An aerial photograph of a coastal industrial and residential area. The foreground is dominated by a large body of water. Along the shoreline, there are several large industrial buildings, including a prominent white warehouse and a large parking lot filled with vehicles. The background shows a dense residential area with many houses, extending towards a range of hills under a cloudy sky.

# DESCRIPTION OF THE ENVIRONMENT

## 10.0 History of the Area

### 10.1 Introduction

This section provides an overview of the Project area's history. It includes descriptions of Māori occupation and European settlement within Onehunga, Penrose and Ōtāhuhu, and provides regional context where necessary. Further detailed information relating to the area's history can be found in *Section 12.7: Archaeology and built heritage*. Cultural information relating to the area is discussed in *Section 12.6: Effects on values of importance to Mana Whenua*.

### 10.2 Māori occupation

Prior to Pākehā arrival in the late 18<sup>th</sup> and early 19<sup>th</sup> centuries, extensive Māori settlements existed throughout the Manukau Harbour, Tāmaki River and Hauraki Gulf. Evidence of these settlements is seen in the many archaeological sites found along shorelines and the slopes of surrounding volcanic cones. Onehunga, Penrose and Ōtāhuhu in particular were important areas due to their close proximity to the Manukau and Waitematā Harbours, strategic defensive locations and fertile volcanic soils.

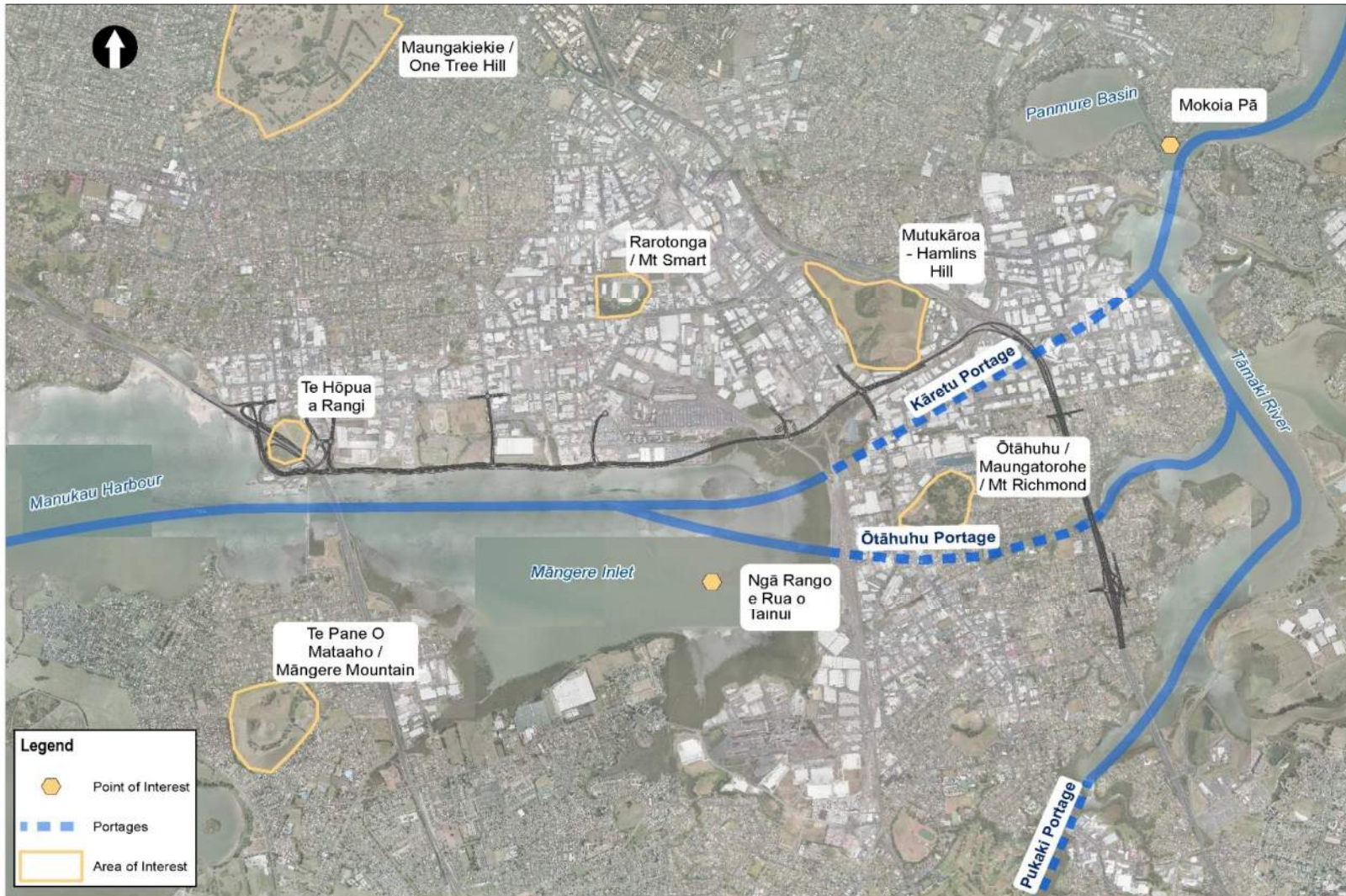
The Auckland isthmus between the Māngere Inlet and Ōtāhuhu Creek is only several hundred metres wide between the east and west coast and represents the narrowest part of New Zealand. Its low elevation and short distance was utilised by Māori for overland portage of canoes and boats. Three key portages were used for overland access and the movement of people and goods between the Waitematā and the Manukau Harbour. The portages were Ōtāhuhu, Kāretu and Pukaki. Their locations are shown in Figure 10-1. Evidence suggests that the Ōtāhuhu portage linking the Māngere Inlet and Tāmaki River was in use as far back as 1100AD. The small island Nga Rango Erua o Tainui (also known as Ngarango e rua o Tainui), located in the upper reaches of the Māngere Inlet is said to be the final resting place of the skids used to haul the great waka Tainui across the Ōtāhuhu portage.

The Māngere Inlet is of significant cultural importance to Mana Whenua not only because it provided access to the Ōtāhuhu and Kāretu Portages but also because the coastline, riverbanks, intertidal areas and freshwater streams were an important source of resources.

Other sites within the Project area with evidence of Māori occupation are shown on Figure 10-1 and include:

- Te Hōpua a Rangi - the basin of Rangihūamoā (the wife of the first Waiohūā paramount chief Huakaiwaka);
- Mutukāroa-Hamllins Hill - a settlement site with at least three areas of occupation and of strategic importance to the Kāretu Portage;
- Rarotonga/Mt Smart - a cultural site that stretches across Onehunga;
- Ōtāhuhu/Maungatorohe/Mt Richmond – a site closely associated with the Ōtāhuhu Portage;
- Mauinaina and Mokoia - two fortified pā at the mouth of the Panmure Basin and positioned to control movement on the Tāmaki River;
- Ihumatao - associated with the volcanic cones of Te Ihu o Mataaoho/the nose of Mataaoho and Te Pane o Mataaoho/Māngere Mountain; and
- Maungakiekie/One Tree Hill - dominating the centre of the Auckland isthmus and one of the largest and most significant pā sites in the area.

Figure 10-1: Sites of cultural importance



### 10.3 19<sup>th</sup> century

From the mid-1840s, Europeans progressively settled around the upper reaches of the Manukau Harbour. Defence settlements were established in Onehunga and Ōtāhuhu due to their ability to provide strategic military and navel defence points. These settlements rapidly expanded and Onehunga Town Centre was established in 1847. Ōtāhuhu was developed as a European town in 1848. Housing, churches and shops followed as the population grew rapidly over the next 20 years.

Industrial development began with a flour mill constructed on Princes Street in 1854 and Onehunga Port (at the location of the current Onehunga Wharf) in 1862. Timber trading flourished during the 1860s with kauri and kahikatea brought down the Manukau Harbour to local sawmills on the Onehunga Foreshore. Infrastructure expanded with the construction of wharves (1858 and 1865), railway connections to Auckland (1873), and the first Māngere Bridge in 1875 (replaced by what is now known as the Old Māngere Bridge in 1915). The area's first water reservoir was established at Captain Springs in 1878.

New commercial, industrial and residential buildings were constructed during the 1870s and 1880s. By 1891, Onehunga's population was nearly 3,000 and various industries, transportation infrastructure, utilities, churches, schools and public amenities continued to be established or further developed.

