

Central Interceptor Scheme



Central Interceptor Main Project Works Assessment of Effects on the Environment

Part B – Site Specific Assessments

Part B – AEE Report Contents

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Appendix A Certificates of Title

Appendix B Stormwater Calculations

Glossary of terms

Term	Definition
Central Interceptor scheme	Comprises the main tunnel and link sewers and connections to existing reticulation and associated works as well as the CSO Collector Sewers.
Combined Sewer Overflow	The discharge of wastewater and stormwater from a combined sewer system. Typically outfalls to watercourses or marine environment.
dB	Decibel – A measurement of sound level expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$.
dBA	A measurement of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
Decanting Earth Bund (DEB)	A temporary berm or ridge of compacted soil (including topsoil) constructed to create impoundment areas where ponding of runoff can occur and suspended material can settle before runoff is discharged.
Gasket	A mechanical seal which fills the space between two or more mating surfaces, generally to prevent leakage from or into the joined objects.
$L_{Aeq(t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates.
Rising main	From the pump station to the Mangere WWTP the sewer is pressurised by pumping and is termed a rising main.
Siphon (Manukau Siphon)	Siphons (inverted siphons) allow stormwater or wastewater sewers to pass under obstructions such as rivers and harbours. The siphon flows under pressure without pumping. The section of sewer passing beneath the Manukau Harbour is termed the Manukau Siphon.
Tunnel invert	Refers to the bottom of the internal cross section of the tunnel.

Glossary of abbreviations

Abbreviation	Definition
AC	Auckland Council
ACM	Asbestos containing material
AEE	Assessment of Effects on the Environment
ARP: ALW	Auckland Council Regional Plan: Air, Land and Water
ARPS	Auckland Council Regional Policy Statement
ARP: SC	Auckland Council Regional Plan: Sediment Control
ARP: C	Auckland Council Regional Plan: Coastal
ATF	Air Treatment Facility
Auckland City District Plan	Auckland Council District Plan (Auckland City Isthmus Section)
CAR	Corridor Access Request
CBD	Central Business District
CMA	Coastal Marine Area
CMP	Construction management plan
CNMP	Construction noise management plan
CPA	Coastal Protection Area
CPTED	Crime Prevention Through Environmental Design
CSO	Combined Sewer Overflow
CTMP	Construction traffic management plan
DEB	Decanting Earth Bund
ECBF	East Coast Bays Formation
EPB	Earth Pressure Balance
ESCP	Erosion and sediment and stormwater control plan
ID	Internal diameter
LS1	Link Sewer 1: Motions Road to Western Springs
LS2	Link Sewer 2: Norgrove Avenue to Mount Albert War Memorial Reserve
LS3	Link Sewer 3: PS 25 (Miranda Reserve) to May Road
LS4	Link Sewer 4: Kiwi Esplanade to Witla Court
Manukau District Plan	Auckland Council District Plan (Manukau Section)

Abbreviation	Definition
MCA	Multi Criteria Analysis
MOTAT	Museum of Transport and Technology
MT1	Main tunnel section 1: Western Springs to May Road
MT2	Main tunnel section 2: May Road to Mangere Pump Station
MTBM	Micro Tunnel Boring Machine
NES	National Environmental Standard
NoR	Notice of Requirement
OPW	Outline Plan of Works
PAH	Polycyclic aromatic hydrocarbon
PS	Pump Station
PSR	(Auckland Council) Parks, Sports and Recreation
RL	Reduced Level
RMA	Resource Management Act 1991
SH 16	State Highway 16
SH 20	State Highway 20
SMP	Site Management Plan / Remedial Action Plan
SVOC	Semi-volatile organic compound
TBM	Tunnel Boring Machine
TPH	Total petroleum hydrocarbon
UV	Ultraviolet
Watercare	Watercare Services Ltd
WWTP	Wastewater Treatment Plant

(i) Introduction

This Part B of the Assessment of Effects on the Environment (AEE) contains the site specific descriptions and assessments for each of the construction sites. It covers:

- Site location, property details and existing environment information;
- Proposed works, including permanent features and construction works; and
- Assessment of effects on the environment.

This Part B should be read in conjunction with Part A of the AEE which provides an overview of the project and the effects. The particularly relevant sections are:

- Section 5 - descriptions of the types of site facilities and typical schematics;
- Section 6 - potential construction methods and construction management;
- Section 11 - assessment of the effects of the tunnels;
- Section 12 - summary of the effects at the sites.

Reference should also be made to the A3 drawing set in Part C.

For each site the proposed works expected to occur at each location have been generally described. The permanent works and construction equipment and activities include, but are not limited to, the listed items in each section. The project has been developed to a concept design stage and it is likely that some design and construction details will change as the project is optimised in the detailed design and construction stages. While the layouts and dimensions provided in the AEE and drawings are approximate, the designs represent an appropriate basis for assessing the potential effects arising from construction, operation, inspection and maintenance of the main project works.

Part B draws on information contained in the following technical reports which can be found in Part D Appendices A to K:

- Landscape and Visual Assessment (Boffa Miskell, Technical Report A)
- Arboricultural Assessment (Arborlab, Technical Report B)
- Assessment of Ecological Effects (Boffa Miskell, Technical Report C)
- Archaeological Assessment (Clough & Associates, Technical Report D)
- Traffic Impact Assessment (Traffic Design Group, Technical Report E)
- Noise Impact Assessment (Marshall Day Acoustics, Technical Report F)
- Vibration Assessment (Tonkin & Taylor, Technical Report G)
- Odour Assessment (Beca, Technical Report H)
- Ground Contamination Assessment (Tonkin & Taylor, Technical Report I)
- Groundwater and Surface Settlement Assessment (Tonkin & Taylor, Technical Report J)
- Erosion and Sediment and Stormwater Control Plans (SKM, Technical Report K)

The sites are ordered as follows:

Part B Section No.	Site name	Shaft No.	Classification	Drawing reference
Main Tunnel				
1A	Western Springs	WS 1	Primary	AEE-Main-1.1 AEE-Main-1.3
1B	Western Springs			AEE-Main-1.2

Part B Section No.	Site name	Shaft No.	Classification	Drawing reference
	CSO Collector			AEE-Main-1.4
2	Mount Albert War Memorial Reserve	AS 1 L2S3	Secondary	AEE-Main-2.1 AEE-Main-2.2
3	Lyon Avenue	AS 2	Secondary	AEE-Main-3.1 AEE-Main-3.2
4	Haverstock Road	AS 3	Secondary	AEE-Main-4.1 AEE-Main-4.2
5	Walmsley Park	AS 4	Secondary	AEE-Main-5.1 AEE-Main-5.2
6	May Road	WS 2	Primary	AEE-Main-6.1 AEE-Main-6.2
7	Keith Hay Park	AS 5	Secondary	AEE-Main-7.1 AEE-Main-7.2
8	Pump Station 23 (Frederick Street)	AS 6	Secondary	AEE-Main-8.1 AEE-Main-8.2
9	Kiwi Esplanade	AS 7	Secondary	AEE-Main-9.1A AEE-Main-9.2A
10	Mangere Pump Station	WS 3	Primary	AEE-Main-10.1 AEE-Main-10.2
Link Sewers				
11	Motions Road	L1S1	Secondary	AEE-Main-11.1 AEE-Main-11.2
12	Western Springs Depot	L1S2	Secondary	AEE-Main-12.1 AEE-Main-12.2
13	Rawalpindi Reserve	L2S1	Secondary	AEE-Main-13.1 AEE-Main-13.2
14	Norgrove Avenue	L2S2	Secondary	AEE-Main-14.1 AEE-Main-14.2
15	Pump Station 25 (Miranda Reserve)	L3S1	Secondary	AEE-Main-15.1 AEE-Main-15.2
16	Miranda Reserve	L3S2	Secondary	AEE-Main-16.1 AEE-Main-16.2
17	Whitney Street	L3S3	Secondary	AEE-Main-17.1 AEE-Main-17.2
18	Dundale Avenue	L3S4	Secondary	AEE-Main-18.1 AEE-Main-18.2
19	Haycock Avenue	L3S5	Secondary	AEE-Main-19.1 AEE-Main-19.2

(ii) Mitigation measures

A number of measures are proposed to mitigate potential adverse effects. These differ for each construction site. Prior to commencement of works, a construction management plan or plans will be prepared which will address construction issues and mitigation measures and cover vibration management, noise management, traffic management, tree protection, archaeological site discovery protocols, erosion and sediment control, contaminated land management, and communications management.

Mitigation measures more specific to particular effects are addressed below. Site specific mitigation is set out in this report.

A. Landscape and visual

A number of measures are proposed to mitigate landscape and visual effects. The specific measures to be implemented will depend on the site, but generally include:

- Site reinstatement works, including regrassing, revegetation, landscaping, and reinstatement of facilities (such as park furniture) where these have been removed for construction;
- Where practicable, use of grass cell or similar for permanent access areas to provide all weather vehicle access whilst reducing visual impacts;
- Perimeter fences around main construction works areas to screen construction activities and protect public health and safety. These fences may themselves have some visual effects and where appropriate it may be possible to incorporate measures such as murals or information boards to mitigate these effects;
- Incorporation of appropriate urban design and CPTED (Crime Prevention Through Environmental Design) principles in the design of temporary pedestrian accessways and permanent facilities such as air treatment facilities;
- Removal of the temporary construction platform at PS 23 (Frederick Street).

Reinstatement works in parks and reserves will be developed in conjunction with Auckland Council and Local Boards (or Regional Facilities Auckland at Western Springs and the Crown at Lyon Avenue) and the Landscape and Visual Assessment (Part D Technical Report A) contains potential options as a starting point.

B. Recreation and public access

The construction sites have been designed to minimise effects on recreation and public access, for example by as far as possible locating sites outside of areas of high use or active recreation. Further mitigation measures generally include:

- Consideration of CPTED principles in design of construction site layouts and permanent works;
- Provision of alternative pedestrian/cycle pathways where existing pathways are impacted by construction works;
- Consideration of retention of mature trees where possible;
- Reinstatement works will be developed in conjunction with Auckland Council and Local Boards (or Regional Facilities Auckland at Western Springs and the Crown at Lyon Avenue) and seek to coordinate with long term plans for the parks and reserves. This will depend on the site, but may include replanting, restoration of pedestrian linkages, and/or integration with Auckland Council stream enhancement projects.

C. Vegetation

Measures for mitigating effects of vegetation removal will depend on the circumstances and effects at each site. Mitigation may include the following measures, or a combination of these:

- Pruning rather than removing trees where practicable;

- Replacement planting at sites where trees have been removed;
- Where works are in close proximity to retained trees, use of tree protection measures where appropriate; and
- Relocation of trees e.g. within council reserves, where practicable.

D. Ecology

At sites identified as having or potentially having native lizards present (Mt Albert War Memorial Reserve, Lyon Avenue, May Road, PS 23 (Frederick Street), Motions Road, and PS 25 (Miranda Reserve)), a skink salvage operation is proposed to trap and relocate native skinks prior to construction commencing.

At Lyon Avenue, PS 23 (Frederick Street), and PS 25 (Miranda Reserve) replanting and/or enhancement (e.g. infill planting) of existing bush areas, is proposed to mitigate the ecological effects of vegetation removal. Options are addressed in the Ecology Report (Part D Technical Report C).

The temporary construction platform at PS 23 (Frederick Street) is proposed to be removed following construction.

E. Archaeology

To manage the potential for the discovery of unrecorded archaeological remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga, or koiwi tangata (human remains) are exposed during the works.

F. Traffic

Construction traffic movements for each of the sites are described in Part B of the AEE. A range of site specific traffic management provisions have been proposed at sites to manage traffic effects. Mitigation measures to be generally implemented at each site are:

- Restricting heavy vehicles to the largest allowable truck size as shown on the truck tracking curve diagrams;
- Ensuring construction truck routes generally avoid right turns and follow arterial routes as described in the traffic impact assessment report (Part D Technical Report E);
- Limiting truck movements outside of normal working hours; and
- Preparing a Construction Traffic Management Plan(s).

G. Noise

Various measures are proposed to manage construction noise. Noise barriers will be installed at some construction sites where appropriate. These will be constructed early in the project where practicable. A construction noise management plan will be prepared to assist with the management of noise during construction. Mitigation measures that may be employed include managing construction hours for noisier activities, communication with neighbours, and use of less noisy construction methods where practicable. At the May Road and Western Springs sites enclosures will be constructed over the construction shafts to reduce construction noise levels. Where blasting is required, controlled blasting techniques will be used to keep noise to acceptable levels.

H. Vibration

Mitigation of vibration will generally be through the management of construction to limit generation at the source. This would include measures such as maintenance of access roads to limit vibration from heavy vehicles, use of best practice controlled blasting methods, maintenance of equipment etc. If it is necessary to further limit the magnitude of vibrations, methods will depend on the situation, but may include measures such as:

- Use of an alternative method of construction;

- Isolation of the source (e.g. use of elastic or rubber packers beneath rails over critical section of rail);
- Construction of a vibration attenuation barrier between the source and receiver e.g. excavation of a trench, installation of a barrier or series of piles or open holes;
- Possible relocation of residents for the period when vibrations exceed tolerances;
- Modification of the affected building structure to change the response characteristics e.g. installation of bracing to modify the building response frequency; and
- Isolation of very sensitive equipment such as utilising an airbag or floating slab.

I. Groundwater and settlement

The effects of the proposed works on groundwater and ground settlement will be largely managed through the use of appropriate construction methodology:

- Use of an Earth Pressure Balanced TBM or similar methodology (and/or ensure a suitably water tight liner is installed quickly following excavation) will help to limit groundwater effects during construction where the main tunnel is excavated in Kaawa sands and Puketoka Formation (in the Manukau Lowlands, just to the north of the Mangere Pump Station site) or in high permeability ECBF;
- Installation of tunnel liner to minimise groundwater infiltration into the tunnel; and
- Use of appropriate shaft construction methodologies e.g. secant piling, diaphragm walling, open caisson and/or basalt grouting or a combination of such methods; and diaphragm walling methodology at WS3 Mangere Pump Station.

J. Odour

A combination of methods will be used to mitigate the effects of odour, as identified throughout the report. In summary these are:

- Maintaining the system under negative pressure during normal operating conditions;
- Installing primary air treatment facilities at Mangere WWTP and secondary air treatment facilities at PS 23 (Frederick Street) with provision for facilities to be installed later at Western Springs, May Road, and PS 25 (Miranda Reserve) if determined to be needed;
- Designing air intakes to minimise the potential for winds blowing across the vent creating venturi effects within the duct and drawing out odorous air; and
- Managing the cleaning of grit traps, to reduce the potential for odour generation. Management measures could include:
 - Cleaning up of any spilt materials rapidly.
 - Timing maintenance to minimise disruption to nearby receivers (e.g. during the daytime in residential areas).
 - Transportation of material removed from grit chambers in an enclosed vehicle to appropriately authorised disposal facilities.

K. Monitoring

Monitoring measures, and contingency procedures and measures in the event of issues arising, will be included in the relevant sections of the CMP. Noise and vibration levels will be measured during critical phases of construction. Groundwater and settlement monitoring will be undertaken to measure the effects that construction has on the groundwater system around the shafts, tunnels and on ground surface levels above the tunnels. The CMP would contain procedures in the event that groundwater/settlement responses behave differently than expected or approach or exceed set trigger levels. Contingency measures will be identified and implemented as necessary.

1A. Western Springs (WS1)

1A.1 Introduction

The Western Springs WS1 site is on the main tunnel MT1 alignment and is required as a construction base and to provide a connection to the existing Branch 7 Sewer. It is also a connection point to the main tunnel for proposed LS 1 and CSO Collector Sewer CC2. The site is a key long term access site and a potential key connection site for the future link to the CBD. The site is a primary construction site that will operate as either a launch or reception site for the TBM.

The proposed works are shown on drawing numbers AEE-MAIN-1.1 and 1.3 included in the A3 drawing set (Part C).

1A.2 Location and site description

The Western Springs site is located at Western Springs Park, 731 Great North Road, Grey Lynn. The construction site is located to the north of the playing fields between Bullock Track and Western Springs Stadium.

The site is zoned Open Space 3 (organised recreation) in the Auckland City District Plan and is located on flat land adjacent to the playing fields at Western Springs and the entrance to Western Springs Stadium. The site is designated for a council carpark (C06-08) and the District Plan contains a concept plan for the Western Springs Stadium (C05-08). The site is located at the base of a steep vegetated slope which rises up to Old Mill Road at the top of the ridge. There is a public walkway through the bush which runs along the base of the slope past the proposed construction area. The playing fields consist of rugby fields in winter and cricket ovals in summer. On the other side of the fields, there is a row of mature Cedar trees between the playing fields and Great North Road and Stadium Road.

The Museum of Transport and Technology (MOTAT) is located to the south west of the site and Western Springs Park and Auckland Zoo are to the west. There is residential development to the north and east of the site and to the south on the other side of Great North Road. A car yard is located on the corner of Great North Road and Bullock Track.

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.



Figure 1A-1 Location plan

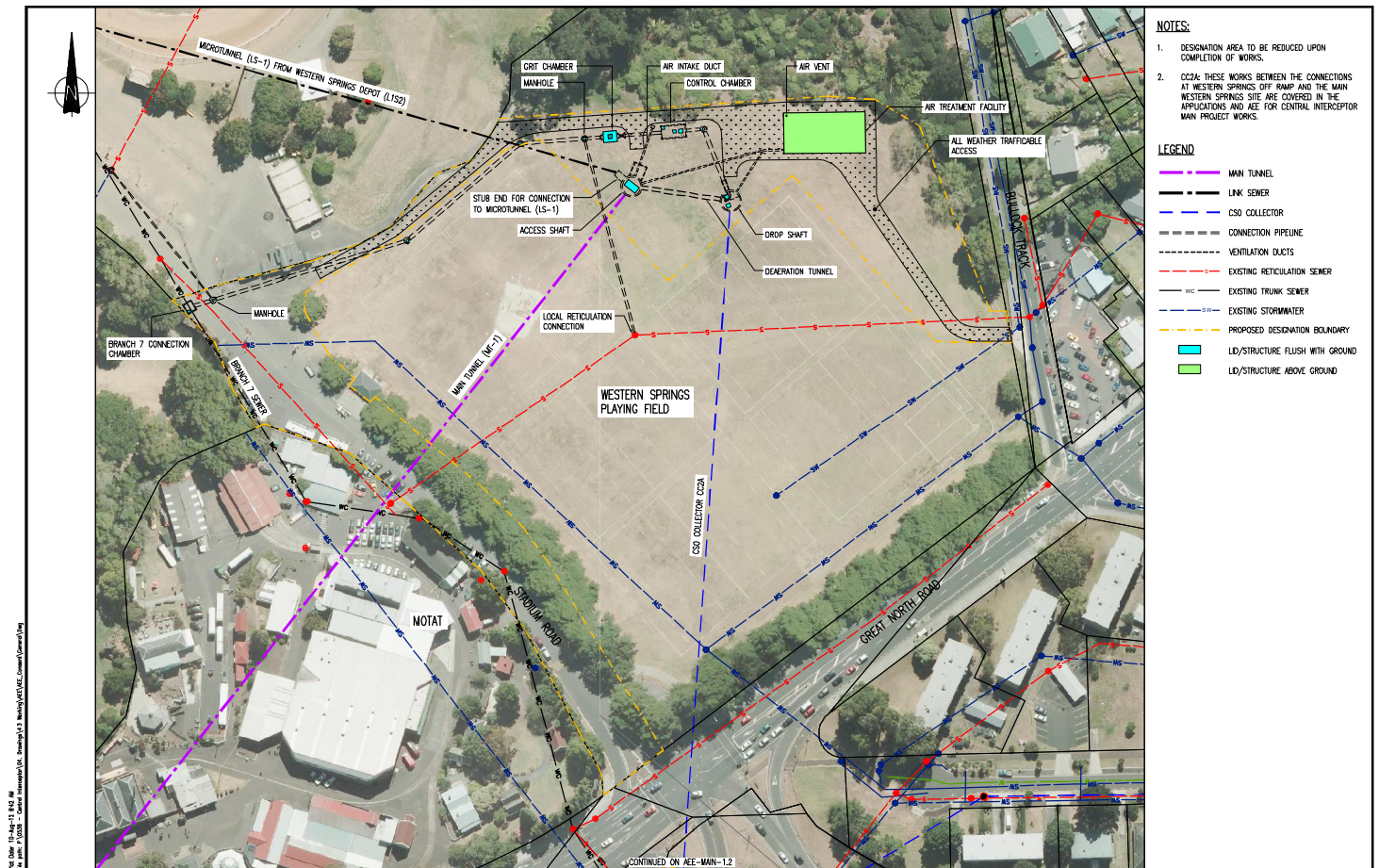
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Photograph 1A-1 main construction area

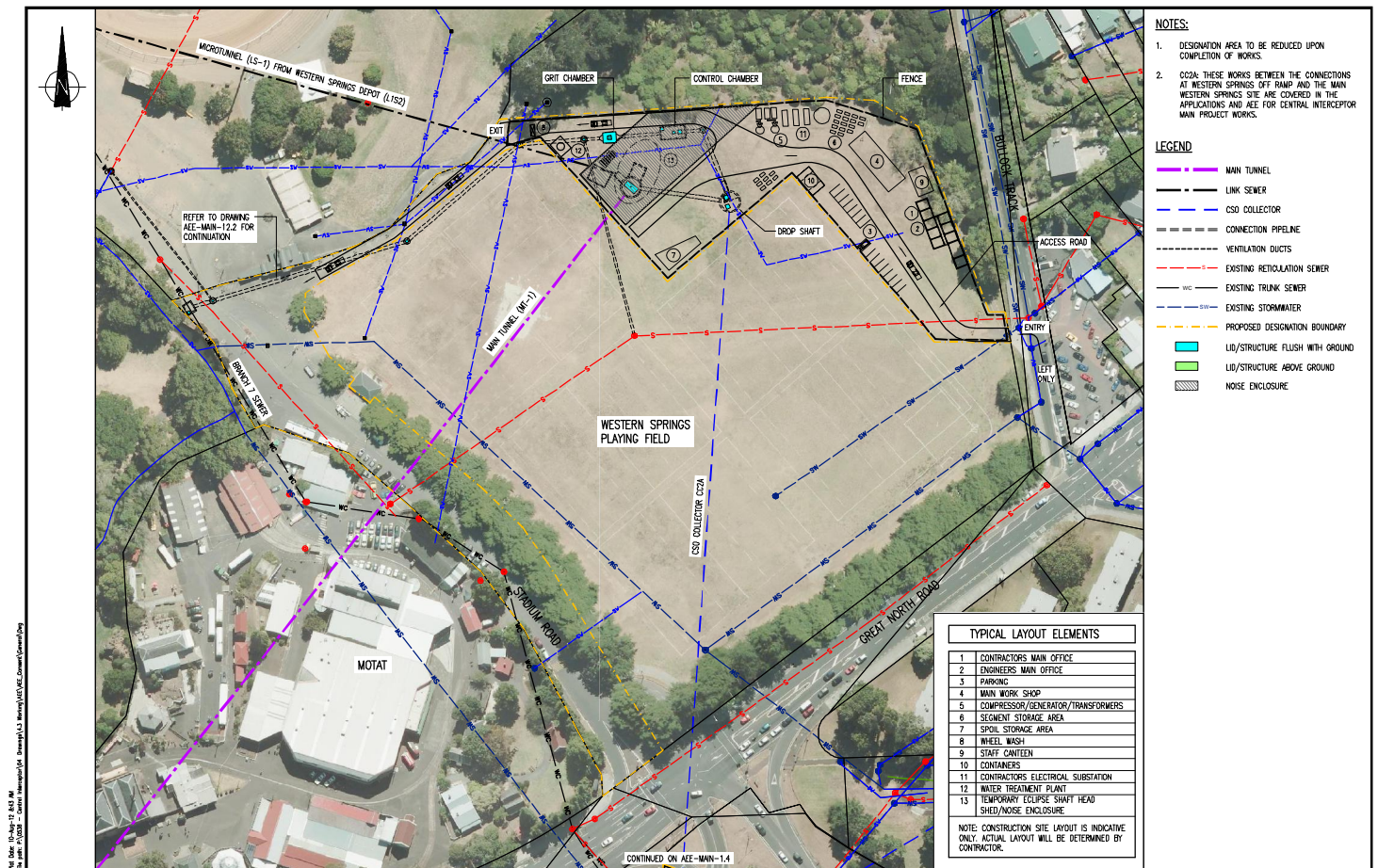


Photograph 1A-2 construction are from Stadium Road



- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
 - CSO24 THESE WORKS BETWEEN THE CONNECTIONS AT WESTERN SPRINGS OFF RAMP AND THE MAIN WESTERN SPRINGS SITE ARE COVERED IN THE APPLICATIONS AND AEE FOR CENTRAL INTERCEPTOR MAIN PROJECT WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LIQ/STRUCTURE FLUSH WITH GROUND
 - LIQ/STRUCTURE ABOVE GROUND

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT	waterCare services limited	CENTRAL INTERCEPTOR GENERAL WESTERN SPRINGS (WS1) - PERMANENT WORKS PLAN	CAD FILE AEE-MAIN-1.1	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1250 A3	0538
DWG. CHECKED		JS	08/12	AEE AUGUST 2012	DRAWING No.	ISSUE	AEE-MAIN-1.1	A
REV'D P. MGR		JS						
ISSUE	DATE	AMENDMENT	BY	APPROV.	DATE	REVISION MARKS		
A	17/08/12	CONSENT ISSUE	AP	PH	APPRO. P. DIR	CC		



- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
 - CSO24 THESE WORKS BETWEEN THE CONNECTIONS AT WESTERN SPRINGS OFF RAMP AND THE MAIN WESTERN SPRINGS SITE ARE COVERED IN THE APPLICATIONS AND AEE FOR CENTRAL INTERCEPTOR MAIN PROJECT WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LIQ/STRUCTURE FLUSH WITH GROUND
 - LIQ/STRUCTURE ABOVE GROUND
 - NOISE ENCLOSURE

TYPICAL LAYOUT ELEMENTS

1	CONTRACTORS MAIN OFFICE
2	ENGINEERS MAIN OFFICE
3	PARKING
4	MAIN WORK SHOP
5	COMPRESSOR/GENERATOR/TRANSFORMERS
6	SILTMENT STORAGE AREA
7	SPOIL STORAGE AREA
8	WHEEL WASH
9	STAFF CANTEEN
10	CONTAINERS
11	CONTRACTORS ELECTRICAL SUBSTATION
12	WINTER TREATMENT PLANT
13	TEMPORARY ENCLOSURE SHAFTHEAD SHED/NOISE ENCLOSURE

NOTE: CONSTRUCTION SITE LAYOUT IS INDICATIVE ONLY. ACTUAL LAYOUT WILL BE DETERMINED BY CONTRACTOR.

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT	waterCare services limited	CENTRAL INTERCEPTOR GENERAL WESTERN SPRINGS (WS1) - CONSTRUCTION WORKS PLAN	CAD FILE AEE-MAIN-1.3	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1250 A3	0538
DWG. CHECKED		JS	08/12	AEE AUGUST 2012	DRAWING No.	ISSUE	AEE-MAIN-1.3	A
REV'D P. MGR		JS						
ISSUE	DATE	AMENDMENT	BY	APPROV.	DATE	REVISION MARKS		
A	17/08/12	CONSENT ISSUE	AP	PH	APPRO. P. DIR	CC		



Existing View (from Stadium Road)



Proposed View - Indicative



Existing View (from Bullock Track)



Proposed View - Indicative

1A.3 Land ownership and interests

Main site	
Address	731 Great North Road, Grey Lynn
Legal description	Lot 12 DP 168863
Title reference	NA103A/1
Owner	Regional Facilities Auckland Ltd
Reserve status	n/a
Local Board	Waitemata

1A.4 Proposed works

1A.4.1 Permanent works

Drawing reference	AEE-MAIN-1.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel, Link Sewer 1, CSO Collector Sewer CC2A • Connecting pipes to Branch 7 Sewer and local reticulation overflows • 7 m ID access shaft (27 - 42 m deep) • 7 m ID drop shaft (27 - 42 m deep) • Deaeration tunnel • Grit chamber • Control chamber • Connection chamber • Air intake • Air treatment facility and air vent • Manholes
Site reinstatement	<ul style="list-style-type: none"> • Regrassing and replanting • Astro turf covers (or similar) over shaft covers
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access to main site via Bullock Track/Stadium Road. Access required approximately once a week for normal operation (or less frequent without ATF).
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Periodic emptying of grit trap • Maintenance of control gates • Maintenance of ATF

1A.4.2 Construction works

Drawing reference	AEE-MAIN-1.3
Construction site area	Main construction area approx 8,400 m ² , plus Stadium Road upgrades
Duration of construction	5 years
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 27 - 42 m deep 25 x 15 m ellipse shaped shaft for TBM launch or reception; 27 - 42 m deep drop shaft • TBM assembly and launch/retrieval • MTBM launch and retrieval • Removal of spoil from tunnel • Spoil storage • Liner segment handling and storage • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – access and drop shafts, ATF and air vent, grit, control and connection chambers • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: security fencing, site offices, staff canteen, staff/visitor parking • Site access roading (including upgrading of Stadium Road) • Noise enclosure shed over shaft • Crawler crane, piling rigs, ground improvement rigs, tower crane or gantry crane • Water treatment equipment • Wheel wash • Grout equipment • Slurry separation plant • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment • Workshops • Electrical substation • Compressor/generator • Site lighting <p>If the site is used for TBM reception only some activities would not be required or would be reduced in scale. Spoil removal/storage would be limited to shaft excavations and segment storage would not be required. A mobile crane would be used when required.</p>

1A.4.3 Air treatment facility

A staged approach is proposed for the project air treatment facilities. Construction of an air treatment facility at this site is proposed at a later stage, if required following a review of system ventilation after

a period of scheme operation (i.e. if odour discharges become an issue). It is intended to be provided for within the designation, in the event that it is required.

If required, the Air Treatment Facility (ATF) proposed for this site is a secondary (wet weather flow) air treatment facility 30 x 15 m, around 5 m high with a 0.9 m diameter ventilation stack extending 1 m high from the top of the building. Other ancillary structures are proposed to be below ground level.

An indicative location for the ATF is shown on Drawing AEE-Main-1.1. The final design will be developed at a later stage should the review referred to above demonstrate that such a facility is required. Details of the final design will be provided in an Outline Plan of Works (OPW).

1A.5 Assessment of effects

1A.5.1 Landscape and visual effects

Views of the perimeter fence and any structures visible above the fence would be confined to the eastern side of Bullock Track in front of the car yard, along the southern side of Great North Road, and within the park, including Stadium Road and the playing fields. Views beyond the open space are partially obscured by the perimeter of cedar trees around the outer edge of the park. The viewing audience would consist of park users, residents in the flats facing Great North Road, and motorists and pedestrians using the roads outside of the park.

1A.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Removal and pruning of mature trees at the edge of the works area;
- Construction of a perimeter fence;
- Visibility of a temporary shed over the shaft head;
- Visibility of the construction of the ATF building above the fence; and
- Construction activity and vehicle movements.

In summary, it is expected that there will be a more than minor level of adverse effects on open space and landscape character during the construction period due to the use of the open space and the external appearance of the fence. Minor adverse effects on visual amenity are expected due to the limited visibility of the works from residential locations, the transient nature of much of the viewing audience (predominantly passing foot and vehicle traffic) and the visual context (views are generally backdropped by rising landform and vegetation).

1A.5.1.2 Permanent effects

Permanent features that will remain at the site are the site accessway around the facilities, the ATF (if required) and air vent, access and drop shafts, grit chamber, control and connection chambers, and manholes. The air treatment facility and air vent will be above ground structures, while the others will be below ground with covers at ground level, flush with the adjacent surface. Photomontages of the site before and after are shown on the earlier Figure 6 and 7 (from the landscape and visual assessment in Part D Technical Report A).

The design of the ATF will be developed at a later date, should the ATF be required, with key urban design principles, including CPTED to be considered. Site reinstatement measures include repairing and grassing the land surface and installing astro turf (or similar) over covers where required to minimise the impact on the playing fields. The details of site reinstatement will be developed in discussion with Regional Facilities Auckland. Regional Facilities Auckland has indicated that they are looking at possibilities for future development of the playing fields area at Western Springs.

Adverse effects on open space and landscape character are expected to be less than minor, with the potential for small beneficial effects, depending on the final design. Visual amenity effects are expected to be neutral and over time as the elements weather, and any planting matures, these effects would be beneficial.

1A.5.2 Recreation and public access effects

There will be no public access within the area required for construction for the duration of the works. However public access to the playing fields will be maintained and pedestrian access is provided around the edge of the flat open space adjacent to the adjoining road network. A path is provided through the lower slopes of the hill connecting Bullock Track to the stadium and up the hill to Old Mill Road and Surrey Crescent.

The construction site and location of permanent works have been designed so as to minimise impact on the adjacent playing fields, although there will be some impact on amenity during construction due to construction noise, traffic movements and construction structures. This disruption will be ongoing during the construction period of around 5 years. There is a small area of trenching required to connect to one of the existing sewers that may cross a corner of a playing field. Due to the short duration of this work it could be undertaken mid-week (or at some other time in agreement with Regional Facilities Auckland) to avoid disruption to scheduled sports activities.

The ATF (if required) will permanently occupy an area of space at the edge of the field. This will be designed so far as possible to minimise impact on the playing fields and on visual amenity at the site. For example, it may be possible to integrate a shelter or viewing area into the structure.

It is understood that the playing fields are used as a temporary parking area during events at Western Springs. The occupation of an area of the park will therefore result in a small reduction in parking in these circumstances.

The footpaths on both sides of Bullock Track, Stadium Road, and Great North Road will remain functional during construction. The site will be enclosed in fencing and existing pedestrian refuges on Bullock Track, the signalised intersection at Stadium Road/Great North Road and speed bumps on Stadium Road will all help to ensure that pedestrians will be able to travel safely around the perimeter of the site during construction.

The footpath in Western Springs Park to the north and east of the site will remain open during the works and adequate sight distance is provided to make sure the site access road is clear before pedestrians cross.

Overall, there will be minor effects on recreation and public access during the period of construction.

1A.5.3 Vegetation effects

The site is largely grass-covered and sits at the base of a vegetated slope. Key vegetation within the main site construction footprint consists of several poplar trees, a willow tree, and an area of native planting of mixed species. Species on the edge of the construction area include ngaio, poplar, ti kouka, and willow.

The trees within the construction area will be removed. The trees are not significant specimens, but they do contribute to the general vegetative cover at the edge of the field. This could be partially mitigated by replanting and improving landscaping over the long term. Other native trees on the fringe of the main site construction area have overhanging branches and will require pruning and/or protection during construction. The pruning would be minor and would not adversely affect the trees' form or vigour.

To upgrade the access along Stadium Road will require works within the dripline of a row of significant cedar trees on the eastern side of Stadium Road. Measures will be taken to minimise the effect on these trees, for example only minor pruning and branch lifting using tiebacks, if temporary clearance under the lower branches is required. Measures will also be undertaken to minimise the effects on the rootzone of the trees, including avoiding root loss where possible, and minimising changes in water infiltration, soil moisture levels and gaseous exchange.

1A.5.4 Ecological effects

The habitat type at the site is grass with a few exotic trees and the site has no ecological value with respect to vegetation. Bird values at the site are low. Native bird species identified at the site were

paradise shelduck, spur-wing plover, kingfisher and swallow. Introduced species were blackbird, myna, sparrow, starling, mallard, and chaffinch. The site is of low value as lizard habitat.

Some vegetation removal will be required but the vegetation is not of ecological value. The loss of mown field habitat for bird feeding is expected to be of less than minor effect as there is ample habitat available elsewhere. The site has low overall ecological value and, as a result the ecological effects of the main project works are considered to be less than minor.

1A.5.5 Archaeological and heritage effects

The Western Springs area has a number of recorded archaeological sites relating to both Maori and European heritage. In this area there are five archaeological sites, one maritime heritage site, three military heritage sites, four historic structures, a brick findspot, and three Maori Heritage Sites (Wai Orea (Western Springs main lake), Nga Kauaewhati and Te Rehu), with other sites located in the wider area. Although there are a number of identified sites in the wider Western Springs area, there are no archaeological sites identified within the construction footprint. None of the heritage buildings or known archaeological sites in the Western Springs area will be affected by the proposed works.

A field survey did not identify archaeological remains in the northern corner of the playing fields, but the swampy nature of the ground and its close proximity to a former ridge pa means there is potential for isolated artefacts related to Maori settlement to be uncovered during construction works in this area. It is unlikely that structural remains relating to occupation (such as pits and post holes) would be present due to the swampy nature of the ground which would have made it less suitable for settlement. Subsurface testing to locate isolated finds is not considered feasible. To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

There are several heritage buildings located nearby at MOTAT. As assessed in the Vibration Report (Part D, Technical Report G), the risk of damage due to vibration effects on the buildings at MOTAT is considered to be very low.

1A.5.6 Traffic effects

1A.5.6.1 Existing environment

The characteristics of the surrounding roads are summarised below:

- Great North Road:
 - Is a District Arterial Road in the Auckland City District Plan;
 - Provides linkages between Avondale in the west and central Auckland in the east;
 - Forms a signalised intersection with Stadium Road and SH16 eastbound on/ off-ramps at Western Springs/MOTAT to the western edge of the site;
 - Forms a priority intersection with Bullock Track and Tuarangi Road to the eastern edge of the site.
- Stadium Road:
 - Is part of Lot 12 DP 168863, owned by Regional Facilities Auckland;
 - Is a Local Road in the Auckland City District Plan;
 - Serves as a feeder road for the Western Springs Stadium parking area, as well as a parking area for MOTAT and the Western Springs playing fields.
- Bullock Track
 - Is a Collector Road in the Auckland City District Plan;
 - Provides a connection between Great North Road in the south and Old Mill Road / Surrey Crescent in the north.

1A.5.6.2 Traffic effects arising from construction works

At this primary construction site, which will either be a launch or retrieval site for the TBM, construction traffic will typically be large truck and trailer units with a typical capacity of 15 m³. Traffic movements will vary through the phases of construction and by construction season, ranging between 18 to 60 standard vehicle movements per day and 64 to 104 heavy vehicle movements per day.

A site entry is proposed to be located on Bullock Track with one-way access through the site and exit via Stadium Road. This arrangement will prevent right turns onto Bullock Track and address potential safety issues with vehicles turning right onto Great North Road from Bullock Track southbound.

It is proposed to upgrade Stadium Road to ensure the safety of school children being dropped off at the MOTAT entrance on Stadium Road. This will include a 2 m footpath on the western side of Stadium Road, a bus drop-off area on the western kerb, and widening of Stadium Road on the eastern side by reducing the existing footpath width (to avoid additional encroachment on trees).

The effects of the proposed works on the surrounding intersections have been modelled using SIDRA. There could be small increases in delays and queue length resulting in a no more than minor impact at the following intersections:

- Great North Road/Stadium Road/MOTAT on/off ramp (less than minor);
- Great North Road/ Bullock Track/Tuarangi Road (minor);
- Great North Road/St Lukes Road (less than minor); and
- St Lukes Road/Western Springs on/off ramps (less than minor).

The construction works at the Western Springs site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period with mitigation measures in place. These include limiting vehicle movement to left hand turns only and limiting movements during major events at Western Springs Stadium (discussed further in Section 1A.5.14), as well as the measures described in Section (ii) "Mitigation Measures" at the beginning of this report.

1A.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance, such as cleaning of grit traps, and maintenance of control gates and the ATF. Access is proposed via the existing maintenance road off Stadium Road. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per week.

1A.5.7 Noise effects

1A.5.7.1 Existing environment

The nearest residential receivers are located approximately 60 m to the east of the main site, with further dwellings to the north on Old Mill Road, and to the south on Great North Road.

Currently the predominant noise source is traffic from surrounding roads. An ambient noise level of 65 dB L_{Aeq} was measured on 12 May 2011 during the day time and 55 dB L_{Aeq} was measured on 19 July 2011 during the night time.

1A.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling. At this primary construction site construction operations will occur 24 hours a day 7 days a week. The Construction Noise Standard contains lower noise limits for evening periods and Sundays and public holidays. To manage noise levels it is proposed to construct an enclosure over the temporary tunnelling shaft site with a weighted sound reduction index (Rw) of at least 40. Openings will be designed to face away from sensitive noise receivers.

Other measures proposed to manage noise levels are:

- Concentration of truck traffic in the Monday-Saturday day-time and weekday evening periods to limit noise impact during the night-time;

- Closure of enclosure doors at night-time to ensure maximum noise reduction;
- Limiting noise intensive construction work to within the enclosure other than Monday to Saturday daytime (0730 – 1800hrs) and weekday evening (1800 – 2000hrs) periods. (Night-time works outside the enclosure of a less noise intensive nature may still occur);
- Containing the generator, compressor, electrical substation, and water treatment equipment within suitable noise barriers or enclosures.

A draft construction noise management plan has been prepared which includes recommendations and processes to mitigate noise levels (refer Part D Technical Report F).

Noise levels at the closest noise sensitive receivers (42 Sefton Avenue, 6 Old Mill Road and 744 Great North Road) due to tunnelling and excavation are expected to be typically between 50 to 64 dB L_{Aeq} during the Monday to Saturday day-time and weekday evening periods and 40 to 45 dB L_{Aeq} at all other times. Construction noise levels are predicted to be compliant with the Construction Noise Standard and will be similar to the ambient noise levels of the area.

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges are not expected to exceed the Construction Noise Standard at the nearest residential receiver, but if noise from this preparatory work becomes an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

1A.5.7.3 Operational noise effects

Long term noise emission sources at the site are the air treatment facility (fans etc.) and the air intake (the movement of air, although this is not expected to be significant). Noise levels from the air intake at nearby sites are predicted to be readily compliant with the proposed noise limit (refer proposed designation conditions and noise impact assessment in Part D Technical Report F). Air treatment facility noise levels will be compliant with mitigation measures in place (including an enclosure of appropriate materials and design). Noise levels from the air treatment facility are predicted to be between 34 to 40 dB L_{Aeq} at representative nearby dwellings.

1A.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting may be required during construction of shafts and underground chambers. Given the separation distance at this site, any vibration effects are expected to be less than minor. In comparison, vibration levels generated by the MOTAT tram are expected to exceed transmitted vibrations arising from the Central Interceptor construction activities at the Western Springs site.

1A.5.9 Odour effects

Most of the time during normal operation adverse effects due to odour discharges are not expected to occur. The two main potential air discharge points at Western Springs are the grit trap (during routine cleaning) and displaced air vented via the air intake. During heavy rainfall events that cause the main tunnel to fill and prevent air extraction and treatment at the Mangere ATF it is possible air may be discharged at this air intake. This would likely only occur around 6 to 8 times per annum (or less if the ATF at May Road is installed). As part of the staged approach to odour management (refer Part A Section 5.5), if these air discharges become an issue, a wet weather (secondary) ATF may be installed at this location, as noted earlier.

The emptying and cleaning of grit traps is likely to occur about four times per year. This is a potentially odorous activity but it is infrequent and of short duration and measures will be taken to minimise the duration and effects. Watercare operates numerous grit traps on the existing network and has extensive experience with their management. Consideration will be given to scheduling of the grit trap emptying, and it is likely to be generally undertaken on week days, when usage of the adjacent sports fields is generally lower. The nearest residential receptors are located some distance away (approximately 60 m) on Bullock Track. The separation distance between the facilities at this location

and the nearest residential receptors is likely to be sufficient to avoid more than minor adverse effects on those receptors during cleaning of grit traps.

Overall, given the general operation of the Central Interceptor under negative pressure, the relatively infrequent emptying of the grit chamber (and with mitigation measures in place) and the infrequency of air discharges via the air intake or the installation of a suitable ATF, adverse effects due to odour discharges at the Western Springs site will be no more than minor.

1A.5.10 Contaminated sites effects

A desk top study and soil testing has been undertaken for the site. The Western Springs property is an old landfill, but information and testing indicates that the landfill does not extend into the construction site.

All metals, total petroleum hydrocarbon (TPH) and polycyclic aromatic hydrocarbon (PAH) test results are below the ARP: ALW permitted activity soil criteria (discharges) and the NES contaminant standards for a commercial/industrial end use. However, contaminant concentrations exceed the defined background concentrations for Auckland. One of the two samples tested for asbestos fibres contained Chrysotile (0.00001 %), below the assessment criterion of 0.001 %.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The generally low level contamination found indicates that the works can be appropriately managed to mitigate any effects to the environment using the procedures set out in the draft SMP.

Following comparison of test results with Auckland Council cleanfill criteria, likely disposal requirements for material to be disposed of off-site have been identified as follows:

- Fill material: to be disposed of to either a managed fill site or a licenced landfill; and
- Natural soils: to be disposed of to a general cleanfill site.

1A.5.11 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP include stabilised clean water diversions, silt fences and decanting earth bunds. Sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the public stormwater network. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

Proposed stormwater treatment and attenuation devices include grass swales, proprietary devices, and rain tanks. Stormwater volumes calculated in accordance with TP10 are provided in Part D Technical Report K.

The ESCP for this site will be finalised through the CMP process.

1A.5.12 Effects of stormwater discharges from permanent works

The impervious area of the permanent works is expected to total approximately 2,510 m². While the impervious area threshold will be exceeded by permanent works, the surfaces will be subject to low vehicle traffic volumes and there will be limited sources of contaminants. Drawing SW-MAIN-1 in the A3 drawing set contains indicative stormwater management measures for the site. These include installation of a proprietary treatment device to treat stormwater prior to discharge into the existing stormwater network.

Permanent stormwater management for this site will be confirmed in the detailed design process, and will be consistent with TP 10.

1A.5.13 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

1A.5.14 Effects on Stadium operation

Watercare has been in discussion with Regional Facilities Auckland as owner of Western Springs Park. Matters discussed have included site access and the impact of the construction works on events held at Western Springs Stadium. It is understood that events, such as concerts, may occur approximately 10 to 20 times per year. During these events there will be large numbers of pedestrians, particularly before and after the events, and at the end of the events people exit the stadium through the gates and across the proposed site access between Stadium Road and the construction site. To manage this, and ensure the safety of pedestrians, construction traffic will not exit the site along this route during these times. Pedestrian access will be maintained via footpaths provided on Stadium Drive. It will be necessary for the contractor to liaise with Regional Facilities Auckland to determine the times and dates of any events during the construction period. Measures and procedures will be included in the traffic management plan.

With respect to long term plans and the permanent works at the site, it is understood that Regional Facilities Auckland is currently looking at possibilities for future development of the sports grounds at Western Springs. Watercare will work closely with Regional Facilities Auckland on the development of site reinstatement details.

1A.6 Alternatives sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating main tunnel shaft in south west corner of playing fields;
- Locating main tunnel shaft in the motorway interchange south of Western Springs;
- Locating main tunnel shaft at Motions Road site (with micro tunnel back to Western Springs); and
- Locating main tunnel shaft at the north east corner of the Western Springs playing field with micro tunnel connection to motorway interchange.

Following selection of the proposed site in the north east corner of the playing fields a number of modifications to the site layout have helped to minimise the effects of the site on the park. The final layout includes:

- A condensed and rotated construction area to fit along the northern edge of the playing field; and
- Permanent facilities located as far from the playing fields as practicable.

Figures showing the sites and layout alternatives are located at the end of this section.

1A.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.


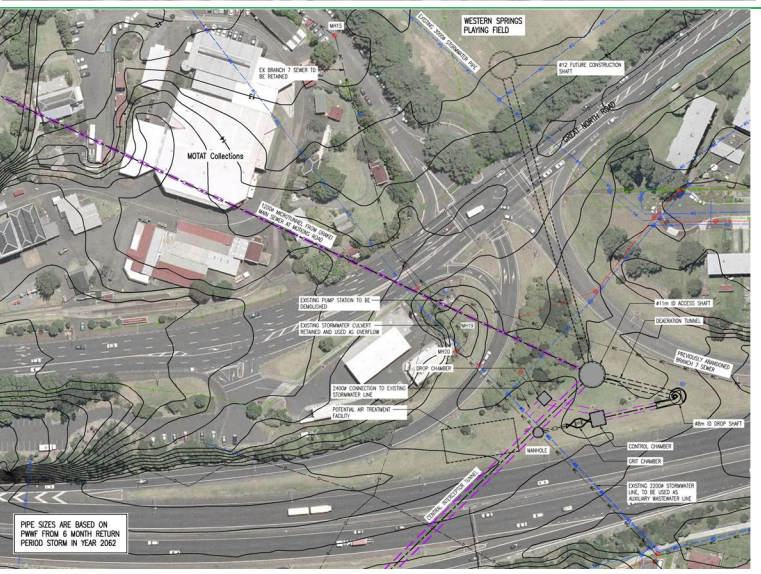

The site will be occupied for construction works for a period of around 5 years. There are no immediately adjacent neighbours, with the nearest residential property located approximately 60 m from the site. There is expected to be more than minor effects on the open space and landscape character during the construction period and minor adverse visual effects. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and pedestrian access will be maintained.

There will be minor effects on recreation and public access during the period of construction. The playing fields and site footpaths will remain in use and measures will be taken to coordinate and manage activities in relation to events at Western Springs Stadium.

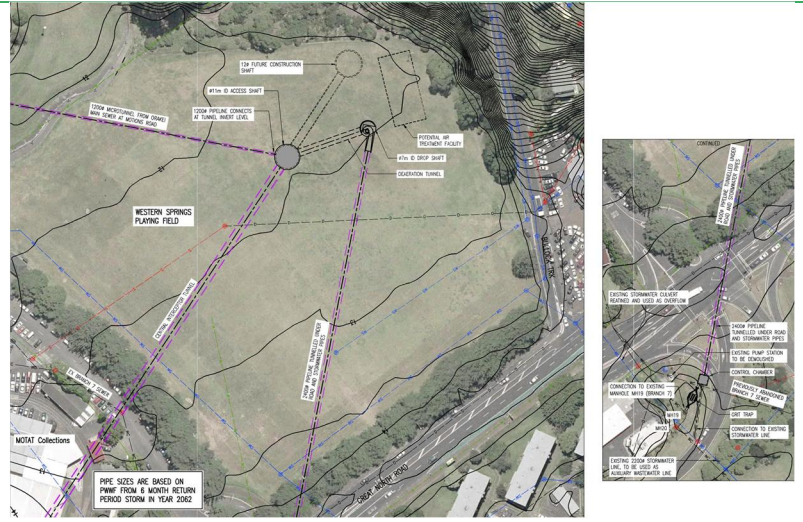
The proposed ATF will be a permanent visible feature at the site. The structure will be designed to minimise effects on recreation and visual amenity and with mitigation measures the adverse landscape and visual effects at the site will be less than minor.

Overall, the site has been located to minimise effects, and measures will be in place to mitigate effects. Watercare will work closely with Regional Facilities Auckland on design development, during construction, and in the development of site reinstatement details.

Western Springs alternative sites and layouts

Comment on alternative	
<p>Tunnel shaft located in south west corner of playing fields</p> <p>Provides accessibility to motorway</p> <p>Impacts on playing fields</p>	
<p>Tunnel shaft located in the interchange south of Western Springs</p> <p>Microtunnel to Motions Road launched from this location</p> <p>Reduced impact on the Western Springs Playing Fields</p> <p>Access required for a main construction site not suitable</p>	
<p>Main tunnel shaft located at Motions Road site (with microtunnel back to Western Springs)</p> <p>Alternative site for the main tunnel terminus at Motions Road</p> <p>Access required for a main construction site not suitable</p>	

Tunnel shaft located centrally within the playing field
Impacts on playing fields



For the reasons summarised above, these options were not pursued.

1B. Western Springs Interchange - CSO Collector Sewer site

1B.1 Introduction

The Western Springs CSO Collector Sewer site is required to connect the CSO Collector Sewer CC2 to the main tunnel at Western Springs.

The proposed works are shown on drawing numbers AEE-MAIN-1.2 and 1.4 included in the A3 drawing set (Part C).

1B.2 Location and site description

The site is located on Great North Road at the junction to the motorway opposite Western Springs. The site is zoned Special Purpose 3 (transport corridor) and Business 1 and contains an existing pump station. Part of the site is designated Motorway (A07-01) and identified as an interchange control area (D05-04) in the Auckland City District Plan. Just to the east of the site is the motorway on ramp, with residential development beyond this. The neighbouring site to the west contains a Caltex service station.

The Museum of Transport and Technology (MOTAT) and Western Springs Park are located to the north of the site. There is residential development to the east of the site on the other side of the motorway junction.

1B.3 Land ownership and interests

CSO Collector Sewer site	
Address	Great North Road, Grey Lynn
Legal description	<ol style="list-style-type: none"> 1. Lot 2 DP 10276 2. Lot 3 DP 10276 3. Part Lot 4 DP 10276 4. Part Lot 146 DP 7415 and Lot 3 DP 34837 5. Allot 76 Sec 7 Suburbs of Auckland 6. Pt Lot 3 DP 10276 7. Pt Lot 3 DP 10276 and Allot 75 Sec 7 Suburbs of Auckland
Title reference	<ol style="list-style-type: none"> 1. Gazette Notice A614884 (1972 p12) 2. Gazette Notice B021450.1 3. Proclamation 17511 4. Gazette Notice 200083 5. NA51B/461 6. NA371/245 7. NA51D/863
Owner	<ol style="list-style-type: none"> 1. The Crown (for better utilisation) 2. The Crown (for Motorway purpose) 3. The Crown (for Motorway purpose) 4. The Crown (taken for the Auckland-Kumeu Motorway) 5. Auckland Council 6. Auckland Council 7. Tawa Farms Limited
Local Board	Waitemata

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.



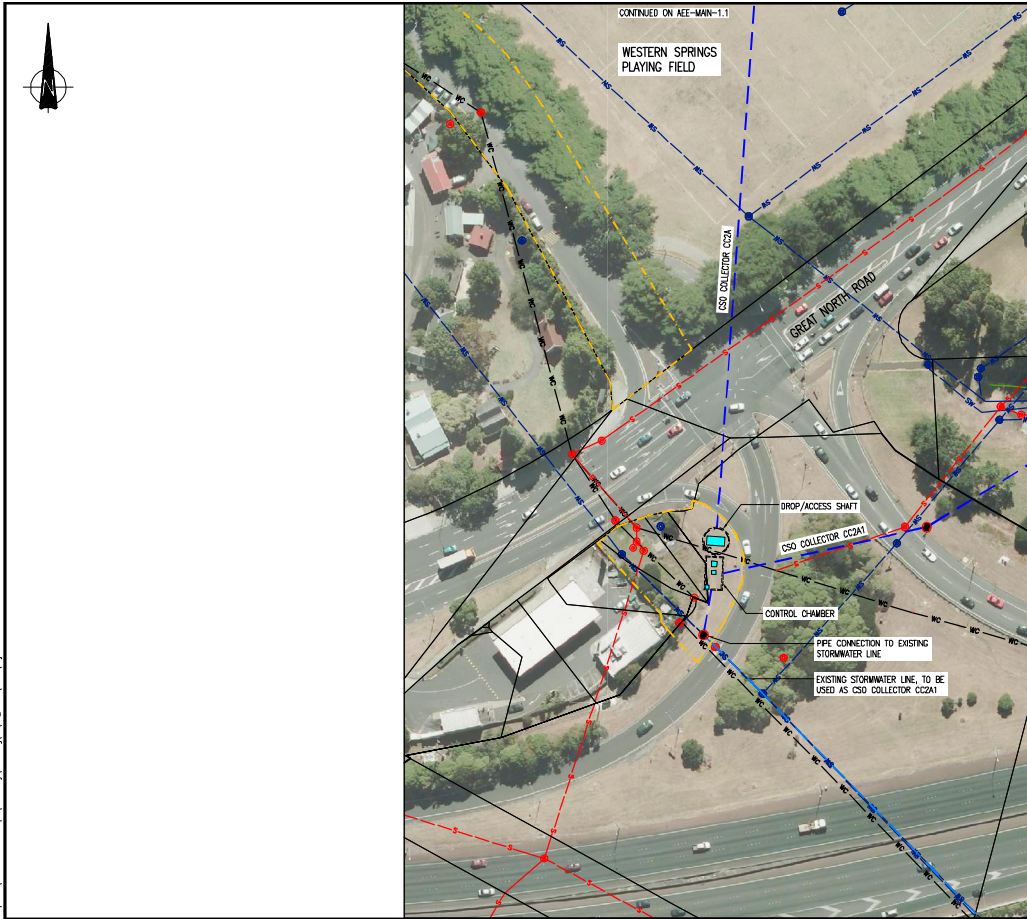
Figure 1B-1 Location plan

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Photograph 1B-1 Construction area

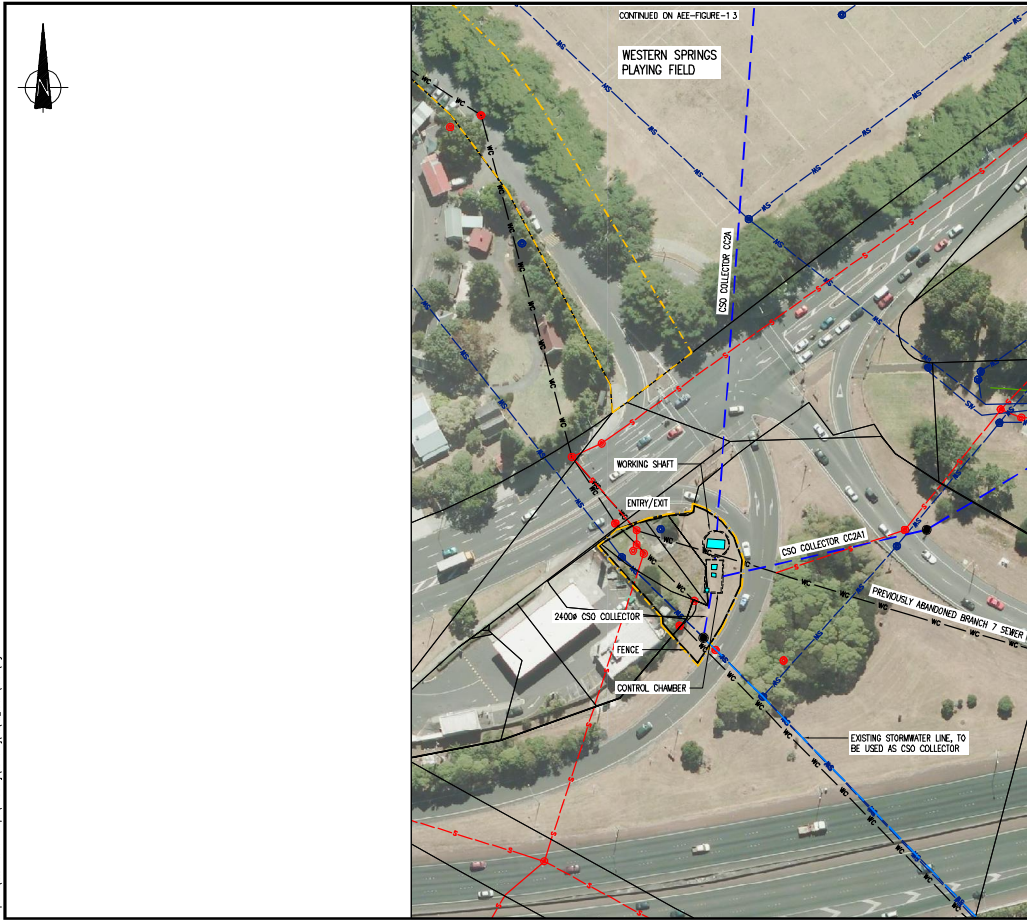
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 17/08/12 11:42 AM



- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
 - C22A: THESE WORKS BETWEEN THE CONNECTIONS AT WESTERN SPRINGS OFF RAMP AND THE MAIN WESTERN SPRINGS SITE ARE COVERED IN THE APPLICATIONS AND AEE FOR CENTRAL INTERCEPTOR MAIN PROJECT WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012		CENTRAL INTERCEPTOR GENERAL WESTERN SPRINGS INTERCHANGE - PERMANENT WORKS PLAN	CAD FILE AEE-MAIN-1.2	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1000 A3	0538
REV'D. P.MGR		JS					DRAWING No.	ISSUE
REV'D. P.MGR		JS		AEE-MAIN-1.2		A		

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 17/08/12 11:42 AM



- NOTES:**
- C22A: THESE WORKS BETWEEN THE CONNECTIONS AT WESTERN SPRINGS OFF RAMP AND THE MAIN WESTERN SPRINGS SITE ARE COVERED IN THE APPLICATIONS AND AEE FOR CENTRAL INTERCEPTOR MAIN PROJECT WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012		CENTRAL INTERCEPTOR GENERAL WESTERN SPRINGS INTERCHANGE - CONSTRUCTION WORKS PLAN	CAD FILE AEE-MAIN-1.4	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1000 A3	0538
REV'D. P.MGR		JS					DRAWING No.	ISSUE
REV'D. P.MGR		JS		AEE-MAIN-1.4		A		

1B.4 Proposed works

1B.4.1 Permanent works

Drawing reference	AEE-MAIN-1.2
Permanent works	<ul style="list-style-type: none"> • CSO Collector CC2A and CC2A1 and connecting pipe to existing stormwater line • Upgraded existing overflow • 7 m ID drop shaft • Control chamber
Site reinstatement	<ul style="list-style-type: none"> • Regrassing
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access. Access required approximately once every 3 months for normal operation.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of control gates

1B.4.2 Construction works

Drawing reference	AEE-MAIN-1.4
Construction site area	Approx 1050 m ²
Duration of construction	6-8 months construction activities 2 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations • Demolition of existing pump station • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • Excavations for underground permanent works • Trenching of connections • Upgrade existing overflow (into pipe) • Construction of permanent features – drop shaft, control chamber • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing • Crawler crane • Water treatment equipment • Wheel wash • Slurry separation equipment • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment

1B.5 Assessment of effects

1B.5.1 Landscape and visual effects

Landscape and visual effects resulting from construction will be:

- Removal and pruning of mature trees at edge of works area; and
- Construction of a perimeter fence.

The majority of the viewing audience will be transient (passing foot and vehicle traffic).

Permanent features that will remain at the site are the control chamber and drop shaft both of which will be below ground with only covers visible. These will be at ground level, flush with the adjacent surface. The landscape and visual effects of both construction and permanent works are expected to be no more than minor.

1B.5.2 Vegetation effects

The site is a predominantly open grassed area with some vegetation, mainly along the boundary with the Caltex site. Key vegetation consists of early mature specimens of *Pittosporum*, wattle and puka.

The vegetation and trees adjacent to the boundary of the Caltex site provide some screening between the sites and help to screen a cabinet and a cellular antennae compound on the site. This vegetation may require removal, but loss of vegetation would have a negligible effect on the environment and effects will be mitigated, if necessary, by replanting at the completion of the works.

1B.5.3 Archaeological and heritage effects

The Western Springs area has a number of recorded archaeological sites relating to both Maori and European heritage. In this area there are five archaeological sites, one maritime heritage site, three military heritage sites, four historic structures, a brick findspot, and three Maori Heritage Sites (Wai Orea (Western Springs main lake), Nga Kauaewhata and Te Rehu), with other sites located in the wider area. Although there are a number of identified sites in the wider Western Springs area, there are no archaeological sites identified within the construction footprint. None of the heritage buildings or known archaeological sites in the Western Springs area will be affected by the proposed works.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

There are several heritage buildings located nearby at MOTAT. As assessed in the Vibration Report (Part D, Technical Report G), the risk of damage due to vibration effects on the buildings at MOTAT is considered to be very low.

1B.5.4 Traffic effects

Great North Road is a District Arterial Road in the Auckland City District Plan. It provides linkages between Avondale in the west and central Auckland in the east. The site is located next to the SH16 motorway off ramp that leads to a signalised intersection with Great North Road for right turning vehicles and a give way for left turning vehicles. An existing access to this area is located on the northern side of the site.

Site traffic is anticipated to be low relative to the main site (assessed in Section 1A above). Vehicles accessing this site are likely to be restricted to single-unit trucks due to its confined space. Access to and from the site will also be limited to a left-in / left-out operation only as it is in close proximity to Great North Road and the SH16 off ramp. Due to the low number of traffic movements, and the left in/left out nature of the access, the access to the site can be safely managed.

Watercare has met with NZTA and will continue discussions regarding the proposed works and the implications of the works adjacent to the motorway.

1B.5.5 Noise effects

The nearest residential dwellings are located across the other side of the motorway off ramp at 744 Great North Road. The predominant existing noise source is traffic from surrounding roads. Construction noise levels are expected to be compliant with the Construction Noise Standard. Operational noise levels will be low and will comply with the proposed noise limit (refer proposed designation conditions and noise impact assessment in Part D Technical Report F).

1B.5.6 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting may be required during construction of shafts and underground chambers. Given the separation distance at this site, any vibration effects are expected to be less than minor.

1B.5.7 Contaminated sites effects

A desk top study and soil testing has been undertaken for the site. The site is located adjacent to a service station, but the underground fuel tanks and associated facilities are located more than 20 m away from the proposed construction site.

Metals and total petroleum hydrocarbon (TPH) test results are below the ARP: ALW permitted activity soil criteria (discharges) and the NES contaminant standards for a commercial/industrial end use, but the benzo(a)pyrene equivalent (B(a)P eq.) concentration at 3.46 mg/kg in the sample exceeds the ARP: ALW soil criterion of 2.15 mg/kg.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The generally low level contamination found indicates that the works can be appropriately managed to mitigate any effects to the environment using the procedures set out in the draft SMP.

Following comparison of test results with Auckland Council cleanfill criteria, likely disposal requirements for material to be disposed of off-site have been identified as follows:

- Fill material: to be disposed of to either a managed fill site or a licenced landfill; and
- Natural soils: to be disposed of to a general cleanfill site.

1B.5.8 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP include stabilised clean water diversions and a silt fence. Sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the public stormwater network. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP. Proposed stormwater management utilises grass filter strips.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

1B.5.9 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

1B.6 Alternative sites and layouts

Alternatives considered at this site are described in Section 1A above.

1B.7 Conclusion

The site is reasonably remote from dwellings, with the closest residential property located across the other side of the motorway off ramp. Noise levels are expected to comply with the Construction Noise Standard. Site traffic will need to be managed to minimise effects on the Caltex site and the Motorway and Watercare will continue to discuss the proposed works with NZTA.

2.0 Mt Albert War Memorial Reserve (AS1 and L2S3)

2.1 Introduction

The Mt Albert War Memorial Reserve AS1 site is on the main tunnel MT1 alignment and is required to provide connections to the existing Branch 8 sewer. It is also a connection point to the main tunnel for proposed Link Sewer 2. It is a secondary construction site and will be used for inspection of the main TBM during construction and the launch/retrieval of the MTBM for Link Sewer 2.

The proposed works are shown on drawing numbers AEE-MAIN-2.1 and 2.2 included in the A3 drawing set (Part C).

2.2 Location and site description

The Mt Albert War Memorial Reserve site is located within Mt Albert War Memorial Reserve, 751 to 761 New North Road, Mt Albert. The construction site is located in the north western corner of the reserve.

The site is zoned Open Space 4 (community) in the Auckland City District Plan and is located in a grassed and planted area in the north western corner of the Mt Albert War Memorial Reserve. There is an asphalted area with a basketball hoop in the eastern part of the proposed construction area. Within the construction area and along the boundaries with the residential sites there is a mix of semi mature native trees and shrubs. There is also a sculpture and some sandstone relics from the Auckland Town Hall.

Within the reserve, to the south and east, are tennis courts, a table tennis table and informal active recreation areas and a collection of community buildings including the Mt Albert War Memorial Hall, and the Mt Albert Community and Recreation Centre. There is a car park immediately to the south of the proposed construction area. Immediately adjacent to the eastern edge of the site is a walkway connecting Asquith Avenue in the north through the reserve to New North Road in the south.

The site is adjacent to residential development on Wairere Avenue. To the north, beyond the reserve, is residential development and the rail line. The reserve is surrounded by residential development, with a motel to the east on Selcourt Road and commercial development, such as cafes, shops and a petrol station along New North Road opposite the reserve.

2.3 Land ownership and interests

Address	751 – 761 New North Road, Mt Albert
Legal description	1. Pt Lot 1 DP 53828 2. Pt Allot 38 Parish of Titirangi and Pt Allot 171 Sec 10 Subs of Auck (defined on DP 6763) 3. Pt Allot 38 Parish of Titirangi and Pt Allot 171 Sec 10 Subs of Auck 4. Lot 14 and Part Lot 15 DP 7029 (accessway)
Title reference	1. NA5A/1266 2. NA217/108 3. NA988/61 4. NA1999/21 (accessway)
Owner	Auckland Council
Reserve status	For municipal buildings (GAZ 1964 P 693) Borough depot (GAZ 1950 P 2027)
Local Board	Albert-Eden

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

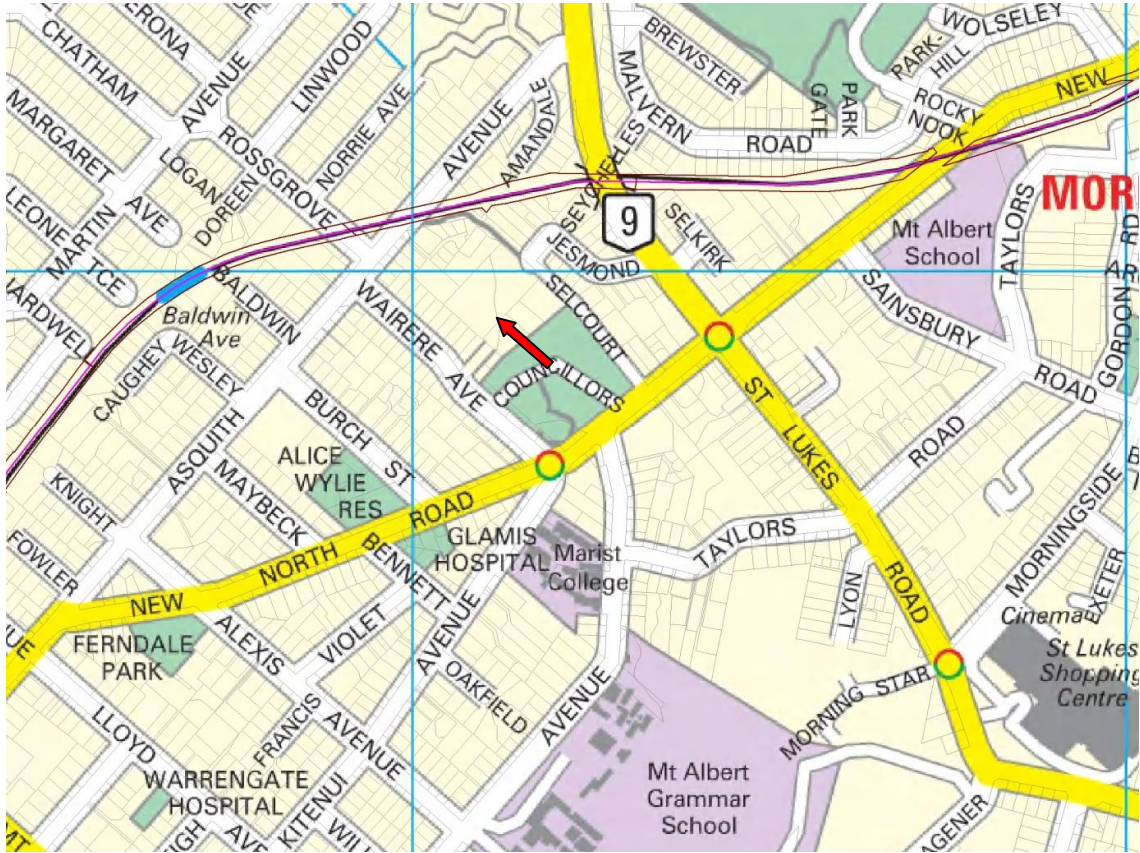
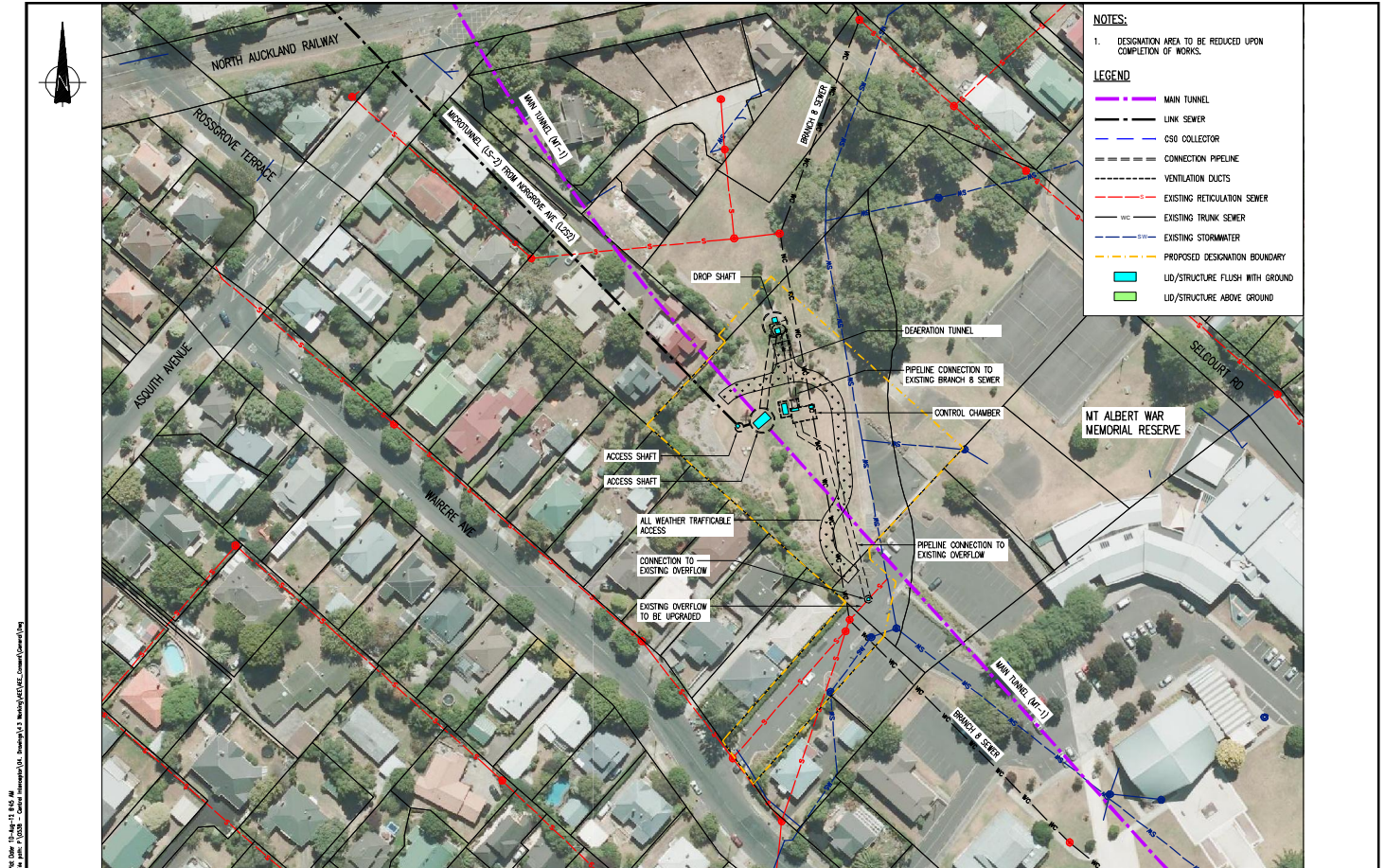


Figure 2-1 Location plan

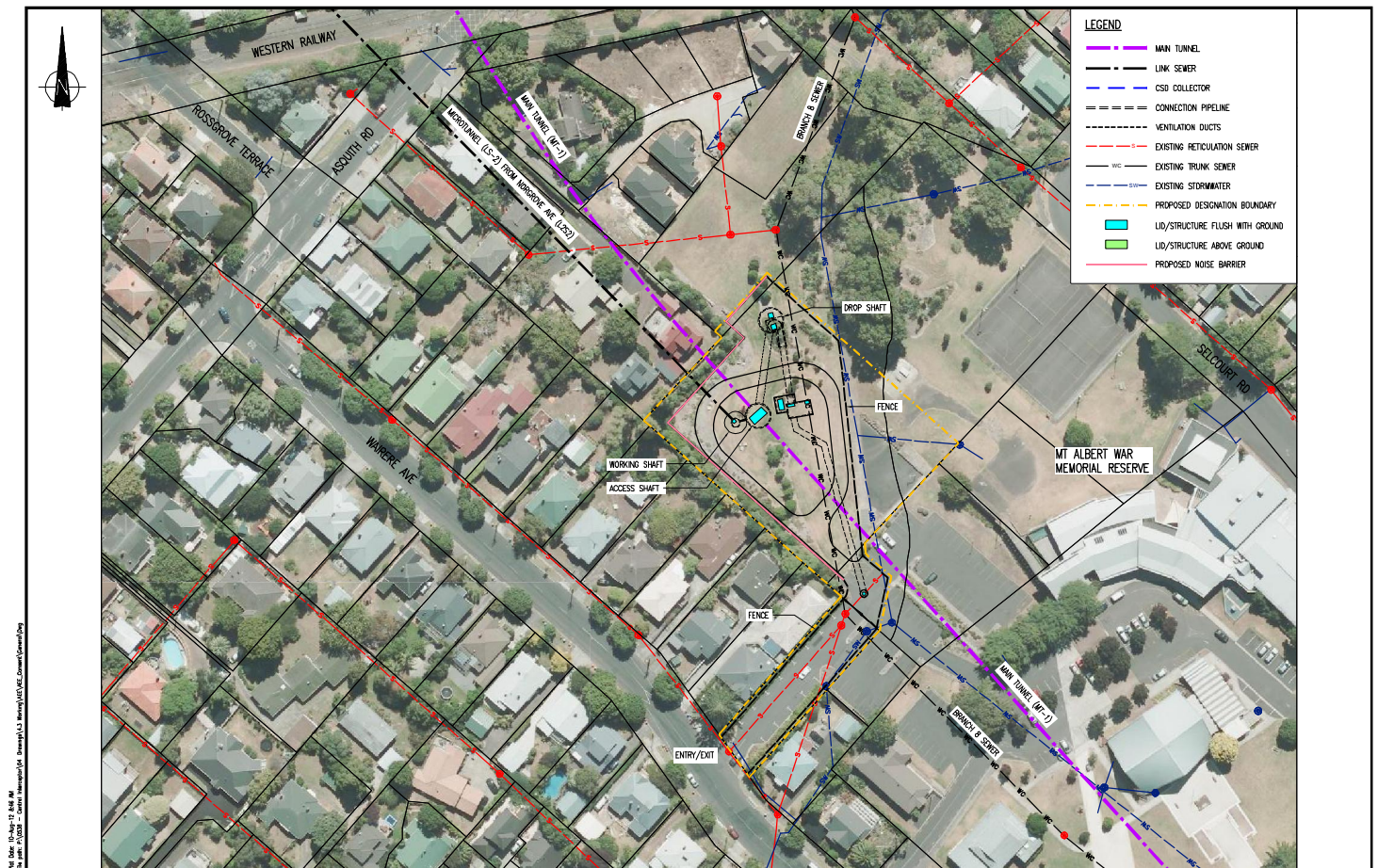
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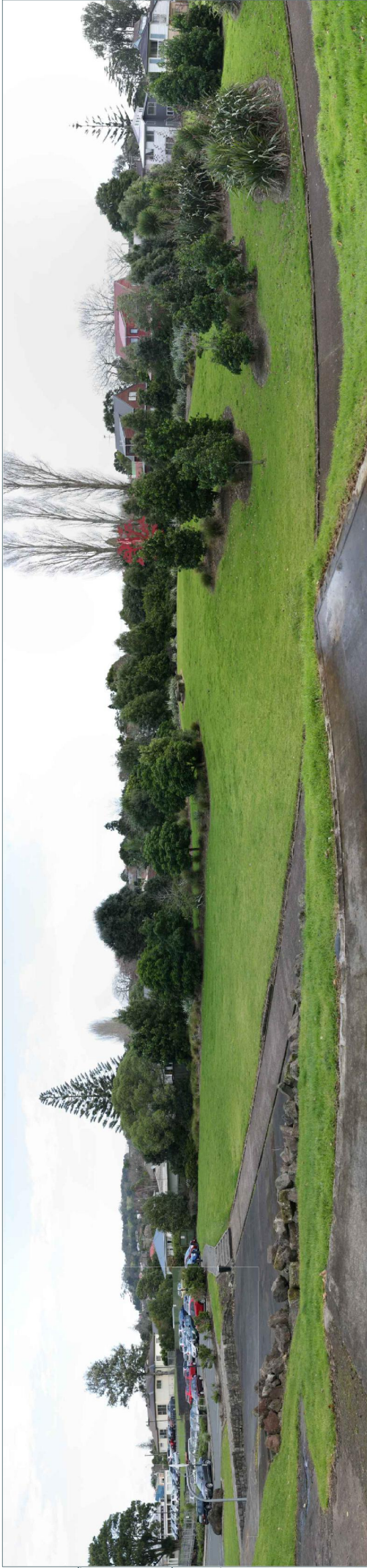
Photograph 2-1 Proposed construction area



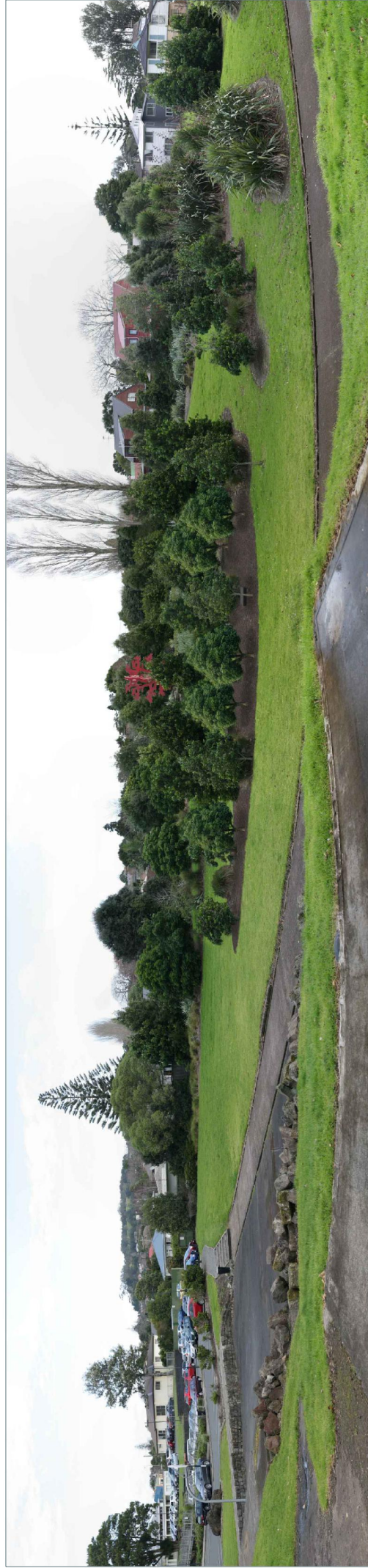
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Existing view from in front of tennis courts



Proposed view - Indicative

2.4 Proposed works

2.4.1 Permanent works

Drawing reference	AEE-MAIN-2.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel, Link Sewer 2 • Connecting pipes to Branch 8 sewer and existing overflow and Link Sewer 2 • 2.4 m ID access shaft (to LS2) (38 - 53 m deep) • 7 m ID access shaft (38 - 53 m deep) • 7 m ID drop shaft (38 - 53 m deep) • Control and connection chambers • Deaeration tunnel • Upgrade existing overflow
Site reinstatement	<ul style="list-style-type: none"> • Regrassing and replanting
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via Wairere Road and existing driveway. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of control gates

2.4.2 Construction works

Drawing reference	AEE-MAIN-2.2
Construction site area	Approx. 5,400 m ²
Duration of construction ¹	12 - 18 months construction activities 3.5 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 9 m (x2) and 8.5 m diameter, 38 - 53 m deep construction access and drop shafts; • TBM inspection • MTBM launch/retrieval and associated activities including: Removal of spoil from tunnel, spoil storage, liner segment handling and storage • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – access and drop shafts, control and connection chambers • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking,

¹ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

	workshop <ul style="list-style-type: none"> • Crawler crane • Water treatment equipment • Wheel wash • Generator • Slurry separation equipment • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment
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2.5 Assessment of effects

2.5.1 Visual and landscape effects

There are a number of houses around the western and northern perimeter of the open space where the construction site is to be located. However, they are generally well screened from view (e.g. by the vegetation along the western boundary) and residents would only have obscured views of the site and construction works. Towards the east and south the extent of visibility is restricted by existing vegetation and rising land. The viewing audience would mostly be users of the reserve and locals who use the formalised pedestrian path.

2.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Removal and possible transplanting of trees and shrubs from within the construction area;
- Construction of a perimeter fence to screen activities from public view; and
- Construction activity and vehicle movements.

In summary, minor adverse effects are expected on open space and landscape character and visual amenity during the period of construction. This is due to the relatively discrete corner of the reserve being occupied, a limited number of small to medium sized trees being removed, and the limited extent of visibility of the works, particularly from residential locations.

2.5.1.2 Permanent effects

Replanting will occur following construction and the sculpture will be reinstated. Permanent visible features will be the site accessways around the facilities, the access and drop shafts and chamber covers (at ground level, flush with the adjacent surface). A photomontage of the site before and after is shown on Figure 12 (from the landscape and visual assessment in Part D Technical Report A).

The level of effects on open space and landscape character and on visual amenity is expected to be neutral or slightly positive, depending on the final design and as planting matures.

2.5.2 Recreation and public access effects

The construction site and location of permanent works have been designed so as to minimise the impact on the reserve and community centre users. It is located away from the areas of the reserve most likely to be used for active recreation and from the community purpose buildings. However there will be some impact on amenity during construction due to construction noise, traffic movements and construction structures.

The construction works will prevent the use of the basketball court and will require an alternative pedestrian access to be provided in order to retain the north-south access through the reserve.

The footpaths on both sides of Wairere Avenue and surrounding roads will remain fully functional during the construction works. Users of the car park will be able to walk to the south east to access buildings or use the footpath on Councillors Drive to access Wairere Avenue.

2.5.3 Vegetation effects

Vegetation within the construction area consists of clumps of young to early mature natives. Key vegetation within the construction footprint consists of several puriri and other small natives, karaka trees, a flax, ti kouka, and an area of native planting/astelia. Species adjacent to but outside of the construction works area consist of Pittosporum, ngaio, pohutukawa and karaka.

The construction area has been located to minimise disturbance to vegetation. The perimeter fence is to be set back from the residential boundaries to retain the majority of vegetation around the perimeter of the site. Vegetation within the construction area will require removal. The vegetation loss will be minimal in the context of the total vegetation coverage within the reserve and will be mitigated by replacement planting following completion of construction. Tree protection measures will be implemented when needed to ensure appropriate protection where works take place within the vicinity of trees to be retained.

2.5.4 Ecological effects

The habitat type at the site is grass with mature flax clump plantings and the site has low vegetation value. Bird values at the site are moderate-low. The only native bird species identified at the site was silvereye, although tui are likely to visit the site. Introduced species were blackbird, myna, sparrow, starling, and song thrush.

While no lizards were found during a survey of the site, due to the potential habitat suitability for skinks, a salvage operation is proposed and therefore adverse effects on native lizards are unlikely to be more than minor.

A number of trees within the construction area will be removed. The loss of mown field habitat for bird feeding is expected to be of less than minor effect as there is ample habitat available elsewhere. The site has overall moderate-low ecological value and the effects on the site are expected to be minor. Watercare will work with Auckland Council and the Albert-Eden Local Board to develop appropriate reinstatement to mitigate these effects.

2.5.5 Archaeological effects

There is a recorded burial site (R11/139) identified nearby on Wairere Avenue, but this is shown as having been destroyed. No archaeological or heritage sites are recorded at the construction site and, as it is in a built-up and generally modified area, the likelihood of intact archaeological remains being present is low.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

2.5.6 Traffic effects

2.5.6.1 Existing environment

The characteristics of the surrounding roads are summarised below:

- Wairere Avenue:
 - Is a Local Road in the Auckland City District Plan;
 - Connects Asquith Avenue with New North Road; and
 - Intersects with New North Road and Kitenui Avenue approximately 170 m south east of the site.
- Councillors Drive:
 - Is an internal road within the reserve;

- Provides access to parking areas within the reserve; and
- Connects Wairere Avenue to New North Road.

2.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

Site access is proposed to be through the existing car park access road from Wairere Avenue. This would cover the access lane and approximately 14 parking spaces. A parking survey of the carpark, undertaken on a fine spring Saturday, indicated low demand for the parallel parking spaces in this area and the spaces immediately adjacent to the construction site. Observations of the site show the carpark is predominantly used by YMCA and community centre visitors. Use of the carpark is not expected to be significantly different between seasons. Therefore, temporary removal of the carparking spaces is not expected to cause adverse effects. In the rare instances that parking supply may be exceeded, there is ample on-street parking on Wairere Avenue to accommodate spill-over parking demand.

During construction the access will either be closed for public traffic (with access to the carpark from the alternative access on Wairere Avenue or from New North Road) or restricted to exit only with access closed during significant times of construction. Alternative public access is available via Councillors Drive. Heavy vehicles will be restricted to a left turn only from Wairere Avenue onto New North Road eastbound when leaving the site.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

Pedestrian access within the reserve will be maintained as described in Section 2.5.2 above. Although Wairere Avenue can carry moderate levels of pedestrians (particularly associated with school and the Baldwin Avenue train station), the following is noted:

- The presence of speed humps and the nature of Wairere Avenue means truck speeds will be low;
- Only the eastern end of Wairere Avenue will be used for truck access; and
- Adequate pedestrian footpaths exist on Wairere Avenue and these will not be altered by the proposed works.

Nevertheless, construction traffic movements will be managed during peak school times (i.e. just before and just after school hours).

The construction works at Mt Albert War Memorial Reserve are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

2.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance, such as maintenance of control gates. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

2.5.7 Noise effects

2.5.7.1 Existing environment

The nearest residential receivers are located approximately 15 m to the north west of the construction site centre. Currently the predominant noise source is traffic from surrounding roads. An ambient noise level of 47 dB L_{Aeq} was measured on 12 May 2011 during the day time.

2.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations. Surface construction works will generally be undertaken during the hours of 7 am and 6 pm Monday to Friday and 8 am to 6 pm Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A.

Mitigation measures for the site include the use of a 2 m high noise barrier around the western side of the site, and a draft construction noise management plan has been prepared (refer Part D Technical Report F). Noise levels at the closest noise sensitive receivers (9 and 13A Wairere Avenue, 65 Asquith Avenue and 22 Selcourt Road) are expected to be typically between 33 to 73 dB L_{Aeq}. The construction noise levels are predicted to normally comply with the Construction Noise Standard for Monday to Saturday daytime hours, except for at 65 Asquith Avenue where piling operations may exceed the specified limits. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate this, for example, confining piling operations to the daytime period. Noise management measures may also be needed when noise intensive works occur in close proximity to 9 Wairere Avenue.

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges may result in noise levels above the Construction Noise Standard for a period of time. Where noise from this preparatory work may be an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

2.5.7.3 Operational noise effects

The permanent works (access shaft, drop shaft, flow control structures and overflow) may generate low noise levels due to the movement of water. Noise levels will be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) and as such, no mitigation measures are necessary.

2.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting may be required. No damage to structures due to vibrations is expected, but there may be some short term disturbance of residents at the closest properties (9 - 17 Wairere Avenue and 65 Asquith Avenue). A number of mitigation methods are available to manage effects, as described in Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

2.5.9 Odour effects

The facilities to be located at this site (drop shaft, access shafts and control chambers) are not likely to be significant sources of odour and adverse effects due to discharges of odour are unlikely. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Therefore the adverse effects at this site are expected to be less than minor.

2.5.10 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP for control of erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains and a decanting earth bund. Sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to grass. Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

2.5.11 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The results suggest there is potential for contamination at the site, due to the potentially contaminating activities having occurred which are likely to have affected shallow soils. Fill on the site could contain low to moderate levels of contamination. Council property files indicate a council depot and workshops formerly existed bordering the east of the construction site. An underground storage tank was installed within the depot and it is not clear whether this has been removed. The likely contaminants at the site are unknown but would typically be expected to be metals, hydrocarbons and asbestos containing material.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

2.5.12 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate design and construction methodologies as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

2.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft and pump station on the tennis courts;
- Locating shaft west of the tennis courts;
- Locating shaft in the car park; and
- Locating shaft in the south western corner of the reserve.

In response to concerns raised by residents, an alternative site was also considered in reserve land adjacent to New North Road. However, this would require a larger footprint and greater impact on the reserve and amenity, and therefore was not pursued.

Following selection of the proposed site in the south western corner of the reserve a number of modifications to the site layout have helped to minimise the effects of the site on the reserve. The final layout includes a construction area that has been rotated to fit within the reserve and reduce impact on the reserve (including on the carpark and vegetation).


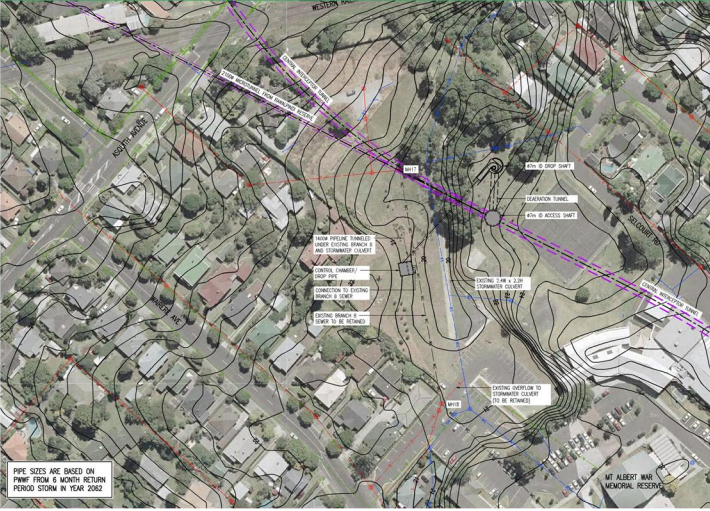

Figures showing the sites and layout alternatives are located at the end of this section.

2.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows in the nearby Meola Creek.

There will be an adverse effect on the general amenity of the reserve and neighbouring sites during construction and there will be minor and temporary effects on recreation and public access. The residential properties from about 5 to 19 Wairere Avenue and in the rear of 65 Asquith Avenue back onto the reserve in the vicinity of the proposed construction site. Due to the close proximity of these dwellings to the site it will be necessary to implement construction management measures in order to minimise the effects of construction activities on these properties. A noise barrier is proposed to mitigate noise levels and construction activities will need to be managed so as to mitigate the effects of vibration at the closest properties. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and pedestrian access will be maintained. Permanent features will be below ground and only covers and accessways will be visible at the surface. Site reinstatement details will be developed in consultation with the landowner, Auckland Council and Albert-Eden Local Board.

Mount Albert War Memorial Reserve alternative sites and layouts

Comment on alternative	
<p>Features a pump station</p> <p>Impacts on recreational facilities (tennis court)</p>	
<p>Reduces impact on recreational facilities (tennis court)</p> <p>Restricts pedestrian access across park</p>	
<p>Improved access for construction activities</p> <p>Set back from residential properties</p> <p>Impact on recreational facilities (carpark) and use of community buildings</p>	

Reduces the need to access site via residential street

Larger site footprint required directly adjacent to children's playground, or in New North Rd in order to connect to local network

Increased length of Link 2 microtunnel requires an additional interim shaft located in tight residential area



For the reasons summarised above, these options were not pursued.

3.0 Lyon Avenue (AS2)

3.1 Introduction

The Lyon Avenue AS2 site is on the main tunnel MT1 alignment and is required to connect to the existing Edendale Branch sewer. It is a secondary construction site which provides for inspection of the main tunnel TBM during construction.

The proposed works are shown on Drawing numbers AEE-MAIN-3.1 and 3.2 included in the A3 drawing set (Part C).

3.2 Location and site description

The Lyon Avenue site is located within the Roy Clements Treeway, bounded by Mt Albert Grammar, Meola Creek, Morning Star Place, and St Lukes Mega Centre in Mt Albert. The construction area is close to the existing overflow channel, to the south of the apartments on Morning Star Place.

The site is located along the Roy Clements Treeway, a walkway that runs along beside Meola Creek. This area is zoned Special Purpose 2 (education) and is part of the designated Mt Albert Grammar School site (E05-24). The site is largely covered by vegetation and contains a mix of recent and older plantings. The site extends into the adjacent Business 4 zoned property to the north containing residential apartments on Morning Star Place. There is an existing Watercare designation (E06-06) for wastewater purposes at the site in the location of an existing overflow channel which discharges to Meola Creek. Much of the overflow channel has recently been covered over to form a visitor parking area for the Morning Star apartments.

To the east are large format retail stores at the St Lukes Mega Centre. The Mt Albert Grammar playing fields are located on the opposite (western) side of the Creek. The Roy Clements Treeway connects Alberton Avenue and Haverstock Road around the northern and eastern boundaries of Mt Albert Grammar and through Fergusson Reserve. The walkway connects to the rear of the St Lukes Mega Centre.

3.3 Land ownership and interests

Main site	
Address	36 Alberton Avenue, Mt Albert
Legal description	1. Pt Allot 168 Sec 10 Suburbs of Auckland DP 7365 2. Pt Allot 169 Sec 10 Suburbs of Auckland DP 7365
Title reference	Gazette 1948 P 1142 (vested in Crown for school purposes)
Owner	The Crown
Local Board	Albert-Eden
Morning Star Apartments	
Address	Morning Star Place, Mt Albert
Legal description	1. Plan Number 346086 - Subdivision of Lot 15 DP 7699 and Lot 2 DP 206560 2. Future Development Unit 4 Deposited Plan 346086
Title reference	1. 231549 2. 235517 (Stratum in Freehold)
Owner	1. Body Corporate 346086 (Multiple unit owners) 2. St Lukes Holdings Limited

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.



Figure 3-1 Location plan

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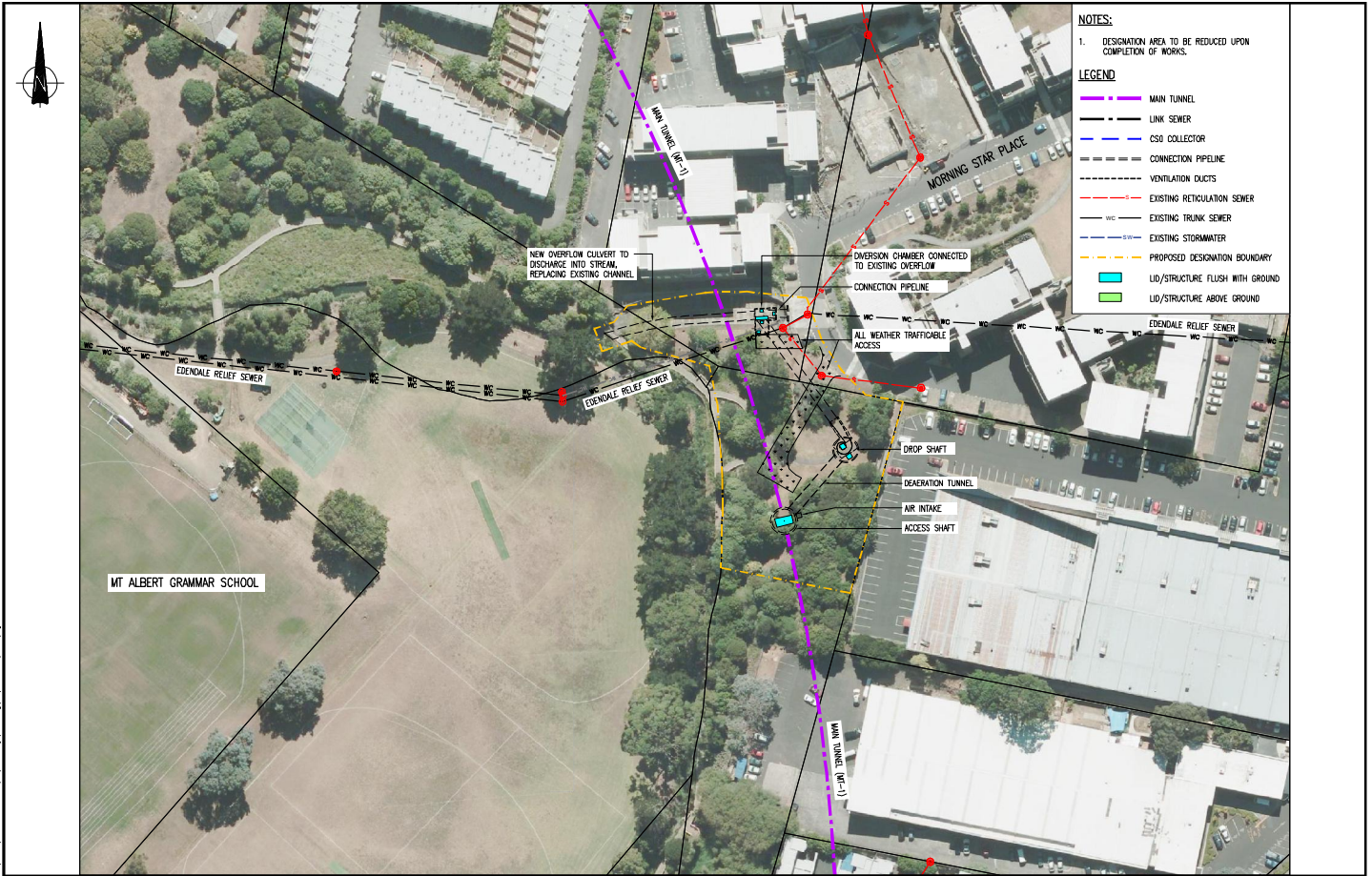


Photograph 3-1 Roy Clements Treeway boardwalk (Meola Creek is located on the right)



Photograph 3-2 Construction area looking north towards Morning Star apartments

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3.4 Proposed works

3.4.1 Permanent works

Drawing reference	AEE-MAIN-3.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel • Connecting pipes to existing sewer and overflow • 7 m ID access shaft (45 – 60 m deep) • 7 m ID drop shaft (45 – 60 m deep) • Deaeration tunnel • Air intake • Control and diversion chamber • New overflow culvert to replace existing overflow channel
Site reinstatement	<ul style="list-style-type: none"> • Replanting • Reinstatement of pedestrian access
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via Morning Star Place. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of control gates

3.4.2 Construction works

Drawing reference	AEE-MAIN-3.2
Construction site area	Approx. 4050 m ²
Duration of construction ²	12 - 18 months construction activities 3 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 9 m diameter, 45 – 60 m deep construction access and drop shafts • TBM inspection • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – access and drop shafts, diversion chamber • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane

² The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

	<ul style="list-style-type: none"> • Water treatment equipment • Wheel wash • Generator • Spoil storage area
--	--

3.5 Assessment of effects

3.5.1 Visual and landscape effects

From ground level locations such as along the treeway and around the accessways and car parks to the rear of the apartments and the Mega Centre views would be restricted to the exterior of the proposed perimeter fence. Some residents in the upper levels of some of the apartments on Morning Star Place would have elevated views over the site.

3.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Removal and possible transplanting of trees and shrubs from within the construction area;
- Construction of a perimeter fence;
- Construction activity and vehicle movements;
- Views of construction activities from the balconies of a number of upper level floors in the apartment buildings adjacent to the site to the north and east; and
- Removal of pedestrian access through the site to the St Lukes Mega Centre carpark.

An alternative pedestrian access will be provided to the St Lukes Mega Centre around the southern extent of the construction site. Mainly due to the removal of vegetation at this site, a more than minor level of effects on open space and landscape character is expected at this site. Effects on visual amenity are expected to be moderate to more than minor. There is limited visibility of works from ground level, but higher visibility from a small number of upper level apartments.

3.5.1.2 Permanent effects

Following completion of construction, replanting will be undertaken and the existing pedestrian access reinstated. Permanent visible features will be the site accessways around the facilities, the access and drop shaft covers (at ground level, flush with the adjacent surface) and a control chamber at the head of the existing overflow channel, underneath the existing visitor carpark area.

Due to the removal of semi-mature and mature vegetation the temporary adverse effects are expected to be more than minor. A significant amount of planting has been undertaken by the community along the Roy Clements Treeway and a boardwalk was constructed through the site in 2008. Site reinstatement will be designed to tie in with the work of local community groups (for example the St Lukes Environmental Protection Society) and initiatives for the Roy Clements Treeway. In the long term, visual effects would be moderately adverse immediately following construction and replanting. This would reduce to less than minor adverse effects over a period of five to ten years as planting matures. Once construction is completed and the establishment period ended, the visual amenity of the area would be restored. Effects on open space and landscape character would be neutral to beneficial. The effects on natural character values of Meola Creek would be highly beneficial due to the reduction in overflows entering the creek.

3.5.2 Recreation and public access effects

There will be an impact on amenity during construction due to noise, traffic movements and structures. The construction site and location of permanent works has been sited so as not to directly impact the Mt Albert Grammar playing fields. Footpath access along the Treeway will be maintained during construction and an alternative alignment to the south of the construction area will provide access between the Treeway and St Lukes Mega Centre.

3.5.3 Land use and property effects

The site is part of the Mt Albert Grammar School grounds, although it is managed by Auckland Council as a public walkway. The creek separates the construction site from the main school grounds and limits the use of this area for education purposes such as buildings or sports grounds. The proposed works will not alter this situation. The permanent works will not hinder the long term continued use of the site as a walkway and the reduction in overflows will improve the amenity of the area and the condition of Meola Creek.

3.5.4 Vegetation effects

The construction area is largely covered in canopy trees with some open areas supporting ground cover. Vegetation within the construction footprint consists of predominantly mixed natives of a moderate size. Common species include pohutukawa, totara, karaka, lemonwood, and Pittosporum. Also noted were karo, ngaio, kohuhu, kanuka, puriri, kawaka, eucalypt, tree privet, and casuarina.

The understory is dense in the more open areas of canopy, in particular the wetter areas where a native tree is present. Other understorey species include mahoe, mamaku, ti kouka, nikau, akeake, tanguru, kowhai, *Coprosma rhamnoides* and kumarahou. Flax is locally common and there is evidence of recent plantings of hebes, *Coprosma* hybrids, *pseudopanax* hybrids and poroporo.

The proposed works will require vegetation removal, potentially across most of the site. Replanting will help to mitigate the effects. The site area has been minimised and configured to avoid removing trees where possible, including an early mature pohutukawa which provides screening on the north eastern side of the construction area. In developing the detailed design and setting out the construction area, consideration will be given to whether any additional trees within the construction area can be retained if possible. Watercare will work with the landowner, Auckland Council, the Albert-Eden Local Board, and other key parties to develop appropriate reinstatement planting to mitigate these effects.

3.5.5 Ecological effects

The habitat type at the site is mainly native bush (mature plantings) and the vegetation (described in Section 3.5.4 above) is of some botanical interest and provides some benefit to the adjacent Meola Creek. However, there are a number of weed species present.

Bird values at the site are moderate. The native bird species identified at the site were fantail and silvereye. Tui are likely to occasionally frequent the site. Introduced species were blackbird, sparrow, and song thrush.

Native vegetation within the construction footprint described above will be removed. The construction area constitutes approximately 10 % of a wider vegetated riparian area of Meola Creek. In the worst case scenario that most vegetation within the construction area is cleared, this would result in greater than minor effects that would need to be mitigated. Due to this vegetation loss, some displacement of resident birds may occur, but these effects are considered likely to be minor. Only silvereye and fantail were observed to be present at the site and these are quite common in urban landscapes.

While no lizards were found during a survey of the site, due to the potential habitat suitability for skinks and arboreal geckos, a salvage operation is proposed and therefore adverse effects on native lizards are unlikely to be more than minor.

The site has overall moderate ecological value. The ecological effects of the main project works are expected to be greater than minor although are able to be sufficiently mitigated by revegetation and/or enhancement of the remaining bush area.

3.5.6 Archaeological effects

No archaeological or heritage sites are recorded in this location and as it is in a built-up and generally modified area the likelihood of intact archaeological remains being present is low.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

3.5.7 Traffic effects

3.5.7.1 Existing environment

The characteristics of the surrounding roads are summarised below:

- Morning Star Place:
 - Is a private road servicing a number of residential properties; and
 - Connects with St Lukes Road in the north east and ends in a cul-de-sac in the south west.
- St Lukes Road:
 - Is a Regional Arterial Road in the Auckland City District Plan;
 - Connects Balmoral Road in the east and Great North Road to the west of Morning Star Place; and
- Intersects with Morning Star Place and Morningside Drive at a signalised intersection.

3.5.7.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season, ranging from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The site is proposed to be accessed via a temporary access at the western end of Morning Star Place, which is a private road. This access avoids the busy shopping centre access roads. However, the use of the road by construction traffic, including trucks, will have effects on residents and users of Morning Star Place during the period of construction. Truck movements will generally be restricted to during normal working hours, 7 am to 6 pm, Monday to Friday, and 8 am to 6 pm Saturday. The construction works will also require disruption to the visitor carparking area which has been constructed over the existing overflow channel and which will be closed during construction. Ongoing consultation will be undertaken with the body corporate and residents of the Morning Star apartments.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at Lyon Avenue are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

3.5.7.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

The diversion chamber will be located beneath the visitor carparking area for the Morning Star apartments and the parking area will be reinstated following construction of the chamber.

