

**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1104A 9.10-9.60m Specimen depth: 9.30-9.35m
 Sampled by : NC_Site Team
 Date sampled: 20/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Clayey SILT with traces of sand and organics; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/101_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

SOIL PROPERTIES

Specimen Dimensions:			Initial Wet Density	pbi (t/m ³)	1.92
Diameter (mm):	49.92		Initial Dry Density	pdi (t/m ³)	1.46
Initial height (mm):	19.90		Final Dry Density	pdf (t/m ³)	1.64
Final height (mm):	17.69		Initial Void Ratio	eo	0.85
Initial mass of sample (g):	74.63		Final Void Ratio	ef	0.65
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Initial Degree of Saturation	Si (%)	100
			Final Degree of Saturation	Sf (%)	100
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.70
			INITIAL Water Content	Wi (%)	31.6
			FINAL Water Content	Wf (%)	25.4

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t90 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	
0 - 12	12	0.854	-	-	-	-	
12 - 25	13	0.846	5.004	0.31	8.8	2.6 x 10 ⁻²	
25 - 50	25	0.835	5.028	0.25	8.7	2.2 x 10 ⁻²	
50 - 100	50	0.812	5.140	0.24	8.4	2.0 x 10 ⁻²	
100 - 200	100	0.746	9.512	0.37	4.4	1.6 x 10 ⁻²	
200 - 400	200	0.696	11.386	0.14	3.4	4.8 x 10 ⁻³	
400 - 800	400	0.626	8.410	0.10	4.4	4.4 x 10 ⁻³	
800 - 100	-	0.653	-	-	-	-	
100 - 200	100	0.648	1.296	0.03	27	8.2 x 10 ⁻³	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Root time fitting method was used for Cv calculations.

Date tested : 06-14/10/25
 Date reported : 20/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
 This report may only be reproduced in full

Approved Signatory

Designation : Thirushen Pillay
 Date : Senior Civil Engineering Technician
 20/10/25



Test results indicated as not accredited are outside the scope of the laboratory's accreditation

ONE DIMENSIONAL CONSOLIDATION PROPERTIES TEST RESULT REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1104A 9.10-9.60m Specimen depth: 9.30-9.35m
 Sampled by : NC_Site Team
 Date sampled: 20/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Clayey SILT with traces of sand and organics; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/101_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

SOIL PROPERTIES

Specimen Dimensions:			Initial Wet Density	pbi (t/m ³)	1.92
Diameter (mm):	49.92		Initial Dry Density	pdi (t/m ³)	1.46
Initial height (mm):	19.90		Final Dry Density	pdf (t/m ³)	1.64
Final height (mm):	17.69		Initial Void Ratio	eo	0.85
Initial mass of sample (g):	74.63		Final Void Ratio	ef	0.65
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Initial Degree of Saturation	Si (%)	100
			Final Degree of Saturation	Sf (%)	100
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.70
			INITIAL Water Content	Wi (%)	31.6
			FINAL Water Content	Wf (%)	25.4

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t50 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	Coeff. of Secondary Compr. (Csec)
0 - 12	12	0.854	-	-	-	-	-
12 - 25	13	0.846	2.000	0.31	5.1	1.5 x 10 ⁻²	0.00056
25 - 50	25	0.835	2.590	0.25	3.9	1.0 x 10 ⁻²	0.00092
50 - 100	50	0.812	2.190	0.24	4.6	1.1 x 10 ⁻²	0.0016
100 - 200	100	0.746	-	-	-	-	-
200 - 400	200	0.696	3.820	0.14	2.4	3.0 x 10 ⁻³	0.003
400 - 800	400	0.626	2.610	0.10	3.3	3.0 x 10 ⁻³	0.0031
800 - 100	-	0.653	-	-	-	-	-
100 - 200	100	0.648	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Log time fitting method was used for Cv calculations.

Date tested : 06-14/10/25
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Approved Signatory

Designation : Thirushen Pillay
 Date : Senior Civil Engineering Technician
 20/10/25