Waikaraka Park (at 175-243 Neilson Street) was set aside in 1881 for public use as a recreation ground, rifle range and public cemetery. Waikaraka Cemetery opened in 1890 along the southern portion of the reserve and continues to function as a cemetery today. The War Veterans Memorial dedicated to soldiers and servicemen was built in April 1917. Stone walls surrounding Waikaraka Park were built during the Depression years of the early 1930s (and partly relocated in the early 2000s as part of the Neilson Street widening). These built heritage features are still present in the north-western corner of the site and a stone caretaker's cottage is located in the north-eastern corner of the Park. The Landing Restaurant and Bar at 2 Onehunga Harbour Road, constructed in 1879, is the oldest hotel remaining in operation in Auckland.

Figure 10-2 shows the location of heritage items and places within the Project area.

### 10.4 20<sup>th</sup> century

In the early 1900s, cheap flat land and easy access to ports, roads and railways made Onehunga and Ōtāhuhu ideal areas for heavy industry. Southdown freezing works opened in 1905, followed by Westfield and Hellaby's freezing works, new railway workshops, rubber, chemical and fertiliser companies. The Southdown and Westfield freezing works continued to operate until the 1980s.

By 1911, the Onehunga area was subdivided, with a local road network and urban land uses starting to establish. The area continued to grow following World War 1 and World War 2 with development of housing, streets and suburbs increasing. This growth resulted in the construction and development of better road infrastructure and the first section of SH1 opened in July 1953 between the Ellerslie-Panmure Highway and Mt Wellington. The Old Māngere Bridge was supplemented with the existing new crossing in the 1980s, which was later duplicated in the 2000s (Manukau Harbour Crossing).

Upon the completion of the NIMT in 1909, coastal shipping subsequently declined at Onehunga Port. In recent years the port has mainly serviced fishing boats, occasional coastal freighters and the Holcim cement carrier. The Onehunga Branch Line was extended from the Penrose Railway Station to Onehunga Wharf and included the Onehunga Railway Station (corner of Princes Street and Onehunga Mall) and Te Papapa Station (Captain Springs Road).

Figure 10-2: Built heritage items and places of importance



Te Hōpua tidal lagoon was used in the early 20<sup>th</sup> century for boating and a yacht and boating club (now the Aotea Sea Scouts Hall) built on the tuff between the lagoon and harbour in 1911. The Aotea Sea Scouts Hall at 1 Orpheus Drive is the second-oldest boating club in Auckland. The lagoon was reclaimed in the 1930s to create playing fields, now known as Gloucester Reserve. Figure 10-3 shows Onehunga and the lagoon prior to reclamation in the 1930s.

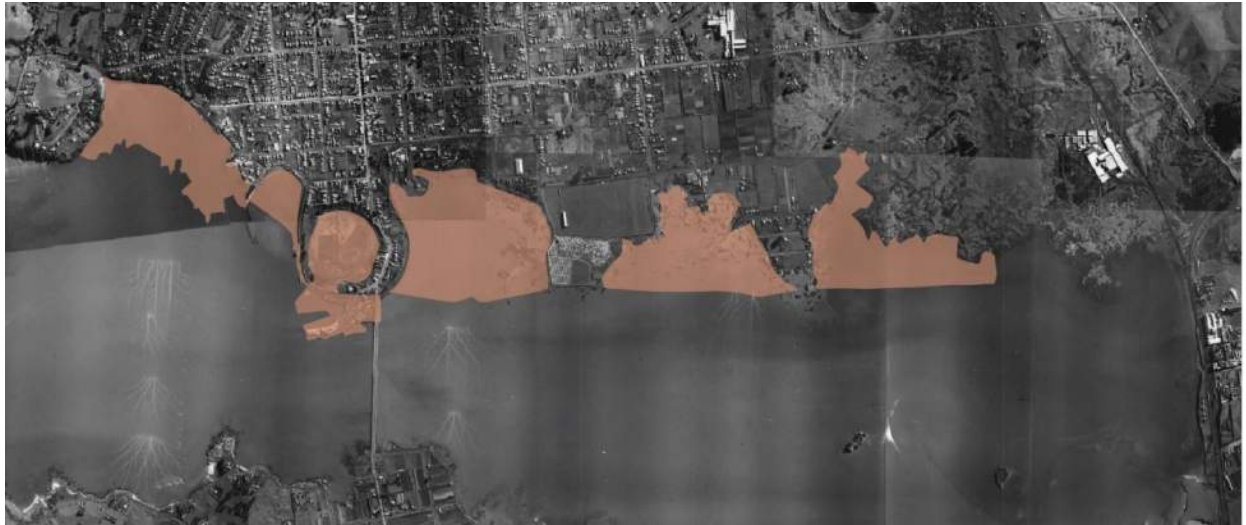
The almost circular shape of Gloucester Park was divided by construction of Hugh Watt Drive in the 1970s which connected Queenstown Road, Hillsborough to Neilson Street, Onehunga. The motorway connection was completed in 1983 with the construction of the new Māngere Bridge to Coronation Road in Māngere.

**Figure 10-3: Onehunga from the air (circa 1930s)**



The coastal edge of Māngere Inlet was highly modified by reclamation throughout the 20<sup>th</sup> century. It is estimated approximately 1.8km<sup>2</sup> (24%) of the CMA has been reclaimed, with the majority occurring after 1940. A number of locations were also used as landfills for municipal waste. Figure 10-4 shows the extent of reclamation undertaken, illustrating the approximate shoreline in 1940 and current day.

Figure 10-4: Approximate extent of reclamation on the northern side of Māngere Inlet 1940-2010



## 11.0 Description of the Existing Environment

### 11.1 Introduction

This chapter provides an overview of the natural, built and social environment in which the Project is located. It focuses on local features and communities that have the potential to be impacted by the Project however regional context is provided where relevant.

The existing environment is described in more detail in the relevant sections of *Part G: Assessment of Effects on the Environment* of this AEE and the associated technical reports contained in *Volume 3: Plan Set*.

### 11.2 Regional context

The Project is located within the Auckland suburbs of Onehunga, Penrose, Mt Wellington, Te Papapa and Ōtāhuhu, approximately 10-15km south of Auckland's CBD. The area is regionally important due to its road and rail transport connections and close proximity to Auckland International Airport and the Port of Auckland (Refer Figure 2-3 in *Section 2.0* of this AEE). Ports of Auckland and Port of Tauranga (MetroPort) both have inland distribution centres located in the Project area. In the Auckland Plan the area is identified as part of the 'regional economic corridor' due to its established commercial, industrial and residential land uses. Transport links between central Auckland, the North Shore, west and south Auckland that cross through the Project area are also regionally important for commuter traffic as well as public and private transport.

The natural environment of the Project area, while discrete and distinct, forms part of a wider environmental and ecological system that stretches across Auckland. This includes groundwater systems, ecological habitats, air and marine environments. A network of community open spaces also exists across the Project area including recreational sports reserves, informal recreation reserves, cemeteries and shared paths.

Regionally important utilities crossing the Project area include high pressure gas mains, water supply, stormwater and wastewater networks, power lines and telecommunications towers (refer to *Section 6.4.7* of this AEE).

### 11.3 Natural environment

#### 11.3.1 Topography and catchments

The Project traverses two major hydrological catchments, being the Manukau Harbour Catchment and the Tāmaki River Catchment (refer Figure 11-1). Within these catchments there are six Auckland Council Drainage Management Areas which discharge stormwater runoff to either the Manukau Harbour (including the Māngere Inlet) or to tributaries of the Tāmaki River (including Ōtāhuhu Creek).

Both catchments are characterised by well-established urban development with a large proportion of impervious surfaces (roads, roofs and concrete areas). Stormwater from impervious areas drains into the piped stormwater network which eventually discharges to coastal areas at the bottom of catchments. Rain that falls on open ground typically soaks through topsoil layers to groundwater. The stormwater reticulation network (piped network) outside of SH20 and SH1 (which is operated by the Transport Agency) are managed and operated by Auckland Council.

The topography of the catchments is generally flat to undulating with a slight gradient from the upper, inland areas to coastal margins. The topographical feature of Mutukāroa-Hamlins Hill is the exception with substantial elevation above the surrounding area.



### 11.3.2 Surface water

Permanent streams within the Project area include Southdown Stream, Miami Stream, Anns Creek and a tributary of Tāmaki River near Clemow Drive (Clemow Stream). Wetlands are present within Te Hōpua and Anns Creek Reserve. These streams and wetlands are shown on Figure 11-1.

Southdown Stream crosses beneath Hugo Johnston Drive via twin culverts. The catchment upstream of Hugo Johnston Drive is piped and predominantly industrial. The lower reaches of the stream in Southdown Reserve are estuarine and discharge to the north-east corner of Māngere Inlet through an 80m long culvert. Southdown Reserve is a stormwater treatment wetland managed by Auckland Council.

