

**SOIL CONTAMINATION SCREENING
PROPOSED DENTAL FACILITY
HENDERSON INTERMEDIATE SCHOOL**

Prepared for:

Waitemata District Health Board
Private Bag 93 503
Takapuna
North Shore City, 0740

Report Date: 17 May 2010
Project Ref: ENVINEWP51028

Written/Submitted by:



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ENVINEWP51028-R001

17 May 2010

Waitemata District Health Board
Private Bag 93 503
Takapuna
North Shore City, 0740

Attention: Rodney Harvey

Dear Rodney

RE: Proposed Dental Facility at Henderson Intermediate School

Please find attached our report presenting the Soil Contamination Screening completed for the proposed dental facility at Henderson Intermediate School. This project was conducted in accordance with our proposal dated 9 December 2009.

If you have any queries or you require any further clarification on any aspects of this report, please contact the undersigned.

For and on behalf of Coffey Environments NZ Limited.



Shane Moore
Environments Manager, New Zealand

RECORD OF DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Prepared for:	Initials
1	ENVINEWP51028-R001	DRAFT	17 May 2010	Waitemata District Health Board	
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1 INTRODUCTION

1.1 Terms of Reference

This report has been prepared for the Waitemata District Health Board (WDHB) in accordance with Coffey Environments NZ Limited (Coffey) proposal dated 9 December 2009 and instructions received from Rodney Harvey, Project Manager Oral Health for the WDHB on 14 April 2010.

1.2 Objectives

Coffey understand that the WDHB is in the process of developing a dental facility within a portion of the Henderson Intermediate School property at 70 Lincoln Road, Henderson. The development involves excavation of trenches for buried services, as well as excavation of pile holes for the foundations of the dental facility building. We understand that WDHB require completion of soil contamination screening investigation in order to identify suitable locations for the disposal of any excess spoil resulting from the earthworks phase of the development. Coffey were therefore engaged by the WDHB to collect and analyse soil samples from the areas where excavations will occur during the development.

1.3 Scope of Works

The following scope of works was undertaken:

1. A review of historic aerial photographs in order to broadly assess the history, previous land use and potential source(s) of contamination at the site.
2. An intrusive site assessment to investigate the potential presence of contaminant residues which may have resulted from historic land uses. This stage of the works included:
 - Development and implementation of a targeted soil sampling plan to screen the proposed excavation areas based on the site development plan. Soil samples were collected from five (5) locations across the proposed development site.
 - Submission of soil samples to an accredited analytical laboratory for a combination of heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc) and organochlorine pesticide (OCP) analyses.
 - Comparison of laboratory results with the relevant health based soil screening criteria for residential land use, including maintenance / excavation activities, to assess the potential risk to human health during and after the proposed redevelopment of the site.
 - Comparison of laboratory results with the Auckland Regional Council (ARC) / Ministry for the Environment (MfE) cleanfill criteria to assess potential options for the reuse or disposal of excess spoil which may be generated during the earthworks phase of the proposed development.
 - Preparation of this report summarising the findings of the assessment.

2 SITE DESCRIPTION AND HISTORY

The proposed site for the dental facility is located within the Henderson Intermediate School grounds in the south western quadrant of the property, in an undeveloped grassed area immediately south of the playing fields, as indicated in the Kay & Keys architectural outline plan of works (refer to Appendix A).

The neighbouring properties in all directions are residential. Commercial properties, occupied predominantly by retail sales businesses, are located approximately 200 m towards the north east of the site, across Lincoln Road.

The Henderson Intermediate School is situated approximately 25 m to 30 m above mean sea level (amsl) between the Henderson Creek and the Huruhuru Creek which ultimately discharge to the Auckland harbour, located approximately 800 m east of, and approximately 900 m north-north west of the site, respectively. The geology of the area is described as comprising pumiceous deposits of the Puketoka Formation of the Tauranga Group. Soils of the Tauranga Group are classified as non-volcanic marine or alluvial sediments of the Pleistocene to Holocene periods. These materials range from light-grey to orange-brown, pumiceous mud, sand and gravel with black muddy peat and lignite (Kermode 1992¹), however, the finer grained materials tend to be dominant.

It is expected that a shallow perched aquifer is likely to exist within the Puketoka Formation, however, groundwater, was not intersected or investigated as part of this assessment.

Historic aerial photographs (refer to Appendix B) indicate that neighbouring sites were utilised for horticultural purposes between at least 1940 and 1959. Horticultural activities are considered a potential source of heavy metals and organochlorine pesticides (OCPs). However, no other potential sources of contaminants are evident in the immediate vicinity of the site with the more recent commercial uses of the adjacent properties considered unlikely to have impacted the site given the separation and typically low permeability ground conditions associated with fine grained materials observed on site (refer to Appendix C).

The storage and use of dangerous goods by grounds staff at the school were considered unlikely to have potential to cause significant contamination as any spills / losses would result in localised surface contamination. Furthermore, the majority of such spills / losses are likely to occur within the immediate vicinity of the dangerous goods storage building during maintenance / refuelling activities. The dangerous goods store is located approximately 150 m from the proposed location for the dental facility, therefore migration of any contaminants (if present) is considered unlikely.

¹ Kermode, L.O. (1992) Geology of the Auckland urban area. Scale 1:50 000. Institute of Geological & Nuclear Sciences geological map 2. Institute of Geological & Nuclear Sciences Limited., Lower Hutt, New Zealand.

