC Project are to:

- Realise the capacity of the Auckland Harbour Bridge, and improve safety and efficiency of access by road between the North Shore and Auckland and between Central Auckland and surrounding areas.
- Facilitate the delivery of the intended transportation benefits of the adjacent Central Motorway Junction and North Shore Busway Projects.

These objectives are referred to in the remainder of the AEE as the "Project Objectives".

Primary Methods

Transit's primary methods for achieving its objectives include:

- Provide additional lanes on the motorway through St Mary's Bay (SMB) and through Victoria Park;
- Upgrade the motorway through SMB and Victoria Park, including but not limited to:
 - Under-grounding northbound lanes in Victoria Park
 - Upgrading of safety barriers;
 - Providing noise barriers
 - Landscaping and restorative planting
 - Urban design
- Design and coordinate the works to integrate with the CMJ and Busway Projects.

The reasons for the HBTC Project and the need for the designation are expanded in Section 3.

1.3.3 Key Components of the HBTC Project

The proposed HBTC Project involves:

- Construction of a new tunnel adjacent to the retained VPV to provide 3 lanes north bound.
- Retention of the VPV to provide 4 lanes south bound.
- Widening of the existing carriageway through St Mary's Bay to provide 5 lanes northbound; and 5 lanes southbound and a shoulder bus lane.

- Extension of the Shelly Beach overbridge west end span to accommodate the widened carriageway including the bus shoulder lane.
- Modifications to the motorway connections within the project being:
 - The Shelley Beach southbound off-ramp
 - The Fanshawe Street on and off-ramps
 - The Wellington Street on-ramp
- Ancillary works to facilitate the proposed works and mitigate adverse effects include:
 - Tree removal and pruning and works within driplines
 - Lighting
 - Noise walls
 - Safety barriers
 - Pedestrian linkages

The project will also achieve the following:

- Only temporary loss of Victoria Park open space during construction (restoration of open space on completion). The 460 metre long tunnel beneath Victoria Park, providing three lanes for northbound traffic, will minimise the loss of open space in the central city and avoid adverse environmental effects on the park e.g. from additional noise and any visual effects.
- Optimisation of the existing resource by retaining use of the viaduct over Victoria Park to provide four lanes for southbound traffic. The use of the viaduct achieves an efficient use of the existing resource. The project is cognisant of the future aspirations of the community to replace the viaduct (the southbound lanes) with a tunnel and the project is designed not to preclude this as a future possibility.
- Preservation of key heritage icons, including the Birdcage Hotel.
- Better pedestrian linkages through a pedestrian overbridge linking Jacob's Ladder with the Westhaven area and increased open space and better public access along St Mary's Bay cliffs and at the former HMNZS Ngapona site.
- Avoidance and mitigation of noise effects via tunnelling and noise walls.

A more detailed description of the proposed work is provided in Section 4: Description of Project.

1.4 Resource Management Act 1991 Consents Required

The following designations and resource consents are required under the Resource Management Act 1991 (RMA) to secure the land required for the motorway works and to enable the physical construction, ongoing operation and maintenance of the route.

1.4.1 Existing Designation

The HBTC Corridor is covered by existing designations in two separate District Plan documents. These are the Auckland City District Plan – Central Area Section 2004

("Central Area Plan") and the Auckland City District Plan - Isthmus Section 1999 ("Isthmus Plan"). See Figure 1.2 and Attachment E of the "HBTC Project – Overview, Notices of Requirement and Attachments" contains copies of the relevant planning maps showing the existing designations in the Auckland City District Plan (Central Area and Isthmus).

In the Central Area Plan the reference number is 283.

In the Isthmus Plan, the reference number is A07-01.

In both District Plans, the existing HBTC Corridor is designated as "motorway", with Transit New Zealand as the requiring authority. In both District Plans, the designations are historical and have no associated conditions.

It is noted that a further designation for "Motorway" with the reference number A07-01A in the Isthmus Plan also applies in the vicinity of Shelly Beach Road overbridge. This designation relates to work that was done on the east side of Shelly Beach Road. This work has been completed.

1.4.2 Notice of Requirement For A New Designation and Alterations to existing Designations

Transit proposes to apply for three new designations and two alterations to existing designations. These are summarized as follows:

Notice of Requirement for new designation (s168 RMA) – Auckland City District Plan: Central Area (NOR 1)

This notice of requirement includes: parts of Victoria Park, part of Fanshawe Street, part of Beaumont Street and part of Westhaven Drive.

This area is required for the construction, operation and maintenance of the motorway including the proposed north bound tunnel and ancillary safety and operational services, temporary construction storage areas and office facilities, maintenance and access areas, vegetation removal and restoration works including relocation of services, footpaths, landscaping and planting.

This is referred to as NOR 1.

Notice of Requirement for a new designation (S168 RMA) – Auckland City District Plan: Isthmus Area (NOR 2)

This notice of requirement includes: part of Franklin Road, part of Victoria Street, part of Beaumont Street, part of Westhaven Drive, part of 98 Beaumont Street (Victory Christian Church) and the former HMNZS Ngapona site.

This area is required for the construction, operation and maintenance of the motorway including; sections of the proposed north bound tunnel, its portals and approaches, and ancillary safety and operational services and works, a pedestrian footbridge over the motorway to Westhaven in the vicinity of Jacob's Ladder, relocation of the Birdcage Hotel, temporary construction storage areas and office facilities, maintenance and access areas, relocation of services, vegetation removal and restoration works including footpaths, landscaping and planting.

This is referred to as NOR 2.

Notice of Requirement for a new designation (s168 RMA)– Auckland City District Plan: Isthmus Area (NOR 3)

This notice of requirement relates to land at the rear of 26-36 Napier Street, Freeman's Bay. The land is within the Isthmus Plan but adjoins the formed motorway and designation shown in the Central Area plan. The existing designation boundary forms the jurisdictional boundary between the two plans. As the land is related to the motorway within the Central Area and stands alone from the other parts of the designation in the Isthmus plan for clarity this has been served as a separate notice.

This area is required for the construction, operation and maintenance of the motorway including the realignment of the on-ramp at Wellington Street, widening of the motorway, temporary construction and access, ongoing use and maintenance of the extended motorway and construction of safety and noise barriers, removal of vegetation and restoration landscaping and planting.

This is referred to as NOR 3.

Alteration of Existing Designation (s181 RMA) – Auckland City District Plan: Isthmus Area (NOR 4)

This alteration relates to the existing motorway designation boundary within the Isthmus Plan and includes areas adjoining, and along both sides of, the existing motorway in St Mary's Bay, to the west from the vicinity of the former HMNZS Ngapona site to the vicinity of Shelly Beach Road overbridge and, to the east alongside Westhaven Drive.

It provides for the construction, operation and maintenance of the motorway including; mitigation works, safety and noise barriers, vegetation removal/pruning and restoration works including footpaths, landscaping and planting.

This is referred to as NOR 4

Alteration of Existing Designation (s181 RMA) – Auckland City District Plan: Isthmus Area (NOR 5)

This alteration relates to the existing motorway designation boundary within the Isthmus Plan and includes areas of land adjoining the existing Shelly Beach Road off-ramp, near Point Erin Park, and land below the southern side of the existing Shelly Beach overbridge.

The designation is required to provide for the construction, operation and maintenance of the motorway and particularly the Shelly Beach Road off ramp and bridge. The works include; the relocation the existing bridge support column to allow for the additional width of the motorway and additional lanes below, vegetation removal/pruning and restoration works including footpaths, landscaping and planting, and ancillary works associated with the motorway. As the land relates to the motorway off ramp /overbridge it is distinguished from other parts of the designation in the Isthmus plan and for clarity this has been served as a separate notice.

This is referred to as NOR 5.

1.4.3 Other Resource Consents To Be Sought

The following is a summary of the resource consents sought from the Auckland Regional Council to enable construction and operation of the HBTC project. A full description of the relevant rules is included in Section 7.

Table 1.1
Summary of Activities Requiring Resource Consents from Auckland Regional Council

Activity	Statutory Document	Activity Status
Diversion and Discharge of stormwater including contaminants associated with construction as part of the HBTC project and from an operational road to the existing reticulated system. (Transit private stormwater network)	PARP: ALW Rule 5.5.4 Transitional Regional Plan PA 11,13 & 15	Discretionary Permitted
Diversion and Discharge of stormwater including contaminants associated with construction as part of the HBTC project and from an operational road to an existing reticulated system. (ACC public stormwater network)	PARP: ALW Rule 5.5.4 Transitional Regional Plan PA 11,13 & 15	Discretionary Permitted
Discharge of stormwater directly into the CMA.	ARP: C Rule 20.5.6 (refer to Rule 5.5.10) PARP: ALW)	Discretionary
Discharge of contaminants to groundwater and land and for discharges as a result of works on a contaminated site.	PARP: ALW Rule 5.5.46	Discretionary
Earthworks and sediment control – for land disturbing activities	ARP: SC Rule 5.4.3.1	Restricted Discretionary
Diversion of groundwater	PARP: ALW Rule 6.5.69	Restricted Discretionary Activity
Take and use of groundwater during construction <20m ³ /day	PARP: ALW Rule 6.5.33	Controlled Activity
>20m ³ but <100m ³ /day	PARP: ALW Rule 6.5.40	Discretionary activity

1.4.4 Reserves Act

Under the Reserves Act 1977 approvals would be required for the use of lands designated as reserves. The relevant statutory bodies are the Minister of Conservation and Auckland City Council (ACC). This will apply to St Mary's Bay but not Victoria Park which is owned by ACC in a fee simple title.

1.4.5 Historic Places Trust Authority

In addition to the Notice of Requirement and Auckland Regional Council consents, approval will also be sought from the NZ Historic Places Trust (NZHPT) under section 12 of the Historic Places Act to allow for the modification of both known and unknown

archaeological sites within the HBTC Corridor (including the Birdcage Hotel and Campbell Free Kindergarten). This authority application(s) will be lodged separately.

1.5 The Environmental Management Plan

As part of this HBTC Project, a Draft Environmental Management Plan (EMP) and Environmental Monitoring Guidelines (EMG) have been prepared. These are Technical Appendix #8 and #9.

The EMP provides for the normal process of design iterations and modifications to construction techniques subsequent to granting of consents, provided that they are in general accordance with the applications for consents, and provided that they meet the performance based requirements identified within the EMP document. Where these requirements of the EMP cannot be met, approval of an alternative method/ technique is dependant upon demonstrating the overall objectives can be met, or that offsetting mitigation can otherwise be provided.

1.6 Structure of the Assessment of Environmental Effects

This AEE (Volume 2) is divided into sections as shown in the following table 1.2.

Table 1.2 - Structure of the AEE

	Section	Content
Section 1	Introduction	Provides an overview of the project, the project proponents, the consents sought and the consenting strategy.
Section 2	Background	An outline of the background of the project.
Section 3	Reasons for the Project	
Section 4	Description of the Project	A description of the proposed HBTC Project including the alignment, physical structures, construction methodology and timeframe.
Section 5	Assessment of Alternatives	An outline of the history of the project and the alternative schemes considered.
Section 6	Description of the Existing Environment	A detailed description of the existing HBTC Corridor.
Section 7	Consultation	A description of the consultation strategy and the outcomes of consultation.
Section 8	Assessment of Environmental Effects	A detailed description of the effects of the project on the environment in accordance with the Fourth Schedule of the RMA.
Section 9	Relevant Statutory Provisions	An outline of the relevant provisions of the RMA and other statutory documents.
Section 10	Relevant Planning Documents	An outline of the planning provisions of relevance to the HBTC Project, including statutory and non-statutory provisions.
Section 11	Proposed Conditions of Designation	
Section 12	Conclusions	A summary of the overall effects, and mitigation measures, of the HBTC Project, and compliance with the RMA.

1.7 Project Team

The following organisations have been involved in the preparation of this AEE, and the technical reports to support the AEE.

Table 1.3 - Project Team

AEE Component	Company
Project Manager	Transit New Zealand
Planning	Beca
Consultation	Beca/Transit New Zealand
Planning Peer Review	Zomac Planning Solutions
Traffic Engineering	Beca
Structural Design	Beca/PB
Geometric Design	Beca
Civil/ Hydrological	Beca
Sediment Control	Beca
Geotechnical	Beca
Contamination	Beca
Visual/Landscape	LA4
Urban Design	Architecture Brewer Davidson
Archaeological	Clough & Associates
Arborist	The Specimen Tree Company
Noise	Marshall Day Acoustics
Air Quality	Beca/Holmes Consulting
Legal	Chapman Tripp Sheffield Young

1.8 Indicative Project Timeframe

The following table outlines the key milestones in the project and anticipated target dates for completion. As these are subject to change they should only be taken as indicative.

Table 1.4 - Project Timeframe

Key Milestone	Target Date
Lodgement of NOR	October 2005
Public Notification of NOR	January 2006
Council recommendation on Notice of Requirement	June 2006
Environment Court Hearing	January 2007 ¹
Start of Construction	February 2008
Project Completion (3 year construction)	February 2011

¹ This is based on the expectation that, if any appeals were lodged, it would take 6 months to get a priority fixture at the Environment Court.

2 Background to the HBTC Project

2.1 The Need For Central Motorway Improvements

Auckland's central motorway network currently consists of three main radials – the Northern, Northwestern, and Southern motorways. All are interconnected through the Central Motorway Junction (or “Spaghetti Junction”) in Newton Gully.

Currently, traffic congestion through Auckland's central motorway network is recognised as one of the most serious issues in Auckland. Congestion on the motorway network is no longer specific to morning and afternoon peak periods, with many sections of the network becoming increasingly congested during the middle of the day and weekends.

Without road improvements, congestion and the subsequent delays will continue to worsen with serious consequences for the economic and social well being of the region and nation.

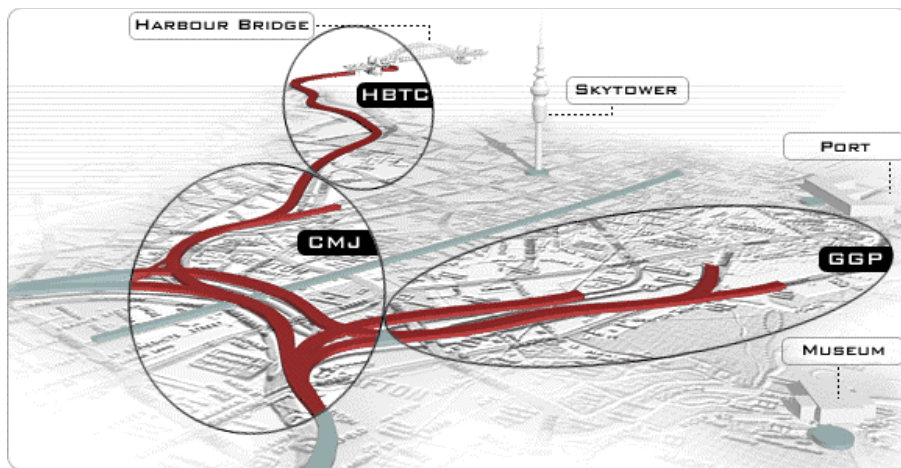
Transit has identified a number of priorities to address current and reduce future congestion. Three linked projects that Transit are progressing in central Auckland are:

- Central Motorway Junction (CMJ) Project – under construction
- Grafton Gully Project (GGP) - projected; and
- Harbour Bridge to City (HBTC) Project.

These projects have been developed together and aim to improve the overall efficiency and safety of the central city motorway system by better managing traffic flows. Together these projects are known as the Central Motorway Improvements (CMI).

The HBTC project is required to enable the full benefits of the CMI projects to be realised. It is designed to provide the same number of lanes approaching and leaving the Auckland Harbour Bridge on the south side from the vicinity of the Shelly Beach overbridge through to the Wellington Street on-ramp

Figure 2.1 - Central Motorway Improvement Projects



2.2 Grafton Gully Project (GGP)

GGP comprises new links to provide direct access between the Northern Motorway, Grafton Gully, and the Port of Auckland. It has also improved access to the lower CBD, Auckland Hospital, Mission Bay and Parnell. The project met the needs of different types of motorists by increasing route efficiency to the port and CBD and removing conflict between local arterial and state highway traffic. The GGP project is now complete.

2.3 Central Motorway Junction Project (CMJ)

CMJ will provide some of the missing connections, including those between the Northern and North-western motorways and between the Northern and Port of Auckland via Grafton Gully. The strategy is also to give priority to motorway-to-motorway movements, principally between the Northern and Southern motorways, but also to and from the North-western Motorway. CMJ is under construction and due for completion late 2006

2.4 Other Projects related to the Central Motorway Improvement Projects

2.4.1 North Shore Busway

The Auckland Harbour Bridge (AHB) forms the interface between the HBTC Project and the North Shore Busway (NSB) projects. The NSB project involves the construction of dedicated bus and high occupancy vehicle lanes on the eastern side of the Northern Motorway from Constellation Drive to the northern approaches to the Auckland Harbour Bridge. The overall objective is to improve access for people travelling between the North Shore and Auckland during peak traffic periods by improving the people carrying capacity of the Northern Corridor. Up to 1300 additional traffic movements will be added on the Auckland Harbour Bridge during these periods.

Although the Busway does not physically connect with the HBTC works, there is an operational interface. Bus priority measures are required through some sections of the corridor and at the Fanshawe / Beaumont Street intersection, in order to connect with the Auckland City bus lane. The success of the Busway project also depends on additional capacity being provided southbound through the HBTC corridor.

2.4.2 New Waitemata Harbour Crossing

Transit's strategy is to undertake, jointly with the ARC and the relevant local authorities, the necessary investigations to determine a preferred route and outline scheme for the next Waitemata Harbour crossing.

The HBTC project is a separate project from the one that will be required for the long term north and south connection across the harbour.

2.5 Regional Land Transport Strategy 2003 and Draft Regional Land Transport Strategy 2005

The Auckland Regional Land Transport Strategy 2003 (RLTS 2003) and Draft Auckland Regional Land Transport Strategy (RLTS 2005), are discussed in more detail in Section 11.

The RLTS 2003 recognises that traffic congestion in the Auckland Region has increased significantly in the past decade. Road investment is one of the Strategy's key elements, along with passenger transport investment, walking, cycling, traffic demand management and road pricing.

It was recognised in the RLTS 2003 that if no improvements are made in the transport network, that transport conditions between the North Shore and the Isthmus will become markedly worse, even allowing for continued peak spreading. The RLTS 2003 outlined that an important part of providing North-South accessibility in the short to medium term will be improvements to the capacity of the Harbour Bridge approaches and implementation of the North Shore Bus Rapid Transit system.

The methods listed in the RLTS 2003 of achieving this include motorway widening through St Mary's Bay and across Victoria Park (the Harbour Bridge to City project) in conjunction with the improvements to the Central Motorway Junction.

A draft regional land transport strategy has been prepared in 2005 in accordance with the Local Government (Auckland) Amendment Act 2004 (LGAAA). This document sets out the policy associated with land transport and therefore does not specifically list the HBTC project as a method. The implementation or method of achieving the policies will be outlined in a separate document to be prepared by the Auckland Regional Transport Authority (ARTA). This document has yet to be prepared, therefore the RLTS 2003 is still current at the time of writing this AEE.

2.6 Land Transport Management Act 2003

The Land Transport Management Act (LTMA) 2003 was enacted on 12 November 2003, creating a new environment for land transport planning in New Zealand. In particular, the Act defined new objectives for Transit New Zealand (Transit) and for funding of transport projects / activities (through Land Transport New Zealand).

Transit's objective (under section 77 of the LTMA), is *'to operate the State highway system in a way that contributes to an integrated, safe, responsive, and sustainable land transport system'*.

Under section 77(2), in meeting its objective, the Act requires Transit to exhibit a sense of *'social and environmental responsibility'*, consistent with the overall purpose of the Act (section 3).

The LTMA also identifies five key outcomes for activities and land transport programmes (sections 19 and 20), which provide direction in achieving social and environmental responsibility in the provision of land transport. These outcomes are consistent with the objectives identified in the New Zealand Transport Strategy (NZTS) being: economic development, safety and personal security, access and mobility, public health and environmental sustainability.

2.7 Preferred Option

In considering options for the Victoria Park section of the route, Transit considered and consulted on both underground and above ground options. It was apparent that the underground options were more expensive than the above ground options. However, while in terms of traffic benefits there is no notable difference between the options the

underground options did have the potential to avoid a number of potentially adverse effects. As discussed in Section 5 of this AEE the underground options (particularly a full tunnel) offered social and environmental benefits (e.g. maintenance of the long term amenity of Victoria Park). It was recognised that the partial (northbound) tunnel option provides a sustainable use of existing physical resources and optimise the life of the viaduct without precluding the option of a full tunnel.

While Transit noted in its earlier investigations that the above ground options would meet its objectives for the project and it is considered that they would also meet Transit's statutory requirements under the RMA, Transit considered that the proposed option best meets its overall objective under the LTMA.

3 Project Necessity

3.1 Introduction

Section s171(1)(c) of the RMA specifies that one of the matters to which particular regard must be given, when considering a NOR is “whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought”. This section of the AEE explains why the designation (and the project itself) is needed (with reference to Transit’s objectives as set out in Section 2).

3.2 Rationale for the Project

The Harbour Bridge to City Corridor is heavily congested, particularly during peak periods. Some 155,000 vehicles per day pass over the Harbour Bridge. As the AHB provides the only route across the Waitemata Harbour (without travelling around the Upper Harbour), the HBTC Corridor performs a dual function of a state highway through route and a local commuter arterial.

Since 1996 Transit has been looking at ways to manage traffic flows through this section of the motorway. Traffic studies show that in order to address the traffic congestion it is necessary to have the same number of lanes approaching and leaving the Harbour Bridge as on the bridge itself, particularly during the morning and evening peaks.

3.2.1 Existing Traffic Flows

Analysis of 2001 traffic flows shows that, during the morning peak period, the VPV is a major contributor to the congestion problem because it has only two lanes for traffic travelling to the city from VPV to Hobson Street onramp. This often results in vehicle backlogs all the way onto the Harbour Bridge. The congestion from the VPV bottleneck reduces the number of vehicles per hour that can access the Fanshawe St off-ramp.

In the evening, the main bottleneck occurs between the Wellington Street on-ramp and the northern end of the VPV. During this period, traffic travelling north towards the Harbour Bridge often forms queues reaching as far back as the Newmarket Viaduct.

3.2.2 Future Traffic Flows

The year 2011 was chosen as the “future year” for use in determining the future traffic conditions in the corridor. This is consistent with the future years modelled in the Auckland Regional Transport (ART) model by the Auckland Regional Council.

The “do-minimum” situation in 2011 is considered to include the currently committed capacity improvements incorporated in the Central Motorway Junction (CMJ) and North Shore Busway projects along with the southbound widening work completed in 2001 under the Shelly Beach Overbridge. No further additional lanes within the HBTC Corridor would be constructed under this scenario.

In the southbound direction of travel, the traffic demand will be predominantly over capacity during the morning peak period. Queues could be expected to extend back over the Auckland Harbour Bridge (as it does currently). In particular, the southbound link

from Shelley Beach to Fanshawe St (St Mary's Bay) and the VPV would have insufficient capacity in their current form to carry 2011 design flows, and would result in significant congestion and queuing.

For the do-minimum case, the level of traffic demand in much of the northbound corridor would exceed the available capacity by the year 2011. This will result in significant congestion and queuing, particularly from the bottlenecks at the Wellington St on-ramp and at the VPV.

3.2.3 Central Motorway Improvements

As discussed in Section 2, the RLTS 2003 has identified the HBTC project in conjunction with the CMJ project as being a key method for reducing traffic congestion in the Auckland Region. Together with the GGP project, these are the Central Motorway Improvements (CMI). The CMI's will assist in releasing traffic congestion by matching lane improvements throughout the whole of the CMI and minimising bottlenecks.

The Draft RLTS 2005 has been developed to review the regional land transport framework for Auckland inline with the changes to the national transport policy framework. As noted Transit's purpose under the LTMA is to contribute to the aim of achieving an integrated, safe, responsive and sustainable land transport system. The HBTC project is essential to Auckland's land transport system and to achieving the purpose of the LTMA.

3.2.4 Land Transport Management Act 2003

The Land Transport Management Act (LTMA) 2003 was enacted on 12 November 2003. The purpose of the LTMA is to contribute to the aim of achieving an integrated, safe, responsive and sustainable land transport system. The HBTC project is essential to Auckland land transport system and achieving the purpose of the LTMA.

3.2.5 Traffic Operations

Improvements to the existing traffic operations are unlikely to provide a similar degree of relief as imparted by the capacity improvements proposed through the HBTC corridor. Operational initiatives such as tidal flow have been considered and discarded, primarily for this reason.

Traffic demand management will assist controlling flows onto the network and is being separately implemented. The current network operation already achieves a degree of demand management as outlined later in this document. It assists the management of incoming flow but does not provide the required additional capacity.

3.3 The Need for the Designation

As a network utility operator and an approved Requiring Authority in terms of section 166 and 167 of the RMA, Transit may use the designation mechanism to construct, operate or propose to construct a road/State highway.

The designations are needed in order for Transit to achieve its principal objective of achieving an integrated, safe, responsive and sustainable land transport system.

It is also necessary to achieve the specific project objectives (identified in Section 1) that relate to improving access between the north and south of the city and to facilitate the benefits of the other Central Motorway Intersection Improvements already underway or completed because:

- The designation will allow Transit and/or its authorised agents to undertake the project or work in accordance with the designation, notwithstanding anything to the contrary in the relevant District Plan;
- The designation will allow land required for the project to be identified in the relevant plans (which already include land shown as designated), to give a clear indication of the intended use of the land;
- The designation enables the project or work to be undertaken in a comprehensive and integrated manner; and
- It protects the site from future development, which may preclude the construction of the project or works.

4 Description of the Project

4.1 Existing Harbour Bridge to City Corridor

4.1.1 Introduction

The location, and surrounds of the existing Harbour Bridge to City (HBTC) Corridor are depicted in Figure 1.1. The 2.2 km long HBTC corridor extends from the southern side of the Auckland Harbour Bridge, south along the existing Northern Motorway (SH 1), through St Mary's Bay and across the Victoria Park Viaduct (VPV) to the Wellington Street overbridge in Auckland City. Included in the corridor are connections at Shelly Beach Road off ramp, Curran Street on ramp, Fanshawe Street on and off ramps, Cook Street off ramp and the Wellington Street on ramp.

The posted speed limit for this section of SH1 is currently 80km/hr.

For convenience in this report, the description of the existing HBTC corridor has been split into two sections, the St Mary's Bay Section and the Victoria Park to Wellington Street overbridge Section.

4.1.2 St Mary's Bay Section

The St Mary's Bay section of motorway starts at the southern abutment of the Auckland Harbour Bridge and extends 1.2km to the south towards the city to the start of the VPV.

The motorway is on grade and passes along a relatively narrow strip of reclaimed land bounded on the western side by a grassed reserve strip at the base of a cliff, on top of which are located residential properties. The eastern side of the corridor is bounded by Westhaven Drive and Westhaven Marina.

The motorway follows a series of moderately tight curves along the former shoreline and is relatively flat in grade. The carriageways in each direction are separated by a median and are at slightly different levels around the curves where the super elevation of each carriageway is developed independently of each other.

Each carriageway carries four lanes of traffic. A southbound shoulder bus lane extends from the Shelly Beach off ramp through to Fanshawe Street.

There is one bridge, the Shelly Beach overbridge, carrying off ramp traffic over the corridor towards the northern end. This is a multi span bridge. The existing lane arrangement fits neatly between the piers of the bridge. The bridge was modified in 2001 to fit one additional southbound lane of traffic between the piers as part of the Shelly Beach Bus Priority Lane Project.

At the southern end of the St Mary's Bay section of the corridor, the traffic lanes split. Two lanes in each direction continue through as SH1 over the VPV and the remaining two lanes continue for a short distance at grade alongside the VPV before joining the local street network at the Fanshawe/ Beaumont Street intersection.

The Fanshawe Street on ramp passes under the VPV and then runs parallel with the Viaduct until opposite Ngapona where the two lanes join with the two northbound lanes to continue through St Mary's Bay.

4.1.3 Victoria Park to Wellington Street Overbridge Section of Motorway

This 1.0 km length of motorway can be further split into two sections. These sections are, the VPV (continuing from the St Mary's Bay section through Victoria Park to the vicinity of the Birdcage Hotel) and the southern, at grade section between the VPV and the Wellington St overbridge.

(a) Victoria Park Viaduct (VPV)

The VPV is a major concrete bridge. This moderately curved 590m long bridge carries SH1 over Victoria Park, Beaumont Street, Victoria Street and runs adjacent to three historic buildings. The viaduct was built during the period 1961 to 1964.

Significant lengths of the approach embankments are contained within reinforced concrete retaining walls located at either end of the viaduct.

The viaduct is made up of twin parallel carriageways each on separate decks. Each carriageway presently carries two lanes in each direction. The 50mm nominal width separation between decks has allowed the super elevation around the horizontal curves to be developed independently and minimise the height of the bridge above the ground.

A concrete barrier is provided on the inside edge of each of the decks to provide median separation between the carriageways. This is a relatively recent addition to the bridge. Edge protection is provided on the outside edge of the decks by the original lightweight steel post and rail system mounted on a concrete kerb.

The viaduct has a number of known deficiencies. A seismic retrofit is required, the edge protection (barriers) does not meet current standards and alkali silica reactivity (ASR) damage is present in some sections of the bridge superstructure.

(b) Road South of VPV to the Wellington Street Overbridge

This section of motorway is at grade and climbs up a 3.3% grade as it continues south to join with the Central Motorway system. The Wellington Street overbridge passes over the motorway at the southern end of the HBTC corridor. An off ramp to Cook Street from the southbound lanes of SH1 exits at the southern end of the VPV.

The section of the corridor south of Cook Street is currently being improved as part of the Central Motorway Junction project. The project is due for completion in late 2006. The Wellington Street on ramp is a single lane ramp that joins the northbound motorway just south of the Birdcage Hotel.

4.2 Overview of Proposed Corridor Improvements

4.2.1 St Mary's Bay

Through the St Mary's Bay section of the corridor the new alignment stays generally within the existing motorway corridor. The carriageway will remain at grade with split carriageways similar to the existing motorway. This section of motorway once complete would consist of:

- 5 lanes southbound and a bus shoulder lane,
- 5 lanes northbound.

The motorway carriageway will be widened on both sides and a new median will be constructed to accommodate the additional lanes. These works can generally be fitted within the existing corridor by making better use of the existing shoulder and median areas. The lane widths will remain at 3.5m. The landscaping strip between Westhaven Drive and the motorway will be affected by the work as the lanes will be widened in this direction. A new narrower landscaping strip will be provided to replace the removed strip. The designation is proposed to be widened by roughly 1m the length of the motorway boundary with Westhaven Drive to provide a consistent and integrated landscape and barrier.

Modifications to the existing Shelly Beach overbridge are required and a new pedestrian bridge across the motorway is proposed at a location near Jacob's Ladder.

Other works required through this section of the corridor include new sign gantries, minor stormwater works, new concrete safety barriers, new concrete edge and median retaining walls, new motorway lighting and noise walls.

Generally there will be no encroachment beyond the existing fence line on the St Mary's Bay side of the motorway except for the area at Shelly Beach overbridge and Ngapona which are discussed in later sections of this AEE. The designation will be widened in parts where mitigation improvements such as landscaping, contouring, safety barriers and noise walls will be located outside the existing motorway designation. Generally it is proposed that footpaths and planting will be undertaken within the reserve with Council agreement.

4.2.2 Victoria Park to Wellington Street Overbridge Section

The existing viaduct will be retained to provide 4 lanes in a southbound direction only (it is noted that only 3 lanes are required, however the existing viaduct already has 4 lanes).

The retention of the viaduct will involve minor upgrading to include seismic strengthening and ASR mitigation. The existing Cook Street off ramp will remain unchanged.

A 3 lane tunnel will be constructed for northbound traffic. The tunnel will be located to the west of the existing viaduct through Victoria Park. The tunnel includes a fully covered section (about 460m in length) under Beaumont Street, Victoria Park and Victoria Street. This section will be constructed by "cut and cover" methods.

The southern approach (uncovered section) to the tunnel starts about 200m north of the Wellington Street overbridge and extends down at a gradient of about 6% to the tunnel portal located near the existing Birdcage Hotel.

The northern tunnel portal is located opposite the Victory Christian Church and ramps up at a gradient of about 4% to join the at grade section of motorway near the northern end of the current HMNZS Ngapona car park.

4.2.3 Interface between the HBTC and the CMJ Projects

The interface between the CMJ and HBTC projects is in the area between Cook Street off ramp and the Wellington Street overbridge. The physical works construction boundaries will depend on construction sequencing and will be determined closer to the time of construction. These will all be contained within the existing designation, with the

exception of works in the vicinity of the Wellington Street on-ramp that requires the designation to be widened to allow for motorway edge works and retaining wall construction on a portion of land at the rear of 26-36 Napier Street.

4.3 Detailed Description of the Proposed Corridor Improvements

The following is a detailed description of the various corridor improvements that form the HBTC Project. The description starts with those parts of the project at the AHB end of the corridor and works southwards.

4.3.1 Shelly Beach Overbridge

The Shelly Beach overbridge takes traffic from the Shelly Beach Road off-ramp, over the motorway to connect with Shelly Beach Road. To allow space for an additional northbound lane, one existing bridge pier is to be relocated about 5 m south (closer to the abutment and cliff). The methods and construction sequence for relocating the pier will be similar to the work carried out on the northern side of the bridge in 2001. This will involve rebuilding the southern abutment and constructing a new pier, cutting the bridge deck at mid span and sliding the southern portion of the deck onto the new abutment. The deck void is then infilled to create the lengthened bridge. This method of construction minimises the time the bridge is closed and preserves the form of the bridge. The bridge and off ramp will be closed for some periods of the works.

A public walkway under the bridge and pedestrian access to Shelly Beach Road will be disrupted during construction but will return to the existing condition at the end of the works.

4.3.2 Westhaven Drive

Westhaven Drive forms the eastern boundary to the motorway through SMB. The road is owned by Ports of Auckland Limited (POAL). Auckland City Council own the Westhaven Marina and manages the use of Westhaven Drive. At present there is a narrow strip of Transit land, between about 1m and 3m in width, between the edge of the motorway carriageway (guardrail) and the post and wire fence on the boundary. This strip contains landscaping, a drainage swale and a crib retaining wall along some of its length. A further landscaping strip of about 1m in width is located on the POAL property between the fence line and the edge of Westhaven Drive.

As part of the new work, a concrete edge that will also be a retaining wall where necessary will be built on the property boundary. This wall will also incorporate the concrete edge protection barrier, light column foundations and gantry supports. A new landscaping strip (about 1m wide) will be built on POAL property between the concrete edge wall and Westhaven Drive. Details of this arrangement are being discussed with POAL and Auckland City.

4.3.3 St Mary's Bay Reserve / Public Open Space

As part of the project a new concrete edge or retaining wall will be built along the fenceline between the motorway and the reserve, similar to the wall on the Westhaven Drive boundary. The wall will incorporate the concrete edge barrier, light column foundations

and gantry supports. A noise wall will also be constructed immediately behind the edge wall.

The grassed open space will be landscaped and a hard surface footpath can be provided if required. The final design of this area will be carried out in discussion with ACC.

4.3.4 St Mary's Bay Pedestrian Bridge and Walkway

A pedestrian bridge is proposed to be constructed across the motorway near Jacob's Ladder and is provided for by way of the designation.

It is proposed to provide a walkway along the western side of the motorway from Jacob's Ladder to Pt Erin. This is in response to Auckland City Community Planning's suggestion that consideration be given to a walkway in order to provide better access (e.g. for cyclists and disabled) across the motorway and improve pedestrian links to the surrounding areas. The exact nature and characteristics of the walkway will be discussed with ACC at the detailed design stage, however it is likely to consist of some hard surface treatment.

4.3.5 Fanshawe / Beaumont Street Intersection

The Fanshawe / Beaumont Street intersection is a major intersection that controls traffic flows leaving and entering the motorway from Fanshawe Street and Beaumont Street. The intersection is partly located under the VPV.

Fanshawe Street is currently being widened and improved by ACC. This includes improvements to the Beaumont Street intersection and the provision of a bus lane on Fanshawe Street.

Modification of the intersection layout is required as part of the HBTC project. These modifications include provision of a left turn lane from the off-ramp to Beaumont Street.

4.3.6 Bus Lanes

In the southbound direction buses travel in the normal traffic lanes over the AHB and will then move into a dedicated shoulder lane from near the Sails restaurant through to Fanshawe Street. In the northbound direction the bus lane from Fanshawe Street will merge with the standard traffic lanes on the Fanshawe Street northbound on-ramp similar to the existing arrangement.

4.3.7 Victoria Park Viaduct Structure

The VPV will be used for 4 lanes of southbound traffic. Some retrofit of the structure is necessary and it is likely that this retrofit will be carried out at the same time as the HBTC project. The retrofit works include new concrete edge protection barriers to replace the existing sub standard barriers and seismic strengthening of the piles and pile caps.

These works are not part of the HBTC project and will be carried out within the existing motorway designation.

4.3.8 North Bound Tunnel

The northbound tunnel is about 460m long and will be constructed on the western side of the existing viaduct. The fully covered tunnel section extends from the Birdcage Hotel in

the south through Victoria Park to near the Victoria Christian Church car park. The southern approach to the tunnel is about 350m long and has a gradient of 6%. The northern exit section is about 220m long and has a gradient of 4%. Both the southern approach and northern exit are of open box section i.e. has no roof.

4.3.9 Drained v Undrained Tunnel Options

At this stage of the design it has not been determined whether the tunnel is of drained or undrained construction. This is a decision that will be made following further investigation of the groundwater system. An undrained or tanked tunnel has less impact on the groundwater levels but must be designed to prevent uplift caused by water pressure on the underside of the tunnel box.

The drained tunnel option would require the capture, treatment and disposal of pumped groundwater and would result in groundwater drawdown on either side of the tunnel. Contaminated groundwater would need to be treated on site prior to disposal.

At this stage of the design both tunnel options are being progressed.

4.3.10 Tunnel Structure

The tunnel will be a cut and cover, single box tunnel, comprising three, 3.5m wide lanes. The internal width of the tunnel varies from about 13m to 16m depending on shoulder widths. The tunnel has a minimum internal height of 6.9m (5.1m vehicle clearance and 1.8m for services). The maximum depth of the tunnel box (measured to underside of floor slab) is 12m below the existing ground level in Victoria Park.

The tunnel comprises secant (bored) pile or diaphragm wall type construction with a concrete roof and floor slab.

4.3.11 Tunnel Systems

The following fire, life and safety systems will be installed in the tunnel:

- Fire exits – exit stairs.
- Fire detection and alarm systems – CCTV, linear heat detection.
- Traffic evacuation and management systems – lane use signs, tunnel message signs, radio re-broadcast system.
- Smoke control system – mechanical ventilation.
- Automatic fire suppression system – zoned deluge suppression system.
- Manual fire fighting systems – fire hydrants, fire hose reels, portable extinguishers.
- Tunnel lighting that caters for the change in light conditions at the tunnel entry and exit areas.

4.3.12 Tunnel Operation

The tunnel will be operated and maintained by Transit. The tunnel systems will be controlled by Transit's 24 hour traffic management centre (ATOMS) located on the north side of the AHB. Manual control of the tunnel systems will also be provided from an on site control room. A tunnel utilities building housing the tunnel controls, emergency

power supply and mechanical and electrical plant, will be located either at the north end of the tunnel (near Westhaven Drive) or at the south end in the vicinity of the Birdcage Hotel.

4.3.13 Birdcage Relocation

The Birdcage Hotel is a historic two-storey building constructed in 1886. The structure consists of brick walls with concrete bands over the windows. The basement has a concrete floor slab but details of the foundations are not known. A main stormwater culvert passes under the building.

The hotel's upper storey is located approximately 3m from the edge of the existing VPV. Construction of the north bound tunnel will require relocation of the Birdcage Hotel.

It is proposed to shift the historic building part of the Birdcage complex approximately 30-50m up Franklin Road. The existing foundations and basement will not be shifted and will be removed by the tunnel construction.

The general methodology for relocating the Birdcage Hotel is as follows:

- Strengthen and brace the upper structure to allow it to be shifted. This will require both temporary and permanent strengthening of the structure.
- Dig around building to expose and strengthen the existing foundations to permit movement of the building without damage. Monitoring devices will be installed to detect movement.
- Prepare new site and foundations for relocated building.
- Construct trench and temporary runway beams on which to move the building.
- Skid building to new site.
- Remove temporary works and make good building.

An authority from the Historic Places Trust is required for the relocation of the Birdcage Hotel. This authority will be applied for separately and prior to the commencement of works.

4.3.14 ATMS

Transit is progressively installing an Advanced Traffic Management System (ATMS) through its network. ATMS allows for the efficient management of traffic, for the provision of real-time traffic and road condition information to motorists, and for the rapid response to incidents. As part of the HBTC project, a strategy will be developed for the integration of changes and / or upgrading of the ATMS through the project corridor.

4.3.15 Sign Gantries

New overhead sign gantries will be required at various locations along the corridor to provide a safe signage system for the new motorway connections. Other sign gantries will be required as part of ATMS systems and lane control and lane lighting signals.

Existing gantries will need to be modified or replaced as a result of the changes to the support locations at the edges and median of the motorway.

It is noted that any traffic signs, direction information or naming signs erected by Transit are exempt from the relevant provisions in the Auckland City Consolidated Bylaw 1998, through clause 27.1.2.1(a).

4.3.16 Motorway Lighting

New lighting will be provided throughout the corridor. The new lights will be located in the central median and along both edges of the motorway as well as in the tunnel and tunnel approaches.

4.3.17 Motorway Safety Barriers

As part of the project safety barriers complying with Transit Standards will be provided. There are two barrier Test Levels which are proposed to be applied to the project:

- **Test Level 4 (TL4):** typically 830mm high concrete barrier
- **Test Level 5 (TL5):** typically 1,070mm high concrete barrier or 830mm high concrete barrier with a rail on top.

The situations in which each of these barriers is used is summarised in the following table:

Table 4.1 Typical Safety Barriers

Situation	Safety Barrier Test Level
Edge barrier, at grade	TL4
Central median	TL4
Central median, split carriageway	TL4 or TL5, depending on difference in elevation

Retaining walls will be required on some sections of the shoulder in St Mary's Bay and where there is a split carriageway in St Mary's Bay, with heights of up to 2.5m and 2m respectively. In these instances, the safety barriers will be incorporated into the reinforced concrete retaining wall structure. To account for the large lateral force due to a vehicle impacting the barrier, these walls would need to be thicker and have a larger base than a conventional retaining wall.

4.3.18 Noise Walls

Noise walls are proposed through various sections of the corridor. The nature of the noise walls proposed are summarised in the following table:

Table 4.2 Proposed Noise Walls

Area	Noise Barrier Details
SMB Western Side	5m high transparent acrylic barrier. Approx length 1200m.
Napier St	2m high solid barrier. Approx length 115m.

It is proposed that any noise walls in St Mary's Bay would generally be designed with transparent panels in order to minimise the loss of views. Nevertheless, the noise walls proposed have potential visual and tree impacts. The final arrangement of the walls will be determined in consultation with the St Mary's Bay community.

4.3.19 Service Relocations

Stormwater

A main stormwater culvert passes through Victoria Park. This conflicts with the tunnel and so will be relocated. This will involve constructing a new stormwater pipe on the west side of the new tunnel from Weld Street, across Victoria Street. The pipe will cross above the new tunnel immediately north of the Kindergarten building and then run to the east of the existing viaduct to connect to the existing culvert.

Other stormwater relocations will be necessary in the vicinity of Lower Union Street and Victoria Street in conjunction with the relocation of the main stormwater culvert.

Wastewater

Watercare's Orakei main sewer passes just south of the south abutment of the VPV between Weld Street and Drake Street. This 1.5m x 2.2m egg-shaped sewer will be diverted to enable it to pass under or over the tunnel.

ATMS / Telecom

As part of the motorway improvements a range of existing services will need to be relocated. The motorway widening through St Mary's Bay and construction of the north bound tunnel will impact the Telstra Clear and ATMS infrastructure. Relocation of this infrastructure will be required in some areas, primarily on the west side of the Fanshawe Street on ramp between Ngapona and Beaumont Street.

Similarly, existing Telecom fibre optic reticulation will require relocation between Ngapona and Beaumont Street on the west side of the motorway.

Other Utilities

Relocation of services (including water, gas, stormwater, wastewater, power, telecommunications) in local streets will also be required. The main areas where the local services will be affected include Beaumont Street in the vicinity of the tunnel alignment and the Union Street, Victoria Street, Franklin Road intersection area.

Where possible service relocations will be carried out before the main construction works are commenced but in all cases relocations will need to be carefully programmed to minimise disruption to the service users. Consultation with utility companies regarding the design of service relocations is ongoing.

4.4 Air Quality Management

It is recognised that vehicle emissions are a significant contributor to the sometimes poor ambient air quality experienced in Auckland. The project has therefore been assessed in terms of the impact on the regional air quality in the HBTC project area. The proposed tunnel will be ventilated using forced ventilation and will then discharge through the tunnel exit portal. The impacts of the proposed project design have been assessed using atmospheric dispersion modelling and compared to the National Environmental Standards for Air Quality (2004).

4.5 Waste and Spoil Management and Minimisation

Waste and spoil management and minimisation will be an important part of the environmental management throughout the project construction phase. Contaminated land is likely to be encountered through parts of the project corridor, and will need to be managed and disposed of appropriately. This issue is discussed further in the EMP. The waste and spoil management requirements will be implemented through the Project Environmental Management Plan.

4.6 Sediment Control During Construction

The total area of earthworks proposed for the project is estimated to be approximately 4 ha.

During construction these could include a combination of silt fences, cleanwater bunds/ cut-off drains and dirty water drains/ bunds, draining to ponds where possible. The purpose of these proposed measures is to avoid, remedy and mitigate the effects of the project in terms of sediment generation during construction. The proposed Erosion and sediment control methodologies are defined in Technical Appendix #6 (Assessment of Land Disturbing Activities).

Resource consent from ARC will be sought for land disturbing activities. This conclusion is made on the basis that more than 2500m² will be exposed at one time within 100m of the CMA and/or greater than 1 ha will be exposed at any one time during the project.

Overall, the quantum of the sediment yield expected from the works is relatively minor. The site involves minor areas of earthworks on generally flat slopes, with the larger excavation within the tunnel and its approach and exit, which will drain into the excavation.

Erosion and sediment control measures are proposed. In general these could include standard control measures such as silt fences, decanting bunds and stormwater inlet protection. The dewatering methodology (detailed in the EMP) addresses the management of any sediment-laden water from within the tunnel excavation (before and after the roof has been constructed), and the tunnel approach and exit.

Undertaking earthworks throughout the winter period may increase the risk of sediment generation and discharge. Transit will be seeking ARC approval for a winter works programme as implemented on the Grafton Gully project, as it is considered that a high level of site management can occur, and counter any increase in the potential for offsite effects as a result of instigating winter works.

4.7 Long-term Drainage and Stormwater Treatment

4.7.1 St Mary's Bay

It is intended that the existing stormwater reticulation systems serving the motorway carriageway will be retained as far as is possible. Within the St Mary's Bay section neither new harbour discharges, nor any changes to an existing harbour outfall pipe are contemplated.

The proposal is to treat as a minimum stormwater from the area of new pavement area or an equivalent area. The proposed treatment devices will be designed to the requirements of ARC's TP10.