Clemow Stream is located within an industrial catchment between the rail corridor and Clemow Drive. It drains northeast to the Tamaki Estuary. It is bounded by SH1 infrastructure to the north east, the Turners & Growers property to the south east and Mt Wellington Highway to the west. Stormwater inputs from SH1 and industrial properties to the south enter the stream via a culvert on the southern side. It is piped upstream and downstream.

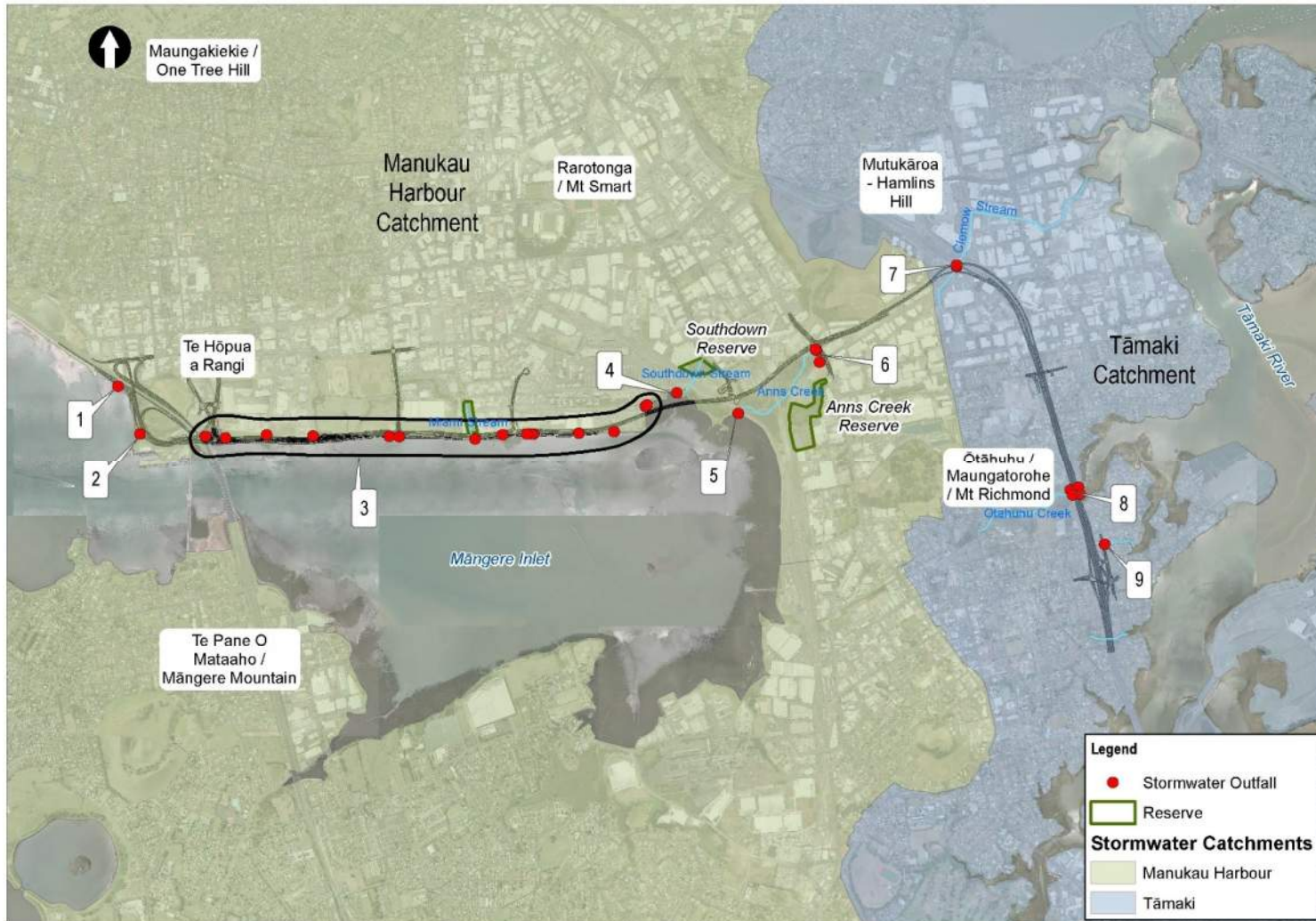
Miami Stream is a small, brackish stream located adjacent to Miami Parade. It is piped for the majority of the upstream catchment however open stream habitat in the heavily industrial catchment may exist. Miami Stream has a short freshwater reach (approximately 20m) that transitions into mangrove-dominated estuarine and then marine habitats in the Māngere Inlet.

#### Stormwater outfall points

The major existing stormwater outfall points within the Project are described below. Figure 11-1 indicates their location and the features are shown in *Plan Set 9: Stormwater of Volume 2*:

1. A large culvert discharging to the CMA beneath SH20 at the Neilson Street Interchange;
2. A stormwater treatment pond treats stormwater from SH20 in this location;
3. Approximately 11 small outfalls along the Māngere Inlet foreshore which discharge into the Māngere Inlet;
4. Three pipes from Southdown Reserve discharging to Māngere Inlet;
5. Two culverts discharge from Anns Creek into the Māngere Inlet;
6. Two culverts discharge to Anns Creek from underneath Great South Road. Three gross pollutant traps on Sylvia Park Road and Great South Road trap gross pollutants and litter from the catchment prior to discharging to Anns Creek;
7. Stormwater from SH1 between Mt Wellington and Panama Road discharges through an underground piped network to Clemow Stream. An existing stormwater pump station lifts stormwater from a low point in this location;
8. Stormwater from SH1 between Panama Road and Princes Street discharges mostly untreated into Ōtāhuhu Creek on both the eastern and western sides of SH1 via four stormwater outfalls. A Transport Agency owned and operated sand filter treats one of these outfalls; and
9. Stormwater from the Princes Street Interchange discharges into a Transport Agency owned and operated stormwater treatment pond within the interchange.

Figure 11-1: Catchments, streams and stormwater outfalls



### Flood prone areas

Auckland Council flood hazard studies and Flood Hazard Mapping indicate that a number of locations within the Project area are subject to potential flooding and ponding (see *Technical Report 12: Stormwater Assessment* for further details). These include commercial sites in Wharangi Street, Hill Street, Neilson Street, Hugo Johnston Drive, Great South Road, Sylvia Park Road, Luke Street, Frank Grey Place and Pacific Rise. Limitations in pipe capacity, lack of secondary overland flow paths and the influence of the tide in southern areas of catchments are thought to contribute to flooding of these low lying commercial areas.

Locations on SH1 that are currently prone to flooding include:

- The northbound Mt Wellington Road off-ramp;
- Beneath the Panama Road overbridge; and
- The northbound on-ramp and southbound off-ramp at Princes Street.

The lowest ground level of industrial property in the Project area is estimated to be at 2.8m RL (Auckland Chart Vertical Datum), on Miami Parade. Mean High Water Springs level is 2.05m RL and the highest recorded tide is 3.04m RL.

### Stormwater quality

Stormwater quality within the Project area is considered typical of industrial and commercial land use in the Auckland context (refer to *Section 12.21: Stormwater* for further discussion). Particles from car exhausts, tyres and brakes, silt, oils and litter collect on road surfaces and are washed from impervious surfaces into the stormwater system during rain events. The area is identified by Auckland Council as likely to be contributing significant quantities of pollutants to the Māngere Inlet<sup>56</sup>.

There are few stormwater treatment systems installed within the Project area however, new developments in the catchment are required by the Auckland Council to provide source control. These controls include treatment for quality and quantity.

It is estimated that approximately 850 tonnes of suspended sediment is generated from 675ha of the Onehunga-Penrose catchment each year. In addition to suspended solids, there are expected to be many other pollutants typically carried in stormwater such as metals, hydrocarbons, nutrients and coliforms.

The results of stormwater quality monitoring undertaken for the Project (as detailed in *Technical Report 12: Stormwater Assessment*) indicate that contaminants including zinc, copper, total suspended solids, and to a lesser extent lead are common in stormwater in this area. The results showed spikes in faecal coliforms and ammoniacal nitrogen levels suggesting local wastewater cross connections and overflows within the stormwater network as well as leachate ingress.

There is also anecdotal evidence from site visits undertaken between January and June 2016 that regular spills and illegal discharges occur within the catchment affecting stormwater quality.

The Māngere Inlet catchment contains some of the most heavily industrialised parts of Auckland. There is a widespread legacy of contamination, including several coastal reclamation sites that were historically used for landfills and uncontrolled filling. It is likely that legacy landfills along the foreshore are leaking

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<sup>56</sup> Integrated Catchment Study Area 4: Onehunga – Medium Level Options Analysis Report, 2004, Auckland City and Metrowater.

leachate into stormwater and groundwater before being discharged into the coastal receiving environment.

