



Preliminary Site Investigation (Contamination)

Sea Defence Structures Renewal

Prepared for Wellington International Airport Limited

Prepared by Beca Limited

5 September 2025



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Revision History

Revision N°	Prepared By	Description	Date
0	Genevieve Smith	DRAFT for client review	11 November 2024
1	Genevieve Smith	For issue to council	22 May 2025
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Document Acceptance

Action	Name	Signed	Date
Prepared by	Genevieve Smith		5 September 2025
Reviewed by	Tyler Neve		5 September 2025
	Sarah Shepherd		5 September 2025
Approved by	Jennifer Hart		5 September 2025
on behalf of	Beca Limited		

Code of Conduct, Qualifications and Experience

Preparation and review of this report / Environment Court Code of Conduct

This report has been prepared by Dr Genevieve Smith. Genevieve is an Environmental Scientist with six years of experience in conducting environmental scientific research and contaminated land investigations. She holds a PhD in Environmental Science (Water Quality and Soil Chemistry) from Lincoln University.

The report has been reviewed by Sarah Shepherd. Sarah is a suitably qualified and experienced practitioner (SQEP) with 20 years of experience managing and delivering a wide variety of environmental investigation works in New Zealand, Asia and the United Kingdom. She is experienced in regulatory compliance, oversight of environmental investigations, monitoring and risk assessment, contractor management, preparation and review of technical reports, as well as consultation with stakeholders and regulatory bodies. Sarah holds a Bachelor of Technology (Hons) Environmental Engineering from Massey University and has been a Certified Environmental Practitioner Site Contamination Specialist since 2016.



Genevieve Smith and Sarah Shepherd, have the qualifications and expertise set out above and confirm that we have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. This report has been prepared in compliance with that Code, as if it was expert evidence presented in proceedings before the Environment Court. Unless stated otherwise, this report is within our area of expertise, and we have not omitted to consider material facts known to us that might alter or detract from the opinions expressed in this report. Beca gives its consent, pursuant to the disclaimer and limitations statement in Section 9 of this report, for the panel convened under the Fast-track Approvals Act 2024 to rely on this report to assist it to determine an application for an approval. Beca does not assume any liability or responsibility to the panel that would be greater than any liability or responsibility Beca has to its Client.

Glossary

Table 1. Glossary of terms (alphabetical)

Term	Definition
ACM	Asbestos-containing material
ACOP	WorkSafe New Zealand Approved Code of Practice for Management and Removal of Asbestos (2016)
ANZG	Australian and New Zealand Guidelines for Fresh & Marine Water Quality
ASL	Above sea level
ASLP	Australian Standard Leaching Procedure
AST	Above-ground storage tank
BTEX	Benzene, toluene, ethylene and xylene
ESCP	Erosion and sediment control plan
CH ₄	Methane
CLMG	Contaminated Land Management Guidelines
CO	Carbon monoxide
COC	Chain of custody
CSM	Conceptual site model
CLMP	Contaminated land management plan
DAF	Dilution and attenuation factor
DGV	Default guideline value
DSI	Detailed site investigation
Eco-SGV	Ecological soil guideline value
GAMAS	New Zealand Guidelines for Assessing and Managing Asbestos in Soil
GWRC	Greater Wellington Regional Council
H ₂ S	Hydrogen sulphide
HAIL	Hazardous Activities and Industries List
HEPA	Heads of EPA Australia and New Zealand
LINZ	Land Information New Zealand
LOR	Limit of reporting
MfE	Ministry for the Environment
NEMP	PFAS National Environmental Management Plan (Version 2)
NESCS	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NRP	Natural Resources Plan
O ₂	Oxygen
OCP	Organochlorine pesticides
RPD	Relative percentage difference
PAH	Polycyclic aromatic hydrocarbons
PFAS	Per- and polyfluoroalkyl substances
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid

Term	Definition
PFOS	Perfluorooctane sulfonate
PID	Photoionisation detector
PSI	Preliminary site investigation
QA/QC	Quality assurance / quality control
SLUR	Selected Land Use Register
SMF	Sludge Minimisation Facility
SPLP	Synthetic precipitation leachate procedure
SQEP	Suitably Qualified and Experienced Practitioner
SVOC	Semi-volatile organic compounds
TCLP	Toxicity characteristic leachate procedure
TPH	Total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compounds
WAC	Waste acceptance criteria
WCC	Wellington City Council
WIAL	Wellington International Airport Limited
WWTP	Wastewater treatment plant

Executive Summary

Beca Limited (Beca) has been commissioned by Wellington International Airport Limited (WIAL) to undertake a Preliminary Site Investigation (PSI) for the Southern Seawall Renewal Project (the Project). This PSI relates to the Southern Seawall and the adjacent eastern beach and bank (the 'seawall site'), and the former southern end of the Miramar Link Golf Course, which will form the Miramar Golf Course Yard (MGC Yard), referred to in this report as the 'golf course site'. For completeness, this PSI does not relate to the George Bolt Yard, as this site is currently hardstand, and no soil disturbance is proposed.

Proposed works include enabling works within the golf course to create a laydown yard (i.e. the MGC Yard), removal and replacement of existing armour units and protection on the seawall (although the majority of the armour units remain in place), and cut, fill, protection, and planting along the eastern bank beside the seawall.

Based on a desktop assessment, the golf course site has been a golf course since 1908, but was recontoured into the present-day layout in 1994-1995. Agrichemicals have been used on the golf course to maintain the greens, fairways and tees including organochlorine pesticides (OCPs), organophosphates, and carbamates, and the site was irrigated with reclaimed treated wastewater until 2019. The western part of the golf course site historically housed the National Airways Corporation (NAC) hangar and apron. The following codes from the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) apply to the golf course site at a 'more likely than not' level of certainty:

- **A10** – persistent pesticide bulk storage or use, including sports turfs. Due to the use of pesticides on the course.
- **F1** – Airports, including fuel storage, workshops, washdown areas, or fire practice areas. Relating to a historical NAC apron within the site.
- **G5** – Waste disposal to land. Due to irrigation of reclaimed wastewater onto the golf course.

The existing airport and Southern Seawall site was developed over several decades. The airport site was initially reclaimed in the 1950s. The present day Southern Seawall, which extended the original reclamation southward by 180m, was constructed between 1971 and 1972, using concrete armour units, imported rock, demolition rubble, and dredged reclamation material. The seawall has been maintained with additional armour units over the past 50 years and, in the mid-1980s, rock fill and armour units were placed to address a breach in the seawall armour. The Moa Point Road tunnel was constructed directly north of the seawall over 2005 and 2006. Imagery from the tunnel construction showed stockpiled asphalt and a layer of terracotta rubble in the seawall soil profile. The eastern bank of the seawall site was potentially used for fire training purposes in the 1980s based on historical aerial photos and an airport master plan. According to the Greater Wellington Regional Council (GWRC) Selected Land Use Register (SLUR), landfilling also occurred at the site (G3 – Landfill sites). However, there does not appear to be evidence of this beyond potential uncontrolled filling. Therefore, the following HAIL codes may apply to parts of the seawall site:

- **F1** – Airports, including fuel storage, workshops, washdown areas, or fire practice areas. Relating to the potential fire practice area on the east side of the site.
- **I** – Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment. Relating to the area of uncontrolled filling on the bank adjacent to the seawall.

Based in an initial conceptual site model, there are potentially complete exposure pathways for construction workers, future site recreational users, and adjacent surface water at the seawall site.

Recommendations

Consenting

The amount of soil disturbance proposed for the seawall is not currently known as detailed design is presently underway. However, the proposed construction methodology leaves most of the existing seawall and armour in place and it is assumed that a majority of soil disturbance will occur in the east area and eastern bank to stabilise the areas. It is likely that the soil disturbance volumes will exceed permitted activity criteria, and consent under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESC) will be required.

According to the golf course cut and fill plan, the volume of soil disturbance and removal within the golf course cannot be completed as a permitted activity, and the WIAL site-wide consent under the NESC consent will apply.

Under the Greater Wellington Regional Council Natural Resources Plan (GWRC NRP), discharges of a contaminant from a contaminated site where a contaminant may enter water are captured by permitted activity Rule R82. To meet the permitted activity requirements, a Detailed Site Investigation (DSI) must be undertaken, the results must indicate that the discharge does not pose an unacceptable risk to human health or the environment on or off the site. The DSI must be provided to GWRC.

A DSI with sampling is recommended, particularly within the eastern bank of the seawall where earthworks are potentially proposed adjacent to the water.

Disposal

If material is to be disposed of offsite, the material will need to be sent to a facility approved to accept such material. Soil sampling results will be required by the facility to determine if acceptance criteria are met. Acceptance is ultimately the decision of the receiving facility.

Based on soil sampling undertaken from a borehole in 2019 (GHD, 2021), soils in the seawall site may not meet the definition of cleanfill. However, additional sampling is required to characterise the soil and inform soil disposal. Additionally, fibre cement sheet fragments were noted in the exposed soil profile in the eastern area. If these fragments contain asbestos, they will require disposal at a landfill consented to receive asbestos. If per- and polyfluoroalkyl Substances (PFAS) are present in spoil, there are no landfills in the lower North Island currently accepting soil with detectable concentrations of PFAS.

The golf course site had not been sampled when the present report was drafted. The upper two-thirds of the golf course have been sampled in recent investigations (GHD, 2024; PDP, 2023), and concentrations of pesticides and / or heavy metals in samples generally met the definition of cleanfill based on the 95% upper confidence level (UCL) of the mean, with the exception of an isolated area where PFAS was detected in a surface sample. It is recommended that sampling is completed in the golf course area to confirm disposal requirements.

1 Introduction

Beca Limited (Beca) has been commissioned by Wellington International Airport Limited (WIAL) to undertake a Preliminary Site Investigation (PSI) for the Southern Seawall Renewal Project (the Project). This PSI relates to the Southern Seawall and the adjacent eastern area (the 'seawall site'), and the former southern end of the Miramar Links Golf Course (the 'golf course site'). For completeness, this PSI does not relate to the George Bolt Yard as there will be no soil disturbance at this site.

This PSI was prepared and the draft submitted for client and project team review in November 2024. The site extent used in this report is based on designs proposed in November 2024 that – as of September 2025 – are superseded. The seawall site has since been reduced to exclude the east bank. Therefore, the proposed works and site extents used to inform this report are not reflective of current designs, however, the information in this PSI remains relevant and appropriate for the purposes of this report. The current designs are included in the subsequent Detailed Site Investigations that have been undertaken and the Project Assessment of Environmental Effects (AEE).

1.1 Objectives

The purpose of this PSI is to:

- Summarise information about the current and historical use of the site to:
 - Inform the potential for contamination (soil, sediment, groundwater).
 - Identify Ministry for Environment (MfE) Hazardous Activities and Industries List (HAIL) activities undertaken at the site.
 - Develop a Conceptual Site Model (CSM).
- Identify potential areas within the site (soil, groundwater, or sediment) that may require sampling, and associated potential contaminants of concern.
- Inform contaminated land consent requirements for the proposed development under the:
 - Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS).
 - Contaminated land rules of the Greater Wellington Regional Council (GWRC) Natural Resources Plan (NRP).

1.2 Scope

The scope of this investigation involved a desk-based study, which comprised the review of historical information relating to the potential for contamination. The following was completed:

- Information sources were reviewed for the site, including:
 - Publicly available historical aerial imagery (approximately one per decade from the 1940s),
 - Relevant property file / archive information from Wellington City Council (WCC),
 - Relevant contaminated land information held by GWRC,
 - Discharge consent, water takes and bore information within 100 m of the site, from GWRC,
 - Information on local geology, hydrogeology and sensitive environmental receptors,
 - Review of previous investigations and known construction undertaken on site or in the immediate surrounding area.
- A site walkover of the seawall area, and an interview with an Airport Fire Services (AFS) staff member knowledgeable about the site history.
- The reporting of the above in a PSI.

This PSI was undertaken and reported in general accordance with:

- Ministry for the Environment Contaminated Land Management Guidelines (CLMG) No. 1 – Reporting on Contaminated Sites in New Zealand (2021).

2 Site Description

2.1 Site Identification

Identifiers for the site are listed in **Table 2** and the site location is shown in **Figures 1** and **2**. The site is split between two areas, being the seawall site and the golf course site as shown in **Figure 2**. Wellington International Airport will be referred to as ‘the airport’.

The proposed works and figures outlined below were based on designs as of November 2024. The design has since changed (notably reducing in size to exclude the eastern bank). As the plans available in November 2024 formed the basis of the PSI site extent and soil sampling investigation, the site extents from November 2024 have been retained. Refer to the Project AEE for the latest designs.

Table 2. Site Identification

Parameter	Seawall	Golf Course
Approximate address	20A Moa Point Road, Rongotai, Wellington 6012	28 Stewart Duff Drive, Rongotai, Wellington 6012
Legal description	Part Lot 3 and Lot 4 DP 78304	Lot 1 DP 552938
Approximate coordinates (NZGD 2000, centre of site)	-41.3362997, 174.8064835	-41.3346241, 174.8119766
Ownership	WCC and the Crown	WIAL
Approximate area of the investigated sites	36,000 m ²	28,600 m ²



Figure 1. Indicative Site location (red polygons) as of November 2024 (Source: NearMap)



Figure 2. Site extent in the red polygons as of November 2024 (Source: NearMap)

2.2 Proposed Works

Refer to **Appendix A** for the concept drawings that informed the PSI, and **Figure 3** for specific areas that were referred to within the seawall site as of November 2024. The only areas where soil disturbance was proposed are within the eastern area / eastern bank of the seawall, and to prepare the golf course for the MGC Yard. Superficial works were proposed on the existing seawall to replace current armouring.

Table 3. Summary of proposed works as of November 2024

Area	Proposed Works
Eastern area and eastern bank remediation	• Cut or fill existing erosion scarp to form 1V:1.5H batter slope. • Protection of batter slope with new geotextile, rock and concrete armour units. • Vegetation clearance, re-contouring with cut material, and planting of existing reclamation (extends seaward from Moa Point Road).
Southern seawall and wave trap	• Removal of existing crest amour units, gabion crest, and wave trap rock protection. • Reconstruction of crest with new rock and concrete armour units, crest wall and wave trap. • Overlay of existing seawall with new rock and concrete armour units (do not intend to remove existing armour and rock from front face of seawall).
Miramar Golf Course	Enabling works including creating a laydown yard on the southern 4-5 ha of the Miramar Golf Course. This will include: • Vegetation clearance and topsoil removal, • Cut and fill to form site yard and buffer zone, • Planting of buffer zone, • Paving of yard access roads, construction of unbound/granular pavements for laydown areas.

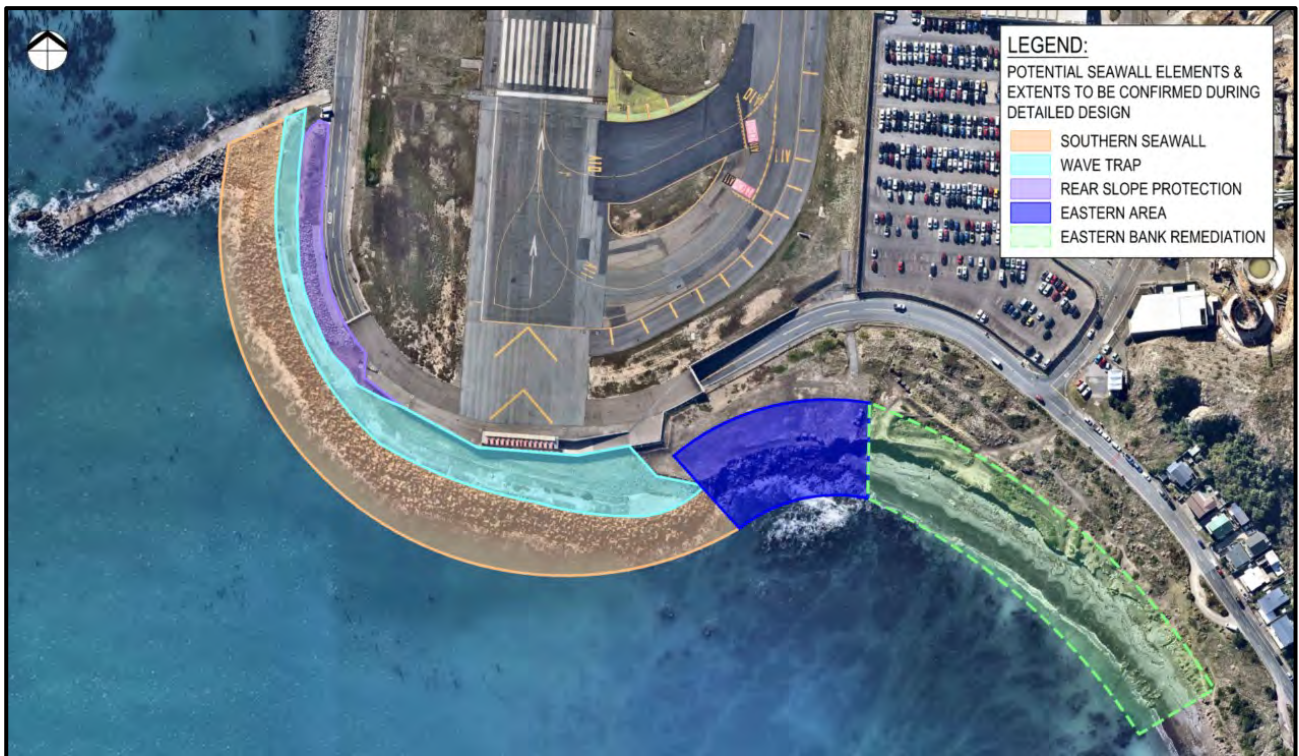


Figure 3. Terms of reference for areas within the seawall site as of November 2024

3 Environmental Setting

3.1 Current Land Uses

The central / west portion of the seawall site is managed by WIAL, and the east portion is managed by WCC. The site currently comprises of reclaimed land adjacent to Moa Point Road / Moa Point Road tunnel, the Lyall Bay Breakwater, and a portion of coastline. According to a seawall structure summary document¹, the existing sea defences structures / the site comprises of:

- Southern Seawall - 12 tonne akmon concrete armour units, constructed in 1972.
- Lyall Bay Breakwater - mass concrete blocks and concrete armour units on southern and western faces, built in 1954-55.
- Western Seawall - steel sheetpile and rock armour, built in 1955-56 and modified between 1983 and 1987.
- Eastern Area - scarp (fill material) with informal rubble protection, constructed in 1972.

The MGC Yard was part of the Miramar Links Golf Course greens and fairways.

3.2 Surrounding Land Uses

3.2.1 Seawall

The airport main runway is north of the seawall and Moa Point Road. The Wellington Sludge Minimisation Facility (SMF) and wastewater treatment plant (WWTP) are approximately 230 m east, and residential properties on Moa Point Road are approximately 160 m south-east. The Cyclotek Pharmaceuticals building, carparking, and various freight and cargo buildings are 100 m north-east.

3.2.2 Golf course

The WWTP and SMF are 30 m south of the golf course. A residential area is 130 m south-east on Kekerenga Street, and the Airport is directly across Stewart Duff Drive to the west.

3.3 Geology and Hydrogeology

According to GNS², the geology underlying the seawall comprises of:

- Holocene reclaimed land, with fill consisting of domestic waste, sand, boulders and rock.
- Holocene ocean beach deposits, consisting of marine gravel with sand, mud and beach ridges.

The geology underlying the golf course comprises of undifferentiated Rakaia Terrane Triassic sandstone and mudstone (sedimentary rocks).

According to an investigation completed for the Moa Point tunnel in 2005³, groundwater was measured within the wave trap on the seawall. It was encountered 8.0 m below the surface of the elevated seawall, and was tidally influenced. Groundwater was measured at 3.4 m bgl in a monitoring well within the east bank in 2019.⁴

It is assumed that groundwater beneath the seawall site flows in a southerly direction towards the coast, and groundwater beneath the golf course site flows in a westerly direction towards Lyall Bay.

¹ Beca, 2024. Sea Defences Structures Renewal – Summary of Historical Seawall Information.

² <https://data.gns.cri.nz/geology/>

³ Beca, 2005. WIAL RESA – South End Geotechnical Interpretative Report.

⁴ Aurecon, 2020. Groundwater monitoring for PFAS analysis.

3.4 Topography

The seawall site is 0 m to 7 m above sea level (asl).⁵ The golf course site is 10 m to 20 m asl.

3.5 Sensitive Receptors

Lyllall Bay is directly south of the seawall and is within the site extent. There are no recorded wells within 500 m of the seawall site, based on the GWRC Webmap Viewer.

An artificial pond is on the golf course, which has previously been used as a water source for irrigation on the greens. There is a surface drain or stream 600 m north of the golf course site. According to GHD Limited (GHD),⁶ seven bores were located within 500 m of the golf course site, and were for either groundwater monitoring or construction. No bores were identified as being for potable water or industrial supply.

⁵ Wellington City Council GIS WebMap Viewer

⁶ GHD, 2018. Wellington International Airport Preliminary Site Investigation (Site-wide).

4 Information Search

4.1 Historical Aerial Imagery

Historical aerial photographs have been reviewed to identify any changes in land use activities at the site and surrounding properties. A summary of observations is provided in **Table 4** and the historical aerial images are provided in **Appendix B**. Historical aerial photographs for the site have been sourced from Retrolens⁷ and Google Earth Pro.

Table 4. Historical aerial imagery review

Year	Seawall	Golf course
1941	- The site has not been reclaimed. The easternmost point is on the original Moa Point beach, which appears to be a rocky outcrop. - There are residential properties directly north-east of the site on Moa Point Road. Quarrying activities have commenced approximately 50 m north of the site, in the area of the present-day car park.	- The historical golf course has been established north of the site and may overlap with the north end of the site. - Quarrying activities are directly south-west of the site. A track connects the quarrying area and historical Moa Point Road, and runs along the perimeter of the site. - The De Havilland factory has been constructed 250 m north-west of the site. - Gun emplacements and base are 600 m south-east of the site.
1954	- Reclamation has commenced 140 m north of the site, and a concrete production area has been established on the reclaimed land. - No changes of significance observed with this area of the site.	- An access road has been created through the site, connecting historical Moa Point Road and what appears to be quarry / cut areas east of the site. - The north-east corner of the site appears to be on the golf course. - Residential areas are being established 60 m east and 170 m south-east of the site.
1961	- The Lyall Bay breakwater has been constructed on the perimeter of the seawall site. - A part of the east side of the site has been reclaimed. - The airport's main runway has been constructed 300 m north of the site.	- The National Airways Corporation (NAC) hangar has been constructed, and a part of the apron overlaps with the west side of the site. The apron does not appear to contain any structures or stored equipment. - Quarrying and access roads are visible through the site.
1974	- The entire area has been reclaimed. - The east side of the site is either being used as a car park or for storage. - Moa Point Road now runs directly north of the site.	The site appears to be part of the golf course, apart from the NAC apron area.
1988	The east side of the site appears to be a storage or refuse area and / or unsealed car park. There are objects visible in the eastern area that look like above ground storage tanks (ASTs) or containers. Refer to Figures 4 and 5 below.	- The NAC apron that overlaps with the site appears to be used for parking. There appear to be three fuel ASTs on the eastern edge of the apron, which overlaps with the current site extent. - Four ASTs are visible 60 m south-west of the site, outside of the site extent.

⁷ Retrolens.co.nz

Year	Seawall	Golf course
	The land between the golf course and seawall has been developed to include the former WWTP milliscreeing facility.	
2000	- There does not appear to be anything stored on the eastern bank, and the tank-like objects have been removed. It is not clear from the imagery whether the recessed area has been filled. - No other significant changes have occurred.	- The east side of the NAC apron has been removed and Stewart Duff Drive has been established on the west perimeter of the site. - The entire site is now used as a golf course. - The Moa Point WWTP has been established to the south of the site, as well as an associated inlet pump station and an automotive workshop.
2016	- The Moa Point Road tunnel has been constructed and the airport's main runway has been extended over it to the north perimeter of the site. - What appear to be stockpiles, earth bunds and akmons are visible on the east end of the site.	- No significant changes have occurred within the site extent. - The Cyclotek building has been constructed between the golf course and the seawall site.
2024	What appears to be akmons are being stored on the east side of the site.	- No significant changes have occurred within the site. - Construction is underway directly south of the site for the SMF.

Imagery from 1988 shows what appears to be two tanks in an artificial recessed area, with a pile of smaller containers adjacent to them (Figure 4 and Figure 5) which is consistent with a fire training area. There also appears to be a drainage point on a corner adjacent to the beach. The objects are not present in 1974 or 2000 aerial imagery.



Figure 4. 1988 aerial imagery showing two objects in the approximate fire training area (Source: Retrolens)



Figure 5. Close up of the recessed area and what appear to be two tanks (1988)

4.2 Information from Greater Wellington Regional Council

4.2.1 Resource Consent Information

The GWRC Webmap Viewer was reviewed for available resource consent information located within and adjacent to the golf course site and seawall site. The placement of resource consent markers on the Webmap Viewer may not be representative of the actual resource consent location.

Golf course

A discharge permit (WGN98019801) was held by the golf course to 'discharge treated wastewater for irrigation after sand treatment and UV treatment'. The consent commenced in 1998 and was surrendered in 2019. Prior to this, it appears the golf course was irrigated using groundwater in the 1980s (WGN820038) and stormwater (WGN94010201) in the 1990s. The consent decision and report were requested from GWRC (**Appendix C**). In summary:

- The golf course could discharge up to 1,100,100 L treated wastewater per day.
- Treated wastewater from Moa Point WWTP was pumped from the outlet of the ultra-violet disinfection chamber within the WWTP. The wastewater was piped to a treatment shed within the golf course for further treatment before being stored in the pond on site.
- Faecal coliforms and total suspended solids were monitored and kept below 50 faecal coliforms/100 mL and 30 mg suspended solids/L.
- The officers report stated that 'preliminary levels of heavy metals in the final wastewater [were] significantly lower than the New Zealand guidelines for sewage sludge application to land and for heavy metal concentrations in soils.'
- It was recommended that heavy metals be monitored and reported in annual reporting. Annual monitoring data was not sighted in the present investigation.

Seawall

The recorded consents within the seawall site relate to the Moa Point outfall pipe into Lyall Bay from the WWTP, or are consents to complete seawall maintenance / inspections or install monitoring equipment. Relevant consents are summarised in **Table 5** below.

Land use and discharge consent WGN170364 was requested from GWRC. The discharge consent was held by WIAL during Taxiway Alfa widening works in 2017. The consent stated that stormwater will be infiltrated within the site during construction, or possibly reach the existing stormwater networks within the site. The stormwater networks on site join the WCC stormwater network, which discharges to the coastal marine area of Lyall Bay.

Table 5. Relevant consents within 200m of the seawall site (Source: GWRC Webmap Viewer)

Start date	File No.	Type	Description	Status
16/01/2015	WGN150124	Discharge to land / water	To discharge cement slurry to the coastal marine area associated with maintenance and repair works at the Lyall Bay breakwater	Expired 16/01/2020
Not listed	WGN080003	Coastal permit	To occupy the foreshore and seabed of the coastal marine area with the existing submarine pipeline	Granted
26/10/1993	WGN93006601	Coastal permit	Moa Point long sea outfall	Expired 08/01/2008
28/08/2017	WGN170364	Discharge to land	Discharge permit to discharge sediment contaminated runoff from areas of bulk earthworks to land	Expired 28/08/2022

Start date	File No.	Type	Description	Status
07/06/1995	WGN940096	Discharge to air	To discharge contaminants to air from milliscreeing plant – 100 m north-east of the seawall site	Expired 31/12/2002
17/03/1995	WGN95002801	Discharge to air	To discharge dust contaminants into the air at Moa Point – 20 m north of seawall site	Expired 02/07/1996
21/04/2014	WGN080003	Discharge to air	To continuously discharge contaminants to air from Moa Point WWTP ventilation system – 100 m north of the seawall site	Active
09/03/2001	WGN910096	Discharge to air	To discharge from the WWTP to the air – 100 m north of the seawall site	Expired 08/01/2008

4.2.2 Information on the Selected Land Use Register

Information on the Selected Land Use Register (SLUR) for the site was requested from GWRC. The GWRC Webmap Viewer does not include the seawall area or the golf course on the SLUR. However, correspondence from GWRC indicated that they are reviewing various investigations across the wider airport and golf course. Draft documentation from GWRC shows that a majority of airport land will be on the SLUR as 12 new entries. This would include all of the Miramar Golf Course (Proposed SLUR No. SN/05/1443/02) and land east of the seawall (Proposed SLUR No. SN/05/1447/02). The majority of proposed SLUR sites are categorised as 'Category I – Verified History of Hazardous Activity or Industry', but the western apron and Taxiway Bravo are classed as 'Category III – Contamination Confirmed'. The western apron and Taxiway Bravo are over 400 m north of the seawall and at least 300 m west of the golf course.

The SLUR HAIL codes for the Miramar Golf Course are based on a PSI prepared by GHD Limited (GHD)⁸, and are:

- **A10** – Persistent pesticide bulk storage or use including sports turfs: From spraying on the greens and discarding leftover agrichemicals on the fairways.
- **G5** – Waste disposal to land: From the use of irrigation water sourced from the WWTP.

The SLUR HAIL codes for the eastern bank of the seawall site at the time of preparing the PSI were based on a 2019 report by GHD⁹ and a 2007 report from URS New Zealand Limited (URS)^{10,11}. The proposed HAIL codes are:

- **F1** – Airports, including fuel storage, workshops, washdown areas, or fire practice areas: Former 'regular' airport fire service (AFS) training ground, including the use of aqueous film forming foam (AFFF), until 2016.
- **G3** – Landfill sites: Landfilling prior to the development of the airport. The waste is understood to have been domestic refuse. It has not been delineated.

The referenced reports have been summarised in **Section 4.3** and **Section 4.4**.

⁸ GHD, March 2020. Wellington International Airport Limited Mirimar Golf Course Preliminary Site Investigation.

⁹ GHD, July 2019. Wellington International Airport Detailed Site Investigation.

¹⁰ URS, 2007. Wellington Airport Potential Locations of Contaminated Land.

¹¹ By the time of the August 2025 update of this report, GWRC had updated the SLUR based on the finding of this PSI and subsequent DSI.

4.3 Previous Investigations – Seawall

The following relevant documents were received with the GWRC SLUR information:

- GHD, September 2018. Wellington International Airport Preliminary Site Investigation
- GHD, 30 July 2021. Wellington International Airport Site Wide Detailed Site Investigation
- GHD, 26 August 2022. Site-wide Contaminated Soil Resource Consent Application – Wellington International Airport Limited.
- GHD, 26 August 2022. Wellington International Airport Site-wide Contaminated Land Management Plan.

For brevity, these documents have not been included in the appendix but can be provided upon request. Only information considered relevant to the site have been included in this PSI.

4.3.1 Wellington International Airport Site Wide PSI, GHD, 2018

GHD completed interviews with knowledgeable airport staff during their PSI. According to staff, AFFF was used in various locations across the airport and just outside the airport from the 1990s during emergency incidents. Standard practice was to cover areas with foam as a precaution during incidents. AFFF in the 1990s may have contained per- and poly-fluorinated alkyl substances (PFAS). GHD prepared a plan of emergency incident areas based on interviews with staff which has been reproduced in Figure 6.

One of the potential locations includes the western part of the seawall site, where emergency events took place in the pre-1970s and early 2000s (Area 'C' on **Figure 6**). Specific details of either incident are not included in the PSI, and it is not known whether the extent of the polygon (i.e. including the seawall) is accurate. It is assumed that the pre-1970s incident is the 1963 NAC Vickers Viscount crash¹², which would have occurred prior to the reclamation / construction of the present-day seawall. Therefore, this incident was outside the site extent. The 2000s incident is discussed further in the site walkover section (**Section 4.8**).

According to the PSI, a second area on the east side of the seawall site was reportedly the 'South Coast Landfill' and used for fire training activities using AFFF (Area 'D' in Figure 6). This information appears to be sourced from a report prepared by URS in 2007.¹³ The URS report does not provide specific information relating to landfill material, the extent, and time frames are not known. Based on information from WIAL, it is suspected that the fire-training area in the URS report was assumed from a 1985 masterplan. Refer to **Section 4.6.2** for more information.

Evidence was not provided verifying Areas A and B, but the site plans stated that Area A was used for AFS training in 1993, and Area B was an emergency response site in 1990 and from 1995 to 1998. Information could not be sourced during the PSI to verify this information.

¹² <https://www.stuff.co.nz/dominion-post/news/69538759/plane-crashes-off-wellington-runway---150-years-of-news>.

¹³ URS New Zealand Ltd, June 2007. Wellington Airport – Potential Locations of Contaminated Land.

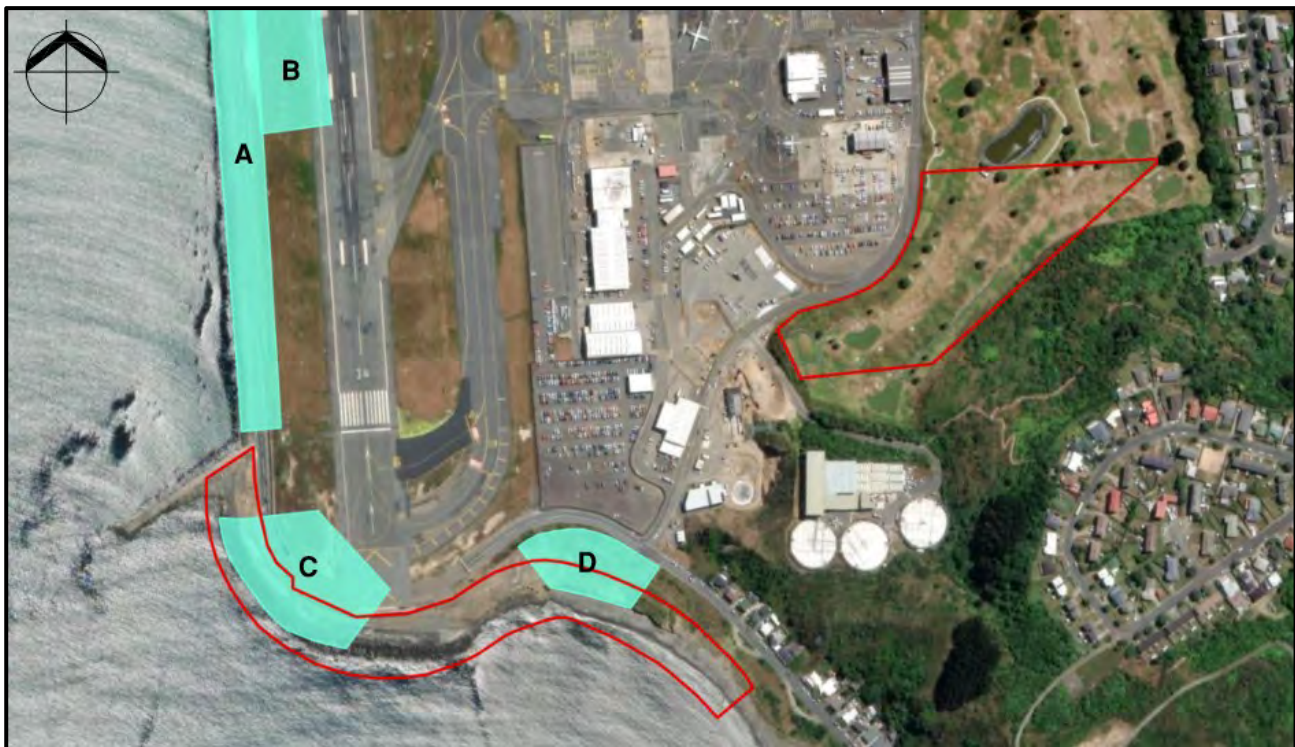


Figure 6. Historical emergency incident locations and / or locations where AFFF were used (cyan polygons), in relation to the seawall and golf course (GHD, 2018) (A = Fire training 1993, B = Emergency response sites 1990, 1995-1998, C = Emergency response sites pre-1970 and early 2000s, D = Potential fire training area).

4.3.2 Wellington International Airport Detailed Site Investigation, GHD, July 2021

Various locations at the airport were sampled during a Detailed Site Investigation (DSI) reported in 2021, including one borehole in the assumed potential landfill area on the east side of the seawall site. Soil samples were collected from the borehole from 0.5 m to 3.4 m bgl. In summary:

- The samples analysed did not exceed human health criteria for heavy metals, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH) or benzene, toluene, ethylene and xylene (BTEX).
- Some heavy metals and PAH were above background concentrations in samples to 3.4 m bgl.
- The borehole log noted pieces of metal between 0.8 and 1.5 m bgl, and gravel and wood at 1.5 to 3.0 m bgl.
- Headspace readings were collected via a photo-ionisation detector (PID) from samples between 1.5 m and 4 m bgl, which gave readings between 0 ppm and 1.3 parts per million.

4.3.3 Taxiway Bravo Resource Consent for Dewatering, GHD, 9 March 2022

A resource consent for dewatering prepared by GHD appended pages from a groundwater PFAS assessment completed by Aurecon in 2020¹⁴. The resource consent was relating to the installation of stormwater system improvements associated with Taxiway Bravo upgrades. A consent was sought to discharge groundwater associated with dewatering to land.

Monitoring wells had been installed at the airport in 2019 and were utilised by Aurecon for groundwater monitoring for PFAS analysis. Monitoring well A4_07 was located within the east bank, approximately 55 m north-west of the suspected fire training area. Groundwater at this location was measured at 3.4 m bgl. Three rounds of sampling occurred in November 2019, March 2020, and July 2020. Sum perfluorohexanesulfonic acid and perfluorooctanesulfonic acid (PFHxS+PFOS) was detected at 0.69 µg/L, 1.42 µg/L, and 2.40 µg/L,

¹⁴ Wellington International Airport PFAS Assessment, Aurecon, December 2020.

respectively. The July 2020 concentration exceeded recreational water criteria. GHD completed groundwater sampling from monitoring well A4_07 in October 2019 and October 2020, and analysed the groundwater samples for heavy metals, TPH, BTEX, and PAH. Copper and mercury exceeded the Australian and New Zealand Environment and Conservation Council (ANZECC)¹⁵ marine criteria for 95% species protection level. TPH, BTEX, and PAH were below the laboratory limit of reporting.

4.3.4 Wellington International Airport Site-wide Contaminated Land Management Plan, GHD, August 2022

The contaminated land management plan (CLMP) summarised a soil PFAS assessment completed by Aurecon in 2020. Aurecon collected and analysed eleven soil samples, one of which was from the monitoring well location used in the groundwater assessment and by GHD in the vicinity of the suspected fire training area. PFAS was not detected in the one soil sample location. The specific depth of the sample is not reported by GHD, and the original Aurecon 2020 report was not provided. Based on the georeferenced historical imagery, the sample location was approximately 100 m north-west of the suspected fire training area.

4.4 Previous Investigations – Golf Course

The following relevant documents were provided with the GWRC SLUR:

- GHD, April 2020. Miramar Golf Course Preliminary Site Investigation,
- GHD, 5 June 2024. WIAL Golf Course Carpark Detailed Site Investigation (Draft).

For brevity, these documents have not been included in the appendix, but can be provided upon request.

4.4.1 Miramar Golf Course Preliminary Site Investigation, GHD, April 2020

A PSI was completed for the wider golf course to inform a proposed development. The following information was considered relevant to the golf course site:

- The Miramar Golf Club was established in 1908, and was used by soldiers to undertake exercises during World War One. The new golf course was constructed in 1994-1995. According to interviews recorded in the site walkover notes, nothing was unearthed / noticed during the earthworks and there was 'lots of clean sand'.
- The golf course has a green keepers shed, club house, 1,000 L diesel AST, 500 L petrol AST, agrichemicals storage shed, and flammable goods storage shed. These are all over 400 m north of the golf course site.
- The lined retention pond (the Pond) was historically used to store irrigation water. It was constructed and lined with high-density polyethylene in 1994. There is a small water treatment plant shed on the south side of the pond that contains filter treatment and UV treatment equipment. According to the site walkover notes, the shed is constructed with fibre board and was built with the pond.
- Irrigation water between 1995 and 2019 was reclaimed from the Moa Point WWTP discharge, pumped to the golf course plant for treatment, and stored in the pond for irrigation onto the golf course. The consent expired in 2019 and potable municipal supply is now used. According to the PSI, town supply was used for irrigation prior to 1995 (noting that this is not consistent with the expired water take consents in **Section 4.2.1**).

The following field notes were made in relation to pesticide use / green maintenance on the site:

- Spraying targeted the fairways, greens and tees.
- The fairways were treated once a year, the greens and tees treated two to three times a year, and the greens also received fungicides two to three times a year.
- The staff 'try to avoid organophosphates' and use it where needed, as required.

¹⁵ Australian and New Zealand Environment and Conservation Council (ANZECC), 2000.

- No fuel spills had been recorded on the course.
- Organophosphates were used on the old course (i.e. prior to it being recontoured in 1994) as a one-off (2 x 60 L drums).
- Fertiliser was applied three to four times per year (slow-release nitrogen-phosphorus-potassium).
- Thiodan (endosulfan) was used for worms. A list of stored chemicals at the golf club included pesticides such as carbaryl (carbamate family), Ethephon (organophosphorus family).
- The south end of the golf course drained to the pond.