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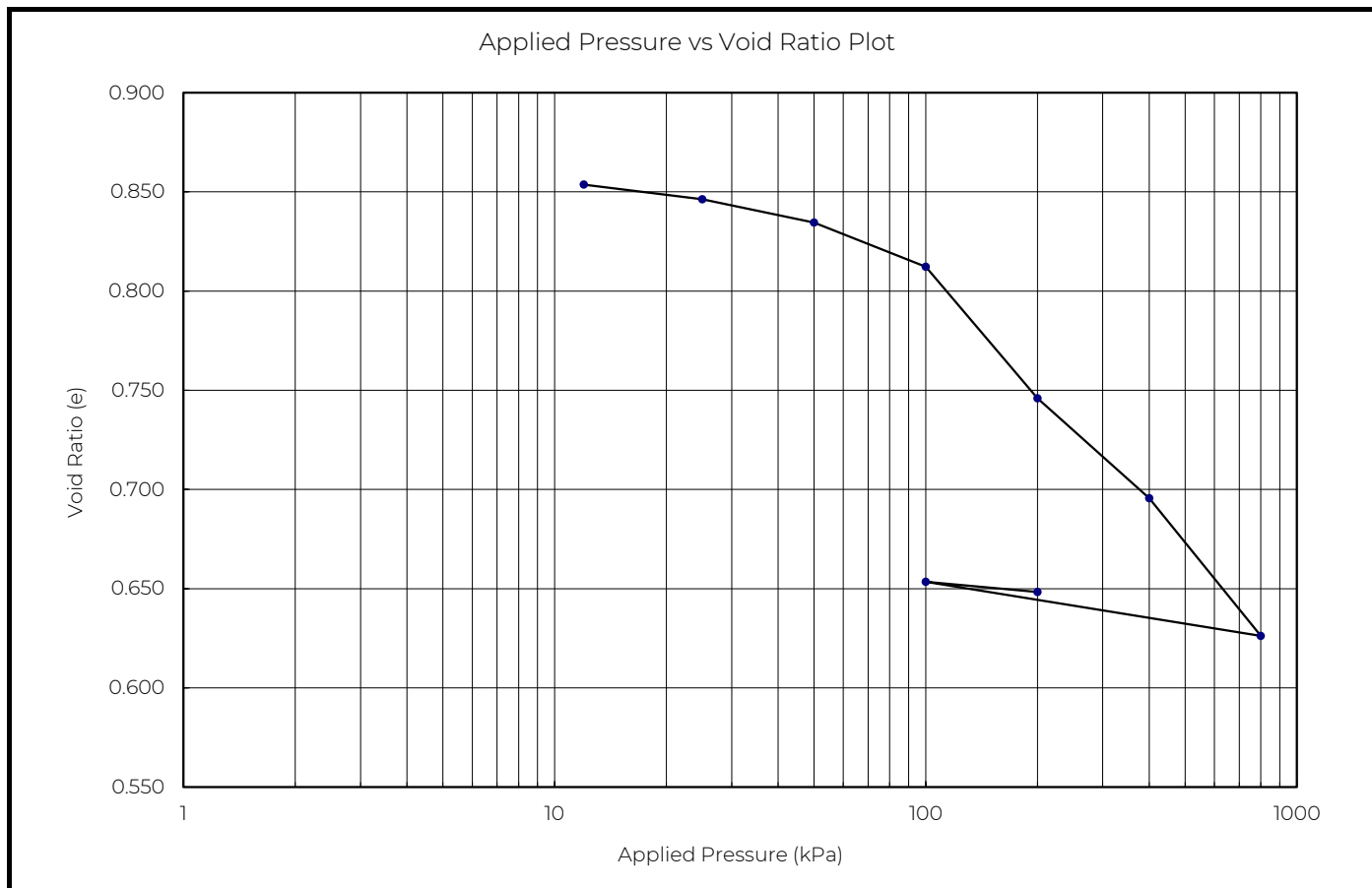
ONE DIMENSIONAL CONSOLIDATION PROPERTIES
Applied Pressure vs Void Ratio TEST REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1104A 9.10-9.60m Specimen depth: 9.30-9.35m
 Sampled by : NC_Site Team
 Date sampled: 20/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Clayey SILT with traces of sand and organics; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/101_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103



Test Method:	Notes:
One Dimensional Consolidation Test: NZS 4402:1986 Test 7.1	Load Increments applied at 24 hr intervals Void ratio is not IANZ Accredited due to assumed Solid Density value.

Date tested : 06-14/10/25
 Date reported : 20/10/25

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Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 20/10/25



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**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1105 3.20-3.70m Specimen depth: 3.60-3.70m
 Sampled by : NC Site Team
 Date sampled: 3/09/2025
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY with minor organics; brown mottled black; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/25-Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102

SOIL PROPERTIES

Specimen Dimensions:				
Diameter (mm):	49.92		Initial Wet Density	pbi (t/m ³) 1.52
Initial height (mm):	20.10		Initial Dry Density	pdi (t/m ³) 0.89
Final height (mm):	15.32		Final Dry Density	pdf (t/m ³) 1.16
Initial mass of sample (g):	59.83		Initial Void Ratio	eo 2.05
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Final Void Ratio	ef 1.32
			Initial Degree of Saturation	Si (%) 94
			Final Degree of Saturation	Sf (%) 98
			Solid Particle Density (Assumed)	Gs (t/m ³) 2.70
			INITIAL Water Content	Wi (%) 71.6
			FINAL Water Content	Wf (%) 48.0

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t90 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	
0 - 12	12	1.980	21.569	1.80	2.1	3.7 x 10 ⁻²	
12 - 25	13	1.951	26.553	0.76	1.6	1.2 x 10 ⁻²	
25 - 50	25	1.901	19.522	0.68	2.2	1.4 x 10 ⁻²	
50 - 100	50	1.809	11.831	0.63	3.4	2.1 x 10 ⁻²	
100 - 200	100	1.655	28.325	0.55	1.3	7.2 x 10 ⁻³	
200 - 400	200	1.463	27.065	0.36	1.3	4.5 x 10 ⁻³	
400 - 800	400	1.263	23.368	0.20	1.3	2.5 x 10 ⁻³	
800 - 100	-	1.332	-	-	-		
100 - 200	100	1.322	4.504	0.04	5.8	2.5 x 10 ⁻³	
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Root time fitting method was used for Cv calculations.

Date tested : 23/10/25-03/11/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 11/11/2025



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ONE DIMENSIONAL CONSOLIDATION PROPERTIES TEST RESULT REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1105 3.20-3.70m Specimen depth: 3.60-3.70m
 Sampled by : NC Site Team
 Date sampled: 3/09/2025
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY with minor organics; brown mottled black; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/25-Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102

SOIL PROPERTIES

Specimen Dimensions:			Initial Wet Density	pbi (t/m ³)	1.52
Diameter (mm):	49.92		Initial Dry Density	pdi (t/m ³)	0.89
Initial height (mm):	20.10		Final Dry Density	pdf (t/m ³)	1.16
Final height (mm):	15.32		Initial Void Ratio	eo	2.05
Initial mass of sample (g):	59.83		Final Void Ratio	ef	1.32
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Initial Degree of Saturation	Si (%)	94
			Final Degree of Saturation	Sf (%)	98
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.70
			INITIAL Water Content	Wi (%)	71.6
			FINAL Water Content	Wf (%)	48.0

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t50 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	Coeff. of Secondary Compr. (Csec)
0 - 12	12	1.980	7.280	1.80	1.4	2.6 x 10 ⁻²	0.0013
12 - 25	13	1.951	9.190	0.76	1.1	8.0 x 10 ⁻³	0.0019
25 - 50	25	1.901	6.130	0.68	1.6	1.1 x 10 ⁻²	0.0031
50 - 100	50	1.809	9.860	0.63	0.97	6.0 x 10 ⁻³	0.0052
100 - 200	100	1.655	8.240	0.55	1.1	6.0 x 10 ⁻³	0.0095
200 - 400	200	1.463	8.060	0.36	0.99	4.0 x 10 ⁻³	0.0084
400 - 800	400	1.263	7.410	0.20	0.93	2.0 x 10 ⁻³	0.0066
800 - 100	-	1.332	-	-	-	-	-
100 - 200	100	1.322	1.410	0.04	4.4	2.0 x 10 ⁻³	0.00061
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Log time fitting method was used for Cv calculations.

