PART H

MANAGEMENT OF EFFECTS ON THE ENVIRONMENT

13.0 Avoiding, Remedying and Mitigating Effects

This section outlines the environmental management measures proposed to be implemented before, during and after construction, to avoid, remedy or mitigate the actual or potential effects on the environment from the Project as identified in *Part G: Assessment of effects on the environment* of this AEE.

The concept design for the Project (as reflected in this AEE and supporting drawings and assessments) has sought to avoid or mitigate adverse effects through the route selection process, design of Project elements and the proposed construction methodology. Where it has not been practicable to avoid adverse effects, the measures set out in this section are proposed to remedy or mitigate adverse effects.

The proposed project delivery framework and the measures to manage adverse effects are addressed further in the sections that follow.

13.1 The Project delivery framework

The assessment of effects in *Part G: Assessment of effects on the environment* (and summarised in *Section 12.0: Introduction and summary of effects on the environment*) identifies a wide range of positive and adverse effects on the environment expected to result from the construction and operation of the Project.

Key to the delivery of the Project, including the management of effects, is the development and implementation of a suite of measures covering detailed design, construction and operation management plans and monitoring. This is collectively referred to as the Project Delivery Framework. It addresses the need to manage areas of environmental sensitivity, recognises environmental risk issues, and identifies the mechanisms to avoid, remedy or mitigate actual and potential effects.

The key features of the Project Delivery Framework are:

- An overarching CEMP to address both designation and resource consent matters related to construction;
- A series of topic specific management plans (e.g. erosion and sediment control, contaminated land);
- Site or activity specific components of the CEMP to manage particular effects during construction (e.g. coastal works); and
- A Communications Plan and accidental discovery protocol.

It is anticipated that the Project Delivery Framework would be formalised in conditions on the designations and resource consents.

The remainder of this section provides details of the Project Delivery Framework elements.

13.1.1 Proposed conditions

Based on the mitigation and monitoring measures summarised in Section 13.2 of this AEE, a suite of designation and resource consent conditions will be developed to ensure that the potential adverse effects that might arise from the construction, operation and maintenance of the Project will be adequately avoided, remedied or mitigated.

Two condition sets will be developed: a set for the designations and a set for the resource consents. Table 13-1 identifies the topics addressed in the designations and the resource consents.

Table 13-1: Topics addressed in designations and resource consents

Designation conditions	Resource consent conditions
• Construction management including noise and vibration, trees etc; • Communication and public information; • Network utilities; • Landscape and visual; • Traffic noise and vibration (operation); • Temporary and permanent traffic and transport; • Social; and • Built heritage and archaeology.	• Construction management; • Earthworks and land disturbance activities (including vegetation clearance); • Temporary and permanent stormwater management; • Coastal works including reclamation and declamation; • Management of contaminated land; • Ground settlement • Temporary and permanent groundwater management; • Ecological management (land); and • Ecological management (coastal environment).

The conditions will relate to the pre-construction, construction and operation phases of the Project.

13.1.2 The Outline Plan process and supporting information

Section 176A of the RMA sets out the process whereby the Transport Agency submits an Outline Plan to Auckland Council. The Outline Plan process enables Auckland Council to review and provide input to the detailed design.

The Outline Plan(s) may be staged to reflect the final Project phases or construction sequencing.

The Outline Plan(s) will address the matters required under section 176A(3) of the RMA including how the Project meets the conditions of the designation. The Outline Plan(s) will also include design details to address:

- Operational traffic and transport; and
- Landscape and urban design through the Urban and Landscape Design Plans; and
- Road traffic noise (operation).

Some of the management plans set out in *Section 13.1.5* will form part of the Outline Plan documentation addressing construction related matters:

- CEMP;
- CNVMP;
- A finalised Construction Traffic Management Plan based on the CTMPF contained as Appendix A to *Technical Report 10: Construction Traffic Impact Assessment*; and
- Network Utilities Management Plan (NUMP).

Details of these plans are set out in further detail in *Section 13.1.5*.

A Communications Plan and an Accidental Discovery Protocol will also be provided to Auckland Council at the same time as the Outline Plan documentation.

The key features of the management plans under the Outline Plan process and the Communications Plan and accidental discovery protocols are discussed further below.

The purpose and intent of the various management plans and other information to be provided to Auckland Council prior to construction are discussed in the following sections.

13.1.3 Design certification for resource consents

Certification of the design will be required from Auckland Council for the following temporary and permanent elements of the Project:

- Coastal structures including stormwater outfalls, retaining walls, seawalls, viaducts, bridges and reclamation;
- Permanent stream diversions and culverts;
- Operational stormwater system including stormwater treatment wetlands and proprietary devices;
- Temporary staging in the CMA and Anns Creek East; and
- Bridge design at Ōtāhuhu Creek.

The certification will confirm that the final design is in accordance with the resource consent conditions and relevant design standards. It is anticipated that the conditions of resource consent will specify the elements requiring design certification.

13.1.4 Urban and landscape plans

The ULDF contained in Volume 2 describes and illustrates the urban and landscape concepts to integrate the Project into the surrounding landscape.

During detailed design and prior to construction, Urban and Landscape Design Plans (ULDP) will be prepared setting out in further detail how the principles of the ULDF will be implemented across the Project. The ULDPs will include:

- The design principles set out in the ULDF and the Transport Agency guidelines;
- Final landscape plans based on the draft plans contained in *Plan Set 14: Landscape*;
- Designs to achieve the sector specific outcomes set out in Section 5 of the ULDF in *Volume* 4 covering:
  - Neilson Street Interchange
  - Māngere Inlet Foreshore
  - Anns Creek
  - Sylvia Park
  - SH1
  - Local roads
- Details of landscape and visual mitigation planting;
- Appearance of structures (including bridges, acoustic barriers etc); and
- Location and concept design for highway furniture (e.g. signposts, lighting standards etc).

As part of preparing the ULDPs, the Transport Agency will consult with a variety of stakeholders including directly affected landowners, Mana Whenua, Auckland Council, cycle and pedestrian groups and, as required, the owners and occupiers of adjacent properties.

