

REPORT

Earthquake Commission

Christchurch Earthquake Recovery
Geotechnical Factual Report
Opawa
Appendix E:
Laboratory Testing



ENVIRONMENTAL AND ENGINEERING CONSULTANTS



REPORT

Earthquake Commission

Christchurch Earthquake Recovery
Geotechnical Factual Report
Opawa
Appendix E:
Laboratory Testing

Report prepared for:
EARTHQUAKE COMMISSION



Report prepared by:
Tonkin & Taylor LTD

Distribution:
EARTHQUAKE COMMISSION
Tonkin & Taylor LTD (FILE)

1 copy

1 copy

November 2011

T&T Ref: REP-OPA-FAC

November 2011

Applicability

This report was produced for the Earthquake Commission (EOC) to assist in assessing insurance claims made under the Earthquake Commission Act 1993. This report is not intended for any other purpose. It is recognised, however, that this report may assist central and local government planning for effective long-term solutions for the affected communities. Neither Tonkin & Taylor Ltd (T&T) nor the Earthquake Commission accepts any liability to any third party with respect to this report.

Limitations

This document is released for general information purposes only and should only be used for design purposes by appropriately qualified and experienced Scientists, Geologists and/or Professional Engineers.

All of the data and information which is contained in this document may only be used for the purposes of recovery and repair of land and building damage associated with the Canterbury Earthquakes (04 September 2010 and 22 February 2011).

This report comprises a main body and separate appendices which must be read in their entirety and are to be used in conjunction with each other.

Document approved for issue by:



Anthony Fairclough
Project Director

Appendix E: Laboratory Test Results

Summary Sheet – Opawa OPA 58

a) Fines content

Borehole ID	Depth of Sample
BH-OPA-01	8.30
BH-OPA-01	11.00
BH-OPA-01	14.70
BH-OPA-01	15.40
BH-OPA-01	19.00
BH-OPA-02	5.50
BH-OPA-02	7.70
BH-OPA-03	1.50
BH-OPA-03	4.00
BH-OPA-03	5.50
BH-OPA-03	6.10
BH-OPA-03	6.90
BH-OPA-03	8.10
BH-OPA-03	8.70
BH-OPA-03	10.20
BH-OPA-03	11.40
BH-OPA-03	12.60
BH-OPA-03	14.70
BH-OPA-03	15.30

b) Particle size distribution

Borehole ID	Depth of Sample
BH-OPA-01	11.50
BH-OPA-02	2.70
BH-OPA-02	3.80
BH-OPA-02	6.50



Cnr Elizabeth & Durham Streets
Tauranga
p. +64 7 571 0280
f. +64 7 571 0282
w. www.geotechnics.co.nz

LAB REF: 467/11
JOB NO: 650494.003

CHRISTCHURCH 2011 EARTHQUAKE REMEDIATION	
LABORATORY TEST RESULTS	
LOCATION: Opawa	BOREHOLE: BH-OPA-01

SAMPLE NO	TEST RESULTS		
	PSD	FINES CONTENT %	WATER CONTENT %
FC-8.3	N/A	13.69	20.1
FC-11.0	N/A	17.81	27.9
PSDWS-11.5	GRAPH ATTACHED	2.56	25.9
FC-14.7*	N/A	10.66	24.8
FC-15.4	N/A	21.74	18.0
FC-19.0	N/A	7.56	25.4

*Notable difference between observed material description and tested material classification

CHECKED:	
DATE:	17/06/11



Cnr Elizabeth & Durham Streets, Tauranga
 New Zealand
 p. +64 7 571 0280
 f. +64 7 571 0282
 w. www.geotechnics.co.nz

