Auckland Unitary Plan Operative in part

Plan Change 43 (Private): McLaughlin's Quarry

Operative 12 November 2021

Enclosed:

- Public Notice
- Seal page
- Clause 20A
- Operative version

Public Notice

Auckland Unitary Plan

Auckland Unitary Plan - Plan Change to become operative

Plan Change 43 (Private) - McLaughlin's Quarry

At its meeting on 30 September the council resolved to approve the above plan change to the Auckland Unitary Plan following the completion of the statutory processes.

The operative date is 12 November.

The updated district plan and background information may be viewed at the following www.aucklandcouncil.govt.nz/planchanges

Dated 5 November 2021

Find out more: phone 09 301 0101 or visit aucklandcouncil.govt.nz

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Seal Page

Auckland Unitary Plan
Plan Change 43 (Private): McLaughlin's Quarry

THE COMMON SEAL of the **AUCKLAND COUNCIL** was hereby affixed under the authority of council:

~~Mayor / Deputy Mayor~~ / Chief Executive / ~~Chief Officer~~

~~Deputy Mayor / Chief Executive / Chief Officer~~ / General Counsel

This plan change became operative on 12 November 2021.

Clause 20A

Memo

Date 21 October 2021

To: Celia Davison – Manager Planning - Central/South

From: Craig Cairncross – Team Leader - Central/South

Subject: **Plan Modification: Clause 20A modification to Auckland Unitary Plan**

Corrections are required to the Auckland Unitary Plan (Operative in Part) 2016 (the AUP).

I seek your approval of this plan modification pursuant to clause 20A, first schedule, Resource Management Act 1991.

You have delegated authority, as a tier four manager, to make a decision to correct an error to an operative plan under clause 20A. Schedule 2A of the Auckland Council Combined Chief Executives Delegation Register[1] authorises all powers, functions, and duties under RMA's first schedule (except clause 17 which cannot be delegated) to tier four positions.

Rule or Section of Unitary Plan	I444 Wiri Precinct
Subject Site (if applicable)	N/A
Legal Description (if applicable)	N/A
Nature of change	A Clause 20A modification is required to correct a number of minor errors in Chapter I444 in the AUP. **Discussion** Numbering errors detected in Chapter I444. This is not consistent with the Auckland Unitary Pan numbering format.
Effect of change	The change is minor in nature. The amendment does not change the application or intent of the provisions but rather it ensures the correct administering of the plan as was originally intended. There is no effect nor impact upon either the environment or persons.
Changes required to be made (text/in-text diagrams)	Amend Chapter I444 in the Operative in Part version. Refer to highlighted changes in **Attachment 1.**
Changes required to be made (maps)	N/A
Attachments	Attachment 1: List of changes

[1] updated February 2021 and available on Kotahi at *Delegation Register*

Prepared by: Craig Cairncross Team Leader - Central/South	**Text Entered by:** Sarah El Karamany Planning Technician
Signature: 	**Signature:** 
Maps prepared by: N/A Geospatial Analyst	**Reviewed by:** Craig Cairncross Team Leader - Central/South
Signature:	**Signature:** 
Decision: I agree/disagree to authorise the Clause 20A modification using my delegated authority Celia Davison Manager Planning - Central/South Date: 9 November 2021	
Signature: 	

Attachment 1: List of changes

Amend Table numbering to be consistent with AUP chapter formatting.

Table I444.4.1 Activity table [rp/dp]

Activity		Activity status		
		Sub-precinct A	**Sub-precinct B**	**Sub-precinct C**
Activities				
(A1)	Activities sensitive to hazardous facilities and infrastructure (excluding dwellings and integrated residential development in sub-precinct A)	NC	NC	NC
(A~~1~~-~~1~~2)	Dwellings and integrated residential development in sub-precinct A	PR		
(A~~1~~-~~2~~3)	Commerical sexual services	NC	NC	NC
Reclamation				
(A~~2~~4)	Reclamation of intermittent stream shown in the Wiri Precinct Plan 3 – Location of Intermittent Stream Refer to Note 1		D	
Development				
(A~~3~~5)	New buildings	P	C	D
(A~~5~~6)	Activities that do not comply with the following Standards: (i) Standard I444.6.2 Building platform	D	D	D
(A~~6~~7)	Activities that do not comply with the following Standards: (i) Standard I444.6.1 Building height (ii) Standard I444.6.5 Planting of Riparian margin areas (iii) Standard I444.6.6 Planting of Wetland margin areas (iv) Standard I444.6.7 Archaeological Management Plan		D	D
(A~~7~~8)	Buildings that do not comply with Standard I444.6.3 Pūkaki Marae – Matukutūreia viewshaft	NC		
(A~~8~~9)	Activities that do not comply with Standard I444.6.4 Archaeological sites	NC	NC	NC

Amend Table number to be consistent with AUP chapter formatting.

I444.6.3. Pūkaki Marae – Matukutūreia Viewshaft

Purpose: to protect the visual integrity of the local viewshaft from Pūkaki Marae to Maunga Matukutūreia to maintain a visual linkage and connection with Ngā Matukurua.

(1) Buildings and structures within sub-precinct A must not penetrate the floor height of the Wiri Precinct viewshaft identified in Precinct Plan 2 - Pūkaki Marae – Matukutūreia Viewshaft.

Note: the floor of the viewshaft is determined in accordance with the survey coordinates contained in Table I444.6.3.1 below and Precinct Plan 3 - Pūkaki Marae – Matukutūreia Viewshaft, and "height" is to be measured using the rolling height method.

Table I444.6.3.1 Schedule of Coordinates

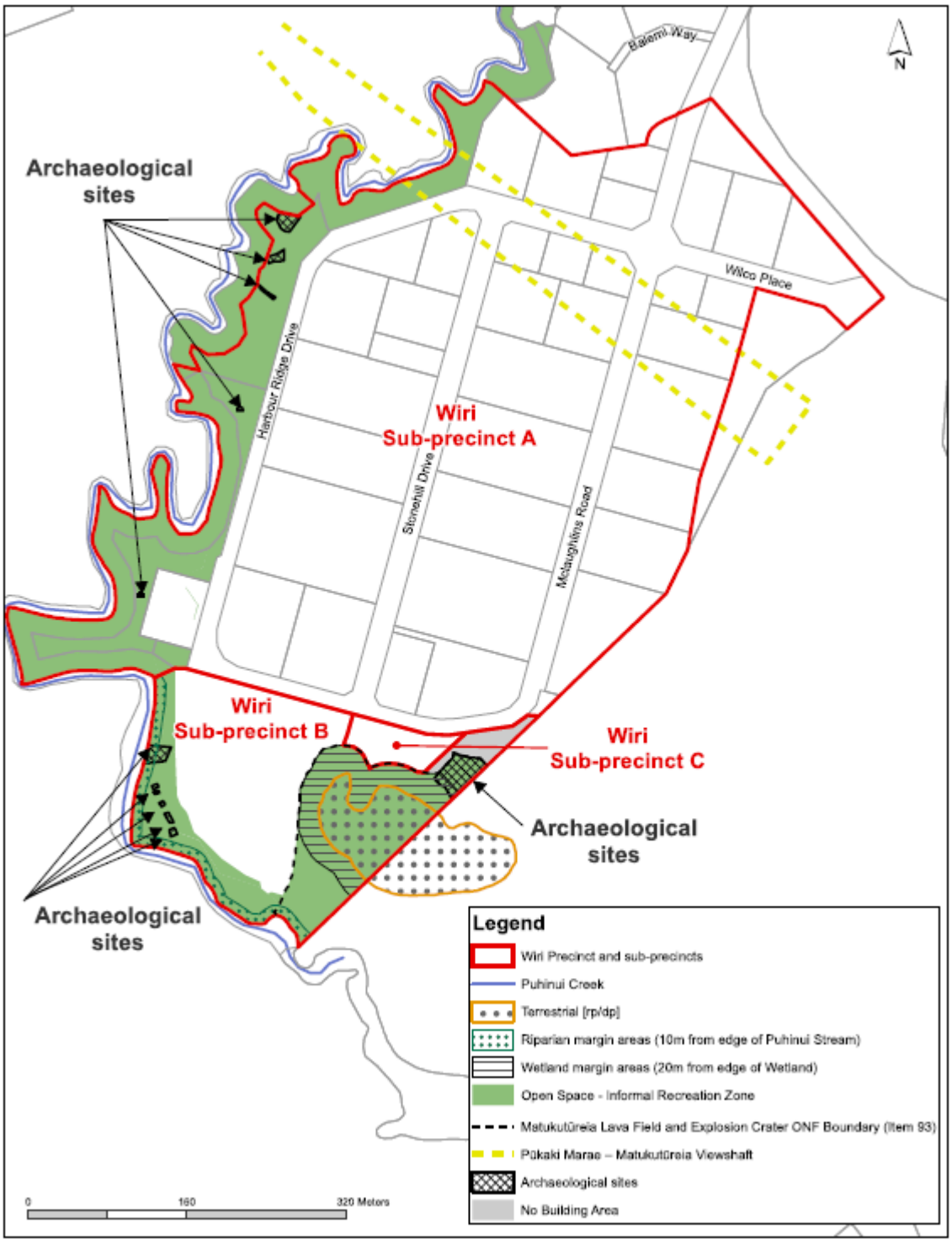
PT	Mt Eden circuit		Height (AGL)	NZ Map Grid	
	Northing	Easting		Northing	Easting
IS1	787316.27	404106.31	9.29	5904259.71	1761093.45
IS2	787333.30	404183.63	9.53	5904275.30	1761171.07
3	785179.79	407301.46	54.48	5902064.32	1764248.53
4	785119.81	407259.67	54.33	5902005.13	1764205.64
5	785684.81	406505.35	43.30	5902584.03	1763461.89

Amend numbering to be consistent with AUP chapter formatting.

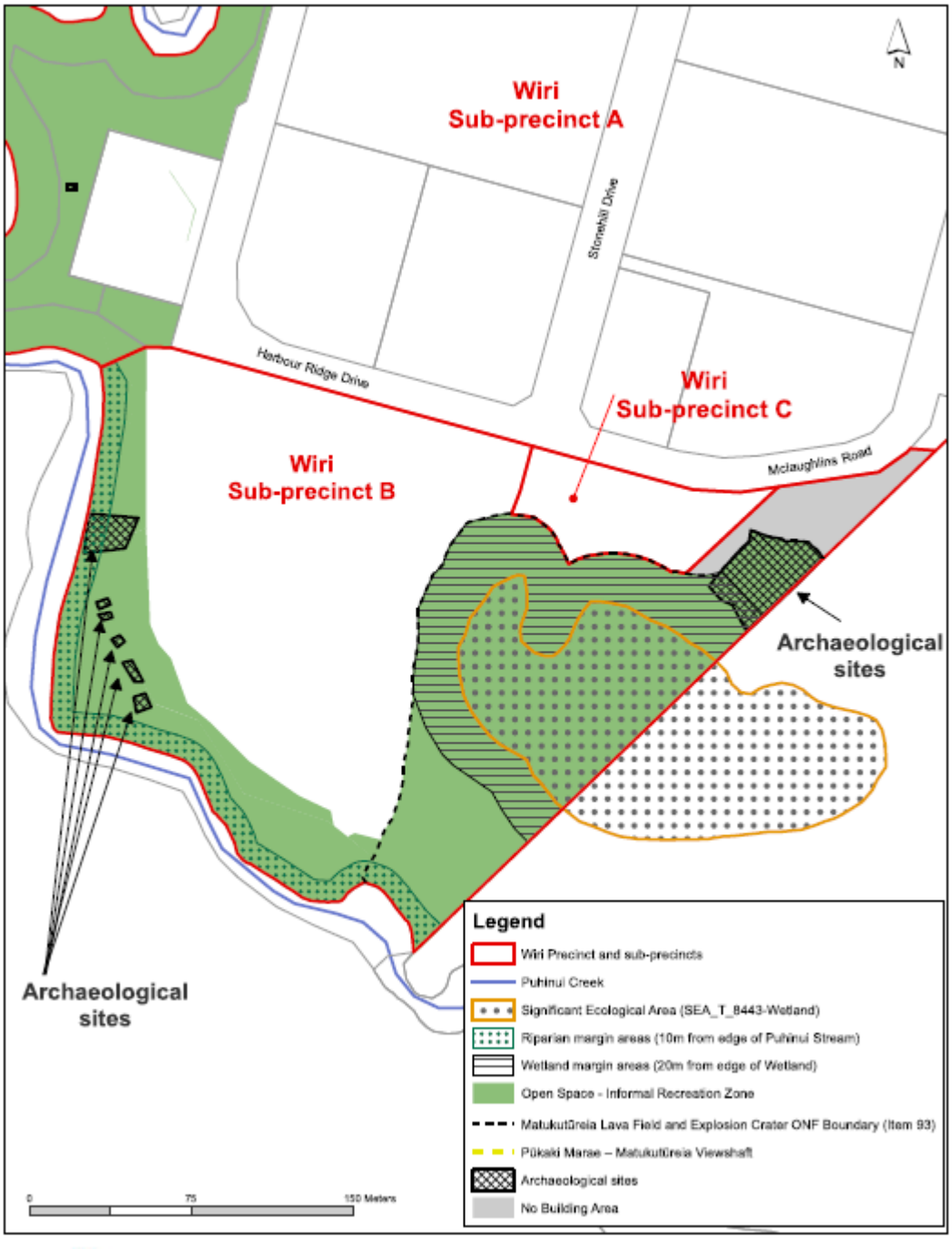
I444.9. Precinct plans

I444.9.1. Wiri Precinct Plan 1

I444.9.1.1. Wiri Precinct Plan 1: Figure 1



I444.9.1.2. Wiri Precinct Plan 1: Figure 2


Wiri
Sub-precinct A
Stonehill Drive
Harbour Ridge Drive
Wiri
Sub-precinct C
Mclaughlins Road
Wiri
Sub-precinct B
Archaeological
sites
Archaeological
sites
N
Legend
Wiri Precinct and sub-precincts
Puhinui Creek
Significant Ecological Area (SEA_T_8443-Wetland)
Riparian margin areas (10m from edge of Puhinui Stream)
Wetland margin areas (20m from edge of Wetland)
Open Space - Informal Recreation Zone
Matukutūreia Lava Field and Explosion Crater ONF Boundary (Item 93)
Pūkaki Marae – Matukutūreia Viewshaft
Archaeological sites
No Building Area
0
75
150 Meters

Operative version

I444. Wiri Precinct

I444.1. Precinct Description

The Wiri Precinct is located in the Wiri Industrial Area and is the site of the former McLaughlins Quarry. By 2009, all quarrying activities had ceased. Prior to 12 November 2021, Wiri Precinct was zoned Special Purpose – Quarry Zone, and the area within sub-precinct A, comprising the rehabilitated quarry floor, had already been developed for industrial activities in accordance with approved resource consents.

The Wiri Precinct is bounded by Puhinui Creek along the southern and western boundaries, with Maunga Matukutūreia (McLaughlins Mountain) and the Matukuturua Stonefields adjoining the eastern boundary.

The purpose of the Wiri Precinct is to enable the continued use of sub-precinct A area for industrial activities, and to enable the establishment of new industrial activities in the remainder of the Wiri Precinct (sub-precincts B and C), while recognising the important cultural, ecological, and geological values present with the precinct.

The Wiri Precinct adjoins the Heavy Industry zoning applied to the wider Wiri Industrial area, contributing to the importance of Wiri as an industrial hub in the urban south area of Auckland.

Open Space – Informal Recreation Zone is applied to the land along the margins of Puhinui Creek and all of the mapped extent of the Matukuturua Lava Field and Explosion Crater Outstanding Natural Feature within the Precinct.

Mana Whenua cultural landscape and values

The Wiri area and the Puhinui peninsula reveal a complex but unique cultural environment of inter-related settlements, travel routes, and fishing, gardening and food and resource gathering areas all closely associated with a series of prominent natural features and waterways that together form an integral part of the stories, genealogy, mythology and histories of Mana Whenua.

Matukutūreia and Matukuturua are natural landmarks and terraced pā sites that were occupied by the ancestors of Te Ākitai Waiohua. The ‘twin’ maunga of Wiri are known collectively as Ngaa Matukurua or ‘the two bitterns’. The surrounding land was cultivated with kumara and food gardens, parts of which are sectioned off with stone walls as found in the Matukuturua Stonefields. Puhinui Creek and Stream were used for travel and to supplement fresh water sources, a traditional fish trap is evident in the creek.

Matukutūreia can clearly be seen from Pūkaki Marae, and preservation of this volcanic viewshaft is a priority to Te Ākitai Waiohua in the future development of Wiri. The significance of the relationship between the maunga, Puhinui Creek and Stream, and the Manukau Harbour as a physical link to the histories and whakapapa of Te Ākitai Waiohua is also important. Cultural values to be protected encompass the history, spiritual, geological, the coastal, archaeological and ecological features within the precinct.