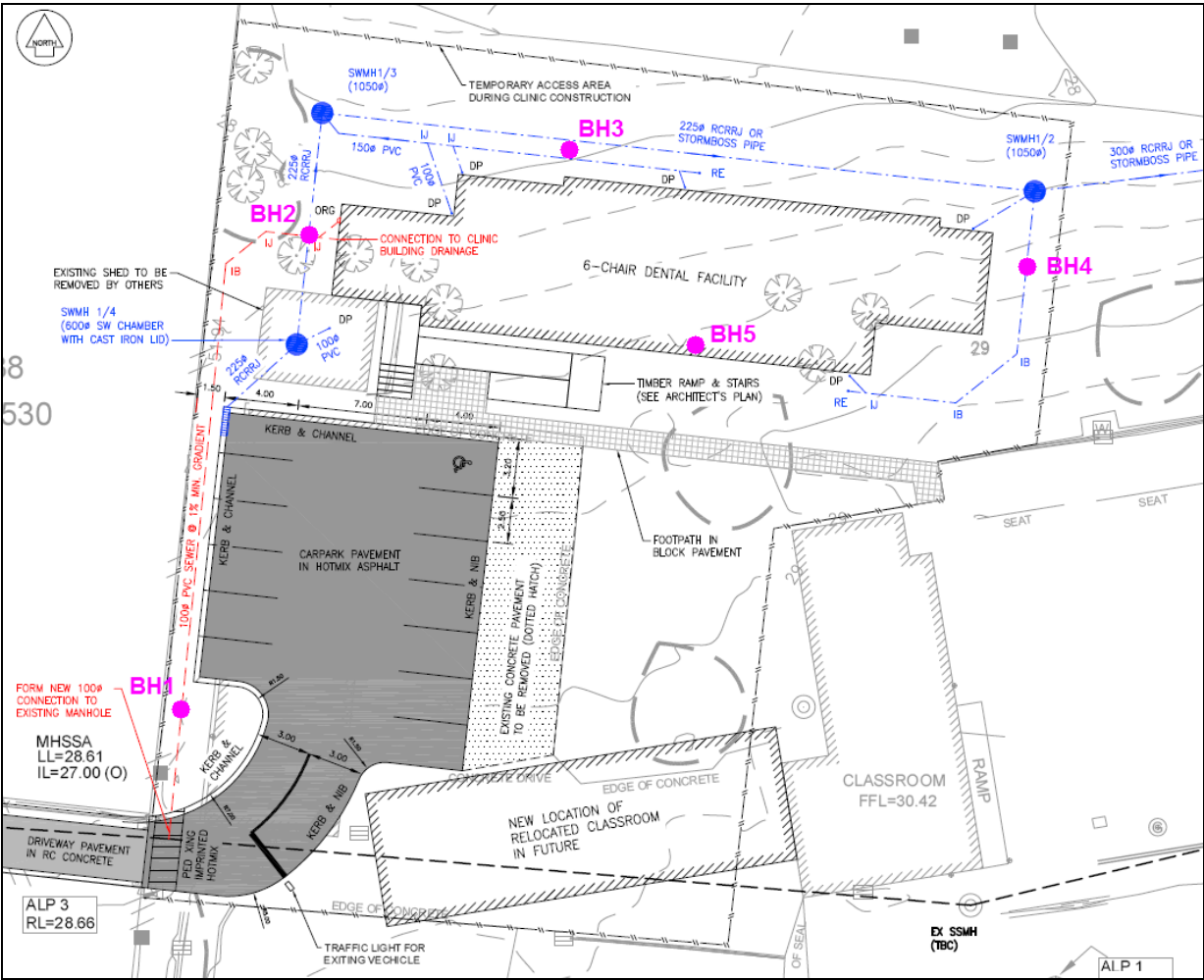
3 METHODOLOGY

Five boreholes were augered in locations where service trench or pile hole excavations are proposed (refer to Figure 1). Soil samples were collected directly from the hand auger using a clean pair of nitrile gloves to dislodge each discrete sample, before placing the soil directly into laboratory supplied sample containers. Following collection all soil samples were immediately placed into chilled storage prior to transport, a total of five (5) samples, from two (2) depths were submitted under standard Coffey Environments chain of custody procedures, to Hill Laboratories in Hamilton for analysis for heavy metals and OCPs. Hill Laboratories Ltd were engaged to conduct all laboratory analysis for quality control and assurance purposes, as they are an International Accredited and New Zealand (IANZ) accredited laboratory.

Following the completion of each borehole and before the collection of each sample, all sampling equipment was decontaminated via a 3 stage process comprising washing with Decon 90, rinsing with potable water and finally rinsing with deionised water.

All soils encountered during sampling were logged in accordance with standard Coffey procedures (based on the New Zealand Geomechanics Society, NZGS 2005). Field data collected during sampling is provided on the field sheets included as Appendix C.

Figure 1: Sample Locations



4 RESULTS

4.1 Quality Assurance Results

4.1.1 Sample Handling and Holding Times

The chain of custody records appended to this report show that the samples were submitted to Hill Laboratories in Hamilton within the generally accepted holding time for these analytes.

4.1.2 Laboratory Quality Control

Hill Laboratories are accredited by IANZ and as such are expected to comply with the accreditation requirements that include the confirmation of validity and suitability of results. Any such breaches in laboratory quality control would be expected to be notified at the time of release of the analytical results. No breaches were reported.

4.2 Soil Results

Soil descriptions, as logged by Coffey personnel during sample collection, are presented in borehole logs appended to this report (refer to Appendix C). The soils encountered on site were consistent with descriptions of the local geology (Kermode 1992²). These soils are considered part of the non-volcanic

The soil analytical results are summarised in comparison to the relevant acceptance criteria, in Table 1. Compounds that were not reported above the level of analytical detection are not shown in Table 1. However, the full analytical report, as received from the laboratory is provided in Appendix D.

The acceptance criteria were selected based on the MfE Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values. As such, New Zealand risk based criteria were selected (if available) over international risk based criteria. The sources of the selected criteria are presented in Table 1. Residential landuse criteria were selected over commercial criteria, even though a dental facility is considered a commercial activity, because the former criteria are calculated by factoring in the presence of children, whereas the latter are based exclusively on adults and are therefore considered less appropriate for the site of the proposed development.

In summary, the results show that soils are suitable for the proposed landuse as well as for Maintenance / Excavation activities. Heavy metals were detected at concentrations within the natural background levels for non-volcanic soils. Furthermore, OCPs were not detected within the laboratory limits of detection.

² Kermode, L.O. (1992) Geology of the Auckland urban area. Scale 1:50 000. Institute of Geological & Nuclear Sciences geological map 2. Institute of Geological & Nuclear Sciences Limited., Lower Hutt, New Zealand.