4.4.2 Miramar Golf Course Carpark Detailed Site Investigation, GHD, 2024

A DSI was completed in 2024 to inform a car park development for WIAL directly north of the golf course site. No sampling occurred within the present site extent. The following was reported:

- Pattle Delamore and Partners Ltd (PDP) completed a DSI of the north end of the golf course in 2023, north of the carpark site investigated by GHD. It was not viewed in the present PSI, but GHD stated that organochlorine pesticides (OCPs) such as dichloro-diphenyl-trichloroethane (DDT) and endosulfan sulphate were detected in samples from the PDP investigation above cleanfill criteria. Arsenic, cadmium, lead and zinc were detected above background concentrations. Samples were not analysed for PFAS.
- GHD did not complete sampling for OCPs within their site extent, as it was assumed that OCPs would be consistent with PDP's findings.
- GHD identified arsenic and cadmium above background concentrations in two out of 11 locations, but soil was considered acceptable as cleanfill based on the 95% upper confidence limit of the mean.
- PFAS was detected as PFOS in one sample at 0.3 m bgl (0.0013 mg/kg) but was not detected in the deeper 0.8 m sample or in the four delineation samples around it. GHD suggested that the PFAS was due to historical use of wastewater for irrigation, combined with the low-lying position of this sample location. The sample location was approximately 260 m north of the present site extent.

4.5 Information Provided by WIAL

4.5.1 Airport Authority Masterplan Information

An image from a 1985 Airport Masterplan was provided by WIAL on 23 September 2024. It was prepared for the then 'Wellington Airport Authority', prior to the establishment of WIAL in 1990. The east part of the seawall side has been labelled 'Rescue / Fire Training Area' (Figure 7). A full copy of the Masterplan was located in WCC's archives (refer to **Section 4.6.2**). This investigation has not encountered any further anecdotal or recorded information relating to this training area, and the Masterplan image below is a combination of existing and proposed developments.

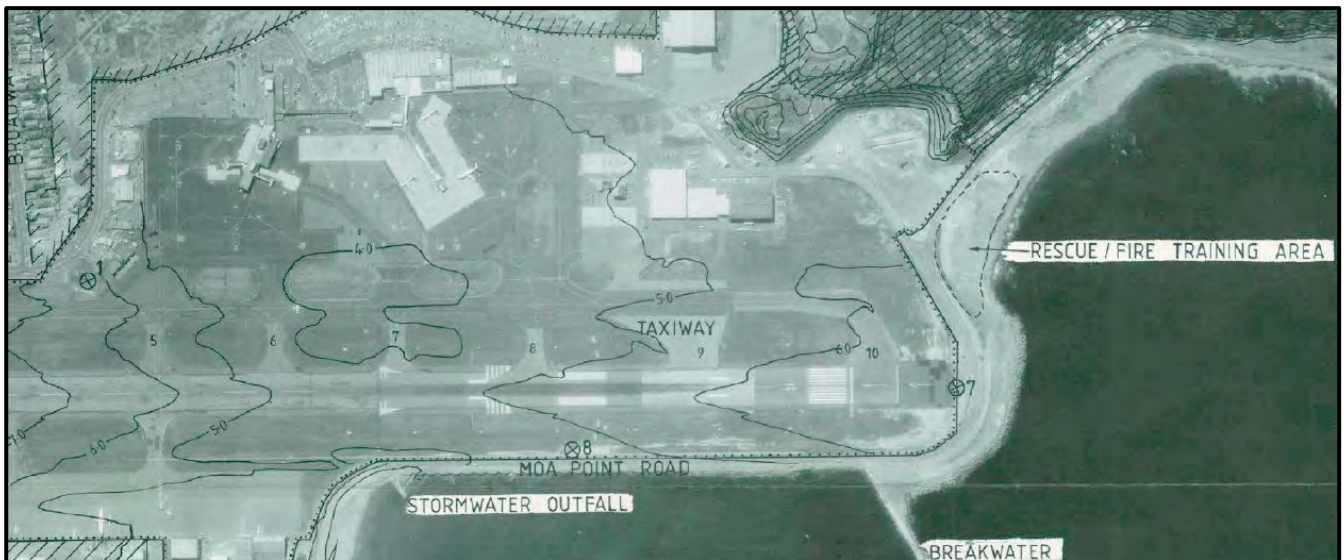


Figure 7. 1985 Airport Masterplan

As discussed in **Section 4.1**, structures consistent with a fire training area are visible in the area indicated in the 1985 Airport Masterplan.

4.6 Information from Wellington City Council

Information was reviewed from the WCC archives¹⁶ for the golf course and the seawall. Copies of referenced material are provided in **Appendix D**.

4.6.1 Golf Course

Reviewed information was not considered relevant to the present investigation, and were primarily for areas outside the site extent. Documents could not be sourced for the NAC apron that historically occupied part of the site.

4.6.2 The Seawall and Airport Authority Masterplan

A complete copy of the 1985 Wellington Airport Authority Masterplan was located in WCC's online archives (refer also to **Section 4.5.1** and **Appendix D**). This informed the historical aerial photograph analysis described in **Section 4.14.1** and the assessment below.

An aerial transparency from 12 November 1989 (Sheet 46.79, Record No. 00462-59) shows the eastern bank. The recessed area is present and the objects (possibly tanks or pressure vessels) are in a different layout with planks and metal frames (Figure 8 & Figure 9). These objects and the recessed area are not present in aerial photography from 1974 but appear from 1987. The objects in the recessed area appear similar to pressure vessels / simulation equipment used for fire training at the airport in the early 1980s.

¹⁶ <https://archivesonline.wcc.govt.nz/>



Figure 8. Aerial transparency from 12 November 1989.

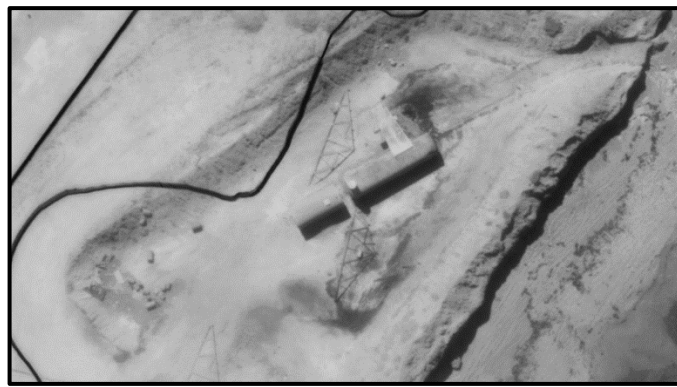


Figure 9. Close up of pit in 1989

According to consent documents, the eastern bank was then designated as a yard, storage area and stockpile area for sewer outfall construction in 1996 (Reference No. 0600 306456). The recessed area is shown in a photograph taken during a site walkover, but the objects shown in **Figure 9** were not present. The consent document discusses levelling the area to create the yard, and the intention to import fill and revegetate the area following the completion of works.

4.7 Other Information

4.7.1 Seawall Construction History

Table 6 is a summary of historical structural renewal information provided in a Beca summary document¹⁷.

Table 6. Construction history of the site

Period	
1951-1954	Ministry of Works completed reclamation for the airport up to the existing Lyall Bay Breakwater.
1971-1972	Ministry of Works reclaimed 180 m of additional land south of the airport and on eastern Moa Point Road. Reclamation comprised of concrete akmon armour units, imported rock, demolition rubble, and reclamation material dredged from borrow pits approximately 365 m away. Repairs were made in 1972 following damaging waves.
1984-1990s	Various repairs were completed in the 1980s due to breach holes forming. In the 1990s, Reno mattresses from the 1970s in the southern seawall were replaced and reinforced.
2005-2006	Brian Perry Ltd constructed the Moa Point Road Tunnel (designed and overseen by Beca).

The following information was also provided:

- The reno mattresses are currently in poor condition, with extensive rusting, deformation and bulging evident in many mattresses. There is exposed fill and rock.
- Documentation for the eastern area was not available, but it consists of informal armouring with tipped rubble and fill underneath.
- Demolition rubble is present in the Lyall Bay Breakwater.
- The western seawall consists of steel sheet piling with bulk fill on the landward side and rock on the seaward side.

4.7.2 Moa Point Tunnel Construction (2005-2006)

Beca was involved in the Moa Point Road tunnel construction that took place between 2005 and 2006. Photographs taken by Beca staff during the construction monitoring were reviewed. Moa Point Road and the seawall in 2004 (prior to tunnel construction) is shown in **Figure 10**. The soil profile on the south side of the

¹⁷ Beca, 2024. Sea Defences Structures Renewal – Summary of Historical Seawall Information.

tunnel during construction is shown in **Figure 11** and **Figure 12**. A layer of rubble (e.g. brick) is visible in the soil profile. The east bank of the seawall is shown in **Figure 13**.



Figure 10. The site prior to tunnel construction (2004)



Figure 11. The soil profile on the south side of the tunnel



Figure 12. The soil profile on the south side of the tunnel



Figure 13. The constructed tunnel (24 November 2006)

4.7.3 NIWA Marine Sediment Study – Lyall Bay

As seawall renewal may require disturbance of sediment, a review of available information relating to contaminants in marine sediments was completed.

The National Institute of Water and Atmospheric Research (NIWA) completed sediment sampling and chemical analysis within Lyall Bay in 2015. The purpose was to characterise the marine sediment south of the airport and the surrounding area prior to the proposed runway extension. The original document could not be sourced, but the following summary was available¹⁸:

“All contaminant levels were well below ANZECC sediment quality guidelines. Contaminant concentrations in Lyall Bay surficial sediments were very low and uniformly distributed across the study area, including at sites most likely to be disturbed by construction activities. Mobilisation of sediment from 0-0.2 m depths from within the area of the proposed runway extension is not expected to result in any significant increase in sediment contaminant concentrations in surrounding areas. From a contaminant perspective, the risk of adverse effects on the water column from transient sediment suspension/disturbance events during construction is very low given that water column concentrations, even after allowing for reasonable mixing, are estimated to be at least two orders of magnitude lower than default ANZECC water quality trigger values.”

¹⁸ https://dc.niwa.co.nz/niwa_dc/srv/api/records/d67afa44-b56f-5165-87cd-e2e46a163df9

4.8 Site Walkover / Interviews

A conversation was held with Graham Rock (Crew Chief, Wellington Airport Fire Services) on 24 October 2024. He has been in the AFS since 1994. The following is a summary of information:

- According to Mr. Rock, the only emergency incident recalled in the early 2000s was a small plane flipping at the end of the runway, where it joins with Taxiway Alfa. At the time, the runway was 50 m shorter than the present-day runway. During this incident, there was a minor fuel leak and a 'couple hundred litres' of mixed AFFF was sprayed directly onto the aircraft via a hand line.
- No other event / crash management was recalled around the end of the runway, and no event was known of that occurred on the present-day southernmost point of the runway, past the runway on Moa Point Road, or on the seawall.
- No fire training was occurring on the beach when he started with AFS in 1994. Training occurred further north, on Airport land around Stewart Duff Drive.
- When asked for any other information that may be relevant within the site extents, Mr. Rock stated that the AFS used to conduct 'BC powder testing' around Moa Point. The location was either on the accessible part of the east bank or in an area further inland that is now a car park. The 'BC powder' was a sodium bicarbonate-based powder. He did not recall any fuel spills, spraying, exercises, disposal, fires or other incidents within or directly adjacent to the site extent.

A site walkover was completed on 24 October 2024. The seawall was viewed from the west side (adjacent to the windsock) and the east side. The beach and bank were walked from the east side of the seawall in line with 38 Moa Point Road. Site photography is available in **Appendix E**. In summary:

- The entire seawall site is publicly accessible (although there is signage discouraging access), and the vegetated part has signage stating it is a bird nesting area.
- Some terracotta and ceramic fragments were visible across the surface of the seawall, but there were no other observations of note.
- The bank above the beach is a combination of bare ground, grass, and dense vegetation. The ground is steeply undulating and appears to be a series of artificial bunds / mounds created with fill.
- The recessed area identified in the 1980s aerial photography is identifiable, but the centre now contains a grassed mound. Debris / refuse or staining was not identified on visible surfaces within the recessed area (other than the ubiquitous terracotta and asphalt fragments), but many areas were densely vegetated and could not be viewed.
- What appears to be terracotta and asphalt fragments are visible across most bare surfaces of the fill and within the exposed cliff.
- The bank ends in a small cliff face directly north of the beach, varying between 0.3 m and approximately 3 m above the beach. The exposed fill profile in the cliff was inspected. The cliff was generally comprised of gravels and silty sand. Refuse was observed in various locations along the cliff face, and at various 'depths'. Refuse included fragments of fibre cement that are suspected asbestos containing material (ACM), bricks, asphalt fragments, slabs of concrete, timber, blue glass, plastic bags, orange mesh, a hose, and metal (waratahs, wiring, rebar). The suspected ACM was generally isolated to fill on the east side, in line with 34-36 Moa Point Road. There was also a defined layer of asphalt in some areas.
- What appeared to be modern construction waste (e.g. the orange mesh) was protruding from the base of the cliff. Therefore, the area may have been reworked during more recent works than the original reclamation (e.g. the 2006 tunnel works).
- Some rebar and brick had eroded from the cliff onto the beach. Otherwise, there were no observations of note from the beach.
- A monitoring well was not identified; however, the site is overgrown.

5 Discussion

5.1 Summary of Information Search

5.1.1 Golf Course

Based on this desktop assessment, the golf course site has been a golf course since 1908 and was recontoured into the present-day layout in 1994-1995. Various agrichemicals have been used on the course to maintain the greens, including endosulfans, organophosphates, and carbamates, and the site was irrigated with reclaimed wastewater until 2019. A discharge consent was previously held to apply treated wastewater to land, which was surrendered in 2019. Wastewater was treated at the WWTP and also treated at the golf course prior to storage in the pond for irrigation. Applying waste to land is considered a HAIL activity (G5 – *Waste disposal to land*).

Soil sampling has not occurred within the present site extent. Previous investigations on the wider golf course have identified some heavy metals and OCPs above background concentrations in soil. PFAS was also identified in shallow soil in one low-lying location 260 m north of the present site extent. The detection appeared isolated to one location and to a shallow depth.

A part of the historical NAC hangar apron overlapped with the west side of the present site extent. The overlapping area appeared to contain ASTs. Site plans for the NAC apron could not be located.

The following HAIL codes apply to the site at a 'more likely than not' level of certainty:

- **A10** – persistent pesticide bulk storage or use, including sports turfs. Due to the use of pesticides on the greens and disposal of leftover agrichemicals onto the fairways.
- **G5** – Waste disposal to land. Due to irrigation of reclaimed wastewater onto the golf course.
- **F1** – Airports, including fuel storage, workshops, washdown areas, or fire practice areas. Relating to a historical NAC apron within the site extent.

5.1.2 The Seawall

The airport and Southern Seawall site was developed over several decades. The airport was initially reclaimed in the 1950s. The present day Southern Seawall, which extended the original reclamation southward by 180m, was constructed between 1971 and 1972, using concrete armour units, imported rock, demolition rubble, and dredged reclamation material. The seawall was repaired several times over the 1980s and 1990s, and the Moa Point Road tunnel was constructed directly north of the seawall over 2005 and 2006. Imagery from the tunnel construction showed stockpiled asphalt and a layer of terracotta rubble in the seawall soil profile. Evidence of uncontrolled filling was observed during the site walkover, including construction debris, suspected ACM (in the Eastern bank), wood, and brick. The fill on the eastern bank appears to have been reworked / remixed, and therefore there are no distinct layers of fill. The GWRC SLUR lists landfilling (HAIL G3) as one of the activities at the seawall site, stating that domestic refuse was placed there. Upon review of available information, this appears to come from URS 2007 report but no evidence that suggests the site was used for landfill activities has been found. The site does appear to have received uncontrolled fill, based on fragments of brick, asphalt and suspected ACM in viewed in the site walkover.

According to the PSI completed by GHD, emergency events occurred on the seawall pre-1970s and in the early 2000s. It has been assumed that the pre-1970s incident is the NAC crash (c. 1963). Images indicate that the crash was located on the edge of the airport / Moa Point Road at the time, which was located above the Lyall Bay breakwater. Historical aerial imagery and archived documents show the seawall area was not reclaimed until the 1970s. As shown in Figure 10, the seawall was separated from the runway by Moa Point Road until after 2006, when the tunnel was completed. Information could not be sourced for the 2000s incident, and could not be recalled by AFS staff during the interview completed by Beca in 2024. The staff member recalled a small aircraft flipped on the main runway in the early 2000s, but this occurred further

north within the airport. Therefore, no evidence has been found that indicate an incident occurred on the present-day seawall.

A 1985 masterplan indicates that the eastern bank of the seawall site was used for fire training purposes. There is no documentation or interviews with a knowledgeable person that shows that this occurred. However, aerial imagery from 1988 show large drums / tanks were at the location consistent with a fire training area (**Figure 8** and **Figure 9**). PFAS sampling was completed in 2020 in from one monitoring well by Aurecon on the eastern bank, 55 m north west of the suspected location (based on georeferenced historical imagery), and would be at a cross-gradient in regards to groundwater flow direction. PFAS was detected in three rounds of groundwater sampling from November 2019 to July 2020, with one round exceeding recreational water criteria. Other groundwater sampling from October 2019 and October 2020 encountered copper and mercury above ANZECC marine criteria (95% species protection level).

Therefore, the following HAIL codes may apply to parts of the site:

- **F1** – Airports, including fuel storage, workshops, washdown areas, or fire practice areas. Relating to the potential fire practice area on the east side of the site.
- **I** - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment. Relating to the area of uncontrolled fill on the bank adjacent to the seawall.

As discussed above, groundwater sampling from a monitoring well in the east bank over 2019 and 2020 has identified PFAS, copper and mercury at concentrations exceeding applied environmental / recreational criteria. Proposed works are not expected to encounter groundwater¹⁹. If this changes, will be management / controls required to minimise discharge to the coastal marine area.

Asphalt blocks, fragments and layers in soil were noted across the east bank during the site walkover. The origin and age of the asphalt is not known. Roding material is not soil and is therefore not subject to NESCS; however, soil under or adjacent to roads containing coal tar has potential to have been impacted by contaminants. Coal tar was a by-product from the gas manufacturing process and was typically sold as a binder for use in roads / pavements. It was used extensively in New Zealand roads until construction of the natural gas reticulation system caused progressive closure of gasworks during the 1970s and 1980s. The gasworks at Miramar close in 1972. Bitumen is derived from crude oil and contains a much lower concentrations of PAHs in comparison to coal tar. Coal tar contains several contaminants of concern. However, the most significant is PAHs which can be hazardous to human health and freshwater ecosystems.

As per Guidelines for Assessing and Managing Coal Tar Contamination in Roding prepared by WasteMINZ dated December 2023, roads should be characterised for the presence of coal tar when the following conditions are met:

- The original road was formed before 1980,
- The road has not been rehabilitated,
- No testing has been carried out to confirm that coal tar in roding material is not present, and
- If coal tar has been found in nearby roads constructed at a similar time.

As the age and origin of the asphalt is not known, the above conditions cannot be applied. However, the following has been considered:

- Soil samples from a single location on the east bank area contained PAH concentrations above background concentrations. However, the concentrations were much lower than would be associated with coal tar.
- Roadways, runways and taxiways in the area were constructed over the 1960s and were established by 1974.

¹⁹ As of July 2025 design, proposed works are not anticipated to encounter groundwater.

It is recommended that, if soil sampling occurs in the east area, PAH analysis is included for soils and asphalt to characterise the material.

5.2 HAIL Activities and Potential Contaminants of Concern

Identified activities, relevant HAIL codes and potential contaminants of concern have been summarised in **Table 7**. A HAIL map has been prepared and is available in **Appendix F**.

Table 7. HAIL activities and potential contaminants of concern

Activity	HAIL Code	Potential Contaminants of Concern
<i>Golf course site</i>		
Current and historical use of pesticides on the fairways, greens and tees.	A10 – Persistent pesticide bulk storage or use, including sports turfs.	- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) - OCPs, organonitrogens, organophosphates, acid herbicides and carbamates.
Historical NAC apron with potential ASTs.	F1 – Airports, including fuel storage, workshops, washdown areas, or fire practice areas.	- Heavy metals - PAH - TPH
Irrigation of reclaimed wastewater onto the golf course between 1998 and 2019.	G5 – Waste disposal to land.	- Heavy metals - PFAS
<i>Seawall site</i>		
Potential fire practice area on the east side of the site.	F1 – Airports, including fuel storage, workshops, washdown areas, or fire practice areas.	- PFAS - Heavy metals - PAH - TPH - Dioxins
Uncontrolled fill on the east bank adjacent to the seawall.	Potentially I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	- Heavy metals - Asbestos - PAH - TPH
Airport activities including fuel storage and fire practices areas located north of Moa Point Road and up hydraulic gradient of the seawall site. This is considered potentially applicable to groundwater and soils at and below the water table only and therefore has not been included in the map in Appendix F.	Potentially H - Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment	- PFAS - Heavy metals - PAH - TPH

5.3 Preliminary Exposure Pathway Assessment

The preliminary Conceptual Site Models (CSM) (Table 8 & 9) were developed to describe the relationship between sources of contamination on site, the human and environmental receptors that may be exposed to those contaminants in the context of soil disturbance, and the pathways by which those receptors may be exposed. Potential risk exists where a receptor is exposed to a contaminant by means of a complete pathway. The level of risk is affected by a combination of factors, including (but not limited to) the type of contaminant, the spatial location and distribution (e.g. near-surface or at depth), and the type of pathway (e.g. via dust inhalation, from hand-to-mouth contact).

Separate CSMs have been prepared for the seawall and the golf course, as the contaminants of concern and key receptors differ.

Table 8. Preliminary Conceptual Site Model – Golf Course

Source	Receptor	Pathway	Pathway Complete?
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) - OCPs, organonitrogens, organophosphates, acid herbicides and carbamates - PFAS - PAH / TPH	Construction workers	Exposure of workers to contaminants in soils and groundwater during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.	Potentially Incomplete Pathway – Given the diffuse nature of the potential contaminant sources, the contaminants are unlikely to present in the area of proposed works at levels that exceed human health criteria for commercial / industrial workers. Previous investigations within the golf course north of the golf course site have not identified contaminants in excess of human health criteria. Maintenance / excavation workers are not a scenario considered by the NESCS. The Methodology ²⁰ states it was considered more appropriate that exposure be limited through the site-specific controls that are required under health and safety legislation.
	Future site users	Exposure of future site users to contaminants in soils – dermal contact, ingestion or inhalation of dust/vapour.	Incomplete Pathway – Based on the potential contaminants of concern and contamination sources, it is likely contaminants will be primarily in the topsoil, which is to be removed and stockpiled. It is understood that the yard will likely be incorporated into future works (i.e. the East Side Area project) and will potentially be sealed as part of this.
	Groundwater resources for public consumption	Leaching and migration of soil contaminants	Incomplete Pathway – There are no known registered potable groundwater bores in proximity to the site, and the site is not within a source protection zone.

²⁰ MfE, 2011. Methodology for Deriving Standard for Contaminants in Soil to Protect Human Health.

According to the Methodology, ‘the exposure parameters for the current New Zealand maintenance / excavation scenario are unrealistic. The typical commercial / industrial site simply does not get dug up on 50 occasions each year, every year for 20 years, involving the same personnel. Therefore, it can be assumed that exposure of an individual would be no more than a few occasions per year, suggesting the current guidelines are conservative by a factor of perhaps 10 for threshold substances.’

Source	Receptor	Pathway	Pathway Complete?
		into groundwater.	
	Surface water	Sediment and runoff directly into surface water discharging into nearby watercourses.	Potentially Complete Pathway – The nearest surface water body is the artificial pond directly north. The pond was historically used for irrigation across the golf course, but is no longer used. Otherwise, it is understood that stormwater on the west side of the golf course drains to the airport stormwater network. Soil disturbance should be subject to standard erosion sediment controls preventing discharge to the pond and irrigation system.
		Migration of soil contaminants into surface water through shallow groundwater discharging into surface water.	Potentially Incomplete Pathway – The onsite manmade pond is lined with high-density polyethylene. Groundwater was encountered at 1.36 to 1.5 m bgl in test pits in the golf course north of the golf course site, and assumed groundwater direction is towards the ocean (250 m). Potential contaminants in surface soil are unlikely to be present at a concentration that poses a risk to the offsite environment via migration of contaminants.

Table 9. Preliminary Conceptual Site Model - Seawall

Source	Receptor	Pathway	Pathway Complete?
- Heavy metals - Asbestos - PAH - TPH - PFAS - Dioxins	Construction workers	Exposure of workers to contaminants in soils and groundwater during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.	Potentially Complete Pathway – Contaminants could be present in the east area and eastern bank at levels that may pose a risk to human health. Further investigation is recommended to assess potential risk. Maintenance / excavation workers are not a scenario considered by the NESCS. The Methodology ²¹ states it was considered more appropriate that exposure be limited through the site-specific controls that are required under health and safety legislation.
	Future site users	Exposure of future site users to contaminants in soils – dermal	Potentially Complete Pathway – The seawall will receive rock and concrete armour units as part of the renewal. The east area will be covered with geotextile, rock, and concrete armour units. The

²¹ MfE, 2011. Methodology for Deriving Standard for Contaminants in Soil to Protect Human Health.

Source	Receptor	Pathway	Pathway Complete?
		contact, ingestion or inhalation of dust/vapour.	exposure pathways in these areas will be incomplete. The eastern bank will be recontoured with cut material and vegetated. The area is an open space accessible to the public. Contaminants could be present at levels that may pose a risk to human health. Further investigation is recommended to assess potential risk.
	Groundwater resources for public consumption	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – There are no known registered potable groundwater bores in proximity to the site, and the site is not within a source protection zone.
	Surface water	Sediment and runoff directly into surface water.	Potentially Complete Pathway – HAIL activities may have occurred on site. Contaminants may be present at levels that could pose a risk to environmental receptors. Soil disturbance will be subject to standard erosion sediment controls preventing discharge to water.
		Migration of soil contaminants into surface water through shallow groundwater discharging into surface water.	Potentially Complete Pathway – Groundwater was previously measured at 3.4 m bgl in a monitoring well within the seawall site, and assumed groundwater flow direction is towards the ocean. Groundwater sampling from the monitoring well has identified contaminants above environmental criteria; however, soil disturbance for the project is not expected to extend to the water table.

6 Development Implications

6.1 Consenting

6.1.1 NESCS

The NESCS applies to land as per clause 5(7):

“Land covered:

(7) The piece of land is a piece of land that is described by (1) of the following:

- a) an activity or industry described in the HAIL is being undertaken on it*
- b) an activity or industry described in the HAIL has been undertaken on it*
- c) it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.”*

HAIL activities have been undertaken on and in proximity of the site as detailed in **Section 5**. Therefore, the regulations of the NESCS apply.

The NESCS applies to five activities taking place on land where HAIL activities have been undertaken on a ‘more likely than not’ basis. For each activity, there are a set of criteria that, if met, the activity may proceed as a permitted activity (PA). Where works cannot comply within these PA criteria, a land use consent is required from WCC under the NESCS. **Table 10** details which activities are triggered for the proposed site works, and criteria for trigger activities are detailed below.

Table 10. NESCS Trigger Activities

Activity		Applicable to the proposed works?
1	Does the proposed activity at the site include the removal or replacement of all, or part of, a fuel storage system?	No
2	Does the proposed activity at the site include soil sampling?	Potentially*
3	Does the proposed activity at the site involve the disturbance of soil?	Yes
4	Does the proposed activity at the site involve the subdivision of land?	No
5	Does the proposed activity involve a changing the use of the piece of land?	Yes

*Soil sampling can be undertaken in accordance with the permitted activity provisions of the NESCS.

6.1.1.1 Soil Disturbance

Under Regulation 8(3) of the NESCS, soil disturbance of up to 25 m³ per 500 m² and disposal of up to 5 m³ per 500 m² of ‘piece of land’ is a PA. Furthermore, under Regulation 8(3) of the NESCS, the following criteria must also be met in order for the proposed works to be considered PA:

- Controls to minimise the exposure of humans to mobilised contaminants must:
 - be in place when the activity begins.
 - be effective while the activity is done.
 - be effective until the soil is reinstated to an erosion-resistant state.
- The soil must be reinstated to an erosion-resistant state within 1 month after the serving of the purpose for which the activity was done.
- Soil must not be taken away in the course of the activity, except that,
 - for the purpose of laboratory analysis, any amount of soil may be taken away as samples,
 - for all other purposes combined, a maximum of 5 m³ per 500 m² of soil may be taken away per year.

- Soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind.
- The duration of the activity must be no longer than 2 months.
- The integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.

The amount of soil disturbance proposed for the seawall is not currently known. Based on the proposed works summary, it is assumed that a majority of soil disturbance will occur in the east area and eastern bank to stabilise the areas, where the potential HAIL areas are located. It is likely that the volumes will exceed permitted activity criteria, and consent may be required.

For soil disturbance and removal above PA volumes or duration, a DSI is required to determine whether it is a controlled or restricted discretionary activity. In the absence of a DSI, the soil disturbance and removal would be a discretionary activity.

According to the golf course cut and fill plan, approximately 4,600 m³ of soil disturbance is proposed to remove topsoil from the site. Following this, approximately 54,150 m³ of soft cut and 34,300 m³ of rock cut is proposed. Therefore, it is not likely that soil disturbance within the golf course can be completed as a PA under the NESCS. The golf course site is covered by the existing site-wide NESCS consent SR520690 granted to WIAL in December 2022, which requires sampling prior to works.

6.1.1.2 Soil Sampling

Sampling the soil of the piece of land is a PA under Regulation 8(2) provided the following requirements are met:

- Controls to minimise the exposure of humans to mobilised contaminants must be in place.
- The soil must be reinstated to an erosion-resistant state within 1 month after the end of the sampling.
- Soil must not be taken away except as samples taken for the purpose of laboratory analysis.
- The integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.

A DSI is recommended if works are to occur in areas shown in the HAIL map (**Appendix F**). If a DSI is undertaken, soil sampling shall be undertaken in accordance with the PA criteria.

6.1.1.3 Subdivision / Changing Use

Under Regulation 5(6) of the NESCS changing the use of the piece of land, means changing it to a use that is reasonably likely to harm human health. For the golf course site, the change from a recreational use (golf course) to a commercial / industrial use is not considered to be a change that is likely to harm human health and therefore Regulation 5(6) is not considered to apply.

6.1.2 GWRC Natural Resources Plan

Under the NRP, discharges of a contaminant from a contaminated site where a contaminant may enter water are a permitted activity under Rule R82. To meet the PA requirements, DSI results must indicate that the discharge does not pose an unacceptable risk to human health or the environment on or off the site, and the DSI needs to be provided to GWRC.

Previous groundwater sampling completed by Aurecon and GHD has identified contaminants (PFAS, copper, mercury) at concentrations above environmental criteria and recreational criteria for PFAS in water. Therefore, the site may pose a risk to the environment. A DSI with soil and groundwater sampling is recommended, particularly within the eastern bank of the seawall where earthworks are proposed directly adjacent to the water.

6.2 Soil Management, Handling, and Disposal

6.2.1 Specifications of Fill

Cleanfill material is defined by NRP as:

“Material that when buried will have no adverse effect on people or the environment; includes virgin natural materials such as clay, soil and rock, and other inert materials such as concrete or brick that are free of:

- a) combustible, putrescible, degradable or leachable components, and*
- b) hazardous substances, and*
- c) products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices, and*
- d) materials that may present a risk to human health, and*
- e) liquid waste.”*

6.2.2 Soil Disposal Off-site

If material is to be disposed of offsite, the following will need to be considered:

- The material will need to be sent to a facility approved to accept the contaminant concentrations present. Soil sampling from the identified HAIL areas will be required to determine if waste acceptance criteria are met. Acceptance is ultimately the decision of the receiving facility. Based on the one sample location in the seawall site assessed by GHD, soils in the eastern area of the seawall site may not meet the definition of cleanfill. However, additional sampling may be required to characterise the soil to inform soil disposal. The golf course site has not been sampled previously but sampling of an area of the golf course north of the site found most soil was suitable for reuse or disposal as cleanfill with the exception of an area of shallow soil which contained PFAS.
- As the composition and origin of the asphalt throughout the east bank is not known, it is recommended that it is sampled to assess the presence of coal tar.
- Fibre cement sheet fragments were noted in the exposed soil profile in the eastern area. If these fragments contain asbestos, they would require disposal at a landfill consented to receive asbestos.

6.2.3 Soil Management

A site-wide Contaminated Land Management Plan (CLMP) is in place in accordance with site-wide NESCS resource consent SR520690 held by WIAL. The golf course site is covered by the site-wide CLMP but the seawall site is not (as it is not owned by WIAL).

Due to the nature of the uncontrolled fill in the eastern bank, it is recommended that a CLMP with an unexpected discovery protocol is adhered to during soil disturbance and soil removal in the seawall site. A DSI will assist to determine the nature and extent of contamination present, and the controls required during soil disturbance.

7 Conclusions and Recommendations

7.1 Conclusions

Based on the reviewed historical aerial imagery, SLUR documents, available property information, previous investigations and a site walkover, activities on the MfE HAIL have been identified within the proposed site extents. The following HAIL codes apply to the golf course site and / or the seawall site at a 'more likely than not' level of certainty:

- **A10** – persistent pesticide bulk storage or use, including sports turfs. Due to the use of pesticides on the fairways, greens and tees of the golf course.
- **F1** – Airports, including fuel storage, workshops, washdown areas, or fire practice areas. Relating to a historical NAC apron within the golf course site and the possible fire training area on the eastern bank of the seawall site.
- **G5** – Waste disposal to land. Due to irrigation of reclaimed wastewater onto the golf course.
- **Potentially I** - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment. Relating to the area of uncontrolled filling on the bank adjacent to the seawall.
- **Potentially H** - Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment. Relating to airport activities including fuel storage and fire practices areas located north of Moa Point Road and up hydraulic gradient of the seawall site.

Based on the information gathered to date, potentially complete exposure pathways have been identified between contaminants and human and environmental receptors.

There is potential for soil disturbance volumes to exceed permitted activity criteria in the golf course site and the seawall site, and land use consent may be required under the NESCS.

7.2 Recommendations

7.2.1 Next Steps

- A DSI including soil sampling and analysis is recommended in the HAIL areas shown in **Appendix F**. Sampling is recommended to characterise potential contamination at the golf course and seawall sites, and to inform soil disposal options.
- It is recommended that the asphalt and fibre cement sheet fragments observed in the seawall are sampled to assess the presence of coal tar and ACM for disposal purposes and to determine if asbestos controls are required.
- A CLMP is recommended for works in the seawall site, which shall be informed by sampling.
- Specific dewatering procedures may be required on the seawall site due to the presence of PFAS, if groundwater is likely to be encountered.
- It is recommended that an Erosion and Sediment Control Plan (ESCP) is prepared prior to works commencing.

7.2.2 Consenting

- The DSI will inform the level of consent (controlled or restricted discretionary) required under the NESCS for soil disturbance and any removal above PA volumes for the seawall site.
- If consent for development is sought prior the completion of a DSI, consent must be sought as a discretionary activity.
- The golf course site is covered by the WIAL site-wide NESCS resource consent.
- Under the NRP, discharges of a contaminant from a contaminated site where a contaminant may enter water are captured by Rule 82 (as a permitted activity). To meet the PA requirements, analytical results

from a DSI must indicate that the discharge does not pose an unacceptable risk to human health or the environment on or off the site, and the DSI must be provided to GWRC. A DSI / sampling is recommended, particularly within the eastern bank of the seawall where potential activities have occurred, and earthworks are potentially proposed directly adjacent to the water.

8 Reviewing Statement

This report has been reviewed by Sarah Shepherd, CEnvP Site Contamination Specialist. Sarah is a suitably qualified and experienced practitioner (SQEP) with 20 years of experience managing and delivering a wide variety of environmental investigation works in New Zealand, Asia and the United Kingdom. She is experienced in regulatory compliance, oversight of environmental investigations, monitoring and risk assessment, contractor management, preparation and review of technical reports, as well as consultation with stakeholders and regulatory bodies. Sarah has been a Certified Environmental Practitioner Site Contamination Specialist since 2016.



9 Limitations

This report has been prepared by Beca Ltd (Beca) for Wellington International Airport Limited (Client). Beca has been requested by the Client to provide a Preliminary Site Investigation in regard to proposed enabling works within the Miramar Golf Course and proposed sea defences renewal works on Moa Point Road, Rongotai, Wellington 6022.

This report is prepared solely for the purpose of assessing potential environmental and human health risk from soils and groundwater at the site (the agreed scope of work) and to support an application by the Client for statutory approvals in relation to renewal of the Southern Seawall at Moa Point Road. The contents of this report may not be used by the Client for any purpose other than in accordance with the stated Scope.

Beca acknowledges the Practice and Procedure Guidance, dated 22 July 2025, provided by the Panel Conveners appointed under the Fast-track Approvals Act 2024, which states that “reports that are intended to be relied on by the panel should not be submitted with a disclaimer stating that the report is not for use by persons other than the applicant”. This report, however, serves a dual purpose; it supports the application for approvals for the Southern Seawall and serves a wider regulatory function, having been prepared under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESC), the contaminated land rules of the Greater Wellington Regional Council (GWRC) Natural Resources Plan (NRP), and the contaminated land rules in Chapter 32 of the Wellington City Council (WCC) District Plan.

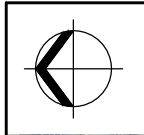
This report has been prepared by Beca on the specific instructions of our Client. It is solely for our Client's use for the purpose for which it is intended in accordance with the agreed scope of work. Any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent, is at that person's own risk and Beca accepts no liability to any other person for their use of or reliance on this report. This report contains information obtained by inspection, sampling, testing or other means of investigation. Unless specifically stated otherwise in this report, Beca has relied on the accuracy, completeness, currency and sufficiency of all information provided to it by, or on behalf of, the Client or any third party, including the information listed above, and has not independently verified the information provided. Beca accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the information provided. Publicly available records are frequently inaccurate or incomplete.

The contents of this report are based upon our understanding and interpretation of current legislation and guidelines (“Standards”) as consulting professionals and should not be construed as legal opinions or advice. Unless special arrangements are made, this report will not be updated to take account of subsequent changes to any such Standards.

This report should be read in full, having regard to all stated assumptions, limitations, and disclaimers.



Appendix A – Concept Drawings



- NOTES:**
- CADASTRAL INFORMATION FROM LINZ DATA BASE AND IN NEW ZEALAND TRANSVERSE MERCATOR 2000 (NZTM2000) COORDINATE SYSTEM
 - MODEL BASED ON EXISTING SURFACE DTM FROM 2013 LIDAR DATA & HISTORIC AIRFIELD TOPOGRAPHIC SURVEY WHERE AVAILABLE AND HEIGHT ADJUSTED TO NZVD2016 BY REDUCING LEVELS BY 0.488m MANUALLY FOR THIS EXERCISE. LEVELS ARE TO BE CONFIRMED BY A REGISTERED SURVEYOR.
 - INFORMATION ADOPTED FROM WELLINGTON AIRPORT RECORDS. NO GUARANTEE IS GIVEN TO THE COMPLETENESS OF SERVICES INFORMATION.
 - YARD WORKS INCLUDE EARTHWORKS, FENCING, PLANTING OF BUFFER ZONE, ACCESS ROADS, ON-SITE CONCRETE BATCHING PLANT (PROVISIONAL), CASTING YARD AND STOCKPILE/STORAGE AREAS.

- LEGEND:**
- CONSTRUCTION YARD & LAYDOWN AREA
 - PROPOSED HAUL / SITE ROAD ROUTES (10m WIDE)
 - MAJOR CONTOURS @ 2.5m INTERVALS
 - MINOR CONTOURS @ 0.5m INTERVALS

LATEST MGC YARD EXTENT (APPROX)

STORMWATER FOND COULD BE RELOCATED TO WEST SIDE OF THE YARD ADJACENT TO STEWART DUFF DRIVE

INDICATIVE LANDSCAPE BUFFER ZONE
APPROX. AREA - 4.496ha

NOT FOR USE BY SEA DEFENCES PROJECT

CONSTRUCTION YARD INCL. LAYDOWN AREA
APPROX. AREA - 5.93ha

STEWART DUFF DRIVE

CASTING YARD

CONCRETE BATCHING PLANT

ORIGINAL DRAWING
IN COLOUR

FOR INFORMATION
NOT FOR CONSTRUCTION

CONFIDENTIAL

SUPERSEDED
FOR PSI INFORMATION ONLY

B FOR INFORMATION		IO	JH	JH	15.04.24
A FOR INFORMATION		TNM			13.03.24
No.	Revision	By	Chk	Appd	Date

Original Scale (A1)	Design	TNM	13.03.24	Approved For Construction*
1:1,000	Drawn	TNM	13.03.24	
Reduce Scale (A3)	Design	JH	15.04.24	
1:2,000	Check	JH	15.04.24	Date

* Refer to Revision 1 for Original Signature



Project: SEA DEFENCE STRUCTURES RENEWAL - STAGE 1 ENABLING WORKS & SOUTHERN SEAWALL

Title: CONSTRUCTION YARD LAYOUT & BULK EARTHWORKS CONTOUR PLAN

Discipline	CIVIL
Drawing No.	3324338-SK-RFT-201
Rev.	B

0 10 20 40 60
FULL SIZE 1:1000; HALF SIZE 1:2000
SCALE (m)

1. SEAWALL PLAN DEPICTS A TRENCHED TOE THROUGHOUT. IN AREAS WHERE TOE ROCK IS CONSIDERED THE EXTENT WOULD BE FURTHER SEAWARD. THIS IS BEING DEVELOPED IN PRELIMINARY DESIGN.