4.7.2 Tunnel

Stormwater and washdown water from the tunnel and tunnel approaches will be collected in a chamber in the floor of the tunnel and then pumped to a treatment device (sand filter or similar) located within Victoria Park. Collection and treatment of contaminated groundwater will be by a separate system.

4.8 Construction Methodology

The general construction methodology and sequence has been driven by the need to minimise disruption to traffic on the motorway and local street network. Because of the heavy use of the roads during peak periods, work will either have to be done outside peak traffic flow times or will have to be separated from the traffic lanes. Some disruption during construction will be inevitable to both traffic and local residents. Ongoing consultation with road users and the local community and businesses will be essential.

The following text outlines the likely construction process for the St Mary's Bay and Victoria Park sections of the project.

4.8.1 St Mary's Bay

The construction sequence will generally be as follows:

1. Widening the northbound left side shoulder by some 2 m. This includes construction of a new concrete edge barrier / retaining wall, widening the existing carriageway, installation of stormwater treatment devices, relocation of some services and installation of new foundations for noise walls and sign gantries.
2. Widening the southbound left side shoulder by some 3 m, including similar works to the northbound widening.
3. Reconstructing the central median area after the widening has been completed.

4.8.2 Victoria Park to Wellington Street

Before any work can commence on the tunnel construction the following works need to be completed:

- Relocation of the Birdcage Hotel.
- Diversion of the main stormwater culvert through Victoria Park.
- Diversion of the Orakei main sewer.
- Removal of trees on alignment of new tunnel.

The tunnel will be constructed by the "cut and cover" method as is usual for tunnels at a shallow depth. This method comprises the following steps:

1. Installation of tunnel walls (either by secant (bored) piles or diaphragm wall method).
2. Excavation sufficient to construct tunnel roof.
3. Construction of concrete tunnel roof.
4. Excavation of remainder of tunnel from within the tunnel.
5. Construction of concrete tunnel floor.
6. Installation of tunnel mechanical and electrical plant for drainage, lighting, ventilation, fire, life and safety.
7. Tunnel finishing including safety barriers, pavements, wall linings, etc.

4.8.3 Pile Installation

The dominant above ground construction activity will be piling. Bored piles are required on both sides of the tunnel for the full length of the tunnel and approaches. It is estimated that up to four piling rigs may be required to be working at any time to install these piles within an appropriate time period.

4.8.4 Tunnel Approaches

The tunnel approaches will be constructed using conventional retaining wall and excavation methods. Tunnel walls will be constructed first similar to above, followed by excavation, drainage, pavement and finishing works. Construction of the tunnel approaches will require temporary motorway alignment changes.

4.8.5 Tunnel Road Crossings and temporary access

Construction of the tunnel under Beaumont Street and Victoria Street will require temporary road diversions to allow the tunnel to be constructed in stages. Access to neighbouring properties will be affected during construction at various times.

4.8.6 Excavation

The tunnel construction will require excavation of predominantly Waitemata series sandstone and overlying reclamation fill materials. The excavation volumes are as follows:

Table 4.3 Excavation Volumes

Location	Volume (m3)
Main tunnel	75,000
Northern approach	15,000
Southern approach	35,000
Total	125,000

It is expected that all excavated material will be removed from site and taken to an approved landfill. Excavation from the tunnel approaches will be carried out by conventional excavator and trucks. This excavation will be carried out relatively quickly.

Excavation of the tunnel will be carried out in various stages and will generally be completed over a longer time period. The initial excavation will be for the tunnel roof

construction. Excavator and truck will carry this out and the rate of excavation will be controlled by the rate of piling.

The bulk of the excavation for the tunnel will be carried out after the tunnel roof has been installed, from within the tunnel. Excavation will be by small excavators and trucks travelling in the tunnel. This will be a slow process because of the lack of room inside the tunnel.

4.9 Construction Areas

Construction areas are required for the following activities:

- Contractor and client office accommodation.
- Storage and laydown areas for plant and materials (pile casings, reinforcing steel, falsework, formwork, etc).
- Access for plant and temporary works.

The main construction area is planned for the west side of Victoria Park. To minimise the area of Victoria Park required during construction, Transit owned land in the vicinity of the Birdcage Hotel and at the Beaumont Street end of Westhaven Drive will also be used for temporary construction areas.

4.10 Construction Timeframe

Following the confirmation of the designation and the granting of resource consents pursuant to the Resource Management Act 1991, it is anticipated that construction would commence immediately. In the intervening period further design and investigations would be undertaken and a contractor selected to implement the works.

It is anticipated that construction would commence during 2008, and that the works would take about 3 years to reach completion. It is expected that the relocation of the Birdcage and the main stormwater and sewer diversions will take about 12 months to complete.

Only then can the tunnel construction commence and this is expected to take about 2 years. The critical path for the project completion will be the tunnel construction and in particular the pile installation.

The works in St Mary's Bay can progress independently of the tunnel and take about 12 to 18 months to complete.

5 Assessment of Alternatives

5.1 Introduction

The development of the HBTC Project has been an iterative process over a 10-year period. A summary of the various investigations undertaken prior to the selection of the current HBTC Project is provided below. More detailed descriptions of the various studies considered and leading up to the current HBTC project can be obtained from Technical Appendix #2, Harbour Bridge to City Project – Options, Identification and Evaluation Report, March 2002. The period after March 2002 is considered in Sections 5.6 and 5.7.

Section 171(1)(b) of the RMA requires the consenting authority when considering a Notice of Requirement (NoR) to have particular regard to whether adequate consideration has been given to alternative sites, routes and methods of undertaking the public work. Section 181(2) requires a similarly robust assessment of alternatives when considering alterations to designations.

The following information is an overview of the various investigations into alternative sites, routes and methods undertaken as part of the HBTC Project to arrive at the preferred option of the North Bound Tunnel.

5.2 Previous Studies (1990 – 1999)

5.2.1 Corridor Improvements (1990 to 1995)

The AHB Corridor Capacity Study Stage II report by Traffic Design Group in 1995 recommended capacity improvements between Esmonde Road and Khyber Pass including:

- 6 x 2 lane morning peak operation of the AHB
- fixed widening of the carriageway through St Mary's Bay
- fixed widening on both sides of the VPV

At this stage tunnels as an alternative were not considered because of the cost.

5.2.2 AHB Approaches: Capacity Improvements Study (1995 to 1997)

A broad range of options were identified for both the St Mary's Bay and VPV sections as part of the 1995 to 1997 Study undertaken by Beca. A number of the options were discarded, mainly due to the significant adverse impact on surrounding land and the consequential need for excessive land acquisition outside the existing motorway designation. Options were also discarded that generated what were considered to be excessive costs (including underground options).

5.2.3 Previous Studies Outcomes

As a result of the previous studies, the Transit Authority noted at its meeting on 29 June 1999 that it:

“Agrees to the concept to widen SMB and the VPV by one lane and extend the MLB to provide a tidal flow arrangement as the basis for proceeding to negotiations with the Auckland City Council for access rights across Victoria Park and to designate or acquire land required and for final community consultation.”

The submission also noted that:

“The option exists for fixed widening on both sides of the motorway across SMB and VPV. However, fixed widening would cost an additional \$7.3m and is not supported by either Auckland City Council or the adjacent communities because of its extra social and environmental impacts. Instead the preferred option is the widening of both the VPV and SMB by one lane and the extension of the existing AHB tidal flow operation.”

5.3 Study Process for the Current HBTC Project (December 2000)

5.3.1 Initial HBTC Options

Beca / Parsons Brinckerhoff were commissioned by Transit in December 2000 to proceed with the preparation and lodgement of the necessary amendments to the existing motorway designation and associated planning consents to allow the HBTC Project to be progressed to construction.

Based on the previous study outcomes, Transit’s objectives for the HBTC Project at its commencement in December 2000 were as follows:

- (a) Balance the capacity of the approaches to the Auckland Harbour Bridge with the capacity of the Auckland Harbour Bridge itself during peak flow conditions.
- (b) Increase the capacity through St Mary’s Bay by extending the tidal flow system.
- (c) Improve traffic flow over the VPV for both capacity and safety management reasons.
- (d) Provide timely delivery to co-ordinate with the adjacent Central Motorway Junction and North Shore Busway projects.

In undertaking the study commissioned in December 2000, Transit identified key goals including the following:

- Reduce traffic delays in the St Mary’s Bay portion of the motorway.
- Design the project to remain within the motorway designation in St Mary’s Bay.
- Minimise traffic delays due to construction.

5.3.2 Introduction of Tidal Flow Scheme

On the basis of previous studies, Transit’s “preferred” option at the commencement of the HBTC Project in December 2000 was a tidal flow scheme, as follows:

- Widening by one lane on the eastern-side of the motorway in St Mary’s Bay. This will provide a total of 9 lanes at St Mary’s Bay, with the central lane operating in tidal flow mode commensurate with the peak flow direction. The central lane is only available for cars because of its width.

- Carriageway widening by (approximately 6m) on the eastern side of the VPV to provide a central tidal flow lane.

5.3.3 Review of the Tidal Flow Option

It was recognised by the Study Team for this project, that there had been significant changes in circumstances since the conclusion of the previous corridor improvement studies, including the publication of the Auckland State Highways Strategy 2000 (ASHS) and the Auckland Regional Land Transport Strategy 1999 (RLTS).

In summary, these changes were:

- Increased preparedness of roading agencies internationally to apply greater rigour to the mitigation of adverse environmental effects of roading projects.
- The adoption of ATMS (Advanced Traffic Management System) provides opportunity to selectively and carefully reduce design standards.
- The change in existing and projected traffic conditions since the 1996-97 studies. Subsequent investigations by Beca raised questions about the ability of VPV to cope with projected inter peak traffic flows past 2011. This is due to the increase in inter-peak traffic and the additional traffic from the proposed North to Port Motorway Link (now completed).

Therefore, it was determined necessary to critically review the merits of the tidal flow option that previous studies such as the AHB Approaches Study, had recommended.

It became apparent early in the study process that objective (b) described in 5.3.1 above (extension of the tidal flow system) was not tenable in the medium term because of inter-peak traffic demands within the corridor. Consequently, a more robust long-term solution was needed.

5.3.4 Overview of the study process

The overall study process for the HBTC project was divided into four phases from December 2000 to October 2005.

Phase 1 - Coarse Screening (December 2000 – February 2001)

Phase 2 – Short Listed Options (April 2001 – July 2001)

Phase 3 provided for the public to comment on the 3 short listed options and the SMBA option. A briefing document, which explained the 4 options, was released to the community for comment. (April 2002)

Phase 4- the AEE (this report) investigates the preferred option in detail and provides the supporting documentation to the notice of requirement for the motorway designation. (Draft AEE – July 2003, Final AEE October 2005)

5.4 Phase 1 - Coarse Screening (December 2000 – February 2001)

5.4.1 Long List of Options

- A long list of options was developed during 2000 and a workshop was held in February 2001 to coarse screen the options. Each expert member of the evaluation team (detailed in Technical Appendix #2) with responsibility for investigating specific effects contributed to the evaluation process.
- The coarse screening process used for the long list of options was founded on identifying any fatal flaws within options. This meant that each of the conceptual options was evaluated against the evaluation criteria with a view to identifying any fatal flaws that might preclude or make its realisation extremely difficult. The criteria were:
 - Operations – Safety, Compatibility with CMJ/Busway, allows for future linkages across harbour, compliance with RLTS and ASHS, ability to cope with traffic flows up to 2021.
 - Environmental - noise, visual, land uses, community, cultural, ecology, coastal, water quality.
 - Project Delivery - designation, resource consents, construction land/air rights purchase.
 - Costs – capital costs, operating costs, BCR.
- The options were scored against the above criteria with a rank of '1' meaning high acceptability and '5' low acceptability. Options, which scored a rank of '5' against any of the criteria were automatically eliminated from further consideration. Table 5.1 describes options considered and the outcomes leading to the initial shortlisted options set out in Table 5.2. A more detailed and extensive description of this coarse screening process can be found in Technical Appendix #2.

Table 5.1 - Alternatives Considered

Option	Description		Outcome
	VPV	St Mary's Bay	
Tidal Flow Options			
TF0	Widen viaduct on east or west side → 5 lanes (2N, 2S, 1 movable bull run)	Widening on eastern side → 9 lanes (4N, 4S, 1 movable bull run)	Carried through for comparative purposes.
TF1	Widen viaduct on east or west side → 5 lanes (2N, 2S, 1 movable bull run) (development of TF0 which achieves min. design standards)	Widening on eastern side → 9 lanes (4N, 4S, 1 movable bull run)	Fatal flaw – operations. However, carried through for comparative purposes.
TF2	Widen viaduct on east or west side → 6 lanes (3N, 3S)	Widening on eastern side → 9 lanes (4N, 4S, 1 movable bull run)	Carried through
TF3	Widen viaduct on east or west side → 5 lanes (2N, 2S, 1 tidal flow)	Widening on eastern side → 9 lanes (4N, 4S, 1 tidal flow)	Fatal flaw – operations
TF4	Widen viaduct on east or west side → 6 lanes (3N, 3S)	Widening on eastern side → 9 lanes (4N, 4S, 1 tidal flow)	Carried through
TF5	Widen viaduct on east or west side → 6 lanes (2N, 2S, 2 bull run)	Widening on eastern side → 8 lanes (3N, 3S, 2 bull run)	Fatal flaw – operations
TF6	Widen viaduct on east or west side → 6 lanes (3N, 3S)	Widening on eastern side → 8 lanes (3N, 3S, 2 bull run)	Fatal flaw – operations
TF7	2 tunnels on east and west side → 6 lanes (3N, 3S)	Widening on eastern side → 9 lanes (4N, 4S, 1 tidal flow)	Fatal Flaws – cost, impact on active recreation
TF8	Tunnel on eastern side → 5 lanes (2N, 2S, 1 tidal flow)	Widening on eastern side → 9 lanes (4N, 4S, 1 tidal flow)	Fatal Flaws – cost, impact on active recreation
TF9	Widen viaduct on east or west side → 6 lanes (3N, 3S)	Widening on eastern side → 9 lanes (4N, 4S, 1 bull run)	Fatal flaw – design standards (140m long barrier gates required)

Option	Description		Outcome
	VPV	SMB	
Static Options			
A1	Widen viaduct on east or west side → 6 lanes (3N, 3S)	Widening on eastern side → 10 lanes (5N, 5S)	Carried through.
A2	Widen viaduct on east or west side → 6 lanes (3N, 3S)	Tunnel → 10 lanes (5N, 5S)	Fatal flaw – project delivery
A3	Tunnel on the eastern side → 6 lanes (3N, 3S)	Tunnel → 10 lanes (5N, 5S)	Fatal Flaw – project delivery, cost
A4	Tunnel on the western side → 6 lanes (3N, 3S)	Widening on eastern side → 10 lanes (5N, 5S)	Carried through
A5	Depressed road on the western side → 6 lanes (3N, 3S)	Widening on eastern side → 10 lanes (5N, 5S)	Carried through
A6	Widen viaduct on east or west side → 6 lanes (3N, 3S)	Depressed road → 10 lanes (5N, 5S)	Fatal flaw – project delivery
A7	Depressed road on the eastern side → 6 lanes (3N, 3S)	Depressed road → 10 lanes (5N, 5S)	Fatal flaws – project delivery, cost, environmental
A8	Widen viaduct on the eastern side → 6 lanes (3N, 3S)	Tunnel (5 lanes) and Depressed road (5 lanes) → 10 lanes (5N, 5S)	Fatal flaws – project delivery, cost, environmental
A9	Tunnel (3 lanes) and Depressed road (3 lanes) → 6 lanes (3N, 3S)	Tunnel (5 lanes) and Depressed road (5 lanes) → 10 lanes (5N, 5S)	Fatal flaws – project delivery, cost
A10	Viaduct (3 lanes) and Tunnel (3 lanes) on the western side → 6 lanes (3N, 3S)	At grade (5 lanes) and Tunnel (5 lanes) → 10 lanes (5N, 5S)	Fatal flaw – project delivery
A11	Viaduct (3 lanes) and Depressed road (3 lanes) on the western side → 6 lanes (3N, 3S)	At grade (5 lanes) and Depressed road (5 lanes) → 10 lanes (5N, 5S)	Fatal flaw – project delivery

5.4.2 Initial Short Listed Options Evaluation

Eight options (the 7 shortlisted above and sub-option TF1A) were then subjected to a more detailed evaluation, in respect of:

- Design standards, geometrics and constructability issues.
- Operational and traffic issues.
- Environmental issues.

Table 5.2 briefly describes the key constraints of each short-listed option and the outcome of the evaluation process.

Table 5.2 - Initial short list of options

Option²	Key Constr nts	Outcome
TF0	Baseline	Baseline
TF1	Limited future inter peak capacity	Eliminated
TF1A (a sub-option to TF1 involving a 'cars only' bull run)	Traffic safety /Limited future interpeak capacity	Eliminated
TF2	Extensive lane control required/Limited future interpeak capacity	Eliminated
TF4	Extensive land control required/Limited future interpeak capacity	Eliminated
A1	No significant constraints	Carried forward
A4	Excessive gradient at southern end/constructability issues/cost	Eliminated
A5	Excessive gradient at southern end/constructability issues/cost	Eliminated

The initial evaluation indicated that all of the tidal flow options had insufficient capacity to carry inter peak traffic demands over the VPV section up to 2021. Capacity is likely to be reached prior to 2011. Each of the "non-tidal" options presented greater opportunities to improve existing environmental conditions than the tidal flow options.

The evaluation (at this time) eliminated Options A4 and A5 (tunnel and lowered motorway) because they had excessive gradients at the southern end, significant constructability issues and large cost premiums. Even though it was noted they had significant environmental advantages in respect of noise reduction, visual effects and improvements to the functionality of Victoria Park.

The evaluation concluded that the preferred fixed carriageway option was Option A1. Option A1 involved widening the current VPV by one lane in each direction throughout its length and a static, non-tidal option on grade through St Mary's Bay, leaving the transfer vehicle garage at Shelly Beach Bridge. One of the reasons for this option being selected was the avoidance of having to relocate the transfer vehicle garage.

² Table 5.1 provides a description of these options

5.5 Phase 2 – Short Listed Option Evaluation Process (April 2001 – July 2001)

Notwithstanding the conclusions reached in Phase 1 “Coarse Screening”, and acknowledging that generally any of the shortlisted options were considered to be able to be taken forward, Transit decided that further studies on operational and environmental grounds, should be carried out for underground options for the VPV section, given the general environmental advantages this option would have. It was considered that involving consultation would further add to the robustness of the evaluation process for this phase. The fundamental issue still to be resolved (on a funding basis) was an underground option versus an above ground option. It was felt that further exploration of below ground options was therefore warranted.

Subsequently, Transit requested that the below ground options (A4 and A5) through Victoria Park be revisited in the options comparison, together with the bridge/tunnel Option (A10) being Stage 1 (the northbound tunnel only) of Option A4. This decision was reached following discussions with a number of key stakeholders who were keen to recognise the environmental benefits of the trench/tunnel options.

The following sections describe the results of the short listing investigations leading to the short list of options described in the “HBTC: Briefing Document: April 2002”.

5.5.1 Objectives for the Short Listing Studies

The objectives for this phase of the investigations were:

- To describe the current single option proposed for the St Mary’s Bay section of road,
- To describe and discuss the seven options for the VPV section and identify the issues relevant to option selection,
- To compare the merits of replacing the existing VPV structure versus modifying and retrofitting it,
- To investigate and report on the nature and merit of an option developed by the St Mary’s Bay Association (SMBA),
- To prepare a short list of options to be advanced to public and stakeholder consultation and from there, to identifying the preferred option.

5.5.2 St Mary’s Bay section

At this stage only one option for St Mary’s Bay was being considered by Transit as feasible based on earlier option evaluations, namely a fixed 5 x 5 lane configuration as part of Option A1. Following a further traffic review of the 5 x 5 configuration through St Mary’s Bay from both a peak hour traffic demand and public transport perspective Transit amended the configuration to the following:

- 4 lanes northbound and a wide shoulder used as a traffic lane in the afternoon peak, and
- 5 lanes southbound and a shoulder that could be used as a bus and high occupancy vehicle priority lane.

5.5.2 Victoria Park to Wellington Street Over Bridge Section of Road

For the Victoria Park to Wellington Street over bridge section of road, four sub-options plus three original options were evaluated. These options principally related to the VPV section of the corridor and include four bridging options and three below ground level road options.

5.5.2.1 Above-ground (viaduct/bridge) Options

- Option A1-s – symmetrical widening – Existing bridge is retained and the deck widened on each side to support two additional lanes
- Option A1-e – eastside widening – Bridge widened by two lanes on the eastern side of the existing alignment. Effectively 85% of the existing eastern bridge superstructure will be demolished and replaced in this option.
- Option A1-w – westside widening – Reverse of Option A1-e
- Option A1-wn – new bridge on westside – To minimise disruption to traffic, a northbound bridge would be built first, followed by demolition of the existing northbound bridge and construction of new southbound bridge in its place. The existing southbound bridge would then be demolished.

5.5.2.2 Below Ground Options (Depressed Road or Tunnel)

- Option A4: Tunnel
- Option A5: Trench road
- Option A10 – Building western most tunnel (i.e. northbound) as the first stage of an ultimate tunnel Option A4. Existing VPV would carry southbound traffic. This option was suggested by Transit as a possible means of achieving some of the environmental benefits that would arise from a tunnel while also recognising existing funding constraints. ACC also put forward this possibility during the Phase 1 Consultation process.

5.5.3 Comparison and Evaluation of Short Listed Options

For the purposes of comparing the Short Listed options the key comparative issues have been summarised and are presented in Tables 5.3 and 5.4.

Table 5.3 - Comparison of Phase II Options

Issue	Bridge Options			
	Option A1-s Symmetrical widening	Option A1 -e East side widening	Option A1 -w West side widening	Option A1 -wn New bridge on west side
Property Impacts (Properties with Major Impacts) (1)	Significant (Birdcage, Kindergarten, Ngapona, Westhaven Drive)	Severe (Lower Union Street, Vic Park/Market, Kindergarten, Westhaven Drive)	Significant (Birdcage, Ngapona)	Significant (Birdcage, Church, Ngapona)
Geometrics	Substandard	Substandard	Substandard	More Compliant
Traffic Operation	As existing	Possible Vic Park Rotary	Possible Vic Park Rotary	As existing
Long Term Impacts	Full VPV replacement expected and extremely difficult	Partial VPV replacement expected	Partial VPV replacement expected	N/A
Constructability	Least difficult	Difficult	Difficult	Less difficult
Delivery Time (yrs)	3	3	3	3
Load Capacity	Substandard	Substandard	Substandard	Compliant
Aesthetics/Visual	Poor	Poor	Poor	Better
Cost (2) (\$million)	60 - 80	70- 90	70-90	90-110

Note (1) Victoria Park impacts (as at April 2001) to be determined during consultation. Variation in effects may not be large.
 (2) Cost estimate prepared for comparative purposes only. Excludes GST and escalation.

Table 5.4 - Comparison of Options

Issue	Below Ground Level Options		
	Option A5 Lowered Motorway	Option A4 Tunnel	Option A10 Bridge/Tunnel (Partial Tunnel1)
Property Impacts (Properties with Major Impacts) (1)	Significant (Birdcage Church Ngapona)	Significant (Birdcage Church Ngapona)	Significant (Birdcage Church Ngapona)
Geometrics	Substandard	Hazardous Vehicle Exclusion	Hazardous Vehicle Exclusion
Traffic Operation	As existing	Standard	Standard
Long Term Impacts	Moderately high operational and maintenance (O&M) requirement	High O&M requirement	High O&M requirement Full VPV replacement expected
Constructability	Very difficult	Very difficult	Very difficult
Delivery Time (yrs)	4-5	4-5	4
Load Capacity	Compliant	Compliant	Substandard
Aesthetics/Visual	Good	Good	Poor
Cost (2) (\$ million)	200-250	230-290	150-180

Note

(1) Victoria Park impacts (as at April 2001) to be determined during consultation. Variation in effects may not be large.

(2) Cost estimate prepared for comparative purposes only. Excludes GST and escalation.

5.5.4 Short Listing of Options

The comparison of the options above showed that there were issues confronting all of the options. Options A1-s and A1-e contained serious deficiencies, e.g. impacts on active recreation areas in Victoria Park, which made these two options less desirable than the others. It was therefore decided that these two options should be removed from the shortlist.

The short list of options for VPV was thus:

- A1-w : westside widening of existing bridge
- A1-wn: new western bridge
- A5: lowered motorway on western side
- A4: tunnel on western side
- A10: bridge / partial tunnel (A5 stage 1) – VPV retained plus northbound tunnel only

5.5.5 Transit Authority Review and Decision

The results of the short list investigations were reported in detail to the November 2001 meeting of the Transit Authority who then resolved that:

- “(b) notes that the “tidal flow” option that was previously considered the preferred option is not on the short list of options,
- (c) having considered the short list of options, agrees to release the following three, with associated material, to the community for consultation:
 - Option A – widening of the existing Victoria Park Viaduct or a new bridge.
 - Option B – new depressed roadway.
 - Option C – full or partial tunnel.
- (d) Bearing in mind the overall roading requirements of the Auckland region and the pressing nature of the problem, notes that only Option A is likely to be fully fundable through the National Roding Programme.
- Given that Options B and C offer no additional roading benefits over Option A, agrees it is appropriate to meet costs of amenity benefits from local funding sources, if these options are selected”

5.5.6 St Mary's Bay Association Option (August 2001)

By May 2001, on-grade widening had been identified as preferred for the St Mary's Bay section. Therefore, options for this section were not investigated further in the period from May to August 2001. However, the SMBA developed its own option for corridor improvements through the HBTC Corridor. This option was presented to Transit in August 2001.

The SMBA Option consisted of a lowered motorway through the central section of St Mary's Bay, linking with a tunnel through Victoria Park. This included shifting the present alignment by up to 85 metres north-east into Westhaven Marina. A large park would be created in the space occupied by the former motorway.

Key features of the option included those described for the tunnel option through Victoria Park plus:

- Increased open space for parts of St Mary's Bay cliff.
- Improved noise conditions for parts of St Mary's Bay.
- Significant reclamation into the Coastal Marine Area.
- Significant alteration to the existing designation boundaries.
- Significant noise and visual impact during construction.
- Changes to foreground and harbour views.
- Possible safety issues with accident migration to sub-standard curves at the ends of the new straightened alignment through St Mary's Bay.

This option was included in the HBTC Briefing Document, which was used for community and stakeholder consultation (Refer to section 7.3) in April 2002.

In July 2002, SMBA presented to Transit a revision to their option. The horizontal alignment remained unchanged (straightened through St Mary's Bay) but the vertical alignment was raised to nearer an at grade level. The main reason for this change was to reduce the cost of the lowered or trench construction to around \$15 million.

SMBA were then advised at their AGM in November 2002 that Transit could not support their revised option but that:

- Transit would be prepared to give consideration to a curvilinear realignment through St Mary's Bay if SMBA was prepared to consider modifying their proposal to such an alignment.
- The proposed acoustic barriers on Transit's at grade option could be designed, as far as reasonably practical, to achieve traffic noise reduction equivalence to the original SMBA Option. Such barriers add around \$8 million to the overall project cost.

Transit decided to continue with its noise wall proposal but would be guided by the majority community reaction to noise walls (i.e. potential for visual impact).

In February 2003, Transit was advised that the SMBA strongly supported a tunnel through Victoria Park.

5.6 Below Ground Options (November 2001 – May 2003)

The Transit NZ Authority meeting in November 2001, noted that:

- Only an above-ground option was likely to be fully funded by National Rooding Programme³; and
- If a below-ground option was selected, it would be appropriate that the funding to meet the additional cost be obtained from local sources.

³ Now called the 'National Land Transport Programme'

In response to consultation feedback, which indicated clear community support for a below-ground option, Transit decided to investigate alternative funding sources for the below-ground options.

5.6.1 Alternative Funding Options

In April 2002 Transit separately formally asked both Auckland City and Infrastructure Auckland (IA) if they would be prepared to contribute to the additional funding required for the below-ground options.

5.6.1.1 Auckland City Council (ACC)

Transit requested answers to the following questions from ACC (by letter, dated 11 April 2002):

1. Which option does the Council prefer? and
2. Does the Council wish to contribute towards this preferred option if it requires additional alternative funding?

ACC in its written response, (submission dated 15 July 2002), stated that, *“Auckland City Council current position is that funding for improvements or additions to the state highway network should be fully funded through Transfund. The Council would be willing to jointly (with Transit NZ) approach Transfund to obtain additional funding for a preferred option if a desirable benefit cost ratio could not be achieved. The City would also support Transit NZ in approaching the Regional Land Transport Committee if the preferred option required a ranking B/C.*

At this stage in the development of the HBTC improvement project, the Council is concerned about how the inflexible nature of the existing benefit cost ratio is being applied to a major project as the only terms of reference for allocating a preferred option. This indicates to the Council that limited recognition is being applied to the greater intangible benefits and disbenefits that may result from the HBTC project.

Auckland City Council does not have a mandate to fund strategic road improvements, but could undertake collaborative agreements with Transit NZ on certain mitigation measures that would effect the local environment and road network”.

5.6.1.2 Infrastructure Auckland (IA)

Initial discussions with IA indicated that a portion of the \$90m currently allocated in its budget for roading projects over the next 5 years, could be made available for below-ground options for the HBTC Corridor. Transit therefore progressed investigations of below-ground options to a level appropriate for an application to IA.

5.6.2 Below Ground Options Evaluation Workshop

A workshop was held on 29 August 2002 to define and select the HBTC concept for the IA application. It included representatives from Transit, Beca, ACC, Chapman Tripp and specialist sub-consultants.

The workshop evaluated five options through Victoria Park and three options through St Mary's Bay. Through Victoria Park, Option A the base option was included as a basis for comparison, and the five options evaluated were:

1. Option A: (base option for comparison purposes) – west side widening of viaduct (above ground)
2. Option B: Lowered Motorway – mainly covered
3. Option B: Lowered Motorway – mainly uncovered
4. Option C: Full tunnel
5. Option C: Northbound tunnel

The base option for St Mary's Bay was included for comparison purposes. Transit also developed a curve easing option. This option 'softened' the curves of the alignment in St Mary's Bay for safety and visual amenity reasons in response to the revised SMBA option (described in paragraph 5.5.6). The curve-easing option still required harbour reclamation (albeit to a lesser amount than the SMBA revised option) harbour reclamation.

The evaluation used a comparative matrix based on a tick/cross score, with 'O' being neutral to quantify the level of benefit/effect. Table 5.5 briefly describes the outcome of the evaluation process.

Table 5.5 - Workshop option selection

Option	Key Constrc nts/benefits	Outcome
Victoria Park Viaduct		
Option A	Baseline – largely maintains existing environment with some mitigation/enhancement	Carried Forward
Option B: lowered motorway mainly covered	Air quality mitigation costs. Environmental benefits not as great as Option C	Eliminated
Option B: Lowered motorway mainly uncovered	Capex savings significantly reduced by air quality mitigation costs. No direct amenity/environmental benefits.	Eliminated
Option C: Full tunnel	Cost. Significant environmental benefits.	Carried forward
Option C: Northbound tunnel	Cost. Maintains existing environment with some environmental benefits. Viaduct remains.	Carried forward
St Marys Bay		
Base option	Baseline	Carried Forward
SMBA (revised)	Extra \$15m cost. Significant reclamation required. Traffic safety issues re inconsistent speed environment.	Eliminated
Curve Easing	Cost. Public open space issues.	Carried Forward

5.6.3 Results of Funding Application to Infrastructure Auckland

Transit met with IA at CEO level on the 3 October 2002 to commence a process that would indicate the level of funding available without the necessity of a potentially lengthy formal application process. IA undertook a 'shadow' Multi Criteria Evaluation (MCE) analysis in accordance with their procedures, at officer level. Following the MCE analysis, IA officers informed Transit that based on published information a full tunnel may be eligible for an IA grant in the indicative range of \$25 to \$30 million, with a northbound tunnel very unlikely to attract any funding.

Should Transit have decided to make a formal application to IA their officers would have recommended this funding amount to the IA Board. It was recognised that the IA Board had the authority to allocate a different amount to the HBTC Project. This was taken into account by the Transit Authority in making its decision not to lodge a formal application in November 2002.

5.6.4 Auckland Regional Council (ARC)

The ARC response to the funding issues was set out in their submission on the Briefing Document. Their submission outlined that the ARC considered funding needed to be addressed in such a way that the preferred option delivered the best transport, environmental, social and economic outcome. It outlined that it is recognised nationally

that Auckland's transport issues are a national issue, and that funding should be from national sources, rather than local sources of funding.

5.6.5 Transit Authority Decision (2002)

At its November 2002 meeting, the Transit Authority confirmed that Transit could not justify either a full tunnel or a northbound tunnel in preference to widening the existing viaduct, without local funding to meet the additional costs.

The Transit Authority took into account, IA's indication that the tunnel would likely qualify for a grant of \$25-30m. For Transit to meet the additional costs of the full tunnel or northbound tunnel would mean delaying other Auckland projects. It was considered that the improvement to Victoria Park did not justify the additional cost and the consequential delay to other critical projects.

Letters were sent to ACC, the Auckland Regional Land Transport Committee and IA, by Transit informing them that Transit proposed to proceed with seeking a designation to widen the existing viaduct, unless they received advice that additional local funding was available. The parties were requested to advise Transit of their views on this matter.

In response to these letters, both the ACC and the ARC confirmed that their preference was for an underground option. Their resolutions regarding the funding issues are discussed below.

5.6.5.1 Auckland City Transport Committee Decision

At its December 2002 meeting, the ACC Transport Committee made resolutions regarding the HBTC Project. These resolutions are set out below:

- "12 SH1: HARBOUR BRIDGE TO CITY PROJECT
- (a) That Transit NZ be informed that the option of widening the current road and viaduct is unacceptable.
 - (b) That Transit NZ be informed that Council expects the improvements to be designed to fully mitigate the impact of this corridor on Auckland City communities through a mixture of trenching and tunnelling.
 - (c) That Transit NZ be informed that Victoria Park is irreplaceable and valued community asset, and should not be further compromised.
 - (d) That Transit NZ be requested to investigate a combination of tolls and debt-funding for the Harbour Bridge to City Project."

5.6.5.2 Auckland Regional Council

At its December meeting, the ARC Strategic Policy Committee made four resolutions regarding the HBTC Project including:

- "(b) That Transit NZ be requested to delay finalising decisions on the preferred option for the Harbour Bridge to City project.
- (c) That the ARC urgently convene a workshop with Transit NZ, Auckland City Council, North Shore City Council, Infrastructure Auckland and Transfund, aimed at achieving a solution for the Harbour Bridge to City Project which achieves widespread support from interested parties."

5.6.6 Auckland Regional Council Funding Options Workshop

A HBTC Funding Options workshop, organised by the ARC, was held in March 2003. Approximately 50 people, including representatives of the ACC, ARC, North Shore City Council, Auckland Regional Land Transport Committee, IA, Ministry of Transport, Transit and local residents and property owners, attended it.

The workshop considered a number of different ways of funding the gap between the above-ground and below-ground options. The consensus was that funding should be obtained from a combination of different sources, those being, "Grants from Infrastructure Auckland/ Transfund, regional rate, territorial rate, localised rate, and an amount per annum from development and reserve contributions."

In addition, in the long-term view, there was a degree of support for a regional petrol tax. The workshop group agreed to the establishment of a taskforce to progress implementation of the funding option. It was decided that the taskforce should consist of the ARC, ACC and Transit representatives.

The taskforce met at the end of March 2003. By this time, the report of the Mayoral forum on the proposal to fund the completion of the regional transport network had become available. The "portfolio" approach being undertaken by the Mayoral Forum included similar options proposed by the workshop/ taskforce group. It was considered that there was potential for the below-ground option to be funded through the same funding mechanisms that are adopted by the Auckland local bodies and central government through the Mayoral forum work.

This conclusion was reported to the ARC Strategic Policy Committee and at its April 2003 meeting, that committee resolved that:

"Transit be requested to explore a Heads of Agreement (Between Transit NZ, ARC, and ACC) which secures an undertaking from these parties, that urgent best endeavours are used to secure the additional funds as envisaged by the Mayoral Forum (funding paper), to fund the gap between the viaduct and tunnel option. On this basis, Transit NZ be requested to provide an undertaking to proceed with consent application for a tunnel."

5.6.7 2003 Transit Authority Decision

At a meeting in May 2003, the Transit Authority determined that they would pursue discussions with ARC and ACC regarding a Heads of Agreement for funding of a below-ground option.

5.7 Preferred Option – North Bound Tunnel (December 2004)

The enactment of the Land Transport Management Act in 2003 (LTMA), allowed Transit to consider the broader social and environmental benefits of projects when seeking funding. In summary, while both above and below-ground options considered in 2002/03 were neutral in meeting the general "transport" and efficiency objectives, the underground options provided better long term environmental sustainability particularly in maintaining the open space environment in Victoria Park and providing other related benefits such as noise reduction. Given this and the support of the underground options by the Auckland City, North Shore City and Auckland Regional Councils, combined with the clear feedback

from the community consultation, the Transit Board resolved in December 2004 that the North Bound Tunnel was now the “preferred option”. The north bound tunnel involves the construction of a new north bound tunnel adjacent to the existing VPV, with the retained VPV being utilised for south bound traffic.

5.8 Conclusion

The HBTC project has been the subject of extensive consultation and investigation over the years. Alternatives assessment undertaken as part of the NOR process did not preclude any of the options as being consent able under the RMA. However, there was a clear community and stakeholder preference for a below-ground option for Victoria Park due to improved environmental outcomes. The process can be summarised as follows:

- Prior to 2003, below ground options had been discarded, as they were not fundable even though the environmental benefits were greater than those for above ground options. However, the introduction of the LTMA and the allocation of additional funding for the Auckland Region now means that an enhanced environmental solution is possible.
- Victoria Park Viaduct has some structural deficiencies and is deteriorating due to ASR attack. However, it could continue to be used for 30 to 40 years if upgrade work is undertaken.
- As a result of the investigations undertaken, a northbound tunnel is the preferred option for the Victoria Park section of the project, as it:
 - Enables the remaining functionality of the VPV to be realised.
 - Partially undergrounds the motorway corridor, without precluding full undergrounding in the future.

6 Description of the Existing Environment

The following sections provide a description of the existing environment in and adjacent to the HBTC Corridor. The potential effects of the project on this environment and mitigation measures are covered in Section 8.

6.1 Existing Land Use

This section summarises the land use activities and zoning of the sites surrounding the existing HBTC Corridor.

6.1.1 Pt Erin Park

Pt Erin Park is located at the northern extent of the HBTC corridor, between the Curran Street on-ramp and the Shelly Beach off-ramp. The Park contains the Pt Erin Baths.

Approximately half of the Park is zoned Open Space 3 within the Isthmus District Plan, with the remainder being zoned Open Space 2. The Open Space 3 zone is applied to those sites in the district, which are used primarily for organised sports and recreation, whilst Open Space 2 is applied to areas for informal recreation.

6.1.2 St Mary's Bay Residential Suburb

Within St Mary's Bay (to the north of Jervois Road), the primary land use is residential. Between New Street and Shelly Beach Road the sites are primarily zoned Residential 1. The Residential 1 zone protects Auckland's built heritage. It contains an extensive collection of timber housing (villas and bungalows), which date back to the early twentieth century. The dwellings generally stand close to the street on relatively small sites. However, within this zone, there are a variety of lot sizes and different period styles. For example London Street contains a mix of traditional dwellings with more modern buildings. The existing subdivision rules provide sites with a minimum area of 400m².

In the area surrounding Curran Street and Shelly Beach Road, the majority of sites are zoned Residential 6 (Medium Intensity) or Residential 7 (High Intensity). The Residential 7 zone is characterised by a range of building types and includes relatively high rise, (three and four storey) multi-unit development. Areas within this zone are generally found adjacent to the regional and district arterial roads. Shelly Beach Road, is a regional arterial road and an off-ramp from the motorway. The majority of sites in this road are zoned Residential 7a. The minimum density in the Residential 6 to 7 zones ranges from 375m² down to 200m².

6.1.3 Open Space at the foot of the St Mary's Bay cliff

A grassed public open space occupies the space between the motorway and the cliffs on the western side of the corridor between the AHB and Ngapona. This open space land is under the ownership of either Transit or Auckland City Council, but is maintained by ACC. Part of this land is designated 'proposed reserve' by ACC (B07-29).

A wire mesh fence separates the existing motorway carriageway and shoulder from this open space. For approximately half the length of the open space, the land owned by Transit (and the motorway designation) extends to the cliff face. For this length the wire

mesh fence serves to protect the motorway. For the other half of the length, the wire mesh fence is located on the boundary between the motorway and land owned by ACC.

The width of the open space varies along this length, depending on the distance between the motorway and the original cliff line. The largest areas of open space are located at the end of St Mary's Road and adjacent to Pt Erin Park, at the intersection of the Curran Street on-ramp and the motorway. This open space is almost entirely flat and mostly grassed. There are no buildings on the open space land. Pohutukawa trees on the St Mary's Bay cliff line overhang the open space.

This open space land is zoned Open Space 2 in the Isthmus District Plan. The Open Space 2 zone is applied to land used for informal recreation. The District Plan states that the expected outcome of the application of this zone is that the retention of areas of open space for informal recreation and visual enhancement will be assured.

6.1.4 Ngapona Naval Facility

The Ngapona Naval Facility consists of a large meeting hall building and associated carpark on a 9401.3m² site, which is leased by the Navy Volunteer Reserves. It is located on the side of the HBTC corridor hard against the road shoulder opposite the start of the northern approach embankment to VPV. This facility is accessed from a driveway from the end of St Mary's Rd, however public access to this facility is restricted. Access from the public open space at the end of St Mary's Rd through to Jacob's ladder is therefore not currently available. The site is currently designated in the Isthmus District Plan for 'defence purposes' (reference B07-16).

The single storey building which has plan dimensions of approximately 26m x 20m was constructed in 1926 and is of lightweight construction. This building has no formal historical listing or registration, but is nevertheless of historical significance because of its location on the former shoreline and long association with the Naval Volunteer Reserve. St Mary's Bay was extended through reclamation in the 1930s with the foreshore originally containing a yacht club and boatsheds. Prior to the 1950s motorway reclamation the HMNZS Ngapona stood on poles above the water.

The site on which the Ngapona facility is located is owned by ACC and leased to the Navy.

6.1.5 Jacob's Ladder

Jacob's Ladder is a public walkway, which has been in use for over 100 years and connects the Beaumont Street area with St Mary's Bay. Jacobs Ladder is a set of stairs, which extends from the eastern end of Waitemata Street down to the rear of the Ngapona building. The Jacob's Ladder steps were the historical western route to the city for those residents living along the western waterfront. The steps are currently maintained by ACC in partnership with a local school.

A sealed pedestrian accessway is currently provided from the bottom of Jacob's Ladder south east to the corner of Beaumont and Fanshawe Street. Currently, no access for the general public is possible from Jacob's Ladder north west through to the reserve area at the end of St Mary's Bay Rd, due to the location of HMNZS Ngapona.

6.1.6 St Mary's College

At the southern end of St Mary's Bay (Waitemata and New Street) is St Marys College. This site is zoned Special Purpose 2 which provides for education facilities. St Marys College is a Catholic Girls Secondary School.

6.1.7 Westhaven Drive/ Marina

To the east of the existing motorway corridor is the Westhaven Marina. The Westhaven Marina extends from the AHB, south, through to the beginning of VPV, on the northern side of the motorway. This area provides private marina berths and mooring facilities and is owned by the ACC.

Within this area, Westhaven Drive forms the eastern boundary to the motorway through St Mary's Bay. Westhaven Drive connects the north side of Beaumont Street with Westhaven Marina. At present there is a narrow strip of Transit land, approximately 1 – 3 metres in width, between the edge of the motorway carriageway (guardrail) and the post and wire fence on the boundary. This strip contains landscaping, a drainage swale and a crib retaining wall along some of its length. A further landscaping strip (approximately 1m in width) is located on the POAL property between the fence line and the edge of Westhaven Drive.

The majority of the land adjacent to the HBTC corridor (excluding Westhaven Drive) is used for parking of both cars and boat trailers. The major buildings on the marina land are the Police Headquarters, Sails Restaurant, Westhaven Marina Office and the Yacht/Cruising Club buildings (at the northern end). Public access is guaranteed to parts of Westhaven by a covenant registered on the title. The locations of the public access ways are generally indicated on the Concept Plan in the Isthmus District Plan ('A07-02 Concept Plan – Open Space 5 Zone – Westhaven', Appendix B (Planning Maps), Section A – Page 1).

The Westhaven marina is zoned Open Space 5 within the Auckland City Isthmus District Plan. The Open Space 5 zone is designed to provide for large-scale leisure and recreation activities. The dominant activity provided for in the District Plan on this site is the provision of land-based facilities associated with the marina berths and pleasure boating (including parking areas).

The marina is designated a Mooring Management Area in the Auckland Regional Plan: Coastal (ARP: C). The purpose of the Mooring Management Areas as stated in Section 2.6 of the ARP: C, *"is to encourage the concentration of moorings within defined areas for management purposes and to ensure efficient use is made of the coastal marine area"*. The Westhaven marina is therefore recognised as an important physical resource for boating.

6.1.8 Waitemata Harbour

The Waitemata Harbour is the gateway to the Hauraki Gulf and the majority of New Zealand's imports and exports by sea. The harbour is particularly important to Aucklanders who value it for recreational use and its connections with the identity of Auckland City, known as the 'City of Sails'.

The Waitemata Harbour adjacent to the HBTC Project area is classified in the ARP: C as a 'General Management Area'.

6.1.9 Victory Christian Church

The Victory Christian Church and associated carpark and administration buildings occupy a large site (1.7817 ha) on the south-western corner of Beaumont Street and Fanshawe Street. The main Church building is located in the south-western corner of the site. The original resource consent (1981) for the building/church activity provided for a seating capacity of 4000 people. However, the Church obtained a resource consent in 1988 to allow them to use part of the auditorium building for classrooms. A condition of this resource consent restricted the seating capacity of the auditorium to 2400. However, the Church has advised that they have the right to revert to the original terms of their consent (seating capacity of 4000), upon ceasing classroom use.

There is also a smaller separate administration building located in the northwestern corner of the site (adjacent to the existing motorway designation). The Church has advised that this building is used for an office, and Church related meetings. An outdoor children's playground is located near this building, adjacent to the northern boundary of the site.

The Church site is zoned Business 4/ Mixed Use in the Isthmus District Plan. Approximately half of the site is used for carparking. The Church obtained a resource consent in November 2000 to operate validated carparking Monday to Saturday. This consent provided for the existing 320 on-site car parking spaces to be used in the following way:

- 19 spaces for the exclusive use of Church employees (located adjacent to the Church offices);
- 100 spaces – the first two aisles closest to the auditorium are roped off for use exclusively for Church patrons in the event of a mid-week event or meeting;
- The balance of 201 spaces is used for validated parking. The pay and display area is run by Tournament Parking during the working day.
- On Sunday, the 320 parking spaces are all available for Church use.

6.1.10 Beaumont Quarter

The Old Gas Works site on Beaumont Street, is a large 2.3665ha site, which has been redeveloped as a mixed-use development, known as the Beaumont Quarter. This site is located on the western side of Beaumont Street and is currently between 65m and 150m from the VPV.

The historic brick buildings that extend along the Beaumont Street frontage have been re-fitted and are being used for a mix of office and retail. Apartments/townhouses and car-

parking have been constructed on the large area of remaining land behind (to the west) the historic buildings. The development contains approximately 240 dwellings.