Table 1: Heavy Metals results

Analyte	Soil Screening Criteria (Residential Landuse)	Soil Screening Criteria (Maintenance / Excavation) ³	ARC TP153 (Non-Volcanic Soils) ⁴	BH1	BH2	BH3	BH4	BH5
Arsenic	30 ¹	1200	12	<2	<2	2.8	<2	<2
Cadmium	10 ²	-	0.65	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	25 ¹	130 000	55	5.2	16.0	10.3	10.1	17.0
Copper	130 ¹	260 000	45	5.4	7.7	9.6	5.8	12.1
Lead	140 ²	-	65	12.8	9.6	18.6	12.5	9.8
Nickel	50 ²	-	35	2.0	2.6	4.7	2.5	2.1
Zinc	200 ²	-	180	<4	7.8	22	9.4	6.5

Notes:

All values quoted in mg/kg.

1 - Health and Environmental Guidelines for Selected Timber Treatment Chemicals, MfE and MoH, 1997

2 - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, (CCME 2002)

3 - Health and Environmental Guidelines for Selected Timber Treatment Chemicals, MfE and MoH, 1997 (Oral Pathway)

4 - Auckland Regional Council Technical Publication No. 153 (2001) Background Concentrations of Inorganic Elements in Soils from the Auckland Region

5 SUMMARY AND CONCLUSIONS

This report has been prepared for the Waitemata District Health Board (WDHB) in accordance with Coffey Environments NZ Limited (Coffey) proposal dated 9 December 2009 and instructions received from Rodney Harvey, Project Manager Oral Health for the WDHB on 14 April 2010.

Coffey understand that the WDHB is in the process of developing a dental facility within a portion of the Henderson Intermediate School property at 70 Lincoln Road, Henderson. The development involves excavation of trenches for buried services, as well as excavation of pile holes for the foundations of the dental facility building. Coffey therefore reviewed historic aerial photographs in order to broadly assess the history, previous land use and potential source(s) of contamination at the site, collected soil samples from the proposed excavation areas and submitted the samples for chemical analyses.

Heavy metals and OCPs were considered potential contaminants, based on the proximity of the site to historic commercial scale horticultural activities.

Soils samples were collected from five (5) locations where excavations are proposed as part of the development of the dental facility. In summary, the results indicate that the soil samples yielded concentrations of heavy metals which comply with the relevant commercial land use criteria, the criteria for Maintenance / Excavation activities and fall within the expected background range for non-volcanic soils in the Auckland Region. Furthermore, organochlorine pesticides were not reported above the level of analytical detection.

It is therefore considered that, in terms of potential contamination, the soil conditions are acceptable for the proposed development. Furthermore, excess spoil resulting from the earthworks phase of the development is considered suitable for either reuse on site or for disposal as cleanfill.

6 LIMITATIONS

The findings of this report should be read together with “Important Information About Your Coffey Environmental Report” attached to this report.

DRAFT

Important information about your **Coffey** Environmental Report

Uncertainties as to what lies below the ground on potentially contaminated sites can lead to remediation costs blow outs, reduction in the value of the land and to delays in the redevelopment of land. These uncertainties are an inherent part of dealing with land contamination. The following notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report has been written for a specific purpose

Your report has been developed on the basis of a specific purpose as understood by Coffey and applies only to the site or area investigated. For example, the purpose of your report may be:

- To assess the environmental effects of an on-going operation.
- To provide due diligence on behalf of a property vendor.
- To provide due diligence on behalf of a property purchaser.
- To provide information related to redevelopment of the site due to a proposed change in use, for example, industrial use to a residential use.
- To assess the existing baseline environmental, and sometimes geological and hydrological conditions or constraints of a site prior to an activity which may alter the sites environmental, geological or hydrological condition.

For each purpose, a specific approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible, quantify risks that both recognised and unrecognised contamination pose to the proposed activity. Such risks may be both financial (for example, clean up costs or limitations to the site use) and physical (for example, potential health risks to users of the site or the general public).

Scope of Investigations

The work was conducted, and the report has been prepared, in response to specific instructions from the client to whom this report is addressed, within practical time and budgetary constraints, and in reliance on certain data and information made available to Coffey. The analyses, evaluations, opinions and conclusions presented in this report are based on those instructions, requirements, data or information, and they could change if such instructions etc. are in fact inaccurate or incomplete.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man and may change with time. For example, groundwater levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project and/or on the property.

Interpretation of factual data

Environmental site assessments identify actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from indirect field measurements and sometimes other reports on the site are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of Coffey through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other problems encountered on site.

Important information about your **Coffey** Environmental Report

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered with redevelopment or on-going use of the site. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. In particular, a due diligence report for a property vendor may not be suitable for satisfying the needs of a purchaser. Your report should not be applied for any purpose other than that originally specified at the time the report was issued.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other professionals who are affected by the report. Have Coffey explain the report implications to professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel), field testing and laboratory evaluation of field samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Contact Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to land development and land use. It is common that not all approaches will be necessarily dealt with in your environmental site assessment report due to concepts proposed at that time. As a project progresses through planning and design toward construction and/or maintenance, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Environmental reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

Appendix A

Architectural Design Plans

**Waitemata District Health Board
Soil Contamination Screening
Proposed Dental Facility at Henderson Intermediate School**