LAB. REF.:
 467/11

FILE:
 650494.003

Sheet of

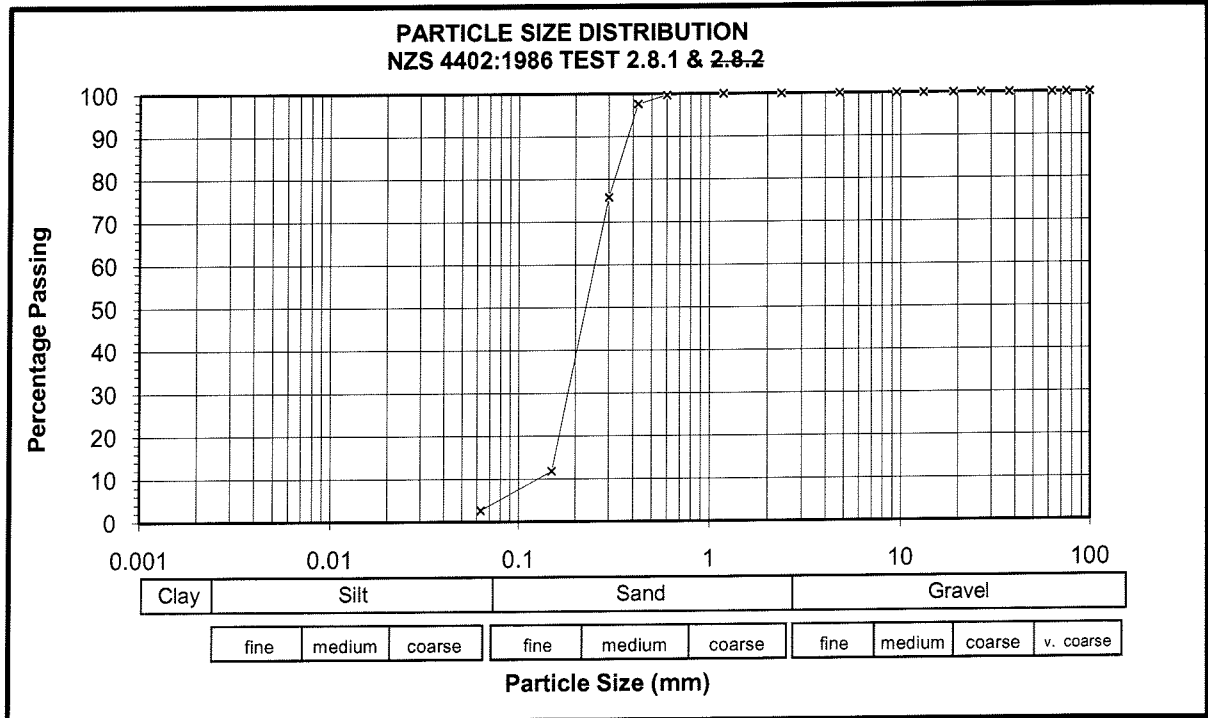
Location: Opawa, Christchurch Job Name: CHRISTCHURCH 2011 EARTHQUAKE REMEDIATION

Material: Fine to medium SAND, grey. Moist, poorly graded.

Sample Number: BH-OPA-01 PSDWS-11.5

Depth: 11.5m

Sample History: Natural/Air-dried/Oven-Dried/Unknown Whole Soil/Fraction passing.....mm sieve



Sieve Aperture (mm)	Cumulative % Passing
200.0	100
150.0	100
100.0	100
75.0	100
63.0	100
37.5	100
26.5	100
19.0	100
13.2	100

Sieve Aperture (mm)	Cumulative % Passing
9.5	100
4.75	100
2.36	100
1.18	100
0.60	100
0.425	98
0.30	76
0.15	12
0.063	3

SPECIFICATION: N/A

Note: For Wet Sieve, the percentage passing the < 0.063mm was obtained by Difference /Weight.

Tested:	RTH	Date:	16/6/11
Calculated:	RTH	Date:	16/6/11
Checked:	<i>RU</i>	Date:	17/06/11

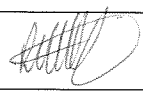


Cnr Elizabeth & Durham Streets
Tauranga
p. +64 7 571 0280
f. +64 7 571 0282
w. www.geotechnics.co.nz

LAB REF: 561/11
JOB NO: 650494.003

CHRISTCHURCH 2011 EARTHQUAKE REMEDIATION	
LABORATORY TEST RESULTS	
LOCATION: Opawa	BOREHOLE: BH-OPA-02

SAMPLE NO	TEST RESULTS		
	PSD	FINES CONTENT %	WATER CONTENT %
PSDWS-2.7	GRAPH ATTACHED	4.02	5.3
PSDWS-3.8	GRAPH ATTACHED	1.49	6.6
FC -5.5	N/A	1.45	21.2
PSDWS-6.5	GRAPH ATTACHED	1.54	3.0
FC-7.7	N/A	84.71	17.6

CHECKED:	
DATE:	28/10/11



Cnr Elizabeth & Durham Streets, Tauranga
 New Zealand
 p. +64 7 571 0280
 f. +64 7 571 0282
 w. www.geotechnics.co.nz

