▪ report

Vic Park Tunnel - Assessment of Environmental Effects

Auckland Regional Council Resource Consents

▪ report

Vic Park Tunnel - Assessment of Environmental Effects

Auckland Regional Council Resource Consents

Prepared for

Transit New Zealand

By

Beca Infrastructure Ltd

March 2006

Revision History

Revision Nº	Prepared By	Description	Date
A	Yolande Joe	First Draft	November 2005
B	Yolande Joe	Second Draft	February 2006
C	Yolande Joe	Final Draft with internal input for Reviewer and Approver	15 March 2006
D	Yolande Joe	Final Draft for Legal, Peer and Client Review	16 March 2006
E	Yolande Joe	Final Draft incorporating Review comments	21 March 2006
F	Yolande Joe	Final Draft for Client	28 March 2006
G	Yolande Joe	Final for submission to Council	31 March 2006

Document Acceptance

Action	Name	Signed	Date
Prepared by	Yolande Joe		
Reviewed by	Craig Hind		
Approved by	Bryce Julyan		
on behalf of	**Beca Infrastructure Ltd**		

Table of Contents

Appendices – Volume 2

Appendix A	Preliminary Geotechnical Appraisal Report
Appendix B	Hydrogeological and Engineering Issues Report
Appendix C	Preliminary Environmental Assessment
Appendix C1	Addendum to Preliminary Environmental Assessment
Appendix D	Initial Environmental Investigation
Appendix E	Assessment of Land Disturbing Activities
Appendix F	Assessment of Contamination
Appendix G	Stormwater Preliminary Design Report
Appendix H	Environmental Management Plan
Appendix I	Environmental Monitoring Guidelines

A3 Plans – Volume 3

Glossary

ACC	Auckland City Council
AEE	Assessment of Environmental Effects
AHB	Auckland Harbour Bridge
ARC	Auckland Regional Council
ARI	Average Recurrence Interval
ARP: C	Auckland Regional Plan: Coastal
ARP: SC	Auckland Regional Plan: Sediment Control
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
DCT	Design Construct Team
DoC	Department of Conservation
DRLTS	Draft Regional Land Transport Strategy 2005
EMG	Environmental Monitoring Guidelines
EMP	Environmental Management Plan
ESCP	Erosion and Sediment Control Plan
FBCS	Freemans Bay Catchment Study
GGP	Grafton Gully Project
HBTC	Harbour Bridge to City (previous name of this project)
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
NSF	Negative Skin Friction
NZHPT	New Zealand Historic Places Trust
PARP: ALW	Proposed Auckland Regional Plan: Air Land and Water

PEA	Preliminary Environmental Investigation
POAL	Ports of Auckland Limited
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
SW	Stormwater
TP10	Technical Publication 10 (Auckland Regional Council)
TP108	Technical Publication 108 (Auckland Regional Council)
Transit	Transit New Zealand
UDP	Urban Design Plan
VPR	Victoria Park Reserve
VPT	Vic Park Tunnel
VPV	Victoria Park Viaduct

1 Introduction

This report is submitted by Transit New Zealand (Transit) in support of its application for resource consents to undertake works associated with the Vic Park Tunnel (VPT) project. The purpose of the VPT project (or 'the project') is to realise the capacity of the Auckland Harbour Bridge, improve safety and efficiency of access by road between the North Shore and Auckland and between Central Auckland and surrounding areas and to facilitate the delivery of the intended transportation benefits of the adjacent Central Motorway Junction and the North Shore Busway Projects. The proposal and particularly aspects relating to this application are described in detail in Section 3 of this report.

The VPT project requires resource consents from the Auckland Regional Council for the following matters: the take, use and diversion of groundwater, discharge of contaminants (passive and for recharge), earthworks (sediment control) and the discharge and diversion of stormwater (including into the existing coastal discharge outlets). This is explained in detail in Section 2 of this report.

This Assessment of Environmental Effects (AEE) has been prepared in accordance with the requirements of Section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA, or the Act) and is intended to provide the information necessary for understanding the proposal and any effects it may have on the environment.

This AEE contains the following information:

- A description of the proposed activity;
- A description of the site and surrounding locality (existing environment);
- A description of the consultation undertaken and to be undertaken in the future;
- An assessment of the effects of the VPT project on the environment; and
- An analysis of the provisions of the RMA and the other relevant planning documents.

The following documents (including this AEE) have been prepared as supporting documentation:

- Vic Park Tunnel – Auckland Regional Council Resource Consents
  Application Forms and Assessment of Environmental Effects – Volume 1
- Vic Park Tunnel – Auckland Regional Council Resource Consents
  Appendices Volume 2

Appendix A	Preliminary Geotechnical Appraisal Report
Appendix B	Hydrogeological and Engineering Issues Report
Appendix C	Preliminary Environmental Assessment
Appendix C1	Addendum to Preliminary Environmental Assessment
Appendix D	Initial Environmental Investigation
Appendix E	Assessment of Land Disturbing Activities
Appendix F	Assessment of Contamination
Appendix G	Stormwater Preliminary Design Report

Appendix H	Environmental Management Plan
Appendix I	Environmental Monitoring Guidelines

- Vic Park Tunnel - Auckland Regional Council Resource Consents
  A3 Plans – Volume 3

1.1 The Vic Park Tunnel Project

1.1.1 Existing VPT Corridor

The VPT corridor extends from the southern side of the Auckland Harbour Bridge, through St Mary's Bay and across the Victoria Park Viaduct (VPV) to the Wellington Street overbridge. The corridor includes motorway 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. The plans in Volume 3 – A3 Plans show the existing corridor with the proposed changes.

The existing corridor comprises 4 lanes at grade in each direction through St Mary's Bay, with a southbound shoulder bus lane extending from the Shelly Beach Road off-ramp through to Fanshawe Street, and 2 lanes in each direction on the elevated VPV.

1.1.2 Objectives of the VPT Project

The VPT 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.

a. Primary Objectives

Transit's primary objectives for the VPT 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 (CMJ) and North Shore Busway Projects.

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

b. Primary Methods

Transit's primary methods for achieving the Project Objectives include:

- Providing additional lanes on the motorway through St Mary's Bay and through Victoria Park;
- Upgrading the motorway through St Mary's Bay and Victoria Park, including but not limited to:
  - Under-grounding 3 northbound lanes in Victoria Park;
  - Upgrading of safety barriers;

- Providing noise barriers;
- Landscaping and restorative planting; and
- Urban design.

- Designing and coordinating the works to integrate with the CMJ and Busway Projects.

1.1.3 Key Components of the VPT Project

The proposed VPT project involves:

- Construction of a new tunnel adjacent to the retained VPV to provide 3 lanes northbound.
- Retention of the VPV to provide 4 lanes southbound.
- Widening of the existing carriageway through St Mary's Bay to provide 5 lanes northbound; and 5 lanes southbound and a southbound shoulder bus lane.
- Extension of the Shelly Beach Road overbridge west end span to accommodate the widened carriageway.
- Modifications to the motorway connections within the project being:
    - The Shelly 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, pruning and works within driplines
    - Lighting
    - Noise walls
    - Safety barriers
    - Pedestrian linkages

A more detailed description of the proposed work is provided in Section 3 of this report.

1.2 Role of the Environmental Management Plan

A key component of the VPT project, specifically in respect to the resource consents the subject of this AEE, are the Environmental Management Plan (EMP) and Environmental Monitoring Guidelines (EMG). These are Appendices G and I respectively. For major projects such as the VPT project, such documents are common practice.

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

The purpose of the EMG is to identify the monitoring requirements and responsibilities relative to the construction phase of the project as identified within the EMP. The EMG is also aimed at monitoring compliance with the conditions of consent and checking outcomes in the receiving environment.

2 Reasons for the Application

The VPT project will require the following consents:

Table 2.1
Summary of Activities Requiring Resource Consents from Auckland Regional Council

Consent No.	Activity	Statutory Document	Activity Status
1	Take and use of groundwater (5-50m3/day) during construction Take and use of groundwater for purposes of groundwater diversion long term Diversion of groundwater during construction and long term	PARP: ALW Rule 6.5.33/34 PARP: ALW Rule 6.5.39 PARP: ALW Rule 6.5.69 Transitional Plan	Controlled/ Discretionary Restricted Discretionary Restricted Discretionary Innominate
2	Discharge of contaminants to groundwater and land and for discharges as a result of works on a contaminated site (passive only excluding recharging)	PARP: ALW Rule 5.5.46 Transitional Plan	Discretionary Innominate
3	Discharge of contaminants to groundwater and land for recharging groundwater	PARP: ALW Rule 5.5.46 Transitional Plan	Discretionary Innominate
4	Land disturbing activities (Earthworks) greater than 2500m2 (3.97ha)	ARP: SC Rule 5.4.3.1	Restricted Discretionary
5	Diversion and Discharge of stormwater from impervious areas (for Transit private stormwater network and Auckland City Council public stormwater network)	PARP: ALW Rule 5.5.4	Discretionary
6	Discharge of contaminants (additional stormwater discharge into existing discharge systems in the CMA)	ARP: C Rule 20.5.6 (refer to Rule 5.5.10 PARP: ALW)	Discretionary

NB. No resource consents are required from the Transitional Plan, apart from take and use of groundwater long term and discharge from contaminated sites, which are innominate activities and are therefore Discretionary Activities under the RMA.

Five Notices of Requirement designating land or altering the existing designation have been lodged with the Auckland City Council (ACC) relating to the VPT project.

An authority to the Historic Places Trust will be applied for, for the relocation of the Birdcage Hotel and the proposed tunnel/excavation works.

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

3 The Vic Park Tunnel Project

The 2.2 km long VPT corridor extends from the southern side of the Auckland Harbour Bridge, south along the existing Northern Motorway (SH1), through St Mary's Bay and across the VPV to the Wellington Street overbridge in Auckland City. Included in the corridor are 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.

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

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

3.1 Proposed Corridor Improvements

3.1.1 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 currently carries four lanes of traffic. A southbound shoulder bus lane extends from the Shelly Beach Road 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 VPV until opposite HMNZS Ngapona where the two lanes join with the two northbound lanes to continue through 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 will 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 carriageway 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 about 1m over the length of the motorway boundary with Westhaven Drive to provide a consistent and integrated landscape and edge and shoulder barrier.

Modifications to the existing Shelly Beach Road 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 treatment and pipe works, new concrete safety barriers, new concrete edge and median retaining walls, new motorway lighting and noise walls.

3.1.2 Victoria Park to Wellington Street Overbridge Section

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 Street overbridge.

a. Victoria Park Viaduct

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 do not meet current standards and alkali silica reactivity (ASR) damage is present in some sections of the bridge superstructure.

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 at each end of the VPV to tie into the new alignment. 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 the "cut and cover" method up to 12m below the existing ground level.

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 existing location of the HMNZS Ngapona car park. The designation is proposed to be widened here (into the Church property) to accommodate the realigned Fanshawe Street on-ramp

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 VPT 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 CMJ project. The project is due for completion in 2007. The Wellington Street on-ramp is a single lane ramp that joins the northbound motorway just south of the Birdcage Hotel. The on-ramp and north bound lanes will be realigned to the West to match the alignment of the tunnel.

3.1.3 Interface between the VPT and the CMJ Projects

The interface between the CMJ and VPT projects is in the area between the 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.

3.2 Detailed Description of the Proposed Corridor Improvements

The following is a detailed description of the various corridor improvements that form the VPT project. The description starts with those parts of the project at the AHB end of the corridor and works southwards. This description should be read in conjunction with the suite of plans provided in A3 Plans - Volume 3.

3.2.1 Shelly Beach Road Overbridge

The Shelly Beach Road 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. Drawing S901 – A3 Plans shows the proposed bridge modifications.

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.

3.2.2 Westhaven Drive

Westhaven Drive forms the eastern boundary to the motorway through St Mary's Bay. The road is owned by Ports of Auckland Limited (POAL). ACC owns the Westhaven Marina and manages the use of Westhaven Drive. At present there is a narrow strip of Transit land, between approximately 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 VPT project, a concrete edge that will also be a retaining wall will be built on the property boundary where necessary. This wall will also incorporate the concrete edge protection barrier, light column foundations, gantry supports and a new fence. 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 ACC.