Natural environment

The western and southern boundary of the precinct follows the Puhinui Creek, which flows into the Manukau Harbour, both of which are Significant Ecological Areas. In recognition of these receiving environments, the Wiri Precinct applies the Open Space – Informal Recreation Zone to the land along the margins of Puhinui Creek. Within sub-precinct A, the riparian margin areas have been revegetated and vested in Auckland Council ownership. Within sub-precinct B, the riparian margins of Puhinui Creek are to be enhanced through native vegetation planting.

Sub-precinct A

Sub-precinct A is located on the footprint of the backfilled quarry. This area has been subdivided to enable the establishment of industrial land uses.

The northern portion of sub-precinct A contains a precinct viewshaft from Pūkaki Marae to Maunga Matukutūreia to maintain a visual linkage and connection with Ngā Matukurua.

Sub-precinct B

Sub-precinct B contains an explosion crater which is an important geological feature being part of Outstanding Natural Feature 93 (Matukutūreia and Matukuturua lava field and explosion crater). Contained within the explosion crater is a wetland, which is identified as a Significant Ecological Area (ID SEA_T_8443). Half of the wetland is located within sub-precinct B, and the other half is located within the adjoining Matukuturua Stonefield site. An Open Space – Informal Recreation Zone has been applied to the Outstanding Natural Feature, its margins and the SEA. This is to assist in ensuring the continued protection in recognition of the important cultural, ecological and geological values.

Sub-precinct C

Sub-precinct C is a small area located between Harbour Ridge Drive to the north and the large wetland (described within sub-precinct B) to the south. Sub-precinct C seeks to deliver development that is sympathetic to and integrates with the Open Space – Informal Recreation Zone adjoining it.

I444.2. Objectives [rp/dp]

(1) The cultural, spiritual and historic values held by Mana Whenua and their relationships associated with the māori cultural landscape (set out in Map 14.9.5) are recognised, and the identified values (set out in Policy 10) are protected or enhanced.

(2) The natural character and ecological values of Puhinui Creek and wetland (SEA_T_8443) are maintained and enhanced.

(3) New buildings within the Wiri sub-precincts B and C are located and designed in a manner that reflects the relationship of these sub-precincts to the surrounding open space, geological and cultural environment.

All relevant overlay, Auckland-wide and zone objectives apply in this precinct in addition to those specified above.

I444.3. Policies [rp/dp]

(1) Protect the visual integrity of the Wiri Precinct viewshaft from Pūkaki Marae to Matukutūreia to maintain a visual linkage and connection with Ngā Matukurua.

(2) Require planting of native vegetation along the riparian margins of Puhinui Creek.

(3) Require planting of appropriate vegetation within the wetland margin areas (of SEA_T_8443) having regard to the wetland's hydrological and ecological functions, and the status of the wetland as an Outstanding Natural Feature.

(4) Apply the Open Space – Informal Recreation Zone to the Outstanding Natural Feature 93 (Matukutūreia and Matukuturua lava field and explosion crater) to ensure its continued protection in recognition of its important cultural, ecological and geological values.

(5) Require open space areas to adjoin Puhinui Creek to ensure accessibility to the Puhinui Creek environment.

(6) Within sub-precincts B and C require development to take into account the surrounding Open Space – Informal Recreation Zone (including the Outstanding Natural Feature 93 (Matukutūreia and Matukuturua lava field and explosion crater and SEA_T_8443), Puhinui Creek), identified archaeological sites in Wiri Precinct Plan 1) and māori cultural values, in the site layout, building design and landscaping.

(7) Within sub-precinct C, require a development of a land use activity type, scale, and built form (including building design, orientation and placement), that integrates with, and positively contributes to, the Open Space – Informal Recreation Zone adjoining it.

(8) Manage reverse sensitivity effects on the development and operation of the Wiri Oil Terminal by avoiding the establishment of dwellings and integrated residential development in sub-precinct A, and avoiding, remedying or mitigating the establishment of activities sensitive to hazardous facilities and infrastructure in sub-precincts A, B and C.

(9) Recognise, protect and enhance the cultural, spiritual and historical values and relationships associated with the māori cultural landscape at Wiri. These values include but are not limited to:

(a) Important sites, places and areas, waahi tapu and other taonga.

(b) Views and connections between Maunga Matukutūrei, Puhinui Stream and Manukau Harbour.

(c) Coastal edge and waterways.

(d) Freshwater quality.

(e) Mauri, particularly in relation to freshwater and coastal resources.

(10) Encourage the provision and enhancement of access for Mana Whenua to Puhinui Creek and its margins, particularly access to scheduled sites or features of for the purposes of Karakia, monitoring, customary purposes and ahi kaa roa.

All relevant overlay, Auckland-wide and zone policies apply in this precinct in addition to those specified above.

I444.4. Activity table [rp/dp]

All relevant overlay, Auckland-wide and zone activity tables apply in this precinct unless otherwise specified below.

Activity Table I444.4.1 specifies the activity status of land use and development activities pursuant to section 9(2) and section 9(3) of the Resource Management Act 1991, and activities in, on, under or over streams pursuant to section 13 of the Resource Management Act 1991.

Where 'NA' has been included in the activity status column, the activity is not applicable in that particular section of the activity table.

Table I444.4.1 Activity table [rp/dp]

Activity		**Activity status**		
		Sub-precinct A	**Sub-precinct B**	**Sub-precinct C**
Activities				
(A1)	Activities sensitive to hazardous facilities and infrastructure (excluding dwellings and integrated residential development in sub-precinct A)	NC	NC	NC
(A2)	Dwellings and integrated residential development in sub-precinct A	PR		
(A3)	Commerical sexual services	NC	NC	NC
Reclamation				
(A4)	Reclamation of intermittent stream shown in the Wiri Precinct Plan 3 – Location of Intermittent Stream Refer to Note 1		D	
Development				
(A5)	New buildings	P	C	D
(A6)	Activities that do not comply with the following Standards:	D	D	D

	(i) Standard I444.6.2 Building platform			
(A7)	Activities that do not comply with the following Standards: (i) Standard I444.6.1 Building height (ii) Standard I444.6.5 Planting of Riparian margin areas (iii) Standard I444.6.6 Planting of Wetland margin areas (iv) Standard I444.6.7 Archaeological Management Plan		D	D
(A8)	Buildings that do not comply with Standard I444.6.3 Pūkaki Marae – Matukutūreia viewshaft	NC		
(A9)	Activities that do not comply with Standard I444.6.4 Archaeological sites	NC	NC	NC

Note 1

No offset as set out in Chapter E3 Lakes, rivers, streams and wetlands will be required for the reclamation of the intermittent stream as this is deemed to be part of the revegetation of the Riparian Margin Areas and Wetland Margin Areas shown in Precinct Plan 1.

I444.5. Notification

(1) Any application for resource consent for an activity listed in Activity Table I444.4.1 above will be subject to the normal tests for notification under the relevant sections of the Resource Management Act 1991.

(2) When deciding who is an affected person in relation to any activity for the purpose of section 95E of the Resource Management Act 1991 the Council will give specific consideration to those persons listed in Rule C1.13(4).

I444.6. Standards

The overlay, Auckland-wide and zone standards apply in this precinct in addition to the following standards.

All permitted, controlled and restricted discretionary activities must comply with the following standards.

I444.6.1. Example standard

Purpose: to manage the effects of building height, including dominance, on the open space areas within Wiri sub-precinct B and to maintain the views from the summit of Maunga Matukutūreia to the Manukau Harbour.

(1) Buildings must not exceed the building height limits specified below:

	Maximum building height	**Maximum building roof height (in metres above sea level)**
Sub-precinct B	15m	RL 29
Sub-precinct C	9m	RL 24.5

I444.6.2. Building platform

Purpose: to ensure that buildings are not located within parts of the Wiri precinct that are identified as having important ecological, cultural and geological values which are sought to be protected, revegetated or enhanced.

(1) All buildings must be located outside the Open Space –Informal Recreation Zone areas and No Building Area identified in Wiri Precinct Plan 1.

I444.6.3. Pūkaki Marae – Matukutūreia Viewshaft

Purpose: to protect the visual integrity of the local viewshaft from Pūkaki Marae to Maunga Matukutūreia to maintain a visual linkage and connection with Ngā Matukurua.

(1) Buildings and structures within sub-precinct A must not penetrate the floor height of the Wiri Precinct viewshaft identified in Precinct Plan 2 - Pūkaki Marae – Matukutūreia Viewshaft.

Note: the floor of the viewshaft is determined in accordance with the survey coordinates contained in Table I444.6.3.1 below and Precinct Plan 3 - Pūkaki Marae – Matukutūreia Viewshaft, and “height” is to be measured using the rolling height method.

Table I444.6.3.1 Schedule of Coordinates

PT	Mt Eden circuit		Height (AGL)	NZ Map Grid	
	Northing	Easting		Northing	Easting
IS1	787316.27	404106.31	9.29	5904259.71	1761093.45
IS2	787333.30	404183.63	9.53	5904275.30	1761171.07
3	785179.79	407301.46	54.48	5902064.32	1764248.53
4	785119.81	407259.67	54.33	5902005.13	1764205.64
5	785684.81	406505.35	43.30	5902584.03	1763461.89

I444.6.4. Archaeological sites

Purpose: to enable the protection of identified archaeological sites within the Wiri Precinct.

(1) Any activity (including earthworks) must not be undertaken within the areas identified as archaeological sites in Precinct Plan 1.

I444.6.5. Planting of Riparian margin areas

Purpose: to achieve areas of continuous indigenous vegetation within the riparian margin areas taking into account restoration of riparian margins, extension of existing ecological corridors and enhancement of existing vegetation.

(1) As part of the first stage of development within sub-precinct B, areas identified as Riparian Margin Areas (excluding identified archaeological sites) in Wiri Precinct Plan 1 must be planted with locally sourced indigenous species in general accordance with Appendix 16 Guidelines for Native Vegetation Plantings.

I444.6.6. Planting of Wetland margin areas

Purpose: to achieve planting of appropriate vegetation within the wetland margin areas having regard to both the hydrological and ecological function of the wetland, and the status the wetland as an outstanding geological feature.

(1) As part of the first stage of development within sub-precinct B, areas identified as Wetland Margin Areas (excluding identified archaeological sites) in Wiri Precinct Plan 1 must be planted in accordance with a Wetland Margin Planting Plan prepared by an ecologist. The Wetland Margin Planting Plan must include appropriate indigenous wetland buffer species composition and densities for planting in the emergent, littoral and terrestrial zones and must be in general accordance with Appendix 16 Guidelines for Native Vegetation Plantings.

I444.6.7. Archaeological Management Plan

Purpose: to develop a management strategy for identified archaeological sites shown in Wiri to ensure their long term preservation.

(1) As part of the first stage of development within sub-precinct B or C, An Archaeological Management Plan must be prepared by an archaeologist, in consultation with mana whenua, council and Heritage New Zealand Pouhere Taonga.

I444.6.8. Stormwater treatment devices

Purpose: to ensure that the effects of stormwater runoff on the high value receiving environments are mitigated.

(1) Stormwater runoff from all impervious areas in sub-precinct B must be treated by stormwater management device(s) that meets the following standards:

(a) the device or system must be sized and designed in accordance with “Guidance Document 2017/001 Stormwater Devices in the Auckland Region (GD01)” or

(b) where alternative devices are proposed, the device must demonstrate it is designed to achieve equivalent level of contaminant or sediment removal

performance to that of “Guidance Document 2017/001 Stormwater Management Devices in the Auckland Region (GD01)”

I444.7. Assessment – controlled activities

I444.7.1. Matters of control

The Council will reserve its control to the following matters when assessing a controlled activity resource consent application.

(1) New buildings in sub-precinct B:

(a) Site layout

(b) Building design and appearance

(c) Landscaping

(d) Māori cultural values

(e) The matters set out in policy 7.

I444.7.2. Assessment criteria

The council will consider the relevant assessment criteria below for controlled activities.

(1) New buildings:

(a) The extent to which site layout and configuration:

(i) Integrates the development within the context of the open space environment forming part of sub-precinct B. The site layout and configuration should enhance relationship to Harbour Ridge Drive and the surrounding open space areas.

(ii) Enables passive surveillance of Harbour Ridge Drive and contributes to streetscape amenity.

(iii) Car parking areas are designed and located to ensure an attractive site layout, particularly when viewed from Harbour Ridge Drive and the open spaces.

(b) The extent to which design and external appearance of buildings

(i) modulates the mass of the buildings by incorporating transitional elements or the use of contrast (such as colour and materials), to reduce the apparent scale and bulk of the buildings.

(c) The extent to which landscaping design and planting:

(i) Complements and enhances the existing landscape character of the area.

(ii) Is used to provide visual softening of large buildings.

(iii) is used as a means to integrate the development within the context of the open space environment forming part of sub-precinct B.

(iv) is used to enhance the overall appearance of the development.

(d) The extent to which impacts of development on māori cultural values are avoided, remedied or mitigated:

(i) the ability to incorporate maatauranga māori and tikanga māori, recognising and providing for the outcomes articulated by Mana Whenua.

(ii) the incorporation of building design elements, art works, naming and historical information to reflect the values and relationship Mana Whenua have with the Puhinui area.

(iii) native landscaping, vegetation and design including removal and replanting.

(iv) minimising landform modification where practicable, and respecting the Māori cultural landscape values identified in Precinct Plan 5: Māori Cultural Landscape Values

(v) maintenance of views from Maunga Matukutūreia to the Manukau Harbour within the areas marked as “No Building Area” within Precinct Plan 1.

(e) Refer to Policy 7.

I444.8. Special information requirements

I444.8.1. Development or subdivision of land in sub-precincts B and C

(1) Planting and landscape plan:

A landscape plan must be submitted showing planting of the site. The landscape plan must include the following information:

(i) a schedule of plant species;

(ii) planting specifications including the number, size and location of individual trees and shrubs;

(iii) planting management plan, including weed management;

(iv) the location and design of public amenity features;

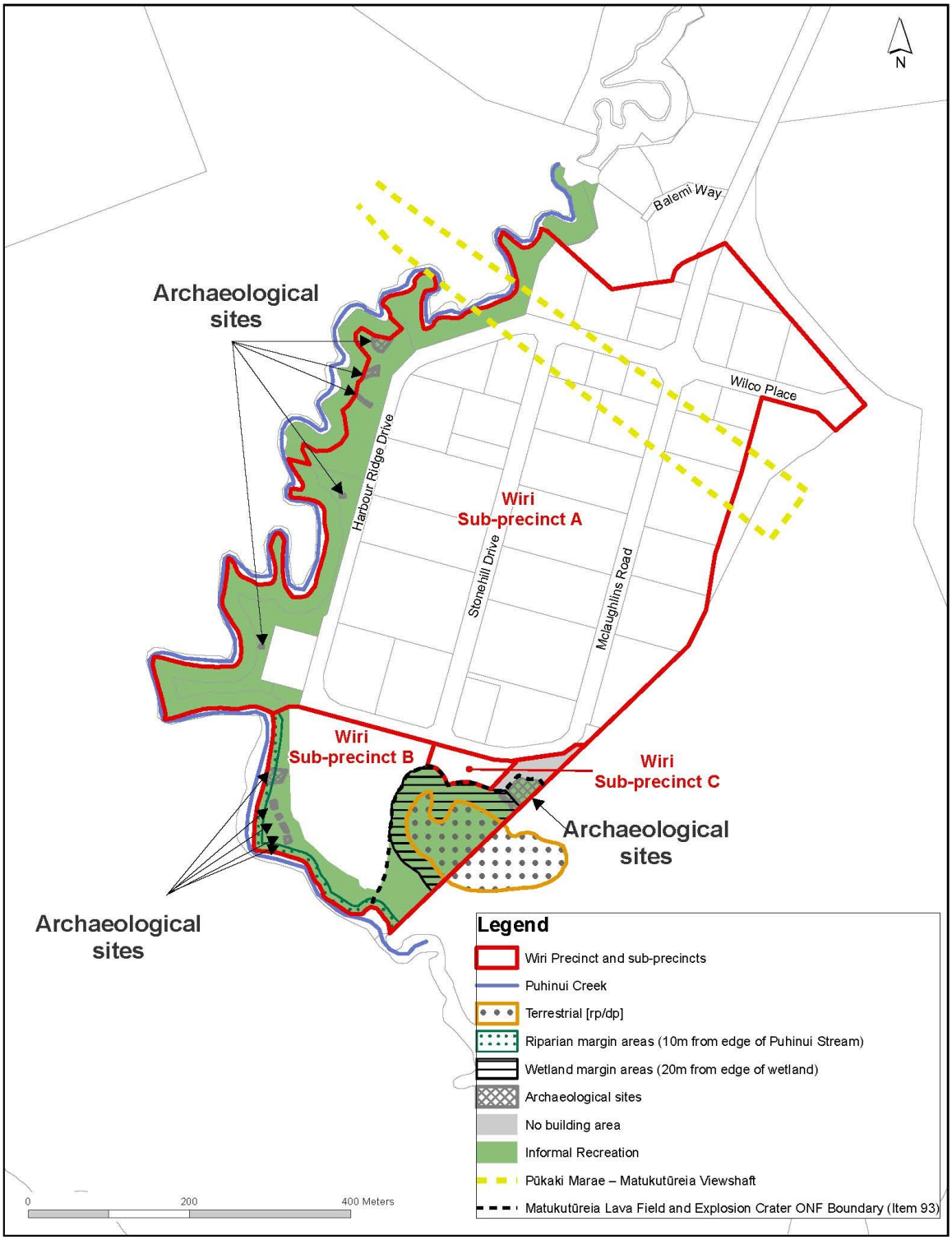
(v) retention and enhancement of native vegetation, existing significant trees and natural features and recognition of plant species once found within the site.