Works potentially continue eastward, to a point 120m east of Stewart Duff Drive

ORIGINAL DRAWING
IN COLOUR

CONFIDENTIAL

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SUPERSEDED
FOR PSI INFORMATION ONLY

[illegible]

Client: 

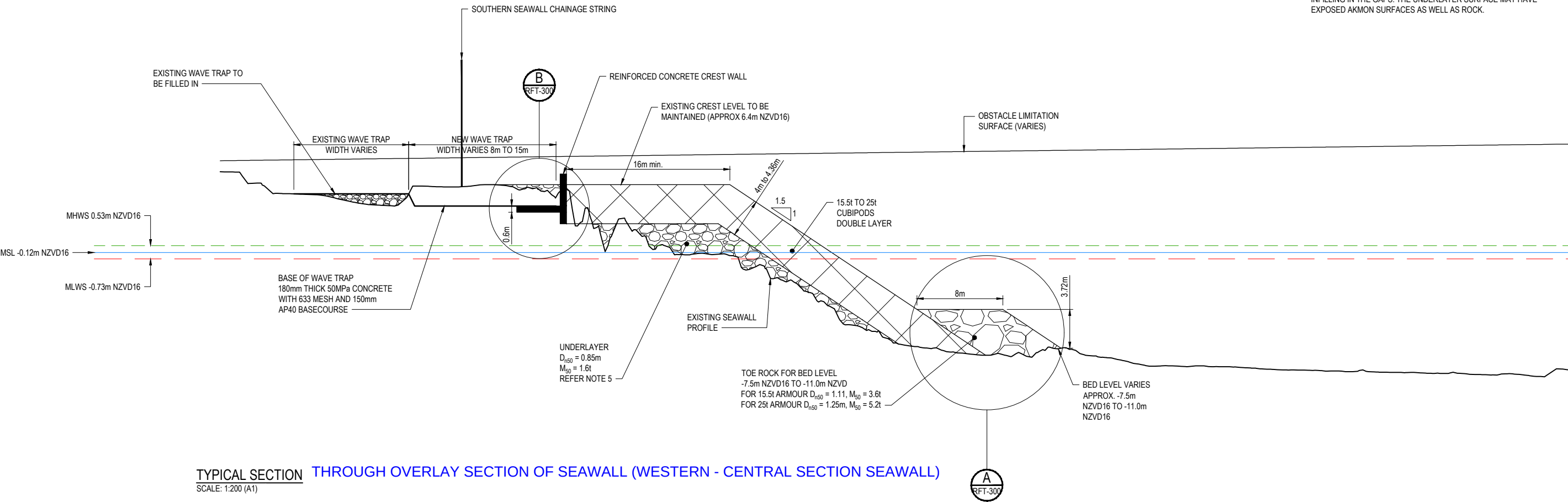
Project: SEA DEFENCE STRUCTURES
RENEWAL - STAGE 1 ENABLING
WORKS & SOUTHERN SEAWALL

Title: SOUTHERN SEAWALL
GENERAL ARRANGEMENT

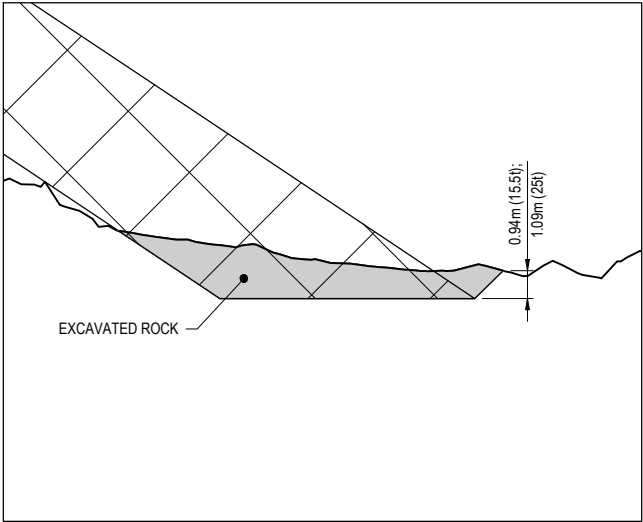
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Drawing No.	3324338-SK-RFT-300	Rev. A

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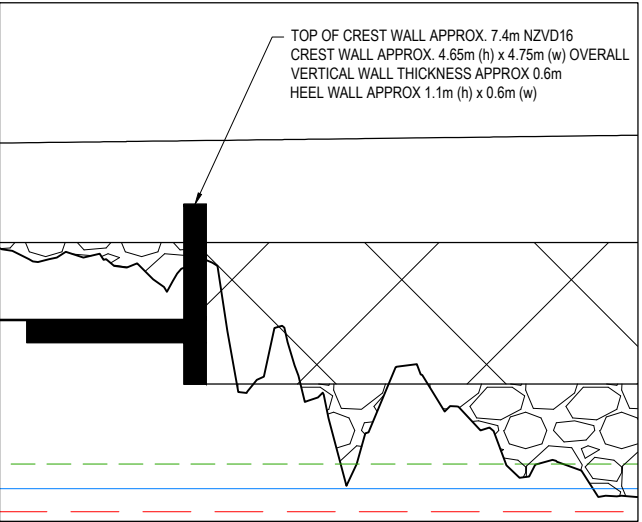
- NOTES:**
- 1. LEVELS ARE IN METRES AND RELATIVE TO NEW ZEALAND VERTICAL DATUM 2016 (NZVD16).
 - 2. DRAWING IS IN METRES UNLESS STATED OTHERWISE.
 - 3. TYPICAL SECTION IS DRAWN TO THE 15.5t CUBIPOD DIMENSIONS. THE CUBIPOD SIZE IS TO BE DETERMINED BASED ON NUMERICAL MODELLING AND PHYSICAL MODEL TESTING.
 - 4. BATHYMETRIC SURVEY DATA:
 - DISCOVERY MARINE LIMITED (DML) CONDUCTED APRIL TO MAY 2021.
 - 5. UNDERLAYER ROCK WILL BE USED TO GRADE THE SLOPE, INFILLING IN THE GAPS. THE UNDERLAYER SURFACE MAY HAVE EXPOSED AKMON SURFACES AS WELL AS ROCK.



TYPICAL SECTION THROUGH OVERLAY SECTION OF SEAWALL (WESTERN - CENTRAL SECTION SEAWALL)
SCALE: 1:200 (A1)



A ALTERNATIVE TOE DETAIL (BED LEVEL LESS THAN -7.5m NZVD16)
RFT-300 1:100 (A1)



B CREST WALL DETAIL
RFT-300 1:100 (A1)

ORIGINAL DRAWING
IN COLOUR
FOR INFORMATION
NOT FOR CONSTRUCTION
CONFIDENTIAL

Original Scale (A1) AS SHOWN				Design WP & AS 13.04.24				Approved For Construction*			
Reduced Scale (A3)				Drawn WP 13.04.24				Date			
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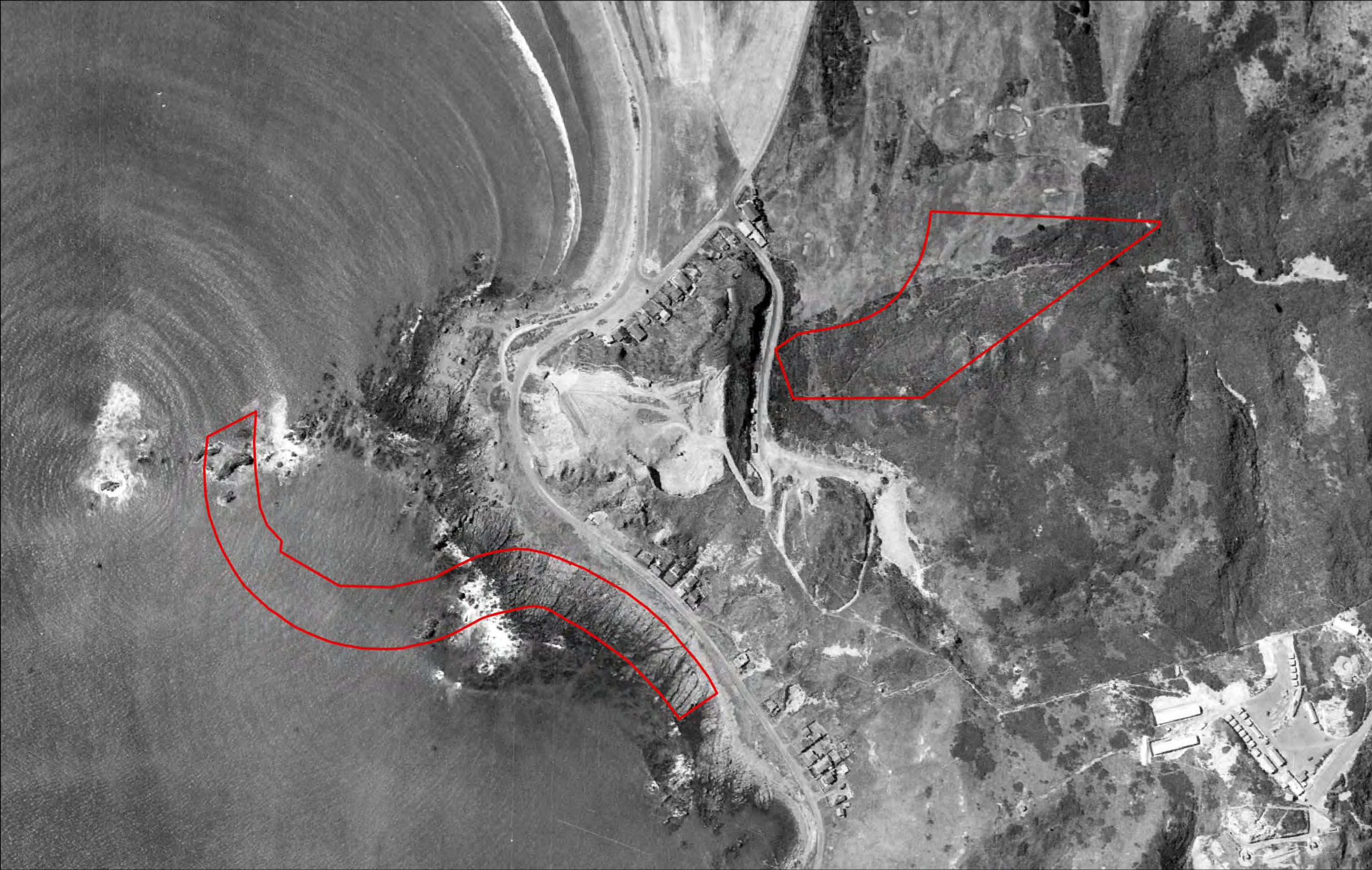
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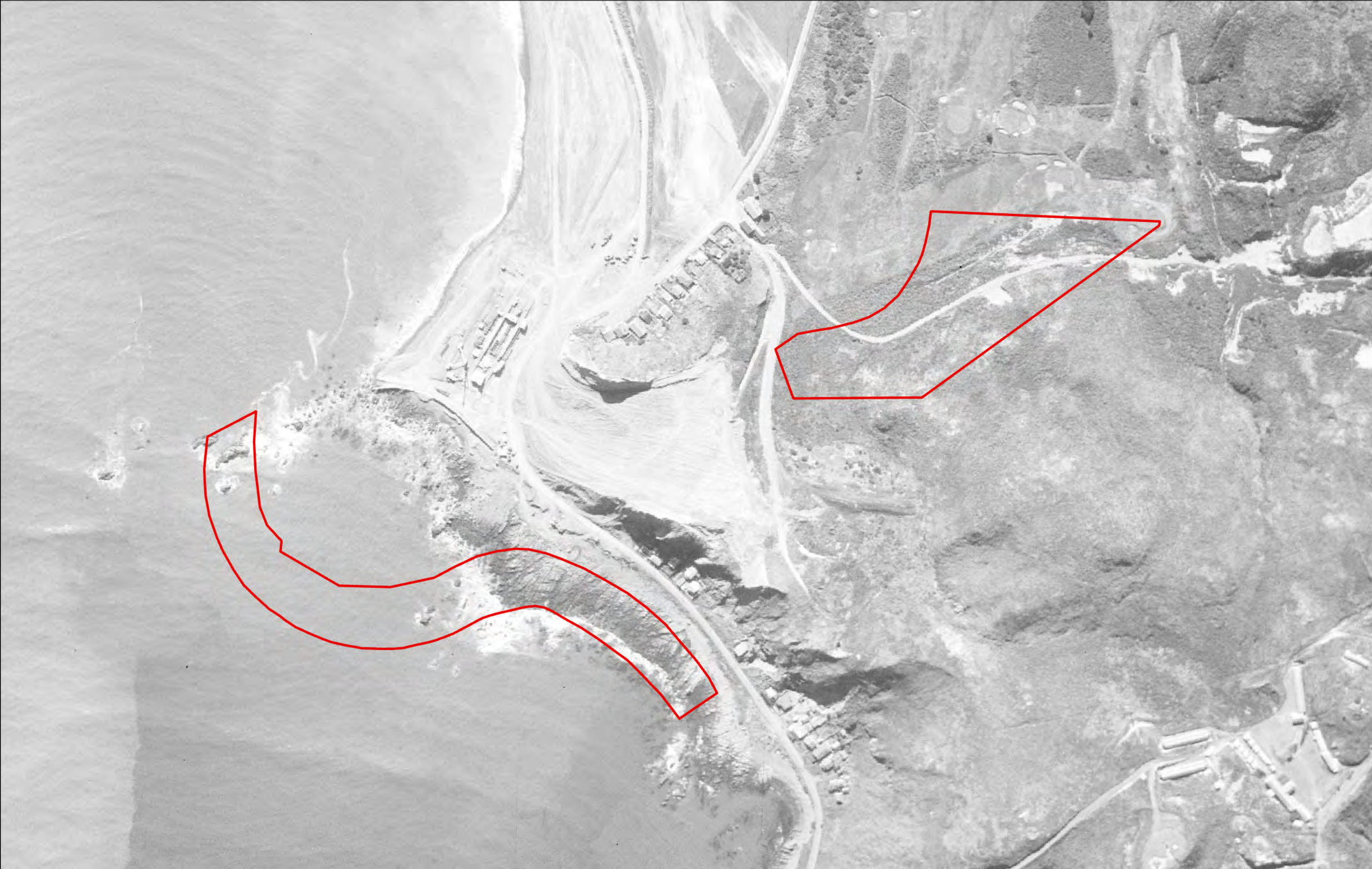
B

Appendix B – Historical Aerial Imagery

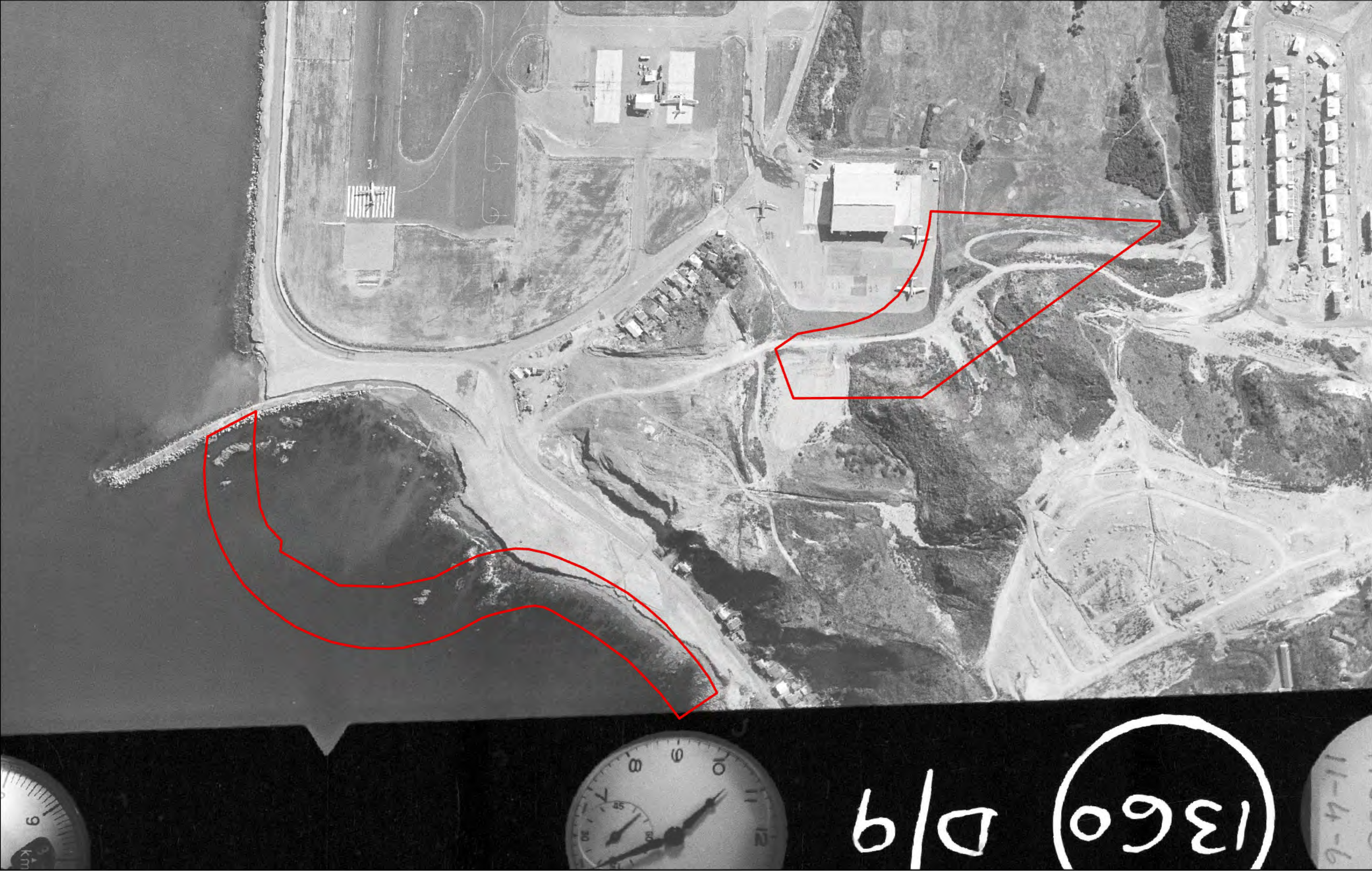


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							Project: SEA DEFENCES STRUCTURES RENEWAL			

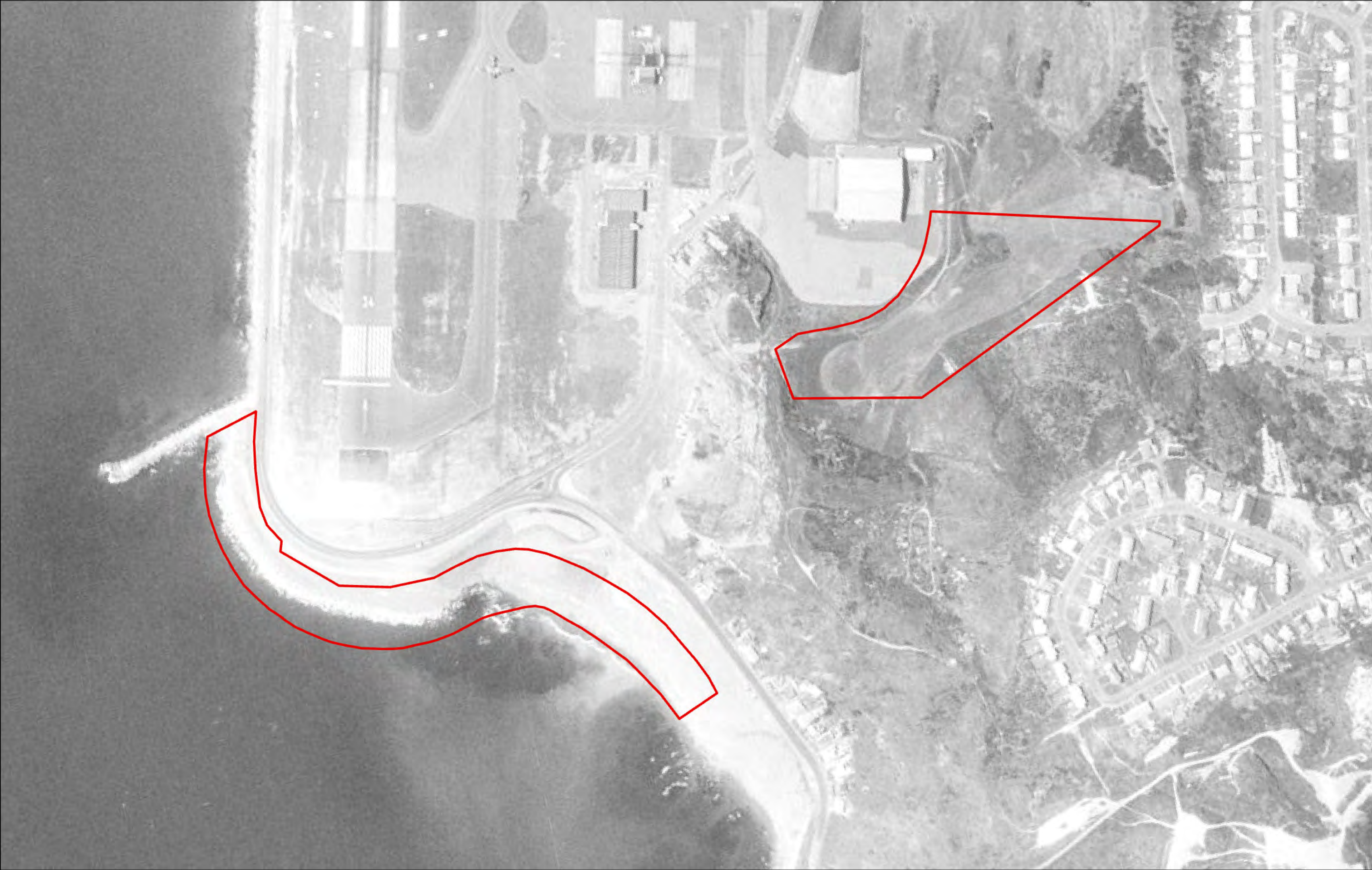
This map contains data derived in part or wholly from sources other than Beca, and therefore, no representations or warranties are made by Beca as to the accuracy or completeness of this information. Map intended for distribution as an A3 PDF document, the scale may be incorrect if printed at different scales. Contains Crown Copyright Data. Crown Copyright Reserved. Basemap source: LINZ



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							Project: SEA DEFENCES STRUCTURES RENEWAL			



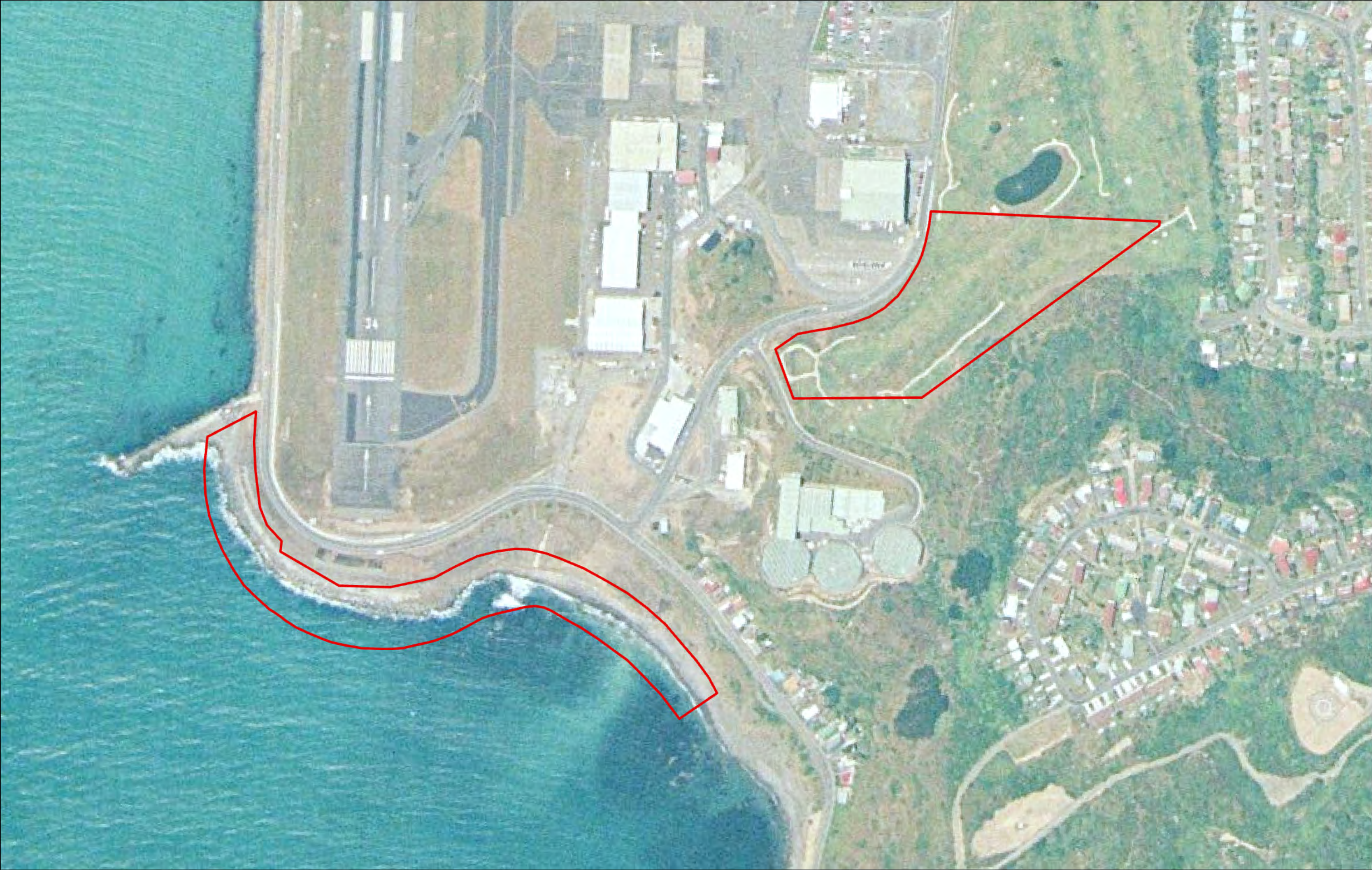
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	1	GJS			01.10.24				Drawing No. APPENDIX A	
							Project: SEA DEFENCES STRUCTURES RENEWAL			



	Revision	Drawer	Verified	Approved	Date	Title: HISTORICAL AERIAL IMAGERY 1974	Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED 			Discipline:	ENVIRONMENTAL
	1	GJS			01.10.24		Project: SEA DEFENCES STRUCTURES RENEWAL			Drawing No.	APPENDIX A



	Revision	Drawer	Verified	Approved	Date	Title: HISTORICAL AERIAL IMAGERY 1988	Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED 		Discipline: ENVIRONMENTAL	
	1	GJS			01.10.24				Drawing No. APPENDIX A	
							Project: SEA DEFENCES STRUCTURES RENEWAL			



	Revision	Drawer	Verified	Approved	Date	Title: HISTORICAL AERIAL IMAGERY 2000	Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED 		Discipline: ENVIRONMENTAL	
	1	GJS			01.10.24				Drawing No. APPENDIX A	
							Project: SEA DEFENCES STRUCTURES RENEWAL			



	Revision	Drawer	Verified	Approved	Date	Title: HISTORICAL AERIAL IMAGERY 2016	Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED 		Discipline: ENVIRONMENTAL
	1	GJS			01.10.24				Drawing No. APPENDIX A
							Project: SEA DEFENCES STRUCTURES RENEWAL		



	Revision	Drawer	Verified	Approved	Date	Title: HISTORICAL AERIAL IMAGERY 2024	Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED 		Discipline: ENVIRONMENTAL	
	1	GJS			01.10.24				Drawing No. APPENDIX A	
							Project: SEA DEFENCES STRUCTURES RENEWAL			



Appendix C – Information from Greater Wellington Regional Council



caring about you & your environment

Resource Management Act 1991

Resource Consent

Consent No. WGN 980198(01) [20429]

Category: Discharge to Land

Pursuant to sections 105 and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any Regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Miramar Golf Club Inc.	
Address	P O Box 15 182, Wellington	
Term of Consent	Granted: 10 September 1998	Expires: 5 October 2019
Purpose for Which Right is Granted	To discharge treated wastewater (recycled water) onto <u>land</u> for irrigation purposes. <i>before main point</i>	
Location	Miramar Links Golf Course, Stewart Duff Drive, Miramar, at or about map reference NZMS 260:R27;618.847.	
Legal Description of Land	Pt Secs 12, 14 and 15 Watts Peninsula District, Pt Lot 2 DP 3166, Pt Lot 1 DP 3177, Lot 1 DP 51082, Pt Lot 1 DP 78363, Lot 3 DP 80623 and Sec. 4 SO 37422.	
Volume/Quantity/Rate	Up to 1,100,000 litres per day	
Standard Conditions	1-5 as on reverse of this form	
Additional Conditions	6-26 as attached	

For and on behalf of
WELLINGTON REGIONAL COUNCIL

Manager, Consents Management

replaces [2666]

Standard Conditions

1. This consent is subject to all relevant provisions of the Resource Management Act 1991, its amendments and any regulations made thereunder. It is the obligation of the consent holder to comply with all the statutory requirements relating to the exercise thereof.
2. The consent holder may keep all such records as may be reasonably required by the Wellington Regional Council and shall, if so requested, supply this information to the Wellington Regional Council.
3. This consent is subject to the Wellington Regional Council or its servants, or its agents, being permitted access at all reasonable times for the purpose of carrying out inspections, measurements and the taking of samples.
4. The design and maintenance of any works relating to the exercise of the consent must be to a standard adequate to meet the conditions of the consent.
5. An annual charge, set in accordance with section 36(2) of the Resource Management Act 1991, shall be paid to the Wellington Regional Council for carrying out its functions in relation to the administration, monitoring and supervision of resource consents, and for carrying out its functions under section 35 (duty to gather information, monitor and keep records) of the Act.

General Information

[not part of the consent]

1. The granting of this consent does not imply compliance with the requirements of any other statute, bylaw or regulation.
2. A consent may be exercised only for the purpose stated in that consent. For example, a consent to take water does not authorise the discharge of water or contaminant into water.
3. A water or discharge consent is not an authority to obtain access to a source of water or a point of discharge.
4. In granting a consent to take or use water the Wellington Regional Council does not guarantee or represent that the quality or quantity specified or implied will be available or maintained.
5. The consent holder must, when required, supply the Wellington Regional Council with information on the exercise of the consent.
6. If there is a serious temporary shortage of water the Wellington Regional Council may issue a direction under section 329 that the taking or use of any water be apportioned, restricted or suspended for a period of up to 14 days and such a direction may be renewed from time to time.
7. The consent holder may apply, pursuant to section 127, to the Wellington Regional Council for a change or cancellation of consent conditions, except that the term of the consent cannot be extended by such a change.
8. A consent shall be exercised only by the consent holder or their duly authorised agent. A coastal, water or discharge consent may, pursuant to sections 135, 136 and 137 and upon written notice to the Wellington Regional Council, be transferred to a new owner of the land in respect of which the consent is granted but on the same terms and conditions and for the same purpose as set out in the consent.
9. The consent holder shall make payment of such annual resource management cost recovery fees as may be notified and confirmed by the Wellington Regional Council from time to time in accordance with section 36 of the Resource Management Act 1991.

Additional Conditions to Resource Consent WGN 980198(01)

6. The implementation and operation of the consented activities shall be in accordance with the consent application officially lodged with the Wellington Regional Council on 25 May 1998 and in accordance with modifications supplied by way of a letter from Truebridge Callender Beach Ltd received by the Wellington Regional Council on 28 July 1998.

Note: Any change from the location, design, implementation and/or operation may require a change in permit conditions pursuant to section 127 of the Resource Management Act 1991.

7. Within six months of the granting of this permit the permit holder shall forward to the Manager, Consents Management, Wellington Regional Council, a finalised copy of the Golf Course Irrigation System Management Plan.

8. The permit holder shall forward to the Manager, Consents Management, Wellington Regional Council an annual report. The report shall include:

- (a) The results of all faecal coliform and suspended solid analyses performed by the permit holder under conditions 20 and 22 of WGN 980198(01).
- (b) The results of all Biological Oxygen Demand and heavy metals analyses performed by the operators of the Moa Point Wastewater Treatment Plant that are forwarded to the permit holder.
- (c) Records of meteorological data collected at the golf course on days when irrigation was undertaken.
- (d) Records of the volumes and frequencies of recycled water used for irrigation.
- (e) Records of inspections and maintenance performed on equipment of the treatment and irrigation system.
- (f) Records of any complaints received in relation to condition 9 below.
- (g) Records of any incidents that have occurred in relation to condition 10 below.
- (h) Any other relevant information.

The report shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council, and shall be submitted within two months of the end of each automated irrigation season.

Note: For the purposes of this permit the automated irrigation season is the period of year in which automated irrigation using recycled water is performed, typically between September and April.

9. The permit holder shall keep a record of any complaints that are received. The complaints record shall at least contain the following, where practical:

- (a) Name and address of complainant.
- (b) Identification of nature of complaint.
- (c) Date and time of complaint and of alleged event.
- (d) Weather conditions at the time of the complaint.

The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any complaints relating to the exercise of this permit, within 24 hours of being received by the permit holder or the next working day.

10. The permit holder shall keep a record of any incident that has or could have resulted in a condition of this permit being contravened.



Additional Conditions to Resource Consent WGN 980198(01) (cont'd)

- (a) The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any such incident within 24 hours of the incident being brought to the attention of the permit holder or the next working day. This includes any incident that may result in a complaint.
- (b) The permit holder shall forward an incident report to the Manager, Consents Management, Wellington Regional Council, within seven working days. This report shall describe reasons for the incident, measures taken to mitigate the incident and measures to prevent recurrence.

Note: For the purposes of this permit incidents include but are not limited to incidents such as power or mechanical failure, monitoring equipment failure or unusual discharges.

11. The Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within four weeks of the Manager, Consents Management, Wellington Regional Council, receiving the results of the initial monitoring programme (described under condition 22 of WGN 980198(01)) and within six months of the first, third, fifth, eighth, 11th, 14th and 17th anniversaries of the date of commencement of this permit for any of the following purposes:

- (a) To address any issues arising from the initial monitoring programme conducted under condition 23 of WGN 980198(01) and/or the annual reports forwarded under condition 8 above.
- (b) To deal with any adverse effects on the environment which may arise from the exercise of this permit and which it is appropriate to deal with at a later stage.
- (c) To increase, decrease or modify any monitoring requirements in light of the results obtained from any previous monitoring or as necessary to deal with any adverse effects on the environment arising from the exercise of this permit.
- (d) To enable consistency with any operative Regional Plans.

12. The permit holder may apply, at any time, pursuant to section 127 of the Resource Management Act 1991, for the change or cancellation of any condition of this permit, other than any condition relating to the term of this permit.

13. There shall be no discharge of recycled water arising from this permit beyond the boundary of the golf course.

Note: For the purposes of this permit the boundary of the golf course is the outer perimeter of land whose legal descriptions are Pt Sec 12, 14 and 15 Watts Peninsula District, Pt Lot 2 DP 3166, Pt Lot 1 DP 3177, Lot 1 DP 51082, Pt Lot 1 DP 78363, Lot 3 DP 80623 and Sec 4 SO 37422.

14. In the event of a non-consented discharge described in condition 13, the permit holder shall:

- (a) Immediately notify the Manager, Consents Management, Wellington Regional Council, and the Public Health Service.
- (b) Immediately investigate the reason why condition 13 was breached.
- (c) Immediately identify and undertake appropriate remedial action, to the satisfaction of the Manager, Consents Management, Wellington Regional Council, to mitigate the effects.
- (d) Forward, within five working days to the Manager, Consents Management, Wellington Regional Council, a report on the steps taken to ensure that condition 13 is not breached in the future.

15. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum 48 hours notice prior to the commencement of each automated irrigation season using recycled water.



Additional Conditions to Resource Consent WGN 980198(01) (cont'd)

16. The permit holder shall install to the satisfaction of the Manager, Consents Management, Wellington Regional Council, suitable back flow prevention and cross connection control to prevent the contamination of the municipal reticulated potable water supply.

Specifications of the back flow prevention and cross connection control measures shall be forwarded to the Manager, Consents Management, Wellington Regional Council, at least two weeks prior to their installation.

17. There shall be no automated irrigation using recycled water performed between the hours of 7.00 am and 9.00 pm.

18. There shall be no automated irrigation using recycled water in southerly winds with wind speeds greater than 20 km/hr and in northerly winds with wind speeds greater than 30 km/hr.

Note: For the purposes of this permit southerly winds are all winds originating from a southerly sector between east and west. Northerly winds are all winds originating from a northerly sector between west and east. The wind direction and wind speed shall be measured from an anemometer located, operated and maintained to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

19. Recycled water shall not be discharged from any point by way of automated or manual irrigation in the following areas:

- (a) Within 30 m of the golf course boundary which adjoins Wellington International Airport between the golf course club house and 378 Broadway.
- (b) Within 40 m of the golf course boundary which adjoins properties between 380 Broadway and 450 Broadway.
- (c) Within 40 m of the golf course boundary which adjoins properties between 452 Broadway and 4 Raukawa Street (including properties between 8 and 48 Monorgan Road).

Note: For the purposes of this consent a discharge point includes but is not limited to automated irrigation spray nozzles, hand held hoses and travel irrigators.

20. Recycled water discharged during irrigation shall meet the following criteria:

- (a) **Faecal Coliforms.** Based on one grab sample taken per week, the mean of the lowest three of the four consecutive weekly faecal coliform concentrations shall not exceed 10 CFU/100 mL.

The concentration in any one weekly sample shall not exceed 50 CFU/100 mL.

- (b) **Suspended Solids.** Based on one grab sample taken per week, the mean of the lowest three of the four consecutive weekly suspended solids concentrations shall not exceed 20 mg/L.

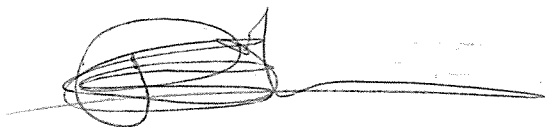
The concentration in any one weekly sample shall not exceed 30 mg/L. (used to be 10)

Note: For the purposes of this condition a weekly sample is one collected each week between Monday and Sunday.

The monitoring methods, procedures and sampling point shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council. The results of all monitoring performed shall be forwarded on request to the Manager, Consents Management, Wellington Regional Council.

21. In the event of an exceedance of the criteria described in condition 20, the permit holder shall:

- (a) Immediately notify the Manager, Consents Management, Wellington Regional Council, and the Public Health Service.



Additional Conditions to Resource Consent WGN 980198(01) (cont'd)

- (b) Immediately investigate the reason why the criteria was exceeded and cease any discharge of recycled water until such time as the quality of the recycled water complies with the criteria of condition 20.

22. Prior to the commencement of each automated irrigation season using recycled water, the permit holder shall collect at least seven consecutive daily samples of recycled water to demonstrate the recycled water can meet those criteria in condition 20. Notwithstanding the criteria in condition 20, the discharge of recycled water shall not commence until such time as the following criteria are met:

- (a) **Faecal Coliforms.** Based on one grab sample taken per day, the mean of the lowest six of seven consecutive daily faecal coliform concentrations shall not exceed 10 CFU/100 mL. 5-6

The concentration in any one daily sample shall not exceed 50 CFU/100 mL. 13

- (b) **Suspended Solids.** Based on one grab sample taken per day, the mean of the lowest six of seven consecutive daily suspended solids concentrations shall not exceed 20 mg/L. <2

The concentration in any one daily sample shall not exceed 30 mg/L. 3

The monitoring methods, procedures and sampling point shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council. The results of all monitoring performed shall be forwarded on request to the Manager, Consents Management, Wellington Regional Council.

23. Prior to the commencement of irrigation using recycled water, the permit holder shall design and undertake an initial monitoring programme using potable water to investigate potential irrigation spray drift and aerosol movement beyond the boundary of golf course. The programme shall include:

- (a) Monitoring of spray drift and aerosol movement under varying wind conditions.
- (b) An assessment as to the adequacy of the proposed potable water areas, wind speed cut-offs and other similar control mechanisms.

The monitoring programme shall be designed and performed to the satisfaction of the Manager, Consents Management, Wellington Regional Council. The programme shall be submitted to the Manager, Consents Management, Wellington Regional Council, at least two weeks prior to the commencement of the programme.

The results of the monitoring programme shall be submitted to the Manager, Consents Management, Wellington Regional Council, at least two weeks prior to the commencement of irrigation using recycled water.

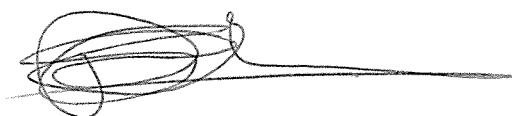
24. × At least two weeks prior to the commencement of irrigation using recycled water, the permit holder shall personally notify, by way of a letter, all of the owners and occupiers of the properties adjoining the boundary the golf course. Those properties to be notified are:

- 380 Broadway to 452 Broadway (south side);
- 8 Monorgan Road to 48 Monorgan Road (western side);
- 2 Raukawa Street to 4B Raukawa Street (western side); and
- Wellington International Airport Ltd.

Note: This letter is only to be sent prior to the first automated irrigation season using recycled water.

The letter shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council, and shall be submitted to the Wellington Regional Council at least two days prior to being sent to the owners and occupiers of the above mentioned properties.

25. At least two weeks prior to the commencement of irrigation using recycled water, the permit holder shall erect and maintain prominent signs at the golf course. The signs shall inform users of the club and other potentially affected persons of the use of recycled water and shall include:



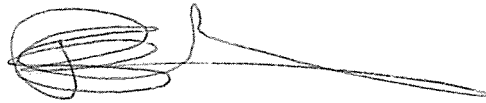
Additional Conditions to Resource Consent WGN 980198(01) (cont'd)

- (a) Any potential risks associated with recycled water.
- (b) Any procedures for reducing potential risks.

Note: These signs shall be maintained during all irrigation seasons using recycled water for the duration of the permit.