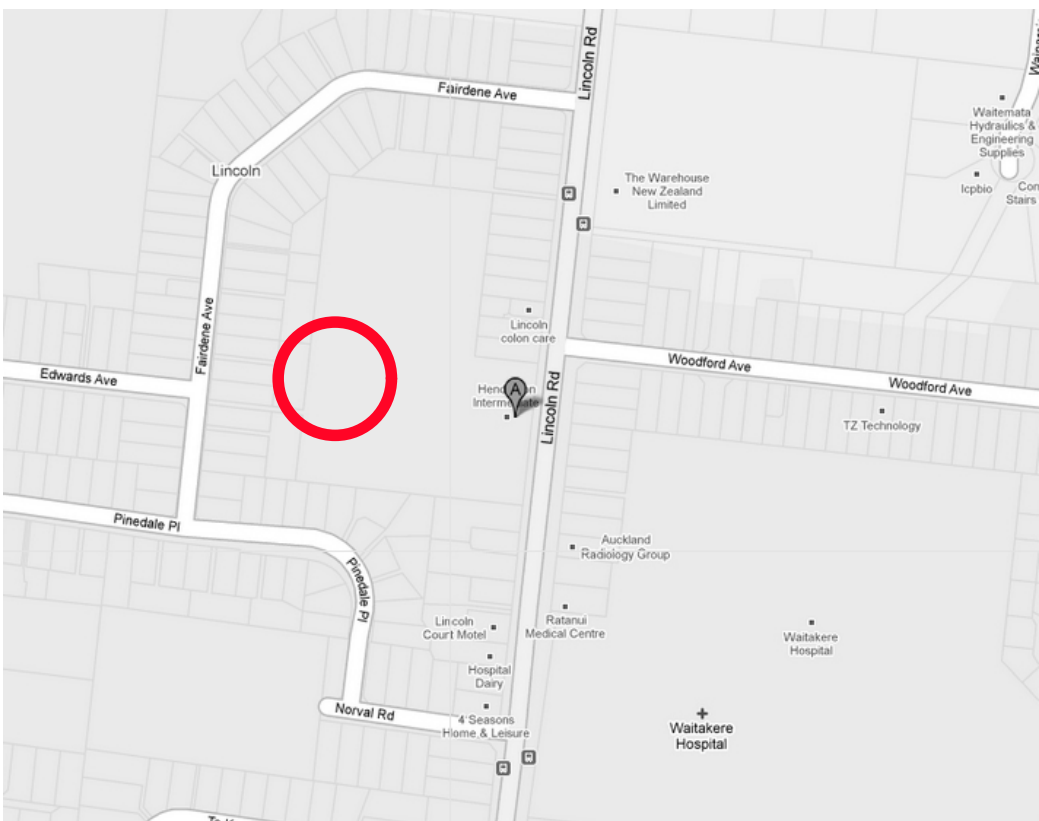
ARCHITECTURAL DRAWING LIST

- 00 COVER SHEET / LOCALITY MAPS
- 01 SITE EXISTING / DEMO PLAN
- 02 PROPOSED SITE PLAN
- 03 FLOOR PLAN, ELEVATIONS & SECTION

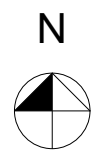
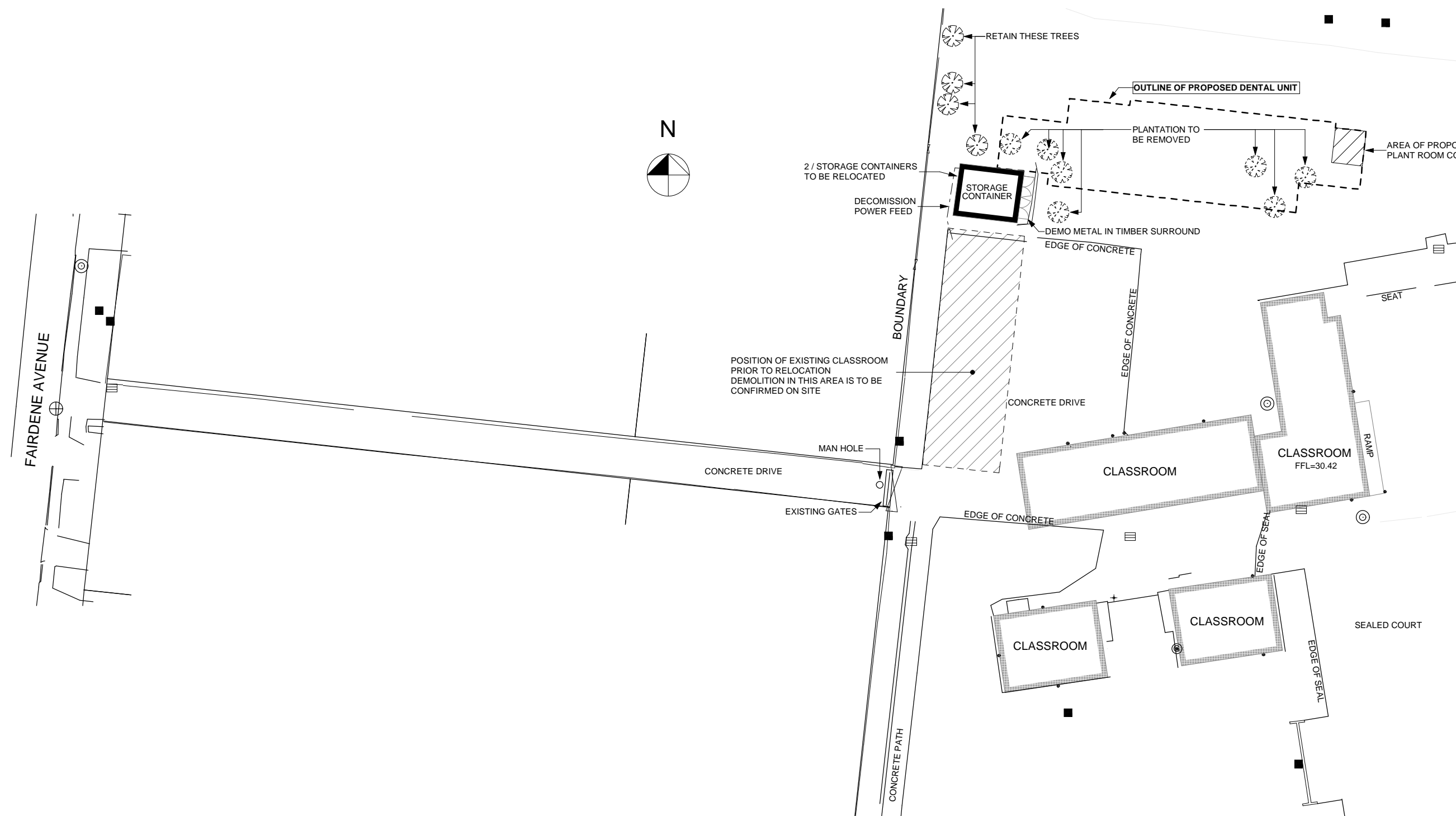


AERIAL VIEW MAP

Fixed Oral Health Care Units
6 CHAIR FACILITY
HENDERSON INTERMEDIATE
70 LINCOLN ROAD
HENDERSON 0610
AUCKLAND