The remainder of the land between the eastern boundary of St Mary's College, College Hill and Beaumont Street, contains a variety of commercial and light industrial premises ranging from office buildings to panelbeaters. The sites within this area are zoned Mixed Use in the Isthmus District Plan.

6.1.11 Apartments and Supermarket

The block of land bounded by Victoria Street West, Franklin Rd and Scotland Street is occupied by a New World Supermarket and the Beaumont Apartments. Vehicular access to both the supermarket and the apartments is from Franklin Road. The apartment complex has two blocks, with one block fronting Franklin Road and one block fronting Victoria Street. The Franklin Road block is closest to the existing VPV, with the distance from the edge of the existing structure ranging between 50m and 80m.

6.1.12 The Birdcage Hotel

The Birdcage Hotel is located on the western side of the HBTC corridor opposite the Victoria Park Market. The land and buildings are owned by Transit. A private, commercial business, providing restaurant and bar facilities is housed in the Hotel in a number of small interconnected buildings alongside and partly beneath VPV. The central feature is the original two-storey brick hotel built in the 1860's. The hotel and the site it occupies (former shoreline) is of historical significance with a Historic Place Trust (HPT) Category II listing and ACC category B listing.

6.1.13 Western Reclamation

Beaumont Street, north of Fanshawe Street, provides one of two main entry points to the area of waterfront land known as the Western Reclamation. The Western Reclamation is at the western end of what is known as the Central Area of Auckland City.

The Western Reclamation consists of approximately 35 hectares of land reclaimed at the foreshore of the Waitemata Harbour. It includes Wynyard Wharf, the area known as "The Tank Farm" and part of the land occupied by the America's Cup bases. The majority of the land is owned either by POAL or Viaduct Harbour Holdings, with a large proportion of this being in long-term leases. This area is covered by the Central Area District Plan and forms the 'Western Reclamation Precinct'.

The Precinct hosts a diversity of commercial activities most of which need to be located in proximity to the harbour, port or harbour edge. The area is the region's second major hazardous substance storage and distribution location. Activities on the Western Reclamation include:

- The southern and south-eastern parts contain businesses focused on serving the marine industry, e.g. diving equipment, navigation equipment and accessories;
- Oil companies and industrial plants lease much of the land north of Pakenham Street;
- A number of restaurants and café/bars operate on the western and eastern sides;

- Ship-to-shore transfers of petroleum and other products occur via pipeline at Wynyard Wharf. In addition, bulk sand and shingle cargoes are handled at the inner southern berth; and
- A specialist bulk cement wharf operates on the western side and coastal and Gulf islands cargo services operate from the northern side of Jellicoe Street.

The sites within the Western Reclamation, in Westhaven Drive (public section) and Beaumont Street, which are adjacent to the motorway, are predominantly businesses associated with the marine industry.

6.1.14 Victoria Park

Victoria Park is the 9-hectare block of land bounded by Victoria Street West, Beaumont Street, Fanshawe Street and Halsey Street. It is reclaimed land and is part of what was previously Freemans Bay. Victoria Park is held in fee simple title by ACC and is not subject to the provisions of the Reserves Act.

The VPV passes over the western side of the Park. Recreational activities on either side of the existing viaduct have evolved into field sports (cricket and rugby) to the east, and sports such as bowls, petanque and skateboarding to the west. (i.e. a degree of severance currently exists).

There is a children's playground, wide pedestrian pathways and seating along the southern boundary of the Park. London Plane Trees, located along the path around the periphery of the sports fields, encircle the park.

A grandstand and associated cricket clubrooms/ indoor training facility is located on the northern boundary. A building used as rugby league clubrooms is located in the northwestern corner of the park. This building is located approximately 8 metres to the west of the existing VPV. A caretaker's building is located in the northeastern corner of the site.

The Campbell Free Kindergarten building (currently disused) is located in Victoria Park immediately adjacent to the eastern side of the VPV, just north of Victoria Street. It is owned by ACC and has a Category B rating in the Central Area District Plan.

Victoria Park is zoned Public Open Space 1 in the Central Area District Plan. This zone covers major parks, squares and reserves. Victoria Park is one of four large areas of public open space within the area covered by the Central Area District Plan, the others being Albert Park, Myers Park and the Symonds St Cemetery. The Central Area District Plan states that Victoria Park fulfils an important role as a sports ground as well as an open space resource for local residents and workers. The District Plan states that the Park forms a distinctive "green belt" between the City and the northwestern suburbs. Victoria Park is also subject to the Victoria Park Management Plan.

6.1.15 Victoria Park Market

The Victoria Park Market is located on the eastern side of the HBTC corridor towards the southern end of VPV. The Market buildings have a Category B historic rating and any effect on the west wall, which forms part of the building, would be significant.

6.1.16 Residential land in Napier Street

A townhouse development is located at the end of Napier Street. The western most building in the development is approximately 15m from the existing motorway.

6.1.17 Freemans Bay Primary School

The Freemans Bay Primary School is located on the corner of Wellington St and Hepburn Street. Parts of the playing fields adjoin the west side of the motorway corridor.

6.1.18 Commercial, light industrial and residential land uses around VP Market, Cook St and Union St.

A building with a variety of commercial tenants is located on the east side of the motorway on lower Union Street between Drake Street and Sale Street.

Other commercial properties are located on Union Street, Cook Street and Sam Wrigley Drive. Placemakers (hardware store) has a large retail outlet with access from Cook Street and Union Street.

6.2 Local Road Network

The HBTC corridor is within an established urban environment with a supporting roading network. The following provides a description of the current local road environment.

6.2.1 The Local Road Transport Network

6.2.1.1 Fanshawe/ Beaumont Street Intersection

The Fanshawe/ Beaumont Street Intersection is a major intersection located immediately east of and partly beneath the existing VPV towards its northern end.

6.2.1.2 Victoria/ Union Street Area Intersection

Cook Street Off Ramp Area

The Cook Street Off Ramp is located immediately to the south of VPV. It provides access for southbound traffic to the central city.

Franklin Road

Franklin Road is located immediately west of the existing VPV. It is described in the Isthmus District Plan as a District Arterial road.

6.2.2 Roading Hierarchy

The Auckland City District Plan provides for the road network throughout the City. Roads are classified according to their intended function in the form of a hierarchy.

The road classification hierarchy is as follows:

■ Primary Roads:

Strategic Routes – part of the network of strategic national importance. Within the study area the only strategic route is the HBTC Corridor itself (SH 1).

Regional Arterials – these roads carry the major traffic movements between the principal sectors of the region not catered for by the strategic routes. The regional arterials within

the study area include Victoria Street West, Beaumont Street, Curran Street, Shelly Beach Road and part of Jervois Road. Traffic flows may be up to and in excess of 40,000 vehicles per day (vpd) and will typically vary from two to six lanes of traffic.

■ Secondary Roads:

District Arterials – These roads carry traffic between major areas of the City (in a manner similar to Regional Arterials above). Within the study area, District Arterials include Franklin Road, College Hill and part of Jervois Road. Traffic flows on these routes will vary between 5,000vpd and 25,000 vpd and will typically vary between 2 and 4 lanes.

Collector Roads – These routes generally collect and distribute traffic to and from the arterial road network. In many instances these roads provide connections between arterials and will generally carry traffic in the order of 3,000vpd and 10,000vpd. The only Collector Road in the study area is Wellington Street.

Local Roads – These roads provide direct access to abutting properties and may also serve to collect and distribute traffic from other local streets in an area. The remaining roads within the study area are local roads, carrying traffic flows generally up to 5,000vpd.

6.3 Existing Social Environment

To determine the existing social environment, the 2001 Census data, obtained from Statistics New Zealand, has been used. The statistics have been used to identify the community characteristics for the areas, which border the existing route. Analysis has been undertaken at Census Area Unit (CAU) level.

The census area units, which were used in this analysis were:

- Auckland Central West
- Auckland Harbourside
- St Mary's
- Freemans Bay

6.3.1 Population Profile

The following population profile is based on 2001 Census data, obtained from Statistics New Zealand.

6.3.1.1 Population Increase (1996 – 2001)

The Freemans Bay and St Mary's census area units are located on the western side of the HBTC corridor and have a relatively stable population structure, with low population growth. The 2001 Census results indicate a 1.5% increase and -6.0% decrease population change in these census area units (1996-2001), which compares to the national population increase of 3.3% for the same period. In contrast, the Auckland Central West and Auckland Harbourside Census area units, which are located on the eastern side of the HBTC Corridor have a rapidly growing population as indicated by the 2001 census results, with a 79% and 789.5% increase in population between 1996 and 2001.

6.3.1.2 Age Groups

In Auckland City, 19.7% of people are aged under 15. The CAU's on the eastern side of the HBTC corridor are within the Auckland CBD and therefore the percentage of the population under 15 is significantly lower, at an average of 4%. The percentage of people under 15 in the St Mary and Freemans Bay CAU's is higher at an average of 12%, but still much lower than the Auckland City figure.

In the same way, on average the percentage of the population over 65 years in the project area is less than in the whole of Auckland City. 10.3% of people in Auckland City are aged 65 and over. In the CBD CAU's, namely, Auckland Central West and Auckland Harbourside, a lower percentage of the population are over 65 years (5.3% and 3.6%). In the western CAU's on average 9% of the population are 65+. However, it is noted that the percentage of people over 65 in the St Marys CAU is the highest at 10.5%. As the above figures indicate, there is a higher than average percentage of working age people (15-65 years) in the project area. On average 85% of the population in the project area are of working age as compared to 70% in Auckland City as a whole.

6.3.1.3 Ethnic Groups (total responses)

A total of 65.7% of people in Auckland City said they belong to the European ethnic group. In the St Marys and Freemans Bay CAU's a significantly higher proportion of people said they belong to the European ethnic group, at 86% and 81%. In Auckland Central West, the percentage of people who said they belong to the European ethnic group was lower at 49%.

The proportion of people within the project area who said they belonged to the Maori ethnic group was on average 7%. This compares to the whole of Auckland City, where 8.4% of people said they belong to the Maori ethnic group. However, it is noted that the proportion of people who said they belonged to the Maori ethnic group was lower in the Auckland Harbourside CAU at 3% and higher in the Freemans Bay CAU at 9%.

There was a lower proportion of people in the project area who said that they belong to Pacific Peoples ethnic groups. 7% of people in the project area as compared to 13.7% of people in Auckland City as a whole said they belonged to Pacific Peoples ethnic groups.

Overall, a slightly higher proportion (15%) of people in the project area said that they belonged to Asian ethnic groups, as compared to Auckland City as whole, where the proportion is 13.7%. However, there were distinct differences between the individual census units. Within the Auckland Central West CAU a significantly higher proportion (33%) of people said they belonged to an Asian ethnic group. The population of St Marys and Freemans Bay contains a much lower proportion of Asian people at 4% and 5% respectively.

6.3.1.4 Personal Income

In Auckland City, 38.8% of the working aged population (aged 15 years and over) earn greater than \$30,000 a year. Within the Auckland Central West CAU the proportion of the population earning over \$30,000 is similar at 39.3%. However, in the majority of the project area, the proportion of the population earning over \$30,000 is significantly higher (between 50.7% and 53.6%) than for the whole of Auckland City.

6.3.1.5 Years at Usual Residence

Within the eastern CAU's, namely Auckland Central West and Auckland Harbourside, the majority of people (77% and 82%) have lived at their current residence for less than 5 years. In these two CBD CAU's, a large proportion of the population, 54% and 66% respectively, have lived at their current address for less than 1 year.

In the western CAU's, namely St Marys and Freemans Bay, the majority of people (63% and 67%) have lived in at their current residence for less than five years. However, it is noted that the population in these CAU's is less mobile than in the CBD CAU's. This is reflected in the proportion of people who have lived at their current residence for between 5 and 10 years (16% and 12% respectively) and those who have lived there for 10 - 25 years (14% and 11%).

6.3.1.6 Occupation Group

Table 6.1 summarises the proportion of the population in each occupation group. The two occupation groups, which the highest proportion of people are employed in, on average across the project area, are 'Legislators, Administrators and Managers' at 21% and 'Professionals' at 22%. It is noted that in the Auckland Central West CAU that there is a relatively even distribution (16% - 18%) between four occupation groups, including the above two and 'Technicians and Associate Professionals' and 'Service & Sales Workers'.

Table 6.1 - Occupation for Usually Resident Population Aged 15 Years and Over Gainfully Employed in the Full-time or Part-time Labour Force⁴

CAU	Auckland Central West	Auckland Harbourside	St Marys	Freemans Bay
Legislators, Administrators and Managers	16%	25%	26%	20%
Professionals	18%	18%	24%	25%
Technicians and Associate Professionals	16%	14%	19%	18%
Clerks	14%	9%	10%	11%
Service & Sales Workers	16%	11%	11%	12%
Agriculture and Fishery Workers	0%	1%	0%	1%
Trades Workers	3%	2%	4%	4%
Plant & Machine Operators and Assemblers	2%	2%	1%	2%
Labourers and Related Elementary Service Workers	3%	1%	1%	3%
Not elsewhere included	12%	14%	4%	4%

⁴ Source: Statistics New Zealand, 2001 Census of Population and Dwellings

6.3.1.7 Household Composition

The three household types, which are on average, most prevalent within the project area are, 'one-person household' at 34%, 'couple only' at 23% and 'household of unrelated people' at 15%. When, considering the results for the St Marys CAU in isolation though, it is noted that the third most common type is 'couple of children'.

6.3.1.8 Dwelling Type

There is a difference in the most common type of dwelling type between the eastern CBD CAU's and the western CAU's. Within the CBD CAU's a large proportion of the population (57% on average) live in a dwelling type encompassed by the description, *'Three or more flats/units/townhouses/apartments/houses joined together, in 3 or more storey building'*.

Within the St Marys and Freemans Bay CAU's the highest proportion of people (45% and 38%) live in a 'separate house'. However, in comparison to the whole of Auckland City, a large proportion of people live in multi-unit housing. The proportion of people living in a dwelling, which was in a building with three or more flats/units/townhouses etc was 27% in the St Marys CAU and 36% in the Freemans Bay CAU.

6.3.1.9 Car Ownership

It is important to note that Statistics New Zealand defines household in terms of physical structure (e.g. dwelling or unit) and there may be more than one family within a single 'household'.

Car ownership within the project area is considered to be relatively high, particularly as the project area is so close to the CBD. On average over the four CAUs, only 19% of households have no motor vehicles. 40% of households have one motor vehicle and 24% have two motor vehicles.

It is noted that the Auckland Central West CAU has a higher proportion of households (33%) that have no motor vehicle, than the other three CAU's.

6.3.1.10 Means of Travel to Work

Within the project area, on average, the most popular method of travelling to work (34%), was driving a private car, truck or van. However, within the Auckland Central West CAU a relatively large proportion of people (38%) said that they walked or jogged. In the St Marys CAU, a noticeable proportion of people (12%) worked at home.

6.3.2 Businesses

Table 6.2 Businesses in the HBTC project vicinity⁵

⁵ Statistics New Zealand, Annual Business Frame Update Survey (AFUS)

Type of business	Auckland Central West	Auckland Harbourside	St Marys	Freemans Bay
Business Services	23%	15%	24%	29%
Property Services	22%	25%	25%	19%
Finance	9%	9%		5%
Personal & Household Good Retailing	6%	6%		8%
Accommodation, cafes & Restaurants	5%	5%		5%
Personal & Household Good Wholesaling			4%	
Motion picture, radio & television services			4%	
Libraries, museums and the Arts			4%	

Table 6.3 Number of employees per business in the HBTC project vicinity

No. of employees	Auckland Central West	Auckland Harbourside	St Marys	Freemans Bay
0 - 5	78%	80%	86%	87%
6 - 9				6%
10 - 49	11%	10%	8%	

6.4 Visual and Landscape

A landscape and visual assessment was undertaken by LA4, in October 2005. The following is a summary of the existing visual and landscape environment (see Technical Appendix #7 - Auckland Harbour Bridge To City Visual and Landscape Effects Assessment, October 2005).

6.4.1 The Existing Harbour Landscape and St Mary's Bay

The landscape of much of this area is dominated by its proximity to the part of the Waitemata Harbour lying east of the Harbour Bridge, Westhaven Marina and St Mary's Bay.

The surrounding landforms and man-made features define this part of the harbour. To the northwest is the Harbour Bridge, and the rocky headland of Point Erin to the west. To the north is the Waitemata Harbour and to the east is the main harbour entrance. To the south and east are the CBD, the defining coastal cliffs of St Mary's Bay, and Victoria Park. The following landscape features were identified as being the key components to the character of this part of the harbour:

- The small remnant of St Mary's Bay;

- Westhaven Marina;
- St Mary's Bay cliff (and the pohutukawa along it);
- The rocky, vegetated promontory of Point Erin; and
- The views of the water (harbour and St Mary's Bay) from the motorway and residential areas largely uninterrupted by man-made elements.

This area is arguably the most viewed piece of harbour in New Zealand. Thousands of commuters look at it as they move to and from Auckland along the motorway and across the Harbour Bridge each day; and large numbers of office workers and residents look out over it from St Mary's Bay, Ponsonby and the CBD.

6.4.2 Victoria Park

Victoria Park is a large inner city park constructed on reclaimed land. It is sited between Beaumont, Fanshawe, Victoria and Halsey Streets and is surrounded by a band of large mature London Plane trees, with other trees also of notable size. Most of the mature London Planes are scheduled trees, and are highly significant in visual terms adding considerably to the amenity of this area. This is the largest open space near the CBD and is used for a range of active recreation, particularly cricket and soccer. Toward the western side of the park is a skateboarding facility, a petanque terrain and a bowling green. The park is also used extensively for passive recreation such as walking, jogging and picnics.

Although largely disguised by built development the original coastal cliff edge can be seen curving south from Fanshawe Street, along the west of Beaumont Street.

Significant landscape features in this area are:

- Victoria Park (particularly its mature trees and spaciousness); and
- The original coastal cliff edge.

6.4.3 The Landscape of the Motorway Corridor

Three main landscape units unfold as one travels along the motorway corridor from Cook Street towards the Harbour Bridge.

6.4.3.1 Landscape Unit 1 - Wellington Street

In the area of Wellington Street, the motorway is in an enclosed cutting with vegetated slopes either side. Moving northward, the motorway is overlooked by commercial buildings, particularly on the eastern side, with the Birdcage Hotel to the west. Travelling along this section, views are focussed ahead along the VPV. The characteristics of this small unit are its enclosed nature, and its views focussed to the north - to the harbour and the buildings and advertising billboards on the corner of Beaumont and Fanshawe Streets.

6.4.3.2 Landscape Unit 2 - Victoria Park

Travelling north across the VPV views are out into the tree tops in the park. Industrial and marine buildings mainly dominate views towards the harbour. The Orams Dry Stack building blocks views out to the Waitemata Harbour from the viaduct until the viaduct turns westward and St Mary's Bay and the marina become visible. For motorists this is the

first close contact with the Waitemata Harbour from the motorway corridor. Travelling south the views out across the park and to the city to the east are significant.

The characteristic of this landscape unit is one of low enclosure, achieved mainly by the barriers on the viaduct and the tops of the trees, with occasional views out.

6.4.3.3 Landscape Unit 3 - St Mary's Bay

Travelling northwest from Beaumont Street, the motorway passes through an area tightly enclosed by buildings and the motorway viaduct. It is at this point that the visual experience of the city gives way to the harbour edge/marina landscape.

North west of HMNZS Ngapona, glimpses of the water of St Mary's Bay on the right are available with the marina beyond. On the left, the pohutukawa clad cliff with the houses perched on the cliff top are the main focus of the view. The motorway swings along the base of these cliffs and there is a sense of being on the dividing line between the harbour and the land. There are a number of vertical elements along this corridor such as lamp posts, stanchions for signs and the masts of yachts in the adjacent marina.

Toward the harbour and the North Shore views are filtered through the yachts. Although further westward, the buildings surrounding Westhaven marina tend to block views to the north.

For those travelling north from the inland parts of the motorway and further south, or the city streets of Auckland, one of the important aspects of this stretch of motorway is the sense of being close to the water - part of the harbour/marina landscape. For these motorists this is the first close contact with the Waitemata Harbour. The remaining areas of water in St Mary's Bay, although small, still give a sense of being connected to the sea, particularly with the combined influence of marine activities. Glimpses of areas of water close to the motorway are an important part of this experience, as are the views of the boats in the marina.

The sensitive elements in this landscape unit are the cliffs and the pohutukawa on the southern side of the motorway, and the remaining areas of open water to the north.

6.4.4 Viewing Audience

The following groups comprise the main audience viewing audience that is the people who are able to see the motorway:

- People travelling on the motorway either northwards or southwards. They would include commuters in private cars and in buses, commercial vehicle drivers, and tourists;
- Some residents who live in the St Mary's Bay area, or overlooking Victoria Park;
- Motorists and pedestrians using nearby roads;
- Office workers in buildings overlooking the various options, and people in offices in the CBD that overlook this area;
- People using Westhaven Marina and the Western reclamation;
- People using Victoria Park for active or passive recreation;
- People walking along the base of the St Mary's Bay cliffs and

- People using retail and commercial premises in the vicinity of Victoria Park market.

6.5 Heritage

A Heritage Assessment was undertaken for the HBTC corridor by Clough & Associates in August 2001, (See Technical Appendix No. 5: Harbour Bridge to City: Heritage Assessment, October 2005). The existing heritage features in the project area are summarised in Table 6.4 below.

The project area transects Freemans Bay, one of the earliest areas of settlement in the new capital city of Auckland. Prior to European settlement in 1840, Freemans Bay contained remains of earlier Maori settlement, with pa sites occupying the headlands at either end of the bay. Gradually, with the expansion of the city, the headlands were cut back and used for reclamation of the bay to provide room for the expansion of industrial and commercial activities along the waterfront. The reclamation process, begun in the 1850s, continues today leaving sites, which once lay on the foreshore, several hundred metres from the water.

6.5.1 Sources of Information

A number of archaeological and historic sites were recorded within close proximity to the project area. The New Zealand Archaeological Association regional site file, the Auckland Regional Council's Cultural Heritage Inventory (CHI) and Auckland City District Plan Schedules were searched for historic archaeological sites recorded on and in the vicinity of the proposed route. The Historic Places Trust Register was consulted for information on registered or listed buildings. Early maps and plans (DPs and SOs) held at Land Information New Zealand (LINZ) were examined and relevant archival material was researched including early photographs, plans and maps and street directories.

6.5.2 Remaining Sites

There are no intact structures remaining in the immediate vicinity of the proposed motorway extensions relating to Maori or the earliest European settlement of Freemans Bay. Maori heritage areas have been identified in the vicinity of the former headland pa and the original foreshore, but there are no physical remains from this period. There are several heritage items that relate to the later 19th and early 20th century which form part of the Freemans Bay heritage landscape. These include the Birdcage Hotel, Victoria Park Market (the Destructor), another hotel (Freemans Hotel)⁶ to the east of the Market, the Beaumont St Gasworks, the Campbell Free Kindergarten and HMNZS Ngapona.

A summary of the heritage sites and buildings within the vicinity of the HBTC route is provided in Table 6.2 below and considered in more detail in the report prepared by Clough and Associates – see Technical Appendix #5.

⁶ This building is well removed from the proposed works area and will not be affected.

Table 6.4 - Heritage Sites and Buildings

Feature	Comment
The Birdcage Hotel (Former Rob Roy Hotel)	<ul style="list-style-type: none"> Part of a collection of 19th Century pubs around Auckland - Site of a hotel since 1865. Property was close to the Freemans Bay shoreline and its corner location refers to an earlier street layout. Current building constructed in 1886. The building is architecturally significant and the original exterior and interior remain largely intact. Archaeological potential is reasonable high. The hotel and its surrounds are scheduled in the Auckland City Council District Plan: Isthmus Section as a Category B building. The hotel has been registered by the Historic Places Trust as a Category II Historic Place. Still operated as a hotel today.
Campbell Free Kindergarten	<ul style="list-style-type: none"> Completed in 1910. First kindergarten in Auckland and its construction was funded by John Logan Campbell. Architecturally significant and it is believed that much of the original interior remains. In the late 1950s, the KA moved the service to a new site and the building was handed over to Auckland City Council. Since then it has been used as the clubrooms for the Grafton Cricket Club and as a practice room for a pipe band. Building and its surrounds are scheduled in the ACC District Plan as category B. Currently unused and in a state of disrepair.
Victoria Park Market (former destructor)	<ul style="list-style-type: none"> Refuse Destructor (rubbish sorted and disposed of) completed in 1905. 1908, a boiler room, generator room and battery house were added and it began generating electricity. 1972, the destructor was closed and was later redeveloped as Victoria Park Markets. The destructor complex is scheduled in the ACC District Plan as Category A, includes the buildings (interior and exterior) and the surrounds (excluding the carpark). Historic Places Trust - the chimney has been registered as Category 1 while the battery house, generator room, boiler room, destructor building and depot buildings have been registered in Category II.
HMNZS Ngapona	<ul style="list-style-type: none"> Historically significant because of its location and its long association with the Naval Volunteer reserve. The headquarters and classroom buildings have been used since 1926. One of the few buildings, which relates to the former shoreline and it originally stood on piles in the water. Not registered by the NZHPT or scheduled by ACC.

Feature	Comment
Victoria Park Trees	<ul style="list-style-type: none"> Group of 65 London Plane Trees, which form a band around the park and date from around the opening of the park in 1905.
Auckland Gas Company Offices and Workshop Buildings	<ul style="list-style-type: none"> Historically significant due to their 100 year association with the Auckland Gas Company (now Enerco) and the production of coal and gas from the site for around 65 years. The buildings fronting Beaumont St were constructed between 1902 and 1924. Scheduled in the ACC District Plan as Category B. The buildings along the Beaumont Street frontage have been registered by the Historic Places Trust as a Category II Historic Place. The site is presently being adapted as a residential apartment complex.
Jacob's ladder	<ul style="list-style-type: none"> 99 step walkway leading down from Waitemata Street in St Mary's Bay down the cliff face to the harbour. Historically significant because of its relationship with the former shoreline, its age and continued use for over 100 years. Not registered by the NZHPT or scheduled by ACC.

6.6 Maori Heritage Values/ Sites

The recorded archaeological sites include two former headland pa. The headland pa, have been largely destroyed by earlier reclamation and development of the area and any remains will not be impacted on by the project. These areas (along with the original foreshore) have also been recorded as Maori heritage sites by Auckland City Council.

Sources of information used to determine the location of any Maori heritage sites were:

- The ARC's Cultural heritage inventory database;
- The Auckland City Council District Plan, Isthmus and Central Area Sections; and
- Discussions with George Farrant, Manager Heritage Planning, Auckland City Council.

One of the former headland pa sites was located in the general area of the southern approaches to the Harbour Bridge and Pt Erin Park. The other was located in the general area of where the VPV, Beaumont St and Victoria Park meet. Victoria Park is reclaimed land and was previously part of Freemans Bay, close to the original shoreline. Auckland City have also scheduled in the District Plan areas around this headland, which were shellfish gathering areas and a canoe hauling area.

6.7 Noise

An assessment of potential traffic noise effects of the HBTC Project has been undertaken by Marshall Day Acoustics. As part of this assessment a measurement survey of the existing ambient noise environment for residential properties within the project area was

undertaken. To assist with the explanation of this section of the AEE report, the noise terminology is explained in the following table:

Table 6.5 Noise Discussion Definitions

Term	Explanation
dBA	A measurement of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
Facade Effect	The Facade effect allows for the reflection of sound from the facade of a building. The Transit Guidelines specify receiver positions to be assessed at 1 metre from the most exposed facade. The Facade Effect adds 2.5 decibels to predicted noise levels.
L_{eq}	The time averaged sound level (on a log/energy basis) over the measurement period (normally A-weighted).
L_{95}	The sound level which is equalled or exceeded for 95% of the measurement period. L_{95} is an indicator of the mean minimum noise level and is used in New Zealand as the descriptor for background noise (normally A-weighted).
L_{10}	The sound level which is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level and is used in New Zealand as the descriptor for intrusive noise (normally A-weighted).
L_{max}	The maximum sound level recorded during the measurement period (normally A-weighted).

6.7.1 Measurement Positions

6.7.1.1 1995 Survey

The 1995 survey included four measurement positions on the city-side of the Harbour Bridge: Amiria Street, Ring Terrace, London Street and Napier Street. In June 2001, before the commencement of the 2001-2002 survey, a measurement at the same address in Ring Terrace was conducted to assess whether the 1995 survey results were still valid after 6 years. The noise levels were found to be very similar, therefore, the inclusion of the 1995 results in this study is considered appropriate.

6.7.1.2 2001 - 2002 Survey

The main areas surveyed in the 2001 - 2002 study were St Mary's Bay, the area surrounding Victoria Park and Freemans Bay. St Mary's Bay is the most densely populated residential area in the study with many cliff-top houses looking directly onto the motorway, therefore the majority of survey sites selected were in this area. In Freemans Bay, the majority of sites were houses, but in the Victoria Park area, apartments and dwellings on top of commercial buildings are more prevalent than houses.

Nineteen sites were used for the 2001 - 2002 survey giving a total of 23 sites when combined with the four sites from the 1995 survey. Eighteen of these sites were in St Mary's Bay, two in the vicinity of Victoria Park and three in Freemans Bay.

6.7.2 Interpretation of Measured Results

6.7.2.1 Marys Bay

The measured L_{eq} levels (24hour) in St Mary's Bay ranged from L_{eq} 53dBA at Dunedin Street (Site No. 13) to L_{eq} 70dBA at Ring Terrace (A) (Site No. 4) with an average of L_{eq} 63dBA throughout the area. The cliff-top sites ranged from L_{eq} 65 to 70 dBA, while the sites one row back from the cliff (including the southern side of Shelly Beach Road, Hackett Street and London Street) ranged from L_{eq} 53 to 62 dBA. This demonstrates the considerable shielding effects of the cliff-top houses and the extra distance back from the cliff for the houses on the western sides of the roads concerned.

6.7.2.2 Victoria Park and Freemans Bay

The measured L_{eq} levels in these areas ranged from L_{eq} 58 dBA at Hepburn Street (Site No. 22) to L_{eq} 67dBA at the corner of Victoria Street West and Franklin Road (Site No. 19) with an average of L_{eq} 64 dBA throughout the area. The two sites closest to the VPV (Sites Nos. 19 and 21) show the highest levels. However, the receiver positions below the level of the viaduct, eliminating the line-of-sight to the road surface, have lower noise levels than more elevated residences.

6.7.2.3 General Comments

Marshall Day noted that, the average noise levels are approximately equal for each of the areas in the survey although the St Mary's Bay survey has a larger range of values. This is most probably due to the larger number of survey sites, the greater distances and increased shielding for some properties, and the fact that the cliff-top sites in St Mary's Bay are exposed to 8 lanes of traffic but only 4 lanes on the VPV.

In general the sites at which the lowest noise levels were measured had some or a combination of the following attributes:

- A larger distance from State Highway 1;
- No line-of-sight to State Highway 1;
- Were well surrounded and shielded by other houses etc; and
- Were situated on streets with low traffic flow.

6.7.3 Computer Modelling of Traffic Noise Generation

Computer modelling of noise produced by road traffic is a vital tool in the prediction of traffic noise impact on areas in the vicinity of major roads, and for the determination of mitigation measures. For the HBTC Project, Marshall Day used the 'SoundPLAN' software. The computer model produces plans showing noise level contours and also calculates the noise levels at selected point receiver positions for increased accuracy.

The noise levels predicted by the model, were checked against the measured levels. Table 1 of Technical Appendix #10 contains a comparison of the measured and predicted levels and shows that for the majority of positions there is good agreement between the measured and predicted levels, with less than two decibel difference. For the positions where there is a greater differential, this is considered by Marshall Day to be due to noise sources other than that of traffic noise resulting in higher measures levels.

6.7.4 Noise Conclusion

The measurements undertaken of the existing noise environment within St Mary's Bay, Victoria Park and Freemans Bay confirmed that traffic noise levels received in these affected areas are high, ranging up to 75 decibels (L_{eq}).

6.8 Geotechnical

6.8.1 Introduction

The existing geotechnical conditions in the project area are described in Technical Appendix #3: Preliminary Geotechnical Assessment – Northbound Tunnel. A summary is provided below.

Details of ground conditions used in the preparation of Technical Appendix #3 were principally derived from geotechnical investigations undertaken between May and July 2001, together with information sourced from Auckland Regional Council (ARC) records, previous Beca investigations not associated with the HBTC project, as well as preliminary data obtained from a current in progress investigation assessing groundwater conditions of the HBTC project area. The locations of investigation points are provided on the Geotechnical site plan, (Figure 1, Appendix A in Technical Appendix #3).

6.8.2 Site Features

The HBTC corridor generally occupies low-lying (+3mMSL to +5mMSL) reclaimed land of the original Freemans Bay embayment and shore platform and St Marys Bay foreshore, as well as naturally infilled drainage gullies and channels originating from the surrounding elevated land and former shoreline cliffs to the south and southwest. The southernmost portion of the corridor occupies the elevated land above the former shoreline, the western side being located in the upper slopes of a moderately incised north oriented drainage valley.

The HBTC corridor can be subdivided into three sections of similar topography, sub-surface condition and existing road construction, each section having broadly similar geotechnical issues:

- St Marys Bay to Victory Christian Church (northern portion)
- Victory Christian Church/Victoria Park (centre)
- Victoria Park to Wellington Street (southern portion).

6.8.3 Site Geology

The geology of the study area is shown on the Geotechnical site plan, (Figure 1, Appendix A) and Long-Section, (Figure 2, Appendix A) in the preliminary geotechnical assessment report. The extent of geologic units shown on the plan are derived primarily from the geologic map Sheet R11 Geology of the Auckland Urban Area 1:50,000 (Kermode, 1992) as confirmed by investigation drilling, construction records and field mapping of outcrop and surface morphology.

In general, the following materials are encountered along the HBTC project alignment:

- Fill;
- Tauranga Group Sediments; and
- Waitemata Group rocks and derived soils

6.8.3.1 Fill

This unit may be further differentiated:

- Construction Fill. Mixed clay to gravel sized materials, variably compacted and may include demolition debris.
- Hydraulic Fill. Forms the St Marys Bay and Westhaven reclamation comprising very soft silts and sand and considered prone to liquefaction.
- Rolled Clay Fill. Firm to stiff, highly plastic clayey silt placed beneath motorway pavement areas over hydraulic fills.
- Rock Sea Walls. End tipped scoria rock core with basalt facing, mortared in places, constructed along the seaward edge of reclamations along the St Marys Bay foreshore.

Where identified, the stages of reclamation and construction of seawalls and fills are shown on the Geotechnical site plan (Figure 1, Appendix A) of the preliminary geotechnical assessment report.

6.8.3.2 Tauranga Group Sediments

This unit may be further differentiated:

- 'Upper' – Recent Marine Sediments. Deposited below present sea level in the last 10 thousand years in the low lying harbour area and its tributaries consisting of varying depths of very soft or loose, unconsolidated silty and sandy marine sediments. Subject to considerable consolidation settlement when surcharged and are considered prone to liquefaction where sandy.
- 'Lower' – Undifferentiated Alluvium. Deposited during the Pleistocene (1.7million to 10 thousand years ago) in low areas of the underlying topography, predominantly estuarine and terrestrial sediments consisting of soft to very stiff silts, sand, clay-silt, peat and colluvium, spatially discontinuous and variable.

6.8.3.3 Waitemata Group (East Coast Bays Formation, ECBF)

ECBF forms the bedrock unit throughout the study area, outcropping along the old cliff line, foreshore and in cuts throughout the area. Comprises very weak to weak interbedded sandstone and siltstone which weathers to soft to very stiff silts and clays and medium dense to dense sands up to 10m thick. Locally the ECBF contains interbeds of stronger, more resistant Parnell Grit. Bedding in the project area generally dips to the northwest at about 15° and locally between 5° and 23°.

6.8.4 Soil Profile

6.8.4.1 St Mary's Bay

The northern third of the alignment is located on reclamation (containing hydraulic fill) placed on the wave cut platform of Waitemata Group siltstones and sandstones beneath

the cliffs and on weak Holocene and Tauranga Group alluvial sediments infilling low areas in the rock profile.

6.8.4.2 Victoria Park Viaduct

Victoria Park is underlain by a significant thickness of variable and uncontrolled fill over weak Holocene and Tauranga Group sediments overlying Waitemata Group rocks. The depth to competent sandstone and siltstone varies along the alignment from about 4.5m near Fanshawe Street to in excess of 10m within the park.

6.8.4.3 Victoria Park Viaduct to Wellington Street

The southern third of the alignment is underlain by residual soil and sidling fill derived from Waitemata Group rocks. Conditions vary across the alignment with limited fill depths of <2m in the southeast increasing to at least 7.5m in the northwest.

6.8.5 Ground Water Level

The project area is located between 50m and 800m from the Waitemata Harbour edge and at the base of a series of valleys, each of which are sources of groundwater.

In the St Marys Bay foreshore area, groundwater is generally encountered at about 2m to 2.5m depth. Within the Victoria Park area, groundwater is typically at about 1.5m to 3m depth, the groundwater table falling gently to the north-northeast, consistent with the approximate location of a buried palaeo valley. In the elevated areas at the southern end of the alignment, groundwater appears to comprise a shallow (approximately 5.5m depth) perched groundwater level within the Fill and a deeper “regional” groundwater level (approximately 7.7m depth) within the Waitemata Group.

6.9 Contaminated Land

The route passes through an area of extensive reclamation, which includes areas of known contamination; some of which has been remediated. A desk-top preliminary environmental assessment (PEA) of the route has identified the risk for soil and groundwater contamination.⁷

In order to identify potentially contaminated sites along the route, the Study Team reviewed information from Auckland City Council (ACC) and Auckland Regional Council (ARC) files and photographs pertaining to the area held by the Auckland Public Library.

The Hazard maps for the route were requested from ACC. These identified several potentially contaminated sites. The identified sites are set out in Table 6.6 together with a summary comment from the ACC records.

Table 6.6 - Summary of Auckland City Potentially Contaminated Sites Register

⁷ TNZ PA1983 Harbour Bridge to City Project: Preliminary Environmental Assessment (Revised)(Volume 1 and 2), Beca, October 2005

Site	Comment
20 Beaumont Street	Enerco Gas/ Tergo Industries; Gasworks and painter (dangerous goods).
100-120 Beaumont Street	Signwriter, dangerous goods.
101-107 Beaumont Street	Mobil Oil/ Shell Oil. On ARC contaminated sites list.
Victoria Park	Dump site and refuse incinerator.
13-15 College Hill	Vehicle repairs.
127 Franklin Road	Automotive Engineering

Sites at 22-24 Drake Street, 47 Sam Wrigley Street, and 23 Westhaven Drive are also listed as potentially contaminated but are unlikely to be affected by the works.

It is noted that the hazard maps do not list the former gasometer sites on the corner of College Hill and Franklin Road. These appear on Auckland City aerial photographs.

6.9.1 Auckland Regional Council Records

A total of six contaminated sites were identified from ARC files for the area under consideration:

- 20 Beaumont Street;
- 95-99 Beaumont Street (Mobil Oil (NZ) Limited);
- 220 Victoria Street; and
- Gaunt Street.
- Beaumont Quarter
- South Western Corner of Victoria Park

A summary of information obtained from ARC records is presented in the PEA, February 2001 Volume 1, and the PEA (addendum), October 2005. . Three boreholes of relevance were identified in the ARC database of bore logs registered as part of resource consent applications.

6.9.2 Auckland City Council Records

ACC maintain a contaminated sites database that is summarised into the hazard maps. This information was used to identify ACC files of relevance to this assessment. The site files, soil register files and remediation files for the sites of interest were reviewed. Information pertaining to 22 sites of interest are summarised in the PEA, Volume 1 (ibid). The ACC archives were also searched for relevant aerial photographs. Three sets of photographs were reviewed. The photographs were flown in 1968, 1970 and 1984.

6.9.3 Summary

From the review of available public information, the likelihood of encountering soil and groundwater contamination can be divided into three broad areas:

- St Marys Bay (to Ngapona)
- Freemans Bay (Ngapona to Drake Street); and

- City (Drake to Wellington Streets).

Through St Marys Bay, records indicate that much of the fill beneath the existing carriageway was hydraulically placed, and that the adjacent cliff has been restricted to residential usage. It is therefore considered that there is a relatively low risk of encountering either contaminated soils or groundwater in this section of the project.

The review of the available records indicates that the subsurface geology and groundwater at Freemans Bay has been impacted by historic and more recent landuse activities.

Examples include the following:

- Refuse incineration and disposal;
- Ash disposal (incinerator and boilers);
- Galvanising;
- Panel beating;
- Paint shops;
- Chemical storage (including transformer oils); and
- Fuel storage.

Previous investigations have shown that there are elevated concentrations of contaminants in the soil and groundwater at Freemans Bay, which have the potential to migrate offsite. Although limited remediation has been undertaken in the area, the available information suggests that it is likely that contaminated soil and groundwater will be encountered during the future works.

The “City” section of the HBTC project (between Drake and Wellington Streets) appears to include several sites with a moderate potential for soil contamination. Current land uses include business, light industry, and residential. This section of the project is considered to have an intermediate risk of soil contamination being encountered.

6.10 Existing Trees

6.10.1 Trees

6.10.1.1 St Mary’s Bay Cliffs

The Auckland City Isthmus District Plan protects trees, which are 20m either side of the seaward boundary of those sites situated along the original cliff face and shoreline of St Mary’s Bay and Herne Bay foreshore between the Harbour Bridge off-ramp (to Ponsonby) and the eastern boundary of the site at 16 Harbour Street, and from the western side of Curran Street to the point where West End Road first abuts Cox’s Bay.

6.10.1.2 Victoria Park Plane Trees

A group of London Plane trees extend around the entire edge of Victoria Park. This ring of trees are protected under the Auckland City District Plan: Central Area Section, which lists the trees as numbering 65.

6.10.1.3 Franklin Road Plane Trees

B07/22 – Avenue of plane trees down the whole street (approx. 112). Scheduled in the District Plan as having ‘historic/cultural value’ and ‘visual amenity value’.

6.11 Coastal Environment

The St Mary’s Bay marine environment is not considered to have any significant biological or conservation values.

The Regional Coastal Plan does not identify the St Mary’s Bay area as any of the following:

- Coastal Protection Area
- Area of significant Conservation Value
- Regionally Significant Landscape/ Outstanding Landscape.

The AHB and its approaches have significantly altered the coastal setting. The southern approach, from St Mary’s Bay to Point Erin, has particularly been altered with a long network of block walls and reclamation, which extends out from the natural coastal edge (i.e., the cliffs) into the Westhaven Marina. Consequently, the shoreline no longer exists in its natural state.

6.12 Air Quality

Technical Appendix #11 provides a technical assessment of the potential effects of the HBTC Project on vehicle emissions and local air quality. This report includes a discussion on the existing air quality within the St Marys Bay/ Victoria Park area. The following information is summarised from that report.

Information on the long term trends in ambient air quality in the Auckland region is available from an ongoing air quality monitoring programme being undertaken by the ARC. The monitoring sites included in this air quality monitoring programme are grouped into four categories; remote, industrial, residential and peak traffic/CBD, depending on the surrounding environment and the location of the monitoring site. Monitoring at peak traffic/CBD sites takes place 2-3 metres from the roadside providing an indication of the exposure of pedestrians and people working close to busy roads. Monitoring at residential sites takes place at least 10 metres from the roadside and represents areas where people live. Remote sites are located away from the city and the industrial site is located in an industrialised area.

These monitoring sites include:

- 6.12.1.1 Peak: Queen Street and Khyber Pass (there is also a monitoring site on the Sky Tower, but this is elevated well above ground level so not representative of ground level concentrations).
- 6.12.1.2 Residential: Takapuna, Mt Eden, Henderson and Pakuranga.
- 6.12.1.3 Industrial: Penrose.
- 6.12.1.4 Remote: Whangaparaoa, Musick Point and Pukekohe

The peak traffic/CBD sites are located close to the road (less than 3m) and give good information on the concentration of pollutants at the edge of the road.

The residential sites are located some distance from the road (about 10m) and provide good information on the concentration of pollutants in residential areas close to a roading corridor, which is similar to the area of most concern in this study.

Of the monitoring sites identified above, the Takapuna site was identified as best representing the St Mary's Bay/Victoria Park area involved in the HBTC upgrade project. The Takapuna Site is operated by NIWA and described as follows:

*"Located with[at] the south corner of the Westlake Girls High School flat playing fields. The east side of the fields are bounded by the Wairau Rd (20m NE) and a wide (5m) storm water drain. The west side is bounded by the Northern Motorway (60 SW). The Southern Motorway [is] elevated above the fields by approximately 3m. Approximately 40m E of the site is a lighted intersection which connects Forrest Hill Rd to Wairau Rd. On the east side of Wairau Rd, south of the intersection and 80m from the monitoring site is a cement mixing facility. To the north of the site is a hill covered by residential housing."*⁸

The Takapuna site is considered similar to St Mary's Bay/Victoria Park area as it is in a coastal location and close to a busy highway with peak traffic flows. Like the St Mary's Bay/Victoria Park area, the site is located in an open park-like area some distance from the busy roads and in a predominantly residential suburb.

Although data from the Takapuna site is sufficient for a preliminary assessment of the background concentrations of air contaminants, air quality monitoring in the St Mary's Bay/Victoria Park area is underway to confirm these background concentrations.

4.10.1 Air Quality Monitoring Results

A full year of monitoring data, for the period January 2004 to December 2004 for all of the Auckland sites is summarised below. Monitoring data is available for three key air quality indicators CO, PM10, NOX for most sites. From this table, Takapuna data, which is considered most representative of the study area, can be compared with the other peak sites in the city.

⁸ "Data CD, contains air quality and meteorology for Auckland summer 1999, Christchurch winter 1999, Christchurch winter 2000, Auckland June 2002" - data supplied by Niwa, Auckland University, Manukau City Council, ARC, Environment Canterbury, University of Canterbury and Landcare. Produced under FRST funded programme, Urban Air Quality Process. (Contract C01640).

Table 6.7: Summary of Auckland air quality monitoring data for 2004 ©

Site Type		NO ₂					CO					PM ₁₀			
		1-hour		24-hour		Annual Average	1-hour		8-hour		Annual Average	Monitoring method	24-hour		Annual Average
		Max	Median	Max	Median		Max	Median	Max	Median			Max	Median	
		200 µg/m ^{3(a)} (132 µg/m ³)		100 µg/m ^{3(a)} (66 µg/m ³)		-	30 mg/m ³ (20 mg/m ³)		10 mg/m ³ (6 mg/m ³)		-		50 mg/m ³ (33 µg/m ³)		20 mg/m ³ (13 µg/m ³)
Peak	Queen Street	226.8	52.4	101.0	54.0	56.3	16.4	1.2	10.1	1.3	1.5	Partisol	52.6	21.5	22.9
	Khyber Pass	270.6	49.4	113.0	56.7	57.6	13.3	1.7	8.6	1.9	2.2	Partisol	47.4	21.6	21.7
Residential	Takapuna	124.1	24.1	51.4	24.8	25.8	7.5	0.2	5.9	0.3	0.5	Partisol	43.3	18.0	19.2
												Beta Gauge	59.5	19.2	20.4
	Mt Eden	66.2	13.8	41.4	16.2	17.3	-	-	-	-	-	Partisol	49.5	13.7	14.7
												Beta Gauge	37.3	14.7	15.3
	Henderson	82.7	11.6	47.0	14.2	16.6	6.5	0.3	4.0	0.4	0.6	Partisol	39.8	14.6	16.3
												Minivol	51.7	11.9	14.3
												Beta Gauge	45.3	16.4	17.5
	Pakuranga	-	-	-	-	-	11.3	0.5	6	0.6	0.8	-	-	-	-
Industrial	Penrose	98.8	22.1	51.8	22.0	23.5	-	-	-	-	-	Beta Gauge	45.2	18.4	19.2
												Hi-Vol	41.2	17.5	18.0
Remote	Musick Point	69.5	4.5	36.0	6.4	8.4	-	-	-	-	-	-	-	-	-

© These data are the property of the Auckland Regional Council. The Auckland Regional Council must be referenced in any publication of these data. The written approval of the Auckland Regional Council must be obtained prior to publication of these data in any modified form.