3.2.3 St Mary's Bay Reserve / Public Open Space

As part of the VPT 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 final design of this area will be carried out in discussion with ACC.

3.2.4 St Mary's Bay Pedestrian Bridge and Walkway

A pedestrian bridge is proposed to be constructed across the motorway near Jacob's Ladder. Where the pedestrian bridge falls on the Jacob's ladder side, it is proposed to link this to a proposed walkway along the western side of the motorway between Jacob's Ladder and Pt Erin. This is in response to ACC 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.

3.2.5 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.

Some minor modification of the intersection layout is required as part of the VPT project. These modifications include provision of a left turn lane from the off-ramp to Beaumont Street and are shown in Plan C203 – A3 Plans, Volume 3.

3.2.6 Northbound Tunnel

The northbound tunnel is approximately 460m long and will be constructed on the western side of the existing viaduct. The fully covered tunnel section extends from the current position of the Birdcage Hotel in the south through Victoria Park to a point within the existing Victory Christian Church car park. The southern approach to the tunnel is approximately 400m long and has a gradient of 6%. The northern exit is approximately 150m long and has a gradient of 4%. Both the southern approach and the northern exit are of open box section i.e. have no roof.

The tunnel construction method is an "undrained" or "tanked" tunnel. This type of tunnel has less impact on groundwater levels and reduces the potential for migration of contaminants. The method involves additional costs for tension piles, etc, which are required to prevent uplift caused by water pressure on the underside of the tunnel box.

a. 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.

b. Tunnel Systems

The following fire, light 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.
- Lighting that caters for the change in light conditions at the tunnel entry and exit areas.

c. 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 located on the north side of the AHB. 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.

3.2.7 Birdcage Relocation

The Birdcage Hotel is an historic two-storey building constructed in 1886. A main stormwater culvert passes under the building.

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.

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.

3.3 Motorway Features

3.3.1 Advanced Traffic Management System

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

3.3.2 Sign Gantries

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

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).

3.3.3 Lighting

New lighting will be provided throughout the VPT 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.

3.3.4 Safety Barriers

As part of the VPT project, safety barriers complying with Transit Standards will be provided along the edges and median of the motorway with the VPT project area.

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.

3.3.5 Noise Walls

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

Table 3.1 Proposed Noise Walls

Area	Noise Wall Details
St Mary's Bay Western Side	Up to 5m high transparent acrylic barrier. Approx length 1200m.
Napier Street	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 ACC and St Mary's Bay community.

3.4 Services

3.4.1 Stormwater

The main culvert draining the Freemans Bay catchment passes under the Birdcage Hotel and through Victoria Park before discharging at the southern end of Wynyard Wharf. The culvert varies in size from 2.1m x 1.9m elliptical culvert at the Birdcage Hotel to a 3.2m x 2.1m elliptical culvert through Victoria Park. The culvert is likely to have been constructed around 1900 when the area was reclaimed. As noted in the FBCS, this culvert is currently under capacity.

Where the culvert passes under the VPV, three existing pile caps span the culvert. These raised pile caps are visible under the VPV near the southern end of Victoria Park.

The existing culvert conflicts with the proposed tunnel alignment from Weld Street to just north of Victoria Street. A diversion of the culvert is proposed to allow tunnel construction and this will also make provision for a possible future southbound tunnel. Refer to drawing C605 (Appendix B) for details of the stormwater diversions.

A new 2.5m diameter stormwater pipe will be constructed from Weld Street and run parallel to and west of the new tunnel. The new pipe increases to 3.0m diameter where it crosses above the tunnel near the south end of Victoria Park and then runs on the east side of the VPV (increases to 3.5m diameter) until it joins back into the existing culvert mid way through the Park.

The existing main stormwater pipe (0.75m diameter) from the CMJ project is currently located in the median of the motorway between Wellington Street and the Cook Street off-ramp. It is proposed to divert this pipe to the east of the existing VPV from MH 105 1E (manhole in Weld Street). The pipe will then run down Union Street (0.9m to 1.2m diameter), across Victoria Street West and then parallel and to the east of the VPV (2.0m diameter) before connecting to the new main stormwater pipe in the middle of Victoria Park.

All new pipes will be designed in accordance with ACC and ARC design practice for the developed catchment.

Other relocation and diversion of stormwater pipes will be required within the road reserve in Beaumont Street, Fanshawe Street, Victoria Street, Franklin Road and Union Street and in Victoria Park as part of the works in the general vicinity of the existing VPV and proposed VPT. These stormwater works are relatively minor compared with the main stormwater diversions.

As part of the VPT project, all existing pipe networks affected by the works will be assessed for capacity and condition. The results of this assessment will be discussed with the asset owner (Metrowater) and any resulting upgrade or renewal of the system will be implemented on a cost sharing basis.

Detailed stormwater design is discussed and shown further in Appendix G - Stormwater Preliminary Design Report.

3.4.2 Stormwater Treatment

It is proposed to treat 29,600m^2 of impervious area out of the total of 75,200m^2 of carriageway in the VPT project area. This is the maximum area that can practicably be treated.

Treatment consists of shoulder type sand filter devices through sections of St Mary's Bay, two sand filter devices located in Victoria Park to treat run-off from the tunnel and parts of the VPV and a sand filter device located near Weld Street to treat run-off from the tunnel's southern approach.

More detailed discussion of the stormwater quality is provided in Section 7.4 of this report and in Appendix G – Stormwater Preliminary Design Report.

3.4.3 Wastewater

Watercare Service Limited's Orakei main sewer passes just north 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.

Issues raised during discussions with Watercare include the following:

- Relocation of the existing grit chamber in Weld Street is not desired.
- Operation and maintenance requirements must be considered.
- Any surcharge of the existing upstream sewer has potential to damage the pipe.
- Hydraulic performance of the diversion is critical.

The sewer is proposed to be diverted to the north (towards the Birdcage Hotel) and over the new tunnel. This will allow the grit chamber to remain in its present location. This option will require some minor changes to the vertical alignment of the southern part of the tunnel and tunnel approach to allow the sewer pipe to pass over the tunnel at the portal location.

3.4.4 Other Utilities

The motorway widening through St Mary's Bay and construction of the northbound tunnel will impact the TelstraClear 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 HMNZS Ngapona and Beaumont Street.

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

TelstraClear's communications network, Telecom's fibre optic cables, Watercare's North Shore No. 1 watermain (700mm diameter CLS pipe) and Vector's IP20 8 inch gas pipe are located in the St Mary's Bay reserve between the AHB and St Mary's Bay Road. Some of these services may require relocation in the vicinity of the relocated pier for the Shelly Beach Road overbridge.

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.

3.5 Construction Details

3.5.1 Sediment Control

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

During construction, mitigation measures 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/or mitigate the effects of the project in terms of sediment generation during construction. The proposed erosion and sediment control methodologies are defined in Appendix E (Assessment of Land Disturbing Activities).

The disturbed area for the tunnel excavation is contained within the tunnel alignment and runoff will drain within the excavation. Erosion and sediment control measures for the tunnel include standard 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.

Transit will be seeking ARC approval for a winter works programme as implemented on the Grafton Gully project. The winter works programme, whill include a high level of site management, will assist in countering any increase in the potential for off site effects as a result of winter works. This is discussed in detail in Appendix E – Assessment of Land Disturbing Activities.

3.5.2 Waste and Spoil Management and Minimisation

Throughout construction, waste and spoil management and minimisation will be an important part of the VPT project's environmental management. Contaminated land is likely to be encountered through parts of the VPT 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 EMP.

3.5.3 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.

3.5.4 Construction Sequence

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

a. St Mary's Bay Section

The construction sequence (refer drawing C501 – A3 Plans) will generally be as follows:

1. Widening the northbound left side shoulder by some 1 to 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 1 to 2m, including similar works to the northbound widening.
3. Reconstructing the central median area after the widening has been completed.

b. Vic Park Tunnel

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 the 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 to underside of pile wall capping beam. This may involve installation of a sheet pile wall or excavation of a batter slope to secure the works.
3. Trim piles as required and construct pile wall capping beam.
4. Construction of concrete tunnel roof.
5. Backfill and reinstatement of ground above tunnel roof.
6. Excavation of remainder of tunnel from within the tunnel.
7. Construction of concrete tunnel floor.
8. Installation of tunnel mechanical and electrical plant for drainage, lighting, ventilation, fire and safety.
9. Tunnel finishing including safety barriers, pavements, wall linings, etc.

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 one time to install these piles within an appropriate time period.

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.

3.5.5 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.

Construction of the tunnel under Beaumont Street and Victoria Street will require temporary road diversions to allow the tunnel to be constructed in stages.

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

Table 3.2 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.

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.

3.5.6 Construction Timeframe

The project will be delivered by the design-construct method (similar to the CMJ project).

During the process for confirmation of the designation and the granting of resource consents pursuant to the RMA, further design and investigation will proceed.

The VPT project is currently programmed for construction between 2009 and 2014. Construction could start earlier than this if funding becomes available.

It is expected that the relocation of the Birdcage Hotel and the main stormwater and sewer diversions will take approximately 12 months to complete. Only then can the tunnel construction commence. Tunnel construction is expected to take approximately 2 to 3 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 will take approximately 12 to 18 months to complete.

4 Existing Environment

The following sections provide a description of the existing environment in and adjacent to the VPT corridor. In summary, the surrounding land uses of the VPT project area are highly urban and varied. Where the VPT project area is adjacent to the coastal area, the coast has been highly modified with existing motorway, marina and residential development on the cliffs above. Through the proposed tunnel area, the ground is mostly reclamation and has been contaminated through historical uses, including industrial activities (e.g. gas works) and waste disposal.

4.1 Existing Land Use

4.1.1 St Mary's Bay

Within St Mary's Bay, the primary land use is residential.

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 HMNZS Ngapona. This open space land is under the ownership of either Transit or ACC, but is maintained by ACC. Part of this land is designated 'proposed reserve' by ACC (B07-29). This open space land is zoned Open Space 2 in the Isthmus Plan. The Open Space 2 zone is applied to land used for informal recreation.

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.

4.1.2 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 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 VPT 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).

4.1.3 Waitemata Harbour

The Waitemata Harbour is the gateway to the Hauraki Gulf and a significant percentage 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 VPT project area is classified in the ARP: C as a 'General Management Area'.

4.1.4 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 to the side of the VPT corridor hard against the road shoulder opposite the start of the northern approach embankment to VPV. The site is currently designated in the Isthmus 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.

4.1.5 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 and a condition of this resource consent restricted the seating capacity of the auditorium to 2400. 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 Plan. Approximately half of the site is used for carparking.

4.1.6 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 Plan.

4.1.7 Apartments and Supermarket

The block of land bounded by Victoria Street West, Franklin Road 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.

4.1.8 The Birdcage Hotel

The Birdcage Hotel is located on the western side of the VPT 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 1860s. 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.

4.1.9 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 Plan.

Victoria Park is zoned Public Open Space 1 in the Central Area 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 Plan, the others being Albert Park, Myers Park and the Symonds St Cemetery. The Central Area 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 Central Area Plan also states that the Park forms a distinctive "green belt" between the City and the northwestern suburbs.

4.2 Geotechnical and Groundwater

The existing geotechnical and groundwater conditions in the project area are described in Appendix A: Preliminary Geotechnical Assessment and Appendix B: Hydrogeological and Engineering Issues Report. A summary is provided below.

Details of ground conditions used in the preparation of Appendices A and B were derived from geotechnical investigations undertaken between May and July 2001 and groundwater investigations between September and October 2005, together with information sourced from ARC records and previous Beca investigations not associated with the VPT project. The locations of investigation points are provided on the Geotechnical Site Plan, (Figures 1-4, in Appendices A and B).

4.2.1 Site Features

The VPT corridor generally occupies low-lying (+3mMSL to +5mMSL) reclaimed land of the original Freemans Bay embayment and shore platform and St Mary's 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 VPT 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 Mary's Bay to Victory Christian Church (northern portion)
- Victory Christian Church/Victoria Park (centre)
- Victoria Park to Wellington Street (southern portion).