### 11.3.3 Geology

The Project is located within the Waitematā basin, a sedimentary basin which formed some 20 million years ago. Sediments from erosion of the surrounding land and volcanic activity have over time accumulated in the basin. Thickening of these sediments resulted in consolidation, forming the sandstones and siltstones of the Waitematā Group. From about six million years ago, a new phase of deposition occurred in the Auckland area leading to the Tauranga Group which overlies the Waitematā Group across most of the Project area.

The Auckland volcanic field developed between 250,000 and 600 years ago, generating regional tuff (compacted, often stratified volcanic ash and debris) and basalt lava flows. The Project area is underlain by lava flows from Maungakiekie-One Tree Hill and Rarotonga-Mt Smart volcanoes as well as Maungarei-Mt Wellington in the east. There are a number of known / visible volcanic features in the vicinity of the Project. These include:

- Te Hōpua. This is a small, volcanic feature of the Auckland volcanic field that has been extensively modified by previous human development. Parts of Te Hōpua are identified as an Outstanding Natural Feature in the AUP (OP) (ID 46 - Hōpua explosion crater and tuff exposure - Site type – B). Over time, the tuff ring was naturally breached by sea level rise and marine and organic muds were deposited within. The breach was closed some 70 years ago and the tuff ring reclaimed with urban refuse and fill;
- Remnant basalt outcrops along the Onehunga Foreshore. Much of the foreshore along the northern margin of the Māngere Inlet consists of outcrops of the distal ends of lava flows which originated from Maungakiekie-One Tree Hill, Rarotonga-Mt Smart and Maungarei-Mt Wellington volcanoes; and
- Lava flows within and around the Anns Creek area. In the north eastern corner of Māngere Inlet and within Anns Creek itself, lava flows from Rarotonga-Mt Smart and Maungarei-Mt Wellington volcanoes are juxtaposed and there are some significant outcrops. Several of these outcrops have been identified as Outstanding Natural Features (AUP (OP) ID 192 Southdown pahoehoe lava flows including Anns Creek, Site type – B).

The Onehunga Bay and Māngere Inlet foreshore have been progressively reclaimed with landfill and engineered fill extending some 500m inland from the present foreshore. The most significant areas of reclamation and landfill include:

- Gloucester Reserve reclamation in Te Hōpua;
- Galway Street Landfill; and
- Pikes Point East and Pikes Point West reclamation and landfills.

Due to the many and varied historic activities and land uses, there are widespread and extensive Hazardous Activities and Industries List (HAIL) sites across the Project area. This includes Gloucester Reserve (uncontrolled fill), Galway Landfill, Pikes Point West and East Landfills, asbestos fill at Hugo Johnston Drive and uncontrolled fill at Anns Creek and Ōtāhuhu Creek.

### 11.3.4 Groundwater

Groundwater in the Project area flows from elevated ground in the north to the coastal areas of Māngere Inlet and Anns Creek. Flow paths are highly variable due to the variable nature and hydraulic characteristics of the underlying geology and basalt lava flows. Groundwater levels in Onehunga are typically 1.2 to 5.5m below ground level. Groundwater recharge is rainfall infiltration, directly as rainfall and through stormwater soakage pits.

The Project crosses two major groundwater aquifers: the Onehunga Aquifer and the Mt Wellington Aquifer. The Onehunga Aquifer is utilised by Watercare to supplement their public water supply network through a groundwater take of approximately 22,000m<sup>3</sup>/day.

Seawater ingress from Māngere Inlet to the basalt and landfill areas along the Onehunga foreshore area is likely.

Key geological features in the Project area including landfills are provided in *Technical Report 13: Groundwater Assessment*.

### 11.3.5 Coastal environment

The Project area includes Māngere Inlet and Ōtāhuhu Creek. Māngere Inlet is located in the north-eastern corner of the Manukau Harbour while Ōtāhuhu Creek is an upper reach of the Tāmaki River which flows to the Waitematā Harbour.

#### Manukau Harbour/Māngere Inlet

The Manukau Harbour covers an area of approximately 350km<sup>2</sup>, of which 226km<sup>2</sup> is intertidal. The Māngere Inlet has an area of 5.7km<sup>2</sup>, with 5.37km<sup>2</sup> of the Inlet being intertidal mudflats.

The northern shore of the Māngere Inlet has been extensively modified through reclamation, port activities, creation of landfills and roads. These activities have resulted in the loss of natural embayments and establishment of a linear shoreline (refer Figure 11-2). The coastal edge is protected by a variety of coastal structures including tipped rock, rock revetments and vertical sea walls offering varying degrees of coastal erosion protection.

**Figure 11-2: Northern coastal foreshore of Māngere Inlet (present day)**



The Māngere Inlet has been subject to significant change since the mid-1800s and was the location of several large scale industrial developments that have resulted in a reduction of the Inlet's surface area. The original Inlet had a CMA of 7.5km<sup>2</sup> but this has been reduced to 5.7km<sup>2</sup> through reclamation, resulting in a loss of 1.8km<sup>2</sup> (24%).

Anns Creek, in the north-eastern corner of the Inlet, comprises a short section of open stream, extensive mangrove stands and some areas of saltmarsh.

The eastern shore of Māngere Inlet was reclaimed to establish the Westfield yards. The southern shore is less modified. The Harania and Tararata Creeks remain relatively intact. Nga Rango Erua o Tainui Island is located in the south-east end of the Inlet.

Historically, a number of industries located adjacent to the Māngere Inlet (e.g. meat works, abattoir, fertiliser works, wool scours, fellmongeries, tannery, woollen mill, wood-pulp works, battery works, soap and candle works and glue works) and discharged waste directly into the Inlet. In more recent times, runoff from railway workshops, a steel plant, Middlemore Hospital, and septic tank and landfill leachate was discharged to the Inlet. The Māngere Wastewater Treatment Plant upgrade, which occurred between 1998 and 2003, contributed significantly to improved water quality in the Manukau Harbour and Māngere Inlet.

The Māngere Bridge and Onehunga Wharf constrict water flows between the Māngere Inlet and the wider Manukau Harbour.

Sediments within the Inlet consist of mud and fine grained sand. Core sampling indicated that sediment texture has been muddy since pre-human times.

Māngere Inlet experiences a significant amount of sediment movement, particularly during windy conditions. Sediment is predominantly from redistribution around the Manukau Harbour and Māngere Inlet rather than from catchment sources.

The subtidal area adjacent to the Onehunga Wharf is dredged periodically, with the area affected being approximately 4,050m<sup>2</sup>. The dredging is associated with maintaining ship accessibility to the wharf.

### **Tāmaki River – Ōtāhuhu Creek**

Ōtāhuhu Creek is a tributary of the Tāmaki River which connects to the Hauraki Gulf. Tāmaki River is on the eastern side of Auckland and forms a long narrow channel about 17km long. Its shores are dominated by mangroves with muddy channels. The middle reaches are a mix of tidal mud flats, patchy marginal strips of mangroves, mud covered low-lying shore platforms, and sandy beaches.

Ōtāhuhu Creek is a shallow tidal creek with extensive mangrove covering and an urbanised catchment of 144ha. A combination of a small wind fetch length and large mangrove areas prevents any significant wave action. In the late 1950s triple culverts were installed under SH1 causing an upstream build-up of sediment. This corresponded with an increase in mangroves. The approximate CMA of the creek to the west of the SH1 is 5 ha, 95% of which is covered with mangroves. Figure 11-3 shows Ōtāhuhu Creek at SH1.

Figure 11-3: Ōtāhuhu Creek (present day)



### 11.3.6 Terrestrial Ecology

The Project is within the Tāmaki Ecological District, an area characterised by terrestrial vegetation that has been heavily modified by urban and industrial development. The Project alignment can be divided into several broad areas based on groupings of terrestrial habitats. At the western extent of the Project area, a small saltmarsh wetland is present within Gloucester Park South (AUP (OP) SEA-T-6103). The wetland is fed by saltwater intrusion and is dominated by indigenous saltmarsh species. It is surrounded by large groups of planted shrubs (a mix of native and exotic species) and rank grassland. There is a large pōhutukawa (*Metrosideros excelsa*) tree beside Onehunga Harbour Road on the edge of Gloucester Park South.

The coastal fringe surrounding Māngere Bridge and SH20 is mostly mangroves and saltmarsh dominated by glasswort. An area of mangroves has been cleared on the western edge of the bridge. Along the coastal walkway are groups of native plantings and a large embankment dominated by weed species.