(2) Evidence of consultation with Kaitiaki / Mana Whenua in respect of new buildings proposed within sub-precincts B and C.

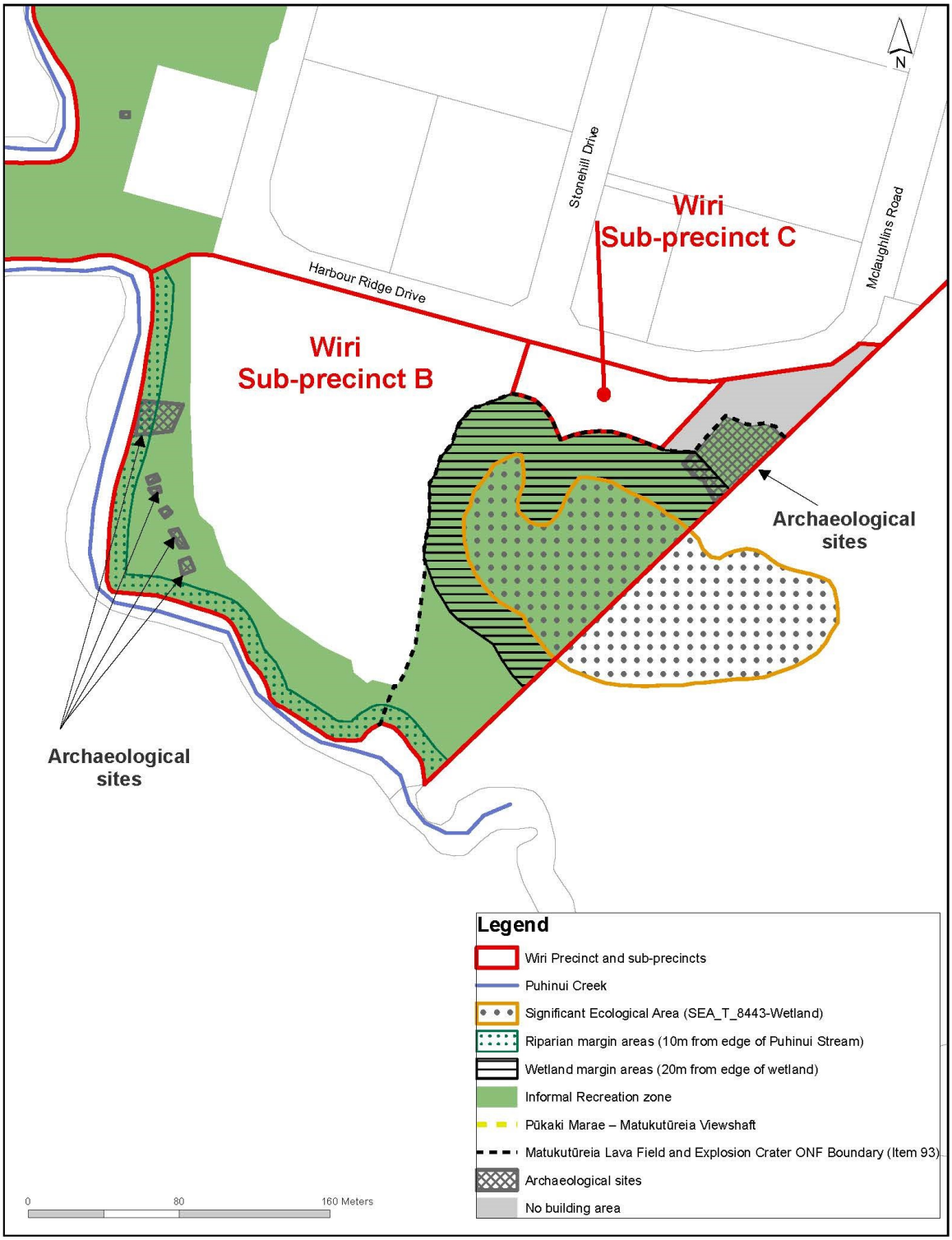
I444.9. Precinct plans

I444.9.1. Wiri Precinct Plan 1

I444.9.1.1. Wiri Precinct Plan 1: Figure 1

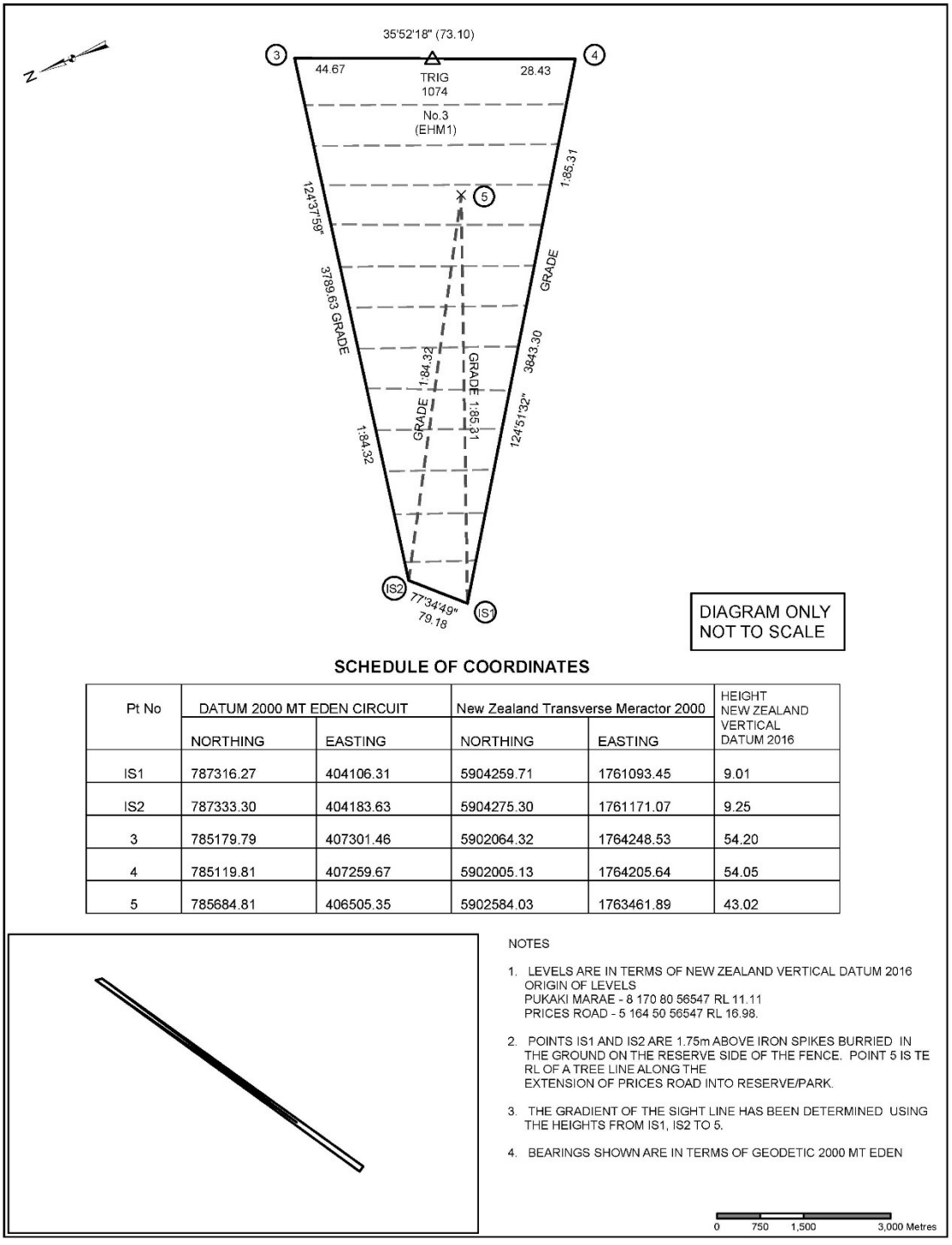


I444.9.1.2. Wiri Precinct Plan 1: Figure 2



I444.9.2. Wiri Precinct Plan 2 - Pūkaki Marae – Matukutūreia viewshaft

I444.9.3. Wiri Precinct Plan 3: Pūkaki Marae – Matukutūreia Viewshaft (survey diagram)



SCHEDULE OF COORDINATES

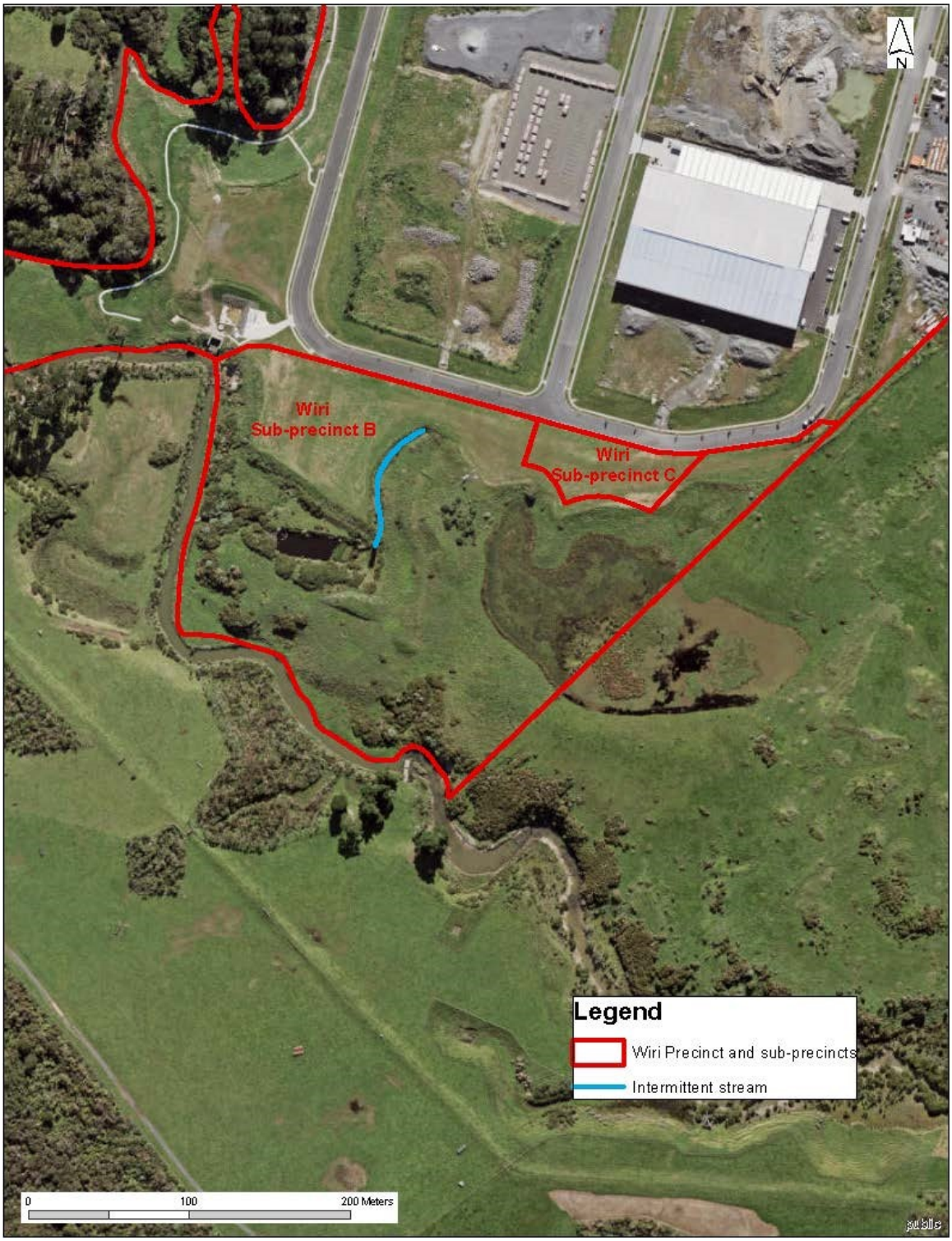
Pt No	DATUM 2000 MT EDEN CIRCUIT		New Zealand Transverse Meractor 2000		HEIGHT NEW ZEALAND VERTICAL DATUM 2016
	NORTHING	EASTING	NORTHING	EASTING	
IS1	787316.27	404106.31	5904259.71	1761093.45	9.01
IS2	787333.30	404183.63	5904275.30	1761171.07	9.25
3	785179.79	407301.46	5902064.32	1764248.53	54.20
4	785119.81	407259.67	5902005.13	1764205.64	54.05
5	785684.81	406505.35	5902584.03	1763461.89	43.02

NOTES

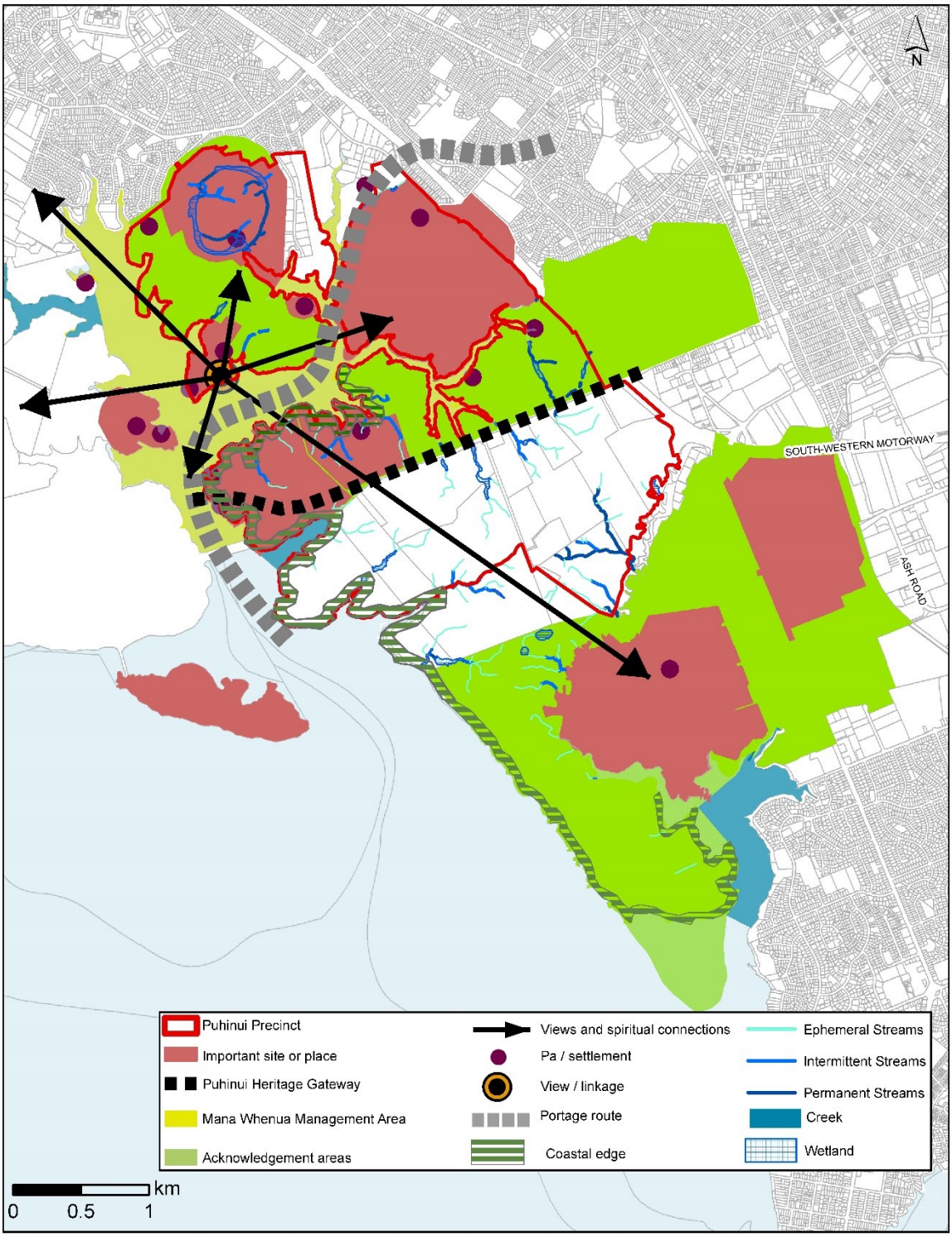
1. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016
   ORIGIN OF LEVELS
   PUKAKI MARAE - 8 170 80 56547 RL 11.11
   PRICES ROAD - 5 164 50 56547 RL 16.98.
2. POINTS IS1 AND IS2 ARE 1.75m ABOVE IRON SPIKES BURRIED IN THE GROUND ON THE RESERVE SIDE OF THE FENCE. POINT 5 IS TE RL OF A TREE LINE ALONG THE EXTENSION OF PRICES ROAD INTO RESERVE/PARK.
3. THE GRADIENT OF THE SIGHT LINE HAS BEEN DETERMINED USING THE HEIGHTS FROM IS1, IS2 TO 5.
4. BEARINGS SHOWN ARE IN TERMS OF GEODETIC 2000 MT EDEN

0 750 1,500 3,000 Metres

I444.9.4. Wiri Precinct Plan 4: Location of intermittent stream within sub-precinct B



I444.9.5. Wiri Precinct Plan 5: Māori Cultural Landscape Values



Schedule 6 Outstanding Natural Features Overlay Schedule [rcp/dp]

Introduction

The factors in B4.2.2(4) have been used to determine the features included in Schedule 6 Outstanding Natural Features Overlay Schedule, and will be used to assess proposed future additions to the schedule.