The location and wording of the signs shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

26. This permit shall expire on 5 October 2019.

A handwritten signature in black ink, consisting of a series of loops and a long horizontal stroke extending to the right.

COPY

28 August 1998
File: WGN 980198
Consents\HrngRpts\980198.PJD:ajw

Report to the Hearings Committee
from Peter Day, Resource Advisor

Discharge to Land Permit and Discharge to Air Permit Applications Associated with the Miramar Golf Club Inc. Proposed Recycled Water Irrigation System

1. Purpose

To report to the Hearings Committee on a resource consent application to the Wellington Regional Council from the Miramar Golf Club Inc. under the Resource Management Act 1991.

2. Application

2.1 Applicant

Miramar Golf Club Inc.
P O Box 15 182
WELLINGTON

2.2 Resource Consents Applied For

WGN 980198(01): A discharge to land permit for the discharge of up to 1,100,000 litres per day of treated waste water from a 4,000,000 litre capacity storage lagoon.

WGN 980198(02): A discharge to air permit for the discharge of contaminants arising from a proposed higher level wastewater treatment facility.

3. Location and Surrounding Environment

The site relating to the application is the Miramar Links Golf Course, Stewart Duff Drive, Miramar, at or about map reference NZMS 260:R27;618.847. The legal descriptions of the site are Pt Sec 12, 14 and 15 Watts Peninsula District, Pt Lot 2 DP 3166, Pt Lot 1 DP 3177, Lot 1 DP 51082, Pt Lot 1 DP 78363, Lot 3 DP 80623 and Sec 4 SO 37422.

The golf course is situated adjacent to Lyall Bay, on Wellington's southern coast. The course is bordered to the west by the Wellington International Airport and in the south-western corner by the Moa Point Wastewater Treatment Plant. Residential properties border the southern, eastern and northern boundaries of the golf course.

The golf course consists of 33 hectares of gently rolling pasture with steep escarpments on the southern and south-eastern boundaries. The site is zoned as Golf Course Recreation Area under the Proposed Wellington City District Plan. The course is also subject to a designation for airport purposes for Wellington International Airport.

4. **Background**

Miramar Golf Club currently uses between 750,000 and 1,000,000 litres of water each night to irrigate the golf course. This is performed on 60 to 80 nights per year, between the months of September and April.

Most of the water used for irrigation is provided by the Wellington City Council's reticulated potable water system. The water is supplied to the golf club at a cost of \$65,000 per annum. The high cost associated with the water has prompted the golf club to consider an alternative means of supply.

In early 1996 the golf club approached the Wellington City Council to investigate the possibility of using treated wastewater taken from the Moa Point Wastewater Treatment Plant. The City Council indicated that it was generally supportive of the proposal providing the golf club met the costs associated with the proposed system. After considering various technical alternatives, the club concluded the most appropriate option was take wastewater from the Moa Point Wastewater Treatment Plant, treat it further and irrigate the golf course using the club's current automated irrigation system.

In November 1997, the golf club contracted Truebridge Callender Beach Ltd to design the proposed system and to prepare and submit the appropriate resource consent applications. These applications were officially received by the Regional Council on 25 May 1998.

5. **Current Irrigation System**

The golf club's current irrigation system consists of:

- a 4, 000,000 litre storage lagoon;
- a pump house and two dedicated pumps;
- 650 individually controlled spray nozzles;
- a 37 km network of piping;
- a computer control system;
- 17 satellite control stations;
- a weather station; and
- various hand held and traveling irrigators.

Water currently drawn from the City Council's reticulated supply is stored in the storage lagoon before being sprayed onto the golf course. Demand on the reticulated system prevents water being supplied directly to the course. Two dedicated pumps then pump water from the lagoon around the golf course to each individual spray nozzle through the golf course's irrigation network.

Up to 15 percent of the total water required for irrigation may also be supplied by stormwater entering the lagoon. Excess stormwater collecting in the lagoon is diverted through an overflow pipe to the City Council's stormwater system.

Each spray nozzle can be individually controlled by the golf course's computer control system, located in the green keeper's building. The system controls the areas and times of spraying from pre-set irrigation programmes. The irrigation programmes can be manually over-ridden to take into account rainfall or various weather forecasts. Irrigation programmes and the computer system can also be controlled from 17 satellite stations and various manual valves located around the course.

A weather station records rainfall and wind speed and direction. The station is linked to the computer control system and automatically stops irrigating during rainfall and when wind speeds exceed certain pre-set trigger levels. The control system records readings from the weather station approximately every 10 seconds.

During each irrigation cycle each spray head is operational for two periods of nine minutes, and up to 32 spray heads operate at any one time. This provides the equivalent of 4.5 mm over irrigated areas. This irrigation programme produces the optimum application rate for the golf course and has been refined over the three years since the system was installed.

Each individual spray head has a spray radius of approximately 20 m.

The storage lagoon has the capacity to store enough water for 3 to 4 night's irrigation. Up to 1,000,000 litres of water is used per night, but if irrigation is performed on consecutive nights the volume is reduced to 750,000 litres on the second and subsequent nights. Automated irrigation currently takes place between 9.00 pm and 6.00 am.

In addition to automated irrigating, some spraying is performed using both hand held hoses and traveling irrigators. These are used to perform spot spraying and to provide additional water when high wind speeds preclude the use of the automated irrigation system.

6. Proposed Recycled Water Irrigation System

6.1 Supply

The golf club proposes to supply recycled water using a dedicated pump to draw treated wastewater from the Moa Point Wastewater Treatment Plant. Wastewater would be supplied from the outlet of the ultra-violet disinfection chamber within the

treatment plant. The wastewater would be piped for further treatment at the golf course.

Following treatment the resulting recycled water will be stored in the existing storage lagoon. The amount of recycled water required will be controlled by a float switch located in the lagoon, linked to the pump at the treatment plant. In the event of a disruption to the supply of wastewater from the plant, potable water can be drawn from the existing City Council reticulated supply to substitute the recycled water.

6.2 Treatment

The recycled water will to comply with the following standard:

- less than 10 faecal coliforms/100 mL; and
- less than 10 mg/L suspended solids.

This quality is consistent with the standard recommended for irrigation of this nature by the relevant ANZECC guidelines¹.

The Regional Council resource consent for the Moa Point Wastewater Treatment Plant currently requires the final wastewater from the plant to contain no more than 200 faecal coliforms/100 mL. Therefore, in order to reduce the levels from 200 faecal coliforms/100 mL to 10 faecal coliforms/100 mL further treatment of the wastewater is required.

The golf club proposes to construct an on-site higher level treatment facility to further treat the Moa Point wastewater. The plant will be constructed adjacent to the existing pump house. The further treatment proposed includes:

- sand filtration;
- ultra-violet treatment; and
- sodium hypochlorite (chlorine) disinfection.

The additional filtration is necessary to reduce the amount of suspend solid material and maximise the effectiveness of the ultra-violet disinfection system. The filtration system will include two enclosed sand filters operating under pressure. The filters will be backwashed to clean the filters and the backwashed material discharged to an existing sewer.

An ultra-violet disinfection system is proposed to reduce the faecal coliform level from 200 faecal coliforms/100 mL to 10 faecal coliforms/100 mL. The system will include six in-line ultra-violet bulbs.

A dose of sodium hypochlorite (chlorine) is to be injected prior to the sand filtration to control bacterial regrowth. This chlorine dose will be injected in line at a rate of 1 mg/L.

¹ Australian and New Zealand Environment and Conservation Council April 1996, Draft Guidelines for Sewage Systems - Use of Reclaimed Water

Following filtration and disinfection, the recycled water will be stored in the storage lagoon, before being pumped onto the golf course.

6.3 Irrigation

The golf club propose to use the club's existing irrigation network. Automated irrigation of recycled water will continue to use the two nine minute irrigation cycle.

In the initial application the golf club proposed that automated irrigation would take place between the hours of 9.00 pm and 7.30 am. Irrigation would also not take place in winds with speeds greater than 30 km/hr. These details were later altered by modifications to the proposed system, these are discussed below.

Manually controlled irrigation using recycled water from hand held hoses, traveling irrigators and manually controlled spray nozzles will be also performed.

6.4 Monitoring

The golf club proposes to monitor the recycled water following filtration and ultra-violet treatment. The levels of faecal coliforms and suspended solids would be determined weekly. The quality of recycled water would be considered satisfactory if:

- the faecal coliform bacteria concentration in any test does not 50 faecal coliforms/100 mL and the mean of the three lowest test samples in a month does not exceed not 10 faecal coliforms/100 mL; and
- the suspended solid concentration in any test does not 30 mg/L and the mean of the three lowest test samples in a month does not exceed 10 ml/L.

7. Alternatives

The golf club considered various alternatives to aspects of the proposal. These included:

- using an alternative standard of final treatment;
- obtaining the treated wastewater from a different part of the Moa Point Wastewater Treatment Plant;
- using chlorine disinfection (as opposed to ultra-violet disinfection);
- abstracting sea water from Lyall Bay and treating it with an on-site desalination plant;
- using drip irrigation of recycled water along the boundary areas; and
- using various potable water buffer zones.

These options were not selected for various reasons, including technical and resource management difficulties and the high costs associated with several of the options.

8. Consultation

The golf club consulted with various interested parties and local bodies prior to the lodging of the consent application. A public meeting was held at the golf club on 2 February 1998 to which members of the club and neighbours of the golf course were invited. Discussions were also held with various other interested groups, these included:

- Wellington International Airport Ltd;
- Tangata whenua representative;
- Public Health Section, Capital Coast Health;
- Environmental Business Control Unit, Wellington City Council;
- Ministry for the Environment;
- Clearwater and Biosolids Projects, Wellington City Council;
- Anglian Water International Ltd; and
- New Zealand Turf Institute.

Since the lodging of the application the golf club have also consulted with Public Health Service of Hutt Valley Health, and the Wellington Tenth Trust.

9. Notification

The application was notified in *The Evening Post* and *Cook Strait News* on 6 and 8 June 1998 respectively. Three signs were also posted at the entrances of golf course on 8 June 1998.

The owners and occupiers of 72 properties adjoining the golf club were individually notified. These properties were:

- 368 Broadway to 452 Broadway (south side);
- 8 Monorgan Road to 48 Monorgan Road (western side); and
- 2 Raukawa Street to 4B Raukawa Street (western side).

Also individually notified were:

- Wellington International Airport Ltd;
- Environmental Control Business Unit, Wellington City Council;
- Strathmore Park Progressive Association ;
- Public Health Service, Hutt Valley Health;
- Wellington Tenth Trust; and
- Te Runanganui o Taranaki Whanui ki te Upoko o Te Ika a Maui.

10. Submissions

Eleven submissions were received on the application at the close of the submission period on Monday, 6 July 1998. One late submission was received on 8 July 1998.

10.1 Submissions in Opposition to the Application

Four submissions were received opposing the application. The reasons for opposition were:

- possible spray drift;
- possible adverse health effects;
- possible odour; and
- various aspects of proposed operation and monitoring of the irrigation system.

10.2 Submissions in Conditional Support of the Application

Six submissions were received conditionally supporting the application. Support was given providing there was:

- appropriate use of buffer zones around the boundary of the golf course;
- no spray drift beyond the golf course boundary;
- appropriate management of hand spraying;
- appropriate monitoring and public access to the results of the monitoring;
- installation of an aerator in the storage lagoon;
- use of sprinklers near the boundary which produce large spray droplets;
- development of a risk management strategy to communicate risks to potentially affected parties;
- no odour from any part of the recycled water system;
- no surface ponding or run-off; and
- review conditions.

10.3 Submission in Support of the Application

One submission supported the application unconditionally.

11. Proposed Modifications to Application

In response to several of the concerns raised by the submitters, the golf club modified the initial application in order to address these concerns. The modifications were presented at the pre-hearing meeting (discussed below) and clarified by way of a letter from Truebridge Callender Beach, received by the Regional Council on 28 July 1998.

The modifications include:

- *establishment of a potable water buffer zone along the boundary adjoining Wellington International Airport.* This buffer will would run between the golf course club house and 378 Broadway. No spray nozzle supplying recycled water will be used within 30 m of this boundary, providing a theoretical buffer of 10 m from the edge of the spray radius to the boundary. Irrigation nozzles within 30 m of the boundary, will be supplied with potable water. Modifications will also be made to several of the potable water spray nozzles to direct spray back onto the golf course;

- *establishment of a potable water buffer zone on the boundary adjoining Monorgan Road.* This buffer will run between 452 Broadway and 4 Raukawa Street (including properties between 8 and 48 Monorgan Road). No spray nozzle supplying recycled water will be used within 40 m of this boundary, providing a theoretical buffer of 20 m. Irrigation nozzles within 40 m of the boundary will be supplied with potable water. Modifications will also be made to the direction of several of the potable water nozzles along this boundary;
- *establishment of a buffer zone on the boundary adjoining Broadway.* This buffer will extend from 380 Broadway to 450 Broadway. During southerly winds greater than 5 km/hr the closest row of nozzles to the boundary will stop irrigating, providing a theoretical buffer of 20 m. During Northerly winds, irrigation will be performed as proposed in the application;
- *automated irrigation using recycled water will not take place in southerly winds with wind speeds greater than 20 km/hr.* The initial application stated 30 km/hr as the cut-off for southerlies. Automated irrigating will still be performed in Northerly winds up to 30 km/hr;
- *management of hand spraying in buffer zones.* No hand spraying of recycled water will be performed in the buffer zones described above;
- *hours of automated irrigation.* The proposed hours of irrigation were reduced. from 9.00 pm to 7.30 am, to 9.00 pm to 7.00 am; and
- *backflow preventers and cross contamination control.* Appropriate measures to prevent backflow and cross contamination of the City Council potable water supply will be installed.

12. Pre-hearing Meeting

A pre-hearing meeting was held on Wednesday, 15 July 1998 in the Committee Room of The Regional Council Centre. Notice of the meeting and a summary of the submissions was sent to the submitters on 9 July 1998.

The meeting was attended by a representative of the golf club, Truebridge Callender Beach, Beca Steven (contracted by Wellington International Airport Ltd), the Public Health Service, three local residents (submitters), and the Regional Council. Truebridge Callender Beach presented the proposed modifications to the irrigation system and the meeting discussed the concerns raised by submitters during the submission period. While no resolution was reached by the way of writing consent conditions, all parties agreed to the Regional Council drafting a set of conditions.

Following the meeting a set of draft conditions and notes of the pre-hearing meeting were sent to all submitters, with a request that the submitters surrender their hearing rights if the conditions addressed their concerns. The notes of the pre-hearing meeting are provided in Appendix 1.

After the meeting Truebridge Callender Beach and the Public Health Service met to discuss the issues of the application relating to public health. The suggestions recommended by the Public Health Service were incorporated into the draft conditions sent to the submitters.

13. **Negotiated Conditions**

Seven submitters withdrew their right to be heard at a hearing, stating they believed the conditions proposed by the Regional Council addressed their concerns.

One submitter withdrew their hearing rights in their original submission.

The Public Health Service requested two alterations be made to the conditions. These were as follows:

- that a condition be incorporated which required the golf club to install back flow preventers and measures to prevent cross connection; and
- that the results of the monitoring programme conducted under the recommended conditions be *designed and performed to the satisfaction* of the Manager, Consents Management, Wellington Regional Council.

Both alterations were agreeable to the applicant and have been incorporated under the recommended consent conditions.

The Public Health Service, Beca Steven, John Ryan and James Moorthy also requested that a copy of the initial monitoring programme be provided to them before the programme commences. They also requested that on completion, the results of the programme be forwarded to them. Truebridge Callender Beach has agreed to forward these documents to these parties.

I do not consider that these changes significantly affect the approvals already granted by other submitters. I am satisfied that the conditions proposed address the concerns raised by all submitters.

14. **Outstanding Issues**

At the time of writing of this report three submitters had retained their right to be heard at a hearing. These were:

- the Public Health Service;
- John Ryan; and
- James Moorthy.

The Public Health Service has agreed to the recommended conditions and are satisfied that the conditions address all of their concerns. Public Health Services has, however, retained its hearing rights in the event that it is are called to provide evidence in a hearing in its capacity as a public health provider.

Despite extensive consultation by Truebridge Callender Beach with John Ryan and James Moorthy, both still have concerns with the application and have retained their hearing rights. John Ryan is concerned with the 30 km/hr northerly wind speed cut-off and the potential for drift to properties on Monorgan Road. James Moorthy is concerned with potential drift to properties on Broadway. While, the golf club has offered to convert the row of nozzles closest to the Broadway boundary to 180° directional nozzles, James Moorthy has still retained his right to be heard.

15. Time Extensions

Two time extensions were requested by the golf club under section 37(5A) of the Resource Management Act 1991. The extensions were requested in order to consult further with submitters and to possibly resolve their concerns. The extensions were granted by the Regional Council on 13 August 1998 and 23 July 1998.

16. Late Submission and Consultation with Wellington Tenth Trust

The Wellington Tenth Trust forwarded a submission that was received after the close of submissions. While the Trust conditionally supported the application, it felt that there was a lack of consultation with tangata whenua and the Trust had some concerns regarding the use of treated human effluent.

Although the submission could not be officially accepted the Trust was informed that its concerns could be considered under Part II (Purpose and Principles) of the Resource Management Act 1991.

Since forwarding the submission, the Wellington Tenth Trust and Truebridge Callender Beach have met to discuss the issue of consultation and the proposed irrigation system. As a result of the meeting, the golf club will formally invited the Trust onto the golf course prior to the commissioning of the system. The Trust is satisfied that this will meet the concerns raised in its submission.

The arrangement between the golf club and the Trust is a mutually satisfactory agreement consistent with the Part II of the Resource Management Act 1991. This resolution is also consistent with specific objectives and policies of Chapters 4 and 14 the Regional Policy Statement.

17. Statutory Framework

17.1 Discharge to Land Permit

Section 15 of the Resource Management Act 1991 prohibits the discharge of any contaminant onto land unless the activity is permitted by a rule in a regional plan or relevant proposed regional plan or expressly allowed by a resource consent.

Rule 7 of the Proposed Regional Plan for Discharges to Land states that the discharge onto land of any water or contaminants other than septage, from on-site sewage treatment and disposal systems is a permitted activity providing:

- the discharge does not exceed 1300 litres per day; and
- there is no direct discharge above the soil surface.

The golf club proposes to discharge up to 1,100,000 litres of recycled water per day onto the golf course. The activity is therefore, is specifically excluded from Rule 7. Activities excluded from Rule 7 are considered as *discretionary* under Rule 8 of the Proposed Regional Plan for Discharges to Land.

17.2 Discharge to Air Permit

Section 15 of the Resource Management Act 1991 prohibits the discharge of any contaminant to air unless the activity is permitted by a rule in a regional plan or relevant proposed regional plan or expressly allowed by a resource consent.

Rule 22 of the Proposed Regional Air Quality Management Plan states that the discharge of contaminants into air relating to sewage and trade waste conveyance, treatment and disposal is a permitted activity, excluding:

the treatment of sewage and/or trade waste off the site on which it was generated.

Activities permitted under Rule 22 are permitted providing:

there is no discharge of odour, gas, vapour or aerosol which is noxious, dangerous, offensive or objectionable at or beyond the boundary of the property.

Under Rule 22 the *disposal* or irrigation of the recycled water is therefore permitted. Although the activity must comply with the condition that there is no discharge of vapour or aerosols beyond the boundary of golf course that *are noxious, dangerous, offensive or objectionable*.

However, the proposed further treatment of wastewater from the Moa Point Wastewater Treatment Plant is not permitted under the provisions of Rule 22. Treatment of sewage *off* the site from which it was generated is specifically excluded from the rule. Activities excluded from Rule 22 become *discretionary* under Rule 24 of the Proposed Regional Air Quality Management Plan.

17.3 No Exception from Section 418

Section 418 of the Resource Management Act 1991 provides an exception from Section 15 of the Act for certain activities lawfully established prior to 1 October 1991. Section 418(1A) does, however, stipulate that section 15(1)(c) applies to any discharges from industrial or trade premises which are used for the storage, transfer, treatment, or disposal of waste materials commenced after 1 October 1991.

As the proposed activity involves the storage, transfer, treatment, and disposal of waste materials and is scheduled to commence after 1 October 1991, the activity is not exempt from section 15(1)(c) of the Resource Management Act 1991.

18. **Matters to be Considered**

Appendix 2 outlines the matters the Committee must have regard towards under sections 104 and 105 of the Resource Management Act 1991 in considering consent applications. These matters include various sections of the Resource Management Act 1991, the Regional Policy Statement, the Proposed Regional Plan for Discharges to Land and the Proposed Regional Air Quality Management Plan.

19. **Assessment of Environmental Effects**

Treated effluent is generally regarded as a waste requiring disposal rather than a resource available for use. Objectives 1 and 2 of Chapter 13 of the Regional Policy Statement advocate the reduction of waste through reuse, recycling and resource recovery. The golf proposes to utilise between 60,000 and 80,000 m³ of recycled water per year, water that would otherwise be discharged to the sea. While reducing the quantities of waste, the substitution of recycled water for potable water also reduces the increasing demands on City Council's potable water system.

The reuse of wastewater is generally supported by the policies and objectives of the Regional Policy Statement and Proposed Regional Plan for Discharges to Land, but only where safeguards are established and where the potential adverse health and environmental effects are extremely low.

There are several actual or potential environmental effects of the proposed irrigation system. These effects include:

- human health risks;
- contamination of the potable water supply;
- odour;
- chemical contaminants;
- groundwater contamination; and
- stormwater contamination.

The effects and the safeguards the golf club proposes to avoid, remedy or mitigate these are discussed below.

19.1 **Human Health Risks**

What are the risks to human health from the proposed irrigation system?

The major effect of the proposed irrigation system is the potential risks to human health. The greatest risk to human health is the possible infection from pathogens present in municipal wastewater. Of the variety of infectious human pathogens present, those of potential concern are:

- viruses (e.g., meningitis, hepatitis A virus);
- bacteria (e.g., faecal coliforms, *Salmonella spp*, and *Escherichia coli*);
- protozoa (*cryptosporidium spp* and *Giardia*); and
- helminths (roundworms, hookworms and flatworms).

Generally viruses and bacteria do not survive well in the environment and their numbers decrease rapidly following treatment and on exposure to the environment. In contrast protozoal cysts and helminth eggs may persist for longer periods of time, particularly in the soil environment.

Generally pathogen concentrations are reduced almost immediately during spray irrigation both from the shock of aerosolisation and downwind travel. Desiccation, ambient temperature, dispersion and solar radiation are also factors which will reduce pathogen viability².

Those potentially at risk from the irrigation system are users of the golf club, particularly early in the morning and occupiers of properties adjoining the golf club. The golf club have however, proposed various safeguards to reduce and monitor this risk. These safeguards should ensure that the risk to human health is sufficiently low. These are discussed below.

Treatment and other safeguards to avoid, remedy or mitigate the potential effects to human health of the proposed irrigation system

Policy 10 of Chapter 13 of the Regional Policy Statement provides that wastewater should be treated to a level which is appropriate to the means of disposal so that adverse effects on human health and the quality of ecosystems are avoided, remedied or mitigated.

The golf club proposes to treat the recycled water to a standard that meets the criteria recommended by the ANZECC guidelines as suitable to irrigate municipal reserves, parks and sports grounds where there is uncontrolled public access (Urban - non-potable, municipal). For the recycled water to be suitable for this purpose it must comply with the following criteria:

- **level of treatment:** secondary with filtration and additional pathogen reduction;
- **water quality:** < 10 faecal coliforms/100 mL, 1 mg/L Cl₂ residual (or equivalent);
- **monitoring:** pH weekly, BOD weekly, faecal coliforms monthly; and
- **controls:** plumbing (cross connection control and back flow prevention).

The bacterial and disinfection standard of < 10 faecal coliforms/100 mL and 1 mg/L Cl₂ respectively will also comply with the Urban - non-potable, classification standard of the guidelines. Recycled water of this standard is suitable for watering gardens, washing cars and paths and flushing toilets. New Zealand's Department of Health guidelines³ also state that recycled water treated to < 10 faecal coliforms/100 mL is

² Department of Health 1992; Guidelines for the Safe Use of Sewage Effluent and Sewage Sludge on Land

³ Department of Health 1992, Guidelines for the Safe Use of Sewage Effluent and Sewage Sludge on Land

suitable for irrigation of salad crops, fruit and other crops for human consumption (unpeeled or uncooked).

Ongoing assessment of monitoring results performed by the club will provide an indication of compliance with these standards. Monitoring is proposed both in a commissioning period prior to each irrigation season and during the course of each irrigation season. The requirement to perform monitoring and the quality with which the recycled water must comply is stipulated in the recommended conditions.

The ANZECC guidelines⁴ generally accept that pathogens such as *Giardia* and *cryptosporidium* are not be represented by the faecal coliform counts stipulated in their criteria. The guidelines state that it is impractical to monitor for the wide variety of human pathogens that may be present. Instead they suggest it is possible operate to an acceptable degree of risk to public health through the use of surrogates such as faecal coliform counts, turbidity and suspended solids measurements.

I am satisfied that the golf club are treating the recycled water to a level appropriate for its use. This standard is satisfactorily monitored by the testing proposed by the club. This is consistent with the policies and objectives of Chapter 13 of the Regional Policy Statement.

I consider that it is satisfactory for the club to operate on an acceptable degree of risk using the proposed monitoring and to rely on further measures to prevent contact with the recycled water described below.

While the golf club is treating the recycled water to a level suitable to significantly reduce the risk to human health the club is also providing further safeguards to reduce this risk.

The safeguards proposed include:

- conducting a monitoring programme;
- using buffer zones;
- imposing wind speed cut-offs;
- irrigating at night; and
- posting and sending notices to potentially affected parties.

The recommended conditions of this permit clearly stipulate that there will be no discharge of recycled water beyond the boundary of the golf course. However, concerns have been raised regarding the potential for spray drift of recycled water beyond the golf course boundary. In order to address these concerns and to evaluate this risk, the golf course will conduct a monitoring programme to assess possible drift under varying wind conditions.

⁴ Australian and New Zealand Environment and Conservation Council April 1996, Draft Guidelines for Sewage Systems - Use of Reclaimed Water

The programme will provide an assessment of the adequacy of the safeguards the golf club have proposed to prevent spray drift. If the results of the programme indicate recycled water is likely to pass to neighbouring properties, the club will need to readdress aspects such as the proposed buffer zones or wind speed cut-offs (discussed below). The requirement to perform the monitoring programme and if necessary re-evaluate the proposed safeguards is stipulated in the recommended conditions.

The club has proposed to install three buffer zones along boundaries adjoining residential properties around the golf course. Details of the buffer zones are described in the proposed modifications to the application.

The golf club will also maintain two wind speed cut-offs. No automated irrigation using recycled water in the following conditions:

- in southerly winds with speeds greater than 20 km/hr; or
- in northerly winds with wind speeds greater than 30 km/hr.

As discussed above, if the monitoring programme indicates that these provisions will be insufficient in preventing possible spray drift, the golf club will be required to re-evaluate them.

While automated irrigation is being performed at night to permit use of the golf course during the day, irrigating at night does provide some separation from the recycled water, particularly for golfers. The golf club may increase this separation by irrigating the first tees of the course first.

Under the recommended conditions the golf club is required to inform adjoining neighbours and users of the golf course of the potential health risks associated with the use of recycled water.

The measures proposed by the golf club to avoid, remedy and mitigate the potential effects to the human health of the irrigation system are consistent with the Policy 10 of Chapter 13 of the RPS. While Policy 10 specifically addresses issues relating to the disposal of treated wastewater, the safeguards proposed are also consistent with the objectives and policies of the Proposed Regional Plan for Discharges to Land and Proposed Regional Air Quality Management Plan and Chapter 8 of the Regional Policy Statement, relating to air.

Are the safeguards proposed by the golf club sufficient to avoid remedy and mitigate the potential health effects?

The use of buffer zones is generally recommended by both ANZECC and Department of Health guidelines^{5 6}. The Department of Health guidelines discuss buffer zones in terms of preventing odour from Municipal effluent disposal systems and are not particularly applicable to the golf club proposal. The ANZECC guidelines recommend the use of buffer zones ... *unless parasites and other pathogens are virtually absent*. Buffer zones of 50 m are suggested for irrigation of agricultural

⁵ Australian and New Zealand Environment and Conservation Council April 1996, Draft Guidelines for Sewage Systems - Use of Reclaimed Water

⁶ Department of Health 1992, Guidelines for the Safe Use of Sewage Effluent and Sewage Sludge on Land

crops, but the guidelines accept buffer zones of less than 50 m. Both guidelines suggest buffer zone distance should be assessed on a site-specific basis.

The Bay of Plenty Regional Council granted a discharge permit to the Tauranga District Council in 1994 to discharge recycled water to various parks and reserves within the Tauranga District. The quality of recycled water was 200 faecal coliforms/100 mL and the size of buffer zones employed was 25 m. The distance of the zones proposed by the golf club are similar to those used in Tauranga, but the levels of treatment proposed by the club is 10 faecal coliforms/100 mL as opposed to 200 faecal coliform/100 mL. The monitoring proposed under the recommended conditions will determine whether the buffer zones proposed are sufficient in preventing drift over the golf course boundary. In the event that are not, the recommended conditions require the golf club to revise these zones.

The use of wind speed cut-offs where necessary, is also recommended by the ANZECC guidelines⁷. The golf course are proposing two wind cut-off speeds, these are described above.

The golf club maintain that the operation of the recycled water irrigation system becomes unfeasible if the wind speed cut-offs are reduced to a level much lower than those proposed. Observation of wind speed frequencies over the golf course support this contention. I am satisfied that the wind speed cut-offs proposed in conjunction with the proposed buffer zones will be sufficient to prevent spray drift beyond the boundary of the golf course. However, should the monitoring programme indicate that drift of recycled water will occur, these cut-off speeds in association with the buffer zones may be re-addressed.

19.2 Contamination of Wellington City Council Reticulated Potable Water Supply

The golf club has stated that there will be no physical connection between the potable water and recycled water systems. The club, therefore, considered that contamination of the potable water supply was not possible. However, there are measures the club can take to ensure contamination does not occur. These include:

- installing appropriate back flow preventers (e.g., air gaps); and
- installing appropriate cross contamination control (e.g., pipeline identification).

These measures were suggested by the Public Health Service in its submission. The golf club agreed to install the controls and their installation is required in the recommended conditions.

19.3 Odour

Odour could potentially originate from three sources of the irrigation system:

- from recycled water during irrigation;
- from recycled water held in the storage lagoon; and

⁷ Australian and New Zealand Environment and Conservation Council April 1996, Draft Guidelines for Sewage Systems - Use of Reclaimed Water

- from the proposed higher level treatment facility;

The golf club maintains that the recycled water will be odourless and that there be no odour associated with the water during irrigation. This is a condition of the permitted activity status of the discharge to air of the recycled water under Rule 22 of the Proposed Regional Air Quality Management Plan. This condition is reinforced in the recommended conditions of this permit.

The golf club has stated that there is little or no potential for odour to arise from the storage lagoon. The suspended solid content of the recycled water is proposed to be less than 10 mg/L. At such levels there should be little or no accumulation of solids and therefore, no anaerobic sludge breakdown of these solids to produce odour. However, the potential for odour arising from the storage lagoon was raised by Beca Steven in its submission. Beca Steven suggested that the golf club install an aerator in the lagoon. The club agreed to this provision and the installation of the aerator has been stipulated in the recommended conditions.

The higher level treatment system proposed by the golf club is fully enclosed and will operate under pressure. The system will therefore, not result in the discharge of odour from the facility. This provision is stipulated by way of proposed conditions in the discharge to air permit required for the facility.

The proposed irrigation system has suffered a degree of *bad press* from Moa Point Wastewater Treatment Plant with regard to odour. Moa Point should be considered as a potential source in event of an odour complaint arising from the golf course.

There are a number of objectives and policies in the Proposed Regional Air Quality Management Plan and in Chapter 8 of the Regional Policy Statement which relate to the protection of ambient air quality. The application is not contrary to these policies and objectives.

19.4 Chemical Contaminants

The potential risk to health from chemical contaminants associated with recycled water is very much lower than that from pathogen infection. However, the accumulation of toxic organic and inorganic compounds over a period of time may result in the contamination of soils, groundwater and surface waters.

The relevant ANZECC guidelines⁸ suggest that it is generally not possible to monitor for all the chemical compounds which may be found in wastewater. However, a degree of safety may be provided by:

- a knowledge of the industrial discharges;
- prescribed processes for wastewater treatment; and
- monitoring of surrogates such as Biochemical Oxygen Demand (BOD₅) and suspended solids.

⁸ Australian and New Zealand Environment and Conservation Council April 1996, Draft Guidelines for Sewage Systems - Use of Reclaimed Water

The requirements of the resource consent held by the Moa Point Wastewater Treatment Plant provides significant information concerning the levels of chemical contaminants possibly being applied to the golf club. The plant currently monitors for heavy metals and BOD₅ (as well as various other parameters including faecal coliforms and suspended solids).

Preliminary levels of heavy metals present in the final wastewater were provided by Anglian Water International. It is apparent from the results that the levels are significantly lower than the New Zealand guidelines⁹ for sewage sludge application to land and for heavy metal concentrations in soils.

The proposed conditions require the ongoing results of the heavy metal and BOD₅ analyses provided to the golf club by the treatment plant to be submitted as part of an Annual Report. It will be possible to assess the likely levels of heavy metals and the BOD₅ being applied to the golf course from these results.

Chapter 6 of the Regional Policy Statement relates to Soils and Minerals and Chapter 13 relates to Waste Management and Hazardous Substances. Policy 6 advocates the use of measures to avoid, remedy and mitigate the effects of contaminants on soils and to dispose of such contaminants in a manner that does not exceed the assimilative capacity of soil. The application is not contrary to the objectives and policies of these chapters.

19.5 Groundwater Contamination

The irrigation programme has been designed to avoid surface ponding and excess run-off. Therefore, although the soils of golf course are relatively free draining, it is unlikely that the recycled water will contaminate the underlying groundwater.

The proposed level of treatment should also, provide protection of the groundwater zone. Recycled water treated to a quality of less than 1000 faecal coliforms/100 mL is recommended as being suitable for re-injection into potable aquifers by the ANZECC guidelines¹⁰. Irrespective, the Miramar Peninsular is not an established groundwater zone and there are no known water abstractions in the greater area of the golf course.

These provisions are consistent with the policies and objectives of Chapter 5 and 13 of the Regional Policy Statement. These policies and objectives provide for the maintenance and protection of groundwater systems and for adverse effects of discharges to these systems to be avoided, remedied or mitigated.

19.6 Stormwater Contamination

Excess run-off and stormwater from the golf course currently discharges to Lyall Bay through golf course's stormwater system. The system consists of a network of stormwater sumps placed throughout the hollows of the course. The sumps connect to two stormwater drains which discharge to Lyall Bay.

⁹ Department of Health 1992, Guidelines for the Safe Use of Sewage Effluent and Sewage Sludge on Land

¹⁰ Australian and New Zealand Environment and Conservation Council April 1996, Draft Guidelines for Sewage Systems - Use of Reclaimed Water

As indicated above the application rate has been refined to reduce excess run-off to the stormwater system. In the event that recycled water did enter the stormwater system, the quality of the water would not have an adverse effect on the water quality at Lyall Bay. The 10 faecal coliforms/100 mL level proposed for the irrigation system is comparable to the 10 faecal coliforms/100 mL level recommended for the cultivation of shell fish (aquaculture) and the 150 faecal coliforms/100 mL guideline recommended for primary contact recreation (swimming, diving, surfing) recreational swimming by the relevant ANZECC guidelines¹¹.

The ongoing monitoring of recycled water quality will provide an assessment of the for adverse associated with run-off of recycled water.

These provisions are consistent with the policies and objectives of Chapter 7 and 13 of the Regional Policy Statement. These policies and objectives provide for the maintenance and protection of the coastal marine area and for adverse effects of discharges to this area to be avoided, remedied or mitigated.

19.7 Miramar Golf Club Management Plan

Submitted with the golf club's consent application was a draft copy of the recycled water irrigation system Management Plan. The plan details other aspects of the irrigation system related to possible environmental effects. These include:

- contingency measures if the Moa Point Wastewater Treatment Plant failed;
- contingency measures if the Moa Point wastewater quality decreases;
- contingency measures if the golf course treatment plant failed;
- annual start and shut down procedures;
- monitoring;
- operation and maintenance procedures; and
- compliance requirements of the Regional Council.

A finalised copy of this plan is to be forwarded to Wellington Regional Council under the proposed conditions. The drafting of the Management Plan is consistent with Policy 4.3 of the Proposed Regional Plan for Discharges to Land.

20. Conclusion

Providing the proposed irrigation system is operated and maintained in accordance with the consent application (and modifications) and according to the recommended conditions that I am satisfied that:

- the risks to human health will be satisfactorily low; and
- any resulting environmental effects will be minor.

I recommend that the Miramar Golf Club be granted those permits for which it applied for.

¹¹ Australian and New Zealand Environment and Conservation Council April 1996, Draft Guidelines for Sewage Systems - Use of Reclaimed Water

21. Term of Consent

I recommend a 21 year term as agreed to by the applicant and the submitters. This term will provide a degree of security for the golf club. The expiry of the permit will also coincide with the expiry of two service contracts between:

- Wellington City Council and Anglian Water International Ltd for the operation of the Moa Point Wastewater Treatment Plant; and
- Miramar Golf Club Inc. and Anglian Water International Ltd for the supply of treated wastewater from the Moa Point Wastewater Treatment Plant.

The golf club is aware of the requirements of the conditions of this permit, particularly those conditions relating to no discharges beyond the boundary of the golf course. The club is also aware that it may be required to provide further mitigation measures to prevent such discharges if the initial monitoring indicates that it is necessary to do so.

The recommended review conditions of the permit provides the Regional Council with the opportunity to address any significant issues arising after the granting of this permit. The review conditions still provide the golf club with a degree of certainty as to when a review is possible.

22. Recommendation

That the Committee, under delegated authority by the Wellington Regional Council, grant, in accordance with sections 105 and 108 of the Resource Management Act 1991, discharge to land permit WGN 980198(01) and discharge to air permit WGN 980198(02) to the Miramar Golf Club Inc. subject to the recommended conditions.

23. Recommended Consent Conditions

Standard Conditions

- (1) *This consent is subject to all relevant provisions of the Resource Management Act 1991, its amendments and any regulations made thereunder. It is the obligation of the consent holder to comply with all the statutory requirements relating to the exercise thereof.*
- (2) *The consent holder may keep all such records as may be reasonably required by the Wellington Regional Council and shall, if so requested, supply this information to the Wellington Regional Council.*
- (3) *This consent is subject to the Wellington Regional Council or its servants, or its agents, being permitted access at all reasonable times for the purpose of carrying out inspections, measurements and the taking of samples.*
- (4) *The design and maintenance of any works relating to the exercise of the consent must be to a standard adequate to meet the conditions of the consent.*

- (5) *An annual charge, set in accordance with section 36(2) of the Resource Management Act 1991, shall be paid to the Wellington Regional Council for carrying out its functions under section 35 (duty to gather information, monitor and keep records) of the Resource Management Act 1991.*

General Conditions for WGN 980198(01) and (02)

Installed and Operated in Accordance with Application

- (6) *The implementation and operation of the consented activities shall be in accordance with the consent application officially lodged with the Wellington Regional Council on 25 May 1998 and in accordance with modifications supplied by way of a letter from Truebridge Callender Beach Ltd received by the Wellington Regional Council on 28 July 1998.*

Note: Any change from the location, design, implementation and/or operation may require a change in permit conditions pursuant to section 127 of the Resource Management Act 1991.

Management Plan

- (7) *Within six months of the granting of this permit the permit holder shall forward to the Manager, Consents Management, Wellington Regional Council a finalised copy of the Golf Course Irrigation System Management Plan.*

Annual Report

- (8) *The permit holder shall forward to the Manager, Consents Management, Wellington Regional Council an annual report. The report shall include:*
- (a) *The results of all faecal coliform and suspended solid analyses performed by the permit holder under conditions 20 and 22 of WGN 980198(01).*
 - (b) *The results of all Biological Oxygen Demand and heavy metals analyses performed by the operators of the Moa Point Wastewater Treatment Plant that are forwarded to the permit holder.*
 - (c) *Records of meteorological data collected at the golf course on days when irrigation was undertaken.*
 - (d) *Records of the volumes and frequencies of recycled water used for irrigation.*
 - (e) *Records of inspections and maintenance performed on equipment of the treatment and irrigation system.*
 - (f) *Records of any complaints received in relation to condition 9 below.*

- (g) *Records of any incidents that have occurred in relation to condition 10 below.*
- (h) *Any other relevant information.*

The report shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council, and shall be submitted within two months of the end of each automated irrigation season.

Complaints and Incidents Procedures

- (9) *The permit holder shall keep a record of any complaints that are received. The complaints record shall at least contain the following, where practical:*
 - (a) *Name and address of complainant.*
 - (b) *Identification of nature of complaint.*
 - (c) *Date and time of complaint and of alleged event.*
 - (d) *Weather conditions at the time of the complaint.*

The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any complaints relating to the exercise of this permit, within 24 hours of being received by the permit holder or the next working day.

Note: For the purposes of this permit the automated irrigation season is the period of year in which automated irrigation using recycled water is performed, typically between September and April.

- (10) *The permit holder shall keep a record of any incident that has or could have resulted in a condition of this permit being contravened.*
 - (a) *The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any such incident within 24 hours of the incident being brought to the attention of the permit holder, or the next working day. This includes any incident that may result in a complaint.*
 - (b) *The permit holder shall forward an incident report to the Manager, Consents Management, Wellington Regional Council, within seven working days. This report shall describe reasons for the incident, measures taken to mitigate the incident and measures to prevent recurrence.*

Note: For the purposes of this permit incidents include but are not limited to incidents such as power or mechanical failure, monitoring equipment failure, or unusual discharges.