3.5.8 Noise effects

3.5.8.1 Existing environment

The nearest residential receivers are the apartments 40 - 50 m to the north and north east of the construction site centre.

Currently the predominant noise source is traffic from surrounding roads. An ambient noise level of 46 dB L_{Aeq} was measured on 12 May 2011 during the day time.

3.5.8.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations. Surface construction works will generally be undertaken during the hours of 7 am and 6 pm Monday to Friday and 8 am to 6 pm Saturday.

A draft construction noise management plan has been prepared (refer Part D Technical Report F). Construction noise levels at the closest noise sensitive receivers (apartments at 27 and 28 Morning Star Place) are expected to be typically between 43 to 74 dB L_{Aeq} . The construction noise levels are predicted to generally comply with the Construction Noise Standard for Monday to Saturday daytime hours, except for piling and excavation in close proximity to the apartments at 27 Morning Star Place and site establishment works in close proximity to the apartments at 28 Morning Star Place. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate effects where needed. Noise levels at the Mount Albert Grammar School classrooms will range between 24 – 45 dB L_{Aeq} (well within the Construction Noise Standard).

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges may result in noise levels above the Construction Noise Standard for a period of time. Where noise from this preparatory work may be an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

3.5.8.3 Operational noise effects

The permanent works (access shaft, drop shaft, flow control structures, overflow and the air intake) may generate low noise levels due to the movement of water and air. Operational noise levels will be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) and no mitigation measures are necessary.

3.5.9 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting may be required. No damage to structures due to vibrations is expected, but there may be some short term disturbance of residents at the closest properties (11-27 Morning Star Place, 12-28 Morning Star Place, 15 Lyon Avenue, and 1 Wagener Place). A number of mitigation methods are available to manage effects, as described in Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

3.5.10 Odour effects

There is an existing overflow at this site and there have been issues in the past with odour here. The replacement of the spillway with a culvert, the significantly reduced operation of the overflow, and avoidance of odour from dry weather flows will result in a reduction in adverse effects due to discharges of odour at this site. The drop shaft, access shaft and control chamber are not likely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent.

It is possible air may be discharged at the air intake during heavy rainfall events that cause the main tunnel to fill and prevent air extraction and treatment at the Mangere ATF. This could potentially give rise to minor localised adverse effects. However, this would likely only occur around 6 to 8 times per annum (or less if the ATF at May Road/PS 25 is installed) and the air intake is proposed to be located relatively distant from the nearby residential properties.

Overall, adverse effects due to discharges of odour will be reduced compared to the current situation.

3.5.11 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains, a silt fence and a Sediment Retention Pond (SRP). Sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the existing open stormwater channel. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process.

3.5.12 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The results suggest there is a moderate risk of contamination at the site, due to potentially contaminating activities having occurred at the site which may have affected shallow soils. Part of the site was previously used for industrial activities and there is potential for low to moderate levels of contamination to have occurred. Potential contaminants would likely be asbestos containing materials, metals (including mercury) and hydrocarbons.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

3.5.13 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate design and construction methodologies as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

3.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft and grit trap on Mount Albert Grammar School sports field; and
- Locating shaft within the Roy Clements Treeway.

Following selection of the proposed site in the Roy Clements Treeway, a number of modifications to the site layout have helped to minimise the effects of the site. The final layout includes:

- A condensed and rotated construction area to fit within the Roy Clements Treeway;
- A configuration which allows for alternative pedestrian access to be provided; and
- A construction area and configuration that minimises effects on trees to the extent practicable.

Figures showing the sites and layout alternatives are located at the end of this section.

3.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows. Benefits will include achieving a reduction in overflows from a significant existing overflow at this site and consequent environmental benefits in Meola Creek. Effects of odour discharges at the site are also expected to reduce.

There will be an effect on the general amenity of the walkway and neighbouring sites during construction. Residential properties, including a number of apartment buildings on Morning Star Place are located in close proximity to the north of the site. It is proposed that vehicles will access the site from Morning Star Place and works will occur in a visitor parking area (the site of an existing overflow already designated by Watercare). Vibration will be managed by control of construction methods and mitigation measures implemented if necessary. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate effects where needed. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence, although those apartments on upper levels with views over the site will be able to see over the fence. Pedestrian access will be maintained and there will only be minor and temporary effects on recreation and public access.

Vegetation removal required at the site will result in more than minor adverse landscape and visual effects, which will be mitigated by replanting, but this will take some time to establish. The ecological effects at the site are considered to be moderate and will be mitigated through replanting and/or enhancement of the remaining bush area.

The permanent works will be largely below ground and only covers and accessways will be visible at the surface. Site reinstatement details will be developed in consultation with the landowner, Auckland Council, the Albert-Eden Local Board, and other key parties.

Lyon Avenue alternative sites and layouts

Comment on alternative	
<p>Large site footprint impacts on recreational facilities (sports field)</p> <p>Large grit trap would require ongoing maintenance access in the school sports field</p>	
<p>Site condensed and moved towards edge of available space to reduce impact on sports field</p> <p>Still has significant impact on sports field</p>	
<p>Reduces impact on sports field</p> <p>Improved access to site</p> <p>Impact on trees</p>	

For the reasons summarised above, these options were not pursued.

4.0 Haverstock Road (AS3)

4.1 Introduction

The Haverstock Road (AS3) site is on the main tunnel MT1 alignment and is required to provide a connection to the existing Branch 8 sewer. It is a secondary construction site which provides for inspection of the main tunnel TBM during construction.

The proposed works are shown on Drawing numbers AEE-MAIN-4.1 and 4.2 included in the A3 drawing set (Part C).

4.2 Location and site description

The Haverstock Road site is located within the premises of Plant & Food Research (a New Zealand government owned Crown Research Institute), bounded by Haverstock Road and Euston Road in Mt Albert. The proposed construction site is on the eastern edge of the property and is proposed to be accessed from Haverstock Road through a section owned by Housing New Zealand.

The site is located on the edge of the Plant & Food Research grounds in an area that is partly grassed and partly contains an area of planted ti kouka (cabbage trees). It is zoned Special Purpose 2 in the Auckland City District Plan and is designated for the Mt Albert Research Centre (E05-05).

Meola Creek runs along the boundary between the Plant & Food Research and Housing New Zealand properties, although it is currently culverted in this section.

To the north and east of the site is residential development, including properties owned by Housing New Zealand. Housing New Zealand has resource consent to redevelop the existing housing with up to 40 new residential units. To the west are the Plant & Food Research buildings. Beyond the Plant & Food land to the south is residential housing on elevated land between Hampstead Road and Mt Albert Road.

4.3 Land ownership and interests

Main site	
Address	120 Mount Albert Road, Mt Albert
Legal description	Lot 1 DP 451490
Title reference	576051
Owner	The New Zealand Institute for Plant and Food Research
Local Board	Albert-Eden
Accessway	
Address	1. 96 Haverstock Road 2. 98 Haverstock Road 3. Camden Road
Legal description	1. Lot 24 DP 45495 2. Lot 15 DP 45495 3. Road reserve
Title reference	1. NA49C/851 2. NA49C/850 3. n/a
Owner	1. Housing New Zealand Limited

	2. Housing New Zealand Limited 3. Auckland Council
--	---

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.



Figure 4-1 Location plan

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Photograph 4-1 Haverstock Road construction site



- NOTES:**
1. DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND

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ISSUE: A DATE: 17/08/12 AMENDMENT: CONSENT ISSUE BY: [Signature] APP'D. BY: [Signature]										AEE AUGUST 2012 <small>Copyright - The drawings, the design and associated content are the intellectual property of WaterCare Services Limited and may not be used without express copyright consent.</small>										DRAWING No.: AEE-MAIN-4.1 ISSUE: A			



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND
 - PROPOSED NOISE BARRIER

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4.4 Proposed works

4.4.1 Permanent works

Drawing reference	AEE-MAIN-4.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel, CSO Collector Sewer CC4 • Connecting pipes to existing sewers and proposed CSO Collector Sewer • 7 m ID access shaft (50 – 65 m) • 7 m ID drop shaft (50 – 65 m) • 4 m diameter manhole • Deaeration tunnel • Control chamber (partly above ground – up to around 3.5 m) • Overflow pipe
Site reinstatement	<ul style="list-style-type: none"> • Regrassing
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via 96-98 Haverstock Road or Camden Road. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of control gates

4.4.2 Construction works

Drawing reference	AEE-MAIN-4.2
Construction site area	Approx. 4,200 m ²
Duration of construction	12 - 18 months construction activities 3 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 9 m diameter, 50 – 65 m deep construction access and drop shafts • TBM inspection • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – access and drop shafts, manhole, connection chamber, overflow • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash • Generator • Spoil storage area

4.5 Assessment of effects

4.5.1 Visual and landscape effects

Many of the nearby residential properties have established gardens with a high degree of tree cover which obscures views to the site. Where views may be afforded around existing houses or through trees they would be limited in extent and generally more distant than adjacent properties.

4.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Removal and possible transplanting of trees;
- Construction of a perimeter fence; and
- Construction activity and vehicle movements.

The effects on landscape character at this site are expected to be very low (less than minor), largely due to the private use of the area, the existing landscape character, the limited proposed alteration to landform, and the nature of the vegetation to be removed. There will be minor adverse effects on visual amenity for those properties on Haverstock Road (Nos. 96 to 102) and 7 Hampstead Road immediately adjacent to the site and less than minor effects on visual amenity for properties further away, depending on their elevation and view over the works.

4.5.1.2 Permanent effects

The permanent visible works at this site will be the site accessways around the facilities, two shaft covers, a control chamber cover and a manhole (all at ground level, flush with the adjacent surface).

Once construction is completed and replanting has established, the permanent works will result in neutral effects on landscape character and visual amenity.

4.5.2 Land use and property effects

Construction activities will require occupation of part of the property and permanent access to the facilities will be required. However, the area occupied by the temporary and permanent works is small in comparison to the wider area and will not prevent the continued use of the property for its current purpose in the long term. Watercare will work closely with Plant & Food Research to ensure coordination with existing and future activities on the site.

The access and manhole on the Housing New Zealand property appear to be in a proposed carpark/landscaped area based on the consented redevelopment plans. Watercare will discuss the proposed works and timing with Housing New Zealand with a view to coordinating the proposed works with any Housing New Zealand development work.

4.5.3 Vegetation effects

The construction area is largely grassed but contains a plot of planted ti kouka in an area of wet ground. These are showing signs of stress and decline. The area also contains privet and willow, with a large clump of willows at the western edge of the proposed construction area.

The trees proposed to be removed are not significant and it is possible they could be relocated if practical. Further discussion will be undertaken with the landowner in relation to this and appropriate site reinstatement.

If the alternative site access from Camden Road is constructed, this will require the removal of a group of trees including four ti kouka, prunus species, a silky oak and an olive tree.

The site is not easily observed from outside the site and there is established vegetation surrounding the proposed construction area which will not be affected. The loss of vegetation outlined above will have a negligible effect on the environment.

4.5.4 Ecological effects

The habitat type at the site is grass with a mass planting of ti kouka and the site has low vegetation value. Bird values at the site are low and no native bird species were identified at the site. Introduced species were blackbird and sparrow. The site is of low value as lizard habitat.

There will be some removal of vegetation, although this is of low ecological value. The site has overall low ecological value and the effects on the site are expected to be less than minor.

4.5.5 Archaeological effects

No archaeological or heritage sites are recorded in this location and as it is in a built-up and generally modified area the likelihood of intact archaeological remains being present is low.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

4.5.6 Traffic effects

4.5.6.1 Existing environment

Haverstock Road is a Local Road in the Auckland City District Plan. It forms a loop road off Fowlds Avenue. It forms a priority controlled intersection with Sandringham Road in the south east, with Sandringham Road having priority. Camden Road is a Local Road in the Auckland City District Plan. It is a two-way unmarked cul-de-sac road intended to provide primarily for property access.

4.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a "worst case" scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The site is proposed to be accessed via a temporary access to be constructed from Haverstock Road. Some kerb-side parking on Haverstock Road near the site entrance and near the intersection with Sandringham Road may need to be restricted to ensure the safe manoeuvring of heavy vehicles. The removal of approximately four spaces is not considered significant and cars will be able to park further west along Haverstock Road.

Depending on the development outcomes at the Housing New Zealand property at 98 Haverstock Road, site access along Camden Road may be used. Camden Road is rather narrow and removal of kerbside parking on Camden Road would be required which may impact on residents. Another alternative access could be via Hampstead Road.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at Haverstock Road are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

4.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month. Permanent access is proposed in the same location as temporary access, from Haverstock Road via the Housing New Zealand property, or via Camden Road.

4.5.7 Noise effects

4.5.7.1 Existing environment

The nearest residential receivers are the residential properties to the north east and south east.

Currently the predominant noise source is traffic from Haverstock Road. An ambient noise level of 44 dB L_{Aeq} was measured on 12 May 2011 during the day time.

4.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations. Surface construction works will generally be undertaken during the hours of 7 am and 6 pm Monday to Friday and 8 am to 6 pm Saturday.

Mitigation measures for the site include the use of 2 m high noise barriers around the northern part of the site, and a draft construction noise management plan has been prepared (refer Part D Technical Report F). Given these measures construction noise levels at the closest noise sensitive receivers (7 Camden Rd, 96 and 98 Haverstock Rd) are predicted to comply with the Construction Noise Standard. Noise levels at nearby receivers from works within the main construction area are expected to be typically between 46 to 70 dB L_{Aeq} .

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges may result in noise levels above the Construction Noise Standard for a period of time. Where noise from this preparatory work may be an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

4.5.7.3 Operational noise effects

The permanent works (drop shaft and overflow) may generate low noise levels immediately above the shaft due to the movement of water. Operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) and no mitigation measures are necessary.

4.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting may be required during construction of shafts and underground chambers. Given the separation distance at this site (around 40 m), any vibration effects are expected to be less than minor.

4.5.9 Odour effects

The facilities to be located at the site include a drop shaft and access shafts, a control chamber and an overflow connection to Meola Creek. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. The overflow will replace an existing overflow and will operate at a much lower frequency due to the increased capacity provided by the Central Interceptor. Watercare records do not indicate that odour has been an issue here in the past and the potential for adverse effects due to odour discharges will be reduced with a decrease in overflow frequency.

4.5.10 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The results suggest there is potential for contamination at the site as the site has been used for horticultural activities. Although no testing has been undertaken within the construction site to date, previous contamination investigations on the property indicate low levels of contamination are likely to be present in near surface soils across the construction site.

There is potential for hotspots of higher contamination levels around chemical storage areas, although it is unclear if any storage area was present within the proposed construction site. Likely contaminants

would be spray residue including metals (arsenic, copper and lead), organochlorine pesticides (OCP) and radioactive materials (which may have been disposed of under glasshouses on the property).

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

4.5.11 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains, a decanting earth bund, and a silt fence. Sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the existing open drain and stormwater network. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process.

4.5.12 Effects of stormwater discharges from permanent works

The impervious area of the permanent works is expected to total approximately 1150 m². While the impervious area threshold will be exceeded by permanent works, the surfaces will be subject to low vehicle traffic volumes and there will be limited sources of contaminants. Drawing SW-MAIN-2 in the A3 drawing set contains indicative stormwater management measures for the site. These include use of a swale to capture and treat runoff from the accessway prior to discharge into the existing stormwater network.

Permanent stormwater management for this site will be confirmed in the detailed design process, and will be consistent with TP 10.

4.5.13 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. Shaft excavations will occur in ECBF overlain by Puketoka Formation. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

4.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft and permanent facilities on residential property in Haverstock Road; and
- Locating shaft and grit trap within the premises of Plant & Food Research.

Following selection of the proposed site in the premises of Plant & Food Research, a number of modifications to the site layout have helped to minimise the effects of the site. The final layout includes:

- A condensed construction area to minimise impact on Plant & Food Research;
- Optimised tunnel design to remove the need for a grit trap at this location; and
- A configuration which allows stream channel naturalisation by other parties.

Figures showing the sites and layout alternatives are located at the end of this section.

4.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

The construction site and permanent works are proposed to be located on Plant & Food Research land. The area to be occupied is relatively small in relation to the overall property. Reinstatement plans will be developed in consultation with Plant & Food Research.

Access is proposed through the Housing New Zealand property at 96 and 98 Haverstock Road and some connection works will occur at No. 98. This is part of the area of the consented housing redevelopment and efforts will be made to coordinate the works with Housing New Zealand, including through timing of any works. Alternative access has been allowed for via Camden Road.

There will be an effect on the general amenity of neighbouring sites during construction. There are some residential properties on Haverstock Road and Camden Road located in relatively close proximity to the site, including the Housing New Zealand sites. A noise barrier is proposed to be used to mitigate noise levels. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and the site is generally well screened by vegetation.

Haverstock Road alternative sites and layouts

Comment on alternative	
<p>Large site footprint impacts on Plant & Food Research property</p>	
<p>Requires removal of at least 3 residential properties</p> <p>Permanent facilities located next to residential properties</p>	
<p>Reduced site footprint reduces impact on private property</p> <p>Large site footprint impacts on Plant & Food Research property</p> <p>Large grit trap would require ongoing maintenance access</p>	

For the reasons summarised above, these options were not pursued.

5.0 Walmsley Park (AS4)

5.1 Introduction

The Walmsley Park (AS4) site is on the main tunnel MT1 alignment and is required to connect to the existing Branch 9 sewer. It is a secondary construction site which provides for inspection of the main tunnel TBM during construction.

The proposed works are shown on Drawing numbers AEE-MAIN-5.1 and 5.2 included in the A3 drawing set (Part C).

5.2 Location and site description

The Walmsley Park site is located at the far eastern end of Walmsley Park in Mt Albert, fronting on to Sandringham Road Extension.

The site is zoned Open Space 2 (informal recreation) and is located at the eastern end of Walmsley Park in an area that is mainly grassed with a few trees. The Park is a long narrow reserve, continuing to the west of the site on both sides of Oakley Creek. The proposed construction area is located near the reserve's frontage on to Sandringham Road Extension. Oakley Creek runs through the reserve to the north of the proposed construction area. There is an existing pedestrian bridge crossing Oakley Creek and a pathway running alongside the northern side of the Creek. It is part of an open space network that surrounds Oakley Creek and extends from the Mt Roskill War Memorial Park in the south east through Alan Wood Reserve to New North Road in the north west. There are a number of mature trees within the construction area.

To the north east and south west are residential houses accessed off O'Donnell Avenue and Sandringham Road Extension. The residential boundaries adjacent to Walmsley Park are fenced with close boarded fences. To the south east, across Sandringham Road Extension is the Wesley Community Centre.

5.3 Land ownership and interests

Address	Sandringham Road Extension, Mt Albert
Legal description	Lot 112 DP 43048
Title reference	Gazette Notice 16176 (1958 P386) (vested in Council for recreational reserve purposes)
Owner	Mt Roskill Borough Council (Auckland Council)
Reserve status	Recreation Reserve
Local Board	Puketapapa

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

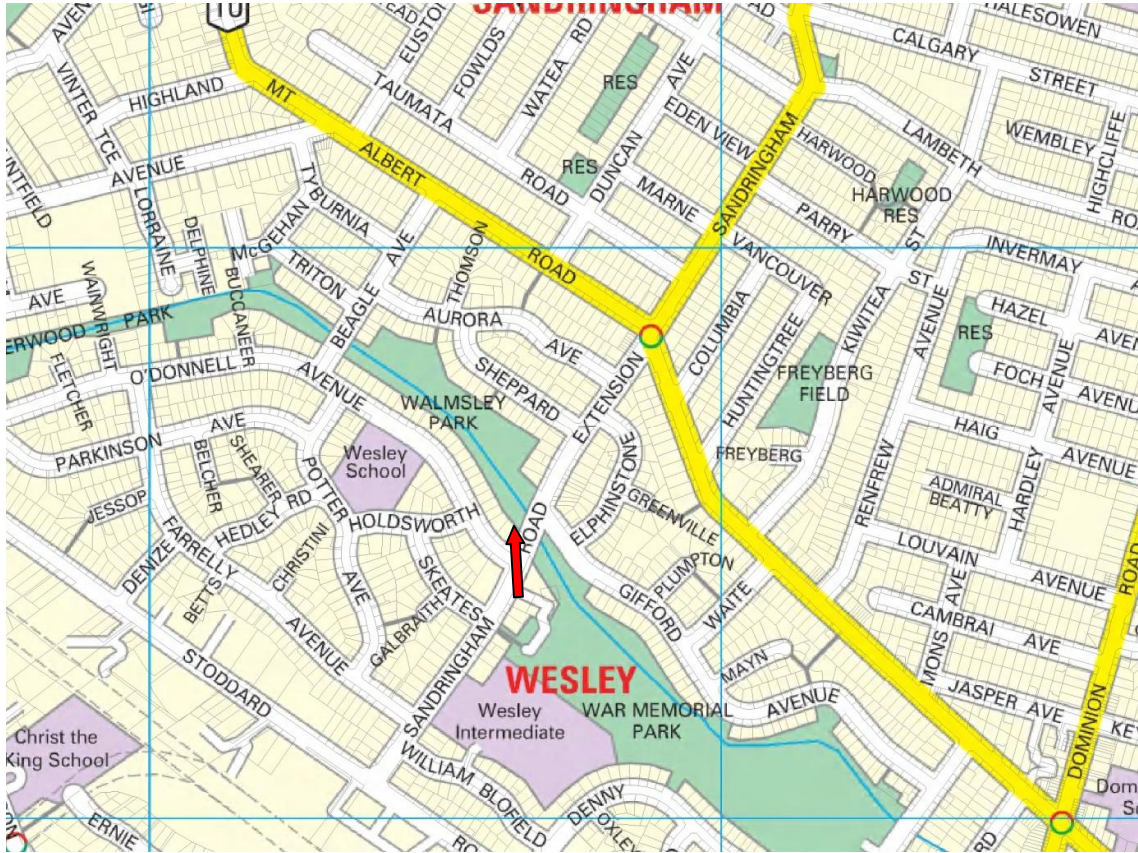


Figure 5-1 Location plan

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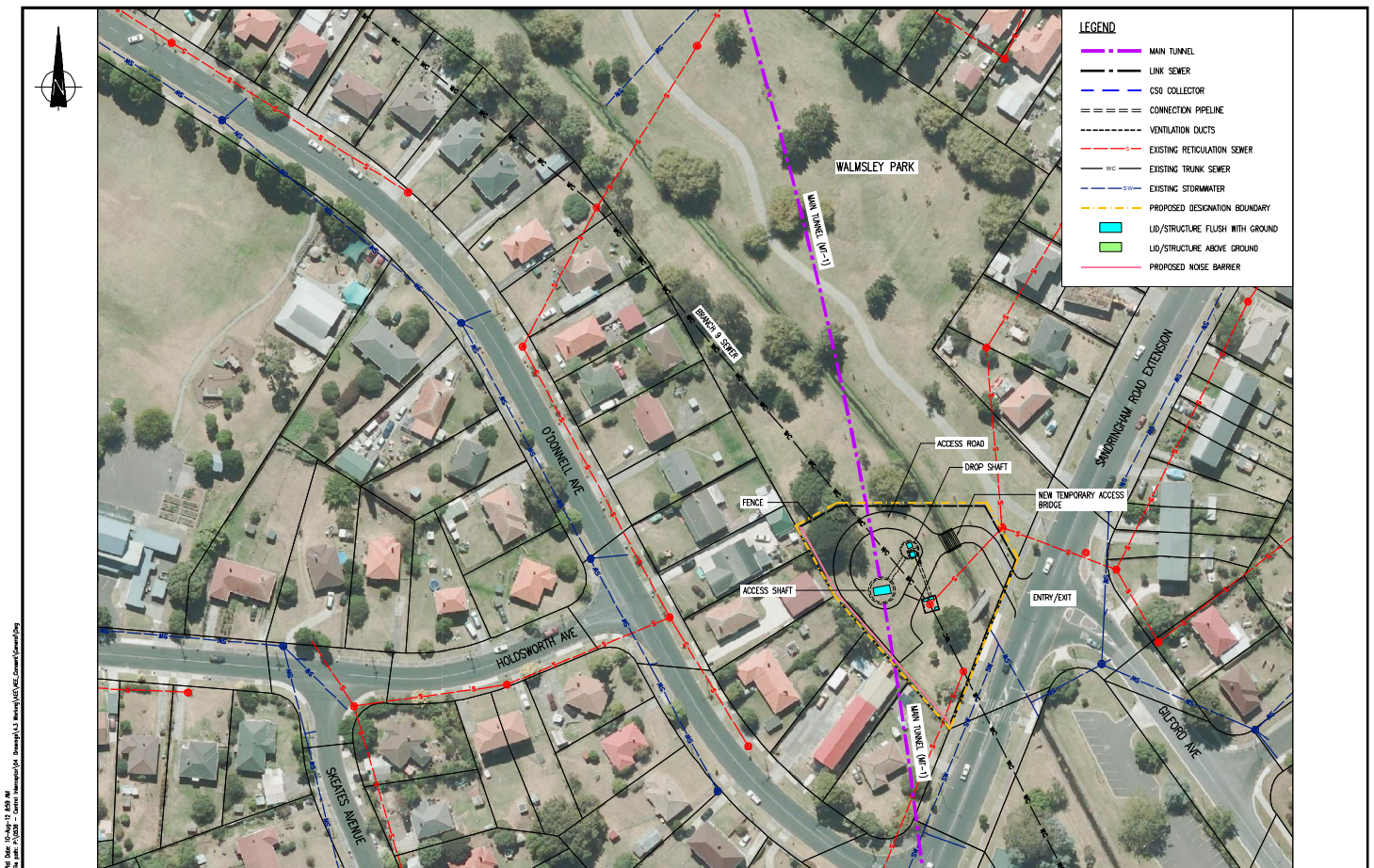


Photograph 5-1 Walmsley Park construction site, facing west



- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012		CENTRAL INTERCEPTOR GENERAL WALMSLEY PARK (AS4) – PERMANENT WORKS PLAN	CAD FILE AEE-MAIN-5.1	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1000 A3	0538
REV'D. P. MGR.		JS					DRAWING No.	ISSUE
APPRO. P. DIR.		CC		AEE-MAIN-5.1		A		



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND
 - PROPOSED NOISE BARRIER

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012		CENTRAL INTERCEPTOR GENERAL WALMSLEY PARK (AS4) – CONSTRUCTION WORKS PLAN	CAD FILE AEE-MAIN-5.2	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1000 A3	0538
REV'D. P. MGR.		JS					DRAWING No.	ISSUE
APPRO. P. DIR.		CC		AEE-MAIN-5.2		A		

5.4 Proposed works

5.4.1 Permanent works

Drawing reference	AEE-MAIN-5.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel • Connection to existing Branch 9 sewer • 7 m ID access shaft (67 – 82 m deep) • 5 m ID drop shaft (67 – 82 m deep) • Deaeration tunnel • Connection chamber
Site reinstatement	<ul style="list-style-type: none"> • Regrassing and replanting
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via Sandringham Road Extension. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Manual adjustment of stop logs.

5.4.2 Construction works

Drawing reference	AEE-MAIN-5.2
Construction site area	Approx. 2,550 m ²
Duration of construction ³	12 - 18 months construction activities 5 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Access bridge construction • Shaft excavations: 9 m diameter, 67 – 82 m deep construction access and drop shafts • TBM inspection • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – access and drop shafts, connection chamber • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading and temporary bridge, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash

³ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

- | | |
|--|--|
| | <ul style="list-style-type: none">• Generator• Spoil storage area |
|--|--|

5.5 Assessment of effects

5.5.1 Visual and landscape effects

There are a number of houses located on O'Donnell Avenue that back onto the reserve in which the construction site will be located. There will be views of the construction site perimeter fence beyond the existing boundary fences from approximately four of these properties. The site may also be visible from houses and flats to the north east across the stream and further east on Sandringham Road Extension. The viewing audience would largely be users of the reserve and locals using the pedestrian pathway through the reserve.

5.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Removal of trees within the site;
- Construction of a perimeter fence; and
- Construction activity and vehicle movements.

The proposed works are expected to have a minor adverse effect on open space and landscape character. The site is located away from the main walkway but the fence around the construction area will be visible and a small number of trees are to be removed. The works will have less than minor adverse effects on visual amenity. There is limited visibility of the works and much of the viewing audience will be of a transitory nature.

5.5.1.2 Permanent effects

Following construction the site will be reinstated and replanting will be undertaken.

The permanent works visible at this site will be the access bridge and site accessways around the facilities, two shaft covers, and a chamber cover (at ground level, flush with the adjacent surface).

Effects on open space and landscape character will be neutral. The long term visual effects on the viewing audience would be neutral and over time as the planting matures these effects could become beneficial.

5.5.2 Recreation and public access effects

There will be some impact on amenity during construction due to construction noise, traffic movements and other construction activities. The site is in an area of passive recreation, at the eastern-most corner of the reserve. The siting of the proposed construction area in this location has been designed to minimise overall impact on the reserve and maintain the current pedestrian access through Walmsley Park. The access across the pedestrian bridge within the site will be re-routed onto the footpath along Sandringham Road Extension.

5.5.3 Vegetation effects

Trees within the construction area include pohutukawa, puriri, kahikatea, magnolia, sheoak, and willow. Many of these are mature or early mature specimens, although the kahikatea are juveniles. The sheoke and puriri on the southern boundary of the site are located on the adjacent property and overhang the fence.

The trees within the construction footprint will be removed. These are not significant specimens and their loss can be mitigated by replanting. Those on the edge of the construction area (including those on the adjacent site) will be protected with appropriate protection measures where required.

Watercare will work with Auckland Council and the Puketapapa Local Board to develop appropriate reinstatement planting to mitigate effects.

5.5.4 Ecological effects

The site has low overall ecological value. No native bird species were identified at the site. Introduced species were blackbird, starling, rock pigeon, and dove. The site is of low value as lizard habitat.

Although vegetation within the construction footprint will be removed, vegetation values are low. The loss of mown field habitat for bird feeding will be of less than minor effect as there is ample habitat available elsewhere. Overall the ecological effects are expected to be less than minor.

5.5.5 Archaeological effects

No archaeological or heritage sites are recorded in this location and as it is in a built-up and generally modified area the likelihood of intact archaeological remains being present is low.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

5.5.6 Traffic effects

5.5.6.1 Existing environment

Sandringham Road Extension is a District Arterial in the Auckland City District Plan. It runs in a north to south direction in the vicinity of the site and links Mt Albert Road with Stoddard Road.

5.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a "worst case" scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The proposed temporary access is from Sandringham Road Extension opposite Gilford Avenue. Site access will be left in/left out only and some restriction of parking on either side of the access way may be needed to enable safe manoeuvring. The access has been located to be around 30 m from the existing pedestrian crossing.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at Walmsley Park are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

5.5.6.3 Traffic effects arising from permanent works

Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

5.5.7 Noise effects

5.5.7.1 Existing environment

The nearest residential receivers are the residential properties on O'Donnell Avenue over 25 m to the west of the construction site centre.

Currently the predominant noise source is traffic from Sandringham Road Extension. An ambient noise level of 55 dB L_{Aeq} was measured on 12 May 2011 during the day time.

5.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations. Surface construction works will generally be undertaken during the hours of 7 am and 6 pm Monday to Friday.

Mitigation measures for the site include the use of a 2 m high noise barrier along the western side of the site, and a draft construction noise management plan has been prepared (refer Part D Technical Report F). Given this measure construction noise levels at the closest noise sensitive receivers (725 and 734 Sandringham Road Extension and 3 and 7 O'Donnell Ave) are expected to be typically between 43 to 78 dB L_{Aeq} . The construction noise levels are predicted to generally comply with the Construction Noise Standard for Monday to Saturday daytime hours, except if vibratory sheet piling occurs. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate this.

5.5.7.3 Operational noise effects

The permanent works (drop shaft and access shaft) may generate low noise levels immediately above the shaft due to the movement of water. Operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) and no mitigation measures are necessary.

5.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. Some construction activities have the potential to generate higher levels of vibration but no damage to structures is expected. There may be some short term disturbance of residents at the closest properties (3 – 9 O'Donnell Avenue). A number of mitigation methods are available to manage effects, as described in Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

5.5.9 Odour effects

The facilities to be located at the site include a drop shaft, access shaft and control chamber, none of which are likely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Adverse effects due to discharges of odour are unlikely to occur.

5.5.10 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains, a decanting earth bund and silt fences. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the existing open drain and stormwater network. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

5.5.11 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The results suggest there is potential contamination at the site, due to the potential for fill present on the site to contain low to moderate levels of contamination. The likely contaminants are unknown but could typically include metals, hydrocarbon and asbestos containing material.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

5.5.12 Oakley Creek stormwater works

Auckland Council is proposing to carry out works in Oakley Creek to resolve flooding issues in the catchment. This is likely to involve stream widening and naturalisation works on part of Oakley Creek in the vicinity of the proposed construction area. The permanent works at the site will be at ground level, so would not pose an obstacle to overland flow paths and shaft and chamber covers would be designed to be watertight if necessary.

5.5.13 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. Shaft excavations will occur in ECBF overlain by Puketoka Formation. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

5.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft and permanent facilities at the eastern edge of Walmsley Park on the north side of Oakley Creek;
- Locating shaft as above but with condensed layout; and
- Locating shaft on the southern side of Oakley Creek, closer to Sandringham Road.

Following selection of the proposed site on the southern side of Oakley Creek, a number of modifications to the site layout have helped to minimise the effects on the park. The final layout includes:

- A condensed construction site area; and
- Improved construction and permanent maintenance access from the road, with less impact on the park.

Figures showing the sites and layout alternatives are located at the end of this section.

5.7 Conclusion



Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There will be an effect on the general amenity of the reserve and neighbouring sites during construction. The residential properties at the southern end of O'Donnell Avenue and on Sandringham Road Extension that share a boundary with the reserve are located in close proximity to the proposed construction site. It will be necessary to implement construction management measures in order to minimise the effects of construction activities on these properties. A noise barrier is proposed to mitigate noise levels and construction activities will be managed to mitigate the effects of vibration at

the closest properties so that effects are minor. Erosion and sediment control measures will be implemented to manage the effects of earthworks and prevent the discharge of sediment laden water to nearby Oakley Creek. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and pedestrian access will be maintained. The construction site is within an area of passive recreation and pedestrian access will be maintained. Therefore there will only be minor and temporary effects on recreation and public access.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface. Site reinstatement details will be developed in consultation with the landowner, Auckland Council.

Walmsley Park alternative sites and layouts

Comment on alternative	
<p>Large site footprint impacts on recreational facilities</p>	
<p>Reduced site footprint reduces impact on recreational facilities</p> <p>Permanent facilities requiring access within the park behind residential properties</p>	

For the reasons summarised above, these options were not pursued.

6.0 May Road (WS2)

6.1 Introduction

The May Road (WS2) site is on the main tunnel alignment and is required to provide a connection to the existing Branch 9A sewer and nearby local reticulation. It is also a connection point to the main tunnel for proposed Link Sewer 3. The site is a primary construction site that will operate as a launch and/or reception site for the TBM for a period of around 5 years.

The proposed works are shown on Drawing numbers AEE-MAIN-6.1 and 6.2 included in the A3 drawing set (Part C).

6.2 Location and site description

The May Road site is located off May Road in Mt Roskill. The construction site is located at the north western end of the property.

The site is situated in an area of undeveloped Business 4 zoned land north west of Mt Roskill and in between May Road, Roma Road, and Marion Avenue. To the north east beyond Roma Road is the recently constructed South Western Motorway Extension (SH20). Roma Road provides access to some large commercial business premises including Foodstuffs and Gilmores. To the west is an area of residential housing development accessed off Marion Avenue.

The undeveloped, largely flat site contains a range of shrubby vegetation and trees, and a watercourse which connects into Oakley Creek on the other side of SH20.

A row of mixed evergreen and deciduous trees are located along part of the boundary with the residential area on Marion Avenue.

6.3 Land ownership and interests

Main site	
Address	May Road, Mt Roskill
Legal description	Lot 2 DP 116924
Title reference	NA66C/174
Owner	May Road Properties Ltd
Local Board	Puketapapa

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

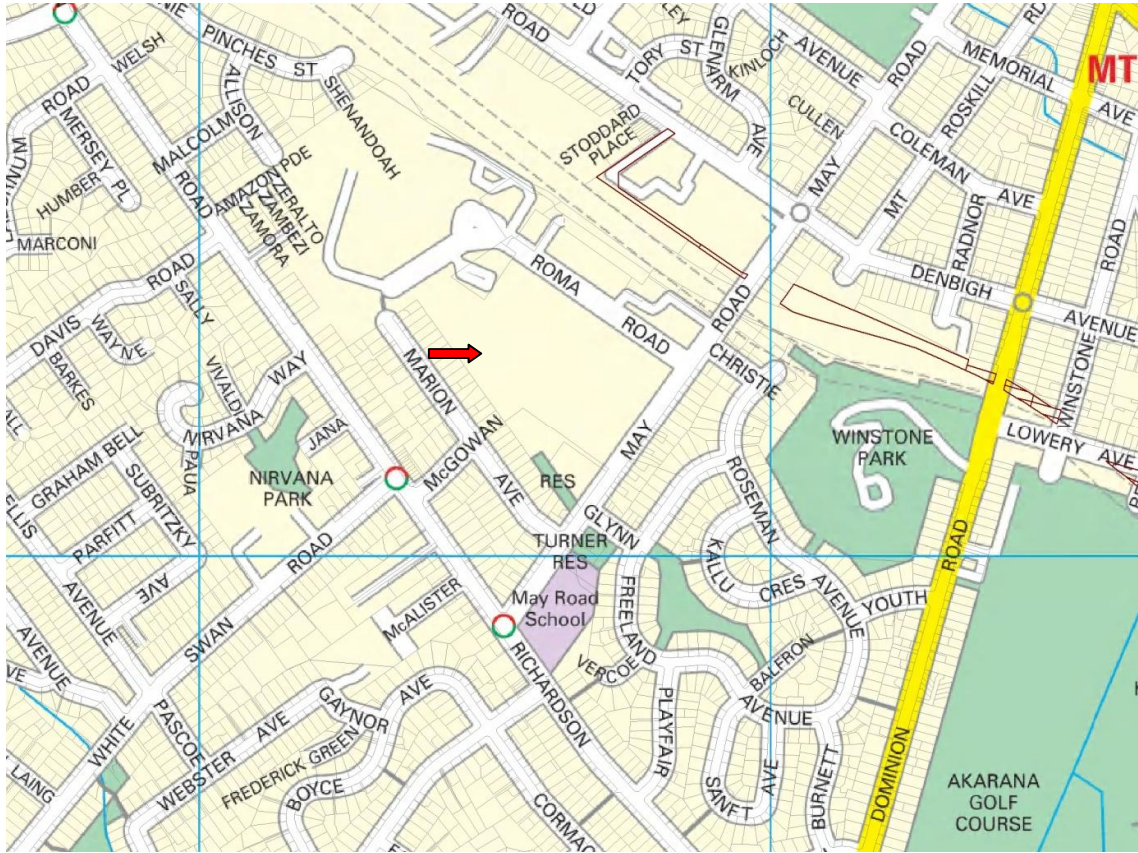


Figure 6-1 Location plan

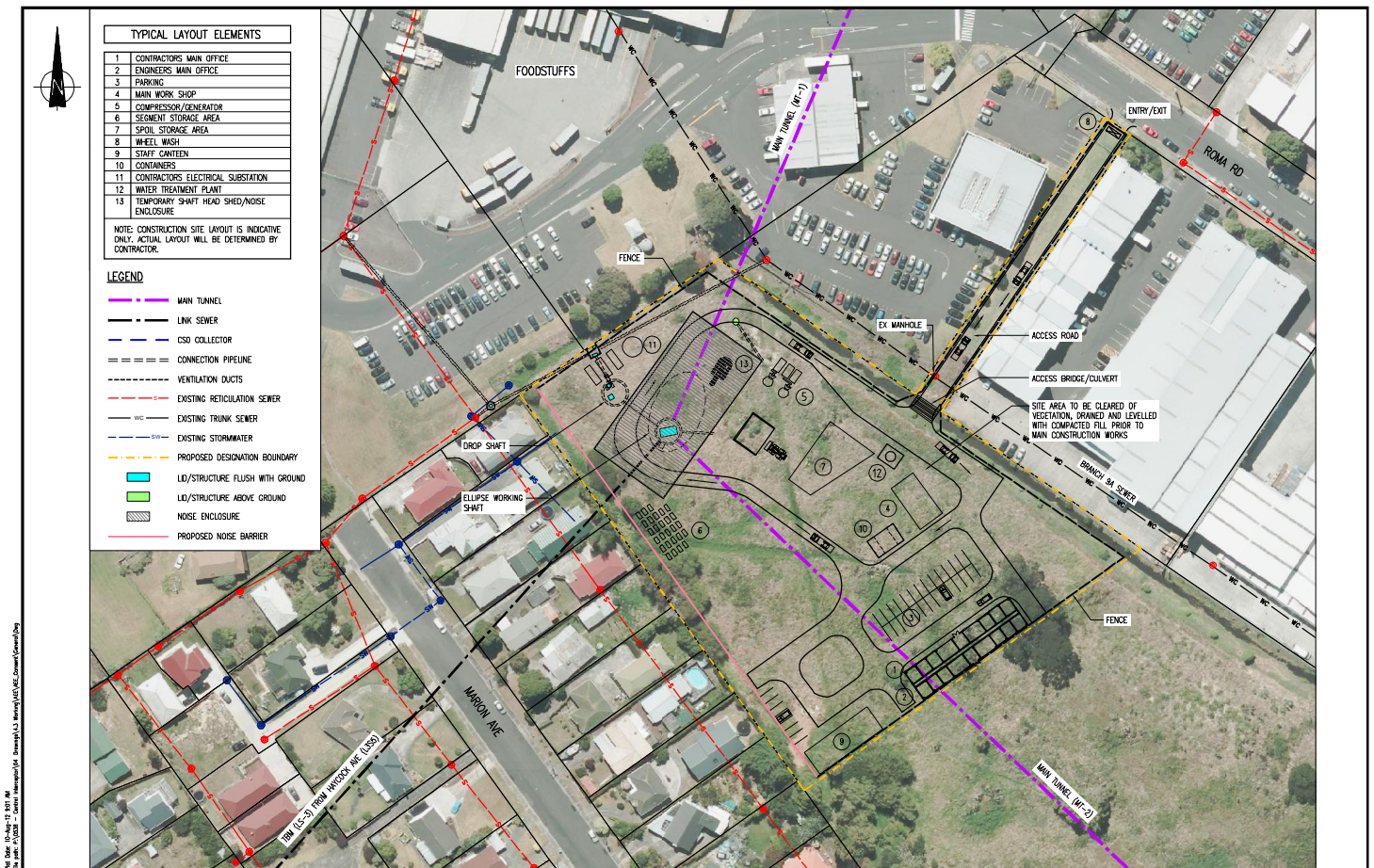
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Photograph 6-1 May Road proposed construction site



DESIGNED: [Signature]		DATE: 08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT		CENTRAL INTERCEPTOR GENERAL MAY ROAD (WS2) - PERMANENT WORKS PLAN	CAD FILE: AEE-MAIN-6.1	DATE: 26-Jul-12		
DRAWN: [Signature]		DATE: 08/12				ORIGINAL SCALE: A1	CONTRACT No.: 0538		
REV'D P.MGR: [Signature]		DATE:	waterCare services limited <small>CONFIDENTIAL - This drawing, its design and contents remain the sole property of WaterCare Services Limited and may not be used without approved Copyright consent.</small>	DRAWING No.:		ISSUE:			
ISSUE: A	DATE: 17/08/12	CONSENT ISSUE		AP: [Signature]	PR: [Signature]	APPRO. P.DIR: [Signature]	CC: [Signature]	BY: [Signature]	DATE: 17/08/12



DESIGNED: [Signature]		DATE: 08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT		CENTRAL INTERCEPTOR GENERAL MAY ROAD (WS2) - CONSTRUCTION WORKS PLAN	CAD FILE: AEE-MAIN-6.2	DATE: 23-May-12		
DRAWN: [Signature]		DATE: 08/12				ORIGINAL SCALE: A1	CONTRACT No.: 0538		
REV'D P.MGR: [Signature]		DATE:	waterCare services limited <small>CONFIDENTIAL - This drawing, its design and contents remain the sole property of WaterCare Services Limited and may not be used without approved Copyright consent.</small>	DRAWING No.:		ISSUE:			
ISSUE: A	DATE: 17/08/12	CONSENT ISSUE		AP: [Signature]	PR: [Signature]	APPRO. P.DIR: [Signature]	CC: [Signature]	BY: [Signature]	DATE: 17/08/12

6.4 Proposed works

6.4.1 Permanent works

Drawing reference	AEE-MAIN-6.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel, Link Sewer 3, CSO Collector Sewer CC5 • Connecting pipes to existing sewers, Link Sewer 3 and CSO Collector Sewer CC5 • 7 m ID access shaft (70 – 85 m deep) • 7 m ID drop shaft (70 – 85 m deep) • Deaeration tunnel • Stop log chamber • Air intake • Air Treatment Facility and air vent
Site reinstatement	<ul style="list-style-type: none"> • Regrassing
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via existing access lot to Roma Road. Access required approximately once a week for normal operation (or less frequent without ATF).
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of ATF • Manual adjustment of stop logs

6.4.2 Construction works

Drawing reference	AEE-MAIN-6.2
Construction site area	Approx. 15,000 m ²
Duration of construction	5 years
Principal temporary construction activities	<ul style="list-style-type: none"> • Access crossing (bridge/culvert) construction • Drainage works to address waterlogged land • Shaft excavations: 70 – 85 m deep 25 x 15 m ellipse shaped shaft for TBM launch or reception; construction shaft for CSO Collector; 9 m diameter, 70 – 85 m deep drop shaft • TBM assembly and launch/retrieval • Removal of spoil from tunnel • Spoil storage • Liner segment handling and storage • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – access and drop shafts • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff canteen, staff/visitor parking • Noise enclosure shed over shaft • Crawler crane, piling rigs, ground improvement rigs, tower crane or gantry crane

	<ul style="list-style-type: none"> • Water treatment equipment • Wheel wash • Grout equipment • Slurry separation plant • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment • Workshops • Electrical substation • Compressor/generator • Site lighting <p>If the site is used for TBM reception only some activities would not be required or would be reduced in scale. Spoil removal/storage would be limited to shaft excavations and segment storage would not be required. A mobile crane would be used when required.</p>
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6.4.3 Air Treatment Facility

Initially, it is not expected that an air treatment facility (ATF) will be required, but space has been allowed for and it is intended to be provided for within the designation, in the event that it is required. If an ATF is determined to be required after a period of scheme operation, it is likely that this would be a dry weather flow (primary) air treatment facility 70 x 37 m, around 8 m high with a ventilation stack 8 to 10 m high and 1.8 m diameter.

Broad architectural options have been considered at concept design stage, and it is envisaged that a large but relatively low building, in keeping with the scale of nearby industrial buildings would be constructed (the maximum height in the Business 4 zone is 15 m). The final design will be developed at a later stage, if the ATF is required, and details will be provided in an Outline Plan of Works.

6.5 Assessment of effects

6.5.1 Visual and landscape effects

There are approximately four properties on Marion Avenue adjoining the south western boundary of the property from where the site and perimeter fence could potentially be visible beyond existing fences and vegetation and between the houses and boundary. Further to the west and southwest up to Richardson Road are additional houses on rising land which may have the opportunity to view over and between the houses in the foreground to the construction works. To the north and east are large scale warehouse and light industrial activities accessed off Roma Road. These activities are also visible to the same residents.

6.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Removal of trees and other vegetation. Existing trees along the residential boundary would remain;
- Construction of perimeter fence; and
- Visibility of the temporary shed and construction of the Air Treatment Facility building and other works above the fence and vegetation for a number of residents in the area between the site and Richardson Road.

The visibility of the site at some residential properties will be partly mitigated by the perimeter fence and could be reduced by the planting of fast growing screening vegetation along the boundary (e.g.

planted following granting of consent and prior to construction commencing). Effects on landscape character will be less than minor due to the business zoning, existing landscape character, and limited alteration to the landform. Adverse visual effects would range from very low for the majority of the viewing audience in properties on Marion Street immediately adjoining the site (due to existing and proposed screening) to minor for those residents that may have a clear elevated view of the site above and between intervening buildings and vegetation up to Richardson Road. For others in this residential area the adverse visual effects would range from low to very low depending on the extent of visibility, but would be less than minor. Although the temporary shed and above ground elements would be visible to some residents, their existing view contains similar industrial scale type elements.

6.5.1.2 Permanent effects

Permanent features that will remain at the site are the site access from Roma Road and around the facilities, the air treatment facility, access and drop shafts, and a stop log chamber. The ATF will be an above ground structure, while the other structures will be at ground level, flush with the adjacent surface. The design of the air treatment facility will be developed at a later stage and details will be provided in an Outline Plan of Works.

The permanent structures (particularly the ATF) will be of a scale in keeping with the adjacent industrial uses and consistent with what could be expected on a site with Business 4 zoning.

With the implementation of mitigation measures, the landscape and visual effects of the main project works will be less than minor.

6.5.2 Land use and property effects

The May Road site is zoned Business 4 Zone, which is described in the Auckland City District Plan as being applied where medium intensity light industrial and service uses are the dominant activities. The proposed works will result in part of the property being used for a non-business use. However, the permanent structures (particularly the ATF) will be of a scale in keeping with the adjacent industrial uses and consistent with what could be expected on a site with Business 4 zoning. The remainder of the site not required for the proposed works could still be used for business purposes. The site is privately owned and Watercare is in discussion with the landowner regarding the works.

6.5.3 Vegetation effects

The site has a high occurrence of weeds throughout the site. The predominant coverage is blackberry, gorse, pampas and the occasional flax with a cluster of wattle. Noted vegetation within the construction footprint consists of early mature specimens of wattle, ngaio, and a spruce.

The vegetation will require removal, with the possible exception of the wattle trees. The vegetation is not significant and the removal of these trees would not have any more than a minor effect on the amenity of the area (as discussed above).

6.5.4 Ecological effects

The habitat type at the site is overgrown grassy weedfield with a few trees with low vegetation value. Bird values at the site are also low. Introduced bird species at the site were blackbird, sparrow and song thrush, with no native bird species identified. The site has been surveyed for lizards and is considered to have low lizard values. Introduced Rainbow skinks were observed to be present at the site, but no native skinks were found. However, the habitat is considered to be suitable for native skinks. A salvage operation is proposed and therefore adverse effects on native lizards are unlikely to be more than minor.

Overall, the ecological effects of the main project works are considered to be less than minor.

6.5.5 Archaeological effects

The Mt Roskill area is an area of archaeological interest. At the May Road site wooden artefacts were recovered in an area of former swamp land (CHI no. 7031; NZAA no. R11/57), although the site is now recorded as having been destroyed.

While there is a low density of known archaeological sites in the area, the close proximity of the site R11/57 (and to a lesser extent Mt Roskill), suggests that archaeological remains could be identified during earthworks in the area. However, these are likely to consist of isolated artefact finds in the former swamp and archaeological survey and subsurface testing of this area is not considered feasible. To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

6.5.6 Traffic effects

6.5.6.1 Existing environment

Temporary and permanent access to the site is proposed to be constructed from Roma Road which joins with May Road.

The characteristics of the surrounding roads are summarised below:

- May Road:
 - Is a Collector Road in the Auckland City District Plan; and
 - Links Mt Albert Road in the north with Richardson Road in the south.
- Roma Road:
 - Is a Local Road in the Auckland City District Plan;
 - Terminates in a cul-de-sac; and
 - Connects with May Road at the south eastern end at a priority-controlled intersection.

6.5.6.2 Traffic effects arising from construction works

At this primary construction site, which will be a launch and/or retrieval site for the TBM, construction traffic will typically be large truck and trailer units with a typical capacity of 15 m³. Traffic movements will vary through the phases of construction and by construction season, ranging between 18 to 60 standard vehicle movements per day and 64 to 104 heavy vehicle movements per day.

To accommodate the path of trucks using the site access to/from Roma Road, it will be necessary to remove approximately 10 m of on street parking. Observations show parking at the northern end of Roma Road is well used, but there is considered to be ample room to accommodate any displaced parking further south on Roma Road.

The effects of the proposed works on the surrounding intersections have been modelled using SIDRA. There could be small increases in delays and queue length resulting in no more than minor effects at the following intersections:

- May Road/Roma Road (less than minor effect);
- May Road/Denbigh Avenue/Stoddard Road (no more than minor effect);
- Denbigh Avenue/Dominion Road (less than minor effect);
- Dominion Road/SH20 westbound (less than minor effect); and
- Dominion Road/SH20 eastbound (no more than minor effect).

The construction works at the May Road site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

6.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. The proposed access road from Roma Road will remain and permanent accessways around the site facilities will remain for maintenance access. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per week.

6.5.7 Noise effects

6.5.7.1 Existing environment

The nearest residential receivers are located close to the site boundary to the west on Marion Avenue.

An ambient noise level of 43 dB L_{Aeq} was measured on 12 May 2011 during the day time and 44 dB L_{Aeq} was measured on 19 July 2011 during the night time.

6.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling. At this primary construction site construction operations will occur 24 hours a day, 7 days a week. The Construction Noise Standard contains lower noise limits for evening periods and Sundays and public holidays. To manage noise levels it is proposed to construct an enclosure over the temporary tunnelling shaft site with a weighted sound reduction index (R_w) of at least 40. Openings will be designed to face away from sensitive noise receivers. A 3 m high noise barrier is also proposed along the western side of the site.

Other mitigation measures proposed to manage noise levels are:

- Concentration of truck traffic and forklift operation in the Monday-Saturday day-time and weekday evening periods to limit noise impact during the night-time;
- Closure of enclosure doors at night-time to ensure maximum noise reduction;
- Noise intensive construction work limited to within the enclosure other than Monday to Saturday daytime (0730 – 1800hrs) and weekday evening (1800 – 2000hrs) periods. (Night-time works outside the enclosure of a less noise intensive nature may still occur); and
- Containing the generator, compressor, electrical substation and water treatment equipment within suitable noise barriers or enclosures.

A draft construction noise management plan has been prepared which includes recommendations and processes to mitigate noise levels (refer Part D Technical Report F).

Noise levels at the closest noise sensitive receivers (41A, 48 and 53A Marion Ave and commercial premises on Roma Road) due to tunnelling and excavation are expected to be typically between 49 to 70 dB L_{Aeq} during the Monday to Saturday day-time and weekday evening periods and 34 to 43 dB L_{Aeq} at night time. The construction noise levels are predicted to generally comply with the Construction Noise Standard for Monday to Saturday daytime hours. At 53A Marion Avenue certain activities e.g. piling could be non compliant during the evening period. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate effects, for example, limiting the noisier activities during the evening and night time periods.

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges may result in noise levels above the Construction Noise Standard for a period of time. Where noise from this preparatory work may be an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

6.5.7.3 Operational noise effects

Long term noise emission sources at the site are the air treatment facility (fans etc.) and the air intake (the movement of air, although this is not expected to be significant). Noise levels from the air intake at nearby sites are predicted to be readily compliant with the proposed noise limits (refer proposed designation conditions and noise impact assessment in Part D Technical Report F). Air treatment facility noise levels will be compliant with the proposed limits with mitigation measures in place (including an enclosure of appropriate materials and design) with noise levels predicted to be between 30 to 42 dB L_{Aeq} at representative nearby dwellings.

6.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting may be required. No damage to structures due to vibrations is expected, but there may be some short term disturbance of residents at the closest properties (51a and 53a – 55a Marion Avenue). A number of mitigation methods are available to manage effects, as described in Section (ii) “Mitigation Measures” at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

6.5.9 Odour effects

The drop shaft, access shafts and control chambers are not likely to be significant sources of odour and most of the time during normal operation adverse effects due to odour discharges are not expected to occur. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent.

A dry weather (primary) ATF may be installed at the May Road site following a period of scheme operation as part of the staged approach to odour management. This would draw air from Link Sewer 3 for treatment. Alternatively, if a dry weather ATF is installed at PS 25 an air intake would be required at May Road. This could result in moderately odorous air discharging from the air intake during moderate to severe wet weather events but would cause no more than minor localised adverse effects of short duration.

Under either scenario, and given the general operation of the Central Interceptor under negative pressure, adverse effects due to odour discharges at May Road are expected to be no more than minor.

6.5.10 Contaminated sites effects

A desk top study and soil testing has been undertaken and indicates that the site contains fill material. Test results show that all metals, polycyclic aromatic hydrocarbon (PAH) and total petroleum hydrocarbon (TPH) concentrations are below the NES contaminant standards for commercial/industrial end use and ARP: ALW permitted activity soil criteria (discharges). However, contaminant concentrations exceed defined background concentrations.

Concentrations of asbestos fibres recorded in the soil at some test pits is marginally above the current international ‘best practice’ guideline of 0.001 % but at these concentrations, the asbestos fibres are unlikely to pose a significant risk to workers during land disturbance and on-site users following development.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The generally low level contamination found indicates that the works can be appropriately managed to mitigate any effects to the environment using the procedures set out in the draft SMP.

Following comparison of test results with Auckland Council cleanfill criteria, likely disposal requirements for material to be disposed of off-site have been identified as follows:

- Fill material: to be disposed of to a managed fill site that is authorised to take the low level metal, hydrocarbon and asbestos concentrations in the fill. If the managed fill site is not able to accept the low level asbestos contaminated soil, then the surplus fill may have to be disposed of at an appropriately licenced landfill.
- Natural soils at shaft locations: to be disposed of to a cleanfill site authorised to accept volcanic type soils, or to a managed fill site.

6.5.11 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP include stabilised clean water diversions, sediment diversion drains, and sediment retention ponds. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the existing open drain. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

Proposed stormwater treatment and attenuation devices comprise of sediment retention ponds. Stormwater volumes calculated in accordance with TP10 are provided in Part D Technical Report K.

The ESCP for this site will be finalised through the CMP process.

6.5.12 Effects of stormwater discharges from permanent works

The impervious area of the permanent works is expected to total approximately 6500 m². While the impervious area threshold will be exceeded by permanent works, the surfaces will be subject to low vehicle traffic volumes and there will be limited sources of contaminants. Drawing SW-MAIN-3 in the A3 drawing set contains indicative stormwater management measures for the site. These include construction of a wetland for stormwater treatment and detention prior to discharge into the existing open channel.

Permanent stormwater management for this site will be confirmed in the detailed design process, and will be consistent with TP 10.

6.5.13 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. Shaft excavations will occur in ECBF overlain by Puketoka Formation. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

6.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating the shaft in the rear carpark of Gilmores on May Road;
- Locating the shaft to the rear of Foodstuffs near Allison Street and Shenandoah Avenue; and
- Locating the shaft in the undeveloped land between May Road, Roma Road and Marion Avenue.

Following selection of the preferred site in the north western end of the undeveloped land, a number of modifications to the site layout have helped to minimise the effects of the works.

The final layout includes:

- A condensed construction site area; and
- Construction access via Roma Road to minimise effects on watercourse.

Figures showing the sites and layout alternatives are located at the end of this section.




6.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There will be an effect on the general amenity of neighbouring sites during construction. There are some residential properties adjacent to the site at the northern end of Marion Avenue and it will be necessary to implement construction management measures in order to minimise the effects of construction activities on these properties. A noise barrier is proposed to mitigate noise levels and construction activities will be managed so as to mitigate the effects of vibration at the closest properties so that effects are minor. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and planting of screening vegetation. Erosion and sediment control measures will be implemented to manage the effects of earthworks and prevent the discharge of sediment laden water to the watercourse. Most of the time, under normal operating conditions, adverse effects due to odour discharges are not expected to occur. Infrequently, there may be some odour of a localised nature, resulting in no more than minor effects.

The permanent facilities, with appropriate design principles implemented, are expected to result in no more than minor adverse landscape and visual effects and will be consistent with the scale of buildings on adjacent properties and with what could be expected on a site with Business 4 zoning.

May Road alternative sites and layouts

Comment on alternative	
<p>Large site footprint impacting on private land</p>	
<p>Available area for site not large enough for primary construction site Access required for a primary construction site not suitable</p>	
<p>Available area for site not large enough for primary construction site</p>	

For the reasons summarised above, these options were not pursued.

7.0 Keith Hay Park (AS5)

7.1 Introduction

The Keith Hay Park site is on the main tunnel MT2 alignment and is required to provide connections to the existing Branch 9 and Branch 9B sewers. It is a secondary construction site which provides for inspection of the main tunnel TBM during construction. The site includes one main construction area and three smaller micro tunnel construction areas.

The proposed works are shown on Drawing numbers AEE-MAIN-7.1 and 7.2 included in the A3 drawing set (Part C).

7.2 Location and site description

The Keith Hay Park site is located within and adjacent to Keith Hay Park, Arundel Street, Mt Roskill. The main construction site is located on property adjacent to the eastern side of Keith Hay Park, near the Arundel Street entrance. The connection to Branch 9B is located to the north of the park at 60 Frost Road with construction areas for the micro tunnel connection located within Keith Hay Park.

The main construction site is located on property adjacent to the eastern side of Keith Hay Park. Three of the properties (49 and 51 Arundel Street and 20 Gregory Place) were formerly residential properties. They are now owned by Auckland Council and have had the houses removed. The fourth property (22 Gregory Place) is privately owned and will be acquired by Watercare. The properties are zoned Residential 5. The site is bordered by residential properties to the north and east and by Keith Hay Park to the west. The eastern boundaries of the Council owned 49 and 51 Arundel Street and 20 Gregory Place have been fenced with a close board timber fence. It is understood that Auckland Council intends to plant a 5 m strip along the eastern boundary fence. A strip of semi-mature mixed vegetation currently separates the proposed main construction site from Keith Hay Park.

The adjoining area of Keith Hay Park contains a complex including the Three Kings United Soccer Club, Cameron Pool, the gym and the Play Centre. The park is zoned Open Space 3 and is used for active recreation, containing a number of playing fields both to the north and south. A concrete lined channel (Oakley Creek) also runs along the eastern edge of the park.

Two of the three micro tunnel construction areas required for the connection to Branch 9 and 9B Sewers are within the park. The third is located to the north of the park on the northern side of the recently constructed section of SH20, zoned road reserve/Special Purpose 3 and designated for proposed motorway/rail/road (F05-05) and for railway purposes (G08-05). To the north of this site are Mt Roskill Grammar School and an area of light industrial development.

There is a pedestrian pathway/cycleway along the eastern edge of the park which connects to Mt Roskill Grammar School on the northern side of SH20 and to the residential area to the east via a bridge to Rainford Street. At the other end the pathway extends down to Waikowhai Intermediate School immediately to the south of the park.

This part of the park is bordered to the east by housing on Arundel Street, Gregory Place, Vic Butler Street, and Rainford Street. A number of trees line the pathway and the watercourse.

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.



Figure 7-1 Location plan

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Photograph 7-1 Keith Hay Park walkway looking north



- NOTES:**
1. DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND

DESIGNED		NL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT waterCare services limited CENTRAL INTERCEPTOR GENERAL KEITH HAY PARK (ASS) – PERMANENT WORKS PLAN	CAD FILE AEE-MAIN-7.1 ORIGINAL SCALE A1 1:1000 A3 DRAWING No. AEE-MAIN-7.1	DATE 26-JUL-12 CONTRACT No. 0538 ISSUE A
DRAWN		JS	08/12			
CHECKED		JS	08/12			
REV'D P.MGR		JS				
ISSUE	DATE	AMENDMENT	BY	DATE		
A	17/08/12	CONSENT ISSUE	AP	19	AEE AUGUST 2012	



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND
 - PROPOSED NOISE BARRIER

DESIGNED		NL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT waterCare services limited CENTRAL INTERCEPTOR GENERAL KEITH HAY PARK (ASS) – CONSTRUCTION WORKS PLAN	CAD FILE AEE-MAIN-7.2 ORIGINAL SCALE A1 1:1000 A3 DRAWING No. AEE-MAIN-7.2	DATE 26-JUL-12 CONTRACT No. 0538 ISSUE A
DRAWN		JS	08/12			
CHECKED		JS	08/12			
REV'D P.MGR		JS				
ISSUE	DATE	AMENDMENT	BY	DATE		
A	17/08/12	CONSENT ISSUE	AP	19	AEE AUGUST 2012	

7.3 Land ownership and interests

Main site and access	
Address	<ol style="list-style-type: none"> 1. 20 Gregory Place 2. 22 Gregory Place 3. 49 Arundel Street (accessway) 4. 49 Arundel Street (accessway) 5. 51 Arundel Street (accessway)
Legal description	<ol style="list-style-type: none"> 1. Lot 28 DP 49583 2. Lot 27 DP 49583 3. Lot 2 DP 52047 4. Lot 2 DP 52047 5. Lot 1 DP 52047
Title reference	<ol style="list-style-type: none"> 1. NA129A/172 2. NA2098/6 3. NA139C/70, 4. 175714 5. NA2C/1200
Owner	<ol style="list-style-type: none"> 1. Auckland Council 2. R.L. and Y.L. Taylor 3. Auckland Council 4. Auckland Council 5. Auckland Council
Local Board	Puketapapa
Connection to Branch 9B	
Address	60 Frost Road, Mt Roskill
Legal description	<ol style="list-style-type: none"> 1. Sec 108 SO 419816 (Legal Road) 2. Sec 51 SO 419816 (Railway purposes) 3. Road reserve
Title reference	<ol style="list-style-type: none"> 1. Gazette Notice 9106996.1 2. 560735 (see Gazette Notice 8806550.5) 3. n/a
Owner	<ol style="list-style-type: none"> 1. Auckland Council 2. The Crown 3. Auckland Council
Connection to Branch 9B – Keith Hay Park	
Address	53 Arundel Street, Mt Roskill
Legal description	Allot 77 Sec 13 Suburbs of Auckland

Title reference	NA8D/230
Owner	Auckland Council
Reserve status	Recreation Reserve

7.4 Proposed works

7.4.1 Permanent works

Drawing reference	AEE-MAIN-7.1
Permanent works	<ul style="list-style-type: none"> Main tunnel Connecting pipes to Branch 9 and Branch 9B sewers and manholes 7 m ID access shaft (79 - 94 m deep) 5 m ID drop shaft (79 - 94 m deep) Connection chamber Deaeration tunnel
Site reinstatement	<ul style="list-style-type: none"> Regrassing and replanting
Access requirements	<ul style="list-style-type: none"> All weather trafficable access via Gregory Place. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> Inspection Manual adjustment of stop logs

7.4.2 Construction works

Drawing reference	AEE-MAIN-7.2
Construction site area	Main construction area approx. 2,900 m ² Micro tunnel construction areas (3) approx. 450 - 520 m ² each
Duration of construction ⁴	12 - 18 months construction activities 5 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> Shaft excavations: 9 m diameter, 79 - 94 m deep construction access and drop shafts TBM inspection MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage Excavations for underground permanent works Trenching of connections Construction of permanent features – access and drop

⁴ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

	<ul style="list-style-type: none"> shafts, connection chamber • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash • Generator • Slurry separation equipment • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment

7.5 Assessment of effects

7.5.1 Visual and landscape effects

To the east of the main construction area there are a number of residential properties on Arundel Street and Gregory Place from where residents would have immediate and close views of the site as the land rises up to the east. Where sites are elevated (including 37 and 41 to 47 Arundel Street and 16 and 18 Gregory Place) residents may have some views over the perimeter fencing.

Visibility of the main construction area from the pathway through the park and car park area will be screened by a fence around the site. Visibility of the micro tunnelling sites within the park may also be screened from view by those using the pathway and residents in houses to the east by perimeter fences.

7.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Removal and/or transplanting of trees from 22 Gregory Place and from along the boundary with the car park to the west (the latter is likely to occur in any event in line with Council concepts for this part of the park);
- Construction of perimeter fences;
- Views from residential sites on Arundel Street and Gregory Place to the east of the main construction site.

In summary, there is expected to be a low level of temporary adverse effects on open space and landscape character during construction. Low adverse visual effects are expected for passersby and residents near the northern end of Keith Hay Park. There are expected to be more than minor adverse effects on visual amenity for approximately six adjoining and nearby properties to the east on Arundel Street and Gregory Place.

7.5.1.2 Permanent effects

Permanent at grade features that will remain at the site are the site accessways around the facilities, the access and drop shaft and chamber covers, and manholes associated with the micro tunnel connection. Disturbed ground will be repaired and regrassed and site reinstatement will be undertaken in consultation with Auckland Council, taking into account the long term plans for the park.

The permanent effects on open space and landscape character are expected to be neutral to beneficial, depending on the final design and integration with Council's long term plans for Keith Hay

Park. Long term visual effects on the viewing audience are expected to be beneficial over time as plantings mature.

7.5.2 Recreation and public access effects

The construction site and location of permanent works has been designed to be located away from the playing fields. The main construction site has been located outside of the main Keith Hay Park complex to avoid effects on the park as much as possible. The micro tunnelling works in the park to connect to the Branch 9B Sewer will take around 6 months and there will be some disruption and some effect on amenity in this area of the park during that time. Pedestrian and cycle access will be diverted where necessary to maintain the existing connections through the park.

Site reinstatement will be undertaken in discussion with Auckland Council and Puketapapa Local Board, taking into account the Council's long term plans for the park. Auckland Council is currently going through a process of preparing a long term concept plan for Keith Hay Park, including the newly acquired sites. As of June 2012 two options exist for the use of 20 Gregory Place and 49-51 Arundel Street, one showing the area vegetated and incorporating a naturalised Oakley Creek, the other showing part of the site being used for a pedestrian and cycleway and as an extension to the adjacent carpark.

7.5.3 Residential amenity

The works will involve the removal of the house at 22 Gregory Place. The other houses on the formerly residential properties now owned by Auckland Council (49 and 51 Arundel Street and 20 Gregory Place) have already been removed by Auckland Council. Auckland Council has agreed with neighbouring properties to plant a buffer area along the property boundary and it is understood that this is to be undertaken shortly. By the time that Central Interceptor works are undertaken at the site this planting should be able to provide some screening for the neighbouring properties to the east of the construction site and minimise the adverse visual effects on these properties. A 3 m high noise barrier is proposed along the northern boundary of the construction site to mitigate noise effects (refer Section 7.5.8.2 below). While the noise wall will help to minimise noise levels at 19 Gregory Place and screen some construction activities, the wall itself will be visible to the occupants along the length of the boundary with 22 Gregory Place.

7.5.4 Vegetation effects

There is an area of vegetation between 20-22 Gregory Place and the neighbouring park comprising of a mixture of exotic species including Persian lilac, prunus, silky oak, Japanese cedar and a Norfolk Island pine. There is also a pohutukawa on the boundary between 20 and 22 Gregory Place. Within the park along the pathway are rows of plane trees, and mixed trees (*Lophostemon*, *Eucalyptus* and *Prunus* species, *Alectryon excelsus*, and *Sophora* species).

Trees within the construction area will need to be removed. It may be possible to retain some of the trees along the boundary, although Council's long term plans for the properties may involve the removal of these trees. The trees adjacent to the proposed construction accessway in Keith Hay Park may be able to be protected and retained, although some may need to be removed or relocated if practical. Tree protection measures will be implemented where needed to ensure appropriate protection of these trees.

Watercare will work with Auckland Council and the Puketapapa Local Board to develop appropriate reinstatement planting to mitigate these effects.

7.5.5 Ecological effects

The site is a residential site with grass and exotic trees. The site has low bird values as only non-native blackbird and sparrow were observed during a site survey. The site is of low value as lizard habitat.

A number of trees within the construction area will be removed but vegetation values are low. The site has low overall ecological value and the effects on the site are expected to be less than minor.

7.5.6 Archaeological effects

No archaeological or heritage sites are recorded in this location. However, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

7.5.7 Traffic effects

7.5.7.1 Existing environment

Arundel Street, Gregory Place, and Rainford Street are classified as Local Roads in the Auckland City District Plan. These streets provide vehicular access to residential properties. Arundel Street also provides vehicular access to Keith Hay Park and Rainford Street provides vehicular access to a public car parking area for park users and pedestrian access to the park.

7.5.7.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a "worst case" scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

Site entry to the main construction site is proposed to be from Arundel Street across 49 and 51 Arundel Street. Site access to Keith Hay Park for the micro tunnelling works will be from Arundel Street or Rainford Street across the existing bridge, which will require strengthening. The access road may also require widening and/or installation of traffic signals. Access will be along the existing pedestrian/cycle path and an alternative pedestrian/cycle path will be provided during construction. This would be determined in consultation with Auckland Council.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at Keith Hay Park are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

7.5.7.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. Access to the main tunnel shaft site is proposed to be via Gregory Place. The access to the manholes in Keith Hay Park associated with the micro tunnelling sites will be either via Arundel Street or Rainford Street. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

7.5.8 Noise effects

7.5.8.1 Existing environment

The nearest residential receivers are located on Gregory Place, to the north, east, and south of the main construction area.

Currently the predominant noise source is traffic from surrounding roads. An ambient noise level of 47 dB L_{Aeq} was measured on 27 July 2011 during the day time.

7.5.8.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations. Surface construction works will generally be undertaken during the hours of 7 am and 6 pm Monday to Friday and 8 am to 6 pm Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A.

Mitigation measures for the site include the use of a 3 m high noise barrier around the north and eastern sides of the site, and a draft construction noise management plan has been prepared (refer Part D Technical Report F). Noise levels at the closest noise sensitive receivers (18 and 19 Gregory Place and 47 Arundel Street) are expected to be typically between 37 to 85 dB L_{Aeq}. The construction noise levels are generally predicted to comply with the Construction Noise Standard for all ground floor receivers. Certain activities, such as piling, are likely to result in non-compliant noise levels at the second story levels of the closest properties. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate this, for example, communication with residents and restrictions on the timing of certain works.

7.5.8.3 Operational noise effects

The permanent works may generate low noise levels immediately above the shaft due to the movement of water. Operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) and no mitigation measures are necessary.

7.5.9 Vibration effects

Most construction activities will only give rise to low levels of vibration. Given the ground conditions and separation distances at this site, the effects of vibration are expected to be less than minor.

7.5.10 Odour effects

Facilities to be located at this site include a drop shaft, access shaft and control chamber, none of which are likely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Adverse effects due to discharges of odour are unlikely to occur.

7.5.11 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains, silt fences and a decanting earth bund. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the existing open channel. Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

7.5.12 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The results suggest there is a low risk of significant contamination at the site. Geological information shows the fill on the western part of the construction site (within the park) comprises silt and clay. Potential contaminants would likely be metals, hydrocarbons, and nitrates.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

7.5.13 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

7.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft on the eastern side of Keith Hay Park, near the Arundel Street entrance;
- Locating shaft within Council property at 49 and 51 Arundel Street;
- Locating shaft at northern edge of Keith Hay Park (not pictured); and
- Locating shaft within private property at 22 Gregory Place and Council property at 20 Gregory Place.

Following selection of the proposed site at 20 and 22 Gregory Place, a number of modifications to the site layout have helped to minimise the effects of the park and neighbouring houses. The final layout includes:

- A condensed construction site area;
- Shafts located centrally within the site to maximise distance from neighbouring houses;
- Coordination with Auckland Council plans for park improvements.

Figures showing the sites and layout alternatives are located at the end of this section.




7.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There will be an effect on the general amenity of the park and neighbouring sites during construction. There are some residential properties adjacent to the main construction site on Gregory Place and Arundel Street that may experience some effects on their amenity. Noise management measures will be required to mitigate effects on these properties. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and an alternative pedestrian/cycle path will be provided. Erosion and sediment control measures will be implemented to manage the effects of earthworks and prevent the discharge of sediment laden water to nearby Oakley Creek.

The permanent works will largely be below ground and only covers will be visible at the surface. Watercare will develop site reinstatement details in consultation with Auckland Council and Puketapapa Local Board taking into account long term plans for the park.

Keith Hay Park alternative sites and layouts

Comment on alternative	
<p>Site location impacts on recreational facilities</p> <p>Access to site through park access road impacts on recreational users</p>	 <p>3D cutaway diagram labels: ACCESS SHAFT, DROP SHAFT, CONTROL CHAMBER, CONNECTION CHAMBER, EXTENSION TUNNEL, MAIN TUNNEL.</p> <p>Legend labels: MAN TUNNEL, LHM TUNNEL, CSO COLLECTOR, CONNECTION PRELINE, EXISTING REGULATION SINKER, EXISTING TRUNK SINKER, EXISTING STORMWATER, PROPOSED SEWAGE TUNNEL, ULTRASTRUCTURE FLOW WITH GROUND, ULTRASTRUCTURE ABOVE GROUND.</p> <p>Notes: 1. SEWAGE TUNNEL TO BE REDUCED UPON COMPLETION OF WORKS.</p>
<p>Site location involves use of land recently acquired by Auckland Council</p> <p>Site access limited</p>	 <p>3D cutaway diagram labels: ACCESS SHAFT, DROP SHAFT, CONTROL CHAMBER, CONNECTION CHAMBER, EXTENSION TUNNEL, MAIN TUNNEL.</p> <p>Legend labels: MAN TUNNEL, LHM TUNNEL, CSO COLLECTOR, CONNECTION PRELINE, EXISTING REGULATION SINKER, EXISTING TRUNK SINKER, EXISTING STORMWATER, PROPOSED SEWAGE TUNNEL, ULTRASTRUCTURE FLOW WITH GROUND, ULTRASTRUCTURE ABOVE GROUND.</p> <p>Notes: 1. SEWAGE TUNNEL TO BE REDUCED UPON COMPLETION OF WORKS.</p>
<p>Site location involves use of land recently acquired by Auckland Council and private residential property</p> <p>Coordination with Auckland Council plans for park improvements</p> <p>Shafts located close to neighbouring property</p> <p>Site access limited</p>	 <p>3D cutaway diagram labels: ACCESS SHAFT, DROP SHAFT, CONTROL CHAMBER, CONNECTION CHAMBER, EXTENSION TUNNEL, MAIN TUNNEL.</p> <p>Legend labels: MAN TUNNEL, LHM TUNNEL, CSO COLLECTOR, CONNECTION PRELINE, EXISTING REGULATION SINKER, EXISTING TRUNK SINKER, EXISTING STORMWATER, PROPOSED SEWAGE TUNNEL, ULTRASTRUCTURE FLOW WITH GROUND, ULTRASTRUCTURE ABOVE GROUND.</p> <p>Notes: 1. SEWAGE TUNNEL TO BE REDUCED UPON COMPLETION OF WORKS.</p>

For the reasons summarised above, these options were not pursued.

8.0 Pump Station 23 (Frederick Street) (AS6)

8.1 Introduction

The Pump Station 23 (PS 23) AS6 site is on the main tunnel MT2 alignment and is required to connect to the existing Onehunga Branch Sewer. It is a secondary construction site which provides for inspection of the main tunnel TBM during construction.

The proposed works are shown on Drawing numbers AEE-MAIN-8.1 and 8.2 included in the A3 drawing set (Part C).

8.2 Location and site description

The PS 23 site is located at 39 Frederick Street in Hillsborough and the adjacent Manukau Harbour.

The site is located on the coastal edge of Hillsborough Bay. The site is zoned Open Space 2 (informal recreation), but it is owned by Watercare and is not publicly accessible. There is an existing Watercare pump station at the site on an area of reclaimed land on the coastal edge. There is a designation on the site for wastewater purposes (the existing pump station) (H08-02). Access to the site is from Frederick Street down a sealed driveway. The site slopes down from the road and the pump station is not visible from the top of the driveway.

There is vegetation along the edge of the driveway. Although the coastal margins either side of the site are well vegetated, there is less vegetation at the coastal edge in the vicinity of the site, with only three individual pohutukawa trees at the edge of the site near the foreshore. There is a small stream which outlets to the coast immediately to the west of the site. The coastline is identified as a Regionally Significant Landscape in the ARP: C (part of the area along the Hillsborough Bay coastal edge, noted for its cliff and vegetation growing along its extent).

The site is bounded by residential housing to the east and west, with a newly constructed house (6/41 Frederick Street) located immediately adjacent to the eastern site boundary, elevated above the site.

There is a rock seawall along part of the coastal edge. The foreshore area comprises of mud flats. Near to the site within the CMA are two high voltage transmission lines with pylons located on the harbour bed.

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

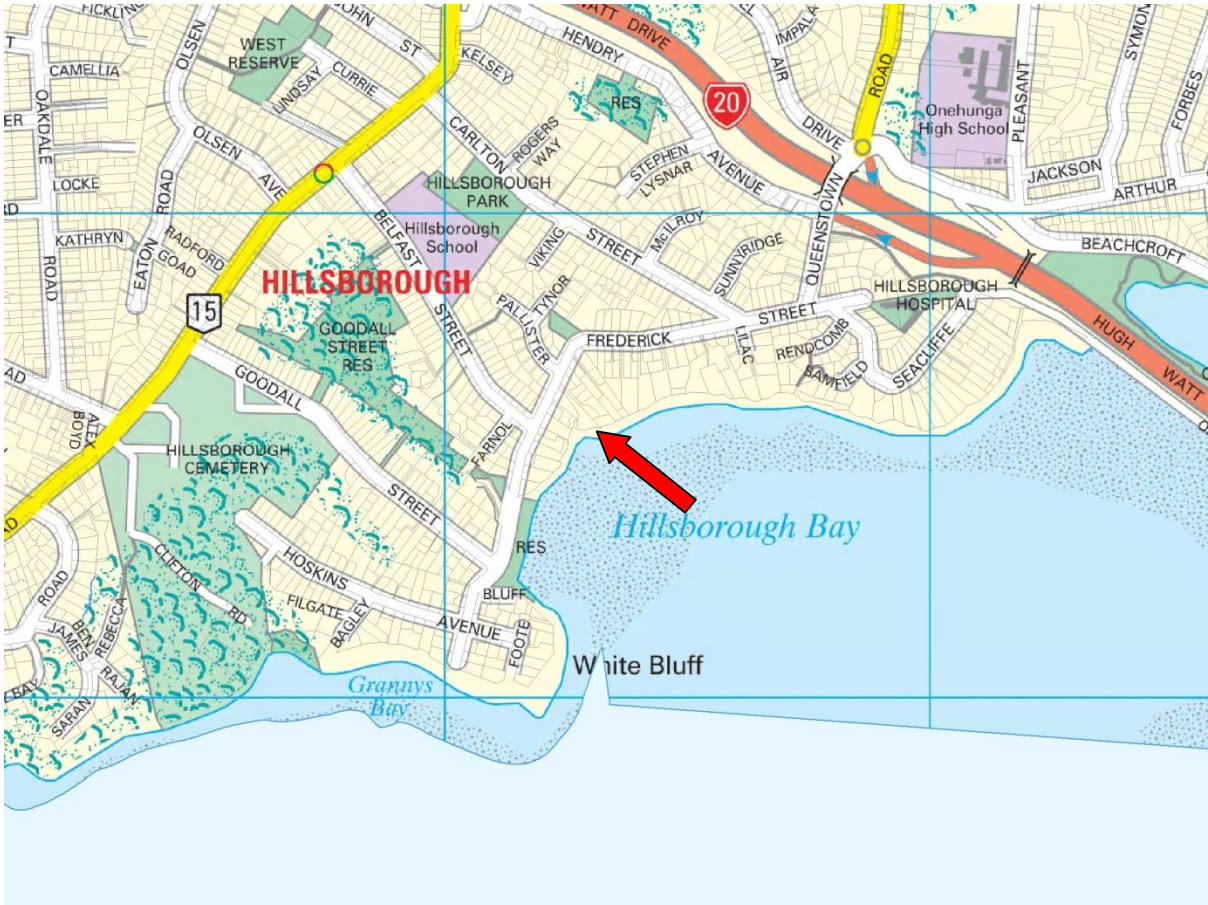


Figure 8-1 Location plan

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Photograph 8-1 Looking north towards site from foreshore



Photograph 8-2 Site with pump station to the right of image



- NOTES:**
- FOR HYDRAULIC REASONS THE CONNECTION CHAMBER, DROP SHAFT AND ACCESS SHAFT EXTEND ABOVE THE EXISTING GROUND LEVEL TO 6m RL.
 - DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.

- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETENTION SEWER
 - WC — EXISTING TRUNK SEWER
 - SW — EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND
 - MEAN HIGH WATER SPRING

DESIGNED: [Signature] 08/12 DES. CHECKED: [Signature] 08/12 DRAWN: [Signature] 08/12 ENGR. CHECKED: [Signature] 08/12 REV'D. P. MGR: [Signature] APP'D. P. DIR: [Signature]										SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT.										waterCare services limited CENTRAL INTERCEPTOR GENERAL PS23 (AS6) - PERMANENT WORKS PLAN										CAD FILE: AEE-MAIN-8.1 DATE: 26-JUL-12 ORIGINAL SCALE: A1 CONTRACT No.: 0538 DRAWING No.: AEE-MAIN-8.1 ISSUE: A									
PROJECT No.: A ISSUE: A DATE: 17/08/12 CONSENT ISSUE: AMENDMENT BY: [Signature] APP'D.: [Signature]										AEE AUGUST 2012										COPYRIGHT - The drawings, the design and associated materials are the sole property of WaterCare Services Limited and may not be used without express copyright consent.										DATE: 26-JUL-12 CONTRACT No.: 0538 DRAWING No.: AEE-MAIN-8.1 ISSUE: A									



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETENTION SEWER
 - WC — EXISTING TRUNK SEWER
 - SW — EXISTING STORMWATER
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PROJECT No.: A ISSUE: A DATE: 17/08/12 CONSENT ISSUE: AMENDMENT BY: [Signature] APP'D.: [Signature]										AEE AUGUST 2012										COPYRIGHT - The drawings, the design and associated materials are the sole property of WaterCare Services Limited and may not be used without express copyright consent.										DATE: 26-JUL-12 CONTRACT No.: 0538 DRAWING No.: AEE-MAIN-8.2 ISSUE: A									



Existing View



Proposed View - Indicative

8.3 Land ownership and interests

Main site	
Address	39 Frederick Street, Hillsborough
Legal description	Lot 1 DP 161858
Title reference	NA97C/394
Owner	Watercare Services Ltd
Local Board	Puketapapa
Coastal Marine Area	
Address	Coastal Marine Area adjacent to 39 Frederick Street, Hillsborough Bay, Manukau Harbour
Legal description	Tidal Lands of Manukau Harbour SO Plan 67474
Title reference	-
Owner	Accorded special status by s11 Marine and Coastal Area (Takutai Moana) Act 2011 ⁵

8.4 Proposed works

8.4.1 Permanent works

Drawing reference	AEE-MAIN-8.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel • Connecting pipes to existing Onehunga Branch Sewer • 7 m ID access shaft (extends approx. 3 m above ground, 28 – 44 m deep) • 5 m ID drop shaft (extends approx. 3 m above ground, 28 – 44 m deep) • Deaeration tunnel • Connection chamber (partly above ground) • Air intake • Pressure relief and ATF air vent (approx. 1 m high above building) • Air treatment facility
Site reinstatement	<ul style="list-style-type: none"> • Replanting • Repaving • Removal of temporary construction platform • Seawall

⁵ Section 11 of the Marine and Coastal Area (Takutai Moana) Act 2011 provides that the common marine and coastal area is accorded a special status. Neither the Crown nor any other person owns, or is capable of owning, the common marine and coastal area, as in existence from time to time after the commencement of the Act. The marine and coastal area covers the area bounded on the landward side by the line of mean high-water springs, and on the seaward side, by the outer limits of the territorial sea. Under the Marine and Coastal Area (Takutai Moana) Act 2011 the Crown and local authorities are divested of any title held in relation to the common marine and coastal area automatically and on an application by the Minister of Conservation the Registrar must cancel the title.

Access requirements	<ul style="list-style-type: none"> All weather trafficable access via existing sealed driveway off Frederick Street. Access required approximately once a week.
Key maintenance requirements	<ul style="list-style-type: none"> Inspection Maintenance of ATF Maintenance of control gates

8.4.2 Construction works

Drawing reference	AEE-MAIN-8.2
Construction site area	Approx. 3,100 m ²
Duration of construction	12-18 months construction activities 5 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> Temporary construction working platform Shaft excavations: 9 m diameter, 28 – 44 m deep construction access and drop shafts TBM inspection Excavations for underground permanent works Trenching of connections Demolition of existing Pump Station 23 structure Construction of permanent features – access and drop shafts, connection chamber Site reinstatement, including removal of temporary construction platform and construction of seawall
Key features/equipment	<ul style="list-style-type: none"> Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop Crawler crane Water treatment equipment Wheel wash Generator Spoil storage area

8.4.3 Temporary construction platform

In order to provide a working platform of sufficient size for construction, it is proposed to establish a temporary construction platform in the CMA adjacent to the existing Watercare pump station property. This is shown on Drawing AEE-MAIN-8.4 in Part C. The area is required to allow for sufficient space to undertake construction works on the site, including the manoeuvring of construction vehicles on the site. The demolition of the existing pump station is also likely to occur while the temporary construction platform is in place.

The footprint of the proposed construction platform is approximately 1300 m² in area. It will extend out approximately 25 m into the CMA at its widest point and will measure around 75 m length along the coastal edge. A construction accessway will be constructed on top of the platform to allow trucks to manoeuvre around the site.

The platform would be constructed by placement of a perimeter bund and then backfilled with cleanfill material to the required elevation. Erosion protection will be provided for the edge of the area. Erosion and sediment control measures will be established on site and spoil will not be placed within the CMA outside of the platform area.

Following completion of construction works the temporary platform will be removed and the foreshore reinstated. A seawall will be constructed along the coastal edge of the site as shown on Drawing AEE-MAIN-8.3. Where necessary, in order to encourage the recolonisation of the area affected by the temporary works, the CMA will be reinstated with clean marine sediment of an appropriate grain size (i.e. fine to very fine sand). Spoil excavated to facilitate construction of the temporary platform will be disposed of to land at an approved facility.

8.4.4 Air treatment facility

The air treatment facility (ATF) proposed for this site is a wet weather flow air treatment facility 25 x 10 m, around 5 m high with a 0.9 m diameter ventilation stack extending 1 m high from the top of the building. Construction of an air treatment facility at this site is proposed to be included in the scheme at startup. Details of the final design will be provided in an Outline Plan of Works.

8.5 Assessment of effects above mean high water springs

8.5.1 Landscape and visual effects

Vegetation and the rising landform screen most views from Frederick Street and adjoining properties. The house at 6/41 Frederick Street (recently constructed) will have views across the top of the site. The site will be visible from the coastal edge of 29, 33A, and 37 Frederick Street, although the majority of the view is obscured by large trees along the coast. Partial oblique views of the site would also be afforded from 21 and 2/25 Frederick Street as part of the wider view of the harbour from these properties. More distant views are also afforded from Taylors Bay Road Reserve where there is a carpark and small beach and a nearby walkway and seating area. Boaters and kayakers would also view the site from the harbour.

8.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Short-term adverse landscape and visual effects within an area identified as a Regionally Significant Landscape;
- Removal of vegetation (including three mature Pohutukawa) around the coastal edge.
- Removal and pruning of trees along accessway;
- Removal of vegetation and excavation of north eastern bank to provide for the air treatment facility; and
- Construction of permanent above ground facilities.

Temporary adverse effects of a more than minor nature are expected to occur during the construction period due to the construction activities and the removal of mature trees and the consequent effects on coastal landscape character. During construction there will be a more than minor level of adverse effects on open space and landscape character. For residents at the new house to the north (6/41 Frederick Street) and the existing house to the south west the effects on visual amenity during construction will be more than minor. From the wider area around the reserve and further out into the harbour the visual effects would be between a low and moderate level depending on the proximity of the viewer.

8.5.1.2 Permanent effects

The temporary construction platform will be removed following construction, the coastal edge restored, and a seawall constructed, likely with basalt rock or similar finish. Replanting will also be undertaken. This would ensure that the elements, features and patterns which originally determined the Regionally Significant Landscape rating would be restored.

The permanent works will include two shafts and a connection chamber, which will all be required to extend around 3 m above ground. The existing pump station will be removed. The new air treatment facility building will be located adjacent to, or partially cut into, the eastern bank. A photomontage of the site before and after is shown on Figure 36 (from the landscape and visual assessment in Part D Technical Report A).

The design for these facilities will be developed during the detailed design process. Potential mitigation measures to aid the incorporation of the permanent features into the site include: using basalt or similar rock to sheath the above ground portion of the access shafts; using recessive materials to help integrate the air treatment facility and vent; and planting to provide scale and vegetative context to the site and provide screening where required from adjoining and nearby residential properties.

With appropriate mitigation measures in place it is considered that there would be less than minor permanent adverse effects on visual amenity and minor adverse effects on open space and landscape character. Although additional structures will be constructed on the site, due to their low profile in relation to other buildings around the coastal foreshore and with appropriate design and planting, the permanent works will be well integrated in to this setting.

8.5.2 Natural character of the coastal environment

The site is located in a modified environment, with residential housing located to the west and east of the site and existing Watercare facilities located on the site itself. There are remaining elements of natural character in the vegetation along the cliffline either side of the site (for which the area is identified as a Regionally Significant Landscape). There will be more than minor temporary adverse effects on natural character due to the loss of some vegetation on the site and construction activities. However, these will be mitigated by revegetation. A temporary construction platform will be constructed to enable the construction works to occur at the site, but this will be removed on completion of the construction works and the CMA reinstated. The permanent structures will be designed to incorporate the features into the site, such as through the use of visually recessive materials and/or sheathing the shafts with a basalt facing. Following completion of construction works and site reinstatement the effects on natural character are expected to be minor and with appropriate design and planting the permanent works would over time be integrated into this setting.

8.5.3 Vegetation effects

There are several pohutukawa trees on the fringe of the works area adjacent to the foreshore which are established and contribute to screening. There is also a medium sized early mature pohutukawa tree beside the existing pump station building. There are trees and other vegetation adjacent to the drive and overhanging the accessway including oak, Coprosma, Pittosporum, wattle, pohutukawa, karo, karaka, puka, privet, and mahoe specimens.

Young kohekohe, mahoe, taupata, houpara, puriri and kawakawa are also found along the coastal edge, growing under a canopy of tree privet. The planted areas beside the accessway are characterised by agapanthus along the site boundaries and the edges of the plantings, together with karamu, ponga, flax, mahoe, karo and ti kouka. Young (apparently naturally regenerating) specimens of totara and karaka are also present. Weeds are plentiful, and include pampas, wattle, tree privet, Japanese spindle tree, jasmine, Japanese honeysuckle and asparagus fern.

The proposed works require the removal of the three pohutukawa trees as well as the removal and/or pruning of the vegetation along the site accessway. Tree protection measures will be implemented to ensure appropriate protection of remaining trees where required. The removal of the pohutukawa trees will alter the level of vegetative cover and screening and is expected to have a more than minor effect. Mitigation planting will be undertaken on the site in areas not occupied by permanent structures.

8.5.4 Ecological effects

8.5.4.1 Existing environment

The habitat at the land-based part of the site is native-exotic shrubland. The vegetation, described in Section 8.5.3 above, is of some botanical interest, but this is compromised to some degree by its generally weedy nature. The site includes bush that is part of the vegetated coastal cliffs that run below Seacliffe Road in Hillsborough Bay. It is also located in close proximity to a large local network of connected forested reserves located to the west. Overall the vegetation is of moderate value.

Native bird species observed at the site were kingfisher, fantail, silvereye and swallow. Although not observed, tui are likely to occasionally frequent the site and possibly some species of shag. Introduced species were blackbird, sparrow, and mallard.

The site is of high value for lizards as ornate skink were found at the site, and these are identified as an "At Risk – Declining" species.

8.5.4.2 Ecological effects

Some vegetation removal is required in the vicinity of the proposed structures. The shrubs and trees near the coastal edge will also be affected by the construction of the access and drop shafts. The modification or loss of vegetation at this site is likely to constitute an adverse effect of a more than minor nature (depending on the extent of any loss or damage) but this will be mitigated by replanting. However, given the existing infrastructure already present at the site, the proposed works are unlikely to alter the existing situation in relation to ecological corridors or connectivity.

A number of bird species were noted as being present in the survey at the site or nearby, and consequently bird values at the site are moderate to high. Some of the birds identified on the mudflats adjacent to the site included at risk species. The disturbance will be kept to a minimum, the works are of a temporary nature, and the CMA will be reinstated following construction works. Ample habitat also exists outside of the construction footprint, to the extent that the proposed works are very unlikely to result in adverse effects upon these species. There is possibly potential for noticeable adverse effects in relation to avifauna due to the loss of bush at this site. However, it is noted that the majority of the bird species observed utilising the area were introduced passerines and the numbers of species observed were low. The extent of bush loss is relatively small in the context of the wider coastal forest of Hillsborough Bay. It is considered that ample alternative bush habitat is available to the extent that the proposed works are expected to result in less than minor effects.

The site is also of high value as lizard habitat due to the presence of ornate skink. Potential disturbance to lizards would be by way of both direct impacts (e.g. loss or degradation of habitat) and indirect impacts (e.g. effective loss of habitat as a result of noise; potentially greater abundance of predators such as rats). With a salvage operation proposed the effects on native lizards are unlikely to be more than minor.

8.5.5 Archaeological effects

No archaeological or heritage sites are recorded at this site and the pump station complex is a highly modified environment. A field survey undertaken at the site and the adjacent Hillsborough Bay area did not identify any archaeological remains, and in general its archaeological potential is considered to be low. To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

8.5.6 Traffic effects

8.5.6.1 Existing environment

Frederick Street is classified as a Local Road in the Auckland City District Plan. It links Hoskins Avenue in the south with Carlton Street in the east. Frederick Street is a two-lane, two way road with on-street parking available on both sides of the carriageway. The Frederick Street/Carlton Street intersection is a priority-controlled intersection.

8.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

Site access will be from the existing access to 39 Frederick Street. Truck access will be managed throughout construction to avoid simultaneous movements near the site access. The best waiting area is considered to be in front of Pallister Drive and speed limits may be temporarily reduced to slow traffic passing trucks parked on the street. It may be necessary to remove on-street parking before the entrance to enable heavy vehicles to safely manoeuvre in and out of the site. The loss of space would be the equivalent of one parking space, which can be easily accommodated elsewhere on Frederick Street.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at the PS 23 site are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period with mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

8.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per week which already occurs because of the existing Watercare facility.

8.5.7 Noise effects

8.5.7.1 Existing environment

The nearest residential receivers are dwellings on Frederick Street, with the nearest dwelling being one that has recently been constructed, located in close proximity to the north east of the proposed construction site boundary (6/41 Frederick Street).

Currently the predominant noise source is traffic from surrounding roads. An ambient noise level of 47 dB L_{Aeq} was measured on 27 July 2011 during the day time.

8.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, construction and removal of the temporary construction platform, and shaft excavations.

Noise levels at nearby receivers (25, 33A and 6/41 Frederick St) are expected to be typically between 42 to 78 dB L_{Aeq}. Certain activities, such as demolition, piling, truck movements, and works associated with the construction platform are expected to exceed noise standards. Due to the nature of the site and the elevated residential neighbours, a noise barrier will not be an effective mitigation method. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate noise effects, for example, communication with neighbouring residents and restrictions on the timing of certain works.

A draft construction noise management plan has been prepared (refer Part D Technical Report F).

8.5.7.3 Operational noise effects

Long term noise emission sources at the site are the air treatment facility (fans etc.) and the air intake (the movement of air, although this is not expected to be significant). Predicted noise levels from the air intake are expected to comply with proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) and no mitigation

measures are necessary. Air treatment facility noise levels will be compliant with mitigation measures in place (including an enclosure of appropriate materials and design). Noise levels from the air treatment facility are predicted to be between 32 to 40 dB L_{Aeq} at nearby dwellings (25, 33A and 6/41 Frederick St).

8.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. Some construction activities (e.g. piling) have the potential to generate higher levels of vibration. No damage to structures is expected, but there may be some short term disturbance of residents at the closest property (6/41 Frederick Street). A number of mitigation methods are available to manage effects, as described in Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

8.5.9 Odour effects

Most of the time during normal operation, adverse effects due to odour discharges are not expected to occur. The drop shaft, access shaft, and control chamber are not likely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent.

There have been intermittent odour issues at this site in the past. Removal of the existing pump station facility with air being drawn to the Mangere ATF should considerably reduce the likelihood of odour discharges occurring at this point. However, during heavy rainfall events (around 6-8 times per year) this air extraction would not be possible and an air treatment facility is proposed for the site. This would maintain tunnel ventilation with odour control during these heavy rainfall events.

A pressure relief vent stack is also proposed, to operate in large storm events if an air pocket is formed in the tunnel between May Road and Mangere Pump Station and air volumes to be vented exceed the capacity of the ATF. The 'first flush' of air in such events would still be discharged via the ATF. It is noted that the vent stack is proposed to be located close to the boundary (around 8 m), near the new dwelling at the rear of 41 Frederick Street. However, this would operate infrequently (in the order of twice in 5 years) and wastewater would be heavily diluted with stormwater and therefore less odorous. The likely meteorological conditions during these weather events have been considered and are expected to result in effective and rapid dispersion of any odour.

The ATF air vent and pressure relief vent stack will be designed and located so as to minimise the potential for adverse odour effects where possible e.g. facing openings away from closest dwellings.

An air intake is proposed for this site. Under normal operation when the system is under negative pressure emissions are not likely to occur. Given the proposed installation of the pressure relief vent, discharges from the air intake vent during severe wet weather events are unlikely.

There is an existing penstock (a structure that controls water flow) at this site which is checked fortnightly. Odour is only likely to be discharged from control chambers when opened for inspection and maintenance and the new control chamber is unlikely to require more frequent inspection and maintenance than the existing penstock. Therefore there is not expected to be an increase in odour from this source compared to the current situation.

Overall, the main project works are likely to reduce the frequency of odour discharges from this location and consequently reduce the adverse effects on the environment.

8.5.10 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. To manage erosion and sediment and stormwater, the draft ESCP proposes use of clean fill material as sediment treatment, by ensuring the edges of the fill are above the mean high tide mark and are graded to drain away from the fill edges. If required, a

sediment sump will be constructed within the fill to filter and contain any sediment laden runoff and provide treatment prior to pumping to the Manukau Harbour. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

An impervious surface area of around 1,450 m² will remain after construction. Most of this area is existing impervious area. Stormwater from the site will be treated as appropriate with TP10 device(s).

8.5.11 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The results suggest there is a low risk of significant contamination at the site. Part of the site has been reclaimed and the source of the fill is unknown. Potential contaminants would likely be metals, hydrocarbons, and nitrates.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

8.5.12 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. Construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

8.6 Assessment of effects below mean high water springs (CMA)

8.6.1 Landscape and visual effects

The landscape and visual effects in the CMA during construction will be as described for the land based activities in Section 8.5.1 above. The temporary construction platform will be removed following construction and the coastal edge restored, likely with basalt rock or similar finish. Along with replanting this would ensure that the elements, features and patterns which originally determined the Regionally Significant Landscape rating would be restored.

8.6.2 Natural character of the coastal environment

The site is located in a modified environment, with residential housing located to the west and east of the site and existing Watercare facilities located on the land based part of the site. A temporary construction platform will be constructed to enable the construction works to occur at the site, but this will be removed on completion of the construction works and the CMA reinstated. In addition, land-based measures such as revegetation and appropriate design of permanent above ground structures are proposed. Following completion of construction works and site reinstatement the effects on natural character are expected to be minor and with appropriate design and planting the permanent works would over time be integrated into this setting.

8.6.3 Recreation and public access effects

The land-based part of the site is owned by Watercare and is not accessible to the public. There is no existing walkway around the site that will be affected by the proposed works. The temporary construction platform to be located in the CMA will affect a relatively small area and public access will still be possible along the foreshore at low tides.

Works will be required to tie in the temporary construction platform to the Auckland Council esplanade reserve immediately to the east of the Watercare property to build the construction platform up to a level above mean high water springs. There is no walkway along here and no effective public access as the esplanade reserves are not fully connected along this coastal edge.

Therefore, any effects on recreation and public access are expected to be of a less than minor nature.

8.6.4 Ecological effects

8.6.4.1 Existing environment

The estuarine environment adjacent to the pump station site comprises mudflats/reef. The seabed to the south of the pump station has been excavated a number of times (pursuant to coastal permits) for Watercare works such as pipe replacement (e.g. Coastal Permit No. 39929).

A number of native bird species were identified on the open mudflats adjacent to the site. The bird species identified were NZ pied oystercatcher, red billed gull, pied stilt, black-backed gull, variable oystercatcher, and white faced heron. These birds were following the moving tide line, and none were actually observed within the footprint of the proposed temporary construction platform. It is likely that at some periods of the tidal cycle, at least some of the birds would use the area to some extent. Non-native mallard were also observed on the inter-tidal mudflats.

Sediment samples were taken along three transects in the estuarine environment in the vicinity of the proposed works in the CMA (see Technical Report C of Part D for locations).

Benthic sediment differed between the three survey sites: the Western Transect (Transect W) was characterised by gravel and cobbles which altered abruptly at approximately 18.5 m to a fine sand substrate; the Central Transect (Transect C) consisted of gravel and sand which then changed to a sandstone reef from approximately 20 m onwards; and the Eastern Transect (Transect E) was characterised by fine mud approximately 2 to 4 cm deep over sandstone.

Analysis of sediment grain size showed the average proportion of surface sediment grain size was dominated across all sites by silt and clay (between 32.1 % for Transect C and 51.6 % for Transect E).

The concentration of common stormwater contaminants (copper, lead, zinc and high molecular weight polycyclic aromatic hydrocarbons (HMW PAHs)) in the sediment samples were compared against the former Auckland Regional Council (ARC) Environmental Response Criteria (ERC) and the Australian and New Zealand Environment and Conservation Council (ANZECC) Interim Sediment Quality Guidelines (ISQG).

The metal contaminants of copper, lead and zinc were detected at concentrations below the low effects threshold concentrations. However, elevated levels of the HMW PAHs in Transects W and C were detected. Concentrations were within the ARC ERC Amber threshold range, but below the ISQG Low threshold.

Core sediment samples collected for intertidal infaunal invertebrate analyses revealed the community within the survey area was dominated by polychaetes, amphipods, gastropods and decapods. The invertebrate community comprised both tolerant and sensitive organisms, but no rare or threatened species were detected. Mean species richness was greatest at Transect C (13.5) and lowest at Transect E (5). The Shannon-Wiener Diversity Index ranged from 1.35 to 2.15, indicating a low to moderate level of species evenness and richness.

Dominant epifauna taxa were *Zeacumanthus lutulentus* and *Potamopyrgus estuarinus*. *Z. lutulentus* was very abundant within the crevices and holes provided by the sandstone reef. There was a noted absence of *Cominella glandiformis*, a common mud whelk. Crab holes were noted in several of the quadrats but were largely absent where the substrate was comprised of sandstone overlain by mud.

8.6.4.2 Ecological effects

A number of bird species were noted as being present in the survey at the site or nearby, and consequently bird values at the site are moderate to high. Some of the birds identified on the mudflats adjacent to the site included at risk species. The disturbance will be kept to a minimum, the works are

of a temporary nature, and the CMA will be reinstated following construction works. Ample habitat also exists outside of the construction footprint, to the extent that the proposed works are very unlikely to result in adverse effects upon these species.

The temporary construction platform will result in loss of intertidal habitat and a temporary loss of intertidal feeding habitat for shorebirds, including "At Risk" species. Once the temporary construction platform is removed it is considered that in the long term the area will be recolonised by common intertidal invertebrates, and the sediment will become more oxygenated through bioturbation and other natural biological and chemical processes. It is considered that the temporary habitat loss associated with the construction platform comprises a moderate (and temporary only) adverse effect.

Effects at this site are expected to be more than minor but can be appropriately mitigated.

8.6.5 Effects on mangroves

Although no mangroves are currently present in the location of the proposed works, specimens may be present by the time construction works begin. Therefore, resource consent is being sought for the removal of mangroves which may be required to undertake the works in the CMA at this site. This will be in a limited area and the effects are expected to be less than minor.

8.6.6 Coastal processes⁶

8.6.6.1 Existing environment

The Manukau Harbour coastal environment is described in Section 9.4 of Part A.

The proposed temporary construction platform is situated on the north-western shores of Hillsborough Bay. The shoreline in this area is characterised as low cliffs formed from Waitemata Group materials. The presence of the wave cut platform that is visible on Drawing No. AEE-MAIN-8.2 (in the A3 drawing set, Part C) suggests that the cliff material is readily erodible and has retreated some 60 to 100 m over the period where sea levels stabilised since the Holocene Transgression. A small stream/stormwater outlet discharges at this location, just to the west of the site.

The area is substantially intertidal, with the proposed construction platform situated around 1.2 m RL. Mean High Water Springs (MHWS) is around 2 m RL and at this condition water levels at the proposed site are around 0.8 m. The site is above the tide level (i.e. dry) from around Mean High Water Neaps (MHWN) and lower.