ID	Name	Location	Site type	Description	Unitary Plan criteria
2	Algies Beach melange	Algies Bay	E	This site is one of the best examples of an exposure of the contact between Northland Allocthon and Miocene Waitemata Group rocks.	a, b, g
3	Ambury Road lava cave	Mangere Bridge	F	A complex 140m long lava cave with two branches and many well-preserved flow features. Part of the cave contains unusual lava stalagmites with corresponding stalactites above.	a, b, c, d, g, i
4	Anawhata gorge and beach	Waitākere	A	This locality includes a combination of unmodified landforms, produced by the dynamic geomorphic processes of the Waitakere coast. Anawhata Beach is an exposed sandy beach, accumulated between dramatic rocky headlands. Inland from the beach, the Anawhata Stream has incised a deep gorge into the surrounding conglomerate rock.	a, c, e, g, i, l
5	Anawhata intrusion	Waitākere	E	A well-exposed, and unusual mushroom-shaped andesite intrusion in sea cliffs in a small embayment around rocks at the north side of Anawhata Beach.	a, b, g, l
6	Arataki volcanic breccia and sandstone	Titirangi	E	The best and most easily accessible exposure in the eastern Waitākere Ranges illustrating the interfingering nature of	a, c, l

				the coarse volcanic breccias from the Waitākere Volcano with the volcanic-poor Waitematā Basin sandstone and siltstones. Road cutting on south side of Scenic Drive.	
7	Auckland Domain Volcano	Parnell	V	Auckland Domain volcano consists of a large tuff ring about 700m in diameter, which extends between the Auckland War Memorial Museum and Auckland City Hospital. A central scoria cone, Pukekaroa, forms a knoll surrounded with alluvium (castle and moat) at the centre of the tuff ring. The adjoining Outhwaite Park scoria mound is associated with the neighbouring Grafton volcano. An accessible example of lithic tuff deposits from the volcano occurs in a natural cliff exposure about 300m north of the Domain duck pond. Features of note include Lovers Lane tuff exposure and a scoria cone lava bomb.	a, c, d, f, g, h, I, e
8	Auckland Grammar School lava exposures	Epsom	D	Two excellent exposures of a very thick lava unit from Mount Eden volcano areas located in the former prison quarry. The rock faces are up to 25m high and exhibit columnar jointing that formed as the lava cooled.	a, c, d, f, g
9	Barriball Road tuff ring and cone	Waiuku	A	This site is one of the larger and best-preserved tuff rings in the South Auckland basalt field. It has a diameter of approximately 1.8km, with Bald Hill forming a high point on the southern rim. A small scoria cone is preserved within the east side of the	a, c, d, e, g, i

				tuff ring.	
10	Beachlands fault	Pohutukawa Bay	B	Best exposure of a fault in the Auckland area that has been active during the Quaternary.	a, b, g, h
11	Beehive Island, Kawau Bay	Kawau Bay	B	This small 'old hat' island surrounded by large intertidal platform with contrasting white shell sand high tide beach is a landform of scientific/educational and scenic value.	a, c, e, g, i, l
12	Belmont Cliffs fault	Belmont	B	Belmont Cliffs Fault is a spectacular minor reverse fault clearly exposed in the cliff and on the shore platform, with associated flysch deposition.	a, c, g, i
13	Blockhouse Bay to Green Bay cliffs	Blockhouse Bay	D	This site consists of cliff and foreshore exposures from west side of Blockhouse Bay around Te Whau Pt and along coast to east side of Green Bay. The area contains excellent exposures of a wide range of features that characterise this part of the Waitemata Basin. These include: thick and thin sandstone turbidite beds, graded and massive; thin- bedded and laminated siltstones and fine sandstone beds with carbonaceous laminae, ripples, trace fossils, micro-faulting, sand fluidisation structures; large and small scale folding, vertical bedding, large and small scale normal, reverse and keystone faults; complex soft sediment deformation. Coastal landforms include a cliffed promontory (Te Whau Point) and a small sea stack.	a, c, g
14	Boggust Park	Favona	V	One of the oldest	a, b, c,

	crater			volcanoes in the Auckland Volcanic field, consisting of a 400-m-diameter explosion crater surrounded by a 9-m-high, semi-circular tuff ring. The tuff ring has been breached and eroded by the sea during the Last Interglacial period (~130,000 years ago) and the crater filled up to the level of the breach with sediment creating a flat floor, 5m above sea level. The crater and inner walls of the tuff ring form Boggust Park, Favona	d, h, i, l
15	Browns Island (Motukōrea)	Browns Island (Motukōrea)	V	Motukōrea is an entire volcanic system in miniature and is the least damaged of Auckland's volcanoes. Partly submerged by rising post-glacial sea level, the volcano features a main scoria cone and crater, surrounded by several smaller scoria mounds within a tuff ring remnant. Extensive, submerged, lava fields extend up to 2km from the central cone. The island is of international significance as the type locality for the mineral motukoreaite, which forms a cement in tuff and beach rock on the southern beach.	a, b, c, d, e, f, g, i, l
16	Cascade Falls and conglomerate bluffs	Waitākere	B	An unusual waterfall eroded so far into a narrow slot in a Piha Conglomerate bluff that the actual fall is hidden.	a, b, e, f, l
17	Cave of a Thousand Press-ups	Greenlane	F	The Cave of a Thousand Press-ups is a complex network of small lava tubes totalling about 270m in length. It is one of the best for cleanliness, complexity,	a, b, c, d, i

				and size. The name for the cave stems from its low height, which varies from 0.2m to 1.2m. It ranges from 0.8m to 10m wide. There are rock falls partly infilling the cave in several places. The general lava flow direction appears to have been to the east, with feeders joining from the north.	
18	Claude Stream basal Waitematā Group sediments	Whitford	E	This 300m section of stream contains the best-exposed and most complete basal Waitematā sequence of limestone and greensand in southeast Auckland. Three lenses of shallow limestone interbedded with shelf greensands rest on greywacke and pass up into Waitematā flysch.	a, c, i
19	Cochranes Gap accretionary lapilli	Pollok	E	A low sea cliff forming a small point on the south side of Cochranes Gap contains the best example of large (5-20mm diameter) accretionary lapilli (chalazoidites) within a pyroclastic flow deposit in New Zealand. These occur within 3-5m thick rhyolitic ignimbrite that is 1 million years old.	a, c, g, h, i
20	Cochrane's Gap Quaternary sands	Pollok	E	This site contains well-exposed Quaternary coastal zone sediments and is the type section for the Awhitu formation. The sands are poor in the black sand minerals ilmenite and magnetite, so pre-date the eruptions of Taranaki and Taupo volcanic centres and the subsequent current transport of black sands northwards along the coast.	a, b, g
21	Cornwallis	Cornwallis	D	High cliffs and intertidal	a, c, g, l

	Peninsula proximal volcanic- rich flysch			rocks bearing a good exposure of a sequence of volcanic-rich flysch beds that accumulated close to the contemporaneous late Miocene Waitākere volcanoes.	
22	Crater Hill	Mangere	V F - Caves	Crater Hill is one of the two best remaining explosion craters and tuff rings in Manukau City. It is a complex volcanic centre including a large, embayed tuff ring 600m in diameter, enclosing a (quarried) scoria cone and small lava flow. Crater Hill has a unique example in the Auckland volcanic field of the cooled remnants of a lava lake that filled the crater and later withdrew down the vent. It is also the only remaining explosion crater in the Auckland field where the external slopes of the volcano outside the crater rim are nearly entirely intact and unmodified. Two lava caves are present. Selfs lava cave is about 48m long and circumferentially oriented within the volcanic crater. Underground Press lava cave is 40m long lava cave with a large main chamber, reputedly used as a base for clandestine, subversive publishing during World War II. The Crater Hill quarry exposures are a useful educational site with excellent exposures of lithic tuff, basaltic lapilli, crater rim collapse features and a thin layer of rhyolitic tephra from the central North Island.	a, b, c, d, e, g, i
23	Cudlip Point deformed	Mahurangi West	D	Excellent and easily accessible examples of	a, c, g, l

	Waitematā Group rocks			structurally deformed Waitematā Group sandstones and Parnell Grit occur in sea cliffs around Cudlip Point. A wide variety of deformational faults and folds are visible here.	
24	Dispute Cove channelled flysch, Kawau Is	Dispute Cove	E	Excellent exposure of a small channel within the basal Waitematā Group flysch deposit.	a, b, i
25	East Pakatoa Island broken formation	Pakatoa Island	D	A world-class example of broken formation in argillite and greywacke rocks, exposed in extremely fresh high tidal exposures. A wide variety of structural features is visible in the base of the cliff and out onto the shore platform.	a, c, i
26	Eastern Beach anticline	Eastern Beach	B	The best example in the Auckland region of an anticline visible in a shore platform and coastal cliff, giving a 3- dimensional view of a fold in Waitematā Group alternating sandstone and mudstone. Of educational, as well as scientific importance.	a, c, e, g, l
27	Fairy Falls and dikes	Henderson Valley	B - dikes C - waterfall	One of best examples of a waterfall in the Waitākere Ranges, and the best place to see rarely occurring dikes in the eastern Ranges. This scenic waterfall cascades over several drops separated by plunge pools.	a, b, c, e, f, g, l
28	Flat Top Hill Tangihua pillow lavas, Kaukapakapa	Kaukapakapa	E	The site contains the only Tangihua volcanics in the Auckland Region. Current exposures in a cutting beside an access road to Flat Top Hill quarry will be lost through future quarrying, but once quarrying ceases the new quarry wall will include an exposure of these	a, b, d

				volcanics.	
29	Frenchmans Cap (Kahakaha), Pakatoa	Frenchmans Cap	B	A rare and excellent example of a 'top- hat' island with its surrounding intertidal rock platform.	a, c, e, g, i, l
30	Goat Island Bay Sedimentary rocks	Te Rere Bay	D	A well exposed basal sequence of Waitematā flysch overlying basement rocks and the type section for the thick-bedded sandstones of the Pakiri Formation occurs in cliffs from beneath Leigh Marine Laboratory, extending west for 2km beyond Goat Island Bay.	a, c, g, l
31	Grants Island old hat	Mahurangi Harbour	B	One of the best examples in New Zealand of a small island surrounded by broad intertidal rock platforms, giving it the classic 'old hat' shape.	a, c, e, g, i, l
32	Great Barrier Island, Harataonga Bay conglomerate	Great Barrier Island (Aotea Island)	D	Clean coastal exposure of Waipapa Terrane Group basement greywacke rock consisting of granite-bearing conglomerate. These are some of the oldest rocks in Auckland, and derive from deep ocean trench sediments.	a, b, l
33	Great Barrier Island, Kaitoke Beach dunefield	Great Barrier Island (Aotea Island)	C	One of the best remaining examples of a relatively unmodified active dunefield anywhere on Auckland’s eastern coastline.	c, e, f, g, h, i, l
34	Great Barrier Island, Man o' War Passage	Great BarrierIsland (AoteaIsland)	A	Best example in the Auckland region of a narrow sea passage between cliffed shorelines. Man o' War Passage is a scenic feature of landscape value.	c, e, f, l
35	Great Barrier Island, Waterfall Bay Miocene	Great Barrier Island (Aotea Island)	E	One of best examples of the Miocene volcanic intrusions into the greywacke rock of	a, b

	intrusions			northern Great Barrier Island occurs around 'Waterfall Bay'. Here, early Miocene quartz porphyry dikes and a stock intrude greywacke and provide only evidence of the earliest volcanic activity on Great Barrier Island, some 18 million years ago.	
36	Great Barrier Island, Whangapoua Estuary	Great Barrier Island (Aotea Island)	C	The best example of a pristine estuary in the Auckland region. Whangapoua Estuary was formed by sea level rise and the damming of a drowned river valley by a sand barrier at the end of the last glaciation.	a, c, e, f, h, l
37	Great Barrier Island, Whangapoua sand spit & tsunami deposits	Great Barrier Island (Aotea Island)	C	To the north of the Whangapoua Harbour entrance are excellent unmodified examples of a sand spit and dunefield. A sheet of gravel extending from the toe of the foredune to over 14m above mean sea level and 200m inland from the beach is the best example of a tsunami deposit in the Auckland Region.	a, c, e, f, h, l
38	Hamlins Hill sandstone ridges and rhyolitic tuff	Penrose	A - ridge E - rhyolite	Hamlins Hill is one of the least modified sandstone ridge complexes remaining in Auckland. Ridges like it are some of the most common landforms beneath urban Auckland, but unmodified and undeveloped examples are rare. Hamlins Hill also includes the best inland exposure of rhyolitic tuff in Auckland City, in an exposure 10m wide and up to 2m high. Its position on top of the hill suggests the rhyolitic ash is from airfall or a pyroclastic flow and not	a, b, c, e, f, g, h, i, k

				reworked by water as is more common.	
39	Hampton Park scoria cone	East Tamaki	V	This small but complete volcanic centre includes a small scoria cone and tuff ring within the outer flank of the Ōtara Hill tuff ring. An initial explosive eruption formed a tuff ring 330m in diameter. Lava partly filled this crater and flowed over the tuff ring to spread on to the flat ground to the west. A scoria cone with a complex crater built up around the volcanic vent. (Hampton Park is also the site of Smale's Church, St John, built in 1862).	a, c, d, e, f, i
40	Harbour View Pleistocene terraces	Te Atatu Peninsula	A	One of the last remaining undeveloped Pleistocene terrace surfaces around the Waitematā Harbour, with two distinctive terrace surfaces (15-20m above sea level, and 2-4m ASL) separated by a former coastal cliff. The terraces are cut into Waitematā Sandstone and Pleistocene deposits.	a, c, e, f, g, h, i, l
41	Hays Stream cliffs limestone	Hunua	E	This 3m thick, fine pebbly, crystalline, slightly flaggy limestone lying between 2 beds of greywacke pebble conglomerate in cliffs beside Hays Creek is the reference section for Papakura Limestone.	a, b, h
42	Helena Rubinstein and Ratcliffe lava caves	Onehunga	F	Helena Rubinstein lava cave is a complex branched lava cave, totalling about 320m in length and featuring many lava rolls. Teat stalactites formed by surface melting cover some ceilings and walls. Located about 20m up-flow from the Helena Rubinstein cave, Ratcliffe	a, b, d, i

				lava cave is a blister cave about 130m long, with no natural entrance. Tunnels connect four chambers in the cave. It varies in width from 3-9m wide and has rock fall material on the floor in a number of places.	
43	Hillsborough Rd tuff	Hillsborough	E	Hillsborough Rd tuff is an easily accessible example of bedded tuff in a more distal part of the Three Kings volcano tuff ring. Excellent examples of bomb impact depressions and weathered chalazoidites (volcanic hailstone) are visible here.	a, c, d, g, i
46	Hopua explosion crater and tuff exposure	Onehunga	B	Hopua volcano is a small explosion crater with a low tuff ring about 500m in diameter. The original crater was breached by the sea and filled with marine sediments. Although damaged by reclamation and motorway construction, the tuff ring is still discernable as a volcanic feature. An intertidal exposure of Hopua tuff in the ManukauHarbour foreshore contains large blocks of basalt.	a, d, g, h, e
47	Horuhoru Island (Gannet Rock) red chert	Horuhoru Rock (Gannet Rock)	B	One of best examples of red chert in the region occurs at Horuhoru Island, where the rock is freshly exposed in sea cliffs. The entire island is composed of bedded red chert, some of which is intricately folded.	a, c, e, i, l
48	Hōteo hogback bluffs and unconformity	Mangakura	A	A unique calcareous sandstone with pseudokast rocks (Hōteo Member), associated with an exposed sedimentary unconformity forms the largest and most	a, c, e, f, g, i