4.2.2 Site Geology

The geology of the study area is shown on the Geotechnical Site Plan, (Figures 1-4) and Long-Section, (Figure 5) in Appendices A and B. The extent of geologic units 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 VPT project alignment:

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

a. Fill

This type of material may be divided into the following subgroups:

- Construction Fill. Mixed clay to gravel sized materials, variably compacted and may include demolition debris.
- Hydraulic Fill. Forms the St Mary's 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 Mary's Bay foreshore.

Where identified, the stages of reclamation and construction of seawalls and fills are shown on the Geotechnical Site Plan (Figures 1-4) included Appendices A and B.

b. Tauranga Group Sediments

This type of material may be divided into the following subgroups:

- '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.

c. Waitemata Group (East Coast Bays Formation, ECBF)

ECBF forms the bedrock unit throughout the VPT study area, outcropping along the old cliff line, foreshore and in cuts throughout the area. It 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°.

4.2.3 Soil Profile

a. St Mary's Bay

The northern portion of the VPT 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.

b. Victoria Park

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.

c. Victoria Park to Wellington Street

The southern portion of the VPT 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.

4.2.4 Ground Water Level

The VPT 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. Recorded groundwater levels indicate a general north-northeasterly gradient falling to approximate sea level near the coast.

In the St Mary's Bay foreshore area, groundwater is generally encountered at about 2m to 2.5m depth.

In the Victoria Park area, groundwater is typically at about 1.5m depth. Localised groundwater levels to about 3m depth are observed within the Fill and Tauranga Group and suggest the presence of "drains" or preferred drainage pathways. These "drains" are broadly coincident with the probable locations of paleo channels within the Waitemata Group. Within the underlying Waitemata Group, groundwater levels are variable with respect to that of the Fill, the head differences being small, generally less than 1m. Consequently, flow direction is variable, some downward drainage occurring towards paleo channels whilst upward flow from the Waitemata Group is indicated where the Waitemata rocks are highly fractured and more permeable than elsewhere.

In the elevated areas at the southern end of the alignment, limited data indicates the piezometric head in the Waitemata Group rock is some 2m below a perched water table in the overlying embankment Fill. Elsewhere some upward flow from the Waitemata Group rock into the overlying Fill can be anticipated in the infilled valleys.

Tidal influences are observed locally in the Waitemata Group, the most significant at the southern side of Victoria Park. A very small influence is also observed in the Fill in the southern portion of Victoria Park. No marked influence is observed elsewhere.

4.3 Contaminated Land

The VPT corridor 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 was undertaken by Beca in 2001 (Preliminary Environmental Assessment (Volume 1 and 2) - Appendix C) and was updated in 2005 (Addendum to Preliminary Environmental Assessment - Appendix C1) to incorporate data made available since the previous study was compiled.

In order to identify potentially contaminated sites along the route, a review was undertaken of the information from ACC and ARC files and photographs pertaining to the area held by the Auckland Public Library.

4.3.1 Auckland City Council Records

ACC maintain a contaminated sites database that is summarised into hazard maps. The hazard maps for the VPT corridor identify several potentially contaminated sites. The identified sites are set out in Table 4.1 together with a summary comment from the ACC records.

Table 4.1 Summary of ACC Potentially Contaminated Sites Register

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 historic ACC aerial photographs.

4.3.2 Auckland Regional Council Records

A total of six contaminated sites were identified from ARC files for the VPT project area.

- 20 Beaumont Street;
- 95-99 Beaumont Street (Mobil Oil (NZ) Limited);
- 220 Victoria Street;

- Gaunt Street;
- Beaumont Quarter; and
- South Western Corner of Victoria Park

A summary of information obtained from ARC records is presented in the PEA (Appendix C, Volume 1) and the Addendum (Appendix C1). Three boreholes of relevance were identified in the ARC database of bore logs registered as part of resource consent applications.

4.3.3 Summary

The PEA indicated that contaminated material, including municipal and industrial waste, was likely to be encountered during project construction. The Addendum made no change to the previous overall assessment, but did uncover additional records relating to soil and groundwater contamination with the Beaumont Quarter, west of the project area, and records of soil contamination within Victoria Park, at locations adjacent to the VPT project corridor.

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

- St Mary's Bay (to Ngapona);
- Freemans Bay (Ngapona to Drake Street); and
- City (Drake Street to Wellington Street).

a. St Mary's Bay

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

b. Freemans Bay

A review of the available council 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.

c. City

The section of the VPT project between Drake Street and Wellington Street 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.

4.4 Coastal Environment

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

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.

The ARP:C 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.

4.5 Stormwater

4.5.1 Catchment Characteristics

The VPT project is located within the Freemans Bay / St Mary's Bay Catchment. This catchment is defined by Shelly Beach Road, Jervois Road, Ponsonby Road, Karangahape Road, Pitt Street, Hobson Street, and the shoreline. This catchment covers approximately 300ha and ranges from near sea level at its northern end to approximately 70m above mean sea level at its southern end (corner of Ponsonby and Karangahape Roads).

Encompassed in this catchment is the 'project area' that comprises the segment of motorway (and its surrounds) between the AHB and Wellington Street. This segment of motorway can be separated into three distinct stormwater regimes, being:

- The upper reach between Wellington Street and the VPV;
- The VPV; and
- The lower reach through St Mary's Bay between the VPV and the AHB.

Drawings C601 to C605 – A3 Plans, describe the existing stormwater network.

4.5.2 Existing Stormwater Systems

a. VPV to Wellington Street

Stormwater from the upper reach of the study area, between Wellington Street and the VPV, consists of surface runoff from the northbound and southbound motorway carriageways and the Cook Street off-ramp and Wellington Street on-ramp.

The CMJ project is currently under construction in this area and changes to stormwater drainage are being made as part of the CMJ project. Resource consent has been granted for this work. The consent was granted on the basis that no increase in peak flow rate would result from the CMJ project. This has been achieved by the construction of an attenuation device located north of Wellington Street overbridge.

The main stormwater pipe south of the Cook Street off-ramp is positioned in the median between the existing northbound and southbound carriageways. A new 0.6m diameter stormwater pipe has been installed north of the Wellington Street overbridge. This joins into the existing 0.75m diameter pipe about 300m south of the Cook Street off-ramp. The 0.75m diameter pipe continues in the motorway median until near the Cook Street off-ramp where it crosses to the west side of the motorway and then joins into the ACC 2.1m x 1.9m culvert in Weld Street. This culvert continues under the Birdcage Hotel and through Victoria Park and discharges near the south end of Wynyard wharf.

The existing culvert has capacity for only the 10 year ARI flow. Secondary flow ponds within Victoria Park and causes flooding in parts of the upstream catchment.

b. Victoria Park Viaduct

Stormwater from the VPV consists of surface runoff from the elevated concrete viaduct structure (approximately 7m above ground level over its central span). Catchpits collect stormwater at pier locations (approximately 15-25m centres), via a longitudinal channel along the shoulder of each carriageway, and discharge through 100mm diameter PVC pipes attached to the piers.

At each end of the VPV (north of Beaumont Street and south of Victoria Street) the discharge is into the street stormwater network. Through Victoria Park, stormwater is collected in sumps beneath the piers after which it is discharged into the ACC 3.2m x 2.1m culvert through Victoria Park.

c. St Mary's Bay

Through St Mary's Bay, surface runoff is from various impervious pavement areas and pervious grass areas. Catchpits collect stormwater and drain to 13 separate Transit discharge culverts via a series of concrete or grass channels and pipes. Culverts pass beneath Westhaven Drive and Marina car parking areas, in places collecting additional stormwater runoff from these areas, and discharge directly into the Coastal Marine Area (CMA) at Westhaven.

The majority of ACC stormwater, collected in the St Mary's Bay sub-catchment, discharges via a 1.2m diameter culvert, beneath the motorway, and into the Westhaven Marina opposite the end of St Mary's Bay Road.

4.5.3 Flood Hazard Mapping and Stormwater Remedial Works

The Freemans Bay Catchment Study (FBCS) (City Design, 1999) assesses flooding in the Freemans Bay/St Mary's Bay catchment and outlines possible stormwater remedial works. It includes the section of motorway corridor south of Beaumont Street.

Some extracts from the FBCS of relevance to the VPT project are as follows:

Victoria Park

Temporary ponding of stormwater in the flat, low lying area of Victoria Park is predicted to occur as a result of overland flow arriving from Victoria Street West. This ponding reaches a maximum depth of approximately 0.2 and 0.6m respectively during the 10 year and 100year ARI events. No significant overflow from the Park is predicted to occur as a result of this overland flow.

Beaumont Street between Victoria and Fanshawe Street

An overland flow of 5m³/s occurs down Beaumont Street during the 100 year ARI event. This flow reaches a maximum flood depth of approximately 0.3 m above the gutter invert.

Vicinity of Scotland, Franklin and Victoria Streets

Overland flows are predicted to pond on Victoria Street at the Franklin Road intersection during both the 10 year and 100 year ARI events. This ponding is predicted to rise to a depth of approximately 0.3 metres before spilling into Victoria Park.

The FBCS recommends various remedial works. These include the construction of a new 1.65m diameter overflow pipe from Victoria Street to Westhaven Marina or a new 2.5m diameter pipe parallel to the existing culvert.

4.6 Other Services

A range of existing utility services are located through the VPT project area. These have been discussed in detail in Section 3.4

5 Options Considered

5.1 Drained v Undrained Tunnel Options

The preferred tunnel construction method is an "undrained" or "tanked" tunnel. This type of tunnel has less potential long term impact on groundwater levels and limits the area affected by migration of contaminants. The method involves additional costs for tension piles which are required to prevent uplift caused by water pressure on the underside of the tunnel box. Construction of the undrained tunnel may require implementation of a temporary groundwater recharge system and low permeability barriers to limit short term groundwater drawdown.

The alternative option is a "drained" tunnel which allows inflow at the tunnel floor. A permanent groundwater recharge system would be required to mitigate against groundwater drawdown and the associated potential impacts of ground settlement and saline intrusion. A permanent groundwater collection and treatment system together with back-up pumping systems to prevent flooding of the tunnel would be required. Long term early warning monitoring systems would also be required to enable rapid intervention against potential impacts due to changes in groundwater levels.

Resource consents are being applied for on the basis of an undrained tunnel.

5.2 Sediment Control Options

a. Surface Earthworks

The opportunities for sediment control associated with the surface earthworks are limited by physical constraints (the motorway corridor through St Mary's Bay is generally narrow and flat). For surface earthworks associated with the VPT project, the following major sediment treatment devices were considered:

i. Sediment Ponds

Sediment ponds tend to be longer-term devices, and therefore are used in situations where runoff can be easily conveyed to them for treatment. The VPT Project is linear and narrow in layout, and therefore it would be generally difficult to convey sediment-laden runoff to such devices.

ii. Decanting Earth Bunds

These devices are more suitable for the VPT project, as they are recommended for catchments of less than 0.3 hectares and suit the narrow width of the project area. Decanting earth bunds provide a similar level of treatment to sediment ponds, and would be able to be located close to each area of earthworks.

iii. Silt Fences

Silt fences can be used for small areas of earthworks where site slopes are not significant. They are not considered suitable for large areas of earthworks such as the entire VPT project, but are appropriate for some smaller parts of the VPT project.

Therefore the proposed methodology for erosion and sediment controls are; the use of decanting earth bunds throughout the VPT project area, supplemented by silt fences and erosion controls.

5.3 Stormwater Treatment Options

5.3.1 Options Considered

The opportunity for stormwater treatment through St Mary's Bay is limited by physical and operational constraints. The motorway corridor is narrow and flat and therefore the opportunity to provide treatment devices is physically restricted in terms of space, availability and gradient. The following options have been considered for stormwater treatment.

a. Swales

For swale type devices the carriageway width is generally too great and the area available for a swale drain insufficient. The super elevation of the carriageway also restricts the position where a swale drain could be effectively located.

b. Sand Filters

Sand filter treatment devices are not appropriate as there is generally insufficient gradient between the collection location and the outlet location for the system to operate. For example the existing pipe outlets are all at about low tide level so a normal treatment device would be flooded at high tide.

c. Shoulder Sand Filters

Shoulder sand filter treatment devices have been trialled successfully on the CMJ project. These are shallow and narrow sand filters that are positioned in the motorway shoulder. These could be used in some areas through St Mary's Bay. These devices require lane closures for access during maintenance and are therefore only used when no other method is available. It is preferable that these devices are located on the nearside (lefthand) shoulder to avoid closure of the "fast" lane during maintenance.