These results suggest that currently air quality in the study area is potentially of concern, with exceedances of the PM10 standard occurring at Takapuna. The monitored levels of NO2 at Takapuna are within the standards, although exceedances have been measured at the peak traffic monitoring sites of Queen Street and Khyber Pass. .

From these results it is apparent that the proposed improvements to the HBTC corridor need to be assessed in terms of their impact on the existing air quality in the Freemans Bay area.

6.12.2 Monitoring

Ambient air quality modelling is proposed to be undertaken by Transit at the Northern Portal of the NBT in order to more accurately assess the air quality of the project area.

6.13 Existing Services

6.13.1 ATMS Infrastructure

ATMS facilities are provided throughout the motorway corridor. This includes above ground installations such as gantries, lane control signals, CCTV installations and roadside cabinets and the underground fibre optic network that includes cable ducts and cable pits.

6.13.2 Telstra Clear

A Telstra Clear communication route extends throughout the corridor. From the AHB, the route follows the west side of the motorway from the Curran Street on ramp through to the north end of the VPV. The cable ducts are fixed to the western side of the viaduct bridge deck over Victoria Park. The route then crosses to the east side of the motorway south of the Cook Street off ramp and is then located alongside the western side of Upper Union Street until Wellington Street.

6.13.3 Telecom

An important fibre optic cable route is located in the grass reserve strip on the west side of the motorway between the AHB and Beaumont Street. This route then passes through Victoria Park (underground approximately under the east side of the viaduct) and then follows Victoria Street. The cable route consists of between 10 and 12, 75 mm diameter ducts encased in concrete with cable and join pits at various locations along the route.

6.13.4 Wastewater

Watercare Services Limited's Orakei main sewer crosses perpendicular to the motorway just north of the south abutment of the VPV (between Weld Street and Drake Street). This 2.2m high by 1.5m wide egg shaped brick structure, conveys wastewater from the western and central parts of Auckland through to Orakei and is a vital part of Auckland's wastewater network.

6.13.5 Local Service Network

There is a range of below ground local services located in the local streets adjoining the motorway corridor. These include gas, power, telecommunications, water, wastewater and stormwater.

6.14 Existing Stormwater System

The HBTC Corridor is located within the Freemans Bay/St Mary's Bay Catchment, which is defined by Shelly Beach Road, Jervois Road, Ponsonby Road, Karangahape Road, Pitt Street, Hobson Street, and the shoreline boundaries. This catchment covers approximately 300ha in area.

The HBTC Corridor can be separated into three distinct stormwater regimes, being:

- The upper reach, south of Victoria Street, drains via a Transit pipe network into the ACC system near the Birdcage hotel. The drainage system in this area has been modified by the recent Central Motorway Junction project;
- VPV which, drains via pipes attached to its piers and into the ACC culvert through Victoria Park; and
- The area through SMB, adjacent to Westhaven Drive, which is drained via Transit stormwater culverts directly into Westhaven (13 separate discharge culverts).

A 2.1m wide by 3.3 m deep egg-shaped culvert runs under Victoria Park with a small amount of cover. This culvert conveys stormwater from the Freemans Bay catchment. The existing VPV bridge piers have been designed to span the stormwater culvert. The culvert then follows a route down Daldy Street and discharges into the Waitemata Harbour near the southern end of Wynyard Wharf.

South of Victoria Park, the culvert reduces in size and passes under the Birdcage hotel and follows the valley towards Hepburn Street.

6.15 Traffic Patterns

6.15.1 Introduction

The HBTC Corridor of motorway forms the southern approach to the AHB and is therefore vital to the regional transportation network. It has significant impact on the local roading network and is key to the operation of the AHB corridor. The traffic demands on this section are sensitive to proposed upstream and downstream capacity improvements, especially the North Shore BRT (Bus Rapid Transit) and High Occupancy Vehicle (HOV) facility (Bus Rapid Transit and Priority Lane) and Central Motorway Junction (CMJ) projects. Similarly, the flows on these projects will be affected by the capacity of the HBTC Project.

The HBTC Corridor is currently heavily congested in both the morning and evening commuter periods. This congestion results from the demand flow on sections of the existing motorway network exceeding capacity, resulting in bottlenecks during peak periods. These bottlenecks also prevent vehicles reaching sections of the motorway that have spare capacity. Traffic Studies show that in order to address the existing congestion

problems on this section of the motorway, it is necessary to provide the same number of lanes approaching and departing the AHB as on the bridge itself, particularly during the morning and evening peaks. This would remove the bottlenecks either side of the bridge and allow the full capacity of the bridge to be realised.

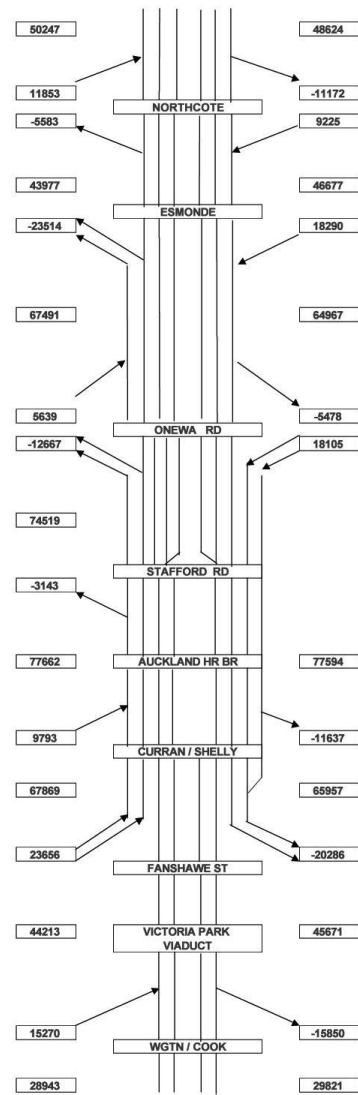
6.15.2 Existing Traffic Flows

The 2001 traffic flows (peak hour flows and Annual Average Daily Traffic (AADT)) for this section of motorway are shown in Figure 6.1. These have not been updated from 2001 to 2004 as a number of the traffic counting loops within this project have not been working since 2001 due to CMJ construction activity. Also the 2001 traffic flows are compatible with 2001 demand figures used in the impact assessment below.

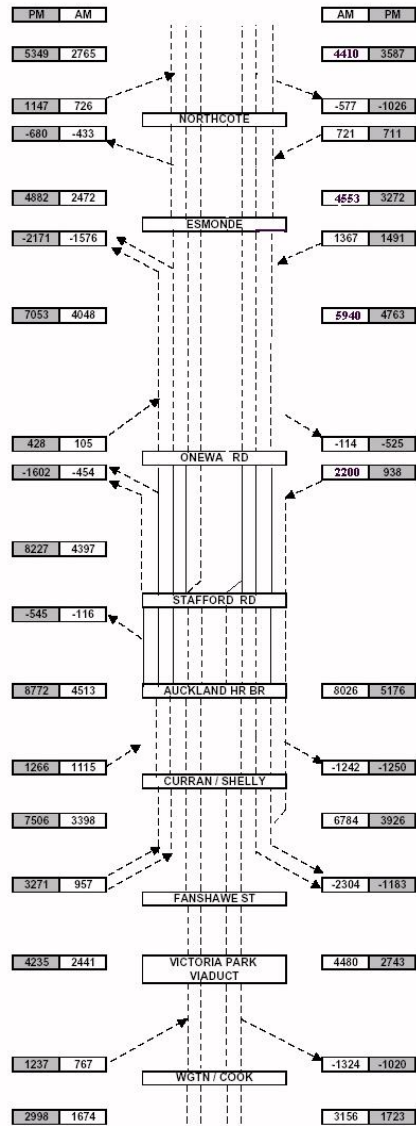
These figures indicate the counted supply of traffic to each motorway ramp and section. The traffic demand, that is the volume of traffic that desires to travel on a particular link, is shown in Tables 6.8/6.9, along with the calculated volume/ capacity ratios. A comparison of 2004 traffic flows (annual average daily flow and weekday peak) with the 2001 data shows little change from 2001 levels. The flow dynamics outlined later in this section still govern current traffic behaviour

Figure 6.1 - Annual Average Daily Traffic and Peak Hour Traffic Flow 2001

NORTHERN MOTORWAY
ANNUAL AVERAGE DAILY TRAFFIC 2001



NORTHERN MOTORWAY
WEEKDAY AM/PM PEAK HOUR TRAFFIC 2001



When the demand for travel exceeds the capacity of a motorway section then that section is said to be exceeding capacity. This is reflected in a Volume to Capacity (V/C) Ratio greater than 1.0. It should be noted that even though the demand for travel on a particular section may exceed the capacity of that section, the demand flow might not be able to reach the said section due to the restricted capacity of upstream or downstream bottlenecks. In this respect, the actual operational volume/ capacity ratio cannot exceed 1.0 in practice. Tables 6.7 and 6.8 show the existing capacity of each ramp/link along the corridor compared with the 2000/2001 supply and demand flows.

Those sections where existing demand is approaching capacity (V/C ratio \Rightarrow 0.8) are shown bold in the table above, whereas those sections where existing demand exceeds capacity (V/C ratio \Rightarrow 1.0) are shown bold and shaded.

**Table 6.8 -
Existing 2000/01 Peak Hour Volume to Capacity Ratio for Motorway Section between
Wellington Street and Esmonde Road Northbound**

Direction		Northbound AM			Northbound PM		
Northbound	Capacity	Demand Flow (AM, vph)	Supply Flow (AM, vph)	V/C Ratio (AM)	Demand Flow (PM, vph)	Supply Flow (PM, vph)	V/C Ratio (PM)
South of Wellington Street	4300	1700	1700	0.40	3350	3000	0.78
Wellington St On Ramp	1700	750	750	0.44	1250	1250	0.74
Wellington Street to Fanshawe Street	4300	2450	2450	0.57	4600	4250	1.07
Fanshawe Street On Ramp	3400	950	950	0.28	3450	3250	1.01
Fanshawe Street to Curran Street	8600	3400	3400	0.40	8050	7500	0.94
Curran Street On Ramp	1700	1100	1100	0.65	1650	1300	0.97
AHB, Curran Street to Stafford Road Off Ramp *	10500	4500	4500	0.43	9700	8800	0.92
Stafford Road Off Ramp	2100	100	100	0.05	550	550	0.26
Stafford Road Off ramp to Onewa Road Off ramp	10500	4400	4400	0.42	9150	8250	0.87
Onewa Road Off Ramp	2100	450	450	0.21	2150	1600	1.02
Onewa Road Off Ramp to Onewa Road On Ramp	8600	3950	3950	0.46	7000	6650	0.81
Onewa Road On Ramp	2100	100	100	0.05	450	450	0.21
Onewa Road to Esmonde Road	8600	4050	4050	0.47	7450	7100	0.87
Esmonde Road Off Ramp	4200	1600	1600	0.38	2450	2200	0.58
North of Esmonde Road Off Ramp	6450	2450	2450	0.38	5000	4900	0.78
* The full capacity of the five northbound lanes of the AHB cannot currently be achieved due to the approach capacity and vehicle interaction at the Curran Street on ramp.							

**Table 6.9 –
Existing 2000/01 Peak Hour Volume to Capacity Ratio for Motorway Section between
Esmonde Road and Wellington Street Southbound**

Direction		Southbound AM			Southbound PM		
Southbound	Capacity	Demand Flow (AM, vph)	Supply Flow (AM, vph)	V/C Ratio (AM)	Demand Flow (PM, vph)	Supply Flow (PM, vph)	V/C Ratio (PM)
North of Esmonde Road	6450	5850	4550	0.91	3300	3300	0.51
Esmonde Road On Ramp	2100	1350	1350	0.64	1500	1500	0.71
Esmonde Road to Onewa Road	6450	7200	5900	1.1	4800	4800	0.74
Onewa Road Off Ramp	2000	100	100	0.05	550	550	0.28
Onewa Road Off Ramp to Onewa Road On Ramp	6450	7100	5800	1.10	4250	4250	0.66
Onewa Road On Ramp ⁹	2200 ¹	2600	2200	1.00	950	950	0.37
Onewa Road to Shelly Beach Road (AHB)*	10500	9700	8000	0.92	5200	5200	0.50
Shelly Beach Off Ramp	2100	1700	1250	0.81	1250	1250	0.60
Shelly Beach Road to Fanshawe Street	8600	8000	6750	0.93	3950	3950	0.46
Fanshawe Street Off Ramp	3400	3000	2300	0.88	1200	1200	0.35
Fanshawe Street to Cook Street	4450	5000	4450	1.12	2750	2750	0.64
Cook Street Off Ramp	2000	1800	1300	0.90	1000	1000	0.50
South of Cook Street	4300	3200	3150	0.74	1750	1750	0.41
* The full capacity of the five southbound lanes of the AHB cannot currently be achieved due to the approach capacity and vehicle interaction at the Onewa Road southbound on ramp.							

As can be seen in the above tables, the worst congestion on the network occurs in the southbound direction during the morning peak period and in the northbound direction during the evening peak period. During these periods many of the ramps/ links are either approaching capacity in relation to demand, or exceed capacity.

⁹ The capacity of the one lane Onewa Road southbound on ramp is high due to the two-lane approach on Onewa Road (which merges to one lane prior to entering the on ramp), and the signal configuration at the Onewa Sylvan Road Intersection. This estimate of capacity has been made from observing historical supply flow counts on the ramp (see **Figure 6.1**).

The capacity values shown above have been estimated using the methodology contained within the Transportation Research Boards Highway Capacity Manual. In addition, these estimated capacities were compared against historic flows to ensure compatibility. As the recorded flow rates (approximately 2200 vph during the 2001 morning peak) on the Onewa Road southbound on ramp frequently exceeds the theoretical capacity, the capacity of that ramp has been adjusted to 2200 vph. In reality capacity is a dynamic property that can change day-to-day and even period-to-period depending on traffic composition/behaviour and vehicle interaction at critical bottlenecks.

The capacities shown in **Tables 6.5 and 6.6** therefore represent theoretical mean values.

During the period between the morning and afternoon commuter peaks (the Interpeak (IP)) traffic demand is noticeably less than during the commuter peaks. This can clearly be seen in Figures 6.3 and 6.4, which show all day flow profiles for each direction of travel on the VPV.

Figure 6.2 - Southbound Daily Flow Profile on the Victoria Park Viaduct

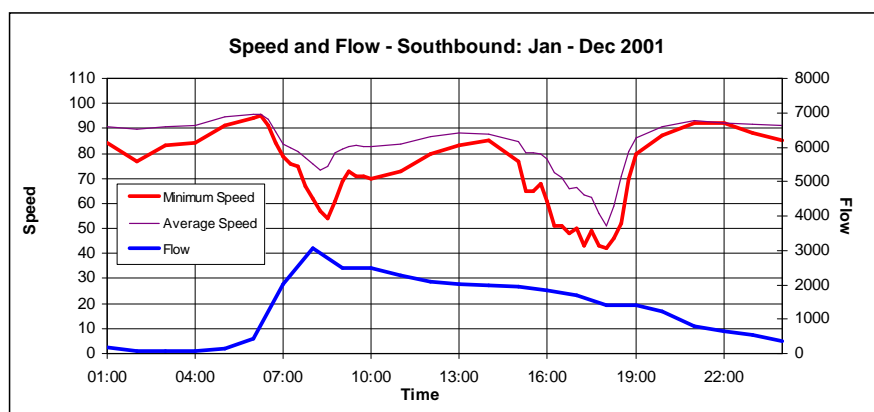
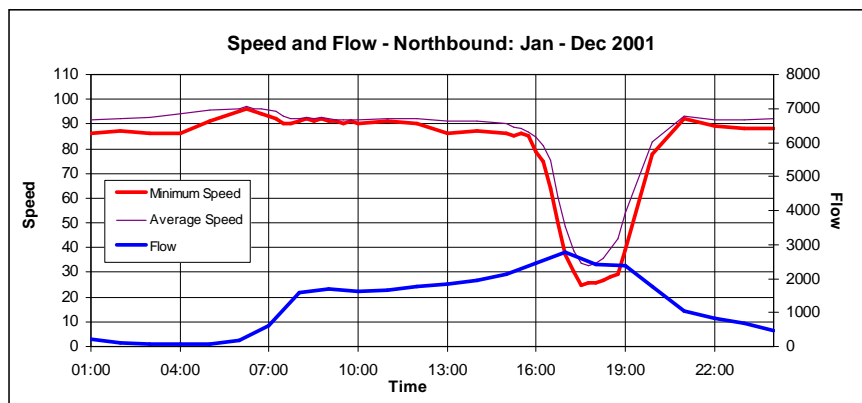


Figure 6.3 - Northbound Daily Flow Profile on the Victoria Park Viaduct



A sharp volume peak at around 8am typifies the southbound traffic profile on the VPV as commuter traffic from the North Shore approaches the city. This peak flow rate is accompanied by a reduction in mean travel speed as the facility approaches and then reaches capacity.

Preceding this morning peak, traffic volumes increase steadily from lower overnight volumes. This increase tends to start around 6am. After reaching a peak flow rate at around 8am the flow rates then decrease steadily for the rest of the day. A noticeable decrease in mean vehicle speeds is evident in the southbound direction from approximately 2pm, however this is not accompanied by an increase in flow rate. This decrease in speed was attributed to blocking back from downstream bottlenecks, principally associated with the on and off ramps between Hobson Street and Gilles Ave. The completion of the CMJ Stage 1 and 2 works from Hobson Street on ramp to the Newmarket Viaduct have resulted this issue reducing significantly. A bottleneck still occurs at Newmarket Viaduct in the southbound direction, but the proposed widening of the Newmarket Viaduct to four southbound lanes through to at least Green Lane East will address this issue.

Mean vehicle speeds in the northbound direction remain generally constant at 80 km/h to 90 km/h for much of the day, except during the evening peak period when vehicle speeds decrease to 20 km/h to 30 km/h. This reduction in speed results from the VPV reaching capacity and the interaction with the bottleneck associated with the Wellington Street northbound on ramp. With the opening of the Port and Northwestern Motorway to Northern Motorway link it bottleneck would only get worse. It is therefore proposed that this motorway link plus the Wellington Street and Curran Street on ramps will be ramp metered to stop the motorway proper traffic from breaking down significantly.

6.15.3 Existing Traffic Conditions

The critical directions of travel (where travel demand is the greatest) have been identified to be southbound during the morning peak period and northbound during the evening peak period. The existing traffic conditions during these periods are discussed below.

6.15.3.1 Southbound (AM Peak)

The supply of southbound traffic to the corridor is restricted by the capacity of the motorway and ramps at Esmonde and Onewa Roads to the north of the AHB.

Although the peak hour supply of traffic flow immediately south of Esmonde Road in the morning peak has decreased from 6600 vph in 1994 to 5500 vph in 2001. This has reduced further to 5,000 in 2002 due to poor lane discipline, resulting in a continued reduction in capacity and resulting in a southbound bottleneck at this location. Likewise, the capacity of the Onewa Road on ramp merge weave is exceeded by demand during the morning peak, creating an additional southbound bottleneck. The result of these bottlenecks (and interaction with bottlenecks to the south of the bridge that block back that are discussed below) is to limit the southbound supply of vehicles to the AHB to approximately 8000 vph (8800 vph in 1994). As the existing capacity of the AHB, with five lanes operating in the direction of travel, is estimated to be 2100 vph per lane (or 10,500 vph total) these bottlenecks therefore prevent the bridge from realising its full capacity.

During the morning peak period, the southbound section of the VPV is a major contributor to southbound traffic congestion through the corridor as it currently has only two lanes for traffic travelling to the city via Cook St and further south, with a capacity in the order of 4450 vph (2225 vph/ lane). The southbound demand during this period is approximately 5000 vph, exceeding capacity by approximately 550 vph. This bottleneck often results in vehicles blocking back from the viaduct and onto the Harbour Bridge. This blocking back in turn reduces the supply of vehicles to the Fanshawe Street off ramp, which then contributes to blocking back across the AHB.

The reduction in supply of vehicles to the AHB over recent years has resulted from the worsening bottleneck at VPV, Esmonde and Onewa Roads from poor lane discipline. The CMJ Stage 1 and 2 works have addressed the bottleneck at Hobson Street, but a new bottleneck at the four to three lane merge onto the Newmarket Viaduct has been created.

The traffic flow on the Fanshawe Street southbound off ramp has also consistently reduced during the morning peak between 1994 (3250 vph) and 2001 (2300 vph). This flow reduction is a combination of the lower traffic flow over the AHB in the peak hour and a reduction in the green time allocated to the off ramp movement at the Fanshawe/ Beaumont Street signalised intersection (due to increased volumes on Beaumont Street associated with the western reclamation development), in conjunction with trip reassignment to Cook Street and further south.

6.15.3.2 Northbound (PM Peak)

In the evening peak period, the northbound supply of vehicles to the corridor is restricted by the capacity of the Wellington Street northbound on ramp merge area and the VPV (4300 vph).

The northbound traffic demand on the VPV during the same period is in the order of 4600 vph during the evening peak, resulting in upstream blocking back from the Wellington Street merge, and slow vehicle speeds across the Viaduct. Queuing back from this bottleneck can reach as far as the Newmarket Viaduct during peak periods, thus restricting traffic flow to the northbound off ramps between Gilles Avenue and Nelson Street, and increasing the queue back to Greenlane interchange on the southern motorway.

The northbound evening peak supply flows on the AHB have been fairly constant at between 8,600 vph to 8,800 vph from 1996 to 2001, apart from a low point in 1997/98 when 8,300 vph were recorded on the AHB. This is despite increasing the number of northbound lanes between Onewa Road and Esmonde Road to four in 2001. This lane increase resulted in the capacity of this section of motorway exceeding demand, but failed to significantly increase northbound volumes on the AHB during the evening peak, further indicating that upstream bottlenecks control the supply of flow to the AHB.

6.15.3.3 Interpeak Period

During the period between the AM and PM Peak Periods (the Interpeak) the capacity of all sections of the motorway and ramps from Esmonde Road to Wellington Street over-bridge exceed current demand.

It is assumed that during the Interpeak period there is a dynamic capacity reduction on the VPV from 4300 vph to 3760 vph due to the change in vehicle classification from

predominantly commuter vehicles to a high mix of heavy and light commercial vehicles, visitors travelling through the city and recreational/ social/ shopping purpose trips. By 2011 it is expected that the two lanes across the VPV will be at capacity and traffic demand will be approximately 4200 vph during the Interpeak period.

6.15.3.4 Bus lanes/ HOV

A bus shoulder lane was constructed southbound from Shelly Beach off ramp to approximately 400m south in 2001. Prior to this, southbound Lane 1 of the AHB formed a lane drop at Shelly Beach southbound off ramp, resulting in under utilisation of this lane by through traffic. The newly constructed facility allows buses only to travel straight through to St. Mary's Bay from Lane 1 in the morning peak period, with the Shelly Beach off ramp acting as a diverge. During all other periods this lane is available to all vehicles, improving lane utilisation.

7 Consultation

7.1 Introduction

The purpose of this section is to provide a summary of the feedback received from consultation undertaken for the HBTC Project. For consultation purposes, the HBTC Project can be divided into four broad phases. These being:

- Phase 1 - Options Being Considered (February 2002 – July 2002);
- Phase 2 – Option Evaluation (October 2002 – April 2003);
- Phase 3 – Funding and Designation Footprint (April 2003 – June 2004); and
- Phase 4 – Preferred Option (September 2005 - Present)

A detailed description of the consultation undertaken (including a schedule of meetings) and the feedback received is set out in Technical Appendix 13a.

7.1.1 Pre-HBTC Project Consultation

Consultation was undertaken on options for capacity improvements for the section of State Highway 1, between Wellington Street and the Auckland Harbour Bridge as part of a number of previous studies between 1995 and 1999. These studies form the background investigations to the HBTC Project:

1. Auckland Harbour Bridge Corridor Capacity Study (1995)
2. The North Shore Busway “Proposals for improved public passenger transport and priority vehicle travel on the Northern Motorway” (1996 - 1997).
3. AHB Approaches Capacity Improvement Study (1997)
4. Victoria Park Widening Study (1999)

Consultation during these early stages focussed on assessing the impacts of various at-grade widening options on three key stakeholders - St Mary’s Bay Residents Association (SMBA), Auckland City Council (ACC) and Ports of Auckland Ltd (POAL).

During this period the wider community and interested parties were kept informed of the project development via a series of newsletters, brochures and the media.

An inventory of consultation undertaken by Transit during this period is provided in Technical Appendix 13a.

7.1.2 Identification of Stakeholders and the Community

Consultation has been divided into 2 broad areas for Phase 1:

7.1.2.1 Stakeholder Consultation

- Directly Affected Landowners
- Key Stakeholders
- Iwi

7.1.2.2 Community Consultation

- Interested Groups
- Interest groups comprised anyone who had a known or likely interest in projects of the nature and scale of HBTC. Those contacted included the territorial authorities of the Auckland region, MP's, local schools, road user groups, and transport organisations, environmental groups.
- Wider Community
- The wider community comprised residential, business interests and other activities (i.e. schools) located along the project corridor. The catchment area (as shown in the Consultation Report (Phase 1)) included Freeman's Bay, St Mary's Bay, Ponsonby Road, Herne Bay (up to Wallace Street), Westhaven and Union St /Drake Street.

7.1.3 HBTC Update Issue 1 - April 2001

This newsletter introduced the public to the reasons why the project is needed and outlined that Transit was currently undertaking engineering and environmental investigations to look at additional ways to manage traffic flows and ease congestion on the section of motorway between Wellington St and the city side of the Auckland Harbour Bridge. The newsletter set out that Transit would advise the public of the timing for community consultation. A copy of this newsletter is contained in Technical Appendix 13a.

7.2 Phase 1 - Options Being Considered (February 2002-July 2002)

7.2.1 Introduction

The purpose of the first phase of consultation on the HBTC Project, undertaken between February 2002 and July 2002, was to inform key stakeholders and the wider community about the HBTC Project. It introduced the three broad options under consideration and key issues (funding, environmental and engineering) to be considered when selecting a preferred option.

7.2.2 Funding Issue

The first phase of HBTC consultation was to a large extent influenced by the funding issue. From the outset, Transit made it clear to stakeholders and the community that only Option A (Above Ground Widening) could be expected to be fully funded from the National Roothing Programme. Funding for the two below-ground options would need to be sought from other sources, with partial funding from Transfund New Zealand.

7.2.3 Stakeholder Consultation Methods

7.2.3.1 HBTC Motorway Project Briefing Document (April 2002)

The HBTC Briefing Document provided the initial information about the project and the basis for discussion with stakeholders. It outlined the need for the project, the 3 broad options under consideration and the issues (including the key issue - funding) to be considered in selecting a preferred option. It was sent to key stakeholders (as outlined in Table 7.1) in March 2002, accompanied by a letter inviting key stakeholders to meet with

the HBTC Project Team. A copy of the Briefing Document is provided in Technical Appendix 13a.

7.2.3.2 Presentations

A number of formal project presentations were made during Phase 1 of Consultation. A summary table is provided in Technical Appendix 13a.

7.2.3.3 Meetings

Individual meetings were held with 16 key stakeholders from March through until June 2002. A schedule of the meetings held is contained in the Technical Appendix 13a. Using the HBTC Briefing Document as a basis for discussion, these initial meetings focussed on:

- Introducing the project and the three broad options being considered;
- Discussing the generic issues to be considered in selecting a preferred option – funding, environmental and engineering;
- Identifying the effects of each of the options on individual stakeholders and discussing how these could be mitigated.

Follow-up meetings were held with key stakeholders in June 2002, predominantly with those who had provided written feedback. The purpose of these meetings was to:

- Provide more detailed information from the ongoing technical investigation (noise, visual, urban design, traffic, etc);
- Respond to issues raised in their submissions and discuss mitigation proposals; and
- Provide an update on the project programme.

Not all those parties identified as being key stakeholders, responded to requests for meeting with Transit and/or provided written feedback. The Project Team continued to contact these parties during Phase 2 of the consultation.

7.2.4 Stakeholder Consultation Feedback

In response to the information provided in the Briefing Document, and at meetings or presentations, Stakeholders were asked to provide the Project Team with written feedback to the following questions:

- 1) Which option you prefer and why?
- 2) Where should funding for the below-ground options be sourced?
- 3) How does the project affect you and your operations?

Table 7.1 below outlines the stakeholders that were consulted:

Table 7.1 - Stakeholders (Phase I)

Directly Affected Land Owners
Auckland City Council (ACC)
Ports of Auckland Ltd (POAL)
Victory Christian Church (VCC)
PR Doole (Placemakers)
Key Stakeholders
St Mary's Bay Association
Freeman's Bay Residents
Auckland City Residents and Ratepayers Association
New World Supermarket
Beaumont Apartments
Franklin Mews
Seychelles Body Corporate
Freemans Bay School
Victoria Park Markets Ltd (VPM)
Owners/Occupiers of 26-36 Napier St, Freemans Bay
Union Street Businesses
Victoria Park
Auckland Waterfront Advisory Group (AWAG)
Navy
Viaduct Harbour Holdings Ltd (VHH)
Trans Tasman Properties Ltd (TTP)
Melview Developments
Auckland City Council (ACC)
Auckland Regional Council (ARC)
North Shore City Council (NSCC)
Historic Places Trust (HPT)
Infrastructure Auckland (IA)
Iwi
Ngati Paoa Whanau Trust
Huakina Development Trust
Ngati Maru
Kawerau A Maki
Ngati Whatua
Ngai Ki Tamaki
Hauraki Maori Trust Board
Ngaati Te Ata
Ngati Rehua Ngati Wai Ki Aotea

A table summarising the written feedback received, as well as copies of letters, is provided in Technical Appendix 13a.

7.2.5 Stakeholder Consultation Conclusions

The responses from stakeholders to Phase 1 Consultation were varied and from the written feedback received, there was no clear option preference or funding solution. The responses had a strong focus on mitigating the effects of the 3 options under consideration, on the

various stakeholders' interests. Certain themes (common to most) emerged. These included:

- Most had a good understanding of the project's objectives and likely impacts on their interests.
- Most (if not all) accepted that the project was needed.
- All showed a willingness to discuss the project and provide feedback (written or verbal) on potential impacts.
- That impacts arising from the project affecting their interests or operations need to be mitigated appropriately.
- Approximately two-thirds of the stakeholder groups were reluctant during the initial stage of consultation to specify a preferred option and funding mechanism. They stated that their interests in the project were broad ranging and complex and that they required more detailed information and consultation, before formally expressing a preference.
- Widely expressed view that the selected option needs to protect and enhance the environmental and amenity values of the area. Environmental protection, mitigation and enhancement were considered to be important - irrespective of option.
- That the selected option accommodates the demands of future development in the area as well as public transport initiatives.

7.2.6 Community Consultation Methods

7.2.6.1 Newsletter

Consultation with the wider community and interested parties began with the circulation of a public newsletter – HBTC Update Issue 2, in April 2002. The newsletter was distributed to 4800 businesses/residents in the project area, posted/emailed to an additional 430 people on the HBTC Consultation database and made available at the Grafton Gully Project (GGP) information centre, Transit and on the Transit website.

The newsletter provided information on the 3 broad options under consideration and explained that funding was a key issue in determining which option would proceed. The public were asked to provide feedback on two main questions – which option is preferred and the extent of support for community based funding of below-ground options?

The newsletter also provided details of the location and time of the first two public open days held on the 4 and 7 May 2003 and informed the public that a detailed briefing document could be obtained at the open days or on request from the Project Team.

7.2.6.2 Open Days

In total three community open days were held in May 2002, with two being held at Ponsonby Primary and one being held at the Freemans Bay Community Centre. It is estimated that in total, 355 people attended the three open days. A wide range of material was presented, including option photomontages, alignment drawings, and noise mitigation concepts. Senior Transit representatives and Project Team were available at the open days to answer questions about the project.

7.2.6.3 Public Meeting

A public meeting was held at St Columba Centre, Ponsonby on 22 May 2002 at the request of WBCB, SMBA and residents from Freeman's Bay. Approximately 80 members of the public attended the public meeting. Senior Transit representatives and members of the HBTC project team attended to answer questions. Materials used at Open Days were available for inspection.

7.2.7 Community Consultation Feedback

Feedback from the community was sought via a standard feedback form¹⁰ (available at the open days), which asked the following questions:

1. Which option do you prefer, and why?
2. If a below-ground option is preferred, where could the additional funding be sourced and are you prepared to contribute?
3. How are you affected by the various options, and how could the effects be mitigated?

The community were also able to submit feedback in their own format via email, letter or verbally.

7.2.8 Community Consultation Conclusions

A total of 219 feedback forms were received. A summary and analysis of written feedback received is provided in Technical Appendix 13a. The key points are provided below.

7.2.8.1 Reasons for choosing options

The outcomes of the initial round of community consultation showed that there is clear support (70%) for a below-ground solution. The highest support (32%) was for Option C (tunnel under Victoria Park). The main reason given for favouring this option was that it provides an overall environmental and amenity improvement and provides opportunity for reinstating Victoria Park and urban - waterfront linkages.

The SMBA option received second highest support (24%). The main reasons given were that it provides a visual improvement and reduces noise.

Lowered motorway and the above-ground options received similar levels of support (14% and 13% respectively). The main reason given for favouring Option B (Lowered Motorway) was that it was aesthetically better than Option A. It was also seen as a good compromise between cost and environmental benefits.

The main reasons for choosing Option A (Above -Ground) were that it is the least expensive and has a faster construction period.

7.2.8.2 Funding Suggestions

82% of the respondents provided feedback on funding. Of those 40% preferred a combination of funding sources with tolls, central government, local government and Infrastructure Auckland being the main contributors. The highest-ranking single

¹⁰ A copy of the standard feedback form is attached in Technical Appendix 13a.

mechanism was re-instating tolls or user pays. A number of respondents referred to overseas examples where tolling has become accepted practice.

7.2.9 Phase 1 Conclusions

Phase 1 of the consultation process provided the following outcomes:

1. There is strong support in the community for an underground solution. Option C (tunnel) is most preferred on environmental and amenity grounds. A combination of funding mechanisms is suggested (tolls, central and local government)
2. There is no clear option preference or funding solution yet amongst stakeholders. Rather, a number of themes have emerged:
 - Widely expressed view that the selected option needs to protect and enhance the environmental and amenity values of the area – environmental mitigation is important.
 - That the selected option accommodates the demands of future development in the area and well as public transport initiatives.
 - That impacts arising from the project affecting their interests or operations need to be mitigated appropriately.

7.3 Phase 2 – Option Evaluation (October 2002- April 2003)

7.3.1 Introduction

The purpose of the second phase of consultation on the HBTC Project, undertaken between October 2002 and April 2003, was to:

- To provide an update on the outcomes of Phase 1 consultation;
- To provide information from continuing technical investigations and environmental assessment of both above and below-ground options, undertaken after July 2002;
- To identify new issues; and
- To undertake more detailed discussions regarding mitigation opportunities.

7.3.2 Funding Issue

Approximately 70% of respondents who provided feedback to Phase 1 consultation indicated support for below-ground options. Respondents suggested numerous alternative funding options including tolling, a bank loan, Infrastructure Auckland (IA), and traditional funding sources. As a result of this feedback, Transit undertook to investigate funding sources for below-ground options and undertook discussions with IA, which indicated that they may be willing to contribute to the project.

Although Transit pursued funding from several sources, no assistance that “*would tip the balance of options*” was offered. At Transit’s November 2002 meeting their Authority confirmed that without local funding to meet the full additional costs, Transit could not justify either a full tunnel or a northbound tunnel in preference to an above-ground option. Letters were sent to ACC, ARC and IA by Transit informing them that Transit proposed to

proceed to seek a designation to widen the existing viaduct, unless they received advice that local funding was available. This advice was released to the general public by way of a media release in the NZ Herald on 1 December 2002.

In response to the Transit Authority decision in November, a HBTC Funding Options workshop, organised by the ARC, was held in March 2003. Approximately 50 people, including representatives of the ACC, ARC, NSCC, RLTC, IA, Ministry of Transport, Transit, local residents and property owners attended the workshop.

Since the workshop, Transit has been pursuing discussions with the ARC and ACC regarding the funding of a below-ground option.

7.3.3 Stakeholder Consultation Methods

7.3.3.1 Meetings

Consultation with Stakeholders during Phase 2 was initiated via the circulation of a public newsletter – HBTC Update Issue 3, in October 2002. Issue 3 was sent to stakeholders accompanied by a letter advising them that Transit would like to meet with them to provide a project update.

Consultation meetings held with stakeholders during Phase 2 involved the provision of information (engineering drawings, technical reports and aerial photographs) from the continuing technical investigations and environmental assessment of both above and below-ground options.

After the release of the Transit Authority decision in December 2002, consultation principally focused on identifying and addressing significant issues specific to individual stakeholders, with respect to the Option A - west-side widening. Ongoing meetings and/or correspondence occurred, to identify mitigation techniques such as re-designing carparking and landscaping and the location of noise walls and pedestrian accessways.

A detailed inventory outlining the consultation undertaken with stakeholders is contained in Technical Appendix 13a. A summary is provided in Table 7.2 below:

7.3.3.2 Presentations

There was one formal project presentation made post July 2002, in addition to the individual meetings. The presentation was at the SMBA's AGM on 26 November 2002. The purpose of the presentation was to update the Association on the project's progress and explain Transit New Zealand's position with respect to the fundable option.

7.3.4 Stakeholder Consultation Feedback

In response to the newsletter and meeting invitation that was sent out, the parties listed in Table 7.2 below were directly consulted.

Table 7.2 - Stakeholders (Phase 2)

Directly Affected Land Owners
Auckland City Council (ACC)
Ports of Auckland Ltd (POAL)
Victory Christian Church (VCC)
Placemakers (PR Doole)
Residents Groups
St Mary's Bay Association
Freeman's Bay Residents Association
Auckland City Residents and Ratepayers Association
Freemans Bay Properties
New World Supermarket
Beaumont Apartments
Franklin Mews
Seychelles Body Corporate
Freemans Bay School
26-36 Napier St – Panavision site
Union Street Businesses
Victoria Park Users
Beaumont St/Western Reclamation Properties
Viaduct Harbour Holdings Ltd (VHH)
Trans Tasman Properties Ltd (TTP)
Melview Developments
Other Key Stakeholders
Auckland Waterfront Advisory Group (AWAG)
Navy
Auckland Regional Council (ARC)
North Shore City Council (NSCC)
Historic Places Trust (HPT)
Iwi
Ngati Paoa Whanau Trust
Huakina Development Trust
Ngati Maru
Kawerau A Maki
Ngati Whatua
Ngai Ki Tamaki
Hauraki Maori Trust Board
Ngati Rehua Ngati Wai Ki Aotea

A summary of Stakeholders issues/concern and the Project Teams response, is provided in the Technical Appendix 13b.

7.3.5 Community Consultation Methods

7.3.5.1 Newsletter

Consultation with the wider community and interested parties during Phase 2 was undertaken via the circulation of a public newsletter – HBTC Update Issue 3, in October 2002. A copy of this newsletter is contained in the Technical Appendix 13b.

The newsletter provided an update on the progress of the project and outlined that as a result of feedback from the first phase of consultation, Transit had been investigating additional funding for a below-ground option from Infrastructure Auckland (IA). The newsletter also outlined that as a result of this Transit was continuing technical investigations and environmental assessment of both above and below ground options.

7.3.5.2 Public Display at the Birdcage

To provide the public with further opportunities to view the details of the HBTC Project, a display outlining the options and issues was put in place, at the Birdcage Hotel on Franklin Road, from October 2003. Copies of project newsletters and briefing document were available at the display. The material displayed was similar to that shown at the open days in May 2002.

7.3.6 Phase 2 Conclusions

Outcomes from Phase 2 consultation was mixed. There was still a strong preference by Stakeholders and the Community for an underground option. The main effects of the project are those that impact on the directly affected landowners (Victory Christian Church, Placemakers, and Ports of Auckland). This stage of consultation had a strong focus on the mitigation of effects (particularly noise and visual) of the project. Certain themes have emerged. These include:

- A widely accepted view that the project was needed.
- An overall preference for undergrounding of the project.
- The majority of those consulted agreed to discuss how the effects of the west-side widening option could be avoided or mitigated, accepting that this is the only fundable option at this time.
- The main effects on those who were not subject to land requirements were noise, visual effects and air quality during and after construction.
- A widely expressed view was that there is a need to protect and enhance the environmental and amenity values of the area e.g. utilising space underneath the viaduct, retaining trees etc
- Stakeholders with land requirements were mainly concerned with how they would operate with the loss of land and/or carparks both during construction and operation of the HBTC project.
- The safety barriers, in particular through the Victoria Park section of the corridor, were generally viewed by residents as not being high enough to mitigate the traffic noise effects.

7.4 Phase 3 Consultation – Funding and Designation Footprint (April 2003 – June 2004)

7.4.1 Introduction

Consultation from the second phase was based upon gaining feedback from stakeholders on how to mitigate effects from the Westside widening (above ground) option, but the preferred options for stakeholders and the community remained as an underground option.

Phase 3 of the consultation process was characterised by the project effectively being placed on hold due to stakeholder and community demand for an underground option while Transit was unable to fund this type of option. No community consultation was undertaken during this phase and deliberations between Auckland City Council, Auckland Regional Council, North Shore City Council was the main form of stakeholder consultation.

7.4.2 Stakeholder Consultation Methods

7.4.2.1 Letters

During Phase Three much of the consultation consisted of letters between Transit and Key Stakeholders. A table summarising the letters and copies of the letters are contained in the Technical Appendix 13b.

These letters related mostly to the funding issue and the roadblock it had created in terms of selecting an option, and of various issues that may have future implications for the preferred option designation footprint.

7.4.2.2 Meetings

Two significant meetings were held in May and June of 2004 with representatives from Transit, ACC, ARC and NSCC in attendance. The first meeting involved council officers in an attempt to set up a 'political meeting' involving political representatives from the above Councils. The 'political meeting' was held in June in an attempt to 'unlock' the HBTC project. The outcome was that Council officers would work together to produce an analysis of options to move HBTC forward. Full minutes of the meetings are included in the Technical Appendix 13b.

7.4.2.3 Presentations

There was one formal project presentation made at the beginning of the 'political' meeting outlined above. Transit delivered the presentation to the Council officers and politicians in attendance. The purpose of the presentation was to give a background and update to those present on the process to inform the debate regarding 'unlocking HBTC'.

7.4.3 Stakeholder Consultation Feedback

Key Stakeholders with whom consultation continued while the funding issues was worked through, are listed in Table 7.3 below

Table 7.3 - Stakeholders (Phase 3)

Key Stakeholders – Funding Resolution
Auckland City Council (ACC)
Auckland Regional Council (ARC)
North Shore City Council (NSCC)
Infrastructure Auckland (IA)
Navy

The concern of Auckland City Council was to source funding to enable undergrounding. Auckland Regional Council's primary concern related to provisions of Bus lanes in whichever preferred option was selected. The Navy was not prepared to lift the defence purpose designation on the Ngapona land until an alternative site was found. A full description of the above Stakeholders concerns are contained in the relevant letters and minutes contained in the Technical Appendix 13b.

7.4.4 Phase 3 Conclusions

The Phase 3 consultation was different to the other three phases in that it was not formal consultation regarding options evaluation/information. This phase was a tie-over period while funding was sourced to make up the difference between Transits preferred option of above ground and ACC's and the communities preferred option of below grounding.

The general conclusion that can be drawn is that neither Transit nor the Key Stakeholders could find a solution to the funding issue.

However, in December 2004 the Transit Board made a decision to pursue a preferred option of a Northbound Tunnel under Victoria Park. This decision was enabled by the introduction of the Land Transport Management Act 2003, which provided for broader consideration of a project's costs and benefits, taking into account social and environmental considerations. This enabled Transit to reconsider in its evaluation, the previous Key Stakeholder and Community consultation results, and the Auckland City Council, Auckland Regional Council and North Shore City Council preference for an underground solution through Victoria Park.

7.5 Phase 4 Consultation – Preferred Option (September 2005 – present)

7.5.1 Introduction

The purpose of the fourth phase of consultation on the HBTC project, beginning in September 2005 and continuing until resource consent lodgement in early to mid 2006, is to:

- Inform Key Stakeholders and the community of Transit's selection of a Northbound tunnel as its preferred option for HBTC;
- Provide information from continuing technical investigations and environmental assessments for the Northbound tunnel and St Mary's Bay motorway improvements;
- Identify any new issues arising from the preferred option; and
- Seek responses from Key Stakeholders and the Community regarding mitigation measures for Transit's preferred option.

7.5.2 Stakeholder Consultation Methods

7.5.2.1 Meetings

Consultations with Key Stakeholders were initiated by direct contact. The Council Liaison Group was re-established with ACC and ARC to progress documentation for the Notice of Requirement for an alteration to the motorway designation, and for the forthcoming Resource consent application.

Meetings were also held the Victory Christian Church, St Mary's Bay Association, ACC Community Planning, the Victoria Park Bowling Club. Minutes of all these meetings are contained in Technical Appendix 13b.

7.5.2.2 Newsletter

As part of the overall fourth consultation phase a public newsletter was prepared – HBTC Update Issue 4 – in October 2005. This newsletter outlined the project background and informed of Transit's decision to pursue a Northbound tunnel as its preferred option for HBTC. This newsletter was mailed to specific Key Stakeholders as outlined in Table 7.4 below. It also contained information and dates of two Public Open Days on the 13th and 15th October 2005.

7.5.3 Stakeholder Consultation Feedback

As part of the direct meetings and Newsletter mailout, Transit is continuing to consult with the following stakeholders:

Table 7.4 - Stakeholders (Phase 4)

Directly Affected Land Owners
Auckland City Council (ACC)
Ports of Auckland Ltd (POAL)
Victory Christian Church (VCC)
Residents Groups
St Mary's Bay Association
Freeman's Bay Residents
Auckland City Residents and Ratepayers Association
Western Bays Community Board
Freemans Bay Properties
New World Supermarket
Beaumont Apartments
Franklin Mews
Seychelles Body Corporate
26-36 Napier St - Panavision site
Beaumont St/Western Reclamation Properties
Viaduct Harbour Holdings Ltd (VHH)
Trans Tasman Properties Ltd (TTP)
Melview Developments
Prism Properties Ltd
Princewood Investments
Other Key Stakeholders
Auckland Waterfront Advisory Group (AWAG)
NZ Navy
Auckland Regional Council (ARC)
North Shore City Council (NSCC)
Historic Places Trust (HPT)
Auckland Police
Infrastructure Auckland (IA)
Department of Conservation
Iwi
Ngati Paoa Whanau Trust
Huakina Development Trust
Ngati Maru
Kawerau A Maki
Ngati Whatua
Ngai Ki Tamaki
Hauraki Maori Trust Board
Ngati Rehua Ngati Wai Ki Aotea

It should be noted that Placemakers, the Union Street businesses and Victoria Park Markets that are in Table 7.2 are not included in Table 7.4. This is because the Westside Widening options proposed alterations to the Cook Street motorway off-ramp. However the

Northbound tunnel preferred option does not propose any alterations to the Cook Street off-ramp and therefore no effect upon these previously affected stakeholders.