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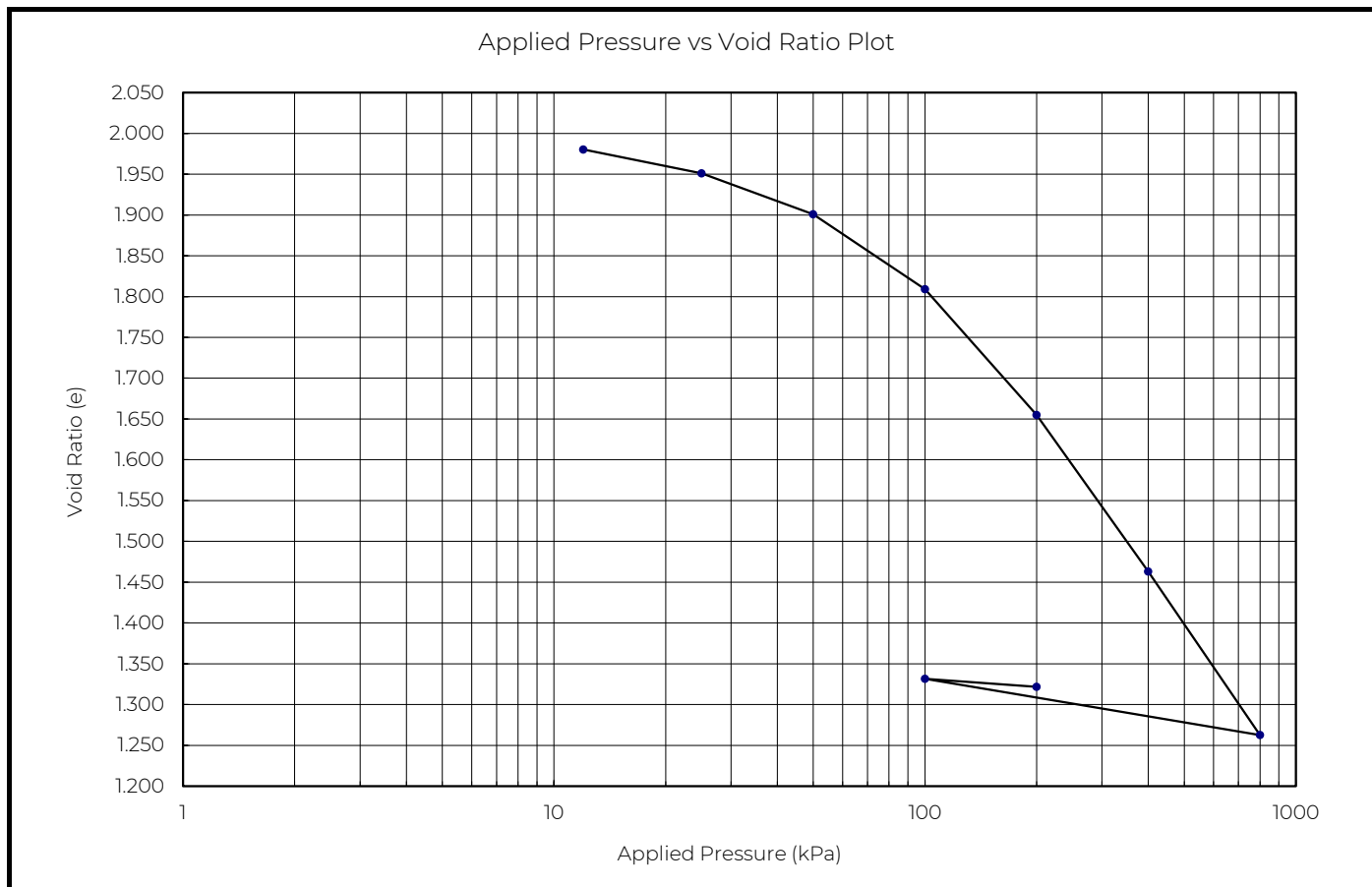
ONE DIMENSIONAL CONSOLIDATION PROPERTIES
Applied Pressure vs Void Ratio TEST REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1105 3.20-3.70m Specimen depth: 3.60-3.70m
 Sampled by : NC Site Team
 Date sampled: 03/09/25 -
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY with minor organics; brown mottled black; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/25-Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102



Test Method:	Notes:
One Dimensional Consolidation Test: NZS 4402:1986 Test 7.1	Load Increments applied at 24 hr intervals Void ratio is not IANZ Accredited due to assumed Solid Density value.

Date tested : 23/10/25-03/11/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 11/11/2025



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**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1105 9.00-9.50m Specimen depth: 9.45-9.50m
 Sampled by : NC_Site Team
 Date sampled: 03/09/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/30_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

SOIL PROPERTIES

Specimen Dimensions:				
Diameter (mm):	49.90		Initial Wet Density	pbi (t/m ³) 1.72
Initial height (mm):	20.00		Initial Dry Density	pdi (t/m ³) 1.17
Final height (mm):	16.93		Final Dry Density	pdf (t/m ³) 1.38
Initial mass of sample (g):	67.36		Initial Void Ratio	eo 1.32
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Final Void Ratio	ef 0.97
			Initial Degree of Saturation	Si (%) 97
			Final Degree of Saturation	Sf (%) 100
			Solid Particle Density (Assumed)	Gs (t/m ³) 2.72
			INITIAL Water Content	Wi (%) 47.1
			FINAL Water Content	Wf (%) 36.5