Detailed design plans suitable for construction will be based on the ULDPs. As part of preparing the detailed design plans, some elements of the Project will require input and design approval from existing and future land owners. For example, the urban and landscape elements for locals roads under the control of Auckland Transport and areas that will become park managed by Auckland Council will require specific input from the final asset owner during detailed design. The asset owner design process would also include any separate Building Consent process under the Building Act for structural elements (e.g. pedestrian bridges and boardwalks).

13.1.5 Management plans and other information

Many of the potential effects identified in *Part G: Assessment of effects on the environment* of this AEE can be managed by implementing specific measures to be set out in a management plan related to that topic area. Management plans will be prepared (or finalised if a draft has already been prepared) and submitted to Auckland Council for review or approval prior to construction commencing. Figure 13-1 shows the management plans forming part of the CEMP for the Project.

Table 13-2 sets out the proposed management plans and the proposed minimum timeframes for submission of each to Auckland Council for approval. While these timeframes are the minimum, it is expected that the Transport Agency and its contractor/s will liaise closely with the Auckland Council during the preparation of the management plans.

Figure 13-1: Management plans under the CEMP

Table 13-2: Management plan submission timing

Management plan	Timing for submission to Auckland Council
Construction Environmental Management Plan	20 working days prior to construction commencing
Coastal Works CEMP	20 working days prior to construction commencing
Ecological Management Plan	20 working days prior to construction commencing
Construction Air Quality Management Plan	20 working days prior to construction commencing
Concrete Batching Management Plan	20 working days prior to construction commencing
Groundwater and Settlement Management Plan	20 working days prior to construction commencing
Construction Erosion and Sediment Control Plans	10 days prior to land disturbance activities commencing
Flocculant Treatment Plan	10 days prior to flocculant use commencing
Contaminated Land Management Plan	20 working days prior to land disturbance activities commencing
Heritage Management Plan including Accidental Discovery Protocols	20 working days prior to construction commencing
Construction Noise and Vibration Management Plan	20 working days prior to construction commencing
Site/activity specific Construction Noise and Vibration schedules	10 days prior to noise generating activity commencing
Construction Traffic Management Plan Framework	20 working days prior to construction commencing
Site/activity specific Traffic Management Plans	10 days prior to activity generating traffic management commencing
Network Utilities Management Plan	20 working days prior to construction commencing
Communications Plan	20 working days prior to construction commencing

Details of each of the management plans (as currently envisaged) including the purpose of the plan and the proposed contents is set out in the sections that follow.

a. **Construction Environmental Management Plan (CEMP)**

The CEMP is the overarching management plan which sets out the methods and tools to be implemented by the Transport Agency to manage effects during construction. It is prepared in order to meet the designation and resource consent conditions and any Transport Agency environmental objectives and guidelines. Its purpose is to ensure that construction related effects are appropriately managed during all stages of construction.

A draft table of contents for the CEMP has been prepared for the Project and is contained in Appendix A of this AEE. The CEMP will be prepared by the Project contractor(s) prior to construction of the Project to meet the requirements of the conditions. The final CEMP will be provided to Auckland Council for approval prior to construction, to allow Auckland Council to confirm that the CEMP meets the applicable requirements of the designations and resource consents. The Transport Agency will require that contractor(s) undertake all construction activities on site in accordance with the provisions of the relevant conditions and management plans as part of their contractual arrangements.

The CEMP will provide details of:

- Environmental policy;
- Staff and contractors' responsibilities;
- Training requirements for employees, sub-contractors and visitors;

- Environmental incident and emergency management;
- Environmental complaints management;
- Compliance monitoring;
- Reporting (including detail on the frequency of reporting to Auckland Council);
- Environmental auditing; and
- Corrective action.

The CEMP provides an overarching framework for the specific environmental management plans which will outline the methodology for delivering more detailed site or activity specific management plans.

The CEMP and supporting plans on specific topic areas may require review and amendment during the life of the Project to reflect changes to activities, risks, mitigation measures, responsibilities and management processes. The ability to make changes to management plans is an important aspect of continually improving the effectiveness of the management plans and the mitigation measures that they provide. It is anticipated that the proposed conditions will provide flexibility to review and modify practices according to changing circumstances.

b. **Coastal Works CEMP**

An activity specific CEMP will be prepared for the coastal works along the Māngere Inlet Foreshore. The purpose of the Coastal Works CEMP is to detail the specific measures to manage works in the CMA including dredging, reclamation, temporary works, bridges and boardwalks and other construction activities.

The additional matters to be addressed in the CEMP for the coastal works are:

- Dredging and declamation methodologies;
- Measures to minimise sediment discharge from dredging operations;
- Storage of equipment; surplus material and construction materials within the CMA;
- Navigation safety measures during construction;
- Channel dredging and infilling methodology and channel monitoring post construction;
- Methodology for the construction and removal of temporary construction staging in Anns Creek Estuary, Anns Creek West and Ōtāhuhu Creek;
- Measures to manage concrete dust entering the CMA from the removal of the Ōtāhuhu Creek box culverts;
- Procedures to respond to accidental discharges to the marine environment;
- Water quality monitoring and trigger levels;
- Monitoring of marine sediment during construction including weekly water quality monitoring;
- A Contingency Plan for trigger level exceedances;
- Monitoring of sediment deposition rates at nominated locations in the Māngere Inlet to confirm modelling predictions; and
- Reporting.

A CESCP (see further discussion in *Section 13.1.5* below) will also be prepared for the coastal works. This will include the specific erosion and sediment control measures (e.g. staging and stabilisation of foreshore areas) and the perimeter controls for the foreshore and viaduct/bridge works and other measures to limit the total suspended solid and sediment deposition.

The Coastal Works CEMP will be approved following the same process as the CEMP and will be implemented for the duration of construction and monitoring activities associated with the foreshore and viaduct/bridge works in the CMA.

c. **Ecological Management Plan (ECOMP)**

The purpose of the ECOMP is to detail the measures to manage the various ecological effects associated with the construction and operation of the Project. It will include details of the mitigation and monitoring for terrestrial, freshwater, marine and avifauna aspects.