Consultation for this Phase of the project is ongoing and feedback will be updated as meetings are held and negotiations resolved. Outcomes of meeting held so far are included in the conclusion below.

7.5.4 Stakeholder Consultation Conclusions

Full consultation with all stakeholders has not been completed at the time of submission. However those stakeholders who are most affected including directly affected landowners have been contacted and consultation has begun. It is now a matter of working through the issues with these stakeholders and agreeing to satisfactory mitigation measures.

From the consultation undertaken thus far the following points can be made:

- ACC and ARC continue to support the undergrounding option.
- VCC have shown preference for an underground carparking option and mitigation measures are being negotiated.
- SMBA are generally accepting of the underground option and are negotiating a balance between mitigation of noise and the visual impact of noise walls.
- ACC Community Planning is satisfied that the area of reserves and open space linkages will be increased by the preferred option and are negotiating details with Transit.

7.5.5 Community Consultation Methods

7.5.5.1 Press Release

A media release entitled “Transit moving on tunnel option for Victoria Park motorway” was released on September 7th 2005. The release advised of the decision to pursue a Northbound tunnel and to undertake field investigations. It also advised that stakeholder meetings and public open days would be occurring during September and October.

7.5.5.2 Email and Phonenumber

As part of the overall consultation strategy an email address and phonenumber was reactivated to field public enquires relating to the preferred option. Both are checked regularly and to date no contact has been received.

7.5.5.3 Newsletter

In the week preceding the Public Open days, approximately 4000 copies of a public newsletter- HBTC Update Issue 4 - was hand delivered to the same distribution area as contained in Technical Appendix 13b.

This newsletter outlined the project background and informed of Transits decision to pursue a Northbound tunnel as its preferred option for HBTC. This newsletter was mailed to specific Key Stakeholders as outlined in Table 7.4 above. It also contained information and dates of two Public Open Days on the 13th and 15th October 2005.

7.5.5.4 Public Open Days

As advertised in the Public Newsletter and in a series of newspaper advertisements (as shown on the Media Schedule in the Consultation Report (Phase 2-4), two Open Days were held on 13th and 15th October 2005 at the Leys Institute in Ponsonby and at Freeman's Bay Community Hall respectively.

The purpose of the Open Days was to inform the community of Transits decision to pursue a Northbound tunnel through Victoria Park as its preferred option for HBTC. The Open Day displays included information on the project objectives, the configuration and key features of the preferred option and environmental and engineering issues associated with the project.

Senior Transit engineers and the Project Team were present to answer questions. In total 54 people attended the Open Days and from these 8 written responses were received.

7.5.6 Community Consultation Feedback

Feedback from the community was sought via a standard feedback form (available at the open days), which asked the following questions:

1. Overall, what do you think of the project once it is completed?
2. Do you have any comments regarding construction effects?
3. Other comments/feedback?

The community were also able to submit feedback in their own format via email, letter or verbally. A summary of the responses received so far and copies of the responses are contained in Technical Appendix 13b.

7.5.7 Community Consultation Conclusions

Overall the response to the preferred option has been positive. No complaints or registrations of opposition have been received via the phonenumber and email that was advertised in the Public Newsletter and the response forms returned at the open days all contained approving comments of the option in general.

The Open Day attendance is also a reflection of the preferred options acceptance within the community with a comparatively low turnout of 54 people in Phase 4 compared to estimated 355 people in attendance at the open days, plus the approximately 80 attendees at the public meeting, held during Phase 1 consultation.

7.5.8 Phase 4 Conclusions

From the consultation undertaken thus far during Phase 4 it can be concluded that both Key Stakeholders and the Community are in general support of Transits decision to pursue a preferred option of a Northbound tunnel.

Consultation will be ongoing with both Key Stakeholders and the Community in order to discuss issues of concern to specific groups and to negotiate mitigation measures.

7.6 Phase 1-4 Conclusions

- Throughout the project all parties consulted generally accepted that the project was necessary.

- Analysis of the consultation undertaken throughout the project's duration reveals a transition in feedback that is directly related to the preferred option Transit was proposing at that point in time. The above-ground option received widespread opposition from a majority of those consulted. Now that a below-ground option is proposed the consultation feedback has been supportive and generally positive.
- As identified in the HBTC Communications and Consultation Strategy (contained in Technical Appendix 13) there are various levels within the consultation spectrum. The consultation process outlined above indicates Transit's approach of 'Involvement' where the Community and Stakeholder concerns are considered in the decision making process. Incorporation of consultation feedback has been reflected in Transits decision not to proceed with the above-ground option in 2003. Instead Transit deferred its decision until a funding solution was found to enable undergrounding as its preferred option.
- It can be concluded that the consultation undertaken was effective and robust and as a result, both Stakeholders and the Community have positively accepted the preferred option.

8 Assessment of Environmental Effects

This section of the complete AEE comprises the detailed assessment of environmental effects. These effects are discussed under the following headings:

- Effects on existing landuses
- Social Environment
- Visual and Landscape
- Urban Design
- Trees
- Heritage
- Tangata Whenua Values
- Noise
- Vibration
- Air Quality
- Geotechnical
- Contaminated Land
- Earthworks
- Stormwater
- Effects on other Existing Services
- Operational Traffic Effects
- Construction Traffic Effects
- Impacts on Parking
- Lighting Effects

8.1 Effects on existing Landuses

8.1.1 St Mary's Bay Residential Suburb

Originally the residents of the Ponsonby/ St Mary's Bay waterfront enjoyed a seaside playground with a thriving maritime village of boat-builders together with yachting and rowing clubs. However the land use changes heralded by the motorway corridor in the 1950s have now been in place for over forty years. Therefore it is apparent that the land is, and will continue to be, used for motorway purposes.

From the end of Curran Street through to the end of New Street, the edge of the sealed carriageway (including shoulder) will not be substantially closer to residential properties, as a result of the project, than the existing situation. Existing residential properties will still be separated from the motorway by open space and ACC reserve land. The extensions to the motorway carriageway will be mostly constructed inside the existing fenceline, which separates the motorway from the reserve/open space at the cliff base.

From the end of New Street through to the Victory Christian Church, there will be a reduction in distance from existing private property boundaries to the new physical motorway edge. This is because of the reduction in the existing shoulder width and the relocation of the Fanshawe Street on-ramp. This reduction also requires the removal of the Ngapona Building (discussed below). These private properties will still be separated from the motorway by approximately 30-40 metres of reserve land.

In summary, the HBTC Project will not result in residential land-take or the removal of any residential dwellings from any residential properties and therefore will not alter the current pattern of land use within the St Mary's Bay area.

8.1.2 St Mary's Bay Reserve and Open Space

The open space at the foot of the St Mary's Bay cliffs from Shelly Beach overbridge through to the entrance to HMNZS Ngapona (below London St) is currently available to the public for passive recreation (e.g. walking dogs). An existing wire mesh fence approximately 2 metres high separates the motorway from this open space.

There will be no significant physical encroachment beyond this existing fenceline as part of the proposed works. There may be small temporary encroachments to install motorway barriers, lighting, noise walls and foundations for signage gantries.

Outside the proposed designation, improvements such as landscaping and footpaths are proposed to assist in enhancing the recreational use and amenity of the area. These include provision for a footpath surface through the St Mary's Bay Reserve improving all-weather access for passive recreation purposes. Transit will liaise with ACC, to ensure that these improvements are consistent with any visions and intentions that ACC has for this reserve area.

A connection across the motorway by way of a pedestrian footbridge is also proposed to be located near Jacob's Ladder. This would connect SMB to the Western Reclamation and Marina areas and vice versa. The exact location and form of the footbridge will be determined through consultation, including SMB residents and ACC.

The project provides for the construction of a 5 metre high transparent noise wall and motorway edge treatment. The wall will begin at Shelly Beach Road and continue to the end of Harbour Street in place of the existing 2m high fence. This wall is proposed as mitigation to address adverse noise effects for St Mary's Bay residents but will also decrease noise experienced in the Reserve. The proposed noise wall will not alter the existing use for passive recreational uses. However, at access areas to the reserve where the cliff is close to the motorway, there is the possible enclosing effect for the proposed noise wall. Designs have been considered for raising the ground level of the reserve in these access areas, through fill, so that pedestrians would be level with the transparent portion of the barrier. The suitability of this mitigation measure would need to be discussed with ACC. This pedestrian issue will be addressed in the proposed UD mitigation plan.

Overall, the project will not result in a reduction in available open space area as currently exists. The proposed footpath, landscaping and the reduction in noise achieved by the

noise walls, will improve the amenity and usability of this open space for passive recreation by the general public.

8.1.3 HMNZS Ngapona

The HBTC Project will require the removal/ demolition of the existing buildings together with at-grade parking on the site and require the relocation of the activities of the Royal New Zealand Navy Volunteer Reserves (RNZNVR) to an alternative site.

Consultation with the Navy has been ongoing over the life of the project and the Navy is aware that it will be required to relocate from its buildings at HMNZS Ngapona. Transit will ensure that the Navy is kept up-to-date with the statutory process and construction timetable to ensure that they are given sufficient warning to allow them to relocate their activities. The Navy has provided assurances that they would vacate the property to make way for the HBTC Project works.

It should also be noted that the Ngapona site is designated for 'Defence Purposes'. The Navy has advised that once they have found a suitable alternative site for the RNZNVR, that they will request that ACC remove the designation from the site.

Proposed landscaping along here could include a reference to the historical significance of the site both as a Navy training facility and also in relation to its use prior to reclamation as a local swimming cove.

The Jacob's Ladder steps immediately adjacent to the site will not be affected by the new work (see further discussion below). Currently no access for the general public is possible from Jacob's Ladder west through to the open space area at the end of St Mary's Rd. The removal of HMNZS Ngapona will enable a new pedestrian access to be created between St Mary's Bay Reserve the Victoria Park area. Furthermore, as stated in the previous section, a pedestrian overbridge is proposed near Jacob's Ladder over the motorway to Westhaven Drive. This will provide further pedestrian linkages in the area, enhancing the availability of recreation uses in the area.

In summary, the landuse of HMNZS will need to be relocated and has been agreed to by the Navy. A historical record of the HMNZS building is recommended.

After completion of the HBTC Project, part of the remaining HMNZS land will be available for a public walkway which then creates public access to be provided from Beaumont Street along the bottom of the St Mary's Bay cliff, right through to the Point Erin Reserve, and provide additional public access across the motorway to Westhaven Drive.

The remaining land area of the HMNZS will be used for the relocated on-ramp. The other part of remaining land will be used temporarily for construction access during the project.

8.1.4 Westhaven Drive/ Marina

The proposed works include alterations to the motorway edge through St Mary's Bay where it abuts Westhaven Drive. The construction of the proposed works will require the removal of existing boundary treatment, including the existing landscaping. The landscaping strip (approximately 1m in width) is proposed to be replaced. The new landscaping strip will serve to reduce headlight conflict between Westhaven Drive and the

motorway and increase the amenity of this area, in a similar manner to the existing edge treatment.

The existing pedestrian corridors and linkages along Westhaven Drive will be maintained and the function of Westhaven Drive as a local road will not be affected by the motorway widening.

8.1.5 Waitemata Harbour

There will be no structures or reclamation as part of this project in the Waitemata Harbour.

8.1.6 Walkway from Jacob's Ladder to Beaumont Street

A sealed pedestrian accessway currently exists between Beaumont Street through to the foot of Jacob's Ladder. This accessway is separated from both the on-ramp and the Victory Christian Church site by landscaping strips containing native and exotic tree species. The existing walkway and landscaping will be removed. The north bound tunnel requires the realigning of the Fanshawe Street on-ramp to the west of the proposed tunnel in the current location of this walkway. A new walkway is proposed to be constructed further to the west. The new walkway is to be reconstructed to similar dimensions as currently exists with new landscaping/vegetation to soften its amenity for users.

This replaced walkway will connect to the new walkway across the HMNZS site. St Mary's Bay residents will be able to access Fanshawe St, Victoria Street and beyond through St Mary's Bay reserve as an alternative to the steep steps of Jacob's Ladder.

8.1.7 Victory Christian Church

The construction of the north bound tunnel (NBT) and realignment of the Fanshawe Street on-ramp to the west requires the use of land currently utilised by the Victory Christian Church site. This results in the landscaping strip between the church site and the motorway being removed. A new landscaped strip is proposed further inside the Church site. While the same amount of trees of the same height may not be able to be replaced, it is considered that the combination of new landscaping and new fencing can achieve similar amenity and screening benefits for the Church.

An area that will be used for construction of the tunnel and the realigned Fanshawe Street on-ramp will be temporarily unavailable. After completion of the project, approximately 90 carparking spaces will be permanently lost. Effects on parking for the whole project area are detailed in Section 8.8. In summary, mitigation measures will be taken during construction and after completion of the project to ensure the Church site has a total of 320 spaces as required by their current resource consent conditions.

Whilst there will be adverse effects on the land use of the subject site during construction and upon completion of the project, it is considered that the land use of the Church operation with associated facilities can continue to be accommodated in line with the parameters of the Church's existing resource consent. All proposals to mitigate adverse effects from loss of land use will be done in consultation with the Church.

8.1.8 Old Gas Works Site

Approximately 240 apartments/townhouses have been constructed on land behind the historic brick buildings, on the old gas works site. No physical works are proposed at the immediate boundaries of this site or on the site. Therefore, the project will not alter the land use activities that are able to be carried out on this site.

8.1.9 Apartments in Franklin Rd

As with the new residential units on the Old Gas Works Site, no physical works are proposed at the immediate boundaries of the site or on the site, therefore, the project will not alter the land use activities that are currently on site.

8.1.10 Western Reclamation

The main access roads to Westhaven (also known as the “tank farm”) are Beaumont Street and Halsey Street. The proposed works include alterations to the Beaumont/Fanshawe intersection, including bus priority measures. Vehicle and pedestrian access will continue to be maintained throughout this area during construction. After completion of the project, the intersection will function efficiently.

The project area does not encroach into the existing land uses of the Western Reclamation.

8.1.11 Victoria Park

No works are proposed to the VPV as part of this project. Maintenance and upgrading of the VPV can occur at any time under the existing designation of the VPV.

A construction zone will be required on the western side of the viaduct. The uses of this zone include: temporary access and construction lay-down areas. This zone is approximately half of the park area between the west side of the existing VPV and Beaumont Street. This area contains the City Newton Sports Club building, the skate board park, public pathways (people run/walk on) and one of the bowling greens. These areas will be required for approximately 24 months or until the HBTC Project is completed.

Therefore, during construction the existing uses including: part of the Victoria Park Bowling Club grounds, City Newton Sports Clubrooms, existing skateboarding facilities and the Petanque Court will not be available. The option of relocating these facilities during construction is being discussed with ACC.

Whilst there are losses to the Park use, these are temporary in nature. Once the project is complete, the park land and uses will be restored to current levels. They may be upgraded and enhanced through consultation with Auckland City and the proposed landscaping mitigation plans for areas outside the proposed designation area. Loss of trees and vegetation is discussed in detail in further sections of this AEE.

It is noted that small emergency exit buildings from the tunnel will be constructed in Victoria Park. These are small in nature and can be incorporated into the landscaping and/or replaced activities and buildings in this area of the Park.

8.1.12 The Birdcage Hotel

The historic Birdcage Hotel is currently located at the proposed NBT entrance and therefore will need to be removed to facilitate the proposed works. In order to avoid its complete loss, it is proposed to relocate the building further up Franklin Road. It is proposed to shift only the historic part of the Birdcage Hotel. The 1969 addition, including the garden bar, which is currently located partially beneath the viaduct and the attached Liquorland building will be demolished. The detailed effects on the heritage aspects of the building are further discussed in Section 8.6.

Part of the heritage value of the Birdcage Building relates to its use as a “corner pub” and its original foreshore location. Therefore, while it is proposed to relocate the building:

- The orientation of the building to Franklin Road will remain the same;
- The use of the building as a hotel (tavern/ restaurant) will be retained;
- No new sites/buildings will be created on any remaining land between the viaduct and the new Birdcage site (preserving the original location from development); and
- A historical recording of the basement is proposed.

The existing Birdcage and Liquorland sites (127 and 133 Franklin Road) are both owned by Transit NZ. Transit NZ also owns the two adjacent sites on Franklin Road. It is proposed to move the Birdcage building up (west) Franklin Road onto one or both of these sites. The adjacent site to Liquorland (125 Franklin Road) is an existing emergency motorway off-ramp and is currently used for parking for Birdcage customers. The next site (123 Franklin Road) is currently occupied by temporary commercial buildings.

The Birdcage relocation will result in the Birdcage building being closer to the residential dwellings at 115 Franklin Road. Consultation has been undertaken with adjacent residents. The designation provides for the relocation of the building.

Whilst the land use of the historic Birdcage Hotel will be lost at its current location and its modern additions and basement will be removed, the historic Birdcage Hotel as a heritage feature will be retained, albeit in a different location than currently.

8.1.13 Properties in Napier Street

8.1.13.1 23 Napier Street

This site contains 8 terrace houses. It is located at the eastern end of Napier Street (northern boundary of Freemans Bay Primary School) and abuts the motorway designation.

The HBTC Project will be constructed within the existing designation at this location, however, it will result in the motorway carriageway being closer to this residential site. The effect of this is mitigated by the topography since the motorway is elevated above the Napier Street site.

The fill bank between this property and the motorway contains a variety of typical motorway trees and shrubs. Those trees closest to the motorway will require removal to construct the additional motorway carriageway areas. This will not significantly reduce the screening of the motorway for these properties and replanting is proposed where possible.

The potential noise effects of the project are discussed in Technical Appendix #10 and in Section 8.7 of this AEE.

8.1.13.2 26-36 Napier Street

This site contains an existing sound recording studio. The designation will be extended into this property to widen the motorway corridor and facilitate the new graded entrance to the NBT. Therefore, there will be a loss of the existing land area surrounding the existing sound recording studio. Existing trees in this area will need to be removed. A new retaining wall and potential planting will be built at the boundary to the new motorway. These new features combined with the existing topography will assist in mitigating adverse effects to the recording studio. It is understood from recent correspondence that the building owner has terminated the lease of the studio, however this has yet to be confirmed.

8.1.13.3 Conclusion

The potential effects of the project on these residential properties include traffic noise effects and construction effects (noise, dust). It is concluded in the following sections of this AEE, that the adverse noise and construction effects will be no more than minor. Therefore, it is considered that the project will not prevent the continuing use of this site.

8.1.14 Freemans Bay Primary School

Freemans Bay Primary is located on the corner of Wellington and Hepburn Streets. The north-western corner of the school site abuts the motorway designation. This corner is used for playing fields and tennis/netball courts.

The Project results in a minor re-alignment of the motorway adjacent to the school boundary, resulting in the carriageway closer to the school.

The school will not lose any existing land and therefore, it is considered that the project will not prevent the continuing land use of the site as a school.

8.1.15 Victoria Park Market

No land take is required from Victoria Park Market and there is no affect on the existing land uses on this site

8.2 Social Environment

Social severance (including accessibility and safety) already exists as a result of the location of the current motorway. Severance effects are either physical (e.g. the road itself, moving traffic which prevents mobility), or psychological (e.g. safety, amenity and lifestyle effects which create a feeling of being “cut-off”).

Overall, the upgrade will have a positive effect in terms of reducing existing severance by:

- Improving the Fanshawe/Beaumont intersection which will enhance access and safety by creating safe, convenient crossing points for pedestrians and provide safe access opportunities for local and side road traffic;
- Generally improving footpaths and public linkages in the project area;

- Creating better links around SMB including a new overbridge between Jacob's Ladder and Westhaven Drive which also enhances access and safety by creating an additional safe, convenient crossing point
- Improving traffic flow, by reducing queues and congestion, for local travellers and travellers from the wider area.

8.3 Visual and Landscape

A landscape and visual assessment was undertaken by LA4. The following is a summary of this assessment included at from Technical Appendix #7. The findings of this report are summarised as follows:

8.3.1 Visual and Landscape Effects Analysis

The motorway corridor consists of different landscape units, which are outlined, in Section 6.4 of this AEE. In summary, they are Landscape Unit 1 – Wellington Street, Landscape Unit 2 – Victoria Park and Landscape Unit 3 – St Mary's Bay

A visual assessment matrix is used by LA4 to assess the degree of landscape and visual effects associated with the proposed works for each landscape unit. The Visual Assessment Matrix is divided into two parts as follows:

- **Part A** assesses the sensitivity of the landscape unit to change. In doing this LA4 included an assessment of the landscape quality, including its contribution to the experience of entering Auckland; landscape heritage in which an assessment of the extent to which the landscape unit conveys a sense of identity because of its endemic or cultural associations; and the size of the viewing audience and its proximity to the proposed option. As part of this assessment the key values and sensitivity ratings for the Auckland urban and peri-urban areas from the ARC's ASP 2 boundaries are considered.
- **Part B** assesses the specific visual and landscape implications of each option including its visual prominence; its visual contrast or integration (i.e. how well does the option fit into the existing scene in terms of composition, and its relationship to elements and features in the landscape); view blockage and obstruction (i.e. does the option intrude into existing views and across landscape elements and features); and amelioration potential (i.e. are there opportunities to merge or integrate the option into the landscape setting). As part of this assessment the aspects contributing to vulnerability to change from the ARC's ASP 2 boundaries assessment are considered.

The rating given at the end of each description denotes the overall visual effects rating including the potential for mitigation measures.

8.3.2 Landscape Unit 1 – Wellington Street

8.3.2.1 Visual Assessment Matrix

	Effect
Part A - Sensitivity	
A1 Visual Quality	Low
A2 Landscape Heritage	Moderate
A3 Visual Absorption	Low*
A4 Visual Catchment	Moderate
Composite Rating	Low-Moderate
Part B - Qualitative Change	
B1 Visual Quality/Integration	Low
B2 Amelioration Potential	Low/Moderate*
Composite Rating	Low-Moderate
Overall Effect on Landscaping Unit	Low-Moderate

**Note - the effect value relates to potential effect in relation to each specific criteria. For A2 Landscape Absorption Capability and B2 Mitigation Potential, a high rating (i.e. high VAC or mitigation potential) results in a low 'effect' rating against these criteria (and visa-versa).*

8.3.2.2 Discussion

Overall the landscape and visual effects on this landscape unit will be relatively low because:

- The location of the development is within a cutting in the existing motorway corridor - which means it will only be visible to motorway users and a few adjacent businesses and residential properties;
- A large part of the proposed development is below ground level;
- Results in relatively low qualitative change in relation to existing land use; and
- Can be reasonably well integrated with appropriate planting along sides of the motorway.
- The Birdcage Hotel will be relocated nearby.

8.3.3 Landscape Unit 2- Victoria Park

8.3.3.1 Visual Assessment Matrix

	Effect
Part A - Sensitivity	
A1 Visual Quality	High
A2 Landscape Heritage	Moderate-High
A3 Visual Absorption	High*
A4 Visual Catchment	High
Composite Rating	High
Part B - Qualitative Change	
B1 Visual Quality/Integration	Low-Moderate
B2 Amelioration Potential	Low-Moderate*
Composite Rating	Low-Moderate
Overall Effect on Landscaping Unit	Moderate

**Note - the effect value relates to potential effect in relation to each specific criteria. For A2 Landscape Absorption Capability and B2 Mitigation Potential, a high rating (i.e. high VAC or mitigation potential) results in a low 'effect' rating against these criteria (and Visa-versa).*

8.3.3.2 Discussion

The key landscape features of Victoria Park are the open grassed spaces of the park, and the mature London Planes around the periphery. Many of these London Planes are magnificent specimens and are particularly important because of their heritage value (between 100 – 120 years old), and the sense of establishment and amenity enhancement they bring to the park.

The built character around the park retains much of its heritage values with the Birdcage Hotel, Victoria Park Market and the Gas Building along Beaumont Street. There are views across the park and from the viaduct crossing the park. This combination of factors results in a landscape unit with a relatively high visual quality.

The proposed motorway upgrade includes the construction of a northbound tunnel under Victoria Street, Victoria Park and Beaumont Streets. All southbound traffic will use the existing viaduct, which will have slight modifications, with solid concrete barriers to replace the existing steel railings.

The construction of the tunnel will necessitate the following removals:

- 4 mature London Planes including one adjacent to the Birdcage.
- A small group of mixed native and exotic tree in the park next to Victoria Street.
- A large elm next to the skateboard area.
- A significant group of pohutukawa and other mixed native specimens near the Newton Sports Club.
- Several Brush Box (*Tristania* sp) street trees on Beaumont Street.

Visually, once the construction is complete, the area will appear almost exactly as it is, but with less trees, as the main part of the works is under the ground. The indicative effects of this vegetation removal are depicted in the photomontages A, B and D (see Technical Appendix #7).

Although these trees collectively are of considerable significance as landscape, heritage and amenity features within the park, their removal must be considered in the context that the preferred option for the motorway upgrade in this area :

- Will result in no further visual intrusion of motorway structures on the park;
- In the short term will result in increased apparent spaciousness of the park;
- There are a large number of remaining trees unaffected by the proposal; and
- With time the trees that have been removed - can be re-established, albeit in a slightly different locations.

Overall the landscape and visual effects on this landscape unit will be moderate.

8.3.4 Landscape Unit 3 – St Mary's Bay

8.3.4.1 Visual Assessment Matrix

	Effect
Part A - Sensitivity	
A1 Visual Quality	High
A2 Landscape Heritage	High
A3 Visual Absorption	Moderate*
A4 Visual Catchment	High
Subtotal	Moderate-High
Part B - Qualitative Change	
B1 Visual Quality/Integration	Low-Moderate
B2 Amelioration Potential	Low-Moderate*
Composite Rating	Low-Moderate
Overall Effect on Landscaping Unit	Moderate

**Note - the effect value relates to potential effect in relation to each specific criteria. For A2 Landscape Absorption Capability and B2 Mitigation Potential, a high rating (i.e. high VAC or mitigation potential) results in a low 'effect' rating against these criteria (and Visa-versa).*

8.3.4.2 Discussion

The main visual effects in relation to this landscape unit will result from the vegetation removal and the introduction of the acoustic barrier.

The construction of the tunnel and realigned on-ramp will necessitate in the removal of most of the mixed vegetation along the edge of the Victory Christian Church car park - removing its current screening. The realignment will also require the removal of the HMNZS Ngapona facility (Auckland Division of Naval Reserves).

West from the Victory Christian Church, along St Mary's Bay cliff line general construction and installation of the acoustic barrier will necessitate considerable pruning and crown lifting. Although most of the significant pohutukawa along this stretch are retained, the selective removal of some trees and pruning will reduce the overall canopy effect in this area.

The pohutukawa on the cliff, and the trees that surround Pt Erin Park and the southern end of the Shelly Beach Road bridge are the focus of the views from the Harbour Bridge travelling south - a view seen by thousands of commuters on a daily basis. These are part of the remnants of coastal pohutukawa cliff line, which extend from St Mary's Bay to Cox's Bay.

The proposed bridge widening in this area will require the removal of 12 pohutukawa and a 3m crown lift on 2 other significant specimens on the cliff below Point Erin Park to allow machinery to pass beneath them for construction works. Individually most of the trees intended for removal in this area are relatively insignificant, however collectively they perform an important visual function, particularly trees 2575 -2579 which grow up under the bridge screening the abutment and assisting in its visual integration.

The ability to mitigate the loss of some of this vegetation is good; particularly the less established planting adjacent Victory Church where some of the existing specimens could be relocated and augmented with new planting. However, tangible mitigation for the loss of substantial cliff-line canopy, individual mature pohutukawa and other smaller groupings is more of a long-term proposition.

As part of the minor realignment on the seaward side of the motorway the entire existing narrow strip of vegetation will be removed. Although this vegetation is small in stature, of variable quality, and discontinuous, it does provide a visual break between the motorway and Westhaven Drive, reducing the apparent scale of the total carriageway. The removal of this vegetation could however be quite rapidly mitigated through appropriate planting.

The acoustic barrier will be constructed using a transparent material (refer to Viewpoint C in Technical Appendix #7). While this will mitigate the adverse effects to some degree, it is considered that the noise walls could still potentially result in relatively high, adverse visual effects.

For motorway users the barrier will be viewed within the context of the motorway corridor and its associated infrastructure, and although not, in relative terms, necessarily objectionable aesthetically, it will introduce a reflective barrier between the viewer and the pohutukawa lined cliff. The acoustic barrier will not intrude significantly on views of most local residents as many are located in elevated positions with views out over the motorway to the harbour and city beyond, or have views of the motorway filtered by trees and other houses. Even for those with clear views of the barrier it will be seen in the wider context of the motorway and wider setting. Negative visual associations that may be associated with the barrier for some residents will also be offset to a degree by the acoustic improvements it will provide. The effects of the acoustic barrier could also be significantly reduced with well considered design.

The overall landscape and visual effects of the motorway upgrade on this landscape unit are moderate.

8.3.5 Mitigation Measures

The following mitigation measures are recommended for each landscape unit to assist in reducing the landscape and visual effects identified in this assessment.

8.3.5.1 Landscape Unit 1 - Wellington Street

- Where space allows – continuation of the native coastal themed revegetation proposed for the Northern Tie-In section of CMJ Core Upgrade into the HBTC project area for continuity and screening of the motorway from adjacent areas.

8.3.5.2 Landscape Unit 2 – Victoria Park

- As part of the outline plan process, a landscape mitigation plan should be prepared by a suitably qualified landscape architect to ameliorate for the loss of significant trees. This plan should be prepared well in advance of initiation of works so that suitable advanced grade or relocatable specimens can be sourced for replacement planting.
- Re-establishment of the lines of plane trees along the south (Victoria Street) and western (Beaumont Street) sides of the park.

8.3.5.3 Landscape Unit 3 – St Mary's Bay

- Replant the new boundary of the Victory Christian Church car park with suitable fast growing native coastal shrubs and pohutukawa specimens identified as suitable for relocation in this area in the Arboricultural report prepared by The Specimen Tree Company 2005.

- Where space allows – instigation of a replanting programme of locally sourced pohutukawa along the base of the cliff-line for the length of St Mary’s Bay, both to replace specimens removed and to provide successional replacements for the existing trees as they naturally decline.
- Planting of a strip of low to medium growing native shrubs on the landward side of the motorway barrier and acoustic wall to soften and integrate this edge with the reserve area.
- Where space allows replanting the remaining strip between the new motorway barrier and Westhaven Drive to assist in screening and separation of the motorway from Westhaven Drive. Some gaps should be left at regular locations to allow the retention of glimpses of the water.
- Ensuring that the acoustic barriers are of a simple aesthetically pleasing design with emphasis on transparency, and minimal structural elements.

To give effect to these suggested mitigation measures, recommended conditions for the NOR are set at in section 11. Conditions include the preparation of a Landscaping Mitigation Plan.

8.3.6 Conclusion – Visual and Landscape

Initially the overall potential effects are relatively high due to the removal of some trees. However, with implementation of the proposed mitigation, the overall visual effects will be reduced to low.

8.4 Urban Design

An Urban Design Steering Group was established to develop an urban design theme for the central motorway corridor (HBTC, GGP and CMJ). The Group comprised of international and local urban design experts working on all three projects as well as ACC. This group prepared a report entitled, “The CMI Urban Design Framework (2001)” (refer to Technical Appendix #17). This Framework was adopted by Transit in the GGP and CMJ Projects and will be adopted for the HBTC project also.

The detail of the urban design elements for the HBTC project have not been finalised at this stage. These will be developed in consultation with key stakeholders, Auckland City Council and tangata whenua. However, preliminary concepts for urban design treatment, following the principles of the CMI Urban Design Framework are being developed and will be progressed as part of the project. In general, a number of issues that are relevant to urban design matters have been identified and considered specifically for the HBTC project:

- The *context* of the project is important. The HBTC project and the motorway impact on Victoria Park and other recreational open space in the area. Such space in the central city is a limited resource. Additional, suitable open space for both passive and active recreation is difficult and costly to obtain. Existing resources such as Victoria Park, St Mary’s Bay – Pt Erin reserve and Westhaven are therefore valued for their recreation and open space values.

- The *character* of the area that the HBTC project corridor passes through is distinguished by its proximity to the coastal environment, its heritage and cultural value (including relationship to Maori) and its relationship to the neighbouring areas of open spaces and trees. Design elements are expected to reflect this character.
- *Connections* are important and the opportunity to maintain and enhance connections within the urban network need to be considered. Clearly the motorway provides for vehicle transport and in particular passenger transport in the form of buses. However, a potential effect of widening the motorway is social severance (see section 8.2 above, of the AEE). Pedestrian connections in particular are key to the success of well-designed cities and towns. The provision of a pedestrian connection across the motorway is a key factor in enhancing the pedestrian environment and local connections between Westhaven/the Western Reclamation area and St Mary's Bay/Victoria Park. This helps mitigate existing and future 'severance'.
- The opportunity exists to *collaborate* with stakeholders and assist Auckland City in achieving its aspirations for *creating* a 'master planned' approach to the open space and pedestrian connections in the vicinity including the design and built form of the structures including pedestrian bridge and facilities, noise and safety barriers, retaining walls, and the restoration of other facilities (combined with replacement landscaping plans).

8.4.1 Mitigation Measures

It is intended that a detailed Urban Design Mitigation Plan will be submitted prior to construction. This mitigation plan will address the matters of the Framework Document prepared by the Steering Group and appropriate urban design measures including treatment of noise attenuation barriers, road safety barriers, retaining walls and pedestrian facilities. Furthermore, urban design measures shall be determined in consultation with iwi.

8.5 Trees

An arboricultural assessment of the trees affected by the project has been undertaken by The Specimen Tree Company (see attached Technical Appendix #12). This report is summarised below.

8.5.1 The affected vegetation

The project will affect 120 identified trees of which 79 will require removal. Approximately 200 further plants/trees are to be removed from the Westhaven Drive landscaping strip. A breakdown of the trees affected is set out in the following section.

8.5.1.1 Northbound tunnel

A construction zone beyond the extremities of the tunnel has been allowed for, and tree removal/pruning has allowed for a vertical clearance from the proposed tunnel to allow for construction machinery.

Summary

The total number of trees and groups of trees affected is 86. 68 require removal, of which:

- 4 are scheduled trees (London Planes),
- 59 have general or coastal protection.
- 5 have no protection.
- Potentially up to 20 of these trees could be transplanted.

18 trees will be retained:

- 6 require pruning and have general or coastal protection.
- All 18 will require protective fencing.
- 6 require excavation within the dripline and have general or coastal protection.

8.5.1.2 Noise Barrier

The proposed construction zone will be on the motorway shoulder.

Summary

The total number of trees or groups of trees affected is 11.

Of the 11 trees:

- All require pruning and have coastal protection. 2 also require pruning for the northbound tunnel.

8.5.1.3 Shelly Beach Road overbridge extension

The proposed construction zone will be 2m either side of the road boundary and extended 20m to the south of the existing bridge. The first 10m on the west side of the road approaching the bridge will be excavated and sheet piled.

Summary

The total number of trees affected by the overbridge extension is 23, all of which have coastal protection. Of the 23:

- 11 require removal.
- 2 require pruning.
- 10 require protective fencing, one of which requires excavation within the dripline.

8.5.1.4 St Mary's Bay Lane Widening

A construction zone to the kerb line of Westhaven Drive has been proposed.

Summary

All plants situated on the boundary require removal. All of the native plants have coastal protection (Approximately 200) and 3 of the exotics.

8.5.2 Mitigation Measures

The planning of the alignment and consideration of construction methodologies has been undertaken to minimise impacts on trees.

The arboricultural assessment identified the following mitigation for the removal of the four scheduled trees in Victoria Park:

- The planting of twelve London Planes, 6.0m high, at the completion of the works within Victoria Park.
- The final planting positions for the trees will be agreed in consultation with ACC.
- This mitigation will be in conjunction with the Landscape Mitigation Plan (LMP) by LA4.
- It is also intended to replant other vegetation to mitigate the loss of non-scheduled trees - this will be done in conjunction with the proposed LMP.

The arboricultural assessment also makes recommendations for the protection of existing trees. This includes conditions to ensure the health and longevity of the remaining trees are maintained during construction and on completion of the proposal.

The preparation of a LMP prior to construction is a suggested condition of the NOR (see Section 11 of this AEE). The recommendations related to tree protection for the retained and/or replanted trees are also suggested conditions in Section 11 of this AEE.

8.6 Heritage

A report on the impacts of heritage features within the project area has been prepared by Clough and Associates and is entitled, "Harbour Bridge to City : Assessment of Environmental Effects – Heritage, October 2005" (see Technical Appendix #16). The findings of this report are summarised in the following sections.

8.6.1 The Birdcage Hotel

The Birdcage Hotel is considered to be the most significant heritage building within the project area. It is currently located immediately to the west of the existing viaduct at the corner of Franklin Road and Victoria Street. The construction of the north bound tunnel results in the need to remove the Birdcage Hotel.

To retain the historical significance of the Birdcage Hotel, It is proposed to move the building from its present position up Franklin Road, within Transit owned land included in the proposed designation. Transit owns the existing Birdcage site and the adjacent two sites, which are occupied by an emergency motorway off-ramp and temporary commercial buildings. It is only proposed to relocate the part of the Birdcage constructed in 1880s. The garden bar, 1969 additions and the Liquorland at the rear would be demolished.

The significance of the Birdcage relates both to the building and its location. Advice from Clough and Associates indicates that provided the building can be moved without compromising its integrity, that such a small move would not appreciably alter the significance of its location. However, the proposed relocation will result in loss of the existing basement, an important aspect of the hotel, as it originally served as the kitchens, servants' dining quarters and storage. A historical recording of the basement area proposed to retain the historical knowledge.

Both the ACC and NZHPT recommended that a Conservation Plan be prepared for the Birdcage to mitigate its relocation. This Conservation Plan has been prepared by Matthews and Matthews Architects Ltd and is entitled "The Birdcage Tavern Freemans Bay Auckland, Conservation Plan, January 2003" (see Technical Appendix #14).

Both the NZHPT and Auckland City Council Heritage Planning Division have been consulted in respect of the proposed relocation of the building. All necessary authorities will be obtained from NZHPT prior to the commencement of modifications, alterations and moving of the Birdcage Hotel.

8.6.2 Campbell Free Kindergarten Building

The Kindergarten building is currently located immediately to the east of the VPV in Victoria Park. Preliminary consultation was held with ACC regarding the option of moving the building to another location in Victoria Park.

However the building does not need be moved since it does not fall within the proposed designation. Construction activity can be managed to avoid effects on the building. Further investigation to determine the extent of potential vibration effects from construction has been undertaken and this information is provided as Technical Appendix #15 and general vibration effects being discussed in Section 8.9 and the Technical Appendix #10. It has been determined that the structural integrity of the building can be secured and that this should be done prior to the commencement of works in the vicinity of the Kindergarten.

As a precautionary measure, a dilapidation report will be prepared for the Kindergarten prior to construction.

8.6.3 The Auckland Gas Company Buildings

The proposal will not impact on heritage aspects of these buildings.

8.6.4 Victoria Park Market

The proposal will not impact on heritage aspects of these buildings.

8.6.5 HMNZS Ngapona

The Heritage Assessment indicates that whilst this building has no heritage protection, it has moderate historical significance. Clough and Associates therefore recommend that detailed recording and further historic research prior to demolition to capture the level of historical significance the building holds.

8.6.6 Jacob's Ladder

The Heritage Assessment indicates that although the ladder is not scheduled or protected it is historically significant and has strong local attachment. The project will not require the removal or any alterations to this structure. It is proposed to construct a new pedestrian walkway adjacent to the re-aligned Fanshawe St on-ramp. Further, the removal of HMNZS Ngapona will allow a public walkway to be provided north of Jacob's ladder. Therefore a pedestrian walkway will be able to be provided alongside the motorway all the way from Beaumont Street through to Point Erin. It is also proposed to provide a pedestrian overbridge at the base of Jacob's Ladder to connect from St Mary's Bay to Westhaven.

Therefore, it is considered that the project will have a positive effect on pedestrian access in St Mary's Bay and the continued use of Jacob's Ladder.

8.6.7 Victoria Park 19th Century Reclamation

The 19th century reclamation area under Victoria Park and the allotments adjacent to the Birdcage in Franklin Rd are of potential archaeological significance and may provide information relating to the 19th century settlement and development of Auckland. NZHPT have identified the need to obtain an authority prior to the commencement of earthworks in this area.

8.6.8 Plane Trees in Victoria Park

The project will require the removal of 3 London Plane trees in Victoria Park. As stated in Section 8.5, replacement planting is proposed for mitigation of the loss of these historic trees. Care has been taken to limit the removal of and alteration to existing trees in Victoria Park as much as possible. In particular the extent of construction area required has been limited to only that necessary to conduct the VPV works including providing access for cranes and lay down areas.

The other remaining scheduled and generally protected trees in Victoria Park will assist in maintaining the heritage values of Victoria Park.

8.6.9 Identified Archaeological Sites

There are four recorded archaeological sites, identified by the NZHPT, located within the HBTC Project area. These sites are listed in the below table, the R11 notations refer to the New Zealand Archaeological Association Site numbers for each site.

Table 8.1 - NZHPT Identified Archaeological Sites within HBTC Project Area

Site Number	Description	Comment
R11/78	Pa site	Largely destroyed, though possible remnants between Sarsfield St and Pt Erin Pool – Not affected.
R11/79	Pa site	Destroyed largely by 19th century reclamation and by the development of the Victory Christian Church site – No remains likely.
R11/1478	Gasometer site	Investigated and since destroyed – Not affected.
R11/1896	Historic residential	Some historic remains adjacent to McDonalds House in Wellington Street – Not affected.

Of the four archaeological sites identified by the NZHPT, three are not affected by the project. The Pa site that is affected (located on the Victory Christian Church site) has been destroyed and no remains are considered likely to be found.

In addition to identified archaeological sites consideration has been given to effects on sites of significance to Maori (identified through consultation) as documented in the following section, Section 8.7 – Tangata Whenua Values.

As a precautionary measure, a suggested condition of the NOR in Section 11 of this AEE requires cessation of work should any human remains be found during construction.

8.6.10 Mitigation Measures for Heritage Effects

8.6.10.1 Birdcage Hotel

The relocation of the Birdcage will require an authority from the NZHPT, which will further specify the particular methodology for its relocation. This will ensure the Birdcage Hotel integrity is kept and its historical context continues to contribute the heritage values of Auckland City.

Although the Birdcage Hotel building can be relocated, the separation from the original basement will affect the historical integrity of the structure. A historic record of this basement is to be recorded.

8.6.10.2 Campbell Free Kindergarten

The structure of the Kindergarten building will be secured against ground vibration caused by construction activity in order to prevent roof damage or collapse, as necessary. The building will be secured in accordance with recommendations contained in Technical Appendix #15 – HBTC Project: Campbell Free Kindergarten and a dilapidation report will be prepared prior to construction.

8.6.10.3 HMNZS Ngapona

While the demolition of the building cannot be avoided it is proposed to mitigate its loss through landscaping and the recording of the historical significance.

8.6.10.4 Tangata Whenua Consultation

Consultation with tangata whenua groups will continue throughout the detailed design phase and during construction. This will allow early input from tangata whenua in the design so as to avoid potential effects on sites of significance to Maori. This process will also allow for assistance from the Tangata Whenua to be sought promptly should archaeological sites be uncovered during construction.

8.6.10.5 Archaeological Sites

It is noted that most of the archaeological sites will not be affected by the proposal, however, to ensure that any archaeological sites are protected if any human remains are found, the suggested conditions of the NOR in Section 11 of this AEE requires work to cease immediately, the area will be secured and no works shall commence until an approval has been obtained from the NZHPT.

Suggested conditions of NOR are contained within Section 11 of this AEE and include the mitigation measures suggested in this heritage section.

8.7 Tangata Whenua Values

The project is located in the vicinity of historic seashore and over land that is, in the main, reclaimed seabed. The existence of past Maori coastal settlements along the historic seashore means that archaeological sites are likely to be buried under areas of reclamation. In addition several sites along the historic seashore have significance to Maori associated to their connections to past events and the cultural history of tangata whenua who have connections to this land and seashore.

The project includes historic and ongoing discharges to the CMA. The special relationship iwi have with water, soil and ecosystems (and particularly the coastal marine area), is recognised within the RMA and the relevant planning provisions. Given the spiritual importance of water to Maori preserving water quality is an important environmental objective for tangata whenua. In addition the use of the coastal environment and potential effects on water quality are issues of importance to tangata whenua due to the potential adverse effect from declining water quality on kaimoana gathering and other customs associated with the coastal environment. Consultation with iwi is noted in Section 7 of this AEE.

It is proposed that this consultation will continue up to and during construction such that adverse effects on tangata whenua can be avoided as much as practicable.

8.7.1 Sites of Significance to Maori Identified by ACC

Discussions with George Farrant of Auckland City indicated that the following sites are significant to Maori:

- 270A: (ACC) Wai Kokota – shell fish gathering area
- 270B: (ACC) & 6816 (ARC) Te To headland
- B07-41 (ACC) Ko Takerehaea – St Mary's Bay Road
- B07-44 (ACC) One Maru – Point Erin base of cliff
- A07-04 (ACC & 6815 (ARC) Te Koraenga Oka – Point Erin Park

In respect to these sites and potential sites the following comments are relevant:

- The headland, which formerly existed in the Victoria Park area is physically gone, however consideration should still be given to the potential effects on the spiritual values associated with this area.

- The iwi consider that the canoe hauling area and the shellfish gathering area are still physically there, albeit covered with fill.

Works through St Mary's Bay will be at-grade. This area is reclaimed land up to the base of the cliff. Further, no new reclamation is proposed. Therefore the project is considered to have little potential to impact on the scheduled sites (those recorded in the Auckland City District Plan: Isthmus Section) through St Mary's Bay.

In addition, the general implementation requirements of the EMP ensure the following:

- The works shall comply with iwi protocols; and
- The works shall be conducted in consideration of Maori spiritual values, especially with regard to water, in the design of the final route of road water and stormwater discharge.

It is considered that overall, any significant adverse effects on values of tangata whenua have been avoided or can be remedied and mitigated.

8.7.2 Recorded Maori Heritage Sites

As previously mentioned there are four archaeological sites within or in the near vicinity of the project area. The recorded archaeological sites include two former headland pa. The Heritage Assessment (refer to Technical Appendix #16) comments that the headland pa has been largely destroyed by earlier reclamation and development of the area and that it is unlikely that further archaeological material will be uncovered. These areas are located along with the original foreshore and shellfishing area and have been recorded as sites of significance to Maori by Auckland City Council, as places of former Maori occupation.

8.7.3 Mitigation Measures for Tangata Whenua Values

As noted in the previous heritage assessment section, most of the archaeological sites will not be affected by the proposal, however, to ensure that any archaeological sites are protected if any human remains are found, the conditions of the NOR require work to cease immediately, the area will be secured and no works shall commence until an approval has been obtained from the NZHPT.

8.8 Noise

An assessment of the noise effects of the construction and operation of the HBTC Project, has been undertaken by Marshall Day Acoustics, refer to Technical Appendix #10. The findings of this report are summarised below.

8.8.1 Traffic Noise

A survey of the existing noise environment was previously carried out in potentially affected areas in the vicinity of sensitive activities such as residential dwellings, schools and churches. These measurements were used to calibrate the predicted traffic noise levels.

Predicted traffic noise levels at sensitive receiver positions were calculated using recent traffic flow counts and predicted traffic flows for 2006. This procedure demonstrated good agreement between measured and predicted traffic noise levels for most measurement

positions (refer Section 3.1 of Technical Appendix #10). The year 2006 was chosen as representative for the existing situation.