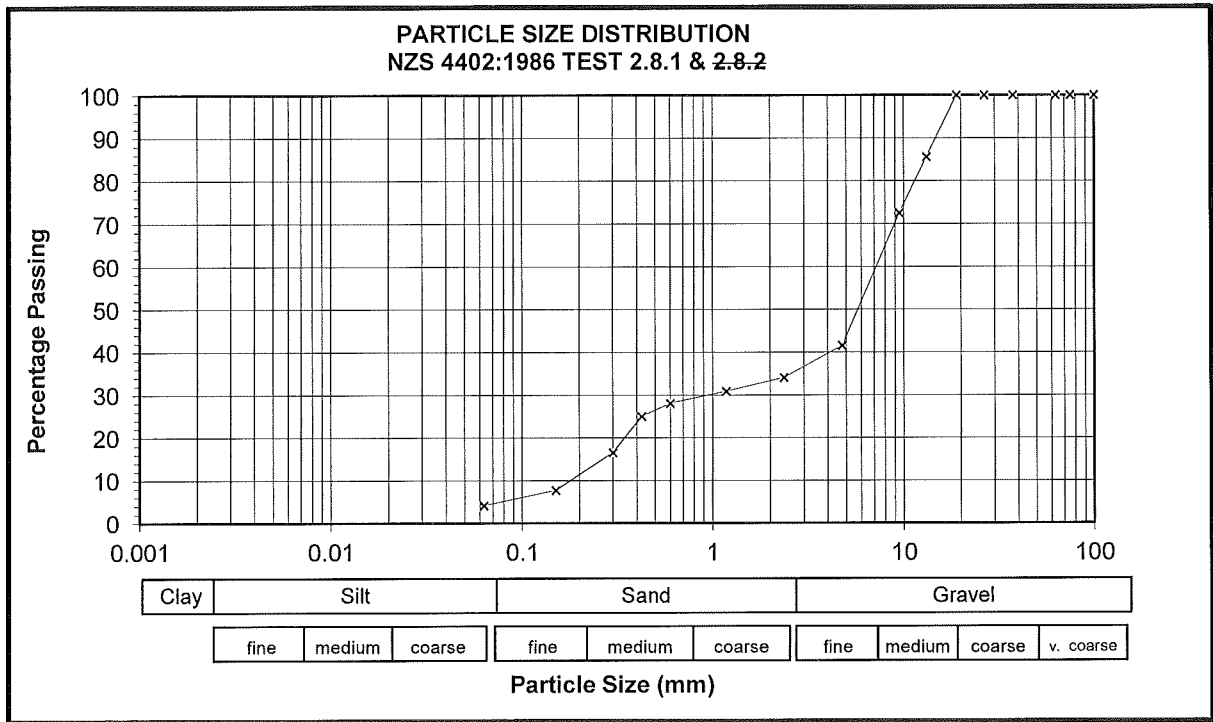
LAB. REF.:
 561/11
 FILE:
 650494.003
 Sheet of

Location: BH-OPA-02, Christchurch Job Name: CHRISTCHURCH 2011 EARTHQUAKE REMEDIATION

Material: Sandy, fine to coarse GRAVEL, dark grey. Medium dense, wet. Sand is fine to coarse.

Sample Number: EQLABOpawa/131011/PSDWS-2.7 Depth: 2.7m

Sample History: Natural/Air-dried/Oven-Dried/Unknown. Whole Soil/Fraction passing.....mm-sieve



Sieve Aperture (mm)	Cumulative % Passing
200.0	100
150.0	100
100.0	100
75.0	100
63.0	100
37.5	100
26.5	100
19.0	100
13.2	86

Sieve Aperture (mm)	Cumulative % Passing
9.5	73
4.75	42
2.36	34
1.18	31
0.60	28
0.425	25
0.30	17
0.15	8
0.063	4

SPECIFICATION: N/A

Note: For Wet Sieve, the percentage passing the < 0.063mm was obtained by Difference / Weight.

Tested:	KHC	Date:	21/10/11
Calculated:	RTH	Date:	26/10/11
Checked:	<i>RM</i>	Date:	28/10/11



Cnr Elizabeth & Durham Streets, Tauranga
 New Zealand
 p. +64 7 571 0280
 f. +64 7 571 0282
 w. www.geotechnics.co.nz