SITE LOCALITY MAP



Site Existing / Demo
1:200

KAY & KEYS

architects

P.O. Box 28717, Remuera, Auckland
Ph. 09-529-9481 Fax 09-529-9483
www.kayandkeys.co.nz

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- Check Dimensions on site before fabrication

- Use figured dimensions in preference to scaled dimensions



WDHB

Fixed Oral Health Care
Units

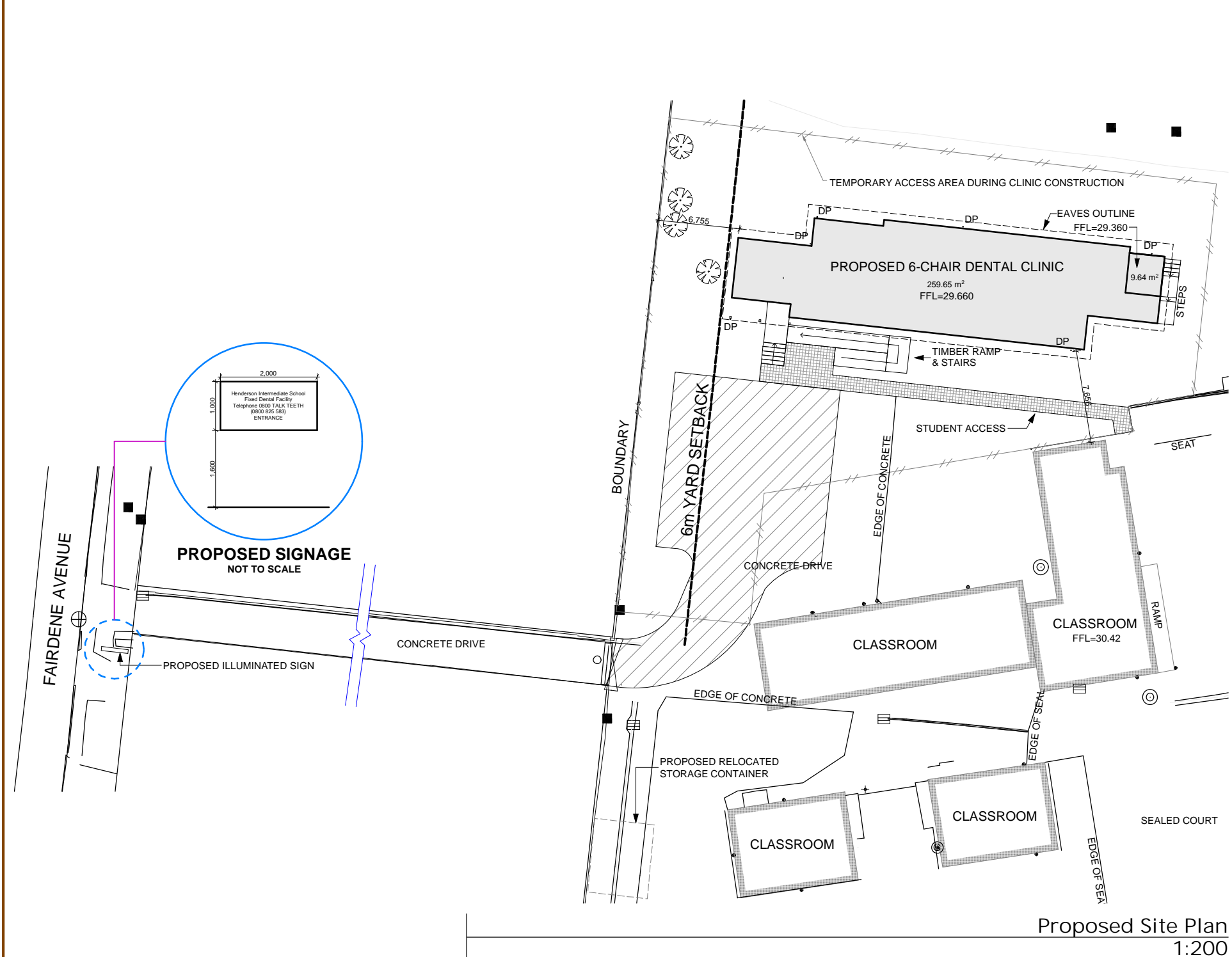
6 CHAIR FACILITY
HENDERSON INTERMEDIATE
70 Lincoln Road,
Henderson, Auckland

Scale	Designed	PK
Original A1	Drawn	BM
	Checked	PK
	Plot Date	13/04/2010

Drawing
Site Existing / Demo

Status	OUTLINE PLAN OF WORKS	
Project No.	Drawing	Revision
GWD 03.1	01	-

ALL DIMENSIONS TO BE VERIFIED ON SITE



Proposed Site Plan
1:200



Lincoln Rd Entrance
1:50

KAY & KEYS

architects

P.O. Box 28717, Remuera, Auckland
Ph. 09-529-9481 Fax 09-529-9483
www.kayandkeys.co.nz

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- Use figured dimensions in preference to scaled dimensions