It is noted that the increase in traffic flow between the time of measurement in 2001 and the existing situation in 2006 has been predicted to result in a less than 1 decibel increase in noise level, therefore, the measured and predicted noise levels are directly comparable. The noise level predictions were calibrated based on the 2001 measurements and showed good agreement, hence the noise survey results are still relevant and it was considered that there was no need to undertake new measurements at this stage of the project.

Transit has issued "Guidelines for the Management of Road Traffic Noise" (Transit Guidelines) which became operative in December 1999, to be used in the design of State Highways and State Highway improvements. In the absence of any national or local standards for road traffic noise, these guidelines provide a method for assessing the impact of, and change in, road traffic noise levels and also for specifying in what circumstances mitigation measures should be implemented.

The study involved measurement of the existing noise environment of the area concerned (St Mary's Bay, Victoria Park and Freemans Bay) which shows that traffic noise levels presently received in the most affected areas are high, ranging up to 75 dBA Leq (24 hours).

Measures including the tunnel itself, and noise barriers, have been designed for the traffic noise levels for year 2021 traffic flows, so as to provide mitigation from potential noise impacts. Five metre high barriers are proposed to be positioned on the western side of the motorway in St Mary's Bay area and 2 metre high barriers are proposed for a small area near Napier Street. The implementation of noise barriers together with the NBT, shows an overall average noise reduction for all assessed receiver positions (in comparison with do-nothing scenario) of 1.6 decibels for the whole project, with an average reduction of just over 1 decibel for the SMB area and an average noise reduction of 2 decibels for the Victoria Park area.

From the noise contours and the individual receiver noise levels provided in Technical Appendix #10 it is apparent that the implementation of the proposed noise mitigation measures (both the tunnel and the noise barriers) is predicted to benefit all receivers in the area to a varying degree, depending on location and applied noise criteria. Due to the increase in traffic flow to the year 2021 there will be an increase in traffic noise generation of approximately 1 decibel. However, with the implementation of mitigation measures there would be an overall decrease in received levels for residents. Of the 149 receiver positions assessed, 131 are predicted to receive noise levels in 2021 similar to, or less than, experienced in 2006.

It is noted that there would be no appreciable noise reflection from the west side noise barriers in St Mary's Bay to the seaward side of the motorway. The overall effect for areas to the eastern (seaward) side of the motorway improvements would be to reduce traffic noise levels to a small extent.

With the implementation of the noise barriers, the majority of the receiver locations will comply with Transit Guidelines. Where compliance cannot be achieved at residential locations, additional noise protection is proposed. This occurs at 6 residential locations in St Mary's Bay and at the Victory Christian Church (non-residential) (see Plan E, E1 and E2,

Appendix 7 of the Technical Appendix #10). This will include direct consultation with the affected landowner to resolve the best mitigation for the circumstance (land uses and topography could alter the best form of mitigation). The suggested conditions for the NOR in Section 11 of this AEE set out a basic framework for this consultation.

Overall, in terms of traffic noise effects, the implementation of the proposed highway improvements would result in reduced traffic noise levels providing improved acoustic amenity for the affected areas. If no change is made to the existing roading layout, noise levels will gradually continue to rise over time with increased traffic flow.

8.8.2 Construction Noise

Construction noise limits are contained in the relevant Auckland City District Plans. With appropriate management, construction noise generated by the required works can, in most potentially affected areas, comply with these limits.

There are, however, some areas of construction, which are anticipated to generate noise levels above limits set out in the District Plans. These include piling of retaining walls for the construction of the cut and cover tunnel under Victoria Park. There may also be some situations where dwellings and other buildings are in such close proximity to construction areas that compliance would be problematic. In these circumstances there will be a need to develop alternative strategies to achieve acceptable outcomes for affected occupiers.

It is recommended that a Construction Noise Management Plan be produced before commencement of construction activity that would detail noise mitigation measures and management procedures to ensure the best practicable outcomes for affected occupiers.

8.8.3 Mitigation Measures

Conditions proposed for the NOR at Section 11 of this AEE require the preparation of a Noise Management Plan for the purposes of addressing operational adverse noise effects. As outlined in 8.8.2 above, a construction noise management plan is also recommended to address adverse noise construction effects.

8.9 Vibration

An assessment of the vibration effects of the construction and operation of the NBT has been undertaken by Marshall Day Acoustics, refer to Technical Appendix #10. The findings of this report are summarised below.

8.9.1 Operational Vibration

Ground borne vibration due to road traffic is a common concern in cities worldwide and residents' complaints are usually related to annoyance and the potential for dwelling damage. As for noise, traffic vibration issues are evaluated by the source – transmission path – receiver process. However, for vibration, the transmission path is through the intervening ground or earth and there are very limited methods for mitigation. Noise from the same source (traffic) can also generate low frequency vibration in lightweight building elements (i.e. windows, walls, doors) and internal items (i.e. plates, glasses and pictures). In this situation the transmission path is through the air rather than the ground.

The main components that affect the amplitude and frequency of ground borne vibration include:

- Vehicle mass, speed and suspension system.
- Road surface roughness and deformities (grates, pot-holes, cracks and the like).
- Soil type and stratification.
- Distance between source and receiver
- Type of building.

Prediction and assessment of the vibration levels from the operation of the modified roads indicate that vibration levels will marginally increase but still comply with the recommended criteria. A condition is proposed in Section 11 of this AEE to monitor vibration levels at nominated 'critical' locations.

8.9.2 Construction Vibration

Vibration damage to buildings, due to construction activities is not uncommonly of concern to people affected as the vibration levels may exceed those of the perception threshold. However, generally these concerns are unfounded, as the level of vibration required to damage buildings is significantly greater than levels at which humans can perceive vibration.

It is not possible to reliably predict vibration levels from construction activities due to the many variables involved, but it is likely that vibration from some proposed construction activities near buildings may potentially exceed the vibration limits (see Technical Appendix #10).

It is understood that construction activities are proposed to be carried out during both daytime and night-time periods. It will be necessary for construction activities to be carefully monitored to ensure that the limits of Technical Standard DIN 4150 are not exceeded.

For this reason a Vibration Management Plan is recommended, which would incorporate the following elements:

- Vibration monitoring measures
- Possible mitigation measures
- Complaint response; and
- Reporting procedures.

It is recommended that any dwellings that are either sensitive to construction vibration or are nominated as being critical (due to proximity and activity type) shall be subject to dilapidation surveys prior to, during and following construction.

It is recommended that vibration generated by construction activities should be assessed in accordance with the provisions of the German Standard DIN 4150. It is likely that some construction activities close to existing buildings may result in vibration levels, which exceed the criteria of this Standard. This possibility should be dealt with by vibration monitoring and the development of a Construction Management Plan.

8.9.3 Conclusion

NBT will provide an improvement to traffic noise levels currently experienced in the Victoria Park area. Mitigation measures proposed in the SMB will also provide improvements for the majority of the residents. Construction noise and vibration impacts will be addressed in the CMP so that acceptable outcomes are addressed for affected occupiers.

8.10 Air Quality

Vehicle emissions are a source of air pollutants, which can result in adverse effects on human health, and effects on ecosystems and amenity values (e.g. dust nuisance).

Technical Appendix #11 provides a technical assessment of the potential effects of the project and impact of the NBT on vehicle emissions and local air quality. The following is a summary of the conclusions reached in that report.

Several factors influence the effect of vehicle emissions from the motorway on air quality. These include weather and topography, vehicle flow, fleet mix and level of congestion.

The NBT is 460 metres long and will include a jet fan ventilation system to dispose air in the direction of the traffic flow, via the Northern Portal.

8.10.1 Assessment Methodology

The assessment of the impacts of motor vehicle emissions is based on the use of a computer model to determine the dispersion of emissions and to predict ground level concentrations of the pollutants close to sensitive receptors. The primary pollutants of concern are carbon monoxide, nitrogen oxides, and particulate matter (PM10).

The dispersion model AUSPLUME was used to assess the future tunnel portal emission impacts and to compare these to the existing air quality scenario. AUSPLUME is an advanced Gaussian dispersion model developed on behalf of the Victorian EPA and applicable to New Zealand conditions.

The design year for the tunnel air quality effects was chosen to be 2010, and the future scenario was selected as 2021.

8.10.2 Weather and Topography

Weather and topography affect the rate of dispersion and where pollutants are transported. The prevailing winds in the St Mary's Bay/Victoria Park area are likely to be on-shore winds from the NNE and offshore winds from the south west.

The dispersion modelling assessment is based on meteorological data from the Auckland Airport (1996). As no monitoring data was available from the study area, this data was selected as being the closest representative station with the required data.

8.10.3 Vehicle Emissions

Vehicle emission rates can increase when vehicles are not travelling efficiently such as 'stop/start' style driving or 'braking/accelerating' style driving. In addition, traffic

congestion causes increased numbers of idling vehicles, which can result in significantly higher overall emissions than free flowing traffic.

The pollutants of concern from vehicle exhausts are:

- Carbon monoxide (CO)
- Oxides of nitrogen (NO_x)
- Particulate matter (PM₁₀)
- Hydrocarbons (Benzene)

The basic relative trends in the emission performance of vehicle traffic are:

- Vehicle emissions increase with congestion;
- Fleet-wise, the average emissions performance improves over time, with new technology additions to the fleet replacing older vehicles.
- CO and PM₁₀ emission increase with congested conditions, whereas NO_x emissions decrease.
- Increases in vehicle numbers will generally result in increased vehicle emissions. Vehicle flow and road design influence the amount (and location) of pollutants being emitted.

8.10.4 Standards

The relevant standards are:

- National Environmental Standards
- Ambient Air Quality Guidelines (AAQG)
- Proposed Air Regional Plan: Air, Land and Water

National Environmental Standards (NES) for Air Quality have been developed by New Zealand's Ministry for the Environment (**MfE, 2004a**). They are mandatory technical environmental regulations and came into effect as of the 1st September 2005. They have the force of regulation and are implemented by agencies and parties with responsibilities under the Resource Management Act 1991 (RMA). In Auckland's case this is Auckland Regional Council.

There are three ambient air quality standards which are of relevance to air emissions from vehicles. Schedule 1 of the regulation sets out ambient air quality concentration limits for the following:

- Carbon monoxide (CO)
- Nitrogen dioxide (NO₂)
- Fine particulate matter that is less than 10 micron in diameter (PM₁₀)

While the NES standards replace AAQG for that particular pollutant and averaging period, levels for pollutants (and averaging periods) not covered by the former still apply.

The Auckland Regional Council through its Proposed Auckland Regional Plan: Air, Land and Water (PARP:ALW), sets air quality targets for Air Quality Management Area. The areas defined in the Plan are Urban and Rural; Industrial; and All Areas (that is, the targets

specified apply everywhere). The HBTC project is within an Urban Air Quality Management Area.

The targets aim to maintain air quality in the Auckland Region where it is already good and enhance air quality in areas where it is degraded or unacceptable. The Urban targets do not apply to roadsides (including kerbsides and footpaths) because it is likely that people will only be exposed for relatively short periods of time.

Table 8.2: Comparison of Air Quality Standards, Guidelines and Targets

Pollutant	NES	AAQG	PARP:ALW	Time Average
Carbon monoxide (CO)	-	30 mg/m³	20 mg/m ³	1-hour
	10 mg/m³	10 mg/m ³	6 mg/m ³	8-hours
Particles (PM ₁₀)	50 µg/m³	50 µg/m ³	33 µg/m ³	24-hours
	-	20 µg/m³	13 µg/m ³	Annual
Nitrogen dioxide (NO ₂)	200 µg/m³	200 µg/m ³	132 µg/m ³	1-hour
	-	100 µg/m³	66 µg/m ³	24-hour
Benzene (year 2002)	-	10 µg/m ³	10 µg/m ³	Annual
Benzene (year 2010)	-	3.6 µg/m³	3.6 µg/m ³	Annual

8.10.5 Impact of the HBTC Project

The realising of capacity through the St Mary's Bay/Victoria Park road corridor, due to the HBTC project, will reduce congestion during peak traffic times. This in turn will reduce the emissions of carbon monoxide and PM10 during these periods.

The assessment has shown that overall, total vehicle emissions will be reduced in the future, as vehicle emission rates are expected to decrease with renewal of the vehicle fleet. Vehicle numbers are predicted to increase in the future, but the general trend towards newer vehicles having lower emissions offsets this.

The dispersion model compared the impacts of the HBTC project with a model of the existing surface roads for the design years 2010 and 2021. Based on the modelling results and the use of average background data from the Takapuna monitoring site:

1. The MfE carbon monoxide 1-hour and 8-hour air quality guidelines are not likely to be exceeded at any location.
2. The predicted maximum 1-hour average guideline for NO₂ is not likely to be exceeded in sensitive areas where the public may be. The 24-hour average guideline is not likely to be exceeded away from the kerbside.
3. The PM10 24-hour average air quality guidelines are not expected to be exceeded in any location. The annual average PM10 guideline value is close to being exceeded at a number of monitoring sites around Auckland. The HBTC project is predicted to contribute only a small amount to the value.

8.10.6 Conclusion

Overall, in the long term there will be a general improvement in air quality across the HBTC corridor. Ground level concentrations are predicted to be within the National Environmental Standards for air quality for all pollutants under the worst case scenario.

8.10.7 Mitigation Measures for Air Quality

A jet fan ventilation system is proposed for the NBT to address any adverse effects on air quality within the tunnel.

As a precautionary measure, a proposed condition of the NOR in Section 11 of this AEE requires the monitoring air emissions after the construction of the project. Measurements of existing air quality will be undertaken to compare to air quality levels in the future as necessary.

8.11 Geotechnical

Beca has undertaken a preliminary geotechnical assessment of the HBTC northbound tunnel route documented in Technical Appendix #3.

The main geotechnical issues that will affect the design and construction of the HBTC Project are summarised below:

8.11.1 St Mary's Bay to Victory Christian Church

8.11.1.1 Foundations

Shallow spread footings, subject to settlement limitations and/or piled foundations are required for the pedestrian overbridge, signage gantries, noise walls, retaining walls, lighting poles etc.

Modification of the Shelley Beach Rd overbridge will require new piled foundations for the relocated pier and excavation of the natural rock and installation of anchors into competent (very weak or better) Waitemata Group at the abutment.

8.11.1.2 Stability

Existing slopes above the motorway (outside of the motorway designation) may have low margins of stability and require an assessment of potential indirect effects (changes in water table, changes in vegetation cover) on stability. Where slopes are directly affected by works, stabilisation measures will be required.

Modifications to the existing reclamation are likely to be limited to improvement of the edge of the existing seawall. The effect on overall stability should be established during detailed design.

8.11.1.3 Settlement

Significant settlements are indicated at extensions to fill embankments with large differential movements at interfaces between new and existing fills. Times for 90% consolidation may be several years where finer grained materials exist. Options to mitigate settlement effects include:

- Monitor during construction prior to proceeding with final pavement seal.
- Flatten interfaces between existing and new fill to reduce differential movements.
- Remove and replace compressible soils.
- Improve the settlement characteristics of the underlying soils by in-situ treatment.

Periodic overlays of the pavement could be used to accommodate small long-term residual settlements.

8.11.2 Victory Christian Church/ Victoria Park

8.11.2.1 Cut and Cover Tunnel and Exit Ramp

Secant pile or diaphragm walls 1m thick founded through Fill and Tauranga Group materials and socketed 3m-8m into competent Waitemata Group, propped (in tunnel sections) and anchored or cantilevered (in open box sections) will provide adequate short and long term excavation stability. Drained and undrained reinforced concrete tunnel floor options may be considered.

An undrained option will require anchor piles below the tunnel floor to resist uplift. A passive collector/recharge trench system would be considered to prevent damming of groundwater upstream of the tunnel. Limited groundwater inflow through wall construction joints will occur and remedial grouting may minimise flow rates.

A drained tunnel with 6m long cut-off walls would require to treat about 25m³/day of groundwater inflow at the tunnel floor. Significant groundwater drawdown at distances of 100m from the tunnel with drawdown effects extending to 300m are indicated. Saline intrusion and contaminant migration could occur.

The majority of predicted long-term steady state drawdown and inflows are indicated to occur within an 18 to 36 month period. Construction staging will need to consider potential drawdown regardless of final tunnel design (drained or tanked). Recharge wells and surface trenches or construction of a low permeability (bentonite or similar) barrier may be employed to mitigate drawdown.

Immediate ground settlements up to 50mm extending to about 30m distance are estimated due to excavation. Significantly larger long-term (10+ years) settlements up to 500mm are indicated due to groundwater drawdown. Settlement would result in full mobilisation of negative skin friction (NSF) on embedded elements including the HBTC tunnel walls and existing piles such as the VPV.

Large inclusions (building rubble, boulders etc) within the Fill could impact on constructability of secant pile or diaphragm walls and tunnel bulk excavation. Pile construction and bulk excavation is required in Waitemata Group rock material with UCS strengths generally less than 5MPa.

8.11.2.2 Ancillary Structures

Shallow spread footings, subject to settlement limitations and/or piled foundations are required for the surface structures comprising tanks, services buildings and other ancillary elements.

8.11.3 Victoria Park to Wellington Street

8.11.3.1 Piled Walls

Anchored and cantilevered 1m diameter bored pile walls at 1.5m centres with drained shotcrete panels between piles will provide adequate short and long term excavation stability. Groundwater inflow and drawdown effects are assessed to be limited.

8.11.3.2 Western Slopes

Preliminary design cut slopes require assessment to confirm stability requirements. A review of the stability of the existing fill slopes above Freemans Bay Primary will be required.

8.11.4 Pavement Subgrade

Subgrade conditions will vary significantly including:

- Fill and Recent Marine/Tauranga Group sediments - CBR values <5%.
- Weathered Waitemata Group soils - CBR values of the order of 5% to 7%.
- Very weak Waitemata Group material - CBR values of >10%.

Undercutting, reworking, stabilisation (lime or cement), compaction or replacement may be required in areas containing low CBR material.

8.11.5 Additional Investigation

Further investigation for detailed design is required:

- At locations of extensions to fill embankments to assess settlements.
- At the Shelly Beach Road southern abutment and proposed relocated southern pier to confirm founding and stability conditions.
- Along the tunnel and ramps to define the Waitemata Group rock and overlying fill/sediment interface, particularly the presence of palaeo valleys and to assess retention and groundwater issues. Drilling and geophysical surveys may be considered.
- For ancillary structures; overbridges, retaining walls, gantries, tanks etc.
- Along the western side of the proposed tunnel approach ramp for retention design and to assess fill embankment and retaining structure stability above Freemans Bay primary school.
- To assess pavement subgrade.

8.11.6 Groundwater Mitigation

The following actions are considered appropriate to mitigate potential adverse groundwater effects:

- Investigations to include pump tests, regular manual and automated (data loggers) monitoring of piezometers, sub-surface probing, geophysical profiling and analysis using 2-D and 3-D flow models to establish 'best estimate' of in-situ and modified conditions.
- In elevated groundwater areas, tunnel and ramp walls are to be of low permeability secant pile or diaphragm type construction to limit groundwater inflow through sidewalls.
- Remedial grouting of construction joints in walls to be carried out as required.

- For an undrained (tanked) option, a passive collector/ recharge trench system would be incorporated within the tunnel / retention system to prevent damming of groundwater upstream of the tunnel.
- For a drained option, tunnel / tunnel ramp walls to be extended as cut-off walls below the tunnel floor to reduce groundwater inflow at the tunnel base.
- Recharge wells could be constructed to reduce groundwater drawdown in the short-term (during construction) and for long-term control of external groundwater levels.
- A low permeability (bentonite or similar) barrier could alternatively be constructed near to the tunnel / tunnel ramps to reduce the lateral extent of drawdown.
- Recharge trenches to collect and disperse surface water to improve infiltration could be constructed.
- A back-up pumping system to be in place in the event of failure of the primary pump(s) for the drained tunnel option.

8.11.7 Monitoring - Groundwater

Monitoring will be required to measure groundwater effects and the effectiveness of mitigation measures. A monitoring program is likely to include:

- Multi-level piezometer array installed around tunnel / tunnel ramps equipped with data loggers.
- Baseline monitoring data taken far in advance of works to obtain seasonal and yearly variations. Existing piezometers from 2001 investigations as well as non-project piezometers in area to be utilised. Data collection already underway.
- Flow meters installed at collection sumps / treatment tank / discharge point to measure tunnel / tunnel ramp inflows during and after construction.
- Regular readings to be carried out during works and post-construction to monitor residual / on-going responses.

8.11.8 Ground Movement Mitigation

The following actions are considered appropriate to mitigate potential adverse ground movement effects:

- Investigations with sub-surface probing, geophysical profiling and laboratory testing together with numerical analysis to establish 'best estimate' of ground conditions and ground response.

8.11.8.1 Tunnel / Tunnel Ramp Excavation

- Walls constructed of a stiff secant pile or diaphragm type system to limit lateral and vertical movements.
- Single phase of wall construction suitable for both the temporary and permanent condition.
- Staged excavation with installation of support (props and anchors) before deepening excavation to limit lateral and vertical movements.

- Groundwater mitigation as detailed in Section 8.11.6 to limit drawdown and resulting settlement.

8.11.8.2 Embankments

- Ground treatment (e.g. lime / cement stabilisation) of poor foundations to limit settlements.
- Remove and replace compressible soils with stable backfill to limit settlement.
- Flatten interfaces between new and old fill to spread differential movement.

8.11.8.3 Slopes

- Walkover inspection of existing slopes / cliff faces to assess for any visual signs of instability.
- Batter slopes to stable gradient.
- Stabilise slope / cliff face in critical areas with support elements; retaining walls, rock anchors (pattern and/or spot bolting), soil nails, surface coating (shotcrete etc).
- Install drainage measures to slope / cliff face.

8.11.9 Monitoring – Ground Movement

Monitoring of wall movements, surface settlements and settlement of nearby structures will be required and could include the following:

- Inclinometers installed at crests of tunnel / tunnel ramp excavations and along slope surface of natural or cut batters.
- Survey targets installed on tunnel / tunnel ramp excavation faces at regular vertical intervals as excavation progresses.
- Arrays of survey points set-up on ground surface and structures around tunnel / tunnel ramp excavations, embankments and slopes.
- Settlement plates installed from base of new fill embankments.
- Baseline monitoring data taken in advance of works.
- Regular readings to be carried out during works and post-construction to monitor residual / on-going movements.

8.11.10 Conclusions

Investigations to date have revealed important geotechnical information against which the detailed design of the NBT will be prepared. Ongoing groundwater modelling will assist in confirming potential groundwater impacts to be addressed in the Auckland Regional Council consents.

8.12 Contaminated Land

8.12.1 Contaminated Sites/Material

The project passes through an area of extensive reclamation, which includes areas of known contamination. Contaminants from these areas have the potential for adverse

effects on adjacent receiving environments (i.e. CMA) if they are not collected and disposed of appropriately.

Once excavated, material may not be suitable for reuse on the site if it contains contaminants at concentrations above acceptable guideline values. This may therefore necessitate the removal of that material from the site and appropriate disposal to a controlled landfill. Alternatively, the material might only be marginally contaminated (relative to the existing land use) but require off site disposal for other reasons (e.g. engineering unsuitables, or excess material). It is therefore equally important to identify and manage these materials so that contaminated material that is not suitable for use as cleanfill elsewhere is also disposed of to a controlled landfill.

Given the nature of the surrounding land, the project is not considered to be an appropriate means of addressing the 'regional' environmental risk associated with any gross scale soil and groundwater contamination that might be encountered. However, this contamination may be partially mitigated through the excavation of materials as required by the construction of the project. Rather, the focus will be on the appropriate management, of excavation works that uncover materials deemed contaminated, such that these are managed and disposed of appropriately.

8.12.2 Mitigation Measures

A preliminary environmental assessment (PEA) (refer to Technical Appendix #4) was undertaken to identify the risk for soil and groundwater contamination along the route. This information is summarised in Section 6.9 of this AEE and describes the existing environment.

Three primary areas of risk were identified:

- Environmental
- Health and Safety
- Commercial

The preliminary environmental assessment (and the PEA Addendum) recommend that Transit implement a programme of soil and ground water testing during construction to enable the potential risks to be assessed and appropriately managed (refer to Section 6 of Technical Appendix #4). A recommended staged approach to determine whether material can be retained on site or whether it should be removed and disposed of at a controlled landfill is identified in Section 4.4 of the EMP (refer to Technical Appendix #8).

Stage One of the initial testing was completed in 2002 and the results of a further programme of testing carried out in October 2005 will be available prior to the application for resource consents. The results of the initial testing are provided in the report titled "Initial Environmental Investigation" (refer to Technical Appendix #5). The results show a low level of heavy metal contamination across the whole of the area of the project works. Further testing will be necessary to determine whether non-cleanfill material can be retained on-site or whether it should be removed and disposed of at a controlled landfill. Section 4.4.1 of the EMP sets out the process for handling non-cleanfill material.

As fill exists over much of the route, and, as no investigation is ever thorough enough to rule out the presence of hazardous materials, it has been recommended that Transit include general contingency measures in the EMP provided as Technical Appendix #8. The EMP addresses the possibility of randomly distributed contaminants being encountered during the works despite pre-construction testing being implemented along the route.

The EMP requires the Engineer to develop construction requirements for the management of any contaminated materials and include these within Technical Specifications. The EMP states that these specifications should be submitted to the ARC for approval prior to the calling of tenders. The Specifications, amongst other things, will require the Contractor to develop a specific management plan as part of their "Contractors Environmental Management Plan" CEMP to address the handling and disposal of contaminated materials.

8.13 Earthworks

The following text describing the effect of sediment discharge on receiving environments in Auckland has been sourced from Auckland Regional Council Technical Publication No. 90:

"Hundreds of hectares of land are stripped of vegetation or laid bare each year around Auckland for the construction of subdivisions, roads, landfills and other developments. Without protection measures, the transformation of this land can result in accelerated on-site erosion and greatly increased sedimentation of waterways, estuaries and harbours.

The adverse ecological effects caused by sediment in waterways include:

- *Modified or destroyed instream values.*
- *Modified estuarine and coastal habitats.*
- *Smothering and abrading of fauna and flora.*
- *Changes in food sources and interruption of life cycles.*

In addition to ecological changes, there may be damage to water pumps and other structures; the quality of water supplies usually diminishes; localised flooding can occur and there is a loss of aesthetic appeal."

Means to avoid, remedy or mitigate sediment related effects have been addressed in generic terms in the HBTC Environmental Management Plan (EMP) and monitoring requirements are outlined in the EMG. More detailed information is outlined in Technical Appendix #6: Harbour Bridge to City Project, Assessment of Land Disturbing Activities, October 2005, including:

- Area of soil disturbance likely to occur as a result of construction activities.
- Potential sediment generation and discharge from disturbed soil surfaces.

8.13.1 Sediment Yield Potential

Runoff from any works in the HBTC Project area discharges via the stormwater network to the Waitemata Harbour. Three aspects relating to erosion and sediment control have been evaluated (in Technical Appendix #6), namely the:

- *sediment generation potential*, given the topographical characteristics of the land under consideration;

- *sediment delivery*, the amount of eroded sediment that is retained on site prior to it entering sediment treatment devices;
- *sediment yield*, the amount of sediment discharged from the site following treatment.

The total area of land disturbance is estimated to be approximately 4 ha.

Technical Appendix #6 assumes that the earthworks for the HBTC project will be undertaken over a 36month period, including works over the winter period. It is proposed that the contractor will undertake winter works in accordance with the winter works protocols developed during the Grafton Gully Project (as detailed in section 8.2 of Technical Appendix #6).

8.13.1.1 Methodology

The universal soil loss equation (USLE) was used to assess sediment yield. To reflect the site characteristics, the USLE estimates were corrected to reflect the area exposed, the duration of the works, the efficiency of sediment control devices and the sediment delivery ratio.

8.13.1.2 Results

Table 5.2 in Technical Appendix #6 sets out the results of the yield calculations for the HBTC project. Overall, the quantum of the sediment yield expected from the works is relatively minor (10 tonnes). This is due to the fact that topography of the site and nature of the project involves minor areas of earthworks on generally flat slopes.

8.13.2 Estimated Sediment Yield from earthworks Compared to Existing Catchment Discharges

8.13.2.1 St Mary's Bay Section

This length of motorway discharges via a series of outfalls that pass under Westhaven Drive directly to the Harbour in the vicinity of Westhaven Marina. The USLE estimate indicates that approximately 0.5 tonnes of sediment may be discharged from these works over the 3 to 4 month period of construction (assuming all these works occur together).

By comparison, stormwater from this area of carriageway alone is estimated to discharge 1 tonne of sediment per hectare per year¹¹, or approximately 6.75 tonnes for this 1500 m length of motorway. The adjoining residential catchment of approximately 50 ha (the area encompassed by Shelly Beach Road, Jervois Road, St Mary's Bay Road, Green Street and New Street across to Westhaven Drive) is estimated to contribute 0.2 t/ha/yr¹, and this equates to 10 tonnes of sediment per year.

Therefore, it is estimated that approximately 16.75 tonnes per year of sediment discharges to this area of Waitemata Harbour, or approximately 5 tonnes over the 3-4 month period of construction. Whilst the increase in discharge of 0.5 tonnes represents a small increase over the background sediment loading, the quantum of the discharge is considered to be minor in the context of discharges to the Harbour.

¹¹ Reference: Auckland Regional Council Draft Update of TP10 (Stormwater Treatment Devices: Design Guideline Manual, 1992).

8.13.2.2 Fanshawe Street to Wellington Street Section

This section of motorway lies within the 201 ha Freemans Bay catchment, which has a mixed land use consisting of residential, commercial and some reserve areas, including Victoria Park. The USLE estimate indicated that 9 tonnes of sediment might be discharged from this section of the proposed works, with approximately 6 tonnes predicted to come from the Wellington Street to Cook Street section over a 12 month construction period.

In contrast to these estimated discharges, the overall catchment is estimated to discharge approximately 107 tonnes per annum (based on: 13.5 ha reserve; 7.5 ha motorway; 70 ha commercial; and 110 ha medium density residential). Over the construction period for works in this area (18 months), a discharge of 9 tonnes represents a small increase over background.

8.13.3 Mitigation Measures

As set out in Technical Appendix #6, the Cook Street to Wellington Street construction activity has the highest potential for sediment generation and discharge. As a result, it is recommended that this area should be targeted for control during construction. The other areas have minor potential for generation and discharge, and standard sediment control methodologies should be employed to treat runoff from construction areas.

Proposed erosion and sediment control measures are suggested in Technical Appendix #9. In general these consist of standard control measures including silt fences, decanting bunds and stormwater inlet protection. These methodologies and management practices have been developed from those outlined in the EMP.

The EMP identifies activities of risk and means to avoid or mitigate the effects from these, together with a framework for anticipating, preventing, and responding to non-compliance or emergency situations. Application of the requirements contained within the EMP will assist in managing erosion and sediment yields from the site. It is expected, as stated in the EMP, that the successful contractor will use this information as the basis for an ESCP to be submitted to the ARC for approval. All erosion and sediment control measures shall be constructed in accordance with TP90 as a minimum.

8.13.4 Monitoring

A structured monitoring procedure is proposed in the EMP, which provides for frequent monitoring and auditing of that monitoring process. The likelihood of significant sediment discharge will be minimised by ensuring that all erosion and sediment control measures are constructed appropriately and that maintenance is undertaken in a timely manner.

The contractor, in accordance with the Environmental Monitoring Guidelines (EMG) (refer to Technical Appendix #9) will undertake regular monitoring and maintenance of the erosion and sediment control measures. Monitoring will consist of regular visual inspections of all erosion and sediment control devices, including during storm events.

Where identified as required, maintenance of control measures shall be undertaken immediately.

Records of the visual inspections and any maintenance shall be kept, detailing:

- Monitoring of erosion and temporary sediment control devices that has taken place;
- Erosion and sediment controls requiring maintenance;
- Personnel responsible for completing the action, and by when;
- When the maintenance required was completed;
- Areas of non-compliance with the approved ESCP together with reasons for non-compliance.

8.13.5 Conclusion

Implementing appropriate erosion and sediment control measures can significantly reduce the potential for sediment discharge. Overall, the sediment yield calculations indicate that the potential sediment yield from these works to be minor. While treated sediment will be discharged from on site devices, leading to some changes to the environment, the magnitude and period of the discharges together with the environmental management procedures are such that significant adverse environmental effects should be avoided, remedied, or mitigated.

8.14 Stormwater

The overall approach to the management of the long-term stormwater quality and quantity aspects of the HBTC Project has been identified within the EMP (refer to Section 5.16 of Technical Appendix #8). The preliminary drainage and stormwater treatment design for the HBTC Project is outlined in Section 4 of this AEE.

8.14.1 Potential Effects

The effects of stormwater on aquatic environments are due to two factors:

- A large increase in the volume of water that runs off impervious urban surfaces compared to absorbent vegetated land uses, combined with increased speed of runoff; and
- Contamination of stormwater with a wide range of potentially harmful substances.

A large proportion of contaminants are bound to particulate matter transported by stormwater. In piped or open systems, a high proportion of these suspended solids pass through the drainage network and reach the marine or groundwater receiving environment, where settlement takes place and incorporation of the contaminants into marine sediments.

Road transport zones, and motorways in particular, are recognised as a major source of contaminants and in particular metals, such as lead from emissions from leaded-fuel vehicles, and copper and zinc from vehicle component wear. These contaminants are discharged into the atmosphere or directly onto the road where they become entrained in stormwater runoff. In addition, polynuclear aromatic hydrocarbons (PAHs), which are highly toxic to aquatic life, occur naturally in oil products and are found on road surfaces from dripping fluids as well as from combustion and release to air, and deposition on the carriageway.

8.14.2 Stormwater Quality

To minimise the effects of discharging contaminants to the coastal marine area, stormwater treatment devices will be incorporated, where practicable, into the design of the upgraded network. Treatment of discharges has not occurred along this corridor in the past and therefore the provision of stormwater treatment devices will reduce the quantity of contaminants and improve the quality of discharge from this stretch of motorway.

Stormwater will be treated to Auckland Regional Council Technical Publication Number 10 – Stormwater Treatment Devices (TP10) standards. The treatment system will be designed to remove approximately 75% of sediment load on a long-term average basis for the additional impervious areas (or equivalent). This is compared to the existing situation where there is no treatment.

8.14.3 Stormwater Quantity

With regard to an increase in the stormwater quantity, due to an increase in impervious surface area, flooding issues have been considered as part of the drainage network. The new drainage system is designed to pass the 100-yr ARI without secondary flow onto the motorway, beyond the shoulders. Consultation with Auckland City Council's Manager of Stormwater Infrastructure has revealed that the inconvenience of flooding to Victoria Park and surrounding roads is short lived and infrequent. The increased quantity of discharge would be minor compared to the existing situation and therefore based on the information provided by ACC the effect of the Project in terms of flood risk is considered to be minor.

8.14.4 Receiving Environment

While specific monitoring of the receiving environment has not been undertaken for the Westhaven area adjacent to existing stormwater outfalls, it is considered that information describing similar receiving environments may be used for evaluation of the effects of sediment discharge.

The receiving environment is considered to be similar to that of other wharf environments such as Captain Cook Wharf that receives sediment discharges from stormwater outfalls servicing the Britomart area. The assessment of effects for the consenting of the Britomart development included a comprehensive analysis of wharf pile biota for the purposes of assessing whether any construction discharges from that proposal may have significant effects in such a receiving environment.

That assessment concluded that for flora and habitats to be present near to outfalls these would need to be tolerant to suspended solids. Given that the Westhaven coast has been the location of historic discharges it is considered that the receiving environment could not contain high ecological values.

The proposal to treat stormwater runoff from the area of new pavement or an equivalent area would not worsen the present situation. It is also noted that the use of this area for recreational boating would have an adverse impact on the ecology of this area.

Notwithstanding this it is accepted that the existing and ongoing discharges may have had and could continue to have an adverse effect on water quality entering the Waitemata harbour.

8.15 Effects on other Existing Services

As part of the motorway improvements a range of existing services will need to be relocated. The motorway widening through SMB and tunnel through Victoria Park will impact the Telstra Clear and ATMS infrastructure. Relocation of this infrastructure will require new routes to be provided near the existing routes but clear of any new foundations for retaining walls, noise walls, etc.

Major diversion of existing services include the Orakei main sewer (Watercare) between Weld and Drake Streets, stormwater culvert (ACC) through Victoria Park and Birdcage hotel areas and fibre optic cables (Telecom) in the vicinity of Ngaona to Beaumont Street.

Relocation of other services (including water, gas, stormwater, wastewater, power, telecommunications) in local streets will also be required. The main areas where the local services will be affected include Beaumont Street in the vicinity of the tunnel alignment and the Union Street, Victoria Street, Franklin Road area.

Where possible service relocations will be carried out before the main construction works are commenced but in all cases will need to be carefully programmed to minimise disruption to the service users.

8.16 Operational Traffic Effects

8.16.1 Southbound Corridor

The proposed southbound capacity improvements will increase the supply of flow to the Auckland Harbour Bridge during the AM Peak period to approximately 10,200 to 10,500 vph, thereby permitting the bridge to reach its operational capacity.

Mean southbound vehicle speeds through the corridor should remain in the range 60 km/h to 80 km/h, with significantly reduced congestion being experienced south of the Esmonde Road bottleneck.

Modifications to the Fanshawe Street off ramp will allow buses to bypass any queuing associated with the signals at the end of the off ramp, and the signal arrangement would be modified to handle increased flows associated with the development of the Western Viaduct Harbour.

The two southbound lanes through CMJ are proposed to utilise the existing northbound Viaduct structure. Traffic with a destination for Cook Street, Port (Grafton) and the Northwestern Motorway would be directed to use the existing two lane southbound viaduct structure.

The existing substandard Cook Street off ramp geometry will not be upgraded as this would involve significant modification to the existing viaduct structure and the accident history at the off ramp does not warrant this investment.

The proposed improvements will reduce congestion and increase operating speeds through the southbound corridor during all periods, with the most noticeable benefit during the AM peak period. Bus travel times will be reduced by the implementation of bus priority facilities on the motorway and adjacent local network (Fanshawe Street).

8.16.2 Northbound Corridor

The proposed capacity improvements to the northbound corridor will increase the flow that can reach the AHB during the PM peak period to approximately 9,900 to 10,000 vph, leaving spare capacity of approximately 500 vph.

Mean northbound vehicle speeds through the corridor should be in the range 60 km/h to 80 km/h, except for the section of motorway immediately upstream of the Wellington Street on ramp.

With the 2011 PM Peak flow on the combined Port and Northwestern Motorway to Northern motorway link estimated at between 1300 to 1700 vph, and the link configured as a lane gain, the capacity of the Wellington Street on ramp would be restricted to 800vph by the implementation of a single lane ramp meter. It would be possible to further improve the capacity of the Wellington Street on ramp merge area by configuring the combined Port and Northwestern to North link to enter the motorway as two lanes, including a single lane gain plus merge lane, similar to the existing Hobson Street/ Northwestern motorway four lane to three lane merge. This is expected to reduce the volume of vehicles in Lane 1 immediately upstream of the Wellington Street on ramp to approximately 650 to 850 vph.

The flows predicted for the year 2011 for the Curran Street on ramp are expected to decrease as a result of trip reassignment. If this flow reduction does not eventuate then the influence of the on ramp merge area on the upstream motorway would be more pronounced. As part of the Travel Demand Management project being implemented by Transit, the Curran Street on ramp will be metered to control the potential flow break down at the Curran Street merge

The proposed improvements will reduce congestion and increase operating speeds through the northbound corridor during all periods, with the most noticeable benefit during the PM peak period.

8.16.3 Bus / HOV Lanes

At present southbound buses travel in normal traffic lanes over the Auckland Harbour Bridge (AHB) and then briefly exit onto a bus lane under the Shelly Beach overbridge before entering a bus shoulder lane constructed southbound from Shelly Beach off ramp to approximately 400m south. This bus lane was extended to Fanshawe Street in 2005. Prior to this, southbound Lane 1 of the AHB formed a lane drop at Shelly Beach southbound off ramp, resulting in under utilisation of this lane by through traffic. Bus lanes commence again from the intersection of Fanshawe / Beaumont Streets and these are located on both sides of Fanshawe Street providing for northbound and southbound buses.

The HBTC project incorporates the following improvements:

- Southbound buses will use a dedicated shoulder lane commencing from near the Sails restaurant through to Fanshawe Street.
- In the northbound direction the bus lane from Fanshawe Street will merge with the normal traffic lanes on the Fanshawe Street northbound on-ramp.
- At the Fanshawe Street / Beaumont Street intersection, bus priority measures will be provided for the bus lane, however this lane will need to be shared by vehicles turning

left to Beaumont Street South. A combination of roadside signs and on road markings will inform motorists of this requirement.

8.16.4 Northbound Bus Priority Shoulder Lane

Consultation with ARC and ACC is ongoing toward resolving how to provide northbound bus priority facilities from Fanshawe Street to the AHB. At present it is proposed that the northbound shoulder be used for both buses and normal traffic in peak periods. The ARC has indicated a preference for an additional priority lane in peak periods. The alternative of providing an additional bus priority northbound lane would require further encroachments onto the St Mary's Bay Cliff and/or land reclamation to create the necessary width for another lane. The ACC has proposed that the northbound shoulder lane be used for buses only in peak periods.

8.16.4.1 Modelling of Northbound Bus Priority Options

The modification of Lane 1 through St. Mary's Bay for use by buses only would not have a significant detrimental effect on the operational behaviour and mean vehicle speeds on the motorway through the corridor. However as the micro-simulation model includes only a small part of the adjoining local road network, what cannot be shown is the delay to vehicles on that network resulting from the reduced capacity of the Fanshawe Street on ramp and subsequent trip reassignment.

The micro-simulation tests indicate that mean bus speeds through St. Mary's Bay could be increased by approximately 4 km/h. The travel time benefit that could be achieved per bus between Fanshawe Street and Curran Street would therefore be approximately 2.9 seconds at mean speed.

This option would require ramp metering of the Wellington Street and Curran Street on ramps.

8.16.5 Cook Street Off –Ramp

It is proposed that the existing Cook Street off ramp is not modified.

8.16.6 Local Road Impacts

As additional capacity is provided for traffic travelling through CMJ to travel between the north and the south, west and Grafton/port area, there will be minimal impacts on the surrounding road network and these impacts should be positive. These positive impacts are due to traffic between the Port, eastside of the CBD, Grafton and for the Northwestern Motorway that travel to/from the north over the Auckland Harbour Bridge now being able to use the Port to North and Northwestern to North motorway links therefore reducing traffic using Fanshawe Street and Cook Street/Wellington Street ramps.

8.16.7 Traffic Beyond 2011

The HBTC project is one element in the motorway corridor through Auckland city. When the current corridor upgrades (CMI, Newmarket viaduct, northern busway, local lane additions, etc.) are completed after 2011, constraints are likely to be operations based, and less related to physical capacity. Transit's current traffic demand management initiatives

will assist by managing flows onto the corridor. Further operations management would likely be considered.

The next generation of physical improvements including a third Waitemata Harbour crossing would complement these operations initiatives. These improvements are forecast to be required after 2015.

8.17 Dangerous Goods Vehicles

The issue raised by the passage of vehicles carrying dangerous goods through the tunnel will be assessed through a comprehensive and co-ordinated approach. It is expected that most categories of dangerous goods vehicles will be allowed to use the tunnel following an appropriate risk assessment.

8.18 Construction Traffic Effects

Traffic effects during construction can be managed by phasing of the works so traffic impacts to the motorway and local road network are not concentrated in one location and/or are over a short period of time so that disruption and reduced capacity are minimised. All temporary traffic management will be in accordance with TNZ "Code of Practice for Temporary Traffic Management" (COPTTM). In addition, Traffic Management Plans are to be prepared. These will cover construction effects on the traffic network and safety. Furthermore, the EMP requires that the CEMP includes mitigation and contingency measures for traffic on site and at exit/egress to public roads.

Construction of the improvements through St Marys Bay will require specific traffic management to both protect the work site and minimise adverse traffic effects. Typical management measures include lane width variation, lane shifting, temporary lane/shoulder closures and barriered edge protection. The recent CMJ Stage One and Two works have used similar management measures and their effects on adjacent traffic are well understood. Some short-term disruption will occur as motorists adjust to new traffic layouts and controls.

For the local road network, traffic management measures could include diversions, lane narrowing, temporary lane closures or total closures for short-duration activities.

The adverse effects on both motorway and local road networks will be mitigated by carefully planning. Specific actions would include advance publicity of diversions and closures, limiting closures to periods of lower traffic flow, maintaining an equivalent number of lanes through work sites, sign posting of diversion routes and regular traffic management publicity in newspapers, on radio and the Transit website. Experience from recent motorway improvements shows that advance publicity of management measures is effective in reducing their adverse effects. Road closures would be implemented only when traffic flows fall below pre-set levels. These would generally occur at night-time.

The construction related traffic during the project will vary as activities proceed across the site. It is not possible to currently estimate the number of trips generated with a degree of accuracy as the overall programme is still under development. The major trip generating activities are listed in Table 10.1, together with a range of likely daily trips on the urban

network. This estimate is based on recent experience from the CMI project works and is subject to further confirmation during the specimen design stage.

Table 8.3 Estimated Construction Traffic Levels

Activity	Range of daily trips to/from site
Excavation of the tunnel	50 to 150
Delivery of materials	20 to 100 at peak
Daily staff travel	Up to 150
Traffic management	25 to 50
Site administration and management	50 to 150

Traffic access to the site will be managed to limit effects on the surrounding network. The traffic management plan will address this issue as well as preferred routes for specific operations such as removal of excavated material.

The level of traffic trips outlined above can be accommodated without significant adverse effect, within the current urban network.

8.19 Impacts on Parking

A survey of car parking likely to be affected by the HBTC project was undertaken on 24 April 2003. The results are listed in table 8.4 below.

Table 8.4 - Carparks Affected by the HBTC Project

Project Area	Number of Car parks Affected	Type of Carpark
The eastern side of Union Street between Drake Street and Sale Street.	7	Public Pay and Display
The northern end of Union Street under the existing viaduct.	43	Public Pay and Display
Carpark at the corner of Victoria Street, Franklin Road and Union Street.	27	Pay and Display 240min max
Carparks under the overbridge next to Campbell Free Kindergarten.	15	120mins. Carparks not defined.
Parking under the viaduct near City Newton Sports Club building and Victoria Park Skateboard ramp	26	120mins. Carparks not defined.
Victory Christian Church	Temporary loss of parks only.	Private
Ports of Auckland (eastern end of Westhaven Drive)	8 Boat spaces	Private
Project Area	Number of Car parks Affected	Type of Carpark
Total Private Carparks affected	28	
Total ACC Carparks affected	240	
Total Carparks affected	321	

In summary, in addition to the VCC carpark, 8 boat spaces will be directly affected by the proposed HBTC works. Transit is currently in consultation with VCC to discuss mitigation measures, so that the carparks can be replaced.

Potentially 8 boat spaces could be lost with the construction of the pedestrian overbridge from Jacobs Ladder to land beside Westhaven Drive.

8.20 Lighting Effects

The proposed light poles, along the motorway, will be approximately 12m in height (1m taller than the existing poles). The existing poles are spaced at 30m – 40m intervals and these will be replaced with new poles at 50m – 60m intervals. The existing poles are located on either side of the carriageway.

The replacement lighting will consist of poles at the median and on either side of the carriageway, although the number of poles will be reduced since they will be spaced further apart. The outer poles will be located on the outer side or attached to the acoustic wall on the St Mary's Bay Cliff side and attached to the outside edge barrier of the carriageway nearest the harbour.