Waves at this location are depth limited (the height of the water column) and also affected by fetch and wind direction. The shoreline is relatively sheltered from the dominant south west wind and wind-generated wave direction due to the presence of the White Bluff headland to the south west. The area is most exposed to the south east and easterly fetches that occur less frequently and with less intensity than from other directions. Tidal flows are limited due to the site's location at the upper part of the tidal cycle.

8.6.6.1 Coastal processes effects

Hillsborough Bay is a low energy environment in terms of tidal currents, and is more affected by wind and wind generated waves, with the highest waves occurring during strong south westerly winds at high tide levels. These conditions affect the more exposed central and southern parts of the bay. The proposed construction platform is in an area of low energy due to its location at the upper part of the seabed in an area that is only inundated when water levels reach MHWN and above and in the more sheltered north western corner of Hillsborough Bay. The effects of the construction platform on coastal processes, apart from the temporary occupation of the seabed, are expected to be less than minor. The impacts of the temporary occupation can be managed as long as all the construction material is removed upon completion of the works, as proposed.

⁶ Coastal process assessment completed by Tonkin & Taylor Ltd

8.6.7 Navigation and safety

The structure will be located at the coastal edge extending out approximately 25 m. No effects on navigation and safety are anticipated.

8.6.8 Archaeological effects

As noted above, no archaeological or heritage sites are recorded at this site and the pump station complex is a highly modified environment. Accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

8.6.9 Noise effects

As noted in Section 8.5.7.1 above the nearest residential receivers are dwellings on Frederick Street. Certain activities, including some works associated with the construction platform, are expected to exceed noise standards. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate noise effects, for example, communication with neighbouring residents and restrictions on the timing of certain works.

8.6.10 Earthworks/disturbance effects

Erosion and sediment control measures will be put in place to manage the effects of the disturbance and deposition of material in the CMA. Measures will be in place during construction and removal of the platform to minimise effects on water quality and disturbance of the CMA. A draft erosion and sediment and stormwater control plan to manage the site during the period of time that it is being used for construction activities is included in Part D Technical Report K. This includes the use of clean fill and a sediment sump, as outlined in Section 8.5.10.

8.7 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Constructing a permanent reclamation for tunnel shaft and pump station in Granny's Bay;
- Locating a construction area in the CMA and Hillsborough Bay car park and playground;
- Locating the shaft to the northern end of Belfast Reserve;
- Constructing a permanent reclamation for shaft and pump station at the site of existing PS 23; and
- Constructing a temporary construction platform for shaft at the site of existing PS 23 and removing the existing facility.

Following selection of the proposed site at the location of existing PS23, a number of modifications to the site layout have helped to minimise the effects of the proposed works. The final layout includes:

- A condensed construction site area;
- No reclamation, only a temporary construction platform that will be removed; and
- A new ATF, but no new pump station, and removal of existing pump station.

Figures showing the sites and layout alternatives are located at the end of this section.

8.8 Conclusion




Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There are residential properties located on Frederick Street in relatively close proximity to the site, with a new dwelling constructed close to the boundary at the rear of 41 Frederick Street. It will be necessary to implement construction management measures in order to minimise the effects of construction activities on these properties, such as the control of construction methods to minimise noise and vibration generation.

Measures will be taken to mitigate the ecological effects of the proposed works including replanting, salvage of native lizards, and removal of the temporary construction platform to reinstate the foreshore following construction.

There will be temporary adverse effects on the coastal landscape due to construction and vegetation removal. The permanent structures at the site, the drop shaft, access shaft and ATF will be around 3 to 5 m high, with an air vent/pressure relief vent in addition. The site presently contains Watercare structures but the scale and number of the proposed structures is greater than what presently exists. The structures will be designed to minimise adverse landscape and visual effects, for example, through the use of recessive materials, and/or by sheathing the shaft structures in basalt.

PS 23 (Frederick Street) alternative sites and layouts

Comment on alternative	
<p>Large reclamation causing impacts on coastal marine area</p> <p>Large permanent facility (pump station)</p>	
<p>Large reclamation causing impacts on coastal marine area</p> <p>Large permanent facility (pump station)</p>	
<p>Large construction area in coastal marine area</p> <p>Impacts on community facilities (car park and walkway)</p> <p>Construction requires removal of playground</p>	

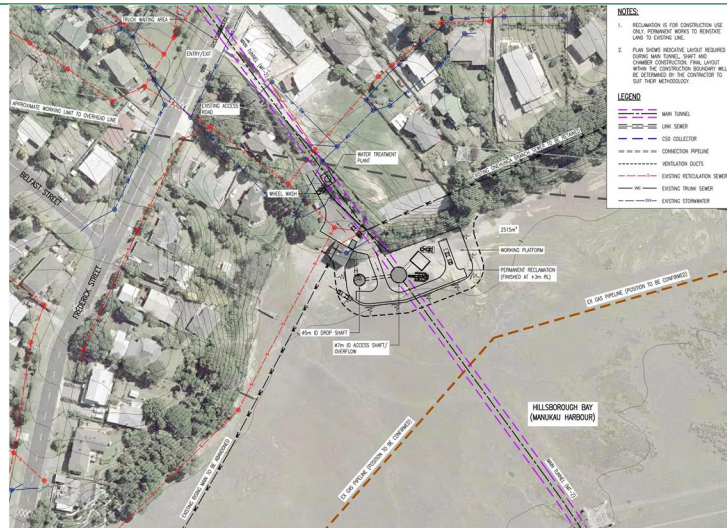
Impacts on ecology and trees in the reserve

Surrounded by residential dwellings



Large reclamation

Tunnel optimised to remove pump station



For the reasons summarised above, these options were not pursued.

9A. Kiwi Esplanade (AS7)

9A.1 Introduction

The Kiwi Esplanade AS7 site is on the main tunnel MT2 alignment and is required to provide connections to the existing Western Interceptor and Mangere Bridge Branch Sewer. It is a secondary construction site which provides for inspection of the main tunnel TBM during construction.

The proposed works are shown on Drawing numbers AEE-MAIN-9.1 and 9.2 included in the A3 drawing set (Part C).

9A.2 Location and site description

The site is located within Kiwi Esplanade Reserve on the southern shores of the Manukau Harbour. The proposed construction site is located in the vicinity of the existing public toilet facility and a small area of planted pohutukawa trees, adjacent to the access driveway to the Manukau Yacht and Motor Boat Club building and car parking area. To the west within the reserve is a grassed open area and further to the west is Ambury Park, separated by a small inlet/lagoon. The site is zoned Public Open Space 2.

The reserve is part of a reserve/walkway network that extends from Mangere Bridge in the east to the Otuataua Stonefields in the south west. A footpath runs along the perimeter of the reserve adjacent to the coastal edge.

To the south on the southern side of Kiwi Esplanade are residential houses which have views out over the reserve and harbour beyond.

The site has been located in the vicinity of the existing public toilet facility to minimise the disturbance to the open space. It is also located away from the coastal walkway which will allow continued use of this pedestrian linkage around the coast.

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.



Figure 9A-1 Location plan

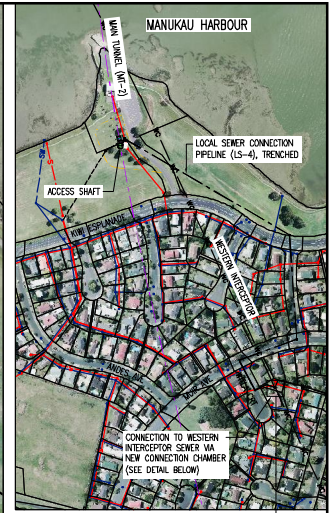
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Photograph 9A-1 Existing toilet block within proposed construction area



Photograph 9A-2 View across the proposed construction site to the north east



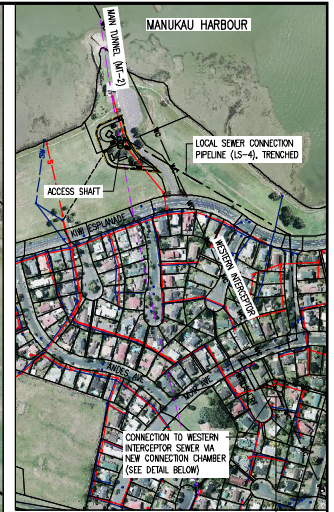
NOTES:

1. DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS

LEGEND

- MAIN TUNNEL
- LINK SEWER
- CSD COLLECTOR
- CONNECTION PIPELINE
- VENTILATION DUCTS
- EXISTING RETICULATION SEWER
- VC EXISTING TRUNK SEWER
- SV EXISTING STORMWATER
- PROPOSED DESIGNATION BOUNDARY
- LIU/STRUCTURE FLUSH WITH GROUND
- LIU/STRUCTURE ABOVE GROUND

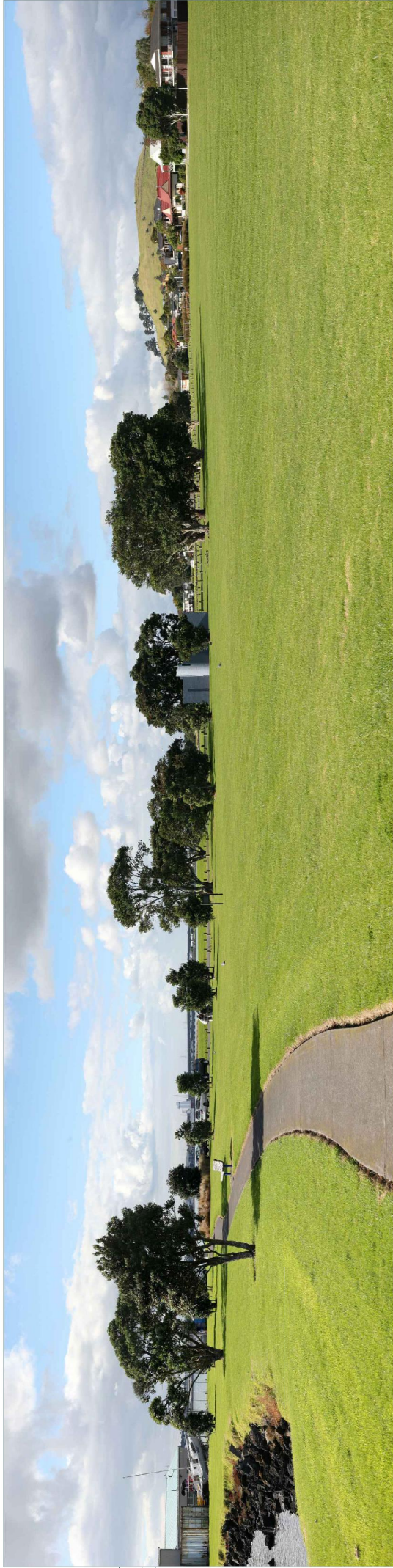
DESIGNED: [Signature] 08/12 DES. CHECKED: [Signature] 08/12 DRAWN: [Signature] DIMS. CHECKED: [Signature] REV'D. P.MGR: [Signature] APP'D. P.DIR: [Signature]										SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT				CENTRAL INTERCEPTOR GENERAL KIWI ESPLANADE UTILITIES (AS7) – PERMANENT WORKS PLAN		CAD FILE: AEE-MAIN-9.1 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
ISSUE: A 17/08/12 DATE: 17/08/12 AMENDMENT: [None] BY: [None] APP'D.: [None]										AEE AUGUST 2012		COPYRIGHT - This drawing, its design and content, remains the sole property of Water Care Services Limited and may not be used without express written consent.		DRAWING No.: AEE-MAIN-9.1 ISSUE: A		DATE: 26-JUL-12 CONTRACT No.: 0538			



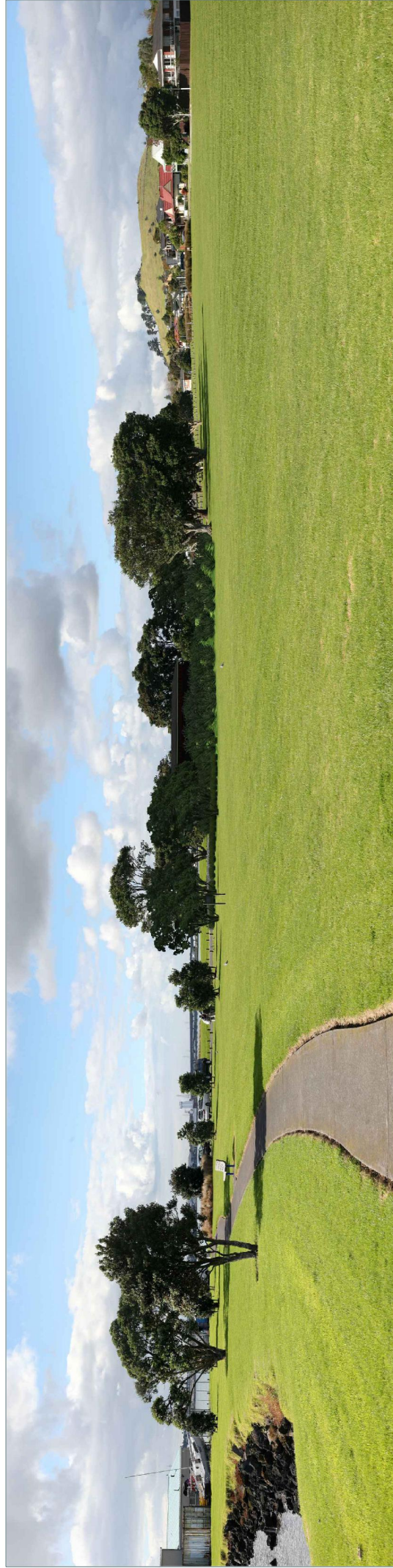
LEGEND

- MAIN TUNNEL
- LINK SEWER
- CSD COLLECTOR
- CONNECTION PIPELINE
- VENTILATION DUCTS
- EXISTING RETICULATION SEWER
- VC EXISTING TRUNK SEWER
- SV EXISTING STORMWATER
- PROPOSED DESIGNATION BOUNDARY
- LIU/STRUCTURE FLUSH WITH GROUND
- LIU/STRUCTURE ABOVE GROUND

DESIGNED: [Signature] 08/12 DES. CHECKED: [Signature] 08/12 DRAWN: [Signature] DIMS. CHECKED: [Signature] REV'D. P.MGR: [Signature] APP'D. P.DIR: [Signature]										SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT				CENTRAL INTERCEPTOR GENERAL KIWI ESPLANADE (AS7) – CONSTRUCTION WORKS PLAN		CAD FILE: AEE-MAIN-9.2 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
ISSUE: A 17/08/12 DATE: 17/08/12 AMENDMENT: [None] BY: [None] APP'D.: [None]										AEE AUGUST 2012		COPYRIGHT - This drawing, its design and content, remains the sole property of Water Care Services Limited and may not be used without express written consent.		DRAWING No.: AEE-MAIN-9.2 ISSUE: A		DATE: 26-JUL-12 CONTRACT No.: 0538			



Existing View



Proposed View - Indicative



Existing View (from outside # 84 on Kiwi Esplanade)



Proposed View - Indicative

9A.3 Land ownership and interests

Main site	
Address	84R-86R Kiwi Esplanade
Legal description	1. Lot 1 DP 77585 2. Lot 2 DP 77585
Title reference	1. NA33D/1223 2. NA33D/1224
Owner	1. Auckland Council 2. Auckland Council
Reserve status	1. Recreation reserve
Local Board	Mangere-Otahuhu
Link Sewer 4	
Address	84R Kiwi Esplanade
Legal description	Lot 3 DP 77585
Title reference	NA33D/1225
Owner	Auckland Council

9A.4 Proposed works

9A.4.1 Permanent works

Drawing reference	AEE-MAIN-9.1
Permanent works	<ul style="list-style-type: none"> • Main tunnel, Link Sewer 4 • 7 m ID access shaft (extends approx. up to 2 m above ground level, 30 - 45 m deep) • 3 m ID drop shaft (extends approx. up to 2 m above ground level, 30 - 45 m deep) • Deaeration tunnel • Pressure relief vent (approx. 3 m high, incorporated into proposed new toilet block) with passive air treatment filter • New toilet block
Site reinstatement	<ul style="list-style-type: none"> • Regrassing
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via existing driveway from Kiwi Esplanade. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of air treatment structure

9A.4.2 Construction works

Drawing reference	AEE-MAIN-9.2
Construction site area	Approx. 3400 m ²
Duration of construction ⁷	12 - 18 months construction activities 5 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Demolition of existing toilet block • Shaft excavations: 9 m diameter, 30 - 45 m deep construction access and drop shafts • TBM inspection • Excavations for underground permanent works • Trenching of connection (Link Sewer 4) • Construction of permanent features – access and drop shafts and new toilet block • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment plant • Wheel wash • Generator • Spoil storage area

9A.5 Assessment of effects

9A.5.1 Landscape and visual effects

A fence will surround the construction site. The fence and works within would be visible from the western end of the reserve, including the walkway and obliquely from the houses towards the western end on the southern side of Kiwi Esplanade. Many views to the south and east would be obscured or partially obscured by the existing pohutukawa (most of which will be retained). The viewing audience would include reserve users, residents accessing houses via Kiwi Esplanade, and some residents in their houses.

9A.5.1.1 Temporary effects

Landscape and visual effects resulting from construction will be:

- Construction of a perimeter fence;
- Removal and possible transplanting of small pohutukawa trees;
- Views of construction activities over the perimeter fence from upper levels of two-storey houses on Kiwi Esplanade (through gaps in remaining pohutukawa trees); and

⁷ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

- Removal of existing toilet block and replacement with portable toilets during the construction works period.

In summary, there is expected to be a minor level of temporary adverse effects on open space and landscape character during construction. A less than minor level of adverse effects on visual amenity is expected, as construction will take place behind the perimeter fence which will be generally well screened by vegetation, and harbour views will not be obstructed for residential properties on Kiwi Esplanade.

9A.5.1.2 Permanent effects

Permanent features that will remain at the site are a small site accessway, a new toilet block (with integrated air vent), and access shaft and drop shaft (1.5 m above ground). The design will be developed during the detailed design phase but a preliminary concept for the structures has been developed to illustrate how the new toilet facilities and above ground structures could be integrated. A photomontage of the site before and after is shown on Figures 41 and 42 (from the landscape and visual assessment in Part D Technical Report A). Neutral to small beneficial effects on open space and landscape character of the reserve and coast are expected with an appropriately designed new toilet block and elevated shaft structure and replacement pohutukawa trees planted. Permanent visual amenity effects on residents and visitors are expected to be neutral.

9A.5.2 Recreation and public access effects

The construction area is small in the context of the overall reserve area. The site has been located away from the walkway around the perimeter of the reserve adjacent to the coastal edge. Temporary toilets will be provided if necessary to mitigate the temporary loss of the toilet block facility during construction works.

As described above, the permanent works are expected to have neutral to positive effects on open space and landscape character. The permanent works will not impact on an active recreation area and will not impact on the walkway.

A passive air treatment system is proposed to be installed so that the operation of the air vent is not expected to have an adverse effect on reserve users.

9A.5.3 Vegetation effects

Several pohutukawa and puriri trees are located within the construction area. A number of these will be retained, particularly in the southern part of the construction area, which will maintain some screening of the site. Measures will be implemented to ensure the protection of the trees to be retained. Some pohutukawa and a puriri will need to be removed. However, the vegetation modification is considered to be minor.

9A.5.4 Ecological effects

The habitat type at the site is grass with planted semi-mature pohutukawa. Both black-backed gull and red-billed gull were seen at Kiwi Esplanade, as were hundreds of NZ pied oystercatcher, roosting and feeding on the open fields here. Along with the adjacent Ambury Park, the portion of Kiwi Esplanade Reserve in the immediate vicinity of the construction site is a well-used high tide roost for shore birds (especially NZ pied oystercatchers, mainly from late December until July). The open fields to the east (i.e. on the other side of the toilet block access road) appear to be an important roost, with many hundreds of NZ pied oystercatcher being observed here on all surveys of Kiwi Esplanade (AS7). On approximately half of the field surveys undertaken hundreds were observed roosting on the open fields immediately to the west of the site. Shore birds were not consistently using the area in the immediate vicinity of the construction footprint.

Several little black shags were also observed feeding opposite Kiwi Esplanade. Red billed gull, NZ pied oystercatcher, and pied stilt are Threatened or At Risk species. Introduced species observed at the site were blackbird, sparrow, starling, and song thrush. The site is of low value as lizard habitat.

The main ecological value of the site is its habitat (roosting/feeding) value for native birds, including At Risk species. Ample habitat exists outside of the construction footprint e.g. at Ambury Park, to the extent that the proposed works are very unlikely to result in adverse effects upon these species. The potentially most disruptive construction activities, including trenching works, to the extent practicable, will be programmed to occur when shore bird numbers are at their lowest (August to early December). Overall the ecological effects of the proposed works are expected to be minor.

9A.5.5 Archaeological effects

There are no recorded archaeological sites within the proposed works area. This area of the reserve has been previously modified through the installation of the toilet block, landscaping, and planting. There was no evidence of midden found during site investigations for this project.

However, there are a number of recorded archaeological sites in the Ambury Park area. Due to its close proximity to Ambury Park, at the Kiwi Esplanade site archaeological remains relating to Maori occupation are possibly present. To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

9A.5.6 Traffic effects

9A.5.6.1 Existing environment

Kiwi Esplanade is a Local Road in the Manukau District Plan. It connects with Waterfront Road to the east of the site. The site is proposed to be accessed via the existing access driveway from Kiwi Esplanade.

9A.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at Kiwi Esplanade are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

9A.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

9A.5.7 Noise effects

9A.5.7.1 Existing environment

The nearest residential receivers are located over 100 m to the south of the main construction site centre on Kiwi Esplanade.

An ambient noise level of 40 dB L_{Aeq} was measured on 12 May 2011 during the day time.

9A.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations. Surface construction works will generally be undertaken during the hours of 7 am and 6 pm Monday to Friday and 8 am to 6 pm Saturday.

Noise levels are expected to comply with the Construction Noise Standard, with noise levels at the closest noise sensitive receivers (85 and 87 Kiwi Esplanade and 3 Yorkton Rise) due to construction and excavation expected to be typically between 28 to 67 dB L_{Aeq} during the day-time.

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges are not expected to exceed the Construction Noise Standard at the nearest residential receiver, but if noise from this preparatory work becomes an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

A draft construction noise management plan has been prepared (refer Part D Technical Report F).

9A.5.7.3 Operational noise effects

The permanent works (access shaft and air vent) may generate low noise levels immediately above the shaft due to the movement of water and air. Operational noise levels will be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) and no mitigation measures are necessary.

9A.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. Some construction activities (e.g. potential blasting in basalt for shaft construction) have the potential to generate higher levels of vibration. However, given the distance to the nearest dwellings, the effects of vibration at this site are expected to be less than minor.

9A.5.9 Odour effects

Most of the time during normal operation adverse effects due to odour discharges are not expected to occur. The drop shaft and access shaft are unlikely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent.

The pressure relief air vent at Kiwi Esplanade (to be incorporated into the new toilet block facility) will operate in the event that an air pocket is created as the main tunnel fills to the north and south. Due to the distance between the vent and dwellings, the very infrequent operation of the vent, the short duration of the discharge on each occasion and the dilution by stormwater during these events (causing the odour to be less than normal dry-weather flows) more than minor adverse effects are not expected.

A passive air treatment filter will be installed at the site to treat air coming out of the vent during wet weather events. This proposed shaft is the most downstream shaft where air will discharge in tunnel storage mode conditions. Air will begin to flow out of this shaft once the bottom end of the tunnel is full and air can no longer flow to the primary ATF at Mangere WWTP. This will occur approximately 6 to 8 times per year and is expected to occur for around 10 to 30 minutes depending on the rate of fill within the tunnel. The air will be pushed through the air filter system as the tunnel fills and will likely be treated using an activated carbon or similar system.

9A.5.10 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains and a decanting earth bund. The outlet from the decanting earth bund (DEB) will discharge to the Manukau Harbour via a level spreader to minimise the potential for erosion of the coastal edge.

Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

9A.5.11 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. No potentially contaminating activities have been identified at the site.

9A.5.12 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. Shaft excavations will occur in ECBF overlain by Puketoka Formation. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

9A.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Watercare considered a number of different options for a construction site and air vent within the Mangere Bridge area. Options included:

- Locating the shaft at the western end of Kiwi Esplanade Reserve;
- Locating the shaft in Kiwi Esplanade Reserve more centrally and closer to the coastal edge;
- Locating the shaft in Muir Avenue Park;
- Locating the shaft in the south east corner of Ambury Park bull paddock adjacent to Ambury Road;
- Locating the shaft at the eastern side of Ambury Park; and
- Locating the shaft in Kiwi Esplanade Reserve in the location of the existing toilet block.

Following consultation with Auckland Council, local residents and other organisations, the options were reduced to two preferred sites – one being at the location of the existing toilet block at Kiwi Esplanade and the other in Ambury Park, west of Ambury Road. Both of these options are assessed in the technical reports in Part D of this AEE. Further targeted consultation took place once a conceptual layout for each of these sites had been developed.

Having assessed the options and considered feedback received, Watercare selected Kiwi Esplanade as the preferred construction site in Mangere Bridge and is not proceeding with Ambury Park as an option. In particular, feedback was received from iwi and Auckland Council Parks staff in opposition to the Ambury Park site due to potential impacts on heritage and park activities, and given availability of other alternatives. Watercare also recognises that Ambury Park is a significant cultural and geological heritage site of regional importance.

Although local Mangere Bridge residents had previously raised opposition to a site on the foreshore reserve, the original site at the western end of Kiwi Esplanade was relocated, and the site now proposed takes account of key concerns raised about visibility and odour. In particular, the construction site is screened by large trees and can be landscaped to tie in with the surrounding development, and passive odour treatment facilities are now proposed in an underground chamber.

The final layout at Kiwi Esplanade includes:

- A condensed construction area;

- Construction and permanent access via an existing formed road;
- Screening by existing trees; and
- Opportunity for new upgraded toilet block facility with permanent features (vent and shaft) incorporated to reduce visual effects.

Figures showing the sites and layout alternatives are located at the end of Section 9B.

9A.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There will be an effect on the general amenity of the reserve and neighbouring sites during construction. Residential properties are located a reasonable distance from the site, approximately 100 m away on Kiwi Esplanade. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence. From the upper storeys of a small number of the houses opposite the site it will be possible to see over the fence, but these views will be in the context of a wider vista. Pedestrian access will be maintained and there will only be minor and temporary effects on recreation and public access.

The portion of Kiwi Esplanade Reserve in the immediate vicinity of the construction site is a well-used high tide roost for shore birds. Construction works will be managed so that, to the extent practicable, the most disruptive construction activities are programmed to occur when shore bird numbers are typically at their lowest. With mitigation measures in place, the ecological effects of the proposed works are expected to be minor.

There will be permanent above ground features remaining at the site (the shafts and rebuilt toilet block). These will be visible to nearby houses, but at a distance. The detailed design will incorporate measures to integrate the structures into the site, resulting in no more than minor long term visual effects.

Part of Link Sewer 4 will be trenched through the reserve from the shaft at Kiwi Esplanade reserve to Yorkton Rise. The effects of this are addressed in Section 12.19 of Part A.

9B. Kiwi Esplanade pump station removal

Watercare proposes to remove the existing pump station located on Kiwi Esplanade to the southwest of the proposed Kiwi Esplanade construction site. A 225 to 300 mm diameter pipe will be trenched to connect the existing sewer to the drop shaft (a permitted activity). These works are shown on Drawing AEE-MAIN-9.2.

Land ownership	
Address	86R Kiwi Esplanade
Legal description	Lot 1 DP 77585
Title reference	NA33D/1223
Owner	Auckland Council
Reserve status	Recreation reserve
Local Board	Mangere-Otahuhu

The visible structures at the surface comprise a series of metal and concrete covers and paving and an equipment box approximately 1.5 m high. There are a number of existing trees surrounding the structure, which provide some visual screening. Immediately adjacent is a clump of mixed native species, including ngaio, *Coprosma repens*, black matipo, and karo. It may be necessary to remove these trees to carry out the work. There are also a number of puriri trees, however these are further away from the structure and will not require removal. The site is shown in the photograph below.



Photograph 9B-1 Existing pump station structures

The removal of the existing pump station structure in Kiwi Esplanade reserve will have positive effects on the use and enjoyment and amenity values of this public open space. Adverse effects during demolition will be of a temporary nature only and the site will be regrassed following removal of the structure. The overall effects of this work will be positive and the effects of tree removal can be mitigated by replanting if necessary.

Mangere Bridge West alternative sites and layouts

<p>Comment on alternative</p> <p>Large site footprint impacts on recreational facilities</p> <p>Shaft location between road and shoreline has potential impact on bird migratory patterns</p> <p>Structures within Reserve affecting public amenity</p>	
<p>Shaft location causing impact on recreational facilities</p>	
<p>Shaft moved to northern edge of reserve to reduce impact on public amenity</p> <p>Potential impact on bird migratory patterns</p> <p>Structures within Reserve affecting public amenity</p> <p>Site requires raised permanent features</p> <p>Air vent located away from residential property</p>	

Work site is located in residential area

Traffic impacts on neighbouring community from truck access during construction



Site is located in sensitive archaeological land



Site is located in sensitive archaeological land

Reduces impact on recreational facilities

Air vent located away from residential property



Site is located near archaeological and cultural features

Construction activities impact on access via the existing road

Air vent located away from residential property

Impacts on recreational facilities including camping.



For the reasons summarised above, these options were not pursued.

10.0 Mangere Pump Station (WS3)

10.1 Introduction

The Mangere Pump Station site is on the main tunnel MT2 alignment and is required to connect the Central Interceptor to the Mangere WWTP. The site is a primary construction site that will operate as a launch site for the TBM.

The proposed works are shown on Drawing AEE-MAIN-10.1 included in the A3 drawing set (Part C).

The site is designated by Watercare (designation No. 144A in the Manukau District Plan) for the Mangere WWTP and the underlying zoning of the site is Mangere Puhinui Rural. The proposed works are within the general scope of the existing designation. Therefore the focus of this section is on the resource consents required under the regional plans to undertake the works.

10.2 Location and site description

The Mangere Pump Station site is located at the Mangere WWTP, off Island Road, Mangere. The construction site is located at the northern end of the WWTP close to Greenwood Road.

The site is located on low-lying land at the northern end of the Mangere WWTP. The site currently contains a building formerly used as a sludge drying facility and now used for storage. There are areas of grassed open space and scattered trees.

Mangere Lagoon is located to the north of the site and the Manukau Harbour to the west. There is a coastal walkway to the north and west and a carpark to the east for users of the walkway, accessed off the corner of Creamery Road and Greenwood Road. To the north beyond the Mangere Lagoon are Ambury Farm Park and an area of residential housing along Wallace Road. To the east is an area zoned Mangere-Puhinui Rural and which is part of a designated odour buffer for the WWTP.

The coastal edge to the west of the site has a rock seawall with interspersed mangrove seedlings and a foreshore area comprising of mud flats.

The site is visible from the walkway from Ambury Park and across the low lying areas around the nearby Manukau Harbour and Mangere Lagoon. The site is also visible from Puketutu Island and along Island Road. From these locations the site is seen within the context of the existing WWTP facilities and structures.

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.



Figure 10-1 Location plan

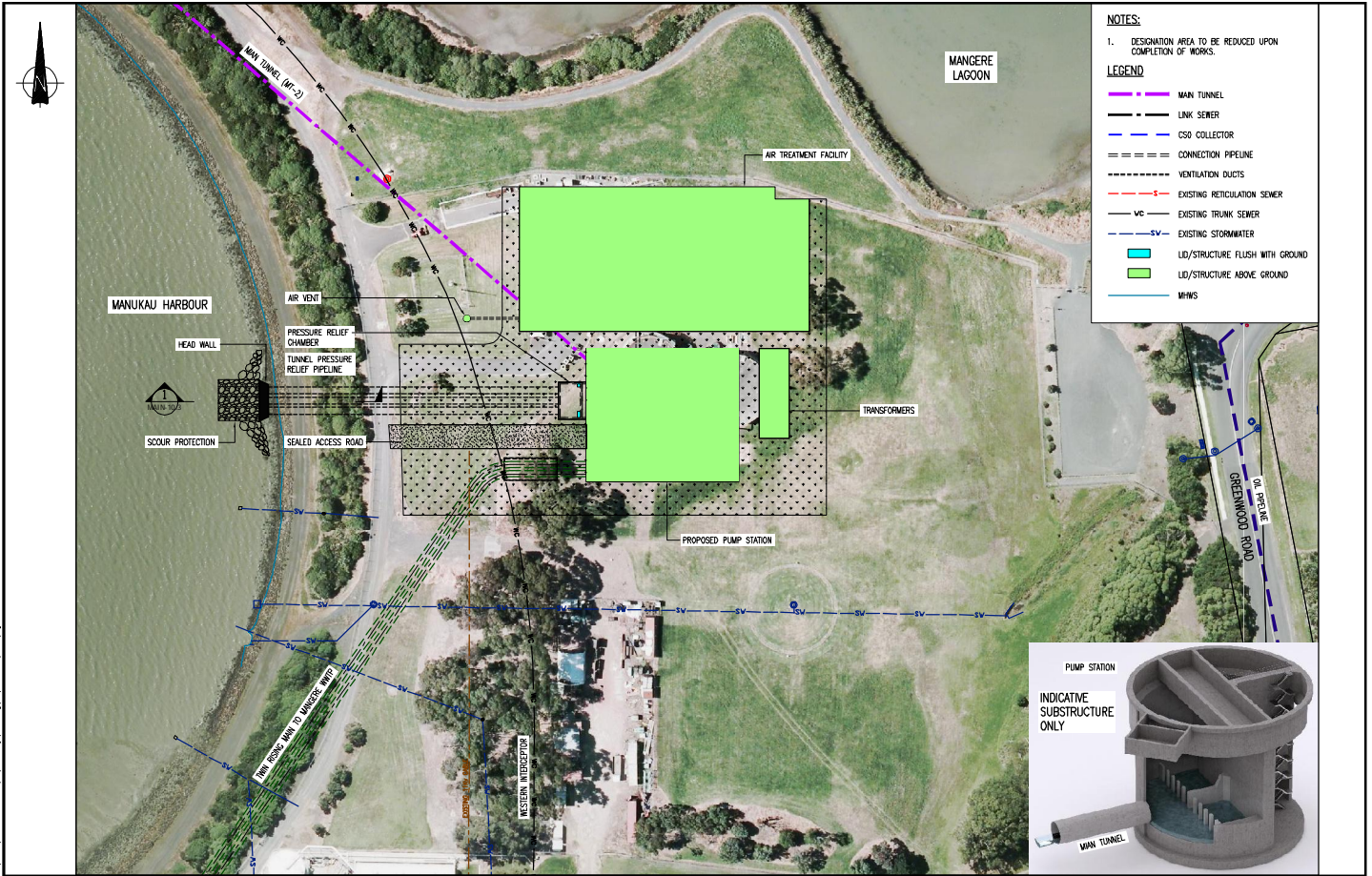
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Photograph 10-1 Existing buildings in site construction area



Photograph 10-2 Coastal environment adjacent to WWTP looking south



NOTES:

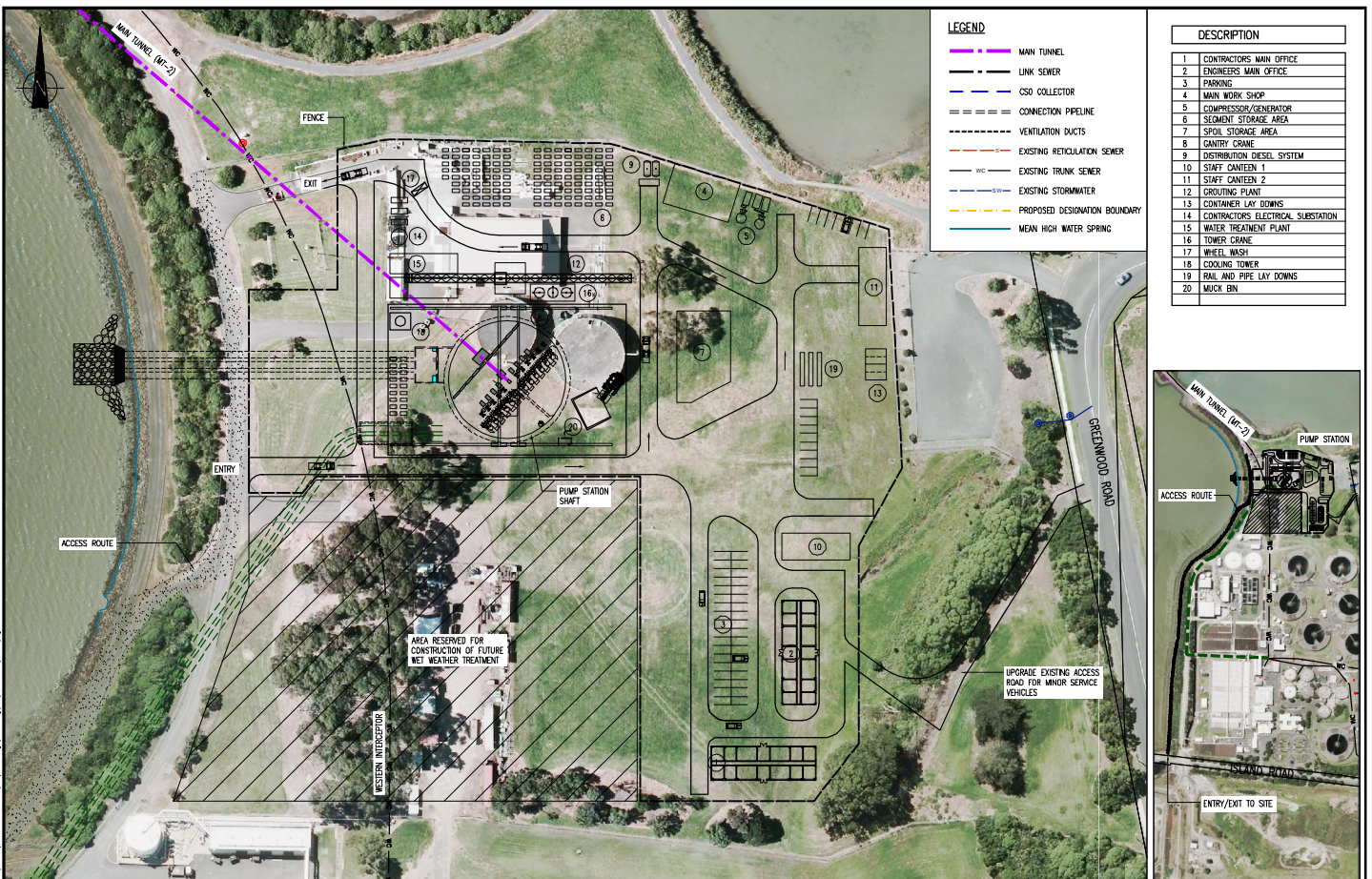
1. DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.

LEGEND

- MAIN TUNNEL
- LINK SEWER
- CSD COLLECTOR
- CONNECTION PIPELINE
- VENTILATION DUCTS
- EXISTING RETICULATION SEWER
- VC - EXISTING TRUNK SEWER
- SV - EXISTING STORMWATER
- LD/STRUCTURE FLUSH WITH GROUND
- LD/STRUCTURE ABOVE GROUND
- MHWS

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 Project No: A

DESIGNED	SL	08/12	REVISION	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT	waterCare services limited	CENTRAL INTERCEPTOR GENERAL MANGERIE PUMP STATION (WS3) - PERMANENT WORKS PLAN	CAD FILE	AE-MAN-10.1	DATE	26-JUL-12
DES. CHECKED	JS	08/12					ORIGINAL SCALE	A1	CONTRACT No.	0538
DRAWN	JS	08/12					DRAWING No.	AE-MAN-10.1	ISSUE	A
ENG. CHECKED	JS	08/12								
REV'D P. MGR	JS									
APPRO. P. DIR	CC									
BY	DATE									
				AEE AUGUST 2012						



LEGEND

- MAIN TUNNEL
- LINK SEWER
- CSD COLLECTOR
- CONNECTION PIPELINE
- VENTILATION DUCTS
- EXISTING RETICULATION SEWER
- VC - EXISTING TRUNK SEWER
- SV - EXISTING STORMWATER
- PROPOSED DESIGNATION BOUNDARY
- MEAN HIGH WATER SPRING

DESCRIPTION

- 1 CONTRACTORS MAIN OFFICE
- 2 ENGINEERS MAIN OFFICE
- 3 PARKING
- 4 MAIN WORK SHOP
- 5 COMPRESSOR/GENERATOR
- 6 SLOTTED STORAGE AREA
- 7 SPOIL STORAGE AREA
- 8 GANTRY CRANE
- 9 DISTRIBUTION DIESEL SYSTEM
- 10 STAFF CANTEN 1
- 11 STAFF CANTEN 2
- 12 GROUTING PLANT
- 13 CONTAINER LAY DOWNS
- 14 CONTRACTORS ELECTRICAL SUBSTATION
- 15 WATER TREATMENT PLANT
- 16 TOWER CRANE
- 17 WHEEL WASH
- 18 COOLING TOWER
- 19 RAIL AND PIPE LAY DOWNS
- 20 MUCK BIN

DESIGNED	SL	08/12	REVISION	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT	waterCare services limited	CENTRAL INTERCEPTOR GENERAL MANGERIE PUMP STATION (WS3) - CONSTRUCTION WORKS PLAN	CAD FILE	AE-MAN-10.2	DATE	26-JUL-12
DES. CHECKED	JS	08/12					ORIGINAL SCALE	A1	CONTRACT No.	0538
DRAWN	JS	08/12					DRAWING No.	AE-MAN-10.2	ISSUE	A
ENG. CHECKED	JS	08/12								
REV'D P. MGR	JS									
APPRO. P. DIR	CC									
BY	DATE									
				AEE AUGUST 2012						

File Date: 15-Aug-11 1:38 PM
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 Project No: A

10.3 Land ownership and interests

Main site	
Address	Island Road, Mangere
Legal description	Lot 2 DP 156421
Title reference	NA94A/54
Owner	Watercare Services Ltd
Local Board	Mangere-Otahuhu
Coastal Marine Area	
Address	Coastal Marine Area adjacent to Mangere WWTP
Legal description	Lot 2 DP 156421
Title reference	NA94A/54
Owner	Watercare Services Ltd

10.4 Proposed works

10.4.1 Permanent works

Drawing reference	AEE-MAIN-10.1
Permanent works	<ul style="list-style-type: none"> • Pump station (above ground and up to 50 m below ground) • Valve chamber/flow meter • Air treatment facility (above ground) • Ventilation duct and air vent (above ground) • Rising main to WWTP • Connection to wet weather treatment unit • Pressure relief chamber • Emergency pressure relief pipeline and outlet • Transformers • Sealed access road and surrounding porous pavement area
Site reinstatement	<ul style="list-style-type: none"> • Regrassing
Access requirements	<ul style="list-style-type: none"> • Permanent sealed access road via Island Road.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of ATF • Maintenance of pump station

10.4.2 Construction works

Drawing reference	AEE-MAIN-10.1
Construction site area	Approx. 23,000 m ²
Duration of construction	6 years
Principal temporary construction activities	<ul style="list-style-type: none"> • Demolition of existing storage building • Shaft excavations: construction of a 35 m diameter 35 - 50 m deep diaphragm wall shaft to house pump station and for TBM launch

	<ul style="list-style-type: none"> • TBM assembly and launch • Removal of spoil from tunnel • Spoil storage • Liner segment handling and storage • Pump station construction • Excavations and construction of other permanent features • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: upgrading site access roading, site offices, staff/visitor parking • Crawler crane, piling rigs, ground improvement rigs, tower crane or gantry crane • Water treatment plant • Wheel wash • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation plant • Workshops • Electrical substation • Compressor/generator • Site lighting

10.4.3 Pump station emergency pressure relief

An Emergency Pressure Relief (EPR) structure is proposed at the Mangere WWTP site as shown on drawing AEE-MAIN-10.1 in the A3 drawing set. Cross sections of the outfall structure are shown on AEE-MAIN-10.3.

As described in Section 5.11.5 of Part A, the EPR structure is required to safely control the outflow location in the event of extreme or emergency event inflows to the tunnel allowing pressure to be safely released from the tunnel without causing damage to the pump station or tunnel structures. The likelihood of the EPR operating is very low, and the discharge would occur where pump station failure coincided with a significant storm event that used all available storage in the tunnel.

The EPR structure would be a piped outfall located immediately to the west of the proposed pump station.

In summary, the EPR structure will comprise:

- 10 m long overflow weir (lowering of pump station wet well wall);
- manually cleaned coarse screen (to prevent discharge of large floating debris);
- collection chamber;
- discharge pipes; and
- outfall structure in the CMA including headwall, flap valve and erosion protection to mudflats e.g. Reno mattress.

Construction of this structure will involve works in the CMA, on the foreshore adjacent to the pump station. This work in the CMA will involve the construction of an outlet structure and associated erosion protection works. Construction will involve removal of part of the existing seawall and installation of the outfall structure and erosion protection. Standard erosion and sediment control measures for working in the coastal environment would be employed and much of the excavation would be managed to occur while the tide is out. Construction of the outfall structure is likely to take place over a period of a few weeks.

10.4.4 Air treatment facility

The Air Treatment Facility (ATF) proposed for this site is a bark biofilter. This would be a concrete, open topped tank containing bark media, irrigation pipework and ventilation ducting. A staged approach is proposed for the project air treatment facilities, with construction of an air treatment facility at this site proposed to be included in the scheme at start up.

The final design of the ATF structure will be developed during the detailed design phase and details will be provided in an Outline Plan of Works.

10.5 Assessment of effects above mean high water springs

As the majority of the works at this site are authorised by the existing designation, only the effects of those aspects requiring resource consents are considered in the following section.

10.5.1 Odour effects

All air extraction from the Central Interceptor, including the new pump station, will be drawn through the air treatment facility at this site. At this stage a biofilter system is proposed. There is also potential for odour discharges during the infrequent operation of the emergency pressure relief point.

The site is located well within the existing odour boundary for the Mangere WWTP. The operation of the Central Interceptor will not noticeably add to the odour already being discharged from other parts of the WWTP, and is highly unlikely to cause adverse effects beyond the immediate vicinity of the facility.

10.5.2 Contaminated sites effects

A desk top study and soil testing has been undertaken for the site. The construction site was reclaimed in the late 1950s and was developed in the 1980s and used as a sludge dewatering facility.

Test results showed all PAH and SVOC concentrations are below the ARP: ALW permitted activity soil criteria (discharges). However, metals concentrations in samples collected from a number of test pits exceed the ARP: ALW permitted activity soil criteria (discharges).

All metals, polycyclic aromatic hydrocarbon (PAH) and semi-volatile organic compounds (SVOC) concentrations are below the NES contaminant standards for a commercial/industrial end use. However, a significant proportion of the results are above the defined range of background concentrations. Asbestos fibres were not detected in the three samples of fill material analysed.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The generally low level contamination found indicates that the works can be appropriately managed to mitigate any effects to the environment using the procedures set out in the draft SMP. Following comparison of test results with Auckland Council cleanfill criteria, likely disposal requirements for material to be disposed of off-site have been identified as follows:

- Fill material: to be disposed of to a managed fill site authorised to take the metal contaminant levels in the fill, or to a licenced landfill.
- Natural soils (underlying estuarine sediments): to be disposed of to a cleanfill site authorised to accept volcanic type soils or to a managed fill site.

10.5.3 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains and sediment retention ponds. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the Manukau Harbour and / or the adjacent estuary. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft

ESCP. Stormwater volumes calculated in accordance with TP10 are provided in Part D Technical Report K.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process.

10.5.4 Effects of stormwater discharges from permanent works

The impervious area of the permanent works is expected to total approximately 10,200 m². While the impervious area threshold will be exceeded by permanent works, the surfaces will be subject to low vehicle traffic volumes and there will be limited sources of contaminants. Drawing SW-MAIN-4 in the A3 drawing set contains indicative stormwater management measures for the site. These include construction of a swale for stormwater treatment and detention prior to discharge into the existing stormwater pipe.

Permanent stormwater management for this site will be confirmed in the detailed design process, and will be consistent with TP 10.

10.5.5 Groundwater and settlement

Shaft excavations will occur in the Kaawa and Puketoka Formation. The anticipated construction methodology of diaphragm walling through the Kaawa sands unit to the underlying ECBF is expected to control potential settlement to less than 50 mm so that structural damage to nearby buildings and structures is not likely to occur.

WS3 (Mangere Pump Station) is located at the edge of the Manukau Kaawa Aquifer but is not expected to intercept any of the productive layers of the aquifer based on current geological understanding. The proposed construction methodology is expected to prevent any significant groundwater inflow or drawdown from the aquifer in any case.

Therefore, with appropriate construction methodology in place as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

10.6 Assessment of effects below mean high water springs (CMA)

10.6.1 Landscape and visual effects

The EPR structure would be visible by pedestrians walking to the north. This view would be approximately 300 metres away. Currently walkers can access the area where the structure is proposed, but it is understood that this area will be restricted in future and an alternative access will be provided around the lagoon and through other western land adjacent to Greenmount Road. Distant views would be possible from Island Road for passing motorists travelling east. The emergency pressure relief structure will be set into the existing seawall, with part of the structure, including the erosion protection, extending out onto the foreshore. In the context of the existing modified environment, including existing structures and the seawall, the WWTP adjacent, and the limited viewing audience, the temporary and permanent landscape and visual effects of the structure are expected to be less than minor.

10.6.2 Recreation and public access effects

The walkway access around the edge of the Manukau Harbour may need to be restricted at times during the construction of the emergency pressure relief structure. This would only be for a limited period of time and coastal access would remain along the walkway via the route around Mangere Lagoon.

10.6.3 Ecological effects

The construction of the emergency pressure relief structure will result in the removal of part of the existing seawall and disturbance of the mud flats in the area around the proposed structure. The

structure will occupy an area in the CMA of approximately 300 m² and is therefore relatively small in size and will result in minimal intrusion into the intertidal area. No native birds were observed during a site survey of the construction area.

Overall, ecological effects due to the construction and occupation of the emergency pressure relief structure are expected to be less than minor.

10.6.4 Effects on mangroves

The occasional mangrove is present along the existing seawall. These are currently small specimens, but larger specimens may be present by the time construction works begin. Therefore, resource consent is being sought for the removal of mangroves which may be required to construct the EPR structure. This will be in a limited area and the effects are expected to be less than minor.

10.6.5 Coastal process effects⁸

The concept design for the EPR structure comprises three pipes and a wing wall that extends through an existing rock revetment that extends along the majority of the shoreline in this area (refer Drawing AEE-MAIN-10.3). The effects of the proposed works on the physical coastal processes operating at this location are likely to be less than minor due to the presence of the structure in this modified coastal edge.

As noted above, the likelihood of the structure being called into service is extremely small. If it does operate, flows are likely to result in the formation of a scour hole seaward of the outlet structure. This is expected to be a localised and relatively small scale effect and therefore of a less than minor nature.

10.6.6 Navigation and safety

The structure will be located at the coastal edge with erosion protection such as a reno mattress extending out approximately 12 m. No effects on navigation and safety are anticipated.

10.6.7 Noise effects

The nearest dwellings are located over 500 metres distance to the east of the site. Noise levels are expected to be compliant with the noise standards in the ARP:C.

10.6.8 Earthworks/disturbance effects

Erosion and sediment control measures will be put in place to manage the effects of the disturbance in the CMA and minimise effects on water quality. Standard erosion and sediment control measures for working in the coastal environment would be employed and much of the excavation would be timed to occur while the tide is out.

10.6.9 Effects of EPR operation on coastal environment

The emergency pressure relief (EPR) structure may only operate in very rare situations. For example, this would be an event where pump station failure of extended duration coincided with a significant storm event that used all available storage in the tunnel (refer Part A Section 5.11.5). In this event, diluted wastewater would be discharged to the Manukau Harbour.

The risk of the EPR activating is greatly mitigated by the storage provided by the tunnel (approximately 12 hours during a 10 year storm) and Watercare's ability to provide standby power in a reasonably short time frame (typically less than four hours). Estimates of the combined probabilities of events leading to the EPR activating show that it is unlikely to activate more than once every 50 years. Notwithstanding this, resource consent to discharge from the EPR is being sought as there is a designed overflow point, and in the unlikely event that the EPR point is used, appropriate conditions are established that respond to this scenario.

⁸ Coastal process assessment completed by Tonkin & Taylor Ltd

If the discharge occurs, the event would be expected to cause a short term deterioration in ecological, aesthetic and public health water quality characteristics. No long term significant adverse effects would persist, and any effects would be expected to be quickly remedied through tidal flushing and natural degradation processes.

As a comparison, it is noted that emergency bypasses currently occur from the WWTP on a number of occasions annually during storm conditions. Watercare's monitoring of these bypass discharges indicates no measurable effect on the Manukau Harbour. Future upgrades planned at the Mangere WWTP for the treatment of excess flows will improve the quality of these existing bypass discharges. Compared to the existing authorised bypasses, the EPR discharge is expected to be of less volume and occur significantly less often.

10.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

This assessment has considered the effects of the proposed works that require resource consents.

Erosion and sediment control measures will be put in place to control the effects of earthworks and stormwater management measures will manage stormwater runoff from permanent impervious surfaces. The emergency pressure relief structure will occupy a relatively small footprint in a modified coastal environment and the likelihood of it operating is extremely small. The effects on coastal processes are likely to be less than minor.

The nearest dwellings are a considerable distance away and the site is located well within the existing odour boundary for the Mangere WWTP.

11.0 Motions Road (L1S1)

11.1 Introduction

The Motions Road L1S1 site is on the Link Sewer 1 alignment and is required to provide connections to the existing Orakei Main Sewer and to a local reticulation overflow. It is a secondary construction site and will be used for the launch/retrieval of the MTBM for Link Sewer 1.

The proposed works are shown on Drawing numbers AEE-MAIN-11.1 and 11.2 included in the A3 drawing set (Part C).

11.2 Location and site description

The Motions Road site is located on Motions Road Reserve, Motions Road, Western Springs.

The site is located in a flat to gently sloping grassed reserve area adjacent to Motions Creek. It is zoned Open Space 4 (community) and Open Space 2 (informal recreation) and is designated for a council carpark (C05-10). There is limited scattered vegetation within the main construction area. The area on either side of Meola Creek is planted in native trees and shrubs. A pedestrian walkway goes through the site and leads to a footbridge which crosses the creek to the Pasadena Intermediate School playing fields to the south west.

To the north are Western Springs College and a carparking area. Across Motions Road to the east is Auckland Zoo.

11.3 Land ownership and interests

Address	Motions Road, Western Springs
Legal description	1. Allot 57 Section 9 Suburbs of Auckland 2. Lot 1 DP 168863
Title reference	1. NA43B/991 2. NA102C/992
Owner	Auckland Council
Reserve status	1. Stopped road 2. Local purpose esplanade reserve
Local Board	Albert-Eden

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

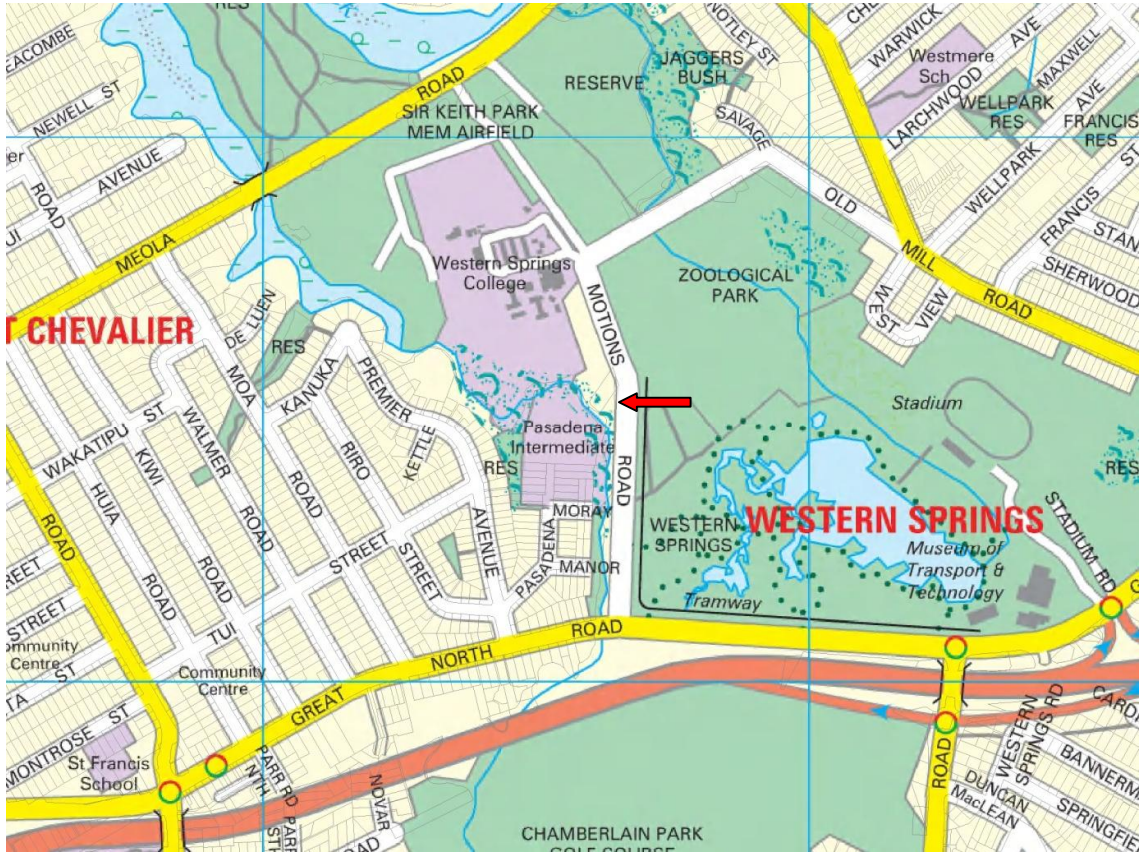
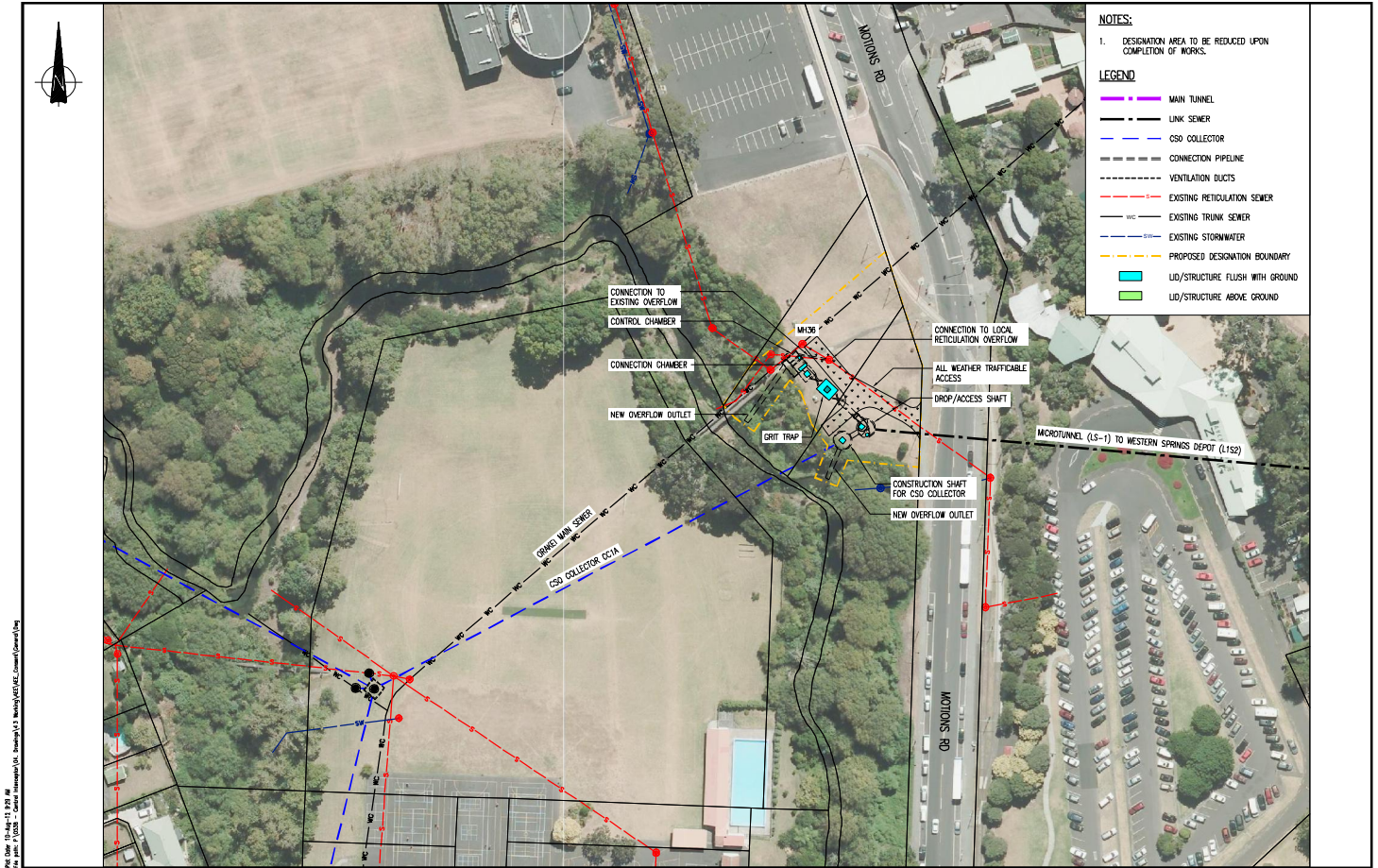


Figure 11-1 Location plan

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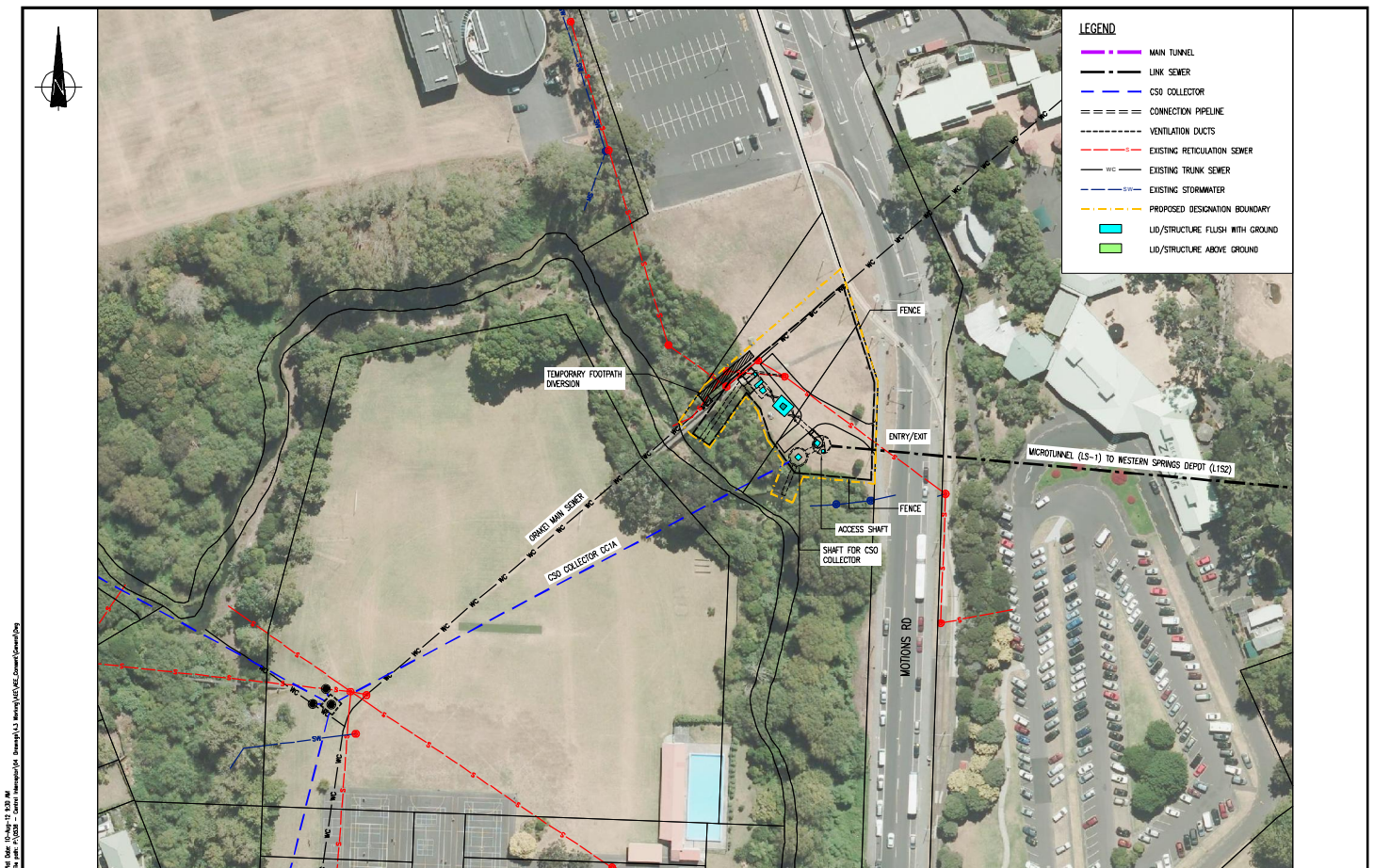


Photograph 11-1 Proposed construction area



- NOTES:**
1. DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND

DESIGNED: [Signature] 08/12 DES. CHECKED: [Signature] 08/12 DRAWN: [Signature] 08/12 REV'D. P.MGR: [Signature] 08/12 APP'D. P.DIR: [Signature] 08/12 BY: [Signature] DATE: 08/12										SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012				CENTRAL INTERCEPTOR GENERAL MOTIONS ROAD (L1S1) - PERMANENT WORKS PLAN		CAD FILE: AEE-MAIN-11.1 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
PROJECT No.: A ISSUE: A DATE: 17/08/12 AMENDMENT: CONSENT ISSUE BY: [Signature] APP'D. P.DIR: [Signature]										AEE AUGUST 2012		COPYRIGHT - The drawings, designs and specifications herein are the exclusive property of WaterCare Services Limited and may not be used without express copyright approval.		1:1000 A3		DRAWING No.: AEE-MAIN-11.1 ISSUE: A			



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND

DESIGNED: [Signature] 08/12 DES. CHECKED: [Signature] 08/12 DRAWN: [Signature] 08/12 REV'D. P.MGR: [Signature] 08/12 APP'D. P.DIR: [Signature] 08/12 BY: [Signature] DATE: 08/12										SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012				CENTRAL INTERCEPTOR GENERAL MOTIONS ROAD (L1S1) - CONSTRUCTION WORKS PLAN		CAD FILE: AEE-MAIN-11.2 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
PROJECT No.: A ISSUE: A DATE: 17/08/12 AMENDMENT: CONSENT ISSUE BY: [Signature] APP'D. P.DIR: [Signature]										AEE AUGUST 2012		COPYRIGHT - The drawings, designs and specifications herein are the exclusive property of WaterCare Services Limited and may not be used without express copyright approval.		1:1000 A3		DRAWING No.: AEE-MAIN-11.2 ISSUE: A			

11.4 Proposed works

11.4.1 Permanent works

Drawing reference	AEE-MAIN-11.1
Permanent works	<ul style="list-style-type: none"> • Link Sewer 1, CSO Collector CC1 • Connecting pipes to existing Orakei Main Sewer and proposed CSO Collector CC1 • 5 m ID access/drop shaft (21 – 36 m deep) • Control chamber • Grit chamber • Two new overflows and outlet structures
Site reinstatement	<ul style="list-style-type: none"> • Regrassing and replanting
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via Motions Road. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of control gates • Periodic emptying of grit trap

11.4.2 Construction works

Drawing reference	AEE-MAIN-11.2
Construction site area	Approx. 2,100 m ²
Duration of construction ⁹	12 - 18 months construction activities 3 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 6.5 m ID, 21 – 36 m deep construction/drop shaft for LS1, construction shaft for CSO Collector CC1 • MTBM launch/retrieval for LS1 and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • MTBM launch/retrieval for CC1 and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – drop shaft, grit and control chambers • Site reinstatement

⁹ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, site fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment plant • Wheel wash • Generator • Slurry separation plant • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation plant
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11.5 Assessment of effects

11.5.1 Landscape and visual effects

The site perimeter fence would be visible from Motions Road and the southern edge of the Western Springs College car park, as well as to those using the footbridge across the creek.

Landscape and visual effects resulting from construction will be:

- Removal of trees and shrubs from within the construction area;
- Construction of a perimeter fence;
- Removal of existing picnic table;
- Removal of two Pohutukawa trees within the main construction area and removal of some riparian vegetation down to the creek; and
- Provision of alternative pedestrian access to the footbridge over Motions Creek.

The construction works will result in temporary minor adverse effects on open space and landscape character and less than minor effects on visual amenity. The area is not a heavily used area of open space, although it is well-used by pedestrians. The removal of smaller trees from the site will have low adverse landscape effects.

Permanent visible features that will remain are the site accessways around the facilities, and the shaft, grit and control chamber lids (all at ground level, flush with the adjacent surface).

With replacement planting, the long-term effects of vegetation removal will be mitigated and as the permanent structures are flush with the ground and limited in scale and number, any ongoing adverse landscape and visual effects will be less than minor in nature.

11.5.2 Recreation and public access effects

The area is well-used by pedestrians, particularly before and after school hours. Alternative pedestrian access will be provided so that people can continue to use the footbridge across Meola Creek during construction. There is a picnic table within the construction area that will need to be moved for construction and later reinstated. However, there will be remaining space within the reserve for informal recreation.

11.5.3 Vegetation effects

Vegetation within the main construction works area consists of two young pohutukawa trees. Various native species are present at the edge of the construction area and within the riparian area of Motions Creek. Species include Hoheria, Pittosporum, kanuka, Coprosma, *Entelea arborescens*, ti kouka, and *Meliclytus ramiflorus*.

There will be some vegetation removal required, particularly around the edge of the construction area and in the riparian area to allow construction of the overflow pipelines and an alternative pedestrian

accessway. There may be some edge effects due to exposing the internal trees to winds and sunlight which can be addressed by aftercare management. The area of vegetation removal is not significant in relation to the quantity of vegetation within the area and the vegetation is young to early mature and would be easy to replant if necessary. The effects of this vegetation removal would be less than minor and can be mitigated by replanting and aftercare management.

Watercare will work with Auckland Council and the Albert-Eden Local Board to develop appropriate reinstatement planting.

11.5.4 Ecological effects

The habitat type at the site is grass with a small area of shrub plantings. Bird values at the site are low with the only native bird species identified at the site being silvereye. Introduced species were blackbird and rock pigeon.

No lizards were found during a survey of the site, but due to the potential habitat suitability for skinks and arboreal geckos, a salvage operation is proposed. Therefore, adverse effects on native lizards are unlikely to be more than minor.

The vegetation at the site is of low ecological value. The loss of mown field habitat for bird feeding is expected to be of less than minor effect as ample habitat is available elsewhere. Overall the ecological effects of the proposed works at the site are expected to be less than minor.

11.5.5 Archaeological effects

The Western Springs area was an area of Maori settlement and 19th century industrial development. No archaeological or heritage sites are recorded within the construction area and the site is located within a landscaped reserve. However, there is some potential for discovery of unrecorded archaeological remains. To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

11.5.6 Traffic effects

11.5.6.1 Existing environment

Site entry is proposed to be from Motions Road. Motions Road is a Collector Road in the Auckland City District Plan. It links Old Mill Road in the north with Great North Road in the south.

A signalised pedestrian crossing is located immediately to the north of the construction site. With Western Springs College, The Auckland Performing Arts Centre, and Pasadena Intermediate in close proximity to the site, Motions Road experiences significant pedestrian volumes before and after school hours. Pedestrian surveys focussing around school opening and closing hours indicate that a large volume of pedestrians use the footbridge between Motions Road and the Pasadena Intermediate playing fields.

11.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a "worst case" scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

Site access is proposed to be off Motions Road, and heavy vehicle traffic will be restricted to a left turn out only onto Great North Road.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The proposed temporary diversion of the north eastern end of the footbridge will maintain pedestrian movements across this bridge and therefore will not cause any adverse effects. Construction traffic movements will be managed during peak school times (i.e. just before and just after school hours).

The construction works at the Motions Road site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

11.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

11.5.7 Noise effects

11.5.7.1 Existing environment

The nearest residential receivers are located on Premier Avenue, approximately 220 m to the south west of the site centre. Other receivers in the area are Auckland Zoo, Western Springs College and Pasadena Intermediate School.

Currently the predominant noise source is traffic from Motions Road. An ambient noise level of 41 dB L_{Aeq} was measured on 12 May 2011 during the day time.

11.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling. Construction works will generally take place from 7 am to 6 pm Monday to Friday and 8 am to 6 pm Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A. Measures will be undertaken to limit noise generation, such as avoiding noise intensive construction work during night time and on Sundays.

A draft construction noise management plan has been prepared (refer Part D Technical Report F). Construction noise levels at the closest noise sensitive receivers are predicted to comply with the Construction Noise Standard. Noise levels at the closest noise sensitive receivers (47A Premier Ave, 99 Motions Road, Auckland Zoo and Western Springs College) are expected to be typically between 30 to 65 dB L_{Aeq} .

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges are not expected to exceed the Construction Noise Standard at the nearest receiver, but if noise from this preparatory work becomes an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

11.5.7.3 Operational noise effects

Operational noise from the permanent works (operation of the overflow and removal of debris from the grit trap), if any, will occur on an infrequent basis. The nearest receivers are located some distance away and noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) with no mitigation measures necessary.

11.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting or rock breaking may be required. Western Springs College is a sufficient distance away that the effects of vibration are expected to be less than minor. There is not expected to be damage to structures at Auckland Zoo, but there may be some short term disturbance of people or animals. However, the potential for disturbance to animals in the zoo has previously been considered by Tonkin & Taylor during an assessment of effects for the MOTAT tram. This study concluded that

animals in zoos adjust quickly to levels of vibration which are below human perception levels (about 0.3 mm/s). Most would also not be highly alarmed by low frequency events which transmit vibrations up to 1 mm/s such as blasting.

Therefore effects of vibration are expected to be minor. Vibration management measures will be addressed as part of the CMP.

11.5.9 Odour effects

The drop shaft and access shafts and control chamber to be located at the site are not likely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. However, the grit trap will require emptying and cleaning approximately four times per year and this is a potentially odorous activity. The separation distance between the facilities and the nearest residential receptors (approximately 250 m) is sufficient to avoid significant adverse effects on those receptors during cleaning of grit traps. The separation distance from the two schools is around 100-150 m and from Auckland Zoo is around 100 m. Consideration will be given to scheduling of the emptying and cleaning of grit traps to minimise adverse effects on the neighbouring schools or zoo visitors. Watercare operates numerous grit traps on the existing network and has extensive experience with their management.

Overall adverse effects are likely to be less than minor except possibly during the cleaning of the grit chamber when minor localised adverse effects may occur for a short duration.

11.5.10 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K.

Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains, stabilised vehicle access, a decanting earth bund, and silt fences. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to Motions Creek. As outlined in AEE Part A Section 9.3.2, Motions Creek is identified as a degraded urban stream. It has not been identified as having significant values that will be sensitive to the temporary discharge of stormwater, subject to appropriate use of sediment control measures during construction. Additional impervious area during construction will not be significant. The temporary increase in volume of runoff to the stream is not expected to be significant compared with existing overland flows in the area. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP. Effects on Motions Creek from the earthworks are anticipated to be less than minor.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process.

11.5.11 Contaminated sites effects

A desk top study and soil testing has been undertaken for the site. The desk study review showed that the property the construction site is on is a closed landfill, but based on aerial photographs and site topography, the landfill was not considered likely to extend onto the construction site.

Test results showed all metals and the majority of polycyclic aromatic hydrocarbon (PAH) concentrations are below the ARP: ALW permitted activity soil criteria (discharges). The exception being a single concentration of benzo(a)pyrene equivalent (B(a)P eq.) of 8.8 mg/kg in test pit 2 that exceeds the ARP: ALW soil criterion of 2.15 mg/kg.

All metals, total petroleum hydrocarbon (TPH) and PAH concentrations are below the NES contaminant standards for a commercial/industrial end use. However, a significant proportion of results are above the defined background concentrations.

Asbestos fibres were not detected in all tested soil samples, but cement board collected from two locations contained chrysotile and amosite. Asbestos bound together in cement board and left undisturbed should not pose a risk to human health. However, during the proposed works the asbestos-containing cement board could be disturbed and asbestos fibres could become airborne. Therefore control measures will be implemented to prevent the generation of airborne asbestos fibres and effects on human health of excavation workers.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The generally low level contamination found indicates that the works can be appropriately managed to mitigate any effects to the environment using the procedures set out in the draft SMP.

Following comparison of test results with Auckland Council cleanfill criteria, likely disposal requirements for material to be disposed of off-site have been identified as follows:

- Fill material: to be disposed of at an appropriately licenced managed fill facility. The presence of asbestos containing material may result in some material requiring disposal to licenced landfill.
- Natural soil: to be disposed of to a cleanfill site authorised to accept volcanic type soils or a managed fill site.

11.5.12 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

11.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating the upstream terminus of the main tunnel in the park and carpark and using the site to retrieve the TBM and launch a micro tunnel east to Western Springs;
- Locating site as above, with site area condensed; and
- Locating site as above, but with further reduced site layout for a micro tunnel connection only.

Following selection of the proposed site, a number of modifications to the site layout have helped to minimise the effects of the site. The final layout includes:

- A condensed construction site area; and
- Provision for alternative pedestrian access across footbridge.

Figures showing the sites and layout alternatives are located at the end of this section.

11.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There will be an effect on the general amenity of the reserve and neighbouring sites during construction. The nearest noise sensitive receivers, including Pasadena Intermediate and Western Springs College, are located some distance away and construction noise levels are not expected to exceed the Construction Noise Standard. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence. An alternative pedestrian access will be provided to maintain access across the creek between Motions Road and Pasadena Intermediate School.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface. Site reinstatement details will be developed in consultation with the landowner, Auckland Council.

Motions Road alternative sites and layouts

Comment on alternative	
<p>Upstream terminus for main tunnel.</p> <p>Large site footprint in high use area</p>	
<p>Site condensed and rotated to reduce footprint</p>	

For the reasons summarised above, these options were not pursued.

12.0 Western Springs Depot (L1S2)

12.1 Introduction

The Western Springs Depot L1S2 site is on the Link Sewer 1 alignment and is required to provide an access shaft to the Link Sewer 1. It is a secondary construction site and will be used for the launch/retrieval of the MTBM for Link Sewer 1.

The proposed works are shown on drawings AEE-MAIN-12.1 and 12.2 included in the A3 drawing set (Part C).

12.2 Location and site description

The Western Springs Depot site is located at Western Springs Park, 859 Great North Road, Grey Lynn. The construction site is located within the area behind the Council works depot building. This area is currently used for storage and as a base for maintenance activities within the park. It is zoned Open Space 2 (informal recreation). The depot is accessed from Stadium Road, through the Stadium gates. A fence circles the yard area in which the construction site is proposed to be located and separates the site from the vegetated slope to the north and west. Beyond the site to the south is an area of Western Springs Park containing vegetation and open space.

12.3 Land ownership and interests

Address	859 Great North Road, Grey Lynn
Legal description	Lot 11 DP 168863
Title reference	NA102C/1000
Owner	Auckland Council
Reserve status	n/a
Local Board	Waitemata

12.4 Proposed works

12.4.1 Permanent works

Drawing reference	AEE-MAIN-12.1
Permanent works	<ul style="list-style-type: none">• Link Sewer 1• 2.4 m ID access/drop shaft (24 - 39 m deep)
Site reinstatement	<ul style="list-style-type: none">• Paving/recompacting
Access requirements	<ul style="list-style-type: none">• Existing paved access via Stadium Road. Access required infrequently for inspection.
Key maintenance requirements	<ul style="list-style-type: none">• Inspection

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

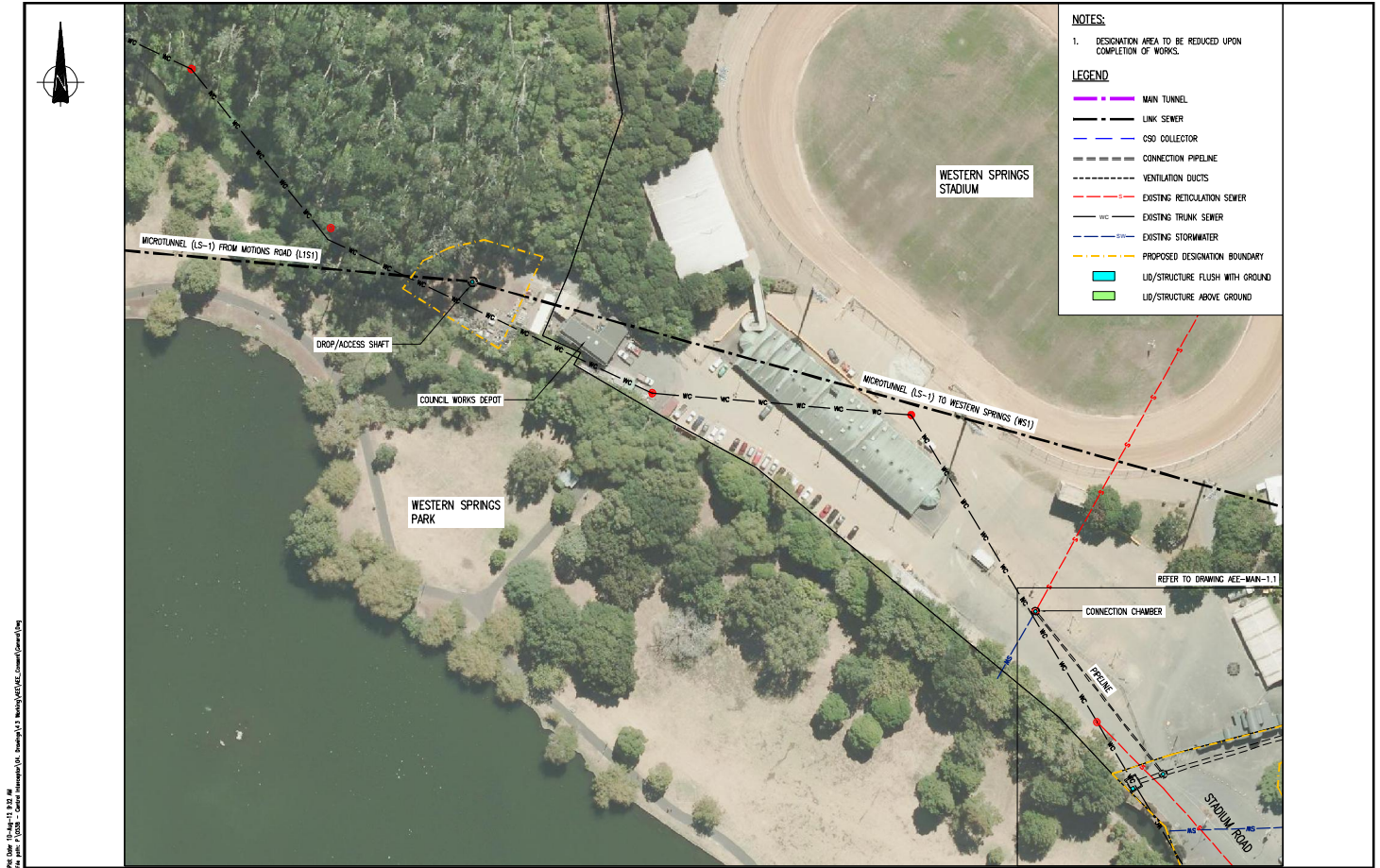


Figure 12-1 Location plan

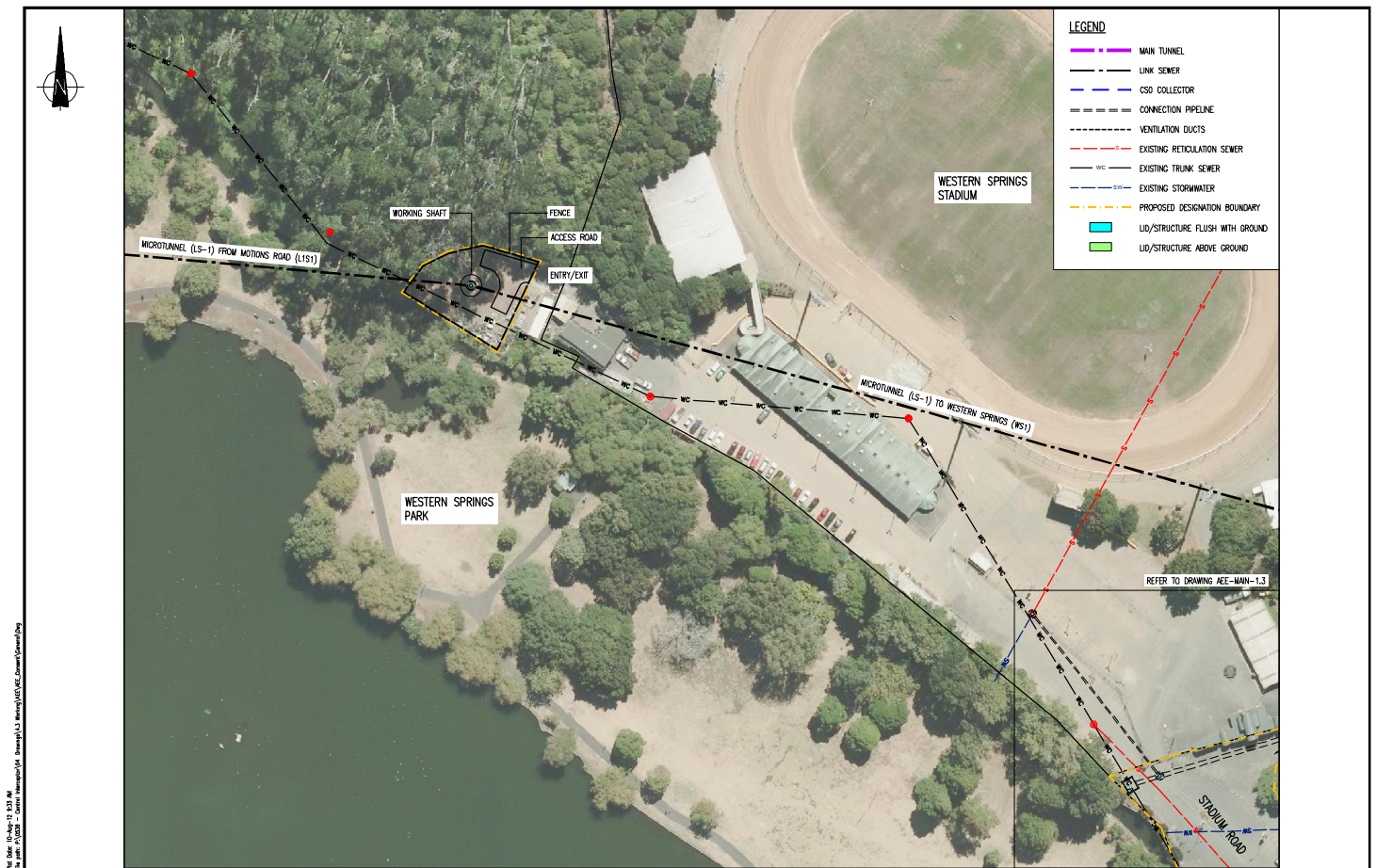
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Photograph 12-1 Western Springs Depot proposed construction site



DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT		CENTRAL INTERCEPTOR GENERAL WESTERN SPRINGS DEPOT (L1S2) - PERMANENT WORKS PLAN	CAD FILE AEE-MAIN-12.1	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:10000 A3	0538
REV'D. P. MGR.		JS				DRAWING No.	ISSUE	
APPRO. P. DIR.		CC				AEE-MAIN-12.1	A	
ISSUE	DATE	AMENDMENT	BY	APPRO.	DATE			
A	17/06/12	CONSENT ISSUE		AP	17/06/12			



DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT		CENTRAL INTERCEPTOR GENERAL WESTERN SPRINGS DEPOT (L1S2) - CONSTRUCTION WORKS PLAN	CAD FILE AEE-MAIN-12.2	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:10000 A3	0538
REV'D. P. MGR.		JS				DRAWING No.	ISSUE	
APPRO. P. DIR.		CC				AEE-MAIN-12.2	A	
ISSUE	DATE	AMENDMENT	BY	APPRO.	DATE			
A	17/06/12	CONSENT ISSUE		AP	17/06/12			

12.4.2 Construction works

Drawing reference	AEE-MAIN-12.2
Construction site area	Approx. 760 m ²
Duration of construction	6-8 months construction activities 2 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 10 m ID, 24 - 39 m deep construction shaft • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • Construction of permanent features – access shaft • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Site fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment plant • Wheel wash • Generator • Slurry separation plant • Storage areas for construction materials, including tunnel segment storage area • Ventilation plant • Spoil storage area

12.5 Assessment of effects

12.5.1 Landscape and visual effects

The site is not visible to the public as it is well screened from all views. During construction there will be a perimeter fence within the yard. The only permanent visible feature that will remain at the site is a shaft cover at ground level, flush with the adjacent surface. The area will be resealed/recompacted following completion of construction works. Therefore no temporary or permanent effects are expected on open space and landscape character or on visual amenity.

12.5.2 Recreation and public access effects

Effects on recreation and public access are expected to be no more than minor. The site is located away from the recreation areas of the park and will not be visible to the public. Effects due to traffic using Stadium Road will be addressed as described in Section 12.5.5 below.

12.5.3 Vegetation and ecological effects

There is an area of native vegetation and pines located behind the existing fence. It is not anticipated that any vegetation will require removal. Some trees overhanging the site may require minor pruning, and this is not likely to adversely affect the health of the trees. Roots are not expected to be present, but this will be confirmed during initial excavations and appropriate measures taken in accordance with good arboricultural practices if necessary.

The depot yard has low ecological value. The ecological effects as a result of the proposed works are expected to be less than minor.

12.5.4 Archaeological effects

The Western Springs area was an area of Maori settlement and 19th century industrial development. No archaeological or heritage sites are recorded within the construction area and the site is located within a paved carpark. However, there is some potential for discovery of unrecorded archaeological remains. To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

12.5.5 Traffic effects

12.5.5.1 Existing environment

Site entry is proposed to be from Stadium Road. The characteristics of the surrounding roads are summarised below:

- Stadium Road:
 - Is part of Lot 12 DP 168863, owned by Regional Facilities Auckland.
 - Is a Local Road in the Auckland City District Plan.
 - Serves as a feeder road for the Western Springs Stadium parking area, as well as a parking area for MOTAT and the Western Springs playing fields.
- Great North Road:
 - Is a District Arterial Road in the Auckland City District Plan.
 - Forms a signalised intersection with Stadium Road and SH16 eastbound on/off ramps at Western Springs/MOTAT to the western edge of the site.

12.5.5.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

Site vehicles will gain access via the existing access road into the Stadium car park at the end of Stadium Road. The access path to the Depot will be restricted to one lane only and traffic controls will be implemented to direct opposing traffic.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected. To mitigate effects on Western Springs Stadium, it is proposed to restrict heavy vehicle movements during major events occurring at the stadium.

It is proposed to upgrade Stadium Road to ensure the safety of school children being dropped off at the MOTAT entrance on Stadium Road. This will include a 2 m footpath on the western side of Stadium Road, a bus drop-off area on the western kerb, and widening of Stadium Road on the eastern side by reducing the existing footpath width (to avoid additional encroachment on trees).

The construction works at the Western Springs Depot site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period with mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

12.5.5.3 Traffic effects arising from permanent works

Traffic generation post construction for normal operation, inspection and maintenance will be very infrequent.

12.5.6 Noise effects

12.5.6.1 Existing environment

The nearest residential receivers are located on West View Road, approximately 160 m to the north west of the site centre.

Currently the surrounding ambient noise environment is characterised by urban hum, contributed to by distant traffic noise from the north western motorway, located approximately 400 metres to the south and noise from nearby Auckland Zoo to the west. An ambient noise level of 44 dB L_{Aeq} was measured on 12 May 2011 during the day time.

12.5.6.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations. Surface construction works will generally be undertaken during the hours of 7 am and 6 pm Monday to Friday and 8 am to 6 pm Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A. Measures will be undertaken to limit noise generation, such as avoiding noise intensive construction work during night time and on Sundays.

The predicted construction noise levels at the closest noise sensitive receivers are expected to be compliant with the Construction Noise Standard. Noise levels at the closest noise sensitive receivers (on Old Mill Rd and Westview Rd) are expected to be typically between 16 to 42 dB L_{Aeq} .

If blasting is required through basalt, controlled blasting techniques would be used to limit noise to comply with the Construction Noise Standard. Preparation works for setting blast charges are not expected to exceed the Construction Noise Standard at the nearest residential receiver, but if noise from this preparatory work becomes an issue, the process would be managed through the construction noise management plan to mitigate effects on nearby receivers.

A draft construction noise management plan has been prepared (refer Part D Technical Report F).

12.5.6.3 Operational noise effects

Little operational noise is expected from the access shaft and operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) with no mitigation measures necessary.

12.5.7 Vibration effects

Most construction activities will only give rise to low levels of vibration. If excavations through basalt are required, this has the potential to generate higher levels of vibration, and there is the potential that controlled blasting may be required. No damage to structures due to vibrations is expected, but there may be some short term disturbance of people at the Council Works Depot. A number of mitigation methods are available to manage effects, as described in the Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of people is expected to occur, having confirmed the construction methodology, Watercare will implement appropriate measures to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

12.5.8 Odour effects

The access shaft to be located at the site is not likely to be a significant source of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Therefore adverse effects due to discharges of odour are unlikely to occur.

12.5.9 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage

erosion and sediment and stormwater include stabilised clean water diversions and a silt fence. The sediment control measures will reduce the total suspended solids in the stormwater prior to entering existing overland flows. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

12.5.10 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. Results suggest potential for low levels of contamination across the construction site. Council property files refer to the property and surrounding area as a rubbish tip/weak ground. The fill within the construction site is likely to comprise silt/clay. Potential contaminants would likely be metals, hydrocarbons, and asbestos containing material.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

12.5.11 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate construction methodology as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

12.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating the site adjacent to the Council depot, to the rear of the Western Springs main stage; and
- Locating the site within the storage yard to the rear of the depot.

Following selection of the proposed site in the Western Springs depot yard, the layout has been developed to minimise the effects of the site, particularly during events at Western Springs Stadium.

Figures showing the sites and layout alternatives are located at the end of this section.

12.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

Effects on amenity within the reserve are expected to be no more than minor. Effects on the Stadium, particularly related to traffic and parking, will need to be managed in consultation with the landowner (Regional Facilities Auckland) and site users, and through the implementation of a construction traffic management plan. There are no immediately adjacent neighbours, with the nearest residential property located over 150 m from the site. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and pedestrian access will be maintained.

The permanent works will largely be below ground and only covers will be visible at the surface and no effects on landscape character or visual amenity are expected.

Western Springs Depot alternative sites and layouts

Comment on alternative	
<p>Site location restricts use of area for staging during events at Western Springs Stadium</p>	<p>NOTES: 1. PLAN SHOWS EXISTING LAYOUT REQUIRED FOR THE WATER TUNNEL, GAS COLLECTOR AND CONNECTION PIPELINE. FINAL LAYOUT OF THE WATER TUNNEL, GAS COLLECTOR AND CONNECTION PIPELINE WILL BE DETERMINED BY THE HYDROLOGICIST.</p> <p>LEGEND: - - - - - WATER TUNNEL - - - - - GAS COLLECTOR - - - - - CONNECTION PIPELINE - - - - - VENTILATION DUCTS - - - - - EXISTING RETICULATION SENSOR - - - - - EXISTING TRUNK SENSOR - - - - - EXISTING CONDUIT</p>

For the reason summarised above, this option was not pursued.

13.0 Rawalpindi Reserve (L2S1)

13.1 Introduction

The Rawalpindi Reserve L2S1 site is on the Link Sewer 2 alignment and is required to provide connections to the Orakei Main Sewer, the Branch 8 sewer and a local reticulation overflow. It is a secondary construction site and will be used for the launch/retrieval of the MTBM for Link Sewer 2.

The proposed works are shown on drawings AEE-MAIN-13.1 and 13.2 included in the A3 drawing set (Part C).

13.2 Location and site description

The Rawalpindi Reserve site is located at Rawalpindi Reserve, off Rawalpindi Street in Mt Albert. The construction site is located within the northern end of the reserve.

Rawalpindi Reserve is a grassed reserve, zoned Open Space 2 (informal recreation). The reserve slopes down towards Meola Creek which runs along the eastern boundary. There is an existing Watercare grit trap on the property (shown in the centre of Photograph 13-1). Within the reserve to the south of the proposed construction area is a children's playground. The reserve also contains a number of trees and other vegetation. The site is relatively well enclosed by rising landform to the west and vegetation along the banks of the creek and within the balance of the reserve, Chamberlain Park Golf Course (across the creek to the east and north of the reserve) and private properties.

To the west and south is residential land that is accessed off Rawalpindi Street, Fontenoy Street and Parkdale Road.

13.3 Land ownership and interests

Address	9a Rawalpindi Street, Mt Albert
Legal Description	1. Lot 32 DP 41107 2. n/a (Meola Creek)
Title Reference	1. NA26B/398 2. n/a
Owner	1. Auckland Council 2. The Crown (Meola Creek)
Reserve status	1. Recreation reserve
Local Board	Albert-Eden

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

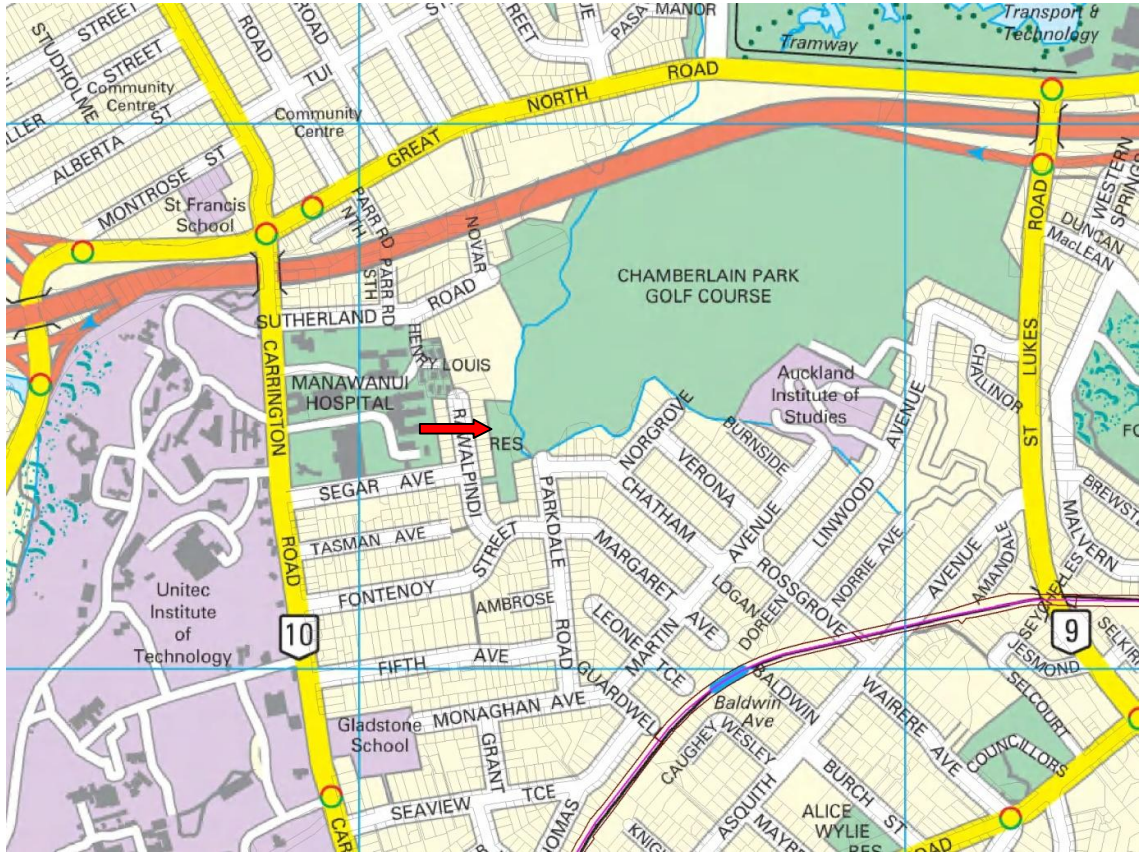


Figure 13-1 Location plan

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Photograph 13-1 Looking towards construction area, facing north



DESIGNED		08/12		REVISION	SITE LAYOUT OVERFLOW PIPELINE FROM LOCAL RETICULATION ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT	waterCare services limited	CENTRAL INTERCEPTOR GENERAL	RAWALPINDI RESERVE (L2S1) - PERMANENT WORKS PLAN	CAD FILE AEE-MAIN-13.1	DATE 26-JUL-12
DES. CHECKED		08/12							ORIGINAL SCALE A1	CONTRACT No.
DRAWN		08/12							1:10000 A3	0538
REV'D P.MGR									DRAWING No.	ISSUE
APPROV. P.DIR									AEE-MAIN-13.1	A
ISSUE	DATE	AMENDMENT	BY	APPROV.	DATE	REVISION				
A	17/08/12	CONSENT ISSUE								



DESIGNED		08/12		REVISION	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT	waterCare services limited	CENTRAL INTERCEPTOR GENERAL	RAWALPINDI RESERVE (L2S1) - CONSTRUCTION WORKS PLAN	CAD FILE AEE-MAIN-13.2	DATE 26-JUL-12
DES. CHECKED		08/12							ORIGINAL SCALE A1	CONTRACT No.
DRAWN		08/12							1:10000 A3	0538
REV'D P.MGR									DRAWING No.	ISSUE
APPROV. P.DIR									AEE-MAIN-13.2	A
ISSUE	DATE	AMENDMENT	BY	APPROV.	DATE	REVISION				
A	17/08/12	CONSENT ISSUE								



Existing View (from in front of playground looking North)



Proposed View - Indicative

13.4 Proposed works

13.4.1 Permanent works

Drawing reference	AEE-MAIN-13.1
Permanent works	<ul style="list-style-type: none"> • Link Sewer 2 • Connecting pipe to Orakei Main Sewer, Branch 8 Sewer, and local reticulation overflow • 7 m ID access/drop shaft (28 - 43 m deep) • Diversion chamber • Control chamber • Improved overflow pipe and outfall structure
Site reinstatement	<ul style="list-style-type: none"> • Contouring • Regrassing and replanting
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access extension to existing accessway from Rawalpindi Street. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Maintenance of control gates • Periodic emptying of existing grit trap (as currently occurs)

13.4.2 Construction works

Drawing reference	AEE-MAIN-13.2
Construction site area	Approx. 4800 m ²
Duration of construction ¹⁰	12 - 18 months construction activities 3 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Grading of land and construction of retaining wall • Shaft excavations: 10 m ID, 28 - 43 m deep construction shaft • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – drop shaft, diversion and control chambers • Site reinstatement (including reinstatement of ground profile)
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking,

¹⁰ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

	<p>workshop</p> <ul style="list-style-type: none"> • Crawler crane • Water treatment equipment • Wheel wash • Generator • Slurry separation equipment • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment
--	--

13.5 Assessment of effects

13.5.1 Landscape and visual effects

The site is relatively well screened from view by rising landform to the west and vegetation to the east which effectively obscures views from surrounding residential properties and the golf course across the creek. The site will be visible to those using the park and the playground.

Landscape and visual effects resulting from construction will be:

- Construction of a perimeter fence;
- Removal of trees and shrubs; and
- Construction activity and vehicle movements to and from the site visible from the playground and some adjoining properties.

Due to the sloping nature of the site it will be necessary to undertake grading of the site and construct a retaining wall.

Due to a large proportion of the open space in the northern part of the reserve being occupied during construction, the change in landscape character, and the proposed earthworks, temporary adverse effects on open space and landscape character are expected to be more than minor. Minor adverse visual effects are expected for users of the park and adjoining residents who may have partial views of the sites through trees.

The only permanent visible features that will remain at the site are a shaft cover and two chamber lids (at ground level, flush with the adjacent surface), as well as the existing grit chamber lid. The landform will be reinstated as agreed with Auckland Council and grassing and planting will be undertaken.

The long term effects of the permanent works will result in less than minor adverse visual effects.

A photomontage of the site before and after is shown on Figure 61 (from the landscape and visual assessment in Part D Technical Report A).

13.5.2 Recreation and public access effects

There will be an impact on amenity within the reserve during construction due to noise, traffic movements and structures. The construction area will also occupy much of the northern part of the reserve. However, these effects will be temporary, being limited to the duration of construction. The works will not physically impact on the playground and pedestrian access to the playground will be maintained parallel to the site access. However, due to potential safety impacts due to the restriction in visibility, it may be preferable to temporarily close the playground. This will be determined in consultation with Auckland Council.

13.5.3 Vegetation effects

The vegetation within the proposed works area is young to early mature. There are several large established trees within private properties adjacent to the reserve. Species include lemonwood, olive,

Pittosporum, privet, flax, monkey apple, Norfolk Island hibiscus, banksia, ash, Brazilian pepper, willow, feijoa, rhododendron, magnolia and Norfolk Island pine.

Vegetation removal will be required within the construction area and along the western boundary. Some specimens at the edge of the proposed works may be able to be retained and tree protection measures will be implemented where works are to occur in close proximity to retained trees.

The trees and vegetation proposed to be removed are not significant specimens and the majority are young small specimens. The effect of this vegetation removal would be less than minor and any effects can be mitigated by replanting and aftercare management.

Watercare will liaise with Auckland Council and the Albert-Eden Local Board to develop appropriate reinstatement works or planting at the site.

13.5.4 Ecological effects

The habitat type at the site is grass with some flax and exotic trees, and the site has low ecological value. Bird values at the site were recorded as being low. No native bird species were identified during the survey at the site, although tui are likely to regularly visit the site. Introduced species were blackbird, sparrow and magpie. The site is of low value as lizard habitat.

Vegetation within and on the edge of the construction footprint described above will be removed, however it has low ecological value. The loss of mown field habitat for bird feeding is expected to be of less than minor effect as ample habitat is available elsewhere. Overall the ecological effects on the site are expected to be less than minor.

13.5.5 Archaeological effects

No archaeological or heritage sites are recorded within the construction area and the site is located within a landscaped reserve. There is little potential for discovery of unrecorded archaeological remains.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

13.5.6 Traffic effects

13.5.6.1 Existing environment

Rawalpindi Street is a no-exit road of approximately 280 m, and is classified as a Local Road in the Auckland City District Plan. It connects with Fontenoy Street at the southern end.

13.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a "worst case" scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

Site access is proposed to be from Rawalpindi Street and alternative pedestrian access will be provided to the playground during construction.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at the Rawalpindi Reserve site are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

13.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

13.5.7 Noise effects

13.5.7.1 Existing environment

The nearest residential receivers are located on Rawalpindi Street, approximately 20 m to the west of the construction site boundary.

Currently the predominant noise source is traffic from Rawalpindi Street. An ambient noise level of 47 dB L_{Aeq} was measured on 12 May 2011 during the day time.

13.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling. Construction works will generally take place from 7 am to 6 pm Monday to Friday and 8 am to 6 pm Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A. Measures will be undertaken to limit noise generation, such as avoiding noise intensive construction work during night time and on Sundays.

With mitigation measures in place (a 2 m high noise barrier along the western side of the site), the predicted construction noise levels at the closest noise sensitive receivers are expected to be compliant with the Construction Noise Standard. Noise levels at the closest noise sensitive receivers (11, 19 and 29 Rawalpindi Street and 46 Parkdale Road) are expected to be typically between 26 to 69 dB L_{Aeq} .

13.5.7.3 Operational noise effects

Operational noise (including from overflows and grit trap cleaning) will be infrequent. Noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) with no mitigation measures necessary.

13.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. Although some activities may generate higher vibration levels at times (e.g. piling), given the distance to the nearest dwellings and the ground conditions, the effects of vibration at this site are expected to be less than minor.

13.5.9 Odour effects

The drop shaft and control chambers are not likely to be significant sources of odour and most of the time during normal operation adverse effects due to odour discharges are not expected to occur. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Therefore the adverse effects at this site are expected to be less than minor. The existing grit chamber is to be retained and will require periodic emptying as currently occurs, which is a potentially odorous activity, although it will be infrequent and of short duration with no more than minor localised adverse effects and already occurs. Although an existing overflow is to be retained and upgraded, this will operate at a lower frequency than the current overflows, reducing overall adverse odour effects.

13.5.10 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains and a decanting earth bund. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP. The decanting earth bund (DEB) outlet will discharge to

the nearby stream via a UPVC pipe. A pinned geotextile overlaid with large rock will break up the flow and minimise the potential for scouring and erosion.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

13.5.11 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The site appears to have been part of a reserve since 1940 with no significant visible change over time. The risk of significant contamination is considered to be low. Potential contaminants would likely be metals and nitrates.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

13.5.12 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. Construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

13.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating the shaft towards the north of Rawalpindi Reserve;
- Locating the shaft towards the south of Rawalpindi Reserve;
- Locating the shaft in Chamberlain Park Golf Course on the east side of the creek;
- Site layouts allowing for construction of a new grit trap facility; and
- Site layouts using the existing grit trap facility.