5.3.2 Proposed Option

It is proposed that shoulder sand filters will treat 12,000m^2 out of a total pavement area of 40,700m^2 in St Mary's Bay. This is the maximum area that can be practicably treated and will require approximately 10 x 10m long, shoulder type sand filter devices.

The areas to be treated have been selected where there is adequate shoulder width and the devices can be located in the nearside shoulder.

5.4 Wastewater Diversion Options

5.4.1 Options Considered

The following options have been considered for the diversion of the Orakei Main Sewer.

a. Inverted Siphon

This involves the construction of an inverted siphon under the new tunnel on the same horizontal alignment as the existing sewer. Watercare has indicated during consultation that it does not prefer this option because of operation and maintenance difficulties.

b. Southern Diversion

A diversion of the sewer to the south and under the new tunnel alignment is likely to require tunnelling of part of the diversion and require the relocation of the grit chamber. This option is also not preferred following consultation with Watercare.

5.4.2 Proposed Option – Northern Diversion

The proposed option is the diversion of the sewer to the north (towards the Birdcage Hotel) and over the new tunnel. This will allow the grit chamber to remain in its present location. This option will require some minor changes to the vertical alignment of the southern part of the tunnel and tunnel approach to allow the sewer pipe to pass over the tunnel at the portal location. Watercare has indicated an initial preference for this option. Details of this option have to be worked through in consultation with Watercare.

6 Consultation

6.1 Introduction

The purpose of this section is to provide a summary of the feedback received so far from consultation undertaken for the VPT project. For consultation purposes, the VPT 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).

It is noted that consultation to date has not raised any significant issues related to this resource consent application.

6.1.1 Pre-VPT Project Consultation

Consultation was undertaken on options for capacity improvements for the section of State Highway 1, between Wellington Street and the AHB as part of a number of previous studies between 1995 and 1999:

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

6.1.2 Identification of Stakeholders and the Community

Consultation has been divided into 2 broad areas:

1. Stakeholder consultation – those with a direct interest:

- Directly affected landowners
- Key Stakeholders
- Iwi

2. Community consultation – those with an interest greater than the general public:

- Interested groups - anyone who had a known or likely interest in projects of the nature and scale of VPT.
- Wider community - residential, business interests and other activities located along the project corridor.

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

The purpose of the first phase of consultation on the VPT project, undertaken between February 2002 and July 2002, was to inform key stakeholders and the wider community about the project.

6.2.1 Stakeholder Consultation

There were 3 methods employed to undertake stakeholder consultation: the HBTC Motorway Project Briefing Document (April 2002), presentations and meetings and follow-up meetings.

Most of the stakeholders had a good understanding of the VPT project's objectives and likely impacts on their individual interests and there was general acceptance that the project was needed.

It was clearly communicated that impacts arising from the project affecting stakeholder interests or operations needed to be mitigated appropriately and there was a widely expressed view that the selected option needs to protect and enhance the environmental and amenity values of the area.

6.2.2 Community Consultation

There were 3 methods employed to undertake community consultation: newsletter, open days and a public meeting.

Of 219 feedback responses received from the community, there was a majority support of 70% for an underground solution. The highest support (32%) was for a 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.

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

The purpose of the second phase of consultation on the VPT project, undertaken between October 2002 and April 2003, was to provide information from continuing technical investigations and environmental assessment of both above and below-ground options, undertaken after July 2002 and to undertake more detailed discussions regarding mitigation opportunities.

Stakeholder consultation methods included meetings and presentations. Community consultation methods included newsletter and public display at the Birdcage Hotel.

Outcomes from Phase 2 consultation were mixed. There was still a strong preference by Stakeholders and the Community for an underground option. This stage of consultation had a strong focus on the mitigation of the project's effects (particularly noise and visual). Certain themes emerged, including:

- A widely accepted view that the project was needed and 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 was the only fundable option at the 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 was a need to protect and enhance the environmental and amenity values of the area.

- 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 project.

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

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 ACC, ARC and North Shore City Council was the main form of stakeholder consultation. Stakeholder Consultation Methods included letters, meetings and presentations.

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 Transit's above ground preferred option and ACC's and the community's preferred option of below ground.

The general conclusion that can be drawn is that neither Transit nor the Stakeholders could at the time find a solution to the issue of funding a below ground option.

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 Stakeholder and Community consultation results, and the ACC, ARC and North Shore City Council preference for an underground solution through Victoria Park.

6.5 Phase 4 Consultation – Vic Park Tunnel (September 2005 – present)

The purpose of the fourth phase of consultation on the VPT project, beginning in September 2005 and ongoing, is to inform stakeholders and the community of Transit's decision to build a northbound tunnel as its preferred option for the project.

It was also to provide information from continuing technical investigations and environmental assessments for the northbound tunnel and St Mary's Bay motorway improvements and to seek responses from Stakeholders and the Community regarding mitigation measures for Transit's preferred option.

Consultation has been undertaken and is continuing, including with the following groups and organisations.

Directly Affected Land Owners
Auckland City Council
Ports of Auckland Ltd
Victory Christian Church
The Production Village

Freemans Bay and St Mary's Bay Properties
Beaumont Quarter
New World Supermarket
Beaumont Apartments
Franklin Mews
Seychelles Body Corporate
Victoria Park Markets
Victoria Park Users
Harbour St Properties
Beaumont St/Western Reclamation Properties
Innovus Ltd
Viaduct Harbour Holdings Ltd
Trans Tasman Properties Ltd
Melview Developments
Westhaven Marina
Iwi
Ngati Paoa Whanau Trust
Ngati Whatua O Orakei Maori Trust Board
Ngai Tai Ki Tamaki Tribal Trust
Other Stakeholders
Navy
Auckland Regional Council
North Shore City Council
Historic Places Trust
Residents' Groups
St Mary's Bay Association
Western Bays Community Board
Freemans Bay School
Utility Companies
Telecom
Vector
Vodafone
Metrowater
Watercare
Citylink
TelstraClear

6.5.1 Stakeholder Consultation

Stakeholder consultation methods include meetings and newsletters.

The consultation process is well progressed at the time of submission of this application. Detailed discussions have occurred with directly affected landowners and Iwi to decide appropriate mitigation options. All stakeholders and the wider community have been informed and have been provided the opportunity to comment on the project. Meetings have occurred.

6.5.2 Community Consultation

Community consultation methods include a press release, an enquiry email and phoneline, newsletter and public open days.

Overall the response to the VPT project has been positive. No complaints or registrations of opposition have been received via the phoneline and email that was advertised in the 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 acceptance within the community of the project with a comparatively low turnout of 54 people in Phase 4 compared to estimated 355 people in attendance at the earlier open days, plus the approximately 80 attendees at the public meeting, held during Phase 1 consultation.

6.6 Overall Conclusions

Throughout consultation thus far the parties that were consulted have generally accepted that the VPT 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 an underground option is proposed the consultation feedback has been supportive and generally positive.

There are various tiers of stakeholder/community input in 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 Transit's 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 proposed 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 VPT project.

7 Assessment of Environmental Effects

7.1 Geotechnical and Groundwater

A preliminary geotechnical assessment and a hydrogeological and engineering assessment of the project route documented in Appendix A (Preliminary Geotechnical Appraisal) and Appendix B (Hydrogeological and Engineering Issues Report) has been undertaken.

The main geotechnical and groundwater issues that will affect the design and construction of the VPT project are summarised in the following sections:

7.1.1 Construction Effects

For the tunnel excavation period of 6 months, dewatering of the excavation will be required before permanent sealing of the floor occurs. Dewatering of the excavation ***without*** mitigation measures is predicted to result in drawdown of up to 3m near the tunnel, reducing to about 0.5m at 100m distance from the tunnel with measurable levels extending up to 200m from the tunnel. Associated potential impacts of such drawdown without mitigation would include:

- Settlements of 50mm-70mm near the tunnel where compressible soil thicknesses are a maximum, reducing to 10mm–30mm along Victoria and Beaumont Streets, and in the south of the Western Reclamation. Settlement would impact 39 lots as well as pavements and services around the tunnel and exit ramp.
- Limited saline intrusion in the area near the northern tunnel portal.
- Migration of contaminants into the tunnel drainage system and mixing of aquifer waters around the base of the tunnel.

With recharge mitigation measures (see Section 7.1.2) in place during excavation, existing groundwater levels will be generally maintained, although limited local drawdown very close to the tunnel may occur. Consequently, drawdown related settlements and saline intrusion would not be expected. Migration of contaminants consistent with the existing environmental response to the north-northeasterly groundwater gradient across the area will continue to occur, albeit with modified flow paths. Predicted modification of groundwater flow around the tunnel indicates flow paths associated with the Fill, and hence contaminated groundwater, passing over the tunnel and not below the tunnel floor. Modified flow paths passing below the tunnel are associated with the Tauranga and Waitemata Groups and are predicted to influence a zone to about 2-3m below the tunnel cut-off wall.

For the tunnel and exit ramp with cut-off walls extending 6m below excavation level, groundwater inflows at the tunnel floor during the 6 month construction excavation period of the order of 5 to 50 m^3/day are predicted. Collection, treatment and appropriate disposal of the contaminated groundwater inflow will be required (See Section 7.2).

Immediate ground settlements up to 50mm extending out to about 30m distance from the tunnel are estimated due to excavation. Settlement would result in full mobilisation of negative skin friction (NSF) on embedded elements including the tunnel walls and existing piles such as the VPV. However, it is also likely that many existing piled structures are subject to NSF effects at present due to ongoing normal consolidation of Fill and Tauranga Group sediments.

7.1.2 Construction Mitigation

a. Groundwater

The following actions are considered appropriate to mitigate potential adverse groundwater effects associated with construction:

- 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.
- Tunnel / tunnel ramp walls to be extended as cut-off walls below the tunnel floor to reduce groundwater inflow at the tunnel base during construction.
- Recharge wells could be constructed to reduce potential groundwater drawdown in the short-term construction condition.
- A low permeability (bentonite or similar) barrier in the Tauranga Group and upper Waitemata Group materials could also be constructed near to the tunnel / tunnel ramps to reduce the lateral extent of drawdown during construction.
- Recharge trenches to collect and disperse surface water to improve infiltration could be constructed during construction.
- Collection and treatment of groundwater in accordance with Section 7.2 Contaminated Land.

b. Ground Movement

- Investigations with sub-surface probing, geophysical profiling and laboratory testing together with numerical analysis to establish 'best estimate' of ground conditions and ground response.

i. 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.

7.1.3 Long Term Effects

a. Embankments

Settlements are anticipated where the existing carriageway embankments will be widened along St Mary's Bay.

b. Foundations and Slopes

Impacts associated with new shallow and piled foundations will be limited to localised settlements.

Modification to the stability of existing slopes above the motorway and the existing reclamation along St Mary's Bay, as well as the existing fill slopes above Freemans Bay Primary School may occur due to indirect effects such as changes in the water table. Potential for instability associated with the excavation of new slopes will also occur.

Mitigation approaches encompassed within normal engineering design will address these effects.

c. Wellington Street to Victoria Park Approach Ramp

The proposed structure along this section comprises anchored and cantilevered bored pile walls with drained shotcrete panels between piles. Immediate ground settlements <50mm due to excavation will be expected. Groundwater inflow and drawdown effects are assessed to be limited.

d. Undrained Cut and Cover Tunnel and Northern Exit Ramp

In the long term, the interception of the existing north-northeasterly groundwater gradient by the tunnel will occur. Without mitigation, damming (elevation) of groundwater upstream and lowering of groundwater downstream of the tunnel is predicted. Upstream damming may result in:

- Flooding of tree root systems and basement structures;
- Buoyancy effects such as upward movement of services that were designed for a lower water level;
- Migration of contaminants towards the ground surface; and
- Concentration of contaminants where the groundwater is "dammed" by the tunnel.

Without mitigation, downstream drawdown of up to 1 m (immediately down gradient of the tunnel) is predicted and could result in settlements of up to 100mm to 140 mm (dependent on pre-consolidation and secondary consolidation) through the zones of thickest Fill / Tauranga Group.