The specific matters to be addressed in ECOMP are:

- Lizard management including survey, relocation, release sites, monitoring and habitat enhancement;
- Methodology for pruning or removal and disposal of native vegetation (including mangroves);
- Measures to protect lava flow shrubland and lava flow outcrops during construction including details of the pier exclusion area, the area to be excluded from the construction footprint, protective fencing and signage;
- Methodology for the construction and removal of temporary construction staging in Anns Creek East;
- Timing of works to minimise disturbance during bird breeding season;
- Details of protection, enhancement, rehabilitation and restoration of habitats in the Māngere Inlet, Ngarango Otainui Island, Anns Creek, Southdown Reserve and Ōtāhuhu Creek;
- Details of the salt marsh trial and restoration along the eastern edge of the Anns Creek Estuary;
- Details of the transplanting of common hard shore organisms to the landward edge of the new landform including post construction monitoring;
- Monitoring of habitats and values during construction including monitoring of avifauna and temporary stream diversions; and
- Post construction monitoring of the quality of stormwater from the stormwater wetlands.

The ECOMP will be implemented for the duration of construction and monitoring activities associated with the Project.

d. **Construction Air Quality Management Plan (CAQMP)**

The purpose of the CAQMP is to detail the dust management and emission controls to be applied by the construction contractor at the time of construction to minimise the effects of dust.

The specific matters to be addressed in CAQMP are:

- Dust suppression measures including consideration of weather conditions and procedures for the use of water sprays on stockpiles and exposed areas of the site;
- Visual monitoring of dust emissions;
- Measures to manage hazardous air pollutants from the disturbance of contaminated soils including landfills and asbestos;
- Measures to manage odour and landfill gas (including methane) from the disturbance of closed landfills;
- Measures to manage engine exhaust emissions from construction vehicles including construction vehicle maintenance; and
- Complaints investigation, monitoring and reporting.

The CAQMP will also include specific measures for the concrete batching activity as part of mudcrete operation. As part of the CAQMP, a Concrete Batching Plant Management Plan will be prepared and will provide details of:

- Equipment inspection, maintenance, monitoring and recording, including baghouse, pressure relief valves, and high level alarms; and
- Procedures for responding to process malfunctions and accidental cement discharges.

e. **Groundwater and Settlement Management Plan (GSMP)**

GSMP will be prepared to provide details of how groundwater and settlement beyond the Project designation will be managed during and following construction.

The GSMP will include details of:

- Groundwater monitoring bores including location, depth and geological unit;
- Method for bore construction and piezometer installation;
- Methods and frequency for groundwater monitoring;
- Groundwater trigger levels;
- Procedures to follow in the event of trigger levels being exceeded;
- Confirmed estimated settlements and building damage categories using the methodologies set out in *Technical Report 14: Settlement Effects Assessment*;
- Ground and building settlement markers;
- Frequency of monitoring of ground and building settlement markers prior to, during and following construction; and
- Settlement monitoring for specific network utilities as agreed with the Network Utility Operators through the NUMP.

f. **Construction Erosion and Sediment Control Plans (CESCPs)**

Prior to the commencement of works for each specific area and/or activity within the Project site, a CESCP will be prepared. As a minimum the CESCPs will demonstrate how the requirements of Auckland Council Guidelines relating to the capture and treatment of sediment laden discharges from the site will be met. The CESCP will follow the principles set out in *Technical Report 12: Stormwater Assessment* in Volume 3.

The CESCP will include:

- A risk assessment of sediment yield including slope, receiving environment, soil types and duration;
- Details of the specific erosion and sediment control measures;
- Supporting calculations and design drawings;
- Catchment boundaries for the sediment controls;
- Location of the works, and cut and fill operations;
- Details of construction methods to be employed, including timing and duration;
- Management of exposed areas, including progressive stabilisation considerations;
- Details of the flocculation treatment to be implemented (forming the Flocculation Management Plan); and
- Details of monitoring.

The CESCPs will be certified by Auckland Council prior to land disturbance activities commencing.

As part of the Project CEMP, the following specific matters relating to erosion and sediment control will also be included:

- The identification of appropriately qualified and experienced staff to manage the environmental issues on site;
- The identification of staff who have clearly defined roles and responsibilities to monitor compliance with consent conditions and CESCP;
- Provision of details of a chain of responsibility for managing environmental issues and details of responsible personnel; and
- The establishment of a sediment control team (including representatives from the contractor, Auckland Council and the Transport Agency) to meet and review erosion and sediment control on a weekly basis.

g. **Contaminated Land Management Plan (CLMP)**

The purpose of the CLMP is to detail the measures to manage health, safety, and environmental risk associated with contaminated material at the site during construction and operation.

A draft CLMP has been prepared for the Project and is contained as Appendix D of *Technical Report 17: Contaminated Land Assessment* in Volume 3. The Draft CLMP will be finalised and certified by Auckland Council prior to land disturbance activities commencing following detailed design.

The CLMP contains details of:

- Roles and responsibilities for management and implementation of the CLMP;
- Health and safety precautions including personal protective equipment to manage inhalation and dermal contact with contaminated material;
- Unexpected contamination discovery protocols;
- Risk mitigations or management measures to address human health and environmental risks associated with the contaminants of potential concern identified in this report;
- Management of risks related to exposure to landfill gas such as confined space entry requirements;
- Dewatering and disposal of liquid wastes;
- Contaminated soil management, reuse, and offsite disposal;
- Management and tracking of soil movements and appropriate disposal – this may involve sampling of stockpiled material to establish whether it is suitable for re-use as fill for the Project or depending on the level of contaminants, which class of landfill for disposal would be required. Soil containing asbestos will need to be managed and disposed of appropriately;
- Management of stockpiling, including cover to stop dust and runoff;
- Secure fencing and signage to minimise exposure to members of the public;
- Dust suppression;
- Wheel wash bays to prevent spread of contaminants and covering of trucks transporting soil off site and decontamination for equipment and personnel;
- Stormwater and erosion and sediment controls; and
- Contingency plans for spillages of contaminated media.