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t90 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	
0 - 12	12	1.314	5.500	0.33	8.1	2.6 x 10 ⁻²	
12 - 25	13	1.295	8.766	0.64	5	3.1 x 10 ⁻²	
25 - 50	25	1.272	10.399	0.41	4.2	1.7 x 10 ⁻²	
50 - 100	50	1.233	16.131	0.34	2.6	8.7 x 10 ⁻³	
100 - 200	100	1.164	22.699	0.31	1.8	5.5 x 10 ⁻³	
200 - 400	200	1.047	27.636	0.27	1.4	3.7 x 10 ⁻³	
400 - 800	400	0.915	23.625	0.16	1.5	2.3 x 10 ⁻³	
800 - 100	-	0.978	-	-	-		
100 - 200	100	0.967	4.419	0.06	7.3	4.2 x 10 ⁻³	
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Root time fitting method was used for Cv calculations.

Date tested : 25/09/25-03/10/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
 Date reported : 23/10/25 This report may only be reproduced in full

Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 28/10/2025



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**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1105 9.00-9.50m Specimen depth: 9.45-9.50m
 Sampled by : NC_Site Team
 Date sampled: 03/09/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/30_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

SOIL PROPERTIES

Specimen Dimensions:				
Diameter (mm):	49.90		Initial Wet Density	pbi (t/m ³) 1.72
Initial height (mm):	20.00		Initial Dry Density	pdi (t/m ³) 1.17
Final height (mm):	16.93		Final Dry Density	pdf (t/m ³) 1.38
Initial mass of sample (g):	67.36		Initial Void Ratio	eo 1.32
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Final Void Ratio	ef 0.97
			Initial Degree of Saturation	Si (%) 97
			Final Degree of Saturation	Sf (%) 100
			Solid Particle Density (Assumed)	Gs (t/m ³) 2.72
			INITIAL Water Content	Wi (%) 47.1
			FINAL Water Content	Wf (%) 36.5

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t50 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	Coeff. of Secondary Compr. (Csec)
0 - 12	12	1.314	3.760	0.3292	2.766	8.9 x 10 ⁻³	0.001
12 - 25	13	1.295	4.450	0.6371	2.319	1.4 x 10 ⁻²	0.001
25 - 50	25	1.272	5.090	0.4130	1.994	8.1 x 10 ⁻³	0.002
50 - 100	50	1.233	4.820	0.3355	2.062	6.8 x 10 ⁻³	0.002
100 - 200	100	1.164	7.740	0.3126	1.241	3.8 x 10 ⁻³	0.003
200 - 400	200	1.047	8.800	0.2704	1.025	2.7 x 10 ⁻³	0.004
400 - 800	400	0.915	7.500	0.1611	1.076	1.7 x 10 ⁻³	0.004
800 - 100	-	0.978	-	-	-	-	-
100 - 200	100	0.967	1.920	0.0582	3.926	2.2 x 10 ⁻³	0.001
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Log time fitting method was used for Cv calculations.

Date tested : 25/09/25-03/10/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
 Date reported : 23/10/25 This report may only be reproduced in full

Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 28/10/2025



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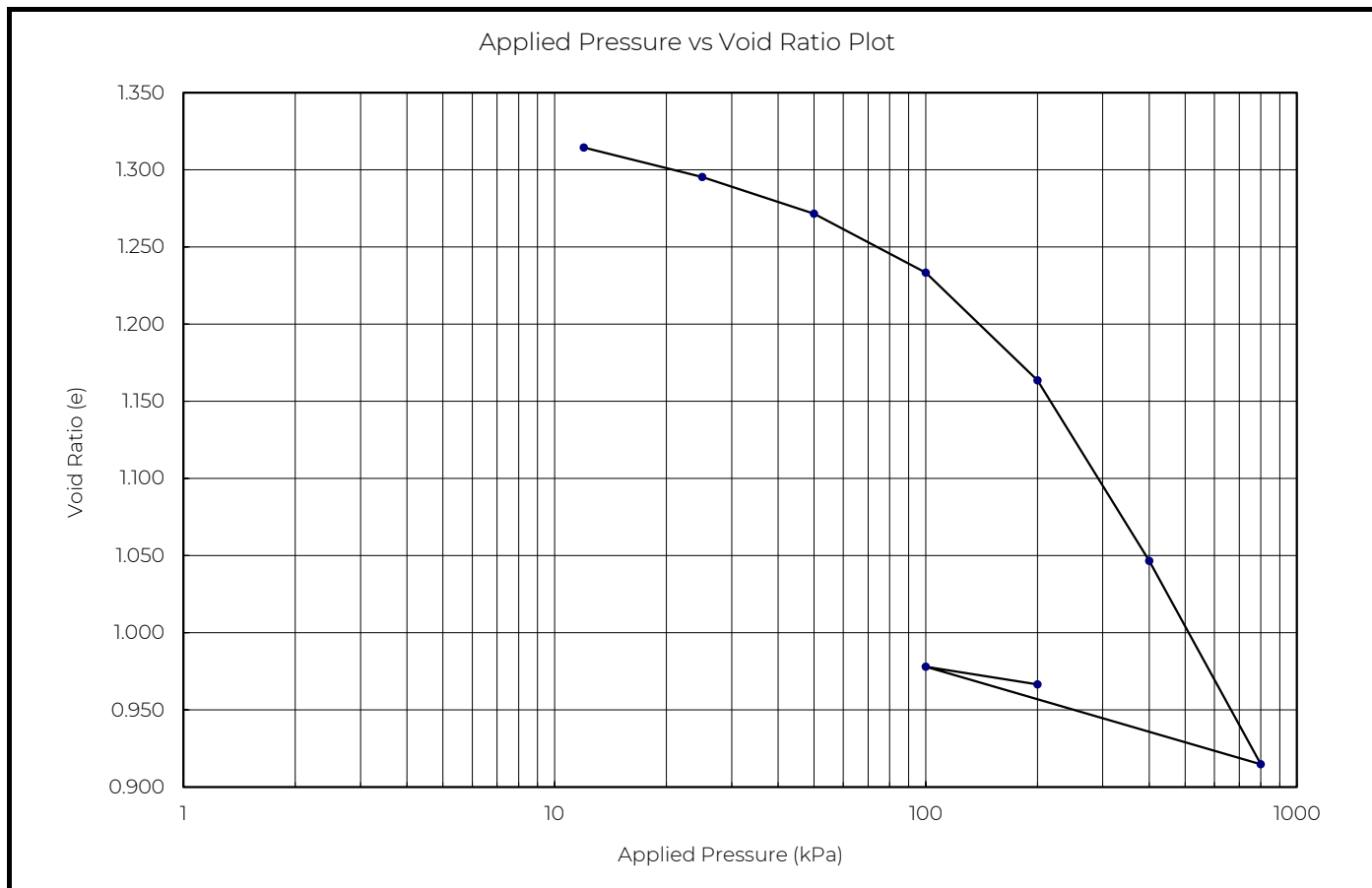
ONE DIMENSIONAL CONSOLIDATION PROPERTIES
Applied Pressure vs Void Ratio TEST REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1105 9.00-9.50m Specimen depth: 9.45-9.50m
 Sampled by : NC_Site Team
 Date sampled: 03/09/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/30_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103