Review Conditions

- (11) *The Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so, pursuant to section 128 of the Resource Management Act 1991, at any time within four weeks of the Manager, Consents Management, Wellington Regional Council, receiving the results of the initial monitoring programme (described under condition 22 of WGN 980198(01)) and within six months of the first, third, fifth, eighth, eleventh, fourteenth and seventeenth anniversaries of the date of commencement of this permit for any of the following purposes:*
- (a) *To address any issues arising from the initial monitoring programme conducted under condition 23 of WGN 980198(01) and/or the annual reports forwarded under condition 8 above.*
 - (b) *To deal with any adverse effects on the environment which may arise from the exercise of this permit, and which it is appropriate to deal with at a later stage.*
 - (c) *To increase, decrease or modify any monitoring requirements in light of the results obtained from any previous monitoring, or as necessary to deal with any adverse effects on the environment arising from the exercise of this permit.*
 - (d) *To enable consistency with any operative Regional Plans.*
- (12) *The permit holder may apply, at any time, pursuant to section 127 of the Resource Management Act 1991, for the change or cancellation of any condition of this permit, other than any condition relating to the term of this permit.*

Conditions Specific to WGN 980198(01): Discharge to Land Permit.

Effects Beyond the Boundary

- (13) *There shall be no discharge of recycled water arising from this permit beyond the boundary of the golf course.*

Note: For the purposes of this permit the boundary of the golf course is the outer perimeter of land whose legal descriptions are Pt Sec 12, 14 and 15 Watts Peninsula District, Pt Lot 2 DP 3166, Pt Lot 1 DP 3177, Lot 1 DP 51082, Pt Lot 1 DP 78363, Lot 3 DP 80623 and Sec 4 SO 37422.

- (14) *In the event of a non-consented discharge described in condition 13, the permit holder shall:*
- (a) *Immediately notify the Manager, Consents Management, Wellington Regional Council and the Public Health Service.*

- (b) *Immediately investigate the reason why condition 13 was breached.*
- (c) *Immediately identify and undertake whatever appropriate remedial action to the satisfaction of the Manager, Consents Management, Wellington Regional Council, to mitigate the effects.*
- (d) *Forward within five working days to the Manager, Consents Management, Wellington Regional Council, a report on the steps taken to ensure that condition 13 is not breached in the future.*

Operation of Irrigation System

- (15) *The Manager, Consents Management, Wellington Regional Council shall be given a minimum 48 hours notice prior to the commencement of each automated irrigation season using recycled water.*
- (16) *The permit holder shall install to the satisfaction of the Manager, Consents Management, Wellington Regional Council, suitable back flow prevention and cross connection control to prevent the contamination of the municipal reticulated potable water supply.*

Specifications of the back flow prevention and cross connection control measures shall be forwarded to the Manager, Consents Management, Wellington Regional Council, at least two weeks prior to their installation.

- (17) *There shall be no automated irrigation using recycled water performed between the hours of 7.00 am and 9.00 pm.*
- (18) *There shall be no automated irrigation using recycled water in southerly winds with wind speeds greater than 20 km/hr and in northerly winds with wind speeds greater than 30 km/hr.*

Note: For the purposes of this permit southerly winds are all winds originating from a southerly sector between east and west. Northerly winds are all winds originating from a northerly sector between west and east. The wind direction and wind speed shall be measured from an anemometer located, operated and maintained to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

- (19) *Recycled water shall not be discharged from any point by way of automated or manual irrigation in the following areas:*
 - (a) *Within 30 m of the golf course boundary which adjoins Wellington International Airport between the golf course club house and 378 Broadway.*
 - (b) *Within 40 m of the golf course boundary which adjoins properties between 380 Broadway and 450 Broadway during southerly winds.*

Note: For the purposes of this condition southerly winds are all winds originating from a southerly sector between east and west which are greater than 5 km/hr (measured by an anemometer described in condition 15).

- (c) *Within 40 m of the golf course boundary which adjoins properties between 452 Broadway and 4 Raukawa Street (including properties between 8 and 48 Monorgan Road).*

Note: For the purposes of this consent a discharge point includes but is not limited to automated irrigation spray nozzles, hand held hoses and travel irrigators.

Recycled Water Quality Criteria and Monitoring Requirements

- (20) *Recycled water discharged during irrigation shall meet the following criteria:*

- (a) ***Faecal coliforms.*** *Based on one grab sample taken per week, the mean of the lowest three of the four consecutive weekly faecal coliform concentrations shall not exceed 10 CFU/100 mL.*

The concentration in any one weekly sample shall not exceed 50 CFU/100 mL.

- (b) ***Suspended solids.*** *Based on one grab sample taken per week, the mean of the lowest three of the four consecutive weekly suspended solids concentrations shall not exceed 10 mg/L.*

The concentration in any one weekly sample shall not exceed 30 mg/L.

Note: For the purposes of this condition a weekly sample is one collected each week between Monday and Sunday.

The monitoring methods, procedures and sampling point shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council. The results of all monitoring performed shall be forwarded on request to the Manager, Consents Management, Wellington Regional Council.

- (21) *In the event of an exceedance of the criteria described in condition 20, the permit holder shall*

- (a) *Immediately notify the Manager, Consents Management, Wellington Regional Council and the Public Health Service.*

- (b) *Immediately investigate the reason why the criteria was exceeded and cease any discharge of recycled water until such time as the quality of the recycled water complies with the criteria of condition 20.*

Recycled Water Quality Criteria and Monitoring Requirements Prior Commencing each Automated Irrigation Season

- (22) *Prior to the commencement of each automated irrigation season using recycled water, the permit holder shall collect at least seven consecutive daily samples of recycled water to demonstrate the recycled water can meet those criteria in condition 20. Notwithstanding the criteria in condition 20, the discharge of recycled water shall not commence until such time as the following criteria are met:*

- (a) ***Faecal coliforms.*** *Based on one grab sample taken per day, the mean of the lowest six of seven consecutive daily faecal coliform concentrations shall not exceed 10 CFU/100 mL.*

The concentration in any one daily sample shall not exceed 50 CFU/100 mL.

- (b) ***Suspended solids.*** *Based on one grab sample taken per day, the mean of the lowest six of seven consecutive weekly suspended solids concentrations shall not exceed 10 mg/L.*

The concentration in any one daily sample shall not exceed 30 mg/L.

The monitoring methods, procedures and sampling point shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council. The results of all monitoring performed shall be forwarded on request to the Manager, Consents Management, Wellington Regional Council.

Initial Monitoring Programme

- (23) *Prior to the commencement of irrigation using recycled water, the permit holder shall design and undertake an initial monitoring programme using potable water to investigate potential irrigation spray drift and aerosol movement beyond the boundary of golf course. The programme shall include:*

- (a) *Monitoring of spray drift and aerosol movement under varying wind conditions.*
- (b) *An assessment as to the adequacy of the proposed potable water areas, wind speed cut-offs and other similar control mechanisms.*

The monitoring programme shall be designed and performed to the satisfaction of the Manager, Consents Management, Wellington Regional Council. The programme shall be submitted to the Manager, Consents Management, Wellington Regional Council, at least two weeks prior to the commencement of the programme.

The results of the monitoring programme shall be submitted to the Manager, Consents Management, Wellington Regional Council, at least two weeks prior to the commencement of irrigation using recycled water.

Notification to Affected Parties

- (24) *At least two weeks prior to the commencement of irrigation using recycled water, the permit holder shall personally notify, by way of a letter, all of the owners and occupiers of the properties adjoining the boundary the golf course. Those properties to be notified are:*

- *380 Broadway to 452 Broadway (south side)*
- *8 Monorgan Road to 48 Monorgan Road (western side)*
- *2 Raukawa Street to 4b Raukawa Street (western side)*
- *Wellington International Airport Ltd*

Note: This letter is only to be sent prior to the first automated irrigation season using recycled water.

The letter shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council, and shall be submitted to the Wellington Regional Council at least two days prior to being sent to the owners and occupiers of the above mentioned properties.

- (25) *At least two weeks prior to the commencement of irrigation using recycled water, the permit holder shall erect and maintain prominent signs at the golf course. The signs shall inform users of the club and other potentially affected persons of the use of recycled water and shall include:*

- (a) *Any potential risks associated with recycled water.*
- (b) *Any procedures for reducing potential risks.*

Note: These signs shall be maintained during all irrigation seasons using recycled water for the duration of the permit.

The location and wording of the signs shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

Term of Permit

- (26) *This permit shall expire on ?? August 2019.*

Conditions Specific to WGN 980198(02): Discharge to Air Permit

Effects at or Beyond the Boundary

- (13) *There shall be no discharges to air (including but not limited to odour, gas, vapour, or aerosol) arising from the exercise of this permit that are noxious, dangerous, offensive or objectionable at or beyond the boundary of the golf course.*

Note: For the purposes of this permit the boundary of the golf course is the outer perimeter of land whose legal descriptions are Pt Sec 12, 14 and 15 Watts Peninsula District, Pt Lot 2 DP 3166, Pt Lot 1 DP 3177, Lot 1 DP 51082, Pt Lot 1 DP 78363, Lot 3 DP 80623 and Sec 4 SO 37422.

- (14) *In the event of a non-consented discharge described in condition 13, the permit holder shall:*
- (a) *Immediately notify the Manager, Consents Management, Wellington Regional Council.*
 - (b) *Immediately investigate the reason why condition 13 was breached.*
 - (c) *Immediately identify and undertake whatever appropriate remedial action to the satisfaction of the Manager, Consents Management, Wellington Regional Council, to mitigate the effects.*
 - (d) *Forward within five working days to the Manager, Consents Management, Wellington Regional Council, a report on the steps taken to ensure that condition 13 is not breached in the future.*

Operation of Irrigation System

- (15) *The permit holder shall install an aerator in the storage lagoon prior to receiving wastewater from the Moa Point Wastewater Treatment Plant.*

Term of Permit

- (16) *This permit shall expire on ?? August 2019.*

Report prepared by:



PETER DAY

Resource Advisor, Consents Management

Recommendation approved by:



ROB FORLONG

Manager, Consents Management

Appendix 1:

**Notes of a Pre-hearing Meeting held on 15 July 1998
at 7.00 pm in the Committee Room, Level 5, The Regional Council Centre**

Miramar Golf Club Inc. Application for Discharge to Land and Discharge to Air Permits: WGN 980198

Present

Ron Haverland	Beca Steven
Chris Callender	Beca Steven
Andrew Bichan	Public Health Service
Chris Edmonds	Public Health Service
Erin Kearney	Public Health Service
John Ryan	Local resident
Bill Waters	Local resident
James Moorthy	Local resident
Ray O'Callaghan	Truebridge Callender Beach
Phil Stickney	Truebridge Callender Beach
Del Hogg	Miramar Golf Club Inc.
Romae Duns (Facilitator)	Wellington Regional Council
Peter Day	Wellington Regional Council
Jo Dougan	Wellington Regional Council

1. Introduction

Romae opened the meeting at approximately 7.00 pm. She welcomed everyone and explained that the purpose of the meeting was to address questions that submitters had of the applicant and to explore the possibility of coming to an agreement on consent conditions.

Romae introduced the agenda for the meeting which included a summary of the issues raised in submissions. These were as follows:

- Odour:
 - treatment;
 - lagoon; and
 - spray,
- Spray drift:
 - treatment performance/health effects; and
 - management options (high pressure verses low pressure systems; altering nozzles near boundary; control mechanisms; buffer zones; separate boundary system; hand spraying)

- Operation and maintenance:
 - cross connection potential; and
 - ponding and surface run-off.
- Monitoring.

Bill requested that potential effects of the application on his roof be added to the list of issues. This was done.

2. Proposed Modifications to Application

In response to the issues raised in submissions, Truebridge Callender Beach (TCB), on behalf of Miramar Golf Club Inc. (MGC), proposed to modify the initial application in an effort to meet several concerns. Ray described the modifications proposed.

These consisted of the establishment of three *buffer* zones:

- **Boundary adjoining gateway to Wellington International Airport:** All sprinkler nozzles within 30 m of this boundary would remain on potable water as opposed to recycled water. This would produce a theoretical buffer zone of 10 m between the edge of the spray radius of each sprinkler and the golf course boundary.
- **Boundary adjoining properties on Broadway:** During northerly winds less than 30 km/hr, irrigation using recycled water would be performed as in the consent application. During southerly winds, the row of nozzles closest to the boundary would not operate. Therefore, during southerly winds the closest nozzles using recycled water would be 40 m from the boundary, providing a theoretical buffer of 20 m.
- **Boundary adjoining properties on Monorgan Road:** All sprinkler heads within 40 m of this boundary would remain on potable water as opposed to recycled water. This would produce a theoretical buffer zone of 20 m.

Ray further indicated that the golf club also proposed to use directional spray nozzles and spray adapters where necessary. He also explained that blanket winds speed cut offs would still be maintained over the entire course. No irrigation would take place in southerly winds with wind speeds greater than 20km/hr and in northerly winds with wind speeds greater than 30 km/hr. Ray also clarified that southerly winds were regarded as all those winds in a southern sector between east and west, and northerly winds were regarded as all those winds in a northern sector between west and east.

John, James, Erin and Chris (Edmonds) all raised questions to clarify aspects of the proposed modifications. Most questions related to the proposed distances between the irrigation of recycled water and the various golf course boundaries. These questions were answered by Ray.

The meeting progressed to discuss the issues raised in the submissions.

3. Spray Drift

John was concerned with the potential for spray drift of the recycled water and the possibility of adverse health effects arising from it (such as exposure of drying washing). He felt that properties adjoining the golf course would be exposed to such effects every day whereas golfers would possibly be exposed only a few times per week. He questioned the wind cut off speed and suggested it be reduced. He produced a copy of the draft Department of Health (DOH) guidelines for the spraying of agricultural compounds. The guidelines recommend that no spraying of such compounds be performed above 15 km/hr. John further concluded that any drift beyond the boundary of the golf course would be unacceptable.

Bill described the ability of strong Southerlies to carry material such as sand from the construction site of the Moa Point Wastewater Treatment Plant (WTP) on to his property. He considered that the potential existed for winds to also carry recycled water from the golf course to his property. He also felt that the proposed buffer zones would not be sufficient in preventing possible spray drift.

James raised the question of cross winds (such as westerlies) and the possibility for spray drift to properties adjoining the golf club on Broadway.

Chris Edmonds was concerned about the possible inhalation of aerosols containing protozoa and viruses that could survive the proposed treatment system. He also indicated that irrigation would be performed at night when there would be little or no UV radiation from the sun. Chris considered this was particularly relevant to users of golf course in the early morning when irrigation had occurred the previous night. Chris further stated that the relevant regulatory guidelines recommend in situations where the levels of viruses and similar pathogens are unknown or the risks could not be quantified, that buffers zones should be established.

Erin pointed out that it would be difficult to distinguish effects over the boundary of the golf course.

Ray stated that current irrigation system had been in operation for three years and the golf club had established a good understanding of it's operation and of the prevailing weather conditions over the golf course. He clarified that golf club did investigate installing a buffer zone supplied by potable water around the perimeter of the entire golf course. However, there were technical difficulties in achieving this and the capital costs involved in establishing a separate system were too great.

In response to Bill's question Ray reassured Bill that the golf club would not spray in high winds (southerlies greater than 20 km/hr and northerlies greater than 30 km/hr). He also produced correspondence supplied by BHP which indicated that the recycled water would have no detrimental effect on Bill's roof.

In response to Chris Edmonds' concern, Ray maintained that the relevant guidelines were developed with the knowledge that pathogens other than faecal coliforms may also exist in the recycled water and that the guidelines were set for faecal coliforms in accordance with this.

Ray concluded that with the three proposed buffers zones and the high level of treatment a high level of safety would be provided. He maintained that the golf club was committed to preventing any spray drift beyond the golf course boundary and if a problem was encountered the golf club would review the operation of irrigation system.

In response to those concerns raised regarding possible health effects, Romae inquired as to whether the submitters present would be prepared to let the PHS be responsible for their concerns. This was agreeable to all parties and the representatives of TCB (and MGC) and the PHS agreed to meet at a later date to discuss these issues and possibly reach some resolution.

Romae also inquired as to whether all parties would be satisfied for Peter to draft a set of consent conditions to address the concerns regarding spray drift after the meeting between TCB and the PHS. This was also agreeable to all parties.

4. **Odour**

John noted that the potential health effects from irrigation was his biggest concern although he questioned how it would be possible to discriminate between possible odours from the golf club and those from the WTP. He further asked whether odour was proportional to possible health effects.

In response to John's question, Andrew clarified that odour was not proportional to possible health effects. He further noted that any odour resulting from the irrigation of recycled water would occur at night, however if any odour problems were encountered it would be more than likely that they would be associated with the storage lagoon.

Bill raised the question of as to whether midges would be a problem associated with the lagoon.

Ray stated that the odour problems associated with the WTP had confounded the issue of odour in relation to the MGC application. He noted that a build up of algae in the storage lagoon could produce odour problems. Therefore, in response to the submission forwarded by Beca on behalf of Wellington International Airport, the golf club proposed to install an aerator in to the storage lagoon.

In relation to the concerns raised regarding odour, Ray further noted that similar lagoons with lower quality recycled water than that proposed had not encountered any odour problems. He emphasised that MGC didn't want any odour inside golf course let alone outside. He would happy to have standard odour related condition placed on the permit. In response to Bill's question, Ray clarified that with the aerator and high turn over in the lagoon no problems with midges were anticipated.

In relation to John's and Ray's point concerning the WTP, Romae explained the steps Wellington Regional Council (WRC) would take in investigating any possible odour complaints and the service provided by WRC (Pollution Response). She also explained the details of the frequency, intensity, duration, odour, location (FIDOL factors) in relation to general odour complaints and how these would be used to determine or discount possible sources of any odour complaints. She also explained the interpretation and wording of the WRC's standard odour condition.

All parties agreed to Peter drafting a set of conditions to address the issue of possible odour.

5. Operations and Maintenance

Andrew raised the concern for possible cross connection between the potable and recycled water systems. Andrew requested that the PHS see the specifications of any back flow preventers before they were installed.

Chris Edmonds stated that suitable signage and colour coding of the potable and recycled water reticulation system would help prevent possible cross connection. He also raised the question of what irrigating was performed up until 7.30 am.

John questioned the placing of the golf club's anemometer as to whether there was a sheltering effect. He also commented on the flooding of the creek running through the course with regards to possible contamination of the stormwater system.

Chris Callender questioned whether potable water would be pumped through the lagoon at the end of each irrigation system.

Ray clarified that no cross connection was possible. The potable and recycled water systems would be placed on two separate systems with no connections between the two. Back flow preventers would also be installed and he would be happy to provide the specifications of these to the PHS. In response to John's question, Ray suggested that calibration of the anemometer could be performed every year and that this could be incorporated into a consent condition. In response to Chris Callender's question he stated that this was already in the golf course Management Plan.

Ray clarified the current irrigation cycle which had been developed to minimise surface ponding. He also explained the network of stormwater sumps. He concluded that with the refined application rates and high level of treatment proposed, the levels of faecal coliforms possibly entering Lyall Bay would be undetectable above the background levels already present. In response to Chris Edmonds' question Ray stated that irrigating up until 7.30 am was a rare event, but he would check as to what irrigating was done at this time.

6. Monitoring

Chris Edmonds felt that there was no monitoring proposed to account for effects of cumulative faecal coliforms. Chris also felt that a condition of any permit granted should stipulate that if the water quality criteria proposed was exceeded, irrigating would cease.

Ron questioned that if analysis of the samples indicated that the water quality criteria had been exceeded some irrigation would already have been performed.

Andrew stated that the relevant ANZECC guidelines suggest daily testing and that if the quality proves to be satisfactory to test less often. Andrew also questioned what the procedures would be for dealing with back to back monthly results greater than the proposed water quality criteria.

Erin questioned what the details of the feedback with Moa Point were.

Ray clarified what would be performed under the MGC Management Plan. In response to Ron's and Andrew's questions, Ray suggested that a one week commissioning period would be suitable to prove to performance of the treatment and the quality of the recycled water. In response to Erin's question Ray clarified what the proposed feedback mechanisms with the WTP were. He further stated that the golf club would be supplied with wastewater from the plant during the summer when there is typically a lower flow through the plant. The low flow predominantly corresponds with a higher quality final product.

7. Conclusion

Romae explained what would happen next in the consent process as follows:

- the PHS and TCB (and MGC) would meet to discuss the health related concerns of the submitters and possibly reach some resolution;
- Peter would draft a set of consent conditions. A copy of these would be sent to all submitters along with a copy of the pre-hearing meeting summary and a surrender of submission form; and
- a hearing may be necessary and that all parties would be advised if this was the case.

Romae concluded the meeting at approximately 9.50 pm and thanked everyone for their attendance and participation.

Appendix 2:

Matters for Consideration

1. Resource Management Act 1991

Section 104 of the Resource Management Act 1991 (RMA) outlines the matters that a consent authority is to have regard towards when considering an application. Section 104 gives precedence to Part II of the RMA.

Section 104 (1) states that the consent authority shall have regard to:

- (a) *Any actual and potential effects on the environment of allowing the activity; and*
- (b) *Any relevant regulations; and*
- (c) *Any relevant national policy statement, New Zealand coastal policy statement, regional policy statement, and proposed regional policy statement; and*
- (d) *Any relevant objectives, policies, rules, or other provisions of a plan or proposed plan; and*
- (e) *Any relevant designations or heritage orders or relevant requirements for designations or heritage orders; and*
- (f) *Any other matters the consent authority considers relevant and reasonably necessary to determine the application.*

Section 104 (3) states that:

Where an application is for a discharge permit or coastal permit to do something that would otherwise contravene section 15 or 15B (relating to discharge of contaminants), the consent authority shall, in having regard to the actual and potential effects on the environment of allowing the activity, have regard to-

- (a) *The nature of the discharge and the sensitivity of the proposed receiving environment to adverse effects and the applicant's reasons for making the proposed choice; and*
- (b) *Any possible alternative methods of discharge, including discharge into any other receiving environment.*

Part II of the RMA (Purposes and Principles) includes:

Section 5 - Purpose

- (1) *The purpose of this Act is to promote the sustainable management of natural and physical resources.*

- (2) *In this Act, "sustainable management" means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while-*
- (a) *Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
 - (b) *Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
 - (c) *Avoiding, remedying, or mitigating any adverse effects of activities on the environment. Status Compendium*

Section 6 - Matters of National Importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

- (a) *The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- (b) *The protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*
- (c) *The maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- (d) *The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.*

Section 7 - Other Matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to-

- (a) *Kaitiakitanga:*
- (b) *The efficient use and development of natural and physical resources:*

- (c) *The maintenance and enhancement of amenity values:*
- (d) *Intrinsic values of ecosystems:*
- (e) *Recognition and protection of the heritage values of sites, buildings, places, or areas:*
- (f) *Maintenance and enhancement of the quality of the environment:*
- (g) *Any finite characteristics of natural and physical resources:*

Section 8 - Treaty of Waitangi

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Section 15 - Discharge of contaminants into environment

- (1) *No person may discharge any-*
 - (a) *Contaminant or water into water; or*
 - (b) *Contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
 - (c) *Contaminant from any industrial or trade premises into air; or*
 - (d) *Contaminant from any industrial or trade premises onto or into land-*

unless the discharge is expressly allowed by a rule [in a regional plan and in any relevant proposed regional plan], a resource consent, or regulations.

Part I, Interpretation and application, section 2, Interpretation defines contaminant and industrial and trade premise as:

"Industrial or trade process" includes every part of a process from the receipt of raw material to the dispatch or use in another process or disposal of any product or waste material, and any intervening storage of the raw material, partly processed matter, or product.

"Contaminant" includes any substance (including gases, liquids, solids, and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy, or heat-

- (a) When discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or*
- (b) When discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land or air onto or into which it is discharged.*

2. Regional Policy Statement

The Regional Policy Statement contains a number of objectives and policies aimed at maintaining and enhancing the natural and physical environment, and providing for the existing and reasonably foreseeable future uses of the environment. The relevant Chapters, objectives and policies of the Regional Policy Statement are:

Chapter 4 - The Iwi Environmental Management System

- Objective 1 A mutually satisfactory relationship is developed and maintained between the Wellington Regional Council and the iwi of the Region.*
- Objective 2 The principles of the Treaty of Waitangi are taken into account in resource management.*
- Objective 3 There are increased opportunities for tangata whenua to exercise kaitiakitanga in the Region.*
- Objective 4 There are increased opportunities for the cultural aspirations and tikanga of tangata whenua with regard to natural and physical resources to be met.*
- Policy 2 To support the active participation of tangata whenua in the development and implementation of resource management policy and plans, and in the resource consent granting process.*
- Policy 3 To promote awareness of the Treaty of Waitangi and the Maori environmental management system within local authorities and other resource management agencies.*
- Policy 4 To recognise and provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga.*

Policy 6 To recognise and promote the role and importance of kaitiakitanga.

Chapter 5 - Freshwater

Objective 1 The quality of fresh water meets the range of uses and values for which it is required, safeguards its life supporting capacity, and has the potential to meet the reasonably foreseeable needs of future generations.

Objective 3 Freshwater resources of significance or of high value for cultural, spiritual, scenic, ecosystem, natural, recreational, or other amenity reasons are protected or enhanced.

Policy 2 To promote the conservation and efficient use of fresh water.

Policy 4 To maintain and protect the quality of fresh water so that it is available for a range of uses and values, and:

- (1) Its life supporting capacity is safeguarded; and*
- (2) Its potential to meet the reasonably foreseeable needs of future generations is sustained; and*
- (3) For surface water, any adverse effects on aquatic and riparian ecosystems are avoided, remedied, or mitigated.*

Policy 6 To ensure that the effects of contaminants contained in point source discharges on the quality of fresh water and aquatic ecosystems are avoided, remedied, or mitigated and allowing for reasonable mixing:

- (1) Do not render any fresh water unsuitable for any purpose specified in any regional plan for that water;*
- (2) Do not prevent the receiving fresh water from meeting any standards established in any regional plan for that water;*
- (3) Do not render any water in the coastal marine area unsuitable for any purpose specified in a regional coastal plan for the Wellington Region.*

Chapter 6 - Soils and Minerals

Objective 1 The soils of the Wellington Region maintain those desirable physical, chemical, and biological characteristics which enable them to retain their life supporting capacity and to sustain plant growth.

Policy 6 To avoid, remedy or mitigate the adverse effects of harmful waste and contaminants on soil, and to dispose of these in ways which respect the assimilative capacity of the soil and which comply with relevant standards set for water quality and air quality.

Chapter 7 - The Coastal Environment

Objective 3 Coastal water quality is of a high standard.

Policy 5 To maintain or improve the quality of coastal water by:

- (1) Improving, where necessary, the quality of fresh water entering the coastal marine area;*
- (2) Avoiding, remedying or mitigating the effects of activities in the coastal environment that can degrade coastal water; and*
- (3) Avoiding, remedying or mitigating the effects of point discharges that directly enter the coastal marine area so the effects do not render any water in the coastal marine area unsuitable for any purpose specified in a Regional Coastal Plan for the Wellington Region.*

Chapter 8 - Air

Objective 3 The adverse effects of the discharge of contaminants into air on human health, local or global environmental systems and public amenity are avoided, remedied or mitigated.

Policy 6 To avoid or minimise, where appropriate and practicable, the discharge of contaminants to air at their source by the development and implementation of improved control technology and by good pollution control practice.

Policy 8 To avoid, remedy or mitigate the adverse effects of local and global air pollution on human health.

Policy 11 To avoid, remedy or mitigate the adverse effects of air pollution on public amenity values.

Policy 12 To avoid, remedy or mitigate the adverse effects of odours on public amenity.

Chapter 13 - Waste Management and Hazardous Substances

Objective 1 The quantity of waste generated is reduced.

Objective 3 Adverse effects on the environment and human health from the inappropriate disposal of residual liquid and solid wastes are avoided or, where this is not possible, remedied or mitigated.

Policy 10 To ensure, in all decisions on the treatment and disposal of sewage, that:

- (1) Sewage is treated to a level which is appropriate to the means of disposal so that adverse effects on human health and the quality of ecosystems are avoided, remedied or mitigated, and in particular:*
 - (a) For discharge into or onto land, adverse effects on the quality of groundwater and surface water are avoided, remedied or mitigated;*
 - (b) For discharge into coastal water, the discharge, after reasonable mixing, does not render the receiving waters unsuitable for contact recreation or for any other purpose specified for that water in the Regional Coastal Plan;*
 - (c) For discharge into freshwater, the discharge, after reasonable mixing, does not render the receiving waters unsuitable for any purpose specified for that water in any relevant plan;*
- (2) The values and views of the relevant iwi are given due recognition; and*
- (3) The values and views of the appropriate communities of interest are taken into account.*

3. Amended Proposed Regional Plan for Discharges to Land

The Proposed Regional Plan for Discharges to Land contains policies, objectives and rules relevant to the proposed discharge of recycled water. These are:

Objective 5 The adverse environmental effects of discharges of liquid contaminants from point sources into or onto land are avoided, remedied or mitigated.

Policy 4.1 To give particular consideration to any relevant iwi management plans or statements of tangata whenua views when considering applications for the discharge of human effluent (treated or untreated) to land.

Policy 4.2 To give particular regard to the following matters when assessing applications for permits to discharge contaminants to land from reticulated sewerage systems;

- (1) the nature of the contaminants entering the sewerage system and being discharged from the system;*
- (2) whether trade wastes are present in the system, and any actions required to:*
 - (a) monitor the trade wastes entering the system; and*
 - (b) minimise the adverse effects of trade wastes on the treatment of the effluent;*
- (3) the extent to which stormwater is able to enter the system, and any actions required to avoid, remedy or mitigate the effects of system overload by stormwater;*
- (4) the management of the system, and any actions required to avoid, remedy or mitigate the effects of any accidental discharges from the system;*
- (5) the location of the discharge site and the hydrogeological conditions at and around the site;*
- (6) the extent to which the effluent is treated prior to the discharge entering any water, and any actual or potential effects of the discharge on surface water, coastal water, and groundwater.*

- (7) *the effects of any odour or contaminant discharged into air;*
- (8) *any actual or potential effect of the discharge on human health or amenity, and on the health and functioning of plants, animals or ecosystems;*
- (9) *any other uses or values of the discharge site and surrounding area, including any values placed on the site by tangata whenua; and*
- (10) *the Ministry of Health Guidelines for the Safe Use of Sewage Effluent and Sewage Sludge on Land¹, or alternative researched and documented benchmarks for assessment.*

Policy 4.3 To require discharges to land from reticulated sewerage systems to be managed in accordance with a site-specific discharge management plan.

Policy 4.5 To ensure that on-site sewage treatment and disposal systems are sited, designed and maintained in such a way as to avoid, remedy or mitigate any adverse effects on groundwater, surface water or human health, the Council will have particular regard to:

- (1) *the groundwater characteristics of the site, including depth, velocity, and existing uses;*
- (2) *the soil characteristics of the site and surrounding area, including depth to gravels, texture, drainage, and soil variability;*
- (3) *site constraints including topography, slope, lot size, location of any bores and existing structures; and*
- (4) *the anticipated flow rate to the system.*

Policy 5.1 To allow discharges of liquid contaminants to land which are not likely to have adverse effects on soil, water quality and amenity values, particularly where the effects of the contaminants would be greater if they were discharged directly into water.

¹ Department of Health, 1992

Rule 7 Permitted Activities (on-site sewage treatment and disposal)

The discharge into or onto land of any water or contaminants other than septage, from on-site sewage treatment and disposal systems is a permitted activity if:

Either

- (1) the system is already in use at the time this Rule comes into force; and*
- (2) the discharge does not exceed 1300 litres per day (calculated as a weekly average);*

provided the following conditions are met:

- (a) the discharge shall consist only of contaminants normally associated with domestic sewage;*
- (b) no stormwater shall be allowed to enter the system;*
- (c) there shall be no direct discharge from the system to groundwater or surface water, or above the soil surface; and*
- (d) the system shall be maintained on a regular basis.*

Or

- (3) the system is a new or upgraded system; and*
- (4) the discharge does not exceed 1300 litres per day (calculated as a weekly average); and*
- (5) the system shall be installed on the same property as the premises to which the system is connected; and*
- (6) there shall be no direct discharge above the soil surface;*

provided that conditions (a)-(d) above and the following conditions are complied with:

- (e) a site investigation shall be carried out. The matters to be addressed in a site investigation are set out in Appendix 6 of this Plan;*
- (f) the system shall be designed, constructed and operated to meet the following performance criteria:*

- (fa) *the system shall be designed with sufficient effluent retention time to enable adequate treatment in relation to any constraints identified in the site investigation;*
- (fb) *the effluent shall be evenly distributed to the entire filtration surface of the disposal field;*
- (fc) *the bottom of the effluent disposal system shall be sufficiently above the groundwater at its highest level, in relation to any constraints identified in the site investigation, to prevent any contamination of groundwater;*
- (fd) *the area available for treatment shall be appropriate for the volume of the discharge and any constraints identified in the site investigation.*

The Council will accept as compliance with criteria (fa)-(fd) an effluent treatment and disposal system designed, and constructed, and operated in accordance with the principles and procedures outlined in Technical Publication No. 58 "On-Site Wastewater Disposal from Households and Institutions" (Second Edition, Auckland Regional Council, 1994).

Rule 8 Discretionary Activities (discharges containing human effluent)

The discharge into or onto land of any water or contaminants containing human effluent, septage, or sewage sludge, other than those discharges permitted under Rule 7 of this Plan is a discretionary activity.

4. Amended Proposed Regional Air Quality Management Plan

The Proposed Regional Air Quality Management Plan contains policies, objectives and rules relevant to the proposed recycled water system. These are:

Objective 2 People and communities are able to carry out activities involving the discharge of contaminants to air while ensuring that adverse effects, including any adverse effects on:

- *local ambient air quality;*
- *human health;*
- *amenity values;*
- *resources or values of significance to tangata whenua; and*
- *the quality of ecosystems, water, and soil;*

are avoided, remedied or mitigated.

- Policy 4 To avoid, remedy or mitigate any adverse effect of the discharge of contaminants to air that is noxious, dangerous, offensive, or objectionable.*
- Policy 5 To avoid or minimise, where appropriate and practicable, the discharge of contaminants to air at their source.*
- Policy 7 To avoid remedy or mitigate the adverse effects of the discharge of contaminants to air on amenity values.*
- Policy 8 To encourage the development and use of industry guidelines, and codes of practice to reduce the adverse effects of the discharge of contaminants to air.*
- Policy 9 To give particular consideration, where relevant, to the following matters when assessing an application for a resource consent to discharge contaminants to air:*
- (1) the volume, composition and characteristics of the discharge, ...*
 - (2) the frequency, intensity, duration, offensiveness, location and time of the discharge;*
 - (3) the potential for the discharge to be reduced at source, and in particular, the desirability of minimising the emission of any of the "Hazardous Air Contaminants" ...;*
 - (4) any actual or potential effects of the discharge on human health and safety;*
 - (5) any actual or potential effects of the discharge on amenity values, including any effects of odour or particulate matter arising from the discharge;*
 - (6) any actual or potential effects of the discharge on resources or values of significance to tangata whenua;*
 - (7) any actual or potential effects of the discharge on the health and functioning of ecosystems, plants and animals, including indigenous ecosystems and plants and animals of commercial significance;*
 - (8) any actual or potential effects of the discharge on other environmental media;*

- (10) *any cumulative effects which may arise over time or in combination with other effects;*
- (11) *any effects of low probability but high potential impact; and*
- (12) *any positive effects arising from activities associated with the discharge; and*

Policy Y

To have regard to the following matters when determining the nature and extent of any conditions to be placed on a resource consent:

- (1) *the significance of the adverse effects arising as a consequence of, or in association with, the proposed activity;*
- (2) *the extent to which the proposed activity contributes to the adverse effects;*
- (3) *the extent to which the adverse effects of the proposed activity can be, and have been, dealt with by other means;*
- (4) *any proposals by the applicant to avoid, remedy or mitigate adverse effects, and any agreements reached at pre-hearing meetings;*
- (5) *the monitoring proposed to be carried out by the applicant;*
- (6) *the extent to which the community as a whole benefits from the proposed activity and from any proposed conditions on a consent;*
- (7) *the financial cost of complying with any conditions on a consent;*
- (8) *the extent to which a condition placed on a consent will avoid, remedy or mitigate any adverse effects*
- (9) *the degree of compliance with a relevant industry code of practice; and*
- (10) *agreements with affected parties.*



Appendix D – Information from Wellington City Council



WELLINGTON INTERNATIONAL AIRPORT MASTER PLAN



CITY OF WELLINGTON
 Department of Administration and Finance
 WELLINGTON CITY COUNCIL, P.O. BOX 2199, WELLINGTON

MUNICIPAL OFFICE BUILDING,
 5 MERCER STREET,
 WELLINGTON,
 NEW ZEALAND.

PLEASE ADDRESS COMMUNICATIONS TO
 THE TOWN CLERK

IN REPLY PLEASE QUOTE

TC 58/1

FOR ENQUIRIES PLEASE TELEPHONE

Mr R.E. Lane
 724-599 EXT. 759

30 JULY 1985

MEMORANDUM FOR

ASSISTANT CITY ENGINEER (DESIGN)

WELLINGTON INTERNATIONAL AIRPORT MASTER PLAN

Attached for your use is a copy of the completed Master Plan document. The contribution you have made to this work is appreciated.

Note that master copies nos. 001 and 002 are held in the Design Division library and by the Civil Aviation Division of the Ministry of Transport respectively. The formal amendments that will be issued from time to time shall be recorded in each of those copies and circulated to be added to all known copies.

D. Niven
 TOWN CLERK

J. Hunt - copy N° 009.

The following should be considered in a review of the 1985 Masterplan

1. Ansell terminal
2. consequential gate layout
3. Commuter aircraft to be to south
4. RNZAF hangar & operation western apron
5. New security gate across hangar taxiway
6. ANZ hangar to stay
7. road proposed around the back of the hangar to eliminate security / gate problems
8. Note (in respect of 7 and elsewhere) land currently proposed for exchange with golf club (4 areas + 356 Broadway ?)
9. Milliscreen located on the airport land for purpose of reducing airstrike incidents
10. Allow for permanent milliscreen and for land thereon to be non airport land should ownerships be separated in the future.
11. Rescue-five practice area on foreshore (is this in fact acceptable?)
12. New 2 level south west pier & 3 aerobridges for ANZ. Note proposal to move all passengers via the 1st floor level & then to ground level loading gates by escalator
13. Proposal to run airport as a company from October 1st (a Board of Directors with WCC and Govt representation) has perhaps been overtaken by recent Budget night proposal to sell off the airports entirely to private enterprise.
14. Rescue Five now a private firm contracting to the Airport Management.
15. Main runway overlaid for central 30m with 45mm A.C. & then grooved March, April 1988
16. 767 is largest aircraft currently in scheduled use @ Wgtn. (Wgtn is an "alternative" for some 747 flights + the 747 SP could return at some time. Largest gate is for 767 (?)

17. RESAs are being studied but the possibility of providing an extended runway in conjunction should be considered in parallel. Airways Corp are to provide a schedule of aircraft take off & landing requirements for different runway lengths to check the feasibility & costs of providing an extended facility.
18. I understand that a new noise survey is being undertaken and that noise and late night operations are a very real issue. Airport Manager will appraise of this. A written expression of the currently understood "curfew" would be relevant.
19. RELane has further reports by Becca Carter Hollings & Ferner re new terminal building



WELLINGTON CITY COUNCIL

WORKS DEPARTMENT

CITY ENGINEER N. FYFE

Municipal Office Building, 5 Mercer Street, P.O. Box 2199, Wellington 1, New Zealand

Reply to City Engineer

Attention: J. Forde

Telephone: 724-599

Extension: 8406

Fax: 064-04-710417

Please Quote:

55/96 DM

12 July 1988

Director, Civil Engineering

Dear Sir

WELLINGTON INTERNATIONAL AIRPORT MASTER PLAN

In April of 1987, you were asked for your recommendations for alterations to the above Airport Master Plan. Most interested parties supplied recommendations and these have been noted. Since those recommendations more change has taken place at the Airport and it is now considered appropriate to completely revise the existing Master Plan.

Therefore, I now request any further recommendations that may be appropriate for the Master Plan Revision. Any past recommendations still valid will be considered and need not be repeated. Please forward your recommendations of alterations, corrections etc. to:

The City Engineer
(Attention J. Forde)
P.O. Box 2199
WELLINGTON

Yours faithfully

J.G. Forde
for DESIGN ENGINEER

(C 45)

[00550:6:99]

WELLINGTON INTERNATIONAL AIRPORT MASTER PLAN

PREPARED FOR:-

WELLINGTON AIRPORT AUTHORITY

MAY 1985

BY J.H.FYSON M.I.C.E., M.I.P.E.N.Z., B.A. (CANTAB)

WELLINGTON CITY COUNCIL WORKS DEPARTMENT

009

ACKNOWLEDGEMENTS, INTER ALIA:-

Wellington City Council Works Department
Wellington City Council Planning Department
Ministry of Transport, Civil Aviation Division
Ministry of Transport, NZ Meteorological Service
Air New Zealand
Wellington Chamber of Commerce
Wellington Regional Planning Authority
Ministry of Works and Development
Safe Air Ltd
Mobil Oil N.Z. Ltd
Airport Manager, Wellington Airport Authority
Civil Aviation Manager, Wellington Airport

Cover Photograph courtesy of Mr K. Martin.