				prominent hogback ridge in the Auckland region. The 4km ridge of prominent thick sandstone bluffs is conspicuous from State Highway 1, 2 - 3km south of Wellsford.	
49	Hoteo River incised meanders	Wellsford	A	The Hōteo River is the longest in the Auckland Region. It flows in a deeply incised meandering gorge through broken hill country for some 30km and is one of the outstanding landforms in this part of the region.	a, c, e
50	Huaroa Point shore platform	Army Bay	D	An extensive intertidal platform cut across dipping Waitematā sandstones and siltstones.	a, c, e, g, l
51	Hunua Falls volcanic neck	Hunua	C	The Wairoa River forms a scenic 30m high waterfall where it cascades over a basalt plug in the neck of a volcano, which has intruded up a fault line (an unusual feature). Volcanic tuff ring deposits and lava bombs are exposed in true right bank of the waterfall.	a, b, d, e, f, g, i, k
52	Ihumātao buried forests	Mangere	E	Best example in New Zealand of a fossilised mature kauri forest, and of a fossil forest, buried and preserved beneath volcanic ash. Trunks and stumps of large kauri trees are preserved in ancient swamp deposits. This is overlain by the remains of a younger, more diverse forest that was killed and buried by tuff from Maungataketake volcano and subsequently exhumed by coastal erosion.	a, b, d, g, h, i
53	Ingram Road III tuff ring	Bombay	A	The Ingram Road III tuff ring is a fairly well-defined tuff ring remnant,	a, c, d, e, i

				approximately 1km in diameter. It joins with the smaller Ingram Road IV tuff ring in the south.	
54	Jordans Road Miocene fossils	Kaukapakapa	E	A small roadside quarry face contains a well - preserved and diverse bathyal molluscan and coral fauna fossils from the early Miocene.	a, b, g, h, i
55	Karamatura, Marama catchments & Mt Donald McLean	Huia	A	This locality includes a range of scenic landforms that are both characteristic and extraordinary examples of their type. These include inland bluffs, waterfalls, gorges and steep hill slopes. Mt Donald McLean is one of very few exfoliated domes in the Ranges.	c, e, f, g, i, l
56	Karekare Falls	Karekare	C	This 20m high waterfall flowing over Piha Formation conglomerate is spectacular and the most easily accessible waterfall in the Waitākere Ranges.	c, e, f, g, i, l
57	Karekare South stratified conglomerate	Karekare	D	High cliffs at the southern end of Karekare beach contain excellent exposures of planar-stratified volcanic conglomerate, deposited on the slopes of the Miocene Waitakere volcano and subsequently exposed by uplift and coastal erosion.	a, c, e, g, i, l
58	Kariotahi Quaternary sands	Waiuku	D	A well-exposed sequence of Quaternary coastal sediments showing the beginning of black sand deposition, with the current transport northwards of ilmenite and magnetite-rich sediments, following the commencement of volcanism in the central North Island and Taranaki. The younger deposits have a relatively	a, b, g

				high black sand content.	
59	Kawakawa Bay deformed chert beds	Kawakawa Bay	E	In shore platforms at Tawhitikino Beach and near Waiti Bay, chert pods appearing to be of Triassic age among Jurassic greywackes give a useful indication of the melange nature of Waipapa Terrane.	a, b, g, i, l
60	Kawau Island pillow lavas	Kawau Island	E	One of the best examples of tubular pillow lavas in New Zealand. An excellent three-dimensional exposure of pillow lava tubes is visible in a coastal section at Point Fowler.	a, c, d, i, l
61	Kawau Island, Slater Point fossil sea stack	Kawau Island	B	This exposure of a greywacke sea stack buried by shallow marine conglomerate is possibly the best example of a fossil sea stack in New Zealand.	a, c, i, l
62	Kennedy Park deformed Waitemata strata	Castor Bay	D	Cliffs below JF Kennedy Memorial Park contain excellent and easily accessible exposures of complex deformed Waitematā strata, folds and faults.	a, c, e, g, l
63	Kepa Rd landslip	Ōrākei	B	This site is an unusual example of a largely intact landslide. Volcanic tuff and ash plastered on the steep slope of an original sandstone ridge on the inside wall of Ōrākei Basin volcano is sliding slowly downwards. There are several excellent head scarps and landform features typical of slow moving landslides. It remains undeveloped due to its instability.	a, b, e, g, i
64	Keyhole Rock	Keyhole Rock	B	Excellent example of wind and salt erosion producing a small opening through a sea stack.	b, e, f, g, l

65	Kidds Beach Pliocene conglomerate	Karaka	E	The beach and foreshore platforms here contain the best and most extensive exposures of Pliocene jasper and quartz-rich conglomerate that provide evidence for the former existence of a west-flowing 'Clevedon River' sourced from the Coromandel and Waiheke area and depositing in the Manukau Harbour.	a, b, g, h
66	Kidds Beach shell spits	Karaka	C	This series of shell spits is the largest area and best example of actively accreting shell spits in the Manukau Harbour. Some of the elongate shell spits are up to 2m high.	c, e, g
67	Kitekite Falls	Piha	C	One of highest and most easily accessible falls in Waitākere Ranges. Kitekite Falls cascade over a cliff of Piha Formation volcanic conglomerate, in which three dikes are visible.	c, e, f, g, i, l
68	Kitenui Ave lava cave	Mount Albert	F	Kitenui Ave lava cave is one of the longest and best-preserved lava caves in Auckland. The cave floor also features some of the best lava stalagmites. The cave extends for 250m and is up to 20m wide in places.	a, c, d, i
69	Kohuora explosion crater	Papatoetoe	V	Kohuora is a large, low-profile, double- lobed explosion crater and tuff ring. It is the only one of this shape in the Auckland volcanic field. Although modified by erosion and subdivision, the crater walls indicate that there were at least four explosive vents. The crater floor has been artificially drained, leaving only a small part of the original wetland intact.	a, b, c, d, e, f, g, h, k

70	Kotanui Island stack (Frenchmans Cap)	Whangaparaoa	B	A prominent and well defined contemporary sea stack eroded out of Waitematā Group rocks.	a, c, e, g, i, l
71	Kuataika rocky peak	Waitakere	B	A good exposure of partly exfoliated Piha Formation stratified volcanic conglomerate forms the most prominent high point in the northwest Waitākere Ranges. Kuataika Track passes beside the peak and leads to panoramic views.	a, c, e, l
72	Lake Okaihau	Lake Okaihau	C	Lake Okaihau is a good example of a dune-dammed lake, formed when active dunes dammed a small valley eroded in older Pleistocene sediments.	a, c, e, f, i
73	Lake Ototoa dune lake	Lake Ototoa	C	Relatively complex and excellent example of a freshwater lake between sand dunes.	a, c, e, f, i
74	Lake Pupuke volcano	Lake Pupuke	E	Pupuke volcano is large compound explosion crater (about 1500m diameter) partly filled with a fresh water lake covering 104 ha and 55m deep. Lava is mostly mantled with tuff, but has been quarried inside the crater. A lapilli knoll to the southwest forms the highest point. Lava chemistry supports two eruptions from this volcano.	a, b, c, d, e, f, g, h
75	Lake Tomarata and Spectacle dune lakes	Te Ārai	C	Tomarata and Spectacle Lakes are the best examples of dune-dammed lakes on the east coast of Auckland or Northland.	a, c, e, f, h, i
76	Landscape Road Lava Cave	Mount Eden	F	An excellent example of a lava cave, this relatively simple tunnel is 100m in length and 10m in diameter.	a, c, d, g, i
77	Leigh reef and Panetiki Island	Omaha Bay	B	Leigh Reef and Panetiki Island provide excellent	a, c, e, g, h, l

				examples of the characteristic rocky shores and reefs of the region's east coast and a top-hat islet. An excellent example of basal Waitematā conglomerate.	
78	Lion Rock neck	Piha	A	Lion Rock is a large rocky stack with a lion-shaped profile, and is one of the region's iconic landforms. The rock is formed from a volcanic neck filled with a wide range of volcanic eruption and erosion products as well as andesite intrusions.	a, b, e, f, g, i, l
79	Liverpool Street tuff exposure and chalazoidites	Epsom	E	One of best and most accessible exposures of bedded tuff in Auckland, this site consists of an exposure of fine to coarse tuff and thin scoriaceous layers, erupted from nearby Three Kings volcano. Also visible are small slump faults and a bed rich in chalazoidites (volcanic hailstone).	a, c, d, g, h, i
80	*[deleted]*				
81	Lynfield cliffs Waitematā Group section	Lynfield	D	This section provides a wide diversity of the rock types, sedimentary structures and structural styles that characterise the mixed volcanic/non-volcanic facies of this part of the Waitematā Basin on the lower flanks of the Waitakere Volcano.	a, c, e, g
82	Mahurangi limestone, Wilsons Cement works	Mahurangi East	E	Wilsons cement quarry is the type locality of Mahurangi Limestone, an Oligocene muddy limestone. It is also historically important as the first Portland cement plant in the Southern Hemisphere.	a, f, g, j, e
83	Mahurangi North Parnell Grits	Warkworth	D	Best exposed sequence of more than one Parnell Grit bed within the Waitematā Basin. Here,	a, c, i

				three Parnell Grit beds occur within a Waitematā Sandstone exposure.	
84	Mangatāwhiri Barrier Spit (Omaha Spit)	Omaha	C	Mangatāwhiri barrier spit is composed of unconsolidated Holocene coastal sediments deposited either side of an initial barrier ridge. The landform records the episodic depositional history of the area, and although modified by urban development, still contains good examples of sand dunes and a small area of fossil beach ridges. The spit has been the site of historic beach erosion issues affecting dwellings built on the dunes.	a, c, e, g, l
85	Mangatu Stream Parnell Grits	Kaipara Flats	D	Mangatu Stream and its tributaries provide good exposures of the thickest sequence of volcanic mass flow deposits within the WaitemataBasin, with thick and thin volcanogenic mass flow beds visible. 1km stretch of Mangatu Stream.	a, c, d, i
86	Māngere Lagoon explosion crater	Māngere Bridge	V	A large explosion crater (23 ha) with low-profile tuff ring and a small, central scoria cone. Invaded by rising sea level and filled with tidal sediments to form a tidal lagoon. Māngere Lagoon is contiguous to and partly overlain by lava from Māngere Mountain.	a, c, d, e, f, g, h, i
87	Māngere Mountain volcano (Te Pane o Mataoho)	Māngere Bridge	V	Māngere Mountain is one of the best examples in the Auckland volcanic field of a large, well-preserved scoria cone with a breached crater. Two features of the volcano are unique in the Auckland field: The crater lava plug (surrounded by	a, b, c, d, e, f, g, h, i

				gas vents) and the presence of a deep, secondary, explosion crater in the rim of the main scoria cone.	
88	Manukapua Island (Big Sand Island)	Tāpora	C	Excellent and rare example of a fetch-limited barrier island with Holocene sand dune belts at Tāpora on the Kaipara Harbour.	a, b, e, g, h, i
89	Manukau foreshore lava flows	Māngere Bridge	B	This area contains the best example of pahoehoe lava surfaces in New Zealand. Many small areas of well-formed pahoehoe lava from Mangere Mountain volcano occur in the foreshore north of Kiwi Esplanade. Lava flow exposures extend westward around the coastal edges of Ambury Regional Park.	a, c, d, e, g, i
90	Māori Bay sea cave	Muriwai	F	A well-visited, easily accessible, typical sea cave eroded along joints through the volcanic sandstone of Otakamiro Point.	b, e, f, g, i
91	Mathesons Bay basal Waitematā Group rocks and fossils unconformity and Miocene reef corals		E	Easily accessible, well-exposed educational site showing onlap of early Miocene Waitematā sediments on Waipapa Group, with an excellent example of thrusting. This is also the richest locality in New Zealand for unusual chaliciform reef corals.	a, b, c, g, l
93	Matukutūreia and Matukuturua lava field and explosion crater	Wiri	V (Large volcanic landforms)	The Matukuturua lava field is one of the best-preserved lava fields remaining in the Auckland volcanic field and is an important representative example of the volcanic lava terrain that underlies much of the city. The lava field erupted from McLaughlin's Mountain	a, c, d, e, g, h, i

				(Matukutūreia) volcano. Most of the original scoria cone and a section of the lava field in the north have been quarried away. Associated with the lava field is a section of an explosion crater remaining from the early phases of the eruption. A small wetland has formed within the explosion crate.	
95	Meola Creek and estuary	Point Chevalier	C	The lower end of Meola Creek is the best example in Auckland of a stream that was displaced by a lava flow and now meanders around its irregular edge. This is also one of the least modified sections of a natural stream remaining on the Auckland isthmus.	a, c, g, i, l
96	Meola Reef (Te Tokaroa)	Waitematā Harbour	B	This is longest lava flow in Auckland Volcanic Field. It originated at Mt St John volcano (prior to the eruption of Mt Eden) and extends over 10km, nearly crossing the present-day Waitemata Harbour to within 600m of Kauri Point on the North Shore.	a, b, d, e, f, g, i, l
97	Mercer Bay chimney and sea cave	Piha	B	This site is a particularly good example of a sea cave that has eroded vertically upwards along joint planes to form a 100m high chimney. Eroded into the south side of Te Ahu Ahu Point, the chimney opens near the top of the high cliffs above the north end of MercerBay. A sea tunnel through which a small stream flows provides access at low tide around to the chimney cave.	a, b, c, e, i, l
98	Mission Bay	Orakei	E	This is the best-exposed	a, c, g, i,

	thrust			example of Waitematā Group strata in the cliffs of the Tamaki Drive. A thrust (low angle fault) with folded sediment along it is the most interesting structural feature in these prominent cliffs.	l
99	Mokoroa Falls	Waitākere	C	This scenic waterfall is the best example in west Auckland of a fall held up by erosion-resistant thick sandstone.	c, e, f
100	Mortimer Pass lava cave	Epsom	F	This is the only rift cave known in Auckland, formed by the solidifying top of a lava flow sliding forward over more molten material underneath. The cave is about 35m long, with an S-shaped vertical cross section at right angles to the direction of flow.	a, b, d, g, i
101	Motor Holdings lava cave	Mount Wellington	F	This lava cave is about 114m long, and averages about 1m wide. Features within the cave include lava rolls, a chamber (3m wide and 3m high), a small ponded flow, and a rough 'coral' floor. The cave had two entrances near the southern end, but both are now filled.	a, c, d, i
102	Motuihe Island, Limestone Point basal Waitemata Group sedimentary rocks	Waihaorangatahi Bay	D	A 300m coastal section around 'Limestone Point' contains a small (50m by 30m) example of well-developed coastal karst, which is the only limestone karst in the Auckland region. The section consists of shallow water, sandy bioclastic limestone, and conglomerate overlain by deep-water Waitematā flysch, all resting on greywacke basement rock.	a, b, e, g, i, l
103	Motuihe Island, Ocean	Motuihe Island	D	Easily accessible cliffs contain a well- exposed	a, c, e, g, i, l

	Beach basal Waitemata Group sedimentary rocks			greywacke stack buried by basal Waitemata sandstones and mudstones, shelly sandstone and finally a thick Parnell Grit bed.	
104	Motuketekete Island Waitemata Group Miocene basal limestone	Motuketekete Island	E	Geological exposure of shallow water shelly conglomerate and bioclastic limestone of the Kawau Subgroup passing up into deep water Waitematā Group flysch. This is one of only three known localities in New Zealand where reef corals are preserved in growth position and is the only occurrence of early Miocene limestone between Auckland and Bream Tail. It is also a good exposure of the sequence passing up into flysch.	a, b, g, i, l
105	Motuora Island Parnell Grit	Motuora Island	D	One of best and largest exposures of a Parnell Grit bed forms the intertidal shore platform right around MotuoraIsland. The bed contains large rip-up blocks of upslope sedimentary facies.	a, c, d, e, l
106	Motutapu folded chert, Administration Bay	Motutapu Island	D	The best-known and most easily accessible exposure of tightly folded chert beds within the greywacke sequence of the Waipapa Terrane. Exposure in shore platform.	a, c, g, l
107	Motutapu Island coastal features incl.basal Waitemata Group contact, with fossil giant barnacles	Motutapu Island	D	This locality is important for historic and educational reasons for showing the sedimentary relationship of the early Miocene Waitematā Group to the underlying basement, and the character of the early Miocene coastline. It is the type locality for a giant barnacle species,	a, b, c, e, g, i, l

				with fossil plates found at the base of the fossil sea stack on which the barnacles once grew. Geomorphic features include well-developed shore platforms cut in greywacke, Parnell Grit and Waitematā sandstone.	
108	Mt Albert (Ōwairaka)	Mount Albert	V	Mt Albert is the western-most eruptive centre in the Auckland volcanic field. The volcano consists of a large scoria cone (now severely modified by quarrying), which overlies obscured tuff ring remnants. Lava flows spread in three directions from the volcano to cover some 3.3 km².	a, c, d, e, f, g, h, i
109	Mt Eden (Maungawhau)	Mount Eden	V	Mt Eden consists of a complicated scoria cone structure with a deep, well- preserved, conical crater about 50m deep. Basalt lava flowed in all directions and good lava outcrops are now exposed within the extensive lava fields. More viscous, thicker lava flows later in the eruption accumulated to form a thick pedestal. The former quarry occupied by EdenGardens provides good exposures of the features of the lower scoria cone, such as bedded scoria, in places intruded by dikes and irregular intrusions of basalt. Mt Eden is one of Auckland's most prominent volcanic features, and considered to be of national importance.	a, c, d, e, f, g, h, i, k
110	Mt Hobson (Ōhinerua)	Remuera	V	Mt Hobson is a small, well-preserved scoria	a, c, d, e, f, g, h,