Following selection of the proposed site in the reserve, a number of modifications to the site layout have helped to minimise the effects of the site. The final layout includes:

- A condensed construction site area aligned to reduce the area used within the reserve; and
- Use of the existing grit trap facility rather than construction of a new one, to reduce the site footprint and construction effects.

Figures showing the sites and layout alternatives are located at the end of this section.

13.7 Conclusion



Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows. At this site, the overflow will operate less frequently, with consequent environmental benefits in Meola Creek.

There will be temporary effects on the general amenity of the reserve during construction and the works will occupy a large portion of the property. There are some residential properties along Rawalpindi Street that back onto the reserve and are located in relatively close proximity to the site where temporary effects on amenity may occur. It will be necessary to implement construction management measures, such as the use of a noise barrier, in order to minimise the effects of construction activities on these properties. The site is relatively well screened from view by

surrounding residential properties. Landscape and visual effects during construction will be mitigated by measures such as a perimeter fence and an alternative pedestrian path to the playground will be provided.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface. Watercare will develop site reinstatement details in consultation with Auckland Council and the Albert-Eden Local Board.

Rawalpindi Reserve alternative sites and layouts

Comment on alternative	
<p>Large site footprint required to construct new, large grit trap</p>	
<p>Site area reduced and shaft location shifted towards the south of the park</p>	

For the reasons summarised above, these options were not pursued.

14.0 Norgrove Avenue (L2S2)

14.1 Introduction

The Norgrove Avenue L2S2 site is on the Link Sewer 2 alignment and is required to connect to the Branch 8 Sewer and collect a local reticulation overflow. It is a secondary construction site and will be used for the launch/retrieval of the MTBM for Link Sewer 2.

The proposed works are shown on drawings AEE-MAIN-14.1 and 14.2 included in the A3 drawing set (Part C).

14.2 Location and site description

The Norgrove Avenue site is located at the northern end of Norgrove Avenue, Mt Albert. The construction site is located within the paved road reserve and an area of Open Space 2 (informal recreation) zoned reserve between the rear of houses on Verona Avenue and Chamberlain Park Golf Course.

The site is within a flat paved road at the point where the road ends in a dead-end. To the north the site slopes down to a vegetated area and a tributary of Meola Creek. Beyond this is the Chamberlain Park Golf Course. There is residential housing along both sides of Norgrove Avenue.

Three houses (at 16 Norgrove Avenue) obtain access from the end of Norgrove Avenue down a single driveway.

14.3 Land ownership and interests

Main site	
Address	Norgrove Avenue, Mt Albert
Legal Description	1. n/a (road reserve) 2. Part marked Plantation Reserve DP 16371
Title Reference	1. n/a (road reserve) 2. NA740/40
Owner	Auckland Council
Reserve status	2. For recreation ground
Local Board	Albert-Eden

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

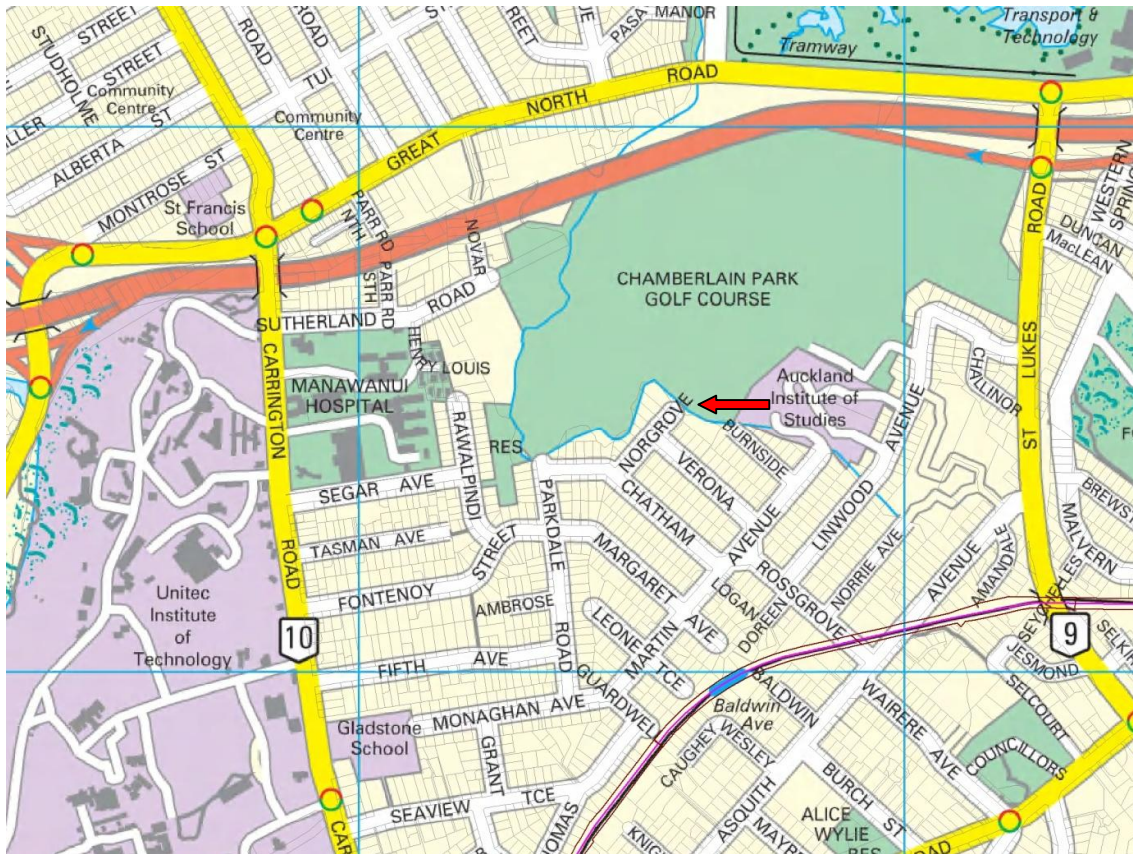


Figure 14-1 Location plan

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- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSD COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND

DESIGNED: JL DES. CHECKED: JS DRAWN: JL ENWG. CHECKED: JL REV'D. P. MGR: JS APP'D. P. DIR: JL BY: JL DATE: 08/12		SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012				CENTRAL INTERCEPTOR GENERAL NORGROVE AVENUE (L2S2) - PERMANENT WORKS PLAN		CAD FILE: AEE-MAIN-14.1 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
ISSUE: A DATE: 17/06/12 CONSENT ISSUE AMENDMENT:		AP: JL PR: JL APP'D. P. DIR: JL BY: JL DATE: 08/12		REVISIONS:		COPYRIGHT: The drawings, designs and specifications herein are the sole property of WaterCare Services Limited and may not be used without express copyright consent.		DRAWING No.: AEE-MAIN-14.1		ISSUE: A	



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSD COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND
 - PROPOSED NOISE BARRIER
 - MOBILE/TEMPORARY NOISE BARRIER

- NOTES:**
- MOBILE NOISE BARRIER USED TO SCREEN LOCAL PROPS AT REAR OF VERONA ST PROPERTIES.

DESIGNED: JL DES. CHECKED: JS DRAWN: JL ENWG. CHECKED: JL REV'D. P. MGR: JS APP'D. P. DIR: JL BY: JL DATE: 08/12		SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT AEE AUGUST 2012				CENTRAL INTERCEPTOR GENERAL NORGROVE AVENUE (L2S2) - CONSTRUCTION WORKS PLAN		CAD FILE: AEE-MAIN-14.2 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
ISSUE: A DATE: 17/06/12 CONSENT ISSUE AMENDMENT:		AP: JL PR: JL APP'D. P. DIR: JL BY: JL DATE: 08/12		REVISIONS:		COPYRIGHT: The drawings, designs and specifications herein are the sole property of WaterCare Services Limited and may not be used without express copyright consent.		DRAWING No.: AEE-MAIN-14.2		ISSUE: A	

14.4 Proposed works

14.4.1 Permanent works

Drawing reference	AEE-MAIN-14.1
Permanent works	<ul style="list-style-type: none"> • Link Sewer 2, CSO Collector CC3 • Control chamber • Overflow and outlet structure • 8 m ID access/drop shaft (30 – 45 m deep)
Site reinstatement	<ul style="list-style-type: none"> • Paving • Regrassing and replanting
Access requirements	<ul style="list-style-type: none"> • Paved access and all weather trafficable access via Norgrove Avenue. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of control gates

14.4.2 Construction works

Drawing reference	AEE-MAIN-14.2
Construction site area	Approx. 2,900 m ²
Duration of construction ¹¹	6 - 8 months construction activities 2 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 8.5 m ID 30 – 45 m deep construction shaft • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • Excavations for underground permanent works • Trenching of connections (CSO Collector CC3) • Construction of permanent features – drop shaft • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash • Generator • Slurry separation equipment

¹¹ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 6 – 8 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

	<ul style="list-style-type: none"> • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment
--	--

14.5 Assessment of effects

14.5.1 Landscape and visual effects

The small fenced construction area would be visible to a few residents at the northern end of Norgrove Avenue as they come and go from their property, and from the very front of their property. Views from within the houses on these properties appear to be well screened by vegetation.

Landscape and visual effects resulting from construction will be:

- Construction of a perimeter fence;
- Removal of a tree to provide continued access to 16 Norgrove Avenue;
- Removal of trees within construction area; and
- Construction activity and vehicle movements.

The temporary effects on open space and landscape character and on visual amenity would be minor due to the removal of vegetation and the visibility of the fence from the three properties immediately adjacent.

The only permanent visible features that will remain at the site are the shaft covers, located at ground level, flush with the adjacent surface. Ongoing landscape and visual effects due to the permanent structures will constitute low adverse to neutral effects (less than minor). The road will be resealed following completion of construction works and the berm grassed. Replacement planting will be undertaken to mitigate the effects of the removal of trees within the construction area.

14.5.2 Vegetation effects

There is a street tree (a Pittosporum) located outside 14 Norgrove Avenue. A hedge and a jacaranda are located along the boundary of 27 Verona Avenue. Between the houses on Verona Avenue and the stream there is a mix of native and exotic mature and early mature trees including lemonwood, willow, puriri, Queensland box, and Phoenix palm trees. Also present are woolly nightshade, poplar and tree privet.

The Pittosporum street tree will require removal, as will the trees within the construction area. This includes some established trees which will reduce the vegetative cover, although vegetation outside the area required for construction will remain. The effect of the vegetation removal will be mitigated by replanting and aftercare management. Trees on the edge of the construction area will be retained but may require some pruning.

Watercare will work with Auckland Council and the Albert-Eden Local Board to develop appropriate reinstatement planting.

14.5.3 Ecological effects

The habitat type at the site is pavement, grass, plantings and treeland and vegetation is of low ecological value. Bird values at the site are low with bird species identified at the site being shining cuckoo and grey warbler. Introduced species were blackbird and sparrow. The site is of low value as lizard habitat.

The site has low overall ecological value and the ecological effects of the proposed works at the site are expected to be less than minor.

14.5.4 Archaeological effects

No archaeological or heritage sites are recorded within the construction area and the site is partly located within a paved road. There is little potential for discovery of unrecorded archaeological remains.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

14.5.5 Traffic effects

14.5.5.1 Existing environment

Norgrove Avenue is classified as a Local Road in the Auckland City District Plan. It ends in a cul-de-sac at the north eastern end of the road. The road is an unmarked two-laned, two way street with on-street parking available on both sides of the carriageway. Verona Avenue intersects with Norgrove Avenue approximately 50 m from the northern end of the street.

14.5.5.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

There is limited site area available on Norgrove Avenue and it is unlikely that trucks will be able to turn around at the end of Norgrove Avenue. The western leg of Norgrove Avenue may be used to assist with trucks reversing into the site when accessing from Verona Avenue, to allow vehicles to forward exit.

The northern end of Norgrove Avenue is a cul-de-sac so no through traffic will be blocked by the proposed works. It will be necessary to provide alternative access to the private properties at 14 and 16 Norgrove Avenue. Figure 26 in Technical Report D of Part D, identifies alternative access via the footpath to these properties. Kerb-side parking on both sides of this end of Norgrove Avenue will be removed during the construction period. However, on-street parking on the remaining sections of Norgrove Avenue and nearby roads is readily available.

The construction works at the Norgrove Avenue site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period with mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

14.5.5.3 Traffic effects arising from permanent works

Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

14.5.6 Noise effects

14.5.6.1 Existing environment

The nearest residential receivers are located on Norgrove Road, approximately 14 m to the north west of the centre of the construction site.

Currently the predominant noise source is traffic from the north western motorway, located approximately 440 m to the north. An ambient noise level of 47 dB L_{Aeq} was measured on 12 May 2011 during the day time.

14.5.6.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling. Trenching will take place to create the CSO Collector Sewer CC3.

Construction works will generally take place from 7 am to 6 pm Monday to Friday and 8 am to 6 pm Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A. Measures will be undertaken to limit noise generation, such as avoiding noise intensive construction work during night time and on Sundays.

With mitigation measures in place (a 2.5 m high noise barrier around the southern perimeter of the site), the predicted construction noise levels at the closest noise sensitive receivers are expected to be compliant with the Construction Noise Standard. Noise levels at the closest noise sensitive receivers (16 Norgrove Ave, 20 Burnside Ave, and 23 and 27 Verona Ave) are expected to be typically between 25 to 69 dB L_{Aeq}. If sheet piling methods are used, noise levels may be higher, in which case management measures would be implemented through the construction noise management plan.

A draft construction noise management plan has been prepared (refer Part D Technical Report F).

14.5.6.3 Operational noise effects

Little operational noise is expected from the drop shaft (due to the movement of water) and operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) with no mitigation measures necessary.

14.5.7 Vibration effects

Most construction activities will only give rise to low levels of vibration. Some activities, e.g. piling, have the potential to generate higher levels of vibration. There is a low risk of vibration causing damage to the closest structures and there may be some short term disturbance of residents at 14 and 16 Norgrove Avenue and 27 Verona Avenue. A number of mitigation methods are available to manage effects, as described in Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

14.5.8 Odour effects

The drop shaft and connection chamber to be located at the site are not likely to be significant sources of odour and adverse effects are unlikely. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. The proposed new overflow will operate at a lower frequency than the existing overflow. Watercare's records indicate that there has been a history of odour complaints from the lower reaches of Branch 8. It is considered that the potential for adverse effects due to discharges of odour will be reduced compared to the current situation.

14.5.9 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains, a silt fence and decanting earth bunds. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the nearby stream, minimising effects on the receiving environment. Additional impervious area during construction will not be significant (approximately 850 m²). The temporary increase in volume of runoff to the stream is not expected to be significant compared with existing overland flows in the area. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

14.5.10 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. No information has been identified that indicates potential contamination of the road or reserve portion of the site.

14.5.11 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate design and construction methodologies as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

14.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft on the north bank of the creek within Chamberlain Park Golf Club; and
- Locating shaft at northern end of Norgrove Avenue and constructing CSO Collector.

A figure showing the site alternative on the northern side of the creek is located at the end of this section.


14.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There will be an effect on the general amenity of the reserve and neighbouring sites during construction. There are some residential properties located at the northern end of Norgrove Avenue (numbers 12 to 16), Verona Avenue (numbers 17 to 27) and 20 Burnside Avenue in relatively close proximity to the site. A noise barrier is proposed to mitigate noise levels and construction activities will be managed so as to mitigate the effects of vibration at the closest properties so that effects are minor. Construction works will be visible from residential areas, but these will generally be screened by the perimeter fence. Alternative access to the private properties at 14 and 16 Norgrove Avenue will be provided during construction and detailed traffic management for these accesses will be developed.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface. Watercare will develop site reinstatement details in the reserve in consultation with Auckland Council and Albert-Eden Local Board.

Norgrove Avenue alternative sites and layouts

Comment on alternative	
<p>Construction site requires work down steep bank</p> <p>Would require works on both sides of stream to connect to local overflow and access from multiple locations</p>	

For the reasons summarised above, this option was not pursued.

15.0 Pump Station 25 (Miranda Reserve) (L3S1)

15.1 Introduction

The Pump Station 25 (PS 25) L3S1 site is on the Link Sewer 3 alignment and is required to provide connections to the existing Western Interceptor, Titirangi Diversion Sewer, local reticulation and local reticulation overflows. It is a secondary construction site and will be used for the launch/retrieval of the MTBM for Link Sewer 3 and for construction of CSO Collector Sewer CC6A.

The proposed works are shown on drawings AEE-MAIN-15.1 and 15.2 included in the A3 drawing set (Part C).

15.2 Location and site description

The PS 25 site is located within Miranda Reserve off Miranda Street in New Windsor. The construction site is located at the western end of the reserve.

Miranda Reserve is a narrow linear reserve oriented in an east west direction, either side of a tributary of Whau Creek. Miranda Reserve is a grassed reserve, zoned Open Space 2 (informal recreation). There is continuous vegetation on both sides of the stream. Miranda Reserve provides a pedestrian connection to Blockhouse Bay Road in the east and to Wolverton Street in the west, via Miranda Street. There is an existing Watercare pump station at the site and the site is designated for this activity (G03-03). The pump station (also referred to as the St Georges Pump Station) has a brick facade and is approximately 20 m x 12 m footprint and around 4 - 5 m high. There is an adjacent bark bed biofilter and a valve chamber approximately 5 m x 6 m footprint and around 2 m high. An above ground sewer crosses the site running in a north west to south east direction.

The reserve is contained to the north and south by residential development, including a number of townhouses and a retirement village development. Overhead high-voltage power lines cross the reserve in an approximately east west direction.

15.3 Land ownership and interests

Main Site	
Address	32B Miranda Street
Legal description	Lot 90 DP 39331
Title reference	NA26B/363
Owner	Auckland Council
Reserve status	Recreation Reserve
Local Board	Whau

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

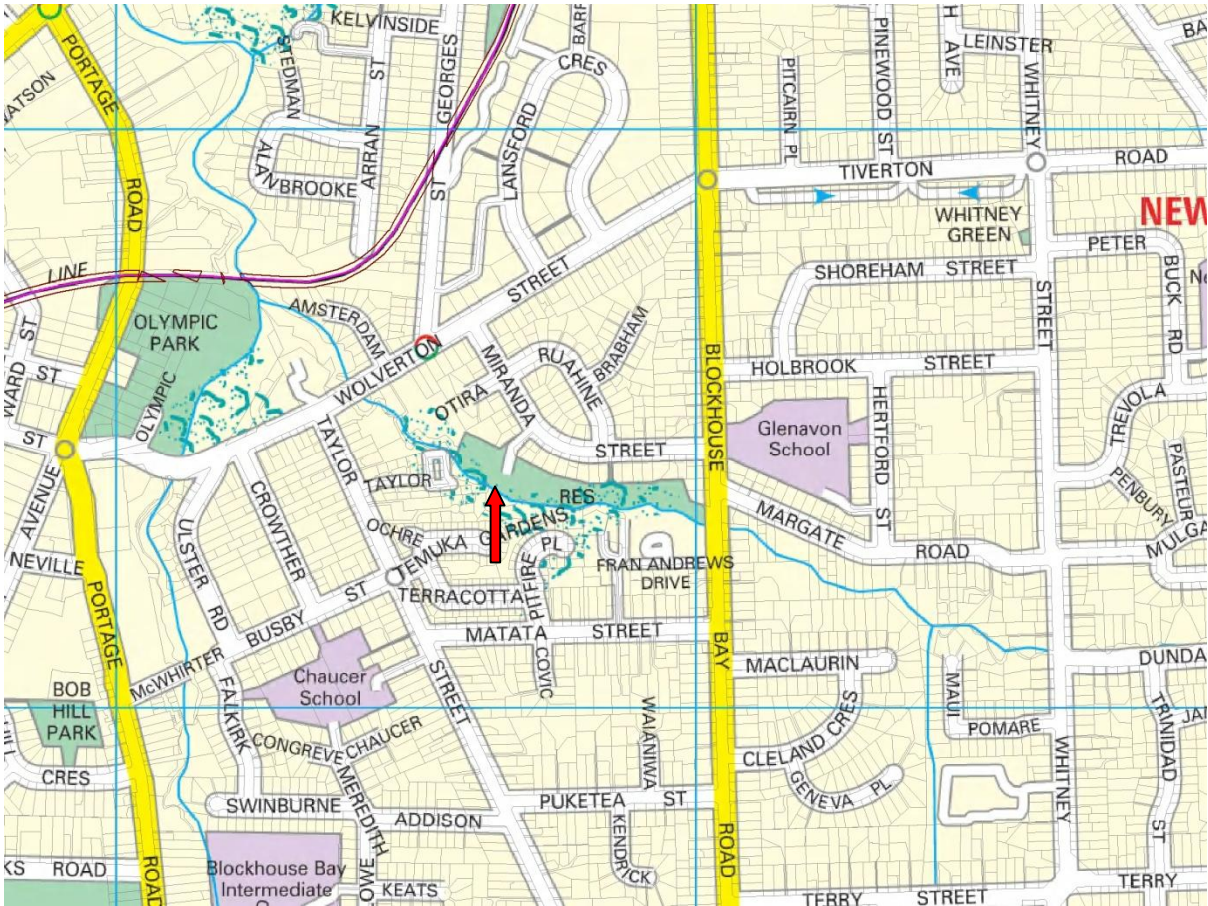


Figure 15-1 Location plan

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Photograph 15-1 Construction area, showing existing pump station building and above ground sewer



Photograph 15-2 Existing valve chamber



- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSD COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND

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ISSUE	DATE	AMENDMENT	AP	PR	APPRO. P. DIR.	CC	BY	DATE	REVISION
A	17/08/12	CONSENT ISSUE							

DESIGNED: NL
 DES. CHECKED: JS
 DRAWN: JL
 ENVS. CHECKED: JL
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REVISION

SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT

AEE AUGUST 2012



CENTRAL INTERCEPTOR GENERAL
PS25 (L31) - PERMANENT WORKS PLAN

CAD FILE: AEE-MAIN-15.1	DATE: 26-JUL-12
ORIGINAL SCALE: A1	CONTRACT No.: 0538
DRAWING No.: AEE-MAIN-15.1	ISSUE: A



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSD COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LD/STRUCTURE FLUSH WITH GROUND
 - LD/STRUCTURE ABOVE GROUND

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ISSUE	DATE	AMENDMENT	AP	PR	APPRO. P. DIR.	CC	BY	DATE	REVISION
A	17/08/12	CONSENT ISSUE							

DESIGNED: NL
 DES. CHECKED: JS
 DRAWN: JL
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08/12
 08/12

REVISION

SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT

AEE AUGUST 2012

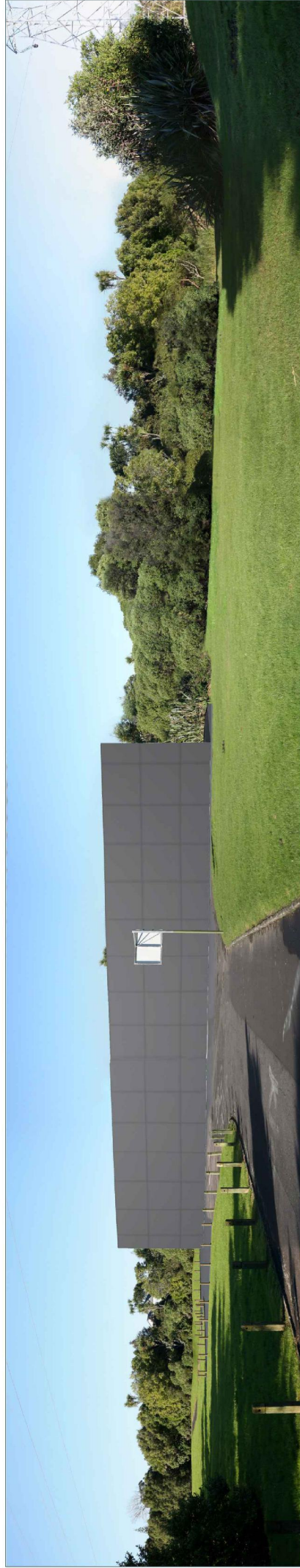


CENTRAL INTERCEPTOR GENERAL
PS25 (L31) - CONSTRUCTION WORKS PLAN

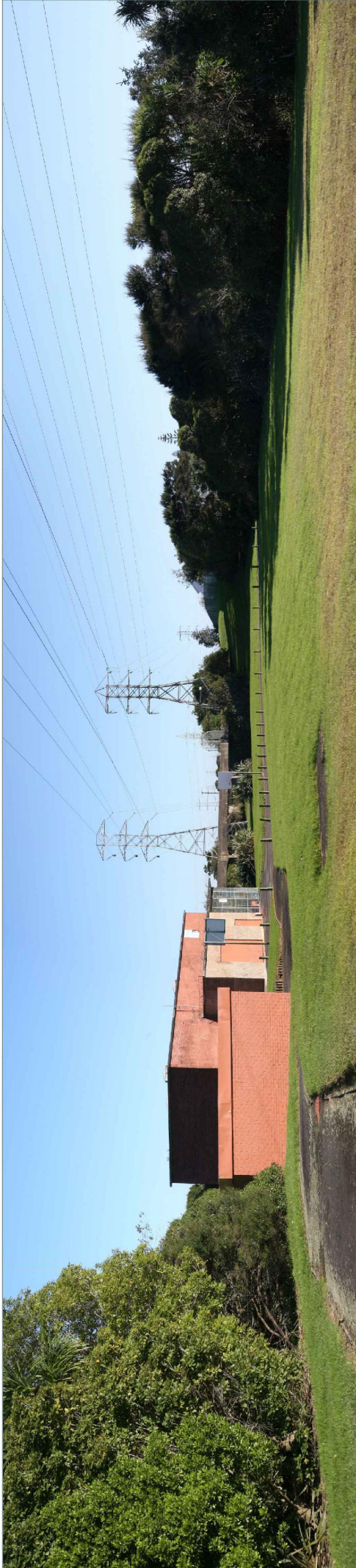
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ORIGINAL SCALE: A1	CONTRACT No.: 0538
DRAWING No.: AEE-MAIN-15.2	ISSUE: A



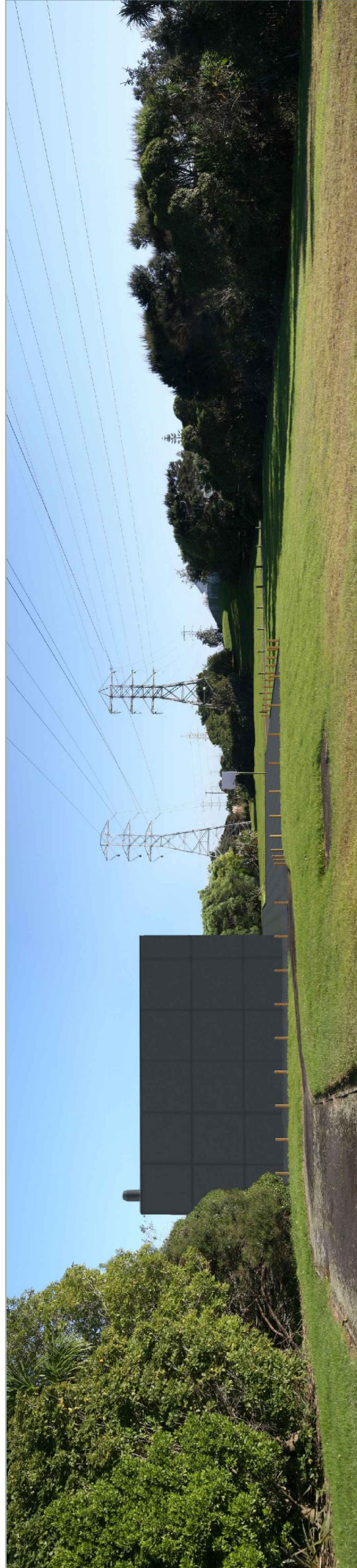
Existing View (From Miranda Street Access)



Proposed View - Indicative



Existing View (from Walkway to East of Pump Station)



Proposed View - Indicative

Viewpoint Details

Date of Photography: 10:10am, 30 June 2011
Data Sources: AECOM, AECOM site (IDAR (Nov. 2010), Auckland Council aerials (2008), BML)

Note - Photomontages are indicative of the Permanent Works. Fields of view have been set up to accurately represent the Preliminary Concept Design for each site and its surrounds. Given the indicative nature of the photomontages, the client should be aware that there may be differences between each photomontage and has not been noted.

15.4 Proposed works

15.4.1 Permanent works

Drawing reference	AEE-MAIN-15.1
Permanent works	<ul style="list-style-type: none"> • Link Sewer 3, CSO Collector Sewer CC6A and CC6A6 • Connecting pipes to Western Interceptor, Titirangi Diversion Sewer and local reticulation overflow • 8 m ID access/drop shaft (28 - 43 m deep) • CSO Collector shaft • Control chamber • Grit trap • Air treatment facility and air vent • Air intake
Site reinstatement	<ul style="list-style-type: none"> • Regrassing and replanting
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access extension to existing accessway via Miranda Street. Access required approximately once a week (or less frequent without ATF).
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection • Maintenance of control gates • Periodic emptying of grit trap • Maintenance of air treatment facility

15.4.2 Construction works

Drawing reference	AEE-MAIN-15.2
Construction site area	Approx. 5,800 m ²
Duration of construction ¹²	12 - 18 months construction activities 2-3 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Retaining wall • Shaft excavations: 8 m ID, 28 - 43 m deep construction shaft (main works); Shaft excavations: 7 m ID for CSO Collector Sewer shaft • Demolition of existing pump station and valve chamber • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage (main works) • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment

¹² The "occupation" period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 12 – 18 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

	<p>handling and storage (CSO Collector Sewer works)</p> <ul style="list-style-type: none"> • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – drop shaft, control chamber, grit chamber • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash • Generator • Slurry separation equipment • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment

15.4.3 Air treatment facility

Initially, it is not expected that an air treatment facility (ATF) will be required, but space has been allowed for and it is intended to be provided for within the designation, in the event that it is required.. If an ATF is determined to be required after a period of scheme operation, it is likely that this would either be a wet weather flow (secondary) air treatment facility 30 x 15 m, around 5 m high or a dry weather (primary) facility 40 x 15 m, around 8 m high. The associated ventilation stack would be approximately 1 m high and 0.9 m diameter, extending from the top of the building. The final design will be developed at a later stage, if the ATF is required, and details will be provided in an Outline Plan of Works.

15.5 Assessment of effects

15.5.1 Landscape and visual effects

From the north the construction site will largely only be visible to park users, as vegetation on the boundary of the reserve and private properties screen views. From the south, residents may have views across the gully. Much of these views are currently screened by existing vegetation.

Landscape and visual effects resulting from construction will be:

- Removal of native riparian vegetation;
- Removal of vegetation (flax) around the existing above ground sewer;
- Pruning of native vegetation along driveway to enable site access;
- Earthworks to provide access for chamber and shaft construction; and
- Construction of a perimeter fence.

The works, particularly vegetation removal, are expected to have minor short term adverse effects on open space and landscape character. For some houses across the creek that have views of the site there will be more than minor short-term adverse effects on visual amenity.

Revegetation of areas not required for permanent works will be undertaken following completion of construction.

Permanent at-grade works will comprise shaft cover, grit chamber and control chamber covers and a site accessway. A retaining wall will be constructed to stabilise the slope in parts of the southern part of the construction area and this will remain on a permanent basis. Above ground structures comprise the air treatment facility building and air vent. Existing structures will be demolished. The existing above ground sewer at the site is expected to be removed and replaced with a below ground pipeline as part of separate works to be undertaken by Watercare, prior to construction of the Central Interceptor works.

Once construction is completed and the revegetated area is established, the permanent works, with an appropriately designed ATF (if constructed) will have less than minor adverse effects on open space and landscape character and on visual amenity.

A photomontage of the site before and after is shown on Figures 70 and 71 (from the landscape and visual assessment in Part D Technical Report A).

15.5.2 Recreation and public access effects

There will be some impact on amenity during construction due to construction noise, traffic movements and construction structures. The construction area will impinge on the pedestrian accessway. Temporary pedestrian access will be provided around the fenced area to maintain the existing east west connection through the reserve or otherwise provided via the existing pedestrian accessway between 14 and 16 Miranda Street.

A basketball hoop at the site will also be removed. Reinstatement options for the reserve will be worked through with Auckland Council and Whau Local Board.

15.5.3 Vegetation effects

15.5.3.1 Existing environment

The construction area contains an area of native vegetation adjacent to the Whau Creek tributary. It consists of predominantly maturing historic plantings together with what appears to be a small remnant of native bush and shrublands. The canopy is somewhat broken and patchy, but where it is coherent it is characterised by ngaio (planted) kohuhu (probably planted), mapou (abundant throughout), mahoe, ponga, pigeonwood and exotic trees (i.e. woolly nightshade, Chinese privet, Sydney golden wattle and brush wattle). Other species appearing in the understorey include much mapou, together with mahoe, akeake, kumarahou, hangehange, karaka, flax and bracken. Weeds are plentiful in the mid and ground tiers, and include pampas, wandering jew, blackberry, smilax, inkweed, Chinese privet, montbretia, bindweed, thistle, Arum lily, asparagus fern, tree privet and nasturtium.

Adjacent to the site access from Miranda Street are semi established pohutukawa trees. Clumps of flax are present in the vicinity of the above ground sewer.

15.5.3.2 Effects on vegetation

An area of native vegetation within the construction works area will need to be removed. The removal of this vegetation is not significant in relation to the quantity of vegetation within the area. This vegetation is young to early mature and would be easy to replant. The effect of this vegetation removal would be less than minor and can be offset by replanting and aftercare management. The ecological effects of this vegetation removal are considered below.

Some pruning may be required where the pohutukawa overhang the accessway and the flax will be removed. Tree protection measures may be required where works are in close proximity to trees to be retained. Removal of fringe edge vegetation can have some adverse effects by exposing the remaining edge to winds and opening the ground area to sunlight. This can be addressed by appropriate aftercare management.

15.5.4 Ecological effects

15.5.4.1 Existing environment

The habitat type at the site is weedy native bush, plantings and grass. The vegetation is described in Section 15.5.3.1 above. The vegetation is of some botanical interest, but this is compromised to some degree by its generally weedy nature and the canopy is somewhat incoherent and patchy. The vegetation also has ecological value by virtue of its benefit to the stream and its contribution to local wildlife corridors. It is part of a larger corridor (although not fully connected) that stretches from the Whau River in the west to the Maungakiekie Golf Course in the east. The corridor varies in width and at Miranda Reserve it is generally at its widest, being around 40 m width and present on both sides of the stream.

The bush provides habitat for birds and fantail, silvereye, grey warbler, and kingfisher were found to be present at the site. Tui are expected to at least occasionally frequent the site and morepork may be resident. Blackbird, sparrow, chaffinch, and myna were also observed at the site.

The site also provides habitat for lizards. Copper skink (a non-threatened endemic species) was found to be present.

15.5.4.2 Ecological effects

Although there are issues with weed infestation within the vegetation to be removed, the loss of vegetation is considered to be an adverse ecological effect of a more than minor nature which will be mitigated by replanting. Watercare will work with Auckland Council and the Whau Local Board to develop appropriate reinstatement planting to mitigate effects.

Although most disturbance will occur during construction, permanent structures will remain and occupy space, resulting in a permanent (albeit small) reduction in corridor width. It is considered that both the temporary effects and permanent effects of the proposed works at this site constitute adverse effects on the ecological corridor that are more than minor.

A number of native bird species were noted as being present at the site and consequently bird values are considered to be moderate. With respect to the possibility of noticeable adverse effects in relation to avifauna due to the loss of bush at this site, the majority of the bird species observed utilising the area were introduced passerines and the extent of bush loss is relatively small in the context of the wider vegetated corridor. It is considered that ample alternative bush habitat is available to the extent that the proposed works are expected to result in less than minor effects on avifauna.

The site is also of high value as lizard habitat. Potential disturbance to lizards would be by way of both direct impacts (e.g. loss or degradation of habitat) and indirect impacts (e.g. effective loss of habitat as a result of noise; potentially greater abundance of predators such as rats). With a salvage operation proposed for native lizards the effects on native lizards are unlikely to be more than minor.

15.5.5 Archaeological effects

No archaeological or heritage sites are recorded within the construction area and the site is located within a landscaped reserve. The area has been substantially developed previously and it is unlikely that any archaeological features or deposits would be encountered.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

15.5.6 Traffic effects

15.5.6.1 Existing environment

Miranda Street is a Local Road in the Auckland City District Plan and it primarily provides for property access. It links Wolverton Street and Blockhouse Bay Road.

15.5.6.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

Site access is proposed to be via the existing access road from Miranda Street. Truck routes will generally avoid uncontrolled right turns from Blockhouse Bay Road onto Miranda Street and from Miranda Street onto Wolverton Street.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The construction works at the PS 25 site are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

15.5.6.3 Traffic effects arising from permanent works

Some traffic movement is expected associated with ongoing operation, inspection and maintenance of site facilities, including the air treatment facility. Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per week.

15.5.7 Noise effects

15.5.7.1 Existing environment

The nearest residential receivers are located on Miranda Street, over 40 m to the north east of the site. Currently the predominant noise source is traffic from Miranda Street. An ambient noise level of 49 dB L_{Aeq} was measured on 17 May 2011 during the day time.

15.5.7.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling.

Construction works will generally take place from 7 am to 6 pm Monday to Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A. Measures will be undertaken to limit noise generation, such as avoiding noise intensive construction work during night time and on Sundays.

The predicted construction noise levels at the closest noise sensitive receivers are expected to be generally compliant with the Construction Noise Standard. Noise levels at the closest noise sensitive receivers (32A Miranda St, 16 Pitfire Place, 29 Temuka Gardens, Taylor Close) are expected to be typically between 43 to 79 dB L_{Aeq}. Noise levels may temporarily exceed the standards during trenching and during demolition works. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate effects.

15.5.7.3 Operational noise effects

The permanent works at the site (the air treatment facility and the air intake) may generate low noise levels due to the operation of fans etc. and movement of air. Noise levels from the air intake at nearby sites are predicted to be readily compliant with the proposed noise limits (refer proposed designation conditions and noise impact assessment in Part D Technical Report F). Air treatment facility noise levels will be compliant with mitigation measures in place (including an enclosure of appropriate materials and design). Noise levels from the air treatment facility are predicted to be between 33 and 37 dB L_{Aeq} at representative nearby dwellings.

15.5.8 Vibration effects

Most construction activities will only give rise to low levels of vibration. Although some activities may generate higher vibration levels at times (e.g. piling), given the distance to the nearest dwellings and the ground conditions, the effects of vibration at this site are expected to be less than minor.

15.5.9 Odour effects

The drop shaft and control chamber are unlikely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. However, the emptying and cleaning of grit traps, expected to be required approximately four times per year, is a potentially odorous activity. Given the proximity to houses there will be a significant risk of odour discharge from the emptying of grit traps causing localised short term adverse effects in the immediate area and consideration will need to be given to scheduling the activity to minimise effects on residents. The grit trap is located approximately 45 m from the nearest dwelling. Watercare operates numerous grit traps on the existing network and has extensive experience with their management. The activity will occur infrequently and for a short duration and the effects are not expected to be more than minor if appropriately managed.

An air intake vent has been allowed for at the site. Under normal operation when the system is under negative pressure emissions are not likely to occur. During heavy rainfall events that cause the main tunnel to fill and prevent air extraction and treatment at the Mangere ATF it is possible air may be discharged at this air intake. This would likely only occur around 6 to 8 times per annum. Meteorological conditions during such events are likely to result in effective and rapid dispersion of any odour. If a primary ATF is installed at this site, an air intake would no longer be required.

It is also noted that removal of the existing pump station will remove a potential odour source. The risk of occasional discharges during the emptying of the proposed grit trap is largely offset by the benefit arising from the removal of the pump station and overall the adverse odour effects at this location are likely to be no more than minor.

15.5.10 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The construction site has been part of a reserve since 1940, with buildings established after 1959. The risk of significant contamination is considered to be low. Potential contaminants would likely be metals, hydrocarbons and nitrates.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

15.5.11 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains and a sediment retention pond. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to Miranda Reserve Stream, minimising effects on the receiving environment. The temporary increase in volume of runoff to the stream due to additional impervious area is not expected to be significant compared with existing overland flows in the area. If required, erosion protection measures will be installed to minimise the risk of scouring and erosion at the discharge point. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

15.5.12 Effects of stormwater discharges from permanent works

The impervious area of the permanent works is expected to total approximately 1710 m². While the impervious area threshold will be exceeded by permanent works, the surfaces will be subject to low vehicle traffic volumes and there will be limited sources of contaminants. Drawing SW-MAIN-5 in the A3 drawing set contains indicative stormwater management measures for the site. These include construction of a proprietary treatment device for stormwater treatment prior to discharge into the existing stormwater network.

Permanent stormwater management for this site will be confirmed in the detailed design process, and will be consistent with TP 10.

15.5.13 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate design and construction methodologies as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

15.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating the shaft on the north eastern side of the existing pump station; and
- Locating the shaft to the rear of the existing pump station site;

Following selection of the proposed site to the rear of the existing pump station, a number of modifications to the site layout have helped to minimise the effects of the site and to accommodate features required to be constructed.

The final layout includes:

- A condensed construction site area that avoids the overhead power lines;
- Removal of the existing pump station; and
- Maintenance of access through the reserve.

Figures showing the sites and layout alternatives are located at the end of this section.

15.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.



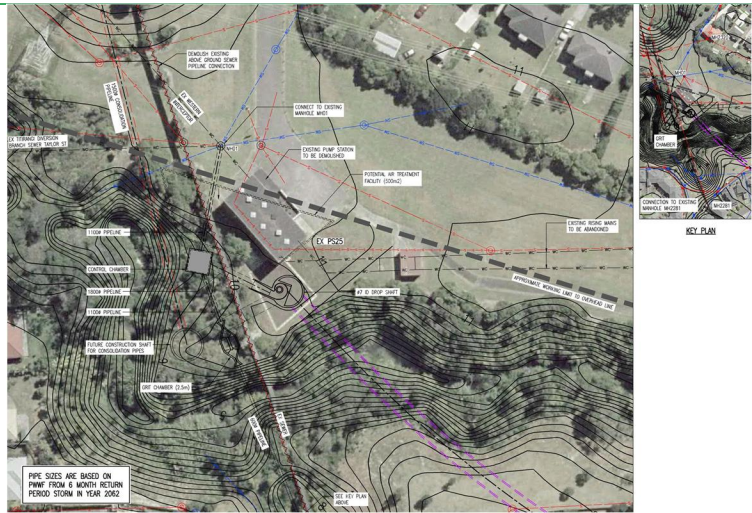
Construction activities will have an impact on the amenity and recreation value of the reserve. Alternative pedestrian access will be provided so that connections through the reserve are not lost. The closest dwellings are on Miranda Street to the north of the construction site and across the Creek to the south on Temuka Gardens and Pitfire Place and some effects on residential amenity are expected. Noise levels are expected to generally comply with the Construction Noise Standard and noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate noise effects. Much of the site is screened from views of neighbouring residents. There may be short term adverse visual effects of a more than minor nature for some nearby residents, but the long term effects of the permanent works are expected to be less than minor.

There are overhead transmission lines in the vicinity of the works. As addressed in Section 12.18 of Part A, where works are required within the 12 m overhead line corridor, appropriate measures will be implemented where required and works will be undertaken in accordance with Transpower guidelines.

The site is already occupied by existing Watercare facilities and the permanent features will be generally in the same area as the existing facilities, although of a more extensive nature if the ATF is constructed. The vegetation removal will result in adverse visual and ecological effects until replanting becomes established. Site details and reinstatement options will be worked through with Auckland Council and Whau Local Board to ensure that the long term impacts at the site are minimised.

The site is of moderate ecological value in terms of its vegetation and value as habitat for birds and of moderate to high value as habitat for lizards. Measures will be taken to mitigate the ecological effects of the proposed works including replanting and the salvage of native lizards.

PS 25 (Miranda Reserve) alternative sites and layouts

Comment on alternative	
<p>Shaft located centrally within the park</p> <p>Large construction footprint and close proximity to overhead lines and residential properties</p>	
<p>Shaft located centrally within the park</p> <p>Close proximity to overhead lines and residential properties</p>	
<p>Shaft located at the rear of the site. Reduces impact on grassed area of park.</p> <p>Increased distance between residential properties and construction activities</p>	

For the reasons summarised above, these options were not pursued.

16.0 Miranda Reserve (L3S2)

16.1 Introduction

The Miranda Reserve L3S2 site is on the Link Sewer 3 alignment and is required for link sewer construction and to connect to CSO Collector CC7. It is a secondary construction site and will be used for the launch/retrieval of the MTBM for Link Sewer 3.

The proposed works are shown on drawings AEE-MAIN-16.1 and 16.2 included in the A3 drawing set (Part C).

16.2 Location and site description

The Miranda Reserve site is located within Miranda Reserve, accessed off Blockhouse Bay Road in New Windsor. The construction site is located at the eastern end of the reserve.

Miranda Reserve is a narrow linear reserve oriented in an east west direction, either side of a tributary of Whau Creek. Miranda Reserve is a grassed reserve, zoned Open Space 2 (informal recreation). There is a children's playground in the location of the proposed construction site. There is continuous vegetation on both sides of the stream. Miranda Reserve provides a pedestrian connection to Blockhouse Bay Road in the east and to Wolverton Street in the west, via Miranda Street.

At this eastern end of the reserve there is residential land to the north and south and across the other side of Blockhouse Bay Road to the east. Views into the site are largely restricted by vegetation within the reserve, apart from where it is open to the road. An access path branches off the main east-west path towards the playground. Overhead high-voltage power lines cross the reserve to the north and south of the construction site.

16.3 Land ownership and interests

Main Site	
Address	32B Miranda Street
Legal description	Lot 90 DP 39331
Title reference	NA26B/363
Owner	Auckland Council
Reserve status	Recreation Reserve
Local Board	Whau

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

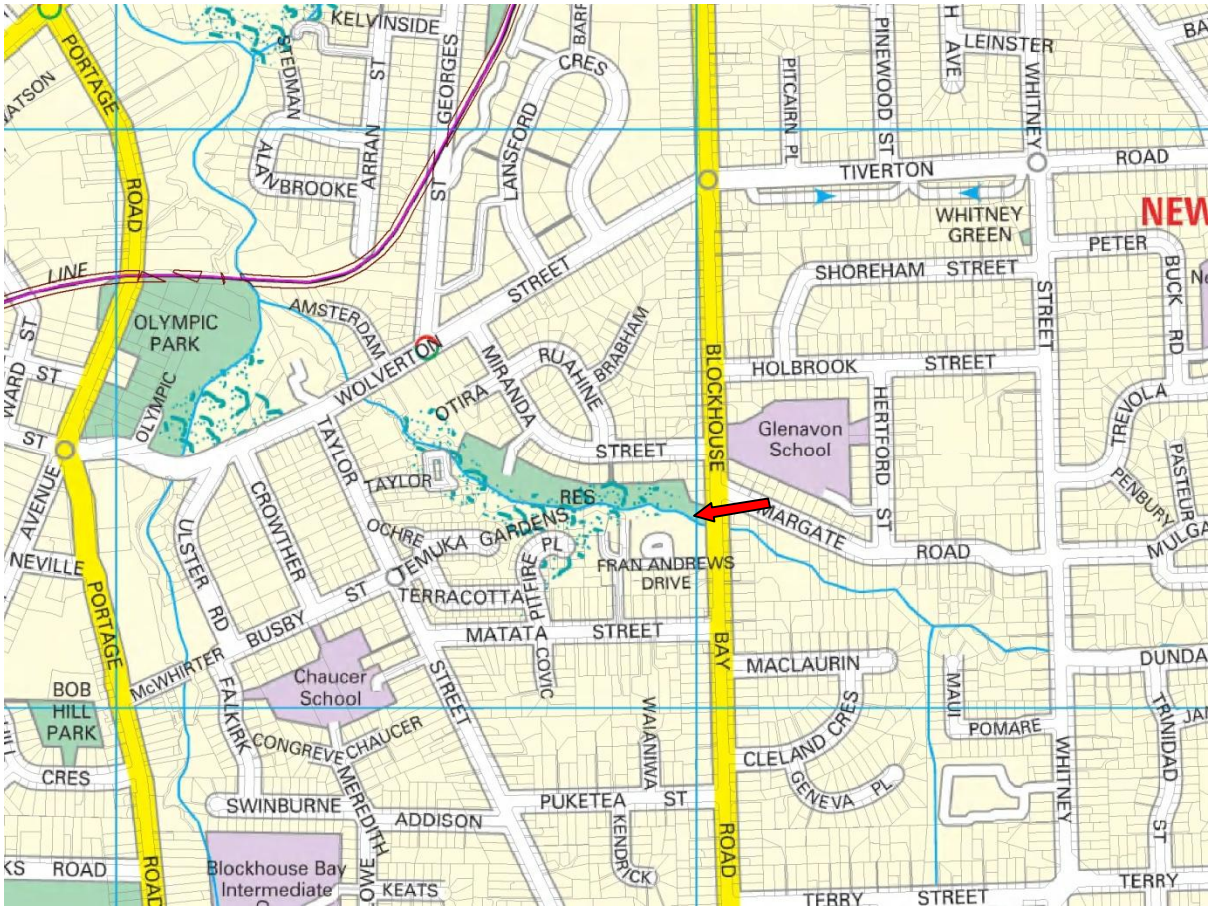
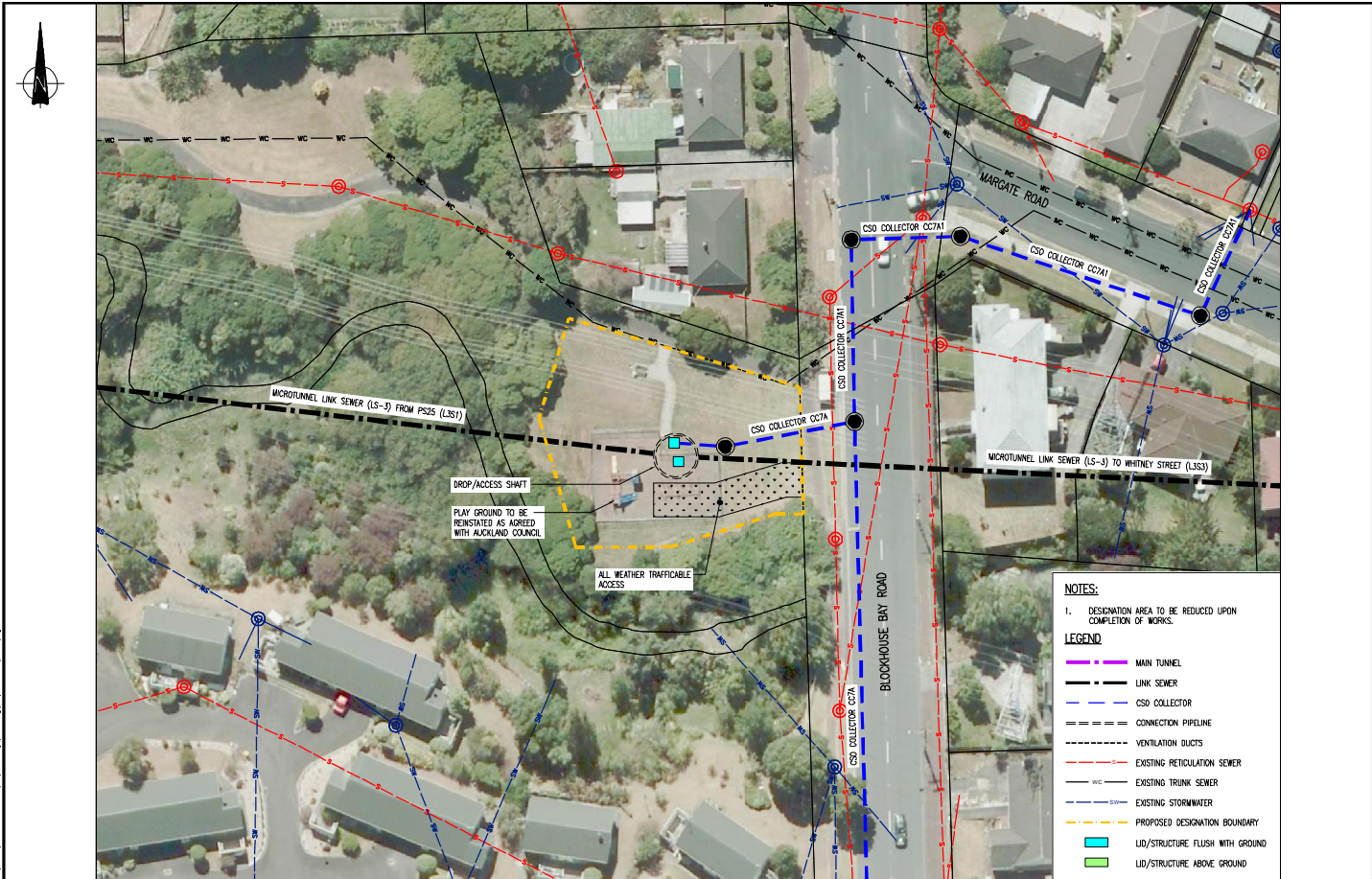


Figure 16-1 Location plan

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Photograph 16-1 Proposed construction site

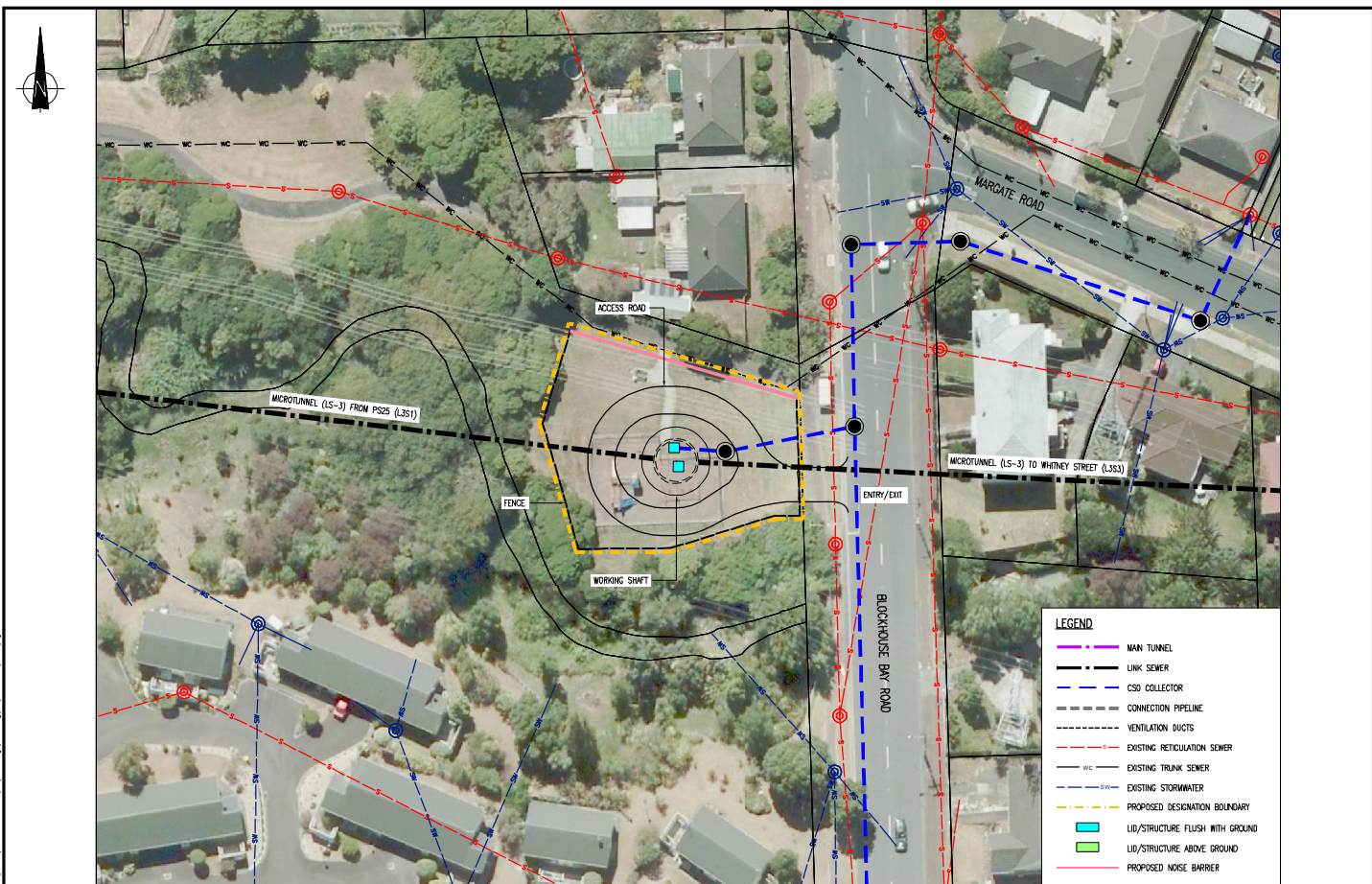


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DWG. CHECKED	JS	08/12	
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SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT
waterCare services limited
 CENTRAL INTERCEPTOR GENERAL
 MIRANDA RESERVE (L3S2) - PERMANENT WORKS PLAN
AEE AUGUST 2012

CAD FILE: AEE-MAIN-16.1
 ORIGINAL SCALE: A1
 DATE: 26-JUL-12
 CONTRACT No.: 0538
 DRAWING No.: AEE-MAIN-16.1
 ISSUE: A



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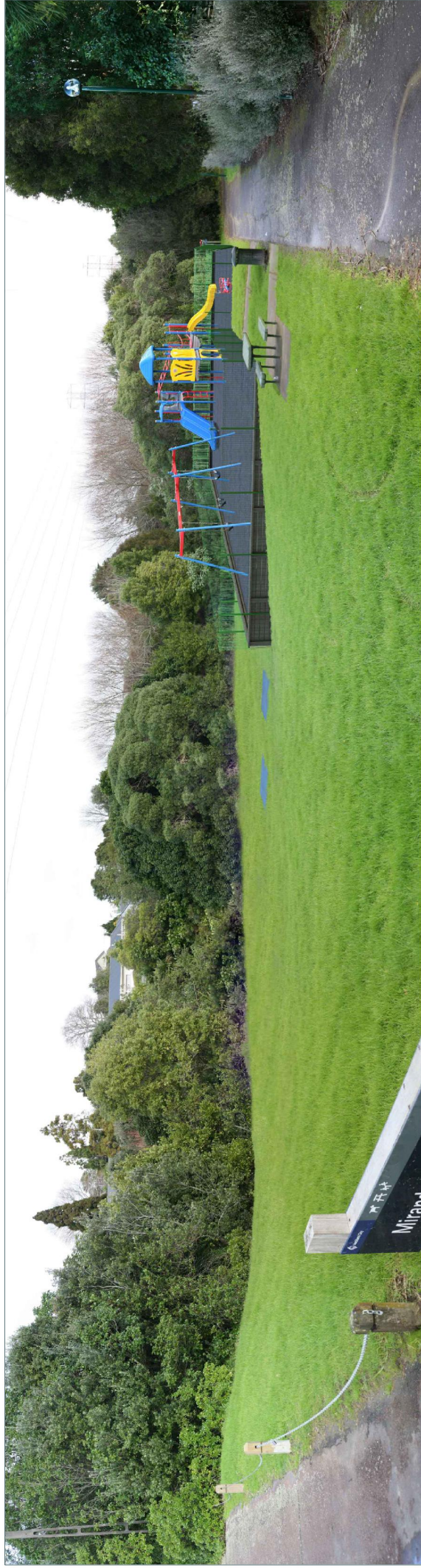
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SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT
waterCare services limited
 CENTRAL INTERCEPTOR GENERAL
 MIRANDA RESERVE (L3S2) - CONSTRUCTION WORKS PLAN
AEE AUGUST 2012

CAD FILE: AEE-MAIN-16.2
 ORIGINAL SCALE: A1
 DATE: 26-JUL-12
 CONTRACT No.: 0538
 DRAWING No.: AEE-MAIN-16.2
 ISSUE: A



Existing View (from Blockhouse Bay Road)



Proposed View - Indicative

16.4 Proposed works

16.4.1 Permanent works

Drawing reference	AEE-MAIN-16.1
Permanent works	<ul style="list-style-type: none"> • Link Sewer 3, CSO Collector CC7 • 6 m ID access/drop shaft (30 - 45 m deep)
Site reinstatement	<ul style="list-style-type: none"> • Reinstatement playground and park furniture • Regrassing
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via Blockhouse Bay Road. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection

16.4.2 Construction works

Drawing reference	AEE-MAIN-16.2
Construction site area	Approx. 1,000 m ²
Duration of construction ¹³	6 - 8 months construction activities 2 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 10 m ID, 30 - 45 m deep construction shaft • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • Trenching of connections (CSO Collector CC7) • Construction of permanent features – drop shaft • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash • Generator • Slurry separation equipment • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment

¹³ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 6 – 8 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

16.5 Assessment of effects

16.5.1 Landscape and visual effects

The site is visible from Blockhouse Bay Road and houses directly opposite where the reserve fronts the road and from within the reserve itself. The viewing audience includes passersby on the footpath and users of the walkway.

Landscape and visual effects resulting from construction will be:

- Removal of the playground for the duration of the works;
- Pruning of trees around the edge of the construction site;
- Construction of perimeter fence; and
- Construction activity and vehicle movements.

Temporary adverse effects on this area of the reserve would be more than minor during construction. Adverse visual effects on users of the park and houses located opposite the site would be minor.

Following construction the playground and footpath will be reinstated in the same or similar location as agreed with Auckland Council and disturbed ground repaired and regrassed.

The only permanent visible works will be a shaft cover (at ground level, flush with the adjacent surface) and the maintenance accessway. The permanent structures are flush with the ground and limited in scale and number. With the playground reinstated, adverse effects on open space and landscape character would be less than minor and effects on visual amenity would be neutral.

A photomontage of the site before and after is shown on Figure 76 (from the landscape and visual assessment in Part D Technical Report A).

16.5.2 Recreation and public access effects

There will be an effect on the recreational use of the reserve during the two year construction period due to the removal of the playground. However, the playground will be reinstated upon completion of the works. Pedestrian access will be maintained to Blockhouse Bay Road to maintain the existing east west connection through the reserve.

16.5.3 Vegetation and ecological effects

There are no trees within the construction works area, but there are a few trees that may overhang the edge of the construction area. These are a group of puriri/karo, a Pittosporum, and a ngaio.

The trees on the edge of the construction site may require pruning and some may need to be removed. This will have minimal effect on the overall vegetation cover and mulching and replanting may be undertaken if necessary to reduce the risk of edge effects on remaining vegetation due to pruning and removal of these trees. The vegetation modification is very minor.

The site is not of ecological value and the only bird species identified during the survey at the site was blackbird. There are not expected to be any ecological effects at this site.

16.5.4 Archaeological effects

No archaeological or heritage sites are recorded within the construction area and the site is located within a landscaped reserve. There is little potential for discovery of unrecorded archaeological remains.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

16.5.5 Traffic effects

16.5.5.1 Existing environment

Blockhouse Bay Road is a Collector Road in the Auckland City District Plan. It links Great North Road in the north with Donovan Street in the south. Blockhouse Bay Road intersects with Margate Road some 45 m north of the site.

There is a bus shelter directly in front of the site in the area where construction access is proposed.

16.5.5.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The bus shelter will require relocation to enable construction of the site accessway. There is adequate space for this to be shifted approximately 40 m to the south of its existing location. This is expected to have minimal effect on bus services and users.

The construction works at the Miranda Reserve site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

16.5.5.3 Traffic effects arising from permanent works

Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

16.5.6 Noise effects

16.5.6.1 Existing environment

The nearest residential receivers are located on Blockhouse Bay Road, over 20 m to the north of the proposed shaft location.

Currently the predominant noise source is traffic from Blockhouse Bay Road. An ambient noise level of 51 dB L_{Aeq} was measured on 12 May 2011 during the day time.

16.5.6.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling.

Construction works will generally take place from 7 am to 6 pm Monday to Friday and 8 am to 6 pm Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A. Measures will be undertaken to limit noise generation, such as avoiding noise intensive construction work during night time and on Sundays.

With mitigation measures in place at the main construction site (a 2 m high noise barrier along the northern edge of the site), the predicted construction noise levels at the closest noise sensitive receivers are expected to comply with the Construction Noise Standard. Noise levels at the closest noise sensitive receivers (337 and 356 Blockhouse Bay Road and property on Fran Andrews Drive) are expected to be typically between 46 to 68 dB L_{Aeq}.

16.5.6.3 Operational noise effects

The only permanent feature at the site will be a drop shaft which may generate low noise levels immediately above the shaft due to the movement of water. Operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) with no mitigation measures necessary.

16.5.7 Vibration effects

Most construction activities will only give rise to low levels of vibration but some activities, such as piling, have the potential to generate higher levels of vibration. With mitigation measures in place to manage effects (e.g. use of appropriate equipment to limit vibration generation), the effects of vibration at the closest properties (373 and 356 Blockhouse Bay Road) are expected to be minor. At 353 Blockhouse Bay Road which is located a greater distance away, the effects are expected to be less than minor. Vibration management measures will be addressed as part of the CMP.

16.5.8 Odour effects

The drop shaft to be located at this site is not likely to be a significant source of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Therefore adverse effects due to discharges of odour are unlikely.

16.5.9 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains and a decanting earth bund. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the nearby stream, minimising effects on the receiving environment. Additional impervious area during construction will not be significant (approximately 580m²). The temporary increase in volume of runoff to the stream is not expected to be significant compared with existing overland flows in the area. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

16.5.10 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. The construction site has been part of a reserve since 1940. The level of risk of contamination at the site is considered to be low.

A draft SMP has been prepared to address the management of contaminated soils for the main project works and is contained in Technical Report I of Part D. The proposed construction work should be able to be undertaken safely and securely with minimal risks to the environment by implementing appropriate strategies such as testing of soil to establish contaminant levels and determine spoil disposal requirements prior to bulk excavation work.

16.5.11 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate design and construction methodologies as proposed, construction of the tunnel and shaft

is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

16.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft within the reserve along the northern boundary close to residential properties; and
- Locating shaft within the eastern end of the reserve adjacent to Blockhouse Bay Road.

The proposed site location at the eastern end of the reserve provides a location which allows construction of a micro tunnel of an appropriate length. The location adjacent to Blockhouse Bay Road allows for a reduced length of access through the reserve to the site.

A figure showing the alternative site is located at the end of this section.

16.7 Conclusion


Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There are some residential properties located in relatively close proximity to the site on Blockhouse Bay Road and it will be necessary to implement construction management measures, such as a noise barrier and control of construction methods to minimise vibration generation, in order to minimise the effects of construction activities on these properties. There will be an effect on recreation during the construction works as the playground will be removed. This will be reinstated following construction in consultation with Auckland Council and Whau Local Board. Pedestrian access through the reserve will be maintained and the bus shelter will be relocated to enable construction of the site accessway.

There are overhead transmission lines in the vicinity of the works. As addressed in Section 12.18 of Part A, where works are required within the 12 m overhead line corridor, appropriate measures will be implemented where required and works will be undertaken in accordance with Transpower guidelines.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface resulting in less than minor long term effects on open space and landscape character and neutral effects on visual amenity.

Miranda Reserve alternative sites and layouts

Comment on alternative	
<p>Shaft located further within Miranda Reserve</p> <p>Close proximity to residential properties</p> <p>Conflict with site access and pedestrian access, potentially causing safety issues in playground area</p> <p>Vegetation removal required for site access</p>	

For the reasons summarised above, this option was not pursued.

17.0 Whitney Street (L3S3)

17.1 Introduction

The Whitney Street L3S3 site is on the Link Sewer 3 alignment and is required for construction and to provide a connection to the Avondale Diversion Sewer. It is a secondary construction site and will be used for the retrieval of the MTBM for Link Sewer 3.

The proposed works are shown on drawings AEE-MAIN-17.1 and 17.2 included in the A3 drawing set (Part C).

17.2 Location and site description

The Whitney Street site is located within the road reserve of Whitney Street in New Windsor approximately 25 m from the intersection with Mulgan Street and Margate Road. The construction area is located on the grass verge on the eastern side of the road outside 120 and 124 Whitney Street. There is a pedestrian refuge in the centre of Whitney Street in this location.

The surrounding land use is residential. A dairy is located at 128 Whitney Street, on the corner of Whitney Street and Mulgan Street with a parking area outside the Whitney Street frontage.

17.3 Land ownership and interests

Address	Whitney Street
Legal description	n/a
Title reference	n/a
Owner	Auckland Council
Reserve status	Road reserve

17.4 Proposed works

17.4.1 Permanent works

Drawing reference	AEE-MAIN-17.1
Permanent works	<ul style="list-style-type: none">• Link Sewer 3• Connecting pipe to Avondale Diversion Sewer• 6 m ID access/drop shaft (46 - 61 m deep)
Site reinstatement	<ul style="list-style-type: none">• Regrassing and paving
Access requirements	<ul style="list-style-type: none">• Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none">• Inspection

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

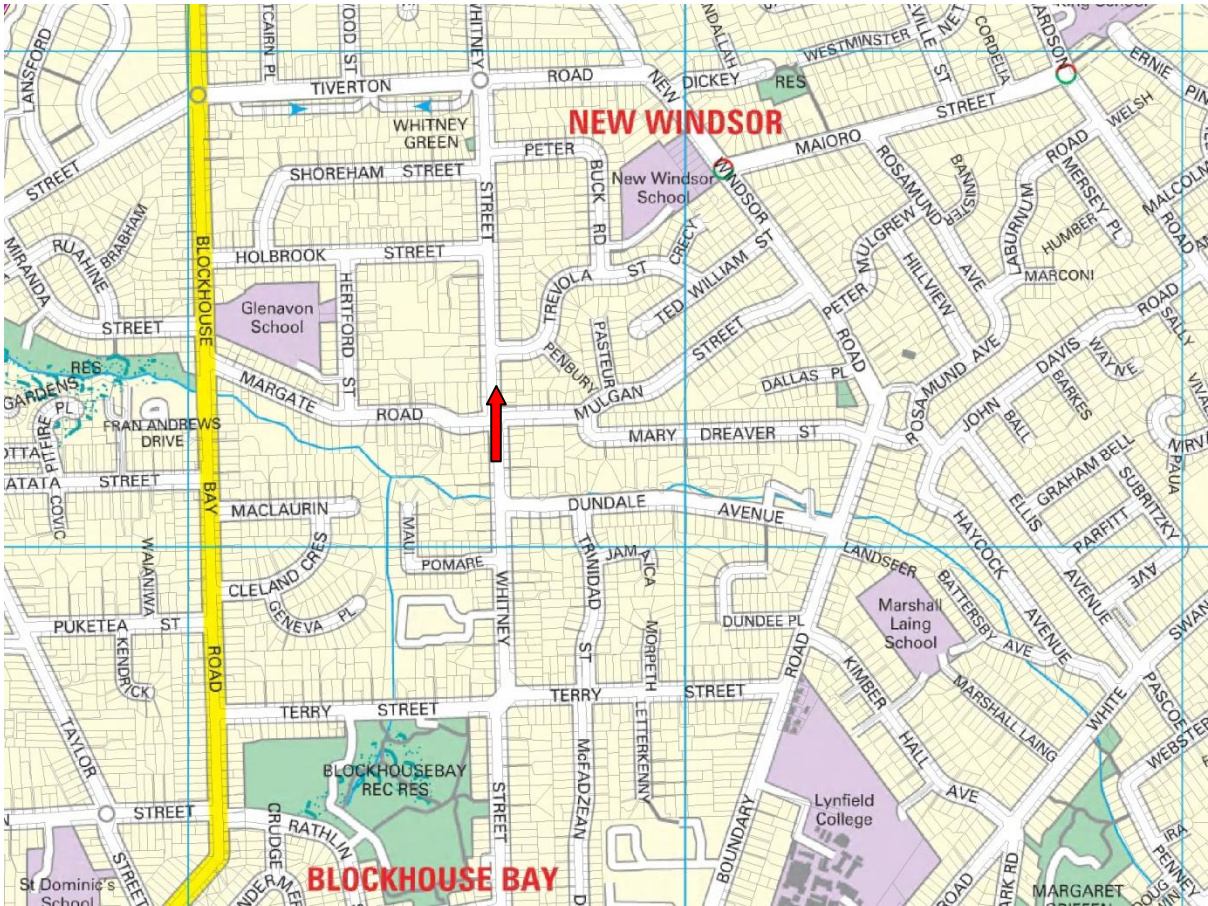


Figure 17-1 Location plan

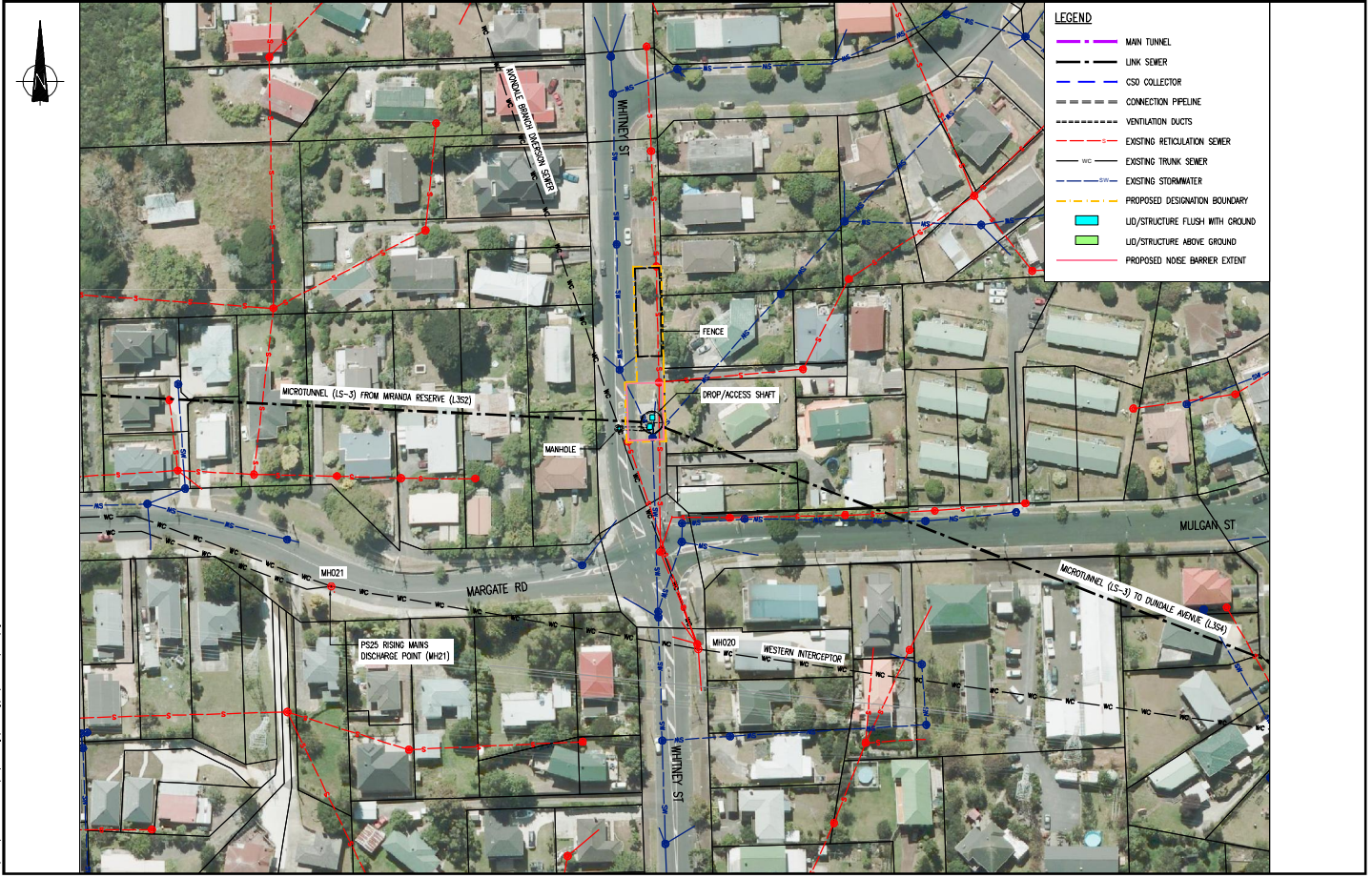
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- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSD COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND

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 File Path: C:\Users\jmc\Documents\Projects\15-Aug-11 3:30 AM - Central Interceptor Gen - Whitney St - Mulgan Ave\Aerial\Aerial\Aerial.dwg

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT		CENTRAL INTERCEPTOR GENERAL WHITNEY STREET (L3S3) - PERMANENT WORKS PLAN	CAD FILE AEE-MAIN-17.1	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1000 A3	0538
DWG. CHECKED		JS				DRAWING No.	ISSUE	
REV'D. P. MGR.		JS				AEE-MAIN-17.1	A	
APPROV. P. DIR.		CC						
ISSUE	DATE	AMENDMENT	BY	APPROV.	DATE			
A	17/08/12	CONSENT ISSUE						



- LEGEND**
- MAIN TUNNEL
 - LINK SEWER
 - CSD COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND
 - PROPOSED NOISE BARRIER EXTENT

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 File Path: C:\Users\jmc\Documents\Projects\15-Aug-11 3:30 AM - Central Interceptor Gen - Whitney St - Mulgan Ave\Aerial\Aerial\Aerial.dwg

DESIGNED		SL	08/12	SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT		CENTRAL INTERCEPTOR GENERAL WHITNEY STREET (L3S3) - CONSTRUCTION WORKS PLAN	CAD FILE AEE-MAIN-17.2	DATE 26-JUL-12
DES. CHECKED		JS	08/12				ORIGINAL SCALE A1	CONTRACT No.
DRAWN		JS	08/12				1:1000 A3	0538
DWG. CHECKED		JS				DRAWING No.	ISSUE	
REV'D. P. MGR.		JS				AEE-MAIN-17.2	A	
APPROV. P. DIR.		CC						
ISSUE	DATE	AMENDMENT	BY	APPROV.	DATE			
A	17/08/12	CONSENT ISSUE						

17.4.2 Construction works

Drawing reference	AEE-MAIN-17.2
Construction site area	Approx. 500 m ²
Duration of construction	6-8 months construction activities 2 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none">• Shaft excavations: 6.5 m ID, 46 - 61 m deep construction shaft• MTBM retrieval• Trenching of connection• Construction of permanent features – drop shaft• Site reinstatement
Key features/equipment	<ul style="list-style-type: none">• Construction base, including: site access roading, security/noise fencing• Crawler crane• Water treatment equipment• Wheel wash• Generator• Spoil storage area

17.5 Assessment of effects

17.5.1 Landscape and visual effects

The site (screened by a perimeter fence) will be visible from the front of No's 111, 113A, 115, 118, 120, 124, and 128 Whitney Street and 56 Margate Road. It will also be visible to those visiting the dairy and passersby on the road and footpath to the west.

Landscape and visual effects resulting from construction will be:

- Construction of a perimeter fence;
- Construction activity and vehicle movements; and
- Potential views of the works from adjoining residential properties.

A less than minor level of adverse effect on landscape and visual amenity is expected due to the construction works at this site. Construction works will generally be screened by the perimeter fence.

The only permanent visible works will be a shaft cover (at ground level, flush with the adjacent surface). Permanent landscape and visual effects will be neutral as manholes in the road berm are an expected component of roadways.

17.5.2 Vegetation and ecological effects

The site is a grassed road side verge with a single street tree (a Queensland Box tree). A pohutukawa in the front of 120 Whitney Street could potentially require pruning. The vegetation modification is very minor.

The site has low ecological value and there are expected to be less than minor ecological effects.

17.5.3 Archaeological effects

No archaeological or heritage sites are recorded within the construction area and the site is located within a developed residential area. There is little potential for discovery of unrecorded archaeological remains.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

17.5.4 Traffic effects

17.5.4.1 Existing environment

Whitney Street is a Local Road in the Auckland City District Plan. It connects Tiverton Street in the north with Donovan Street in the south. Mulgan Street is a Local Road in the Auckland City District Plan. It links Whitney Street with New Windsor Road to the east.

The Whitney Street/Mulgan Street intersection is a priority controlled intersection with traffic on Mulgan Street controlled by “stop” signage and markings.

17.5.4.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The construction area is within the road reserve, partly on the eastern berm/footpath, and partly within the southbound lane of Whitney Street. Access to properties at 122, 124 and 126 Whitney Street will remain open. A construction traffic management plan has been prepared for this site. It includes measures to narrow the traffic lanes on Whitney Street to retain two-lane two-way traffic movements, reduce speed limits, and divert pedestrian movements to the other side of the street. Two way traffic flows on Whitney Street will be maintained during construction by removing the existing pedestrian refuge on Whitney Street.

This will not affect the three carparking spaces for the dairy which are located in a parking bay area on Whitney Street.

The construction works at the Whitney Street site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period, with the mitigation measures in place as described in Section (ii) “Mitigation Measures” at the beginning of this report.

17.5.4.3 Traffic effects arising from permanent works

Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

17.5.5 Noise effects

17.5.5.1 Existing environment

There are dwellings in close proximity to the site, with the residence at 124 Whitney Street being approximately 20 m from the construction site centre.

Currently the predominant noise source is from traffic on Whitney Street. An ambient noise level of 51 dB L_{Aeq} was measured on 12 May 2011 during the day time.

17.5.5.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling.

With mitigation measures in place at the construction site (a 2 m high noise barrier around the site perimeter), the predicted construction noise levels at the closest noise sensitive receivers are expected to be generally compliant with the Construction Noise Standard. Noise levels at the closest noise sensitive receivers (115, 124, and 130 Whitney Street and 56 Margate Road) are expected to be typically between 49 to 73 dB L_{Aeq}. Certain activities such as trenching and piling may cause non-

compliant noise levels. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate effects, for example the use of mobile screening around trenching activities,

17.5.5.3 Operational noise effects

The only permanent feature at the site will be a drop shaft which may generate low noise levels immediately above the shaft due to the movement of water. Operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) with no mitigation measures necessary.

17.5.6 Vibration effects

Most construction activities will only give rise to low levels of vibration. However, some activities e.g. piling, have the potential to generate higher levels of vibration. There is a low risk of vibration causing damage to the closest structures and there may be some short term disturbance of residents at 128 and 130 Whitney Street. A number of mitigation methods are available to manage effects, as described in Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Vibration management measures will be addressed as part of the CMP.

17.5.7 Odour effects

The drop shaft to be located at this site is not likely to be a significant source of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Therefore adverse effects due to discharges of odour are unlikely.

17.5.8 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions and possibly silt fences. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to existing cesspits. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

17.5.9 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. No information has been identified that indicates potential contamination of the site.

17.5.10 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate design and construction methodologies as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

17.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included:

- Locating shaft on the north western corner of Margate Road and Whitney Street;
- Locating shaft on the south eastern corner of Mulgan Street and Whitney Street;
- Locating shaft to the rear section of a property on the north eastern corner of Mulgan and Whitney Street; and
- Locating shaft on Whitney Street within the road reserve.

The final layout of the proposed site in the Whitney Street road reserve includes:

- Condensed construction site area;
- Shaft located in the road reserve reducing impact on private property; and
- Maintenance of access to neighbouring properties.

17.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

Traffic management measures will be put in place to minimise effects on the road network and minor effects are anticipated. A noise barrier is proposed around the perimeter of the construction and noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate effects of noise levels at nearby dwellings on Whitney Street. Mitigation measures will also be implemented where necessary to minimise the effects of vibration on neighbouring properties.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface resulting in neutral visual effects.

18.0 Dundale Avenue (L3S4)

18.1 Introduction

The Dundale Avenue L3S4 site is on the Link Sewer 3 alignment and is required for construction of the tunnel. It is a secondary construction site and will be used for the launch/retrieval of the MTBM for Link Sewer 3.

The proposed works are shown on drawings AEE-MAIN-18.1 and 18.2 included in the A3 drawing set (Part C).

18.2 Location and site description

The Dundale Avenue site is located off Dundale Avenue, New Windsor. The site is located within grassed road reserve on the northern side of Dundale Avenue approximately 170 m east of the intersection with Boundary Road. The construction site is located at the western end of a grassed area of road reserve adjacent to the formed carriageway.

The site is within a flat open grassed area. A small watercourse (a tributary of Whau River) fringed with vegetation traverses the property to the north of the construction area. The open grassed area is split by an accessway to Blockhouse Bay Community Church/Christian Kindergarten. A number of residential properties are also located north of the watercourse. Across the road to the south is residential housing on rising land, some of which has views across the site.

18.3 Land ownership and interests

Address	Dundale Avenue, New Windsor
Legal Description	n/a
Title Reference	n/a
Owner	Auckland Council
Reserve status	Road reserve
Local Board	Whau

18.4 Proposed works

18.4.1 Permanent works

Drawing reference	AEE-MAIN-18.1
Permanent works	<ul style="list-style-type: none">Link Sewer 32.4 m ID access/drop shaft (40 – 55 m deep)
Site reinstatement	<ul style="list-style-type: none">Regrassing and replanting
Access requirements	<ul style="list-style-type: none">All weather trafficable access via Dundale Avenue. Access required infrequently for inspection.

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

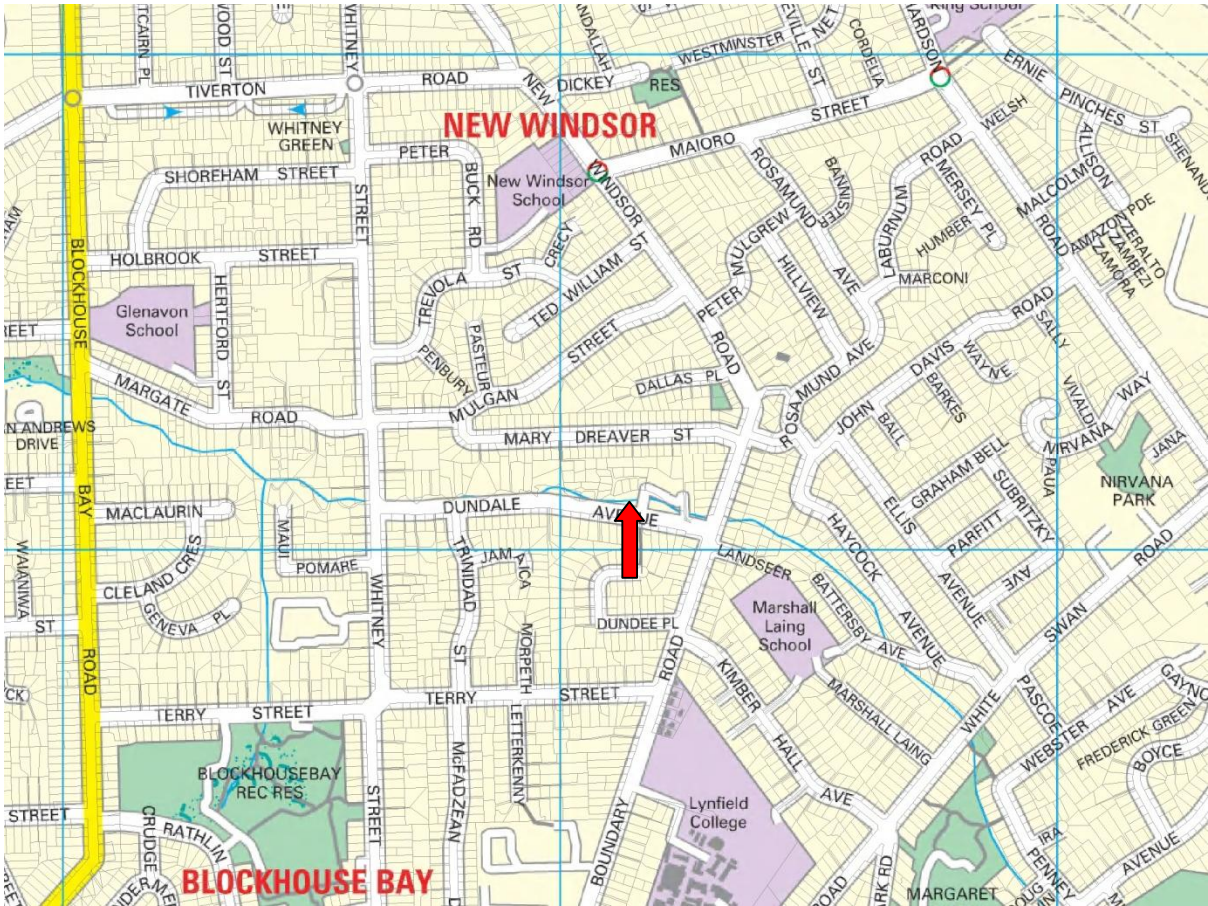


Figure 18-1 Location plan

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- NOTES:**
- DESIGNATION AREA TO BE REDUCED UPON COMPLETION OF WORKS.
- LEGEND**
- MAN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND

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PROJECT No.: A ISSUE: A DATE: 17/08/12 CONSENT ISSUE: [Signature] AMENDMENT: [Signature]		AP: [Signature] PW: [Signature] APP'D. P. DIR: [Signature] CC: [Signature] BY: [Signature] DATE: 08/12		AEE AUGUST 2012		CENTRAL INTERCEPTOR GENERAL DUNDALE AVENUE (L3S4) - PERMANENT WORKS PLAN		DRAWING No.: AEE-MAIN-18.1 ISSUE: A	



- LEGEND**
- MAN TUNNEL
 - LINK SEWER
 - CSO COLLECTOR
 - CONNECTION PIPELINE
 - VENTILATION DUCTS
 - EXISTING RETICULATION SEWER
 - EXISTING TRUNK SEWER
 - EXISTING STORMWATER
 - PROPOSED DESIGNATION BOUNDARY
 - LID/STRUCTURE FLUSH WITH GROUND
 - LID/STRUCTURE ABOVE GROUND
 - PROPOSED NOISE BARRIER

DESIGNED: [Signature] 08/12 DES. CHECKED: [Signature] 08/12 DRAWN: [Signature] DWG. CHECKED: [Signature] REV'D. P. MGR: [Signature]		SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT				CAD FILE: AEE-MAIN-18.2 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
PROJECT No.: A ISSUE: A DATE: 17/08/12 CONSENT ISSUE: [Signature] AMENDMENT: [Signature]		AP: [Signature] PW: [Signature] APP'D. P. DIR: [Signature] CC: [Signature] BY: [Signature] DATE: 08/12		AEE AUGUST 2012		CENTRAL INTERCEPTOR GENERAL DUNDALE AVENUE (L3S4) - CONSTRUCTION WORKS PLAN		DRAWING No.: AEE-MAIN-18.2 ISSUE: A	

18.4.2 Construction works

Drawing reference	AEE-MAIN-18.2
Construction site area	Approx. 1,100 m ²
Duration of construction ¹⁴	6 - 8 months construction activities 2 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Shaft excavations: 10 m ID, 40 – 55 m deep construction shaft • MTBM launch/retrieval and associated activities including: removal of spoil from tunnel, spoil storage, liner segment handling and storage • Construction of permanent features – access shaft • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash • Generator • Slurry separation equipment • Storage areas for construction materials, including tunnel segment storage area • Spoil storage area • Ventilation equipment

18.5 Assessment of effects

18.5.1 Landscape and visual effects

The site is visible from the houses opposite on Dundale Avenue (65 to 83 Dundale Avenue) and those who access properties to the north from the road edge on either side of the site i.e. 62, 64, 66, and 68 - 74 Dundale Avenue. The viewing audience will comprise residents and road users passing by.

Landscape and visual effects resulting from construction will be:

- Construction of a perimeter fence;
- Removal of scattered native trees within the construction area; and
- Construction activity and vehicle movements visible to residents opposite with a clear view from elevated land.

Construction works will generally be screened by the perimeter fence and be for a relatively short duration, resulting in no more than minor visual effects. The disturbed ground will be repaired and grassed and replacement planting undertaken. The construction works will result in less than minor adverse effects on open space and landscape character and visual amenity.

¹⁴ The “occupation” period indicates the total timeframe within which the project works would be completed at the site. Over this timeframe actual site construction works may be intermittent due to construction staging or sequencing, and the need to undertake connection and commission works at the site after other parts of the project are completed elsewhere. It is expected that active construction works on the site will occur for around 6 – 8 months. When active construction works are not occurring and it is feasible to make the site safe for the public, access restrictions and site fencing may not be needed across the whole of the site.

The only permanent visible feature that will remain at the site is a shaft cover and maintenance access at ground level, flush with the adjacent surface. The ongoing landscape and visual effects of the permanent works will be neutral.

18.5.2 Vegetation and ecological effects

The area is mostly grassed, with occasional semi established young to early mature trees throughout. These consist of a number of puriri, kowhai, and titoki trees. Outside of the construction area along the watercourse is a large continuous area of vegetation cover.

The trees within the construction area will require removal. They are not significant specimens and their removal will not greatly alter the cover in the wider area. The vegetation modification is very minor.

The only bird species identified during the survey at the site was blackbird. The site has low ecological value and less than minor ecological effects are expected at the site.

18.5.3 Archaeological effects

No archaeological or heritage sites are recorded within the construction area and the site is located within a landscaped road reserve. There is little potential for discovery of unrecorded archaeological remains.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

18.5.4 Traffic effects

18.5.4.1 Existing environment

Dundale Avenue is a Local Road in the Auckland City District Plan. It links Whitney Street in the west with Boundary Road in the east. It forms a priority T-intersection with Boundary Road approximately 170 m to the east of the construction site.

18.5.4.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a "worst case" scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The expected traffic generation and low additional traffic volumes are well within the capacity of the surrounding roads and the typical hourly fluctuations of the nearby roads. Consequently minimal effects on the surrounding road network are expected.

The access to the adjacent church and kindergarten will remain open, but truck movements may need to be limited around the opening and closing hours of the kindergarten and church services to avoid peak pick up and drop off periods. There will be close consultation with the site managers of the facilities during construction.

Approximately 15 m of on street parking will be removed to accommodate the driveway and truck paths. The loss of parking is not considered significant as there is ample off street parking for the kindergarten and community facilities.

The construction works at the Dundale Avenue site are expected to have a less than minor effect on the operation of the surrounding road and pedestrian network during the works period, with mitigation measures in place as described in Section (ii) "Mitigation Measures" at the beginning of this report.

18.5.4.3 Traffic effects arising from permanent works

Traffic generation post construction for normal operation, inspection and maintenance is expected to be infrequent.

18.5.5 Noise effects

18.5.5.1 Existing environment

The nearest residential receivers are located over 25 m to the north of the construction site and a kindergarten is located approximately 35 m north east of the site.

Currently the predominant noise source is traffic from Dundale Avenue. An ambient noise level of 44 dB L_{Aeq} was measured on 12 May 2011 during the day time.

18.5.5.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, shaft excavations and tunnelling.

Construction works will generally take place from 7 am to 6 pm Monday to Saturday, but some work may occur outside these hours as described in Section 6.17.4 of Part A. Measures will be undertaken to limit noise generation, such as avoiding noise intensive construction work during night time and on Sundays.

With mitigation measures in place (a 2 m high noise barrier around the site perimeter), the predicted construction noise levels at the closest noise sensitive receivers (66D and 73 Dundale Ave) are expected to comply with the Construction Noise Standard. Noise levels at these nearby receivers are expected to be typically between 43 to 68 dB L_{Aeq} .

18.5.5.3 Operational noise effects

Little operational noise is expected from the access shaft and operational noise levels are predicted to be within proposed noise limits at adjacent sites (refer proposed designation conditions and noise impact assessment in Part D Technical Report F) with no mitigation measures necessary.

18.5.6 Vibration effects

Most construction activities will only give rise to low levels of vibration. Although some activities may generate higher vibration levels at times (e.g. piling), given the distance to the nearest dwellings and the ground conditions, the effects of vibration at this site are expected to be less than minor.

18.5.7 Odour effects

The access shaft to be located at this site is not likely to be a significant source of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. Therefore adverse effects due to discharges of odour are unlikely.

18.5.8 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions and a silt fence. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to existing overland flow. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

18.5.9 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. No information has been identified that indicates potential contamination at the site.

18.5.10 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shafts as described in Section 11.2 of Part A. With appropriate design and construction methodologies as proposed, construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

18.6 Alternatives sites and layouts

Initially, Link Sewer 3 was designed as a segmental tunnel and no intermediate shaft site was required in this area. Suitable locations for an intermediate shaft within this area were limited, and the selected site was the only one found to be of sufficient size and within the length limit of micro tunnel constructability.

18.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

There are some residential properties on Dundale Avenue, a kindergarten and a church located in relatively close proximity to the site and it will be necessary to implement construction management measures, such as a noise barrier, and traffic management measures, in order to minimise the effects of construction activities on these properties.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface. Site reinstatement details will be developed in consultation with the landowner, Auckland Council.

19.0 Haycock Avenue (L3S5)

19.1 Introduction

The Haycock Avenue L3S5 site is on the Link Sewer 3 alignment and is required to provide connections to the Western Interceptor, Lynfield Branch Sewer and CSO Collector CC-8. It is a secondary construction site and will be used for the retrieval of the MTBM/TBM for Link Sewer 3.

The proposed works are shown on drawings AEE-MAIN-19.1 and 19.2 included in the A3 drawing set (Part C).

19.2 Location and site description

The Haycock Avenue site is located at 4 Haycock Avenue, Mt Roskill. The property is zoned for residential use (Residential 5) and contains a single residential dwelling. The construction site extends into the Haycock Avenue road reserve.

The construction site is surrounded by residential development apart from an area to the south where a tributary of Whau Creek is located in an area of open space (zoned Residential 5).

19.3 Land ownership and interests

Main Site	
Address	1. 4 Haycock Avenue, Mt Roskill 2. Haycock Avenue
Legal Description	1. Lot 79 DP 48241 2. n/a (road reserve)
Title Reference	1. NA1875/79 2. n/a
Owner	1. V.E. Laughland 2. Auckland Council
Local Board	Puketapapa

A location plan and copies of the proposed works plans (as referenced above) are provided on the following pages.

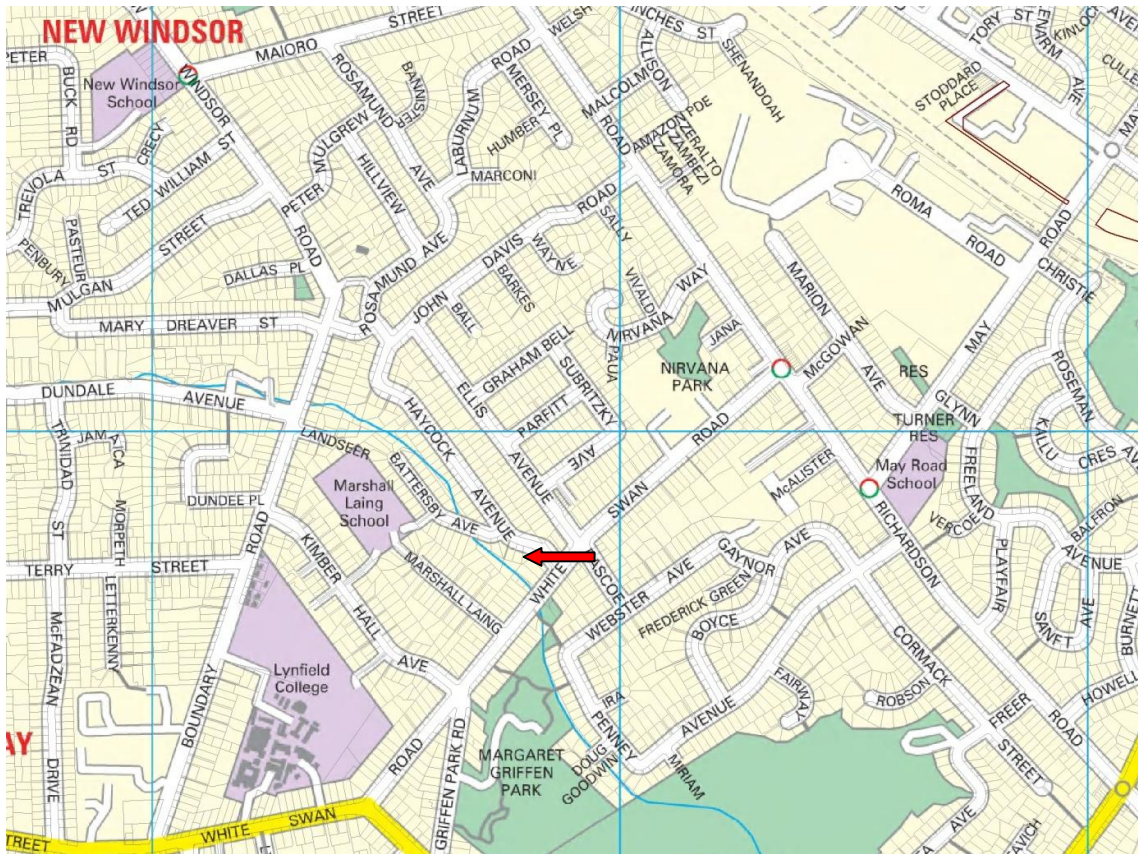


Figure 19 - 1 Location plan

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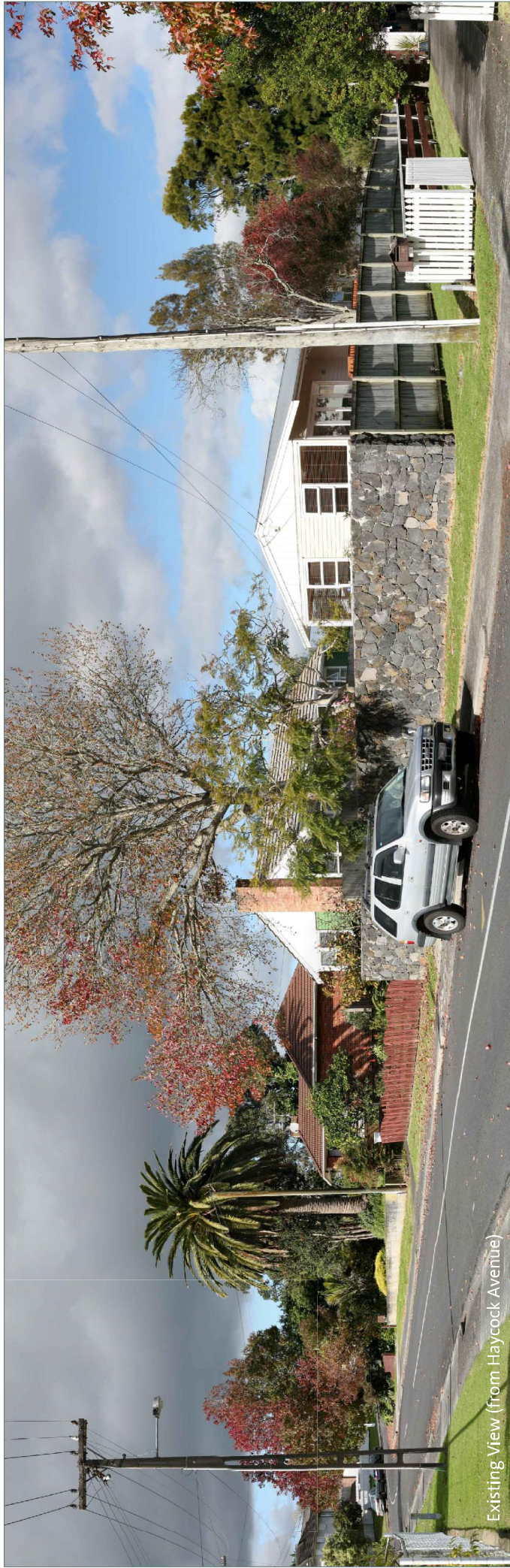
Photograph 19-1 Looking north west up Haycock Avenue



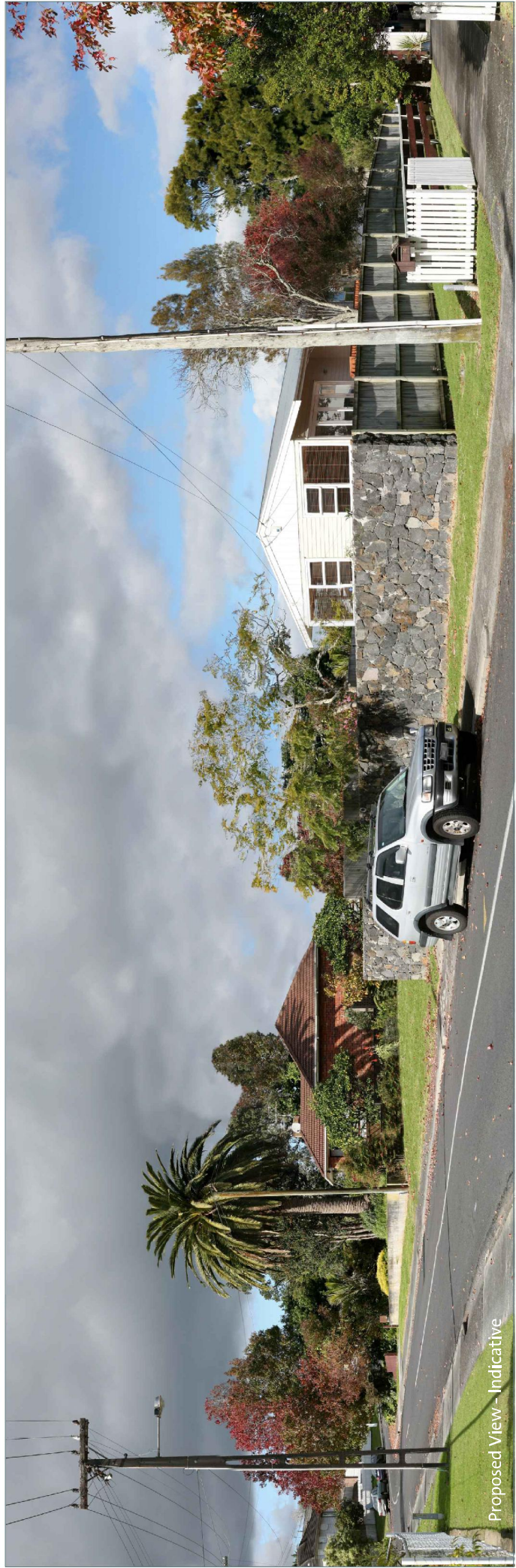
DESIGNED: [Signature] 18/07/12 DRAWN: [Signature] 08/07/12 CHECKED: [Signature] 08/07/12 REV'D. P.MGR: [Signature] APP'D. P.DIR: [Signature]										SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT				CENTRAL INTERCEPTOR GENERAL HAYCOCK AVENUE (L3SS) - PERMANENT WORKS PLAN		CAD FILE: AEE-MAIN-19.1 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
ISSUE: A 17/08/12 DATE: 17/08/12 AMENDMENT: [Blank] BY: [Blank] APP'D: [Blank]										AEE AUGUST 2012		COPYRIGHT - The design, the drawings and contents herein are the sole property of WaterCare Services Limited and may not be used without express written consent.		DRAWING No.: AEE-MAIN-19.1 ISSUE: A		DATE: 26-JUL-12 CONTRACT No.: 0538			



DESIGNED: [Signature] 18/07/12 DRAWN: [Signature] 08/07/12 CHECKED: [Signature] 08/07/12 REV'D. P.MGR: [Signature] APP'D. P.DIR: [Signature]										SITE LAYOUT AND DESIGNS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN DEVELOPMENT				CENTRAL INTERCEPTOR GENERAL HAYCOCK AVENUE (L3SS) - CONSTRUCTION WORKS PLAN		CAD FILE: AEE-MAIN-19.2 ORIGINAL SCALE: A1 1:1000 A3		DATE: 26-JUL-12 CONTRACT No.: 0538	
ISSUE: A 17/08/12 DATE: 17/08/12 AMENDMENT: [Blank] BY: [Blank] APP'D: [Blank]										AEE AUGUST 2012		COPYRIGHT - The design, the drawings and contents herein are the sole property of WaterCare Services Limited and may not be used without express written consent.		DRAWING No.: AEE-MAIN-19.2 ISSUE: A		DATE: 26-JUL-12 CONTRACT No.: 0538			



Existing View (from Haycock Avenue)



Proposed View - Indicative

Note - Photomontages are indicative of the Permanent Works. Fields of view have been set up to accurately represent the Preliminary Concept Design for each site and its surrounds. Given the indicative nature of the photomontages, there may be some differences between each photomontage and has not been noted.