Test Method:	Notes:
One Dimensional Consolidation Test: NZS 4402:1986 Test 7.1	Load Increments applied at 24 hr intervals Void ratio is not IANZ Accredited due to assumed Solid Density value.

Date tested : 25/09/25-03/10/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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Approved Signatory


 Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 28/10/2025



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ONE DIMENSIONAL CONSOLIDATION PROPERTIES TEST RESULT REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1106 4.50-5.00m Specimen depth: 4.80-4.85m
 Sampled by : NC_Site Team
 Date sampled: 19/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Clayey SILT; grey mottled brown; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/6_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100

SOIL PROPERTIES

Specimen Dimensions:			Initial Wet Density	pbi (t/m ³)	1.60
Diameter (mm):	49.90		Initial Dry Density	pdi (t/m ³)	0.95
Initial height (mm):	20.00		Final Dry Density	pdf (t/m ³)	1.13
Final height (mm):	16.78		Initial Void Ratio	eo	1.87
Initial mass of sample (g):	62.45		Final Void Ratio	ef	1.41
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Initial Degree of Saturation	Si (%)	99
			Final Degree of Saturation	Sf (%)	100
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.72
			INITIAL Water Content	Wi (%)	68.3
			FINAL Water Content	Wf (%)	56.1

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t90 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	
0 - 12	12	1.863	-	-	-	-	
12 - 25	13	1.850	1.120	0.34	40	1.3 x 10 ⁻¹	
25 - 50	25	1.822	1.185	0.39	37	1.4 x 10 ⁻¹	
50 - 100	50	1.773	1.615	0.35	27	9.2 x 10 ⁻²	
100 - 200	100	1.685	1.703	0.32	24	7.6 x 10 ⁻²	
200 - 400	200	1.530	2.845	0.29	14	3.9 x 10 ⁻²	
400 - 800	400	1.328	3.671	0.20	9.4	1.8 x 10 ⁻²	
800 - 100	-	1.417	-	-	-	-	
100 - 200	100	1.405	1.505	0.05	21	9.8 x 10 ⁻³	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Root time fitting method was used for Cv calculations.

Date tested : 24-30/09/25
 Date reported : 16/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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Approved Signatory

Designation : Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 16/10/25



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LHF2419 (12/23)

Page 1 of 3

WSP
 Auckland (Ride Way)
 Quality Management Systems Certified to ISO 9001

7A Ride Way, Albany
 Private Bag 101982, NS Mail Centre, North
 Shore City, 0745, Auckland, New Zealand

Telephone 09 415 4660
 Website www.wsp.com/nz

**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1106 4.50-5.00m Specimen depth: 4.80-4.85m
 Sampled by : NC_Site Team
 Date sampled: 19/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Clayey SILT; grey mottled brown; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/6_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100

SOIL PROPERTIES

Specimen Dimensions:		Initial Wet Density	pbi (t/m ³)	1.60
Diameter (mm):	49.90	Initial Dry Density	pdi (t/m ³)	0.95
Initial height (mm):	20.00	Final Dry Density	pdf (t/m ³)	1.13
Final height (mm):	16.78	Initial Void Ratio	eo	1.87
Initial mass of sample (g):	62.45	Final Void Ratio	ef	1.41
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.		Initial Degree of Saturation	Si (%)	99
		Final Degree of Saturation	Sf (%)	100
		Solid Particle Density (Assumed)	Gs (t/m ³)	2.72
		INITIAL Water Content	Wi (%)	68.3
		FINAL Water Content	Wf (%)	56.1

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t50 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	Coeff. of Secondary Compr. (Csec)
0 - 12	12	1.863	-	-	-	-	-
12 - 25	13	1.850	0.450	0.34	23	7.6 x 10 ⁻²	0.00044
25 - 50	25	1.822	0.490	0.39	21	8.1 x 10 ⁻²	0.00078
50 - 100	50	1.773	0.520	0.35	19	6.7 x 10 ⁻²	0.00085
100 - 200	100	1.685	0.620	0.32	16	4.9 x 10 ⁻²	0.0019
200 - 400	200	1.530	0.810	0.29	11	3.2 x 10 ⁻²	0.0029
400 - 800	400	1.328	1.320	0.20	6.1	1.2 x 10 ⁻²	0.0044
800 - 100	-	1.417	-	-	-	-	-
100 - 200	100	1.405	0.370	0.05	20	9.0 x 10 ⁻³	0.0004
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Log time fitting method was used for Cv calculations.