The CLMP will be implemented during construction under the supervision of a Suitably Qualified and Experienced Practitioner as defined by the Ministry for the Environment's guide to the NES Soil [92].

h. **Heritage Management Plan including Accidental Discovery Protocols**

The purpose of the Heritage Management Plan is to set out the specific measures to manage historic heritage during the construction and operation of the Project. The HMP will be prepared by an archaeologist and built heritage advisor and will contain details of:

- Identification of the Project archaeologist and built heritage advisors and their roles and responsibilities;
- Specific areas/features requiring supervision and the measures to be undertaken to protect and manage these;
- Whether HNZPT and/or Auckland Council heritage staff and or mana whenua supervision is required for specific areas/features;
- Accidental discovery protocols where areas are not covered by a HNZPT Archaeological Authority;
- Vibration monitoring during vibration intensive construction works in proximity to heritage features and the process to review construction methodologies to reduce vibration; and
- Methodology for pre and post construction building condition surveys of the Aotea Sea Scouts Hall and The Landing prior to works commencing to confirm the condition, context and physical features of the buildings.

The process to be followed should the monitoring indicate damage attributable to the Project:

- Monitoring of other historic heritage structures within close proximity to construction activities; and
- Documenting built heritage features to be removed (e.g. Onehunga Wharf rail structure).

As part of the Heritage Management Plan, an accidental discovery protocol will be finalised in consultation with Mana Whenua and HNZPT and will apply throughout the Project unless replaced by an archaeological authority obtained from HNZPT in accordance with the Heritage New Zealand Pouhere Taonga Act 2014.

The accidental discovery protocol will set out the process and procedures that apply following the discovery of material that could be an archaeological site, kōiwi and/or taonga.

The specific aspects which the accidental discovery protocol will deal with include:

- Actions to be taken following the discovery of material including ceasing work in the immediate area and securing the area;
- The parties to be notified of the discovery and providing guidance on management of the discovery;
- The circumstances when an archaeological authority must be obtained from HNZPT; and
- When work in the area of the discovery can recommence.

92 http://www.mfe.govt.nz/publications/rma-land-hazards/users-guide-national-environmental-standard-assessing-and-managing

i. Construction Noise and Vibration Management Plan (CNVMP) and Schedules

The purpose of the CNVMP is to include specific details relating to methods for the control of noise and vibration associated with all Project construction works to demonstrate (as far as practicable) compliance with NZS 6803 and the Transport Agency Noise and Vibration Guide 2013.

Specific aspects which the CNVMP will deal with include:

- Measures adopted to meet the noise criteria set out in the designation;
- Measures adopted to meet the vibration criteria set out in the designation; and
- Where either of the above cannot be met, the process that will be followed to appropriately mitigate noise and vibration effects including methods that may be applied outside the designation to achieve BPO in the form of a Construction Noise and Vibration Schedule (CNV Schedule).

The CNVMP will include the following information:

- Summary of Project criteria;
- Summary of assessments/predictions;
- General construction practices, management and mitigation;
- Liaison with potentially affected parties;
- Noise and vibration management and mitigation measures specific to sites, activities and/or receiving environments;
- Preparation of a CNV Schedule where the proposed activity cannot meet the noise and vibration limits for the Project;
- Circumstances and process for the relocation of residents during noisy activities;
- Monitoring and reporting requirements;
- Procedures for handling complaints; and
- Procedures for review of the CNVMP throughout the Project.

The preparation of this plan will be undertaken by a qualified acoustics specialist. It will outline the consultation undertaken with potential affected parties including the owners and occupiers of properties directly affected by the works.

Where a CNV Schedule is required, this will include details of specific measures that will be adopted to achieve BPO.

j. Construction Traffic Management Plan Framework (CTMPF) and Traffic Management Plans

A draft CTMPF has been prepared for the Project and is contained as Appendix A to *Technical Report 10: Construction Traffic Impact Assessment* in Volume 3. Following the appointment of a contractor(s), the CTMPF will be finalised.

The purpose of the CTMPF is to manage the various traffic management, safety and efficiency effects associated with construction of the Project. It is required to address Project-wide traffic management matters including the staging of works, construction yard access, methodology for detour routes and a process for the submission of site specific traffic management plans.

The finalised CTMPF will detail the methods for the delivery of temporary traffic management during the construction of the Project and will:

- Comply with the COPTTM, where practicable and include a method for situations where non-compliance or departures from the standards are required;
- Focus on leading industry standards with regard to temporary traffic management and safety;
- Minimise disruption on the state highways and local roads, wherever practicable;
- Limit, where possible, the number of construction vehicle trips on local roads and obtain access from arterial roads and state highways;
- Maintain existing flows and travel times on state highways and local roads adjacent to the work sites, where practicable;
- Minimise the impact of works on vulnerable road users such as pedestrians and cyclists;
- Minimise the effects of construction traffic on local roads used for access;
- Minimise the impact of construction parking;
- Detail the process for developing TMPs having consideration for all key stakeholders, including residents, emergency services and public transport providers;
- Identify all issues and have a planned TMP submitted and approved by Auckland Transport, and the Transport Agency's network management consultant (as relevant);
- Provide effective communication to affected parties; and
- Implement temporary traffic management.

The finalised CTMPF will be prepared in consultation with Auckland Transport roading asset managers and the Transport Agency's network operations teams. The CTMPF is required to be consistent with the Transport Agency and Auckland Transport codes of practice for temporary traffic management (as discussed in *Section 12.13.1* of this AEE).

A key feature of the CTMPF is the requirement for site or activity specific TMPs to be prepared during construction of the Project. TMPs are required to describe the measures that will be taken to manage the effects associated with construction on parts of the route prior to works being undertaken. It is likely that there will be several TMPs for the construction of the Project, which relate to the staging of the Project.

Specific aspects which the TMPs will deal with include:

- Temporary traffic management measures;
- Individual management plans for intersections;
- Access to private properties;
- Safety measures;
- Signage; and
- Detours.