The luminance of the existing lamps is approximately 30 Lux when measured at ground level adjacent to the pole (the brightest point). The maximum luminance for permitted activities as stated in the District Plan is 150 Lux. The new lamps will be of a similar luminance to the present lamps of approximately 20 Lux and this is considerably less than the 150 Lux threshold for permitted activities prescribed in the District Plan.

The design of the new lamps is anticipated to achieve an improvement in terms of glare through the design and tilt angle of the lamps such that glare is minimised as much as is

practicable. The overall effect of the proposed lighting will be to improve the uniformity of lighting through the addition of lights on the median barrier that will eliminate the present light and shadow effect.

The new lighting in some instances would be slightly closer to residential properties where the carriageway is widened. Each of the dwellings are elevated above the St Mary's Bay Cliff and located a considerable distance in terms of lighting effect from the carriageway. The effect of the lighting in terms of luminance and glare would not be appreciably different to the existing situation because of the elevated aspect of dwellings in St Mary's Bay and the distance of separation. While in the case of dwellings located on Napier Street these are located below the gradient of the motorway eliminating light spill effects.

It might be necessary to locate light poles near to buildings in the vicinity of the north end of the Victoria Park Viaduct where the motorway merges at ground level with Beaumont Street and Fanshawe Street and adjacent to the Victory Christian Church Administration building. In such case a specific design would be used to minimise the effects of glare and luminance.

8.20.1 Mitigation Measures

New lighting is proposed in order to guarantee compliance with the average category V3 of the AS/NZS1158 (1997) road lighting standard. Compliance with this standard would improve the uniformity of lighting and would therefore be an improvement on the present situation.

In instances where light poles must be located near to buildings then a specific design would be used to minimise the effects of glare and luminance. Mitigation measures might include reflective screens positioned behind lamps to avoid backlighting of buildings.

8.21 Management Plans

There are a number of management plans, which have been or will be prepared at various stages of the project. These are as follows:

- Project Management Plan (PMP)
- Environmental Management Plan (EMP)
- Environmental Monitoring Guidelines (EMG)
- Contractors Environmental Management Plan (CEMP)

The PMP will incorporate each of the management plans necessary to demonstrate compliance with notice of requirement conditions. Management plans are proposed to provide assurances that potential construction effects including noise and traffic effects are mitigated. Management Plans are also proposed to demonstrate mitigation of adverse effects on trees and landscape.

The EMP is proposed as the mechanism by which performance-based consent conditions for the entire project will be implemented. The EMP requires the adoption of good environmental practices for the proposed activities and identifies the mechanisms to be utilised to avoid, remedy or mitigate potential adverse environmental effects.

The CEMP is to be developed by the Contractor to demonstrate how the requirements of the conditions of consent, the EMP and the EMG are to be implemented.

Matters to be addressed within the CEMP have been identified in the relevant sections of the EMG. Responsibility for administration and implementation of the EMP and EMG will remain with the Consent Holder.

8.21.1 Project Management Plan (PMP)

A PMP shall be prepared and will include a number of management plans intended to provide assurances that the proposed Notice of Requirement (NoR) conditions can be met. The proposed NoR conditions are provided in Section 11 of this AEE. These conditions provide an overall framework for how environmental effects will be managed while the management plans contained in the PMP will include detailed methods to avoid, minimise and mitigate adverse environmental effects and to improve amenity through urban design and landscaping.

8.21.2 Environmental Management Plan (EMP)

A Draft Environmental Management Plan (EMP) has been prepared for the project. The purpose of the EMP is to create a template for the working environment of the HBTC Project, and to enable both the consent holder and the ARC to manage the environmental elements, including any adverse environmental effects of the Project. The EMP is proposed as the mechanism by which performance-based consent conditions for the entire project will be implemented.

8.21.3 Environmental Monitoring Guidelines (EMG)

The Environmental Monitoring Guidelines (EMG) is attached in Technical Appendix #9 and its purpose is to identify the monitoring requirements and responsibilities relative to the construction phase of the project as identified within the EMP. The Guidelines are also aimed at monitoring compliance with the conditions of consent and checking outcomes in the receiving environment.

8.21.4 Erosion and Sediment Control Plan (ESCAP)

The basic principles to be employed for an Erosion and Sediment Control Plan (ESCP), is to undertake land disturbing activities in a manner that reduces the potential for erosion of bare soil surfaces to occur (Erosion Control) and to employ treatment devices to treat all sediment laden water prior to discharging from the site (Sediment Control).

Erosion control will always be focussed on ahead of sediment control, however, it is noted that the nature of the works, may preclude standard erosion control methodologies (for instance progressive stabilisation may not be achievable due to the subgrade construction requirements).

The basic erosion and sediment control principles are as follows (as noted in ARC Erosion and Sediment Control Guidelines for Land Disturbing Activities 'TP90'):

- *Minimise Disturbance*, only work those areas required for construction to take place.

- *Stage Construction*, carefully plan works to minimise the area of disturbance at any one time.
- *Protect Steep Slopes*, careful consideration of activities on steep slopes and the control of runoff from these areas need to occur.
- *Stabilise Exposed Areas Rapidly*.
- *Protect waterways*.
- *Install Perimeter Controls*, divert clean water away from areas of disturbance and divert runoff from areas disturbed to sediment control measures.
- *Employ Detention Devices*, treat runoff by methods that allows sediment to settle out.
- *Undertake training*.
- *Modify the ESCP throughout Construction*, as construction progresses and the nature of land disturbing activities change, the ESCP needs to be modified to reflect the changing conditions on site.
- *Assess and Adjust*, inspect, monitor and maintain control measures.

8.21.5 Conclusion

The management plan framework proposed enables environmental issues to be addressed as they arise within a framework agreed with ACC as a condition of the NOR. Details relevant to the ARC consents are noted in the EMP and will be addressed in more detail during the resource consent phase.

8.22 Assessment of Environmental Effects Conclusion

Section 8 has set out a comprehensive assessment of the environmental effects of the HBTC project. Any adverse effects generated by the proposal will be minor due to avoidance, mitigation or remediation. Positive effects of the project have also been considered so that on balance, the adverse effects are minor.

9 Relevant Statutory Provisions

This section assesses the proposed HBTC Project against provisions of the Resource Management Act 1991 (RMA), Hauraki Gulf Marine Park Act 2000, Historic Places Act 1993 and Land Transport Management Act 2003.

9.4 Resource Management Act 1991

The RMA governs the use and development of New Zealand's natural and physical resources through:

- Part II, which establishes the purpose and principles applying to resource consents and designations;
- Section 104, which prescribes matters to be taken into account in granting resource consents; and
- Section 171, which prescribes matters to be taken into account in confirming designations.

The following sections of the RMA are most relevant to the HBTC Project.

9.4.1 Part II – Purpose and Principles

The consideration of the Notice of Requirement and applications for Resource Consent are subject to Part II of the RMA.

9.4.1.1 Section 5 - Purpose

The purpose of the RMA is to promote the sustainable management of natural and physical resources. Sustainable management is defined in Section 5(2) as:

“... managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while:

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (a) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- (b) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.”*

The proposed motorway extension reflects the principles of Part II of the RMA as it enables the community to provide for their social, cultural and economic well-being by providing for a sustainable State highway corridor, relieving traffic congestion on the current motorway corridor, improving access between the North Shore and central City, and providing an efficient roading network. Adverse environmental effects are inherent to any large-scale project such as the HBTC Project. The effects of the project are evaluated in this AEE in Section 8 – Assessment of Environmental Effects. The assessment of effects in Section 8 demonstrates that the potential for adverse effects on the environment can be adequately avoided, remedied or mitigated and the life-supporting capacity of air, water, soil and ecosystems maintained.

9.4.1.1.1 Section 5(2)(a)

The existing HBTC corridor and the proposed extension are 'physical resources', which require sustainable management in accordance with subsection 5(2).

9.4.1.1.2 Section 5(2)(b)

With regard to section 5(2)(b) a range of measures and mechanisms will be employed when constructing and operating the corridor which will safeguard the life-supporting capacity of the air, water, soil and ecosystems. These are outlined in the EMP. (Refer to Technical Appendix #8 – Draft Environmental Management Plan (EMP)).

9.4.1.1.3 Section 5(2)(c)

Potential adverse effects from the construction and operation of the new motorway have been identified in Section 8 and mitigation measures to address those effects have also been addressed in Section 8 with suggested conditions of the NOR in Section 12. It is concluded that any effects having the potential to adversely affect the environment can be mitigated to ensure that impacts will be no more than minor.

9.4.1.2 Section 6 - Matters of National Importance

Section 6 of the RMA sets out matters of national importance, which shall be recognised and provided for. Such matters include:

- “(a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development;*
- (b) The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development;*
- (c) The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;*
- (d) The maintenance and enhancement of public access to and along the coastal marine area, lakes and rivers;*
- (e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga;*
- (f) The protection of historic heritage from inappropriate subdivision, use and development;*
- (g) The protection of recognised customary activities.”*

The relevant sections are discussed below:

9.4.1.2.1 Section 6(a)

All works within the coastal environment and discharges to it will be managed to ensure that the water quality is not further compromised, and that the natural character (where it exists) is maintained and/or enhanced.

9.4.1.2.2 Section 6(b)

The proposed designation and associated works will not affect any outstanding natural features or landscapes in terms of the meaning of Section 6(b) of the RMA.

9.4.1.2.3 Section 6(c)

There will be an acknowledged loss of some indigenous vegetation, this can be ameliorated with mitigation.

9.4.1.2.4 Section 6(e)

This section requires that the relationship between Maori, their culture and traditions and their ancestral lands, water, sites, waahi tapu and other taonga be recognised and provided for as a matter of national importance. A summary of the consultation that has been undertaken is set out in Section 7 of this AEE.

9.4.1.2.5 Section 6(f)

A heritage assessment for the HBTC corridor (refer Section 8 of this AEE and Technical Appendix #16 – Harbour Bridge to City Project Heritage Assessment) has identified a number of sites, buildings and trees likely to be affected by the designation and works. Mitigation measures are also detailed in Section 8. The historic heritage of the Birdcage Hotel is protected by its relocating up Franklin Road to ensure the historic heritage values are maintained.

9.4.1.3 Section 7 - Other Matters

This section lists certain matters to which particular regard is to be had in making resource management decisions. These matters are as follows:

- a) *Kaitiakitanga;*
- aa) *The ethic of stewardship;*
- b) *The efficient use and development of natural and physical resources;*
- ba) *The efficiency of the end use of energy;*
- c) *The maintenance and enhancement of amenity values;*
- d) *Intrinsic values of ecosystems;*
- f) *Maintenance and enhancement of the quality of the environment;*
- g) *Any finite characteristics of natural and physical resources;*
- h) *The protection of the habitat of trout and salmon;*
- i) *The effects of climate change;*
- j) *The benefits to be derived from the use and development of renewable energy.*

The relevant provisions are assessed below:

9.4.1.3.1 Section 7(a) and 7(aa)

Consultation was undertaken with iwi/hapu to ensure that regard is had to sections 7(a) and 7(aa). The proposed designation and works do not comprise any elements that will impinge on the ability of Maori to practice their role as Kaitiaki, or the community as a whole to pursue and practice an ethic of stewardship.

9.4.1.3.2 Section 7(c)

The HBTC Project will not significantly alter the amenity values along the corridor. Section 8 assesses effects on amenity and landscape and sets out the proposed mitigation measures, including enhanced pedestrian access.

9.4.1.3.3 Section 7(d)

Regard has been had to the intrinsic value of ecosystems, and it is considered that the proposed designation and works will not significantly affect current values.

9.4.1.3.4 Sections 7(f)

The HBTC Project involves extension to existing structures and an incremental increase in the intensity of an existing activity. These changes however represent a minor change to the physical environment that has been highly modified by land reclamation and the establishment of the existing motorway. The HBTC Project will lead to an overall enhancement of the environment in terms of improving the efficiency of the roading network with a consequent reduction in traffic congestion.

9.4.1.4 Section 8 - Treaty of Waitangi

This section requires those exercising powers or functions under the RMA to take into account the principles of the Treaty of Waitangi.

Case law provides a guide in terms of applying section 8. In *Haddon v Auckland RC A77/93*, the Planning Tribunal expressed the view that a duty of consultation was a principle of the Treaty, and all parties were under a duty to consult at the initial stages. Consultation with tangata whenua's ongoing and will continue through all stages of planning and construction.

9.4.1.5 Sections 168 and 181 - Notice of Requirement and Alteration to Designation

Transit is a network utility operator approved as a requiring authority under Section 167 of the RMA. The Notices of Requirement (NOR's) and Notices of Alteration to Designation are lodged with the relevant territorial authority (ACC) under Sections 168(2) and 181(2) respectively of the RMA.

The information required by Section 168 and 181 is presented in detail in the NOR forms contained in the document titled HBTC Project - Overview and Statutory Application Forms.

9.4.1.6 Section 171 - Recommendation by the Territorial Authority

Under Section 171, the territorial authority (ACC) may recommend to the requiring authority (Transit) one of the following:

- confirm the designation
- modify the designation
- impose conditions
- withdraw the requirement

This recommendation is based on matters the territorial authority is required to have particular regard to when considering an NOR under sections 168 or 181. The matters to be considered are set out in section 171(1) of the RMA and are reproduced below.

Section 171. Recommendation by territorial authority

- (1) *When considering a requirement and any submissions received, the territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to –*
- (a) *Any relevant provisions of-*
 - (i) *a national policy statement,*
 - (ii) *a New Zealand coastal policy statement,*
 - (iii) *a regional policy statement, or proposed regional policy statement; and*
 - (iv) *a plan or a proposed plan; and*
 - (b) *Whether adequate consideration has been given to alternative sites, routes, or methods of undertaking work if*
 - (i) *the requiring authority does not have an interest in the land sufficient for undertaking the work; or*
 - (ii) *it is likely that the work will have significant adverse effect on the environment; and*
 - (c) *Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought; and*
 - (d) *Any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement.*

These matters are commented on below:

Section 171(1)(a)

The relevant provisions of other statutory documents are discussed in detail in the following section. In summary, the proposal is consistent with these documents.

Section 171(1)(b)

Extensive consideration has been given to alternatives as discussed in Section 5 of this AEE. The project selected is appropriate for the upgrade of the HBTC corridor, and a reasonable and justifiable process was followed in respect of the identification and consideration of the preferred option.

Section 171(1)(c)

The project and designation are considered reasonably necessary as discussed in Section 3 of this AEE.

A designation is the most appropriate consent process to ensure that Transit's objectives for the project are attained because:

- It will allow land required by the project to be identified in the relevant plans to give a clear indication of the intended use of the land;
- It will restrain land uses and/or development that may otherwise hinder or prevent the project;
- It will allow Transit to do anything in accordance with the designation, notwithstanding anything to the contrary in the District Plan;

Therefore, in respect of section 171(1)(c) it is considered that a designation is reasonably necessary to achieve Transit's objectives regarding the proposed public work.

Section 171(1)(d)

The effects of the proposal are discussed in Section 8 of this AEE. In summary, the adverse effects are considered to be no more than minor. Furthermore, other non-statutory documents are assessed in the following section with no part of the project considered to be contrary to them.

9.5 Hauraki Gulf Marine Park Act 2000

The Hauraki Gulf Marine Park Act 2000 (HGMPA) outlines broad policy matters, which recognise the features that contribute to the national significance of the Hauraki Gulf and appropriate objectives for the Gulf's management. The Act's stated purpose is to integrate the management of the natural, historic, and physical resources of the Hauraki Gulf; to establish objectives for the management of the Gulf; to establish the Hauraki Gulf Marine Park and the Hauraki Gulf Forum; and to recognise the relationship tangata whenua have with the Gulf and its islands. The Hauraki Gulf Marine Park established by this Act includes all areas of foreshore, seabed and seawater within the Gulf, and the HBTC corridor falls within the catchment of the Hauraki Gulf as specified by the Act.

When assessing applications for activities within the Gulf and its catchment the ARC is required to have regard to the matters on sections 7 and 8 of the HGMPA.

Section 7 of the Act states that:

- (1) *The interrelationship between the Hauraki Gulf, its islands, and catchments and the ability of that interrelationship to sustain the life-supporting capacity of the environment of the Hauraki Gulf and its islands are matters of national significance.*
- (2) *The life-supporting capacity of the environment of the Gulf and its islands includes the capacity---*
 - (a) to provide for--- (i) the historic, traditional, cultural, and spiritual relationship of the tangata whenua of the Gulf with the Gulf and its islands; and (ii) the social, economic, recreational, and cultural well-being of people and communities:*
 - (b) to use the resources of the Gulf by the people and communities of the Gulf and New Zealand for economic activities and recreation: and*
 - (c) to maintain the soil, air, water, and ecosystems of the Gulf.*

Section 8 of the Act states that in order to recognise the national significance of the Gulf, the objectives for its management are as follows:

- (a) the protection and, where appropriate, the enhancement of the life-supporting capacity of the environment of the Hauraki Gulf, its islands, and catchments:*
- (b) the protection and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments:*
- (c) the protection and, where appropriate, the enhancement of those natural, historic, and physical resources (including kaimoana) of the Hauraki Gulf, its islands, and catchments with which tangata whenua have an historic, traditional, cultural, and spiritual relationship:*
- (d) the protection of the cultural and historic associations of people and communities in and around the Hauraki Gulf with its natural, historic, and physical resources:*
- (e) the maintenance and, where appropriate, the enhancement of the contribution of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments to the social and economic well-being of the people and communities of the Hauraki Gulf and New Zealand:*
- (f) the maintenance and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments, which contribute to the recreation and enjoyment of the Hauraki Gulf for the people and communities of the Hauraki Gulf and New Zealand.*

In relation to the Section 8 of the HGMPA the following comments are made:

- The proposed designation and works associated with the HBTC Project are not expected to adversely affect the life-supporting capacity of the environment in terms of soil, water, air and ecosystem resources.
- Adverse effects on the natural, historic and physical resources of the Gulf and its catchment are considered to be no more than minor.
- In terms of protecting and enhancing the cultural and spiritual values of tangata whenua it is intended that consultation will be ongoing throughout the project, and issues resolved as they arise.

- The HBTC Project will have positive social and economic effects in terms of reducing congestion and improving access between the North Shore and Central City.
- The HBTC Project will not impede the enjoyment of, or recreational opportunities associated with the Hauraki Gulf.

9.6 Historic Places Act 1993

Sections 9 to 21 of the Historic Places Act 1993 (HPA) apply to archaeological sites. All archaeological sites are afforded protection under Sections 9 and 10 of the HPA (whether they are formally recorded and/or registered or not), whereby it is unlawful for any person to modify, damage or destroy the whole or any part of an archaeological site without the prior authority of the Historic Places Trust (the Trust).

Archaeological sites are defined in Section 2 of the HPA as any place in New Zealand that

- (a) *Either –*
 - (i) *Was associated with human activity that occurred before 1900; or*
 - (ii) *Is the site of the wreck of any vessel where that wreck occurred before 1900; and*
- (b) *Is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand.*

Application to the Trust for an authority to modify, damage or destroy an archaeological site is made under Sections 11 and 12 of the HPA. Under section 14 on receipt of an application the Trust may grant an authority in whole or in part, subject to such conditions as it sees fit, or decline to grant an authority in whole or in part.

Section 22 of the HPA imposes upon the Trust a responsibility to establish and maintain a Register of historic places, historic areas, waahi tapu and waahi tapu areas. Under Sections 22 and 23 of the HPA the Trust may assign Category I or Category II status to any historic place, historic area, waahi tapu and waahi tapu area.

The effects of the HBTC Project on cultural and archaeological sites are discussed in Section 8 and in Technical Appendix #16- Heritage Assessment. To mitigate the effect of the construction of the north bound tunnel at the location of the Birdcage Hotel resulting in the need for its removal, it is proposed that the hotel be relocated. A Conservation Plan has been prepared (see Technical Appendix #14) and will be submitted to the Historic Places Trust (HPT) for their review as part of the Authority applications. Consent to modify a historic site would be required under Section 12 of Historic Places Act (HPA) to relocate the Hotel. An authority from the NZHPT has a standard two-year lapsing period. Due to the potential for delays in obtaining other necessary consents for the HBTC Project it is considered prudent to delay an application under the HPA until closer to the start of construction of the proposed works. In the interim, consultation with the HPT is ongoing.

9.7 Land Transport Management Act 2003

The Land Transport Management Act 2003 (LTMA) was enacted in November 2003. The purpose of the LTMA is listed in Section 3 of that Act, as follows:

3.

- (1) *The purpose of this Act is to contribute to the aim of achieving an integrated, safe, responsive, and sustainable land transport system.*
- (2) *To contribute to that purpose, this Act –*
 - a) *provides an integrated approach to land transport funding and management; and*
 - b) *improves social and environmental responsibility in land transport funding, planning, and management; and*
 - c) *changes the statutory objectives of Transfund and Transit to broaden the focus of each entity; and*
 - d) *improves long-term planning and investment in land transport; and*
 - e) *ensures that land transport funding is allocated in an efficient and effective manner; and*
 - f) *improves the flexibility of land transport funding, including provisions enabling new roads to be built on a tolled or concession agreement basis or on a basis involving a combination of those methods.*

It is considered that the project meets the purpose of the LTMA as follows:

- providing upgrades and additional elements to an existing roading system to ensure it continues to operate in a safe, integrated, responsive and sustainable manner, taking into account social and environmental considerations.
- The project responds to the traffic needs of the Auckland Region (as outlined in Section 3 of this AEE) in an integrated manner. The HBTC project will assist in realising the full potential of the CMI Projects, as the GGP project is complete and the CMJ project is near completion.
- The project will be constructed in stages to ensure the continued safety of the motorway users. Once complete the safety of the motorway users is ensured through standard motorway measures (eg safety barriers and road marking).
- The social and environmental considerations have been assessed throughout this report and it is considered that any adverse effects are minor.

10 Relevant Planning Documents

Section 171 of the RMA requires the ACC, when it considers notices of requirement and alterations to existing designations, to have regard to the relevant provisions of any national policy statement, the New Zealand Coastal Policy Statement, and regional and district planning documents. 'Other matters' also need to be considered.

It is considered that the following policy statements and plans are relevant to the proposed HBTC Project:

- New Zealand Coastal Policy Statement
- Auckland Regional Policy Statement
- Auckland Regional Plan: Sediment Control
- Proposed Auckland Regional Plan: Air, Land and Water.
- Auckland Regional Plan: Coastal
- Auckland City District Plan: Central Area Section 2004
- Auckland City District Plan – Isthmus Section 1999

The following non-statutory documents are also considered:

- Auckland Regional Growth Strategy
- Auckland Regional Land Transport Strategy 2003
- Draft Auckland Regional Land Transport Strategy 2005
- Growing Our City Through Liveable Communities 2050
- National State Highway Strategy
- Transit's Planning Policy Manual
- Transit's Environmental Standards

10.1 New Zealand Coastal Policy Statement 1994

10.1.1 Introduction

The New Zealand Coastal Policy Statement 1994 (NZCPS) sets out policies for the preservation of the natural character of the coastal environment. Both the land and coastal-based activities are required to have regard to the NZCPS.

The NZCPS provides guidance on the management of the coastal environment to consent authorities, and the plans produced by these authorities are required to be consistent with the policies contained in the NZCPS. As a result many of the NZCPS policies will be implemented via the Auckland Regional Plan: Coastal and the Auckland Regional Policy Statement. The following policies of the NZCPS have relevance to this project.

10.1.2 National Priorities For the Preservation of Natural Character

Policy 1.1.1 requires the preservation of the natural character of the coastal environment by encouraging activities to occur in areas already compromised, by taking into account the

effects on the natural character of the coastal environment and by avoiding cumulative adverse effects.

Policy 1.1.2 requires the protection of areas of significant vegetation and habitats by avoiding adverse effects on key areas for threatened wildlife, protecting ecosystems, which are unique to the coast, and recognising that any other coastal areas should be disturbed as little as practicable.

Policy 1.1.4 requires the preservation of key ecological processes within the coastal environment.

The HBTC Project involves no physical disturbance of the CMA. The project involves increasing the variable width of State highway 1 along the St Mary's Bay section on existing reclaimed land. The project avoids the need for further land reclamation, therefore avoiding further impacts on the coast and it located in an area that is already compromised by existing manmade structures, eg. Westhaven marina, St Mary's Bay suburb housing, existing motorway.

10.2 Auckland Regional Policy Statement

The Auckland Regional Policy Statement (RPS) became operative on 31 August 1999. The RPS is a statement about managing the use, development and protection of natural and physical resources of the Auckland Region. The aim of the RPS is to achieve integrated, consistent and co-ordinated management of the Region's resources, and to provide greater certainty over the ways that natural and physical resources are to be managed, and hence create an awareness of the constraints and opportunities of the Auckland Region.

10.2.1 Regional Overview and Strategic Direction

Chapter 2 of the RPS – Regional Overview and Strategic Direction, provides the strategic framework for managing the significant environmental issues of the Region. Chapter 2 identifies two key resource management issues that are relevant to the HBTC Project.

Firstly, the RPS defines the national roading network as regionally significant infrastructure and recognises that *“regionally significant physical resources, including infrastructure, are essential for the community's social and economic wellbeing”* (Issue 2.3.4). The RPS also recognises that *“Auckland's transportation system is essential for the community's social and economic wellbeing and some parts of it are nearing significant thresholds”* (Issue 2.3.5).

Chapter 2 of the RPS also includes a number of Strategic Objectives and Policies relevant to the HBTC Project. These include:

Objective 2.5.1-6

“To promote transport efficiency, and to encourage the efficient use of natural and physical resources, including urban land, infrastructure and energy resources”.

Policy 2.5.2-1

“The use, development and protection of natural and physical resources on the Region is to be managed so that the Region's growth is accommodated in a manner and in locations that are consistent with the Strategic Objectives and which promote the sustainable management of those resources”.

Policy 2.5.2-6

“Provision is to be made to enable the safe and efficient operation of existing regional infrastructure which is necessary for the social, and economic well being of the region’s people, and for the development of regional infrastructure (including transport and energy facilities and services) in a manner which is consistent with this strategic direction and which avoids, remedies or mitigates any adverse effects of those activities on the environment”.

Assessment

The HBTC Project is intended to ease congestion between the Auckland Harbour Bridge and the Central Motorway Junction, particularly during the morning and evening peak periods. It is recognised that congestion on Auckland’s central motorway network has reached critical levels, with delays estimated to cost the Region approximately \$1 billion per year. Improvements associated with the HBTC Project will provide for both the improvement of traffic efficiency through the corridor, and assist in providing capacity to accommodate the growth the Auckland CBD and wider area. Without these improvements the efficient operation of the corridor is impeded, with consequential impacts on the social and economic well-being of the region’s people.

10.2.2 Matters of Significance to Iwi

Chapter 3 of the RPS contains objectives and policies regarding matters of significance to iwi. Objective 3.3-3 is relevant to the HBTC Project and states that:

“To involve Tangata Whenua in resource management processes in ways which:

- (i) take into account the principles of the Treaty of Waitangi, including rangatiratanga;*
- (ii) have particular regard to the practical expression of kaitiakitanga”.*

Assessment

Iwi has been consulted throughout the HBTC Project. Consultation undertaken is described in Section 7 of this AEE, and is considered to have been undertaken in accordance with the above policies.

10.2.3 Transport

Chapter 4 of the RPS contains objectives and policies regarding transport matters. The RPS recognises that “the transport system is a significant regional resource providing for the movement of people, goods, services and resources. The existence of deficiencies in the transport network leads to poor access between some parts of the Region and congestion in some parts of the transport network, inhibiting the ability of the community to provide for its social, economic and cultural well being” (Issue 4.2.4). Chapter 4 also contains objectives and policies relevant to the HBTC Project. These include:

Objective 4.3-2

“To develop a transport network which enables all sections of the community to gain access to community resources”.

Objective 4.3-3

“To develop a transport network which provides an acceptable level of accessibility between important activity areas”.

Assessment

The HBTC Project has been designed to enable all sections of the community to move more freely between the central motorway network and the Auckland Harbour Bridge, thereby improving access between the central and northern sectors of the Region.

10.2.4 Coastal Environment

Chapter 7 of the RPS includes objectives and policies related to the coastal environment. Those relevant to the HBTC Project include:

Policy 7.4.10-1

“The diverse range of values of the coastal environment shall be recognised and the need to enable people and communities to provide for their social, economic and cultural well being shall be provided for in appropriate areas of the coastal environment”.

Policy 7.4.10-8

“Appropriate subdivision, use and development shall be encouraged to locate in areas where the natural character has already been compromised, thereby avoiding sprawling or sporadic subdivision, use and development in the coastal environment”.

Policy 7.4.13-1

“Public access shall be maintained and enhanced to and along the CMA and to publicly owned land in the coastal environment”.

Assessment

The coastal environment adjacent to the HBTC Project is already a highly modified environment with the existing motorway network, Westhaven Drive, Westhaven Marina and associated marina activities. The widening of the St Mary’s Bay portion of the corridor is primarily within the existing motorway designation and does not require any additional structures in the Coastal Marine Area (CMA).

The HBTC Project will have no adverse impact on the Westhaven Marina or Westhaven Drive, therefore the current level of public access in this area will be maintained. A proposed pedestrian overbridge between the Westhaven area and the base of Jacob’s Ladder will further enhance public access to the CMA.

10.2.5 Water Quality

Chapter 8 of the RPS provides for the maintenance and enhancement of water quality in the Auckland Region through a comprehensive and integrated management approach. Policies relevant to the HBTC Project include:

Policy 8.4.4-1

“Adverse effects on water quality caused by the discharge of contaminants (including non-point source discharges) shall be avoided, particularly the discharge of potentially toxic, persistent or bio-

accumulative contaminants. Where it is not practicable to avoid discharges, they shall be adequately remedied or mitigated”.

Policy 8.4.7-1

“All new developments discharging stormwater, whether allowed as a permitted activity or by a resource consent, shall adopt appropriate methods to avoid or mitigate the adverse effects of urban stormwater runoff on aquatic receiving environments”.

Policy 8.4.7-3

“All land disturbance activities which may result in elevated levels of sediment discharge shall be carried out so that the adverse effects of such discharges are avoided, remedied or mitigated”.

Assessment

The ARC identifies the best practicable option (BPO) as the best means for implementing the policies above for both temporary and long-term water quality improvement. In the HBTC Project, stormwater treatment devices shall be designed to achieve, on a long-term average basis, 75% removal of sediment from stormwater generated from new pavement areas (or an equivalent area) created by the HBTC Project. Discharges during the construction phase of the project will be managed in accordance with the EMP (refer to Technical Appendix #13 – Draft Environmental Management Plan) and summary provided in Section 4.5 of this AEE. The methods for managing long-term stormwater management and treatment are provided in Section 4.6 of this AEE.

10.3 Auckland Regional Plan: Coastal

The Auckland Regional Plan: Coastal (ARP: C) was publicly notified in 1995, and was re-released in 1999. All references to the Plan have now been resolved and the Environment Court has granted consent to approve and make operative those parts of the Plan that relate to the coastal environment (with the exception of provisions subject to variation).

On 5 August, 2004, the Minister of Conservation, Hon Chris Carter, granted approval, providing the final requirement to make the Plan operative in part. Those parts not subject to variations are operative from 8 October 2004. There are six Variations to the Proposed Plan. Appeals on variation 1 appear in Chapters 10, 20 and the definitions.

The ARP: C applies to activities within the coastal marine area of the Auckland Region, but also covers related parts of the ‘coastal environment’. The purpose of the ARP: C is to provide a framework to promote the integrated and sustainable management of Auckland's coastal environment.

The CMA is divided into a number of management areas in the ARP: C. The project has the potential to directly affect the General Management Area.

10.3.1 Part III: Values

Part III of the ARP: C contains objectives and policies relevant to specific ‘values’ of the coastal environment. Relevant provisions include:

10.3.1.1 Natural Character

Objective 3.3.1 seeks “to preserve the natural character of the coastal environment by protecting the coastal marine area from inappropriate subdivision, use and development”.

Natural Character policies focus on:

- Preserving and protecting the coastal environment, and avoiding, remedying or mitigating adverse effects on the natural character of the coastal environment.
- Protecting remaining elements of natural character in those areas characterised by modification and development.
- Recognising the role that landscape, natural features, ecosystems and cultural and historical sites make to natural character.

Assessment

The HBTC route will not affect the existing natural character of the coastal environment as the lane widening at the St Mary’s Bay corridor will mostly occur within the existing motorway designation.

10.3.1.2 Landscape

With regard to landscape, the main objectives of the plan are to protect outstanding landscapes and to maintain the key elements, features and patterns of Regionally Significant Landscapes, as well as maintaining the diversity, integrity and landscape quality of the coastal environment.

Assessment

There are no Regionally Significant or Outstanding Landscapes along the HBTC route, and it is considered that the proposed designation and works will generally not alter the existing diversity, integrity and landscape quality of the coastal environment.

10.3.1.3 Coastal Matters of Significance to Tangata Whenua

Chapter 6 of the ARP: C includes provisions of relevance to tangata whenua values. Relevant objectives include:

Objective 6.3.1

“To recognise that the coastal marine area has characteristics of special spiritual, historical, and cultural significance to Tangata Whenua”.

Objective 6.3.2

“To sustain the mauri of natural and physical resources of the coastal environment, and to enable provision for the social, economic and cultural wellbeing of Maori”.

Assessment

Consultation has been undertaken with iwi. Maori Heritage sites adjacent to the route have been identified in consultation with Iwi and are listed in Section 7 of this AEE, and mitigation measures and protocols for the monitoring of earthworks as documented in the EMP (refer to Appendix 8 – Environmental Management Plan) in the vicinity of these sites will minimise impacts on physical remains.

10.3.1.4 Public Access

It is an objective of the ARP: C that public access to the coastal environment should be maintained and enhanced provided there are no adverse effects on the natural and cultural values of the coastal environment.

Assessment

The HBTC Project will improve access to the coastal marine environment through the provision of a new pedestrian footbridge over the motorway between St Mary's Bay and the coast (Westhaven Drive and marina). Existing access on the northern side of the motorway is enhanced.

10.3.2 Part IV: Use and Development

10.3.2.1 General

Chapter 10 of the ARP: C contains general provisions, which apply to all subdivision, use and development in the CMA that requires resource consent. Relevant policies include:

Policy 10.4.3

"Subdivision, use and development of the coastal marine area shall be considered more appropriate where the environment has already been highly modified by human activities, or located in areas where development already exists..."

Policy 10.4.4

"The positive environmental effects and benefits arising from any proposal for subdivision, use and development shall be taken into account when assessing the overall effects of a proposal".

Policy 10.4.8

"Cumulative adverse effects of new subdivision, use and development shall be avoided as far as practicable, remedied, or mitigated, taking into account the extent to which existing subdivision, use and development, either of the same or different kind to that proposed, already has adverse effects, and the extent to which any new subdivision, use or development will exacerbate such effects."

Policy 10.4.13

"Nuisance effects from noise, odour, dust, light, glare, vibration, and traffic shall be avoided, remedied or mitigated by the adoption of the best practicable option where appropriate".

Assessment

No new structures or activities are proposed in the CMA. Where the HBTC Project is adjacent to the CMA, is already within an area highly modified by the existing motorway corridor. Positive effects are identified in Section 8 of this AEE. Nuisance effects will be avoided, remedied or mitigated in accordance with the EMP and mitigation measures proposed in Section 8 of this AEE.

10.3.3 Noise

Chapter 35 of the ARP: C covers issues of noise in or adjacent to the coastal marine area.

Policy 35.4.1

“Activities undertaken within the coastal marine area shall be required to:

- a) comply with the noise standards specified in this Plan;*
- and*
- b) where noise standards are not specified, to adopt the best practicable option to ensure that the emission of noise does not exceed a reasonable level for all other activities.*

Assessment

Construction will be undertaken in compliance with a ‘Construction Management Plan’ (CMP). The issues that this plan will address are listed in Section 8 of this AEE. Works will be undertaken to prevent noise emissions exceeding the standards applying to construction activities as provided in the Auckland City Council District Plans.

10.4 Auckland Regional Plan: Sediment Control

The Auckland Regional Plan: Sediment Control (ARP: SC) was made operative in November 2001 and addresses the issues of elevated sediment generation and discharge from areas subject to land disturbance. The plan seeks to promote a sediment control programme, through the introduction of objectives and policies, rules and methods to avoid, remedy or mitigate adverse effects resulting from sediment laden discharges entering the receiving environment.

Objectives relevant to the HBTC Project include:

“To maintain or enhance the quality of water in waterbodies and coastal water”.

“To reduce the exposure of land to the risk of surface erosion leading to sediment generation”.

“To minimise sediment discharge to the receiving environment”.

Relevant policies include:

Policy 5.2.1

“Land disturbance activities which may result in the generation and discharge of elevated levels of sediment will be required to employ methods which avoid, remedy or mitigate adverse effects on the quality of water in waterbodies and coastal waters”.

Assessment

In accordance with these objectives and policies, erosion and sediment control measures will be implemented as detailed in Section 4.5 and in more detail in Technical Appendix #6 – Assessment of Land Disturbing Activities. By implementing appropriate erosion and sediment control measures the potential for sediment discharge is significantly reduced. Coupling these measures with the environmental management procedure, in the EMP (refer to Technical Appendix #8 – Draft Environmental Management Plan), any significant adverse effects will be avoided, remedied or mitigated.

10.5 Proposed Auckland Regional Plan: Air, Land & Water

The Proposed Auckland Regional Plan: Air, Land & Water (PARP: ALW) was notified in October 2001. Submissions and further submissions on the Plan have closed. Hearings were held through 2003. Decisions on submissions and further submissions were notified on 8 October 2004. The PARP: ALW is the key mechanism for implementing the ARC's functions under the RMA, in relation to the management of air, land and water resources (excluding coastal waters in the CMA) of the Auckland Region.

10.5.1 Air Quality

Chapter 4 of the PARP: ALW addresses air quality. The following objectives and policies are relevant to the HBTC Project:

Objective 4.3.6

"To minimise the discharge of contaminants into air from mobile sources, while enabling sustainable development and protecting the health and social well-being of the people of the Auckland Region."

Policy 4.4.15

"Any land proposal with transportation effects, and any new transport projects or proposals for redeveloping transport infrastructure which have the potential to adversely affect air quality, should be assessed at a level considered appropriate for the size and scale of the project or proposal, and should consider the following:

- (a) *effects on human health*
- (b) *effects on local or regional air quality, and*
- (c) *any alternative or methods to mitigate effects on air quality or minimise the discharge of contaminants into air.*

Assessment

An air quality analysis has been undertaken which shows that the proposal will meet the National Environmental Standards for air quality. These standards seek to minimise effects on human health and the environment, therefore, it is considered that these objectives and policies are met.

10.5.2 Discharges and Contamination

Chapter 5 of the PARP: ALW addresses discharges to land or water, and acknowledges that vehicle use is a major cause of stormwater contamination. The following objectives and policies are relevant to the HBTC Project.

Objective 5.3.4

"To provide for and enable diversions and discharges associated with stormwater and wastewater networks within the Metropolitan Urban Limits, while adopting the best practicable option to minimise any actual or potential adverse effects of these activities".

Policy 5.4.6

"When processing consent applications for private stormwater discharges the ARC shall have regard to:

(b) The overall effects of stormwater discharges and diversions from the site, and in particular, the extent to which stormwater quality treatment and quantity control are or will be provided for existing and proposed land uses within the same Certificate of Title or contiguous area”.

Chapter 5 of the PARP: ALW also addresses contaminated land. The Plan acknowledges that there are a number of sites within the Auckland Region that suffer from contaminated soil or water due to historic activities and practices. The Plan puts in to place measures to prevent more land becoming contaminated and defines workable guidelines for site management or remediation. Objectives and policies relevant to the HBTC Project include:

Objective 5.3.13

“To ensure the remediation and management of contaminated land... is undertaken to protect the environment and public health”.

Policy 5.4.33

“To promote the management of contaminated land to ensure that there are no significant adverse effects on the environment or public health”.

Policy 5.4.34

“The management of contaminated land may allow contaminants to remain in the ground on the site where it can be demonstrated that:

- (a) The extent and nature of the contamination will not pose a threat to the environment or public health*
- (b) The current zoned land use will not be adversely affected;*
- (c) Ground and surface water resources are not at risk from contamination; and*
- (d) Ongoing monitoring and management in a manner appropriate to the extent and type of contamination of the site is undertaken to ensure that (a), (b) and (c) are achieved”.*

Assessment

The effects of the stormwater discharge are discussed in Section 8 of this AEE. It is considered that the proposed stormwater treatment will improve water quality and that the effects during construction will be avoided by implementing measures detailed in the EMP (refer to Technical Appendix #8 – Draft Environmental Management Plan) and mitigation methods detailed in Section 8.

Disturbance of the (historically) contaminated land in Victoria Park, will occur during the construction of the tunnel. This disturbance will be managed so that any adverse effects on public health and the environment are avoided. Section 6 provides further details on the type and scale of contamination and the management and mitigation measures are summarised in Section 8. For specific detail regarding the conducting of works on a contaminated site refer to the EMP (Technical Appendix #8).

10.6 District Planning Documents

Two District Plans apply to the proposed HBTC project. The section of the project from the Harbour Bridge south to the Victoria Bridge Viaduct is covered by the Auckland City

Operative Isthmus District Plan 1999. The remaining section of the project, including the VPV, south to the Wellington Street over bridge is covered by the Auckland City District Plan Central Area Section 2004.

10.6.1 Auckland City District Plan – Central Area Section 2004

The Central Area Plan seeks to achieve an urban environment that is modern, dynamic, varied, and with high amenity values. The Plan also seeks to achieve easy access throughout the City. Relevant sections of the Central Area Plan are discussed below.

10.6.1.1 Resource Management (Part 3).

This part of the Central Area Plan sets out the general issues, objectives and strategy for the Central Area. The following two objectives relating to 'An Accessible Centre' and 'A Place of Opportunities' are considered relevant:

Objective 3.5.2

"To facilitate access throughout the Central Area for passenger transport, private vehicles visiting and servicing the Central Area and for pedestrians and cyclists".

Objective 3.5.4

"To ensure that the Central Area is acknowledged as an outstanding centre in business, culture, arts, accommodation, entertainment and learning and is responsive to new ideas and change".

Assessment

The HBTC Project will reduce the current congestion on the existing corridor thereby facilitating access to the City for private vehicles and passenger transport. By improving access to the City, the City is able to grow and expand in terms of business culture and entertainment opportunities.

10.6.1.2 Strategic Management Areas (Part 4)

The Central Area Plan sets out that Strategic Management Areas (SMAs) that provide the means to achieve integrated resource management for the Central Area. The SMAs permit the identification of significant physical, social and development characteristics within the Central Area and the identification of the issues affecting each area. The Central Area Plan identifies that all strategic planning decisions, plan changes and resource consent applications will be assessed against the relevant SMA's objectives and policies. The HBTC project travels through the Western SMA.

Western SMA

The Western Strategic Management Area (Western SMA) slopes westward from Hobson Ridge towards Freemans Bay and the Waitemata Harbour. It accommodates a variety of low to medium intensity activities (industrial, residential commercial), which require good road access and derive benefit from close proximity to the Core CMA. The Western SMA also contains Victoria Park, which is the only area for active recreation in the Central Area.

Western SMA objectives and policies relevant to the HBTC Project include:

Objective 4.3.3.1

“To provide for an environment that emphasises commercial, entertainment, recreational, tourist, cultural and residential activities in order to achieve vitality while managing the significant adverse effects of activities on each other, on public spaces in the Western SMA and on the sustainability of the Central Area”.

Policies 4.3.3.1

- a) *“By providing for a variety of activities including those that rely on good vehicular access and which are unlikely to compromise the operation of the major road corridors to and from the Central Area.*
- b) *By protecting and enhancing the special character elements of the Victoria Park market Precinct”.*

Objective 4.3.3.3

“To maintain and improve accessibility to, from and within the SMA, the motorway and key arterial routed and to improve the gateway status of the Western SMA”.

Policies 4.3.3.3

- a) *“By improving passenger transport to, from and within the SMA.*
- b) *By avoiding, remedying, or mitigating the adverse effects of transportation on the environment.*
- d) *By providing for improved visual amenity at the western gateways into the Central Area”.*

Assessment

The HBTC project does not involve any works that will alter the existing amenities and uses in the Western SMA. The existing public access in and around the Western SMA will be maintained. New and replaced pedestrian facilities in St Mary’s Bay (including a proposed footbridge over the motorway) will enhance the existing public access in the Western SMA and pedestrian connections on the area. The proposed designation provides for releasing capacity in the roading system which will assist the Busway project which seeks to improve passenger transport.

10.6.1.3 Transportation Section (Part 9).

The Central Area Plan recognises that the Central Area fulfils a crucial role in the Auckland Region’s economy, and the growth and functioning of that economy necessitates a transportation system that allows good access to the Central Area. Objectives and policies relevant to the HBTC Project include:

Objective 9.2.1

“To ensure that people can move easily around the Central Area”.

Policies 9.2.1

- a) *By providing for safe, attractive, efficient and identifiable linkages, networks and environments for vehicles, including bicycles and pedestrians.*

Objective 9.2.2

“To maintain accessibility to and from the Central Area”

Policies 9.2.2

- a) *“By giving greater priority to passenger transport and service traffic where appropriate.*
- e) *By providing for, protecting and enhancing the roading system to ensure it's long-term sustainability.*
- f) *By providing for future road works to improve the roading system”.*

Objective 9.2.3

“To provide for the development of improved passenger transport to, from and within the Central Area”.

Assessment

The HBTC project will improve the existing corridor by realising capacity and improving the roading system. It will also relieve the current pressure on existing local roads surrounding the motorway by facilitating the CMJ and GGP projects. This assists in ensuring people can move easily around the Central Area and provides for efficient and identifiable linkages, networks and environments for vehicles, including bicycles and pedestrians. The HBTC project also takes into consideration the Busway project so that passenger transportation is further facilitated.

10.6.1.4 Heritage (Part 10).

The Central Area Plan recognises that there are significant heritage items within the Central Area and that the purpose of the plan with regard to heritage is to identify heritage resources worthy of preservation, adopt suitable measures to protect these resources, and to ensure that new development in close association with the heritage resources recognises and makes provision for the visual and physical protection of such resources.

The Central Area Plan identifies Victoria Park as a scheduled Maori Heritage Site. Victoria Park is noted as having been Wai Kokota (a shell fish gathering area) and Te To (a headland canoe hauling area below site of significant event). Sixty-five London Plane trees (*Platanus acerifolia*) within Victoria Park are scheduled as a Category B item in the Proposed District Plan.

Heritage objectives and policies relevant to the HBTC Project include:

Objective 10.3.1

“To recognise and protect resources of natural, cultural and scientific heritage value”.

Policies 10.3.1

- (a) *“By identifying, assessing and protecting important heritage buildings, objects and places including landscape, trees, gardens, historic places, archaeological sites and waahi tapu by scheduling such features in the Plan”.*

Objective 10.9.3

“To systematically recognise, protect and enhance significant buildings, objects, properties and places valued as part of the district’s heritage”

Policies 10.9.3

- (b) *“By adopting rules in the Plan that require heritage buildings, objects, places, sites, features and areas of special value to received appropriate care and conservation consideration.*
- (d) *By requiring the preparation of a Conservation Plan or Heritage Inventory, where it is necessary to ensure the proper management of a heritage property”.*

Objective 10.11.3

“To protect trees and groups of trees which significantly contribute to the City’s character, heritage and amenity”.