Date tested : 24-30/09/25
 Date reported : 16/10/25

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Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 16/10/25



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LHF2419 (12/23)

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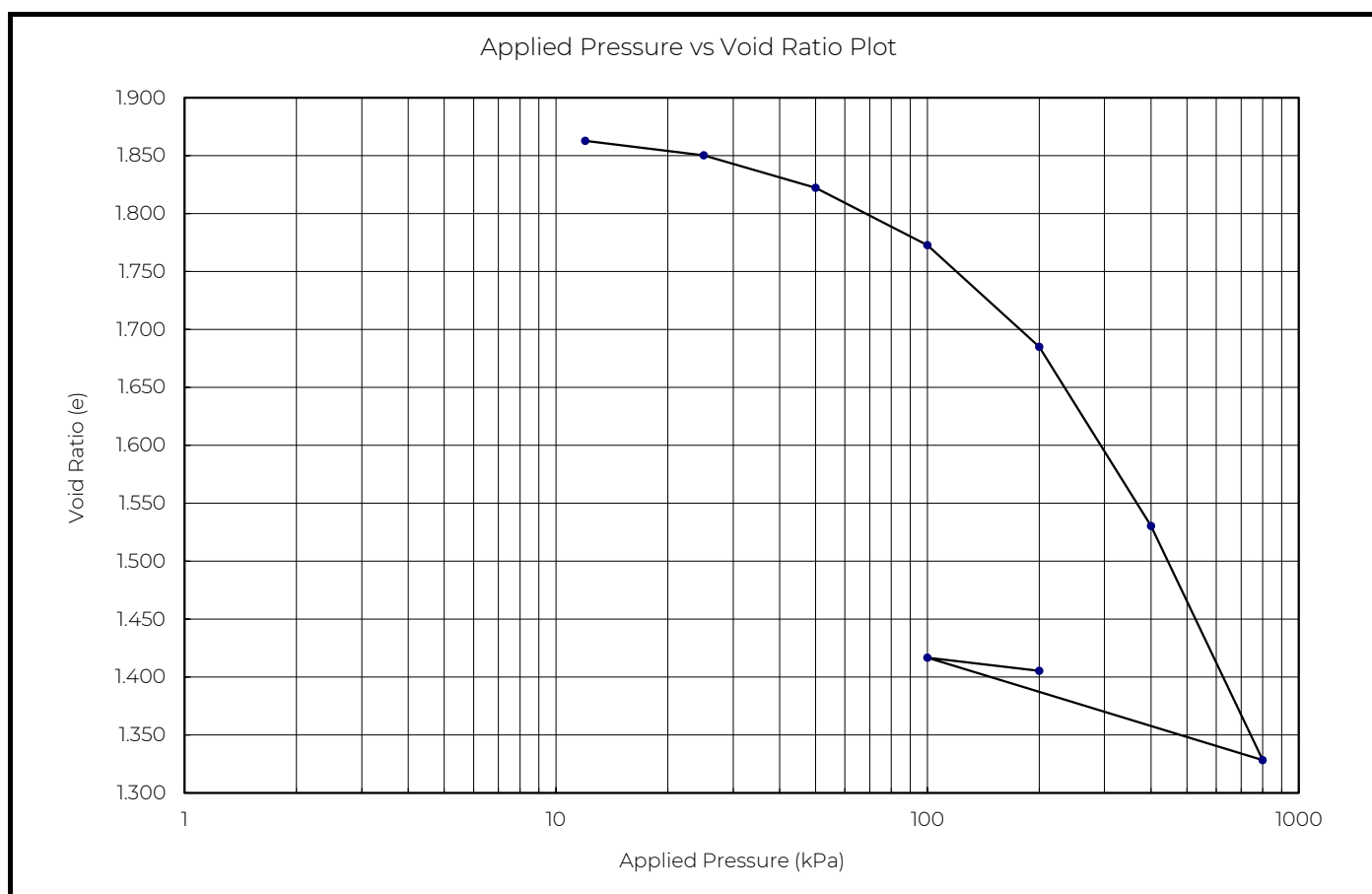
ONE DIMENSIONAL CONSOLIDATION PROPERTIES
Applied Pressure vs Void Ratio TEST REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1106 4.50-5.00m Specimen depth: 4.80-4.85m
 Sampled by : NC_Site Team
 Date sampled: 19/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Clayey SILT; grey mottled brown; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/6_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100



Test Method:	Notes:
One Dimensional Consolidation Test: NZS 4402:1986 Test 7.1	Load Increments applied at 24 hr intervals Void ratio is not IANZ Accredited due to assumed Solid Density value.

Date tested : 24-30/09/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
 Date reported : 16/10/25 This report may only be reproduced in full

Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 16/10/25



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ONE DIMENSIONAL CONSOLIDATION PROPERTIES TEST RESULT REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1140 7.50-8.00m Specimen depth: 7.95-8.00m
 Sampled by : NC Site Team
 Date sampled: 10/09/2025
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist;plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/77-Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

SOIL PROPERTIES

Specimen Dimensions:					
Diameter (mm):	50.00		Initial Wet Density	pbi (t/m ³)	1.91
Initial height (mm):	20.00		Initial Dry Density	pdi (t/m ³)	1.46
Final height (mm):	17.85		Final Dry Density	pdf (t/m ³)	1.63
Initial mass of sample (g):	74.90		Initial Void Ratio	eo	0.85
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Final Void Ratio	ef	0.65
			Initial Degree of Saturation	Si (%)	98
			Final Degree of Saturation	Sf (%)	100
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.70
			INITIAL Water Content	Wi (%)	31.0
			FINAL Water Content	Wf (%)	25.0

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t90 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	
0 - 12	12	0.848	27.590	0.25	1.6	4.0 x 10 ⁻³	
12 - 25	13	0.839	18.916	0.39	2.3	8.8 x 10 ⁻³	
25 - 50	25	0.824	14.360	0.34	3	1.0 x 10 ⁻²	
50 - 100	50	0.798	8.757	0.28	4.9	1.4 x 10 ⁻²	
100 - 200	100	0.756	14.450	0.23	2.9	6.5 x 10 ⁻³	
200 - 400	200	0.698	14.453	0.17	2.8	4.5 x 10 ⁻³	
400 - 800	400	0.630	9.667	0.10	3.9	3.7 x 10 ⁻³	
800 - 100	-	0.660	-	-	-		
100 - 200	100	0.654	1.883	0.04	19	6.4 x 10 ⁻³	
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		
-	-	-	-	-	-		

Test Methods:		Notes:
One Dimensional Consolidation Test.	NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content	NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
		Root time fitting method was used for Cv calculations.