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Viewpoint Details
 Date of Photography: 11:54am, 24 May 2012
 Data Sources: AECOM, AECOM site (IDAR (Nov. 2010), Auckland Council aerials (2008), BML)

CENTRAL INTERCEPTOR AND ASSOCIATED WORKS
 Haycock Avenue (L355)
 Photomontage: Viewpoint 1
 Date: 20 July 2012 | Revision: B |
 Plan prepared for Watercare Services Ltd by Boffa Miskell Limited
 Author: michael.bain@boffamiskell.co.nz | Checked: J.Goodwin

19.4 Proposed works

19.4.1 Permanent works

Drawing reference	AEE-MAIN-19.1
Permanent works	<ul style="list-style-type: none"> • Link Sewer 3, CSO Collector CC8 • Connecting pipes to Western Interceptor and Lynfield Branch Sewer • 8 m ID access/drop shaft (40 - 75 m deep) • Connection chambers • Air intake • Manholes
Site reinstatement	<ul style="list-style-type: none"> • Regrassing, paving and replanting
Access requirements	<ul style="list-style-type: none"> • All weather trafficable access via Haycock Avenue. Access required approximately once a month.
Key maintenance requirements	<ul style="list-style-type: none"> • Inspection

19.4.2 Construction works

Drawing reference	AEE-MAIN-19.2
Construction site area	Approx. 680 m ²
Duration of construction	6-8 months construction activities 2 years site occupation for construction
Principal temporary construction activities	<ul style="list-style-type: none"> • Demolition of existing house • Shaft excavations: 8.5 m ID, 40 - 75 m deep construction shaft; CSO Collector construction/connection shaft • Retrieval of MTBM and TBM (TBM may be removed, or left in situ) • Excavations for underground permanent works • Trenching of connections • Construction of permanent features – drop shaft, chambers • Site reinstatement
Key features/equipment	<ul style="list-style-type: none"> • Construction base, including: site access roading, security/noise fencing, site offices, staff/visitor parking, workshop • Crawler crane • Water treatment equipment • Wheel wash • Generator • Spoil storage area

19.5 Assessment of effects

19.5.1 Landscape and visual effects

Visibility of the construction activities would be obscured by the external fence which would appear similar to a typical residential boundary fence. The viewing audience would include residents of 2 and 6 Haycock Avenue and those opposite at 1 to 5 Haycock Avenue, as well as some of the residents to the south across the stream. Views would largely be of the perimeter fence.

Landscape and visual effects resulting from construction will be:

- Removal of the house and change to the residential character of this site;
- Removal of trees from the site; and
- Construction of the perimeter fence.

Temporary effects on landscape character of a minor nature are expected to occur due to the change to the character of the site. Low adverse visual effects are expected and the perimeter fence would screen construction activities from view.

Permanent visible works will be two chamber lids (at ground level, flush with the adjacent surface), a shaft cover and three manholes. The removal of a house within an established residential area and the resultant vacant lot would result in some change in the character of the immediate area, although this could occur as of right. Site reinstatement will consider landscape design and planting and the long term end use of the section to maintain the quality and amenity values in this area. Adverse permanent effects on open space and landscape character would be less than minor and could be highly beneficial depending on the long term end use of the sites. Effects on visual amenity will be neutral.

A photomontage of the site before and after is shown on Figure 88 (from the landscape and visual assessment in Part D Technical Report A).

19.5.2 Land use and property effects

The proposed works will result in a change of use from residential to an undeveloped site with some landscaping/planting unless a residential dwelling is ultimately reinstated on the site. This will involve the purchase of 4 Haycock Avenue and demolition of the existing house on the site. Watercare is in discussion with the landowner regarding the purchase of the property.

19.5.3 Vegetation and ecological effects

There is a mature Liquidambar tree in the front of the house at 4 Haycock Avenue that will require removal. Although it is an established tree, it is not individually significant. The vegetation modification is very minor.

The site has low ecological value and ecological effects are expected to be less than minor.

19.5.4 Archaeological effects

No archaeological or heritage sites are recorded within the construction area and the site is located within landscaped residential properties. There is little potential for discovery of unrecorded archaeological remains.

To address the possibility of uncovering remains, accidental discovery protocols will be developed to set out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed during the works.

19.5.5 Traffic effects

19.5.5.1 Existing environment

Haycock Avenue is classified as a Local Road in the Auckland City District Plan. It becomes John Davis Road in the north and links with White Swan Road in the south.

19.5.5.2 Traffic effects arising from construction works

At this site construction traffic will generally be single unit trucks (7 m³) with some large truck and trailer units. Traffic movements will vary through the phases of construction and by construction season. Based on trip generation data for the Lyon Avenue site (a “worst case” scenario), traffic movements are expected to range from between 12 to 14 standard vehicle movements per day and 34 to 56 heavy vehicle movements per day.

The expected traffic generation and low additional traffic volumes are well within the typical hourly fluctuations of the nearby roads.

In order to undertake the proposed works, part of the footpath and the westbound lane of Haycock Avenue are proposed to be closed off and used as part of the construction site area. Draft construction traffic management provisions have been prepared for this site. Kerb-side parking on Haycock Avenue between White Swan Road and Battersby Avenue will be temporarily removed during the works. The westbound traffic lane will be temporarily closed during construction and two-way traffic flows on Haycock Avenue will be retained if possible by means of temporary traffic signals. Pedestrians will be directed to the footpath on the opposite side of Haycock Avenue.

The reduction in on-street parking will only affect a maximum of eight properties, which have the ability to accommodate off-street parking. There is also ample available parking elsewhere along Haycock Avenue.

The construction works at the Haycock Avenue site are expected to have a minor effect on the operation of the surrounding road and pedestrian network during the works period, with the mitigation measures described at the beginning of this Part B.

19.5.5.3 Traffic effects arising from permanent works

Traffic generation post construction for normal operation, inspection and maintenance is estimated to be around one vehicle per month.

19.5.6 Noise effects

19.5.6.1 Existing environment

There are dwellings in close proximity to the site, with the nearest dwellings within a 20 m radius of the site centre.

Currently the predominant noise source is traffic from surrounding roads. An ambient noise level of 48 dB L_{Aeq} was measured on 12 May 2011 during the day time.

19.5.6.2 Construction noise effects

Noise generation at the site is most likely to be associated with site establishment machinery, the water treatment facility, and shaft excavations.

With mitigation measures in place at the construction site (a 2.5 m noise barrier around the site perimeter), construction noise levels at the closest noise sensitive receivers (1, 2, and 6 Haycock Avenue, and 83B White Swan Road) are expected to be typically between 42 to 76 dB L_{Aeq}. Certain activities such as the demolition of existing structures, trenching outside of the site boundary, and the use of a large crawler crane (to remove the TBM from the shaft) may exceed the limits specified in the Construction Noise Standard. Noise management measures, in accordance with the construction noise management plan, will be implemented to mitigate effects, for example the use of mobile screening around trenching activities, and communication with neighbouring residents.

19.5.6.3 Operational noise effects

The only permanent structure will be a drop shaft and air intake and connection chamber which may generate low noise levels due to the movement of water and air. Operational noise levels due to the drop shaft operation during high flows (approximately 30 decibels) will be compliant with proposed noise limits (refer proposed designation conditions and noise impact assessment in Part D Technical Report F), with acoustic screening from adjacent domestic fences.

19.5.7 Vibration effects

Most construction activities will only give rise to low levels of vibration but some activities, e.g. piling, have the potential to generate higher levels of vibration. There is a low risk of vibration causing damage to structures at 2 and 6 Haycock Avenue but there would likely be some short term disturbance of residents. A number of mitigation methods are available to manage effects, as described in Section (ii) "Mitigation Measures" at the beginning of this report. If disturbance of residents is expected to occur (having confirmed the construction methodology), Watercare would implement appropriate measures in advance to ensure that the effects of vibration are mitigated. Effects at 79b White Swan Road are expected to be less than minor. Vibration management measures will be addressed as part of the CMP.

19.5.8 Odour effects

The drop shaft and connection chambers are unlikely to be significant sources of odour. Under normal operating conditions, the Central Interceptor will be maintained under negative pressure, minimising the discharge of odour, and access for maintenance will be infrequent. An air intake vent has been allowed for at the site and under normal operation when the system is under negative pressure emissions are not likely to occur. During heavy rainfall events that cause the main tunnel to fill and prevent air extraction and treatment at the Mangere ATF it is possible air may be discharged at this air intake. This would likely only occur around 6 to 8 times per annum (or less if the ATF at May Road/PS 25 is installed). Meteorological conditions during such events are likely to result in effective and rapid dispersion of any odour. This would result in no more than minor localised adverse effects of short duration.

19.5.9 Effects of earthworks and stormwater during construction

Erosion and sediment control measures will be put in place to manage and minimise the effects of earthworks during construction. A draft erosion and sediment and stormwater control plan (ESCP) for the site is included in Part D Technical Report K. Measures proposed in the draft ESCP to manage erosion and sediment and stormwater include stabilised clean water diversions, sediment diversion drains and a decanting earth bund. The sediment control measures will reduce the total suspended solids in the stormwater prior to discharge to the nearby open channel. The discharge to the channel will be via a level spreader to minimise the risk of erosion. Indicative Universal Soil Loss Equations have been calculated for the site and are included in the draft ESCP.

Dust control measures will be implemented should this be required and wheel wash facilities will be established to ensure truck wheels are cleaned before travelling on local roads.

The ESCP for this site will be finalised through the CMP process. The measures to be utilised during construction will be in accordance with TP 90 and will be appropriate for the extent of earthworks to be undertaken.

19.5.10 Contaminated sites effects

A desk top review has been undertaken for the site, including a check of council databases, historic aerial photographs and certificates of title. No information has been identified that indicates potential contamination at the site.

19.5.11 Groundwater and settlement

Analyses have been undertaken to consider the potential for effects on groundwater and settlement due to the construction of the tunnel and shaft at this site as described in Section 11.2 of Part A. Construction of the tunnel and shaft is not expected to have an effect on groundwater users in the vicinity and surface settlements are not expected to cause adverse effects to buildings and services.

19.6 Alternative sites and layouts

Through the site selection and concept design process a number of alternative sites and site layouts were considered. Options included various combinations of site layouts affecting private properties on

Haycock Avenue. The selected site includes a condensed site area to minimise impacts on private properties.

19.7 Conclusion

Overall the main project works will have significant positive effects – providing for growth, mitigating asset risk, and reducing overflows.

The works at this site will involve the purchase and demolition of a house located at 4 Haycock Avenue. There are some residential properties located in close proximity to the site on Haycock Avenue and White Swan Road and it will be necessary to implement construction management measures, such as a noise barrier and noise management measures, in accordance with the construction noise management plan, in order to minimise the effects of construction activities on the amenity of these properties. Traffic management measures will be put in place to minimise effects on the road network and minor traffic effects are anticipated. Mitigation measures will also be implemented where necessary to minimise the effects of vibration on neighbouring properties.

The permanent works will largely be below ground and only covers and the accessway will be visible at the surface. Adverse permanent effects on open space and landscape character would be less than minor and could be beneficial depending on the long term end use of the site. Effects on visual amenity will be neutral.

Appendix A – Certificates of Title

Part B Section Ref	Site name	Address	Legal description	Certificate of Title	Owner (23.05.12)
1A	WS1 - Western Springs site	731 Great North Road	Lot 12 DP 168863	NA103A/1	Regional Facilities Auckland Limited
1B	Western Springs CSO Collector site	-	Lot 2 DP 10276	Gazette Notice A614884 (1972 p12)	The Crown (for better utilization)
1B	Western Springs CSO Collector site	-	Lot 3 DP 10276	Gazette Notice B021450.1	The Crown (for Motorway purpose)
1B	Western Springs CSO Collector site	-	Part Lot 4 DP 10276	Proclamation 17511	The Crown (for Motorway purpose)
1B	Western Springs CSO Collector site	-	Part Lot 146 DP 7415 and Lot 3 DP 34837	Gazette Notice 200083	The Crown (taken for the Auckland-Kumeu Motorway)
1B	Western Springs CSO Collector site	-	Allot 76 Sec 7 Suburbs of Auckland	NA51B/461	Auckland Council
1B	Western Springs CSO Collector site	-	Pt Lot 3 DP 10276	NA371/245	Auckland Council
1B	Western Springs CSO Collector site	-	Pt Lot 3 DP 10276 and Allot 75 Sec 7 Suburbs of Auckland	NA51D/863	Tawa Farms Limited
2	AS1 - Mt Albert War Memorial Reserve site	751-761 New North Road	Pt Lot 1 DP 53828	NA5A/1266	Auckland Council
2	AS1 - Mt Albert War Memorial Reserve site	751-761 New North Road	Pt Allot 38 Parish of Titirangi and Pt Allot 171 Sec 10 Subs of Auck (defined on DP 6763)	NA217/108	Auckland Council
2	AS1 - Mt Albert War Memorial Reserve site	751-761 New North Road	Pt Allot 38 Parish of Titirangi and Pt Allot 171 Sec 10 Subs of Auck	NA988/61	Auckland Council
2	AS1 - Mt Albert War Memorial Reserve site	751-761 New North Road	Lot 14 and Part Lot 15 DP 7029	NA1999/21	Auckland Council
3	AS2 - Lyon Avenue site	36 Alberton Avenue (Mount Albert Grammar School)	Pt Allot 168 Sec 10 Suburbs of Auckland DP 7365	Gazette 1948 P 1142 (vested in Crown for school purposes)	The Crown (Mount Albert Grammar School)
3	AS2 - Lyon Avenue site	36 Alberton Avenue (Mount Albert Grammar School)	Pt Allot 169 Sec 10 Suburbs of Auckland DP 7365	Gazette 1948 P 1142 (vested in Crown for school purposes)	The Crown (Mount Albert Grammar School)
3	AS2 - Lyon Avenue site	Morning Star Place	Plan Number 346086 - Subdivision of Lot 15 DP 7699	231549	Body Corporate 346086 (Multiple unit owners)

			and Lot 2 DP 206560		
3	AS2 - Lyon Avenue site	Morning Star Place	Future Development Unit 4 Deposited Plan 346086	235517 (Stratum in Freehold)	St Lukes Holdings Limited
4	AS3 - Haverstock Road site	120 Mount Albert Road	Lot 1 DP 451490	576051	The New Zealand Institute for Plant and Food Research Limited
4	AS3 - Haverstock Road site	96 Haverstock Road	Lot 24 DP 45495	NA49C/851	Housing New Zealand Limited
4	AS3 - Haverstock Road site	98 Haverstock Road	Lot 15 DP 45495	NA49C/850	Housing New Zealand Limited
4	AS3 - Haverstock Road site	Camden Road	Road reserve	-	Auckland Council
5	AS4 - Walmsley Park site	Sandringham Road Extension	Lot 112 DP 43048	Gazette Notice 16176 (1958 P386) (vested in Council for recreational reserve purposes)	Mt Roskill Borough Council (Auckland Council)
6	WS2 - May Road site	May Road	Lot 2 DP 116924	NA66C/174	May Road Properties Ltd
7	AS5 - Keith Hay Park site	20 Gregory Pl	Lot 28 DP 49583	NA129A/172	Auckland Council
7	AS5 - Keith Hay Park site	22 Gregory Pl	Lot 27 DP 49583	NA2098/6	R.L. and Y.L. Taylor
7	AS5 - Keith Hay Park site	49 Arundel St	Lot 2 DP 52047	NA139C/70	Auckland Council
7	AS5 - Keith Hay Park site	49 Arundel St	Lot 2 DP 52047	175714	Auckland Council
7	AS5 - Keith Hay Park site	51 Arundel St	Lot 1 DP 52047	NA2C/1200	Auckland Council
7	AS5 - Keith Hay Park site	53 Arundel St	Allot 77 Sec 13 Suburbs of Auckland	NA8D/230	Auckland Council
7	AS5 - Keith Hay Park site	60 Frost Road	Sec 108 SO 419816 (Legal Road)	Gazette Notice 9106996.1	Auckland Council
7	AS5 - Keith Hay Park site	60 Frost Road	Sec 51 SO 419816 (Railway purposes)	560735 (see Gazette Notice 8806550.5)	The Crown
7	AS5 - Keith Hay Park site	60 Frost Road	Road reserve	-	Auckland Council
8	AS6 - PS23 site	39 Frederick Street	Lot 1 DP 161858	NA97C/394	Watercare Services Ltd
8	AS6 - PS23 site	CMA adjacent 39 Frederick Street	Tidal Lands of Manukau Harbour SO Plan 67474	-	Accorded special status by s11 Marine and Coastal Area (Takutai Moana) Act 2011
9	AS7 - Kiwi Esplanade	84R Kiwi Esplanade	Lot 2 DP 77585	NA33D/1224	Auckland Council
9	AS7 - Kiwi	86R Kiwi	Lot 1 DP 77585	NA33D/1223	Auckland Council

	Esplanade	Esplanade	(Recreation Reserve)		
9	Kiwi Esplanade Link Sewer 4	70R Kiwi Esplanade	Lot 3 DP 77585	NA33D/1225	Auckland Council
10	Mangere Pump Station - WS3	Greenwood Road	Lot 2 DP 156421	NA94A/54	Watercare Services Limited
11	L1S1 - Motions Road site	136 Motions Road	Allot 57 Section 9 Suburbs of Auckland	NA43B/991	Auckland Council
11	L1S1 - Motions Road site	985 Great North Road	Lot 1 DP 168863	NA102C/992	Auckland Council
12	L1S2 - Western Springs Depot site	859 Great North Rd	Lot 11 DP 168863	NA102C/1000	Auckland Council
13	L2S1 - Rawalpindi Reserve site	9a Rawalpindi Street, Mt Albert	Lot 32 DP 41107	NA26B/398	Auckland Council
13	L2S1 - Rawalpindi Reserve site		stream	-	The Crown
14	L2S2 - Norgrove Avenue site	Norgrove Avenue, Mt Albert	road reserve	-	Auckland Council
14	L2S2 - Norgrove Avenue site	Norgrove Avenue, Mt Albert	Part marked Plantation Reserve DP 16371	NA740/40	Auckland Council
15	L3S1 - PS25 site	32B Miranda Street	Lot 90 DP 39331 (Recreation Reserve)	NA26B/363	Auckland Council
16	L3S2 Miranda Reserve site	32B Miranda Street	Lot 90 DP 39331 (Recreation Reserve)	NA26B/363	Auckland Council
17	L3S3 - Whitney Street site	Whitney St	road reserve	-	Auckland Council
18	L3S4 - Dundale Avenue site	Dundale Avenue	road reserve	-	Auckland Council
19	L3S5 - Haycock Avenue site	4 Haycock Avenue	Lot 79 DP 48241	NA1875/79	V.E. Laughland
19	L3S5 - Haycock Avenue site	Haycock Avenue	Road reserve	-	Auckland Council



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA103A/1
Land Registration District North Auckland
Date Issued 13 June 1996

Prior References

NA20B/492 NA932/171

Estate Fee Simple
Area 6.3235 hectares more or less
Legal Description Lot 12 Deposited Plan 168863

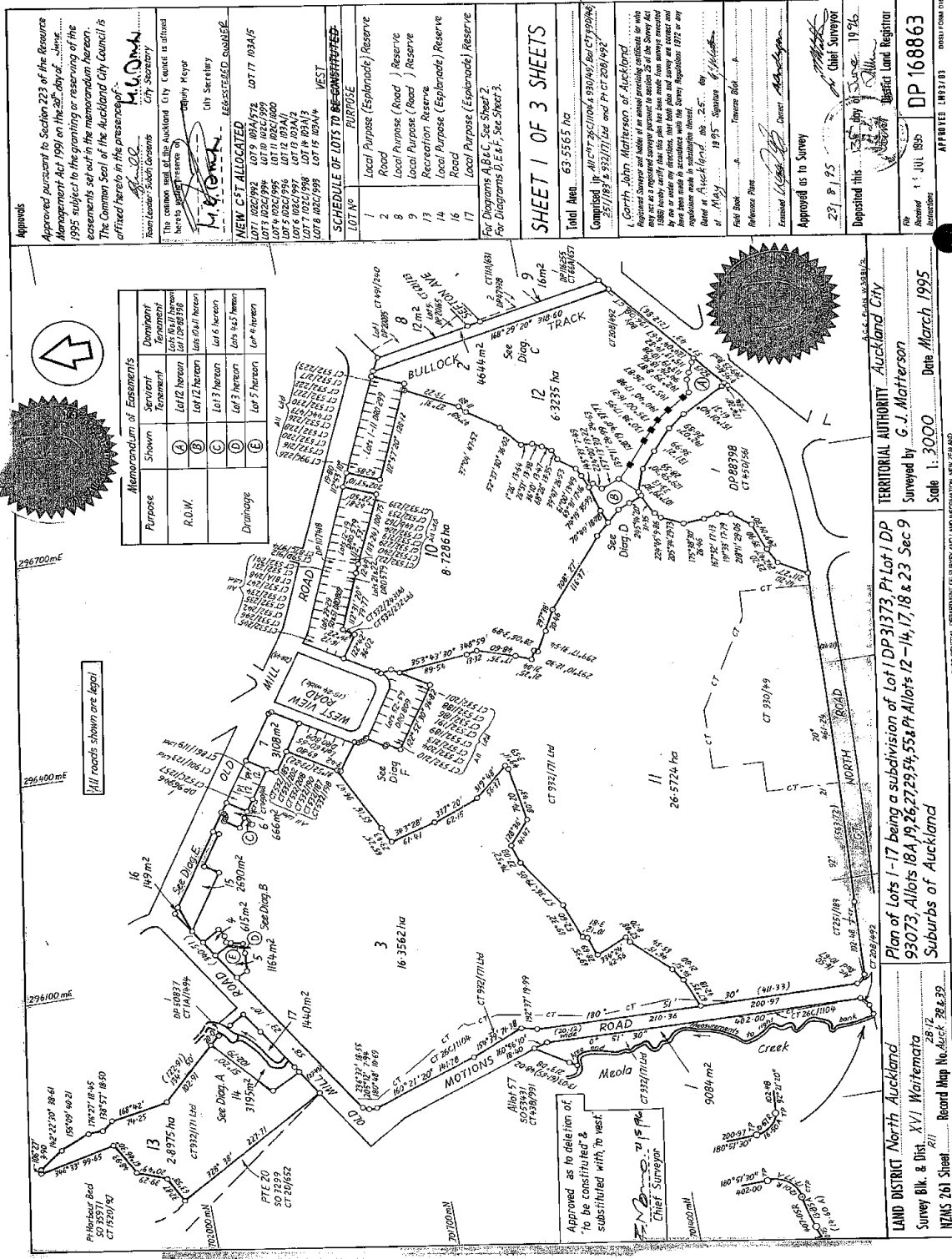
Proprietors

Regional Facilities Auckland Limited

Interests

Subject to a right of way over parts marked A and B on DP 168863 specified in Easement Certificate D007081.4 - 13.6.1996 at 1.22 pm

The easements specified in Easement Certificate D007081.4 are subject to Section 243 (a) Resource Management Act 1991



Approved Pursuant to Section 223 of the Resource Management Act 1991 on the 25th day of June 1995 subject to the granting or reserving of the easements set out in the memorandum hereon. The Common Seal of the Auckland City Council is affixed hereto in the presence of:

H. O'Malley
 Mayor
 City Secretary
 City Clerk
 City Treasurer
 City Engineer
 City Surveyor
 City Assessor
 City Auditor
 City Solicitor
 City Registrar
 City Comptroller
 City Controller
 City Secretary
 City Clerk
 City Treasurer
 City Engineer
 City Surveyor
 City Assessor
 City Auditor
 City Solicitor
 City Registrar
 City Comptroller
 City Controller

Purpose	Shown	Memorandum of Easements	Dominiary
R.O.W.	(A)	Lot 12 hereon	Lot 12 hereon
Drainage	(B)	Lot 12 hereon	Lot 12 hereon
	(C)	Lot 13 hereon	Lot 13 hereon
	(D)	Lot 14 hereon	Lot 14 hereon
	(E)	Lot 15 hereon	Lot 15 hereon

NEW CST ALLOCATED

LOT 1 0202/992 LOT 9 1024/972 LOT 17 1034/5
 LOT 2 0202/995 LOT 10 1022/1000
 LOT 3 0202/996 LOT 11 1023/1000
 LOT 4 0202/997 LOT 12 1034/2
 LOT 5 0202/998 LOT 13 1034/3
 LOT 6 0202/999 LOT 14 1034/4
 LOT 7 0202/1000 LOT 15 1034/5
 LOT 8 0202/1001 LOT 16 1034/6

SCHEDULE OF LOTS TO BE CONSOLIDATED

LOT No	PURPOSE
1	Local Purpose (Esplanade) Reserve
2	Road
3	Road
8	Local Purpose (Road) Reserve
9	Local Purpose (Road) Reserve
13	Recreation Reserve
14	Local Purpose (Esplanade) Reserve
16	Road
17	Local Purpose (Esplanade) Reserve

SHEET 1 OF 3 SHEETS

Total Area: 63.5565 ha

Completed by: **M. J. Mather** 25/11/95

For Diagrams A, B, C, D, E, F, See Sheet 2.

For Diagrams G, H, I, J, See Sheet 3.

Approved as to Survey

23rd June 1995

Deposited this 23rd day of June 1995

DP 168863

1995 JUL 19 1995

DP 168863

APPROVED PURSUANT TO SECTION 223 OF THE RESOURCE MANAGEMENT ACT 1991 ON THE 25th DAY OF JUNE 1995

25 JUN 1995

TERMINAL AUTHORITY Auckland City

Surveyed by G. J. Mather

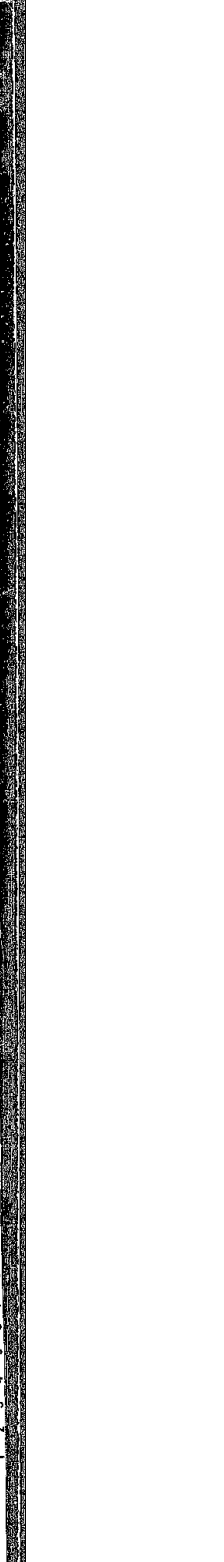
Scale 1:3000 Date March 1995

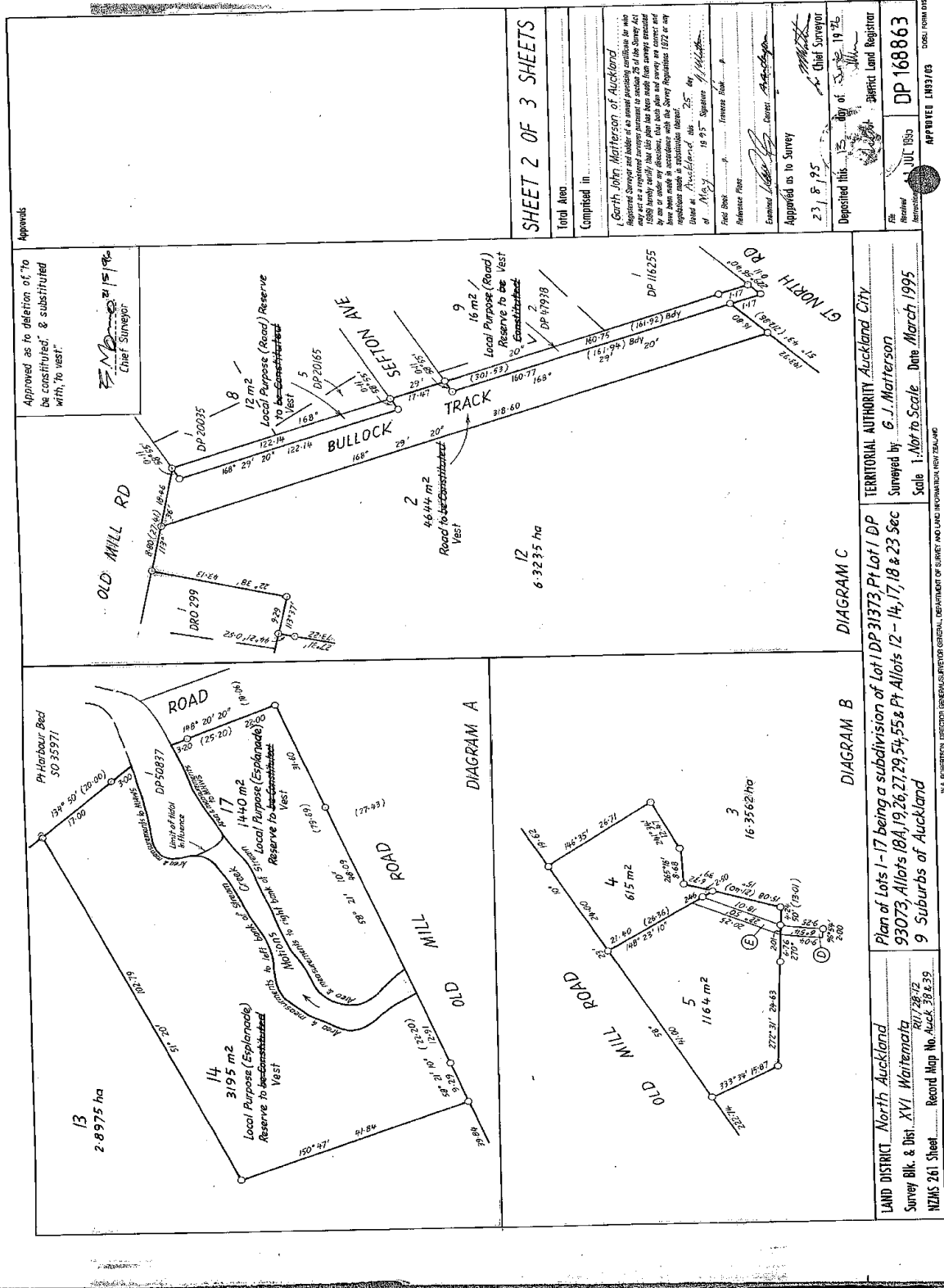
Plan of Lots 1-17 being a subdivision of Lot 1 DP 31373, Pt Lot 1 DP 93073, Allots 18A, 19, 26, 27, 29, 54, 55 & Pt Allots 12-14, 17, 18 & 23 Sec 9 Suburbs of Auckland

LAND DISTRICT North Auckland

Survey Blk & Dist. XVI Waitenata

Record Map No. Auckland 28 & 29





Approved as to deletion of 'to be constituted' & substituted with 'to vest'

[Signature]
Chief Surveyor

SHEET 2 OF 3 SHEETS

Total Area	
Completed in	
<p>Garth John Matterson of Auckland Registered Surveyor and holder of a current practising certificate under the Survey Act 1953 hereby certifies that this plan has been made from survey conducted by me or under my direction, that such plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in pursuance of the said Act.</p> <p>Dated at Auckland this 25th day of July 1995 Signed <i>[Signature]</i> Surveyor</p>	
Field Book	
Reference Plan	
Examined <i>[Signature]</i> Chief Surveyor	
Approved as to Survey	
23, 8, 1995	
Deposited this 13th day of July 1995	
DP 168863	
DP 168863	

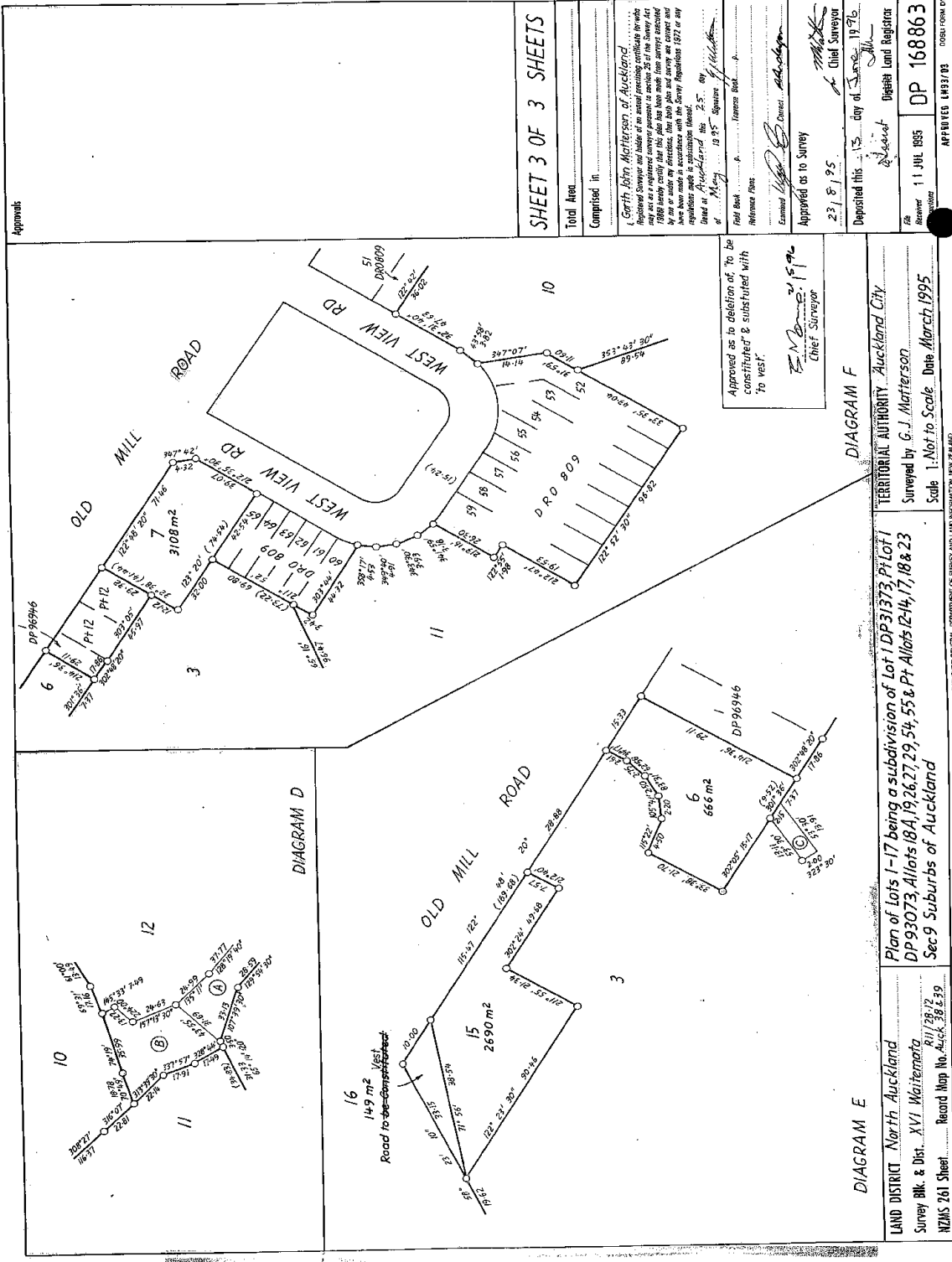
TERRITORIAL AUTHORITY Auckland City
Surveyed by G. J. Matterson
Scale 1:400 to Scale Date March 1995

LAND DISTRICT North Auckland
Survey Blk. & Dist. XVI Waitemata
NZIAS 261 Sheet
Record Map No. Auckland 38 & 39

Plan of Lots 1-17 being a subdivision of Lot 1 DP 31373, Pt Lot 1 DP 93073, Allots 18A, 19, 26, 27, 29, 54, 55 & Pt Allots 12-14, 17, 18 & 23 Sec 9 Suburbs of Auckland

APPROVED EN31/93

V.A. RUBINSTEIN, DIRECTOR GENERAL SURVEY AND LAND INFORMATION SERVICES



6-1
A614884

Declaring Land Taken for State Primary School in the City of Gisborne

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for State primary school from and after the 17th day of January 1972.

SCHEDULE

GISBORNE LAND DISTRICT

ALL those pieces of land situated in the City of Gisborne, Gisborne R.D., described as follows:

- A. R. P. Being
- 0 0 23.3 Part Lot 1 D.P. 3096, being part Whataupoko No. 6D Block; coloured yellow on plan.
 - 0 0 25.1 Part Lot 2, D.P. 3096, being part Whataupoko No. 6D Block; coloured sepia on plan.
 - 0 0 25.1 Part Lot 2, D.P. 3096, being part Whataupoko No. 6D Block; coloured blue on plan.

As the same are more particularly delineated on the plan marked M.O.W. 25791 (S.O. 6135) deposited in the office of the Minister of Works at Wellington, and thereon coloured as above-mentioned.

Dated at Wellington this 15th day of December 1971.
PERCY B. ALLEN, Minister of Works.

(P.W. 31/462/1; Na. D.O. 32/111/1)

Declaring Land Taken, Subject as to Parts to Fencing Agreements for Buildings of the General Government, in the Borough of Taupo

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken, subject as to Lot 37, D.P. S. 5405, to the fencing agreement contained in transfer S. 331043 and subject as to Lot 79, D.P. S. 33323, to the fencing agreements contained in transfers S. 70717 and S. 207990, South Auckland Land Registry, for buildings of the General Government, from and after the 17th day of January 1972.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

ALL those pieces of land situated in the Borough of Taupo, described as follows:

- A. R. P. Being
- 0 0 31.5 Lot 3, D.P. S. 7621 and being part Section 8, Block II, Tauhara Survey District. All certificate of title, No. 3B/210, South Auckland Land Registry.
 - 0 1 0 Lot 37, D.P. S. 5405 and being part Section 1, Block VI, Tauhara Survey District. All certificate of title, No. 5B/1039, South Auckland Land Registry.
 - 0 0 39.5 Lot 79, D.P. S. 33323 and being part Section 1, Block VI, Tauhara Survey District. All certificate of title, Volume 1781, folio 34, South Auckland Land Registry.

Dated at Wellington this 10th day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 24/4185; Hn. D.O. 36/27/3/3/0)

Declaring Land Taken, Subject to Building-line Restrictions and Fencing Agreements, for Buildings of the General Government (Ministry of Works Staff Accommodation) in the City of Tauranga

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, sufficient agreements to that effect having been entered into, the land described in the Schedule hereto is hereby taken subject as to Lot 22, D.P. S. 3060, to the building-line restriction imposed by S. 96722, subject as to Lot 8, D.P. S. 4929, to the building-line restriction imposed by S. 267984, subject as to Lot 17, D.P. S. 1790, to the

fencing agreement contained in transfer S. 116138, subject to Lot 5, D.P. S. 7291, to the fencing covenant contained in transfer S. 223159 and subject also as to Lot 46, D.P. S. 913 to the fencing covenants contained in transfers S. 47290 and S. 217200, South Auckland Land Registry, for buildings of the General Government from and after the 17th day of January 1972.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

ALL those pieces of land, situated in the City of Taurang described as follows:

- A. R. P. Being
- 0 0 35.7 Lot 22, D.P. S. 3060 and being part Allotments 4 and 4G, Parish of Te Papa. All certificate of title, Volume 1439, folio 41, South Auckland Land Registry.
 - 0 0 32.4 Lot 8, D.P. S. 4929 and being part Allotment 11 Parish of Te Papa. All certificate of title, Volume 1736, folio 84, South Auckland Land Registry.
 - 0 0 32.3 Lot 17, D.P. S. 1790 and being part Allotment 11 Parish of Te Papa. All certificate of title, Volume 1280, folio 10, South Auckland Land Registry.
 - 0 0 24.7 Lot 5, D.P. S. 7291 and being part Allotment 10 Parish of Te Papa. All certificate of title, Volume 1792, folio 71, South Auckland Land Registry.
 - 0 0 30.2 Lot 46, D.P. S. 9138 and being part Allotment 10 Parish of Te Papa. All certificate of title, No. 8A/1322, South Auckland Land Registry.
 - 0 0 29.1 Lot 3, D.P. S. 7325 and being part Allotment 1 Parish of Te Papa. All certificate of title, No. 1D/1455, South Auckland Land Registry.

Dated at Wellington this 10th day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 19/467/18/1; Hn. D.O. 46/10/0)

Declaring Land Taken for a Government Centre in the City of Wellington

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for a Government Centre from and after the 17th day of January 1972.

SCHEDULE

WELLINGTON LAND DISTRICT

ALL those pieces of land situated in the City of Wellington Wellington R.D., and described as follows:

- A. R. P. Being
- 0 0 2.17 Part Town Section 544. All certificate of title, Volume 318, folio 125, Wellington Land Registry.
 - 0 0 14.83 Part Town Section 544. All certificate of title, Volume 318, folio 126, Wellington Land Registry.

Dated at Wellington this 21st day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 24/2537/129; Wn. D.O. 45/0/1/0, 45/18/5)

Declaring Land Taken for Better Utilisation in the City of Auckland

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for better utilisation from and after the 17th day of January 1972.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL those pieces of land situated in Block XVI, Waitemara Survey District, City of Auckland, North Auckland R.E. described as follows:

Being
 0 0 035 Allotment 28, Section 7, Suburbs of Auckland.
 All certificate of title, Volume 601, folio 113,
 North Auckland Land Registry.
 0 0 229 Lot 2, D.P. 10276. All certificate of title, Volume
 261, folio 42, North Auckland Land Registry.

Dated at Wellington this 14th day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 71/2/5/0; Ak. D.O. 71/2/5/0)

Declaring Land Taken, Subject to and Together With Rights of Way, for the Generation of Electricity in the City of Manukau

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken, subject to and together with the rights of way contained in easement certificate A-490141, North Auckland Land Registry, for the generation of electricity from and after the 17th day of January 1972.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

All that piece of land containing 1 rood and 0.5 perches situated in Block III, Otahuhu Survey District, City of Manukau, North Auckland R.D., and being Lot 143, D.P. 62869. All certificate of title, No. 19B/706, North Auckland Land Registry.

Dated at Wellington this 10th day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 92/16/29/6; Ak. D.O. 92/16/100/6/3)

Declaring Land Taken for Better Utilisation in Block III, Alexandra Survey District, Raglan County

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for better utilisation from and after the 17th day of January 1972.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

All that piece of land containing 1 acre 1 rood 1 perch, situated in Block III, Alexandra Survey District, being Allotment 201A2A2C1, Parish of Karamu. All certificate of title, No. 10D/1226, South Auckland Land Registry.

Dated at Wellington this 21st day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 72/23/2B/0; Hn. D.O. 72/23/2B/04)

Declaring Land Taken for a Pleasure Ground, a Service Lane, and Street in the Borough of Whakatane

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, sufficient agreements to that effect having been entered into, the land firstly described in the Schedule hereto is hereby taken for a pleasure ground; the land secondly described in the Schedule hereto is hereby taken for a service lane, and the land thirdly described in the Schedule hereto is hereby taken for street; and also hereby declares that the land described in the said Schedule shall vest in the Mayor, Councillors, and Citizens of the Borough of Whakatane from and after the 17th day of January 1972.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

All those pieces of land situated in the Borough of Whakatane described as follows:

Being

Lot 1, D.P. S. 15296. Part certificate of title, No. 1C/1348, South Auckland Land Registry.

Being
 A. R. P.
 0 0 35.1 Lot 6, D.P. S. 15296. Part certificates of title, Nos. 1C/1348, 1C/1349, 1C/1350, and 5B/877, South Auckland Land Registry.

0 0 13.6 Lot 5, D.P. S. 15296. Part certificates of title, Nos. 1C/1348 and 1C/1349, South Auckland Land Registry.

Dated at Wellington this 10th day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 51/4600; Hn. D.O. 43/8/0/12)

Declaring Land Taken, Subject to Certain Rights, for the Generation of Electricity in the City of New Plymouth

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken, subject as to Lot 15, D.P. 10360, to the sewerage rights created by transfer 185956, and subject as to Lots 3, 4, 5, 6, 19, and 20, D.P. 10359, and Lots 7, 8, 16, and 17, D.P. 10360, to the building-line restriction contained in resolution 185955, Taranaki Land Registry, for the generation of electricity from and after the 17th day of January 1972.

SCHEDULE

TARANAKI LAND DISTRICT

All those pieces of land described as follows:

A. R. P. Being
 1 0 2.3 Lots 3, 4, 5, 6, 19, and 20 D.P. 10359.
 1 2 4.27 Lots 7, 8, 9, 10, 14, 15, 16, 17, and 18, D.P. 10360.

Being all certificate of title, No. C2/163, Taranaki Land Registry.

Dated at Wellington this 15th day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 92/13/28/6/1; Wg. D.O. 92/13/28/0/1/3)

Declaring Land Taken for Commercial or Industrial Purposes in the City of New Plymouth

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for commercial or industrial purposes and shall vest in the Mayor, Councillors, and Citizens of the City of New Plymouth from and after the 17th day of January 1972.

SCHEDULE

TARANAKI LAND DISTRICT

All that piece of land, containing 2 roods and 28.5 perches situated in the City of New Plymouth, Taranaki R.D., being part Lot 1, D.P. 4945, being part Sections 721, 722, 723, and 941, Town of New Plymouth; parts closed road and part Huatoki stream bed; as the same is more particularly delineated on the plan marked M.O.W. 19139 (S.O. 9700) deposited in the office of the Minister of Works at Wellington, and thereon coloured orange. All declaration 139485.

Dated at Wellington this 14th day of December 1971.

PERCY B. ALLEN, Minister of Works.

(P.W. 53/376; Wg. D.O. 39/112/0)

Declaring Land Taken, for the Purposes of Part II of the Urban Renewal and Housing Improvement Act 1945, in the City of Wellington

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for the purposes of Part II of the Urban Renewal and Housing Improvement Act 1945 and shall vest in the Mayor, Councillors, and Citizens of the City of Wellington from and after the 17th day of January 1972.

6-2
CN 30214501

*Declaring Land Taken for the Auckland-Kumeu Motorway
in the City of Auckland*

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works and Development hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for the Auckland-Kumeu Motorway, from and after the 17th day of December 1981.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 33 square metres, situated in the City of Auckland, and being part Lot 3, D.P. 10276; as shown on plan S.O. 55639, lodged in the office of the Chief Surveyor at Auckland, and thereon marked "H".

Dated at Wellington this 8th day of December 1981.

W. L. YOUNG, Minister of Works and Development.
(P.W. 71/2/5/0; Ak. D.O. 71/2/5/0/358)

*Declaring Land Taken for the Auckland-Hamilton Motorway
in the City of Auckland*

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works and Development hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for the Auckland-Hamilton Motorway, from and after the 17th day of December 1981.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 20 square metres, situated in the City of Auckland, and being part Lot 6, D.R.O. 422; as shown on plan S.O. 55972, lodged in the office of the Chief Surveyor at Auckland, and thereon marked "A".

Dated at Wellington this 8th day of December 1981.

W. L. YOUNG, Minister of Works and Development.
(P.W. 71/2/11/0; Ak. D.O. 71/2/11/0/272)

*Declaring Land Taken for Housing Purposes in the City of
Auckland*

PURSUANT to section 32 of the Public Works Act 1928, and section 35 of the Finance Act (No. 2) 1945, the Minister of Works and Development hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for housing purposes and shall vest in the Auckland City Council, from and after the 17th day of December 1981.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 304 square metres, situated in the City of Auckland, and being Allotment 53, Section 5, Suburbs of Auckland; as shown on plan S.O. 55994, lodged in the office of the Chief Surveyor at Auckland.

Dated at Wellington this 8th day of December 1981.

W. L. YOUNG, Minister of Works and Development.
(P.W. 71/2/5/0; Ak. D.O. 71/2/5/0/282)

*Declaring Land Taken for Road in Block VI, Port Nicholson
Survey District, City of Wellington*

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works and Development hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for road and shall vest in the Wellington City Council from and after the 17th day of December 1981.

SCHEDULE

WELLINGTON LAND DISTRICT

ALL that piece of land containing 53 square metres, situated in Block VI, Port Nicholson Survey District, being part Lot 1, D.P. 23455; as shown on plan S.O. 30286, lodged in the office of the Chief Surveyor at Wellington and thereon marked "J".

Dated at Wellington this 8th day of December 1981.

W. L. YOUNG, Minister of Works and Development.
(P.W. 71/9/2/0; Wn. D.O. 19/2/2/0/9/27)

*Declaring Land Taken for Waterworks in Block II, Akatarawa
Survey District, Borough of Kapiti*

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works and Development hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken for waterworks, and shall vest in the Wellington Regional Council, from and after the 17th day of December 1981.

SCHEDULE

WELLINGTON LAND DISTRICT

ALL that piece of land containing 1806 square metres, situated in Block II, Akatarawa Survey District, and being also the closed road adjoining or passing through Section 414, Hutt District. All certificate of title, Volume 356, folio 117.

Dated at Wellington this 8th day of December 1981.

W. L. YOUNG, Minister of Works and Development.
(P.W. 50/1016/0; Wn. D.O. 96/7/0/7)

*Declaring Land Taken Together With and Subject to Certain
Rights for Commercial Purposes in the City of Christchurch*

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works and Development hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken, subject to and/or together with the easements listed in the said Schedule and applicable as shown, for commercial purposes and shall vest in the Christchurch City Council, from and after the 17th day of December 1981.

SCHEDULE

CANTERBURY LAND DISTRICT

ALL those pieces of land situated in the City of Christchurch, described as follows:

- | Area
m ² | Being |
|------------------------|--|
| 73 | Lot 1, D.P. 4131. All certificate of title 293/77. Together with right of way over part Town Section 256 and together with and subject to party wall rights granted by Transfer 323351. |
| 83 | Part Town Section 256. All certificate of title 364/176. Together with right of way created by conveyance 27145 and together with and subject to party wall rights granted by Transfer 323351. |
| 228 | Part Town Section 256. All certificate of title 9A/32. Together with right of way over part Town Section 256. |

Dated at Wellington this 8th day of December 1981.

W. L. YOUNG, Minister of Works and Development.
(P.W. 53/367/1; Ch. D.O. 38/73)

*Declaring Land Taken for, Subject to a Fencing Agreement,
for the Generation of Electricity (Housing) in the Borough
of Kaikohe*

PURSUANT to section 32 of the Public Works Act 1928, the Minister of Works and Development hereby declares that, a sufficient agreement to that effect having been entered into, the land described in the Schedule hereto is hereby taken, subject to the fencing agreement contained in transfer 690004, North Auckland Land Registry, for the generation of electricity (housing), from and after the 17th day of December 1981.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 809 square metres, situated in the Borough of Kaikohe, and being Lot 19, D.P. 43474. All certificate of title, Volume 2102, folio 20, North Auckland Land Registry.

Dated at Wellington this 8th day of December 1981.

W. L. YOUNG, Minister of Works and Development.
(P.W. 92/14/22/56; Ak. D.O. 92/14/21/6/14)

PROC 17511 Proclamation

Copy - 01/01, Page - 002, 01/03/11, 09:22



DocID: 319867889

6-3
Proc - 17511

Extract from *N.Z. Gazette*, 28 April 1960, No. 27, page 537

Land Taken for Better Utilisation in the City of Auckland

CORBHAM, Governor-General
A PROCLAMATION

PURSUANT to the Public Works Act 1928, I, Charles John Viscount Cobham, the Governor-General of New Zealand, hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for better utilisation; and I also declare that this Proclamation shall take effect on and after the 2nd day of May 1960.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

All those pieces of land situated in Block XVI, Waitemata Survey District, City of Auckland, Auckland R.D., described as follows:

- 4: R. F. Being
- 0-0 28-04 Part Allotment 43, Section 5, and part Allotments 21 and 26, Section 7, Suburbs of Auckland. All certificates of title, Volume 1041, folio 137, Auckland Land Registry.
- 0-0 0-17 Allotment 17 of Section 7, Suburbs of Auckland. All certificates of title, Volume 601, folio 112, Auckland Land Registry.

Given under the hand of His Excellency the Governor-General, and issued under the Seal of New Zealand, this 5th day of April 1960.

[Ss.] H. WATT, Minister of Works.

God Save the Queen!

(P.W. 71/2/5/0; D.O. 71/2/5/0)

E. G. OWEN, Government Printer, Wellington, New Zealand.

1081/137
601/112

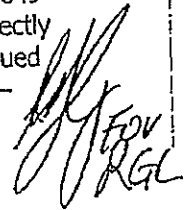
17511

PROCLAMATION

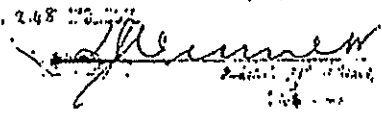
8742436.1 Gazette Notice (2011 p 999) declaring part Lot 4 DP 10276

a) now known as Section 12 on SO 434649 to be road, which pursuant to Section 5 Land Transport Management Act 2003 forms part of State Highway 1;

b) now known as Section 14 on SO 434649 to be land set apart for the functioning indirectly of a road (segregation strip) CIR 554928 issued and all shall vest in Her Majesty the Queen - 14.4.2011 at 7.00am



17511
1091/137
May 1960
2.48




o/c's noted 20.4.10

~~B021450.2 } Cancelled as to part lots then
12.1.1982 } 10.176 and 07 issued~~

~~B021450.2 Certificate under Section 99
Public Works Amendment Act 1988
Using part Allotment 75 Sec 7 Suburbs
of Auckland in Grey Lynn Association
Football Club Incorporated - 12.1.1982 of 12.02
oc
NEW C.T. issued 510/792~~

Recorded on D.P. 7415, D.P. 10276

~~B.048068.2 Certificate under Section
107(7) Public Works Act 1981 vesting the
part Allotment 78 Section 7 Suburbs of
Auckland in Graham Maxwell Gould
and Lindsay Matthews as tenants in common
in equal shares - 26.3.1982 at 9.15%~~

~~NEW C.T. 518/1146 issued~~

LAND BY DEEDS
Number 10000
Form 1
11 MAY 1960
Time 2.15
Page 1
Abstract No. 091

6-4
GN 200083

GN 200083 Gazette Notice

Copy - 07/01, Page - 004, 22/11/77, 10:27



DgclD: 313599979

Extract from N.Z. Gazette, 24 February 1972, No. 18, p. 164

Land Held for State Housing Purposes, Set Apart for the Auckland-Kanara Motorway by the City of Auckland

Pursuant to section 21 of the Public Works Act 1951, the Minister of Works hereby declares the land described in the Schedule hereto to be set apart for the Auckland-Kanara Motorway from and after the 15th day of February 1972.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

All these pieces of land situated in Block XVI, Waitohu Survey District, City of Auckland, North Auckland B.D., described as follows:

A. B. P.

Lot

- 2111/42 } 0 32.38 Lot 138, D.P. 18452, Part certificate of title, Volume 2111, folio 62. C-4-4442
- Lo 0 28.94 Lot 142, D.P. 18452, Part certificate of title, Volume 2111, folio 62.
- 217/1226 } 0 19.31 Lot 149, D.P. 18452, Part certificate of title, Volume 1822, folio 12.
- 217/1227 } 0 0 25.89 Lot 153, D.P. 18452, Part certificate of title, Volume 1822, folio 12.
- 217/1228 } 0 0 32.97 Lot 5, D.P. 34461, Part certificate of title, Volume 1822, folio 12. 241-11
- 217/1229 } 0 1 2.57 Lot 7, D.P. 34461, Part certificate of title, Volume 1822, folio 12.
- not sighted } 217/1230 } 0 0 32.34 Lot 3, D.P. 34461, Part certificate of title, Volume 1822, folio 12.
- 217/1231 } 0 0 26.49 Lot 4, D.P. 34461, Part certificate of title, Volume 1822, folio 12.
- 217/1232 } 0 0 26.64 Lot 5, D.P. 34461, Part certificate of title, Volume 1822, folio 12.
- 217/1233 } 0 0 26.64 Lot 7, D.P. 34461, Part certificate of title, Volume 1822, folio 12.
- 217/1234 } 0 0 35.68 Lot 8, D.P. 34461, Part certificate of title, Volume 1822, folio 12.
- 2111/42 } 0 0 25.6 Lot 6, D.P. 34461, Part certificate of title, Volume 1822, folio 12. 229-9-5
- 1361/66 } 0 0 21.81 Lot 1, D.P. 34471, Part certificate of title, Volume 1841, folio 66.
- 0 0 35.21 Lot 2, D.P. 34471, Part certificate of title, Volume 1841, folio 66.
- 0 1 20.35 Lot 3, D.P. 34471, Part certificate of title, Volume 1841, folio 66. 200-1-17
- 143/249 } 1 0 20 Lot 1, D.P. 31194, Part certificate of title, Volume 141, folio 249. 154
- 0 2 22.5 Lot 13, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 0 1 21.2 Lot 14, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 0 0 27.2 Lot 15, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 0 0 26 Lot 20, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 1361/66 } 0 0 24.2 Lot 23, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 0 0 34.6 Lot 25, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 0 0 27.2 Lot 27, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 0 0 34.1 Lot 30, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- 0 0 20 Lot 31, D.P. 34472, Part certificate of title, Volume 1841, folio 66.
- B-407815.1 } 0 0 25.7 Lot 4, D.P. 48119, Part certificate of title, Volume 1822, folio 12. 17/15
- 1561/66 } 0 0 25.7 Lot 17, D.P. 6790, Part certificate of title, Volume 718, folio 181. 17/15
- 0 1 8.63 Lot 116, D.P. 7815, Part certificate of title, Volume 1841, folio 66. 74-15

North Auckland Land Registry.

Entered at Wellington this 24 day of February 1972.

PERCY S. ALLEN, Minister of Works.

(P.W. 71/219); A.L. D.O. 71/2157)

A. A. Bishop, Government Printer, Wellington, New Zealand.

Wood on O.S. 2111/42.
1361/66,
843/249,
718/183

7 March 1972 at 10.36 a/c
Waharoa
Ave.



8021450.2 Certificate under Section 99 Public Works Amendment Act 1968 vesting part of Section 7 Suburb of Auckland herein in Grey Lynn Association Football Club Incorporated - 12.1.1982 at 12.02 o/c
New CT. issued 5/12/92

Said on. DPs. 29441, 38437, 3114, 17412, 39426, 48119, 6766, 7416.

B.0480682 Certificate under Section 107 (1) Public Works Act 1981 vesting the part Allotment 70 Sect 7 Suburb of Auckland in Graham Maxwell Gould and Lindsay Matthew as tenants in common in equal shares - 24.3.1982 at 9.15 o/c

New CT. 518/1146 issued

B.216120.1 Gazette Notice (N.Z. Gazette No. 134, 25.8.1983 p. 2760) acquiring parts (31 square metres and 912 square metres) herein for road and vesting same in the Auckland City Council on 25.8.1983 - 16.9.1983 at 2.11 o/c

B.332970.1
O.N.C.T.
26.9.1984

Cancelled as typist and
New CT issued
558/678

11/2/92
A.L.R.

8319633.1 Gazette Notice (N.Z. Gazette 13.12.1984 p. 567) declaring part (188m²) Lot 95 Plan 6756 to be acquired for an accessway and vesting same in the Auckland City Council on the 13th day of December 1984 - 11.1.1985 at 10.18 o/c

Waharoa
Ave

B.407513.1 Gazette Notice (N.Z. Gazette 11.4.1985 page 1578) acquiring part Lot 31 Plan 38426 (1 square metre) for road and vesting same in the Auckland City Council - 30.4.1985 at 2.04 o/c

RECALL FILE LABEL
F5000012060579

8742436.1 Gazette Notice (2011 p 999) declaring

a) part Lot 1 DP 31164, part Lot 95 DP 6756, Lots 20, 23 & 25, part Lots 13, 14 & 19 DP 39426, Lots 1, 2, 3 DP 38437 and part Lot 146 DP 7415 (now known as Section 10, 11 & 12 on SO 434649) to be road, which pursuant to Section 5 Land Transport Management Act 2003 forms part of State Highway 1

b) part Lot 1 DP 31164, part Lot 146 DP 7415, part Lots 13, 14 & 19 DP 39426, part Lot 95 DP 6756 (now known as Section 13, 14, 15 & 17 on SO 434649) to be land set apart for the functioning indirectly of a road (segregation strip) CIR 554928 issued and all shall vest in Her Majesty the Queen - 14.4.2011 at 7.00am

Waharoa
Ave
FOLRGL

0103 - PIC with
MURPHY L. S.
10/2/2011 - 10:34
14/2/2011

2000883
DISTRICT LAND REGISTRY
AUCKLAND NO. 1
MAR 7 10 36 AM '72

7/12/92



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA51B/461
Land Registration District North Auckland
Date Issued 13 April 1982

Prior References
GN A614884

Estate	Fee Simple
Area	145 square metres more or less
Legal Description	Allotment 76 Section 7 Suburbs of Auckland

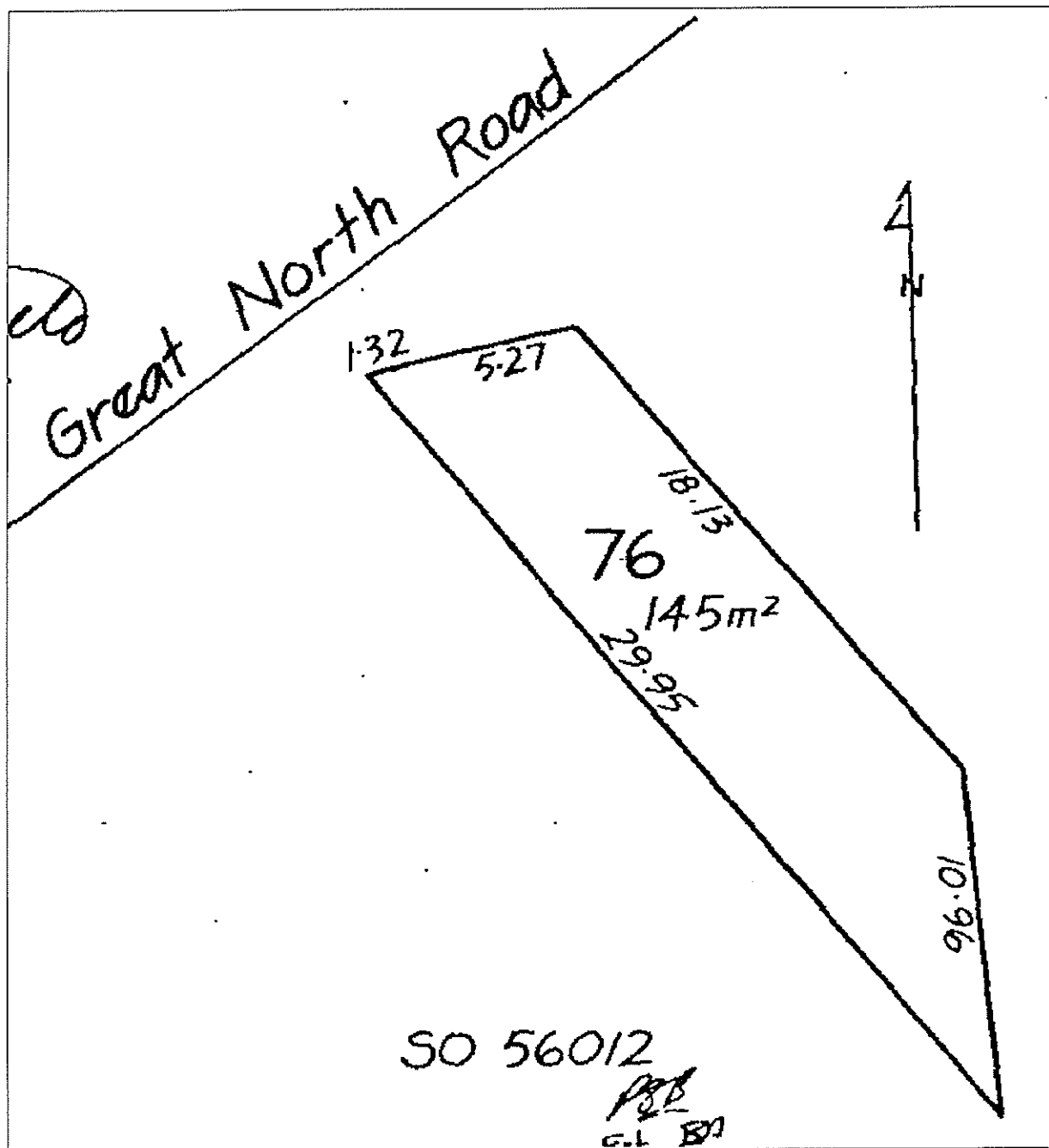
Proprietors
Auckland Council

Interests

Subject to Section 5 Coal Mines Act 1979
Subject to Section 8 Atomic Energy Act 1945
Subject to Section 8 Mining Act 1971
Subject to Section 3 Geothermal Energy Act 1953
Subject to Section 3 Petroleum Act 1937

Identifier

NA51B/461





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA371/245**
Land Registration District **North Auckland**
Date Issued 12 May 1923

Part-Cancelled

Prior References
NA261/13

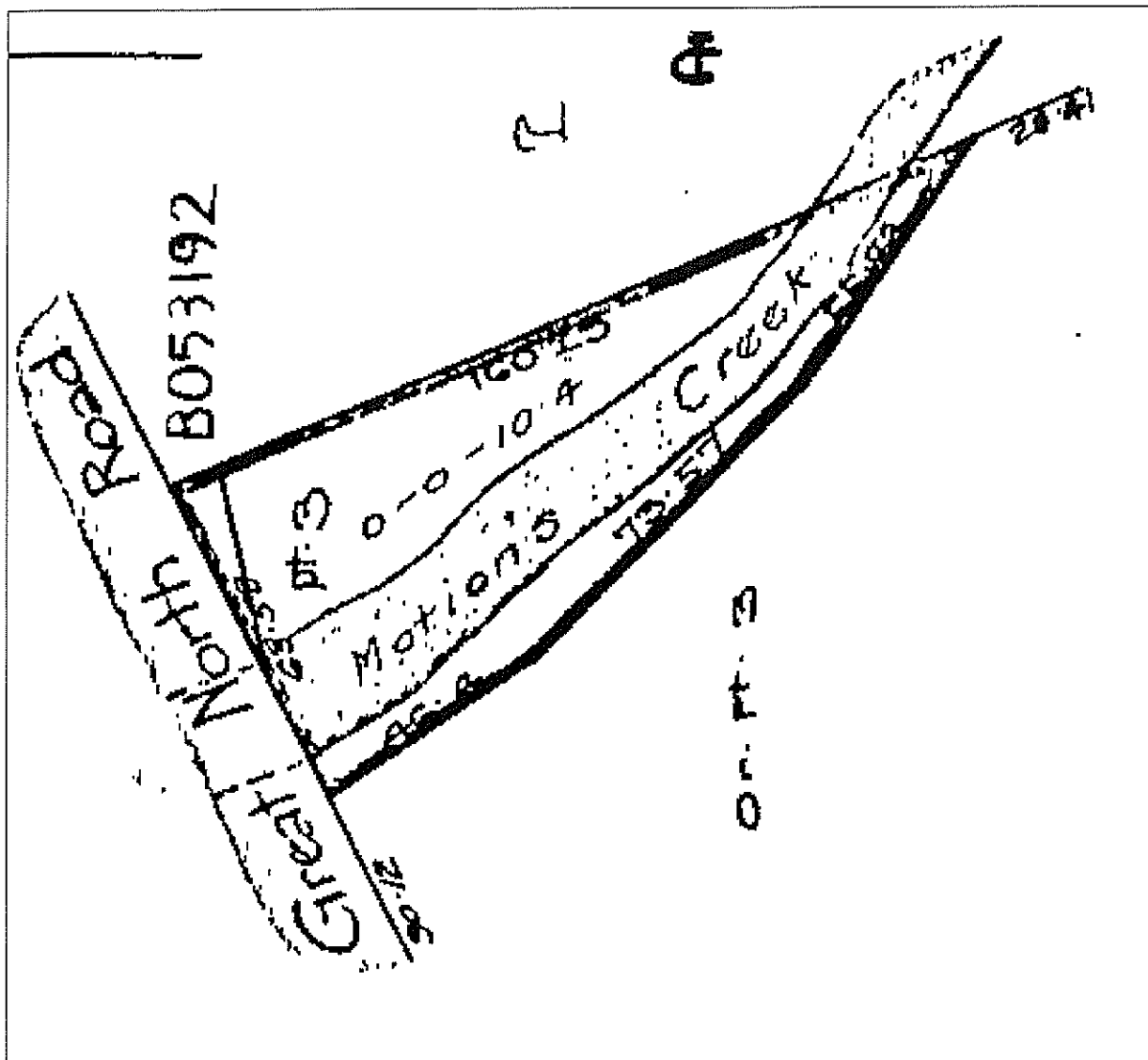
Estate Fee Simple
Area 263 square metres more or less
Legal Description Part Lot 3 Deposited Plan 10276

Proprietors
Auckland Council

Interests
B053192.1 Gazette Notice (New Zealand Gazette 18.3.1982 p.845) acquiring part (8m²) for Auckland - Kumeu
Motorway - 13.4.1982 at 12.05 pm

Identifier

NA371/245





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA51D/863**
Land Registration District **North Auckland**
Date Issued 27 April 1982

Prior References

NA51D/792 NA854/189

Estate Fee Simple
Area 1198 square metres more or less
Legal Description Part Lot 3 Deposited Plan 10276 and
 Allotment 31 and Allotment 75 Section 7
 Suburbs of Auckland

Proprietors

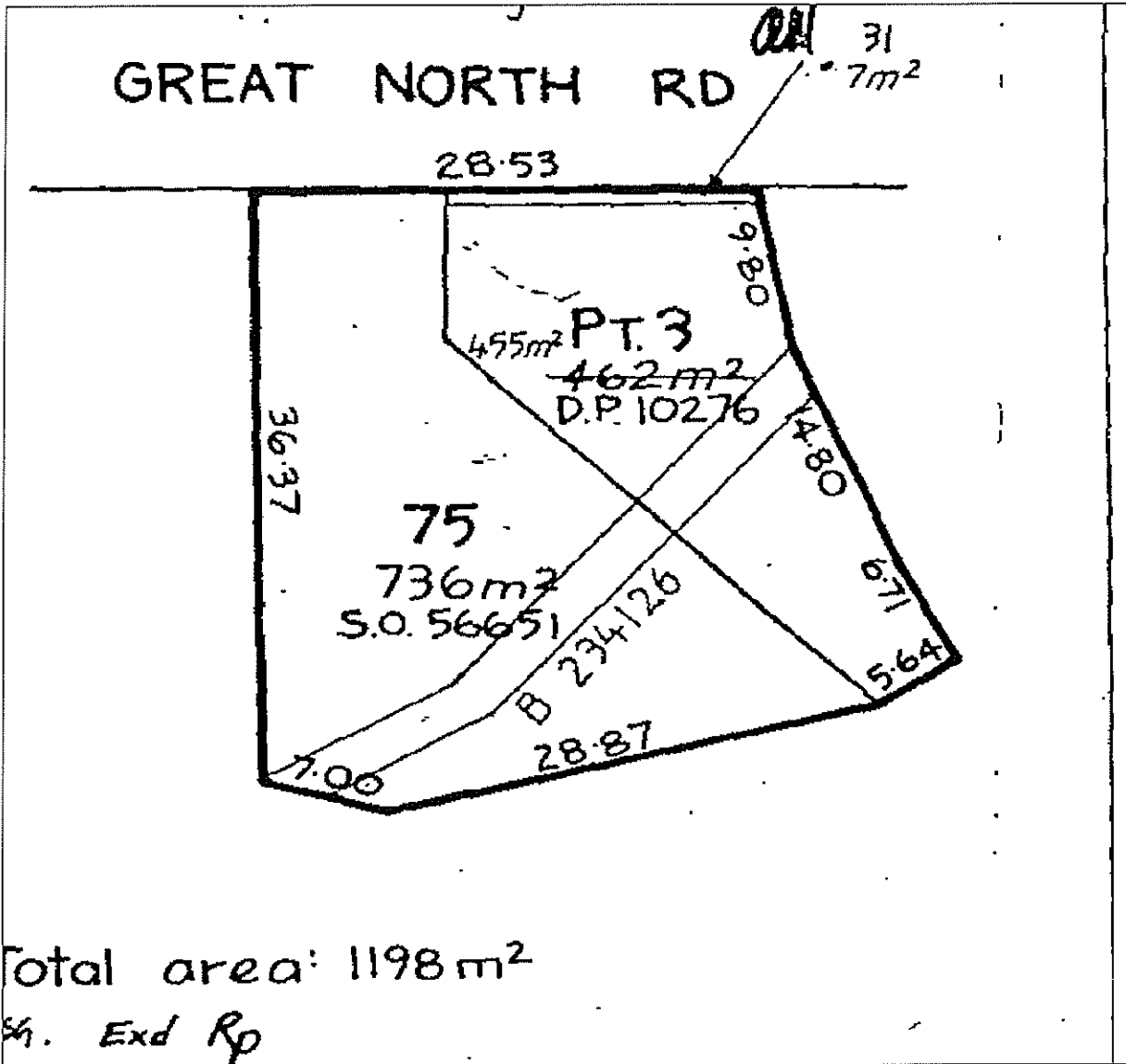
Tawa Farms Limited

Interests

Subject to Section 5 Coal Mines Act 1979 (affects Allotment 75 Section 7 Suburbs of Auckland)
Subject to a flood water drainage right created by Gazette Notice B234126.1(NZ Gazette 2.10.1983 No. 177 page 3553) - 9.10.1983 at 10.50 am (affects Allotment 75 Section 7 Suburbs of Auckland and part of part Lot 3 DP 10276)
D543635.4 Lease to Challenge Petroleum Limited Term 15 years commencing on the 8.9.2000 - 25.9.2000 at 10.37 am (renewal and purchasing clause)
Fencing clause in Lease D543635.4 - 25.9.2000 at 10.37 am
8040232.6 Mortgage to Westpac New Zealand Limited - 16.1.2009 at 9:17 am

Identifier

NA51D/863





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA5A/1266
Land Registration District North Auckland
Date Issued 26 January 1965

Part-Cancelled

Prior References

NA536/181

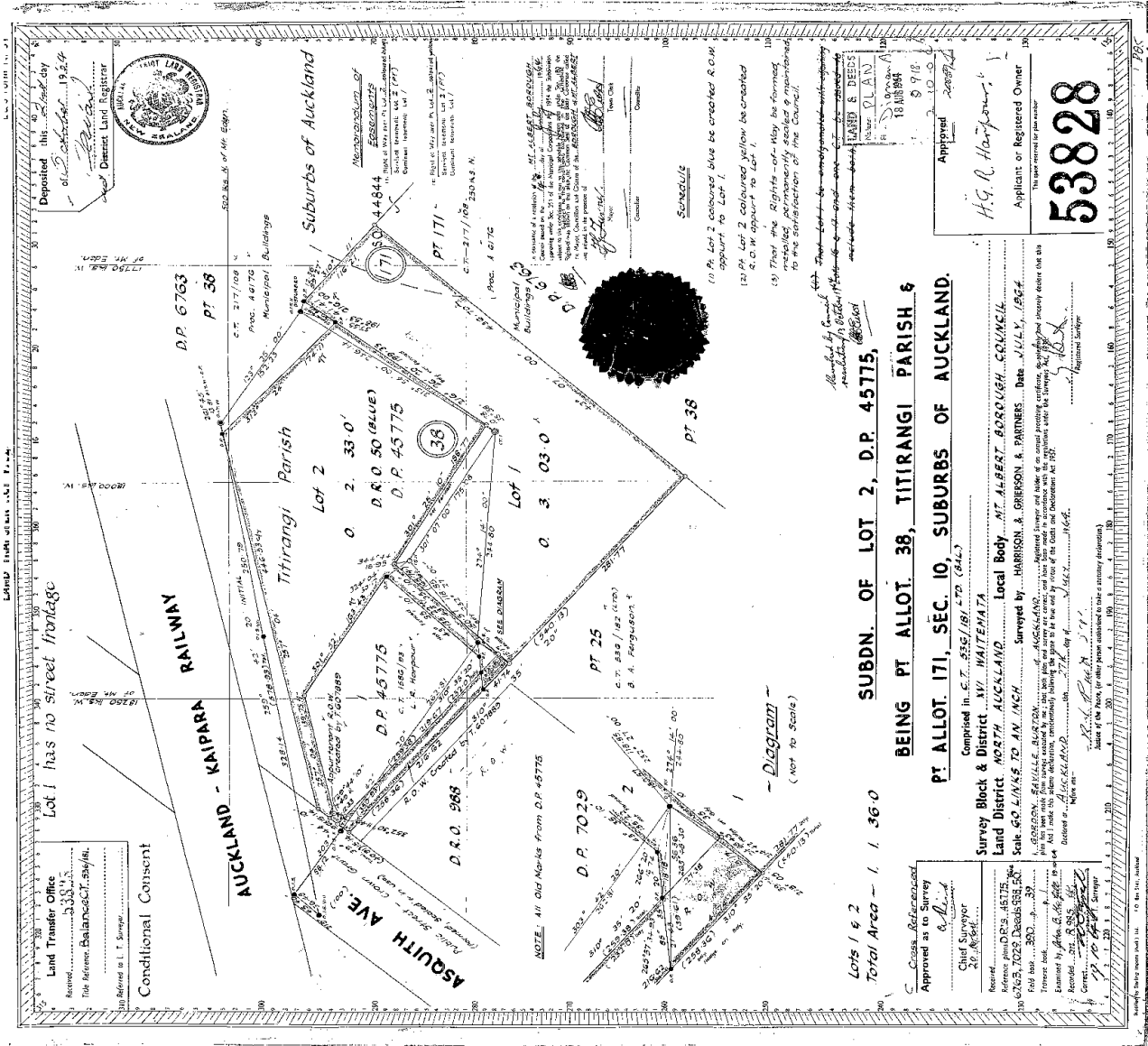
Estate Fee Simple
Area 3111 square metres more or less
Legal Description Lot 1 Deposited Plan 53828

Proprietors

Auckland Council

Interests

154226.1 Proclamation declaring part (5.4p) within land taken for street - 22.2.1974 at 1.49 pm
7197692.7 Pursuant to Section 107 (9A) Public Works Act 1981 where Section 1 SO Plan 344191 herein has been amalgamated with CT NA103B/749 - 19.1.2007 at 9.00 am



Deposited this 19th day of ... 1954
District Land Registrar
W. H. ...

Approved [Signature]
Applicant or Registered Owner
H. R. Harcourt
53828

Subdn. of Lot 2, D.P. 45775,
Being Pt. Allot. 38, TITIRANGI PARISH &
Pt. Allot. 171, Sec. 10, SUBURBS OF AUCKLAND.

Composed in C.T. 555/181 & 570 (644.)
Survey Block & District ...
Land District NORTH AUCKLAND Local Body ...
Scale 60 LINES TO AN INCH

Approved as to Survey & ...
Chief Surveyor
Examined by ...
Recorded ...



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy

R. W. Muir
Registrar-General
of Land

Identifier **NA217/108**
Land Registration District **North Auckland**
Date Issued 20 February 1914

Part-Cancelled

Prior References

APP 5058 PROC A6176

Estate Fee Simple
Area 1.3453 hectares more or less
Legal Description Part Allotment 170-171 Section 10
Suburbs of Auckland and Part Allotment
38 Parish of Titirangi and Defined On
Deposited Plan 6763
Purpose for municipal buildings

Proprietors

Auckland Council

Interests

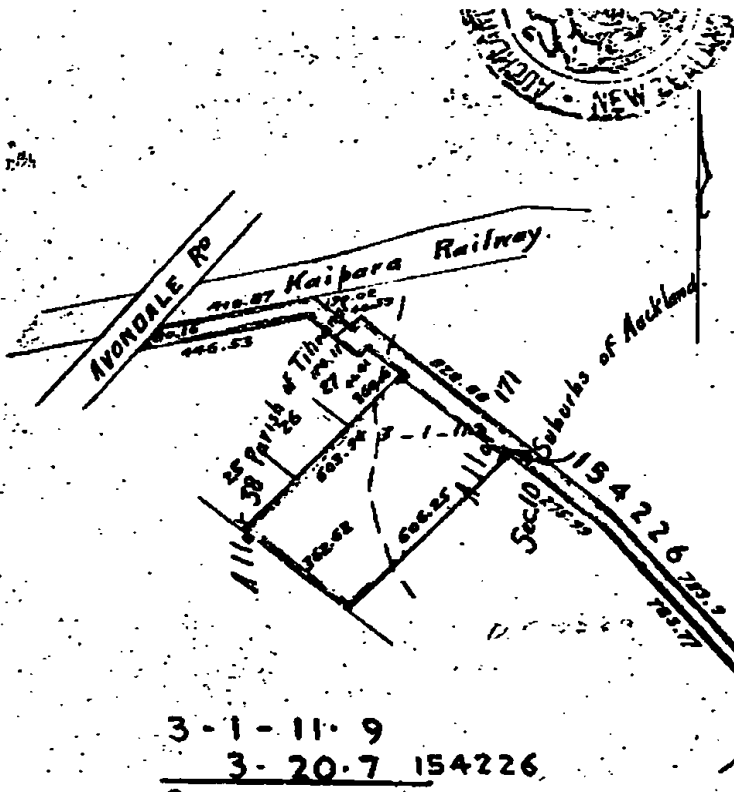
Subject to a right of way over part created by Conveyance 183042 (R133.30)
Subject to a right of way over part created by Deed of Grant 231287 (R222.514)
154226.1 Proclamation (NZ Gazette 31.1.1974 p.153) proclaiming part (3559m²) to be taken for street and vesting
in the Mount Albert Borough Council on and after 31.1.1974 - 22.2.1974 at 1:49 pm
D626310.1 CERTIFICATE PURSUANT TO SECTION 37(2) BUILDING ACT 1991 (ALSO AFFECTS CTs
NA1999/21, NA7D/1149, NA270/60, NA719/128, NA717/314, AND NA719/127) - 30.7.2001 at 12:15 pm

Title Diagram NA217/108

Cpy - 01/01, Pgs - 001, 24/12/10, 10:57



DocID: 512410067



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3-1-11-9
 3-20-7 154226
 2-1-31-2
 Scale - 4 Chains
 E.R.F.

Mortgage

ERIC AREA IS 1.3453 ha The King
 1.3453 ha 1910 st



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA988/61**
Land Registration District **North Auckland**
Date Issued 01 February 1951

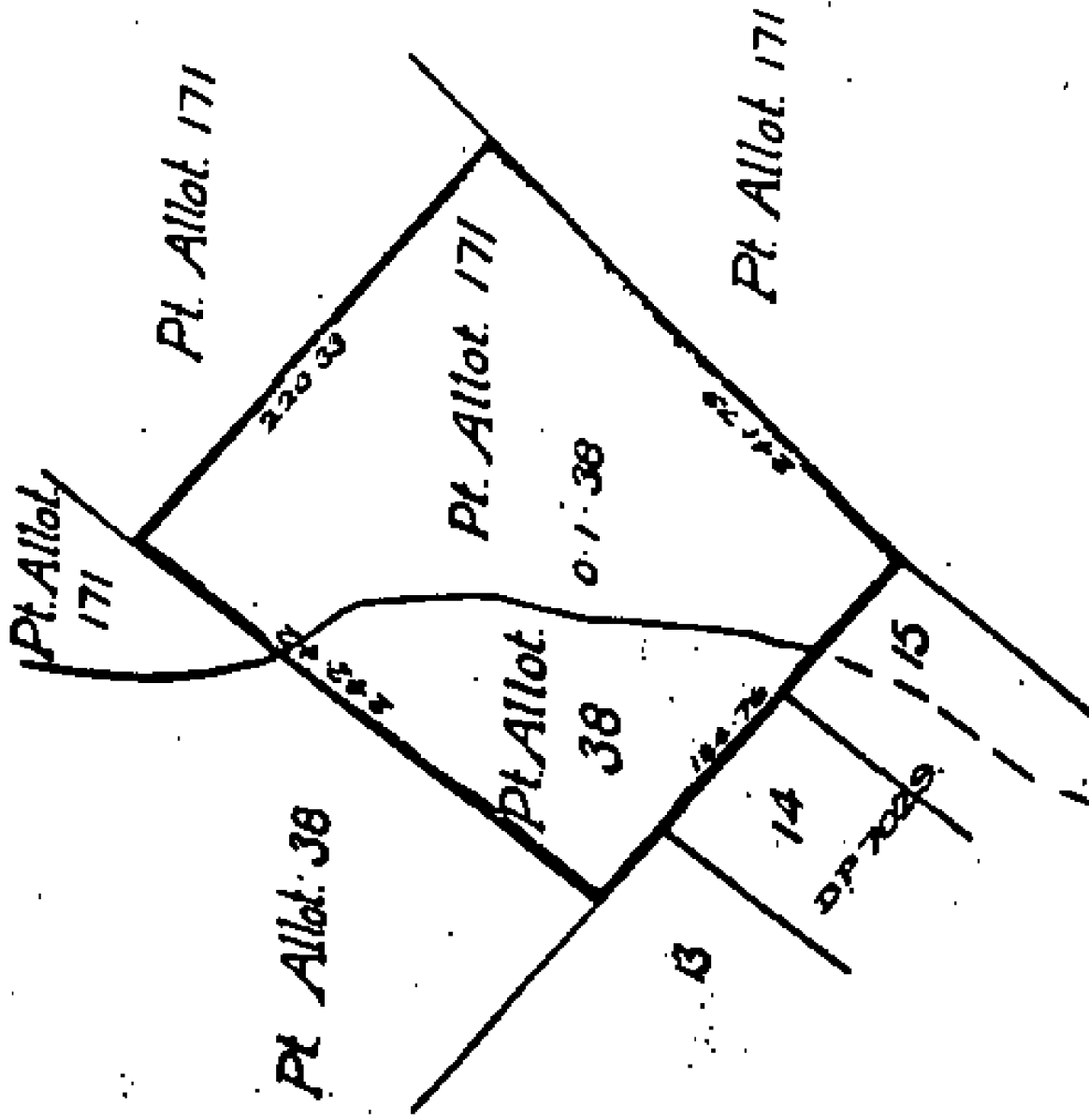
Prior References

NA536/185 PROC 13117

Estate Fee Simple
Area 1973 square metres more or less
Legal Description Part Allotment 38 Parish of Titirangi and
 Part Allotment 171 Section 10 Suburbs of
 Auckland
Purpose Borough depot

Proprietors
Auckland Council

Interests





COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA1999/21**
Land Registration District **North Auckland**
Date Issued 04 December 1961

Prior References

NA265/227 NA340/79

Estate Fee Simple
Area 944 square metres more or less
Legal Description Lot 14 and Part Lot 15 Deposited Plan
7029

Proprietors

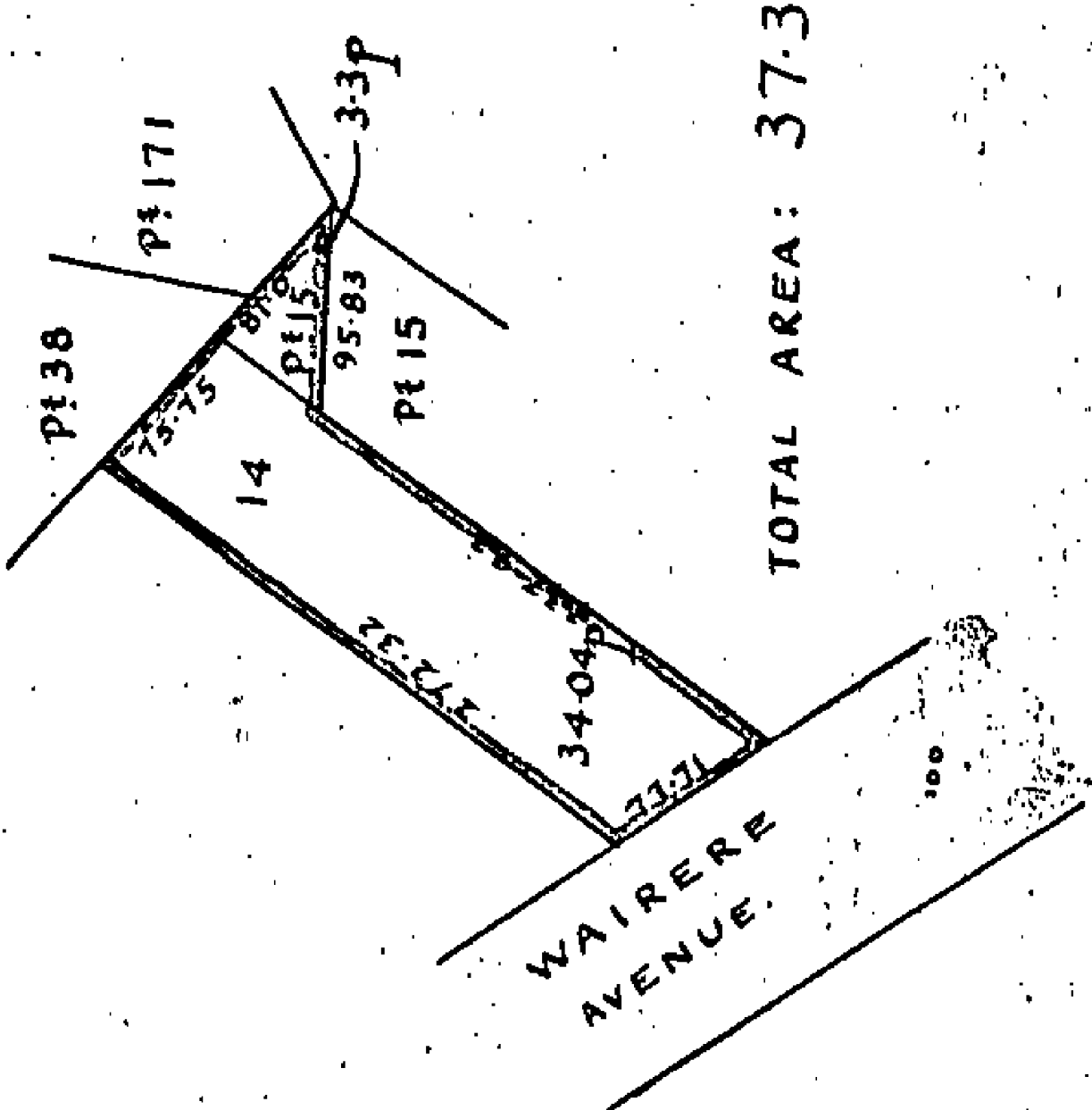
Auckland Council

Interests

Subject to Section 351D (3) Municipal Corporations Act 1954
D626310.1 CERTIFICATE PURSUANT TO SECTION 37 BUILDING ACT 1991 (ALSO AFFECTS CST
NA217/108, NA7D/1149, NA270/60, NA719/128, NA717/314, NA719/127) - 30.7.2001 AT 12.15 PM

Identifier

NA1999/21



Street Closed in the Hikurangi Town District

[L.S.] B. C. FREYBERG, Governor-General
A PROCLAMATION

PURSUANT to section twelve of the Land Act, 1924, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim as closed the portion of street described in the Schedule hereto.

SCHEDULE

APPROXIMATE area of the piece of street closed: 1 acre 6-4 perches. Adjoining Lot 22 and Lots 24 to 35 (inclusive), and part Lot 30, D.P. 17558, being portion of Allotment 42, Hikurangi Parish, and portion of Allotment 42, Hikurangi Parish.

Situated in Block XVI, Hukerenui Survey District (Auckland R.D.). (S.O. 34343.)

In the North Auckland Land District; as the same is more particularly delineated on the plan marked P.W.D. 125978, deposited in the office of the Minister of Works at Wellington, and thereon coloured green.

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 31st day of August, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 31/263.)

Additional Land Taken for a Technical School in the City of Palmerston North

[L.S.] B. C. FREYBERG, Governor-General
A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the additional land described in the Schedule hereto is hereby taken for a technical school; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE areas of the pieces of additional land taken:—

A. R. P.	Being
3 0 28	Part of Suburban Section 230, Township of Palmerston North; coloured orange.
5 0 2-23	Suburban Section 235, Township of Palmerston North, part being also Lots 5, 6, 7, 8, and part of Lot 4 on D.P. 10561; coloured blue.

All situated in Block X, Kairanga Survey District (City of Palmerston North). (S.O. 21691.)

In the Wellington Land District; as the same are more particularly delineated on the plan marked P.W.D. 127577, deposited in the office of the Minister of Works at Wellington, and thereon coloured as above mentioned.

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 3rd day of September, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 31/457/1.)

Additional Land Taken for a Public School in the Borough of Cambridge

[L.S.] B. C. FREYBERG, Governor-General
A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the additional land described in the Schedule hereto is hereby taken for a public school and shall vest in the Education Board of the District of Auckland as from the date hereinafter mentioned; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE area of the piece of additional land taken: 1 acre 2 roods 8-8 perches.

Being Lots 3, 4, and 5 on D.P. 28423, being Allotment 142 and part Allotment 140, Township of Cambridge East, and being the residue of the land comprised and described in Certificate of Title, Volume 711, folio 354 (Auckland Land Registry).

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 3rd day of September, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 31/889.)

Land Taken for a Public School in the Borough of New Plymouth

[L.S.] B. C. FREYBERG, Governor-General
A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for a public school and shall vest in the Education Board of the District of Taranaki as from the date hereinafter mentioned; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE area of the piece of land taken: 4 acres 3 roods 18 perches.

Being Lot 1, Deposited Plan 6148, part Section 46, Fitzroy District, Block V, Paritutu Survey District, and being the whole of the land comprised and described in Certificate of Title, Volume 158, folio 161 (Taranaki Land Registry).

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 31st day of August, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 31/868.)

Land Taken for a Public School in the Borough of Pahiatua

[L.S.] B. C. FREYBERG, Governor-General
A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for a public school and shall vest in the Education Board of the District of Wellington as from the date hereinafter mentioned; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE areas of the pieces of land taken:—

A. R. P.	Being
0 1 32-7	Lots 2 and 3, D.P. 11894; coloured orange.
1 1 16-67	Part Lot 220, D.P. 377, and part Lot 1, D.P. 281; coloured blue.
0 0 31-31	Part Lots 128, 129, and 133, D.P. 305; coloured blue.
0 2 29-12	Part Lots 126, 127, 128, 132, and 133, D.P. 305; coloured orange.
0 1 0-1	Part Lots 126, 127, 132, and 133, D.P. 305; coloured sepia.
0 1 12-03	Part Lots 125 and 126, D.P. 305; coloured blue.

Situated in Block VIII, Mangahao Survey District (Borough of Pahiatua). (S.O. 21611.)

In the Wellington Land District; as the same are more particularly delineated on the plan marked P.W.D. 127494, deposited in the office of the Minister of Works at Wellington, and thereon coloured as above mentioned.

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 7th day of September, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 31/859.)

Land Taken for a Secondary School in the Borough of Mount Albert

[L.S.] B. C. FREYBERG, Governor-General
A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for a secondary school; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

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SCHEDULE

APPROXIMATE areas of the pieces of land taken:—

A.	R.	P.	Being
18	1	15.5	Part Allotments 41 and 42, Parish of Titirangi, on D.P. 7365, and part Allotments 168 and 169 of Section 10, Suburbs of Auckland, on D.P. 7365; coloured yellow.
0	0	18.2	Part Allotment 41, Parish of Titirangi, on D.P. 22808; coloured blue.

Situated in Block IV, Titirangi Survey District (Auckland R.D.). (S.O. 34849.)

In the North Auckland Land District; as the same are more particularly delineated on the plan marked P.W.D. 127576, deposited in the office of the Minister of Works at Wellington, and thereon coloured as above mentioned.

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 31st day of August, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 31/429.)

Land Taken for a Quarry in Block V, Waiwera Survey District, Waitemata County

[L.S.] B. C. FREYBERG, Governor-General

A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for a quarry and shall vest in the Chairman, Councillors, and Inhabitants of the County of Waitemata as from the date hereinafter mentioned; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE area of the piece of land taken: 4 acres 1 rood 3 perches.

Being part Allotment 165, Makarau Parish.

Situated in Block V, Waiwera Survey District (Auckland R.D.). (S.O. 33225.)

In the North Auckland Land District; as the same is more particularly delineated on the plan marked P.W.D. 126887, deposited in the office of the Minister of Works at Wellington, and thereon coloured yellow.

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 3rd day of September, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 54/710.)

Land Taken for Better Utilization in the Borough of Otahuhu

[L.S.] B. C. FREYBERG, Governor-General

A PROCLAMATION

PURSUANT to the Public Works Act, 1928, and section thirty of the Finance Act (No. 2), 1945, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for better utilization; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE area of the piece of land taken: 32 perches. Being Lot 7, D.P. 33172, being part of Fairburn's Grant No. 269A, and being the whole of the land comprised and described in Certificate of Title, Volume 859, folio 184 (Auckland Land Registry).

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 6th day of September, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 70/2/7/0.)

Land Taken for the Development of Water-power (Springfield Substation) in Block XV, Spaxton Survey District

[L.S.] B. C. FREYBERG, Governor-General

A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for the development of water-power (Springfield Substation).

SCHEDULE

APPROXIMATE area of the piece of land taken: 1 rood.

Being part of Lot 12, D.P. 2663, part of Rural Section 14998, Block XV, Spaxton Survey District, and being all the land comprised in Certificate of Title, Volume 377, folio 282 (Canterbury Land Registry).

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 3rd day of September, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 88/33.)

Land Taken for Street in the City of Dunedin

[L.S.] B. C. FREYBERG, Governor-General

A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for street and shall vest in the Mayor, Councillors, and Citizens of the City of Dunedin as from the date hereinafter mentioned; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE areas of the pieces of land taken:—

A.	R.	P.	Being
0	0	5.85	Lot 1, L.T. plan 6366, being part Sections 1 and 2; coloured blue.
0	0	7.37	Lot 1, L.T. plan 6365, being part Section 1; coloured yellow.
0	0	7.47	Lot 5, L.T. plan 6364, being part Section 2; coloured yellow.

Situated in Block XV, Dunedin and East Taieri Survey District (City of Dunedin) (Otago R.D.). (S.O. 9660.)

In the Otago Land District; as the same are more particularly delineated on the plan marked P.W.D. 127588, deposited in the office of the Minister of Works at Wellington, and thereon coloured as above mentioned.

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 31st day of August, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 51/1463.)

Land Taken for Street in the Borough of Gisborne

[L.S.] B. C. FREYBERG, Governor-General

A PROCLAMATION

PURSUANT to the Public Works Act, 1928, I, Lieutenant-General Sir Bernard Cyril Freyberg, the Governor-General of the Dominion of New Zealand, do hereby proclaim and declare that the land described in the Schedule hereto is hereby taken for street and shall vest in the Mayor, Councillors, and Burgesses of the Borough of Gisborne as from the date hereinafter mentioned; and I do also declare that this Proclamation shall take effect on and after the thirteenth day of September, one thousand nine hundred and forty-eight.

SCHEDULE

APPROXIMATE area of the piece of land taken: 2 roods 30.2 perches. Being part Waikanae No. 6 Block (Borough of Gisborne). (S.O. 4461.)

In the Gisborne Land District; as the same is more particularly delineated on the plan marked P.W.D. 127654, deposited in the office of the Minister of Works at Wellington, and thereon coloured orange.

Given under the hand of His Excellency the Governor-General of the Dominion of New Zealand, and issued under the Seal of that Dominion, this 6th day of September, 1948.

R. SEMPLE, Minister of Works.

GOD SAVE THE KING!

(P.W. 51/3177.)



SUPPLEMENTARY RECORD SHEET UNDER UNIT TITLES ACT 1972

Search Copy

Identifier 231549
Land Registration District North Auckland
Date Issued 01 July 2005
Plan Number DP 346086

Subdivision of
Lot 15 Deposited Plan 7699 and Lot 2 Deposited Plan 206560

Prior References
NA10D/1202 NA135A/60

Unit Titles Issued

189159	189161	189162	189163
189165	189166	189169	189170
189171	189172	189173	189174
189176	189177	189179	189180
189181	189184	189185	189186
189187	189188	189210	189211
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189239	189240	189241	189243
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189257	189258	189259	189260
189261	189263	189264	189272
189275	189285	189286	189287
189288	189289	189290	189291
189292	189293	189294	189295
189297	189298	189299	189300
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189306	189307	189308	189310
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189316	189318	189320	189321
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189334	189335	189336	189337
189338	189341	189345	189358
189360	189361	189362	189363
189364	189365	189366	189367
189368	189369	189370	189371

Identifier**231549****Unit Titles Issued**

189372	189373	189374	189376
189378	189379	189381	189385
189387	189388	189392	189393
189394	189395	189396	189397
189398	189399	189400	189401
189403	189410	189411	189417
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353204	353205	397964	397965
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567492	572787	572788	572789
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574879	575529	575530	575531
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575540	575541	575542	575543
575544	575545	575546	575547
575548	575549	576236	577034
577035	581526		

Interests**OWNERSHIP OF COMMON PROPERTY**

Pursuant to Section 47 Unit Titles Act 2010 -

(a) the body corporate owns the common property and

(b) the owners of all the units are beneficially entitled to the common property as tenants in common in shares proportional to the ownership interest (or proposed ownership interest) in respect of their respective units.