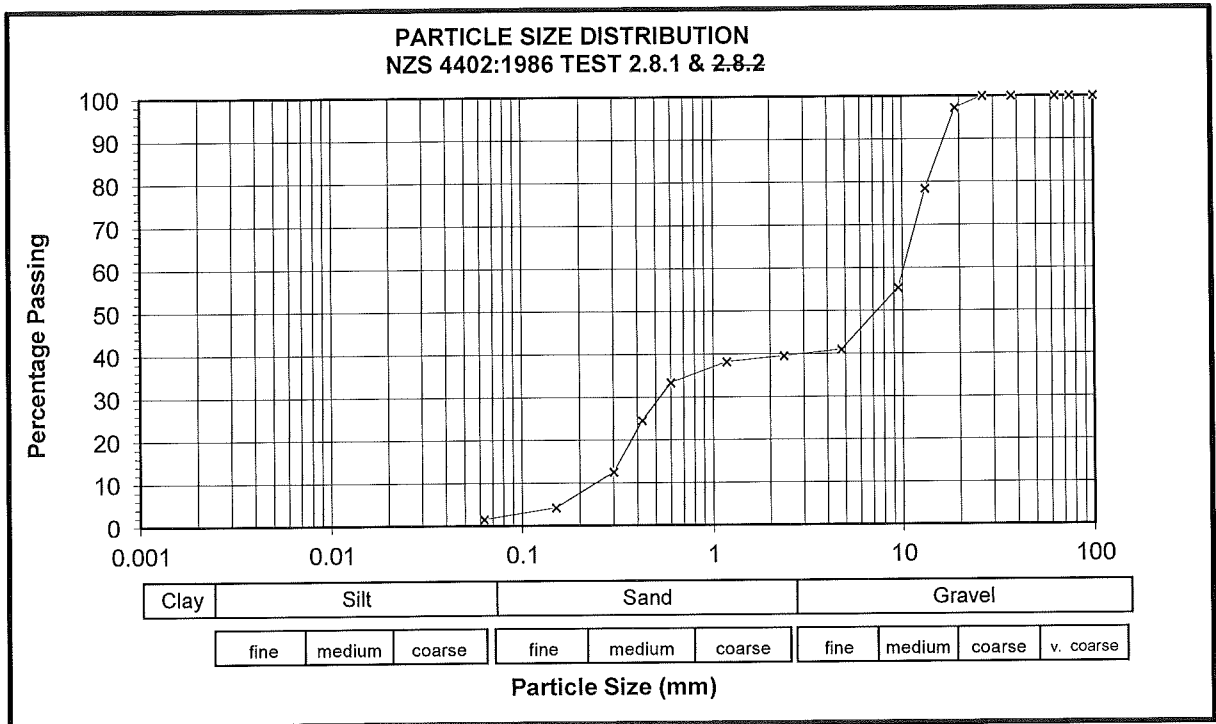
LAB. REF.:
 561/11
 FILE:
 650494.003
 Sheet of

Location: BH-OPA-02, Christchurch Job Name: CHRISTCHURCH 2011 EARTHQUAKE REMEDIATION

Material: Sandy, fine to coarse GRAVEL, dark grey. Medium dense, wet. Sand is fine to coarse.

Sample Number: EQLABOpawa/131011/PSDWS-3.8 Depth: 3.8m

Sample History: Natural/Air-dried/Oven-Dried/Unknown. Whole Soil/Fraction passing.....mm sieve



Sieve Aperture (mm)	Cumulative % Passing
200.0	100
150.0	100
100.0	100
75.0	100
63.0	100
37.5	100
26.5	100
19.0	97
13.2	78

Sieve Aperture (mm)	Cumulative % Passing
9.5	55
4.75	41
2.36	40
1.18	38
0.60	33
0.425	25
0.30	13
0.15	4
0.063	2

SPECIFICATION: N/A

Note: For Wet Sieve, the percentage passing the < 0.063mm was obtained by Difference / Weight.

Tested:	KHC	Date:	21/10/11
Calculated:	RTH	Date:	26/10/11
Checked:	<i>RM</i>	Date:	28/10/11



Cnr Elizabeth & Durham Streets, Tauranga
 New Zealand
 p. +64 7 571 0280
 f. +64 7 571 0282
 w. www.geotechnics.co.nz