				cone, with a horseshoe crater (about 250m diameter) and minor lava flows to the south.	I, k, i
111	Mt Richmond (Ōtahūhū)	Mount Wellington	V	Mt Richmond volcano consists of a partially intact tuff ring (about 800m diameter) surrounding a swampy depression with a group of small cratered scoria cones at the centre. There are many vents associated with the scoria cones but no known lava flows.	a, c, d, e, f, g, h, i
112	Mt Robertson (Sturges Park)	Ōtahūhū	V	Mt Robertson volcano consists of a large, swamp-filled, tuff ring forming a "castle-and-moat" structure around a small, cratered, scoria cone. Part of the Ōtahūhū commercial area is built on the northeastern rim of the tuff ring.	a, c, d, e, f, g, h, i, k
113	Mt Roskill volcano (Puketāpapa)	Mount Roskill	V	Mt Roskill volcano is a simple scoria cone with an initial tuff ring almost buried beneath it. The cone originally had two shallow craters (now destroyed by a water reservoir). Small lava flows extend northwest along Oakley Creek to reach the Mt Albert lava flows.	a, c, d, e, f, g, h, i
114	Mt Royal lava cave	Mount Albert	F	Mount Royal lava cave is an excellent example of a lava cave, with the largest and best-developed lava stalactites and dribbles in New Zealand. It extends about 54m from the back of a garage under a private residence. The cave is about 2-3m in diameter and also features several excellent examples of gas chimneys.	a, c, d, i
115	Mt Smart	Penrose	V	Mt Smart scoria cone	a, c, d, f,

	volcano remnant (Rarotonga)			originally stood about 50m higher than the surrounding terrain. Now, only the southern base of the cone remains to define its original size and shape. The rest has been quarried away, with the site occupied by a major sports stadium. A large area of lava flows extends south to Manukau Harbour.	g, e
116	Mt St John (Te Kōpuke)	Epsom	V	Mt St John is a reasonably well-preserved, simple scoria cone with a crater about 180m in diameter and 20m deep. A thin mantle of Three Kings tuff forms an impervious layer in the crater that allows an ephemeral pond to fill. Recent research into rock chemistry has revealed that Mt St John is the source of the longest lava flow in the Auckland volcanic field, which extends over 10km to form Meola Reef (Te Tokaroa).	a, c, d, e, f, g, h, i
117	Mt Victoria volcano (Takarunga)	Devonport	V	Mt Victoria is a steep sided scoria cone, the largest north of the harbour with a summit crater breached towards the south east from whence lava flowed towards the former Waitemata valley. Duders Hill was a small welded scoria cone (now quarried) on the harbour shore.	a, c, d, e, f, g, h, i
118	Mt Wellington (Maungarei)	Mount Wellington	V, F	Mt Wellington is the largest scoria cone in the Auckland volcanic field. The high, circular scoria cone encloses a 60m deep crater (about 220m diameter) with three vents. Mt Wellington is associated with nearby	a, b, c, d, e, f, g, h, i

				Purchas Hill, which consisted of two small, cratered, scoria cones in the centre of a large tuff ring. The centre of the Mt Wellington cone is just outside the southern rim of this tuff ring. Scoria and extensive lava deposits overlie the tuff deposits from early eruptions. Lava flows streamed from the volcano towards Penrose and thence to the Manukau Harbour. At the western foot of Mt Wellington scoria cone is the 16m deep, bell-shaped Ruapōtaka lava shaft; a vertical cave which is regionally significant in its own right. The best example of partially fused cowpat lava bombs in the Auckland volcanic field is located near the top of the inner slopes of Mt Wellington's crater.	
119	Muriwai and Rangitira Beaches	Muriwai	C	Muriwai and Rangitira Beaches form the longest beach in the Auckland region. This area provides an almost unmodified example of an exposed sandy beach in a high-energy coastal environment.	c, e, f, g, i
120	Muriwai andesitic pillow lava flows	Muriwai	D	Some of the best-preserved pillow lava formations in the world occur in four separate locations in a quarry, coastal cliffs and intertidal platforms near Muriwai. The pillow lavas are interbedded with fossiliferous sediments that give an indisputable bathyal depth for the lava emplacement.	a, b, e, f, g, h, i
121	Muriwai Miocene	Muriwai	D	Unusual, bathyal molluscan fauna and also	a, b, g

	fauna, Maori Bay			a conglomerate bed with redeposited shallow water reef corals occur in cliffs at the south end of Maori Bay.	
122	Muriwai volcaniclastic sediments	Muriwai	D	The best exposures in New Zealand of submarine canyons and channels filled with volaniclastic sediments are well- exposed in coastal cliffs and intertidal platforms here. Outcrops consist of mostly fine-grained volcaniclastic sediments with several pillow lava flows. There are also exposures of canyon wall contacts and canyon fill sediments, lensing conglomerates and cross-bedded sandstones.	a, c, e, g, i
123	Musick Point cannon- ball concretions	Bucklands Beach	D	One of the best and most easily accessible examples of spherical concretions in the Auckland region. Concretions are both loose on the foreshore and embedded in the lower cliffs on the west side of Musick Point.	a, c, g, i, l
124	Musick Point overthrust	Bucklands Beach	B	The northern tip of Musick Point contains an overthrust fold involving flysch beds.	a, c, e, f, g, i, l
125	Narrow Neck structural discordance	Narrow Neck	D	The shore platform at Takapuna Head displays a classic example of a structural discordance, with a 90 degree difference in the dip of strata within the Waitematā Group.	a, c, g, l, l
126	New North Rd lava cave (HebronCollege)	Mount Albert	F	Located in the Mt Albert lava field, the New North Rd lava cave is one of the better examples of a meandering lava cave. The cave is 60m long, 5m wide and 1.5m high and contains some of the	a, c, d, i

				best lava rolls in Auckland lava caves.	
127	Nihotupu Gorge volcaniclastic flysch	Huia	D	The Nihotupu Gorge contains the best-exposed section through this interfingering lateral facies boundary between Waitematā basin flysch and the Waitākere volcaniclastic pile.	a, c, i, l
128	Nihotupu pillow lavas and falls	Waiatarua	D - lavas C - waterfall	Well-exposed examples of the easternmost pillow lavas in the Waitākere Group form the Nihotupu Falls at head of the Upper Nihotupu Reservoir and also occur in an old quarry nearby.	a, c, e, f, g, i, l
129	Ninepin Rock volcanic neck	Ninepin Rock	B	Ninepin Rock is an excellent example of a coastal stack. It is formed from an eroded volcanic neck combining intrusive tongues of lava and agglomerate fill with bombs.	a, c, e, f, g, l
130	North Head volcano (Maungauika)	Devonport	V	A small, steep-sided scoria cone fills and overtops the crater rim of a basaltic tuff cone. A small lava flow to the west does not extend beyond the foot of the tuff cone. Good exposures of basaltic tuff can be seen in tunnels and along the coast. This notable landmark at the entrance to Auckland Harbour has been considerably eroded by the sea.	a, c, d, e, f, g, h, I, l
131	North Pararaha Cliffs submarine slide	Karekare	D	This site contains the best exposure of a large submarine slide on the slope of an early Miocene Waitākere volcano and the largest slide deposit in the Miocene rocks of northern New Zealand.	a, b, c, e, g, i, l
132	North-west Motorway lava flow, Western Springs	Mount Albert	D	This 500m section of motorway cuttings is one of best and most commonly seen cuttings	a, c, d, g

PC 22 (Awaiting Minister of Conservation sign off)

				through a basalt lava flow in Auckland. It provides good visual evidence of the route of Auckland's longest lava flow, from Mt St John to Meola Reef via Western Springs. It also contains excellent examples of columnar jointing.	
133	O'Neill Bay crater	Muriwai	D	One of the best-exposed craters in the Waitakere region occurs in cliffs at the north end of O'Neill Bay. The 200m wide crater is filled with andesite flows and cutting stratified breccias.	a, c, e, g, l
134	Oakley Creek waterfall	Point Chevalier	C	An 8m high waterfall formed over thick sandstone beds is the largest and highest waterfall on the Auckland isthmus. This section of Oakley Creek is also one of least modified streams and stream valleys in the area.	b, e, f, g, i
135	Ōhaka Head dike swarm	Huia	D	Two sets of dikes intruding into andesite conglomerate at the base of Ōhaka Head comprise the best-exposed dike swarm in the Waitākere Ranges.	a, c, e, g, i, l
136	Ōkahu Bay bayhead fill	Ōrākei	B	A 10 ha flat behind Ōkahu Bay is the best-preserved example of an early Holocene bayhead fill on the Auckland isthmus. The flat composed of intertidal shell-bearing mud, is about 1m above sea level and provides obvious evidence of a higher early Holocene sea level.	a, c, f, g, h, I, e
137	Omokoiti/ Waioneke salt meadows	South Head	C	One of the best and largest examples of salt meadows, salt marsh, high tide islets and sand spits along the coast of the Kaipara Harbour.	a, c, g, h, I, e
138	One Tree Hill	One Tree Hill	V	One Tree Hill is one of	a, c, d,

	(Maungakiekie)			the region's iconic landforms. It is among the largest of all the volcanoes in the Auckland volcanic field. The complex scoria cone was built up around several vents and features a central, oval crater (30m deep) and two large horse-shoe craters. Thick and extensive lava flows probably cover more than 20 km², and extend to the coast at Onehunga. The lava field contains lava caves and is partially mantled with tephra from Three Kings volcano.	e, f, g, i, k
139	Onehunga Springs (Bycroft Spring)	Onehunga	C	Bycroft Spring provides visual evidence for the Onehunga freshwater aquifer system that flows within the base of the One Tree Hill lava field. The springs originally arose on the Manukau Harbour foreshore in its former position near here, but are now largely fed by overflow from freshwater springs located within the WaterCare facility across Princes St. Although this site is currently in less than excellent condition, freshwater springs naturally flowing out from beneath lava flows are regionally rare.	a, b, g
140	Onehunga Springs (Captain Springs)	Onehunga	C	Captain Springs provides visual evidence for the Onehunga freshwater aquifer system that flows within the base of the One Tree Hill lava field. The springs originally arose on the Manukau Harbour foreshore in its former position near here.	a, b, g
141	Hochstetter Pond (The Grotto or Grotto St	Onehunga	B	This unusual circular depression in part of the One Tree Hill lava flow was probably formed by	a, b, g, j

	pond)			the collapse of a lava cave roof. The depression, surrounded on three sides by basalt lava, is filled with a pond supporting wetland vegetation. The presence of diatomite in the pond floor shows it was in existence for thousands of years. 'The Grotto' is shown on Hochstetter's geological map of Auckland.	
142	Onepoto explosion crater	Northcote	V	This large, simple explosion crater (about 700m diameter) is breached to the south by the sea and partly infilled with intertidal mud. The floor of the crater is now almost completely reclaimed. Tree moulds encountered during quarrying show that Onepoto volcano overwhelmed a forest.	a, c, d, e, f, h, i
143	Ōrākei Basin volcano	Ōrākei Basin	V	Ōrākei Basin is a volcanic explosion crater and large tuff ring (1km in diameter). The tidal inlet was formed when the sea entered Purewa Creek valley and breached a former freshwater lake that occupied the crater. Subsequently, the basin was closed off by the railway embankment and the water level and flushing of the basin is now controlled. Sediment cores taken from Ōrākei Basin revealed 90 ash layers deposited by eruptions from other volcanoes over the past 90,000 years.	a, c, d, e, f, h, i, l, b, k
144	Ōrākei Greensand Miocene fossils, Hobson Bay	Ōrākei	E	This greensand exposure is historically important as the type locality for several Mollusca and numerous Foraminifera, collected by Hochstetter	a, c, g, j, l

				in 1859 and described by Karrer in 1864. Exposures still remain on the muddy foreshore.	
145	Ōrere River terraces	Orere Point	A	The Ōrere River valley contains excellent examples of terraces cut into alluvial gravel and sediment along a section approximately 4km long from the river mouth at Ōrere Point. Stream terraces are rare in the Auckland region.	a, b, e, g, h, l
146	Ōruawharo hyaloclastite	Tapora	D	The best example of hyaloclastic breccia and associated vent complex in the Miocene volcanics of Northland is exposed in the foreshore and cliffs on the north side of Ōkahukura Peninsula.	a, c, g
147	Otuataua lava flows	Mangere	V	One of the least modified remaining areas of lava flows in the Auckland volcanic field. Western lava flows from Otuataua volcano feature very rocky surfaces, some of which have been modified in prehistoric and historic times. The scoria cone has mostly been quarried away.	a, c, d, e, f, g, h, i
148	Paihia Rd lava cave	One Tree Hill	F	This cave is one of the best-preserved examples of a small meandering (U- shaped) lava cave. It is located within the One Tree Hill lava field and contains some of the best lava rolls and benches in Auckland's lava caves.	a, c, d, i
149	Pakiri Beach		C	Pakiri Beach is the only exposed east coast surf beach free of housing and backed by extensive sand dunes and dune lakes. It is a rare and significant example of a wild and scenic coastline.	c, e, f, g, i, l
150	Panmure Basin volcano	Panmure Basin	V	Panmure Basin is a volcanic explosion crater and associated tuff ring	a, c, d, e, f, h, i, l

				(about 1400m diameter) formed in relatively soft alluvial ground by a series of explosive eruptions. It is still relatively complete and was naturally breached by postglacial sea level rise to form a tidal lagoon. Lapilli deposits from Mt Wellington mantle the northwest rim of the crater.	
151	Papakanui dune field and spit	Woodhill Forest	A	Papakanui spit is a mobile sandspit, which usually encloses Waionui inlet. The spit is associated with a large area of mobile dune fields containing a varied complex of sand dunes rising to over 60m. This extensive area of unmodified dunes and coastline is unique in the Region.	a, c, e, f, h, i
152	Pararaha gorge and exfoliation domes	Huia	A	This locality includes a group of scenically spectacular erosional landforms cut into the volcanic conglomerate rock. The steeply incised Pararaha gorge contains several waterfalls while some of the precipitous hillslopes culminate in weathered exfoliation domes on the ridgetops high above.	c, e, f, g, i, l
153	Paratutae wave-cut notch	Huia	B	The best example of a wave-cut notch on the west coast of Auckland is situated on the northeast side of Paratutae Island.	a, c, e, g, i, l
154	Parnell Baths Parnell Grit	Parnell	D	The type locality for Parnell Grit, a thick submarine volcanic lahar (mudflow) interbedded in Waitematā Group turbidites. This important educational site is located in cliffs behind Parnell Baths carpark.	a, c, f, g, i, j
155	Patauoa Creek	South Head	B	This 200m by 100m	a, c, g, i

	mouth Last Interglacial terrace			terrace is one of the best examples of 6m high coastal terrace, formed as a result of higher sea level during the Last Interglacial.	
156	Pigeon Mountain scoria cone	Half Moon Bay	V	Pigeon Mountain is a prominent landform despite major damage by quarrying. The volcano consisted of a tuff ring (about 500m in diameter) with a scoria cone, several small scoria mounds and a small explosion crater on the northwest rim of the tuff ring. A small, lava flow is still visible at Wakaaranga Creek.	a, c, d, e, f, g
157	Piha Gorge	Piha	A	This site is the best example of a gorge in the Waitakere Ranges. Piha gorge is a narrow (5-20m wide) and deeply incised gorge, with vertical walls cut in breccia 50-100m high.	c, e, f, g, i, l
158	Point Chevalier Waitemata Group sedimentary structures	Point Chevalier	E	This site is one of the best exposures of Waitemata Group strata in the central Auckland area, for educational purposes. Excellent examples of trace fossils, faults, intraformational slump folding, ripple-drift cross-bedding and water escape structures are exposed in 5m high cliffs around the tip of Point Chevalier.	a, c, g, i
159	Point England accretionary lapilli	Point England	E	An exposure of rhyolitic, co-ignimbritic deposits from the Taupo Volcanic Zone. A thin bed of accretionary lapilli (chalazoidites or ‘volcanic hailstones’) is visible near the base of a low eroded sea cliff in the TamakiRiver foreshore.	a, c, g, i
160	Pokorua dune-dammed lake	Lake Pokorua	C	Lake Pokorua and the surrounding wetland is	a, c, vi, f, g

				the best example of a dune-dammed lake on the Awhitu Peninsula.	,h, I, e
161	Pollen and Traherne Islands and mudflats	Waitematā Harbour	A	This is an area of low islands, saltmarsh, mangroves, shellbanks, and estuarine and harbour mud flats. It is the best remaining largely unmodified area of its type in the Waitematā Harbour. The biggest and least disturbed area of saltmarsh remaining in the Waitemata Harbour grows in the shelter of Pollen Island. The majority of this area is protected within the Motu Manawa (Pollen Island) Marine Reserve.	a, c, g, f, h, i, l, e
162	Ponui Island pillow lava	Third Bay	E	This excellent example of a pillow lava flow within Waipapa Terrane greywackes forms a small point at northern end of ThirdBay. Sea cliff and shore platform.	a, c, d, l
163	Puhinui intertidal banks and shellbanks	Manukau Harbour	C	An area of dynamic shellbanks at the mouth of Puhinui Creek is one of the best examples on the ManukauHarbour. The shellbanks and intervening intertidal banks also form a complex of habitats for a variety of animal and plant communities.	a, c, e, g, h, i
164	Puhinui volcanic explosion craters	Wiri	V	Three, small, elongate (200-250m) craters (Pond, Arena, Eroded) each sit at the top of a small (7-8m high) tuff cone forming the hills of Puhinui Reserve. Pond Crater retains a small freshwater lake in the crater; Arena Crater is filled to the overflow level with lake sediment; and Eroded Crater has a small stream eroded	a, b, c, d, g, h, i, l