Proposed physical works in transport corridors (local roads, State highways and rail corridors) are also subject to the *National Code of Practice for Utility Operators' Access to Transport Corridors*. Under that code, a Corridor Access Request must be submitted to the relevant road controlling authority (Auckland Transport or the Transport Agency) for works in roads or to KiwiRail for works in the rail corridor. This is a well-established process to ensure that all work is done safely and complies with national regulations.

k. **Network Utilities Management Plan (NUMP)**

The purpose of the NUMP is to ensure that the design and construction of the Project takes account of and includes measures to address the safety, integrity, protection and (where necessary) the relocation of existing network utilities.

Specific aspects which the NUMP will deal with include methods and measures to:

- Ensure that critical infrastructure can be accessed for maintenance at all reasonable times, or emergency works at all times, during and after construction activities;
- Manage the effects of dust and any other material potentially resulting from construction activities and able to cause material damage, beyond normal wear and tear, to transmission lines; and
- Ensure that no activity is undertaken during construction that would result in ground vibrations and/or ground instability (e.g. from earthworks) likely to cause material damage to network utilities.

The NUMP will include the following information:

- Protocols for liaison and information exchange between network utility providers and the Transport Agency during the detailed design phase;
- Process for network utility provider approval of proposed works on their utilities (where applicable / necessary);
- Protocols to undertake on-site works, including operating procedures and responsibilities for network utility operators' contractors and the Transport Agency's contractors;
- Protocols for utility provider design and supervision services;
- Protocols for inspection and final approval of works by network utility providers; and
- Settlement monitoring required for specific utilities as agreed with the network utility operator.

l. **Communications Plan**

A Communications Plan will be prepared and implemented by the Transport Agency prior to and during construction of the Project. The purpose of the Communications Plan is to identify the proactive and reactive communication protocols to keep the community and other stakeholders engaged and informed.

Conditions are proposed which set out the purpose and contents of the Plan. In summary, the specific aspects which the Plan will deal with include:

- Details of the site or Project Manager and the community liaison person, including their contact details;
- The stakeholders including residents and businesses who will be communicated with;
- Communication methods, including an assessment of how these methods reach the different audience/stakeholder groups, and detail of when each of these methods will be used (e.g. Regular communication or event specific methods); and
- Any stakeholder specific communication plans that are required.

A key part of the community engagement throughout the detailed design and construction phase is through the CLGs (see *Section 12.14.6.1* for further discussion). The CLGs are a mechanism to disseminate information and obtain community input into the Project. The expected terms of reference for the CLGs will be set out in the designation conditions. The Transport Agency has extensive experience and well established processes for communication and community engagement during projects.

13.2 Summary of measures to manage adverse effects

The positive effects of the Project are set out in *Section 6.0 Description of the Project* and the effects sections in *Part G: Assessment of effects on the environment*. The Project will provide greater transport capacity across and in Onehunga-Penrose by separating local traffic from through traffic helping to support significant growth identified for Auckland.

In summary, once completed the proposed works will provide the following positive effects:

- Significant benefits for the transport network including travel time reductions and improved travel time reliability, reduced traffic on local roads, improved accessibility, improved resilience of the transportation network and improved travel reliability for buses;
- Improved pedestrian and cycle connectivity and safety;
- Supporting improved business efficiency and growth through reduced congestion, notably for transport and logistics businesses;
- Landscape restoration around the northern Māngere Inlet; and
- Improved water quality for discharges to the Māngere Inlet.

A range of measures are proposed for the Project to avoid, remedy or mitigate the potential adverse effects identified in *Part G: Assessment of effects on the environment*. These measures are summarised in Table 13-3.

The measures will be implemented during further development of the Project. For example, in the development of the detailed design, prior to and during construction, and once the permanent works are completed. It is anticipated that these proposed measures will be reflected in the designation and consent conditions which will apply to the work. The figures that follow Table 13-3 show the key physical measures proposed to mitigate effects of the project.

Table 13-3: Summary of measures to avoid, remedy or mitigate the potential adverse effects

AEE Section	Topic	Measures	Mechanism to implement measures
12.2	Traffic and transport effects	• Replace parking at The Landing; provision of clearways on Captain Springs Road and off-peak parking on Galway Street; remove parking, provide u-turn facility and additional parking on Hugo Johnston Drive; access to 8 Sylvia Park Road; reinstate right turn onto Onehunga Mall from Neilson Street. • Undertake further liaison with Auckland Transport regarding the form and timing of the AMETI bus link to the Sylvia Park Town Centre.	Detailed design
12.4	Land use, property and business disruption effects	• Acquire land (where required) in accordance with the provisions of the PWA. • Engage early with affected businesses to enable business planning in response to the works and where required to facilitate business relocation (as appropriate). • Ongoing communication with affected business owners and operators. • Involve affected businesses in the preparation of construction traffic management plans and construction management. • Consult with businesses on specific access requirements during construction; temporary signage and other information to direct and inform those business owners and customers of access. • Manage potential effects on business operations sensitive to noise and vibration through liaison with key businesses (e.g. the glass bottle logistics business).	PWA process Detailed design for permanent works Communication mechanisms prior to and during construction Construction planning, methodologies and management measures
12.5	Network utilities	• Undertake detailed design in consultation with utility operator. • Incorporate responses for specific utilities into design/construction methodology in consultation with operators. • Manage construction activities near network utilities to minimise impacts (e.g. dust). • Relocate network utilities where necessary in consultation with utility operator. • Undertake settlement monitoring during construction for key utilities (e.g. high pressure gas).	Liaison with network utility operators Detailed design for temporary and permanent works Construction planning, methodologies and management measures NUMP
12.6	Cultural / Tangata Whenua	• Implement protocols for engagement and ongoing input from Mana Whenua in detailed design and construction. • Specific protocols and Te Aranga principles for the design of specific elements (e.g. structures in Te Hōpua). • Protocols for recognition of Mana Whenua and the cultural significance of the landscape in which the Project sits (e.g. undertaking blessings for construction works). • Implement protocols for cultural monitoring in significant sensitive sites (e.g. earthworks in the area of Te Apunga o Tainui, works in the vicinity of the historic coastline and works at Te Hōpua). • Develop an accidental discovery protocol for the Project in consultation with Mana Whenua and HNZPT. • Source locally grown natives for proposed landscaping. • Mana Whenua to participate in the review of monitoring reports for water quality and discharges to the CMA, reporting on ecological outcomes from the Project and in the development of any necessary contingency or response plans (e.g. if monitoring triggers are reached). • Offer cultural monitoring post construction to Mana Whenua.	Ongoing engagement through a Mana Whenua Liaison Group Detailed design for structural elements and planting Construction methodologies and monitoring Accidental Discovery Protocols Post construction monitoring
12.7	Archaeology and built heritage	• Design of landscaping and urban design elements to reduce further isolation of the Aotea Sea Scouts Hall and maintain connectivity with the wider environment. • Undertake building condition surveys of the Aotea Sea Scouts Hall and The Landing prior to works commencing to confirm the condition, context and physical features of the buildings. • Apply Accidental Archaeological Discovery Protocols for areas not covered by an HNZPT Authority during construction to ensure appropriate steps are taken in the event of archaeological discoveries. • Manage historic heritage values during construction in accordance with conditions of any HNZPT Archaeological Authority. • Identify opportunities for interpretive and commemorative material for any archaeological discoveries. • Seek Archaeological Authority(s) from HNZPT under the HNZPT Act for areas identified as having greater potential for archaeological discoveries. • Monitor specific heritage features during construction (e.g. stone walls at Waikaraka Cemetery). • Monitor vibration during vibration intensive construction works in proximity to heritage features.	Detailed design Archaeological Authority(s) under the HNZPT Act Accidental Discovery Protocols Construction monitoring HMP