Te Wai Awhina

WDHB

Fixed Oral Health Care Units

6 CHAIR FACILITY
HENDERSON INTERMEDIATE
70 Lincoln Road,
Henderson, Auckland

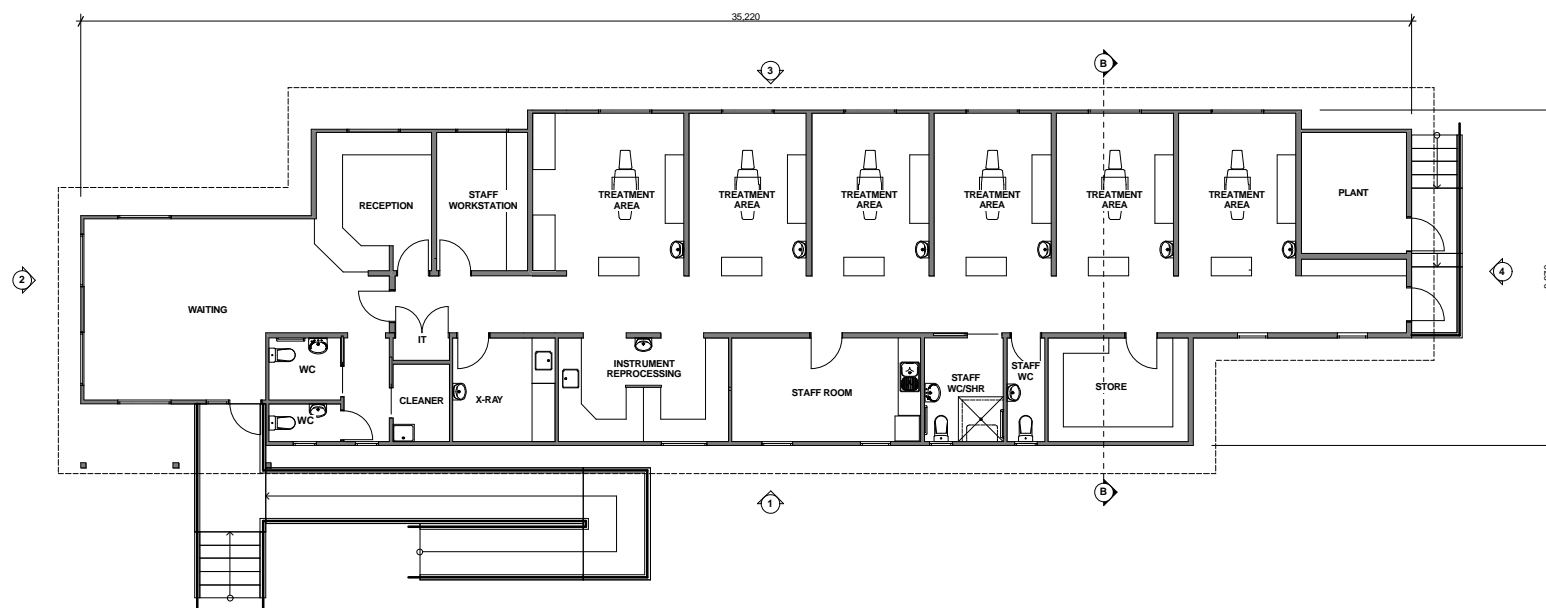
Scale	Designed	PK
Original A1	Drawn	BM
	Checked	PK
	Plot Date	13/04/2010

Drawing
Proposed Site Plan

Status: OUTLINE PLAN OF WORKS

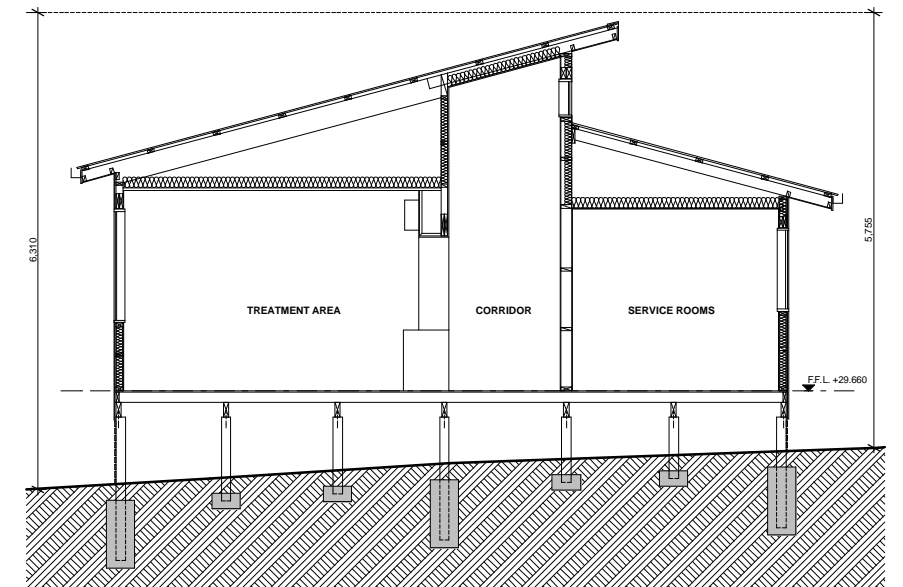
Project No.	Drawing	Revision
GWD 03.1	02	-