				through the middle of it. This is the only cluster of small explosion craters in the Auckland Volcanic field.	
165	Puka Street grotto	Onehunga	B	This is the best-preserved example of a deep, steep-sided depression within a lava flow. The pit formed by roof collapse of a lava tube from One Tree Hill, while presumably still-flowing lava rafted the collapsed debris away. Puka St grotto is shown on Hochstetter's geological map of Auckland.	b, d, g, i, j
166	Pūkaki Lagoon volcano	Māngere	V	Pūkaki Lagoon is one of the best two remaining examples of an explosion crater and tuff ring in Manukau City. It is a simple circular explosion crater, which erupted about 60,000 to 70,000 years ago. Thick lapilli mantles the northeast side of the tuff ring, which is breached on the seaward side by a narrow channel. The crater filled with intertidal mud when sea level rose. Cores taken from the crater sediments have provided a record of volcanic ash fall and information about the environmental history of the district. The landform is largely unspoiled by urban development.	a, c, d, e, f, h, i
167	Pukapuka Quarry unconformity	Pōhuehue	E	A small limestone quarry visible from State Highway 1 contains one of very few exposures of a sedimentary contact of basal Waitematā Group conglomerate on top of Northland Allochthon limestone.	a, b, g
168	Pukeiti scoria	Mangere	B, F	Pukeiti is the only	a, c, d,

	cone and lava field (Puketapapa)			remaining example of a small, cratered scoria cone in the Auckland volcanic field and the only remaining, largely intact scoria cone of four originally in this area. A very small scoria cone with a shallow crater marks the site of the vent from which lava flows spread in a northerly direction. Pukeiti is contiguous to Otuataua lava and tuff. Two lava caves are known to occur here (Lino lava cave and Rubbish Pit lava cave).	e, f, g, h, i
169	Pukekōhe East tuff ring	Pukekōhe East	V	Pukekōhe East tuff ring is the best preserved tuff ring in the South Auckland volcanic field. The volcano erupted through a fringe of lava from Rutherford's cone, which lies just to the northeast. The tuff ring is approximately 1km in diameter and 80m deep, with erosion resistant lava around two thirds of the crater accounting for its well-preserved morphology.	a, c, d, e, f, g, h, i
170	Puketutu Island volcano	Māngere	V	Puketutu Island is an isolated compound volcanic centre, with tuff ring remnants, several scoria cones, and many lava flows, some submarine, covering an area of 2.1km^2. Although it is extensively quarried, Puketutu is one of only three examples in the Auckland volcanic field where a complete volcano consisting of tuff ring remnants, scoria cones and lava fields is nearly intact. It is one of only three island volcanoes in the field and the only one in the Manukau Harbour. On	a, c, d, e, f, h, g

				the west side of the island is the best example in New Zealand of a lava flow intruding and baking soft sediment, pushing up an anticline of tuff and intruding as dikes along the fractured anticline crest.	
171	Purewa Estuary	Ōrākei	C	This is the best example of a small, drowned stream valley estuary on the Auckland isthmus, where near pristine estuaries are rare. The mud and mangrove-filled estuary remains unmodified upstream of Meadowbank Railway Station. The estuary played an important role in the geological history of Ōrākei Basin.	c, e, g, i, l
172	Rakino greywacke and basal Waitematā section	Rakino Island, Hauraki Gulf	D	The coast between Orange Bay and the north end of Māori Garden Bay contains good examples of a chert and grey argillite sequence; a well-rounded argillite boulder beach; and basal Waitematā sequence sediments.	a, c, l
173	Rakitu Island Black and White Rock	Rakitu Island (Arid Island), Hauraki Gulf	E	A basalt lava flow within a rhyolitic sequence is located on a large intertidal rock off Ora Point. This is the only known basalt in the Great Barrier region.	a, b, d, l
174	Rakitu Island obsidian breccia	Rakitu Island (Arid Island), Hauraki Gulf	E	Pyroclastic rhyolite breccia with blocks of brown and grey obsidian occurs in the lower part of Ora Point, Rakitu Island. This is the only coastal occurrence of obsidian in the Great Barrier region.	a, b, d, l
175	Rangiriri Spit (Pollock Spit)	Pollok	C	Rangiriri Spit is an excellent unmodified example of an active shell spit, located at the entrance to a small inlet	a, c, e, g, h, i

				on the on the western side of Manukau Harbour.	
176	Rangitoto Island	Rangitoto Island, Hauraki Gulf	V	Rangitoto Island perhaps the most iconic landform in the Auckland region. It is the youngest and largest volcano in the Auckland volcanic field and has an uneroded lava surface formed from numerous a lava flows covering approximately 23km². The summit consists of several scoria mounds, with a main central scoria cone containing a 60m deep crater. Recent research has confirmed that Rangitoto volcano is the result of two separate eruptions, which may have occurred as long as several decades apart. A cone to the north of the main summit cone was formed during the earlier eruption. Rangitoto Island also has smaller lava features of geological significance, including several lava caves and examples of a lava flow surfaces and levees. Near Rangitoto wharf is the only known example in New Zealand of pillow lava lobes that flowed into the sea and were rapidly cooled in the intertidal zone.	a, b, c, d, e, f, g, h, i, k, l
177	Raventhorpe tuff ring	Bombay	A	The reasonably well-preserved Raventhorpe tuff ring is the largest of five tuff rings in this part of the South Auckland volcanic field. Lavas from the Bombay cones are thought to have partially filled the Raventhorpe tuff ring forming a lava lake up to 3m thick, before overflowing northward via a breach in the tuff ring	a, c, d, e, i

				wall.	
178	Red Beach Miocene flysch	Red Beach	E	An excellent exposure of a penecontemporaneous slump within a Waitematā flysch sequence.	a, c, g, l
179	Red Hill volcanic centre	Red Hill	A	Excellent exposures of bedded tuff resulting from explosive eruption phases in a complex volcanic centre that was active c. 1.1 million years ago.	a, b, d, g, l
181	Rotoroa Island, North Kaheno Cove folded greywacke	Rotoroa Island, Hauraki Gulf	D	Excellent fresh exposures of multi-phased folds in thin-bedded argillite and greywacke occur in the shore platform and cliff base for 400m northwards from the north end of Kaheno Cove.	a, c, i, l
182	Rotoroa Island, South Kaheno Cove coastal stack	Rotoroa Island, Hauraki Gulf	E	At the south end of Kaheno Bay, an excellent example of a coastal stack with an arch and guts are eroded in greywacke with well-exposed faults and folds of varying kinds.	a, c, e, l
183	Scotlands lava cave	Onehunga	F	This lava cave is a simple straight tube, about 200m long, which varies in width from 10m to 2m and is 2-3m in height. In the northern portion, roof sags form two pillars in the middle of the cave.	a, c, d, i
184	Shackleton Road caves - Carrads lava cave	Mount Eden	F	A good example of a lava cave, about 90m in length. The cave is up to 6m wide and 2-3m high and is accessed from a large entrance on the southern side of Shackleton Road. The negotiable part of the cave terminates in at a rock fill, about 20m beyond which there is a continuation of the same lava tube. This is the larger of two subparallel	a, c, d, i

				caves (see also Easties lava cave), and it was modified for use as an air raid shelter during World War II.	
185	Shackleton Road caves - Easties lava cave	Mount Eden	F	This 70m long lava cave is the smaller of two subparallel caves (see also Carrads lava cave). The cave consists of two main sections separated by rockfill, a sewer pipe and debris. Near the entrance, the passage is 10m wide and 3m high, while the second part of the cave is 4m wide, 2-3m high and 40m long.	a, c, d, i
186	Shoal Bay chenier shell spits	Shoal Bay	C	Several narrow shell spits on west and north sides of Shoal Bay provide good examples of shell cheniers accreted parallel to the shore and now separated from it by low mangrove forest.	a, c, e, g, h, i, l
187	Snells-Algies point siliceous mudstone	Kawau Bay	D	The freshest and most extensive exposure of Cretaceous siliceous mudstone (Whangai facies) in the Auckland Region is exposed in Snells-Algies point cliffs and shore platform.	a, c, g, i, l
188	South Kaipara dune lakes	Woodhill Forest	C	Lake Kereta and the associated lakes to north and south provide excellent examples of elongate freshwater lakes between dunes of different ages.	a, c, e, f, h, i
189	South Pakatoa shore platform	Pakatoa Island	B	This is a good representative example of a high tidal shore platform eroded into thin-bedded argillite and greywacke. An incipient sea stack has almost formed by erosion on the end of the point.	a, c, l
190	South RotoroaIsland boxwork weathering	Rotoroa Island, Hauraki Gulf	B	Located in coastal cliffs, this is an excellent example of boxwork weathering (a	a, c, i, l

				characteristic rectangular weathering pattern) in jointed greywacke.	
191	South Te Henga pillows and hyaloclastites	Bethells Beach	D	Coastal cliffs south of Te Henga Beach contain well-exposed examples of pillow lavas and hyaloclastites.	a, c, g, l
192	Southdown pahoehoe lava flows incl. Ann's creek	Penrose	B	One of few examples of pahoehoe surfaces on basalt lava flows in the Auckland volcanic field. Several small flow lobes (probably from Mt Wellington volcano) are visible from the coastal walkway on Māngere Inlet and at Ann's Creek between Great South Rd and the railway line.	a, c, d, g, i
193	St Heliers - Karaka Bay Waitematā Group and shoreline	Saint Heliers	D	This coastal section is the best on the Auckland isthmus to study exposures of a wide range of Waitematāsandstone strata and structures. Other features include unusual greywacke/ultramafic inclusions in tuff from St Heliers volcano (in boulders on the beach) and Holocene beach rock conglomerate. Ladies Bay is the only remaining example of a largely natural, unmodified beach on the southern coast of the Waitemata Harbour.	a, b, c, g, h, i, l
194	St Heliers explosion crater	Saint Heliers	V	This site is a simple explosion crater with neither scoria nor lava, located on an older sedimentary ridge. The explosion crater is about 500m in diameter, with a swampy floor now occupied by Glover Park. The northern crater rim has been eroded to form a sea cliff, in which tuff from the volcano is	a, c, d, f, g, h, l, e

				visible.	
195	St Leonards Beach, Takapuna, flysch and slump unit	Takapuna	D	An intertidal reef and section of cliffs provides a well-exposed outcrop and well studied sequence of typical Waitemata Group deep water flysch, with a wide range of sedimentary structures, including a parcel of intensely folded beds.	a, c, g, l
196	Stewarts lava cave (Mortimer's Cave)	Mount Eden	F	This is an excellent example of a relatively complex lava cave. The two-part lava cave is about 180m long, with three levels, and a cave-in-cave feature. It also contains typical lava cave wall features such as lava rolls and drip formations.	a, c, d, i
197	Tāhuna Tōrea cuspate foreland and shell spit	Glendowie	C	Tāhuna Tōrea is the largest, most accessible and outstanding example of a cuspate foreland formed from two sand/shell spits in the Auckland region. A low triangular shell and sand spit encloses salt marsh and ponds at the western end, with a narrow shell spit extending a further 1km out across the Tamaki Estuary. The distal shell spit shifts in response to wind, wave and tidal action.	a, b, e, f, g, i, l
198	Takanini pumicite	Takanini	E	An excellent example of a primary tephra deposit from Taupo Volcanic Zone is exposed in the eroded face of a low coastal cliff at Pahurehure Inlet. The non-welded ignimbrite was not extensively modified by estuarine processes during deposition.	a, c, g, h, i
199	Takapuna chabazite	Takapuna	E	The most silica-poor reported, sedimentary chabazite occurs in thin tuff beds composed	a, b

				dominantly of chabazite, with minor amounts of andesine, quartz and chlorite	
200	Takapuna Reef fossil forest and cliff lava exposures	Hauraki	B	This site encompasses two contiguous areas of lava flows from Pupuke volcano in which there are well preserved lava moulds and casts of trees, many of which appear to have been in growth position at the time of the eruption. Takapuna Reef Fossil Forest is one of the best examples in the world of a lava- preserved fossil forest. There is evidence that multiple lava flows passed through a standing forest here. In the cliffs to the north, there are tree moulds up to 2m in diameter as well as good examples of gas blisters and segregation vesicles in the lava.	a, b, d, e, f, g, i, l
201	Tamaki Campus basalt	Saint Johns	E	This cutting is the only exposure and remaining evidence of lava spilling northwards over ridge from Mt Wellington towards Glen Innes. Columnar jointing is clearly visible in the lava flow.	a, c, g, i
202	Tamaki estuary rhyolitic ignimbrite	Pakuranga	E	Some of the best exposures in the Auckland region of rhyolitic ignimbrite flow deposits, showing that Auckland is within the range of superheated pyroclastic flows erupted from the centre of the North Island. The southernmost part of the site includes a section through fossil forest, peat deposited during three climate cycles, ignimbrite with branch moulds, a small incised valley and	a, c, g, h, I, l

PC 22 (Awaiting Minister of Conservation sign off)

				further rhyolitic tephra. The deposits here are 3m thick and bury charred vegetation.	
203	Tank Farm volcano	Shoal Bay	V	Tank Farm volcano is a simple but well-preserved explosion crater and tuff ring (about 800m diameter), breached by the sea to the southeast and partially filled with intertidal mud. No lava or scoria appears to have been erupted.	a, c, d, e, g, h, i, l
204	Tāpapakanga Stream terraces	Orere Point	A	The lower reaches of the Tāpapakanga Stream valley contain excellent examples of terraces cut into alluvial gravel and sediment. Well-developed alluvial stream terraces are rare in the Auckland region.	a, b, e, g, h, l
205	Tapora dunes	Tapora	A	This area consists of a large Holocene sand dune system, now mostly stabilised beneath pasture. Dune patterns are relatively complex due to the position of the dune field opposite the Kaipara Harbour entrance. The sand topography has produced a varied coastline including sand islands and sheltered inlets such as Gum Store Creek.	a, c, e, h
206	Tauhoa River multi- coloured mudstone	Wharehine	E	An easily accessible foreshore exposure of the clay-rich multicoloured Paleocene mudstones that helped lubricate the sliding of Northland allochthon.	a, b, g
207	Tauhoa Road serpentinite	Mangakura	E	This roadside exposure of a serpentinite lense entrained by Northland allochthon is the only exposure of serpentinite blocks remaining in the Auckland Region after	a, b, g

				others have been quarried away completely.	
208	Tāwharanui Beach and dunes	Tāwharanui Peninsula	C	The beach and dunes on the northern side of Tāwharanui Peninsula are some of the least modified and best-protected examples remaining on the east coast of the region. Elsewhere, beaches and dunes are frequently threatened by development or coastal structures. A tsunami deposited sand sheet occurs among the dunes.	a, c, e, g, h, i, l
209	Tāwharanui fossiliferous Jurassic section, Anchor Bay	Anchor Bay	B	The shore platform on the northern side of Tāwharanui Peninsula features an exposure of basement fossils in Jurassic rocks. This is a very rare occurrence in Northland.	a, b, g, l
210	Taylor Hill scoria cone (Taurere)	Glendowie	V	Taylor Hill volcano produced a simple tuff crater about 900m in diameter, with several small scoria cones around at least five vents. Two small lava flows moved down valleys to the east (where there is now a freshwater spring) and northwest. Much of the central scoria cone cluster is within Taylors Hill Reserve.	a, c, d, e, f, g, h, i, k
211	Te Atatu fossil forest	Te Atatu	E	Remnants of forest vegetation of Pleistocene age are exposed at intertidal levels near the northern end (eastern side) of Te Atatu peninsula.	a, c, g, h, i
212	Te Henga - Erangi Pt. Kauwahaia Island and sea caves	Waitākere Bay	A	Erangi Point and Kauwahaia Island provide an excellent and scenic example of the exposed rocky coastline and islands of Auckland's west coast. Erangi Point	b, c, g, f,

				features two of the best examples of sea caves that pass right through a point, anywhere in New Zealand.	
213	Te Henga/ Bethells dune dammed swamp	Muriwai	C	This is the largest wetland remaining on the Auckland mainland and is a landform of scientific, educational and scenic importance. Holocene sand dunes dammed the Waitakere River to form the wetland, which extends c.5km inland. Beneath the wetland, there are sandy cockle-shell bearing sediments that accumulated here when this was a tidal estuary in the middle Holocene.	a, c, e, f, g, h, i, l
214	Te Komoki exfoliation dome (Jackie Hill)	Huia	B	The weathered exfoliation dome of Te Komoki is a prominent landform of primarily scenic value on the south side of Little Huia Bay.	c, e, f, l
215	Te Muri Beach and Estuary, Mahurangi	Puhoi	C	One of the least modified examples of a small estuary remaining on the east coast of the region. Partially enclosed behind a Holocene beach deposit (Te Muri Beach).	c, g, i, l
216	Te Muri salt marsh and shell spits	Wairoa Bay	C	One of best examples of salt marsh and shell spit in the Auckland region.	c, g, I, l
217	Te Toro Quaternary sands	Pollok	E	This site contains an exposure of sands which predates the eruptions of Taranaki and Taupo volcanic centres and the subsequent current transport of black sands northwards along the coast. The base of the section is unconformable upon much older weathered Waitematā Group sediments.	a, b, g
218	The Arches, Tiritiri Matangi	Tiritiri Matangi Island, Hauraki	B	A spectacular series of four, 4-8m high arches is	b, e, l