AEE Section	Topic	Measures	Mechanism to implement measures
12.8	Geological heritage	• Enhance the park within Te Hōpua tuff crater to include interpretative material explaining its geological history and scientific values. • Improve the link between Gloucester Park and the proposed pathway that runs along Māngere Inlet to the east. • Establish interpretive signage in Te Hōpua and at Anns Creek which provides educational opportunities and enhances knowledge of Auckland's volcanic field. • Avoid damage to lava flows during construction by identifying an exclusion area within the Anns Creek East area within which no permanent or temporary piers are placed and by exluding areas from the construction footprint. • Increase public access to Anns Creek.	Detailed design for temporary and permanent works Construction planning, methodologies and management measures
12.9	Trees	• Undertake Arboricultural assessments prior to construction commencing to confirm the characteristics of trees with potential to be retained and to assess if any existing trees are worthy of retention and the protection measures for amenity trees adjacent to the works. • Develop tree protection measures (by an arborist) to be implemented during construction to avoid and minimise the potential effects on retained trees. • Replace planting for amenity trees removed within open space and road reserves.	Detailed design Construction methodologies and management measures CEMP
12.10	Landscape and Visual	• Treatment of structures, streetscape, landform (including the coastal edge) and landscape planting in accordance with the ULDF to: – Rehabilitate and restore the degraded landscape of Māngere Inlet; – Reconnect Onehunga with Māngere Inlet and its port; – Enhance the legibility and aesthetic qualities of Te Hōpua tuff crater; – Visually reinforce the appearance of the EWL as an arterial road; – Restore Anns Creek; and – Rehabilitate and re-open (physically and visually) Ōtāhuhu Creek.	Detailed design
12.11	Noise and Vibration – Operation	• Control traffic noise generation or effects in accordance with NZS 6806 through acoustic barriers or acoustic treatment/modification of buildings. • Ongoing road maintenance to manage operational vibration.	Detailed design Maintenance and operation
12.11	Noise and Vibration – Construction	• Compliance with Project noise limits during construction developed in accordance with NZS 6803. • Compliance with vibration criteria set out in the Noise and Vibration Guide 2013 during construction. • Compliance with underwater noise performance standards during construction in the CMA. • Use of BPO measures to avoid unreasonable noise where noise limits or vibration criteria will be exceeded.	Construction planning, methodologies and management measures CNVMP
12.12.3	Air Quality - operation	• Monitor air quality for the new sections of road as part of general state highway air quality monitoring.	Monitoring as part of existing maintenance and operation activities
12.12.2	Air Quality – construction	• Manage dust emissions from construction activities (earthworks, vehicle movements and wind entrainment from unsealed surfaces) and the disturbance of contaminated material (including asbestos) through dust suppression measures including minimising exposed areas of earthworks, consideration of weather conditions and procedures for the use of water sprays on stockpiles and exposed areas of the site. • Visually monitor dust emissions. • Manage hazardous air pollutants from the disturbance of contaminated soils including landfills and areas of asbestos through minimising exposed and worked areas and tracking and handling procedures. • Manage odour and landfill gas (including methane) from the disturbance of closed landfills through monitoring of landfill gas. • Manage engine exhaust emissions from construction vehicles through regular checks and maintenance of construction machinery.	Construction planning, methodologies and management measures CAQMP and CLMP