Proposed mitigation measures (Section 7.1.4) will directly address groundwater flow at covered tunnel sections, however in tunnel ramp (open box) areas interception of the groundwater table still occurs and near surface water will travel parallel to the tunnel and cross it where flow over the roof becomes possible.

With mitigation, long term modification of groundwater flow are indicated to be split around the tunnel. Flow paths associated with the Fill, and therefore contaminated groundwater (Section 7.2 Contaminated Land), pass over the tunnel whilst flow paths associated with the Tauranga and Waitemata Groups pass below the tunnel floor.

Limited long term groundwater inflow ('leakage') through wall construction joints will occur and will require ongoing collection, treatment and disposal (Section 7.2 Contaminated Land Section).

7.1.4 Long Term Mitigation

The following actions are considered appropriate to mitigate potential long term adverse groundwater effects:

a. Groundwater

- For the long term condition, passive groundwater bypass systems both over and under the tunnel cross-section would be incorporated within the tunnel / retention system to prevent damming (elevation) of groundwater upstream and drawdown downstream of the tunnel.
- Leakage associated with the long term undrained condition in accordance with Section 7.2 Contaminated Land.

b. Ground Movement

i. 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.

ii. Embankments

- Periodic overlays of pavement could be used to accommodate small long-term residual settlements.
- 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.
- Use of lightweight fill.

7.1.5 Construction and Long Term Monitoring

a. Groundwater

Monitoring will be required to measure groundwater effects and the effectiveness of mitigation measures, particularly during construction. 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 has already been undertaken.
- 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, as well as post-construction to monitor residual / on-going responses.
- Settlement monitoring in accordance with Section 7.1.5
- Contaminant monitoring in accordance with Section 7.2 Contaminated Land.
- Various trigger levels (e.g. advisory, alert, alarm) with appropriate remedial action plans.

b. 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 the ground surface and structures around tunnel / tunnel ramp excavations, embankments and slopes.
- Settlement plates installed from the 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.
- Various trigger levels (e.g. advisory, alert, alarm) with appropriate remedial action plans.

7.1.6 Geotechnical and Groundwater Conclusion

Based on the discussions above, it is considered that the adverse effects related to geotechnical and groundwater matters both during construction and in the long term can be managed and mitigated such that these will be no more than minor.

7.2 Contaminated Land

7.2.1 Introduction

The VPT project passes through an area of extensive reclamation, which includes areas of known contamination. A Preliminary Environmental Assessment (PEA) of the project (refer to Appendix C) was undertaken to identify the risk of soil and groundwater contamination along the VPT corridor. The results of that assessment are summarised in Section 4.3 of this report.

The PEA (and the 2005 Addendum) recommended that Transit implement a staged programme of soil and groundwater testing. The investigations were aimed at enabling the potential risks associated with any contamination, if found to be present, to be assessed so that appropriate management mechanisms could be identified and implemented (refer to Section 6 of Appendix C1, and Section 4.7 of the EMP; Appendix H).

Stage One of the initial testing was completed in 2002 and a further programme of testing was carried out in October 2005. The 2002 investigation included drilling and testing 18 boreholes along the project corridor varying between 6-18 metres in depth below ground level. The 2005 investigation included six additional boreholes, five of which were positioned within the proposed project route and one approximately 200 metres west, where records of significant contamination had previously been found. The latter investigation was aimed mostly at the assessment of groundwater issues arising from the inclusion of the VPT.

The analytical results of the soil and groundwater testing were compared against an adopted set of criteria: 'background criteria', 'environmental criteria' and 'statutory criteria'. The basis for these criteria is documented in the report titled "Vic Park Tunnel - Assessment of Contamination, March 2006" (refer to Appendix F).

Soil and groundwater samples were tested for a suite of parameters including heavy metals, total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs) and semivolatile and volatile organic compounds (SVOCs and VOCs respectively). The results of both investigations, as well as the detailed methodology, are provided in the abovementioned contamination report (Appendix F). Materials beyond the extent of the project works area, and those not disturbed by works activities, are not part of the scope of this project.

7.2.2 Investigation Results

As a consequence of the investigations to date, the VPT project area has been classified into "risk zones" (low, medium and high). St Mary's Bay is assessed as low (not 'no') risk of being contaminated, Freeman's Bay as high risk and City section as moderate risk. The extent of these zones is detailed in Appendix F – Assessment of Contamination report. The results are overviewed below.

a. Soil

Most of the boreholes tested along the project route (18 in total) were found to contain contaminants in the soil exceeding the adopted background criteria. Most of the contamination is expected to be associated with the fill through the Victoria Park area. The fill through the Park varies, but was generally found to be 1 – 5m deep. Whilst the materials underlying the fill were not tested, it has been assumed that these should be largely able to be classified as cleanfill. Further 'verification' testing during construction is proposed to check upon this assumption (refer to the EMP).

b. Groundwater

Groundwater was tested at ten borehole locations along the project route. Over half of the analysed samples were found to be contaminated with some heavy metals exceeding both the adopted receiving environment criteria and statutory criteria.

7.2.3 Contaminated Soils

a. Construction Effects

Due to the presence of contaminants in the soils, a range of construction related effects are possible. These include the discharge of sediment bound contaminants from eroded materials (contaminated groundwater discharges are discussed separately below), dust, and potentially odour. Mitigation for these effects is summarised below.

Excavated contaminated materials will be disposed of off site to an appropriate and consented disposal facility (likely a landfill). If required by landfill disposal criteria, materials may need to be pre-treated (e.g. through stabilising techniques) to enable landfill disposal; however the results obtained to date do not suggest that this is required. Cleanfill is to be imported on to the site for the tunnel cover and backfill.

b. Construction Mitigation

As fill exists over much of the VPT route and as no investigation is ever thorough enough to completely rule out the presence of hazardous materials, it has been recommended that Transit include general contingency measures in the EMP (provided as Appendix H). 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 also requires construction controls to be implemented to enable contaminated materials and associated adverse effects to be appropriately managed. The EMP sets out the following general requirements:

- As the material is excavated from the site, 'verification' testing will be conducted to confirm the results of the initial testing.
- Once excavated, material may not be suitable for reuse on the site if it contains contaminants at concentrations above acceptable guideline values. Contaminated soil will be removed from the site and disposed of at a controlled landfill.
- Any soil encountered with contaminants present at hazardous levels may require pre-treatment (e.g. stabilising) prior to removal to a consented landfill.

- Where practicable stockpiles of contaminated materials is to be kept to a minimum (if stockpiles are necessary, the EMP contains mechanisms for their use).
- Only cleanfill or, if firstly approved by the ARC (and any additional necessary consents are obtained) marginally contaminated material may be reused on the site.

Further detailed requirements are provided within the EMP. The EMP also includes general requirements for managing effects such as dust and odour such that adverse effects are expected to be no more than minor and can be appropriately avoided, remedied, or mitigated. With respect to erosion and sediment control, the following should be noted and the EMP referred to for more details on the means through which potential effects will be avoided, remedied, or mitigated:

- Surface runoff is expected to be limited to initial stripping;
- Specific measures for surface works are to be in general accordance with ARC Technical Publication 90 (TP90);
- During the main tunnel excavations, runoff and groundwater entering the excavations will be collected and pre-treated prior to discharge to either the sewer, or, if approval can be obtained from the ARC, used to recharge groundwater (contaminated groundwater discharges are discussed separately below).

c. Long Term Effects

Due to the overall cut to fill balance, and the proposed earthworks methodology for the tunnel, materials excavated from the tunnel works area will be removed off site (rather than set aside for reuse). As a consequence of the presence of contaminants, fill materials will be disposed of off site to an appropriate and consented disposal facility (likely a landfill). Cleanfill is to be imported on to the site for the tunnel cover and backfill. Therefore there will be an overall net improvement on the site, and in particular within an area of the surface sediments through Victoria Park. Where areas of cleanfill can be identified (refer to the verification testing requirements within the EMP), this will be separated out to reduce the unnecessary disposal of these materials to landfill.

d. Long Term Mitigation

No further mitigation is proposed or considered to be required in relation to contaminated soils due to the overall net improvement that the excavation of the tunnel materials will have. Groundwater related effects are discussed in the following section.

7.2.4 Contaminated Groundwater

The following section is based on the material contained in the documents in Appendix A (Preliminary Geotechnical Appraisal Report), B (Hydrogeological and Engineering Issues Report) and F (Assessment of Contamination). This section assesses effects based upon the undrained tunnel, and as such assumes this design choice as the key tool adopted to mitigate adverse effects upon the environment.

a. Construction Effects

Construction related impacts associated with the possible drawdown of groundwater are discussed within Section 7.1. As a consequence of the proposed approach to mitigate drawdown, collateral effects such as saline intrusion or contaminant mobility are not expected, or at worst have been assessed as being localised and restricted to the construction phase of the project. As part of the recharge process, some flushing of contaminants is however possible.

b. Construction Mitigation

As noted above, the groundwater within the project area already exhibits contamination, and therefore the aim of the works will be to neutralise any effects as far as practicable so that any adverse effects are not exacerbated. Water from construction dewatering is to be collected and treated prior to disposal to either the sewer, or, if approval can be obtained from the ARC, used to recharge groundwater. As a consequence of the recharge process, some flushing of contaminants is possible. However this is expected to be offset by the use of either potable water or treated groundwater (should approval for reuse of the water be obtained). Groundwater monitoring has been proposed during construction to enable additional mitigation measures to be identified (should these be required).

c. Long Term Effects

As a consequence of the tunnel itself, a change in the groundwater flow patterns could result, which could in turn give rise to the 'mixing' of the unconfined aquifer waters. The upward groundwater migration from the deeper part of the aquifer within the Waitemata rock into the shallower groundwater environment is expected to contribute to this localised mixing, which will probably occur around the base of the tunnel. Due to the natural upward movement of the groundwater, it is unlikely that the contaminants found in the shallower groundwater environment will be mobile enough to migrate downwards, against the natural groundwater circulation.

Groundwater flows are also likely to be split around the tunnel, passing over and below the tunnel. Flow paths associated with the contaminated Fill (and the associated groundwater) are expected to pass over the tunnel and not below the tunnel floor. Some effects upon the groundwater are expected beneath the tunnel, but these are expected to be relatively localised (refer to the *Vic Tunnel Project - Hydrological and Engineering Assessments* report. Beca, March 2006).

d. Long Term Mitigation

Flow splitting is collateral to the overall mitigation strategy and should give rise to localised effects only. No contaminant migration to underlying groundwater systems is thought likely due to the regional groundwater regime. Consequently no additional or specific mitigation (beyond that proposed already to manage drawdown; refer Section 7.1) is proposed. Long term monitoring is required however to enable outcomes to be assessed against the assessed level of effects (refer to the EMP).

7.2.5 Contamination Summary

The issues associated with contamination likely to be encountered during the course of the project are summarised in the following points:

- The VPT project runs through a highly modified environment. Previous investigations[1] have identified that there is a high likelihood of soil and groundwater contamination being encountered along at least part of the route.
- As the material is excavated from site during the construction of the tunnel, testing will be conducted to check disposal requirements ('verification' testing). Excavated materials will not be suitable for reuse on the site if they contain contaminants above acceptable guideline values and will be disposed of to a controlled landfill. 'Clean' materials may be either reused or used as cleanfill off site. Section 4.7.2 in the EMP details the categorisation of the sediments.
- Groundwater inflows to the site are expected at the excavation face and from the excavation floor. The groundwater is to be collected and conveyed to a treatment system prior to discharge to sewer, or if approved, groundwater recharge (refer Section 4.8 of the EMP).
- To offset construction impacts, groundwater recharge is proposed using either potable water or treated groundwater abstracted from the tunnel works.
- Some flushing of contaminants during recharge is possible but would be offset by use of clean or treated water.
- Preliminary hydrogeological modelling[2] has indicated that drawdown during construction and post-construction will be a factor and has the potential to pose adverse effects on receptors in the vicinity of the works (refer Section 4.9 of the EMP).
- To offset long-term impacts the design of the tunnel is to incorporate mitigation measures to mitigate drawdown and related effects.
- Long-term drawdown is expected to be adequately mitigated to avoid saline intrusion and gross changes to contaminant mobility.
- Groundwater flows are likely to be split around the tunnel, passing over and below the tunnel.
- Flow paths associated with the contaminated Fill (and hence contaminated groundwater) should pass over the tunnel and not below the tunnel floor.
- Flow paths passing below the tunnel are likely to be associated with the Tauranga and Waitemata Groups and are predicted to influence a zone to about 2m-3m depth below the tunnel cut-off walls.
- Flow splitting is collateral to the overall mitigation strategy and should give rise to localised effects only.