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Subject to a right (in gross) to construct and maintain a spillway over part in favour of The Auckland Regional Authority created by Transfer 230899

Subject to Section 27B State-Owned Enterprises Act 1986 (which provides for the resumption of land on the recommendation of the Waitangi Tribunal and which does not provide for third parties, such as the owner of the land, to be heard in relation to the making of any such recommendation) (affects part formerly CsT NA78D/386

Identifier**231549**

and NA10D/1075)

Subject to Part IV A Conservation Act 1987 (affects part formerly CT NA10D/1075)

B882961.1 Notice pursuant to Section 18 Public Works Act 1981- 1.9.1988 at 9:08 am (affects part formerly CT NA58C/827)

Appurtenant hereto are rights of way and a parking right specified in Easement Certificate B987452.9 - 4.5.1989 at 2.28 pm (affects the part formerly in CT NA10D/1202)

The easements specified in Easement Certificate B987452.9 are subject to Section 309 (1) (a) Local Government Act 1974

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C018956.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by The Auckland City Council - 20.7.1989 at 1.48 pm (affects part formerly CT NA58C/827)

C018957.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by The Auckland City Council - 20.7.1989 at 1.48 pm (affects part formerly CT NA32A/143)

Appurtenant hereto is a right of way created by Transfer C864585.1 - 12.7.1995 at 1.19 pm (affects part formerly CT NA121A/577)

Subject to a right of way over parts marked A, B, F, E and G on DP 346086 created by Transfer D078829.1 - 12.12.1996 at 3.00 pm

Subject to a right to convey water over part marked B and to drain sewage over parts marked C and E on DP 346086 created by Transfer D107933.2 - 13.2.1997 at 2.57 pm

Subject to a right of way over part marked D on DP 346086 created by Transfer D590193.2 - produced 26.3.2001 at 11.16 am and entered 29.3.2001 at 9.00 am

Subject to a support right over part marked A-U and a stormwater right over parts marked C, E, F, U, Z, AA and AC and a sanitary sewer right over parts marked F, T, U, V, W and X on DP 206560 created by Transfer D667342.6 - 18.12.2001 at 3.46 pm

The easements created by Transfer D667342.6 are subject to Section 243 (a) Resource Management Act 1991 D667342.7 Deed of Land Covenant - 18.12.2001 at 3.46 pm (affects the part formerly in CT NA135A/60)

Land Covenant in Transfer 5507472.1 - 5.3.2003 at 9:00 am

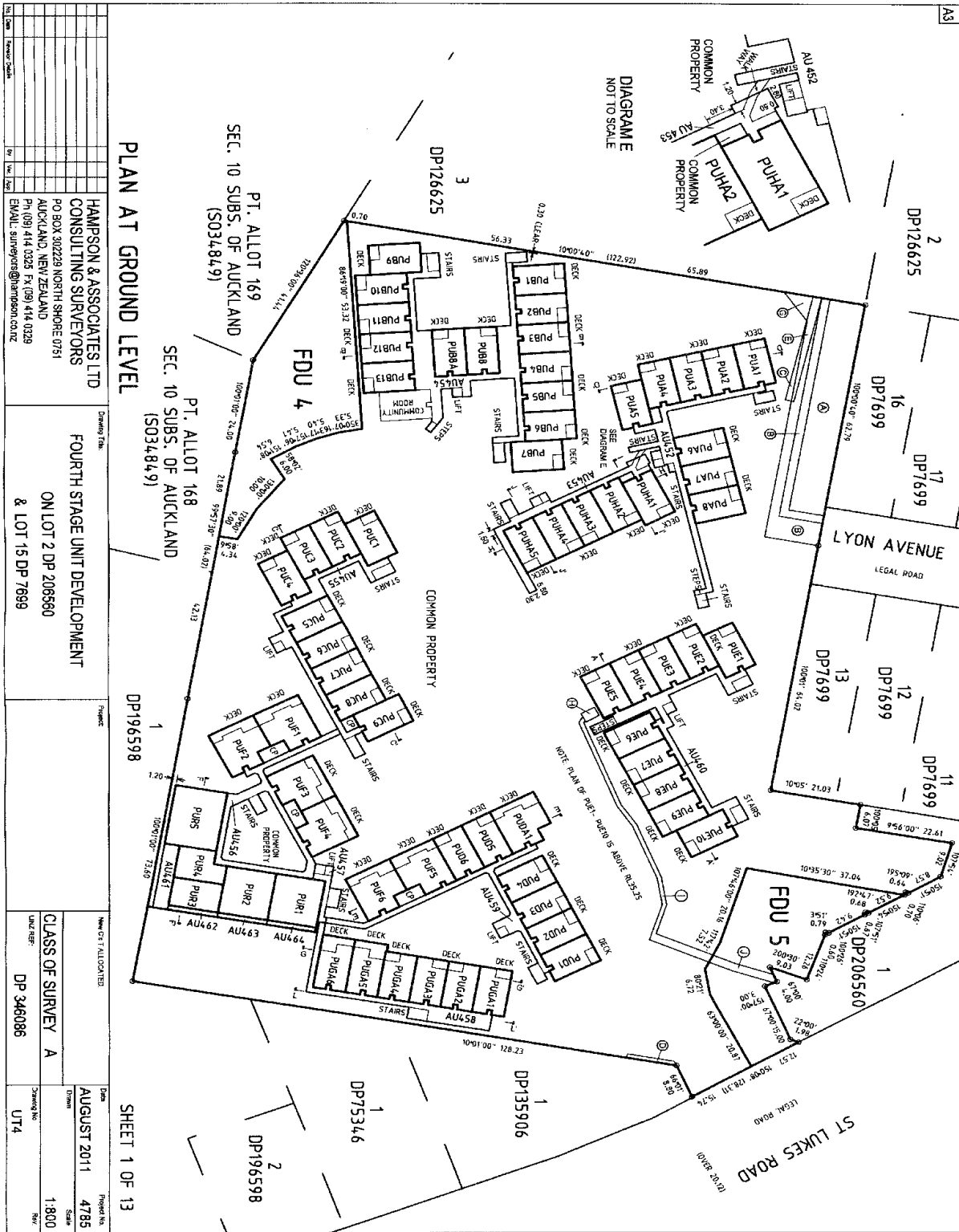
Subject to a right (in gross) to an electricity supply easement over part marked D on DP 345047 and a cable access and supply easement over part marked C on DP 345047 in favour of Vector Limited created by Transfer 6479661.4 - 1.7.2005 at 9:00 am

6479661.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 1.7.2005 at 9:00 am

6479661.8 Change of rules of the Body Corporate - 1.7.2005 at 9:00 am

8444778.1 Change of rules of the Body Corporate - 17.3.2010 at 1:46 pm

8889183.1 Certificate of assessment of ownership interest pursuant to Section 32 Unit Titles Act 2010 - 26.10.2011 at 10:56 am (affects fourth stage unit plan DP 346086)



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 AUCKLAND, NEW ZEALAND
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 EMAIL: surveys@hampson.co.nz

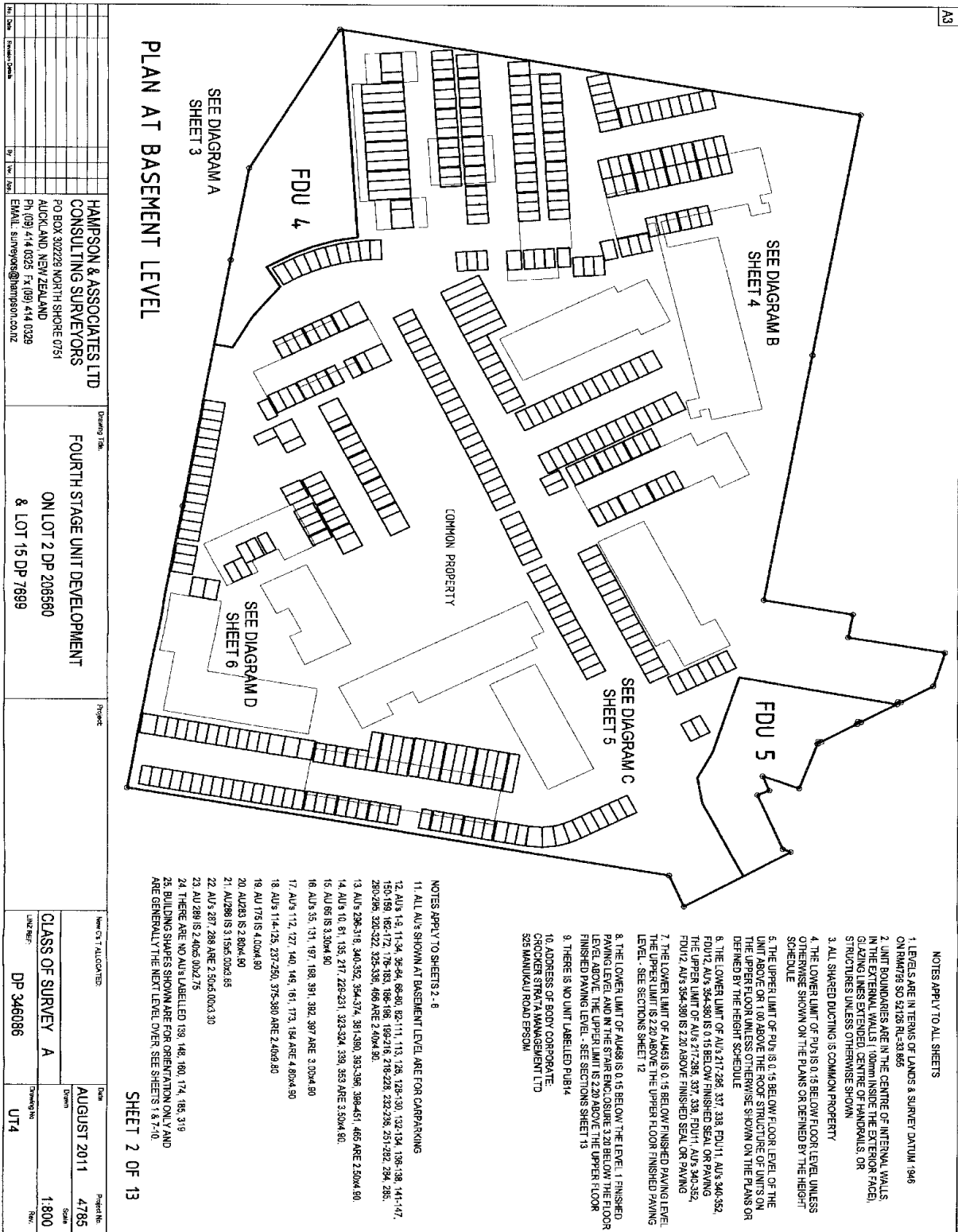
FOURTH STAGE UNIT DEVELOPMENT
 ON LOT 2 DP 206560
 & LOT 15 DP 7699

CLASS OF SURVEY A
 DP 346086

AUGUST 2011
 4785

SHEET 1 OF 13

547604785120SDR2011 4785 4TH STAGE UT Title No 15 11.14.08 2011



PLAN AT BASEMENT LEVEL

A3

NOTES APPLY TO ALL SHEETS

1. LEVELS ARE IN TERMS OF LANDS & SURVEY DATUM 1946 ON RM4798 SO 32726 RL-333665
2. UNIT BOUNDARIES ARE IN THE CENTRE OF INTERNAL WALLS IN THE EXTERNAL WALLS 1.00m INSIDE THE EXTERIOR FACE; GLAZING LINES EXTENDED CENTRE OF HANDRAILS OR STRUCTURES UNLESS OTHERWISE SHOWN
3. ALL SHARED DUCTING IS COMMON PROPERTY
4. THE LOWER LIMIT OF PU3 IS 0.15 BELOW FLOOR LEVEL UNLESS OTHERWISE SHOWN ON THE PLANS OR DEFINED BY THE HEIGHT SCHEDULE
5. THE UPPER LIMIT OF PU3 IS 0.15 BELOW FLOOR LEVEL OF THE UNIT ABOVE OR 1.00 ABOVE THE ROOF STRUCTURE OF UNITS ON THE UPPER FLOOR UNLESS OTHERWISE SHOWN ON THE PLANS OR DEFINED BY THE HEIGHT SCHEDULE
6. THE LOWER LIMIT OF AU3 IS 0.15 BELOW FINISHED PAVING LEVEL. THE UPPER LIMIT IS 2.20 ABOVE THE UPPER FLOOR FINISHED PAVING LEVEL. SEE SECTIONS SHEET 12
7. THE LOWER LIMIT OF AU3 IS 0.15 BELOW FINISHED PAVING LEVEL. THE UPPER LIMIT IS 2.20 ABOVE THE UPPER FLOOR FINISHED PAVING LEVEL. SEE SECTIONS SHEET 12
8. THE LOWER LIMIT OF AU3 IS 0.15 BELOW THE LEVEL 1 FINISHED PAVING LEVEL AND IN THE STAIR ENCLOSURE 3.20 BELOW THE FLOOR LEVEL ABOVE. THE UPPER LIMIT IS 2.20 ABOVE THE UPPER FLOOR FINISHED PAVING LEVEL. SEE SECTIONS SHEET 13
9. THERE IS NO UNIT LABELLED PUB4
10. ADDRESS OF BODY CORPORATE: CROCKER STRATA MANAGEMENT LTD 525 MANUKAU ROAD EPSOM

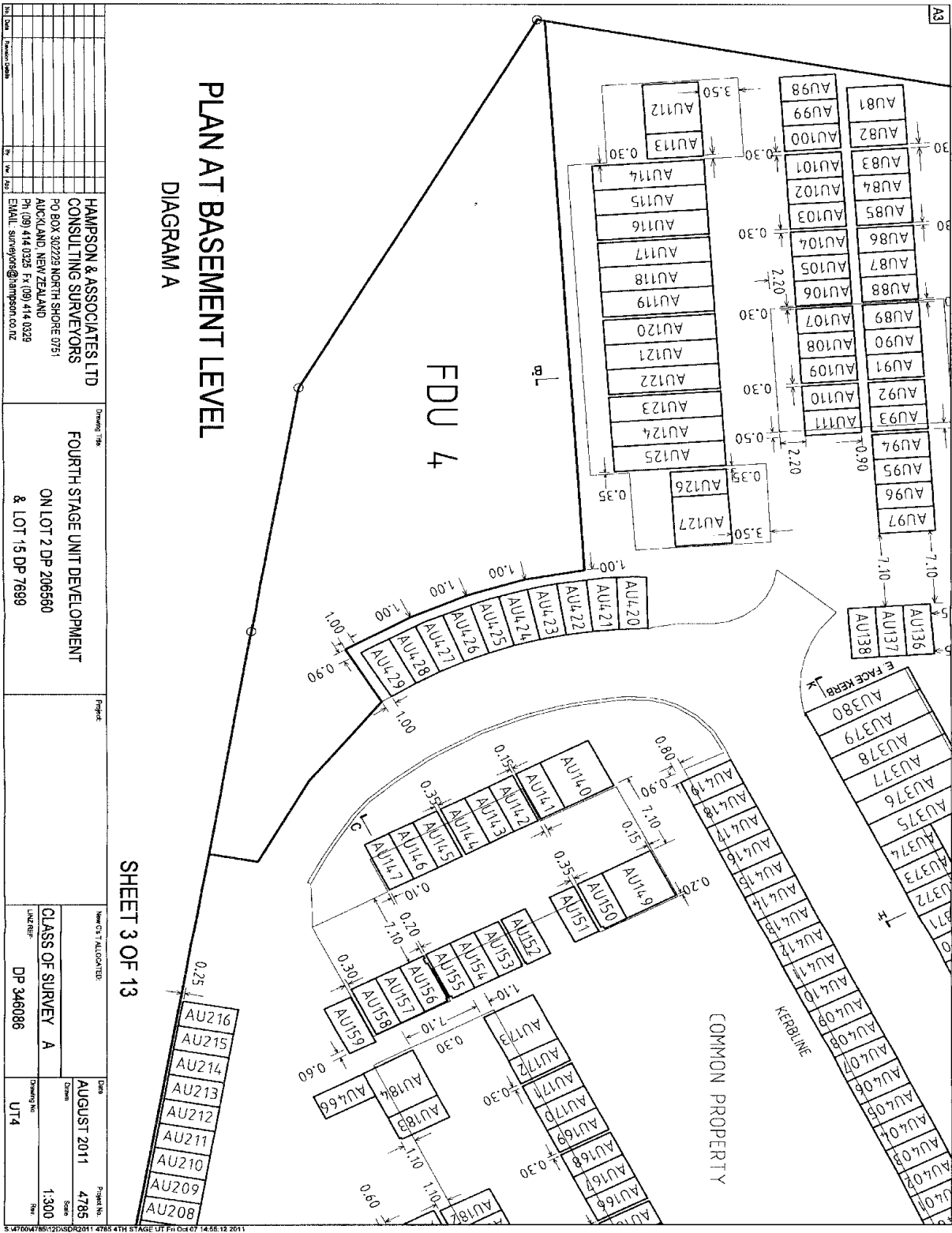
NOTES APPLY TO SHEETS 2 - 6

11. ALL AU'S SHOWN AT BASEMENT LEVEL ARE FOR CARPARKING
12. AU'S 1-5, 11-34, 35-44, 65-80, 82-111, 113, 126, 128-130, 132-134, 136-138, 141-147, 150-159, 162-172, 175-183, 185-186, 189-218, 219-228, 232-236, 251-262, 284, 285, 280-289, 320-322, 325-336, 405 ARE 2.40M 80.
13. AU'S 226-318, 340-352, 354-374, 381-390, 393-395, 398-451, 465 ARE 2.50M 80.
14. AU'S 10, 81, 135, 217, 222-231, 323-324, 329, 353 ARE 3.50M 80.
15. AU 65 IS 3.30M 80
16. AU'S 35, 101, 197, 198, 391, 392, 397 ARE 3.00M 80
17. AU'S 112, 127, 140, 145, 161, 173, 184 ARE 4.80M 80
18. AU'S 114-125, 237-250, 375-380 ARE 2.40M 80
19. AU 173 IS 4.00M 80
20. AU283 IS 2.80M 80
21. AU280 IS 3.15M 0.0x3.55
22. AU'S 297, 298 ARE 2.50x3.00x3.30
23. AU 289 IS 2.40x5.00x2.75
24. THERE ARE NO AU'S LABELLED 139, 148, 160, 174, 185, 319
25. BUILDING SHAPES SHOWN ARE FOR ORIENTATION ONLY AND ARE GENERALLY THE NEXT LEVEL OVER. SEE SHEETS 1 & 7-10

SHEET 2 OF 13

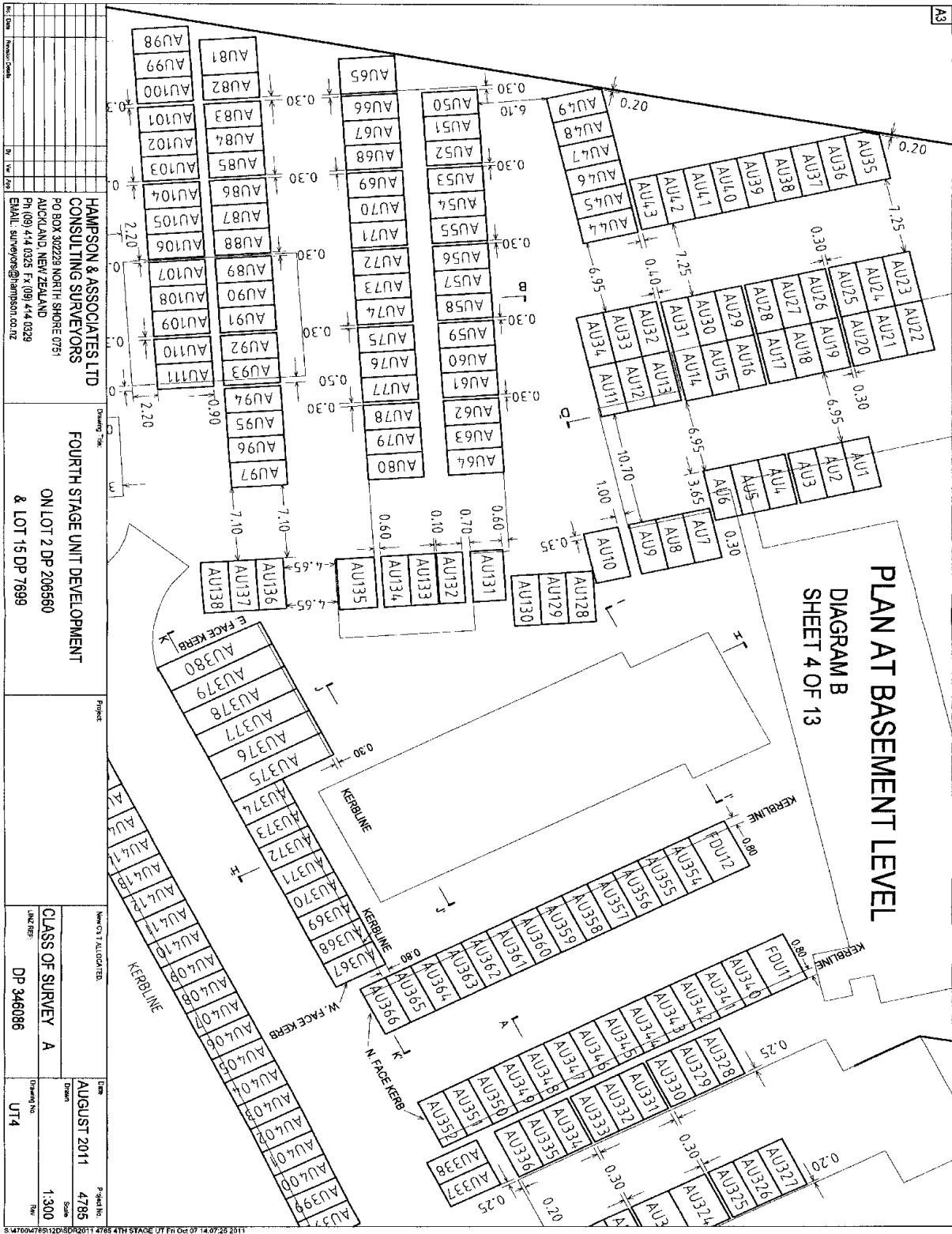
<p> HAMPSON & ASSOCIATES LTD CONSULTING SURVEYORS PO BOX 302228 NORTH SHORE 0751 AUCKLAND NEW ZEALAND Ph: (09) 414 0325 Fx: (09) 414 0329 EMAIL: surveys@hampson.co.nz </p>		<p> Drawing Title FOURTH STAGE UNIT DEVELOPMENT ON LOT 2 DP 208560 & LOT 15 DP 7899 </p>		<p> Project Name of Titled Area CLASS OF SURVEY A DP 346086 </p>		<p> Date AUGUST 2011 Drawn Scale 1:800 </p>	
<p> No. Date 1 13/06/2011 </p>		<p> Drawing No. UT4 </p>		<p> Project No. DP 346086 </p>		<p> Project No. 4785 </p>	

S:\47004\7891\2125\DR\2011_4785_4TH STAGE UT F1 Sep 02 13:30:40 2011



HAMPSON & ASSOCIATES LTD CONSULTING SURVEYORS PO BOX 302228 NORTH SHORE 0751 AUCKLAND, NEW ZEALAND Ph: (09) 414 0325 F: (09) 414 0329 EMAIL: surveys@hampson.co.nz		Drawing Title FOURTH STAGE UNIT DEVELOPMENT ON LOT 2 DP 206560 & LOT 15 DP 7699		Project CLASS OF SURVEY A DP 346086		Date AUGUST 2011 4785 1:300 UTA	
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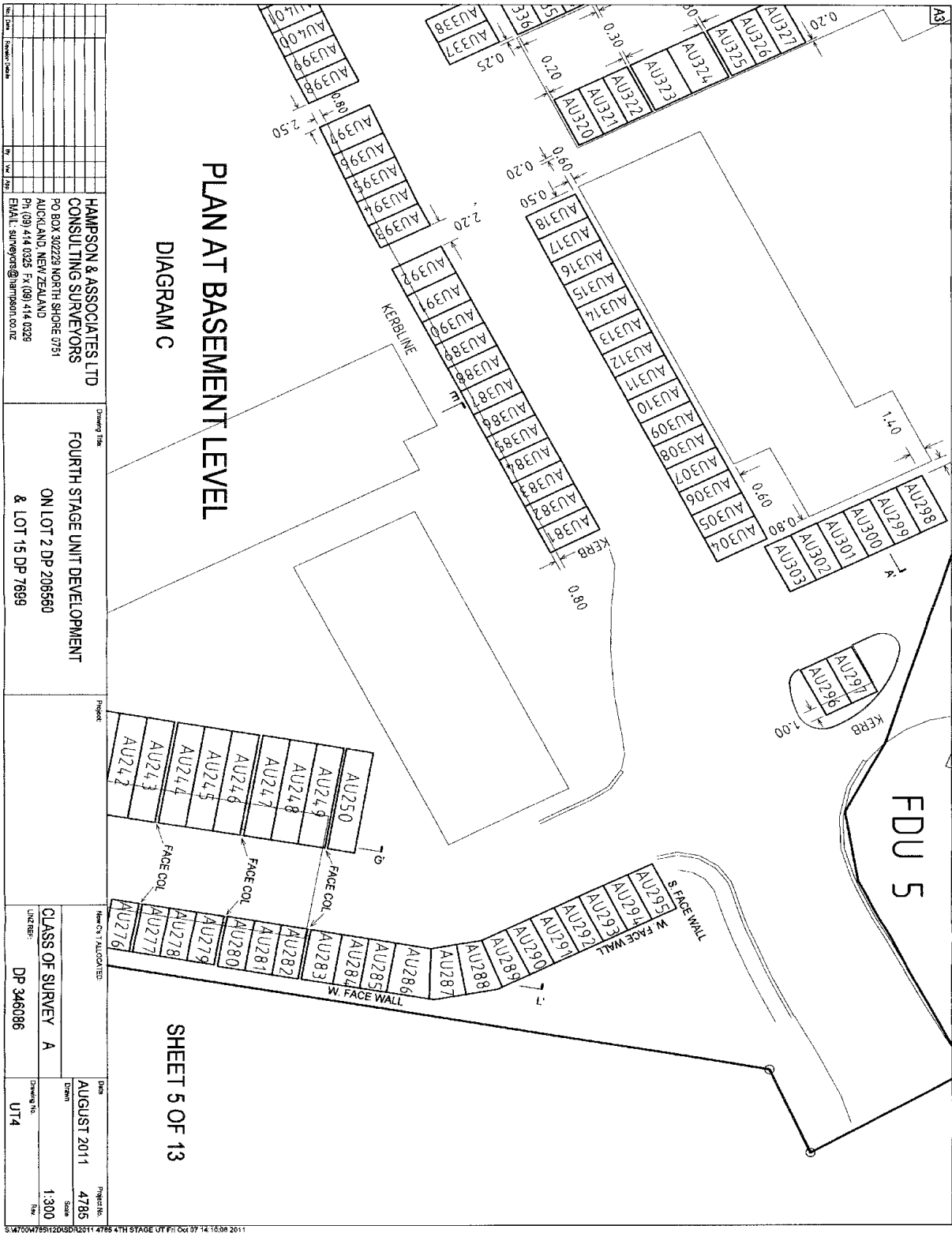


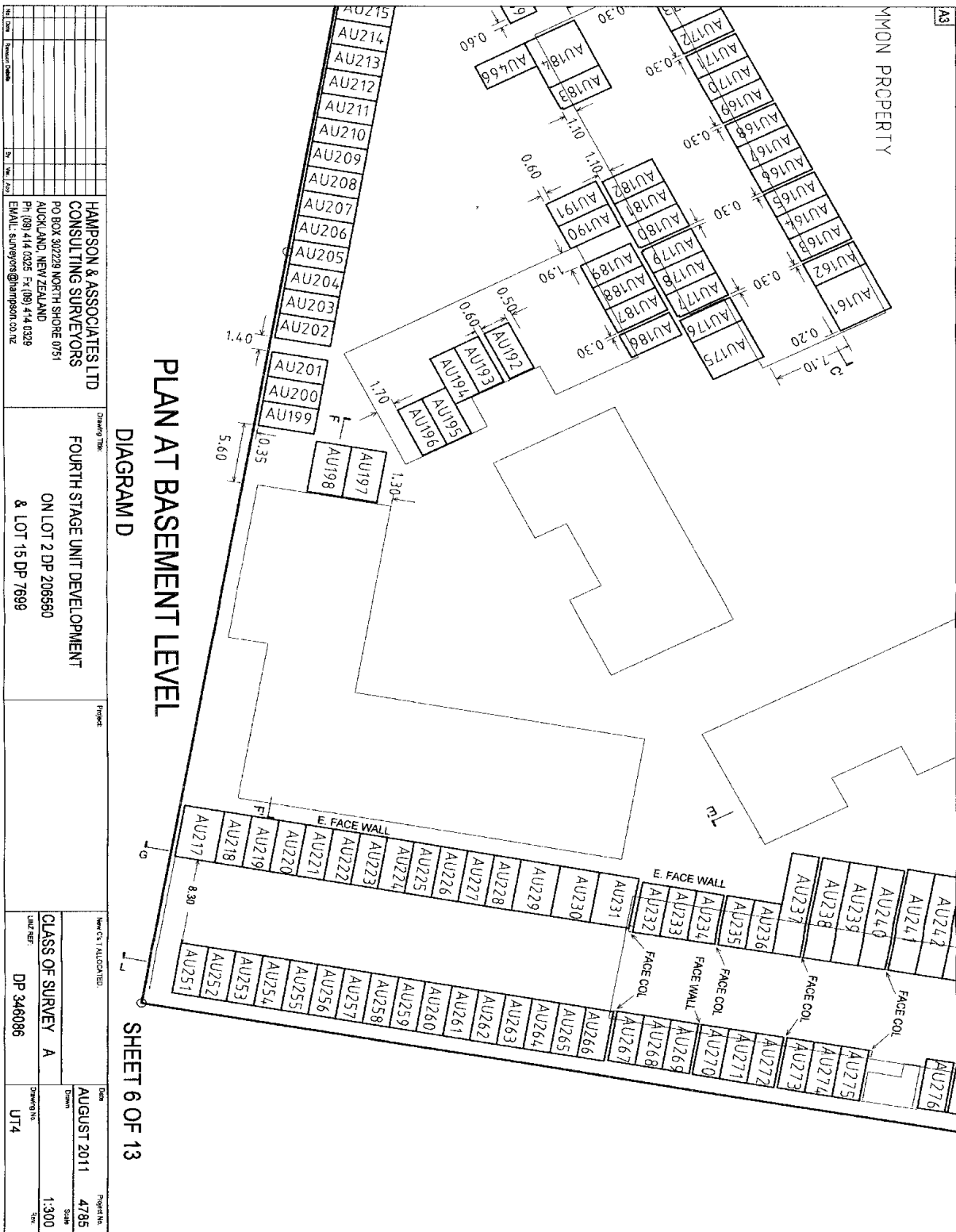
HAMPSON & ASSOCIATES LTD
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AUCKLAND NEW ZEALAND
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EMAIL: surveys@hampson.co.nz

FOURTH STAGE UNIT DEVELOPMENT
ON LOT 2 DP 208560
& LOT 15 DP 7899

CLASS OF SURVEY A
DP 346086
DATE AUGUST 2011
DRAWING NO UTA
SCALE 1:300

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EMAIL: surveys@hampson.co.nz

FOURTH STAGE UNIT DEVELOPMENT
ON LOT 2 DP 206560
& LOT 15 DP 7699

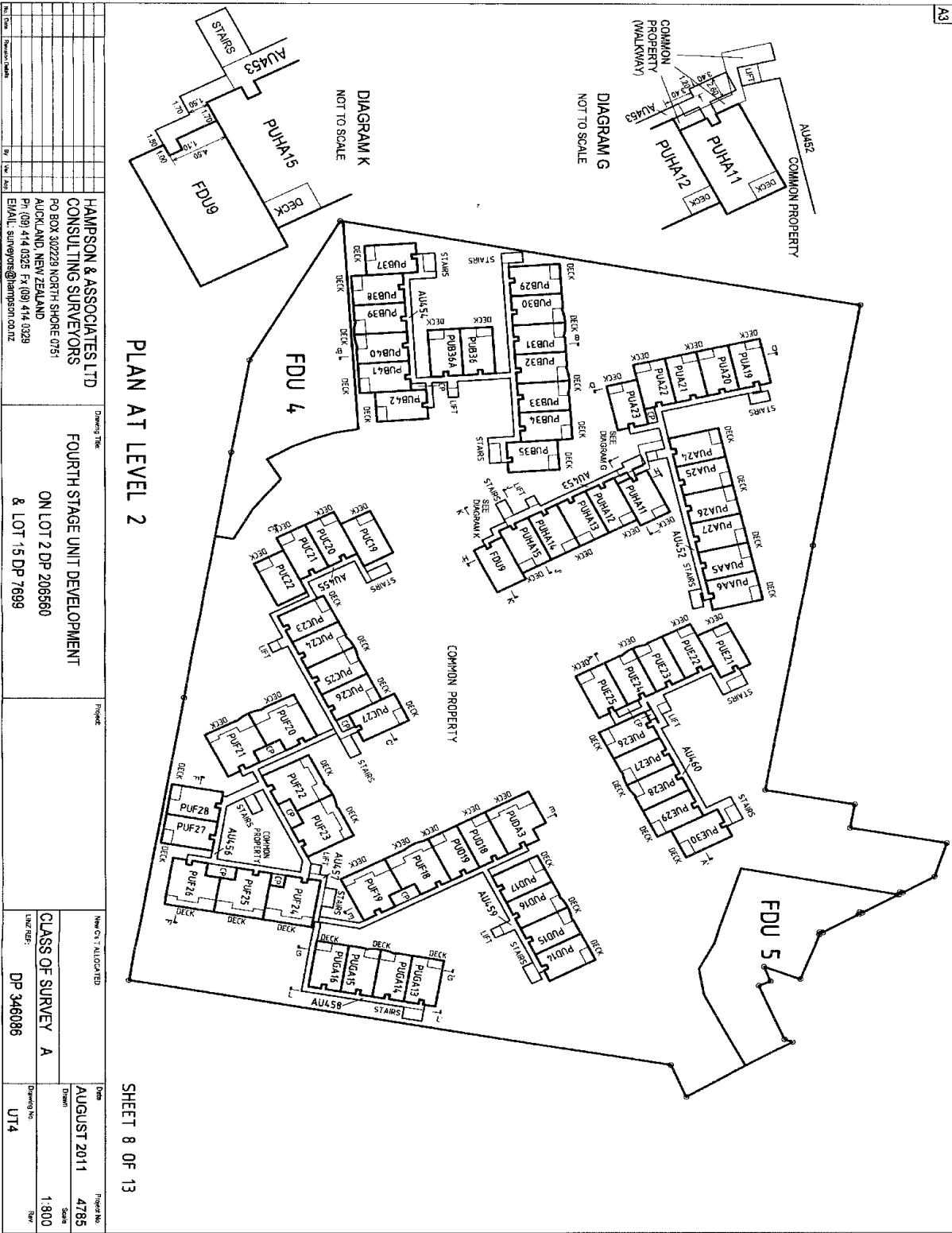
CLASS OF SURVEY A
DP 346086

DATE: AUGUST 2011
PROJECT NO: 4785
SCALE: 1:300
DRAWING NO: UT4

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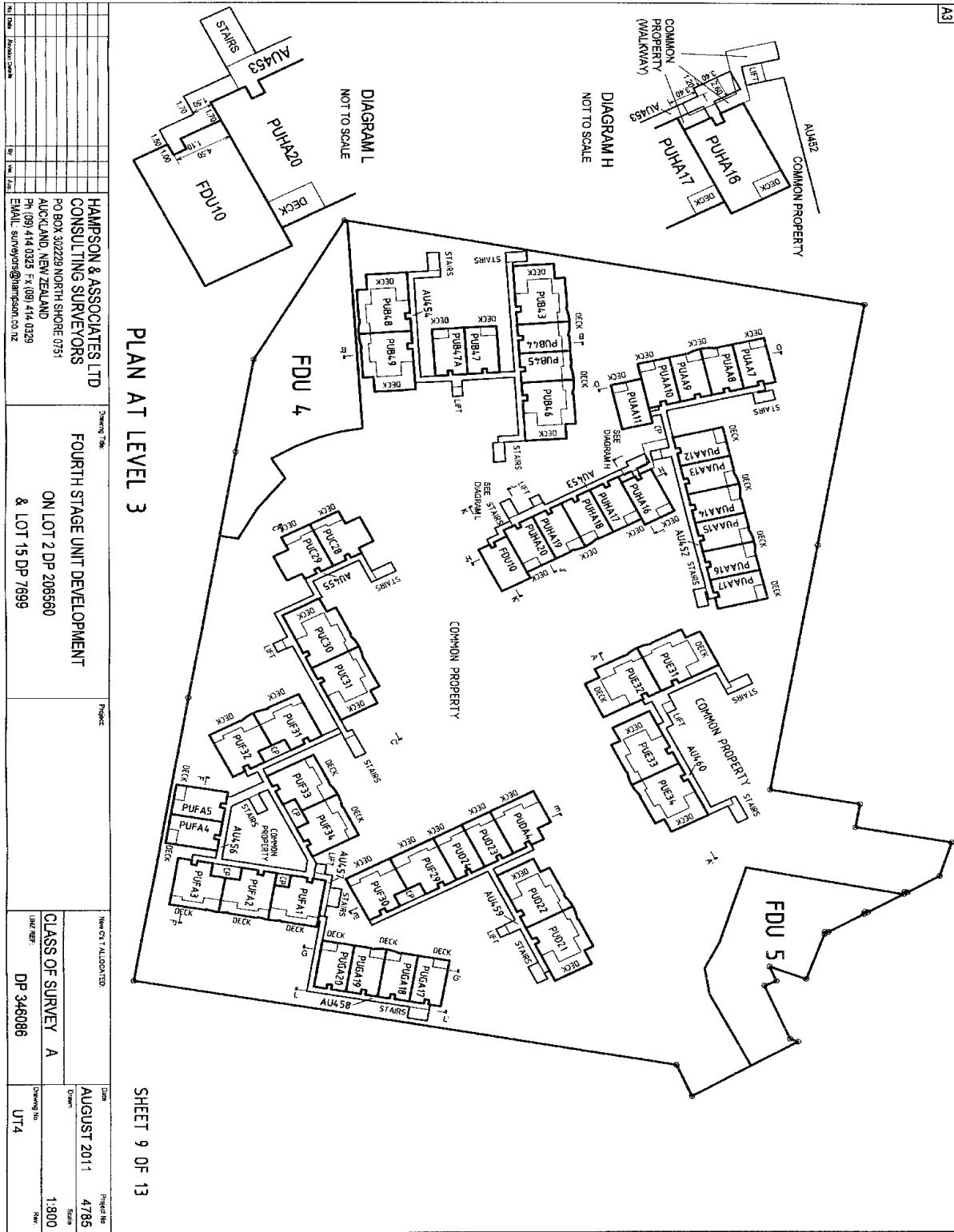


PLAN AT LEVEL 2

SHEET 8 OF 13

<p>HAMPSON & ASSOCIATES LTD CONSULTING SURVEYORS PO BOX 30223 NORTH SHORE 0751 AUCKLAND, NEW ZEALAND Ph: (09) 414 0235 Fx: (09) 414 0239 EMAIL: surveys@hampson.co.nz</p>		<p>Drawing Title FOURTH STAGE UNIT DEVELOPMENT ON LOT 2 DP 206560 & LOT 15 DP 7699</p>		<p>Name of Valuator CLASS OF SURVEY A DATE REF: DP 346086</p>	
<p>By: [Signature]</p>		<p>Drawn By</p>		<p>Date AUGUST 2011 Project No 4785 Scale 1:800 Rev UT4</p>	

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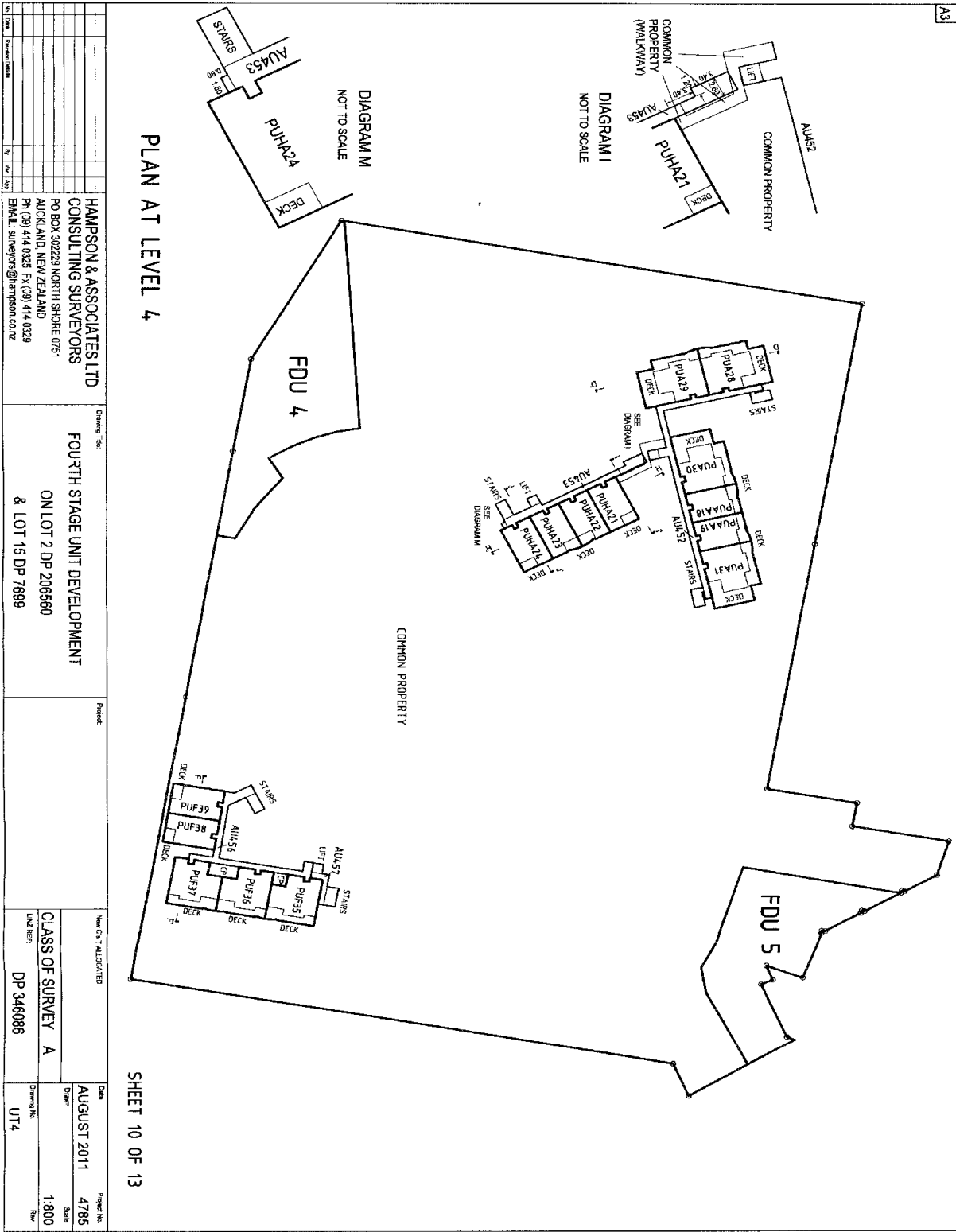


PLAN AT LEVEL 3

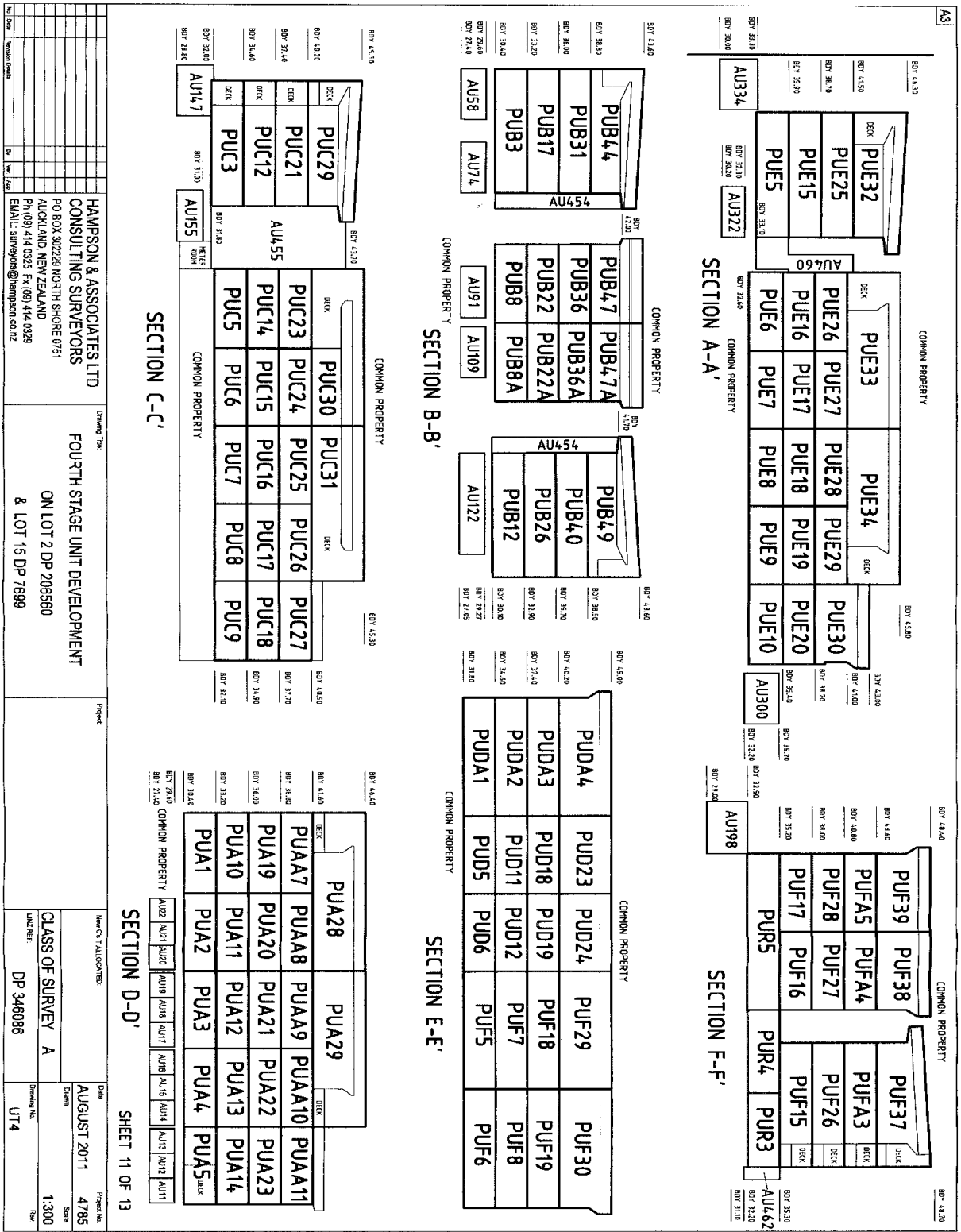
SHEET 9 OF 13

<p>HAMPSON & ASSOCIATES LTD CONSULTING SURVEYORS PO BOX 302228 NORTH SHORE 0731 AUCKLAND, NEW ZEALAND Ph (09) 414 0325 Fx (09) 414 0329 EMAIL: surveyors@hampson.co.nz</p>		<p>Project Title FOURTH STAGE UNIT DEVELOPMENT ON LOT 2 DP 206560 & LOT 15 DP 7699</p>		<p>New or 1st ALIQUANTION CLASS OF SURVEY A DP 348098</p>		<p>Scale AUGUST 2011 4786 1:800 Drawing No. U74</p>	
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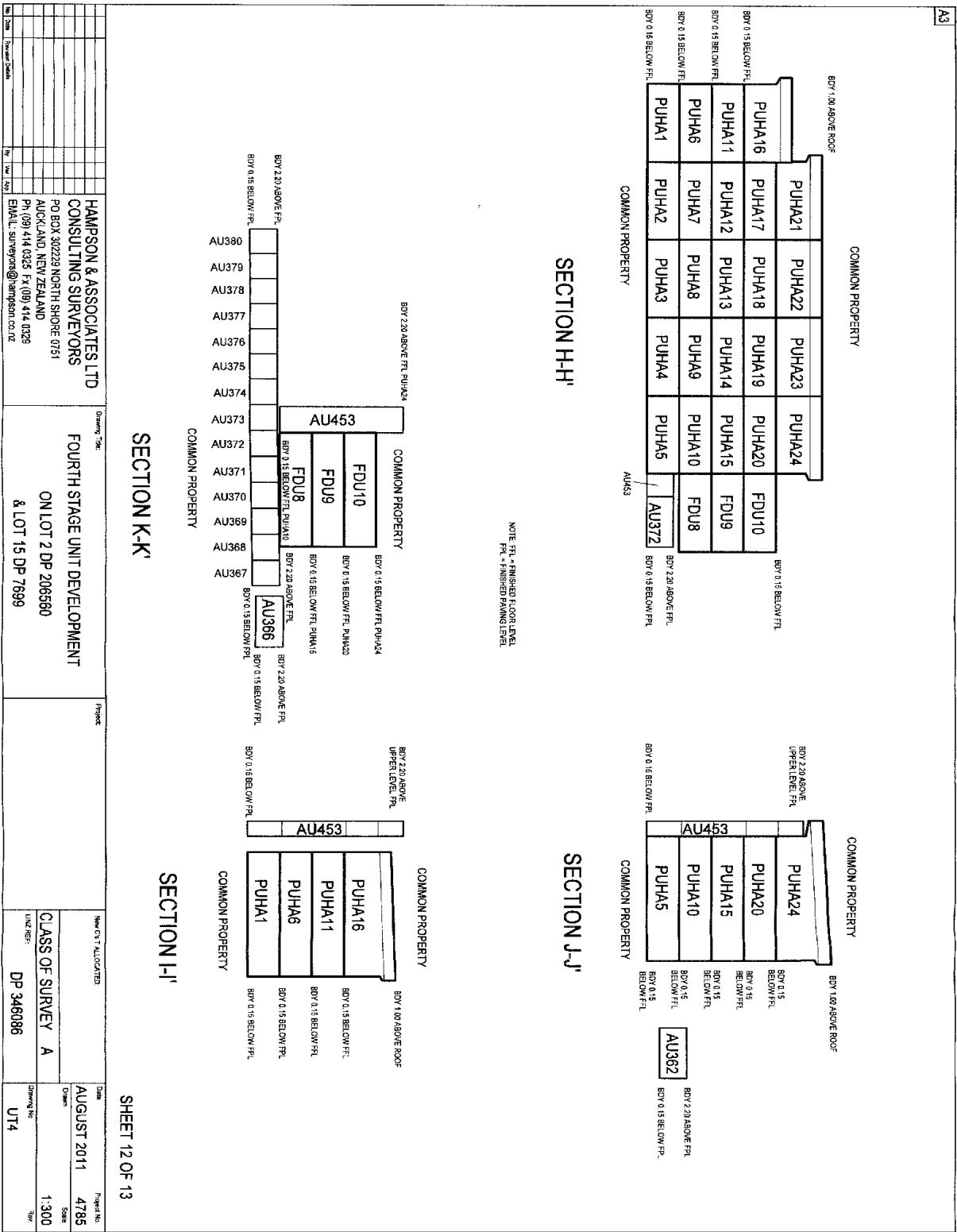
HAMPSON & ASSOCIATES LTD
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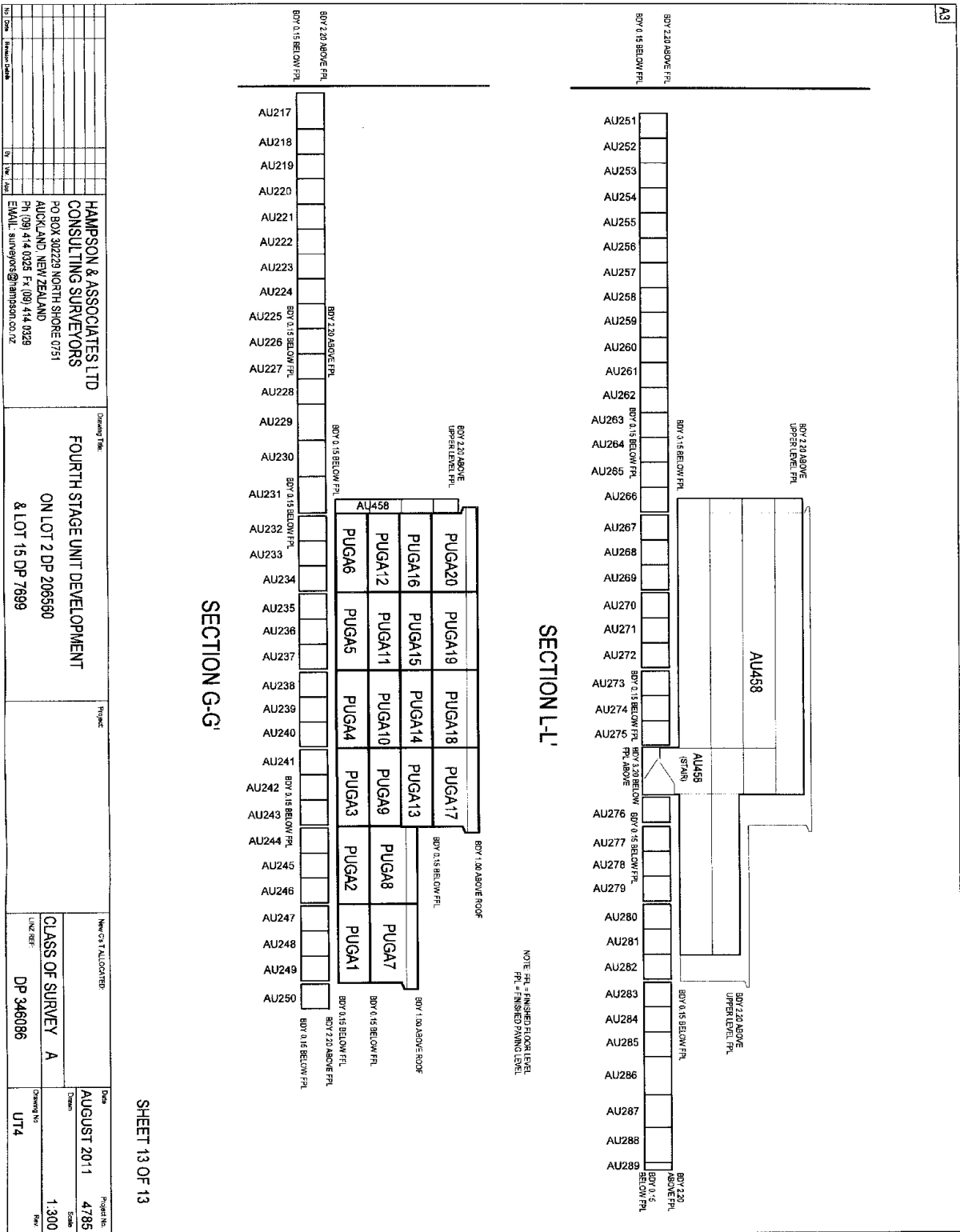
FOURTH STAGE UNIT DEVELOPMENT
ON LOT 2 DP 206560
& LOT 15 DP 7699

CLASS OF SURVEY A
DP 346086

DATE AUGUST 2011
DRAWN BY 4785
SCALE 1:300
SHEET 11 OF 13

S 47004785/12/ASDR2011 4785 4TH STAGE UT Fm Sep 02 13:34:17 2011







**COMPUTER UNIT TITLE REGISTER
UNDER LAND TRANSFER ACT 1952**




R. W. Muir
Registrar-General
of Land

Search Copy

Identifier 235517
Land Registration District North Auckland
Date Issued 02 August 2005

Prior References
231547

Supplementary Record Sheet
231549

Estate Stratum in Freehold
Legal Description Future Development Unit 4 Deposited
Plan 346086

Proprietors
St Lukes Holdings Limited

The above estates are subject to the reservations, restrictions, encumbrances, liens and interests noted below and on the relevant unit plan and supplementary record sheet

6571782.1 Encumbrance to Auckland City Council - 13.9.2005 at 1:38 pm
6571782.2 Encumbrance to Auckland City Council - 13.9.2005 at 1:38 pm
8652523.4 Encumbrance to Watercare Services Limited - 16.12.2010 at 10:15 am
8669385.3 Mortgage to Fidelity Limited - 23.12.2010 at 6:59 pm
8711737.1 Variation of Mortgage 8669385.3 - 9.3.2011 at 9:04 am
8867950.2 Covenant pursuant to Section 108(2)(d) Resource Management Act 1991 - 7.10.2011 at 12:16 pm
8867950.5 Covenant pursuant to Section 108(2)(d) Resource Management Act 1991 - 7.10.2011 at 12:16 pm

Identifier

235517



**SUPPLEMENTARY RECORD SHEET
UNDER UNIT TITLES ACT 1972**

Search Copy

Identifier

231549

Land Registration District **North Auckland**

Date Issued 01 July 2005

Plan Number DP 346086

Subdivision of

Lot 15 Deposited Plan 7699 and Lot 2 Deposited Plan 206560

Prior References

NA10D/1202 NA135A/60

Unit Titles Issued

189159	189161	189162	189163
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Identifier**235517****Unit Titles Issued**

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575548	575549	576236	577034
577035	581526		

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(a) the body corporate owns the common property and

(b) the owners of all the units are beneficially entitled to the common property as tenants in common in shares proportional to the ownership interest (or proposed ownership interest) in respect of their respective units.

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Subject to a right (in gross) to construct and maintain a spillway over part in favour of The Auckland Regional Authority created by Transfer 230899

Identifier**235517**

Subject to Section 27B State-Owned Enterprises Act 1986 (which provides for the resumption of land on the recommendation of the Waitangi Tribunal and which does not provide for third parties, such as the owner of the land, to be heard in relation to the making of any such recommendation) (affects part formerly CsT NA78D/386 and NA10D/1075)

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Appurtenant hereto are rights of way and a parking right specified in Easement Certificate B987452.9 - 4.5.1989 at 2.28 pm (affects the part formerly in CT NA10D/1202)

The easements specified in Easement Certificate B987452.9 are subject to Section 309 (1) (a) Local Government Act 1974 Subject to a right of way over parts marked A, B, F, E and G on DP 346086 created by Transfer B987452.10 - 4.5.1989 at 2.28 pm

Subject to a water supply right (in gross) to over part in favour of Watercare Services Limited created by Transfer C015672.3 - 13.7.1989 at 9.12 am

C018956.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by The Auckland City Council - 20.7.1989 at 1.48 pm (affects part formerly CT NA58C/827)

C018957.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by The Auckland City Council - 20.7.1989 at 1.48 pm (affects part formerly CT NA32A/143)

Appurtenant hereto is a right of way created by Transfer C864585.1 - 12.7.1995 at 1.19 pm (affects part formerly CT NA121A/577)

Subject to a right of way over parts marked A, B, F, E and G on DP 346086 created by Transfer D078829.1 - 12.12.1996 at 3.00 pm

Subject to a right to convey water over part marked B and to drain sewage over parts marked C and E on DP 346086 created by Transfer D107933.2 - 13.2.1997 at 2.57 pm

Subject to a right of way over part marked D on DP 346086 created by Transfer D590193.2 - produced 26.3.2001 at 11.16 am and entered 29.3.2001 at 9.00 am

Subject to a support right over part marked A-U and a stormwater right over parts marked C, E, F, U, Z, AA and AC and a sanitary sewer right over parts marked F, T, U, V, W and X on DP 206560 created by Transfer D667342.6 - 18.12.2001 at 3.46 pm

The easements created by Transfer D667342.6 are subject to Section 243 (a) Resource Management Act 1991

D667342.7 Deed of Land Covenant - 18.12.2001 at 3.46 pm (affects the part formerly in CT NA135A/60)

Land Covenant in Transfer 5507472.1 - 5.3.2003 at 9:00 am

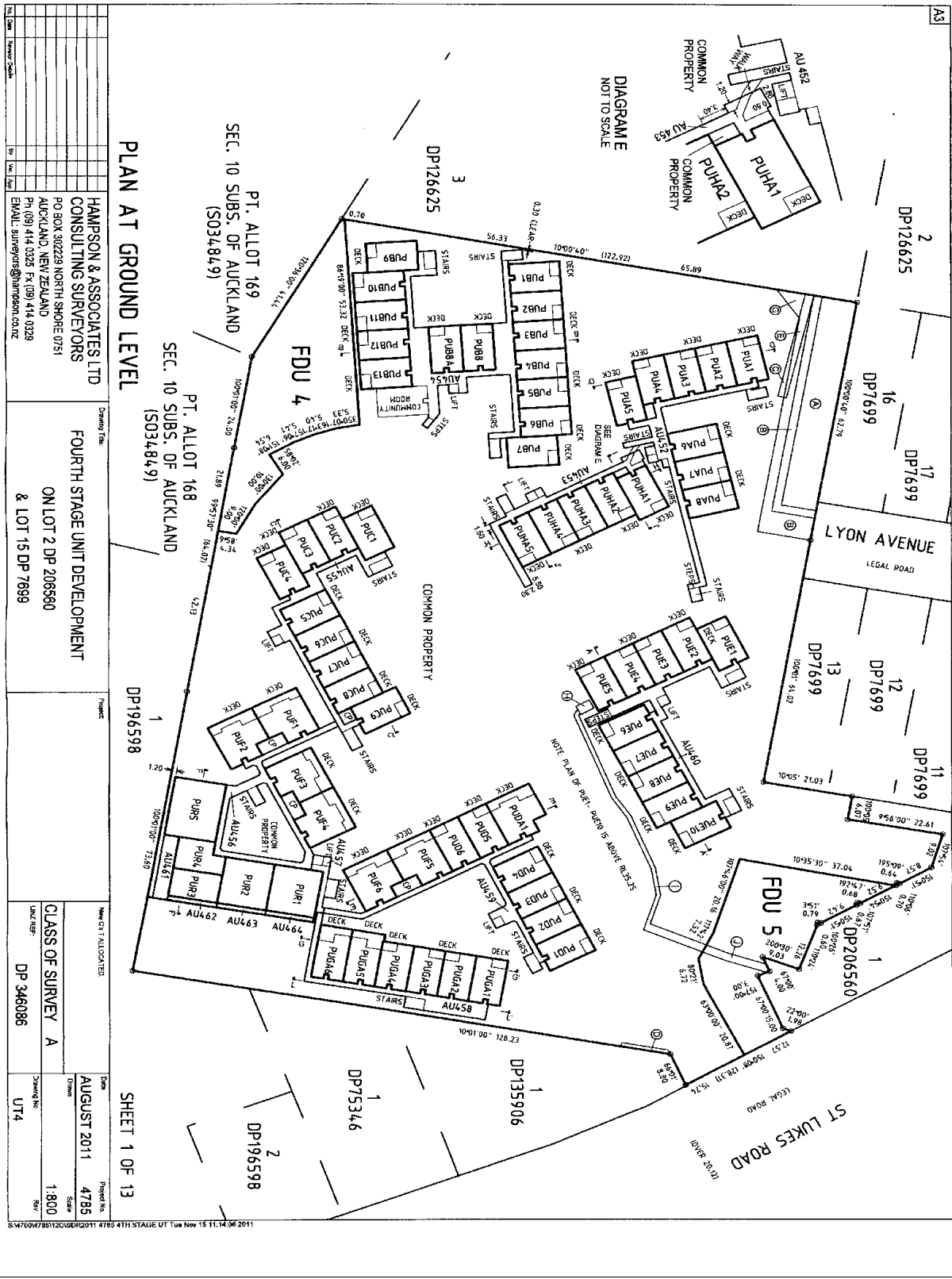
Subject to a right (in gross) to an electricity supply easement over part marked D on DP 345047 and a cable access and supply easement over part marked C on DP 345047 in favour of Vector Limited created by Transfer 6479661.4 - 1.7.2005 at 9:00 am

6479661.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 1.7.2005 at 9:00 am

6479661.8 Change of rules of the Body Corporate - 1.7.2005 at 9:00 am

8444778.1 Change of rules of the Body Corporate - 17.3.2010 at 1:46 pm

8889183.1 Certificate of assessment of ownership interest pursuant to Section 32 Unit Titles Act 2010 - 26.10.2011 at 10:56 am (affects fourth stage unit plan DP 346086)



PLAN AT GROUND LEVEL

FOURTH STAGE UNIT DEVELOPMENT
ON LOT 2 DP 206560
& LOT 15 DP 7699

CLASS OF SURVEY A
DP 346086

DATE: AUGUST 2011
SCALE: 1:800
SHEET 1 OF 13

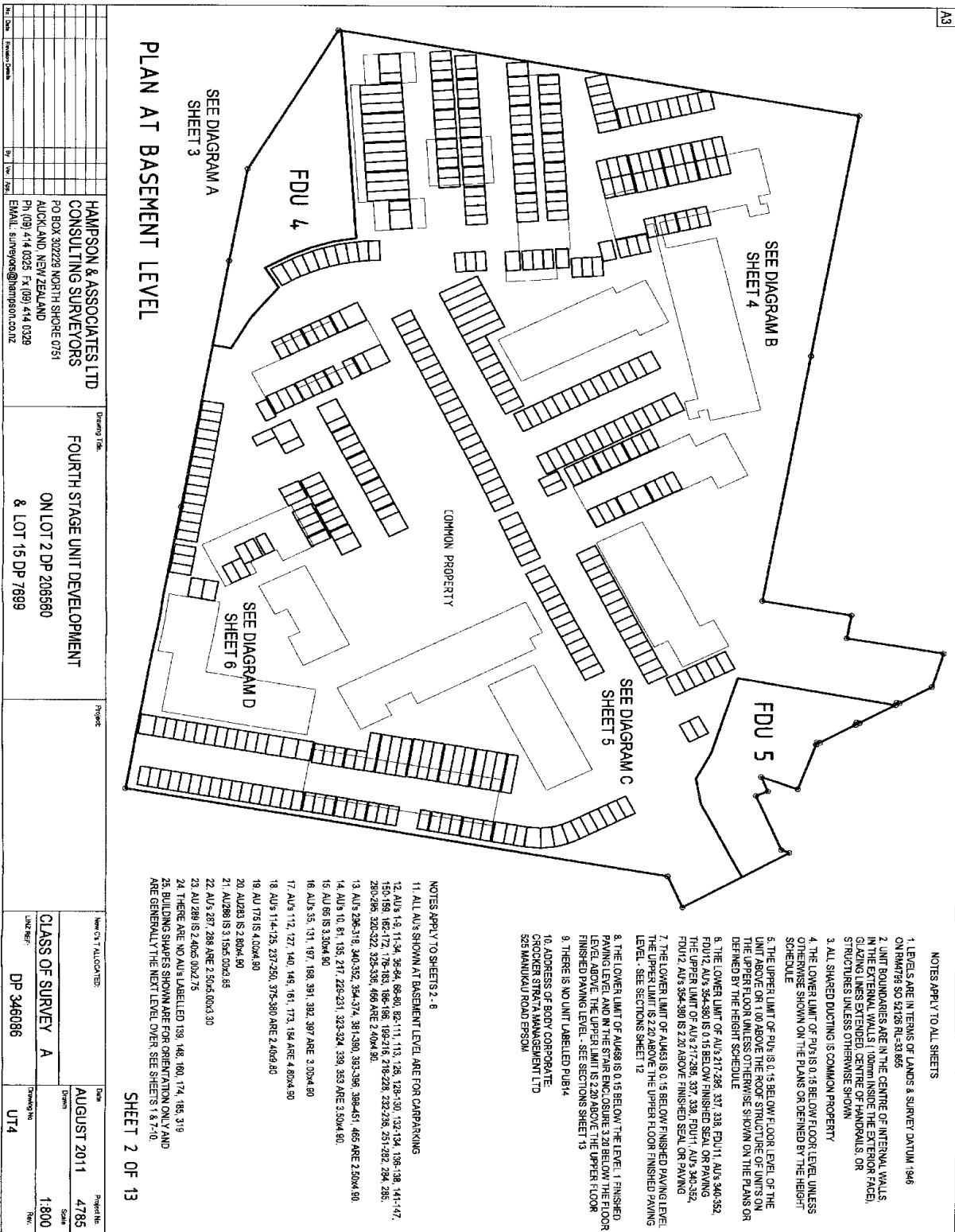
HAMPSON & ASSOCIATES LTD
CONSULTING SURVEYORS
PO BOX 302223 NORTH SHORE 0751
AUCKLAND, NEW ZEALAND
PH: (09) 414 0325 FX: (09) 414 0329
EMAIL: surveyors@hampson.co.nz

PT. ALLOT 169
SEC. 10 SUBS. OF AUCKLAND
(S0348491)

PT. ALLOT 168
SEC. 10 SUBS. OF AUCKLAND
(S0348491)

Project No. 4785
Date AUGUST 2011
Scale 1:800
Drawing No. U74

8:476047851201082011 4785 4TH STAGE UT 1 Tue Nov 15 11:14:06 2011



A3

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 AUCKLAND NEW ZEALAND
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 EMAIL: SURVEYS@hampson.co.nz

FOURTH STAGE UNIT DEVELOPMENT
 ON LOT 2 DP 206560
 & LOT 16 DP 7699

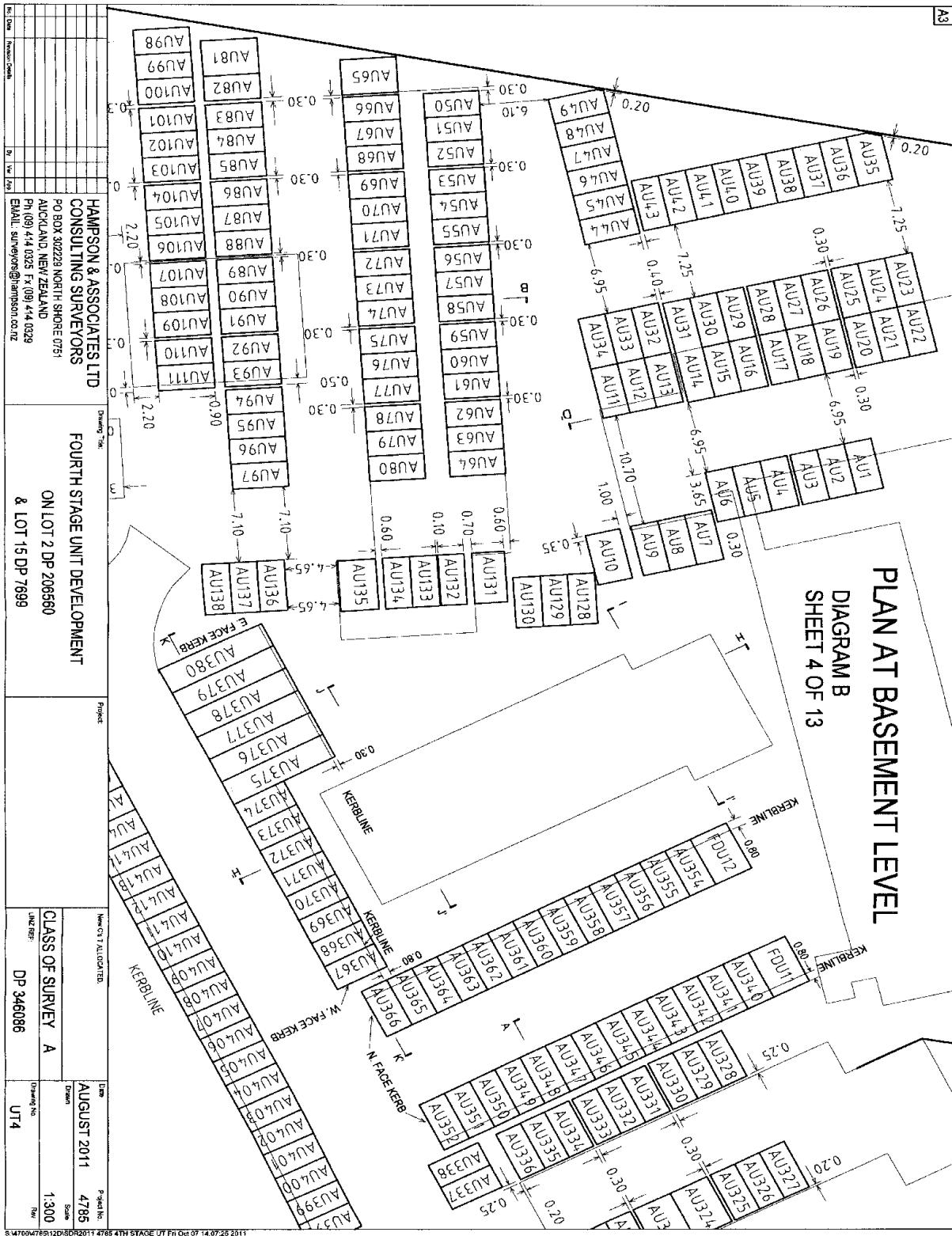
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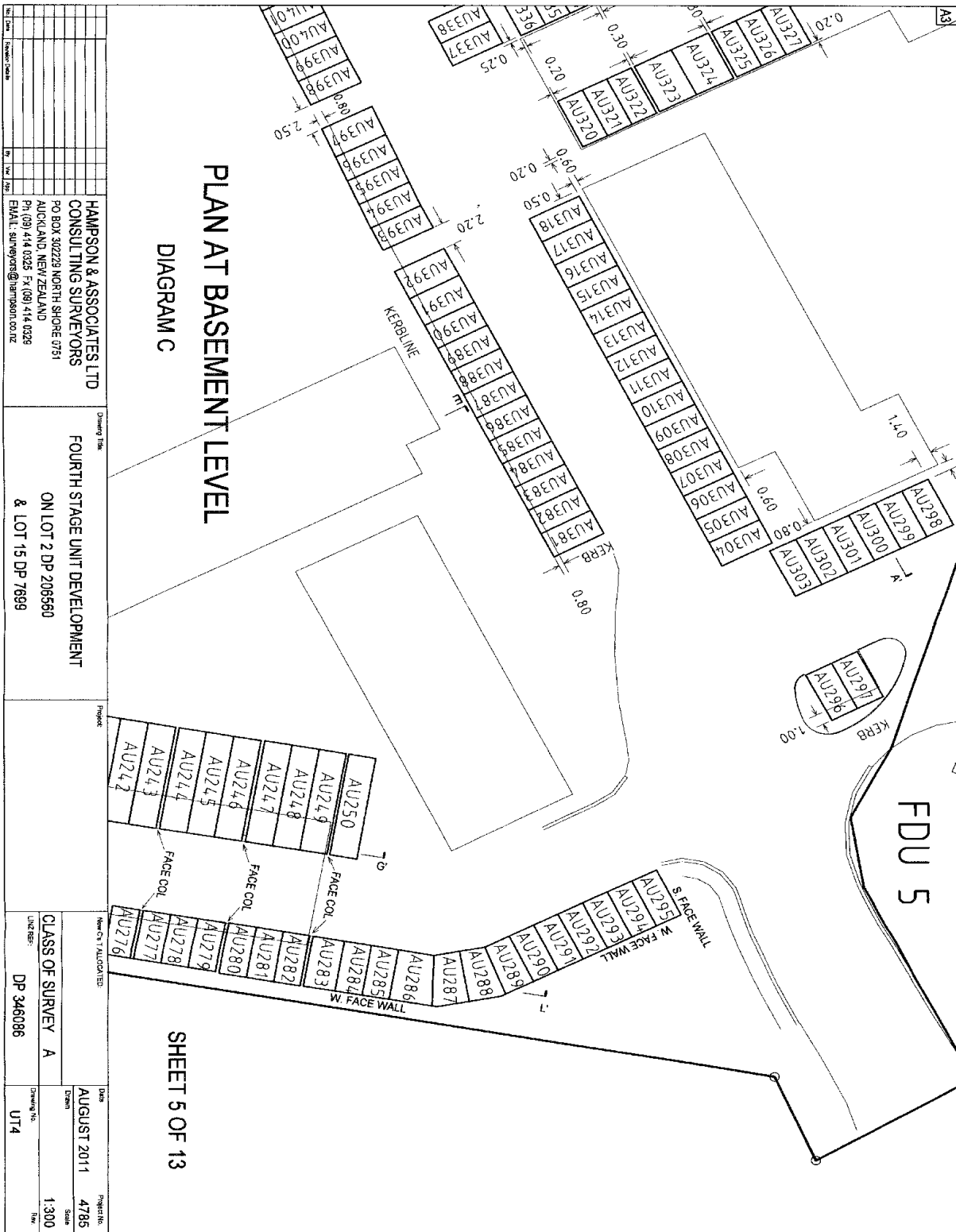
CLASS OF SURVEY A
 DP 346096

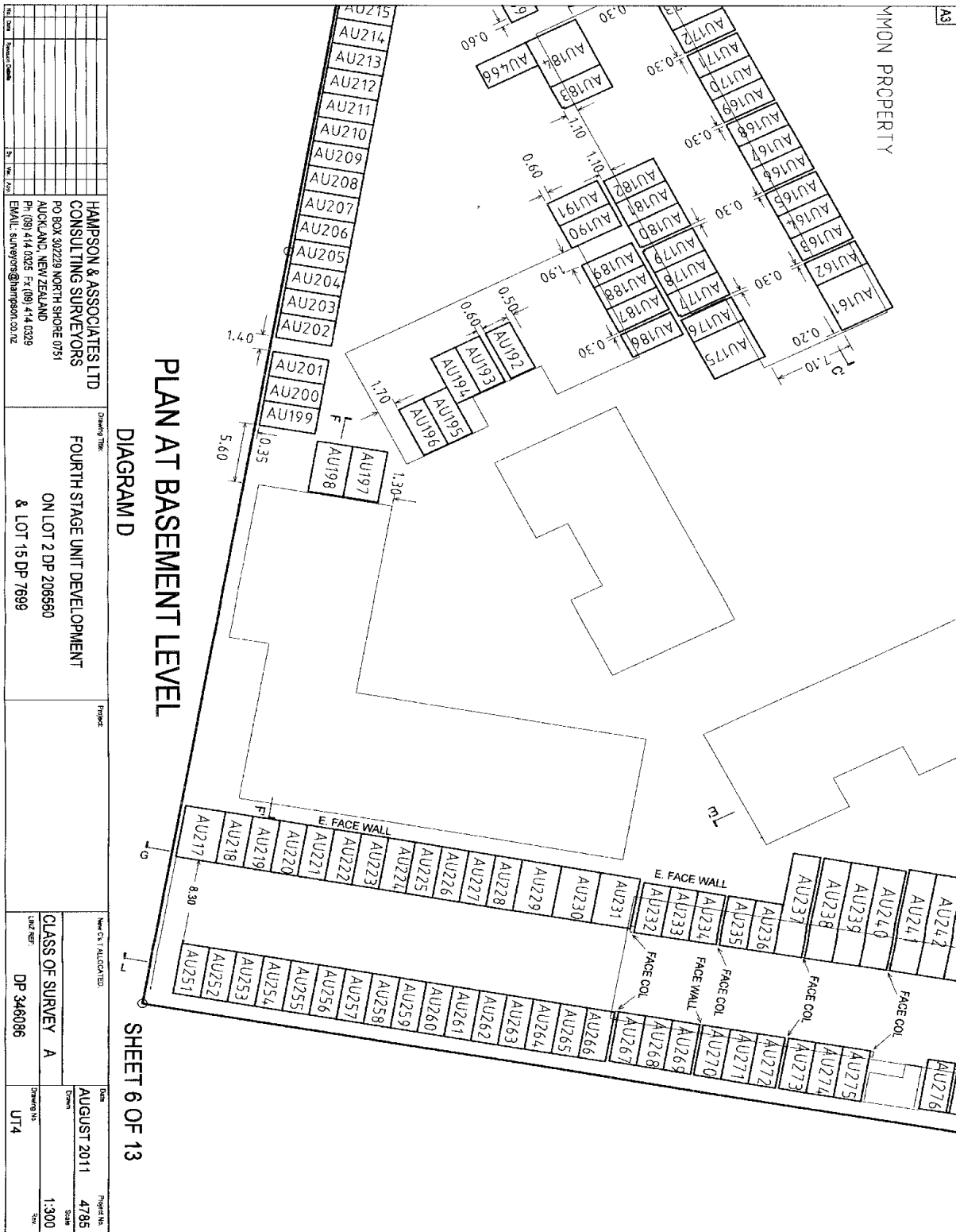
DATE AUGUST 2011
 SCALE 1:800
 DRAWING NO. U74

- NOTES APPLY TO ALL SHEETS
1. LEVELS ARE IN TERMS OF LANDS & SURVEY DATUM 1948 ON MAPS 789 SO 52/28 FC-33/899
 2. UNIT BOUNDARIES ARE IN THE CENTRE OF INTERNAL WALLS IN THE EXTERNAL WALLS 100mm INSIDE THE EXTERIOR FACE, GLAZING LINES EXTENDED CENTRE OF HANDRAILS OR STRUCTURES UNLESS OTHERWISE SHOWN
 3. ALL SHARED DUCTING IS COMMON PROPERTY
 4. THE LOWER LIMIT OF PDU IS 0.45 BELOW FLOOR LEVEL UNLESS OTHERWISE SHOWN ON THE PLANS OR DEFINED BY THE HEIGHT SCHEDULE
 5. THE UPPER LIMIT OF PDU IS 0.15 BELOW FLOOR LEVEL OF THE UNIT ABOVE OR 1.00 ABOVE THE ROOF STRUCTURE OF UNITS ON THE UPPER FLOOR UNLESS OTHERWISE SHOWN ON THE PLANS OR DEFINED BY THE HEIGHT SCHEDULE
 6. THE LOWER LIMIT OF AU'S 217-295, 337, 338, PDU11, AU'S 340-352, PDU12, AU'S 354-380 IS 0.15 BELOW FINISHED SEAL OR PAVING. THE UPPER LIMIT OF AU'S 217-295, 337, 338, PDU11, AU'S 340-352, PDU12, AU'S 354-380 IS 2.20 ABOVE FINISHED SEAL OR PAVING
 7. THE LOWER LIMIT OF AU'S 18 IS 0.15 BELOW FINISHED PAVING LEVEL. THE UPPER LIMIT IS 2.20 ABOVE THE UPPER FLOOR FINISHED PAVING LEVEL. SEE SECTIONS SHEET 12
 8. THE LOWER LIMIT OF AU'S 8 IS 0.15 BELOW THE LEVEL 1 FINISHED PAVING LEVEL AND IN THE STAIR ENCLOSURE 3.20 BELOW THE FLOOR FINISHED PAVING LEVEL. THE UPPER LIMIT IS 2.20 ABOVE THE UPPER FLOOR FINISHED PAVING LEVEL. SEE SECTIONS SHEET 13
 9. THERE IS NO UNIT LABELLED PUB14
 10. ADDRESS OF BODY CORPORATE: CROCKER STRATA MANAGEMENT LTD 525 MANUKAU ROAD EPSOM
- NOTES APPLY TO SHEETS 2 - 6
11. ALL AU'S SHOWN AT BASEMENT LEVEL ARE FOR CARPARKING
 12. AU'S 1-9, 11-34, 36-94, 96-90, 92-111, 113, 126, 128-130, 132-134, 136-138, 141-147, 150-159, 162-172, 176-183, 186-188, 189-218, 218-228, 232-238, 251-252, 294, 295, 298-299, 320-322, 335-336, 469 ARE 2.40M x 9.0
 13. AU'S 298-318, 340-352, 354-374, 381-380, 383-386, 388-451, 465 ARE 2.50M x 9.0
 14. AU'S 10, 81, 135, 217, 228-231, 323-324, 339, 353 ARE 3.50M x 9.0
 15. AU 66 IS 3.00M x 9.0
 16. AU'S 35, 131, 197, 198, 391, 392, 397 ARE 3.00M x 9.0
 17. AU'S 112, 127, 140, 149, 161, 173, 184 ARE 4.80M x 9.0
 18. AU'S 114-125, 237-250, 375-380 ARE 2.40M x 9.0
 19. AU 175 IS 4.00M x 9.0
 20. AU'S 2 IS 2.80M x 9.0
 21. AU'S 288 IS 3.15M x 0.0355
 22. AU'S 287, 289 ARE 2.50M x 0.0333
 23. AU 290 IS 2.40M x 0.0275
 24. THERE ARE NO AU'S LABELLED 139, 148, 160, 174, 185, 319
 25. BUILDING STAIRS SHOWN ARE FOR ORIENTATION ONLY AND ARE GENERALLY THE NEXT LEVEL OVER. SEE SHEETS 1 & 7-10

SHEET 2 OF 13









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 AUCKLAND NEW ZEALAND
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 EMAIL: surveys@hampson.co.nz

FOURTH STAGE UNIT DEVELOPMENT
 ON LOT 2 DP 206560
 & LOT 15 DP 7899

CLASS OF SURVEY A
 DP 346086

DATE AUGUST 2011
 DRAWN BY U74
 PROJECT No. 4785
 SCALE 1:800
 SHEET 7 OF 13

S:\70004785\1206\DR2011\4785 4TH STAGE UT Pn Oct 07 15:07:03 2011

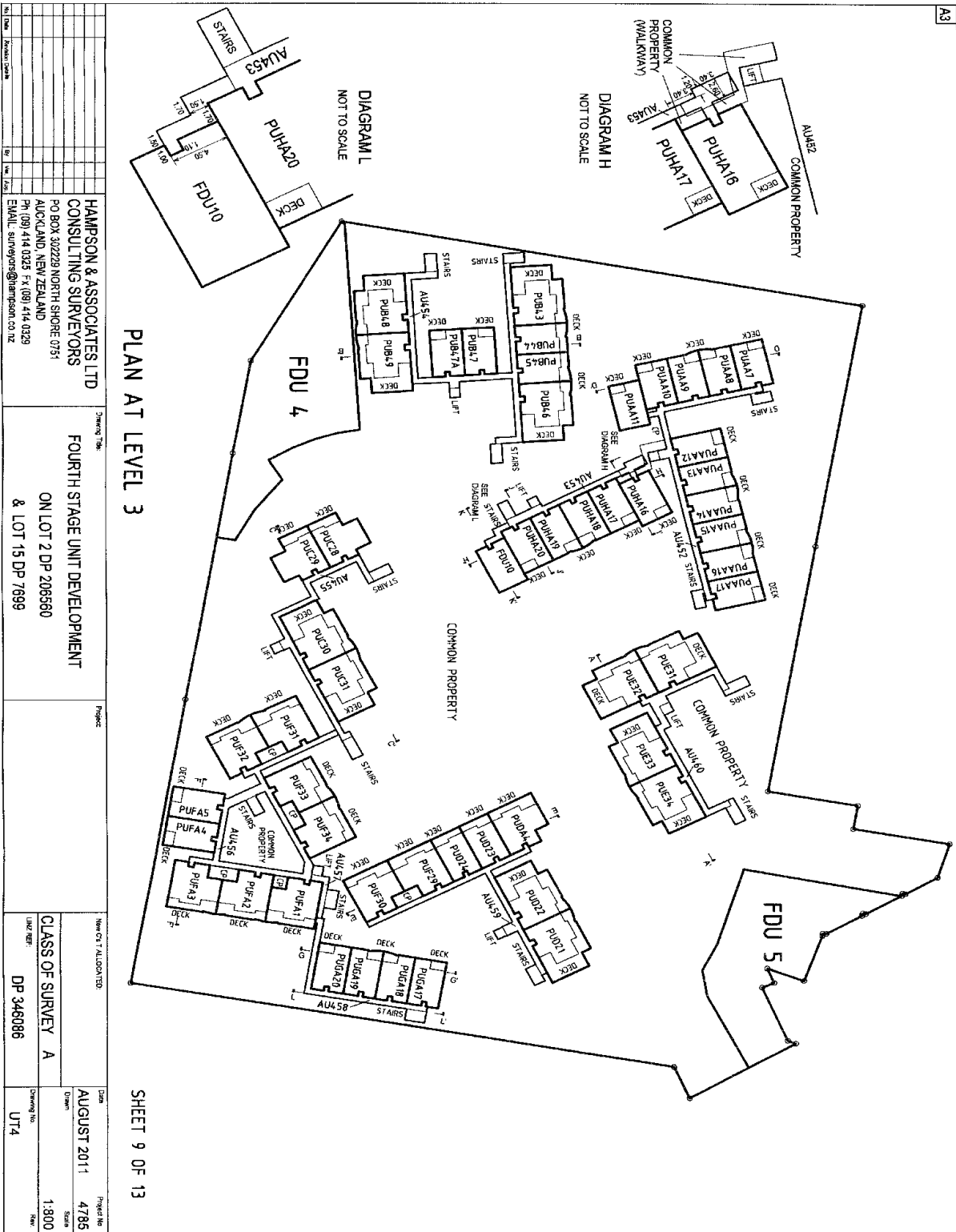


PLAN AT LEVEL 2

SHEET 8 OF 13

<p>HAMPSON & ASSOCIATES LTD CONSULTING SURVEYORS PO BOX 30229 NORTH SHORE 0751 AUCKLAND NEW ZEALAND Ph: (09) 414 0325 Fx: (09) 414 0329 EMAIL: surveyors@hampson.co.nz</p>		<p>Drawn Title FOURTH STAGE UNIT DEVELOPMENT ON LOT 2 DP 206560 & LOT 15 DP 78999</p>		<p>Project CLASS OF SURVEY A DP 346086</p>		<p>Date AUGUST 2011 Drawing No UT4</p>		<p>Sheet No 4785 Scale 1:900 Date 1:900</p>	
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547606785126150202011 4785 4TH STAGE UT Fr Oct 07 16:25:37 2011

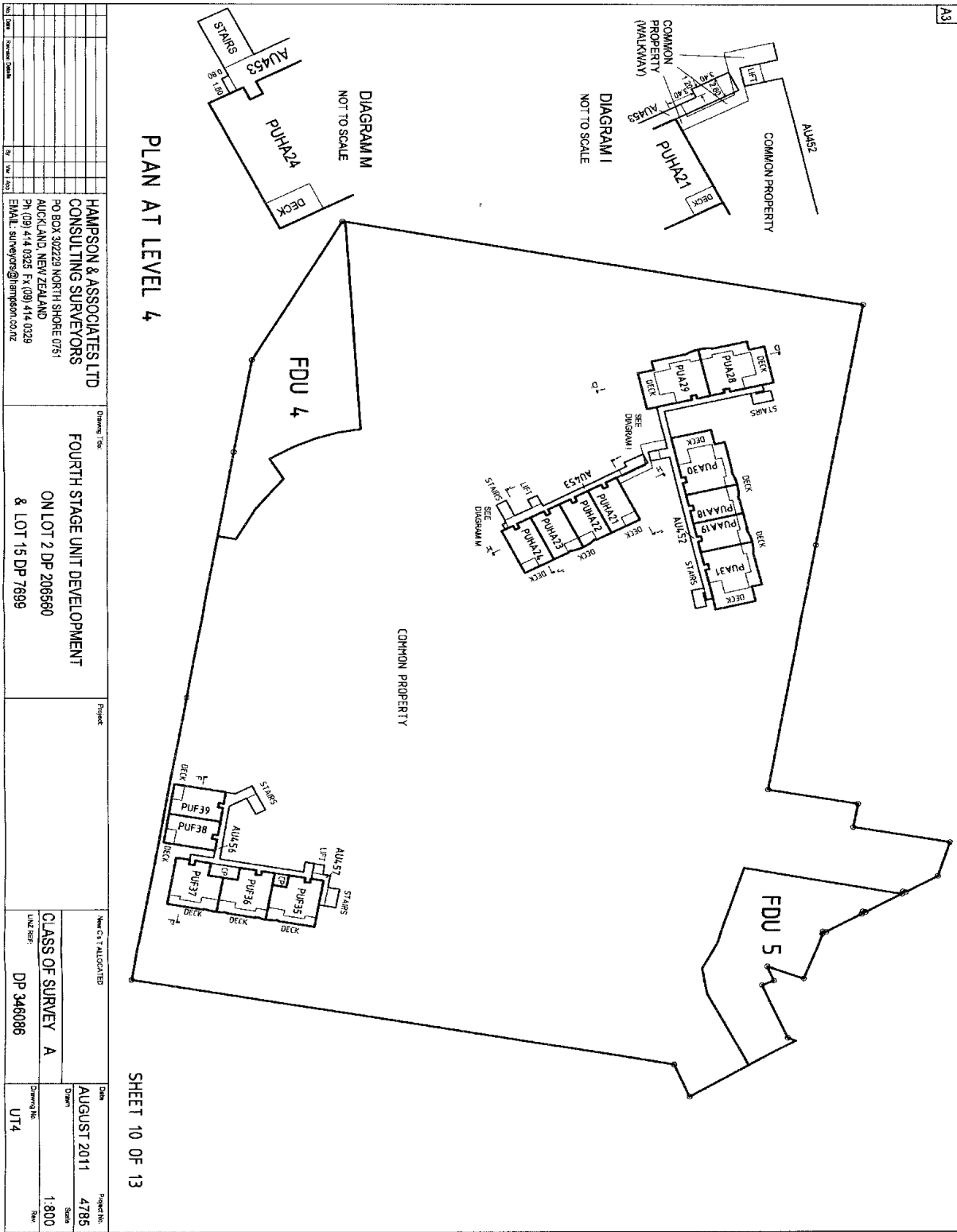


PLAN AT LEVEL 3

SHEET 9 OF 13

<p>HAMPSON & ASSOCIATES LTD CONSULTING SURVEYORS PO BOX 30228 NORTH SHORE 0751 AUCKLAND, NEW ZEALAND Ph: (09) 414 0325 Fx: (09) 414 0329 EMAIL: surveys@hampson.co.nz</p>		<p>Project No: FOURTH STAGE UNIT DEVELOPMENT ON LOT 2 DP 206560 & LOT 15 DP 7699</p>		<p>Scale: CLASS OF SURVEY A UNIT NO: DP 346086</p>		<p>Date: AUGUST 2011 Drawing No: UT4</p>	
1	2	3	4	5	6	7	8

S:\476047851\2011\4785 4TH STAGE UT Mod Nov 14 10 08 39 2011



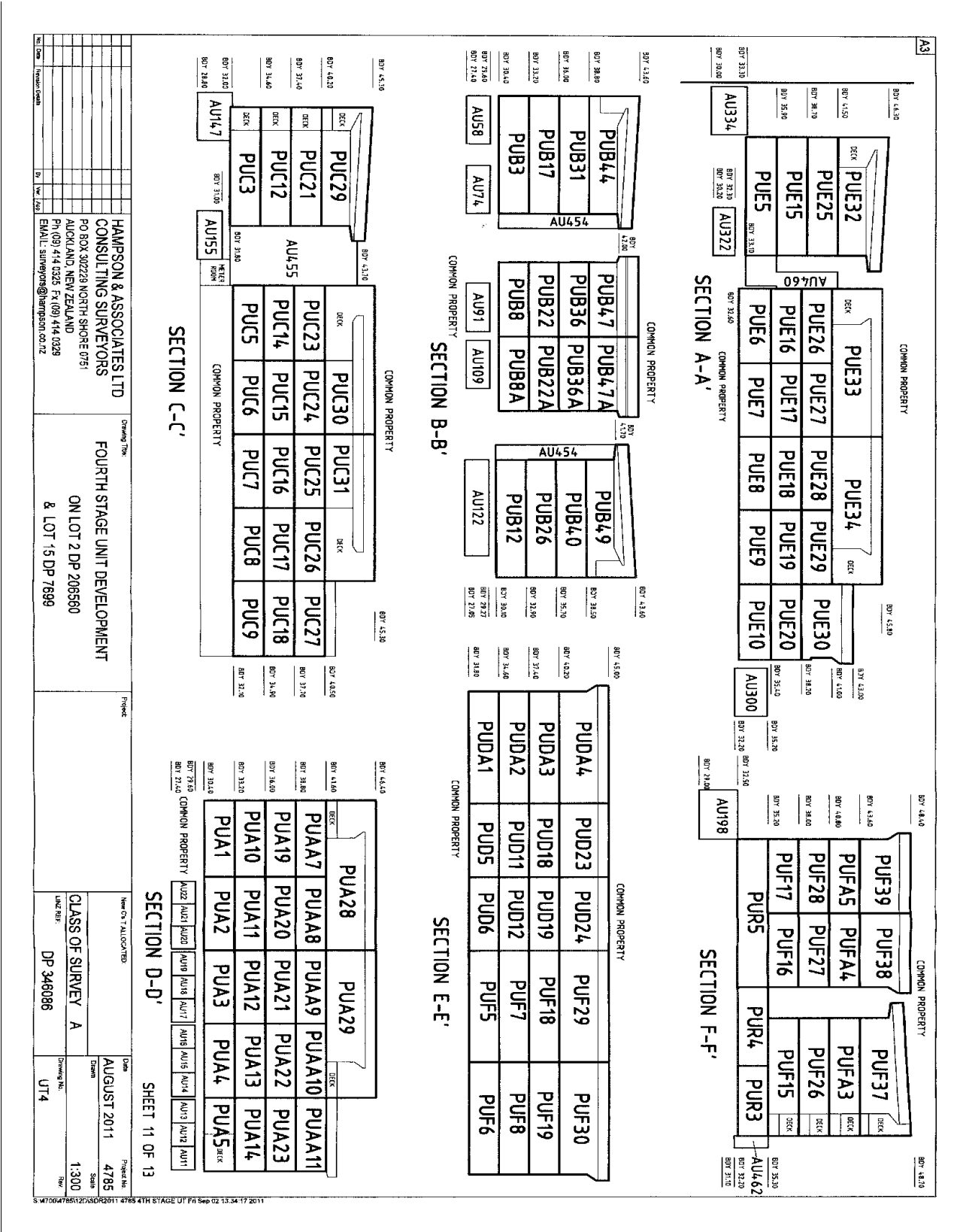
HAMPSON & ASSOCIATES LTD
 CONSULTING SURVEYORS
 PO BOX 302229 NORTH SHORE 0751
 AUCKLAND NEW ZEALAND
 Ph (09) 414 0325 Fx (09) 414 0329
 EMAIL: surveyors@hampson.co.nz

FOURTH STAGE UNIT DEVELOPMENT
 ON LOT 2 DP 206560
 & LOT 15 DP 7899

CLASS OF SURVEY A
 DP 346086
 AUGUST 2011
 4785
 1:800
 U14

PLAN AT LEVEL 4

SHEET 10 OF 13



HAMPSON & ASSOCIATES LTD
CONSULTING SURVEYORS
 PO BOX 30722 NORTH SHORE 0751
 AUCKLAND NEW ZEALAND
 PH (09) 414 0325 FX (09) 414 0329
 EMAIL: surveys@hampson.co.nz

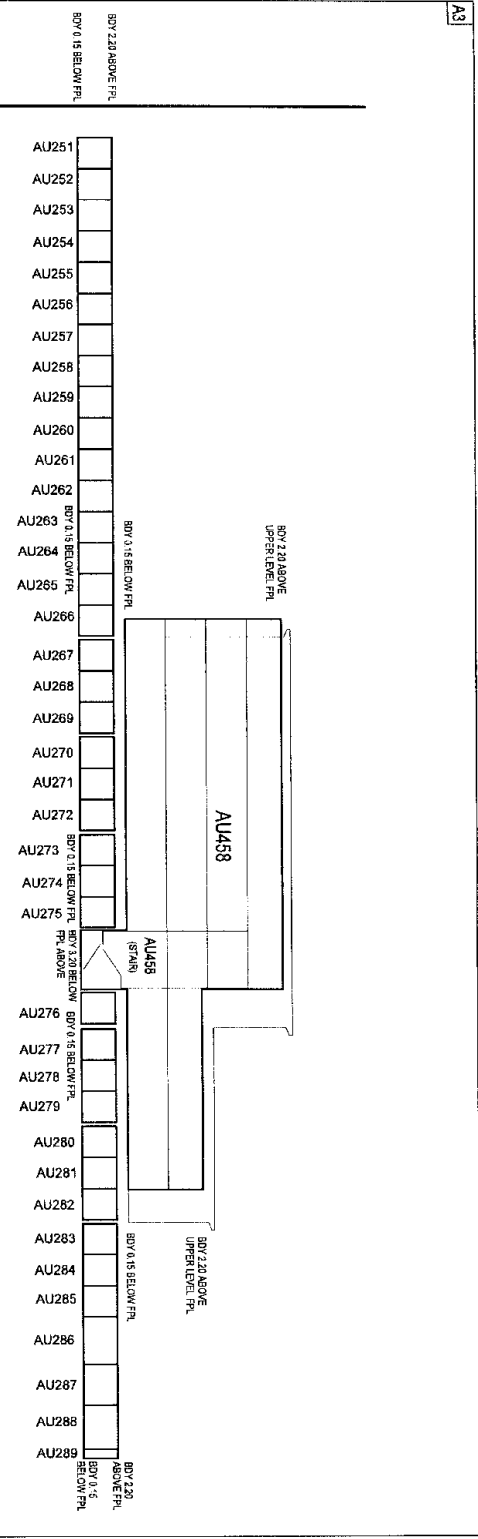
FOURTH STAGE UNIT DEVELOPMENT
 ON LOT 2 DP 206560
 & LOT 15 DP 7699

CLASS OF SURVEY A
 DP 346086

DATE: 11 AUGUST 2011
 DRAWN: UT4
 SHEET 11 OF 13

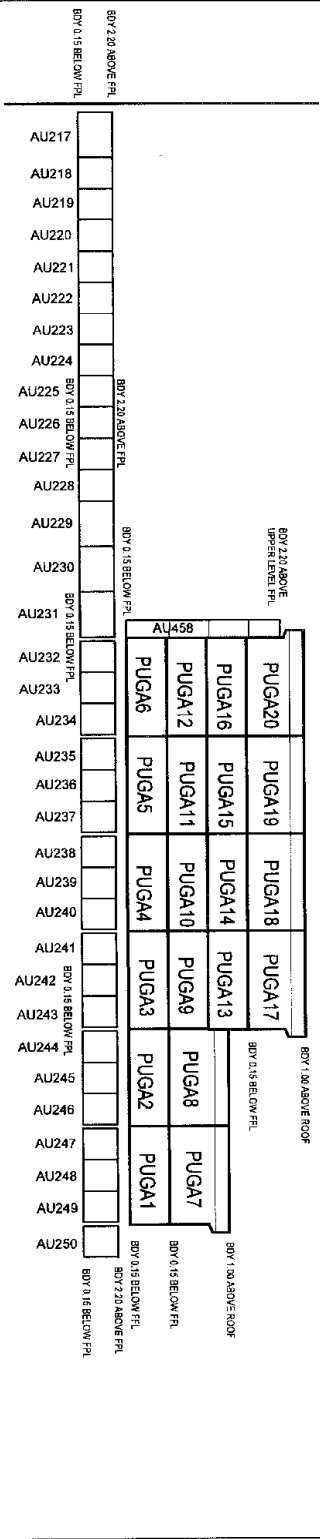
S:\M70647881\27\SDR2011\4788\4TH STAGE UT PH Sep 02 13:34:17 2011

A3



SECTION L-L

NOTE: FFL = FINISHED FLOOR LEVEL
FFL = FINISHED FINING LEVEL



SECTION G-G

SHEET 13 OF 13

<p>HAMPSON & ASSOCIATES LTD CONSULTING SURVEYORS PO BOX 30229 NORTH SHORE 0751 AUCKLAND, NEW ZEALAND PH (09) 414 0235 FX (09) 414 0239 EMAIL: surveyors@hampson.co.nz</p>		<p>Drawing Title FOURTH STAGE UNIT DEVELOPMENT ON LOT 2 DP 206560 & LOT 15 DP 7699</p>		<p>Project</p>	
<p>New CS T ALLOCATED CLASS OF SURVEY A UNZ REF: DP 346086</p>		<p>Date AUGUST 2011 Drawing No UT4</p>		<p>Project No. 4785 Scale 1:300</p>	

S:\4700\4785\125050R2011_4785_4TH STAGE UT SECTIONS Max: Nov 14 16:03:41 2011



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **576051**
Land Registration District **North Auckland**
Date Issued 03 May 2012

Prior References

139489

Estate Fee Simple
Area 6.6938 hectares more or less
Legal Description Lot 1 Deposited Plan 451490

Proprietors

The New Zealand Institute For Plant and Food Research Limited

Interests

Appurtenant hereto is a water right created by Transfer 655655 (affects part Lot 1 DP 451490 formerly contained in CT NA1656/6)

Subject to Part IV A Conservation Act 1987

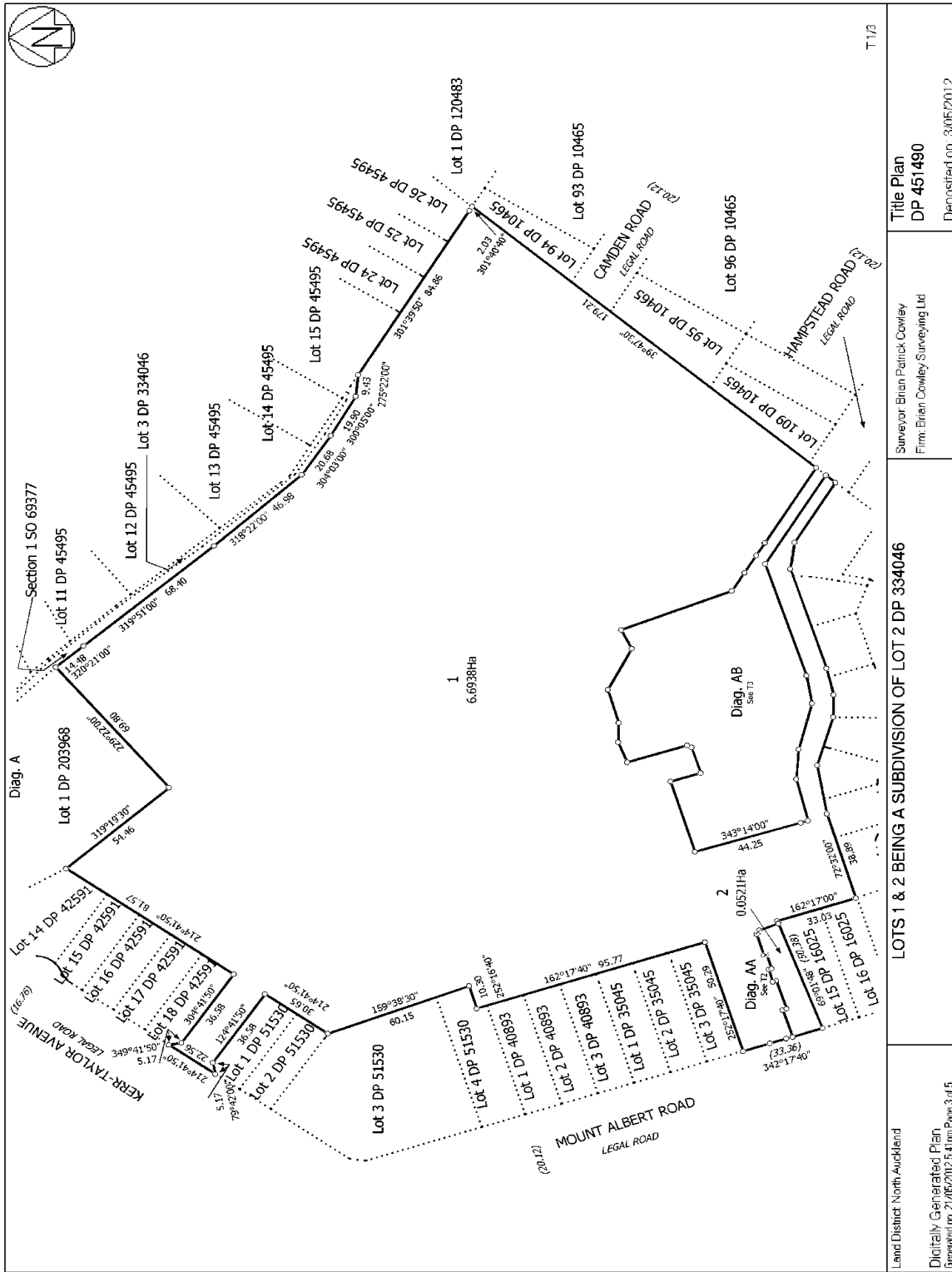
Subject to Section 11 Crown Minerals Act 1991

Appurtenant hereto are rights of way and drainage rights specified in Easement Certificate C558939.5 - 19.1.1994 at 2.23 pm

Subject to a right of way over parts marked A , B and C and drainage rights over parts marked B and D all on DP 451490 specified in Easement Certificate C558939.5 - 19.1.1994 at 2:23 pm

C558939.9 CAVEAT BY HER MAJESTY THE QUEEN - 19.1.1994 AT 2.23 PM

Appurtenant hereto is a right of support created by Easement Instrument 9037741.4 - 3.5.2012 at 4:33 pm

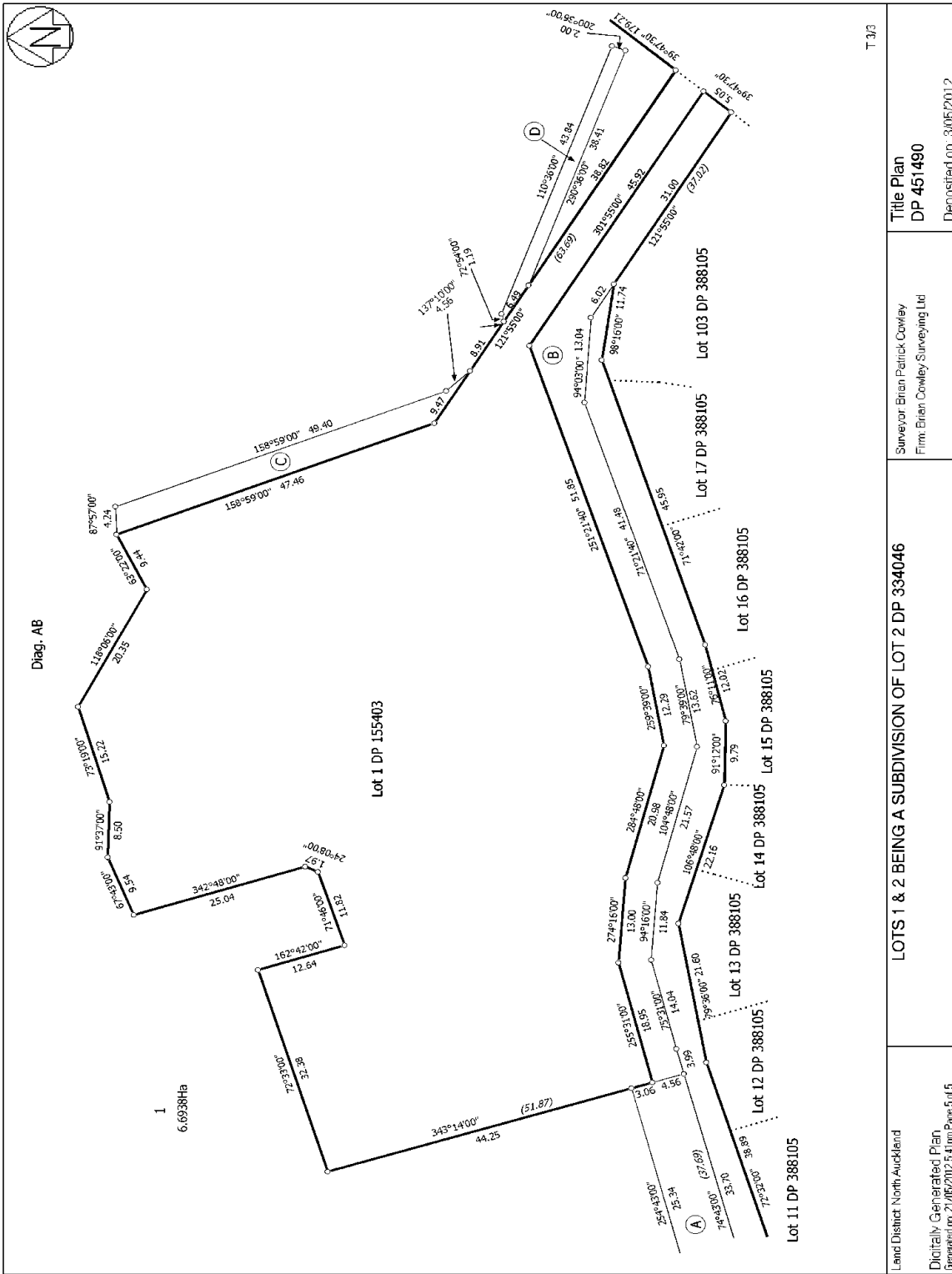


Land District North Auckland
 Digitally Generated Plan
 Generated on 21/05/2012 5:41pm Page 3 of 5

Surveyor Brian Patrick Cowley
 Firm Brian Cowley Surveying Ltd

LOTS 1 & 2 BEING A SUBDIVISION OF LOT 2 DP 334046

Title Plan
 DP 451490
 Deposited on 3/05/2012



T 3/3

<p>Land District North Auckland Digitally Generated Plan (Generated on 21/05/2012 5:41pm) Page 5 of 5</p>	<p>LOTS 1 & 2 BEING A SUBDIVISION OF LOT 2 DP 334046</p>	<p>Surveyor: Brian Patrick Cowley Firm: Brian Cowley Surveying Ltd</p>	<p>Title Plan DP 451490 Deposited on: 3/05/2012</p>
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**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA49C/851
Land Registration District North Auckland
Date Issued 04 September 1981

Prior References

NA2075/84

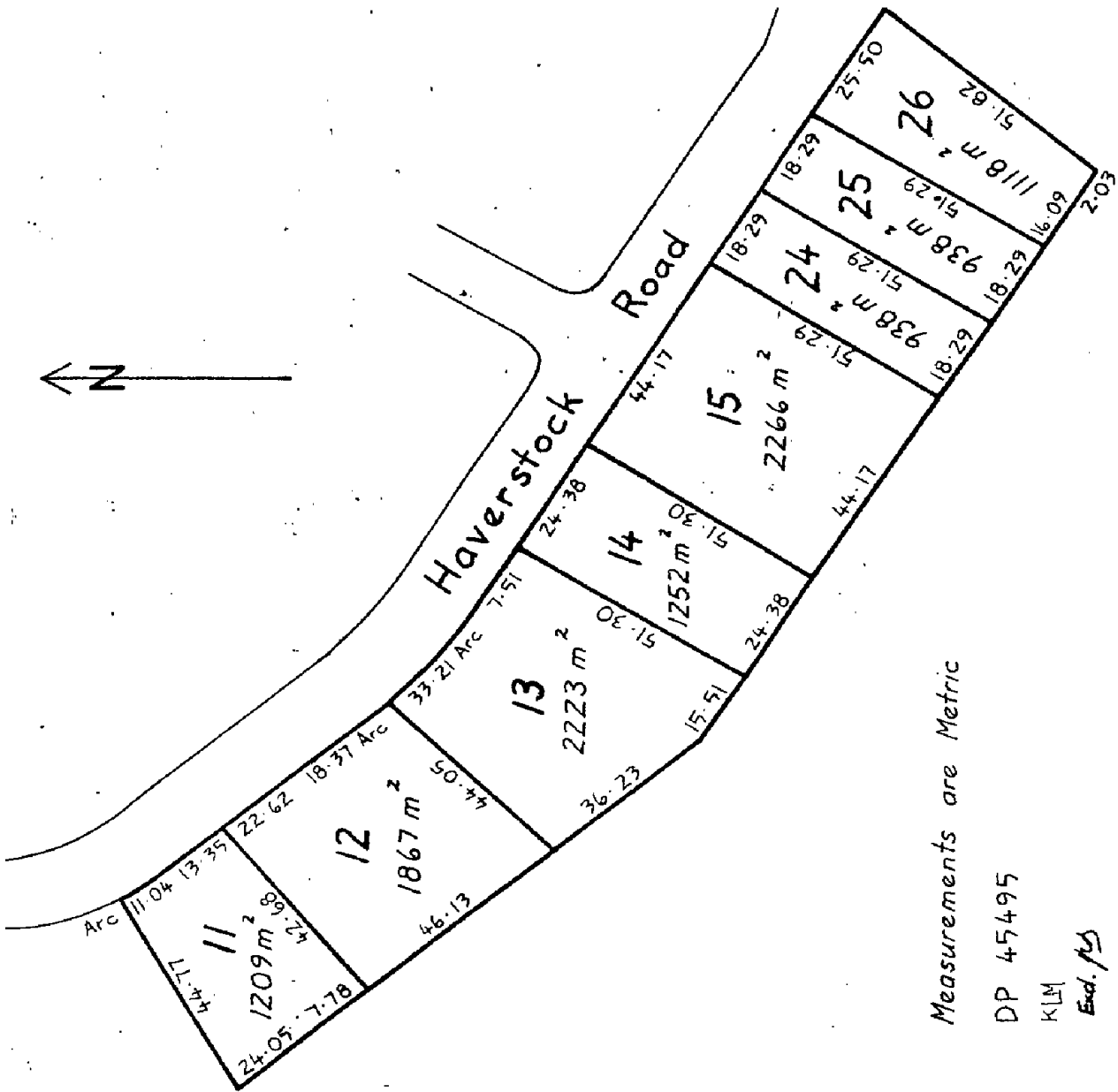
Estate Fee Simple
Area 938 square metres more or less
Legal Description Lot 24 Deposited Plan 45495

Proprietors

Housing New Zealand Limited

Interests

Subject to Part IV A Conservation Act 1987
Subject to Section 11 Crown Minerals Act 1991





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA49C/850
Land Registration District North Auckland
Date Issued 04 September 1981

Prior References

NA2075/84

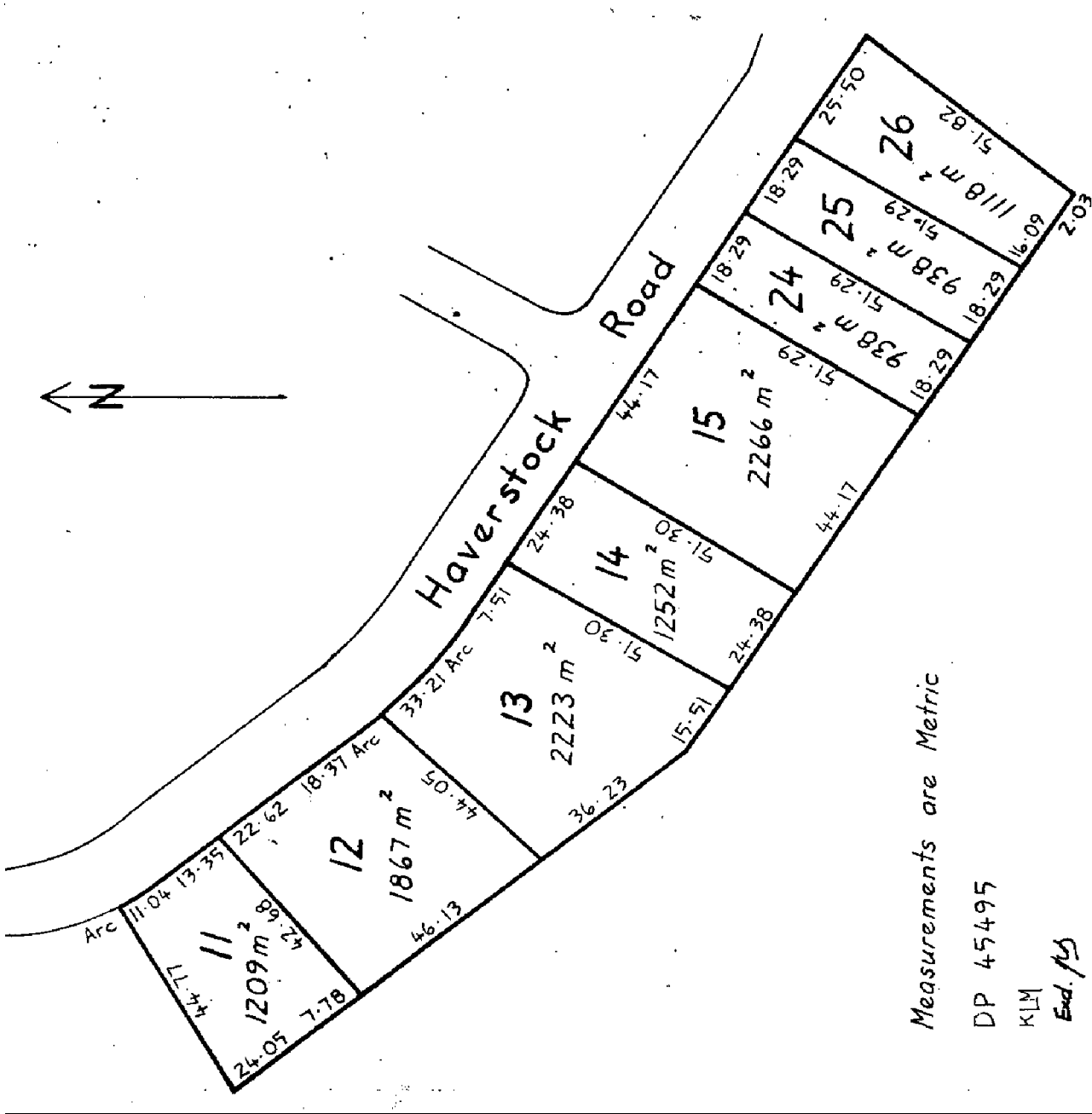
Estate Fee Simple
Area 2266 square metres more or less
Legal Description Lot 15 Deposited Plan 45495

Proprietors

Housing New Zealand Limited

Interests

Subject to Part IV A Conservation Act 1987
Subject to Section 11 Crown Minerals Act 1991



Measurements are Metric

DP 45495

KLM

End. 1/15

Appointment of Sea Fisheries Licensing Authority

PURSUANT to section 6 of the Fisheries Amendment Act 1945, the Minister of Marine hereby appoints
Gerald Lionel O'Halloran
to be the Sea Fisheries Licensing Authority for a term of three years from the date hereof.