AEE Section	Topic	Measures	Mechanism to implement measures
13.13	Construction Traffic	• Traffic management measures during construction to manage: – Footpath closures/detours – Pedestrian crossing closures – Cycle lane closures/path closures/detours – Property access closures – Shoulder closures – Lane closure - alternating flow operation – Lane closure - contra-flow operation – Lane closure - one-direction closure – Road closures/detours – Short term closures for installation of long-term closures / traffic control measures – Site access – Temporary speed limits • Site/activity specific traffic management during construction to manage localised effects (e.g. property access requirements).	Ongoing consultation and information Liaison with local residents and businesses Construction planning, methodologies and management measures CTMP and site/activity TMPs Early advertising of road closures to the public through a variety of different measures
12.14	Social Impact	• Establish CLGs to disseminate information and obtain community input into detailed design of certain facilities along the route (e.g. cycle and pedestrian connections). • Regular communication and liaison prior to and throughout construction. • Consider moving sensitive residents to alternative accommodation for the duration of night works. • A full-time contact phone number for residents to liaise with the construction team on any issues that arise during construction. • Formalise a complaints and response process (and monitoring thereof) for the above communications plan. • Communicate construction timeframes on signs close to key community transport linkages. • Establish a recreation space early on the southern Waikaraka Park area to provide for ongoing recreation use and replacement open space during construction. • Early planting of open spaces, management of graffiti on the construction site and construction yards and maintaining adequate lighting of those areas identified for public access. • Liaise with key businesses and community facilities in construction planning and over the construction period to discuss issues of access and their operations. • Work with Auckland Transport to as far as practicable provide a temporary commuter cycle facility. • Keep key walking and cycling connections open and where no alternative access is available, closures only occur at night. • Liaise with businesses including consideration of pedestrian and vehicle access signage for those businesses whose access will be disrupted or altered by construction works. • Engage early on the land acquisition process. • Provide and sign parking areas to users of the Manukau Foreshore Walkway for the period that the Onehunga Harbour Road parking area is unavailable during construction. • Provide weekend car parking surrounding the Waikaraka Park and community buildings. • Community engagement initiatives. • Work with the The Southern Initiative to promote training and employment opportunities for young people. • Acoustic barriers constructed near private properties as outlined in *Section 12.11: Noise and Vibration* of this AEE. Consult residents on site specific design requirements and to confirm the implementation programme. • Enhance community outcomes through input on landscape design (through the CLG). • Reinstate the construction yard at Waikaraka Park for recreation facilities. • Signage plan for community linkages and connections between walkways and open space/recreation areas. • Design of walking and cycling connections between Panama Road and Frank Grey Place undertaken in consultation with the local community and residents.	Ongoing consultation and information Liaison with local residents and businesses Detailed design Construction planning, methodologies and management measures Communication Plan
12.15	Erosion and Sediment Control	• Implement erosion and sediment control measures during construction including structural (physical) and non-structural (site management and staging of the works) measures to meet Auckland Council DG05 requirements and Transport Agency guidance.	Construction planning, methodologies and management measures CESCPs

AEE Section	Topic	Measures	Mechanism to implement measures
12.16	Groundwater	• Monitor groundwater during and following construction of the works between the Neilson Street Interchange and Anns Creek. • Monitor groundwater quality of leachate prior to discharge to treatment wetlands.	Detailed design Construction monitoring Post construction monitoring GSMP
12.17	Ground Settlement	• Monitor settlement monitoring including ground and building markers during the construction of the EWL Trench adjacent to Onehunga Wharf to confirm the assessed settlement and to monitor effects. • Pre and post construction structural condition surveys for specific buildings adjacent to the Neilson Street Interchange. • Pre-construction surveys and ongoing settlement monitoring for key network utilities (as agreed with the network utility operator).	Pre, during and post construction monitoring GSMP
12.18	Contaminated Land	• Manage effects on human health and the environment from works in contaminated land by: – Managing contaminated soil and disposal during construction; – Discharges of dust generated by land disturbance activities; – Discharge of sediment from land disturbance activities; – Exposure to landfill gas; – Potential human health risks for the construction work force; – Discharge of leachate from the Pikes Point Landfill leachate interception system. • Protocols for the testing, identification and offsite disposal (where necessary) of contaminated soil during construction.	Construction planning, methodologies and management measures CLMP
12.19	Coastal Processes	• Detailed design of temporary and permanent coastal works. • Detailed construction methodology for the coastal works. • Stage the reclamation in the Māngere Inlet to minimise exposed areas. • Infill the dredged channel between the dredging site in the Māngere Inlet and the Waikaraka Park construction yard to minimise adverse effects on the Māngere Inlet geomorphology. • Erosion and sediment control measures and perimeter controls for the foreshore works and bridge construction. • Monitor water quality for the dredging and mudcrete operations within the Māngere Inlet. • Contingency planning for trigger level exceedances within the Māngere Inlet during construction which may require changes to the dredging methodology; • Monitor sediment deposition rates at nominated locations in the Māngere Inlet following construction to confirm the modelling. • Manage concrete dust from the removal of the Ōtāhuhu Creek box culverts to prevent this entering the creek • Investigate options for declamation in the Manukau Harbour.	Detailed design Construction planning, methodologies and management measures Pre, during and post construction monitoring Coastal Works CEMP