Date tested : 15-24/10/25
 Date reported : 11/11/2025

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Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 11/11/2025



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**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1140 7.50-8.00m Specimen depth: 7.95-8.00m
 Sampled by : NC Site Team
 Date sampled: 10/09/2025
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist;plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/77-Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

SOIL PROPERTIES

Specimen Dimensions:					
Diameter (mm):	50.00		Initial Wet Density	pbi (t/m ³)	1.91
Initial height (mm):	20.00		Initial Dry Density	pdi (t/m ³)	1.46
Final height (mm):	17.85		Final Dry Density	pdf (t/m ³)	1.63
Initial mass of sample (g):	74.90		Initial Void Ratio	eo	0.85
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Final Void Ratio	ef	0.65
			Initial Degree of Saturation	Si (%)	98
			Final Degree of Saturation	Sf (%)	100
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.70
			INITIAL Water Content	Wi (%)	31.0
			FINAL Water Content	Wf (%)	25.0

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t50 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	Coeff. of Secondary Compr. (Csec)
0 - 12	12	0.848	-	-	-	-	-
12 - 25	13	0.839	5.620	0.39	1.8	7.0 x 10 ⁻³	0.00066
25 - 50	25	0.824	4.090	0.34	2.5	8.0 x 10 ⁻³	0.001
50 - 100	50	0.798	3.580	0.28	2.8	8.0 x 10 ⁻³	0.0016
100 - 200	100	0.756	3.800	0.23	2.6	6.0 x 10 ⁻³	0.0024
200 - 400	200	0.698	3.640	0.17	2.6	4.0 x 10 ⁻³	0.0031
400 - 800	400	0.630	3.000	0.10	2.9	3.0 x 10 ⁻³	0.0032
800 - 100	-	0.660	-	-	-	-	-
100 - 200	100	0.654	0.750	0.04	11	4.0 x 10 ⁻³	0.00025
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Log time fitting method was used for Cv calculations.

Date tested : 15-24/10/25
 Date reported : 11/11/2025

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Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 11/11/2025



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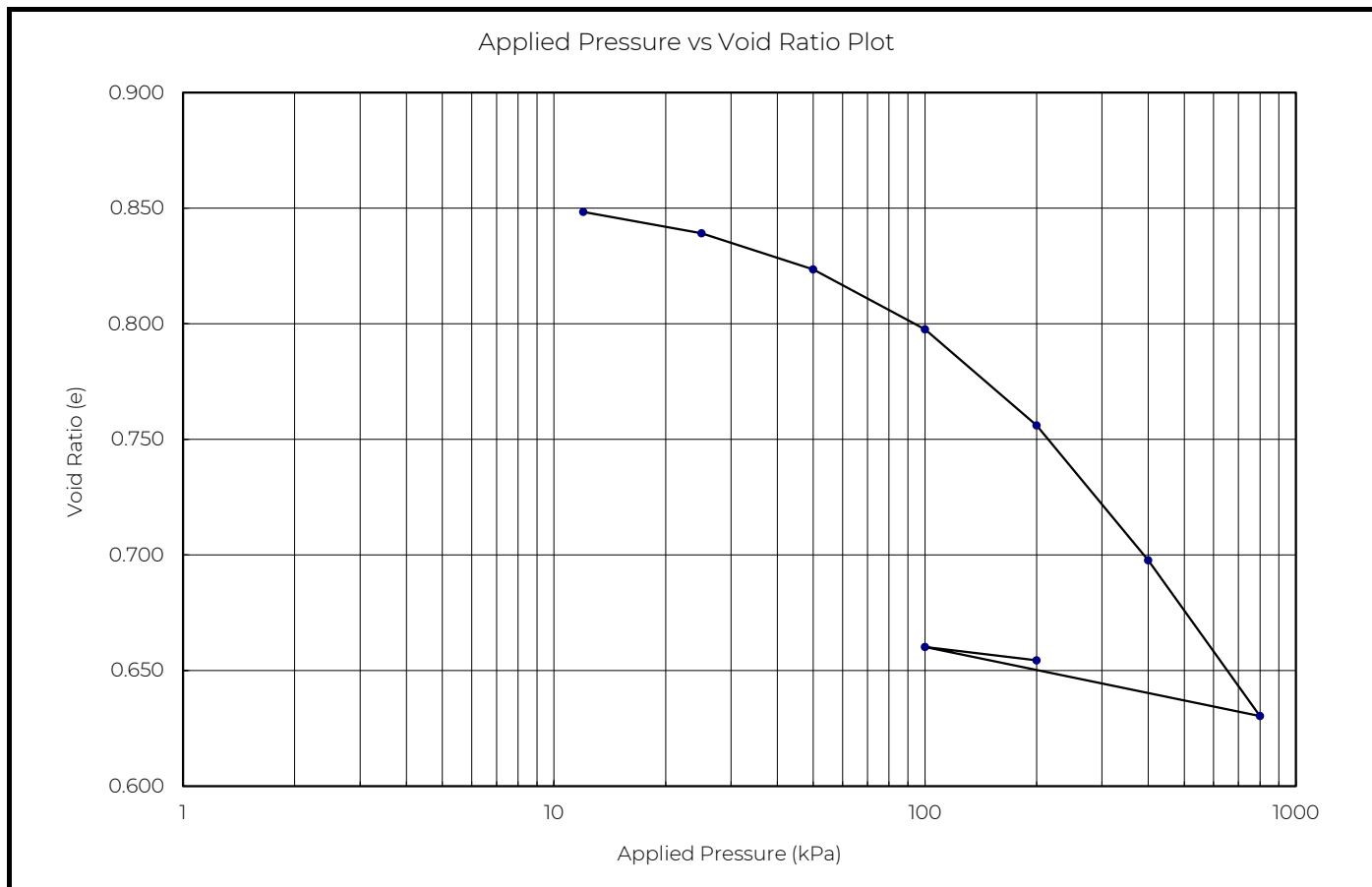
ONE DIMENSIONAL CONSOLIDATION PROPERTIES
Applied Pressure vs Void Ratio TEST REPORT