	Island	Gulf		eroded through greywacke cliffs midway along the east coast of Tiritiri Island, 50m north of Fisherman Bay.	
219	The Gap volcaniclastic conglomerate and Taitomo Cave, South Piha	Piha	A C - Blowhole	This site, including Nun Rock, Taitomo Island, The Gap and nearby cliffs forms the best example of contemporary sea arches and blowholes on the west coast of Northland and Auckland. It is also the best exposure of high energy, marine coarse volcaniclastic facies in the Waitākere Ranges. A marine volcaniclastic conglomerate sequence contains features such as lenses, wedges, low angle cross-beds and dikes. Two tunnels are cut through the breccia, the Kaiwhare Blowhole along a joint plane, and Taitomo Island tunnel along a dike	a, b, c, e, f, g, l
220	The Tor - Torbay stack	Torbay	B	'The Tor' at Torbay is a well formed sea stack of geological and scenic significance.	c, e, f, l
221	The Watchman dacite dome and crater	Karekare	A	At the foot of the northern cliffs of The Watchman and in cliffs behind UnionBay, are the only flow-banded dacite in the Waitakere Ranges (a good example of flow structures in volcanic rocks) and a well-exposed crater from an initial explosive eruption. The large, multiple crater is filled by a thick pile of rubbly breccia (andesite and dacite) and several extrusional tongues of folded, flow-banded dacite (forming The Watchman).	a, b, c, e, f, i, l
222	Three Kings volcano (Te	Mount Roskill	V	Three Kings volcano was formerly the most	a, c, d, e, f, g, h

	Tatua A Riukiuta)			complex centre in the Auckland volcanic field, but has now mostly been quarried away. The initial explosive phases of the eruption produced a large tuff ring, 1km in diameter, and spread substantial lapilli and ash deposits more than 2km to the east and north. Five moderately sized scoria cones and many other smaller cones surrounded some 20 discernible vents. Of the scoria cones, only Big King has been partly protected by its reserve status. Lava flows spread around the crater, and northwestwards to the vicinity of Western Springs. A quarry face exposes tuff on the eastern side of Mt Eden Rd.	
223	Ti Point basalt	Ti Point	A	The type locality for Ti Point basalt, which erupted in the mid-late Miocene. The exposed eastern coast of Ti Point contains scenic cliffs eroded from this rock.	a, b, e, l
224	Tiritiri MatangiIsland shore platform	Tiritiri Matangi Island, Hauraki Gulf	D	An excellent example of a well- developed shore platform cut in greywacke surrounds most of Tiritiri Matangi.	a, c, e, i, l
225	Toroanui and Okiritoto Falls	Waimauku	C	Two prominent falls within 300m of each other on the Okiritoto Stream flow over near-horizontal early Miocene sedimentary strata. Significant waterfalls are rare in this area.	b, e
226	Waiatarua Swamp	Remuera	C	One of best examples in Auckland of a freshwater lake formed by the damming of a valley by a lava flow (from Mt Wellington). Lake sediments contain	b, e, g, h

				tephras from Mayor Island and central North Island volcanoes and a pollen record of vegetation changes in Auckland.	
227	Waiheke Island, Blackpool spilite pillow lava	Huruhi Bay, Waiheke Island	E	The Blackpool spilite is a 3m dark green spilitic pillow lava with calcite interstices bearing pyrite. It is of Triassic age and a good example of basement volcanics in the region.	a, c, d, l
228	Waiheke Island, Double "U"Bay shallow marine Miocene fossils	Waiheke Island, Hauraki Gulf	E	This site contains rich shallow water macrofauna in a deepening sequence and is type locality of a number of fossil molluscs. The cliff and intertidal exposure is one of three rich Miocene fossil localities on Waiheke Island.	a, b, g, h, i, l
229	Waiheke Island, Fossil Bay fossils and rock sequence	Waiheke Island, Hauraki Gulf	E	This site contains well-exposed shallow water fossiliferous sediments overlying bored and eroded basement rocks and is the type locality of many unusual fossil species. The sediments contain a rich shallow macrofauna including in-situ reef corals.	a, b, c, h, l
230	Waiheke Island, Island Bay submarine volcanics	Waiheke Island, Hauraki Gulf	D	This site contains an easily accessible, well-exposed coastal section through fresh Waipapa greywacke sequences, containing pillow lavas and chert. It differs from most of the greywacke sequences on Waiheke Island, which are dominantly thick sandstone.	a, b, d, g, l
231	Waiheke Island, Motukaha gravel tombolo	Church Bay, Waiheke Island, Hauraki Gulf	C	This is the best example of a narrow gravel tombolo in the region. A cobble and pebble	c, e, g, i, l

				tombolo 2-8m wide stretches 200m across the gap between Waiheke Island and Motukaha Island.	
232	Waiheke Island, Oneroa Beach Miocene fossils	Oneroa, Waiheke Island, Hauraki Gulf	E	A rock outcrop that is occasionally exposed in the sand on OneroaBeach is one of only three localities on Waiheke Island containing well-preserved early Miocene fossils.	a, c, g, h, l
233	Waiheke Island, Pohutukawa Point chert stack	Rocky Bay (Whakanewha Bay), Waiheke Island, Hauraki Gulf	B	This is the most easily accessible and one of best examples of red chert on Waiheke Island. The hard chert rock forms the narrow ridge of Pohutukawa Point along with a small but impressive stack at its seaward end.	c, e, g, l
234	Waiheke Island, Te Matuku Bay shell spit and tidal marsh	Te Matuku Bay (Mcleods Bay), Waiheke Island, Hauraki Gulf	C	Te Matuku Bay contains an excellent example of a small chenier shell spit and enclosed tidal marsh.	c, e, f, i, l
235	Wainamu dune- dammed lakes	Bethells Beach	A	This scenic locality with its combination of two freshwater lakes and an inland dune, which is still mobile, is unique in the Auckland Region. Lake Wainamu and Lake Kawaupaka were formed when active sand dunes dammed the stream valleys.	c, e, f, g, i, l
236	Pukewairiki tuff ring	East Tamaki	V	The Pukewairiki (Waiouru) tuff ring has an indistinct, crater- like depression about 300m in diameter. The crater is breached to the southwest by tidal creeks and has an 8m terrace along the Tamaki River. It is one of the oldest volcanoes in the Auckland volcanic field.	a, c, d, e, f, g, l
237	Wairoa River Gorge	Clevedon	A	Formed along the Wairoa fault trace, the Wairoa River gorge is one of few	c, e, h, i

				good examples of steep, incised river gorges in the Auckland region.	
238	Waitākere Falls	Waitakere	C	Although water flow is restricted by the adjacent water reservoir, Waitākere Falls are among the best and highest examples of the waterfalls that feature in the Waitākere Ranges.	c, e, f, g, l
239	Waitangi Falls conglomerate, Omeru Scenic Reserve	Kaukapakapa	C	The scenic Waitangi Falls are a good example of a waterfall held up by erosion-resistant conglomerate rock. This is the best, most-easily accessible place to see the Helensville Conglomerate unit. Omeru Scenic Reserve	c, e, f, g, i
240	Waitangi Falls, Glenbrook	Glenbrook	C	These low falls at the head of a small tidal estuary are one of the two most significant waterfalls over a basalt lava flow in the South Auckland volcanic field.	c, d, e, f, g, i
241	Waitomokia foreshore tuff with sedimentary bombs	Mangere	E	Excellent exposures of tuff deposits are cut into the outer slopes of Waitomokia volcano in the foreshore near Oruarangi Creek. The tuff contains bombs including ‘samples’ of older sedimentary rocks torn from beneath the Manukau lowlands by the erupting volcano.	b, g,
242	Waiwera Parnell Grit	Waiwera	D	An easily accessible educational cliff exposure showing a complex volcanic sediment gravity flow (Parnell Grit) interbedded with flysch.	a, c, d, g, l
243	Watchman Islet	Watchman Island	B	Watchman Islet is a small top hat islet eroded from a drowned Waitemata Sandstone ridge. The shore platform is more resistant to	c, e, f, i, l

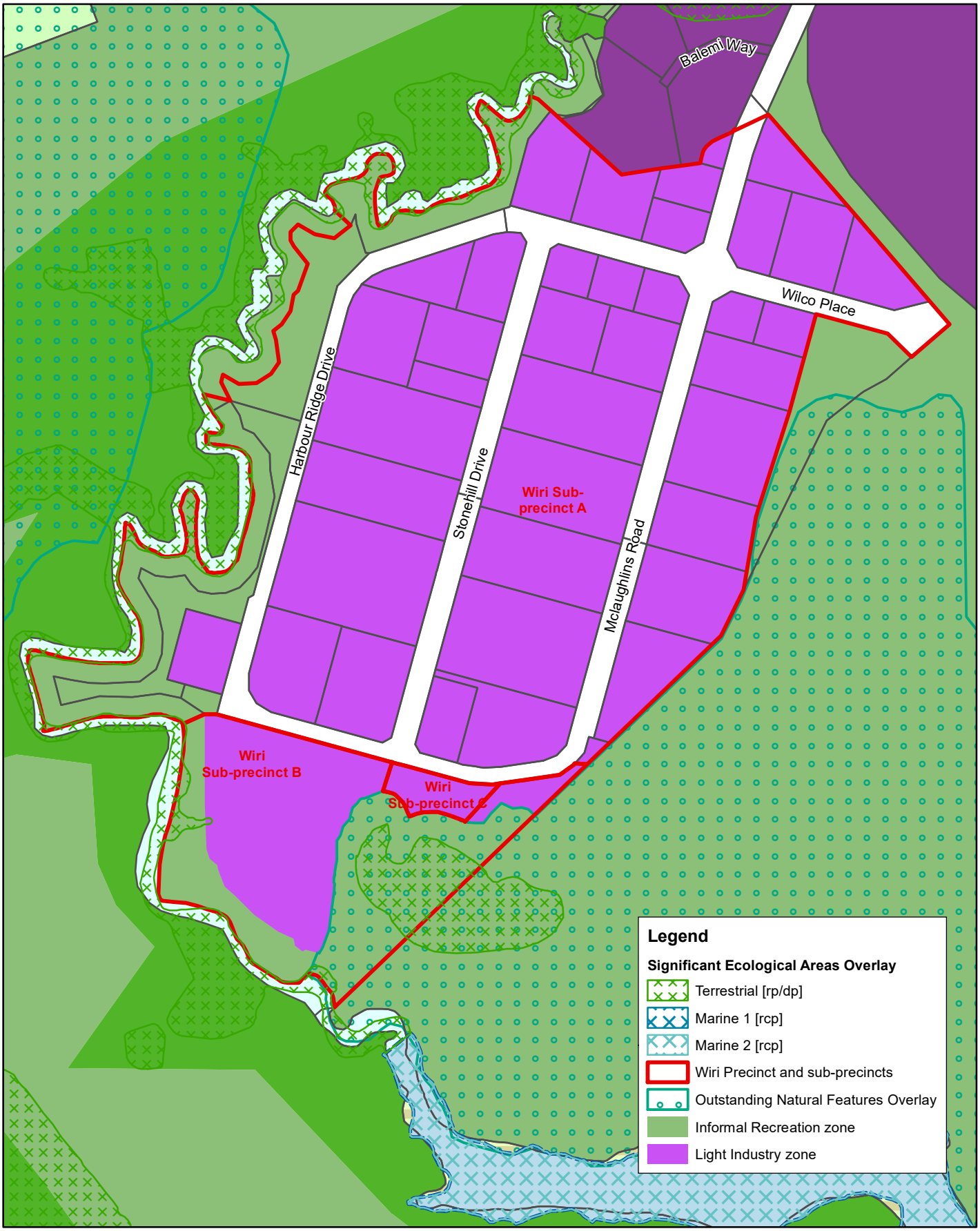
PC 22 (Awaiting Minister of Conservation sign off)

				erosion than the islet. The islet is a small but well-known landscape feature of the Waitemata Harbour.	
244	Wēiti River shell spits	Karepiro Bay	C A1	Some of the best examples in New Zealand of actively forming intertidal shell spits. These have been used to derive a record of past sea level change. (The 'A1' identification applies to the motor camp at the end of Duck Creek Road which is a more modified but still recognisable part of the feature).	a, b, e, g, h, i, l
245	Wenderholm Sand Barrier & Puhoi Estuary	Puhoi	C	Puhoi Estuary is an excellent example of a drowned river valley contained by a bay-mouth sandspit (Wenderholm Sand Barrier). Former beach ridges emplaced prior to the formation of the sandspit are visible on a flat to the south side of the estuary.	a, c, e, f, g, h, i, l
246	Wesley Bay-Cape Horn section	Waikowhai Bay	D	This site consists of shore platform and exposed cliffs along the coast from the east end of Wesley Bay to 200 m west of Cape Horn. The area contains excellent exposures of a wide range of features that characterise this part of the Waitemata Basin on the lower flanks of the Waitākere Volcano. It is also the type locality for a few microfossils and macrofossils.	a, c, e,i g
247	Western Springs and lava outcrops	Western Springs	B	Western Springs contains exposures of the natural edge of Auckland's longest lava flow, with excellent examples of columnar jointing, vesicles and small lava tongues, some with pahoehoe surfaces.	a, c, d, e, g, i

				Natural springs flow from cracks in the lava flow. These features were much more common prior to the urban development of Auckland.	
248	Whangaparaoa Peninsula Waitemata Group deformation	Army Bay	D	The cliffs and intertidal platforms of the rocky coastline at the end of the Whangaparaoa Peninsula are made up of sedimentary Waitemata Group rocks that were deposited during the Miocene. Together the cliffs and shore platform in the northern part of the area are one of several sites on the Whangaparaoa Peninsula that display a regionally important three dimensional exposure of folds and faults in these rocks. The shore platform is extensive and is considered to be a landform of regional geological importance. Whangaparaoa Head has two significant geological features, a vertically tilted strata and an area of Parnell Grit with huge blocks of displaced basalt forming the point east of Army Bay.	a, c, e, g, l
249	Whatipu Caves and pyroclastic breccia dikes	Huia	F	At back of the Whatipu coastal flat is a group of 4-5 caves, eroded by the sea along the joints and old volcanic necks and pipes in Waitakere Group volcanic breccias. The caves were abandoned by the sea due to the aggrading coastline. The site also includes the best- exposed group of pyroclastic dikes of volcanic origin in northern New Zealand.	a, b, e, f, g, i, l
250	Whatipu coastal flats	Huia		The Whatipu coastal flat is an extensive and	a, b, e, f, g, i, l

				impressive wilderness area of sandf lats and low dunes, most of which were deposited between 1900-1930. A shifting network of wetlands occupies poorly drained areas among the dunes The site is the best example of rapid recent sand aggradation in New Zealand. Significant coastal erosion has affected the area in recent years.	
251	White Bluff structures	Hillsborough	D	One of the best exposures of complexly deformed Waitemata Group rocks, showing faults and folds in coastal cliffs and on the foreshore.	a, c, e, g
252	Whites Beach crater	Anawhata	D	One of the three best exposed craters in Waitakere Ranges, Whites Beach crater is a 1km wide vent filled with pahoehoe flows, autoclastic breccia, a small pillow lava flow, and intruded by andesite.	a, c, e, g, l
253	Wiri lava cave	Wiri	F	Wiri lava cave is the best example of a lava cave in New Zealand and at 290m, is also the longest known lava cave in the country. The cave lies within the northeast slopes of Manurewa, a small volcanic cone (now mostly quarried away). The cave is a linear tube that has conveyed molten lava through the lower slopes of the scoria cones and out into the lava flow field. The passage cross- sections vary in shape to include circular, semi- circular, gothic, triangular and irregular, and terraces, benches, and kerbs	a, b, c, d, I, k

				modify these shapes. The floor displays areas of smooth pahoehoe, and clinkered a surfaces and the main gutter shows festooning of the surface. Small teat stalactites are common and refluxing of the walls has caused minor flowstone to develop in places.	
254	Wonga Wonga Bay submarine slide	Huia	E	A unique example, probably in New Zealand, of a section of dike caught up in a submarine slide deposit is visible in the cliffs of Wonga Wonga Bay. A 4m x 1m section of andesite dike is enclosed in chaotic deposits of a submarine slide that slid down the slopes of the early Miocene Waitākere Volcano.	a, b, g, l
255	Ascot – Mitchelson Roads lava caves	Remuera	F	A small group of lava caves identified by ground penetrating radar, without access from the surface.	a, d, i



PPC 43 - Wiri Precinct