Amendment Record Sheet

AMENDMENT LIST		INITIATED BY	DESCRIPTION	DATE OF ENTRY
NUMBER	EFFECTIVE DATE			

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	1.2	Objective
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	2.11.1	Traffic Routes External and Internal
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1. NATURE OF MASTER PLAN

1.1 Definition

The Master Plan describes the current state of development of the airport, also proposals for ultimate development — with some indication of their timing. The Plan requires amendment as facilities are added or changed, and also whenever there is a change in planning or proposals for the future. The Plan is not a substitute for the "Aeronautical Information Publication, Planning Manual" of the Civil Aviation Division, Ministry of Transport, which contains information, regularly kept up-to-date, for aviators and aircraft operators. This AIP Manual is the recognized authority on many of the matters discussed in the Master Plan, such as runway length, visual ground aids etc. Other publications of the Aeronautical Information Service describe the radio navigational aids etc; these are only briefly mentioned in the Master Plan.

1.2 Objectives

The information in the Plan is intended for the use of anyone interested in, or affected by, the airport and its future development. The Plan therefore concerns not only those whose livelihood is drawn from the airport but also nearby residents whose way of life is subject to its effects in other ways. Also, when one of the parties to the Airport Agreement (See Sec. 3.1. below) wishes to construct buildings or facilities, reference should first be made to the Master Plan to see how the area selected is related to any other future development proposal.

1.3 Contents

The Plan consists of a written portion, sections numbered 1 to 9; two maps and five drawings. The general arrangement of the sections is:

1. Nature of Master Plan
2. to 4. Description of the existing installation.
5. to 8. Discussion of proposed future plans, and of environmental aspects.
9. Programming

2. DESCRIPTION OF AIRPORT

2.1 Historical Note

The general area of the present airport has had association with aviation since 1910 when Arthur Schaefer built his own aeroplane and flew a few yards along the beach of Lyall Bay.

Following World War I the recreation ground was used for joyriding flights, and some levelling of sandhills further extended the area available. By 1928, nineteen hectares had been made available for flying, having a 600m runway in a north westerly direction, and 365m north east. This was licensed as a municipal aerodrome in 1929. Kingsford-Smith on his second trans-Tasman crossing landed at Rongotai.

By the time World War II broke out the aerodrome had expanded to 34 hectares and was in use for commercial services. Later Evans Bay was used as a water aerodrome by flying boats of the airline TEAL, for regular flights to and from Australia: this service was discontinued in the early 1950s. Arguments over the siting of a major airport for Wellington continued over the years, ending in 1950 with agreement following a mission headed by Sir Frederick Tymms. The verdict from this mission was disappointing — Rongotai was the best of a bad lot offering, and would never be suitable for large aeroplanes. (The current use of this airport by B747SP aircraft shows up the risk of making such pronouncements!)

Paraparaumu aerodrome served as a joint airport with Rongotai for a number of years until the latter was enlarged as described below.

In 1952 construction began on the present aerodrome. The task involved massive sea protection, rock and earth excavation, and removal or demolition of some 180 houses, and it was not completed until 1959. The runway was extended to its present length in 1972. The present airport area is about 100 hectares, and the paved runway length is 1935m.

For a detailed description of the existing facilities refer to the drawings accompanying this Master Plan, and to the notes below Sections 2.2. to 2.20.

2.2. Drawings and Maps

Sheet No. 1 is the topographical map at 1:50,000 of the vicinity. Added to the printed Lands and Survey sheet are approach planes (except close to the airport where sheet 3 applies) and some of the navigational aid stations.

Sheet No. 2 is the city street map at 1:20,000, showing the road access, also some closer navigational aid stations.

Sheet No. 3 is a drawing at 1:10,000 depicting the close-in approach planes and consequent protection zoning for heights of buildings.

Sheet No. 4 at 1:5,000 is a general drawing of the airport as built.

Sheets 5, 6 and 7 at 1:1,000 show the terminal areas in greater detail than is possible on Sheet 4, and also future planning in those areas.

These 7 sheets are to their scale size. The two "master" copies of the plans to be held by Ministry of Transport, and the Wellington City Council, are to be kept up to date in both by mutually circulated amendments.

2.3 Runway, Strip and End Safety Areas

2.3.1 Standards

Descriptions of these and succeeding notes employ the terminology of "Annex 14 to the Convention on International Civil Aviation" — eighth edition, March 1983 —

a document which describes international standards and recommended practices for aerodromes. The standards are mandatory for countries which are party to the Convention; the recommended practices should be followed where possible.

Wellington's runway and strip statistics are listed on sheet 4 of the drawings. Additional information not on the drawing but relevant to Annex 14 is given below (figures in brackets are the relevant clauses of Annex 14).

2.3.2 Runway surface friction calibration (2.6)

The runway surface, which is mainly of bitumen, has been grooved transversely throughout, the grooves being generally 30mm apart, 4mm wide, and 5mm deep. This treatment gives a good friction characteristic, and the friction value is occasionally tested by MWD using a "Mu-Meter". In the event of further overlay to the runway pavement it will be essential to provide either grooving (as now) or an open graded friction layer, to prevent aquaplaning.

2.3.3 Runway strip and classification (3.3.3)

Although the runway is provided with an Instrument Landing System (ILS) approach, the strip is not wide enough for the runway to be classified as "Precision Approach Runway Category I" which is the group of those served by ILS systems (1.1, Definition of Instrument Runway) which brings the aircraft down to 200ft — Category II brings it down to 100ft and Category III right down to the surface. Nevertheless a compromise classification has been approved for this case allowing a decision height of 650ft for approach from the north and 500ft from the south.

2.3.4 Grading of Runway Strip

The graded area of the strip conforms to the requirement for an "instrument runway" (3.3.8) but on the western side it is less than the width recommended for a "precision approach runway" throughout its length. This recommendation is for a width of 105m from runway centre line, along the middle 1,335m of strip length, tapering to 75m over the 150m lengths at each end; whereas at present it exceeds 75m only alongside the western apron. The wider graded area is intended to serve in the event of an aeroplane running off the runway, and the widths recommended are drawn from the experience of various countries in incidents of this nature.

2.3.5 Runway End Safety Areas

The recommendation of Annex 14 (3.4) is for at least 90m to be provided beyond the strip at each end; this is at present not available in relation to the paved runway. Accordingly, the landing thresholds are each displaced to compensate in part for this deficiency. Thus, although the paved length is 1,935m, the "landing distance available" as notified to aviators is 1,813m because the thresholds are displaced 61m at each end. This applies to "regular operators under approved conditions". The length declared for other operators is only 1,722m. Recommendations are being prepared for the provision of end safety areas, bearing in mind the operational length requirements of various aircraft.

2.4 Taxiways

The main taxiway is now adequate for Code E aircraft (3.7), but these large aircraft can only use stub taxiways 1, 2 and 10 to the runway.

The main parallel taxiway has a separation distance between centre lines of taxiway and runway of 110m which is adequate for a non-instrument runway (3.7.7) but for an instrument runway Annex 14 recommends 180m for code E aircraft — wing span up to 60m. Furthermore, the separation of this taxiway from Calabar Road power poles and other obstructions is below standard for Code E aircraft. The taxiway to the Air New Zealand maintenance area produces a conflict with road traffic which is discussed in sections 2.11 and 2.19 below.

2.5 Sea Protection.

2.5.1 General

As mentioned in 2.1 above, sea protection formed a major part of the original construction. It is a continuing factor in ensuring the security of the runway (in the physical sense) at the southern end. The cost of this protection is a charge to the airport and not to the public road system, although the latter lies within the protection given. (See section 3.1. below).

2.5.2 Nature of Protective Works

Details of the protective works are not shown on the drawings accompanying this Plan. In general terms they comprise —

- (a) Along the western side of the strip, a wall of inter-locking steel sheet piling arranged in cellular formation. The piling has deteriorated with age and was being reinforced with rock protection on the seaward side in 1984.
- (b) A breakwater of concrete formed on a natural rock ridge (shown in outline on sheet 4) supplemented by large precast units.
- (c) At the south end exposed to direct wave action the original protection was with concrete "tetrapods", a proprietary shaped block weighing 15 tons. When the runway was extended in 1972 the new protection was with 10T and 12T 'akmon' blocks. These have suffered wave displacement particularly towards the breakwater end, and a major reinforcement project is in hand, in order to produce a stable shape.

Behind the akmon protection is a wave trap to prevent masses of sea water reaching the road.

2.5.3 Cost factors in maintaining or extending the works

The protection facing south was installed in 1972 and in ten years or so since then the total maintenance cost has been of the order of \$1.5M.

Any extension of the runway to the south would involve complete replacement of this protection requiring capital expenditure of at least \$20M, in addition to the cost of the necessary earth fill and road realignment or tunnel. It is in the light of costs of this magnitude that proposals are made in section 7.3 below.

The remainder of these protective works — breakwater and steel sheet piling — will not need extensive regular maintenance once the present remedial work has been completed.

2.6 Aprons

Aprons currently available for aircraft are in three categories:-

1. The passenger aircraft aprons adjoining gates 8 to 23 on the eastern side of the airport: the pavements are constructed to the strength required for aircraft classification number 49.
2. Cargo aprons for SAFE Air Bristol freighters and Argosy aircraft, with pavement strength appropriate to these aircraft.
3. The western apron area is of a strength currently reported in the Aeronautical Information Publication "Planning Manual" page 2-10; at present it is below that available in the main eastern apron.

Commercial aircraft gate positions 8 to 18 lead to the domestic terminal building. From positions 8, 9 and 10 passengers pass through doors at the SW end, formerly the international area. Positions 11 to 18 are approached through the "finger" system of covered passageways. All eleven positions 8 to 18 currently have ground markings for both B737 and Friendship (F27) aircraft.

In the international area ground markings for B747SP aircraft lead to gates 19 and 22 to connect to installed airbridges. Other ground markings are for gates 20, 21 and 23 which are used occasionally but not for regular commercial flights. Gate 23 is usually available for small international aircraft.

For cargo aircraft, there is a specific position for the Argosy near the main cargo building. Bristol freighters use the SAFE Air apron at their special loading facility. DC8 aircraft are usually unloaded in the vicinity of international gate 22, and B737 cargo aircraft use one of the domestic gates 8-18.

2.7 Air and ground navigational control

2.7.1 Visual Aids

2.7.1.1 Markings

Annex 14 Section 5.2. describes the mandatory and recommended pavement markings for runways of various lengths: code No. 4 applies to runways over 1800m in length as at Wellington. The runway is marked with runway designations (34 at south end, 16 at north).

2.7.1.2 Operational Lighting

Both approaches to the runway being over deep water, normal approach lighting systems are impracticable. Guidance for descent is given by the Visual Approach Slope Indicator System (at this airport the T-Vasis system). By means of red and white lights the pilot can tell whether he is above or below the correct approach slope. The runway ends are identified by flashing white lights (R.E.I.L.).

The runway itself has high-intensity edge lights spaced at about 60M; threshold and end lights; and touchdown zone limit lights. Taxiways have centre line (green) and edge lights (blue). Apron areas are floodlit. The International gates 19 and 22 have "AGNIS" installations for bringing the aircraft to the exact stopping points for the air bridges — these are calibrated at present for B747SP and DC8-53 aircraft.

On the western side, guidance is provided by means of ground reflectors only:—

The northern taxiway has red reflectors delineating the apron;

The southern taxiway has green centre-line reflectors, and its holding position has amber reflectors.

2.7.2 Radio Navigational Aids

Technical description of these aids and their functions is contained in the relevant publications of the Ministry of Transport Civil Aviation Division. They are briefly referred to here, being components of the airport.

2.7.2.1 Instrument Landing System (ILS)

On the airport there is a Localiser at each end of the strip and Glide Path Indicators at two positions to the western side of the strip — see drawing sheet 4. This system gives guidance to aircraft for landing, down to a height of 650ft coming from the north and 500ft from the south.

2.7.2.2 Very High Frequency Omni-directional Range (VOR)

This is in the Palmer Head area, shown on sheet 4. The VOR tells a pilot his radial relative to the ground station, and whether flying away from it or towards it.

The associated Distance Measuring Equipment (DME) is adjacent to the VOR.

This tells the pilot his actual distance from the ground station.

2.7.2.3 Non-Directional Beacons (NDB)

Sheet 1 shows NDB positions at Titahi Bay, Porirua and Newlands. The more westerly positions are to assist the straight northerly approach to the airport, replacing the slightly dog-legged approach which was in force until recently and which was served by the two easterly beacons. Another beacon is at Palmer Head, see sheet 4, for the southerly approach.

These beacons give automatic direction finding towards the beacon when the pilot tunes in to the appropriate frequency.

2.7.2.4 Radar

At Hawkins Hill (sheets 1 and 2) to the west of the airport is the Surveillance Radar Station. Information from this station is transmitted to the MOT Operations Centre in Wexford Road via plate reflectors at Wright's Hill (sheet 2) and Palmer Head (sheet 4). Two reflectors are provided in case on occasions one may be masked by an aircraft passing.

2.7.3 Control Tower

The tower position is shown on sheet 4; it is unusual as being outside the airport proper, in a residential area. In this position it provides a good view of most of the aircraft areas, but there is a case for siting a tower east of and closer to the runway itself: this will be discussed in section 7.6 below. The tower is supplied by mains electricity supplemented by standby power from the Gaudin Street station alongside the western edge of the strip. Control is exercised from the tower over all flights using the runway, from the time the aircraft are in sight.

2.7.4 Operations Centre Wexford Road

Several functions of air traffic control are exercised from this centre. It controls the Domestic Flight Information Region from New Plymouth — Gisborne down to Kaikoura — Westport. Closer to the airport it exercises Approach Control until the aircraft comes into view of the tower. It incorporates a communications network known as Aeronautical Fixed Telecommunications Network (AFTN), part of a world wide system. The Civil Aviation Manager, from this centre, is in charge of all Civil Aviation Division activities in the airport, including Rescue/Fire.

2.8 Passenger Terminal Buildings

2.8.1 Domestic

The present domestic terminal building was a factory, acquired from the de Havilland Aircraft Company in 1959 for temporary (sic) use. Since then there have been many alterations to meet a wide range of changing circumstances, and also substantial additions to cope with international service, to improve baggage handling, and to provide various catering and office facilities. Sheet 5 of the drawings shows the ground floor of the building. What was previously in use for international service at the SW end of the building has now been made available for access to further domestic gate positions, for the police, for commuter airline offices and for an information section.

The first floor of the building contains airline offices, crew rooms, meteorological offices, flight planning, staff recreation areas, a VIP room, and the Wardens' room.

Pedestrian access to the International terminal consists of a gently sloping walkway — covered — starting a few metres from the domestic baggage claim area.

2.8.2 International

The existing International building is shown in ground floor plan view on sheet 5. The first floor has facilities required for departing passengers. Air bridges allow access to aircraft at gates 19 and 22 from this floor. Arriving passengers also use the air bridges and then descend by ramp to the customs and immigration hall on the ground floor. The two air bridges are of the fixed pedestal type.

2.9 Cargo Facilities

2.9.1 Aircraft

Sheet 6 of the drawings shows the general areas for cargo handling. Cargo is carried in specialised cargo aircraft, or in the holds of passenger aircraft. At the time of compiling this plan, aircraft types carrying cargo were:—

Air New Zealand

DC8-53 Cargo version. Carries 30T and takes standard cargo pallet 88/125 base units.

B737-QC when fully converted for cargo carrying. Holds 14T. Some types of container can be used.

B737 passenger aircraft. Can take 2T of cargo.

Friendship (F27) passenger aircraft. Takes 0.8T of cargo.

Qantas

B747SP. Passenger aircraft with cargo space up to 16T.

SAFE Air

Argosy — Normal use as all-cargo aircraft. Capacity 8T.

Bristol Freighter (B170). Normal use is purely freight, takes 5.5T.

“Commuter” airlines also have some cargo capacity and traffic.

There are currently four areas for handling these aircraft.

- DC8 and B747SP — these stand at the international gate positions.
- B737 (cargo or passenger) and F27 use any of the domestic gates 8 to 18. Commuter airlines use gates 8 to 10.
- Argosy. The special apron position for this aircraft is shown on sheet 6.
- B170. Sheet 6 shows the special equipment with two aircraft stands.

The airline Air N.Z. arranges (on behalf of the Airport Authority), for control of these operations including the movement of trolley trains between aircraft and sheds.

2.9.2 The Cargo Process

All cargo from aircraft passing through the hands of Air NZ uses cargo sheds shown on sheet 6. The freight building (no. 7) immediately to the south of the domestic passenger building is owned by the airline and is used for inward (arriving) domestic cargo. The cargo is only briefly held here and is delivered to its destination by Air NZ. All outward (departing) cargo, both international and domestic, makes use of the large shed (no. 16) which is owned by Air NZ and lies at the northern end of the main cargo terminal buildings, to the south of SAFE AIR's installation. Cargo despatched by domestic flights arrives, and is loaded, usually the same evening; international cargo may take longer.

Next to this outward cargo building is the shed owned by the Airport Authority leased to Air NZ (no. 17). This is used for incoming (arriving) international cargo,

including goods from Auckland which are still in bond after transit from overseas.

Adjoining to the south are the cargo offices of Air NZ and above them Customs offices and other office accommodation.

At the southern end of the terminal buildings is a building (no. 20) leased to the freight forwarders, the agents who handle most of the international cargo between customer and airline — Air NZ take a small proportion direct. These freight forwarders are able to work closely with the airline in loading containers for carting to aircraft. The mechanical loading devices and vehicles belong to the airline.

Other freight forwarders are off-airport in the neighbourhood of Tirangi Road, and space is also to be made available for this purpose in the former UEB building between Tirangi Road and the western apron (see sheet 7).

It can be seen that some of the freight does not need further movement by road vehicle once it reaches the forwarding agent, whereas those firms off-airport or in the western apron area must take it by road to the cargo terminal. In some cases these off-airport firms may be equipped to load standard containers on their own transport but at present this is rare.

2.9.3 Safe Air Installation

SAFE AIR's specialised operation for loading two Bristol Freighter aircraft was developed to cater for rail-air freight across Cook Strait before the advent of the rail ferries, but it has continued ever since though on more general operations including mail and car ferrying.

The system consists of two sets of parallel rails on which a traversing table moves. The traverser can halt opposite the bays of the freight shed, opposite the doors of the B170 loading nose, or opposite road transport. The height and inclination of the traverser are adjustable. The mechanism extracts the load (which is carried on a "cargon" carrier designed for this site) from the aircraft, shed or road transport, or loads it onto one of these positions.

The system was originated by New Zealand Railways and was able to cater for intense traffic during the early period of its use. At present only one of the two traversers has been retained. Fork lift trucks supplement the operation of the traverser using small container cages.

2.9.4 Chiller Facilities

Situated between the two hangars at the western apron is a chiller-freezer store. This is available for any customers whether involved in air freight or otherwise, and is a private venture on airport land. It has approval as an export installation for the international meat trade. However, it is not really suited to the type of trade which could be offering to a greater extent, such as horticultural products.

Air NZ have a small volume of chiller facility in the cargo buildings.

2.10 Rescue/Fire Station

There are three major appliances, one rapid intervention vehicle (RIV) and a small four-wheeled drive vehicle at this establishment at the present time — but the exact composition of the vehicle fleet at any time depends on the policy of replacement types.

The criterion is to produce the amount of extinguishing agent to satisfy the airport category which is 7. The principal extinguishing agent is "Aqueous Film Forming Foam", the quantity of water required being 12,100 litres. The amount of dry complementary agent is 225 kg. Additional water is available from a number of hydrants along the western side of the strip, and a few on the eastern side. It is proposed to increase the number on the eastern side to balance. Marine rescue

facilities consist of one 9m jet rescue craft with life rafts to hold 450 people; and two inflatable zodiac dinghies with life rafts for 300. The boats are launched in Evans Bay (at the local yacht club marina); or at Taraki Bay (south east of the airport), where there is a ramp for this purpose.

The rescue/fire station observation cab provides a view of nearly all the aircraft movement areas, the exception being positions immediately south of and close to the finger system. A fire training area is shown on sheet 4 of the drawings.

2.11 Ground Transport

2.11.1 Traffic Routes External and Internal

2.11.1.1 External

Sheet 2 of the drawings shows the road system in Wellington generally. There are many routes to the airport depending on the starting points. One route from the Railway Station to the airport marked on the drawing is that taken by the Airport Bus. The quickest route can depend on the traffic situation and sometimes the longer route around the harbour edge by Oriental and Evans Bays can be better. The Wellington Motorway from the north and from the Hutt Valley at present ends at Ghuznee Street. Plans exist for an arterial, grade separated route from Ghuznee Street to the Mount Victoria Tunnel, whence the quickest route is via Ruahine Street, Wellington Road and Cobham Drive. Traffic for the cargo area approaches via the south end of the runway. General public access from this direction will be discussed in section 7.5 of this Plan.

The Western apron can be approached by any of the streets in the adjoining suburbs.

2.11.1.2 Internal

Sheets 5 and 6 show the internal road system. The road from the south end of the runway through to the Terminal Building intersects the taxiway to the Air NZ hangar. Although this road is not intended, at present, for public use, there is an obligation to allow foot traffic from the houses at Moa Point through to Broadway. The conflict of aircraft and road traffic should be resolved and future proposals are discussed in Section 7.5.

2.11.2 Car Parks

See sheets 5 and 6. The requirements are for the public — long and short term — and for cars owned by Airport employees. Public short term parking is provided for international traffic, adjoining that terminal. All other public parking is east of the existing Domestic terminal building together with rental cars and taxi holding areas. The final layout to be associated with a future single terminal building is discussed in Section 7.5.

2.12 General Aviation

General Aviation in this sense includes aero club activity, flying instruction, aircraft for company executives, air taxis and charter flights, and helicopters. Mostly this activity is carried out from the western apron area, but overseas aircraft are usually handled at gate 23 at the International building, and sometimes corporate aircraft are taken to the area south of the Domestic terminal.

In addition, the Ministry of Transport (Civil Aviation Division) are users of the western apron with their Calibration Flight of F27 and smaller aircraft based at Paraparaumu. Military aircraft also frequently use this apron but there are current negotiations to accommodate these in the main terminal area.

The western apron is shown on Sheet 7. Refuelling is by private arrangement with one or other of the oil companies. Commuter airlines use the terminal facilities on the

eastern side of the Airport.

2.13 Weather Factors

2.13.1 Meteorological Services

The Met office is on the first floor of the Domestic terminal building, adjacent to the flight planning and briefing room. The office is manned 24 hours a day and puts out hourly reports. These go to the Operations Centre, Wexford Road, for distribution through the AFTN.

In addition to putting out hourly reports the Met Office briefs airline pilots before flights. It also answers queries as they arrive from other sources such as military and aero club flyers, from as far away as Wanganui and Picton.

Three anemometers are placed in suitable positions around the airport: these give continuous readings on dials in the office and are also recorded in chart form. Readings are simultaneously recorded from an instrument on Mt. Kau Kau.

From the office a three-way telephone links the Control Tower and the Operations Centre.

For best performance the Met Office should be in a position for seeing both ways along the runway, and this has been arranged in the design of the proposed new terminal building.

2.13.2 Wellington Airport: Serviceability in Adverse Weather

Aspects of weather conditions affecting aircraft are low cloud and/or poor visibility: wind intensity: and cross winds.

The decision to use the runway rests with the aircraft operators — unless it is closed for reasons other than weather. The criteria used cannot therefore be stated here in absolute quantitative terms, applicable in all cases.

Met information described below is based on hourly observations right round the clock.

Section 2.7.2.1 above describes the height limitations for which the I.L.S. System is effective. Met records show that cloud below 700ft and/or visibility below 2000m occurs in about 3.7% of the hourly readings for southerly winds, and below 0.5% for northerlies. Frequency of southerly winds in general is about 60% of that of northerlies.

Due to the constantly moving nature of clouds the effect of this adverse cloud condition is usually of quite short duration.

Wind intensity does not prevent landings and take-offs as a rule, but at winds over 60 knots (which can be expected on about 12 days in the year), passenger aircraft movements can be called off because of the difficulty with handling passengers and equipment in the open at the aprons. Fully protected arrangements such as airbridges can obviate this difficulty.

A cross wind component of 25 knots is regarded as a limit for Friendship aircraft, and this occurs in about 0.04% of the hourly readings. For the larger B737 the limit is 33 knots. 30 knots is reached in about 0.013% of readings and closure on this account for larger aircraft is almost unknown.

Flight delays or cancellations at Wellington are less frequent than at the other two International airports, but because of the route structure, in which Wellington is at the hub, the effects of any such occurrences are more widely felt.

2.14 Aircraft Maintenance and Servicing

2.14.1 Hangar and Apron

Air New Zealand has facilities at its hangar (see sheet 6) for all but the largest aircraft under cover, and even the B747 can be partly protected from the weather. Access to the hangar and apron, which at present crosses a road used by the public, is discussed in section 7.5 below. The hangar floor area is 3400m².

2.14.2 Cabin Services

In the Domestic Terminal Building a small area is used for cabin service for domestic flights. For international traffic Air NZ supply cabin service from their building shown on sheet 6.

2.14.3 Hangars in the Western apron area

Hangar adjoining Lyall Bay Parade. This is owned by the Airport Authority. It was moved bodily from a position east of the present runway during the original construction. Its floor area is 1300m² and its present use is on lease to an industrial firm. The condition of the building would need careful investigation before deciding on any long term use.

The hangar (now owned by the Authority) adjoining George Bolt Street was also transported bodily during the original construction. It is used by the RNZAF as a terminal building and by a private helicopter firm. The floor area is about 1000m². The building is in a sound condition.

Wellington Aero Club hangar is owned by the club on leased land, its area is 800m². It is mainly in use for club purposes but a portion is temporarily sub-let for industrial use.

2.15 Airport Administration

2.15.1 Airport Administration and Maintenance

The Joint-Venture Agreement (further described in 3.1) delegates to the Wellington City Council the day to day management of the airport.

The Council as the Airport Authority has power under the Airport Authorities Act 1966 to 'establish, maintain, operate and manage' the airport. For this purpose the Council appoints the Airport Manager, who has a small administration staff accommodated in the Domestic Terminal Building.

Subject to prior approval of the Secretary for Transport, the Airport Authority can lease airport land 'for any purpose that will not interfere with the safe and efficient operation of the airport'. Such leases may be terminated at any time if the property is required for airport purposes (Airport Authorities Act 1966).

All airport maintenance is the responsibility of the WCC. Minor maintenance of buildings is done by the Manager's own employees, with major items, and reconstruction or improvement, being undertaken by the WCC Works Department, — and in some instances (e.g. sea defences) by the MWD acting as agents for the joint partners.

The Airport Manager is the Authority's link with the public on all matters concerned with the running of the Airport, except for passenger and cargo processing for which the airlines are responsible.

The Airport Manager has a staff of 24 wardens for controlling vehicle movement and parking, their office being on the first floor of the Domestic Terminal building next to the VIP room.

2.15.2 Airport Employment

The total number of persons directly employed at the airport in all fields is (at present) around 1000. This includes Airport Authority, airlines, Ministry of Transport, catering and other concessions, Police, Customs, aviation related industries, freight forwarders, oil companies etc.

2.16 Fuel Supply for Aircraft

The major source for jet fuel starts at the Burnham Wharf (see Sheet 2) whence it is piped to storage tanks off Portsmouth St. Pipes carry the fuel to the storage and distribution compound at the airport, shown on Sheets 4 and 5.

Hydrants are provided at convenient positions at the passenger aircraft loading gates 8 to 23.

The Safe Air cargo loading positions are supplied with petrol (AVGAS) from an installed tank shown on Sheet 6 whence it is piped to both sides of the special loading facility. The Argosy stand is supplied by tanker.

Aircraft in the western apron area are refuelled there using tankers under arrangement with one or other of the oil companies.

Extensions to new aircraft stands or re-arrangement of existing hydrants to cope with revised aircraft spacing are a practical proposition for the future. Hydrant refuelling is preferred to tanker where practicable.

2.17 Standby Electric Power

2.17.1 Gaudin Street Power Station

This station provides standby power — at about a ten-seconds break — to the Control Tower and the operational lighting system (see Section 2.7.1.2).

2.17.2 Wexford Road Operations Centre

This Centre has its own standby power from a set within the complex.

2.17.3 International Terminal Building

Standby power for the building is provided by the Airport Authority from a set adjacent to the eastern end of the building. This set also provides power for the Rescue-Fire Station, and for flood-lighting the International aprons.

2.17.4 Domestic Terminal Building

A standby set at the NW corner of this building, provided by the Authority, is capable of supplying a proportion of the facilities within the building.

2.17.5 Navigational Aids

Navigational aids such as NDBs, VOR and Radar Station are supplied with standby power individually at the various sites.

2.18 Below Ground Construction

2.18.1 Underpass

Sheets 4 and 7 show the position of a pedestrian underpass. This is 4.5 x 2.25m in cross section. Normal use is confined to cyclists and pedestrians, but the end barriers can be removed to permit maintenance and emergency traffic. The underpass roof construction will carry the loadings from the largest aircraft visiting the airport to date, fuelled for the Trans-Tasman crossing.

2.18.2 Stormwater

The system of draining stormwater from the aircraft movement areas consists of slotted surface drains running along the edges of most of the pavements, also from grated gullies in grassed areas. Thence the flow is to a system of pipes leading to outfalls in Lyall Bay, Evans Bay and at Moa Point. The main outfall at Lyall Bay can be seen on Sheet 4, it comprises three 1.4m dia. pipes side by side.

2.18.3 Wellington Main Sewer

The main sewer consisting of twin 1.2m internal size culverts enters the strip in the western apron area and is crossed by the apron taxiway. After running southward along the edge of the strip this sewer crosses the runway near the southern threshold. The W.C.C. Drainage Division have proposals to add a further culvert to the existing two.

2.18.4 Ducts

The aircraft pavement lighting is served by a system of ducts, not shown in detail on the plans.

2.19 Security

2.19.1 Scope

The general term "security" is used here to include:-

- a) Physical barriers between buildings and around the airport perimeter to prevent unauthorised access to areas which may be used by aircraft (i.e. the "air side").
- b) Arrangements inside buildings bordering the airside, to prevent unauthorised access through the buildings.
- c) Arrangements inside the passenger terminal buildings to apply controls on embarking passengers.
- d) A system of policing by foot and mobile patrols, to exercise control over unauthorised access, and to give rapid response to security related incidents.

2.19.2 Fences and Gates

Whereas the ultimate aim is to satisfy all these requirements the present situation (1983) leaves gaps in category (a).

At the time of compiling this Plan the Airport Manager is arranging an automatic gate at George Bolt Street controlled by radio signals. Authorised individuals will carry radios which can signal the gate to open or close, and the code number involved will periodically be changed. If this is successful a similar arrangement will be provided at the Aero Club entrance off Coutts Street, and anywhere else as required. There are still two wide openings in the air side security fence — alongside the Air N.Z. cargo building, and across the taxiway to the Air N.Z. hangar. These openings are not attended by security police as a permanent watch and are a major security hazard.

2.19.3 Security Staff

There are three categories:-

- i) 12 regular police, their office and lock-up being near the SW corner of the domestic terminal building.
- ii) 15 Aviation Security Service, responsible for checking baggage on international flights, and for general security on the air side. Their base is in the finger system.
- iii) 24 Wardens under the Airport Authority. These are employed on traffic and car park duties and on general prevention of unauthorised entry. Their base is on the first floor of the domestic terminal building next to the VIP room.

The allocation of duties to these security bodies is still under discussion on a national basis and no firm policy has yet emerged.

2.19.4 Security in Buildings Adjoining the Air Side

The terms of lease of buildings adjoining the air side include provisions to enforce security. This is effected by any suitable means such as security locks and also by rigorous insistence on all employees being clearly identified in order that unauthorised intruders can be readily spotted. In a building such as a cargo shed it is necessary to have a through way, but those working in the building must be relied on to stop anyone not authorised from going through the building.

2.20 General Comments on Working Layout

2.20.1 Origins

The airport layout is mainly the result of plans made in 1956 by the American Consultant Melvin B Borgeson. One of the main departures from his plan was the placing of the Control Tower off Tirangi Road instead of in front of the terminal building. Also he proposed development into the golf course which has only eventuated to a small degree. There was little provision for cargo expansion in those plans, and the placing of the airline hangar where it is now has serious disadvantages which will be apparent in later sections of this Plan — it hampers the development of cargo areas and it conflicts with road circulation.

Sections 6 and 7 below will examine the forecast demands for facilities as seen today and the proposals to meet these demands. Section 9 will examine the possible programming of such proposals, and will list the further investigations recommended in order to throw light on the predicted requirements.

In this section are brief comments on the present layout.

2.20.2 Airport Utilisation

The forecasts made in 1955 of airport closures have proved to be pessimistic and the present situation is satisfactory by generally accepted standards. Wellington is spared the low visibility resulting from industrial installations which plagues many airports. The runway orientation is the best compromise that could have been obtained in an endeavour to minimise the effects of cross winds and of difficult terrain.

2.20.3 Movement Areas for aircraft

Although high speed exit taxiways from the runway are not provided the multiplicity of turn-offs reduces runway occupancy to an acceptable extent.

All aircraft stands are readily accessible except for gate 23 which is hampered for large aircraft by the presence of various installations along the edge or the entrance road. This disadvantage is discussed in section 7.2 below.

Access to the Air N.Z. Hangar intersects a semi-public road, this is a serious security handicap — see section 6.6 below for proposals to remedy this situation.

Cargo aircraft larger than the Argosy have to use passenger aircraft stands at present, with some consequent inefficiency in cargo handling.

Access to the western apron is adequate but visibility from the Control Tower is hindered by intervening obstacles.

2.20.4 Passenger Terminal Buildings

The present "temporary" domestic terminal building has been remarkably satisfactory for many years. Walking distances to aircraft are short. Congestion does

occur when queues to check in counters lie across the path of passengers arriving from aircraft, and also during periods of flight delays. Baggage collection is now adequate. Kerb space for cars of arriving and departing passengers is very restricted and inconvenient.

The nearby International Building is of a size adequate for the handling of passengers in Code E size aircraft one at a time; there would be considerable delays with two on the tarmac at once. The infrequency of flights at the time of writing this Plan necessarily results in periods of under-utilisation.

Measures to counter the over-crowding of the domestic building and the under-utilisation of the other are contained in proposals for a new building integrating some of the functions of each. These proposals are not discussed in detail in this Plan but sections 6.4 and 7.1 below examine the questions of overall size and forecast traffic.

2.20.5 Car Parks and Traffic Circulation

The public domestic car park is barely adequate for present needs. The international section is seldom fully used. The staff car park opposite the domestic terminal building also has some spare space. Cargo vehicle areas on the land side of the cargo terminal are not adequate for the efficient movement of vehicles.

2.20.6 Western Apron

In the original Borgeson plan it was expected that this area would be a "tremendous asset". As yet this hope has not been fully realised. The apron itself is not fully used and aviation industries have not really developed as much as was then expected. However the potential remains for further development and is discussed in section 6.8 below.

2.20.7 Hangars

The present Air N.Z. hangar was sited behind a hill in order to avoid wind and salt spray. It is a sound building and in regular use but access is a handicap particularly to air side perimeter security.

Hangars on the western side of the airport are not fully in use for aviation purposes at present.

2.20.8 Cargo

The cargo operation has evolved from various beginnings and the facilities provided are of a heterogeneous nature as described in section 2.9 above. All-cargo aircraft should be able to unload close to the sheds they serve, and cargo traffic should not involve long hauls by trolley trains. The facilities for freight forwarders are also inadequate in some respects — the on-airport accommodation is below acceptable standards for employees' welfare, and the operations are exposed to severe weather conditions with consequent loss of efficiency and risk to cargo.

The space available for vehicle movement is generally too small.

2.20.9 Airport Access

The airport bus takes about ten minutes to reach Courtenay Place which is the start of the busy city area: quicker access than this can hardly be expected in any moderate sized city. Access to the cargo area is adequate from the south and west.

2.20.10 Other Facilities

Rental cars are readily available and two firms at present have sites within the airport itself.

The proximity of the city reduces the demand for airport-related accommodation such as motels and hotels, and this also applies to some extent to shopping facilities although there is a small requirement which is met from within the terminal building itself.

3. OWNERSHIP OF AIRPORT, OPERATION AND TOWN PLANNING ASPECTS

3.1 Joint Venture Agreement

In common with many New Zealand airports, Wellington Airport is administered under a 'Joint-Venture' Agreement between the Crown and Wellington City Council. Under the terms of the agreement all costs, both capital and operating, and all revenue are shared on the basis of two thirds to the Crown and one third to the Council. The agreement between the partners was finalised in 1967 but deemed to be in force from 20 July 1959 when the airport was actually completed.

In addition to the agreement the Airport Authority is bound by the provisions of the Airport Authorities Act 1966.

The general administration and financial procedures are further explained in 'Joint Venture Airports Principles and Procedures' which was published by the Civil Aviation Administration in 1961 in collaboration with the representatives of the Local Authorities. The publication contains guide-lines which are recommended for airport authorities to follow.

'Airways Facilities' are defined in the Joint Venture agreement and include all those services provided wholly by the Crown (air traffic control, rescue/fire, aviation security, Meteorological Services, aeronautical communications, navigational aids etc.) for the safe and efficient operation of aircraft. All costs of providing airways facilities are met by the Crown and are recovered by way of airways dues. For the airport works which are shared between Crown and Council, either party can carry out the actual work but the cost is shared. The Ministry of Works and Development is the main agent for MOT works. For example, in the original construction the MOW (as it was then) carried out the earthworks, paving and sea protection works. The City constructed drainage and roads. Maintenance of airport works is the responsibility of the Wellington City Council. The Agreement refers particularly to the sea protection as an airport responsibility whether inside the formal airport boundary or not, (see 2.5 above).

Another aspect is noise. In the Agreement the Council is to take reasonable precautions to minimise noise from ground operations, including aircraft maintenance and engine testing. The Crown has to take precautions "as may be practicable" to ensure that noise from flying is minimised.

Engine testing is also a noise problem, see section 8.2 below.

The Airport manager is an employee of, and appointed by, the Council, while airways facilities under the MOT are the responsibility of their Civil Aviation Manager. The Council manages the accounts of the airport. The Council is also responsible for maintaining the approach clearances into the airport including the enforcing of building height restrictions.

3.2 Land Ownership

The land on which the airport was constructed was owned by the Council. Under the Agreement, land acquired or reclaimed, and/or made available for airport purposes by Crown or Council is, or will be, vested in the Council. The Council provides land required for airways facilities, and if no longer so required it reverts to the Council for general airport purposes. Ownership of buildings remains with whichever party built them as sole cost, but otherwise the ownership is in the 2/3:1/3 proportion. Land for airways facilities is provided without ground rent, but for other government purposes rent is charged and forms part of the joint venture income.

3.3. Relationship with District Town Planning Scheme

Drawing Sheet 4 shows various boundaries, among them "Land Designated for Airport Purposes". This land designation does not coincide exactly with land actually owned by the Council or Crown and there are a few small areas where decisions need

to be taken in due course. There is one major area, the Golf Course, which is designated as required for airport: the use of this land will be discussed in the section on future planning below, item 7.5.

Another area designated for Airport is south east of the airport proper and contains several navigational aids. The actual terrain was being reserved as a possible source of fill for extensions to the runway: this aspect will be discussed below, section 7.3.

The MOT Operations Centre is on Crown-owned land designated in the Scheme as being for "Depot and Workshops" purposes. Its actual use is partly as a control centre for this airport and partly for more distant parts of the country. The designation appears to need amending.

3.4 Tenancy Agreements and Use of Land

Within the boundaries of land designated for airport purposes, which will ultimately become, or has already become, airport property, it should be a matter of policy to admit users of such land for uses associated with aviation. For example, the aero club leases an area from the Authority, on which the club has its own hangar. Use of such a hangar should be stipulated in the tenancy agreement as being allowed only for aircraft or for aviation related purposes, unless specific exemption is given by the Airport Authority.

4. LAND USE ADJACENT TO THE AIRPORT

4.1 Height Restrictions

Sheet 3 of the drawings shows the aircraft flight path and other areas for which height restrictions are required. The Ministry of Transport, Civil Aviation Division (CAD), lays down the criteria required for such clearances, and the City Council is required to enforce restrictions (see section 3.1 above).

These conditions are described in the District Scheme and will not be detailed here. Appendix H of the Scheme, 1979, does not at present correspond in all respects with the details shown on sheet 3, but the latter is the result of more recent information from CAD consequent on the changing of the flight path from the north from being a dog-legged approach to a straight run in.

As a general rule no infringements of the height restrictions within the actual flight path can be allowed. Outside this path, while there are restrictions, some penetration of the surfaces defined is inevitable and the conditions governing such departures from the rules are described in the Scheme.

4.2 Visibility from the Control Tower

The peculiar situation resulting from the siting of the tower away from the airport in a built-up area leads to the need to ensure unobstructed visibility from the tower cab to various areas; these are:-

- (a) The whole of the runway and runway strip; the main taxi-way and taxiway strip; and the stub taxiways leading from runway to main taxiway.
- (b) The flight path fans off the ends of the runway.
- (c) The sea area in Evans Bay where a tall-masted ship could obstruct the operational height clearances.
- (d) Other operational areas adjacent to the manoeuvring areas described in (a) above which are currently in view from the tower cab.

The District Scheme will incorporate provisions to ensure that these requirements are met.