The coastal foreshore of Māngere Inlet has several remnant basalt lava outcrops which extend from the coastal reclamation. These outcrops are dominated by mangrove forest with small pockets of lava shrubland. Within the mangroves at Pikes Point, lava shrublands are dominated by ngaio, karo, flax and saltmarsh species. The whole of the mangrove forest and lava outcrops at Pikes Point are identified as SEA in the Operative District Plan, while in the AUP (OP), five of the lava shrubland areas at Pikes Point are identified as SEA (AUP (OP) SEA-T-9022). Weed species such as gorse (*Ulex europeaus*) and pampas are common on the lava. In the vicinity of Waikaraka Park there are several small lava flows dominated by saltmarsh species, extending out from the rock wall.

The remainder of the coastal shoreline is characterised by mangroves scattered sporadically along the majority of the rocky shoreline. The rocky embankment has small pockets of shrubs such as taupata, karo, and pohuehue. Native plantings and mown grass line the edges of the coastal walkway. Weed species such as moth plant (*Araujia hortorum*) are common. At Waikaraka Cemetery, there is a grove of planted pōhutukawa either side of the Cemetery access road.

Anns Creek is characteristic of the early vegetation cover of the Auckland isthmus. It is the only remaining area in Auckland where native shrubs, herbs and ferns, including threatened species, remain growing together on lava. Three threatened Geranium species have been recorded in Anns Creek: *G. retrorsum*

(‘nationally vulnerable’), *G. solanderi* (‘at risk – declining’), and *Pelargonium inodorum* (regionally ‘sparse’). A threatened volcanic fern, *Pellaea falcata* (‘at risk-declining’) has also been recorded on the lava. The lava field at Anns Creek is the type locality for the shrub *Coprosma crassifolia* collected there by William Colenso in 1846.

The mouth of Anns Creek at Māngere Inlet contains an extensive area of mangroves with basalt lava flows extending into Manukau Harbour (refer Figure 11-4). Native shrub and saltmarsh species occur on the basalt lava flows together with a mix of exotic weed species including blackberry (*Rubus fruticosus* agg.) and gorse. On the landward eastern half of the Inlet, exotic trees such as brush wattle are dominant together with exotic weeds and grasses including moth plant, blue morning glory and cape ivy (*Senecio angulatus*).

Southdown Reserve is dominated by a mix of 20 year or older native and exotic plantings and an area of mahoe (*Melicactus ramiflorus*) forest. The stream flowing through the reserve has an area of raupo and flax at the freshwater end which grades into mangroves, and into a small area of saltmarsh at the southern end, with oioi, salt marsh ribbonwood and *Carex flagellifera*. Weed species are common. The abandoned lot adjacent to Southdown Reserve at 213 Hugo Johnston Drive contains rank grass and weeds.

Vegetation on the banks of Ōtāhuhu Creek on the eastern side of the motorway is dominated by exotic species including bamboo (*Phyllostachys* sp.) and brush wattle. On the western side of the motorway there is a mix of native and exotic trees and shrubs including tutu (*Coriaria arborea*). North and south of Ōtāhuhu Creek, there are planted trees beside SH1 in a number of locations. The Princes Street area is characterised by planted trees and shrubs beside the motorway.

**Figure 11-4: Anns Creek estuary area (present day)**



A range of potential lizard habitat is present throughout the Project area including replanted native vegetation around Miami Creek, vegetated reserve margins with refugia including piled basalt rocks and wood debris (Manukau Foreshore Walkway) and grasslands that provide basking habitat and refugia (Captain Springs Road). The majority of potential lizard habitat is considered ‘poor’ quality, but small areas of ‘moderate’ and ‘high’ quality habitat were observed. No native lizards were detected during lizard surveys undertaken for the Project.



### 11.3.7 Avifauna

Manukau Harbour is an important site for a number of Threatened and At Risk national and international migratory wading and shorebirds. The mangroves, saltmarsh and wading bird habitat at the mouth of Anns Creek in Māngere Inlet is identified in the AUP (OP) as SEA-M1 and is contiguous with wading bird habitat. The SEA-M2 wading bird area in the wider Māngere Inlet extends to Pikes Point. Banded rail (At Risk) and Australasian bittern (Threatened) have historically been reported in the Anns Creek salt marsh, mangroves and wetlands but have not been observed during Project surveys.

A diverse range of shore birds are known to forage on the Māngere Inlet intertidal mudflats and include NZ pied oystercatcher (At Risk), bar-tailed godwit (At Risk), pied stilt (At Risk), lesser knot (Threatened), wrybill (Threatened), northern NZ dotterel (Threatened), royal spoonbill (At Risk), white-faced heron, red-billed gull (Threatened) and black-backed gull. A number of tern and shag species forage in low numbers in the channels and subtidal area of the Māngere Inlet.

High tide roosts within the Māngere Inlet are currently limited but include Pikes Point reef and a large macrocarpa tree on Nga Rango Erua o Tainui Island which are both utilised by royal spoonbill. Other shorebirds do not appear to roost along the northern shoreline of Māngere Inlet in significant numbers. Other important high tide roosts within the wider area include the roofs of several industrial buildings as well as Ambury Park and Kiwi Esplanade to the south.

Unlike elsewhere in the Tāmaki Estuary, Ōtāhuhu Creek does not provide habitat for wading or shorebirds.

The northern shore of Māngere Inlet and surrounding Ōtāhuhu Creek has been highly modified due to urbanisation and commercial activities resulting in terrestrial avifauna assemblages in the area being dominated by exotic species. No Threatened or At Risk land bird species were recorded in this area during Project surveys.

### 11.3.8 Freshwater ecology

Freshwater streams within the Project area are within the Auckland Council Maungakiekie-Tāmaki State of the Environment reporting area. The freshwater grade given to the area in 2014 (the most recent available report) was F, the lowest possible grade (Auckland Council 2014). Freshwater quality indicators used to derive this grade include water quality (grade E), flow patterns (grade D), nutrient cycling (grade F), habitat quality (grade F) and biodiversity (grade F). In general, in stream health in Maungakiekie-Tāmaki is considered impaired due to urban development. Development effects include elevated water temperatures, reduced biodiversity value, changes to the natural flow patterns and increased pollution from contaminated stormwater.

The four permanent streams in the Project area are generally consistent with other waterways in Maungakiekie-Tāmaki in terms of in stream health. Miami Stream, Southdown Stream and Clemow Stream having low ecological values based on poor habitat diversity and condition, low invertebrate and fish diversity and abundance, and high (untreated) stormwater input. Anns Creek has the most evenly spread distribution of aquatic macroinvertebrates (indicating a healthy balance of different types and function), whereas the streams were dominated by one or two taxa which typically indicates a highly modified ecosystem.

Further, all of the streams surveyed were short stream reaches in predominantly piped catchments, so the opportunity for migratory species to move upstream is low.

Anns Creek represents a low lying coastal estuarine sequence with nationally 'At Risk' inanga. The presence of large shoals of juvenile and adult inanga means that the freshwater component at Anns Creek has value as a waterway that supports the potential for spawning and juvenile rearing.

### 11.3.9 Marine Ecology

The Project area includes Māngere Inlet (primarily the northern shore and Anns Creek) and Ōtāhuhu Creek at SH1.

#### Māngere Inlet

Māngere Inlet is a tidal mudflat that almost entirely empties at low tide. The benthos is dominated by silt and clay sediment. The benthic invertebrate community comprises moderate richness, diversity and abundance. Asian date mussels are present sub-tidally. Sediment contaminants are moderately elevated along the northern shore.

Anns Creek comprises a short section of open stream, extensive mangrove stands and some areas of saltmarsh. The marine habitats within Anns Creek are severed in a number of locations by rail corridors, with remnant mangrove stands physically isolated from the main mangrove area.

The eastern shore of Māngere Inlet is reclaimed whereas the southern shore is less modified. Dense mangroves fringe the eastern and southern shores, whereas the northern shore comprises less dense and patchy areas of mangroves.

There are three AUP (OP) SEA-M1 areas in the Māngere Inlet: Anns Creek (21), Ambury (23 - located in the south-west of the Inlet) and a small area in the south-east of the Inlet (22). A large AUP (OP) SEA-M2 (22) area covers most of the remaining CMA within the Inlet, excluding the north-west shore and central areas.

Anns Creek SEA-M1 comprises an ecological sequence and mosaic of vegetation types, including basalt lava shrubland, freshwater wetland, saltmarsh and mangroves. Inanga are known to spawn in this area. Anns Creek is also recognised as a Coastal Protection Area 1 in Auckland Council's Operative Coastal Plan (CPA1 21).

Ambury SEA-M1 comprises an important high tide roost area and foraging area for a wide range of international migratory and New Zealand endemic wading birds. The small SEA-M1 located in the south-east corner of the Inlet comprises a complex of saltmarsh species.