Dated at Wellington this 20th day of March 1958.
W. A. FOX, Minister of Marine.

Revoking Appointments of Child Welfare Officers

PURSUANT to the Child Welfare Act 1925, the Minister of Education hereby notifies that, as the under-mentioned persons have ceased to be Child Welfare Officers, their appointments, made under section 2 of the said Act, have been revoked as from the date hereof:

Cathie, Jean Margaret;
Racza, Michalina; and
Rangihau, John.

Dated at Wellington this 19th day of March 1958.
M. B. HOWARD, for the Minister of Education.

Appointment of Sittings of Court of Appeal

WE, the undersigned, Judges of the Court of Appeal, hereby appoint sittings of the Court of Appeal of New Zealand, to be held in the Supreme Courthouse, in the City of Wellington, at eleven o'clock in the forenoon, on the following days:

Monday, the 19th day of May 1958;
Monday, the 16th day of June 1958; and
Monday, the 21st day of July 1958

and on such other days and at such other times as the Court, from time to time, appoint.

Given under our hands at Wellington this 21st day of March 1958.

H. E. BARROWCLOUGH, C.J.
K. M. GRESSON, P.
A. K. NORTH, J.
T. P. CLEARY, J.

Officiating Ministers for 1958—Notice No. 11

PURSUANT to the Marriage Act 1955, the following names of officiating ministers within the meaning of the said Act are published for general information:

The Church of the Province of New Zealand, Commonly Called the Church of England

The Reverend Edward Sunderland Richardson

Brethren

Mr Frank Martin

Open Door Mission

Mr Clarence Raymond Hunt

Dated at Wellington this 25th day of March 1958.
J. G. A'COURT, Registrar-General.

Declaration That the Waipu North Domain Shall be a Recreation Reserve and Revocation of the Reservation Over the Said Land

PURSUANT to the Reserves and Domains Act 1953, the Minister of Lands hereby declares that the Waipu North Domain, described in the Schedule hereto, shall cease to be subject to provisions of Part III of the Reserves and Domains Act 1953, and shall be deemed to be a recreation reserve subject to Part II of the said Act, and further, revokes the reservation for recreation purposes over the said land.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALLOTMENT 195A, Parish of Waipu, situated in Block XII, Ruakaka Survey District: Area, 2½ acres, more or less. (S.O. Plan 1872.)

Dated at Wellington this 19th day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 1/565; D.O. 8/944)

Declaration That State Forest Land Shall be a Scenic Reserve

PURSUANT to the Reserves and Domains Act 1953, the Minister of Lands hereby declares that the State forest land described in the Schedule hereto shall be a scenic reserve subject to the said Act.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT—PART MANGAMUKA GORGE SCENIC RESERVE

SECTIONS 4, 5, and 6, Block IX, Maungataniwha Survey District (formerly part Maungataniwha West No. 2 Block): Total area, 320 acres, more or less. (S.O. Plan 40223.)

Dated at Wellington this 24th day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 10/91/66; D.O. 3/1770/25)

Reservation of Land and Declared to be Part of Naseby Domain

PURSUANT to the Land Act 1948, the Minister of Lands hereby sets apart the land described in the Schedule hereto as a reserve for recreation purposes, and further, pursuant to the Reserves and Domains Act 1953, declares the said reserve to be a public domain subject to the provisions of Part III of the last-mentioned Act, to be part of the Naseby Domain to be administered as a public domain by the Domain Board.

SCHEDULE

OTAGO LAND DISTRICT

SECTIONS 14, 15, 16, and 17, Block I, Town of Naseby: Area, 22.8 perches, more or less. (S.O. Plan 600 TN.)

Dated at Wellington this 24th day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 1/289; D.O. 14/176/4)

Reservation of Land

PURSUANT to the Land Act 1948, the Minister of Lands hereby sets apart the land described in the Schedule hereto as a reserve for scenic purposes.

SCHEDULE

TARANAKI LAND DISTRICT

LOT 1, D.P. 5703, being part Section 384, Town of Inglewood, situated in the Borough of Inglewood: Area, 1 acre 2 roods 26 perches, more or less.

Dated at Wellington this 19th day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 4/1145; D.O. 13/7/2)

Reservation of Land and Vesting in the Mount Roskill Borough Council

PURSUANT to the Land Act 1948, the Minister of Lands hereby sets apart the land described in the Schedule hereto as a reserve for recreation purposes, and further, pursuant to the Reserves and Domains Act 1953, vests the said reserve in the Mayor, Councillors, and Citizens of the Borough of Mount Roskill, in trust, for that purpose.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

LOT 112, D.P. 43048, being part Allotment 87, Titirangi Parish, situated in Block IV, Titirangi Survey District: Area, 8 acres 3 roods 35.9 perches, more or less. Part certificate of title, Volume 1098, folio 25. Subject to an electric-current-transmission easement created by transfer No. 328520 registered in the Land Registry Office at Auckland.

Dated at Wellington this 19th day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 1/1107/1/9; D.O. 8/1672)

Reservation of Land and Vesting in the Rodney County Council

PURSUANT to the Land Act 1948, the Minister of Lands hereby sets apart the land described in the Schedule hereto as a reserve for recreation purposes, and further, pursuant to Reserves and Domains Act 1953, vests the said reserve in Chairman, Councillors, and Inhabitants of the County Rodney, in trust, for that purpose.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

SECTION 96, Block XVI, Otamatea Survey District: Area, perches, more or less. (S.O. Plan 37873.)

Dated at Wellington this 21st day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 6/1/84; D.O. 8/1941)

Reservation of Land and Vesting in Hauraki Plains County Council

PURSUANT to the Land Subdivision in Counties Act 1946, Minister of Lands hereby declares that the land described in the Schedule hereto is set aside as a reserve for recreation purposes, and further, pursuant to the Reserves and Domains Act 1953, vests the said reserve in the Chairman, Councillors, and Inhabitants of the County of Hauraki Plains, in trust, for that purpose.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

LOT 16, D.P. S. 1739, being part Section 25, Block I, Wail Survey District: Area, 32.1 perches, more or less.

Dated at Wellington this 21st day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 6/1/985; D.O. 8/1042, 8/5/17)

Reservation of Land and Vesting in the Mount Wellington Borough Council

PURSUANT to the Land Act 1948, the Minister of Lands hereby sets apart the land described in the Schedule hereto as a reserve for recreation purposes, and further, pursuant to the Reserves and Domains Act 1953, vests the said reserves in the Mayor, Councillors, and Citizens of the Borough of Mount Wellington, in trust, for that purpose.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

LOT 330, D.P. 44686, being part Allotments 41, 42, and 1 District of Tamaki.

Also Lots 36 and 529, D.P. 44905, being parts Allotments 39 and 40, District of Tamaki.

All situated in Block II, Otahuhu Survey District: Total area, 24 acres 3 roods 10.3 perches, more or less.
Dated at Wellington this 19th day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 1/1107/1/12; D.O. 8/1928)

Vesting a Reserve in the Manganui County Agricultural and Pastoral Association, Incorporated

PURSUANT to the Reserves and Domains Act 1953, the Minister of Lands hereby vests the reserve described in the Schedule hereto in the Manganui County Agricultural and Pastoral Association, Incorporated, in trust, for an agricultural and pastoral showground.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

LOTS 8 and 9, D.P. 44177, being part O.L.C. 242, situated Block V, Takahue Survey District: Area, 3 acres 2 roods, more or less. Part certificate of title, Volume 372, folio 29.

Dated at Wellington this 19th day of March 1958.
C. F. SKINNER, Minister of Lands.
(L. and S. H.O. 22/3604; D.O. 8/722)



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA66C/174**
Land Registration District **North Auckland**
Date Issued 20 August 1987

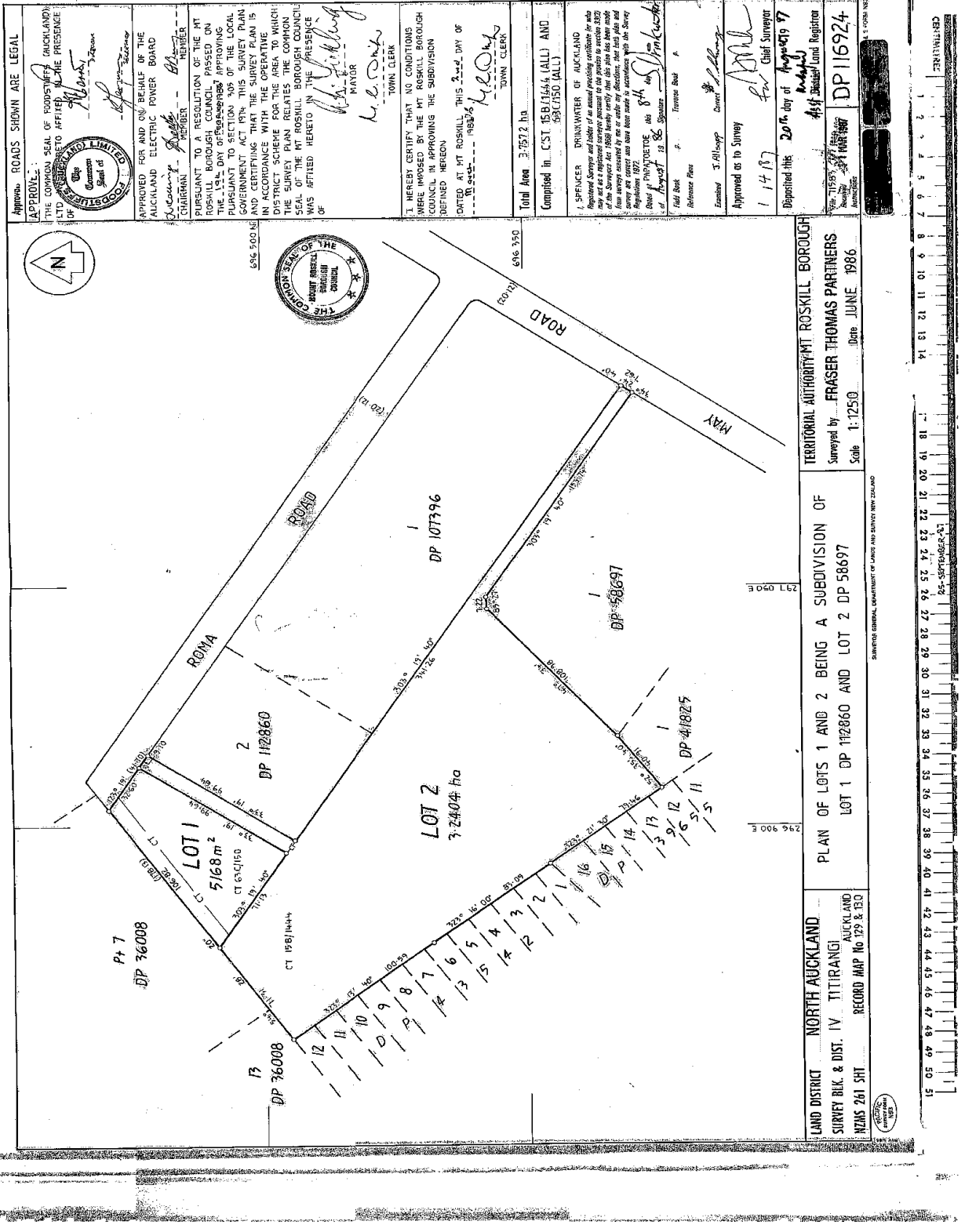
Prior References

NA15B/1444 NA63C/150

Estate Fee Simple
Area 3.2404 hectares more or less
Legal Description Lot 2 Deposited Plan 116924

Proprietors
May Road Properties Limited

Interests



APPROVE, ROADS SHOWN ARE LEGAL
 APPROVAL: THE COMMON SEAL OF ROOSTIFFS (AUCKLAND) LTD IS HEREBY AFFIXED IN THE PRESENCE OF
 [Signature]
 [Signature]

APPROVED FOR AND ON BEHALF OF THE AUCKLAND ELECTRIC POWER BOARD
 CHAIRMAN
 MEMBER
 MEMBER
 PURSUANT TO A RESOLUTION OF THE MT ROSKILL BOROUGH COUNCIL, PASSED ON THE 14th DAY OF SEPTEMBER 1986, APPROVING PLANS TO SECTION 305 OF THE LOCAL GOVERNMENT ACT 1974 THIS SURVEY PLAN IS AND CERTIFYING THAT THE OPERATIVE DISTRICT SCHEMES WHICH RELATES TO THE COMMON SEAL OF THE MT ROSKILL BOROUGH COUNCIL WAS AFFIXED HERETO IN THE PRESENCE OF
 [Signature] MAYOR
 [Signature] TOWN CLERK

I HEREBY CERTIFY THAT NO CONDITIONS WERE IMPOSED BY THE MT ROSKILL BOROUGH COUNCIL IN APPROVING THE SUBDIVISION DEFINED HEREON
 DATED AT MT ROSKILL THIS 22nd DAY OF SEPTEMBER 1986
 [Signature] TOWN CLERK

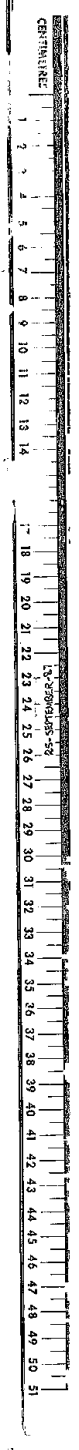
Total Area 37572 ha
 Comprised in CST 15B/1444 (ALL) AND 59C/150 (ALL)

I, SPENCER DRINKWATER OF AUCKLAND Registered Surveyor and holder of an annual practicing certificate, do hereby certify that this plan has been made in accordance with the Survey Act 1980, that the boundaries shown on this plan have been made from surveys conducted by me or under my direction, that the plan and survey are correct and have been made in accordance with the Survey Act 1980.
 DATED AT AUCKLAND THIS 8th DAY OF AUGUST 1986
 [Signature] Reference Plan

Field Book
 Reference Plan
 Examined J. Allwright
 Approved as to Survey
 14/87
 Chief Surveyor

Deposited this 20th day of August 1986
 [Signature] Chief Surveyor
 [Signature] District Land Registrar
 DP 116924

LAND DISTRICT NORTH AUCKLAND
 SURVEY BLK. & DIST. IV TITIRANGI
 RECORD MAP No. 129 & 130
 PLAN OF LOTS 1 AND 2 BEING A SUBDIVISION OF LOT 1 DP 112860 AND LOT 2 DP 58697
 Scale 1:1250
 Date JUNE 1986
 TERRITORIAL AUTHORITY MT ROSKILL BOROUGH
 Surveyed by FRASER THOMAS PARTNERS





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

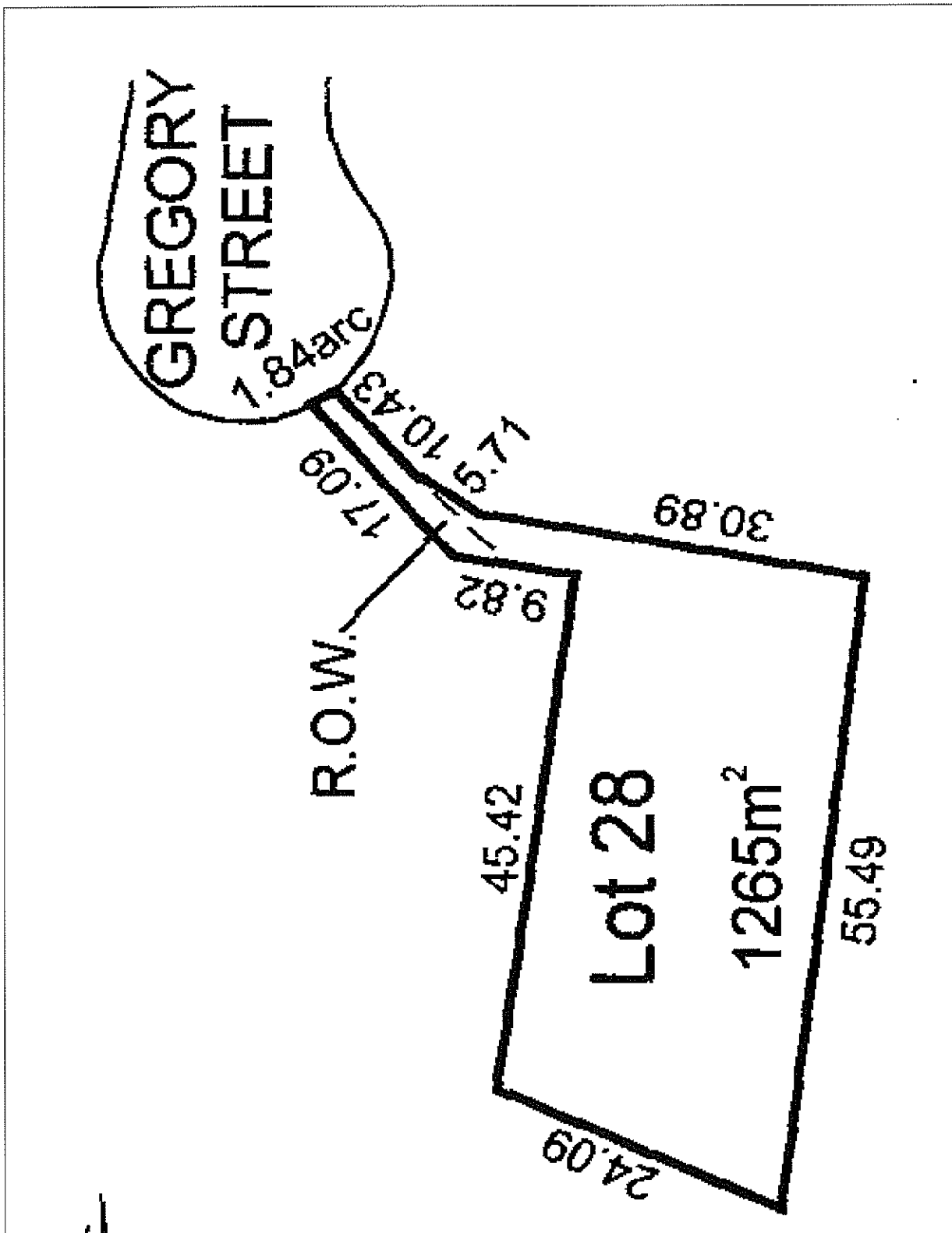
Identifier NA129A/172
Land Registration District North Auckland
Date Issued 28 April 2000

Prior References
NA2B/422

Estate Fee Simple
Area 1265 square metres more or less
Legal Description Lot 28 Deposited Plan 49583
Proprietors
Auckland Council

Interests

Appurtenant hereto is a right of way created by Transfer 688878
Subject to a right of way over part coloured blue on DP 49583 created by Transfer 688878
The easements created by Transfer 688878 are subject to Section 351E (1) (a) Municipal Corporations Act 1954





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA2098/6
Land Registration District North Auckland
Date Issued 24 October 1962

Prior References

NA1974/60

Estate Fee Simple
Area 1138 square metres more or less
Legal Description Lot 27 Deposited Plan 49583

Proprietors

Rohan Leitch Taylor as to a 1/2 share
Yvonne Lesley Taylor as to a 1/2 share

Interests

Fencing Agreement in Transfer 688878 - 24.10.1962
Appurtenant hereto is a right of way created by Transfer 688878 - 24.10.1962
Subject to a right of way over part created by Transfer 688878 - 24.10.1962
The easements created by Transfer 688878 are subject to Section 351E (1) (a) Municipal Corporations Act 1954



COMPOSITE COMPUTER REGISTER
UNDER LAND TRANSFER ACT 1952



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA139C/70**
Land Registration District **North Auckland**
Date Issued 03 July 2002

Prior References

NA2B/328

Estate Fee Simple - 1/2 share
Area 845 square metres more or less
Legal Description Lot 2 Deposited Plan 52047

Proprietors

Auckland Council

Estate	Leasehold	Instrument	L 5271268.2
		Term	999 years commencing on 20 May 2002

Legal Description Flat 1 Deposited Plan DP 211442

Proprietors

Auckland Council

Interests

Appurtenant hereto is a right of way created by Transfer 712569

Subject to a drainage right (in gross) over part coloured blue on DP 52047 in favour of the Mt. Roskill Borough Council created by Transfer 198423

Appurtenant hereto is a right of way created by Transfer D227867.3 - 16.12.1997 at 3.47 pm

5271268.2 Lease of Flat 1 Deposited Plan DP 211442 Term 999 years commencing on 20 May 2002 Composite CT NA139C/70 issued - 3.7.2002 at 9:04 am

6387944.4 Lease of Flat 2 Deposited Plan 342786 Term 996 years and 2 months commencing on 20th March 2005 Composite CT 175714 issued - 19.4.2005 at 9:00 am



**COMPOSITE COMPUTER REGISTER
UNDER LAND TRANSFER ACT 1952**



R. W. Muir
Registrar-General
of Land

Search Copy

Identifier 175714
Land Registration District North Auckland
Date Issued 19 April 2005

Prior References

NA139C/70 NA2B/328

Estate Fee Simple - 1/2 share
Area 845 square metres more or less
Legal Description Lot 2 Deposited Plan 52047

Proprietors

Auckland Council

Estate	Leasehold	Instrument	L 6387944.4
		Term	996 years and 2 months commencing on 20th March 2005

Legal Description Flat 2 Deposited Plan 342786

Proprietors

Auckland Council

Interests

Appurtenant hereto is a right of way created by Transfer 712569

Subject to a drainage right (in gross) over part coloured blue on DP 52047 in favour of the Mt. Roskill Borough Council created by Transfer 198423

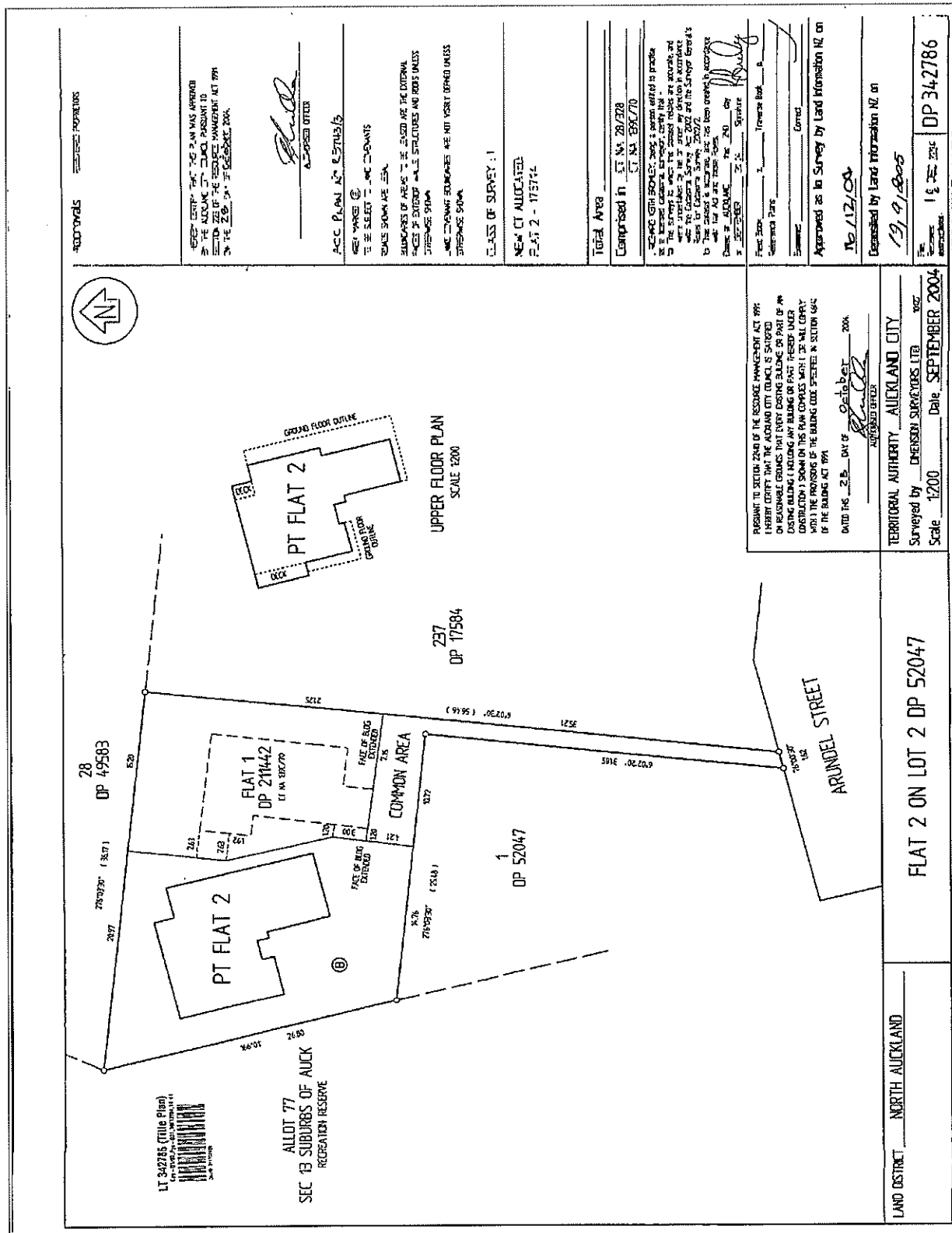
Appurtenant hereto is a right of way created by Transfer D227867.3 - 16.12.1997 at 3.47 pm

5271268.2 Lease of Flat 1 Deposited Plan DP 211442 Term 999 years commencing on 20 May 2002 Composite CT NA139C/70 issued. 1/2 share in the fee simple - 3.7.2002 at 9:04 am

6387944.3 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.4.2005 at 9:00 am

6387944.4 Lease of Flat 2 Deposited Plan 342786 Term 996 years and 2 months commencing on 20th March 2005 Composite CT 175714 issued - 19.4.2005 at 9:00 am

6387944.5 Encumbrance to Auckland City Council - 19.4.2005 at 9:00 am



RECORDS

KEEP THESE PLANS AND THIS AGREEMENT IN THE OFFICE OF THE SURVEYOR GENERAL AT 100 RIVER STREET, AUCKLAND, NEW ZEALAND. THESE PLANS ARE THE PROPERTY OF THE SURVEYOR GENERAL AND ARE NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE SURVEYOR GENERAL.

[Signature]
ACCEPTED OTHER

ACC PLAN NO. 8/2713/3

KEY MARKS @ TO BE SET BY THE SURVEYOR GENERAL. MARKS SHOWN ARE AS SHOWN. SURVEYOR GENERAL IS NOT RESPONSIBLE FOR THE ACCURACY OF ANY INFORMATION PROVIDED BY THE SURVEYOR GENERAL. SURVEYOR GENERAL IS NOT RESPONSIBLE FOR THE ACCURACY OF ANY INFORMATION PROVIDED BY THE SURVEYOR GENERAL.

CLASS OF SURVEY : 1

NEW CT ALLOCATED
PLAN 2 - 175714

Total Area
Comprised in CT No. 28/238
CT No. 896/70

REMARKS: THIS PLAN IS A PART OF THE SURVEY OF THE LAND IN THE DISTRICT OF NORTH AUCKLAND, NEW ZEALAND, AND IS SUBJECT TO THE PROVISIONS OF THE RESOURCE MANAGEMENT ACT 1991 AND THE BUILDING ACT 1991. THE SURVEYOR GENERAL IS NOT RESPONSIBLE FOR THE ACCURACY OF ANY INFORMATION PROVIDED BY THE SURVEYOR GENERAL.

DATE OF SURVEY: 28 SEP 2004
BY: [Signature]
SIGNATURE

APPROVED AS IN SURVEY BY LAND INFORMATION NZ ON 16/12/04

Deposited by Land Information NZ on 19/9/2005

DP 342786

IN ACCORDANCE WITH SECTION 224(1) OF THE RESOURCE MANAGEMENT ACT 1991, I HEREBY CERTIFY THAT THE AUCKLAND CITY COUNCIL IS SATISFIED THAT THE PROVISIONS OF THE BUILDING ACT 1991 HAVE BEEN COMPLIED WITH IN CONNECTION WITH THE CONSTRUCTION OF THE BUILDING OR PART OF THE BUILDING SHOWN IN THIS PLAN. THE BUILDING OR PART OF THE BUILDING SHOWN IN THIS PLAN COMPLIES WITH THE WELL-BEING AND SAFETY PROVISIONS OF THE BUILDING ACT 1991.

DATE THIS PLAN WAS DEPOSITED: 16 SEP 2004
BY: [Signature]
SIGNATURE

TERRITORIAL AUTHORITY: AUCKLAND CITY
Surveyed by: CHENSON SURVEYERS LTD
Scale: 1:200
Date: SEPTEMBER 2004

LAND DISTRICT: NORTH AUCKLAND

FLAT 2 ON LOT 2 DP 52047



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R.W. Muir
Registrar-General
of Land

Identifier NA2C/1200
Land Registration District North Auckland
Date Issued 02 December 1963

Prior References

NA484/280

Estate Fee Simple
Area 658 square metres more or less
Legal Description Lot 1 Deposited Plan 52047

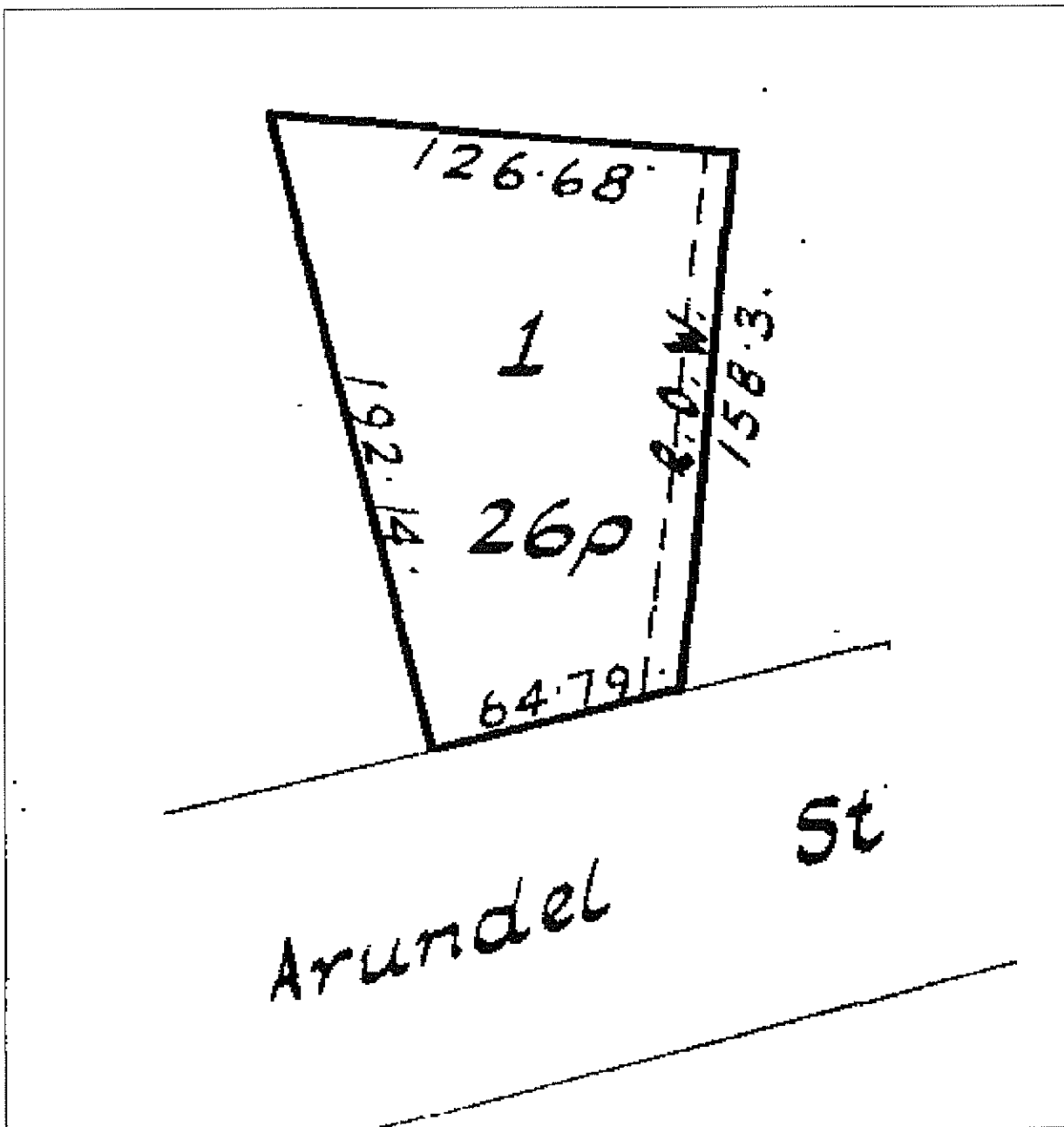
Proprietors
Auckland Council

Interests

Subject to a right of way over part coloured yellow on DP 52047 created by Transfer 712569
Subject to a drainage right (in gross) over part coloured blue on DP 52047 in favour of The Mount Roskill
Borough Council created by Transfer 198423
Subject to a right of way over part marked A on DP 182751 created by Transfer D227867.3 - 16.12.1997 at 3.47 pm

Identifier

NA2C/1200





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA8D/230
Land Registration District North Auckland
Date Issued 19 May 1966

Part-Cancelled

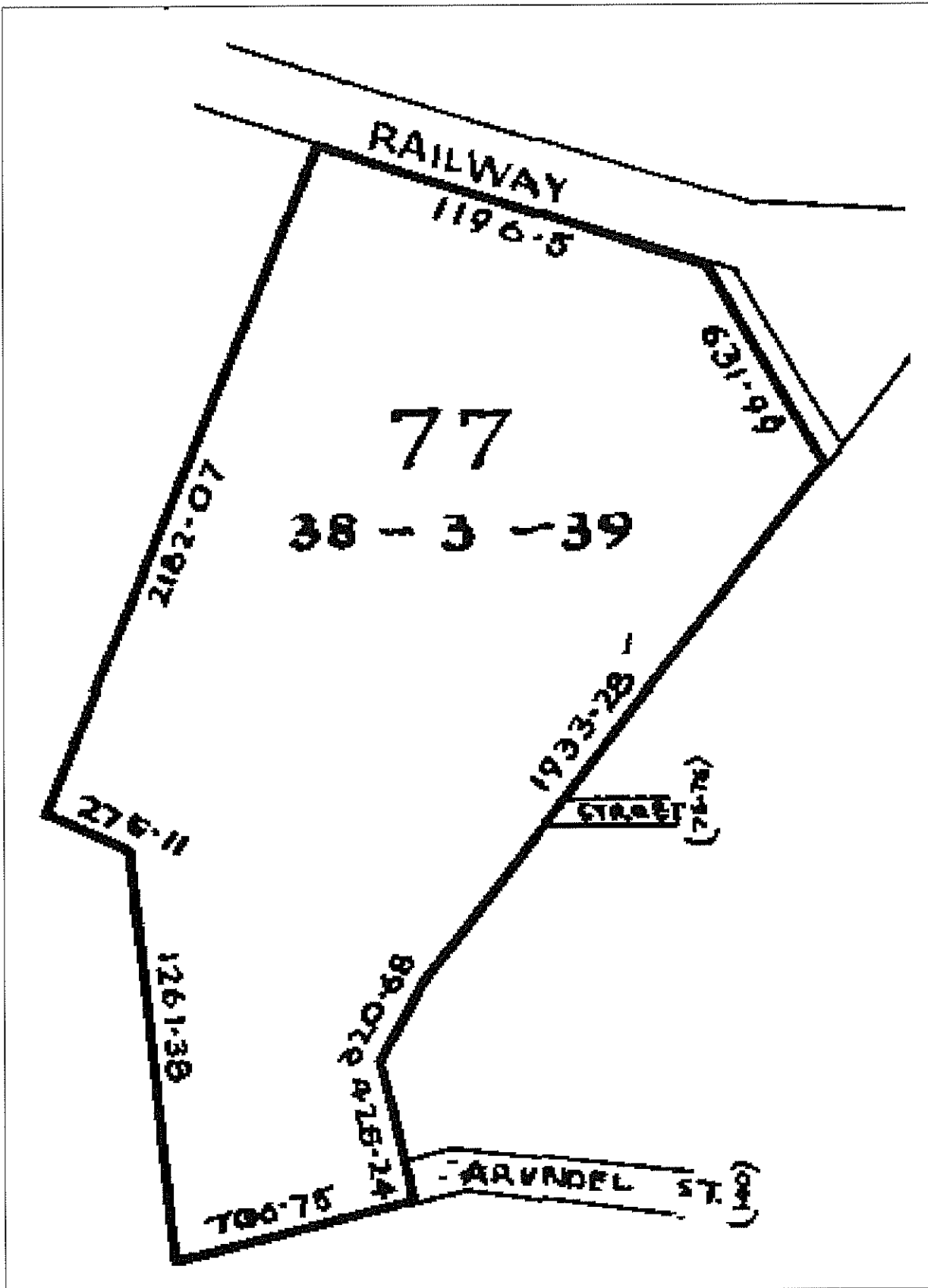
Prior References
NA1644/26

Estate	Fee Simple
Area	15.7802 hectares more or less
Legal Description	Allotment 77 Section 13 Suburbs of Auckland
Purpose	Recreation reserve

Proprietors
Auckland Council

Interests

Subject to Section 59 Land Act 1948
SUBJECT TO THE RESERVES AND DOMAINS ACT 1953
8618489.2 Gazette Notice (2010/2913) declaring part within land now know as Section 71 SO 421535 (7705m²) to be road, which pursuant to Section 5 Land Transport Management Act 2003, forms part of State Highway 20 and vests in Her Majesty The Queen - 20.10.2010 at 4:18 pm





View Instrument Details

Instrument No. 9106996.1
Status Registered
Date & Time Lodged 25 Jun 2012 12:18
Lodged By Whyte, Melanie Rae
Instrument Type Gazette Notice/Order in Council/Proclamation

Toitu te
Land whenua
Information
New Zealand



Affected Computer Registers Land District
513420 North Auckland

Annexure Schedule: Contains 1 Page.

Signature

Signed by Shehan Anthony Malavige De Silva as Crown or Territorial Authority Representative on 25/06/2012 12:15 PM

*** End of Report ***

27
GN 9106996-1

Extract from *New Zealand Gazette*. 21/6/2012, No. 69, p. 1981

**Land Declared Road—Frost Road,
Mount Roskill, Auckland**

Pursuant to section 114 of the Public Works Act 1981, and to a delegation from the Minister for Land Information, Natasha Pollard, Land Information New Zealand, declares the land described in the Schedule to this notice to be road and vested in the Auckland Council on the date of publication hereof in the *New Zealand Gazette*.

**North Auckland Land District—Auckland
Schedule**

Land Declared as Road

Area m ²	Description
996	Part Lot 83 DP 3029 (balance Computer Interest Register 513420); shown as Section 108 on SO 419816.

Dated at Wellington this 12th day of June 2012.

N. POLLARD, for the Minister for Land Information.

(LINZ CPC/2010/14842)

ln3678

NOTICE NO: 3678

- 768 Part Lot 494 DP 19327 (balance Gazette Notice C413691.2); shown as Section 61 on SO 421535.
- 156 Part Lot 495 DP 19327, subject to section 8 of the Mining Act 1971 and section 5 of the Coal Mines Act 1979 (balance Computer Freehold Register NA67B/827); shown as Section 64 on SO 421535.
- 2952 Part Lots 7, 8 and 9 DP 48309 (balance Computer Interest Register 517859); shown as Section 66 on SO 421535.
- 47 Part Lot 519 DP 19327 (balance Computer Interest Register 517853); shown as Section 55 on SO 421535.
- 799 Part Lot 518 DP 19327 (balance Computer Interest Register 517856); shown as Section 56 on SO 421535.
- 88 Part Lot 517 DP 19327 (balance Computer Interest Register 517854); shown as Section 59 on SO 421535.
- 618 Section 34 on SO 421535 (all Computer Interest Register 517116).

at Wellington this 20th day of June 2011.

K. MCPHAIL, for the Minister for Land Information.

(LINZ CPC/2011/16045)

ln4239

**Severance Taken and Set Apart for Rail Purposes—
State Highway 20, Mt Roskill, Auckland**

Pursuant to section 119(1) of the Public Works Act 1981, and to a delegation from the Minister for Land Information, Kerry McPhail, Land Information New Zealand, declares the land described in the Schedule to this notice to be taken as severance and, pursuant to section 52(1), is set apart for rail purposes and shall remain vested in the Crown on the date of publication hereof in the *New Zealand Gazette*.

North Auckland Land District—Auckland

Schedule

Severance

- | | | Description |
|-----|--|---|
| 1 | | Part Allotment 66 Section 13 Suburbs of Auckland (part Computer Interest Register 513418); shown as Section 35 on SO 419816. |
| 141 | | Part Lot 7 DP 36743 (part Computer Interest Register 513425); shown as Section 37 on SO 419816. |
| 224 | | Part Lot 12 DP 39274 (part Computer Interest Register 114396); shown as Section 40 on SO 419816. |
| 136 | | Part Lot 8 DP 36743 (part Computer Interest Register 513425); shown as Section 114 on SO 419816. |
| 107 | | Part Lot 14 DP 38834 (part Computer Interest Register 513418); shown as Section 124 on SO 419816. |
| 51 | | Part Allotment 63 Section 13 Suburbs of Auckland (part Computer Interest Register 513418); shown as Section 125 on SO 419816. |
| 51 | | Part Allotment 64 Section 13 Suburbs of Auckland (part Computer Interest Register 513418); shown as Section 126 on SO 419816. |
| 24 | | Part Allotment 65 Section 13 Suburbs of Auckland (part Computer Interest Register 513418); shown as Section 127 on SO 419816. |

Dated at Wellington this 20th day of June 2011.

K. MCPHAIL, for the Minister for Land Information.

(LINZ CPC/2011/16045)

ln4240

**Land to be Set Apart for Railway Purposes—
State Highway 20, Mt Roskill, Auckland**

Pursuant to section 52 of the Public Works Act 1981, and to a delegation from the Minister for Land Information, Kerry McPhail, Land Information New Zealand, declares the land described in the Schedule to this notice to be set apart for railway purposes and shall remain vested in the Crown on the date of publication hereof in the *New Zealand Gazette*.

North Auckland Land District—Auckland

Schedule

Set Apart for Railway Purposes

- | | Area
m ² | Description |
|------|------------------------|--|
| 3115 | | Part Lot 83 DP 3029 (part Computer Interest Register 513420); shown as Section 51 on SO 419816. |
| 31 | | Part Lot 324 DP 19327 (part Computer Freehold Register NA20C/632); shown as Section 65 on SO 421305. |
| 700 | | Part Lot 325 DP 45527 (part Gazette Notice B249559.1); shown as Section 66 on SO 421305. |

Dated at Wellington this 20th day of June 2011.

K. MCPHAIL, for the Minister for Land Information.

(LINZ CPC/2011/16045)

ln4242

**Land Declared Road—Hillsborough Road and
Stoddart Road, Mt Roskill, Auckland**

Pursuant to section 114 of the Public Works Act 1981, and to a delegation from the Minister for Land Information, Kerry McPhail, Land Information New Zealand, declares the land described in the Schedule to this notice to be road and vests in the Auckland Council on the date of publication hereof in the *New Zealand Gazette*.

North Auckland Land District—Auckland

Schedule

Land Declared as Road

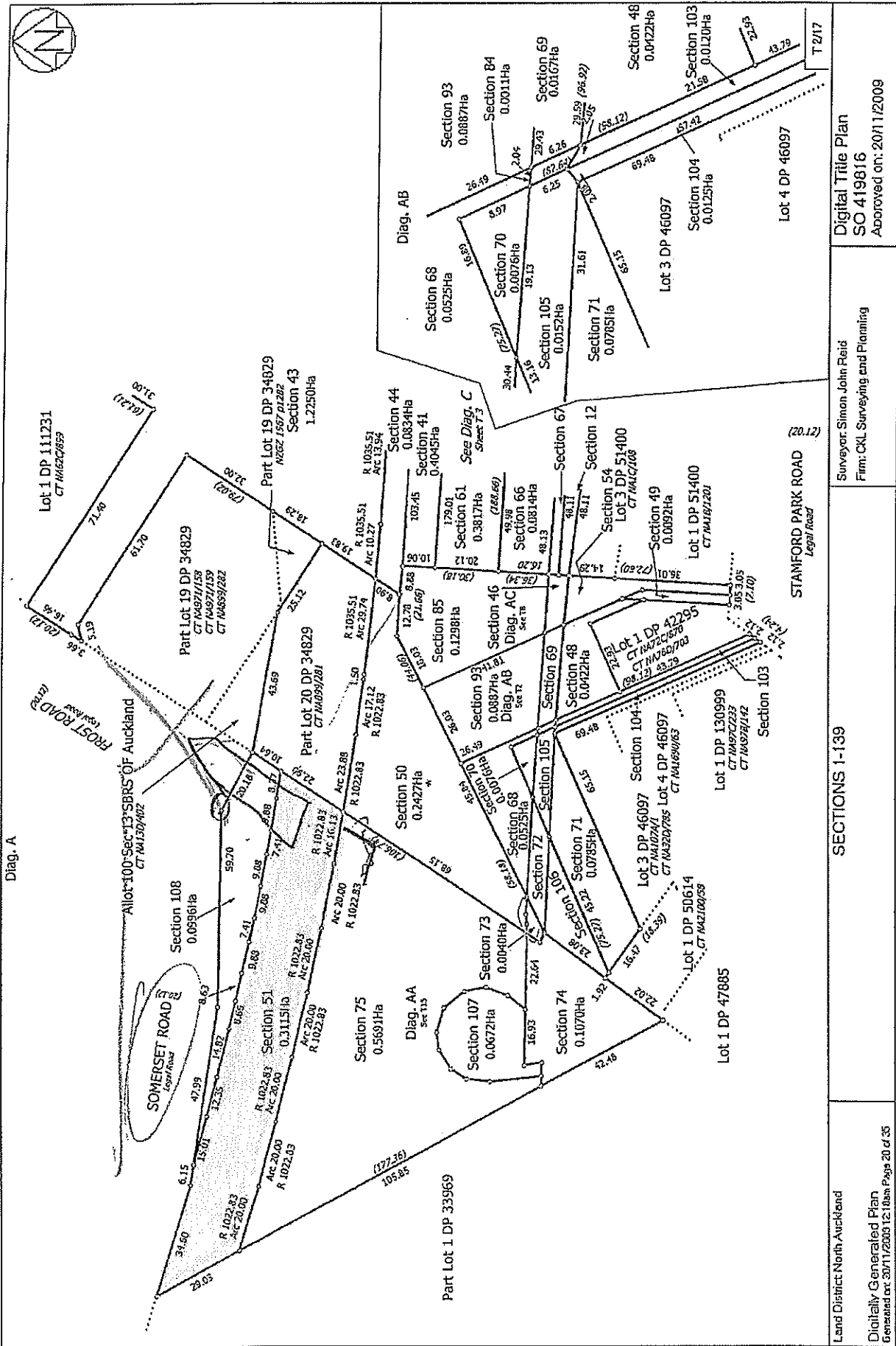
- | | Area
m ² | Description |
|-----|------------------------|--|
| 413 | | Part Lot 1 DP 21413 (part Gazette Notice A541591) and Part Lot 2 DP 9066 (part Computer Freehold Register NA1110/133); shown as Section 14 on SO 418692. |
| 204 | | Part Lot 2 DP 9066 (part Computer Freehold Register NA1110/133); shown as Section 15 on SO 418692. |
| 18 | | Part Lot 1 DP 9066 (part Computer Freehold Register NA216/159); shown as Section 31 on SO 418692. |
| 327 | | Part Lot 5 DP 39816 (part Computer Interest Register 513674); shown as Section 1 on SO 419816. |
| 6 | | Part Lot 5 DP 39816 (part Computer Interest Register 513674); shown as Section 4 on SO 419816. |

Dated at Wellington this 20th day of June 2011.

K. MCPHAIL, for the Minister for Land Information.

(LINZ CPC/2011/16045)

ln4243



Diag. A

<p>Land District North Auckland</p> <p>Digitally Generated Plan</p> <p>Generated on: 20/11/2009 12:10am Page 20 of 35</p>	<p>SECTIONS 1-139</p>	<p>Surveyor: Simon John Reid</p> <p>Firm: CKL Surveying and Planning</p>	<p>Digital Title Plan</p> <p>SO 419816</p> <p>Approved on: 20/11/2009</p>
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**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA97C/394**
Land Registration District **North Auckland**
Date Issued 04 April 1995

Prior References

NA89C/566 NA9B/1172

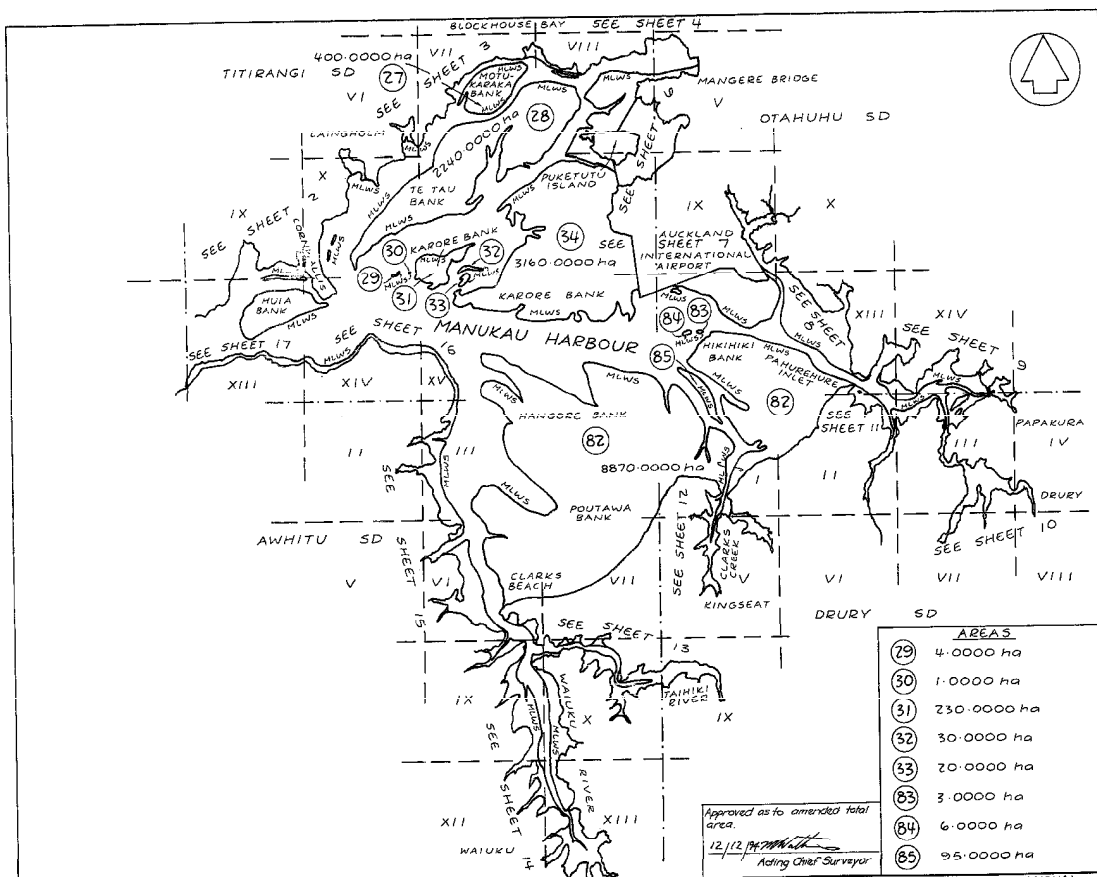
Estate Fee Simple
Area 2030 square metres more or less
Legal Description Lot 1 Deposited Plan 161858

Proprietors

Watercare Services Limited

Interests

Fencing agreements in Conveyance 295599 (R354.238)
Fencing Agreement in Transfer 320187
Fencing Agreement in Transfer 557607
Subject to a drainage right (in gross) over part coloured yellow on Plan 55000 in favour of the Onehunga
Borough Council created by Transfer A136861
C480523.2 CAVEAT BY THE AUCKLAND REGIONAL COUNCIL (AFFECTS PART) - 14.5.1993 AT 1.57 PM



Approval
 STATUS
 Crown Land pursuant to Section 5 of Foreshore and Seabed Endowment Revesting Act 1991.
 Landward boundary of revested lands are to M.H.W.S. unless otherwise shown.
 Revested lands include unlawful reclamations.
 Authorised reclamations are excluded.
 Seaward boundaries of local Authorities follow M.H.W.M.

SCHEDULE		
Shown	Description	Former Registration
(1) (20) (26) (49) (51) (100)	Re Tidal Lands of Manukau Harbour	CT 981172(P) Manukau Harbour Control Act 1911
(15)	Re Lot 6 DP 135212	CT 790/209(P)
(50)	Sec 2 of Bk XIV Otahuhu SD (Land on DP 23288)	CT 625182 (P) Papakura Town Board (Papakura Beach Vesting Act 1915)
(108)	Sec 9 of Bk III Drury SD (Land on DP 23288)	CT 625182 (P) Papakura Town Board (Papakura Beach Vesting Act 1915)

SHEET 1 OF 17
 22200.659 ha
 Total Area 22275.4462 ha

AREAS	
(29)	4.0000 ha
(30)	1.0000 ha
(31)	230.0000 ha
(32)	30.0000 ha
(33)	20.0000 ha
(83)	3.0000 ha
(84)	6.0000 ha
(85)	95.0000 ha

Approved as to amended total area.
 12/12/94
 Acting Chief Surveyor

Approved for Record Purposes only.
 26/9/94
 Chief Surveyor

Deposited this ... day of ... 19 ...
 District Land Registrar
 S067474

LAND DISTRICT NORTH AUCKLAND
 Survey Blk. & Dist. AS SHOWN
 NZHS 261 Sheet Record Map No. Q.11, R.11, R.12

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
 SURVEYED BY ...
 Scale 1:100,000 Date JANUARY 1994

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1991



7866 350 64 19 05 1994 CENTIMETRES



SEE SHEET 3

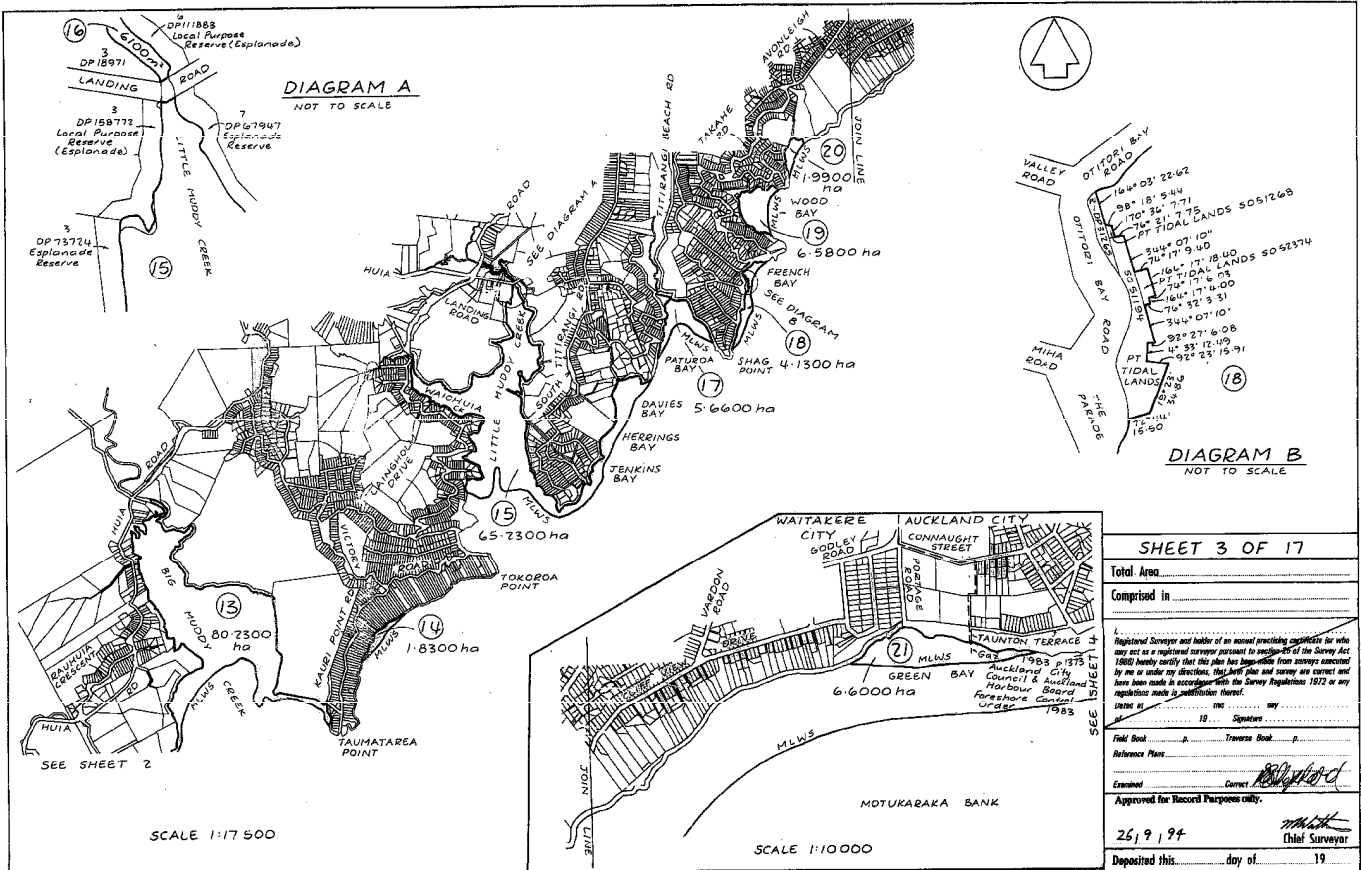
SHEET 2 OF 17

Total Area
Comprised in
<p><small>Registered Surveyor and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to section 45 of the Survey Act 1980 hereby certify that this plan has been prepared from surveys conducted by me or under my direction, that these plans and surveys are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.</small></p>	
Dated at day
File Book Traverse Book
Reference Plans
Examined	Correct <i>[Signature]</i>
Approved for Record Purposes only.	
26/9/94	<i>[Signature]</i> Chief Surveyor
Deposited this day of
File Received
Instructions
District Land Registrar	
50674 74	

LAND DISTRICT NORTH AUCKLAND
 Survey Blk. & Dist. IX, X, XIII, XIV TITIRANGI
 AS ABOVE
 NZMS 261 Sheet Record Map No. PUA1, 2, 3, 4

CROWN LAND REVESTED PURSUANT TO FORESHORE
 AND SEABED ENDOWMENT REVESTING ACT 1991

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
 WAITAKERE CITY
 Surveyed by
 Scale 1:17 500 Date JANUARY 1994



LAND DISTRICT NORTH AUCKLAND
Survey Blk. & Dist. VI, VII, X TITIRANGI
NZMS 261 Sheet Record Map No. 22, 23, 24, 29, 30, 31

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1984

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
AUCKLAND CITY
Surveyed by [Signature]
Scale SEE ABOVE Date JANUARY 1984

SHEET 3 OF 17

Total Area _____
Comprised in _____

I, the Registered Surveyor and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to section 85 of the Survey Act 1980 hereby certify that this plan has been made from surveys conducted by me or under my directions, that said plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

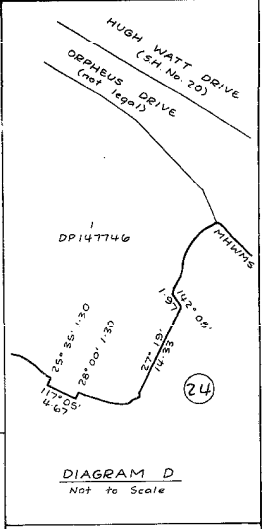
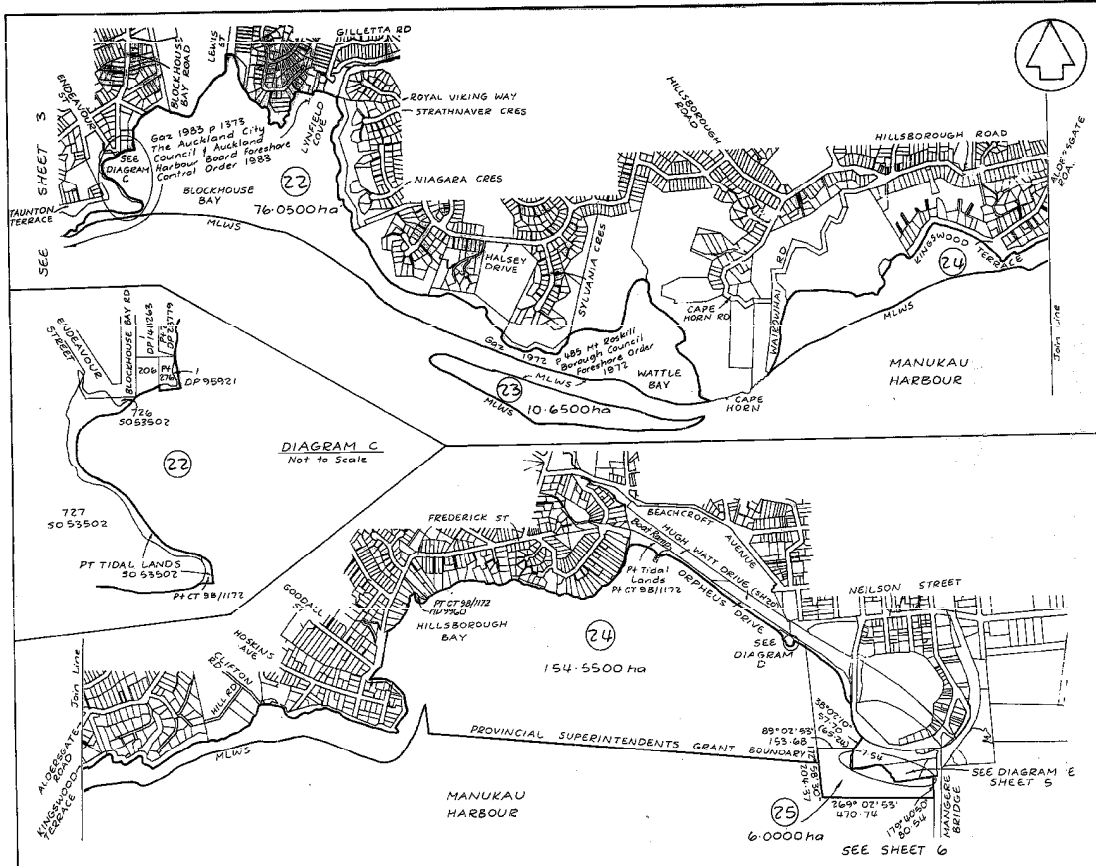
Dated this 19th day of August 1984
[Signature] Chief Surveyor

Approved for Record Purposes only.
25/9/84 [Signature] Chief Surveyor

Deposited this _____ day of _____ 19____
District Land Registrar
File No. 4 AUG 1984
S067474

W.A. ROBERTSON, DIRECTOR GENERAL/SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND





SHEET 4 OF 17

Total Area: _____

Comprised in: _____

I, _____ Registered Surveyor and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to section 25 of the Survey Act 1980 hereby certify that this plan has been made from surveys executed by me or under my direction, that said plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ this _____ day of _____ 19____

Signature: _____

Field Book: _____ Traverse Book: _____

Reference Plans: DP135312, DP147746

Examined: _____ Correct: _____

Approved for Record Purposes only.

26/9/94 _____ Chief Surveyor

Deposited this _____ day of _____ 19____

LAND DISTRICT NORTH AUCKLAND
V OTAHUHU
Survey Blk. & Dist. VII, VIII, TITIEANGI
Record Map No. 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1991

TERRITORIAL AUTHORITY AUCKLAND CITY AUCKLAND REGIONAL COUNCIL
Surveyed by _____
Scale 1:10 000 Date JANUARY 1994

File Received Instructions 14 AUG 1994
District Land Registrar
S067474

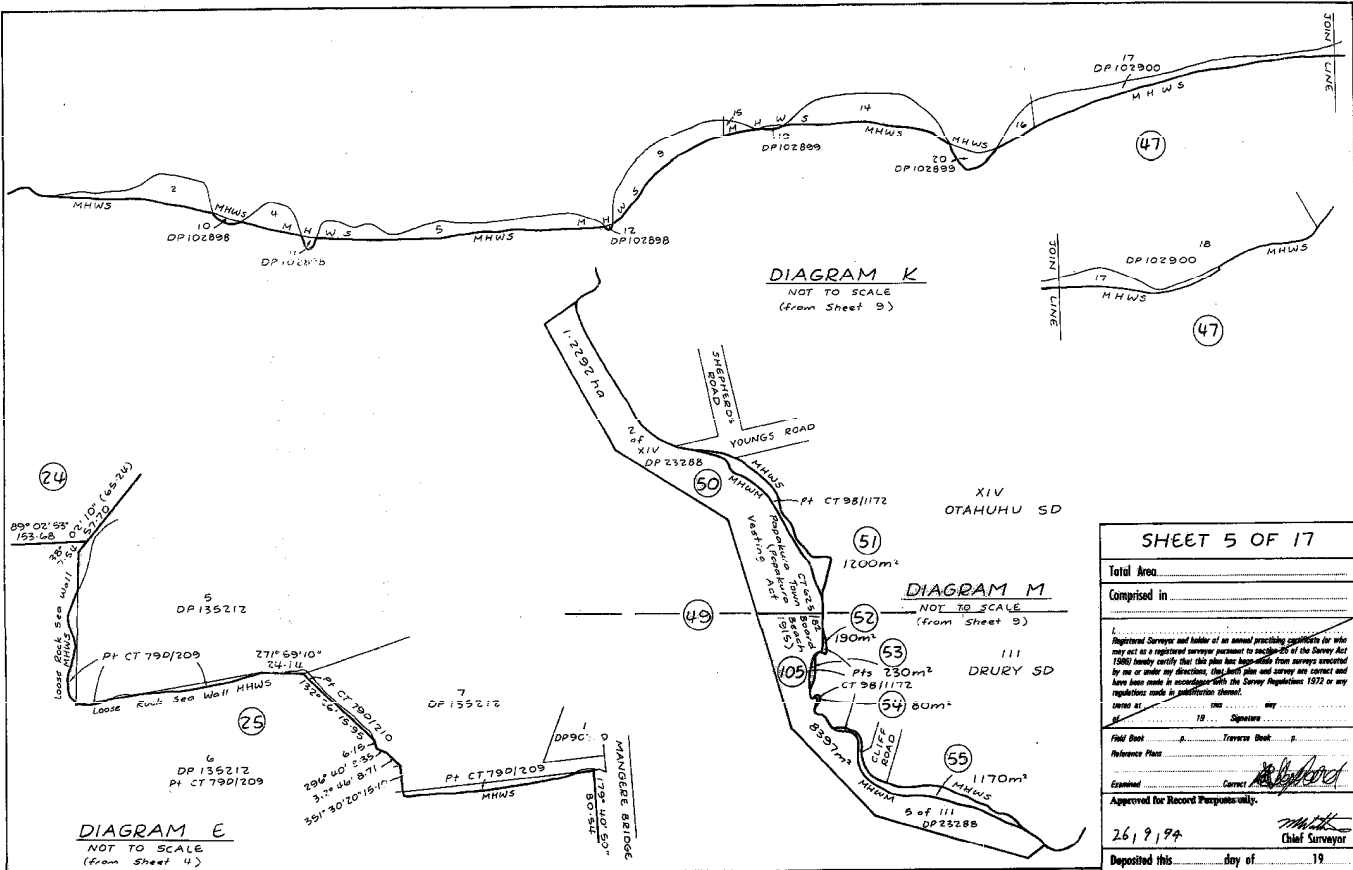


DIAGRAM K
NOT TO SCALE
(from Sheet 9)

DIAGRAM M
NOT TO SCALE
(from Sheet 9)

DIAGRAM E
NOT TO SCALE
(from Sheet 4)

SHEET 5 OF 17

Total Area	_____
Comprised in	_____
<small>I, Registered Surveyor and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to section 107 of the Survey Act 1980 hereby certify that this plan has been prepared from surveys conducted by me or under my direction, that all bearings and distances are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.</small>	
Done at _____	Signature _____
Field Book _____	Transfer Book _____
Reference Plans _____	_____
Examined _____	Correct _____
Approved for Record Purposes only.	
26/9/94	<i>Mick</i> Chief Surveyor
Deposited this _____ day of _____ 19 _____	District Land Registrar
File No. _____	8 AUG 1994
_____	S067474

LAND DISTRICT NORTH AUCKLAND
Survey Blk. & Dist. _____
NZMS 261 Sheet _____ Record Map No. _____

**GROUND LAND REVESTED PURSUANT TO POWERSHERE
AND SEALED ENDOWMENT REVESTED NEW ZEALAND**

TERRITORIAL AUTHORITY
Surveyed by _____
Scale **AS SHOWN** Date **JANUARY 1994**

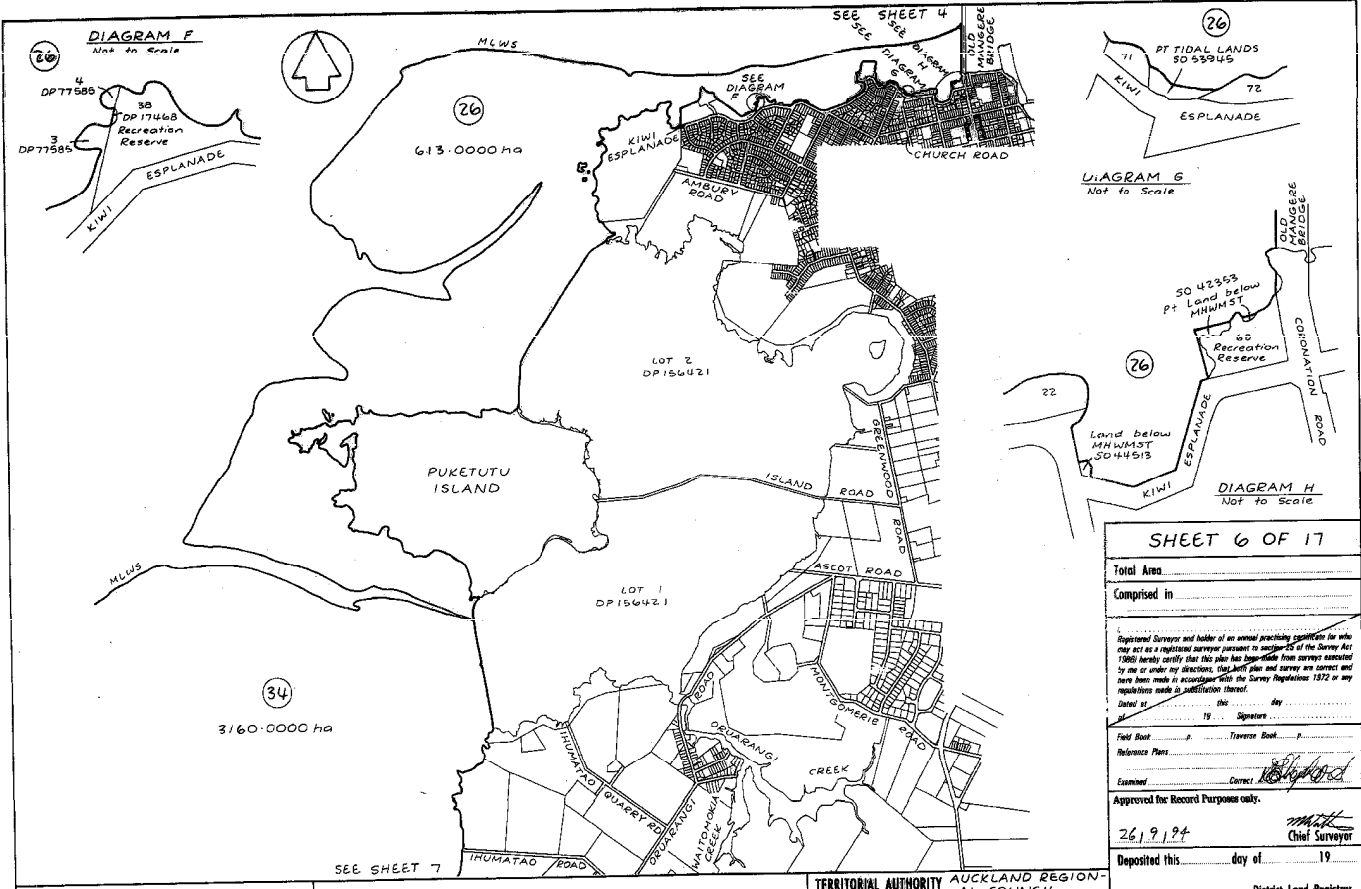
W.A. ROBERTSON, DIRECTOR GENERAL/SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND

APPROVED LNS3/83 SOBU FORM D18

27 SEP 1994



27 SEP 1994



SHEET 6 OF 17

Total Area _____
 Comprised in _____

Registered Surveyor and holder of an annual practicing certificate for who only act as a registered surveyor pursuant to section 25 of the Survey Act 1980 hereby certify that this plan has been made from surveys conducted by me or under my direction, that all plans and surveys are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ this _____ day _____ 19 _____
 Signature _____

Field Book _____ Traverse Book _____
 Reference Plans _____

Examined _____ Correct _____
 Approved for Record Purposes only.

26/9/94 _____
 Chief Surveyor

Deposited this _____ day of _____ 19 _____

District Land Registrar

File No. _____
 Receiver's Reference No. _____

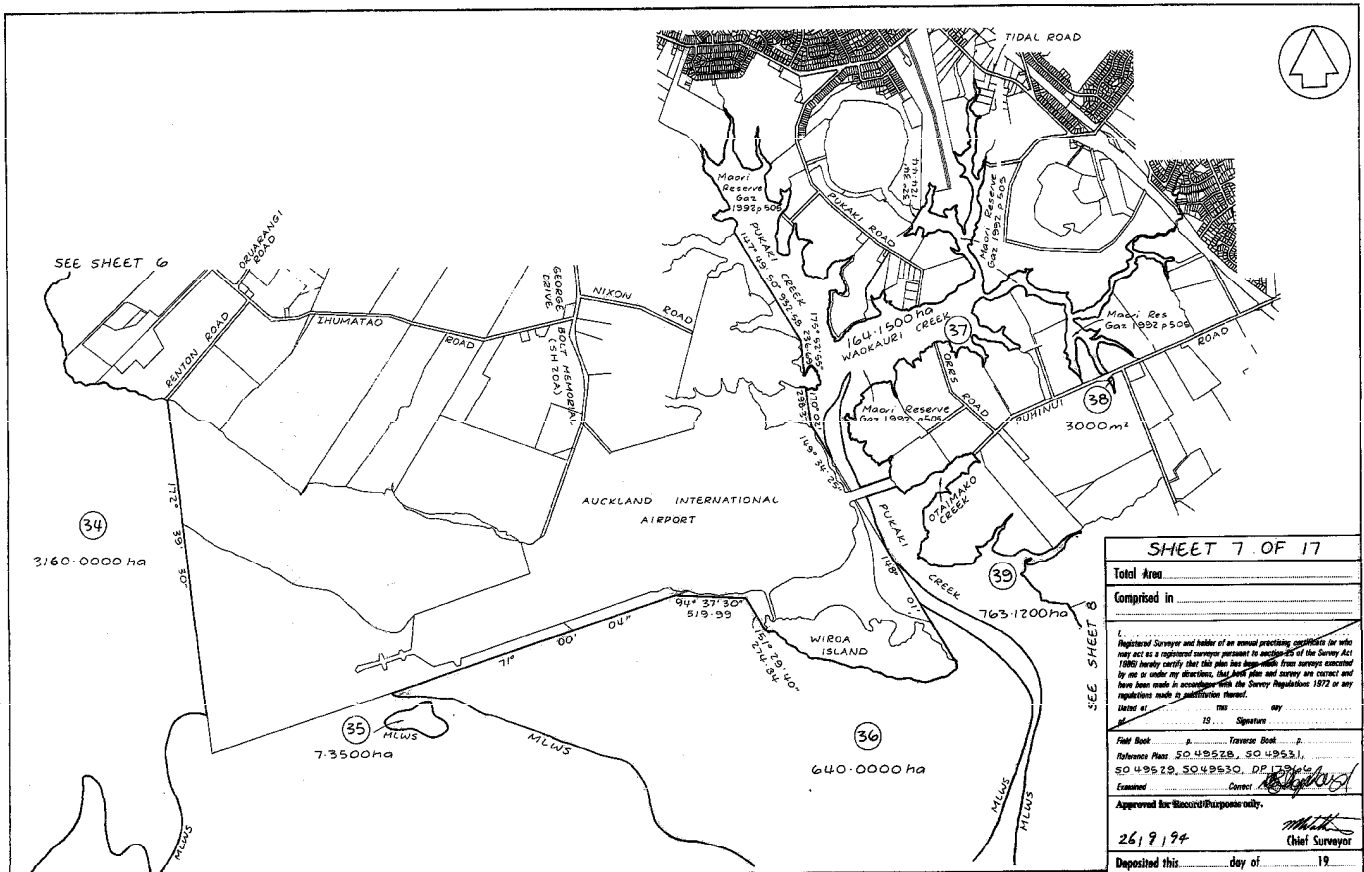
SO-67474

LAND DISTRICT NORTH AUCKLAND
 V. IX OTAHURU
 Survey Blk. & Dist. VIII, XII TITIRANGI
 AS ABOVE
 NZMS 261 Sheet Record Map No. MANGERE.1.2

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1991

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
 MANUKAU CITY
 Surveyed by _____
 Scale 1:17500 Date JANUARY 1994

W. A. ROBERTSON, DIRECTOR GENERAL, SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND



SHEET 7 OF 17

Total Area _____
 Comprised in _____

I, _____ Registered Surveyor and holder of an annual practicing certificate do hereby certify that this plan has been made from surveys conducted by me or under my direction, that said plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ this _____ day of _____ 19____

Field Book _____ p. _____ Traverse Book _____ p. _____
 Reference Plans 50 49528, 50 49531, 50 49529, 50 49530, DP 1298

Examined _____ Correct _____
 Approved for Record/Purposes only.

26/9/94 _____
 Chief Surveyor

Deposited this _____ day of _____ 19____

District Land Registrar

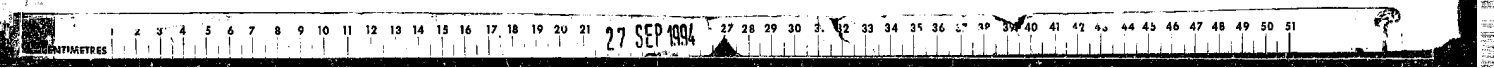
LAND DISTRICT NORTH AUCKLAND
 XII, XVI, TITIRANGI
 Survey Blk. & Dist. IX, X, XVI, OTAHUHU
 PAPATOETOE 19, 20
 NZMS 261 Sheet Record Map No. MAX 6 & 26, 27, 28

**GREENLAND REVESTED PURSUANT TO FOREWIND
 AND SEABED ENDOWMENT REVESTING ACT 1991**

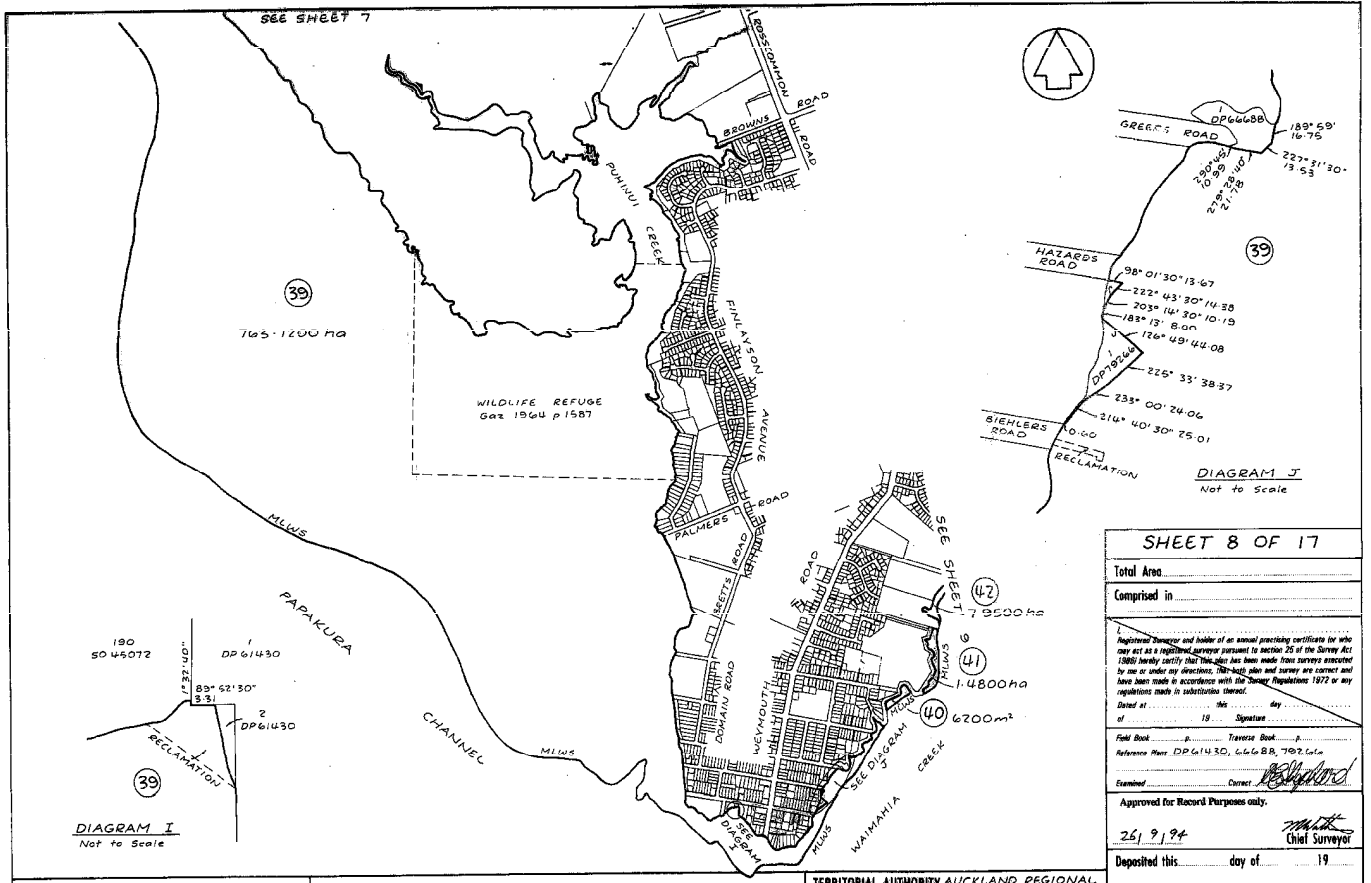
TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
 Surveyed by _____
 Scale 1:17500 Date JANUARY 1994

File Number 4 AUG 1994
 District Land Register
S067474

1:6. ROBERTSON, CROFTER, GENERAL SURVEYORS GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND



27 SEP 1994



SHEET 8 OF 17

Total Area _____

Comprised in _____

I, Robertson Engineer and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to section 25 of the Survey Act 1980 hereby certify that this plan has been made from surveys executed by me or under my direction. The plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ this _____ day of _____ 19 _____

Field Book _____ Traverse Book _____
Reference Mer. DP61430, 66688, 192 C/L

Examined _____ Correct _____
Signature _____

Approved for Record Purposes only
26/9/94 _____
Chief Surveyor

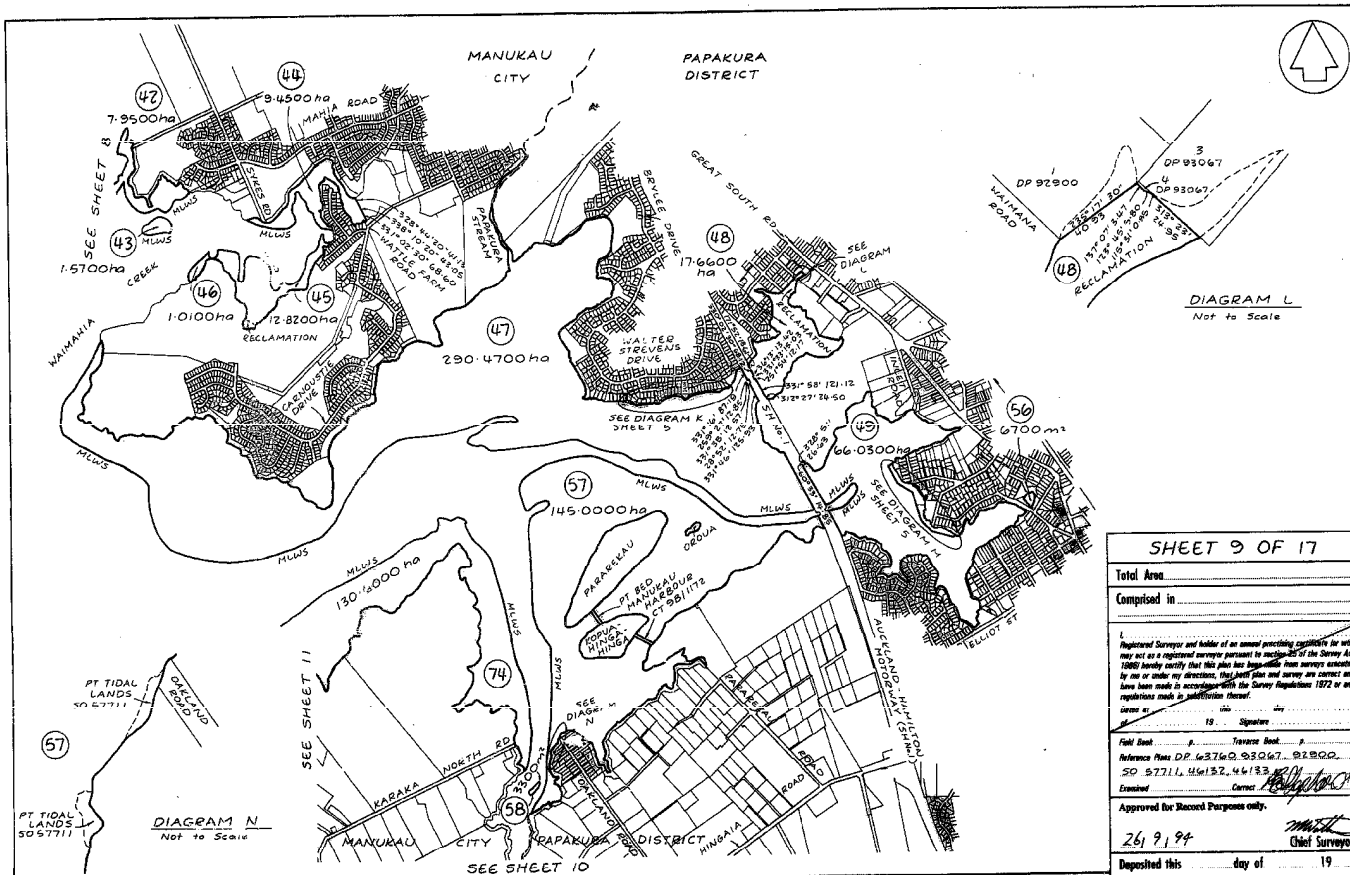
Deposited this _____ day of _____ 19 _____

District Land Registrar
S067474
6 AUG 1994

LAND DISTRICT NORTH AUCKLAND
Survey Bk. & Dist. XIII OTAHUHU
WYMOUTH 1, 3, 4, 5
NZMS 261 Sheet Record Map No. MANUREWA 17, 25

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1991

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
MANUKAU CITY
Surveyed by _____
Scale 1:12 500 Date JANUARY 1994



LAND DISTRICT NORTH AUCKLAND
III, IV PAKAPURA, III DRURY
Survey Blk. & Dist. XIII, XIV OTAHUHU
Manurewa 33, 34, 35, 40, 41, 42
Record Map No. 13395/Manurewa 3, 4
Papakura 1, 2, 3, 6

GROWN LAND REVISED PURSUANT TO FORECLOSURE AND SEPARATION ACT 1981

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
Surveyed by _____
Scale 1:15000 Date JANUARY 1984
MANUKAU CITY PAKAPURA DISTRICT

File No. _____
Received _____ 4 AUG 1994
5067474

W.A. ROBERTSON, DIRECTOR GENERAL/SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND

APPROVED L 985/93 DOB FORM 010



27 SEP 1994 796 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51

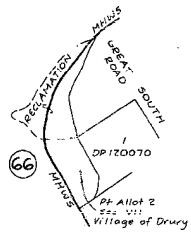
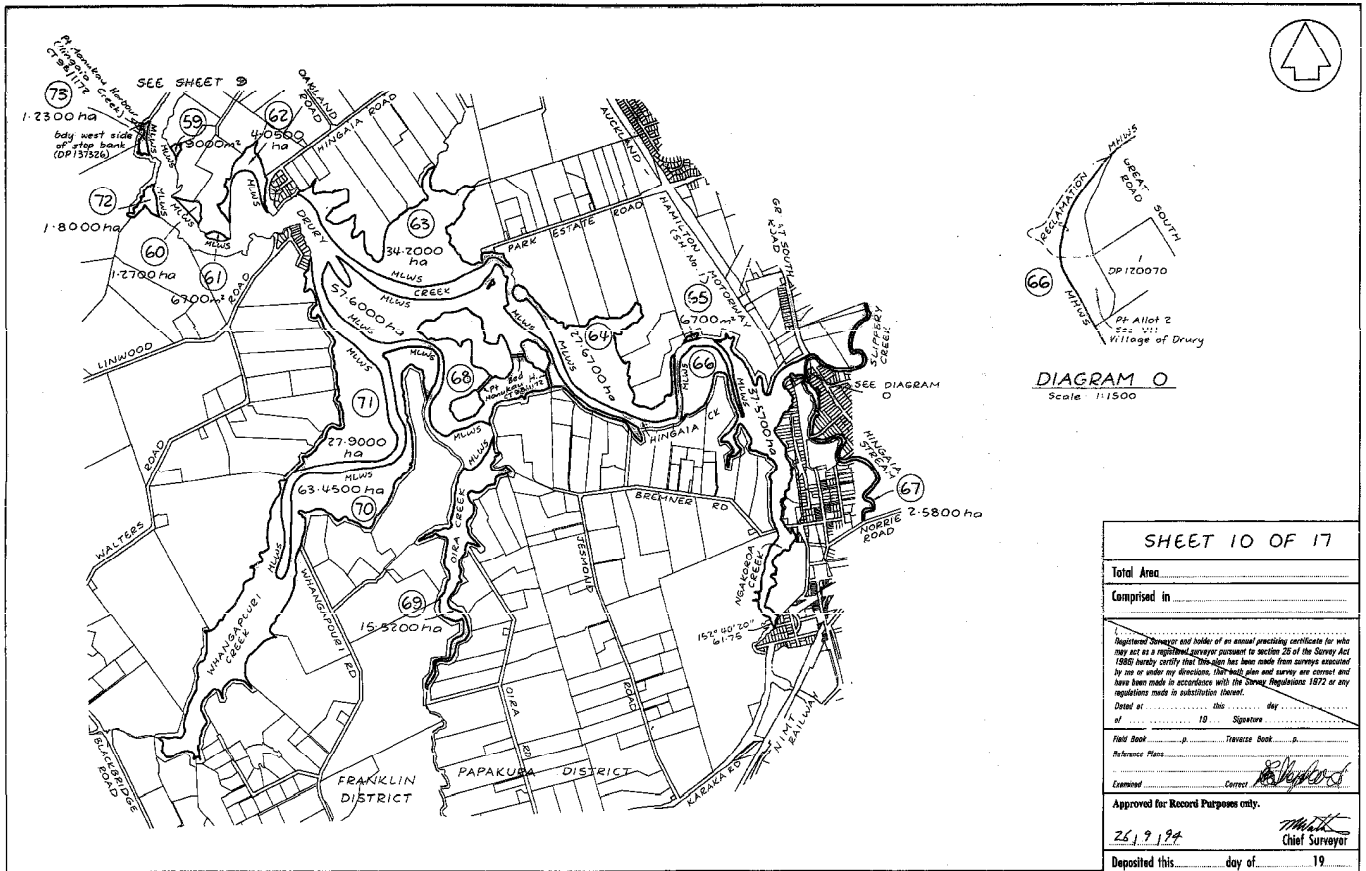


DIAGRAM O
Scale 1:1500

SHEET 10 OF 17

Total Area _____

Comprised in _____

I, the undersigned, being a registered surveyor pursuant to section 26 of the Survey Act 1980 hereby certify that this plan has been made from surveys executed by me or under my direction. All measurements and surveys are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ this _____ day _____ 19 _____

Field Book _____ p. Traverse Book _____ p.

Performance Plans _____

Examined _____ Correct _____

Approved for Record Purposes only.

26/9/94 _____
Chief Surveyor

Deposited this _____ day of _____ 19 _____

District Land Registrar

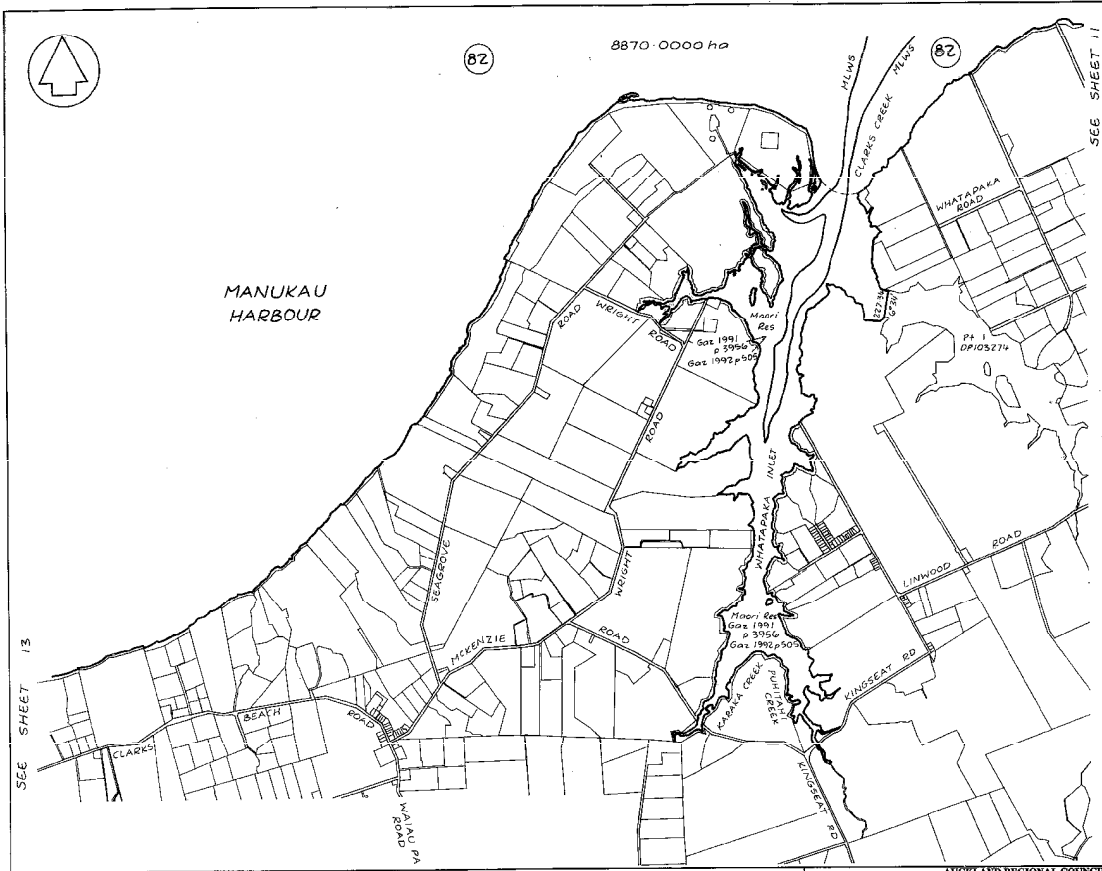
File _____ AUG 1994 _____
SO 67474

LAND DISTRICT NORTH AUCKLAND
Survey Blk. & Dist. III, IV, VII, VIII, DRURY
DRURY
NZMS 261 Sheet Record Map No. 1, 2, 3, 4, 5.

**CROWN LAND REVESTED PURSUANT TO FORESHORE
AND SEABED ENDOWMENT REVESTING ACT 1991**

TERRITORIAL AUTHORITY AUCKLAND REGIONAL
COUNCIL
FRANKLIN DISTRICT
PAPAKURA DISTRICT
Surveyed by _____
Scale 1:15000 Date JANUARY 1994

W.A. ROBERTSON, DIRECTOR GENERAL, SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND



Approvals

SHEET 12 OF 17

Total Area _____

Comprised in _____

I, the undersigned Surveyor and holder of an annual practicing certificate or who may act as a registered surveyor pursuant to section 25 of the Survey Act 1980 hereby certify that the plan has been made from surveys conducted by me or under my direction, that such plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ this _____ day _____ of _____ 19 _____

Signature _____

Field Book _____ p. _____ Traverse Book _____ p. _____

Reference Plane _____

Examined _____ Correct _____

Approved for Record Purposes only.

26/9/94 _____
Chief Surveyor

Deposited this _____ day of _____ 19 _____

District Land Registrar

LAND DISTRICT NORTH AUCKLAND

Survey Blk. & Dist. L. V. DEURY, VII. AWHITU

NZMS 261 Sheet Record Map No. As above

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1991

TERRITORIAL AUTHORITY **AUCKLAND REGIONAL COUNCIL**
FRANKLIN DISTRICT

Surveyed by _____

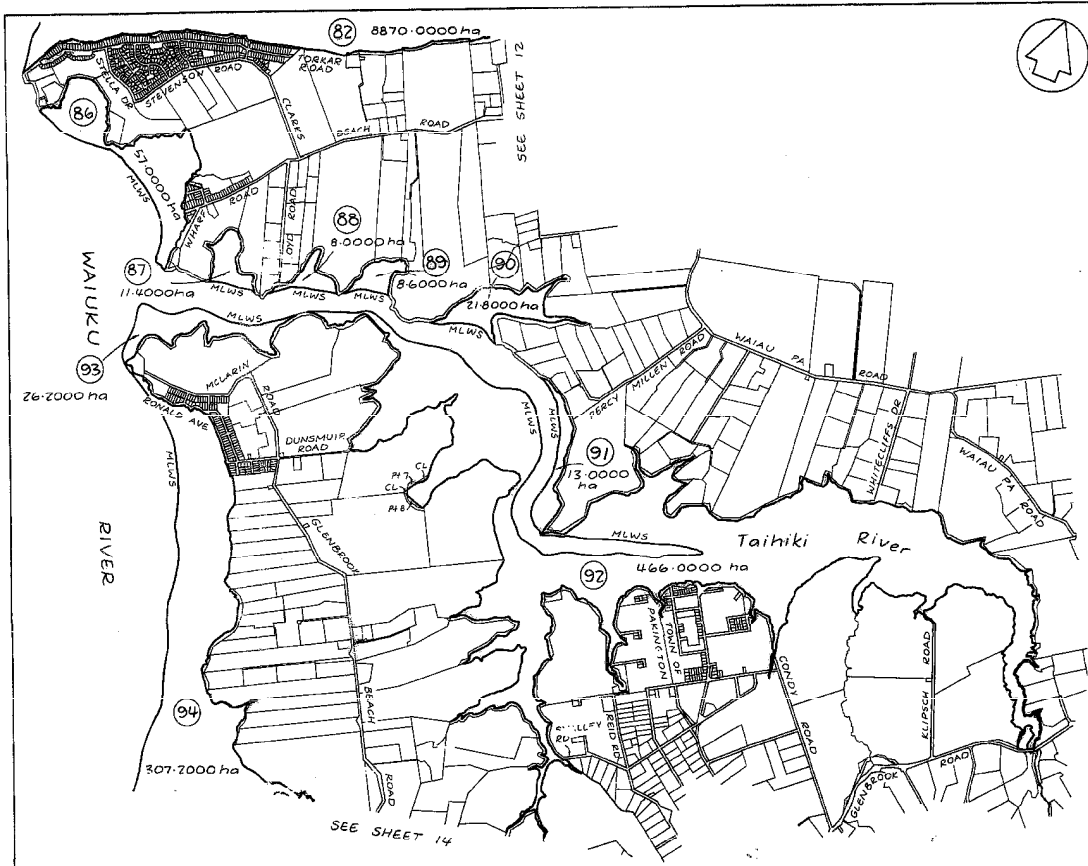
Scale 1: 20 000 Date JANUARY 1994

File Received _____

Number **5067474**

W.A. ROBERTSON, DIRECTOR GENERAL/SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND

DDLI FORM 018



Approvals

SHEET 13 OF 17

Total Area _____

Comprised in _____

I, Registered Surveyor and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to sections 21 of the Survey Act 1980 hereby certify that this plan has been well first survey executed by me or under my direction, that all plans and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ this _____ day _____ 19 _____

Field Book _____ p. Traverse Book _____ p.

Reference Plans _____

Examined _____ Correct _____

Approved for Record Purposes only.

26.9.94 _____
Chief Surveyor

Deposited this _____ day of _____ 19 _____

District Land Registrar

File Number _____ Date 4 AUG 1994

5067474

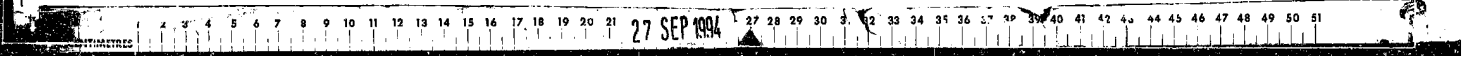
DOBLS FORM 018

LAND DISTRICT NORTH AUCKLAND
IX DRURY
Survey Blk. & Dist. VI, VII, IX, X AWHITU
13.07
NZMS 261 Sheet R12 Record Map No. 11.07.12.07

GROWN LAND REVESTED PURSUANT TO FORESHORE
AND SEABED ENDOWMENT REVESTING ACT 1981

TERRITORIAL AUTHORITY
FRANKLIN DISTRICT
Surveyed by _____
Scale 1:20,000 Date JANUARY 1994

W.A. ROBERTSON, DIRECTOR GENERAL SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND



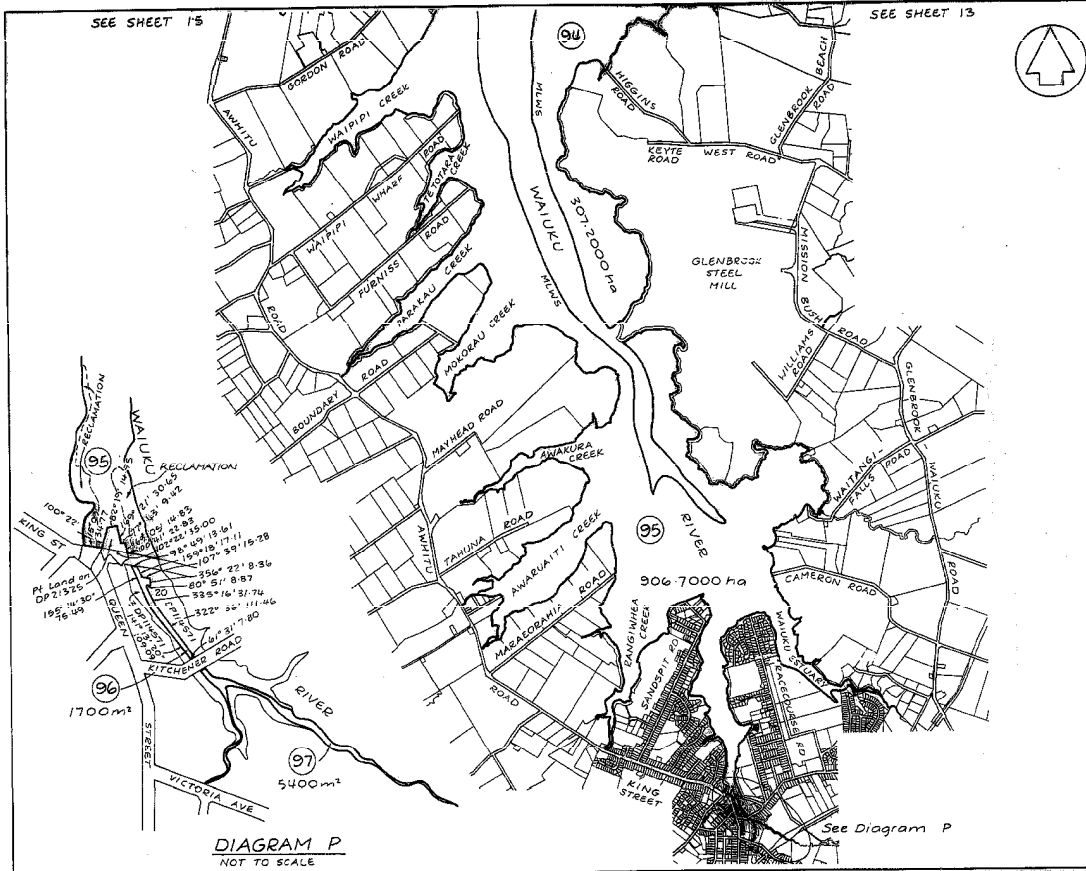


DIAGRAM P
NOT TO SCALE

Approvals

SHEET 14 OF 17

Total Area	
Comprised in	
<p>I, Registered Surveyor and holder of an annual practicing certificate in who may act as a registered surveyor pursuant to section 25 of the Survey Act 1986 hereby certify that this plan has been made from surveys executed by me or under my direction, that the plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.</p> <p>Dated at _____ this _____ day _____ 19 _____</p> <p>Signature _____</p>	
Field Book	Traverse Book
Reference Plans DP 114231, DP 114572	
Examined	Correct
Approved for Record Purposes only.	
26/9/94	<i>M. J. [Signature]</i> Chief Surveyor
Deposited this _____ day of _____ 19 _____	
District Land Registrar	
File No. ABG 1934	S067474

LAND DISTRICT North Auckland
Maoro III
Survey Blk. & Dist. Awhitu IX, X, XI, XII
NZMS 261 Sheet Record Map No. Maoro III, 2, 3, 5, 9

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1991

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL
FRANKLIN DISTRICT
Surveyed by _____
Scale 1: 20 000 Date JANUARY 1994



SHEET 15 OF 17

Total Area _____

Comprised in _____

I, *[Signature]* Registrar General and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to section 25 of the Survey Act 1980 hereby certify that this plan has been made from surveys conducted by me or under my direction. The block plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Dated at _____ day of _____ 19__

Final Book _____ p. Transferred Book _____ p.