4.3 Land uses immediately adjoining the airport

Those areas immediately next to the airport are, taken clockwise starting at Lyall Bay:-

1. Lyall Bay to Coutts Street, industrial (largely associated with aviation) except for the houses fronting Coutts Street itself. The area is well suited to aviation having its own apron and taxiway, but at this stage it is not proposed to be specific in forecasting the use of each particular portion.
2. Coutts Street to Cairns Street. Mainly residential. The presence of a standby power station and over it the ILS facility is a breach in residential use but quite conveniently placed, at present. Any widening of the graded area could affect these two installations, see Section 2.3.4 above.
3. Cairns Street to Cobham Drive — industrial. The small portion between Cairns and Batten Streets would be affected by a widened graded portion of the strip.
4. Cobham Drive to Wexford Road — public road, with harbour along most of the length, but the MOT Operations Centre at one end.
5. Wexford Road to Broadway — Residential.
6. Broadway to just beyond the Air New Zealand Hangar — golf course. If it is found that the golf course can remain, this is a suitable use for land adjoining the airport. See Section 7.5 below.

4.4 Sewer Outfall

At present Wellington's main sewer discharges into the sea at Moa Point and doubts have been raised as to whether this encourages the presence of sea birds and is a consequent hazard to aircraft. Analysis of bird incidents shows that Wellington has more than other airports, but taking into account the frequency of aircraft flights the severity is less in comparison than might appear.

Furthermore the records show that there is little difference between approaches from north and south in this respect, which indicates that the sewer discharge is not a major factor.

A comprehensive report has been prepared for the Wellington City Council (by Beca Carter-Caldwell Cornell, January 1980) setting out the options for sewage treatment and disposal in lieu of the existing raw sewage discharge at Moa Point. That report, in describing the proposals, recommended that certain precautions should be taken in the design to minimise attraction of sea birds to the outfall area.

The Council is proceeding with the detailed design of the first phase of the treatment/disposal system with initial improvements anticipated in 1988.

5. SOCIO-ECONOMIC FACTORS

The factors being considered here concern population trends, economic trends, and the patterns of travel.

A study was made in 1972 by the Regional Planning Authority in the form of a submission to the "Committee of Inquiry into a Second Airport for the Wellington Area". This study examined, among other issues, the probable growth pattern of population in the region, and of employment. The investigations were made into several possible patterns of development, but the general conclusion reached was that "with the passing of time the major (population and employment) growth in the future will be towards the north. This will increase the distance between the existing airport and future population and economic activity centres". This referred to the year 2020 but expected that the process would start much earlier. This conclusion contributed to the recommendation for a second airport. Also discussed were the patterns of air travel. Although it was thought that there would be a general growth of population northwards, the statistics gathered did not point clearly either to the existing or future pattern of travel to and from the airport. It was found that 59% of passengers were non-residents of the Region. Of these non-residents, 57% were travelling on business. These proportions were much the same for residents. What is needed in order to assess the pattern of travel to and from the airport is a survey by questioning travellers. Failing such a survey it seems reasonable to assume that in spite of a likely long-term shift of population northwards in the Region, the preponderance of non-resident passengers, and of business passengers, makes it likely that travel to the airport will not correspond closely to such movement in population. In fact, the Motorway improvements currently in progress will actually improve some travelling times.

Therefore, it is assumed that the next 25 years will not show an adverse change in travel time to the airport, for the majority of passengers. We can, therefore, look at the airport from the point of view of any likely limit to the number of passengers and amount of cargo that can be carried — having regard to the single runway capacity and any other limitations of the site — rather than to any diminishing use due to the factors discussed above.

The trends in passenger traffic are shown in Graph I section 6 below. It can be seen that the general adverse economic situation in New Zealand 1979-1983 resulted in a fall in passenger traffic over those years. Further predictions are mainly guesswork, but it is reasonable to allow for some growth in planning such a facility as an airport, to avoid being caught out with insufficient capacity. In planning the facilities shown in section 7 below, growth rates of 4.5% and 9% are forecast by the NZ Institute of Economic Research as upper and lower limits, and these have been adopted as passenger traffic figures in this Plan for the next 25 years. Recently there have been accelerated growth rates but these have not affected the particular hours of the day which normally take the most intense traffic. Predictions of future traffic from overseas and within New Zealand are currently being undertaken in connection with a Master Plan for Auckland Airport, and the results should be evaluated in due course to gauge the effect in Wellington.

As regards population growth, it is safe to assume on current trends that there will be no drastic changes in the distribution of population within the region served by the airport.

6. FORECAST DEMANDS, AND CAPACITY REQUIREMENTS

6.1 Types of Demand

The demand for Airport facilities occurs in several areas:-
Runway length.
Aircraft movements (landings and take-offs), by types.
Passenger numbers and space required in terminal buildings.
Aircraft gate positions.
Cargo.
Roads and Car Parks.
Airways facilities.

6.2 Runway and Strip Dimensions

6.2.1 Runway

The caveat on pronouncements noted in Section 2.1 above should not be forgotten, nevertheless some pronouncements are inevitable. Nobody in 1950 would have predicted such a large aircraft as the B747SP using a runway of only 1935m length. Site limitations at Wellington and the existence of runways of about 3300m at the two other International Airports make it likely that the length at Wellington need never be greater than will allow the largest aircraft to fly to Melbourne.

The basis for suggesting this proposed limitation is the fact that travellers from Wellington to Australia must inevitably be strongly in favour of direct flights on the grounds of economy and because flights via Auckland or Christchurch not only add on the times of the journey to those places, but also the additional reporting times there and time lost in connecting flights. On the other hand, long distance travellers would find that the additional time caused by this further travel would not be such a significant proportion of the total journey. Furthermore, in many cases long distance travellers from Wellington can fly direct to Australia and start the major sectors from there, although Airline pricing arrangements often work against this convenient practice.

A case is often made against New Zealand having three international airports on the grounds that it has a small population. This is a fallacious argument which ignores the geographical facts. Wellington should rather be regarded as a regional airport, the nearest airports of Australia being part of the region.

While the runway length is likely to remain adequate for the essential purposes served by Wellington Airport, the adequacy of pavement strength must be reviewed at intervals in light of the volume of traffic and aircraft type in use. Note that the all-up weight of aircraft is less pertinent than the frequency of passage of particular individual wheel loadings.

6.2.2 End Safety Areas

In section 2.3.5 above, the present limitations of end safety areas and displaced thresholds are described. The B747SP aircraft is able to cope with these factors, and also other aircraft likely to use Wellington for the Tasman service.

In considering the safety beyond the strip ends, the discussions held at ICAO Montreal in 1974 to evolve the present Annex 14 standard in this respect clearly showed a preference for greater end safety areas if at all possible — up to 300m was preferred by some countries, and the lower figure of 90m as a minimum was only settled on as a concession to economy in costs.

The runway at Wellington, at both ends, presents features which would be a severe hazard in the event of overshooting or undershooting the runway — hazards which could be reduced.

At the southern end, starting at the paved runway end and moving south, there is a

61m length of level strip, then a severe dip at the sunken road. Beyond this is a wave trap, and then the concrete blocks forming sea protection. The wave trap and sea protection are inevitable features which cannot be altered if the embankment is to remain intact. The road hazard could be removed by including a length (90m) in a tunnel; this would only extend the safety area by some 40m beyond the strip, but would improve the safety aspect.

At the northern end there is again a 61m length of level strip, then a major drop in height down to Cobham Drive and the harbour. The requirements of an end safety area include a steepest permissible slope of 5% longitudinally, with changes in slope not to be abrupt. With the present shape the runway end safety area can only end where the ground starts to fall away steeply. To improve the safety aspect it would be possible to place the present roads in tunnels, and to slope the overlying embankment down towards the water's edge. The tunnels would only need to be long enough to provide a 90m width of end safety area overhead.

The embankment longitudinal slope to give clearance above such tunnels would be within the 5% safety limit allowed; beyond and into the sea it could be steeper but in order to avoid an abrupt change a small reclamation into the harbour would be necessary.

The length of end safety area which would be added in such an arrangement would be around 100m. Detailed designs of this nature have not yet been carried out: the amount of reclamation would be determined by the geometry of the tunnel cross section and the necessary depths of fill above.

6.2.3 Dimensions of strip

The length of strip is automatically fixed under Annex 14 at 60m beyond the paved runway at each end. The width of 150m at present available restricts the decision height minima (see 2.3.3 above). For a 300m strip width, cloud altitudes of 300ft in a southerly approach and 450ft for a northerly one could be considered. This would require removal of buildings and terrain in the vicinity of the Control Tower in Tirangi Road, and of the Operations Centre in Wexford Road and Caledonia Street. The present Rescue/Fire Station would also infringe the side clearances. Correction of all these side clearances infringements, including the re-establishment of buildings and communications would cost many million dollars.

In addition it would be necessary to provide centre-line runway lighting, and possibly some approach lighting (despite the comment, in 2.7.1.2 above, that normal approach lighting is impracticable). If the cost of diversions for cloud heights below the present 500 and 650ft minima became significant, and a class I category desirable, then a more detailed examination of all the costs involved would be necessary. Grading of the strip was mentioned in 2.3.4, and also the main taxiway separation from the runway in 2.4, as falling short of the Annex 14 recommendations, but as these are not mandatory provisions it would no doubt be agreed to leave matters as they are, as this correction would involve further millions in house removal along Calabar Road, earthworks, extending the sea protection, and realigning roads.

6.3 Aircraft Movements

The fact that there is a single runway, with no possibility of duplication, limits the intensity of landings and take-offs. It seems to be recognised that about 42 movements an hour is the limit for a single runway according to a paper at the Fifth World Airports Conference given by Sir Peter Masefield. This figure can be increased somewhat when the proportion of large jet aircraft causing wake turbulence is lower.

The current (April 1984) timetable show 19 commercial flights scheduled in the busiest hour, 1640 to 1740, the mix being five B737s, eight Friendships and six commuter aircraft. In the next 25 years this hourly figure would grow to 43 (adopting a growth rate of 4½%). This would thus be within the runway capacity. At a growth of 9% it would reach 50 in 6 years, probably nearing the limit. Further

See Main Sheet 4
+ Probable area

22m
940m
54m
N
S. 22m
3

growth would require rescheduling of flights, and there would be little room for General Aviation during the busy hours which at present are as above, 1740 to 1740, and also in the morning — 0835 to 0935.

With the probable introduction of large aircraft on domestic routes, the problem of runway occupancy will be eased somewhat because fewer aircraft will be needed to carry the same number of passengers. This would serve to delay the saturation in busy hours, for a few more years.

The runway ultimate capacity is an exercise that needs to be undertaken having regard to the aircraft mix and to air traffic procedures.

6.4 Passenger Numbers and Space Required

In this section the relationship between passenger numbers and space required is explored. The detailed sizes of the various rooms and facilities are not discussed, but the overall size of the building is estimated in order to verify (in section 7.1) that the space chosen results in room for expansion, to the limit needed to match full runway utilisation.

There is guidance in the US Federal Aviation Administration's Advisory Circular of 1976 giving a rule of thumb for gross terminal building size of $14m^2$ per design-hour passenger. The present domestic terminal building has a gross area of $7200m^2$. The peak passenger occupancy discernible from April 1984 timetables assuming passenger aircraft are on time and fully laden is 720. This would thus correspond with a figure of only $10m^2$ per passenger. The building is functioning adequately, but only just, and it seems reasonable to take $10m^2$ per passenger as a minimum planning figure under New Zealand conditions even though it is considerably below the FAA figure (some consultants abroad have even used figures as high as $25m^2$).

At $4\frac{1}{2}\%$ growth this figure of 720 would increase in 16 years to 1,500. But we should also allow for, say, two plane loads of international passengers at 250 per aircraft, making 2,000 passengers in total; space required — $20,000m^2$.

The arriving international passengers would require space for security, police, immigration and inward baggage, and for reasons given in Section 7.1 below it is proposed to use a figure of $2,000m^2$ to allow for this factor; giving a total area of $22,000m^2$.

At 9% growth these figures would be reached in 8 years.

Graph I shows the annual traffic since 1960, and for comparison the forecast made which accompanied the Borgeson report. In contrast with the cargo figures on graph II the forecasts for passenger traffic were well below what has eventuated.

6.5 Aircraft Gate Positions Required

Masfield's paper quoted above predicted that the single runway London airports would each need 24 gates — all provided with airbridges, and the U.S. Federal Aviation Administration figures are similar. The aircraft "mix" at Wellington will be different. At present in the peak hours the aircraft are:

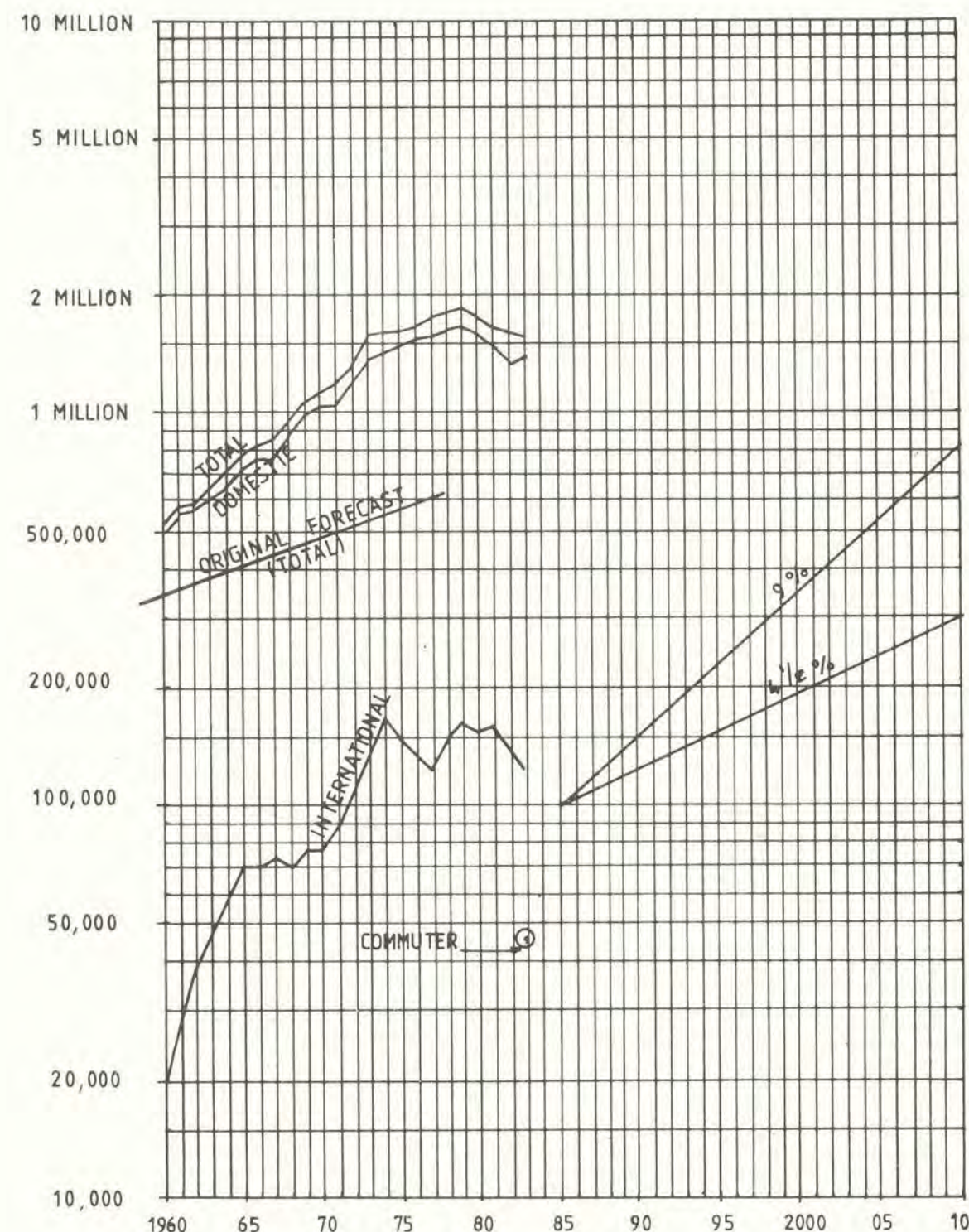
0835-0935 B737 — Seven, Friendships — Seven, Commuter — Three.

1640-1740 B737 — Five, Friendships — Eight, Commuter — Six.

These do not all use the same spaces on the aprons, and the description "gate position" may not be strictly relevant for the small aircraft. With the quick turn-around of aircraft in New Zealand and allowing for a proportion of commuter aircraft, it is considered that 25 gate positions should be adequate ultimately, in various spacings as discussed below.

Aircraft categories given in Annex 14 will be used instead of trying to pick actual

TOTAL ANNUAL PASSENGERS (BOTH WAYS)



GRAPH I WELLINGTON AIRPORT PASSENGERS

named aircraft; thus—

Code Letter	Wing Span	Outer Main Gear Wheel Span
A	Under 15m	Under 4.5m
B	Over 15m, under 24m	Over 4.5m, under 6m
C	Over 24m, under 36m	Over 6m, under 9m
D	Over 36m, under 52m	Over 9m, under 14m
E	Over 52m, under 60m	Over 9m, under 14m

For Code E aircraft — at present the B747 is the only passenger aircraft in this class — two could be required for scheduled flights happening to overlap.

For Code D there should also be two positions. These aircraft (e.g. the B767) will also be able to use Code E positions when vacant.

14 Positions are proposed for Code C and the remaining 7 for Code B commuter type aircraft. All positions should eventually be nose-in and push-out, which enables them to occupy the minimum lateral space along the building or finger, thus reducing the walking distances for passengers.

6.6 Roads and Car Parks

6.6.1 Roads

The main road within the airport boundary, shown on sheets 4, 5 and 6 of the drawings is primarily a link from Calabar Road to the terminal buildings, but further south it crosses the taxiway leading to the Air N.Z. hangar, then leads through the cargo area to terminate at Moa Point Road. At the crossing with the taxiway there is nothing to prevent vehicles — accidentally or otherwise — from entering the aircraft movement area.

One purpose of this section of the plan and section 7.5 below is to find ways of obviating this security hazard. Two alternatives are presented below. They assume a continuation of a road of some sort from north to south. It has been argued that a through road open to the public should not be provided: as mentioned in 2.11.1.2 above the only obligation on the Airport Authority is to provide through access for pedestrians. However, a more sensible approach would seem to be to try and keep cargo traffic away from the passenger end of the terminal area, but to allow light through traffic.

6.6.1.1 Provision of a Movable Barrier on the Taxiway

Under this arrangement a barrier would be opened when aircraft need to use the taxiway, and at those times some warning system would close the road to traffic. The barrier would have to open wide enough to allow large aircraft — which can occasionally need to go to the hangar — to pass through. Their wings could clear the adjoining fixed fence but in the case of Code E aircraft an opening of some 50m would be needed to allow the engines through. Such a gate would entail a substantial capital cost and also some continued operating cost.

6.6.1.2 Road around the Air N.Z. hangar area

The alternative is to provide a new route for the road skirting the security fence throughout. Shown on sheet 6 is an alignment for this road assuming the hangar remains in place. Two routes are given — one following the hangar area perimeter back to the present road near the Shell Co. site: the other through the existing hill, in a cutting, past the BP Co. site.

Discussed in section 6.9 below is the long term proposal for a new hangar south of the cargo area, to replace the present hangar. This would affect the future alignment of the north-south road as can be seen from sheet 6, but it will not affect the immediate step of taking the road around the present hangar, which is

an urgent requirement. The quickest construction of A, this first part of the road would be obtained by keeping to the low level and ending at the Shell Co. site — even this will entail considerable work re-siting some of the Air NZ facilities which lie on the route. Thereafter the sequence of road construction would depend on the timing of other requirements — expansion eastwards of the cargo area (see 6.7 below), possible demand for earth fill at the end safety areas (see 6.2.2. above), and the establishment of a new hangar.

These road proposals all require the taking of the small triangle of land owned by the Golf Club as noted on sheet 6, an area which is not in use as part of the course.

6.6.2 Car Parks

At present there is short-term parking space for over 300 in the International area: for short or long term of over 500 in the Domestic area: and for over 200 in the employees car park. Other employees car parks for smaller numbers are at the cargo and western apron areas.

Guidance for car parking numbers from other airports in this Country and elsewhere can be misleading as Wellington's conditions in relation to the proximity of the City are unusual. The present 800 capacity for the public is barely adequate, the future requirements might be twice this figure based on probable expansion in passenger numbers.

A factor in the provision of car parks is the cost charged for long and short term parking, and the availability of other forms of transport. A high charge for parking can result in passengers choosing bus or taxi to reach the airport; low charges encourage the use of private cars.

The airport is not obliged to provide parking spaces for long periods for travellers, but where space is available it is appropriate for the Authority to earn revenue in this way.

Therefore parking requirements can to some degree be tailored to the areas of land conveniently available.

6.7 Cargo Requirements

6.7.1 Predicted traffic

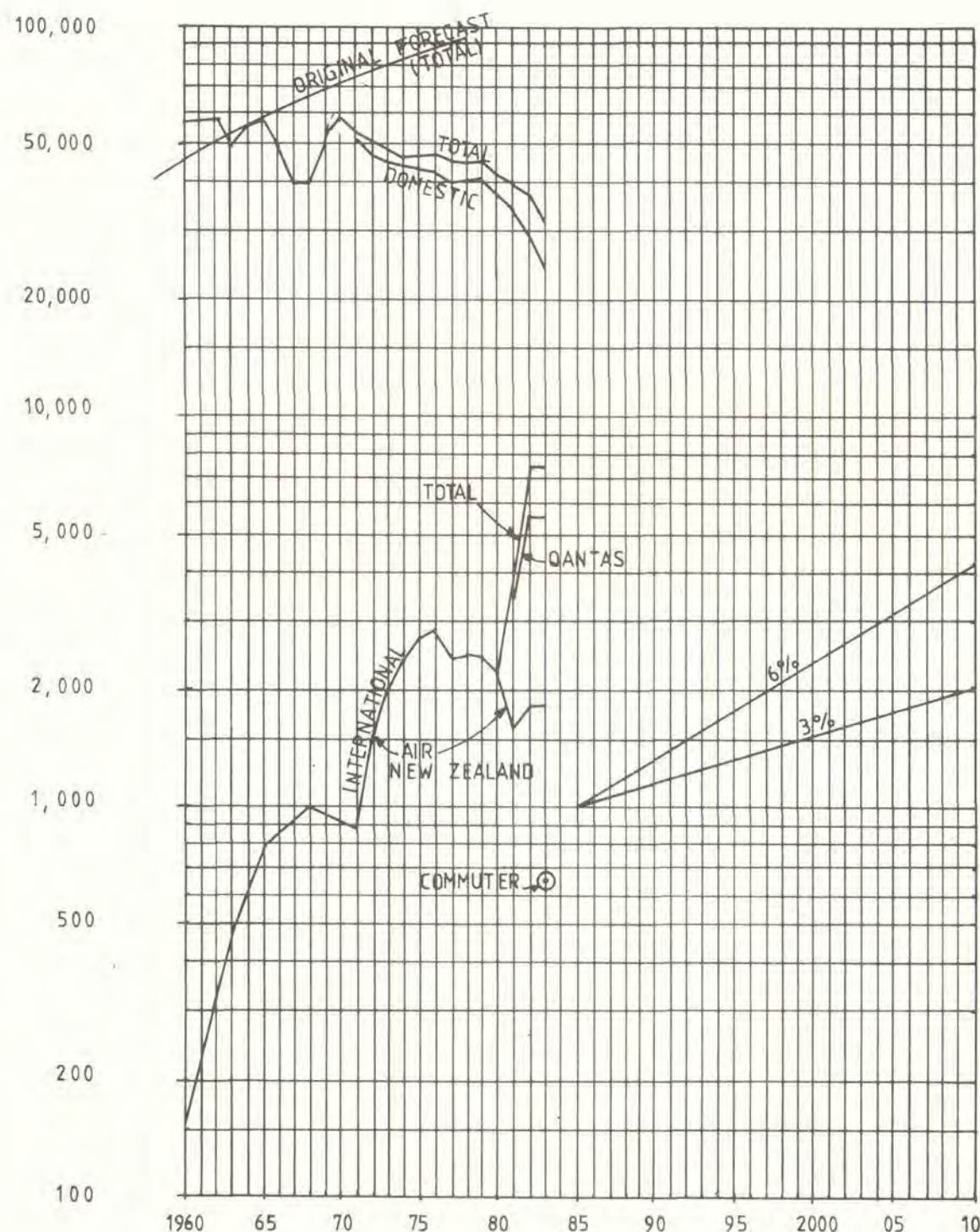
Before proceeding further with the discussion of cargo traffic it must be pointed out that a further investigation and study of the cargo process are recommended (in section 7.4.9 below) and the remarks herein must only be regarded as of an interim nature.

Graph II shows the domestic and international cargo tonnages which have been handled annually since 1960. The original predictions are also shown and it can be seen that the actual quantities did not reach the predictions for long, and since 1970 the total has actually declined.

International traffic improved markedly in two stages — with the introduction of the DC8 and later with the 747SP — but as the domestic tonnages far exceed the international the overall effect has not been so marked.

Domestic tonnages have been falling. There may be various contributory factors such as de-regulation of road transport recently, and the increase in off-peak passenger traffic resulting in less cargo space. It may be that to predict growth in such circumstances is over-optimistic, but from a planning aspect it is necessary to see whether — if growth occurs — the facilities have room to expand. This aspect is explored in sections 6.7 and 7.4. Growth rates of 3% and 6% have been used in these studies.

ANNUAL TONNAGE
(BOTH WAYS)



GRAPH II WELLINGTON AIRPORT CARGO

With international traffic it is difficult to predict a growth rate on present indications. If space is available at prices competitive with other means of transport it will be taken up; it is for the airlines to provide this space. Dependence in the main on passenger aircraft is a major factor. Changes in passenger aircraft frequency, and types, determine the corresponding cargo space available. Take, for example, the current (1985) availability of space in B747SP aircraft. During 1983 there were 626 arrivals and departure flights of this aircraft across the Tasman carrying a total of 5,682 tonnes — i.e. an average of 9T per aircraft.

It has been estimated that the B767 as a substitute will only hold 40 to 45% of the B747SP (depending on the types or container used). Full passenger loads for the aircraft can be stated as 212 and 318 respectively. In order to provide the same passenger carrying capacity as the B747SP, the smaller aircraft would have to fly roughly 50% increase in frequency over the larger. But this would, even with the bigger type of container, still mean that only 67.5% of the cargo would be carried.

These figures show the fickle nature of the cargo capacity offering, being largely dependent as it is on the passenger aircraft types and frequency. All-cargo aircraft are not similarly affected, but it seems uncertain whether any such aircraft will be bought by the airlines concerned.

6.7.2 Existing Assets

A Master Plan for future developments has to take into account what exists rather than planning an ideal layout from scratch. Current building and other assets, some or all of which may be required, are listed below. Numbers correspond with the legends shown on sheets 5, 6 and 7 of the drawings.

Sheet 5

- 7 Air NZ building alongside the domestic passenger terminal building. 700m², used for inward domestic cargo.

Sheet 6

- 9 Air NZ hangar for aircraft maintenance, with extensive apron space. 3400m² building area. Has an occasional cargo function when livestock are being handled.
- 14 SAFE Air terminal building with two concrete aprons for B170 aircraft. To the west is a bituminous concrete apron for Argosy aircraft.
- 16 Air NZ cargo building 2700m², for all outward cargo.
- 17 Airport Authority building leased to Air NZ, 1300m²: used for international inward cargo.
- 19 Cargo office building of 350m² on each of two floors. Air NZ lease the ground floor, customs and others are above.
- 20 Freight forwarders' building leased from the Airport Authority, 1800m². For international cargo.

Sheet 7.

- 23 Hangar owned by the Airport Authority, 1300m², leased to an industrial firm.
- 24 "Airport Cold Storage Ltd" building, overall floor area 425m² of which the freezer portion is 222m² and the chiller portion 64m².
- 26 Hangar now owned by the Airport Authority, 1000m². Used by RNZAF and a private helicopter firm.
- 28 Former UEB building complex, about 3600m² of shed space and 600m² of office space on each of two floors.

6.7.3 Assumptions

Certain assumptions have to be made in compiling this part of the Plan, for cargo development.

It is assumed that for the immediate future international cargo will continue to be handled mainly by freight forwarding agents, between customer and airline, and

that space will have to be provided for these agents whether on or off airport. The proportion of international cargo handled by the freight forwarders is at least 85% of the total, the remainder being direct with the airline. Somewhat the same proportions probably apply to the relationship between on-airport and off-airport forwarders (i.e., on-airport have 85% of the volume).

There are moves to some form of centralisation of these activities, but for the present, for the purpose of allocating space, it will be assumed that there is no change.

The types of all-cargo aircraft to be used are not fully known at present. It will be assumed that the DC8 is to be phased out early, and that the B737 all-cargo aircraft will be available, also the Argosy for some time. It may be that in the future use will be made of a cargo version of the B747SP. As for large passenger aircraft the present B747SP (hold capacity 109m³) will be replaced by the B767 (hold space 87m³). It is assumed that the B170 service will be discontinued in a few years and that the space they use (including that occupied by the SAFE Air building) will become available for other cargo use.

As to the nature of the cargo offering, it seems reasonable to cater for a proportion of perishable items requiring cool storage facilities.

There will also be a requirement for the capacity to handle and cart livestock.

6.7.4 Further Development of Existing Cargo Complex (sheet 6)

The present cargo complex of buildings 16, 17, 19 and 20 could form the core of future development. The freight forwarders at present off-airport could be accommodated in a new building similar in function to the present building 20 but proximity to the air side could not be obtained in view of the long term proposal for the Air NZ hangar.

Customs would be housed in building 19.

Buildings 16 and 17 can be enlarged as necessary to take additional cargo volumes.

Apron space for large cargo-only aircraft should be allowed for: code D sized aircraft are currently in use but space should be considered for code E as a long term measure. The Air NZ hangar and adjacent space could continue to be used for livestock handling while the hangar remains in aircraft use. A different site for a hangar will necessitate similar arrangements for livestock at the new site. Expansion of cargo traffic will require adequate adjacent space for vehicle movement and parking.

A cool store may be needed.

6.7.5 Use of the Western Apron Area for Cargo

The recent acquisition of the UEB building has led to the plans to house some of the freight agents, and most of the Customs offices, in that building. Because this would cost less than a major addition to the cargo complex on the eastern side, it was much more attractive in the short term. Cargo from these agents will have to go by road round the south end of the strip to the main cargo complex. An alternative has been suggested to cart cargo across the runway by airport cargo vehicles, but such an activity would obviously have to fit in with aircraft use of the runway. This might mean considerable delays to cargo when the runway was at its busiest, and the procedure is not acceptable from the aspect of runway control.

Use of the apron itself by all-cargo aircraft is a tempting further idea, but this would involve a further split in the cargo activities — it could hardly be suggested that the western apron area would replace fully the existing cargo terminal into which a great deal of capital has been sunk: nor would there be sufficient space to handle all the aircraft required.

However, the detailed investigation (see 6.8) of this area will further consider the interim or otherwise use of the western apron land for cargo purposes. The primary on-airport cargo handling area is however to be in the south east, as on sheet 6.

6.7.6 Temporary Solution of Cargo Problem

Because the UEB building has been acquired it will continue in use for cargo functions for some years. Meanwhile plans should be made for further development of the main cargo complex, not necessarily retaining the present system of freight forwarders acting individually between customer and airline. There is room in the south eastern area for a further building for agents but it should be regarded as one possibility only, the main requirement now is to ensure that an adequate area is reserved for cargo operations generally. This would encompass the area at present occupied by the airport maintenance building and other small installations. It could mean the eventual removal of the hillside south east of building 12, thus creating further level ground for the growth of cargo functions. Space can also be made available for a cool store if it is found to be necessary.

6.8 The Western Apron Area

The Western apron area should be reserved for aviation use: occupants have access to an aircraft movement area and therefore should be able to make use of this facility.

Possible uses are:-

General Aviation, as described in 2.12 above, as at present.

Aviation related industries.

Maintenance facilities for aircraft.

Maintenance facilities for airport buildings and aircraft pavements.

Freight forwarding agents.

The airport maintenance building can be re-sited behind hangar 23. The freight forwarding situation is discussed in 6.7.5 above. The two existing hangars belonging to the Airport Authority have a useful potential, but no firm proposal for their use is made here. The hangar 26 used by RNZAF would be partly vacated when military operations are transferred to the eastern side of the airport.

It is recommended that there should be a commercial study made of the potential of the Airport Authority's land in this area, and of other land at present "designated for airport purposes".

Shown on sheet 7 is a possible use of the area west of the apron between the UEB complex and Bolt Street, in which a single wide central taxiway would lead between two rows of small hangars. The area would be available for code B aircraft.

The apron itself falls naturally into two main functions and should be treated accordingly as regards pavement strength. To the south of and including the main entrance taxiway the apron occasionally has to take visiting aircraft which may be large, and which for some reason cannot be accommodated in the eastern aprons. The remainder of the apron should be for smaller aircraft, including the northern entrance taxiway.

6.9 Air New Zealand Hangar

Any aircraft facility situated behind other facilities such as cargo handling necessarily sterilises a considerable area due to the large space taken up by an aircraft moving through. A further disadvantage is due to the need for strict security on the air side, which means that roads and taxiways cannot cross without elaborate safety devices (see 6.6.1.1). The conclusion is that in the long term an Air NZ hangar should be situated clear of the cargo operations, and sheet 6 of the drawings shows a proposed long term position for a hangar. It is assumed that a hangar will be provided of similar size to that now in use. Code E aircraft would not be able to be fully housed in such a hangar and the position of the aircraft tail has been assumed as a determining factor in height clearance from the 150m strip, this in turn fixing the hangar position. Road alignments to avoid the hangar compound are discussed in 6.6.1.2. and 7.5.

Engine testing when carried out by day usually takes place in the Air NZ Hangar compound: by night it is at the southern end of the runway or main taxiway. Similar arrangements could continue in the proposed new location.

6.10 Fuel Supply for aircraft

The present arrangement where one oil company operates the main fuel depot and pipelines to aircraft stands, while two other companies have small installations near the cargo area, needs investigation — with a view to all being concentrated in one place. Ownership of pipelines needs to be included in such an investigation.

7. FACILITIES PROPOSED

7.1 Passenger Terminal Building

The proposed terminal building has a gross area of 16,532m², including adaptation of the existing international facilities. Of this, approximately 2000m² is for international arrivals only, leaving 14,532m². Adopting the reasoning of section 6.4 above, this would accommodate a peak of 1453 passengers. Deducting 500 for two plane loads of international passengers leaves 953 domestic. At 4.5% growth this number would be reached in about 6 years, at 9% in 3 years.

The siting of the proposed terminal building, shown in plan view on sheet 5 of the drawings, is such that integration with the existing international building can be achieved with consequent saving in facilities — common user check-in counter, baggage despatch and amenities. The portion of the new building to be constructed can allow the present domestic terminal building to continue in use until the new structure is ready.

The proposed new building will need extension to meet future growth in traffic. This extension can take place in a southerly direction once the existing domestic terminal is removed. The full capacity of 22,000m² mentioned in 6.4 above could be built in the space which would then be available. Until it is required the area can continue as a car park thereby helping to defer the need for construction of a car parking building.

The new integrated terminal building should be provided with two sewage pumping stations: one is already in existence serving the international element of the building, another will be required near the southern end of the domestic wing which has yet to be built.

7.2 Passenger Gate Positions Proposed

The drawing sheet 5 shows the proposed layout of gate positions. Numbering of gates replaces the existing numbering system.

Gates 1 to 13 will be for code C aircraft.

The main finger will need to be extended to provide closer access to gates 9 and 10.

Gates 14 and 15 will be for code D.

Gate 16 is for code E; it is the former gate 19 but with the airbridge swivelled (clockwise in plan view) to allow code D aircraft to reach gate 15.

Gate 17 will be for code C as a normal use. If used by code E in exceptional circumstances it will be an obstruction to large aircraft taxiing astern of it — but access to gates 16 and 18 will still be possible.

Gate 18 will be for code E aircraft using the present airbridge.

Gates 19 to 25 will be for code B commuter aircraft. In these positions the passengers, who are normally carrying their own baggage, will have only a short distance to walk from the check-in counter. These code B positions are shown un-numbered and they can be made to suit the particular aircraft developing at the time. Portions of the car park can be kept in use until such time as full use by commuter aircraft is found necessary.

Following the proposed new terminal building construction, gates 14, 15, 16 and 18 will be the primary facilities for passenger comfort and security. Apron use by RNZAF B727 aircraft will therefore be restricted to gate 17 other than at off peak times.

The possibility was considered of using a gate in the vicinity of positions 19 etc for code E aircraft. This would have entailed the removal of the rescue/fire station, two

rental car installations, and the fuel depot, which would be costly but not impossible. However, the movement of very large aircraft in the confined space bounded by the terminal building and the public road would have presented severe difficulties. Furthermore it is not expected that there will ever be more than three code E aircraft on the airport at one time, and they can be accommodated at gates 16, 17 and 18.

The apron positions listed above have used up all the perimeter space around the terminal building, but it is necessary to park tugs and other servicing equipment as near as possible to the place where it is to be used. For this purpose area 3 at present occupied by a rental car firm will have to be reserved in the long term. There will also need to be some day-time staff accommodation in this space. The time when this area will be required cannot be predicted at this stage, it will depend on the growth in passenger traffic.

7.3 Runway and Strip

7.3.1 **Runway.** As discussed in 6.2 above, the present paved runway length at 1935m is suitable for aircraft likely to be used from Wellington across the Tasman, and no change is proposed.

7.3.2 **Strip.** The length of the strip as required by Annex 14 is 60m beyond the paved runway at each end, and thus remains at 2055m. The width of 300m and other requirements for ILS Category I cannot be met except at vast expense, and no change is proposed.

7.3.3 The Civil Aviation Division of the Ministry of Transport have released (October 1984) a study of the options of runway end safety areas (RESA's) with particular reference to Wellington Airport. The ICAO recommendations re RESAs can be met by a range of options from relocation of runway threshold to bridging over the public roads at each end with a structure capable of supporting the weight of large aircraft. The removal of safety hazards is an integral part of the additional work. Current estimates are of costs from \$640,000 to \$11,000,000 for these examples.

It is essential that this report be given further study in order to determine the appropriate decisions for RESAs at Wellington Airport.

7.3.4 Cost Factors in Extensions

Any extension to the south, other than the short length which could be achieved by putting the road in a tunnel, would be enormously costly (see section 2.5.3 above). To the north the major cost would be the road tunnels.

Filling material for this operation could come from the hillside behind the Operations Centre without lowering the crest of the hill and reducing the shelter it provides for the suburb of Miramar. A further source of fill could be the proposed extension of the cargo area (see section 6.7.6). Both these sources of fill are thus reasonably close and the embankment costs would be kept to a minimum.

Any longer and wider extension to the embankment to the north would run into greatly increased costs from three sources — longer tunnels to cross the full 150m strip, deep fill into the harbour, and more remote sources of fill.

7.4 Cargo Facility Proposals

7.4.1 International Inward Cargo

The Airport Authority building 17 used for inward international cargo has an area of 1300m² and receives at present some 3000 tonnes of annual traffic. Information from recent studies overseas indicates that from 5 to 10 tonnes of annual traffic need a floor space of one square metre, which in this case would mean a floor space of between 600 and 300m². The space is thus ample at present. Expansion to the east to a line continuous with the adjacent Air NZ building would give an area of 2200m² which should cope with between 11,000 and 22,000T. If we consider a

growth of 6%, probably above the likely growth rate, but giving maximum space required, in 25 years the annual traffic would reach about 12,000T. There is thus ample space for expansion.

7.4.2 Inward Domestic Cargo

The present Air NZ building 7 with an area of 700m² is coping with domestic traffic, and this space together with future growth requirements will need to be provided elsewhere when the passenger apron positions are fully extended to the south (see drawing sheet 5). Growth of 6% would require a space of about 2800m² in 25 years. This space should be allowed for in the (present) outward cargo building, see 7.4.3 below.

7.4.3 Outward Cargo

The Air NZ outward cargo building 16 takes domestic and international traffic of about 15,000T annually. It is assumed that this would need a square metre of floor space for every 14T, i.e. a total of 1100m². Growth of 6% would mean a size of 4400m² needed in 25 years, to which should be added the 2800m² for inward domestic traffic, giving a total of 7200m². A 20m extension of the building northwards as shown on sheet 6 would give a ground floor space of 4200m², and the balance could readily be provided by mechanical stacking in two or more levels, as being more economical than constructing more ground floor space.

7.4.4 Apron Positions for All-Cargo Aircraft

Sheet 6 of the drawings shows aircraft sketched in two new apron positions. The DC8 is to the west of the cargo complex. The position would be available for all types of DC8 and also for other D sized aircraft — also of course for the smaller B737. A B747200 is shown at the other position to the north of the main building. This is included as a long term indication that an aircraft of this size could use the site, not as a prediction that it is proposed by any airline at present. Such an apron would take two of the smaller aircraft such as the Argosy or B737.

Access for all aircraft to the present Air NZ hangar would still be available, but when all proposed passenger aircraft positions are developed this taxiway would have to be realigned to allow code E aircraft to clear to the west of passenger gates 9 and 10.

Apron positions for all-cargo aircraft should be provided with piped fuel connections.

7.4.5 Freight Forwarders Accommodation

It is probable that space will be required for some years for at least the present number of agents, some of whom are now off-airport or in the UEB building. The present facility should have some protection against the weather outside the building proper. The present facilities for employees are also inadequate. Further space for agents will be available if required, within the area marked on sheet 6 for cargo purposes.

7.4.6 Cool Store

Space is readily available within the area marked for cargo use for a small cool store building of some 400m² in area. The need for such a facility should be investigated, see 7.4.9 below.

7.4.7 Facilities for Livestock

No special provision appears to be necessary for livestock, provided that, Air NZ can continue to make space available as at present, whether in the existing hangar compound or in the future area.

7.4.8 Vehicle Manoeuvring Area

The cargo complex being severely limited in space for vehicles at the present time, this aspect should be part of the investigations in 7.4.9 below. The removal of the airport maintenance compound will ease the problem.