SEA-M2 covers much of the south-east of the Inlet (22a) and is recognised for saline vegetation on the coastal margins and extensive intertidal mudflats containing benthic invertebrate communities that are diverse and dense. The benthic invertebrate assemblages provide important foraging for international and endemic wading birds, some of which are threatened. The Auckland Council Operative Coastal Plan recognised a smaller area as CPA2 (22a) as important foraging habitat for coastal birds.

The entire Manukau Harbour is recognised by DOC as an Area of Significant Conservation Value (7), with intertidal mudflats, mangrove and saltmarsh of importance. The harbour is recognised as an internationally important feeding, roosting and breeding area for wading birds.

The Māngere Inlet contains large mangrove stands and therefore likely provides habitat for fish species when inundated at high tide. Morrissey et al. (2007) found that the typical fish species that use mangrove habitats include sand and yellow-belly flounder (*Rhombosolea plebeia* and *R. leporina*) and snapper (*Pagrus auratus*). Recreational fishers on the Old Māngere Bridge commonly catch kahawai (*Arripis trutta*) and Jack mackerel (*Trachurus novaezelandiae*) (Kelly & Sim-Smith, 2015).

While pilot whales, killer whales, dolphins and seals have been seen in the Manukau Harbour, it is highly unlikely that whales or dolphin would venture into the upper reaches of the Māngere Inlet. Seals have been seen near the Māngere Wastewater Treatment Plant and other places around the Manukau Harbour however it is highly unlikely they would swim into the Māngere Inlet for any length of time due to the habitat being primarily intertidal, the shallow depth of water at high tide and the barrier presented by the Old Māngere Bridge.

In 2006, the area within Māngere Inlet covered by mangroves was estimated at 110ha. Saltmarsh is currently present in small areas including 0.25ha area of bachelor's button in the south-east corner.

### Ōtāhuhu Creek

Ōtāhuhu Creek, where it is crossed by SH1, comprises a narrow channel fringed by dense mangroves. While the groupings of benthic invertebrates comprise moderate species diversity, richness and abundance, the invasive Asian date mussel is abundant within the channel. Benthic sediment comprises silt and clay and generally has moderate contaminant concentrations. Mangroves dominate the mudflats (occupying approximately 95% of the CMA west of the existing SH1 alignment), with negligible saltmarsh present between mangroves and land around the SH1 crossing (Kelly, 2008).

The intertidal areas within the Ōtāhuhu Creek are recognised in the AUP (OP) as a significant ecological area as they provide extensive areas of foraging habitat for wading birds (SEA-M2, 45c).

Fish present in the Tāmaki Estuary, particularly near Ōtāhuhu Creek are likely to be speckled sole (*Peltorhamphus novaezeelandiae*), sand flounder (*Rhombosolea plebeia*), grey mullet and short-fin eel.

#### 11.3.10 Air quality

Because the Project is located within a regional hub for transport and distribution activities, the air quality environment is heavily influenced by the many arterial roads which have a high volume of truck and heavy vehicle movements. Motor vehicles discharge a wide range of contaminants however nitrogen dioxide and fine particles are the main pollutants of concern due to their potential adverse health effects. Existing air quality data from Auckland Council's Penrose monitoring site and a NIWA research study carried out in Ōtāhuhu East indicates background levels in the Project area currently comply with the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (AQNES).

## 11.4 Built environment

### 11.4.1 Land use

A large portion of the Project is located in one of Auckland's main commercial, industrial and manufacturing areas. It is a regional hub for the transport and distribution of goods, with Ports of Auckland, MetroPort (which services Port of Tauranga), KiwiRail and Toll Freight all operating in the area. A large number of other freight distribution and logistics firms also take advantage of the area's proximity to key markets and the well-established road and rail network. The sections of the Project along SH1 are predominantly surrounded by residential areas such as Ōtāhuhu.

Land use around Neilson Street Interchange and Galway Street is primarily transport, network utilities, open space (informal and formal) and commercial/industrial. Residential areas are located further to the north (Onehunga), west (Hillsborough) and south (Māngere Bridge). The Onehunga Town Centre is also located immediately to the north and the recently constructed Taumanu is to the north-west.

Along the northern shore of Māngere Inlet, land use is primarily industrial and open spaces. Open spaces include the Manukau Foreshore Walkway for walking, cycling and recreation, Waikaraka Cemetery, Waikaraka Park and the Māngere Inlet foreshore.

The north eastern end of Māngere Inlet becomes Anns Creek. The NIMT bisects Anns Creek and connects to the Southdown Freight Terminal located immediately to the north. Land use in this area is dominated by freight loading activities for road and rail. The KiwiRail designation for Southdown Freight Terminal includes a spur through Anns Creek which is designated for rail purposes but has not been constructed.

Anns Creek East is subject to a designation for railway purposes, held by KiwiRail, that traverses the south west corner of the area and authorises activities for railway purposes. Appendix C to *Report 2*:

*Statutory Analysis Report* contains a map showing the location of the designation. The designation has recently been confirmed in the AUP (OP). The designation does not authorise the alteration or removal of vegetation, given that such an activity requires regional consents under the AUP (OP). In addition, one of the current landowners of Anns Creek East, TR Group Ltd, has resource consents for reclamation and development of the eastern part of the area. The consents authorise two stages of works in different parts of Anns Creek East, subject to a comprehensive suite of conditions. Site visits by the Project team have indicated that only the first stage of works has been given effect to. Works related to stage 2, being the filling of an eastern part of Anns Creek adjacent to Great South Road has yet to be undertaken.

Between Great South Road and SH1, land use is predominantly industrial, including major storage and distribution activities. A regionally significant gas storage facility is located on the corner of Vestey Drive and Mt Wellington Highway. Sylvia Park Shopping Centre is located on the eastern side of SH1. A high pressure gas pipeline and transmission lines cross through this area and generally follow the alignment of Sylvia Park Road. Mutukāroa-Hamiltons Hill Regional Park is located to the north.

The Project area from Mt Wellington to Princes Street is dominated by SH1. Around Mt Wellington, land uses are predominantly commercial and light industrial while the Princes Street area is dominated by the residential areas of Ōtāhuhu. The residential areas are predominantly low density single houses on large sites.

The AUP (OP) identifies Onehunga Town Centre as a growth area for both residential and commercial activity, and Sylvia Park Town Centre as a growth area for commercial and retail activities. Ōtāhuhu has been identified as one of the ten priority areas for development in the Auckland Plan. More recently the area has been up-zoned significantly under the AUP (OP) to Mixed Housing, Terraced Housing and Apartment Zoning. The area is also a pilot Spatial Priority Area for Auckland Council which means there is a focus from Auckland Council on job creation, more housing, improved recreation, better transport and a higher quality environment overall.

Existing designations within the Project area include the following:

- ID 6305 – Southdown Freight Terminal (New Zealand Railways Corporation (Kiwi Rail))
- ID 6718 – State highway 20 from Hillsborough Road to Manukau Harbour Crossing, Onehunga (NZ Transport Agency)
- ID 9102 – Gas Transmission Pipeline (First Gas Ltd)
- ID 9947 – Water Supply Purposes – Hunua No. 4 Watermain (Watercare services Ltd)
- ID 1102 – Protection of aeronautical functions (Auckland International Airport Ltd)
- ID 9102 – Gas Transmission Pipeline (First Gas Ltd)
- ID 1677 – Road Widening Great South Road (Auckland Transport)
- ID 6300 – North Auckland Railway Line (New Zealand Railways Corporation (Kiwi Rail))
- ID 6302 – North Island Main Trunk Railway Line (New Zealand Railways Corporation (Kiwi Rail))
- ID 6734 – State highway 1 (NZ Transport Agency)
- ID 8502 – Electricity transmission – overhead electricity transmission lines in a corridor between Penrose Substation on Gavin Street and the Tāmaki River (Transpower New Zealand Ltd)
- ID 8509 – Electricity transmission – overhead tower site and associated overhead transmission lines of the Māngere-Mt Roskill A 110kV transmission line (Transpower New Zealand Ltd ID 551 – Captain Springs Road Local and Sports Park (Auckland Council))
- ID 553 – Pikes Point Transfer Station (Auckland Council)
- ID 1695 – Road Widening – Neilson Street (Auckland Transport)
- ID 1699 – New Road – Pukemiro Street (Auckland Transport)
- ID 1700 – New Road – Captain Springs Road (Auckland Transport)
- ID 1701 – New Road – Manukau Esplanade (Auckland Transport)
- ID 1703 – Road Widening – Church Street (Auckland Transport)

The land use zones for the Project area, as identified within the AUP (OP) are in summary:

- Public Open Space – Sport and Active Recreation
- Public Open Space – Informal Recreation
- Business Mixed Use
- Light Industry
- Heavy Industry
- Strategic Transport Corridor
- Minor Port
- Coastal Transition
- General Coastal Marine
- Public Open Space - Conservation
- General business
- Single House
- Mixed Housing Suburban
- Terrace Housing and Apartment Buildings
- Mixed Use
- Cemetery

#### 11.4.2 Transport network and facilities

The transport network within the Project area is characterised by a wide range of existing infrastructure and facilities including local roads, State highways, passenger and freight rail lines, pedestrian paths, cycle ways and bus services. SH20 and the Neilson Street Interchange mark the western edge of the Project area. SH1 between Mt Wellington Highway and Princes Street marks the eastern edge of the Project area. Great South Road and Mt Wellington Highway bisect the Project area north to south.