ALL DIMENSIONS TO BE VERIFIED ON SITE

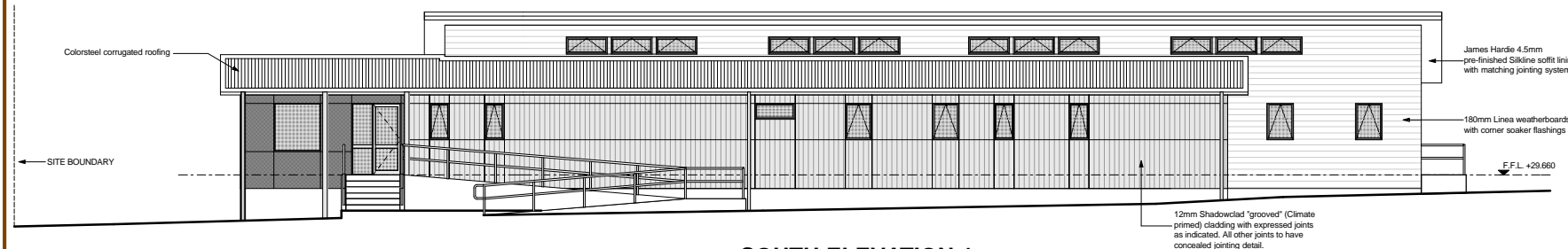


Floor Area = 270m²
Stairs & Ramps Area = 41m²

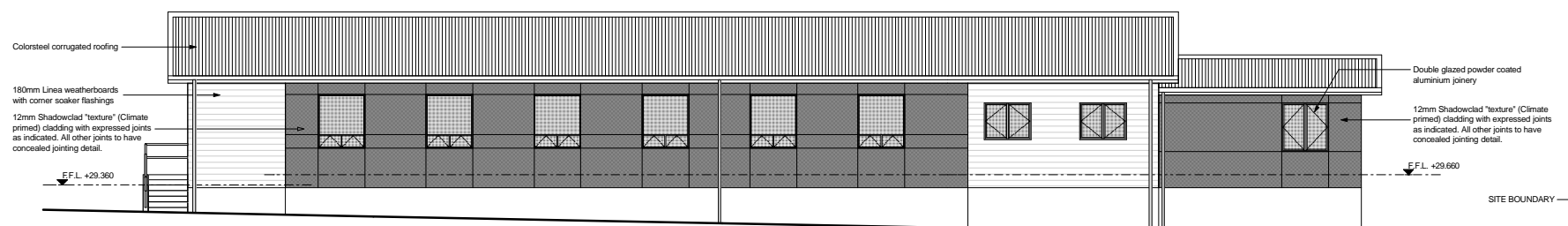
FLOOR PLAN
scale 1:100



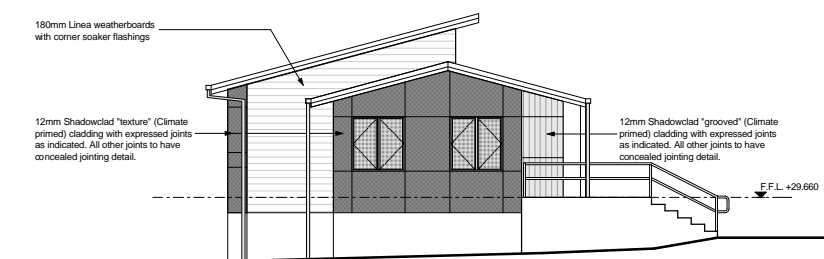
SECTION B
scale 1:50



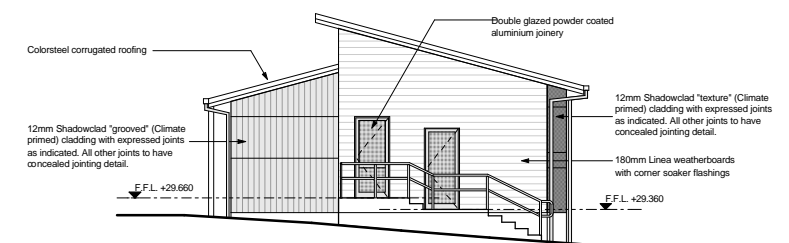
SOUTH ELEVATION 1
scale 1:100



NORTH ELEVATION 3
scale 1:100



WEST ELEVATION 2
scale 1:100



EAST ELEVATION 4
scale 1:100

KAY & KEYS
architects

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- Check dimensions on site before fabrication
Use figured dimensions in preference to scaled dimensions



Te Wai Aotia
WDHB
Fixed Oral Health Care Units
6 CHAIR FACILITY
HENDERSON INTERMEDIATE
70 Lincoln Road,
Henderson, Auckland

Scale	Designed	PK
Original A1	Drawn	MM
	Checked	PK
	Plot Date	13/04/2010

Drawing
Floor Plan, Elevations & Section

Status	OUTLINE PLAN OF WORKS	
Project No.	Drawing	Revision
GWD 03.1	03	-

ALL DIMENSIONS TO BE VERIFIED ON SITE

Appendix B

Historic Aerial Photographs

**Waitemata District Health Board
Soil Contamination Screening
Proposed Dental Facility at Henderson Intermediate School**



IMAGE COURTESY OF THE AUCKLAND REGIONAL COUNCIL





CLIENT: WAITEMATA DISTRICT HEALTH BOARD		PROJECT: CIVIL/ENVS/1028	DESIGNED: CM	FIGURE TITLE: 1940 AERIAL PHOTOGRAPH
		DWG #: 2	DRAWN: CM	
PROJECT TITLE: HENDERSON INTERMEDIATE DENTAL FACILITY		REVISION: 1	STATUS: DRAFT	
		SCALE: NTS		
		DATE: 28-04-10		



IMAGE COURTESY OF THE AUCKLAND REGIONAL COUNCIL

CLIENT: WAITEMATA DISTRICT HEALTH BOARD		PROJECT:	ENV519P51028	DESIGNED:	CM	FIGURE TITLE: 1959 AERIAL PHOTOGRAPH
		DWG #:	3	DRAWN:	CM	
		REVISION:	1	STATUS:	DRAFT	
PROJECT TITLE: HENDERSON INTERMEDIATE DENTAL FACILITY	SCALE:	NTS				
		DATE:	28-04-10			

Appendix C

Borehole Logs

**Waitemata District Health Board
Soil Contamination Screening
Proposed Dental Facility at Henderson Intermediate School**

Project No.	ENVINWP51028
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Date started:	19-04-2010
---------------	------------

Date completed:	19-04-2010
-----------------	------------

Checked by:	
-------------	--

Inclination:	90
--------------	----

Initial water level:	(after mins.)	Static water level:	(after mins.)

Method	Support	Grading	Weathering Terms	Colour	Consistency
DT	C casing	Wg well graded	Fr Fresh	R red	VS very soft
PT	DF drilling fluid	Pg poorly graded	SW Slightly Weathered	W white	S soft
SS	N none	Gg gap graded	MW Moderately Weathered	G grey	F firm
HS		U uniform	HW Highly Weathered	P purple	St stiff
V, T			XW Extremely Weathered	Y yellow	VSt very stiff
AH	Water	Grainsize	RS Residual Soil	Bl Black	H hard
CP	▶ inflow	F fine		Br Brown	Fb friable
NMLC	◀ outflow	M medium	Moisture	O Orange	
HA	◀ initial water level (after excavation)	C coarse	D dry	G Green	Density
NDD	◀ standing water level @ time/date	Plasticity	M moist	B Blue	VL very loose
		Lp low plasticity	W wet		L loose
		Mp medium plasticity			MD med. dense
		Hp high plasticity			D dense
					VD very dense

Project No.	ENVINEWP51028
-------------	---------------

Date started:	19-04-2010
---------------	------------

Date completed:	19-04-2010
-----------------	------------

Checked by:

Inclination:	90
--------------	----

Initial water level:		(after mins.)	Static water level:		(after mins.)
Method		Support	Grading	Weathering Terms	Colour
DT	diatube	C casing	Wg well graded	Fr Fresh	R red
PT	push tube	DF drilling fluid	Pg poorly graded	SW Slightly Weathered	W white
SS	solid stem flight auger	N none	Gg gap graded	MW Moderately Weathered	G grey
HS	hollow stem flight auger		U uniform	HW Highly Weathered	P purple
V, T	V bit, TC bit			XW Extremely Weathered	Y yellow
AH	air hammer			RS Residual Soil	Bl Black
CP	cable percussive				Br Brown
NMLC	NMLC core	Water	Grainsize	Moisture	O Orange
HA	Hand auger	▶ inflow	F fine	D dry	G Green
NDD	Non-Destructive Digging	◀ outflow	M medium	M moist	B Blue
		▽ initial water level (after excavation)	C coarse	W wet	
		▼ standing water level @ time/date	Plasticity		Consistency
			Lp low plasticity		VS very soft
			Mp medium plasticity		S soft
			Hp high plasticity		F firm
					St stiff
					VSt very stiff
					H hard
					Fb friable
					Density
					VL very loose
					L loose
					MD med. dense
					D dense
					VD very dense

Client:	WAITEMATA DISTRICT HEALTH BOARD					Project No.:	ENVINEWP51028		
Project:	HENDERSON INTERMEDIATE DENTAL FACILITY					Date started:	19-04-2010		
Site Address:	70 LINCOLN ROAD, HENDERSON					Date completed:	19-04-2010		
Drill model:	Hand Auger	Drill mounting:		Hole dia (mm):	50	Logged by:	GS	Checked by:	CM
GPS Co-ord:		GPS Datum:		R.L. surface (AHD):			Inclination:	90	

[illegible][illegible]

[illegible]

Initial water level:		(after mins.)	Static water level:		(after mins.)
Method	Support	Grading	Weathering Terms	Colour	Consistency
DT diatube	C casing	Wg well graded	Fr Fresh	R red	VS very soft
PT push tube	DF drilling fluid	Pg poorly graded	SW Slightly Weathered	W white	S soft
SS solid stem flight auger	N none	Gg gap graded	MW Moderately Weathered	G grey	F firm
HS hollow stem flight auger		U uniform	HV Highly Weathered	P purple	St stiff
V, T V bit, TC bit	Water		XW Extremely Weathered	Y yellow	VSt very stiff
AH air hammer	▶ inflow	Grainsize	RS Residual Soil	Bl Black	H hard
CP cable percussive	◀ outflow	F fine		Br Brown	Fb friable
NMLC NMLC core	▽ initial water level (after excavation)	M medium	Moisture	O Orange	
HA Hand auger		C coarse	D dry	G Green	Density
NDD Non-Destructive Digging	▼ standing water level @ time/date	Plasticity	M moist	B Blue	VL very loose
		Lp low plasticity	W wet		L loose
		Mp medium plasticity			MD med. dense
		Hp high plasticity			D dense
					VD very dense

Appendix D

Chain of Custody Documentation and Laboratory Transcripts

**Waitemata District Health Board
Soil Contamination Screening
Proposed Dental Facility at Henderson Intermediate School**



Job Information Summary

Page 1 of 1

Client:	Coffey Environments NZ Limited	Lab No:	785342
Contact:	Claude Midgley	Date Registered:	20-Apr-2010 5:11:18 pm
	P O Box 9924	Priority:	High
	Auckland 1149	Quote No:	
		Order No:	ENVI30085
		Client Reference:	
		Add. Client Ref:	
		Submitted By:	Claude Midgley
		Charge To:	Coffey Environments NZ

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH1 19-Apr-2010 4:00 pm	Soil	GSoil300, PSoil250	Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn; Organochlorine Pesticides Screening in Soil
2	BH2 19-Apr-2010 4:00 pm	Soil	GSoil300, PSoil250	Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn; Organochlorine Pesticides Screening in Soil
3	BH3 19-Apr-2010 4:00 pm	Soil	GSoil300, PSoil250	Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn; Organochlorine Pesticides Screening in Soil
4	BH4 19-Apr-2010 4:00 pm	Soil	GSoil300, PSoil250	Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn; Organochlorine Pesticides Screening in Soil
5	BH5 19-Apr-2010 4:00 pm	Soil	GSoil300, PSoil250	Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn; Organochlorine Pesticides Screening in Soil



ANALYSIS REPORT

Page 1 of 2

Client:	Coffey Environments NZ Limited	Lab No:	785342	SPV1
Contact:	Claude Midgley P O Box 9924 Auckland 1149	Date Registered:	20-Apr-2010	
		Date Reported:	26-Apr-2010	
		Quote No:		
		Order No:	ENVI30085	
		Client Reference:		
		Submitted By:	Claude Midgley	

Sample Type: Soil						
Sample Name:		BH1 19-Apr-2010 4:00 pm	BH2 19-Apr-2010 4:00 pm	BH3 19-Apr-2010 4:00 pm	BH4 19-Apr-2010 4:00 pm	BH5 19-Apr-2010 4:00 pm
Lab Number:		785342.1	785342.2	785342.3	785342.4	785342.5
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	< 2	< 2	2.8	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	5.2	16.0	10.3	10.1	17.0
Total Recoverable Copper	mg/kg dry wt	5.4	7.7	9.6	5.8	12.1
Total Recoverable Lead	mg/kg dry wt	12.8	9.6	18.6	12.5	9.8
Total Recoverable Nickel	mg/kg dry wt	2.0	2.6	4.7	2.5	2.1
Total Recoverable Zinc	mg/kg dry wt	< 4	7.8	22	9.4	6.5
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
alpha-BHC	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
beta-BHC	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
delta-BHC	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
cis-chlordane	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
trans-chlordane	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
2,4'-DDD	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
4,4'-DDD	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
2,4'-DDE	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
4,4'-DDE	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
2,4'-DDT	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
4,4'-DDT	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Dieldrin	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Endosulfan I	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Endosulfan II	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Endosulfan sulphate	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Endrin	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Endrin aldehyde	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Endrin Ketone	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Heptachlor	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Heptachlor epoxide	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Hexachlorobenzene	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Methoxychlor	mg/kg dry wt	< 0.010	< 0.010	< 0.011	< 0.010	< 0.010
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.02	< 0.02	< 0.03	< 0.02	< 0.02



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.

The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Samples
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction.	-	1-5
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	-	1-5
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082).	-	1-5
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-5

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Karen Nichol BSc
Client Services Manager - Environmental Division