Based on the discussions above, it is considered that the adverse effects related to contamination matters can be avoided, remedied, or mitigated so that they will be no more than minor.

---

[1] *Preliminary Environmental Assessment*, Technical Report 7 (Beca, February 2001); *Preliminary Environmental Assessment (Addendum), Technical* Report 7A (Beca, October 2005).
[2] *Vic park Tunnel Project – Hydrogeological and Engineering Assessments Report* (Beca, March 2006).

7.3 Earthworks

7.3.1 Estimated Sediment Yield

Runoff from any works in the project area discharges via the stormwater network to the Waitemata Harbour. Three aspects relating to erosion and sediment control have been evaluated (in Appendix E), 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.

Appendix E assumes that the earthworks for the project will be staged over a 36 month period, including works over the winter period. It is proposed that the Design Construct Team (DCT) will undertake winter works in accordance with the winter works protocols developed during the Grafton Gully Project (as detailed in Section 8.2 of Appendix E).

a. 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.

b. Results

Table 5.3 in Appendix E sets out the results of the yield calculations for the project. Overall, the quantum of the sediment yield expected from the works is relatively minor (8.36 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.

7.3.2 Estimated Sediment Yield vs Existing Catchment Discharges

a. 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 earthworks.

By comparison, stormwater from this area of carriageway alone is estimated to discharge 1 tonne of sediment per hectare per year[3], 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/yr, 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 12 - 18 month period of construction. The increase in discharge of 0.5 tonnes represents an increase over the background sediment loading of approximately 9%. The quantum of the discharge is considered to be minor in the context of discharges to the Harbour.

b. 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 7.9 tonnes of sediment might be discharged from this section of the proposed works.

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), or 214 tonnes over the construction period. Over the construction period for works in this area (24 months), a discharge of 7.9 tonnes represents an increase of 3% over background.

7.3.3 Construction and Long Term Effects

The following text describing the effect of sediment discharge on receiving environments in Auckland has been sourced from ARC Technical Publication No. 90 (TP90):

"*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."

[3] Reference: Auckland Regional Council Draft Update of TP10 (Stormwater Treatment Devices: Design Guideline Manual, 1992).

Means to avoid, remedy or mitigate sediment related effects have been addressed in generic terms in the EMP and monitoring requirements are outlined in the EMG. More detailed information is outlined in Appendix E: Assessment of Land Disturbing Activities, March 2006.

7.3.4 Dewatering for Earthworks

During excavation of material from beneath the tunnel roof, it is expected that groundwater and stormwater may enter this work area. Dewatering will therefore be required to allow earthworks to continue. The DCT will treat this water via an appropriate sediment control system prior to discharge to the approved receiving environment (recharge to ground, or discharge to sewer). The DCT will provide an appropriate methodology that addresses these aspects.

7.3.5 Construction Mitigation

As set out in Appendix E, 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 Appendix E. 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 DCT will use this information as the basis for an ESCP to be submitted to ARC for approval. All erosion and sediment control measures shall be constructed in accordance with TP90 as a minimum.

7.3.6 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 DCT, in accordance with the EMG (refer to Appendix I) 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.

7.3.7 Earthworks Conclusion

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 erosion and sediment control measures are such that the adverse effects can be mitigated and will be no more than minor.

7.4 Stormwater

The VPT project proposes to deliver a practical, cost-effective design that provides appropriate collection and, where practicable, treatment of stormwater given the site constraints.. The existing stormwater network is to be retained and enhanced where practicable.

The overall approach to the management of the long-term stormwater quality and quantity aspects of the project has been identified within the Stormwater Preliminary Design Report and the EMP (refer to Section 5.16 of Appendix G). The preliminary drainage and stormwater treatment design for the project is outlined in Section 3 of this AEE.

7.4.1 Additional Impervious Area

The additional impervious area from the VPT project is approximately 11,500 m^2 as summarised in Table 7.1.

Table 7.1 Impervious Areas

Location	Impervious Area (m^2)		
	Existing	Additional	Total
St Mary's Bay	37,700	3,000	40,700
Fanshawe Street off-ramp	4,700	400	5,100
Fanshawe Street on-ramp	4,000	500	4,500
Tunnel northern exit	0	3,600	3,600
Tunnel southern approach	0	4,000	4,000
VPV	15,300	0	15,300
Southbound – VPV to Cook Street off-ramp	2,000	0	2,000
Total	**63,700**	**11,500**	**75,200**
*Tunnel – covered section**	*0*	***6,000***	***6,000***

* The standard stormwater treatments are designed for rainfall events, as there will be no rainfall within the tunnel, the tunnel has not been included for the purpose of this assessment. However, any surface water originating from the covered section of the tunnel will be treated.

7.4.2 Stormwater Treatment

Transit proposes that stormwater treatment devices (shoulder sand filters) will be provided to treat 29,600 impervious area as summarised in Table 7.2

Table 7.2 Proposed Treatment

Location	Proposed Areas (m^2)		
	Treated	Untreated	Total
St Mary's Bay	12,000	28,700	40,700
Fanshawe Street off-ramp	0	5,100	5,100
Fanshawe Street on-ramp	0	4,500	4,500
Tunnel northern exit	3,600	0	3,600
Tunnel southern approach	4,000	0	4,000
VPV	10,000	5,300	15,300
Southbound – VPV to Cook Street off-ramp	0	2,000	2,000
Total	**29,600**	**45,600**	**75,200**

a. St Mary's Bay

Through St Mary's Bay the project involves an average increase in the carriageway width of between 2m and 3m. The total additional impervious area is about 3,000m^2.

It is proposed that shoulder sand filters will treat 12,000m^2 out of a total pavement area of 40,700m^2 in St Mary's Bay. This is the maximum area that can practicably be treated and will require approximately ten x 10m long, shoulder type sand filter devices. The areas to be treated have been selected where there is adequate shoulder width and the devices can be located in the nearside shoulder.

b. Fanshawe Street On and Off-Ramps

No treatment is proposed for the on and off-ramps as there is insufficient space and gradient. The on-ramp is constrained by the concrete pile retaining wall on one side and the tunnel structure on the other and has minimum shoulder width. The off-ramp is constrained by Westhaven Drive and the VPV structure and also has minimum shoulder widths. The ramps are flat and so there is insufficient gradient to pipe stormwater to treatment devices remote from the motorway e.g. Victoria Park.

c. Victoria Park Viaduct

Victoria Park provides ample space for the provision of treatment devices. The most suitable type is a standard sand filter located under the existing VPV. This will have a minimal impact on the Park and will be able to treat the portion of the VPV through the Park (about 10,000m^2). One device is proposed for the northern end of the VPV (near Beaumont Street) and one device at the southern end (near Victoria Street). The northern device will be about 5m x 5m in area and the southern device about 10m x 5m and will also cater for stormwater from the tunnel (refer 4.5.3 of Appendix G – Stormwater Preliminary Design Report).

d. Fanshawe/Beaumont and Victoria/Franklin/Union Street Intersections

It may be possible for some runoff from the Fanshawe / Beaumont Street intersection and the Victoria / Franklin / Union Street intersection to be treated by the same sand filters described in 4.3.2 of Appendix G – Stormwater Preliminary Design Report. This would be very beneficial and will be dependent on the grades and pipe depths of the existing stormwater network in the vicinity of the intersections. If it is possible to convey runoff to the sand filter treatment devices without a significant replacement of the existing pipe network, then the devices will be increased in size for the new areas.

These areas have not been included in the treatment analysis but will be investigated further during detailed design and discussed with ACC.

e. Victoria Park Tunnel

Water entering the tunnel will come from five sources as described below. There will be two separate collection systems in the tunnel. One will cater for potentially contaminated groundwater and the other will collect all other runoff within the tunnel and parts of the tunnel approaches.

i. Groundwater

A small amount of groundwater inflow will occur and a groundwater collection and disposal system will be provided. A flow of 5m^3/day (0.06 l/s) has been assumed at this stage of the design. Groundwater will be collected in pipes at the base of the walls and piped to a sump in the tunnel floor. The system will be separate from the stormwater system.

Groundwater will be pumped to a wastewater sewer in the vicinity of Victoria Street.

ii. Stormwater Runoff

Any stormwater that enters the tunnel or those parts of the tunnel approaches that are too low to be drained by the normal pipe network, will drain to the piped stormwater system within the tunnel. This will drain to a pumping chamber located at the low point of the tunnel floor (near the Victoria Street end of the Park). Duty and standby pumps will be provided and the pumping system designed to prevent ponding on the tunnel carriageway. It is likely that the fire deluge system will provide the design flow for pump and chamber design.

The runoff will be pumped to a sand filter treatment device located within the designation near the Victoria Street end of the Park. This treatment device will also cater for runoff from the southern part of the VPV (see 4.3.2 of Appendix G – Stormwater Preliminary Design Report). The outlet from the sand filter will be to the new stormwater pipe through Victoria Park.

iii. Washdown Water

The tunnel walls will be washed periodically. This washdown water will be collected and treated the same as stormwater runoff described in (ii) above.

iv. Fire Deluge System

The tunnel will incorporate a fire fighting system. This will likely include a deluge system that operates in the case of a fire in the tunnel and dumps a large volume of water into a zone of the tunnel when a fire is detected. This water will drain to the piped stormwater system as for (ii) above.

v. Emergency Spills

The drainage system within the tunnel will have the ability to contain spills. This will be achieved by manually operated valves placed in the outlet of the sand filter that will close the outlet pipe and enable the capture, storage and removal of spilled substances.

f. Tunnel Northern Exit

The northern exit from the tunnel (open box section) occurs in St Mary's Bay (near Ngapona) and is about 150m long and has a gradient of about 4%. Because of the lowered road level, runoff from this area will not be able to be collected by the existing pipe network. Runoff will therefore be collected and treated as part of the tunnel stormwater system. The additional impervious area is 3,600m^2.

g. Tunnel Southern Approach

The southern approach to the tunnel (open box section) starts about 200m north of Wellington Street overbridge and extends for 400m to the southern portal at a gradient of about 6%. This area includes the realignment of the Wellington Street on-ramp. The additional impervious area is 4,000m^2.

The northbound carriageway is being lowered and moved to the west to suit the new tunnel vertical and horizontal alignment. Stormwater runoff from the upper part of this section will be collected by conventional catchpits and pipes, then conveyed by a new pipe system to the new stormwater pipe in Weld Street. A sand filter treatment device (approximately 5m x 5m) is proposed in the vicinity of Weld Street to treat this runoff.

When the tunnel approach road level is too low it will not be possible for stormwater to be graded to the pipe network. For this lower section, stormwater will be collected and treated as part of the tunnel stormwater system.

h. VPV to Cook Street

The southbound lanes south of the Cook Street off-ramp are being developed as part of the CMJ project and are not contained within the VPT project. The small area between VPV and the Cook Street off-ramp is part of the stormwater management of the VPT project.

The runoff from the northbound lanes south of the tunnel will be collected and treated as part of the tunnel southern approach stormwater system.

7.4.3 Contaminant Loading

Table 7.3 compares the contaminant loadings for the existing situation to those expected from the various proposed stormwater treatment options. The table also shows that a significant discharge yield of total suspended solids is generated from the existing situation, where no stormwater treatment is being undertaken. Appendix G Stormwater Preliminary Design Report contains more detailed information on contaminant loadings.