Large volumes of traffic flow through the Project area with many road networks and intersections functioning at an unsatisfactory level of service resulting in inconsistent travel times and delays. Traffic volumes in the Project area are anticipated to grow substantially in the future, adding to the traffic congestion already experienced by road users. Traffic growth within the Project area for 2036 is anticipated to be:

- Onehunga (vehicles): 16% increase;
- Onehunga (bus): 230% increase;
- Mt Wellington / Ōtāhuhu (vehicles): 16% increase; and
- Mt Wellington / Ōtāhuhu (bus): 95% increase.

The location of key transport infrastructure within the Project area is discussed in further detail in *Technical Report 1: Traffic and Transport Assessment*.

#### State highways

There are two State highways within the Project area: SH1 and SH20. SH1 is the main north-south route through Auckland and one of the most heavily-used pieces of road infrastructure in New Zealand, carrying more than 150,000 vehicles per day. The Project area includes the section of SH1 between Mt Wellington Highway and Princes Street. SH1 at Mt Wellington consists of three lanes in the northbound direction, which then reduces to two lanes after the Mt Wellington northbound off-ramp (three lanes merge to two lanes). In the southbound direction SH1 consists of two lanes at the interchange becoming three lanes after the southbound on-ramp. Mt Wellington Interchange provides all direction access to SH1 via on/off-ramps. The posted speed limit on SH1 is 100km/h.

SH20 passes through the suburb of Hillsborough to the west of the Project area and Māngere Bridge to the south. SH20 is the main transport connection to Auckland Airport and eventually joins SH1 to the south of Manukau City Centre. Neilson Street Interchange provides all direction connections to SH20. In this location SH20 has three lanes in each direction and a posted speed limit of 100km/hr. Manukau Harbour Crossing immediately to the south of Neilson Street Interchange has four lanes in each direction.

Onehunga Harbour Road and Neilson Street are the main arterials connecting SH20 to Onehunga. SH20 in the vicinity of the Project is shown in Figure 11-5.

**Figure 11-5: Looking south on SH20 with Māngere Inlet in the distance (present day)**



### Local roads

The main arterial roads within the Project area include Neilson Street, Church Street, Mt Wellington Highway, Great South Road, Sylvia Park Road and Onehunga Harbour Road. Secondary arterials include Panama Road, Princes Street and Frank Grey Place. Local and arterial roads generally have posted speed limits of 50km/h and range from two to four lanes. The intersection at Great South Road/Sylvia Park Road is a signalised intersection consisting of three approaches. The south approach has 1200 vehicles per day travelling in the morning, the north approach peaks at 700 vehicles per day, while the Sylvia Park Road approach shows no hourly peaks in traffic demand.

The total traffic volume at the Sylvia Park Road / Mt Wellington Highway Intersection peaks at 3,400 vehicles per hour at 8am and again between midday and 4pm.

Other key local roads within the Project area include:

- Orpheus Drive - provides a connection between Seacliffe Road and Onehunga Harbour Road and provides access to the Onehunga Foreshore area as well as Onehunga Wharf. The road width is generally narrow, particularly south of the Manukau Cruising Club.
- Alfred Street - a short cul-de-sac, approximately 500m long. It primarily serves adjacent industrial business properties on one side and traffic mainly consists of heavy commercial vehicles.
- Captain Springs Road (south) - a cul-de-sac accessed from Neilson Street. It is approximately 500m long and enables access to adjacent industrial businesses and Waikaraka Park. The average daily traffic is 2500 vehicles per day in both directions.
- Hugo Johnston Drive – a cul-de-sac extends from the Neilson Street signalised intersection and continues south where it ends at the Manukau Foreshore Walkway entrance. The five-day average daily traffic was recorded to be 9088 vehicles per day in both directions.

There are also many smaller local roads in and around the Project area in the suburbs of Onehunga, Te Papapa, Penrose, Mt Wellington and Ōtāhuhu. These small local roads are typically two-lanes with a posted speed limit of 50km/h.

For east-west vehicle movements within the Project area, road users are likely to use Neilson Street, Church Street and Sylvia Park Road.

The Panama Road and Princes Street overbridges offer the only east-west connection across SH1 within the Project area. The Panama Road bridge is two lanes with a narrow footpath on both sides and no dedicated cycling provision (refer Figure 11-6). It has a morning peak of 450 vehicles per hour in each direction and then an evening peak of 500 vehicles per hour between 4-5pm.

**Figure 11-6: Panama Road Bridge (present day)**



The Princes Street overbridge is one lane in each direction with a narrow footpath on either side (refer Figure 11-7). The bridge is a key connection over SH1 for residents of Ōtāhuhu and offers access on and off SH1.

**Figure 11-7: Princes Street overbridge (present day)**

### Bus network

The public bus network within the Project area includes up to 18 different buses routes connecting Onehunga Town Centre with other locations across Auckland as well as important bus routes along Great South Road and Mt Wellington Highway, connecting Ōtāhuhu and beyond. There are also a large number of bus connections and bus stops throughout the local streets of Ōtāhuhu and Onehunga.

Reliability is the biggest challenge for public transport within the area, particularly for buses. Buses are subject to regular congestion and accessing Onehunga from SH20 has significant travel time variability of 6-8 minutes over a 2.5km distance.

Auckland Transport is proposing to restructure the bus network which is to be implemented in 2017. This will mean more frequent services travelling between key locations (e.g. Sylvia Park, Ōtāhuhu and Māngere). These will be supplemented by less frequent collector and local routes which connect suburban areas with the main centres.

### Rail network

The Onehunga, NIMT and the North Auckland rail lines all traverse the Project area. There are three train stations within or in close proximity to the Project area: Onehunga and Te Papapa train stations are on the Onehunga Line which travels between Britomart and Onehunga station, and Sylvia Park Station is on the Eastern Line which travels between Britomart through Mt Wellington and terminates at Manukau.

To the north of Anns Creek is the Southdown Rail Yard, which is the main freight loading yard for Auckland. This joins to the NIMT enabling connections across the North Island.

### Pedestrian and cycleways

Within the vicinity of the Project there is approximately 5.1km of off-road shared paths and 0.7km of segregated on-road cycleways. The quality of these existing pedestrian and cycleways is highly variable with many suffering from poor physical connectivity, severance, low visual amenity and safety issues. The exceptions are the Manukau Foreshore Walkway and Taumanu which have high levels of amenity.

Existing pedestrian and cycle connections within the Project area are illustrated in *Technical Report 1: Traffic and Transport* in Volume 3.



In general, the pedestrian and cycleways within the Project area are as follows:

- Taumanu/Orpheus Drive: A high-quality recreational trail and commuter route separated from general traffic. Connections are provided north to the suburb of Highbury, south to Old Māngere Bridge and east across SH20 via a pedestrian bridge to Onehunga. Old Māngere Bridge (see Figure 11-8) is a key north-south movement for pedestrians and cyclists primarily from Māngere Bridge suburb accessing Onehunga Town Centre and other services/facilities. The walking and cycling link contains an underpass which passes under the Manukau Harbour Crossing and through to Onehunga Mall.
- Onehunga Harbour Road and Manukau Foreshore Walkway: A high-quality separated shared path (see Figure 11-9), although it has a somewhat isolated character, hidden behind industrial sites. Connections are provided to the south across Māngere Inlet via Old Māngere Bridge, to the north via local road connections and east to west between Onehunga Wharf and Hugo Johnston Drive. Connections to local roads are generally on narrow footpaths with limited safe crossing points at signalised intersections. At Anns Creek, a pedestrian/cycle bridge provides access across the Kiwi Rail Corridor. The shared path provides links to Waikaraka Park and Anns Creek and extends for approximately 4km from SH20 at Onehunga and ends at Hugo Johnston Drive. It is used by both recreational and commuter cyclists and pedestrians. The highest usage of the path is recorded in the weekend.
- Great South Road to SH1: There are no dedicated cycleways or lanes between Great South Road and the Mt Wellington Interchange at SH1 and Sylvia Park Town Centre. There are pedestrian paths along main roads but limited safe crossing points, e.g. there are no pedestrian crossing facilities at Great South Road-Mt Wellington Highway intersection.
- SH1: Pedestrian connections across SH1 at Princes Street and Panama Road overbridges are narrow with no dedicated cycleways or lanes. Safe connections to adjacent local roads are inadequate.