AEE Section	Topic	Measures	Mechanism to implement measures
12.20	Ecology	• Enhance the existing saltmarsh wetland in Te Hōpua crater (Gloucester Park South) through weed control and buffer planting of appropriate native species. • Restore and recreate saltmarsh habitat along the coastal foreshore. • Minimise effects on the lava flow vegetation by excluding areas from the construction footprint and pier exclusion areas within the lava flow shrublands and saltmarsh habitats in Anns Creek East. Enhance the remaining basalt lava flows and lava shrubland habitats at Pikes Point and Victoria Street through weed control. • Rehabilitate lava shrubland species through planting on the new coastal edge, using eco-sourced local genetic stock and planting of threatened coastal species. • Plant and restore coastal plant species as part of the stormwater wetlands and landscape planting along the coastal foreshore edge. • Weed control and pest control covering a total area of approximately 10ha. • Protect and enhance threatened plant communities (lava shrublands) in Anns Creek through weed control and long-term conservation management, subject to landowner agreements. • Rehabilitate lava shrubland species through planting on the new coastal edge, using eco-sourced local genetic stock. • Restore of coastal ecosystems in Ōtāhuhu Creek through declamation and restoration of fringing saltmarsh and riparian vegetation. • Identify opportunities to create, enhance and connect lizard habitats within the Project area. • Prior to earthworks, identify lizard release sites within the wider Project area. • Restoration planting at Anns Creek, especially enhancement of inanga spawning areas. • Restoration planting of inanga spawning areas. • Enhance remaining waterways through riparian planting and habitat enhancements subject to landowner agreement. • Experimental transplanting of common hard shore organisms to the landward edge of the new landform features. • Investigate opportunities to establish new saltmarsh habitat between terrestrial and mangrove vegetation on the eastern shore of the Māngere Inlet. • Investigate options to increase the abundance of intertidal organisms within the Māngere Inlet) and to increase the abundance of intertidal prey items within the Māngere Inlet. • Investigate opportunities to enhance habitat at or in the vicinity of Ngarango Otainui Island for royal spoonbill. Given macrocarpa have a limited lifespan, more trees could be planted as future roosting habitat for this species. • Plant saltmarsh to replace areas which will be lost under the Project footprint. • Recreate the Anns Creek East raupo wetland in an appropriate location (e.g. at Anns Creek Reserve). • Monitor temporary stream diversions during construction. • Establish a framework for adaptive monitoring during earthwork / construction for elevated discharge of total suspended sediment and/or sedimentation within the CMA. • Post-construction monitor the seaward edge of the new landforms along the northern shore of the Māngere Inlet. • Post-construction monitor the quality of the treated stormwater from the stormwater wetlands along the northern shore of the Māngere Inlet. • Pre-construction monitor Banded rail and Australasian Bittern to determine if they are breeding within the proposed Project footprint. • Reduce the width of the Project footprint as far as practicable by reducing the separation distance between bridge structures in Anns Creek. • Further refinement of bridge pier locations in Anns Creek East to further avoid and minimise adverse effects. • Construction yards confined to the existing consented development areas in Anns Creek East.	Detailed design Construction planning, methodologies and management measures Pre, during and post construction monitoring Operation and maintenance ECOMP
12.21	Surface water	• Detailed design of the stormwater system to incorporate: – All road related stormwater to be designed to achieve 75% TSS removal; – All existing areas of SH20 and SH1 that will be treated as part of the Project will be designed to achieve the same standards of 75% TSS removal; – The stormwater treatment system along the foreshore is to achieve the best practicable treatment standards considering the constraints; – The use of biofiltration systems within the foreshore stormwater wetlands; – Detailed investigations and design to address the likelihood and consequence of blockages, valve, pump and electrical failures and other extreme events with the outcomes incorporated into the final design; and – Further Auckland Council design input into stormwater system that will become Auckland Council assets. • Maintenance for the stormwater treatment devices, network and pump stations to maintain stormwater treatment efficiency and operation and establish emergency response and action plans.	Detailed design Operation and maintenance

Figure 13-2: Mitigation Plan (Māngere Inlet west)

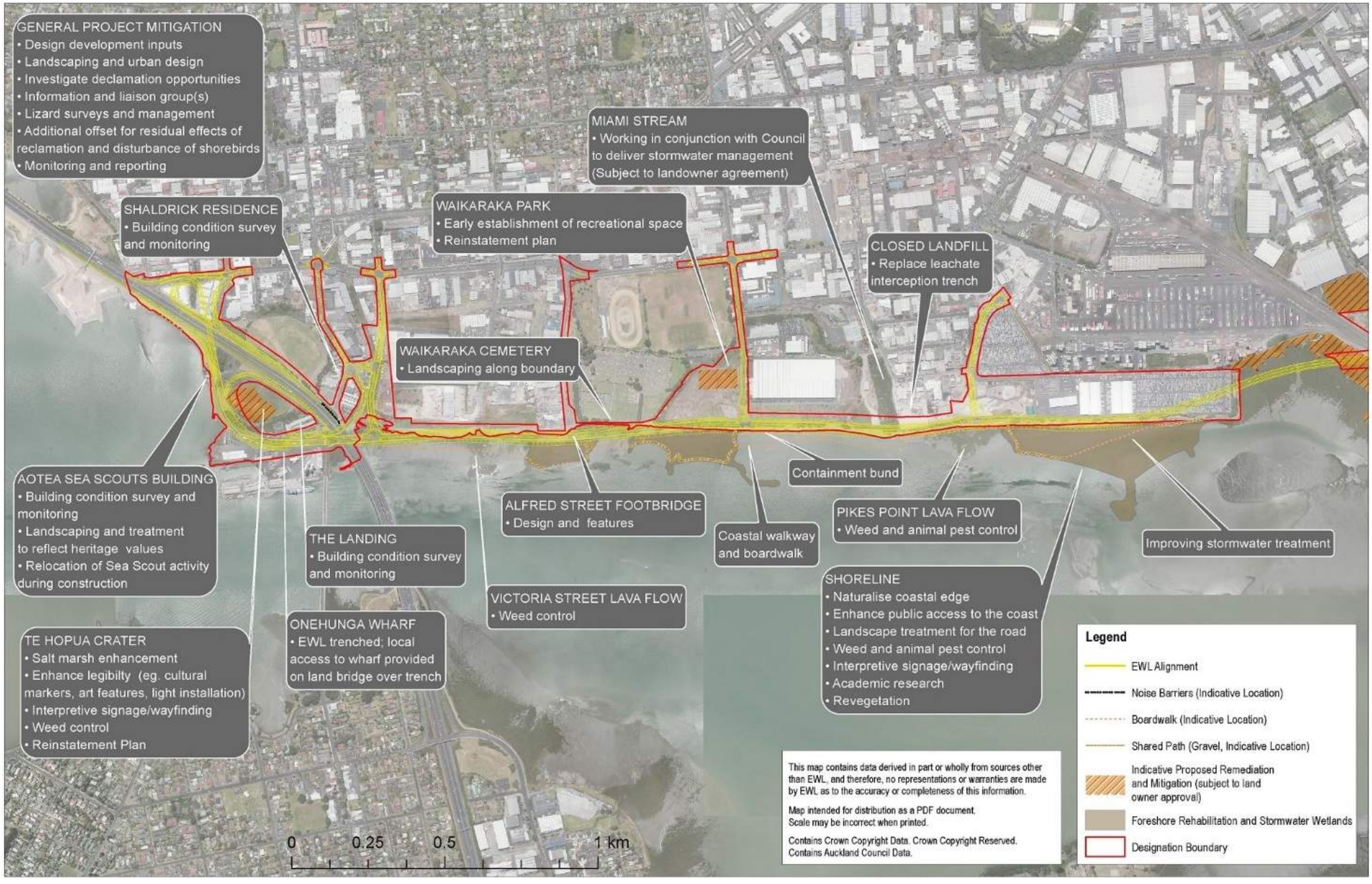

Figure 13-3: Mitigation Plan (Māngere Inlet east and SH1)