Reference Plans _____

Examined _____ Correct *[Signature]*

Approved for Record Purposes only.

261919f
 Deposited this _____ day of _____ 19__

[Signature]
 Chief Surveyor

District Land Registrar

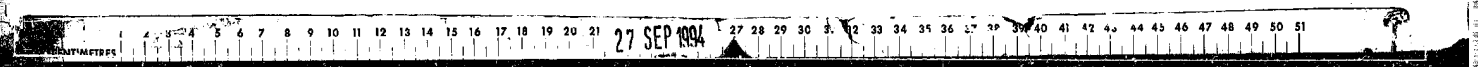
No. _____ of _____ 4 AUG 1994
 S067474

LAND DISTRICT NORTH AUCKLAND
 Survey Blk. & Dist. 11, 111, V, VI, IX, AWHITU
 NZMS 261 Sheet Record Map No. As above

CROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1984

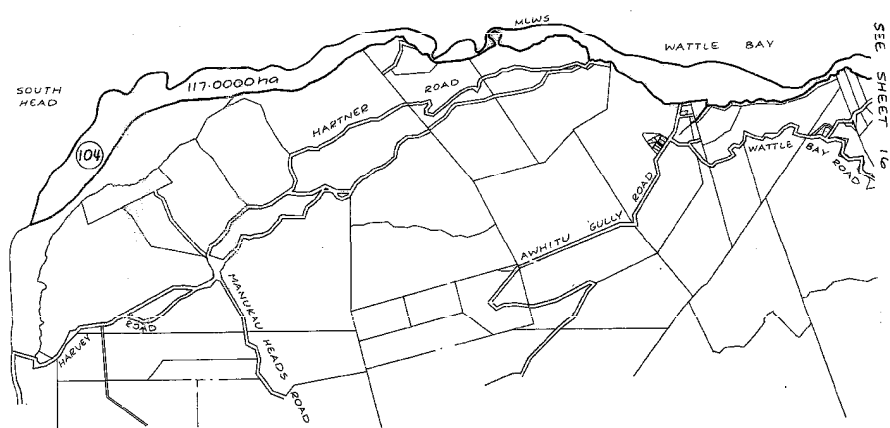
TEMPORAL AUTHORITY
 Surveyed by _____
 Scale 1: 20 000 Date JANUARY 1994

W.A. ROBERTSON, DIRECTOR GENERAL/SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND





MANUKAU HARBOUR



Approvals

SHEET 17 OF 17

Total Area _____

Comprised in _____

I, Registered Surveyor and holder of an annual practicing certificate for, who may act as a registered surveyor pursuant to section 107 of the Survey Act 1988 hereby certify that this plan has been derived from surveys executed by me or under my direction, that all measurements and surveys are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in substitution thereof.

Surveyed on _____ day of _____ 19____

Field Book _____ p. Traverse Book _____ p.

Reference Plans _____

Examined Correct _____

Approved for Record Purposes Only
26/9/94
Chief Surveyor

Deposited this _____ day of _____ 19____

District Land Registrar

File Number 5067474
Date 4 AUG 1994

LAND DISTRICT NORTH AUCKLAND
Survey Blk. & Dist. XIII, XIV TITIRANGI
NZMS 261 Sheet Record Map No. AS ABOVE

GROWN LAND REVESTED PURSUANT TO FORESHORE AND SEABED ENDOWMENT REVESTING ACT 1991

TERRITORIAL AUTHORITY AUCKLAND REGIONAL COUNCIL FRANKLIN DISTRICT
Surveyed by _____
Scale 1:15,000 Date JANUARY 1994

W.A. ASSISTANT DIRECTOR GENERAL/SURVEYOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND

APPROVED 10/04/93 DOL/FORM 018

27 SEP 1994





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA33D/1224
Land Registration District North Auckland
Date Issued 03 February 1977

Prior References

NA1820/80 NA9B/1172

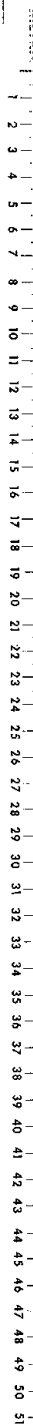
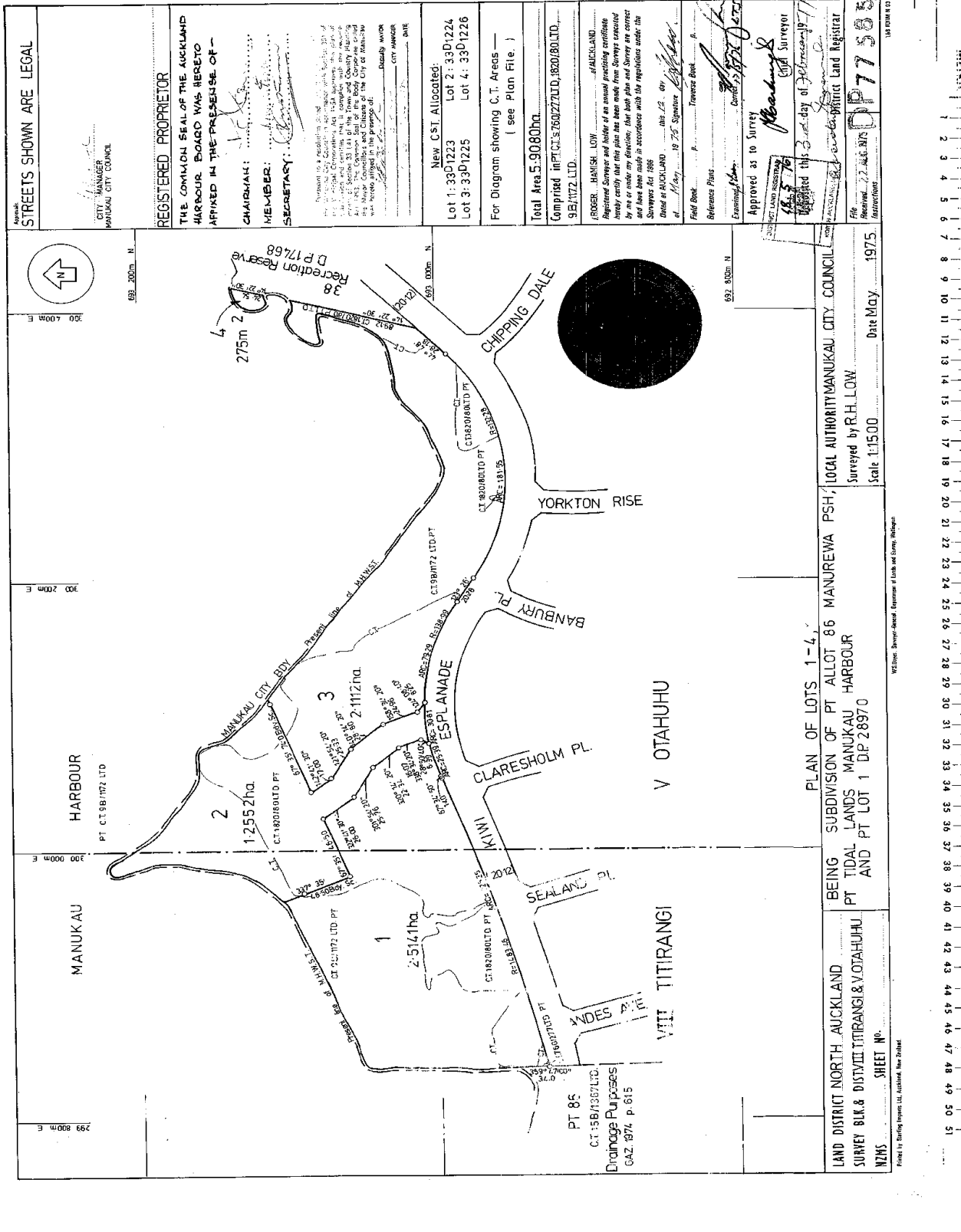
Estate Fee Simple
Area 1.2552 hectares more or less
Legal Description Lot 2 Deposited Plan 77585

Proprietors

Auckland Council

Interests

409014.1 Compensation Certificate by The Minister of Works - 26.8.1975 at 10.55 am
446240.3 Lease to The Manukau City Council Term 50 years commencing 23.11.1976 - 3.2.1977 at 10.53 am





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA33D/1223**
Land Registration District **North Auckland**
Date Issued 03 February 1977

Prior References

NA1820/80 NA760/277 NA9B/1172

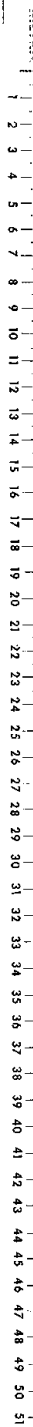
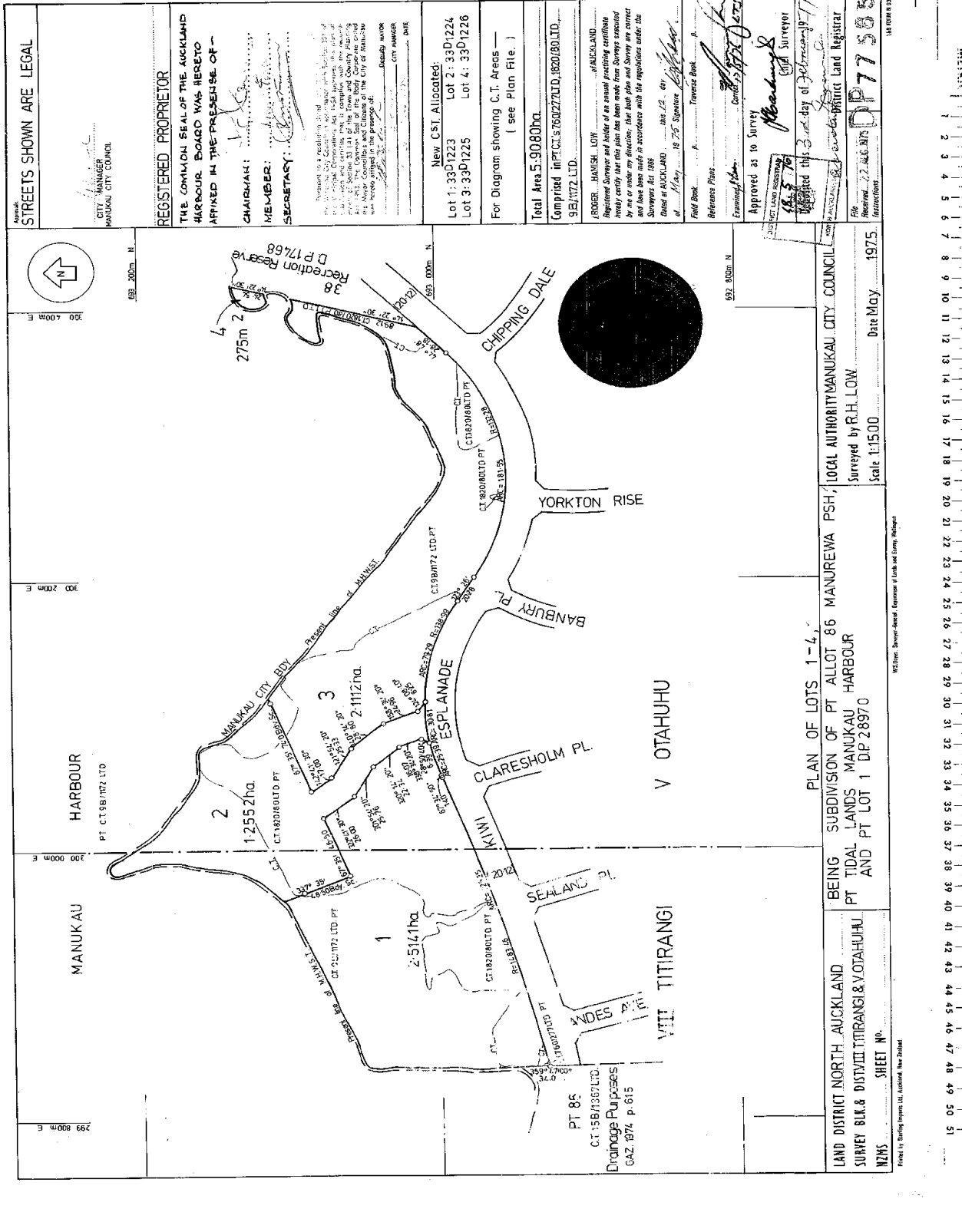
Estate Fee Simple
Area 2.5141 hectares more or less
Legal Description Lot 1 Deposited Plan 77585
Purpose Recreation reserve

Proprietors

Auckland Council

Interests

SUBJECT TO THE RESERVES AND DOMAINS ACT 1953
409014.1 Compensation Certificate by The Minister of Works - 26.8.1975 at 10.55 am (affects part)





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA33D/1225**
Land Registration District **North Auckland**
Date Issued 03 February 1977

Prior References

NA1820/80 NA9B/1172

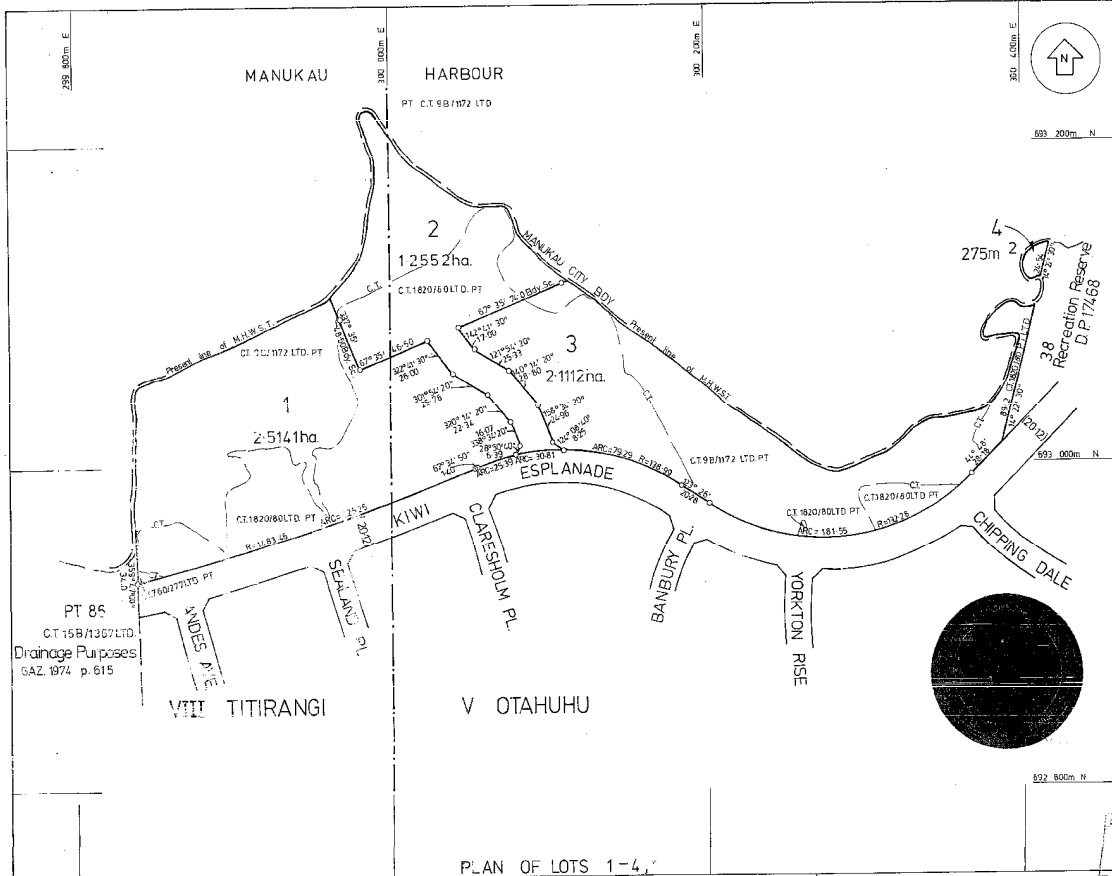
Estate Fee Simple
Area 2.1112 hectares more or less
Legal Description Lot 3 Deposited Plan 77585
Purpose Recreation reserve

Proprietors

Auckland Council

Interests

SUBJECT TO RESERVES AND DOMAINS ACT 1953
409014.1 Compensation Certificate by The Minister of Works - 26.8.1975 at 10.55 am



STREETS SHOWN ARE LEGAL

CITY MANAGER
MANUKAU CITY COUNCIL

REGISTERED PROPRIETOR
THE COMMON SEAL OF THE AUCKLAND HARBOUR BOARD WAS HERETO AFFIXED IN THE PRESENCE OF—

CHAIRMAN: _____
MEMBER: _____
SECRETARY: _____

Pursuant to a resolution dated _____ of the Auckland City Council in accordance with Section 221 of the Municipal Corporations Act 1964 approval of the use of the above land for recreation is hereby granted in compliance with the provisions of Section 221 of the Town and Country Planning Act 1977. The Common Seal of the City Council and the Mayor Councillors and Citizens of the City of Auckland was hereunto affixed in the presence of:

CITY MANAGER

DATE

New CST Allocated:
Lot 1: 33D1223 Lot 2: 33D1224
Lot 3: 33D1225 Lot 4: 33D1226

For Diagram showing C.T. Areas —
(see Plan File.)

Total Area 5.9080ha
Comprised in PCT's 760/277 D, 1820/80 LTD, 95/1172 LTD.

I, ROGER HAMISH LOW, of AUCKLAND, Registered Surveyor and holder of an annual practicing certificate hereby certify that this plan has been made from Surveys executed by me or under my direction, that both plan and Survey are correct and have been made in accordance with the regulations under the Surveyors Act 1988.

Dated at AUCKLAND this 12 day of May 1975. Signature: *R. H. Low*

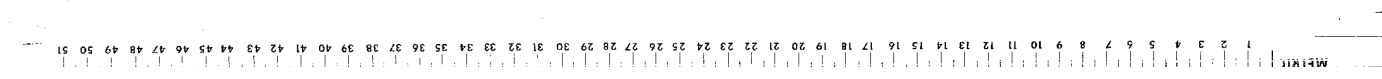
Field Book: _____ Traverse Book: _____

Reference Plans: _____

Examined: _____
Approved as to Survey
18.5.75
Witnessed this 3rd day of February 1977
District Land Registrar

PLAN OF LOTS 1-4

LAND DISTRICT NORTH AUCKLAND BEING SUBDIVISION OF PT ALLOT 86 MANUREWA PSH, LOCAL AUTHORITY MANUKAU CITY COUNCIL
SURVEY BLK. & DIST VIII TITIRANGI & V. OTAHUHU PT TIDAL LANDS MANUKAU HARBOUR AND PT LOT 1 DP 28970 Surveyed by R.H. LOW Date May 1975
NZMS SHEET No. Scale 1:1500 File No. 22.000.0175 DP 77 585





COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



R. W. Muir
Registrar-General
of Land

Search Copy

Identifier NA94A/54
Land Registration District North Auckland
Date Issued 23 December 1993

Prior References

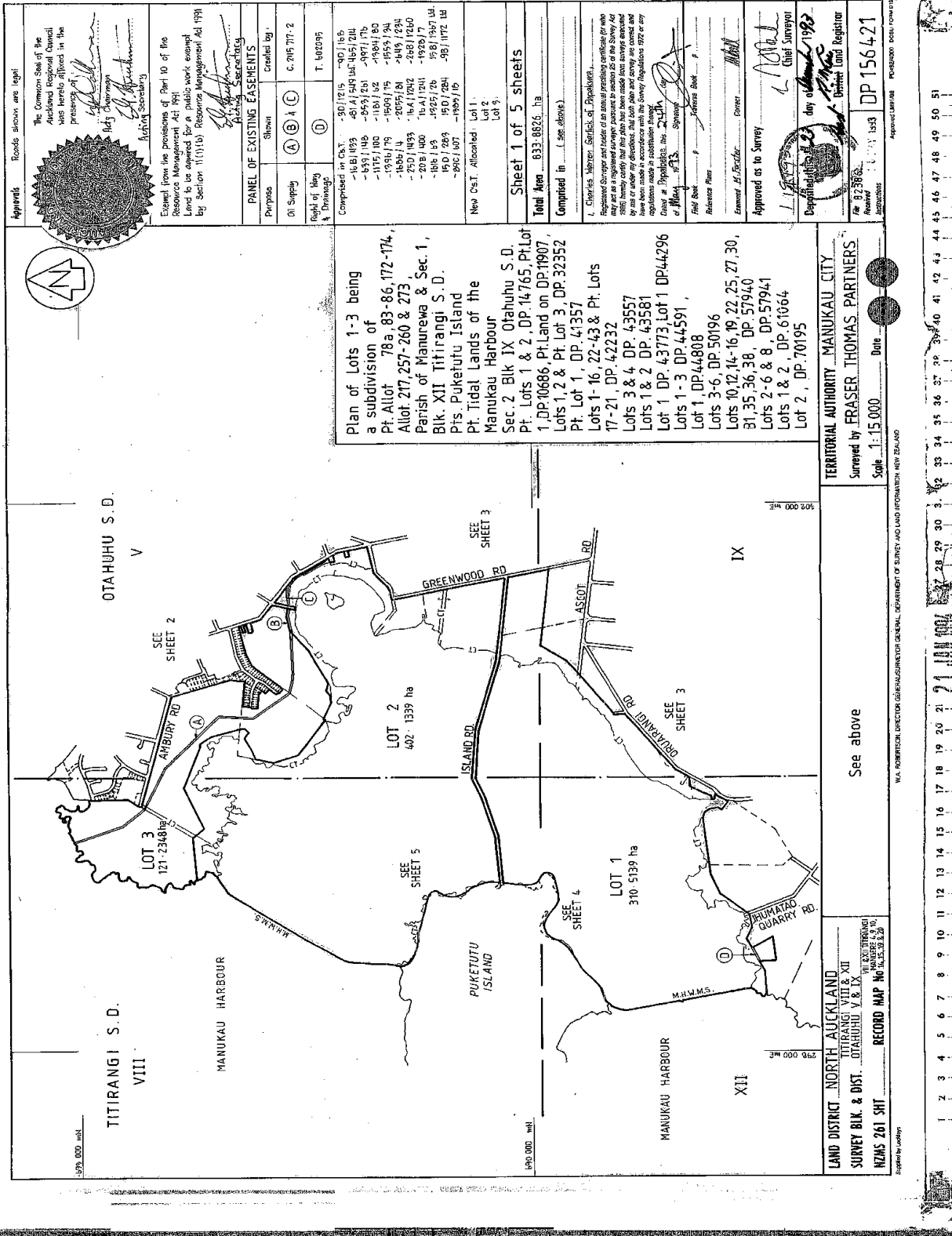
NA1175/100	NA1325/26	NA1328/7
NA1396/79	NA1509/75	NA1616/63
NA16A/1241	NA16A/1242	NA2055/81
NA20B/400	NA81A/549	NA853/261
NA89C/607	NA9B/1172	NA9D/168

Estate Fee Simple
Area 402.1339 hectares more or less
Legal Description Lot 2 Deposited Plan 156421

Proprietors
Watercare Services Limited

Interests

Fencing Agreement in Transfer 390172
Fencing Agreement in Transfer 577139
Fencing Agreement in Transfer 680335
Subject to an oil supply right over parts marked B and C created by Transfer C245717.2
Subject to Section 59 Land Act 1948 (affects part)
Fencing Agreement in Transfer A415549
C555305.8 CAVEAT BY THE AUCKLAND REGIONAL COUNCIL - 23.12.1993 AT 2.49 PM
C571630.1 Deed of Land Covenant - 24.2.1994 at 2.56 pm
Subject to a right (in gross) to transmit electric current over parts marked B and C and an electricity supply right over part marked A on DP 210753 in favour of Vector Limited created by Transfer D697343.3 - 10.4.2002 at 10.40 am
Subject to a right (in gross) to transmit electric current over part marked A on DP 209518 in favour of Vector Limited created by Transfer D697343.4 - 10.4.2002 at 10.40 am



Plan of Lots 1-3 being a subdivision of Pt. Allot 78a, 83-86, 172-174, Pt. Allot 217, 257-260 & 273, Parish of Manurewa & Sec. 1, Blk. XII Tiritangi S.D., Pts. Puketutu Island and Tidal Lands of the Manukau Harbour. Sec. 2 Blk. IX Otahuhu S.D., Pt. Lots 1 & 2, DP. 14765, Pt. Lot 1, DP. 10686, Pt. Land on DP. 1907, Lots 1, 2 & Pt. Lot 3, DP. 32352, Pt. Lot 1, DP. 41357, Lots 1-16, 22-43 & Pt. Lots 17-21, DP. 42232, Lots 3 & 4, DP. 43557, Lots 1 & 2, DP. 43581, Lot 1, DP. 43773, Lot 1, DP. 44296, Lots 1-3, DP. 44591, Lot 1, DP. 44808, Lots 3-6, DP. 50196, Lots 10, 12, 14-16, 19, 22, 25, 27, 30, 31, 35, 36, 38, DP. 57940, Lots 2-6 & 8, DP. 57941, Lots 1 & 2, DP. 61664, Lot 2, DP. 70195

Approved: Roads shown are legal

The Common Seal of the Auckland Regional Council was hereunto affixed in the presence of

Mayor *[Signature]*
 Deputy Mayor *[Signature]*
 Acting Secretary *[Signature]*

Exempt from the provisions of Part 10 of the Resource Management Act 1991. Land to be exempt for a public work exempted by Section 11(1)(b) Resource Management Act 1991

PANEL OF EXISTING EASEMENTS		Shown	Created by
Oil Supply	(A) (B) (C)	(A) (B) (C)	C. 2016 717-2
Right of Way & Drainage	(D)	(D)	T. 60095

Completed in C.S.T. - 90/12/15 - 90/15/5
 -16/8/1993 - 81/1/15/93 4/5/201
 -13/5/1/98 - 8/5/1/201 - 9/7/1/76
 -11/5/1/00 - 1/8/1/52 - 9/8/1/80
 -19/5/1/79 - 19/9/1/75 - 15/5/1/94
 -16/5/1/4 - 20/5/1/81 - 6/19/1/234
 -2/5/1/1935 - 16/1/1241 - 26/8/1240
 -20/8/1/00 - 16/1/1241 - 19/29/1/7
 -16/8/1/93 - 19/25/1/26 - 9/8/1/90/1/1
 -15/1/205 - 15/1/284 - 15/1/172/1/1
 -9/6/1/107 - 16/5/1/10

New C.S.T. Allocated: Lot 1, Lot 2

Sheet 1 of 5 sheets
 Total Area 633.8826 ha
 Comprised in (See above)

I, Charles Nelson, Geomatics of Papakura, Registered Surveyor and holder of an annual practicing certificate for who may act as a registered surveyor pursuant to section 25 of the Survey Act 1986 hereby certify that this plan has been made from surveys conducted by me or under my direction. The plan was made using a total station and the measurements were taken in accordance with the Survey Regulations 1986 or any regulations made in substitution thereof.

Done at Papakura, this 21st day of May 2013.

Surveyor *[Signature]*
 Charles Nelson
 Reference Plan: General Plan
 Examined by: *[Signature]* Coroner
 Approved as to Survey: *[Signature]* Chief Surveyor
 Department of Conservation
 Date: 11/5/2013
 No. 12-386
 Approved as to Survey: *[Signature]* Chief Surveyor
 Date: 11/5/2013
 No. 12-386
 Approved as to Survey: *[Signature]* Chief Surveyor
 Date: 11/5/2013
 No. 12-386

LAND DISTRICT NORTH AUCKLAND
 TITIRANGI V & XII
 SURVEY BLK. & DIST. OTAHUHU V & IX
 RECORD MAP No. 16,153,828

Scale 1:15,000

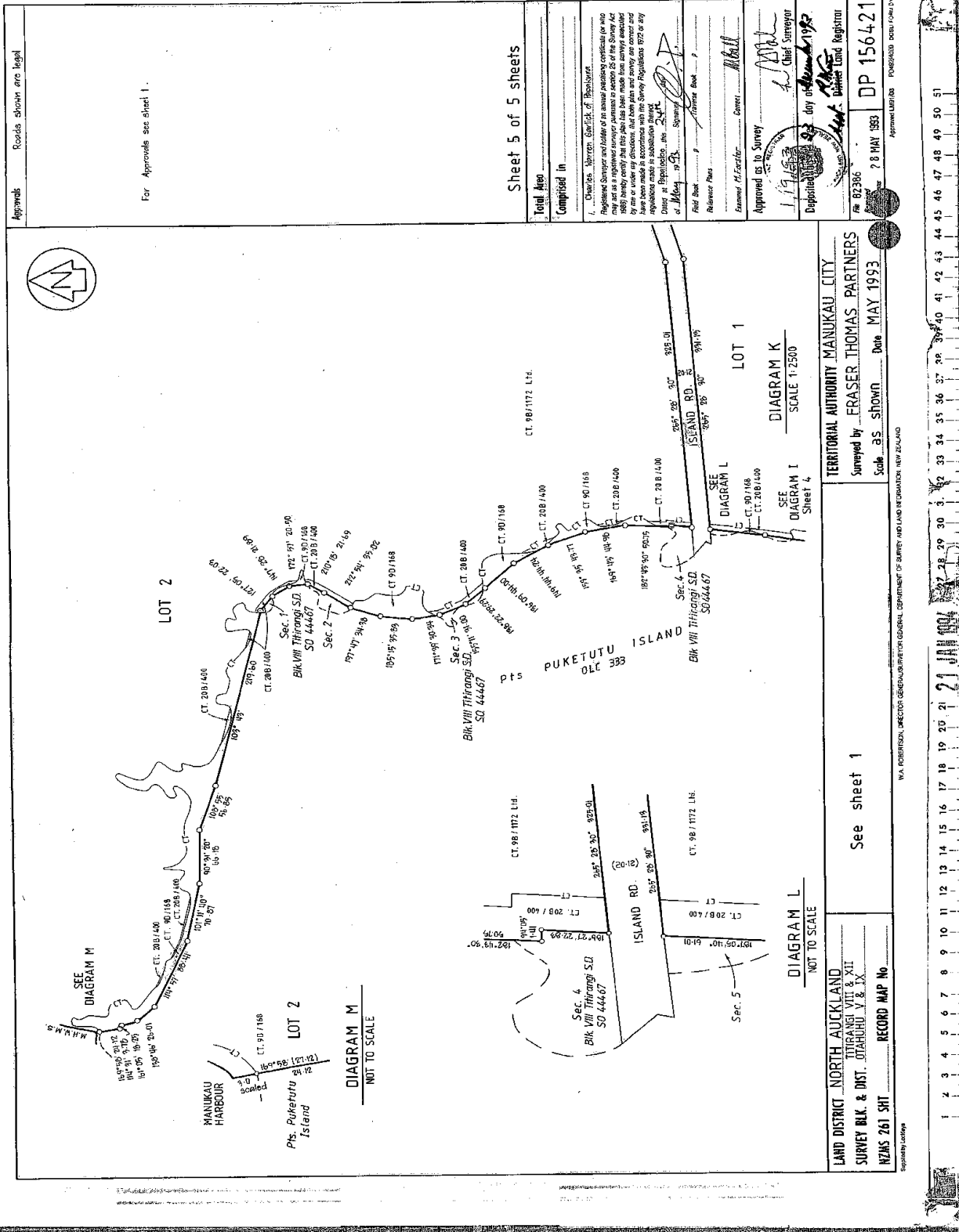
Surveyed by FRASER THOMAS PARTNERS

Date 24 JUN 2013

DP 156421

W.A. ROBERTSON, DIRECTOR GENERAL, DEPARTMENT OF SURVEY AND LAND INFORMATION, NEW ZEALAND

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51



Approvals Roads shown are legal

For Approvals see sheet 1.

Sheet 5 of 5 sheets

Total Area Comprised in

1. Charles Warren, Governor of the Colony
Registered Survey and holder of an annual planning certificate for who may act as a registered surveyor pursuant to section 25 of the Survey Act 1908, and who is duly qualified in accordance with the provisions of the said Act, has surveyed the above land and has caused the same to be laid out as shown on the plan hereunto annexed and has been made in accordance with the Survey Regulations 1927 or any regulations made in substitution thereof.

Director of Lands, New Zealand

Field Book _____ **Survey Book** _____

Reference Plan _____

Examined & Corrected _____

Approved as to Survey _____ **Chief Surveyor**

Deposited _____ **day of _____ 1993**

Fraser Thomas, Licensed Land Registrar

Fr 62386

DP 156421

7 8 MAY 1993

Approved LMB/100 PONGA/0008 DOUGLASS LTD

TERRITORIAL AUTHORITY MANUKAU CITY
Surveyed by FRASER THOMAS PARTNERS
Scale 35 SHOWN Date MAY 1993

See sheet 1

LAND DISTRICT NORTH AUCKLAND
SURVEY BLK. & DIST. OTARAHU V. 8. IX
RECORD MAP No


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R.W. Muir
Registrar-General
of Land

Identifier **NA43B/991**
Land Registration District **North Auckland**
Date Issued 23 May 1980

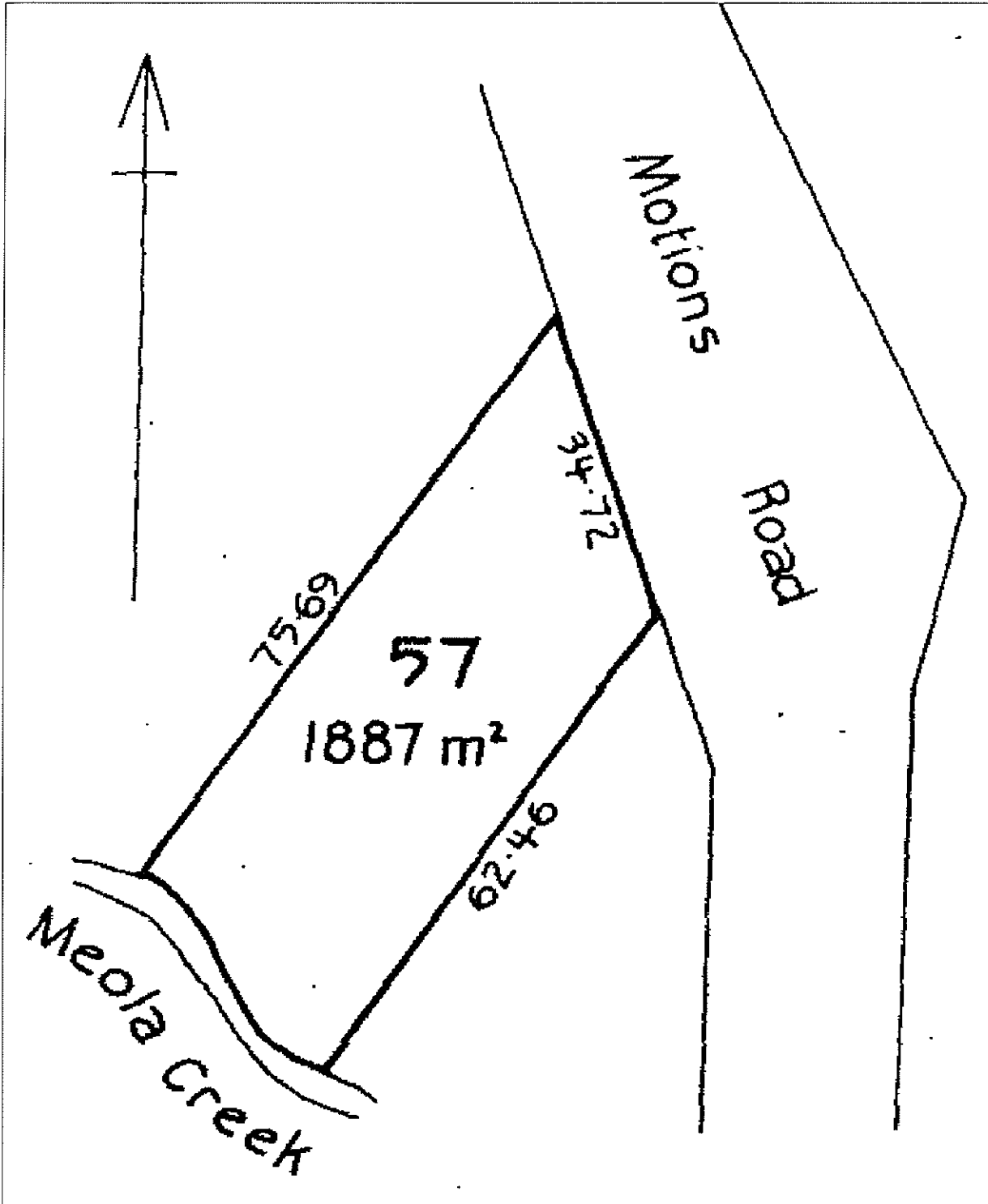
Estate	Fee Simple
Area	1887 square metres more or less
Legal Description	Allotment 57 Section 9 Suburbs of Auckland
Purpose	Stopped Road

Proprietors
Auckland Council

Interests

Identifier

NA43B/991





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA102C/992
Land Registration District North Auckland
Date Issued 13 June 1996

Prior References

NA20B/492 NA26C/1104 NA932/171

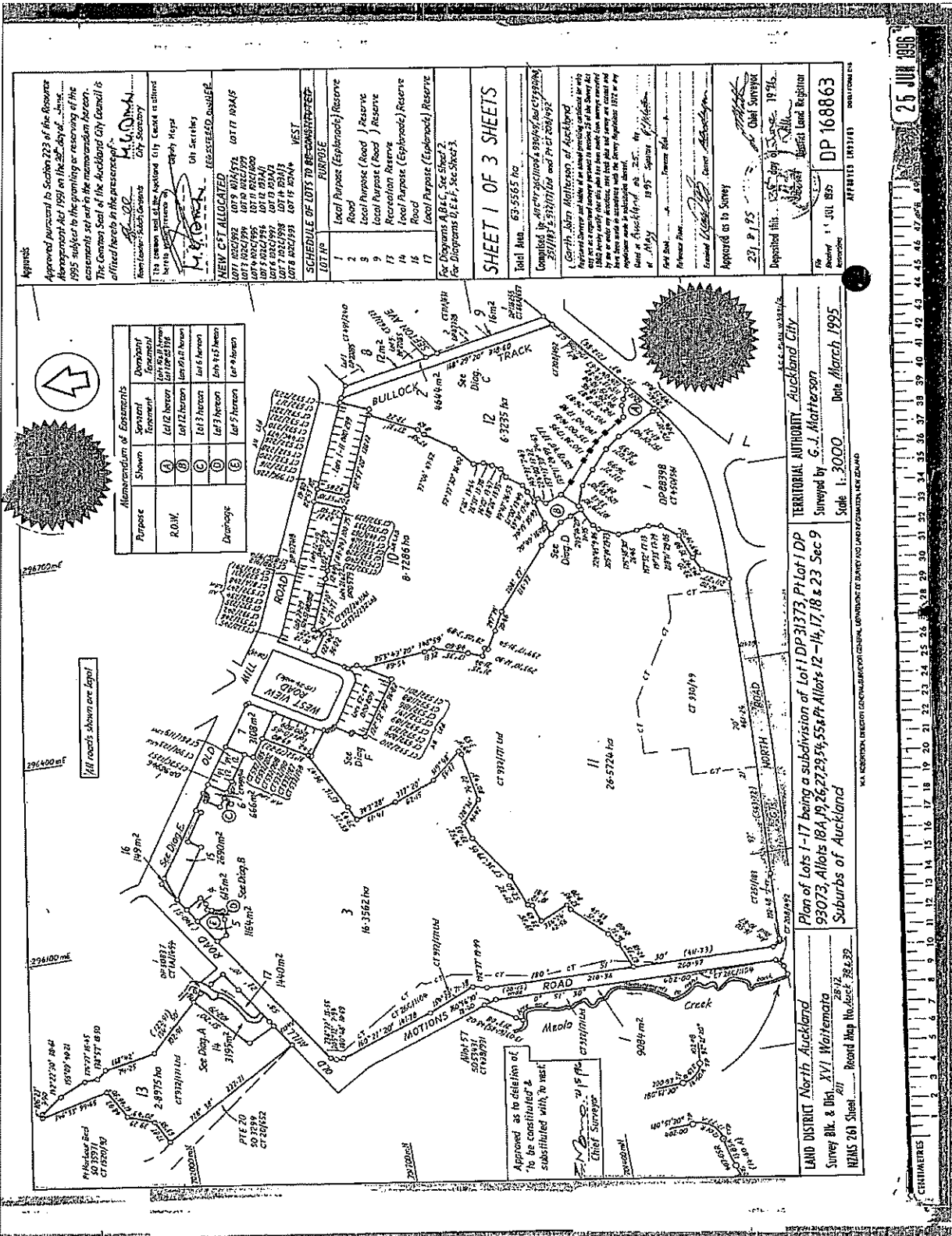
Estate Fee Simple
Area 9084 square metres more or less
Legal Description Lot 1 Deposited Plan 168863
Purpose Local Purpose Esplanade Reserve

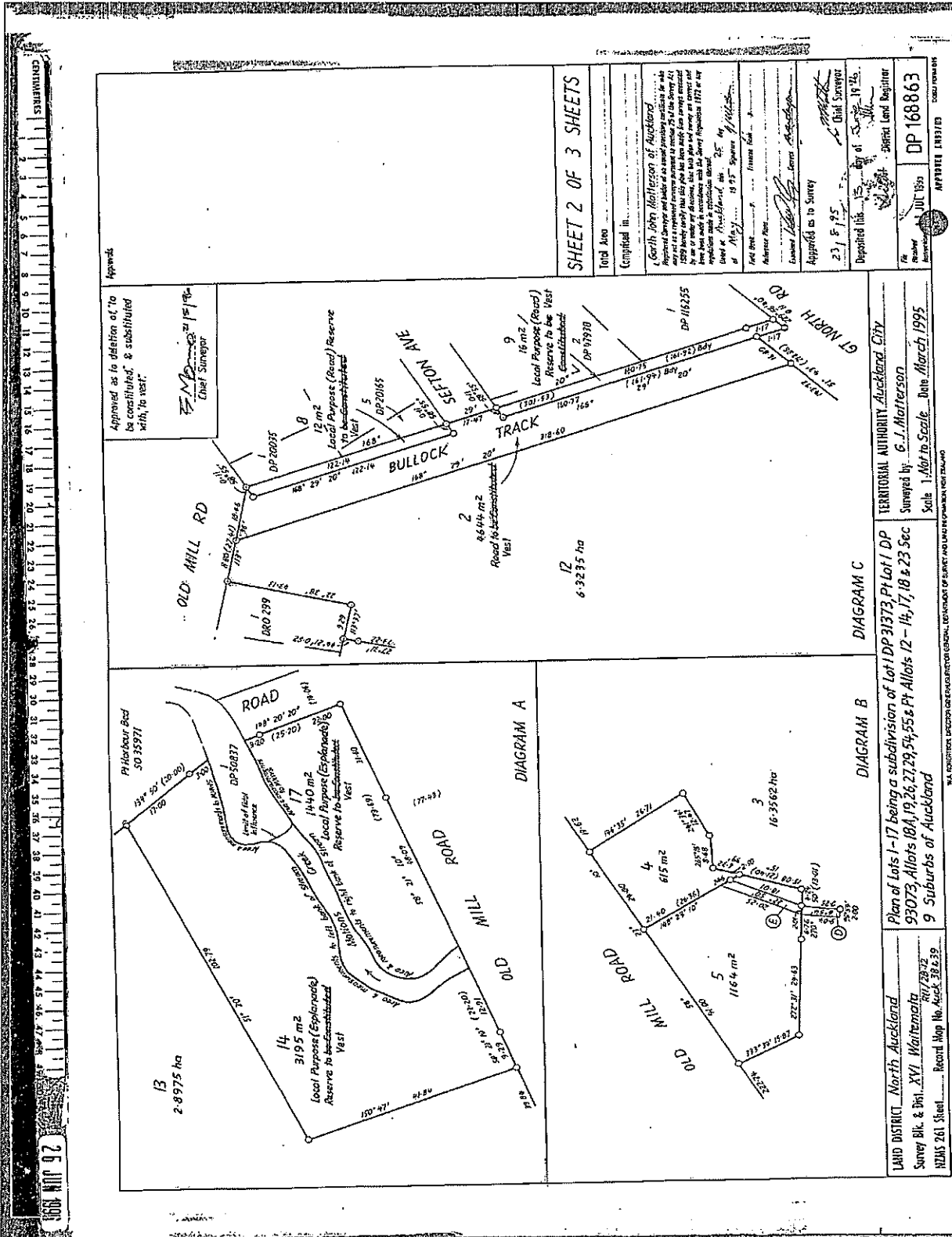
Proprietors

Auckland Council

Interests

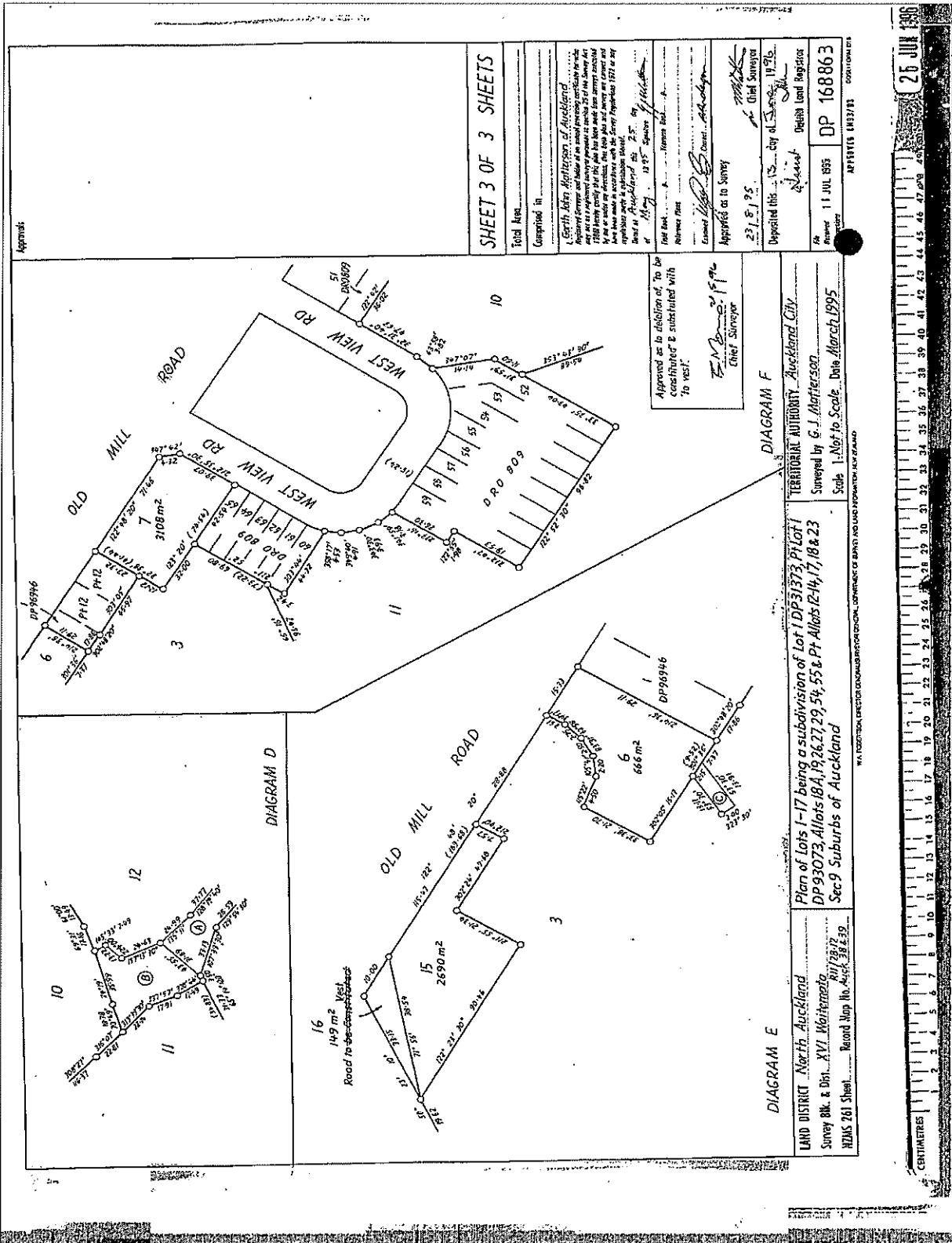
SUBJECT TO THE RESERVES ACT 1977





Transaction Id
Client Reference amoylan001

Search Copy Dated 12/06/12 9:46 am, Page 3 of 4
Register Only





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA102C/1000**
Land Registration District **North Auckland**
Date Issued 13 June 1996

Prior References

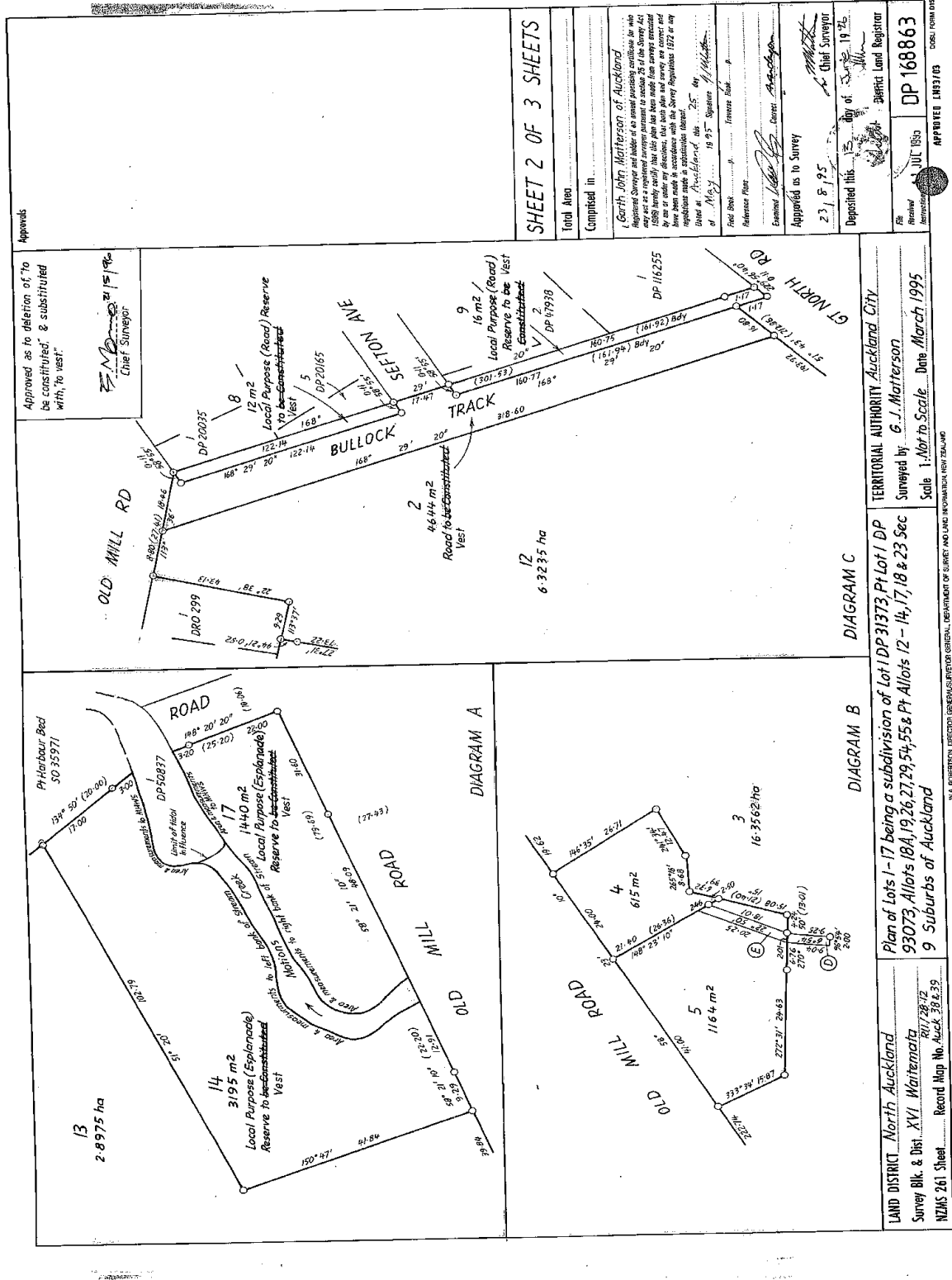
NA20B/492 NA251/183 NA930/49
NA932/171

Estate Fee Simple
Area 26.5724 hectares more or less
Legal Description Lot 11 Deposited Plan 168863

Proprietors
Auckland Council

Interests

Appurtenant hereto are rights of way specified in Easement Certificate D007081.4 - 13.6.1996 at 1.22 pm
The easements specified in Easement Certificate D007081.4 are subject to Section 243 (a) Resource Management Act 1991



Approved as to deletion of 'to be constituted' & substituted with, 'to vest'

G. J. Matterson
Chief Surveyor

SHEET 2 OF 3 SHEETS

Total Area	
Completed in	
<p><i>G. J. Matterson</i> Registered Surveyor and holder of a licence pursuant to the Survey Act 1958 hereby certifies that this plan has been made from survey conducted by me or under my direction, that such plan and survey are correct and have been made in accordance with the Survey Regulations 1972 or any regulations made in pursuance of the said Act.</p> <p>Dated at Auckland this 25th day of July 1995 Signed <i>G. J. Matterson</i> of 19 P's Square</p>	
Field Book	
Reference Plan	
Examined by	<i>G. J. Matterson</i> Chief Surveyor
Approved as to Survey	23rd July 1995
Deposited this	23rd July 1995
By	<i>G. J. Matterson</i> District Land Registrar
DP	DP 168863

TERRITORIAL AUTHORITY Auckland City
Surveyed by *G. J. Matterson*
Scale 1:100 to Scale Date March 1995

DIAGRAM C

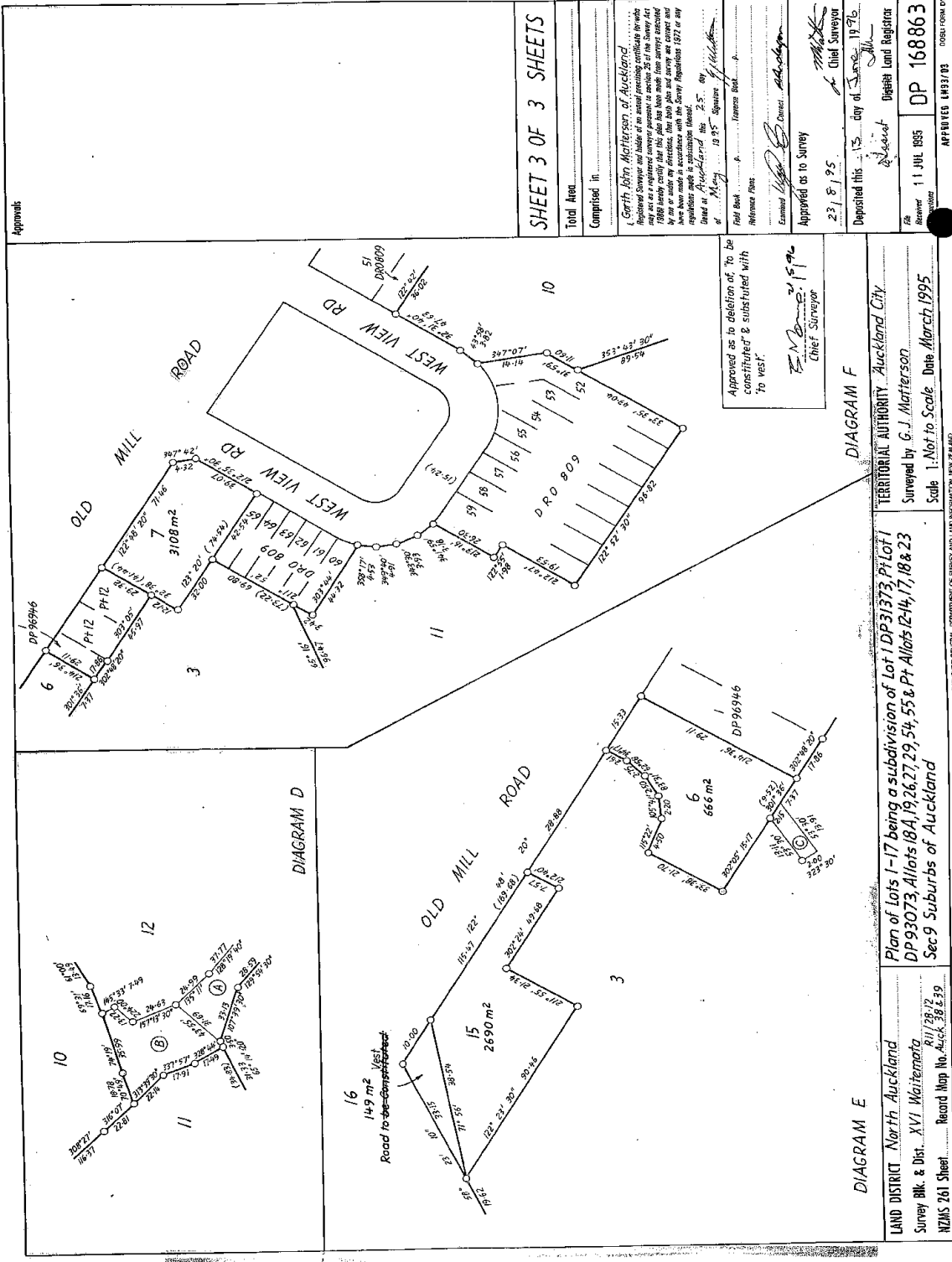
DIAGRAM B

DIAGRAM A

LAND DISTRICT North Auckland
Survey Blk. & Dist. XVI Waitemata
NZIAS 261 Sheet
Record Map No. Auckland 38 & 39

Plan of Lots 1-17 being a subdivision of Lot 1 DP 31373, Pt Lot 1 DP 93073, Allots 18A, 19, 26, 27, 29, 54, 55 & Pt Allots 12-14, 17, 18 & 23 Sec 9 Suburbs of Auckland

APPROVED EN31/93





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier **NA26B/398**
Land Registration District **North Auckland**
Date Issued 01 March 1973

Prior References

OIC 030323

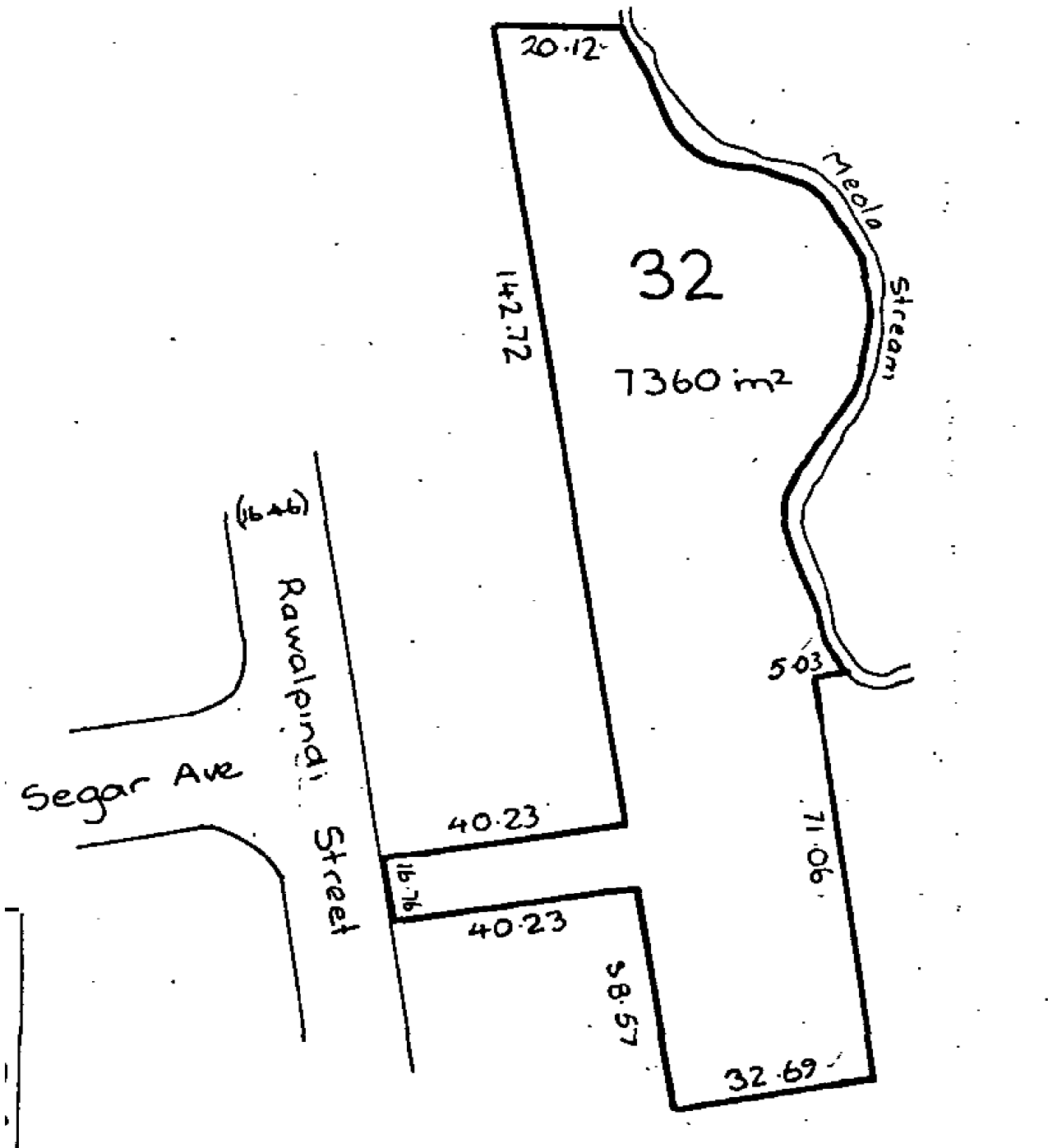
Estate Fee Simple
Area 7360 square metres more or less
Legal Description Lot 32 Deposited Plan 41107
Purpose Recreation reserve

Proprietors

Auckland Council

Interests

SUBJECT TO THE RESERVES AND DOMAINS ACT 1953



Cancelled

REGISTER
NEW ZEALAND

(Land and Deeds) Form B.

Reference: Vol. 798, Folio 268, 830/228
Transfer No.
Application No.
Order for N/C No. C.24635

Register-book, Vol. 902, folio 253.



DUPLICATE DESTROYED

902-253

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate, dated the first day of June one thousand nine hundred and forty-eight, under the hand and seal of the District Land Registrar of the Land Registration District of AUCKLAND, HIS MAJESTY THE KING for the purposes of the Housing Act, 1912,

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial under written or endorsed hereon, subject also to any existing right of the Crown to take and lay off roads under the provisions of any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon bordered, green, be the several admeasurements a little more or less, that is to say: All that parcels of land containing together twelve acres one rood and thirty perchs more or less situated in the City of Auckland being parts of Allotments 29 and 35 Parish of Titirangi parts of the said land being more particularly shown as Lots 15, 16, 22, 23, 24, 25, 26, 28, 29, 30, 31, 58, 59, 60, 61, 62, 69, 70, 71, 72, 73, 102, 103, 104, 105, 106, 107, 108 and 109, parts Lots 17, 18, 21, 63 and 68 and the parts marked Segar Avenue and Tasman Avenue on Deposited Plan No. 312 and Lot 12 on Deposited Plan No. 29400.

Auckland City METRIC AREA IS 5,0332 ha.
S. 0332 ha.

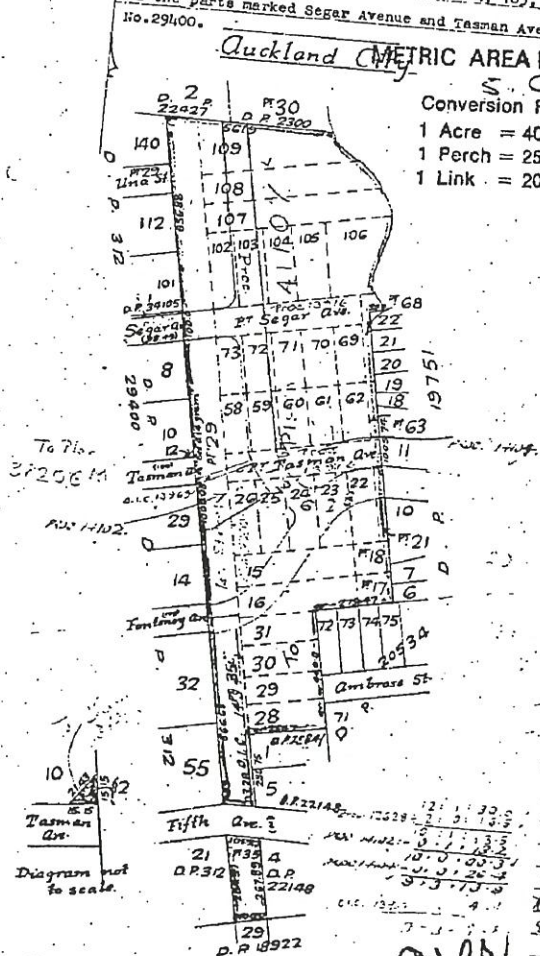
Conversion Factors:
1 Acre = 4046m²
1 Perch = 25.29m²
1 Link = 2012 metres



E. W. Worthington
Assistant District Land Registrar.

Subject to a right of way over the parts Segar Avenue and Tasman Avenue above described implied by virtue of Section 179 (1) Land Transfer Act 1915.

Proclamation 12628 proclaiming 2 acres 16.5 perches as street, entered 14/11/1919 at 3 pm
Proclamation 13916 taking the right of way over part (1 rood 13.6 perches) Segar Avenue and part (1 rood 25.3 perches) Tasman Avenue on D.P. 312 from housing purposes entered 21.8.1953 at 10.4.
Order of Council 1957 declaring 20 perches of lot 21 (as shown on plan 29400) needed in the larger boundaries and divisions of the City of Auckland and to be under the control and management of the Auckland City Council entered 4-15-1957 at 10.5.
Cancelled as to lot 2 plan 28090 Proclamation 14102 declaring lot 3 D.P. 27070 to be Crown land subject to the Land Act 1952. Entered 10.3.1954 at 10.1.
Proclamation 14104 declaring lot 27 D.P. 4107 to be Crown land subject to the Land Act 1952. Entered 10.3.1954 at 10.1.



Total Area: 12:1:30
Scale: 3 chains, inches

over

902/253 REGISTER

D.P. 107/206 issued for lot 32 Plan 41107
(Plan 41107)

Order in Council 16344 setting out
L.P. 41107 (access way) in the Mayor
Council and duties of the Mayor
of Auckland to be under the
control and management of the Auckland
City Council. Dated 2/11/1959 at
Wellington 1122

Agreement for Sale of Lot 25 plan 41107
Her Majesty the Queen with Cadis Chas. Short
K. and Carole Short 23/12/1958 at
Wellington

Vol. 1121 Fol. 26
C 33281 } Cancelled as to lots 1, 2, 3, 4 Plan 38206
13-12-1958 } and new C.T. issued Vol. 1182 Fol. 52

C 33292 } Cancelled as to lots 11, 12, 13, 14 Plan 41107
13-12-1958 } and new C.T. issued Vol. 1182 Fol. 52

634796 } Cancelled as to lots
5-11-1958 } 2, 3 and 40 x 48 (inclusive)
Plan 41107 and new C.T.
issued
Vol. 1315 Fol. 24

K 31486 certifying the existence of a lot of
pipes for sewage
document issued
lots 45, 47, Plan 41107 lot 47 Plan 41107
(cc. 1743/24)
Entered 23-1-1957 at 12.0

D.P. 1383/11 issued for lot 3 Plan 38090
C 35575 } Cancelled as to lots 23, 24, 25
20-6-1957 } 26, 27, 28, 29, 30, 31, 32, 33, 34
35, 36, 37, 38, 39 Plan 41107
and new C.T. issued
Vol. 1385 Fol. 51

C 35672 } Cancelled as to part of lot 35 Plan
10-7-1957 } 35 and new C.T. issued
Vol. 1514 Fol. 80

635864 } Cancelled as to lot 2 Plan
17/1/1959 } 38090 (Order in Council
13969) and new C.T. issued
Vol. 1398 Fol. 14

C 36778 } Cancelled as to lots 16 to 22
12-5-1958 } Plan 41107 and new C.T.
issued
Vol. 1541 Fol. 3
Garnettman A.L.R.

THIS REPRODUCTION (ON A REDUCED SCALE)
CERTIFIED TO BE A TRUE COPY OF THE
ORIGINAL REGISTER FOR THE PURPOSES OF
SECTION 215A LAND TRANSFER ACT 1952.
L. G. Stroman D.L.R.

030326 Proclamation delaying
part C.A.B.R. 11/2/52 Plan 41107
to be brought into
operation for operation
made effective 1/1/1948 -
26/1/1948 at 2.43

D.53968.1) Cancelled as to Lot 50 P^{an}.
ONCT) 41107 and new CT issued
9.10.1996) 102D/770

-CANCELLED-

902/253
A.L.R.

lot 20 DP 38206 IN LIAISON LOT 12 DP 29400

CANCELLED

corrected
by
6-11-95



2500 N.

PT Allot. 174 of Sec. 10

Suburbs of Auckland Plan of Housing Lots 1-50 being a su of Parts Allots. 29 & 35; Lots 26, 60-62, 69-71, 104, 105, Part Lots 15-18, 58, 59, 63, 68, 72, 73, 102, 103, 106-109 and parts mar Segar Avenue and Tasman Avenue on D.P. 312 be being Parts Allotment 29; and Lots 28-30 & Part Lots 20, 21, 31 on Block XVI Waitemata S.D. Parish of Tiltirangi District. Local Body: City of Auckland

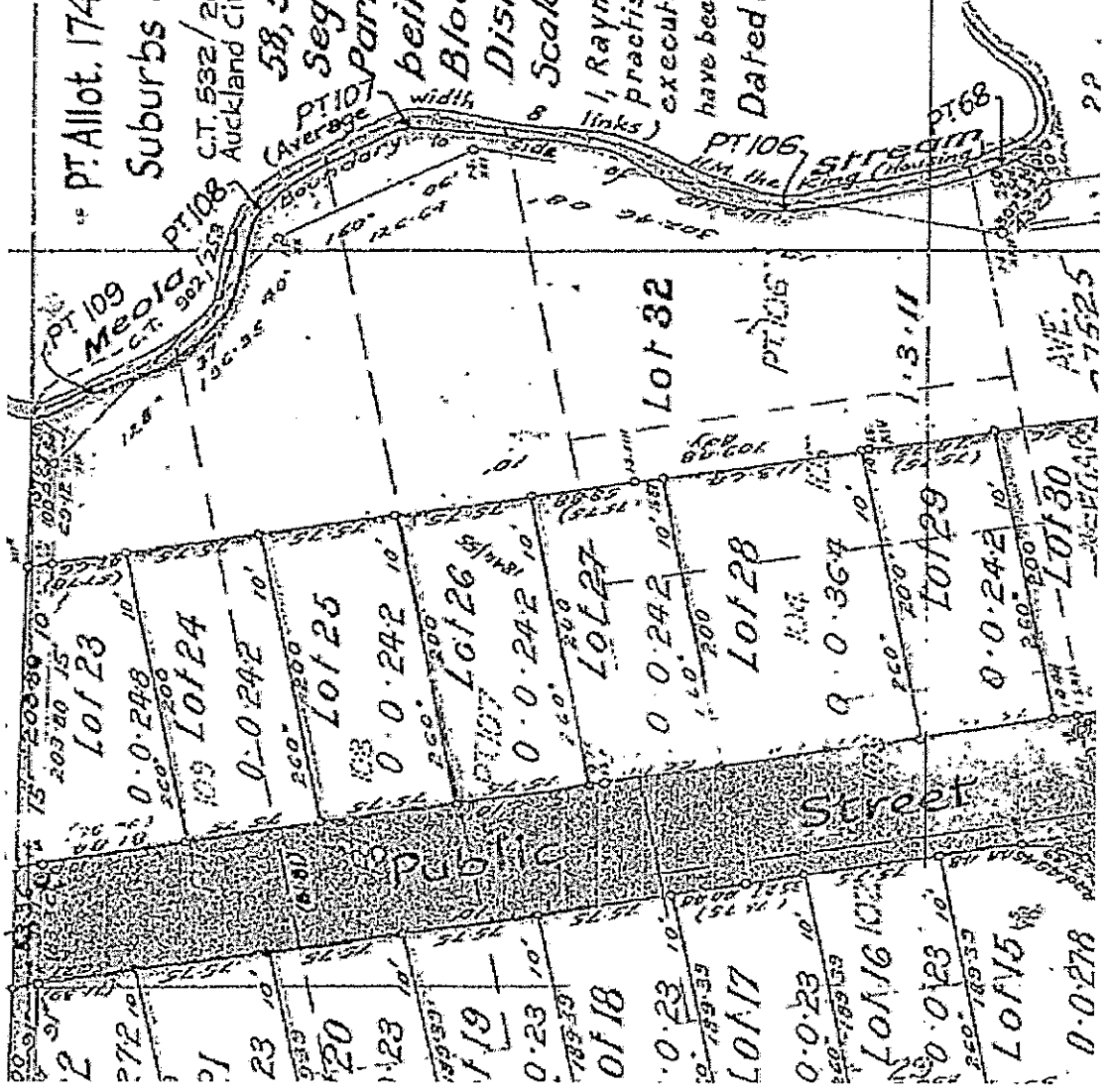
Scale: 1 chain to an inch. Surveyed by: L.J. Empen Date: M. 1, Raymond Jackman of Otahuhu Registered Surveyor and holder of an an practising certificate, hereby certify that this plan has been made from 34 executed by the late L.J. Empen; and I believe that both plan and survey are corre have been made in accordance with the regulations under the Surveyors Act 19. Dated at Otahuhu this 26th day of January 1948

Raymond Jackman Registered Surveyor

Comprised in C.T. 902/253

2000

Deposited this 19th day of 1948





**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



R. W. Muir
Registrar-General
of Land

Search Copy

Part-Cancelled

Identifier NA740/40
Land Registration District North Auckland
Date Issued 27 January 1941

Prior References

NA32/246 NA362/84 NA491/200
NA609/231 NA72/75

Estate Fee Simple
Area 4115 square metres more or less
Legal Description Lot 13 Deposited Plan 17247 and Lot 15
Deposited Plan 20455 and Lot 1 Deposited
Plan 22047 and Part Marked Plantation
Reserve Deposited Plan 16371
Purpose for recreations ground

Proprietors
Auckland Council

Interests

605909 Transfer of Lot 15 DP 20455 to Harold Roy Nicholas and new CT NA1565/86 issued - 25.6.1958 at 9:42 am
879862.1 Gazette Notice (NZ Gazette 9.4.1981 No.37 p.902) declaring part Lot 13 DP 17247 (504 square metres)
and part Allotment 36 parish of Titirangi (2175 square metres) to be classified as reserve for recreation purposes
subject to the Reserves Act 1977 - 14.5.1981 at 1:45 pm
C216357.4 Cancelled as to Lot 2 DP 137239 and new CT NA81B/530 issued - 26.11.1990 at 9:00 am
For historic memorials see paper image of title
Part adjoining road has been stopped see C122535.1



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA26B/363
Land Registration District North Auckland
Date Issued 28 May 1973

Prior References

GN 038895

Estate	Fee Simple
Area	2.4610 hectares more or less
Legal Description	Lot 90 Deposited Plan 39331
Purpose	Recreation Reserve

Proprietors

Auckland Council

Interests

Subject to a drainage right created by Transfer 252154

Subject to the Reserves Act 1977

Subject to Section 59 Land Act 1948.

Subject to a right to drain stormwater easement over part marked E on DP 348621 created by Easement

Instrument 7310903.5 - 5.4.2007 at 9:00 am

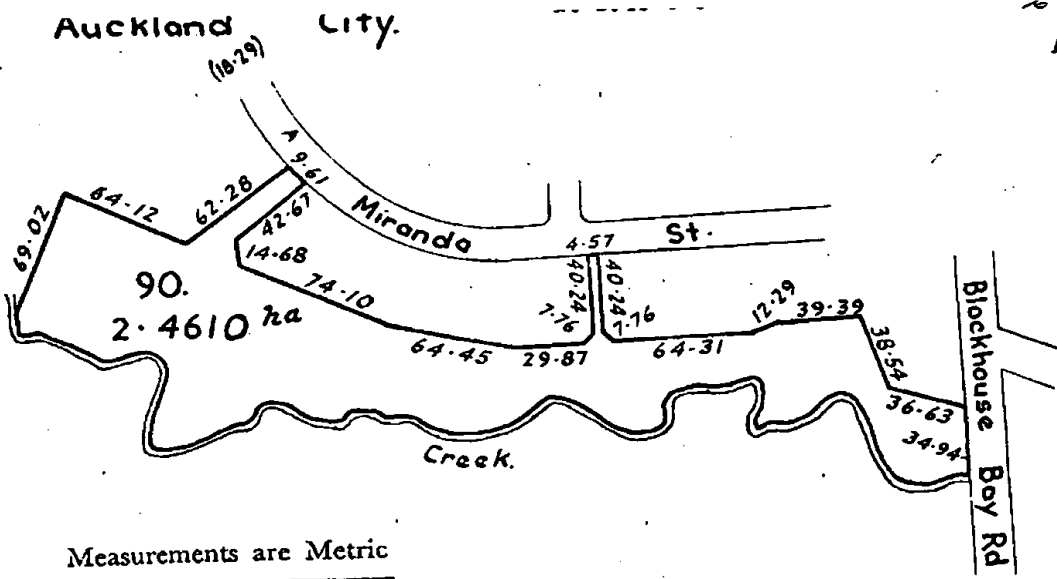
The easements created by Easement Instrument 7310903.5 are subject to Section 243 (a) Resource Management Act 1991

Title Diagram NA26B/36:

Copy 01/01.Pgs - 001.18/04/07.17 42



DocID: 312344-10



Measurements are Metric



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier NA1875/79
Land Registration District North Auckland
Date Issued 17 October 1960

Prior References

NA1518/2

Estate Fee Simple
Area 680 square metres more or less
Legal Description Lot 79 Deposited Plan 48241

Proprietors

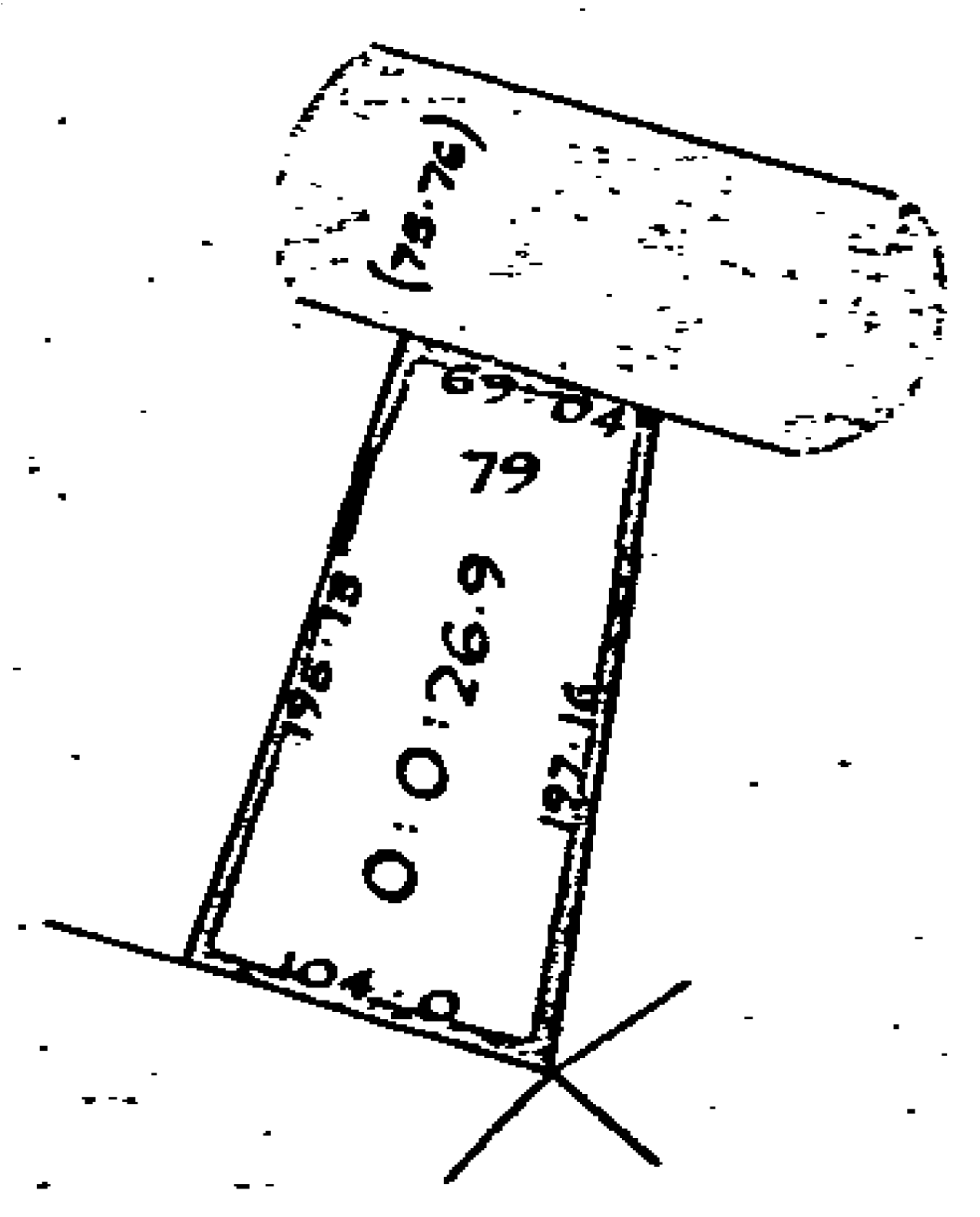
Violet Elizabeth Laughland

Interests

K83194 Building Line Restriction

Identifier

NA1875/79



Appendix B – Stormwater Calculations

TP108 - HYDRAULIC DESIGN (POST-DEVELOPMENT SCENARIO)

Project: **CIAW** By: **LT** Date: **03/7/2012**

Location: **Western Springs (WS1)** Checked: **CBL** Date: **03/16/2012**

1. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (hectares)	Product of CN x Area
Waitemata clay, Class C Tuff, scoria, Class A	Pervious Areas (List)			
	Lawn, parks in good condition	74		0
	Parks, pasture in good condition	39		0
	Subtotal for Pervious Areas		0	0
	Impervious Areas (List)			
	Unconnected impervious	98	0	0
	Connected impervious	98	0.16	16
	Subtotal for Impervious Areas		0.16	16
Totals			0.16	16

* from Table 3.3

$$\text{CN (weighted)} : \frac{\text{total product}}{\text{total area}} = \frac{16}{0.16} = 98$$

$$\text{Ia (weighted)} : \frac{5 \times \text{pervious area}}{\text{total area}} = \frac{5 \times 0}{0.16} = 0.0 \text{ mm}$$

2. Time of Concentration

Channelisation Factor : C = 0.8 (from Table 4.2)

Catchment Length : L = 0.15 km (along drainage path)

Catchment Slope : Sc = 0.01 m/m (by equal area method)

Runoff Factor R : $\frac{\text{CN}}{200 - \text{CN}} = 0.96$

$$\text{Time of Concentration} : t_c = 0.14 C L^{0.66} R^{-0.55} Sc^{-0.30} = 0.13 \text{ hrs}$$

$$\text{SCS Lag for HEC-HMS} : t_p = 2/3 t_c = 0.09 \text{ hrs}$$

3. Soil Storage Parameter : $S = (10/\text{CN}) - 10) * 25.4$

Total	=	5	mm
Pervious	=	0	mm
Impervious	=	5	mm

4. Average Recurrence Interval, ARI (yr) :

5. 24 hour Rainfall Depth, P₂₄ (mm), (from Appendix A)

$$6. \text{ Runoff Index, } c^* : = \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$$

7. Specific Peak Flow Rate, q*, (from Figure 5.1)

$$8. \text{ Peak Flow Rate, } q_p : = q^* A P_{24} \text{ (m}^3\text{/s)}$$

$$9. \text{ Runoff Depth, } Q_{24} : = \frac{(P_{24} - Ia)2}{(P_{24} - Ia) + S} \text{ (mm)}$$

$$10. \text{ Runoff Volume, } V_{24} : = 1000 \times Q_{24} A \text{ (m}^3\text{)}$$

	Storm #1	Storm #2	Storm #3	Storm #4
4. Average Recurrence Interval, ARI (yr) :	1/3 *2	2	5	100
5. 24 hour Rainfall Depth, P ₂₄ (mm), (from Appendix A)	25	75	120	185
6. Runoff Index, c* :	0.71	0.88	0.92	0.95
7. Specific Peak Flow Rate, q*, (from Figure 5.1)	0.034	0.163	0.165	0.167
8. Peak Flow Rate, q _p :	0.0014	0.0196	0.0317	0.0494
9. Runoff Depth, Q ₂₄ :	Pervious	20	70	115
	Impervious	21	70	115
10. Runoff Volume, V ₂₄ :	Pervious	000	000	000
	Impervious	033	112	184
	Total	033	112	184

TP108 - HYDRAULIC DESIGN (POST-DEVELOPMENT SCENARIO)

Project: CIAW By: LT Date: 03/7/2012

Location: Western Springs (WS1) Checked: CBL Date: 03/16/2012

Stormwater runoff from the new impervious area at this site will be treated by two proprietary devices located on the eastern and western ends of the site. Area 1 is the impervious area to be treated by the proprietary device on the western side, and Area 2 is the impervious area to be treated by the device on the eastern side of the site.

1. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (hectares)	Product of CN x Area
<i>Waitemata clay, Class C</i> <i>Tuff, scoria, Class A</i>	Pervious Areas (List)			
	<i>Lawn, parks in good condition</i>	74		0
	<i>Parks, pasture in good condition</i>	39		0
	Subtotal for Pervious Areas		0	0
	Impervious Areas (List)			
	<i>Unconnected impervious</i>	98	0	0
<i>Connected impervious</i>	98	0.14	14	
Subtotal for Impervious Areas			0.14	14
		Totals	0.14	14

* from Table 3.3

CN (weighted) : $\frac{\text{total product}}{\text{total area}} = \frac{14}{0.14} = 98$

Ia (weighted) : $\frac{5 \times \text{pervious area}}{\text{total area}} = \frac{5 \times 0}{0.14} = 0.0 \text{ mm}$

2. Time of Concentration

Channelisation Factor : C = 0.8 (from Table 4.2)

Catchment Length : L = 0.15 km (along drainage path)

Catchment Slope : Sc = 0.01 m/m (by equal area method)

Runoff Factor R : $\frac{CN}{200 - CN} = 0.96$

Time of Concentration : $t_c = 0.14 C L^{0.66} R^{-0.55} Sc^{-0.30} = 0.13 \text{ hrs}$

SCS Lag for HEC-HMS : $t_p = 2/3 t_c = 0.09 \text{ hrs}$

3. Soil Storage Parameter : $S = 10(CN-10) \times 25.4$

Total	=	5	mm
Pervious	=	0	mm
Impervious	=	5	mm

4. Average Recurrence Interval, ARI (yr) :

5. 24 hour Rainfall Depth, P₂₄ (mm), (from Appendix A)

6. Runoff Index, c* : $= \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$

7. Specific Peak Flow Rate, q*, (from Figure 5.1)

8. Peak Flow Rate, q_p : $= q^* A P_{24} \text{ (m}^3\text{/s)}$

9. Runoff Depth, Q₂₄ : $= \frac{(P_{24} - Ia)2}{(P_{24} - Ia) + S} \text{ (mm)}$

10. Runoff Volume, V₂₄ : $= 1000 \times Q_{24} A \text{ (m}^3\text{)}$

	Storm #1	Storm #2	Storm #3	Storm #4
ARI (yr)	1/3 * 2	2	5	100
P ₂₄ (mm)	25	75	120	185
c*	0.71	0.88	0.92	0.95
q* (m ³ /s)	0.034	0.163	0.165	0.167
q _p (m ³ /s)	0.0012	0.0171	0.0277	0.0433
Q ₂₄ (mm) Pervious	20	70	115	180
Q ₂₄ (mm) Impervious	21	70	115	180
V ₂₄ (m ³) Pervious	000	000	000	000
V ₂₄ (m ³) Impervious	029	098	161	252
V ₂₄ (m ³) Total	029	098	161	252

TP108 - SWALE DESIGN (POST-DEVELOPMENT SCENARIO)

Project: **CIAW** By: **AMT** Date: **02/15/2012**
 Location: **Haverstock Road (AS3)** Checked: **CBL** Date: **02/5/2012**

1. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (hectares)	Product of CN x Area
Waitemata clay, Class C Tuff, scoria, Class A	Pervious Areas (List)			
	Lawn, parks in good condition	74		0
	Parks, pasture in good condition	39		0
	Subtotal for Pervious Areas		0	0
	Impervious Areas (List)			
	Unconnected impervious	98	0	0
	Connected impervious	98	0.1036	10
	Subtotal for Impervious Areas		0.1036	10
Totals			0.1036	10

* from Table 3.3

$$\text{CN (weighted)} : \frac{\text{total product}}{\text{total area}} = \frac{10}{0.1036} = 98$$

$$\text{Ia (weighted)} : \frac{5 \times \text{pervious area}}{\text{total area}} = \frac{5 \times 0}{0.1036} = 0.0 \text{ mm}$$

2. Time of Concentration

Channelisation Factor : C = 0.8 (from Table 4.2)
 Catchment Length : L = 0.1 km (along drainage path)
 Catchment Slope : Sc = 0.01 m/m (by equal area method)
 Runoff Factor R : $\frac{\text{CN}}{200 - \text{CN}} = 0.96$

Time of Concentration : $t_c = 0.14 C L^{0.66} R^{-0.55} Sc^{-0.30} = 0.17 \text{ hrs}$
 SCS Lag for HEC-HMS : $t_p = 2/3 t_c = 0.11 \text{ hrs}$

3. Soil Storage Parameter : $S = (0/\text{CN}) - 10) * 25.4$

Total	=	5	mm
Pervious	=	0	mm
Impervious	=	5	mm

4. Average Recurrence Interval, ARI (yr) :

5. 24 hour Rainfall Depth, P₂₄ (mm), (from Appendix A)

6. Runoff Index, c* : $= \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$

7. Specific Peak Flow Rate, q*, (from Figure 5.1)

8. Peak Flow Rate, q_p : $= q^* A P_{24} \text{ (m}^3\text{/s)}$

9. Runoff Depth, Q₂₄ : $= \frac{(P_{24} - Ia)2}{(P_{24} - Ia) + S} \text{ (mm)}$

10. Runoff Volume, V₂₄ : $= 1000 \times Q_{24} A \text{ (m}^3\text{)}$

	Storm #1	Storm #2	Storm #3	Storm #4
ARI (yr)	1/3 *2	2	5	100
P ₂₄ (mm)	25	75	120	185
c*	0.71	0.88	0.92	0.95
q* (m³/s)	0.152	0.163	0.165	0.167
q _p (m³/s)	0.0039	0.0127	0.0205	0.0320
Q ₂₄ (mm)				
Pervious	20	70	115	180
Impervious	21	70	115	180
V ₂₄ (m³)				
Pervious	000	000	000	000
Impervious	021	073	119	186
Total	021	073	119	186

TP10 - SWALE SIZING DESIGN

Project: *CIAW* By: AMT Date: 02/15/2012
 Location: *Haverstock Road (AS3)* Checked: CBL Date: 02/5/2012

1. Swale Characteristics

Swale Base Width	b	=	1.5 m
Swale Grass Height	d _{grass}	=	0.15 m
Swale Bed Slope	S	=	1 in 50
Swale Side Slope (for d < 0.3 metres)	Z	=	1 in 4
Overbank Side Slope (for d > 0.3 metres)	Z	=	1 in 4
Total Swale Depth	d _{swale}	=	0.2 m
Swale Top Width	T	=	2.3 m

2. Swale Sizing

a). Flood Flow

1 in 100 AEP Flood Flow	Q ₁₀₀	=	0.032 m ³ /s	
Flow Retardance Class			C	
Flow Depth	D	=	0.102 m	
Flow Cross-sectional Area	A	=	0.19 m ²	
Hydraulic Radius	R	=	0.08 m	
Mannings Roughness Value	n	=	0.161	d>60mm
Flow Velocity	V	=	0.165 m/s	
Flow Velocity	V	=	0.167 m/s	
VR	VR	=	0.014 m ² /s	
	Q _{calc}	=	0.032 m ³ /s	

Swale sizing of sufficient capacity to contain 1 in 100 AEP Flood Flow

b). Erosion

1 in 5 AEP Flood Flow	Q ₅	=	0.021 m ³ /s	
Flow Retardance Class			E	
Flow Depth	D	=	0.088 m	
Flow Cross-sectional Area	A	=	0.16 m ²	
Hydraulic Radius	R	=	0.07 m	
Mannings Roughness Value	n	=	0.193	d>60mm
Flow Velocity	V	=	0.126 m/s	
Flow Velocity	V	=	0.128 m/s	
VR	VR	=	0.009 m ² /s	
	Q _{calc}	=	0.021 m ³ /s	
Maximum Flow Velocity Allowed			1.50 m/s	

Swale sizing sufficient as Flow Velocity < Maximum Flow Velocity Allowed

c). Stormwater Quality

1/3 of the 1 in 2 AEP Flood Flow	Q_{WQ}	=	0.004 m ³ /s	
Flow Retardance Class			D	
Average Grass Length			0.1 m	
Flow Depth	D	=	0.049 m	
Flow Cross-sectional Area	A	=	0.08 m ²	
Hydraulic Radius	R	=	0.04 m	
Mannings Roughness Value	n	=	0.331	d<60mm
Flow Velocity	V	=	0.047 m/s	
Flow Velocity	V	=	0.053 m/s	
VR	VR	=	0.002 m ² /s	
	Q _{calc}	=	0.004 m ³ /s	
Maximum Flow Velocity Allowed			0.80 m/s	
Hydraulic Residence Time	t	=	9.00 minutes	

Swale sizing sufficient as Flow Velocity < Maximum Flow Velocity Allowed

Swale sizing sufficient as Flow Depth < 2 x Average Grass Length

Required Swale Length for full Water Quality Treatment, L = 29 m

d). Safety

1 in 2 AEP Flood Flow	Q_2	=	0.013 m ³ /s	
Flow Retardance Class			D	
Flow Depth	D	=	0.077 m	
Flow Cross-sectional Area	A	=	0.14 m ²	
Hydraulic Radius	R	=	0.07 m	
Mannings Roughness Value	n	=	0.227	d>60mm
Flow Velocity	V	=	0.091 m/s	
Flow Velocity	V	=	0.101 m/s	
VR	VR	=	0.006 m ² /s	
	Q _{calc}	=	0.014 m ³ /s	
VD	VD	=	0.007 m ² /s	
Maximum VD Allowed			0.4 m ² /s	

Swale safe for wading as VD < 0.4 m²/s

TP108 - SWALE DESIGN (POST-DEVELOPMENT SCENARIO)

Project: **CIAW** By: **AMT** Date: **02/15/2012**
 Location: **PS25 (AS6)** Checked: **CBL** Date: **03/5/2012**

1. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (hectares)	Product of CN x Area
Waitemata clay, Class C Tuff, scoria, Class A	Pervious Areas (List)			
	Lawn, parks in good condition	74		0
	Parks, pasture in good condition	39		0
	Subtotal for Pervious Areas		0	0
	Impervious Areas (List)			
	Unconnected impervious	98	0	0
	Connected impervious	98	0.1707	17
Subtotal for Impervious Areas		0.1707	17	
Totals			0.1707	17

* from Table 3.3

CN (weighted) : $\frac{\text{total product}}{\text{total area}} = \frac{17}{0.1707} = 98$

Ia (weighted) : $\frac{5 \times \text{pervious area}}{\text{total area}} = \frac{5 \times 0}{0.1707} = 0.0 \text{ mm}$

2. Time of Concentration

Channelisation Factor : C = 0.8 (from Table 4.2)

Catchment Length : L = 0.1 km (along drainage path)

Catchment Slope : Sc = 0.01 m/m (by equal area method)

Runoff Factor R : $\frac{CN}{200 - CN} = 0.96$

Time of Concentration : $t_c = 0.14 C L^{0.66} R^{-0.55} Sc^{-0.30} = 0.17 \text{ hrs}$

SCS Lag for HEC-HMS : $t_p = 2/3 t_c = 0.11 \text{ hrs}$

3. Soil Storage Parameter : $S = (10/CN) - 10 \times 25.4$

Total	=	5	mm
Pervious	=	0	mm
Impervious	=	5	mm

4. Average Recurrence Interval, ARI (yr) :

5. 24 hour Rainfall Depth, P₂₄ (mm), (from Appendix A)

6. Runoff Index, c* : $= \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$

7. Specific Peak Flow Rate, q*, (from Figure 5.1)

8. Peak Flow Rate, q_p : $= q^* A P_{24} \text{ (m}^3\text{/s)}$

9. Runoff Depth, Q₂₄ : $= \frac{(P_{24} - Ia)2}{(P_{24} - Ia) + S} \text{ (mm)}$

10. Runoff Volume, V₂₄ : $= 1000 \times Q_{24} A \text{ (m}^3\text{)}$

	Storm #1	Storm #2	Storm #3	Storm #4
ARI (yr)	1/3 *2	2	5	100
P ₂₄ (mm)	26.6666667	80	130	190
c*	0.72	0.89	0.93	0.95
q* (m ³ /s)	0.152	0.163	0.165	0.167
q _p (m ³ /s)	0.0069	0.0223	0.0366	0.0542
Q ₂₄ (mm)				
Pervious	22	75	125	185
Impervious	22	75	125	185
V ₂₄ (m ³)				
Pervious	000	000	000	000
Impervious	038	128	213	316
Total	038	128	213	316

TP10 - SWALE SIZING DESIGN

Project: *CIAW* By: AMT Date: 02/15/2012
Location: *PS25 (AS6)* Checked: CBL Date: 03/5/2012

1. Swale Characteristics

Swale Base Width	b	=	1.5 m
Swale Grass Height	d_{grass}	=	0.15 m
Swale Bed Slope	S	=	1 in 50
Swale Side Slope (for d < 0.3 metres)	Z	=	1 in 4
Overbank Side Slope (for d > 0.3 metres)	Z	=	1 in 4
Total Swale Depth	d_{swale}	=	0.25 m
Swale Top Width	T	=	2.5 m

2. Swale Sizing

a). Flood Flow

1 in 100 AEP Flood Flow	Q_{100}	=	0.054 m ³ /s	
Flow Retardance Class			C	
Flow Depth	D	=	0.121 m	
Flow Cross-sectional Area	A	=	0.24 m ²	
Hydraulic Radius	R	=	0.10 m	
Mannings Roughness Value	n	=	0.131	d>60mm
Flow Velocity	V	=	0.226 m/s	
Flow Velocity	V	=	0.226 m/s	
VR	VR	=	0.022 m ² /s	
	Qcalc	=	0.054 m ³ /s	

b). Erosion

1 in 5 AEP Flood Flow	Q_5	=	0.037 m ³ /s	
Flow Retardance Class			E	
Flow Depth	D	=	0.107 m	
Flow Cross-sectional Area	A	=	0.21 m ²	
Hydraulic Radius	R	=	0.09 m	
Mannings Roughness Value	n	=	0.151	d>60mm
Flow Velocity	V	=	0.177 m/s	
Flow Velocity	V	=	0.184 m/s	
VR	VR	=	0.015 m ² /s	
	Qcalc	=	0.038 m ³ /s	
Maximum Flow Velocity Allowed			1.50 m/s	

Swale sizing sufficient as Flow Velocity < Maximum Flow Velocity Allowed

c). Stormwater Quality

1/3 of the 1 in 2 AEP Flood Flow	Q_{WQ}	=	0.007 m ³ /s	
Flow Retardance Class			D	
Average Grass Length			0.1 m	
Flow Depth	D	=	0.060 m	
Flow Cross-sectional Area	A	=	0.11 m ²	
Hydraulic Radius	R	=	0.05 m	
Mannings Roughness Value	n	=	0.309	d<60mm
Flow Velocity	V	=	0.066 m/s	
Flow Velocity	V	=	0.064 m/s	
VR	VR	=	0.003 m ² /s	
	Q_{calc}	=	0.007 m ³ /s	
Maximum Flow Velocity Allowed			0.80 m/s	
Hydraulic Residence Time	t	=	9.00 minutes	

Swale sizing sufficient as Flow Velocity < Maximum Flow Velocity Allowed

Swale sizing sufficient as Flow Depth < 2 x Average Grass Length

Required Swale Length for full Water Quality Treatment, L = 35 m

d). Safety

1 in 2 AEP Flood Flow	Q_2	=	0.022 m ³ /s	
Flow Retardance Class			D	
Flow Depth	D	=	0.090 m	
Flow Cross-sectional Area	A	=	0.17 m ²	
Hydraulic Radius	R	=	0.07 m	
Mannings Roughness Value	n	=	0.186	d>60mm
Flow Velocity	V	=	0.132 m/s	
Flow Velocity	V	=	0.135 m/s	
VR	VR	=	0.010 m ² /s	
	Q_{calc}	=	0.022 m ³ /s	
VD	VD	=	0.012 m ² /s	
Maximum VD Allowed			0.4 m ² /s	

Swale safe for wading as VD < 0.4 m²/s

TP108 - SWALE DESIGN (POST-DEVELOPMENT SCENARIO)

Project: **CIAW** By: **AMT** Date: **02/15/2012**
 Location: **Mangere PS (WS3)** Checked: **CBL** Date: **03/5/2012**

1. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (hectares)	Product of CN x Area
Waitemata clay, Class C Tuff, scoria, Class A	Pervious Areas (List)			
	Lawn, parks in good condition	74		0
	Parks, pasture in good condition	39		0
	Subtotal for Pervious Areas		0	0
	Impervious Areas (List)			
	Unconnected impervious	98	0	0
Connected impervious	98	0.702	69	
Subtotal for Impervious Areas		0.702	69	
Totals			0.702	69

* from Table 3.3

$$\text{CN (weighted)} : \frac{\text{total product}}{\text{total area}} = \frac{69}{0.702} = 98$$

$$\text{Ia (weighted)} : \frac{5 \times \text{pervious area}}{\text{total area}} = \frac{5 \times 0}{0.702} = 0.0 \text{ mm}$$

2. Time of Concentration

Channelisation Factor : C = 0.8 (from Table 4.2)

Catchment Length : L = 0.1 km (along drainage path)

Catchment Slope : Sc = 0.01 m/m (by equal area method)

Runoff Factor R : $\frac{\text{CN}}{200 - \text{CN}} = 0.96$

Time of Concentration : $t_c = 0.14 C L^{0.66} R^{-0.55} Sc^{-0.30} = 0.17 \text{ hrs}$

SCS Lag for HEC-HMS : $t_p = 2/3 t_c = 0.11 \text{ hrs}$

3. Soil Storage Parameter : $S = (10/\text{CN}) - 10) * 25.4$

Total	=	5	mm
Pervious	=	0	mm
Impervious	=	5	mm

	Storm #1	Storm #2	Storm #3	Storm #4	
4. Average Recurrence Interval, ARI (yr) :	1/3 * 2	2	5	100	
5. 24 hour Rainfall Depth, P ₂₄ (mm), (from Appendix A)	25	75	125	180	
6. Runoff Index, c* :	0.71	0.88	0.92	0.95	
7. Specific Peak Flow Rate, q*, (from Figure 5.1)	0.152	0.163	0.165	0.167	
8. Peak Flow Rate, q _p :	0.0267	0.0858	0.1448	0.2110	
9. Runoff Depth, Q ₂₄ :					
	(mm)				
10. Runoff Volume, V ₂₄ :					
	(m ³)				
	Pervious	20	70	120	175
	Impervious	21	70	120	175
	Pervious	000	000	000	000
	Impervious	145	492	843	1,228
	Total	145	492	843	1,228

TP10 - SWALE SIZING DESIGN

Project: *CIAW* By: AMT Date: 02/15/2012
Location: Mangere PS (WS3) Checked: CBL Date: 03/5/2012

1. Swale Characteristics

Swale Base Width	b	=	2.0 m
Swale Grass Height	d _{swale}	=	0.15 m
Swale Bed Slope	S	=	1 in 50
Swale Side Slope (for d < 0.3 metres)	Z	=	1 in 4
Overbank Side Slope (for d > 0.3 metres)	Z	=	1 in 4
Total Swale Depth	d _{swale}	=	0.3 m
Swale Top Width	T	=	3.2 m

2. Swale Sizing

a). Flood Flow

1 in 100 AEP Flood Flow	Q ₁₀₀	=	0.211 m ³ /s	
Flow Retardance Class			C	
Flow Depth	D	=	0.175 m	d>60mm
Flow Cross-sectional Area	A	=	0.47 m ²	
Hydraulic Radius	R	=	0.14 m	
Mannings Roughness Value	n	=	0.084	
Flow Velocity	V	=	0.445 m/s	
Flow Velocity	V	=	0.448 m/s	
VR	VR	=	0.061 m ² /s	
	Q _{calc}	=	0.211 m ³ /s	

Swale sizing of sufficient capacity to contain 1 in 100 AEP Flood Flow

b). Erosion

1 in 5 AEP Flood Flow	Q ₅	=	0.145 m ³ /s	
Flow Retardance Class			E	
Flow Depth	D	=	0.155 m	d>75mm
Flow Cross-sectional Area	A	=	0.41 m ²	
Hydraulic Radius	R	=	0.12 m	
Mannings Roughness Value	n	=	0.097	
Flow Velocity	V	=	0.356 m/s	
Flow Velocity	V	=	0.361 m/s	
VR	VR	=	0.044 m ² /s	
	Q _{calc}	=	0.146 m ³ /s	
Maximum Flow Velocity Allowed			1.50 m/s	

Swale sizing sufficient as Flow Velocity < Maximum Flow Velocity Allowed

c). Stormwater Quality

1/3 of the 1 in 2 AEP Flood Flow	Q_{WQ}	=	0.027 m ³ /s	
Flow Retardance Class			D	
Average Grass Length			0.15 m	
Flow Depth	D	=	0.088 m	d>60mm
Flow Cross-sectional Area	A	=	0.21 m ²	
Hydraulic Radius	R	=	0.08 m	
Mannings Roughness Value	n	=	0.192	
Flow Velocity	V	=	0.129 m/s	
Flow Velocity	V	=	0.132 m/s	
VR	VR	=	0.010 m ² /s	
	Qcalc	=	0.027	
Maximum Flow Velocity Allowed			0.80 m/s	
Hydraulic Residence Time	t	=	9.00 minutes	

Swale sizing sufficient as Flow Velocity < Maximum Flow Velocity Allowed

Swale sizing sufficient as Flow Depth < 2 x Average Grass Length

Required Swale Length for full Water Quality Treatment, L = 71 m

d). Safety

1 in 2 AEP Flood Flow	Q_2	=	0.086 m ³ /s	
Flow Retardance Class			D	
Flow Depth	D	=	0.115 m	d>60mm
Flow Cross-sectional Area	A	=	0.28 m ²	
Hydraulic Radius	R	=	0.10 m	
Mannings Roughness Value	n	=	0.0964	
Flow Velocity	V	=	0.303 m/s	
Flow Velocity	V	=	0.308 m/s	
VR	VR	=	0.029 m ² /s	
	Qcalc	=	0.086	
VD	VD	=	0.035 m ² /s	
Maximum VD Allowed			0.4 m ² /s	

Swale safe for wading as VD < 0.4 m²/s