Table 7.3 Contaminant Loading

Scenario	Total Area (m^2)	Discharge Yield (kg/yr)			
		Total Suspended Solids	Copper	Zinc	Total Hydrocarbons
Yield (kg/ha/yr)		**700**	**0.09**	**0.45**	**80**
Existing	63,700	4,459	0.6	2.9	510
Treatment Options					
No treatment	75,200	5,264	0.7	3.4	602
Treatment of additional area only	75,200	4,660	0.6	3.0	533
Proposed treatment option	75,200	3,710	0.5	2.4	424
Treatment effectiveness		75%	75%	75%	75%

Table 7.3 shows that the option of treating only the additional impervious area of 11,500m^2 results in a small increase in total suspended solids, copper, zinc and total hydrocarbons compared to the existing situation.

The proposed treatment option (29,600m^2 treated area) shows that a significant improvement in stormwater quality can be achieved. Discharge yields of total suspended solids, copper, zinc and total hydrocarbons are all reduced by about 17% compared to the existing situation.

7.4.4 Stormwater Effects

It is recognised that urban stormwater impacts on aquatic environments through an increase in the volume of water that runs off impervious urban surfaces compared to absorbent vegetated land uses, combined with increased speed of runoff adding to peak flow rates. Urban stormwater can also be contaminated with a range of potentially harmful substances.

A significant proportion of contaminants are bound to particulate matter transported by stormwater. In piped or open systems, most of these suspended solids pass through the drainage network and reach the marine or groundwater receiving environment, where settlement takes place with incorporation of the contaminants into marine sediments.

Road transport zones, including motorways, are recognised as a major source of contaminants and in particular metals, such as 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. Higher rates of contaminant generation occur where vehicles accelerate, brake or are stationary e.g. intersections, ramps, hills and bends.

It is further noted that the impervious area that is proposed to be treated (29,600m^2) is greater than the additional impervious area that will be created by the project (11,500m^2). Positive effects will result when some existing untreated impervious areas will now be treated.

7.4.5 Stormwater Mitigation

To reduce the effect of discharging contaminants to aquatic environments, stormwater treatment measures as discussed in the previous section will be incorporated into the design of the upgraded drainage network. This treatment system will be designed in accordance with TP10. Treatment of stormwater discharges has not occurred in this area in the past, and the provision of any stormwater treatment will reduce the quantity of contaminants and increase the quality of discharge from this length of motorway.

Attenuation only needs to be provided for the area north of the Cook Street off-ramp. In this location there is no additional carriageway area in the southbound direction (VPV). For the northbound carriageway, runoff from the tunnel southern approach is collected and treated as part of the tunnel stormwater system. Attenuation for the small volume of additional flow will be provided in the pump chamber and treatment device associated with the tunnel.

Flooding issues have been considered as part of the drainage network. The new drainage system shall be designed to pass the 100yr ARI, without secondary flow onto the motorway, beyond the shoulders.

7.4.6 Stormwater Conclusion

The following summarises the stormwater matters:

- There is an increase in impervious area of approximately 11,500m^2.
- The proposal will treat 29,600m^2 of carriageway.
- All stormwater will be collected and discharged through existing points via existing or improved networks.
- The quality of stormwater that will discharge from the upgraded section of motorway will be higher than the existing discharge.

- Stormwater treatment measures will be incorporated into the design to treat runoff from all new (or equivalent) pavement areas in compliance with the requirements of TP10. In addition, wherever practicable, treatment measures are proposed to be retrofitted to treat runoff from existing pavement areas.
- The new drainage system shall be designed to pass the 100yr ARI, without secondary flow onto the motorway, beyond the shoulders.

Due to the methodology and mitigation proposed for stormwater matters, it is considered that the adverse effects of the project will be no more than minor.

7.5 Management Plans

There are a number of management plans, which have been or will be prepared at various stages of the VPT project. These include:

- Environmental Management Plan (EMP)
- Environmental Monitoring Guidelines (EMG)
- Contractors Environmental Management Plan (CEMP)
- Erosion and Sediment Control Plan (ESCP)

7.5.1 Environmental Management Plan

An EMP has been prepared for the project and is attached in Appendix H. The purpose of the EMP is to create a template for the working environment of the project, and to enable both Transit and 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. The EMP has adopted good environmental practices for the proposed activities and identifies the mechanisms to be utilised to avoid, remedy or mitigate potential adverse environmental effects.

7.5.2 Environmental Monitoring Guidelines

The EMG is attached in Appendix I 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 EMG is also aimed at monitoring compliance with the conditions of consent and checking outcomes in the receiving environment.

7.5.3 Contractors Environmental Management Plan

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 Transit.

7.5.4 Erosion and Sediment Control Plan

The basic principles to be employed for an ESCP, are 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 considered ahead of sediment control. However, it is noted that the nature of the VPT works, may preclude standard erosion control methodologies (for instance progressive stabilisation may not be achievable due to the subgrade construction requirements).

An ESCP will be prepared as part of the VPT project and will include the basic erosion and sediment control principles as noted in TP90.

7.5.5 Conclusion

The management plan framework proposed for the VPT project will enable environmental issues to be addressed as they arise within a framework agreed with ARC.

7.6 Assessment of Environmental Effects Conclusion

Section 7 has set out a comprehensive assessment of the environmental effects of the VPT 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.

8 Relevant Statutory Provisions

8.1 Legislation

8.1.1 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 HGMPA'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 HGMPA includes all areas of foreshore, seabed and seawater within the Gulf, and the VPT 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 in sections 7 and 8 of the HGMPA.

Section 7 of the HGMPA 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 HGMPA 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 Sections 7 and 8 of the HGMPA the following comments are made:

- The proposed works associated with the VPT 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 VPT project will have positive social and economic effects in terms of reducing congestion and improving access between the North Shore and Central City.
- The VPT project will not impede the enjoyment of, or recreational opportunities associated with the Hauraki Gulf.

8.1.2 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 statute, as follows:

(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 VPT project meets the purpose of the LTMA as follows:

- It will provide 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 in an integrated manner. The VPT 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 motorway users. Once complete the safety of the motorway users is ensured through standard motorway measures (e.g. safety barriers and road marking).
- Social and environmental considerations have been assessed throughout this report and it is considered that any adverse effects of the project will be minor.

8.1.3 Resource Management Act 1991

Any decision on the proposed works must be consistent with the purpose and principles of the RMA as set out in Part II, Sections 5 – 8 of the Act, and must have regard to the matters contained in Section 104 of the Act.

a. Part II – Purpose of the Act

The purpose of the Act, as set out in Section 5, is to promote the sustainable management of natural and physical resources. This is defined 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*
>
> *(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
>
> *(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The proposed VPT project 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 Auckland City, and providing an efficient roading network. The effects of the project are evaluated in this AEE in Section 5 – Assessment of Environmental Effects. The assessment of effects in Section 7 of this report 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.

b. Broader Principles – Sections 6 to 8

The broader principles of the Act are set out in Sections 6 through to 8.

Section 6 identifies a number of matters of national importance. Those relevant to this application are:

> *(a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and 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;*
>
> *(e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga;*

The project is consistent with these relevant provisions as follows:

- All works within the coastal environment and discharges to it will be managed to ensure that the water quality is not compromised, and that the natural character (where it exists) is maintained and/or enhanced.
- The proposal will not affect any outstanding natural features or landscapes in terms of the meaning of Section 6(b) of the RMA.
- There will be an acknowledged loss of some indigenous vegetation. This can be ameliorated with mitigation such as replanting at alternate locations.
- The relationship between Maori, their culture and traditions and their ancestral lands, water, sites, waahi tapu and other taonga has been recognised and provided for through appropriate consultation and liaison.

Section 7 of the Act sets out a number of "other matters" with which to have regard to. Those matters relevant to this application include:

> *a) Kaitiakitanga;*
>
> *aa) The ethic of stewardship;*
>
> *c) The maintenance and enhancement of amenity values;*
>
> *d) Intrinsic values of ecosystems;*
>
> *f) Maintenance and enhancement of the quality of the environment;*

The project is consistent with these relevant provisions as follows:

- Consultation has been undertaken with iwi/hapu to ensure that regard is had to sections 7(a) and 7(aa). The proposed 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.
- The project will not significantly alter the amenity values along the corridor.
- Regard has been had to the intrinsic value of ecosystems, and it is considered that the proposed works will not significantly affect current values.

- The project involves an 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 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.

Section 8 of the Act requires that account be had of the principles of the Treaty of Waitangi. Consultation with tangata whenua has been undertaken, is ongoing and will continue through all stages of planning and construction. The proposal is therefore considered to meet the principles of the Treaty of Waitangi.

c. Section 104

Section 104(1) of the Act requires a consent authority, when considering an application for resource consent, to have regard to:

(a) Any actual and potential effects on the environment of allowing the activity; and

(b) Any relevant provisions of –

a. A national policy statement.

b. A New Zealand coastal policy statement.

c. A regional policy statement or proposed regional policy statement.

d. A plan or proposed plan; and

(c) Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

Section 104B relates to the determination of discretionary or non-complying activity and reads as follows:

After considering an application for a resource consent for a discretionary activity or non-complying activity, a consent authority –

(a) may grant or refuse the application; and

(b) if it grants the application, may impose conditions under section 108

The relevant New Zealand Coastal Policy Statement and regional and district planning provisions are addressed in the sections below, and the actual and potential effects of the proposal are covered in Section 7 of this report.

8.2 Relevant Statutory Documents

8.2.1 New Zealand Coastal Policy Statement 1994

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:

- 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.

Assessment

The VPT Project involves no physical disturbance of the CMA. The project involves increasing the variable width of SH1 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, e.g. Westhaven marina, St Mary's Bay suburb housing and existing motorway.

8.2.2 Regional Land Transport Strategy 2005

Due to the enactment and provisions of the Land Transport Management Act 2003, a new Regional Transport Strategy was 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 the Auckland Land Transport Programme being prepared by Auckland Regional Transport Authority.

The Regional Land Transport Strategy 2005 (RLTS) was adopted in November 2005 and the objectives 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 VPT 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.

8.2.3 Auckland Regional Policy Statement 1999

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.

There are two changes to the RPS that are considered relevant to the VPT project. These are Proposed Change 6 – Giving Effects to the Regional Growth Concept and Integrating Landuse and Transport and Proposed Change 9 – including references to the Hauraki Gulf Marine Park Act 2000. Both Proposed Changes have limited weighting as neither have had formal hearings to hear submissions. However, the Proposed Changes are assessed where relevant following the assessment of the current provisions.

a. 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 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). Secondly, 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 project. These are:

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 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 project will provide for both the improvement of traffic efficiency through the corridor, and assist in providing capacity to accommodate growth in 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.

b. 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 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 project. This consultation is considered to have been undertaken in accordance with the above policies.

c. 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 project. These are:

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 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.

d. Coastal Environment

Chapter 7 of the RPS includes objectives and polices related to the coastal environment. Those relevant to the project are:

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 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 predominately within the existing motorway designation and does not require any additional structures in the Coastal Marine Area (CMA).

The project will have no adverse impact on the current level of public access in this area. A proposed pedestrian overbridge between the Westhaven area and the base of Jacob's Ladder will further enhance public access to the CMA.

e. 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 project are:

Policy 8.4.1-1

"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. Within the 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 project. Discharges during the construction phase of the project will be managed in accordance with the EMP (refer to Technical Appendix H – Environmental Management Plan) and summary provided in Section 5 of this AEE. The methods for managing long-term stormwater management and treatment are provided within the Technical Appendix G – Stormwater Report.

f. Proposed Change 6 – Giving Effect to the Regional Growth Concept and Integrating Landuse and Transport

This Proposed Change seeks to give effect to the Regional Growth concept and integrate landuse and transport matters. It predominately does this by changing the wording in Chapter 2 – Regional Overview and Strategic Direction. Whilst some of the changes proposed are extensive, the general intent remains similar in terms of being relative to the Project. Regional growth and integration between landuse and transport will be met through the implementation of the Project.

g. Proposed Change 9 – Inclusion of reference to the Hauraki Gulf Marine Park Act 2000

This Proposed Change seeks to make relevant inclusions in the RPS relative to the HGMPA. The project will be consistent with these changes as it is consistent with the HGMPA as discussed in Section 6.1 of this AEE.

8.2.4 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 VPT 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 VPT project contributes to this outcome by improving this heavily congested 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.