7.4.9 General Layout and Future Policy

Although some areas have been discussed above and possible facilities shown on the plan, it must be emphasised as being mainly to indicate the space which might be required. It is strongly recommended that an investigation should be carried out in order to indicate the best ways in which the cargo process should be developed. Contributors to such an investigation should include the airlines, freight forwarding agents, Customs, Agriculture and Chamber of Commerce. Such an investigation should deal with the flow of cargo at all stages and the optimum arrangements needed to facilitate this flow.

Meanwhile in the area shown as "Cargo" on drawing sheet 6 other forms of development should not be allowed.

7.5 Roads and Car Parks

7.5.1 Roads, the north-south access

Of the alternatives presented in 6.6 above it is considered that the better would be the second (6.6.1.2) i.e., taking the road round behind the hangar. For immediate construction the road should follow route A. Eventually when the hangar is re-sited the road will need to go behind the hangar — shown as route B. The first task will be the removal of the annexe alongside the hangar, and of the building and installations east of the hangar.

7.5.2 Car Parks

The drawings sheets 5 and 6 show the areas proposed for car parks, associated with the new terminal building. Capacity will be adequate for the traffic expected by passenger aircraft. Car parking in the cargo area is also required but details should await the results of the cargo investigation.

7.5.3 Extension of Roads and Car Parks in the Future

After the removal of the "temporary" terminal building and the construction of the new building, space for car parks and access roads should be adequate. If necessary however a single storey parking building could be erected progressively as the demand arose.

Thus it is concluded that it will not be necessary to take any of the golf course for car parking.

7.6 Airways Facilities

Discussion in this section is not concerned with navigational aids which are the concern of the Ministry of Transport, Civil Aviation Division: but two aspects will be mentioned of a different nature — the siting of the Control Tower, and the Fire/Rescue station.

7.6.1 Control Tower

In the off-airport position occupied by the tower it has functioned adequately, but some factors point to a better siting near the operations centre. One is the restricted view, at present, into the western apron, caused by intervening topography and buildings. Another is the obvious advantage to be gained by having the Operations Centre and Tower adjacent to each other this could not apply when the Centre was in Stout Street, miles away. A disadvantage for the tower would perhaps arise from

glare from the sun later in the day. The proposal for re-siting the tower is still being explored and a site should accordingly be reserved at Wexford Road.

7.6.2 Rescue/Fire Station

The present site of this station would probably be unacceptable if the strip were ever widened to 300m, as the building would infringe the 1 in 7 side clearance (see sections 6.2 and 7.3). In that case, space would no doubt have to be found in the western apron area as the station must have access direct onto the runway at about its middle point. However, assuming the strip is not widened, the present site is the best. It has a good view of the aircraft movement areas, and being close to the aprons means that likely accidents such as fires from aircraft brakes are within close reach of the Station's appliances and staff.

The adjoining plot is leased to a car rental firm, but this will have to be re-negotiated when the rescue/fire facility needs part of the space for dormitory accommodation.

There are two improvements to the functioning of the rescue/fire service which should be considered. For marine rescue the present boat launching site at the Evans Bay Marina has the obvious disadvantage of lengthening the time for a boat to reach the shore. If the strip is lengthened the slope down to the water could include space for the launching trailer. Some wave breaks would need to be incorporated to help shield the boat from being swamped while launching in heavy seas — they occur even in the harbour.

The second improvement worth incorporating is to ramp down from the strip to Batten Street to enable direct access to the western edge of the strip where it meets the harbour. An aircraft crash at the north end of the runway could well need rescue/fire action, from east or west. A proposed ramp is shown on Sheet 4. Otherwise, a rescue vehicle has to traverse a network of suburban streets from Coutts Street to Cobham Drive.

The present fire training area is found to conflict with safety at the Air BP installation and a proposed alternative site is shown on Sheet 4 of the drawings.

7.7 Security

It will be essential for all the air side to be fully fenced from areas accessible to the public. The proposed new access road from the terminal area to Moa Point will need to be fenced to security standard so as to form a link in this air side fence.

8. ENVIRONMENTAL ASPECTS

8.1 The Need for Consideration of Environmental Factors

In the construction of any major new works environmental considerations should take high priority among the factors on which decisions are being taken. When Wellington Airport was under consideration in 1950 onwards, the present-day intensity of consciousness of environmental matters had not been reached, and it may be considered doubtful now whether the decision to remove a considerable residential area and replace it with an airport would have been taken today. However, the airport exists and examination of environmental aspects must be concentrated on any measures that can be taken to alleviate its effects, and to watch closely over any new proposals.

There are several categories of activity which can affect the airport environs. Operating the airport creates noise, and some steps can be taken to alleviate noise. Construction of new works can cause a nuisance while in progress. New works when completed can affect the lives of those living or employed around the area.

8.2 Noise

Noise studies were commissioned by the Town and Country Planning Division of the Ministry of Works and Development in 1973, and observations were made by the DSIR from 34 sites around the airport. The noise contours from B737 aircraft are shown on the chart below, and this includes a few readings for the DC8 which are shown underlined.

Only aircraft take-off noise was recorded, and the contours are a synthesis of take-offs in both directions. Landing noise values could be higher than take-off when they emanate from reverse thrust, but this is a somewhat variable factor dependent on the extent to which it is used by individual pilots. The other aircraft commonly at the airport, Friendships and Bristol Freighters, are less noisy than the B737. Later jet aircraft are also quieter.

Because there is sea or harbour at each end of the runway, the most intense noise level (over 100 EPNdB "Effective Perceived Noise" level, in decibels) is only experienced by a very small proportion of those living in the general area, a distinct bonus resulting from the peculiar layout of the airport.

A simultaneous survey was carried out by "Urban Research Associates" aimed at assessing the impact of noise on people living in the area. It was found that annoyance from noise rises sharply at around the 95 EPNdB level, although it was stressed that a substantial variation exists between individuals in their perception of noise, not accounted for by the physical noise tests.

A survey was completed in 1971 by the Valuation Department to determine the effect of introducing B737 aircraft on the value of houses near the airport. This survey concluded that the new aircraft had no permanent detrimental effect on house values.

Restrictions on flying are at present in force in order to curtail noise at night — jet aircraft may not take off between 11pm and 6am. International arrivals are allowed until 1am. At holiday periods there are slight relaxations of the rules. This restriction should continue, but no other measures are foreseen in view of the world-wide trend towards quieter aircraft.

As is the present policy, engine testing is to be minimised — i.e. testing is only to be carried out when necessary for safety reasons or to prevent significant flight schedule disruption. This policy is to change only if a special facility is provided to reduce noise level experienced in the adjacent residential areas.



8.3 New Construction

This can be a temporary nuisance from dust, noise and traffic intensity, and it can be mitigated to some extent by control procedures. It is not peculiar to airports, but Wellington Airport being hemmed in by urban areas makes any construction (such as runway extension in particular) a potential nuisance. In such cases special measures would need to be taken — and they were during the original construction work and subsequent extension — to limit the nuisance.

8.4 Runway Extensions

The need for a runway extension is discussed in Section 7.3. This section refers to the environmental considerations of alternatives. In September 1975, the Ministry of Transport prepared an Environmental Impact Report on a possible runway extension of 350m either to the north or the south. This Report concluded that the higher cost of an extension to the south was not "outweighed" by the adverse environmental effects of an extension to the north, and preferred the latter.

The Commission for the Environment in its audit on the Report, and on 48 submissions received, concluded that the runway should be extended to the south.

Estimated costs of proposed works are not included in this Master Plan, but are discussed in general terms in section 7.3.

The environmental effects of the 350m extension evidently favoured a southern extension but the proposal in section 7.3 would only be for approximately 100m of end safety area at 90m width, to the north. This is significantly less than the 1975 proposal, so it is evident that the visual and recreational environmental impact would be less.

A further effect should be called environmental as it affects the safety of people. Cobham Drive has been identified as a hazard to the safety of an aircraft overshooting the runway, and ipso facto, to passing traffic. Converting a (short) length of this dual-carriageway road into twin tunnels would by-pass this danger although it would not stop an aircraft from reaching the water.

To the south, there has been considerable experience since 1972 in dealing with the problem of attack by waves, and the conclusion reached is that any reclamation in that direction raises doubts not only as to ultimate cost but even as to absolute feasibility.

9. PROGRAMMING

Section 1.1 above indicated that this Plan would include proposals for ultimate development "with some indication of their timing".

It would be simple if all the future works contemplated could be placed in order of priority with proposed construction periods, but this is not really feasible in all cases. The proposals fall into various categories. Some items are dependent on the outcome of investigations and therefore their timing must await recommendations coming from these reports. These are listed in 9.1 below.

Another small category of investigations may lead to policy changes but not necessarily to any major development work — see 9.2 below.

The remaining proposals can be given tentative priority but this can be upset if growth is higher or lower than expected. Furthermore, comparisons between some categories are unrealistic where the sources of funds are independent of each other. With this reservation Sec 9.3 below lists these proposals.

Finally, Section 9.4 looks at the future designation of properties adjacent to the airport.

9.1 Items for which Investigations have been recommended in this Plan

- a. End safety areas, see 7.3.3.
Related to these proposals would be the source of fill from the north-south road B (7.5.1) and from the expansion of the cargo area (6.7.6)
- b. Western apron area commercial development (6.8)
- c. Cargo, investigation of the best means of cargo handling (7.4.9)

9.2 Items needing investigation which may not involve major changes

- a. Ultimate capacity of the runway and procedures for traffic control (6.3). This might affect the choices made for passenger apron gate positions and the total number deemed necessary in the long term.
- b. Aircraft fuel supply (6.10) — an investigation into the best system for ownership and control.

9.3 Future Proposals

Works referred to in this Plan are listed in a tentative order of priority.

1. New terminal building. See 7.1 and drawing sheet 5.
Detailed planning closely followed by construction should start now with a view to completion of this stage by 1987. This will enable the present domestic terminal building to be removed, and the land developed in accordance with proposals for future terminal extension.

Of equal priority is the construction of a new road around the Air NZ hangar — Sec 7.5. Because of the continuing security risk completion should be aimed at as soon as possible.
2. Freight forwarders' accommodation in building 20 is substandard and should be improved as soon as possible — not a major work.
3. Passenger apron gate positions.
This overall description involves several aspects:-
 - a. Re-alignment of air bridge at gate 16 and additional concrete pavement.
 - b. More (light) aircraft pavement for gates 20-25 to be formed from the existing international car park.

- c. Two new airbridges for gates 14 and 15 — required for wide-bodied aircraft.
 - d. Extension of the main passenger finger walkway westwards.
 - e. New finger going south, replacing the Air NZ inward cargo building. This work will depend on the removal of the cargo building which in turn may have to be preceded by construction of additional space in the main cargo building — either by vertical construction or by extending north towards the present SAFE Air complex — a small extension is possible even with SAFE Air in position.
 - f. Re-arrangement and extension of underground fuel lines.
 - g. Aircraft servicing equipment facilities, Sec 7.2.
4. Cargo apron for all-cargo aircraft — Sec 7.4.4.
This should be completed early so as to free space in the passenger apron and to improve efficiency of the cargo operation. Underground fuel lines should be included.
 5. Airport maintenance building — Sec 6.8.
The re-location of this building has been on forward-looking programmes for some while. The suggested site is vacant — sheet 7, and the work should go ahead for completion in advance of cargo area development.
 6. Rescue/Fire improvements. The provision of a boat ramp off the north end of the embankment must await the outcome of the end safety area proposals (9.1). A ramp at Batten Street could be constructed at any time. Dormitory accommodation is at present under consideration.
 7. Provision of a new Air NZ hangar (6.9) is obviously a major task whose priority will, to some extent, depend on the need for more cargo space.
 8. Facilities for the RNZAF — as this proposal is still under discussion it is not possible to nominate any timing.

9.4 Future Designation of Adjacent Properties

The current District Scheme includes the following areas which could be considered:-

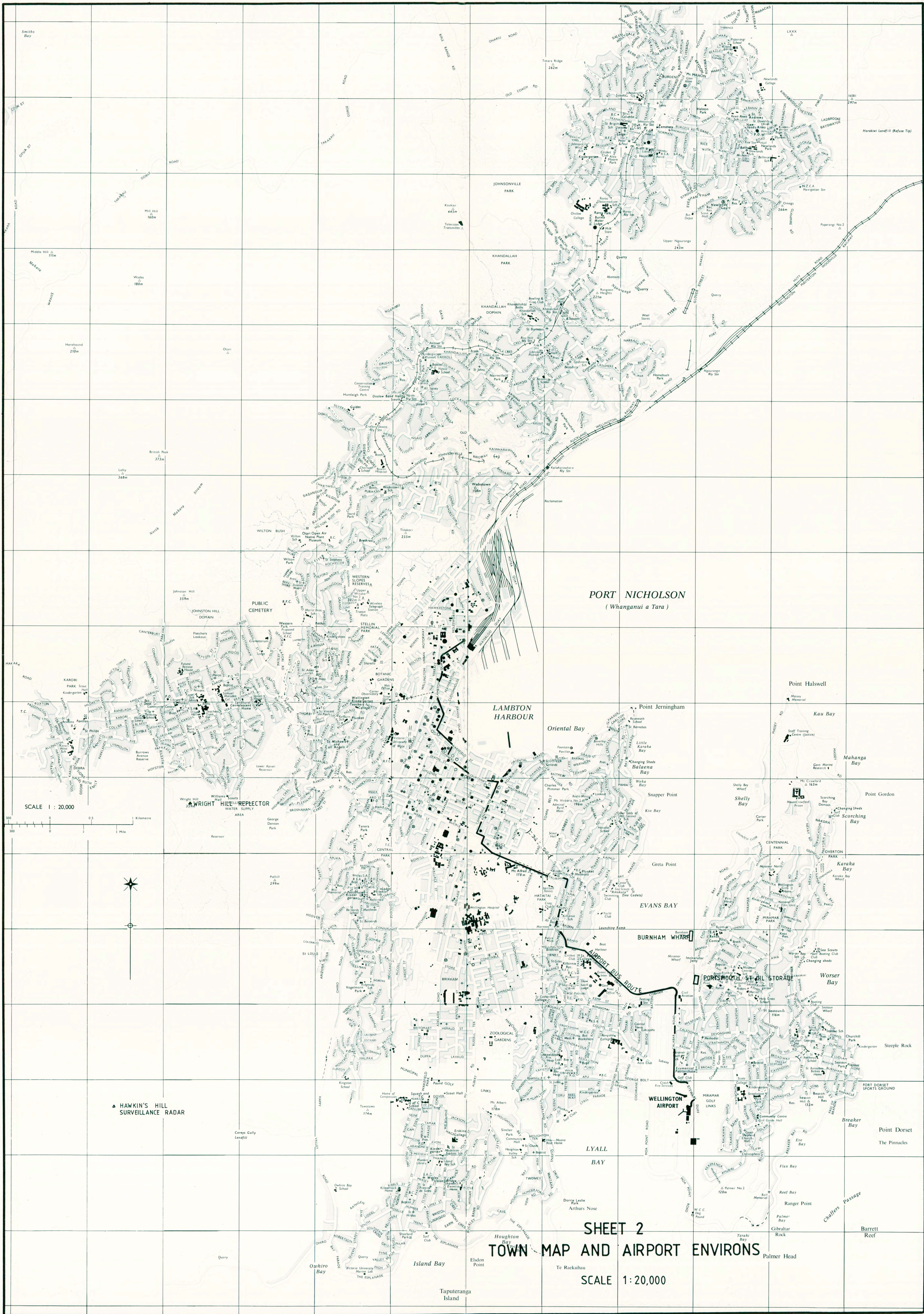
- a. Golf Course. With the exception of the small triangle area mentioned in 6.6.1.2 the Golf Course will not be needed for airport purposes.
- b. In the Western Apron Area some land is designated for Airport which is not at present owned by the Airport Authority. The report on commercial development (9.1) should indicate the likely requirement, or otherwise, for these properties.
- c. The area occupied by the MoT Operations Centre should perhaps be re-designated as required for airport and related purposes.

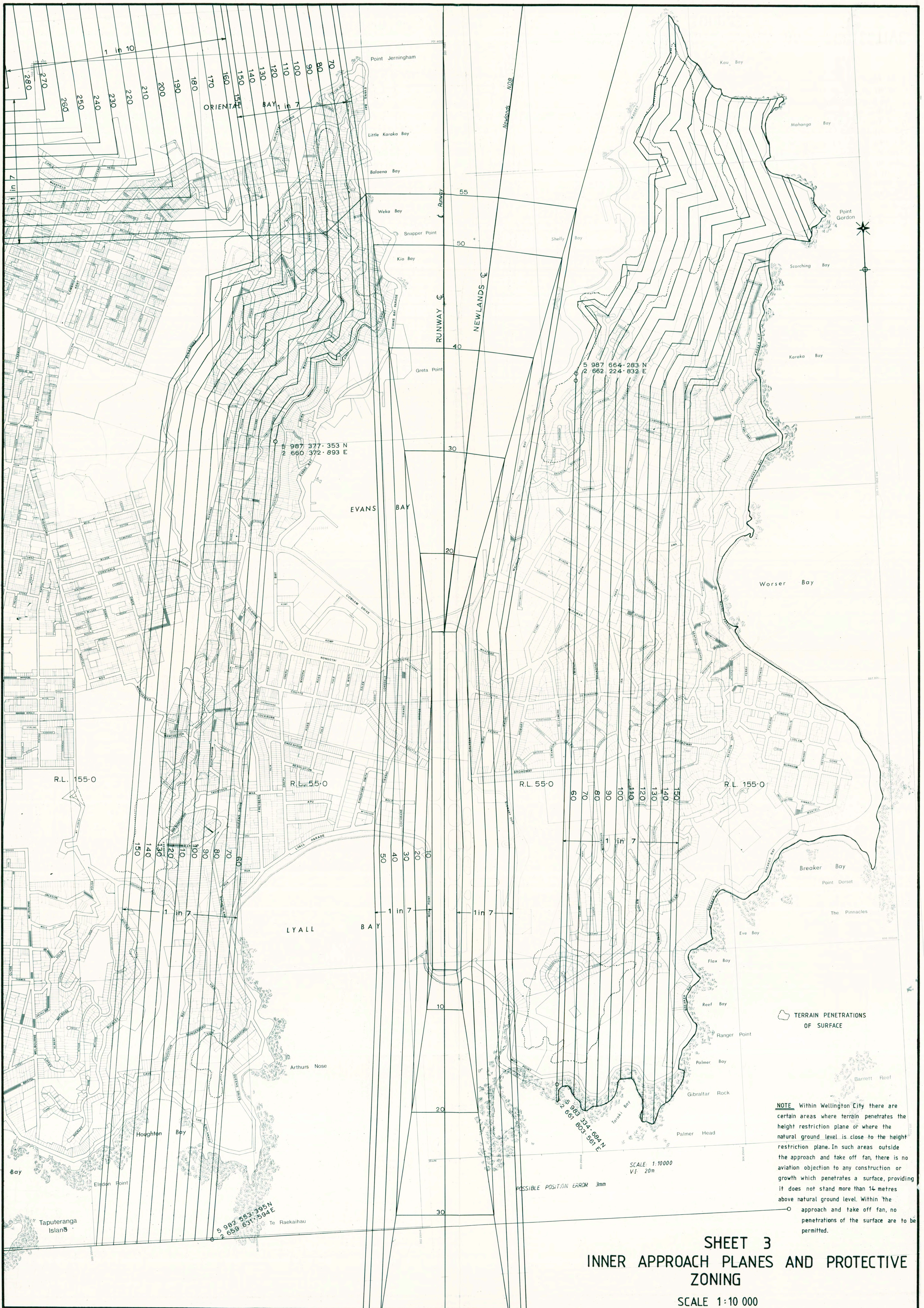
WELLINGTON AIRPORT
REPORTS AND OTHER PAPERS RELEVANT TO MASTER PLAN

(Not all specifically quoted in the Master Plan Itself)

Serial No.	Subject or Title	Date	Origin	COMMENTS
1	A functional plan of Rongotai Aerodrome	1956	Borgeson	Plan for what was built in 1959, and proposed later stages. Sec 2.20.1
2	Joint-venture Airports Principles & procedures	1961	Civil Aviation Administration	Detailed arrangements applicable to all joint-venture airports.
3	Air Trade Study & Terminal Area Requirements	1965	Leigh Fisher	Development proposed into Golf Course
4	Committee of Inquiry into some aspects of the Airport potential of Wellington & Paraparaumu Airports	1967	Gilkison	473m Runway extension for DC8 & B707 would cost \$14M (Note 183m extension was built for \$2.5M Serial 9 below)
5	Wellington Airports, Costs/benefits of alternatives	1970	Gillion	Examined several alternatives
6	Effect of Boeing 737 jet noise on house values near Wellington Airport	1971	Valuation Dept	See Master Plan Sec. 8.2
7	Committee of Inquiry into Second Airport Submission	1972	Regional Planning Authority	See Master Plan Sec. 5
8	Committee of Inquiry into Second Airport	1973		
9	Wellington Airport Extension Panel Symposium	1972	NZIE Wellington Branch	An account of the various aspects of the extension work.
10	Wellington Airport noise survey	1975	MWD	Incorporates DSIR and Urban Research Associates Surveys. See Sec. 8.2
11	Runway Extension Environmental Impact Audit	1975	MOT	Favoured northern extension Sec. 8.4
12	Runway Extension Environmental Impact Audit	1975	48 submissions	See Serial 13 below.
13	Runway Extension Environmental Impact Audit	1976	Commission for the Environment	Favoured southern extension Sec. 8.4
14	"Airports, the Challenging Future" -- Inst of Civil Eng. Conference Proceedings	1976	Sir Peter Masefield	Paper on "Getting the Most from Existing Airports". See Secs. 6 & 7.
15	Design Report Domestic Terminal Stage II	1978	WCC Staff & Pascoe etc. Arch.	Contains information relevant to new building although siting since changed.

Serial No.	Subject or Title	Date	Origin	COMMENTS
16	Wellington Airport Master Plan	1978	WCC Town Planning Division	Precursor in many respects to this Plan.
17	Study of the Development of Wellington Airport	1979	W D Scott & Co.	Examines many aspects of cost and options -- International ops. largely superceded by later changes
18	Anatomy of the Wellington/Australia Connection	1980	Capt. McGreal	Paper to the Royal Aeronautical Society Wellington Branch
19	Investigation of Works & Costs involved in modifying existing Domestic Terminal	1980	Pascoe & Co. Architect	To cater for 1985 needs
20	Evans Bay Runway Extn Investigation & Feasibility Report	1982	MWD	Examined stability of proposed northern extension -- found satisfactory
21	Planning & Design Considerations for Airport Terminal Building Development	1976	FAA	See Sec. 6.4





TERRAIN PENETRATIONS
OF SURFACE

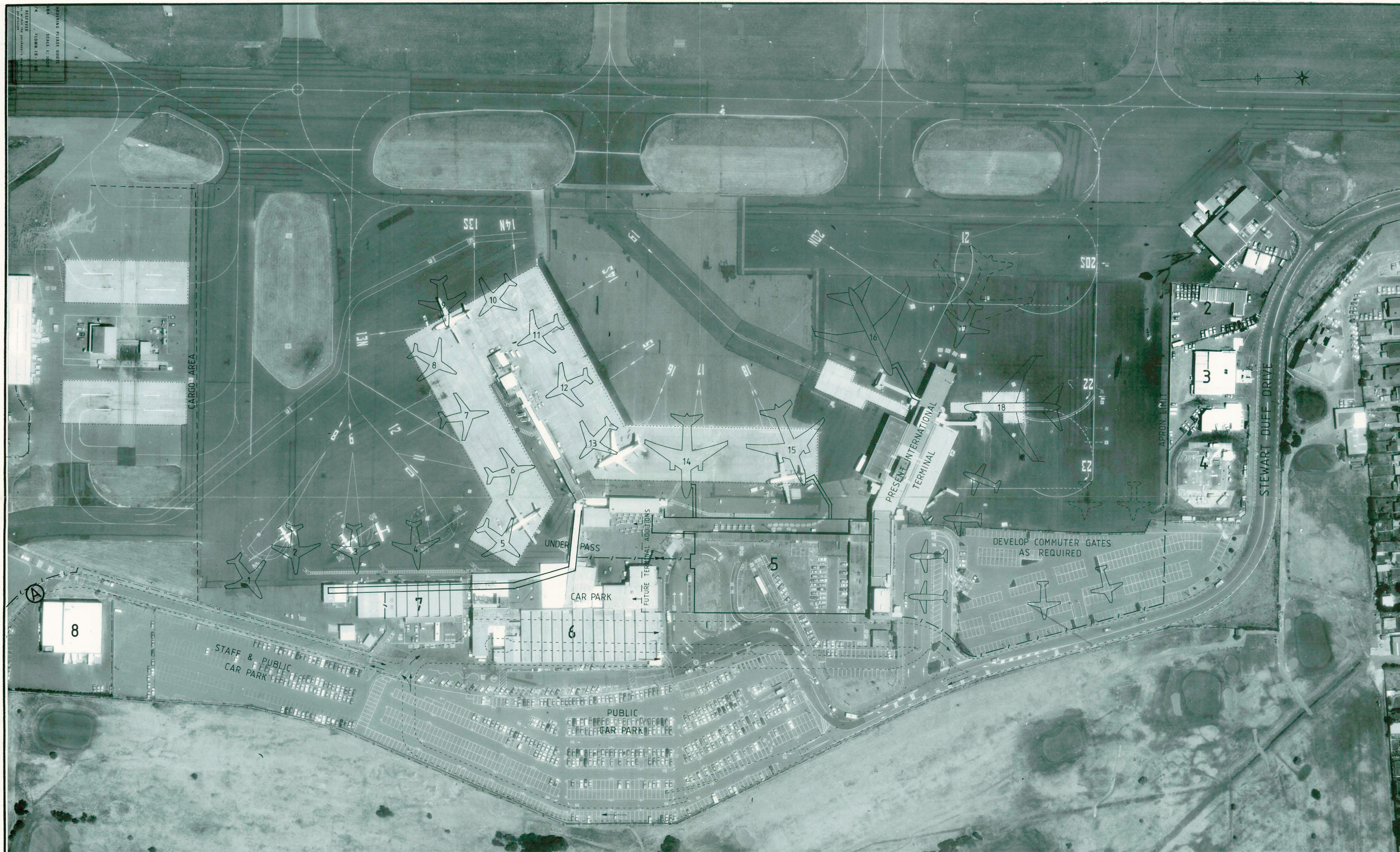
NOTE Within Wellington City there are certain areas where terrain penetrates the height restriction plane or where the natural ground level is close to the height restriction plane. In such areas outside the approach and take off fan, there is no aviation objection to any construction or growth which penetrates a surface, providing it does not stand more than 14 metres above natural ground level. Within the approach and take off fan, no penetrations of the surface are to be permitted.

SHEET 3
INNER APPROACH PLANES AND PROTECTIVE ZONING
SCALE 1:10 000



AERODROME DATA (Refer Annex 14, Chapter 2)				LONGITUDINAL PROFILE OF RUNWAY SLOPES		LEGEND	
AERODROME REFERENCE POINT (A.R.P.)	LATITUDE 41° 19' 44" S LONGITUDE 174° 48' 18" E SITE 171° T 701m from tower.	STRIP	DIMENSIONS 2057 X 152 m END SAFETY AREAS See section 2.3.5 of this plan.	ELEVATIONS ABOVE MSL		⊗ 1 FIRE STATION 2 POWER STATION AND I.L.S. (GLIDE PATH) 3 PRECISION APPROACH RADAR (NOT IN USE) 4 CONTROL TOWER 5 MOT OPS 6 POSSIBLE SITE FOR CONTROL TOWER 7 I.L.S. (LOCALISER) 8 I.L.S. (GLIDE PATH) 9 V.O.R. 10 D.M.E. 11 N.D.B. 12 REFLECTOR	13 RAMP DOWN TO BATTEN STREET (POSSIBLE) AIRPORT BOUNDARY FOR PURPOSES OF BYLAW 1980/3 - ADDITIONAL LAND DESIGNATED FOR AIRPORT BY DISTRICT SCHEME - AIRPORT DEPOT AND WORKSHOPS AS DESIGNATED BY DISTRICT SCHEME - AMENDMENT REQUIRED TO DISTRICT SCHEME LAND NOT REQUIRED FOR AIRPORT PURPOSES (GOLF CLUB)
ELEVATION	40 feet	TAXIWAYS	All surfaces bitumen Width of main taxiway 23m, others vary				
REFERENCE TEMPERATURE	21.1° C (February)	APRONS	SURFACE Part concrete, part bitumen				
RUNWAY	TRUE BEARINGS 3° Both thresholds displaced 61m DIMENSIONS 1935 X 45 m SLOPES See diagram SURFACE Bitumen TYPE Instrument; non precision approach.	STRENGTH OF PAVEMENT	PCN 49 F/A/X/U (for runway, main eastern taxiways and aprons.)				
		DECLARED DISTANCES See current AIP Planning Manual					

SHEET 4
LAYOUT AND DEVELOPMENT PLAN
SCALE 1:5000



LEGEND

- 1 RESCUE/FIRE STATION
- 2 RENTAL CARS - FOR EXTENSION OF RESCUE/FIRE
- 3 RENTAL CARS - FOR USE BY AIRCRAFT SERVICE EQUIPMENT
- 4 FUEL FARM
- 5 NEW DOMESTIC TERMINAL
- 6 EXISTING DOMESTIC TERMINAL

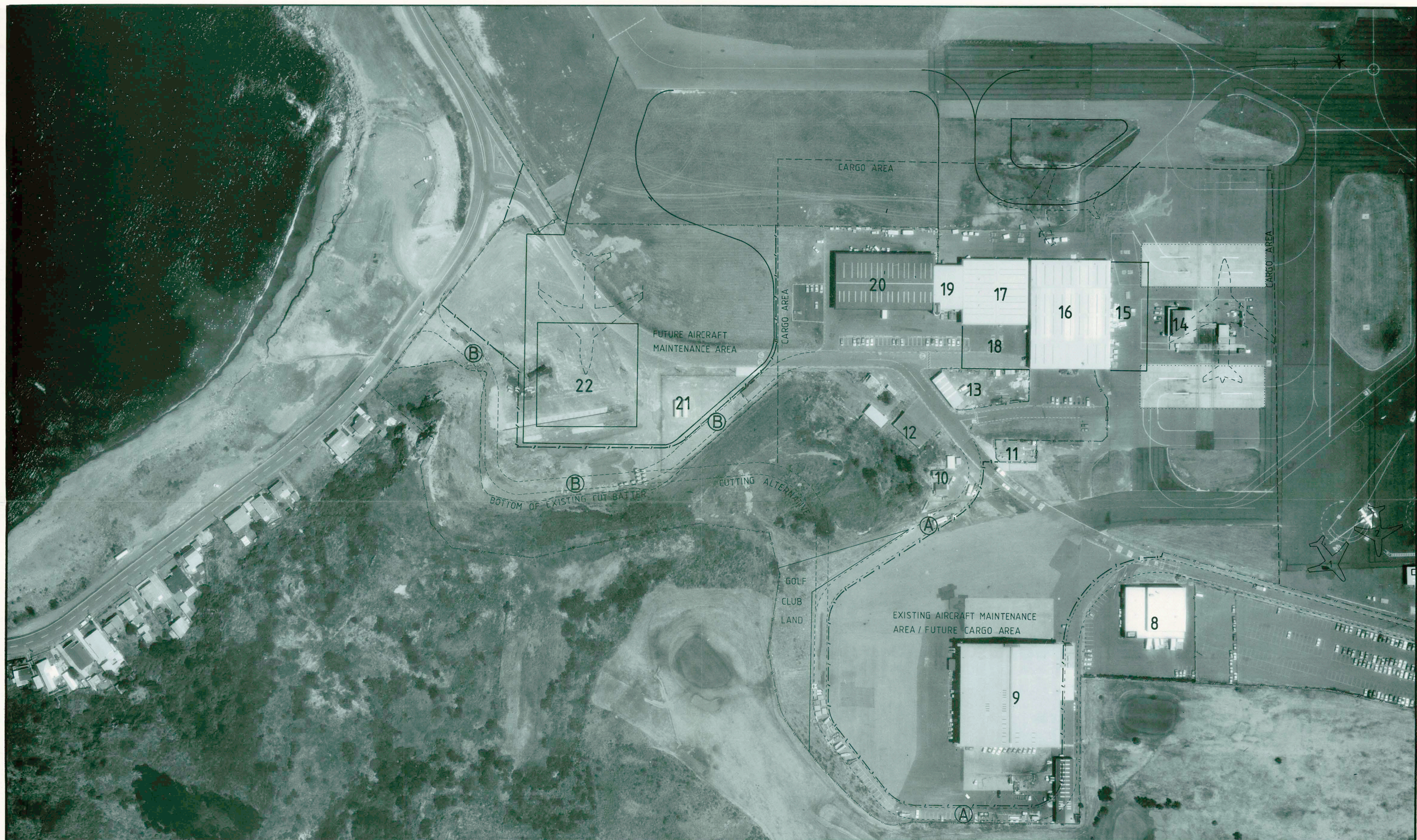
- 7 EXISTING INWARD DOMESTIC CARGO
- 8 CABIN SERVICES
- (A) INITIAL ROAD ALIGNMENT
- PLANE AT GATE 5



- BLAST WALLS
- EXISTING FENCES
- CONCRETE HARDSTAND
- PROPOSED SECURITY FENCES

SHEET 5 WELLINGTON AIRPORT LAYOUT AND DEVELOPMENT PLAN PASSENGER TERMINAL AREA

SCALE 1:1000



LEGEND

- 8 CABIN SERVICES
- 9 EXISTING AIR NEW ZEALAND HANGAR
- 10 SHELL CO.
- 11 AVGAS COMPOUND
- 12 DUTY FREE STORAGE
- 13 AA MAINTENANCE YARD AND BUILDING
- 14 SAFE AIR
- 15 FUTURE EXTENSION TO OUTWARD CARGO

- 16 EXISTING OUTWARD CARGO
- 17 INWARD INTERNATIONAL CARGO
- 18 EXTENSION TO INWARD INTERNATIONAL CARGO
- 19 CARGO OFFICES
- 20 EXISTING FREIGHT FORWARDERS
- 21 BP COMPOUND
- 22 FUTURE LOCATION OF AIR NEW ZEALAND HANGAR

- (A) INITIAL ROAD ALIGNMENT
- (B) FINAL ROAD ALIGNMENT
- CONCRETE HARDSTAND
- PROPOSED SECURITY FENCE
- EXISTING FENCES

SHEET 6
 WELLINGTON AIRPORT
 LAYOUT AND DEVELOPMENT PLAN
 CARGO AREA
 SCALE 1:1000



LEGEND

- | | |
|---|---------------------------------|
| 23 W.C.C. HANGAR | 30 AERO CLUB BUILDING |
| 24 COLD STORE | 31 UNDERPASS |
| 25 MAINTENANCE BUILDING (PROPOSED) | — — — — — EXISTING FENCES |
| 26 FORMER GOVERNMENT HANGAR | — — — — — EDGE OF FUTURE APRON |
| 27 DEVELOPMENT AS GENERAL COMMERCIAL AVIATION | — — — — — FUTURE SECURITY FENCE |
| 28 FORMER U.E.B. BUILDING | |
| 29 AERO CLUB HANGAR | |

SHEET 7 WELLINGTON AIRPORT LAYOUT AND DEVELOPMENT PLAN WESTERN APRON AREA

SCALE 1:1000



Appendix E – Site Photography

Site Location:

Moa Point Road Seawall

Date:

24 October 2024

Project:

WIAL Sea Defences Renewal Project



Photo 1. View from the west end of the seawall. Moa Point Road tunnel is visible far left.



Photo 2. Composition of fill at surface on the seawall



Photo 3. View of the seawall from the east side – other end of Moa Point Road tunnel visible far right.



Photo 4. View from the seawall of the east area / eastern bank, facing south-east.



Photo 5. East side of the seawall, facing north.



Photo 6. East side of the seawall, facing north-east towards the Moa Point WWTP.

Site Location:

Moa Point Road Seawall

Date:

24 October 2024

Project:

WIAL Sea Defences Renewal Project



Photo 7. Vegetated area and mounds on the east side, facing east. Moa Point Road visible in the background.



Photo 8. Vegetated area and mounds on the east bank, facing north.



Photo 9. The recessed area (assumed location of the 1980s objects / tanks), facing south-west.



Photo 9. The recessed area (assumed location of the 1980s objects / tanks), facing west.



Photo 10. The assumed drainage point on the south-east corner of the recessed area.



Photo 11. A fragment of fibre board (suspected ACM) found on the east bank.

Site Location:
Moa Point Road Seawall

Date:
24 October 2024

Project:
WIAL Sea Defences Renewal Project



Photo 12. Example of vegetation in densely vegetated areas.



Photo 13. View from the beach towards Moa Point Road, facing north-east.



Photo 14. Suspected ACM and asphalt in exposed fill – within the eastern bank in line with 35 Moa Point Road.



Photo 15. Suspected ACM in exposed bank - within the far eastern bank in line with 33 Moa Point Road.



Photo 16. A portion of the exposed bank viewed from the beach – a layer of asphalt and timber is visible.



Photo 17. Example of fill contents in the exposed bank.

Site Location: Moa Point Road Seawall	Date: 24 October 2024	Project: WIAL Sea Defences Renewal Project
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Photo 18. Example of fill contents in the exposed bank.



Photo 19. The seawall facing west, viewed from the beach.

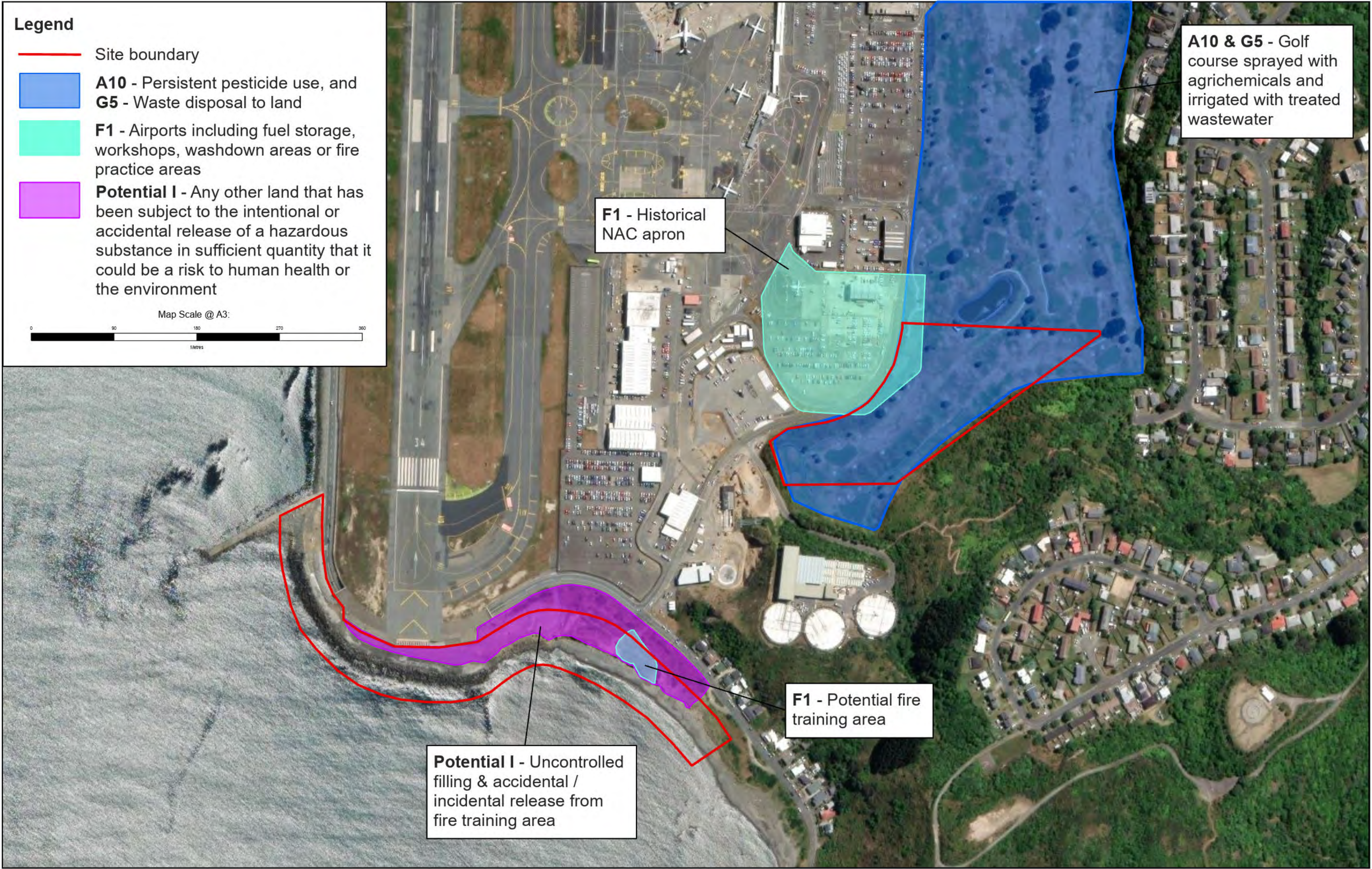


Photo 20. The east bank facing east, viewed from the beach.





Appendix F – HAIL Map



N 	Revision	Drawer	Verified	Approved	Date	Title: HAIL MAP	Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED		Discipline: ENVIRONMENTAL
	1	GJS			01.10.24		Project: SEA DEFENCES STRUCTURES RENEWAL		Drawing No. APPENDIX F
	2	GJS			07.08.25				