Policies 10.11.3

- (a) *“By identifying, recognising and protecting notable trees and groups of trees in public and private ownership.*
- (b) *By continuing the practice of planting trees in roads and on public open spaces and protecting these from unnecessary interference or destruction.*
- (c) *By protecting and promoting trees as habitat and a food source to retain and attract valued wildlife”.*

Assessment

A number of heritage resources have been identified along the proposed HBTC route, Technical Appendix #16 – Heritage Assessment discusses these in detail. As part of the construction of the proposed north bound tunnel 3 London Plane trees will require removal from the northern corner of Victoria Park and 1 London Plane from the corner of Franklin Road and Victoria Street. Planting of significant replacement trees in Victoria Park is proposed to mitigate the loss of the trees. A number of other trees protected under the plan will be removed or require pruning. An assessment of effects on trees is provided in Technical Appendix #12. Mitigation measures concerning trees are discussed in Section 8 of this AEE.

10.6.1.5 Transport Corridor Precinct (Part 14.3)

The Transport Corridor Precinct applies to motorways in the Central Area. The Plan states (Clause 14.3.1) that Council recognises that there has been considerable investment in the motorways and that they provide important transportation links to and from the Central Area. The Plan provisions therefore employ measures to permit the maintenance, management and development of motorways. The Plan adopts a resource management approach (Clause 14.3.2) that provides for the motorway corridors while having regard to the maintenance and enhancement of the surrounding environment.

Objectives and policies for the Transport Corridor Precinct that are relevant to the HBTC Project include:

Objective 14.3.3.1

“To apply special provisions to ensure the sustainable management of the natural and physical resources committed to the existing motorway corridor”.

Policies 14.3.3.1

- a) *By recognising the importance of the motorways to the community and applying special precinct provisions to maintain and protect identified infrastructure.*

Objective 14.3.3.2

“To recognise and maintain the existing corridors as significant resources for transport and utility service conveyance in the Auckland area”.

Policies 14.3.3.2

- a) *By establishing acceptable levels of activity that are compatible with the surrounding environment.*

Objective 14.3.3.4

“To recognise that the existing Transport Corridor has a secondary role as an important ‘backdrop’ physical edge and containment of the Central Business District”.

Policy 14.3.3.4

- a) *“By encouraging the provision of landscaping within the corridor”.*

Assessment

The HBTC projects maintains and improves the existing motorway corridor to ensure its value as a significant resource for transport and utility service conveyance in the Auckland area. The existing motorway will continue to provide the important ‘backdrop’ physical edge and contain the Central Business District. Landscaping is proposed in the corridor where possible.

- (f) Public Open Space Precinct (Part 14.2)

The relevant objectives for the Public Open Space Precinct are listed below:

Objective 14.2.3.1

“To maintain, protect, and augment the open space public squares and parks of the Central Area and to maintain and protect where appropriate open spaces in the form of public streets”.

Policies 14.2.3.1

- a) *By conserving existing open space in the form of squares and parks and other public space to the maximum extent possible.*
- b) *By identifying a range of open spaces and maintaining their character and function.*
- c) *By using the provisions of the Plan as a positive means of conserving and protecting areas of scenic, ecological, heritage, scientific or natural importance including the historical street pattern.*

In order to maintain the open spaces and secure recreation opportunities within the Central Area, the Council has adopted a strategy of applying measures designed to protect, maintain and enhance the open space resource.

Assessment

The Central Area Plan splits public open space into three broad categories: Public Open Space 1 – 3. Public Open Space 1 applies to major parks, square and reserves for which concept plans are applied. Victoria Park is zoned Public Open Space 1. There will be a temporary loss of this park land as a result of the construction of the North Bound Tunnel, however, the park will be restored once the tunnel has been constructed, resulting in no net loss of the park.

10.6.2 Auckland City Operative District Plan 1999 – Isthmus Section

The District Plan was made operative in 1999, and its purpose is to set out the City's resource management strategy including the mechanisms to be used to control the effects of activities and development within the City. The following discussion of objectives and policies focuses initially on those parts of the Plan relating to transportation before considering other zones relevant to the HBTC Project.

10.6.2.1 Transportation (Part 12).

Part 12 of the District Plan recognises that the City's transportation system must cater for movements into and across the City and that due to traffic growth critical sections of the motorway to cater for higher levels of traffic is limited. Therefore an upgrade of these congested corridors is required to improve accessibility.

The existing motorway, and proposed HBTC route is shown in the District Plan as a Strategic Route. Strategic Routes are defined as routes, which *"form part of the network of strategic importance. They include the Southern, South-western, North-western and Northern Motorways"* (Section 12.6.2.2(A)(i)).

Transportation objectives and policies relevant to the HBTC Project include:

Objective 12.3.1 – Efficiency/ Environment

"To manage the use and development of the City's transportation resources in a way that promotes the protection and enhancement of the City's environment".

Objective 12.3.2 – Accessibility/ Safety

"To improve access, ease and safety of movement within the City, while ensuring that adequate provision is made for the various transport needs of the region".

Objective 12.6.1 - Roading

"To take full account of the impact of road traffic on the surrounding environment and to minimise adverse effects that may arise".

"To recognise the roading system as a significant urban resource".

Assessment

The HBTC project will improve access, ease and safety of movement within the City, while ensuring that adequate provision is made for the various transport needs of the region by

upgrading the existing strategic route and allowing for use of the motorway corridor for the Busway project for public transportation. A full assessment of the adverse effects of the proposal has been undertaken in Section 8 of this AEE and concludes that adverse effects can be minimised through various mitigation measures.

10.6.2.2 Special Purpose 3 Zone (Part 10 - Transport Corridor)

The majority of land included in the proposed designation has an underlying zoning of Special Purpose 3 zone (Transport Corridor). The Special Purpose 3 Zone is applied to strategic roads, which are a valuable transport resource. The purpose of the zone is to protect significant transportation corridors for continued use as transport modes. Permitted activities in the Special Purpose 3 zone include *“any facility designed primarily for the movement of people and/or goods”*. The expected outcome of the zone is *“the protection of the Isthmus’ significant transportation corridors for the continued use as transport modes and for alternative use as a conveyor of utility services”*.

Objectives and policies relevant to the HBTC Project include:

Objective 10.6.3.1

“To preserve the existing railway rights of way and certain strategic roads for the purpose of maintaining transport corridors throughout the isthmus”.

Policy 10.6.3.1

“By applying suitable zoning which allows an appropriate range of transportation functions and provides for network utility services”.

Assessment

The HBTC project maintains the existing transport corridor through the isthmus and has been designed primarily for the movement of people and/or goods. The corridor provides for other network utility services such as power and phone. Any connections disturbed by the proposal will be reconnected as necessary.

10.6.2.3 Open Space Zones (Part 9).

Part of the land affected by the proposed extension to the designation in St Mary’s Bay is zoned Open Space. Open Space 2 zones are intended for informal recreation with enhancement of the environment with native vegetation encouraged.

Objectives and policies relevant to the HBTC Project include:

Objective 9.6.2.1

“To protect appropriate areas of open space for the enhancement of the environment and the enjoyment of informal recreation”.

Assessment

The HBTC project meets these intentions and objective as the open space area will be maintained, with the majority of the area continuing to be available for informal and passive recreation. The area will be enhanced by proposed landscaping and the implementation of a noise wall which will reduce the current noise levels experienced in

this area. Where the pedestrian areas experience an enclosed effect from the proposed noise walls, it is possible to build up this area with fill so that pedestrian access will be in line with the height of the transparent wall and able to see through to the harbour/motorway area.

10.6.2.4 Heritage (Part 5C).

The District Plan recognises that Heritage resources are an essential part of the City's cultural values and that conservation of these resources enhance the identity and amenity of the City.

Objectives and policies relevant to the HBTC Project include:

Objective 5C.3.1

"To recognise and protect resources of natural, cultural and scientific heritage value"

Policy 5C.3.1

"By identifying, assessing and protecting important heritage buildings, objects and places including landscape, trees, landforms, historic places and waahi tapu by scheduling such features in the Plan".

Assessment

A number of heritage resources have been identified along the proposed HBTC route, Section 8 and the Technical Appendix #16: Heritage Assessment discusses these in detail. The Birdcage Hotel has been identified as the most important heritage resource, likely to be affected by the HBTC Project. The Heritage assessment suggests mitigation measures, such as the relocation of Birdcage, will protect the heritage resources without a significant loss of integrity. Other precautionary and mitigation measures are proposed for the other heritage features as discussed in Section 8 to ensure the heritage resources continue to be protected.

10.6.2.5 Coastal (Part 5(b))

The District Plan recognises the importance of coastal environment to the economy and lifestyle of people living in the Auckland isthmus area. The District Plan identifies objectives and policies for the management of what is in the area of the HBTC Project a highly modified though critically important natural environment in terms of Auckland's identity and urban amenity.

Objectives relevant to the HBTC project include:

Objective 5B.4.1

"To conserve, protect and enhance the natural and physical resources and preserve the natural character of the coastal environment for the benefit of the City and the nation".

Policies

- "By protecting critical elements such as significant landforms, scenic values, trees, bush and cultural heritage values".

Objective 5B.4.4

“To facilitate public access to and the enjoyment of the Coastal Management Area and the coastal marine area in locations and at a level which does not adversely affect the natural character of the coastal environment”.

Policies

- “By maintaining and enhancing public access to the foreshore except where restrictions are necessary because of safety, security, damage to vegetation and wildlife or conflict with traditional Maori sites, or other exceptional circumstances”
- “By providing for shoreline walkways and boardwalks where these do not conflict with environmental and cultural values or lead to the erosion of sensitive landforms”.

Objective 5B.4.5

“To recognise and provide for Maori values and principles with regard to matters affecting the coastal environment, including those of ecological or natural environmental concern and to recognise the historical and contemporary place of Maori in the coastal environment”.

Policies

- “By developing procedures which ensure that identification and protection of the characteristics of the coastal environment of special value to the tangata whenua are carried out in accordance with tikanga maori”.

Objective 5B.4.6

“To ensure that use, development and protection of the natural and physical resources of the Auckland Isthmus coastal environment are achieved in a fully integrated manner which preserves the natural character of the coastal environment”

Policies.

- “By recognising the integrated nature of the coastal environment and the need to adopt a precautionary or conservative approach to use and development in this area”.
- “By requiring use and development in the Coastal Management Area to have regard to the actual or potential effects of the proposed activity on the coastal environment and especially the coastal marine area”.
- “By ensuring use and development in the Coastal Management Area is not inconsistent with any New Zealand Coastal Policy Statement or Regional Policy Statement or Plan”.

Assessment

The HBTC project does not require any reclamation or the imposition of structures into the Coastal Marine Area. The existing coastal environment of the HBTC corridor is a highly modified environment with a number of existing manmade features such as the existing motorway, Westhaven Marina and residential dwellings in St Mary’s Bay. This means that the proposed works will not adversely affect an existing pristine and natural coastal environment. The project incorporates enhancements to access along the St Mary’s Bay coast and in particular Point Erin in the form of improved pedestrian linkages as discussed in Section 8 of this AEE.

The HBTC project is consistent with the provisions of the NZCPS and relevant regional plans as already discussed in previous sections.

10.6.3 Conclusions – Statutory

It is considered that the project is consistent with the statutory planning documents.

Confirmation of the designation will provide certainty to all parties affected by the proposed works, and will enable land acquisition and mitigation plans to be advanced.

A comprehensive assessment has been undertaken for the construction and operational phases of the project. The specialist assessments, which have been summarised in Section 10 of this AEE, have concluded that the adverse effects of the project on the environment can be avoided, remedied, or mitigated, and that the net effects will be no more than minor.

10.7 Other Relevant Non-Statutory Documents

10.7.1 Auckland Regional Growth Strategy

The Auckland Regional Growth Strategy: 2050 (RGS) was prepared under the Local Government Act 1974 by the Regional Growth Forum. The purpose of the RGS is to “*ensure growth is accommodated in a way that meets the best interests of the inhabitants of the Auckland Region*”. The strategy provides a vision for what Auckland could look like in 50 years time. This vision involves sustaining:

- Strong, supportive communities;
- A high-quality living environment;
- A region that is easy to get around; and
- Protection of the coast and surrounding natural environment.

Chapter 2 of the RGS is relevant to the HBTC Project. It outlines desired regional outcomes, priorities and principles. Among the desired and critical outcomes is Access and Transport Efficiency, which is defined as “more transport choices and high levels of access for all sections of the community, a closer relationship between home and work, activities, shopping, open space etc., managing traffic congestion and a better passenger transport system”.

Assessment

The proposed HBTC Project contributes to this outcome by improving this heavily congestion section of motorway and allowing better access between the North Shore and the Central City. These improvements also assist the North Shore Busway to meet its full potential and complement proposals for the Central Motorway Junction.

10.7.2 Auckland Regional Land Transport Strategy 2003

The Regional Land Transport Strategy 2003 (RLTS) was prepared in 1999 under the Land Transport Act 1998.

The RLTS was developed in parallel to the RGS (see previous section) with a further purpose to “ensure that the transport system contributes towards the Auckland region being a desirable place to live”. This purpose is expressed in the goal of the RLTS, which is

to achieve “a safe, efficient and environmentally sustainable transport system for the Auckland Region which meets the communities accessibility needs at reasonable cost”. To ensure that this goal is reached the Strategy sets in place objectives and policies. The overriding strategy and objectives and policies are met as follows:

- It is considered that the HBTC Project will achieve the objectives of the RLTS by improving access to the City from the North Shore and vice versa. This will benefit those who commute to and from the City for employment, and those who visit the City and the North Shore for the entertainment and recreation facilities they offer. The Project will also facilitate the North Shore Busway. The shoulder on the southbound lanes of the St Mary’s Bay section of the corridor will be used as a bus priority lane.
- By improving the HBTC corridor, the efficiency of this corridor, and the efficiency of the North Shore Busway and the Central Motorway Junction (when coupled with the CMJ works) are also improved.
- The effects of the construction, operation and maintenance of the HBTC Project and measures to mitigate adverse environmental effects are discussed in Section 8. It is considered that with the implementation of these measures the HBTC Project is consistent with these objectives and policies.

Overall it is considered that the HBTC Project does not conflict with any of the objectives and policies of the RLTS.

10.7.3 Draft Regional Land Transport Strategy 2005

Due to the enactment and provisions of the Land Transport Management Act 2003, a new Regional Transport Strategy is required by December 2005. This document focuses on transport strategy solely. The implementation of the strategy has been separated from this document and will be outlined in a document to be prepared by Auckland Regional Transport Authority. The Draft Regional Land Transport Strategy 2005 has been presented for consultation and revised to incorporate the findings of the consultation. It has been adopted by the Auckland Regional Council at the time of writing this AEE report. Due to the December 2005 deadline for this Strategy, it is likely that by the time the Notice of Requirement is publicly notified, this Strategy will have superseded the 2003 Strategy.

The objectives of the Draft RLTS 2005 are:

- Assist economic development
- Assist safety and personal security
- Improve access and mobility
- Ensure environmental sustainability
- Support the Auckland Regional Growth Strategy
- Achieving economic efficiency

The HBTC project is consistent with these objectives by improving and enhancing a motorway that is essential to the State Highway network, is a highly used commuter route and connects the north and south areas of the Auckland Region. These enhancements release capacity in the roading network to improve access and mobility for vehicle users

and public transport, assist economic development and supports the ARGS as discussed in the previous section.

10.7.4 Transit Planning Policy Manual

Under the Transit New Zealand Act 1989, the principal objective of Transit is to “*operate a safe and efficient State highway system*”. Transit’s “Planning Policy Manual” sets out Transit’s policies for:

- Avoiding, remedying, or mitigating adverse effects of the State highway system on the environment; and
- Protecting the State highway system from adverse effects of adjacent land uses.

The Manual describes how Transit will undertake its activities and functions relating to the State highway system under the relevant legislative provisions (Transit Act, RMA and Land Transport Act 1998). The manual represents Transit’s ideals in terms of planning and environmental management. However, Transit’s selection of methods and ability to implement these policies is dependent on the availability of adequate funding. Individual roading projects, including mitigation measures and other conditions emanating from the RMA, are assessed and based on the project evaluation criteria of Transfund New Zealand.

The HBTC Project will be designed and implemented in accordance with the Planning Policy Manual. Chapter 2 of the Manual outlines Transit’s environmental objectives and general policies relating to those objectives. The Manual then describes specific issues, policies and methods related to the effects on natural and physical resources and effects on people and amenity values. Section 8 of this AEE discusses in detail the environmental effects specific to the HBTC project, and proposes mitigation and monitoring measures.

10.7.5 Transit Environmental Plan

The Transit Environmental Plan responds to the Land Transport Management Act 2003 and the New Zealand Transport Strategy. The purpose of the Plan is to set a framework for managing the interface between the environment and the state highway system in a way that improves environmental sustainability and public health in New Zealand. Of particular relevance to the HBTC project are Sections 6.1 Noise and 6.2 Air Quality.

The HBTC project meets the objectives of Section 6.1 as traffic noise levels will be reduced by proposed mitigation measures and the noise from construction works will be controlled through a Construction Management Plan.

The objectives of Section 6.2 are also met as Technical Appendix #11 sets out the contribution of vehicle traffic to air quality from the HBTC project, and explains that the project will meet the relevant National Environmental Standards.

10.7.6 New Zealand National Land Transport Strategy March 2002

The National State Highway Strategy (NSHS) describes Transit’s, goals, objectives, policies and priorities for the State highway system. The Strategy focuses on the nature and form of the state highway system and how it can meet road user and community needs and expectations. The Strategy describes the functions of state highway as:

- Connecting major centres of population
- Providing access to:
 - Major ports and airports
 - Major industrial areas
 - Major primary production areas
 - Major tourist areas
- Serve major urban corridors.

Objectives in the NSHS relevant to the HBTC Project include:

2.2.2 Efficiency Objectives

- *“To provide access, generally via connections to local road networks, to major population centres, ports and airports, industrial centres, major primary production areas, and tourism areas of national importance*
- *To operate, maintain and improve the state highway system to minimise journey times and vehicle operating costs.*
- *To manage traffic demand, in particular, congestion in peak periods.*
- *To protect the long-term functional integrity of state highways and make provision for future highway improvements”.*

2.2.5 Environmental Objectives

- *“To seek to minimise the adverse effects of road use in planning state highway improvements.*
- *To avoid remedy or mitigate, as far as practicable, the adverse effects of highway maintenance, construction activities, and road use on the environment”.*

The NSHS includes policies and plans relating to

- Efficiency and safety improvements
- Traffic and Road Management
- Access and Highway Protection
- Road User Services
- Community Services
- Environmental Protection

It is considered that the proposed HBTC Project is consistent with the NSHS as it will improve access between the North Shore and Central City and reduce congestion and journey times. Any adverse effects arising from the project will be addressed by the mitigation measures detailed in Section 8 of this AEE.

10.7.7 Auckland State Highway Strategy

Transit’s current and long-term strategy for Auckland’s State Highway network is set out in the Auckland State Highway Strategy (ASHS). The ASHS document sets out Transit’s mission for the Auckland motorway network, which is:

“To provide, maintain and operate a safe and efficient motorway network serving national and regional traffic and providing access to major commercial and industrial areas, the port and airport”.

The ASHS has been developed by Transit in the context of the RLTS 2003. It endorses the need for a balanced approach to address the Region’s transport problems and sets out the overall vision for the development of state highways in greater Auckland and details proposals for specific corridors.

The ASHS identifies the HBTC Project area as a key priority and states that in order to defer the need for an additional Waitemata Harbour crossing Transit has adopted a policy of *“widening of the motorway around St Mary’s Bay and across Victoria Park Viaduct south to Wellington Street...”*. In addition the ASHS lists the St Mary’s Bay/Victoria Park Viaduct tidal flow scheme as a major project with an indicative construction timing of 2000-2004.

Due to changes in the motorway network and congestion patterns Transit concluded that the ‘Tidal Flow’ option would not be a viable long-term solution. However, it is considered that the proposed HBTC Project, which better meets Transits objectives and community expectations, is in accordance with the principles and intent of the ASHS.

10.7.8 Auckland City : Growth Management Strategy December 2003.

This strategy has been developed by Auckland City Council in order to fulfil its obligations in respect of implementing the ARGS concept and principles within the Auckland Isthmus. The key principles of Growth Management Strategy are:

- Grow the economy through wealth-creating business investment
- Manage change to quality urban living city form
- Protect the valued natural features and character of heritage areas
- Strengthen communities

The proposed HBTC Project will give effect to these principles by improving access between the North Shore and central City and improves the existing motorway system to assist in the efficiency of the North Shore Busway. These improvements strengthen communities by connecting the north and southern areas of the Auckland Region and contribute to the economy by ensuring important transport corridors are maintained.

10.7.9 Auckland City Cycling and Walking Strategy, 1998

The Transport Planning Group of Auckland City Council prepared the Cycle and Walking Strategy. The purpose of the Strategy is to, *“put in place a strategic direction for the future planning of both recreational and transportation cycling and walking in Auckland City”*.

The strategy has a vision, which corresponds with and builds towards the Auckland City Council vision of an ‘Outstanding City’, which is, ‘a place where it is easy to get around’. In order to do this it is proposed to ‘develop cycle/walkway routes across the city and encourage their use’.

The strategy has six objectives, with the following being the most relevant to the HBTC Project:

- To improve the safety of cycling and walking in Auckland City.

- To improve walking and cycling access to areas of employment, recreation, schools, shops, transit stops, and other public facilities.

Section 3 of the Strategy contains the Network Implementation Plan. This section details the proposed cycling and walking networks for Auckland City. The 'St Mary's Bay foreshore' is one of the strategic links proposed for the network. A shared facility (pedestrians and cyclists) is proposed on the south side of SH 1. Strategic links are defined as critical off-road links, which may be major citywide routes, which cross the city, or short distance routes, which provide vital access between areas. These routes will also service schools, rail and bus transit stations, shopping centres etc, along the way.

The proposal to erect a pedestrian overbridge across the St Mary's Bay section of motorway and to enhance existing and new pedestrian walkways, will achieve the key objectives identified in the Auckland City Cycling and Walking Strategy, 1998.

10.7.10 Auckland City Recreation Precincts Strategy, 1999

The Auckland City Recreation Precincts Strategy, 1999 was prepared for the Community Planning Group of Auckland City Council by Leisure Planning Division. The Parks and Recreation Committee approved it on 30 September 1999.

The recreation precincts strategy sets out goals, objectives and an implementation plan for developing recreation precincts. Recreation precincts are defined as, *"groupings of recreational facilities, which offer a wide variety of both casual and organised activities, for a diverse range of people within the community"*.

The strategy illustrates how recreation precincts relate to other Council planning initiatives such as the Liveable Communities Strategy. The strategy envisages that the development of recreation precincts will contribute to the perception of Auckland as a city, which is alive and exciting and in which people have a sense of belonging and identity.

The Strategy identifies a number of key sites outlining the principles for their selection. Section 4.0 and Section 7.0 of the strategy are relevant to the HBTC Project.

The goals in Section 4.0 outline Council's approach to providing and promoting recreation precincts in the city. The following are the goals most relevant to the HBTC Project:

"Goal 1 – Focal Point"

Council will develop recreation precincts as a recognised focal point for recreational activity".

"Goal 2 – Awareness"

Council will increase people's awareness of recreation precincts and market them so that people see them as places where there is always something happening, and as focal points for recreational activity".

Section 7.0 contains the Implementation Plan for the development of recreation precincts. Victoria Park is identified as one of the proposed recreation precinct to be included in the Recreation Precinct Network within the short term (up to 3 yrs). Victoria Park is identified as having a 'local focus'.

The HBTC project is consistent with this Strategy as the location of the proposed NBT will occur under the existing Victoria Park. Whilst a portion of the Park will be unavailable

during construction, this a temporary situation and the Park will be reconstructed to enable recreation uses to occur in this area. In consultation with ACC, the existing uses can be reinstated or new uses created to make best use of this part of Victoria Park. The majority of Victoria Park (to the east of the existing VPV) will not be affected by the proposed works and therefore continue to be used for organised and informal recreation and contribute to the recreational precincts.

10.7.11 Victoria Park Management Plan

The Victoria Park Management Plan has been prepared for Victoria Park and was adopted by Council in August 2005. The key vision identified in this Management Plan is “to protect and enhance the open space and unique qualities of Victoria Park while providing for a variety of recreational opportunities.”

The HBTC project is consistent with this key vision and associated objectives and intentions of the Management Plan as follows:

- The construction of the NBT is a temporary situation, once completed, the Park area utilised by the construction area will be returned back to Park land. This area can be used for either existing uses prior to construction or new uses as supported by the ACC.
- The existing London Plane trees within the Park are scheduled within the Central Area Plan. The HBTC project requires the removal of 3 of these trees in the Park area to the West of the VPV. It is proposed to mitigate the loss of these trees by replanting significant trees back into this area once the construction is complete. This replanting will be done in consultation with the ACC and to achieve the intentions of the Management Plan.
- The remainder of the Park (to the East of the VPV) will be retained and will be unaffected by the proposed works.

10.7.12 Auckland Urban Living Project - Auckland's CBD

The Auckland City Council has prepared a number of framework and strategy documents for Auckland's CBD in 2004. These documents includes, a framework, action plan and central area access strategy. The key vision for these documents is, “in the next 10 years Auckland's CBD will grow and consolidate its international reputation as one of the world's most vibrant and dynamic business and cultural centres.

The HBTC project assists in achieving the intentions of these documents by creating a more efficient transport corridor to access the CBD, releasing some of the pressure on local roads for local traffic instead of being used at commuter routes which in turn makes local roads safer and less congested, maintains and enhances existing and new pedestrian routes and links through the provision of new public access ways and creates a link to the Busway project for public transportation.

10.8 Relevant Planning Documents Conclusion

Section 10 is a comprehensive assessment of the HBTC project against the provisions of relevant planning documents. In summary, the project is consistent with all relevant planning documents, both statutory and non-statutory.

11 Proposed Conditions of Designations

Proposed conditions for the Notices of Requirement are listed in Section 11.1. Details of the Notices of requirement are provided in the document titled HBTC Project - Overview and Statutory Application Forms.

11.1 Proposed Notice of Requirement Conditions

1. General

- 1.1 Except as modified by the conditions below and subject to final design, the works shall be undertaken in general accordance with the information provided by Transit New Zealand at the hearing, the Notice of Requirement and supporting documents, as follows:
- (a) 'Harbour Bridge To City Project – Overview, Notices of Requirement and Attachments - Volume 1', prepared for Transit New Zealand Limited by Beca Infrastructure Ltd, dated October 2005;
 - (b) 'Harbour Bridge To City Project – Assessment of Environmental Effects – Volume 2', prepared for Transit New Zealand Limited by Beca Infrastructure Ltd, dated October 2005;
 - (c) 'Harbour Bridge To City Project – A3 Plans – Volume 4', prepared for Transit New Zealand Limited by Beca Infrastructure Ltd, dated October 2005;
- 1.2 As soon as practicable, following confirmation of the designation and completion of construction, the Requiring Authority shall give notice to Auckland City Council in accordance with Section 182 of the RMA for removal of those parts of the existing designations (those in existence prior to the lodgement of the new designation subject to condition 1.1 above) between the Auckland Harbour Bridge and Wellington Street overbridge:
- (a) A07 –01 'Motorway' and A07 – 01A 'Motorway': Shelly Beach Priority Lane in the Auckland City District Plan: Isthmus; and
 - (b) 283 'Motorway' in the Auckland City District Plan: Central Area;
- 1.3 As soon as practicable, following completion of construction, the Requiring Authority shall give notice to Auckland City Council in accordance with Section 182 of the RMA for removal of those parts of the designation which are not required for the long term operation and maintenance of the State highway.
- Note that Condition 1.4 is specific to land no longer required for construction purposes once the project is completed.
- 1.4 A liaison person shall be appointed by the Requiring Authority for the duration of the Harbour Bridge To City (HBTC) Project to be the main and readily accessible point of contact for persons affected by the designation and construction work. The liaison person's name and contact details shall be advised to affected parties by the Requiring Authority. This person must be reasonably available for on-going consultation on all matters of concern to affected persons.

- 1.5 Where requested by the owners, the Requiring Authority shall physically peg out the extent of the alignment on individually affected properties once the designation has been confirmed or all appeals have been determined, whichever is later.

2. Project Management Plans (PMP) and Outline Plans

- 2.1 The Requiring Authority shall prepare a PMP which shall include mitigation/ management plans as referred to in conditions 3-9 .
- 2.2 No works shall be undertaken in any particular location(s) until:
 - (a) The PMP, or such part(s) of the PMP as are relevant to the location(s) are submitted to and approved by the Auckland City Council; and
 - (b) Any outline plan(s) required by section 176A of the Resource Management Act 1991 (RMA) in relation to the works in the location(s), are submitted to Auckland City Council.
- 2.3 Where an outline plan or plans are required by section 176A of the RMA for works in any particular location(s) and Auckland City Council agrees that the PMP or relevant part(s) of the PMP contains adequate details to satisfy section 176 RMA, then the PMP or relevant part(s) of the PMP shall be deemed to be a waiver of the requirement for an outline plan in respect of the works in the particular location(s), as provided for in section 176(2)(c) RMA.
- 2.4 The works shall be undertaken in accordance with the submitted PMP and outline plan of works (where required).

3. Environmental

- 3.1 The PMP shall include an Environmental Management Plan. The purpose of the Environmental Management Plan is to address all adverse environmental effects.
- 3.2 The EMP shall also address the implementation of suitable arrangements for stormwater treatment and detention in accordance with ARC guidelines and/or consent requirements.

4. Construction

- 4.1 The PMP shall include a Construction Management Plan (CMP).
- 4.2 The CMP shall include specific details relating to the demolition, construction and management of all works associated with the HBTC Project, including:

General

- (a) Details of the site or project manager, including their contact details (phone, facsimile, postal address, email address);
- (b) The location of large notice boards that clearly identify the name, telephone number and address for service of the site or project manager;
- (c) Any means to ensure that no damage occurs to street trees throughout the construction period;
- (d) Any means of protection of services such as pipes and watermains within the road reserve;

- (e) Measures to be adopted to maintain the land in a tidy condition in terms of disposal/storage of rubbish, storage and unloading of building materials and similar construction activities;
- (f) Location of workers offices and conveniences (e.g. portaloos);
- (g) Procedures for controlling sediment runoff, dust and the removal of soil, debris and demolition and construction materials from public roads or places. Dust mitigation measures should include use of water sprays to control dust nuisance on dry or windy days;
- (h) Procedures for ensuring that residents in the immediate vicinity of construction areas are given prior notice of the commencement of construction activities and are informed about the expected duration of the works;
- (i) Means of ensuring the safety of the general public;

Noise

The CMP shall as far as practicable meet the requirements of the NZS6803:1999 Acoustics – Construction Noise, and shall address the following aspects

- (j) Construction sequence;
- (k) Machinery and equipment to be used;
- (l) Hours of operation, including times and days when noisy construction work would occur;
- (m) The design of noise mitigation measures such as temporary barriers or enclosures;
- (n) Construction noise limits for specific areas;
- (o) Development of alternative strategies where full compliance with NZS6803:1999 cannot be achieved, including consultation with residents and other occupiers to achieve acceptable outcomes;
- (p) Methods for monitoring and reporting on construction noise.

Traffic

- (q) methods of mitigating the local and network wide effects of both construction of individual elements of the HBTC Project, and the use of staging to allow sections of the Project to be opened to traffic while other sections are still under construction.
- (r) consultation with Auckland City Council with regard to the most appropriate means for providing access on Council roads within and adjacent to the designation.
- (s) identification of any existing on-site parking and manoeuvring areas which are affected by the works. Then, as far as practicable, and in consultation with Auckland City Council and the affected landowner, how the affected areas will be relocated or reinstated to achieve compliance with the District Plan or to a similar standard to that existing.
- (t) where necessary, provision of alternative access arrangements as far as practicable, and in consultation with the Auckland City Council and the affected

landowner, where the existing property access is to be removed or becomes unsafe as a result of the works.

- (u) details on the maintenance of pedestrian access and thoroughfare shall be maintained on all roads and footpaths adjacent to the construction works where practicable. Such access shall be safe and clearly identifiable. This shall include the Point Erin, St Mary's Bay and Victoria Park reserve areas.
- (v) Consistency with Transit New Zealand 'Code of Practice for Temporary Traffic Management' (COPTTM)

Vibration

- (w) The CMP shall as far as practicable meet the vibration standards of the German Standard DIN 4150, and shall address the following aspects:
 - Vibration monitoring measures.
 - Criteria
 - Possible mitigation measures
 - Complaint response
 - Reporting procedures
 - Notification and information for the community of the proposed works.
 - Vibration testing of equipment to confirm that the vibration limits will not be exceeded.
 - Location for vibration monitoring when construction activities are adjacent to critical buildings.
 - Operational times.
 - Preparation of dilapidation reports on critical dwellings prior to, during and after completion of works.
- 4.3 The CMP shall be implemented and maintained throughout the entire demolition and construction periods.
- 4.4 Any commercial earthmoving equipment or similar shall be stored or parked within the boundaries of this designation at all times and not on surrounding streets.
- 4.5 All storage of materials and equipment associated with the construction works shall take place within the boundaries of this designation.
- 4.6 Temporary protection shall be installed to prevent vehicles damaging drains, footpaths, berms, kerbs, vehicle crossings and the roads during the site preparation and construction phase of development. Any damage to the drains, footpaths, berms, kerbs, vehicle crossings and the road attributable to any vehicle associated with construction activities shall be repaired to the same or similar standard as existed prior to such damage at no cost to Auckland City Council.

Blasting

- 4.7 If any blasting is required during construction, it shall be so controlled as to ensure that any ground vibration as a result of any blasting will not adversely affect the

structural stability of any building or structure including electrical equipment (that is not connected with the site covered by this designation) or cause any reduction in its utility value. Peak particle velocities measured on any foundation or uppermost full storey of any building not related to the site, which do not exceed the limits set out in Table 1 of German Standard DIN 4150 Part 3:1986 'Structural Vibration in Buildings – Effect on Structures', will be deemed to meet these requirements. Peak particle velocity means the maximum particle velocity in any of the three mutually perpendicular direction. The units are millimetre per second (mm/s).

- 4.8 The noise created by the use of explosives for blasting shall not exceed a peak overall sound pressure of 128dB (i.e. peak over pressure of 0.05kPa) or alternatively the noise shall not exceed a peak sound level of 122dBC. The measurement shall be made in either case at 1m from the most exposed window or door of any occupied building (that is not subject to this designation).

5 Archaeological and Heritage

- 5.1 An archaeologist or some other person approved by the New Zealand Historic Places Trust shall be present to monitor initial earthworks for the HBTC Project.
- 5.2 Detailed protocols for the management of archaeological and waahi tapu discoveries shall be specifically discussed with tangata whenua prior to construction.
- 5.3 If any archaeological sites, including human remains are exposed during site works then the following procedures shall apply:
- (a) Immediately after it becomes apparent that an archaeological or traditional site has been exposed, all site works in the immediate vicinity shall cease;
 - (b) The Requiring Authority shall immediately secure the area so that any artefacts or remains are untouched;
 - (c) The Requiring Authority shall notify tangata whenua, the New Zealand Historic Places Trust, Auckland City Council within 24 hours that an archaeological site has been exposed so that appropriate action can be taken. Works shall not commence in the immediate vicinity of the archaeological site until any approval required from the NZ Historic Places Trust is obtained.
- 5.4 The Requiring Authority shall develop a methodology for the relocation of the Birdcage Hotel and shall include the following:
- (a) where practicable, take into account the recommendations of the Conservation Plan (undertaken by Matthews and Matthews Architects, dated January 2003), and in particular, the schedule of significant features; and
 - (b) consultation with the Manager Heritage Division Auckland City Council
- 5.5 All work concerned with the relocation and restoration of the Birdcage Hotel as approved in the above condition, shall be carried out under the direction of an appropriately qualified architectural conservation specialist.
- 5.6 Prior to the commencement of construction activities in the vicinity of the Campbell Free Kindergarten, a Dilapidation Report on the structure of the Kindergarten shall be

prepared by a suitably qualified building certifier. This report should make any necessary recommendations for reinforcing the Kindergarten to a suitable standard.

- 5.7 Prior to the completion of HBTC works the structure of the Campbell Free Kindergarten shall be reinforced as per the recommendations of the Dilapidation Report of the above condition. This reinforcement work shall be certified by a building certifier familiar with the Dilapidation Report of above condition.
- 5.8 During construction the effects of vibration on the Campbell Free Kindergarten and buildings shall be monitored and appropriate action shall be undertaken if effects are significant.

6. Protected Trees

- 6.1 This condition applies to trees within the designation area that would be subject to Tree Protection rules under the provisions underlying zoning of the District Plan ("Protected Trees").
- 6.2 Removal, trimming/pruning or works within the dripline of Protected Trees, shall be limited to those trees identified in the schedule of the AEE, as follows: [to list]
- 6.3 A suitably experienced, Council approved arborist ('nominated arborist') shall be employed by the consent holder, at the consent holder's expense, to monitor, supervise and direct all works within the drip line or in the vicinity of those protected trees to be retained, for the duration of the works.
- 6.4 Prior to any site works commencing, a pre-commencement site meeting shall be held so that the conditions of consent that pertain to the retained vegetation can be explained by the nominated arborist to all contractors or sub-contractors who will be working on site within the drip-line of, or adjacent to, any protected vegetation that is covered by the consent..
- 6.5 A copy of the Conditions of Consent pertaining to the protected trees shall be held on site at all times.
- 6.6 The following measures shall be taken in respect of the remaining Protected Trees within the designation area:
 - (a) Temporary protective fencing shall be erected around the Protected Trees to be retained prior to the commencement of construction activity and shall remain in place for the duration of the HBTC Project. The purpose of the temporary protective fencing is to provide an area around the retained trees that will facilitate their successful retention during the construction process. The parameters of the enclosure shall be as directed by the Requiring Authority's arborist.
 - (b) Except as provided for in 6.7 and 6.8, the area within the temporary protective fencing shall be considered a total exclusion zone. Transit and its agents shall not:
 - Enter into the delineated area without prior consultation and agreement from the Requiring Authority's arborist.
 - Alter the dimensions of the delineated area without prior consultation and agreement from the Requiring Authority's arborist.

- Store diesel, cement, building materials, site huts, spoil, equipment, or machinery within the delineated area.
 - Spill substances likely to be injurious to tree health within seepage distance of the delineated area
- (c) The temporary protective fencing shall be constructed from a solid face (i.e. plywood or corrugated iron) attached to a sturdy framework of freestanding scaffolding or posts. It must be constructed to a minimum height of 1.8m and must remain in place for the duration of the project.
- 6.7 The Requiring Authority's arborist shall undertake all necessary trimming and pruning works, including the pruning of tree roots uncovered during excavations. Exposed roots shall be covered and kept moist.
- 6.8 The Requiring Authority's arborist shall undertake a tree monitoring programme throughout the construction phase, including monitoring of:
- a) The condition repair and location of the temporary protective fencing;
 - b) Any excavation within the drip line of protected trees;
 - c) General tree health; and
 - d) Compliance with the conditions of consent by way of fortnightly inspections during the construction period. A copy of the monitoring results from each visit shall be sent to the Auckland City Environments' arborist, with one copy being retained on site by the Project Manager, while a further copy is to be retained by the nominated arborist
- 6.9 During the construction process the consent holder's nominated arborist may make recommendations on the installation of irrigation systems, mulch, or remedial pruning works, if they are required to improve tree health.

7. Landscaping Mitigation

- 7.1 The PMP shall include a Landscape Mitigation Plan (LMP) prepared by a suitably qualified landscape architect, and shall address the following matters:
- (a) Transit's "Guidelines for Highway Landscaping" (dated September 2002)
 - (b) consistency with Transit New Zealand's "Central Motorway Improvements: Urban Design Framework" (dated 6 September 2001), including appropriate design measures in respect of:
 - Landscape Planting
 - Open Space
- 7.2 The Landscape Mitigation Plan (LMP) shall provide for:
- (a) The integration of the permanent works into the surrounding landscape;
 - (b) Mitigation of effects on properties in the vicinity of the alignment;
 - (c) Integration, and continuation of significant elements of consistency with recently established planting themes in the CMJ Core area, established desirable coastal vegetation, and the vegetative character of Victoria Park;
 - (d) Retention or relocation of existing trees where practicable

- (e) Replacement planting or mitigation for loss of protected or scheduled trees
- 7.3 The Landscape Mitigation Plan (LMP) shall include the following:
- (a) **Concept Plan/Report** – this shall depict the overall landscape concept, the design intent, layout and mitigation proposals.
 - (b) **Landscape Design Details** – these shall include the following details:
 - Identification of vegetation to be retained
 - Proposed planting including – plant species, mixes, spacing/densities, sizes (at time of planting) and layout;
 - Planting programme – the staging of planting in relation to the construction programme
 - Detailed specifications relating to (but not limited to) the following:
 - vegetation protection (for desirable vegetation to be retained)
 - weed control and clearance
 - ground preparation (topsoiling and decompaction to ensure rapid plant establishment and ongoing vigour)
 - mulching
 - plant supply and planting
 - maintenance regime (requirements and programme)
 - performance standards
- 7.4 In areas where shrub mixes are used – densities shall ensure that low canopy coverage has been attained by the end of the contract maintenance period.
- 7.5 Prior to planting and throughout the ensuing maintenance period all weed species declared as plant pests in the Auckland region by the ARC (including Total Control/Containment Pests/Surveillance Pests & Research Organisms) shall be controlled and removed from the site
- 7.6 Where native plants are used - the composition shall reflect the natural plant associations of the area, and the mixes (where relevant) shall be of suitable richness and diversity to encourage self-sustainability once established. This will require the inclusion of appropriate successional species, including canopy tree species either in the initial planting mix or as enrichment planting
- 7.7 Where practicable, any planting utilising native plants shall use plants genetically sourced from the Ecological District.
- 7.8 Planting areas shall be mulched using suitable weed-free, granular organic mulch. The only exceptions to this shall be where the slopes are too steep to allow for its retention. In such cases a neutral or black coloured biodegradable or photodegradable geotextile shall be used.
- 7.9 Landscape mitigation proposals outside the designation (e.g. Victoria Park reserve, St Mary's Bay reserve, Westhaven Drive and Point Erin) shall be agreed with the appropriate landowner and subsequently implemented.

7.10 The LMP shall be prepared in consultation with Auckland City Council and iwi.

7.11 The landscaping shall be implemented in accordance with the LMP within the first planting season following the completion of the construction works providing climatic conditions are suitable, otherwise at the first practicable opportunity thereafter, and shall be maintained for the next 3 years thereafter.

Should the landscaping be implemented in stages (depending on construction phases), landscaping may be implemented after the first planting season of each stage.

8. Urban design

8.1 The PMP shall include an Urban Design Plan (UDP) prepared by a suitably qualified person, and shall address the following matters:

Transit New Zealand's "Central Motorway Improvements: Urban Design Framework" (dated 6 September 2001), including appropriate design measures in respect of:

- Treatment of noise attenuation barriers;
- Road safety barriers;
- Retaining walls;
- Pedestrian facilities.

8.2 Urban design measures shall be determined in consultation with iwi.

9. Operational Noise

9.1 The PMP shall include a Noise Management Plan (NMP) prepared by a suitably qualified acoustic expert for the purposes of avoiding, mitigating or remedying any adverse noise effects from the operation of the HBTC project following its construction.

9.2 The NMP shall include:

- (a) General measures (e.g. noise attenuation barriers), to achieve at a minimum, compliance with the Transit New Zealand 'Guidelines for the Management of Road Traffic Noise – State Highway Improvements' (December 1999);
- (b) Specific measures for existing dwellings, where these are necessary in addition to the general measures under (a) above to achieve at a minimum, compliance with the Transit New Zealand 'Guidelines for the Management of Road Traffic Noise – State Highway Improvements' (December 1999);

9.3 The NMP shall identify the existing dwellings for which specific measures are required in accordance with condition 9.2(b) above. Those dwellings shall be referred to as 'affected dwelling(s)'.

9.4 Not less than three months prior to the completion of construction of the HBTC Project, the Requiring Authority shall give written notice to the owner of each affected dwelling:

- (a) Advising the options available for mitigation treatment to the affected dwelling and the predicted benefits of implementation of such options in term of noise levels; and

- (b) Advising that the owner has six months within which to decide whether or not to accept mitigation treatment to the dwelling.
- (c) Once an agreement on mitigation is reached between the Requiring Authority and the owner, the mitigation shall be implemented in an accepted timeframe between the Requiring Authority and the owner

9.5 The Requiring Authority shall advise the Auckland City Council of:

- (a) All written notices served in accordance with condition 9.4;
- (b) Any responses received to those written notices;
- (c) Those affected dwellings in respect of which no response has been received.

9.6 Where specific measures are required for an affected dwelling, the Requiring Authority shall be deemed to have complied with condition 9.1 above where:

- (a) The Requiring Authority has completed noise mitigation treatment to an affected dwelling; or
- (b) The owner of the affected dwelling has refused to accept the Requiring Authority's offer to implement noise mitigation treatment to the dwelling prior to the expiry of six months after the practical completion of the HBTC Project; or
- (c) The owner of the affected dwelling cannot after reasonable enquiry be found prior to the expiry of six months after the completion of the State highway construction.

9.7 Subject to condition 9.6, all noise mitigation measures identified by the NMP shall be implemented prior to the completion of construction of the HBTC Project.

10. Operational Vibration

10.1 Vibration levels of the existing State Highway 1 operations shall be measured at nominated critical locations, and submitted to the Council, prior to the commencement of works. These baseline measurements will provide levels for current use and for comparison with future levels.

11. Lighting

11.1 Lighting shall be designed and screened to minimise the amount of lighting overspill and illumination of residential areas.

12. Air Emissions

12.1 A plan for post construction monitoring of air emissions from vehicles at the exit end of the tunnel shall be provided to the Council. The monitoring programmes shall include the following:

- (a) Engagement of an air emissions expert with specialist equipment to monitor air emissions at the above location.
- (b) Measurement of carbon monoxide, nitrogen dioxide, particular matter (PM10), and hydrocarbons in relation to air quality guidelines.
- (c) Details of the number and location of monitoring positions
- (d) A requirement for copies of all air emissions monitoring reports to be provided to the Council upon request.

The monitoring shall be carried out over a six month period within one year of the completion of the HBTC project. Monitoring shall be undertaken during the time of the year that is expected to give rise to the worse case meteorological conditions in terms of air quality.

Advice Notes

- (a) The Requiring Authority needs to obtain all other necessary consents and permits and comply with all relevant Council bylaws.
- (b) Under the Historic Places Act an Authority to Modify an Archaeological Site is required from the NZ Historic Places Trust before any work takes place on an archaeological site.
- (c) Some of the land is subject to existing designations. The provisions of Section 177 of the Resource Management Act 1991 apply accordingly.

12 Conclusions

The Notices of Requirement designating the land for 'Motorway' and alterations to existing designations are sought to allow Transit to operate a safe, efficient and responsive state highway between the southern approaches to the Harbour Bridge and Wellington Street.

The main objectives of the project and in particular the objective to, 'Improve the capacity, safety and efficiency of access by road between North Shore and Auckland and between Central Auckland and surrounding areas', would be achieved by the project.

The designation mechanism is the most appropriate means by which Transit could achieve its objectives. The effects on the environment can be addressed by the mitigation methods proposed. Consideration has been given to alternative sites, routes and methods and these are discussed in the AEE. The nature of the work means that it would be unreasonable or impractical for Transit to use any of the other alternatives considered.

The project is consistent with the relevant provisions of the Regional and District statutory and policy documentation. The adverse effects of the proposal are considered to be minor and mitigation methods are proposed to avoid, remedy or mitigate any adverse effects that have been identified.