**Figure 11-8: View of Old Māngere Bridge looking north towards Onehunga**



**Figure 11-9: Manukau Foreshore Walkway****Ports**

The Port of Onehunga (and Onehunga Wharf) is located south of Gloucester Park, accessed from Onehunga Harbour Road. The site comprises an area of reclaimed land and wharf structures. It is currently used for distribution of bulk materials (cement) and commercial fishing activities. However, Holcim has indicated it will cease its cement operations on the site, with commercial operations closing in 2017. An aerial photo of Onehunga Wharf is shown in Figure 11-10.

Panuku has identified the wharf site as a potential key for its wider Onehunga Transformation programme. Both Panuku and the community have explicit aspirations to transform this area into a mixed use development (e.g. a mix of public space, residential and commercial activities). There is no current programme for the implementation of this development.

**Figure 11-10: Onehunga Wharf**

### 11.4.3 Network Utilities

A number of regionally significant utilities are located within the Project area including transmission and distribution networks for gas, electricity, water supply, wastewater, stormwater and telecommunications. These include:

- Two high pressure gas pipelines owned and operated by First Gas, the Westfield-Hillsborough pipeline between Neilson Street Interchange and Anns Creek, and the Oaonui-Southdown pipeline between Anns Creek and Mt Wellington Highway;
- The 220kV and 110kV transmission lines owned and operated by Transpower;
- The Southdown Co-generation Plant on Hugo Johnston Drive which connects to the overhead transmission network. This site is currently under care and maintenance;
- Cellular communication masts at Great South Road intersection and Frank Grey Place; and
- Three bulk supply watermains owned and operated by Watercare. This includes Hunua 4 at Neilson Street Interchange, Hunua 1 along Great South Road and Hunua 3 within Sylvia Park Road.

An Auckland Council leachate interception system is located on the inside of the seawall at Pikes Point West and East landfills. Typical volumes of leachate discharged to Watercare's trade waste from the leachate interception system at Pikes Point landfill is approximately 50,000 m<sup>3</sup> per year.

The locations of major utilities within the Project area are shown in *Plan Set 12: Utilities Relocation* in Volume 2.

### 11.4.4 Social and community facilities

The Project area contains many social and community facilities including educational facilities, reserves and recreational areas, community centres, business areas and shopping centres. These facilities include (amongst others):

- St Joseph's School
- Taumanu (Onehunga Foreshore)
- Te Tauranga (Onehunga Bay Reserve)
- Gloucester Park
- Waikaraka Park and Cemetery
- Bedingfield Memorial Park
- Onehunga Town Centre (including Onehunga Countdown)
- Sylvia Park Town Centre
- Panama Road School
- Ōtāhuhu Intermediate School
- McAuley High School
- Mutukāroa-Hamlins Hill Regional Park
- Southdown Reserve (closed due to public health concerns)
- Onehunga Community Centre and Library
- Aotea Sea Scouts Hall

Recreational areas at the western extent of the Project area include Gloucester Park, Te Tauranga (Onehunga Bay Reserve) and Taumanu (Onehunga Foreshore). Gloucester Park (see Figure 11-11) is located within Te Hōpua and is bisected by SH20 resulting in a North and South Gloucester Park. Gloucester Park North contains sports fields. To the west of Gloucester Park is Te Tauranga and Taumanu (see Figure 11-12) which is accessed from Beachcroft Avenue and includes a car park, toilets, children's playground and a lagoon. Taumanu and Onehunga Bay Reserve are linked via a recently constructed pedestrian footbridge over SH20. Taumanu is also accessible from Orpheus Drive. Taumanu was opened in 2015 following a three-year construction period creating 6.8ha of new parkland on reclaimed land.

**Figure 11-11: Gloucester Park North****Figure 11-12: Taumanu (Onehunga Foreshore)**

Further to the east, the key reserves and recreational areas are Waikaraka Park (including the Waikaraka Speedway), Mt Smart Stadium, the Manukau Foreshore Walkway and Mutukāroa-Hamlins Hill Regional Park. There are also smaller reserves including Captain Springs Reserve, Simson Reserve (accessed from Hugo Johnston Drive) and Southdown Reserve (currently closed to public access). Waikaraka Park and the Waikaraka Speedway are accessed via Captain Springs Road, Neilson Street and Alfred Street. Waikaraka Park is primarily used as sports fields for a number of clubs including the Onehunga Sports Football Club.

Mutukāroa-Hamlins Hill is a 48ha regional park that is accessed from Great South Road. There is a car park open at all times but only walking tracks to the top. The park offers views over the industrial area of Penrose and Mt Wellington, Anns Creek and the Māngere Inlet (see Figure 11-13) and has historical and cultural significance.

**Figure 11-13: Mutukāroa-Hamllins Hill (from Great South Road)**

Bedingfield Memorial Park is located on Princes Street East, near the Princes Street overbridge. The park contains a children's playground and bike/skate park (refer Figure 11-14). There is no dedicated parking area.

**Figure 11-14: Bedingfield Memorial Park, Ōtāhuhu**

### 11.5 Social and economic context

The Project area is rich in Māori history with many cultural values and issues of significance to Mana Whenua. The Mana Whenua groups associated with the Project area as well as Mataawaka are outlined in *Chapter 13.3.1: Effects on values of importance to Mana Whenua*.

The Project area also represents one of the most significant industrial locations within Auckland. It contributes \$4.7 billion in GDP annually to the New Zealand economy and is therefore both regionally

and nationally significant. It supports the employment of over 68,000 people, second only to Auckland's CBD. Industrial businesses in this area are three times the average size for Auckland indicating the regional and national market that many of these industrial businesses service.

The area has experienced significant change over the past 15 years, beyond that experienced by the Auckland market. Retail, commercial and servicing businesses have seen disproportionate growth. Due to residential demand and increased amenity in the area, land prices and the ability for the area to retain large site sizes has been a primary concern to businesses and their growth aspirations.

A key restriction experienced by businesses in this area is the lack of reliable and constrained transportation routes, along with limited Port access. These restrictions limit business efficiencies and productivity in terms of moving produced goods and inputs (as well as labour movements).

Anticipated future growth for the area is expected to see a continued rise in higher value outputs while still providing for land extensive activities that require ease of access to both the road and rail networks.

### Onehunga

Onehunga is a light industrial and residential suburb located 10km from Auckland's CBD. The majority of residential dwellings in Onehunga are located north of the Onehunga Town Centre. The main street has cafes, convenience stores, a police station and fire station.

Population growth for Onehunga South West and Onehunga South East between 2006 and 2013 was approximately 7%. The 2013 Census indicates that the majority of residents travel to work by private vehicle. Only 11% of residents in Onehunga South West and 18% of residents in Onehunga South East travel to work via active/public transport.

**Figure 11-15: Onehunga Town Centre (looking north up Onehunga Mall)**



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### **Te Papapa, Penrose and Mt Wellington**

Te Papapa contains a mix of residential and industrial land uses. Penrose is predominantly commercial and light and heavy industry, and has a relatively small resident population compared to the rest of the Project area. The industrial and residential properties in the area are primarily accessed via Neilson Street and Church Street, which provide the existing east-west movements between SH1 and SH20.

Mt Wellington is primarily commercial and industrial, with some large lot sizes with light industrial/commercial use or large format retail including Sylvia Park Town Centre. The 2013 Census data indicates the usual resident population is approximately 4,077 people. Population growth in Te Papapa and Penrose between 2006 and 2013 was 6%. A high percentage of residents travel to work by private vehicle (81% in Te Papapa, 76% in Penrose, 86% in Mt Wellington). On average, only 12% of the community travel to work via public or active transport.

### **Ōtāhuhu North and Ōtāhuhu East**

Ōtāhuhu is a mix of industrial and commercial uses to the west and primarily residential dwellings to the east. The suburb is accessed via SH1, through the existing Princes Street Interchange.

The 2013 Census indicates that of those people in employment, 11% travelled to work via public transport or walked/jogged. 69% of the area went to work via a private vehicle or as a passenger in a private vehicle. 10% of the households in the area were recorded to have no access to a motor vehicle with 37% having access to at least one motor vehicle.