8.2.5 Auckland Regional Council – Transitional Regional Plan (1991)

The Transitional Regional Plan (TRP) provides for a number of activities (formerly provided for under Section 22 of the Water and Soil Conservation Act 1967) via General Authorisations (GA). The TRP does not have objectives and policies and is instead a list of particular activities and limits. Providing these activities comply with the limits specified under the GA they are permitted under the TRP.

Discharges from contaminated sites and diversion of groundwater during construction, and long term, are not provided for under the TRP so are therefore assessed as innominate activities and thus are considered Discretionary Activities under the RMA. As there are no objectives and policies under the TRP to assess these activities they are assessed against the PRP:ALW and sections 14 and 15 of the RMA. These assessments are noted in section 8.2.6 and 8.1.3 of this AEE.

8.2.6 Proposed Auckland Regional Plan: Air, Land and Water (As amended by decisions – October 2004)

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.

There have been a number of appeals lodged against the PARP:ALW and to date no sections of the plan subject to appeals have been resolved. Those sections relevant to the VPT project still outstanding include stormwater discharge and the discharge of contaminants to groundwater and land due to works on a contaminated site. These rules are as yet not operative and are not likely to be resolved for some time. Although they are not operative they have progressed through the planning process and some weight should be attributed to them, subject to clarification as to appeal points, in the decision-making process.

The rules relating to groundwater relevant to the VPT project are not subject to any appeals and are now considered to be operative.

a. Stormwater Discharges

The following objectives and policies are relevant to the project.

"Objective 5.3.1

To protect, maintain or enhance the quality of land and water in the Auckland Region by:

(c) Maintaining areas of high environmental quality;

(d) Minimising adverse effects on degraded natural and physical resources where these can be avoided; and;

(e) Enhancing degraded areas where practicable;

This shall be achieved by avoiding or minimising the adverse effects arising from:

i. the discharge of sediment;

iii. contaminant levels in stormwater runoff, including from an industrial or trade process;

viii. discharges from contaminated land

Objective 5.3.3

To minimise, as far as practicable, changes to natural infiltration rates and stormwater runoff volumes, thereby preventing river erosion and protecting aquifer outflows including river and stream base flows.

Objective 5.3.7

To provide for and enable diversions and discharges associated with stormwater and wastewater networks within Urban Areas consistent with the Auckland Regional Growth Strategy and Sector Agreements while adopting the best practicable option to prevent or minimise any actual or potential adverse effects of these activities.

Objective 5.3.8

To ensure that any best practicable option finally adopted for a stormwater or wastewater discharge achieves, as a minimum, objective 5.3.1 (a), (b) and (c) (i) to (iii), Objectives 5.3.3 and Objective 5.3.4 of this Plan and:

i. prevents flooding of legally authorised floor levels of habitat able buildings, and

ii. minimises erosion and sedimentation within any river or stream utilised as part of the network; and

iii. *minimises the accumulation of stormwater derived contaminates in the estuaries and harbours by actively managing the stormwater runoff from land uses with a high contaminant generation potential, including in particular heavily trafficked roads/carparks and industrial areas.*

Policy 5.4.4

When processing consent applications for stormwater diversions and discharges under Rule 5.5.2 to 5.5.5 the ARC shall required the applicant to adopt the best practicable option from the diversion and discharge, which shall be determined by having regard to:

(b) Whether the development is consistent with the Regional Growth Strategy and Sector agreements;

(c) The outcomes of any consultation undertaken with any potentially adversely affected parties;

(e) The level of stormwater quality treatment provided and whether treatment:

i. is provided for new developments or subdivisions, to remove at least 75% of total suspended solids (TSS loads on an average annual basis

ii. includes methods for managing run-off from land uses with a high contaminant generation potential, including in particular, heavily trafficked roads/carparks and industrial areas

iii. includes other methods (source control, traditional or innovative) to reduce the concentration and load of contaminants discharged to estuarine receiving environments. Contaminants of particular concern include finer sediments (>100um), total zinc, and total hydrocarbons (TPH)

(i) Operation and maintenance programmes to ensure the effective functioning of the discharge method

(k) The overall effects of stormwater discharges and diversions at the discharge point(s), 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 stormwater catchment or site. In particular, this includes any existing or developed impervious areas, draining to the same discharge point as new impervious areas".

Assessment

The effects of the stormwater discharge are discussed in Section 7 of this AEE and in Appendix G – Stormwater Preliminary Design Report. It is considered that the proposed stormwater treatment will improve water quality and the relevant matters from policy 5.4.4 are met to ensure adverse effects on the environment related to stormwater discharge are minor.

b. Contamination

Chapter 5 of the PARP: ALW also addresses contaminated land, objectives and policies relevant to the project include:

Objective 5.3.15

To ensure the remediation and/or management of contaminated land, closed and operative solid waste landfills and cleanfills is undertaken to protect the environment and public health.

Policy 5.4.37

"To promote the management of contaminated land to ensure that there are no significant adverse effects on the environment or public health".

Policy 5.4.38

"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 to public health

(b) The current zoned land use will not be adversely affected;

(c) Ground, surface water resources and air quality are not at risk from contamination; and

Ongoing monitoring and management commensurate with the scale and significance of the potential effects of contamination of the site, is undertaken to ensure that (a), (b) and (c) are achieved".

Assessment

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 7 provides further details on the type and scale of contamination, it also provides details on the management and mitigation measures. For specific detail regarding the conducting of works on a contaminated site refer to the EMP (Appendix H) and Assessment of Contamination Report (Appendix F).

c. Groundwater

The relevant objectives and policies are as follows:

"Objective 6.3.8

To enable people and communities to divert groundwater while avoiding, remedying or mitigating adverse effects on groundwater regimes, surface water bodies, neighbouring structures and services and on people and communities.

Policy 6.4.33

Any proposal to take and use groundwater for which a resource consent is required shall demonstrate that:

(c) The taking groundwater will avoid, remedy or mitigate adverse effects on surface water flows

(d) The taking of groundwater will not cause saltwater intrusion or any other contamination

(h) Mitigation options have been incorporated where appropriate, including but not limited to:

i. alternative rates and timing of abstractions

ii. providing alternative water supplies; or

iii water conservation options in times of reduced water availability

Policy 6.4.47

Any proposal to divert groundwater for which a resource consent is required shall demonstrate that the diversion:

(a) Ensures the flow regime required for the life supporting capacity of water bodies is provided for including:

i. low/minimum flows

ii. levels and flows in wetlands; and

iii. lake levels

(b) ensures existing lawful groundwater users are not adversely affected by the proposal

(c) ensures that the proposal avoids, remedies or mitigates any ground settlement that may result in any adverse effects including:

i. damage to structures

ii. damage to buildings; and

iii. damage to services (e.g. roads, pavements, power, gas, electricity, and fibre optic cables)

(d) ensures that the groundwater diversion does not cause or exacerbate any flooding

(e) avoids any actual or potential adverse cumulative effects that may arise from the scale, location and /or number of groundwater diversions in the same area

(f) avoids any actual or potential adverse effects of the discharge of groundwater containing:

i. sediment

ii. contaminants

(g) ensures that adverse effects on ecosystem habitats, both terrestrial and freshwater, are avoided remedied or mitigated.

Rule 6.5.69 also provides a list of matters to which the ARC has restricted its discretion as follows:

(b) Any adverse effects on existing lawful groundwater users, including

i. lawful groundwater diversion

ii. lawful groundwater takes

(c) Any adverse effects on building owners and arising from the potential for ground settlement that may result in significant damage to structures, buildings, and services

(d) The potential for adverse effects arising from surface flooding

(e) Cumulative effects that may arise from the scale, location and/or number of groundwater diversions in the same area

(f) Discharge of groundwater containing sediment and other contaminants

(g) Any adverse effects on the heritage values of the sites, including archaeological significance

(h) Any adverse effects on ecosystem habitat, both terrestrial and freshwater

(i) The duration of the consent

(j) The monitoring and reporting requirements

(k) The timing and nature of reviews of consent conditions

(l) The requirement for and conditions of a financial contribution and/or; and

(m) The requirement for a monitoring and contingency plan/contingency and remedial action plan.

Assessment

The matters relating to groundwater take, use and diversion have been discussed in Section 7.1 of this AEE and in Appendix B – Hydrogeological and Engineering Issues Report. These discussions ensure that the project will meet the relevant objectives, policies and rules listed above. This includes mitigation measures were necessary to ensure the adverse effects related to groundwater and ground movement are minor.

8.2.7 Auckland Regional Plan: Sediment Control 2001

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.

The objectives relevant to the 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".

The 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".

Clause 5.4.3.2

The ARC will restrict the exercise of its discretion to the following matters to the extent which they are relevant in each case:

- *(i) Techniques used to restrict or control sediment being transported from the site and the effects or impacts of sediment on water quality from the techniques chosen, including the practicality and efficiency of the proposed control measures;*
- *(ii) The proportion of the catchment which is exposed;*
- *(iii) The proximity of the operation to the receiving environment;*
- *(iv) The concentration and volume of any sediment that may be discharged;*
- *(v) The time during which the bare earth surface is exposed;*
- *(vi) The time of year when the activity is undertaken;*
- *(vii) The duration of the consent;*
- *(viii) Monitoring the volume and concentration of any sediment that may be discharged;*
- *(ix) Administrative charges under Section 36 of the RM Act;*
- *(x) Bonds under Section 108(1)[A](b) of the RM Act;*
- *(xi) Provisions for obtaining Environmental Benefits (Financial Contributions – Refer to Section 5.7 of this Plan).*

Assessment

In accordance with these objectives and policies, erosion and sediment control measures will be implemented as detailed in Section 7 and in more detail in Appendix E – 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 Appendix H – Environmental Management Plan), any significant adverse effects will be avoided, remedied or mitigated.

8.2.8 Auckland Regional Plan: Coastal 1999

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 matters within the Variations are not relevant to this Project.

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.

a. Part III: Values

Part III of the ARP: C contains objectives and policies relevant to specific 'values' of the coastal environment. Relevant provisions include:

i. 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 project 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.

ii. Landscape

With regard to the landscape chapter, the main objectives 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 project route, and it is considered that the proposed works will generally not alter the existing diversity, integrity and landscape quality of the coastal environment.

iii. Coastal Matters of Significance to Tangata Whenua

Chapter 6 of the ARP: C includes provisions of relevance to tangata whenua values. The two objectives are:

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 already been undertaken with iwi and it is intended to continue this consultation throughout the life of the project. This will assist in ensuring that Tangata Whenua matters are recognised and protected where necessary.

iv. Public Access

Chapter 7 of the ARC:C deals with public access. The key objective relevant to this project is that public access to the coastal environment should be maintained and enhanced, along and within the coastal marine area.

Assessment

The 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). This will assist in better public access and connectivity in the area.

b. Part IV: Use and Development

i. 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

"Any 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 project is adjacent to the CMA, it is already within an area highly modified by the existing motorway corridor. Positive effects are identified in Section 5 of this AEE. Nuisance effects will be avoided, remedied or mitigated in accordance with the EMP and mitigation measures proposed in Section 5 of this AEE.

c. 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 5 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.

8.3 Other Relevant Non-Statutory Documents

8.3.1 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.

The VPT 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 7 of this AEE discusses in detail the environmental effects specific to the VPT project, and proposes mitigation and monitoring measures.

8.3.2 Transit Planning Policy Manual – Supplement

A supplement to the Transit Planning Policy Manual has been published to incorporate the Land Transport Management Act 2003 (LTMA) and other changing Transit policies. The LTMA confirms Transits role in managing the state highway network as a key component of New Zealand's transport system. The VPT project is consistent with the supplement as it is consistent with the LTMA as discussed in previous sections.

8.3.3 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 resource consent applications for the VPT project is Section 6.3 Water Resources.

The VPT project meets the objectives of Section 6.3 as the proposed stormwater treatment devices are considered to be effective. This will limit the adverse effects on the receiving environments.

9 Conclusion

The proposed Vic Park Tunnel project is consistent with the purpose and principles of the Resource Management Act 1991, the Auckland Regional Policy Statement, and the objectives and policies of the Proposed Auckland Regional Plan: Air, Land and Water, Auckland Regional Plan: Coastal and the Auckland Regional Plan: Sediment Control.

The assessment of environmental effects demonstrates that the potential adverse effects will be less than minor.