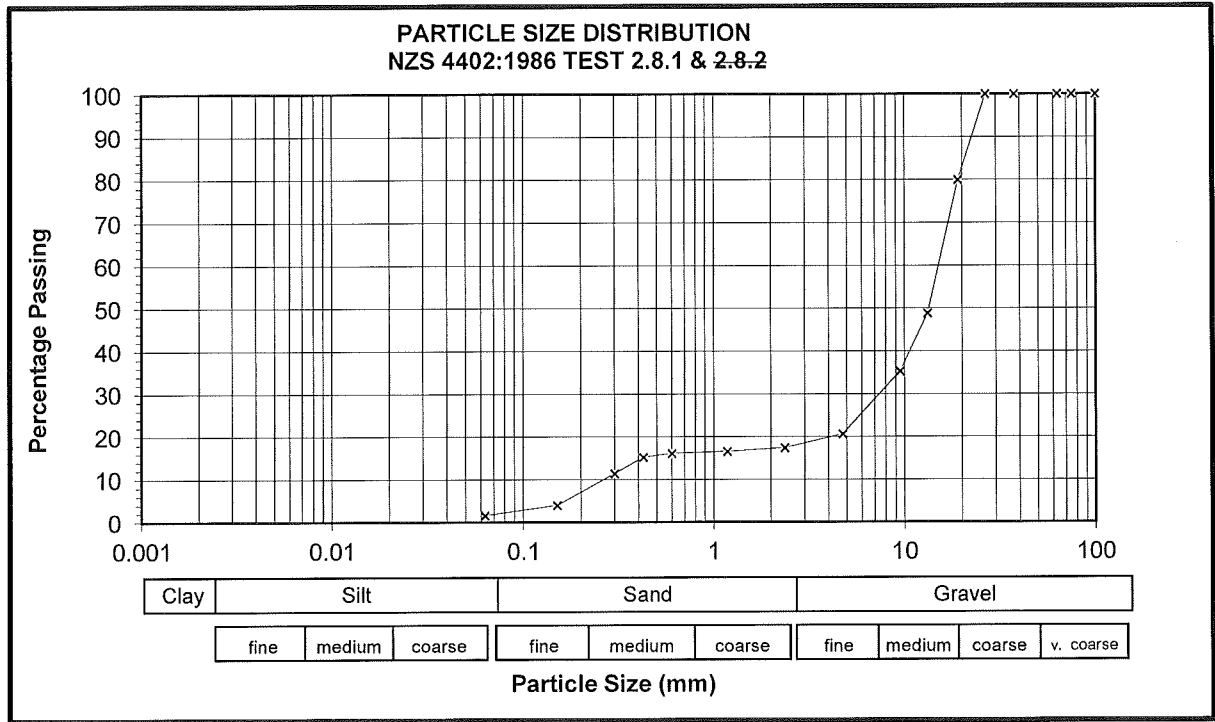
LAB. REF.:
 561/11
 FILE:
 650494.003
 Sheet of

Location: BH-OPA-02, Christchurch Job Name: CHRISTCHURCH 2011 EARTHQUAKE REMEDIATION

Material: Fine to coarse GRAVEL, with some sand, brown. Dense, wet. Sand is fine to coarse.

Sample Number: EQLABOpawa/131011/PSDWS-6.5 Depth: 6.5m

Sample History: Natural/Air-dried/Oven-Dried/Unknown. Whole Soil/Fraction passing.....mm sieve



Sieve Aperture (mm)	Cumulative % Passing
200.0	100
150.0	100
100.0	100
75.0	100
63.0	100
37.5	100
26.5	100
19.0	80
13.2	49

Sieve Aperture (mm)	Cumulative % Passing
9.5	35
4.75	21
2.36	17
1.18	17
0.60	16
0.425	15
0.30	11
0.15	4
0.063	2

SPECIFICATION: N/A

Note: For Wet Sieve, the percentage passing the < 0.063mm was obtained by Difference / Weight.

Tested:	KHC	Date:	21/10/11
Calculated:	RTH	Date:	26/10/11
Checked:	<i>M</i>	Date:	28/10/11



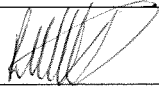
Cnr Elizabeth & Durham Streets
 Tauranga
 p. +64 7 571 0280
 f. +64 7 571 0282
 w. www.geotechnics.co.nz

LAB REF: 537/11
JOB NO: 650494.003

CHRISTCHURCH 2011 EARTHQUAKE REMEDIATION	
LABORATORY TEST RESULTS	
LOCATION: Opawa	BOREHOLE: BH-OPA-03

SAMPLE NO	TEST RESULTS		
	PSD	FINES CONTENT %	WATER CONTENT %
FC-1.5*	N/A	80.68	23.9
FC-4.0	N/A	11.45	38.9
FC-5.5	N/A	80.17	27.6
FC-6.1*	N/A	29.31	20.7
FC-6.9	N/A	93.86	39.5
FC-8.1*	N/A	24.22	20.5
FC-8.7	N/A	13.25	17.1
FC-10.2	N/A	8.68	25.1
FC-11.4	N/A	1.24	25.6
FC-12.6	N/A	0.72	25.7
FC-14.7	N/A	15.12	26.0
FC-15.3*	N/A	89.97	23.8

*Notable difference between observed material description and tested material classification.

CHECKED:	
DATE:	14/10/11



www.tonkin.co.nz

ENVIRONMENTAL AND ENGINEERING CONSULTANTS