Project : Ground Investigation for Northland Corridor
Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
Client : NZTA C/- Aurecon & WSP NZ Ltd.
Sample Location ID: BH2B_1140 7.50-8.00m Specimen depth: 7.95-8.00m
Sampled by : NC Site Team
Date sampled: 10/09/25 -
Sampling method : Pushtube
Sample condition : As Received
Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16
Lab Ref No: WL4708/77-Consol
Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103



Test Method:	Notes:
One Dimensional Consolidation Test: NZS 4402:1986 Test 7.1	Load Increments applied at 24 hr intervals Void ratio is not IANZ Accredited due to assumed Solid Density value.

Date tested : 15-24/10/25
Date reported : 11/11/2025

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Approved Signatory

Thirushen Pillay
Senior Civil Engineering Technician
11/11/2025



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**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1150 2.00-2.50m Specimen depth: 2.30-2.35m
 Sampled by : NC_Site Team
 Date sampled: 18/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/17_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102

SOIL PROPERTIES

Specimen Dimensions:			Initial Wet Density	pbi (t/m ³)	1.57
Diameter (mm):	50.00		Initial Dry Density	pdi (t/m ³)	0.94
Initial height (mm):	20.00		Final Dry Density	pdf (t/m ³)	1.32
Final height (mm):	14.14		Initial Void Ratio	eo	1.91
Initial mass of sample (g):	61.54		Final Void Ratio	ef	1.06
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Initial Degree of Saturation	Si (%)	96
			Final Degree of Saturation	Sf (%)	100
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.72
			INITIAL Water Content	Wi (%)	67.5
			FINAL Water Content	Wf (%)	41.2

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t90 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	
0 - 12	12	1.831	27.973	2.20	1.6	3.5 x 10 ⁻²	
12 - 25	13	1.774	32.644	1.50	1.3	1.9 x 10 ⁻²	
25 - 50	25	1.675	33.382	1.40	1.2	1.7 x 10 ⁻²	
50 - 100	50	1.529	40.016	1.10	0.94	1.0 x 10 ⁻²	
100 - 200	100	1.362	38.699	0.66	0.87	5.6 x 10 ⁻³	
200 - 400	200	1.170	43.256	0.41	0.68	2.7 x 10 ⁻³	
400 - 800	400	0.988	44.415	0.21	0.56	1.1 x 10 ⁻³	
800 - 100	-	1.071	-	-	-	-	
100 - 200	100	1.056	8.171	0.07	2.8	1.9 x 10 ⁻³	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Root time fitting method was used for Cv calculations.

Date tested : 25/09/25-06/10/25
 Date reported : 20/10/25

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Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 28/10/2025



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**ONE DIMENSIONAL CONSOLIDATION PROPERTIES
TEST RESULT REPORT**



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1150 2.00-2.50m Specimen depth: 2.30-2.35m
 Sampled by : NC_Site Team
 Date sampled: 18/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/17_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102

SOIL PROPERTIES

Specimen Dimensions:			Initial Wet Density	pbi (t/m ³)	1.57
Diameter (mm):	50.00		Initial Dry Density	pdi (t/m ³)	0.94
Initial height (mm):	20.00		Final Dry Density	pdf (t/m ³)	1.32
Final height (mm):	14.14		Initial Void Ratio	eo	1.91
Initial mass of sample (g):	61.54		Final Void Ratio	ef	1.06
Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value.			Initial Degree of Saturation	Si (%)	96
			Final Degree of Saturation	Sf (%)	100
			Solid Particle Density (Assumed)	Gs (t/m ³)	2.72
			INITIAL Water Content	Wi (%)	67.5
			FINAL Water Content	Wf (%)	41.2

CONSOLIDATION PROPERTIES

PRESSURE RANGE (kPa)	Pressure Increment (dp)	**Void Ratio (e)	Intercept t50 (min)	Volume Compressibility Mv=m ² /MN	Coeff. of Consolidation Cv=m ² /year	Coeff. of Permeability k=m/year	Coeff. of Secondary Compr. (Csec)
0 - 12	12	1.831	7.240	2.220	1.44	3.1 x 10 ⁻²	0.00275
12 - 25	13	1.774	13.840	1.540	0.712	1.1 x 10 ⁻²	0.00422
25 - 50	25	1.675	13.120	1.420	0.721	1.0 x 10 ⁻²	0.00682
50 - 100	50	1.529	13.640	1.100	0.645	6.9 x 10 ⁻³	0.00876
100 - 200	100	1.362	15.180	0.660	0.518	3.4 x 10 ⁻³	0.00669
200 - 400	200	1.170	16.810	0.406	0.408	1.6 x 10 ⁻³	0.0073
400 - 800	400	0.988	17.000	0.210	0.341	7.0 x 10 ⁻⁴	0.00683
800 - 100	-	1.071	-	-	-	-	-
100 - 200	100	1.056	3.480	0.072	1.52	1.1 x 10 ⁻³	0.000942
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Test Methods:	Notes:
One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1	Sample is saturated during test.
Water Content NZS 4402:1986 Test 2.1	Load Increments applied at 24 hr intervals
	Log time fitting method was used for Cv calculations.

Date tested : 25/09/25-06/10/25
 Date reported : 20/10/25

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Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 28/10/2025



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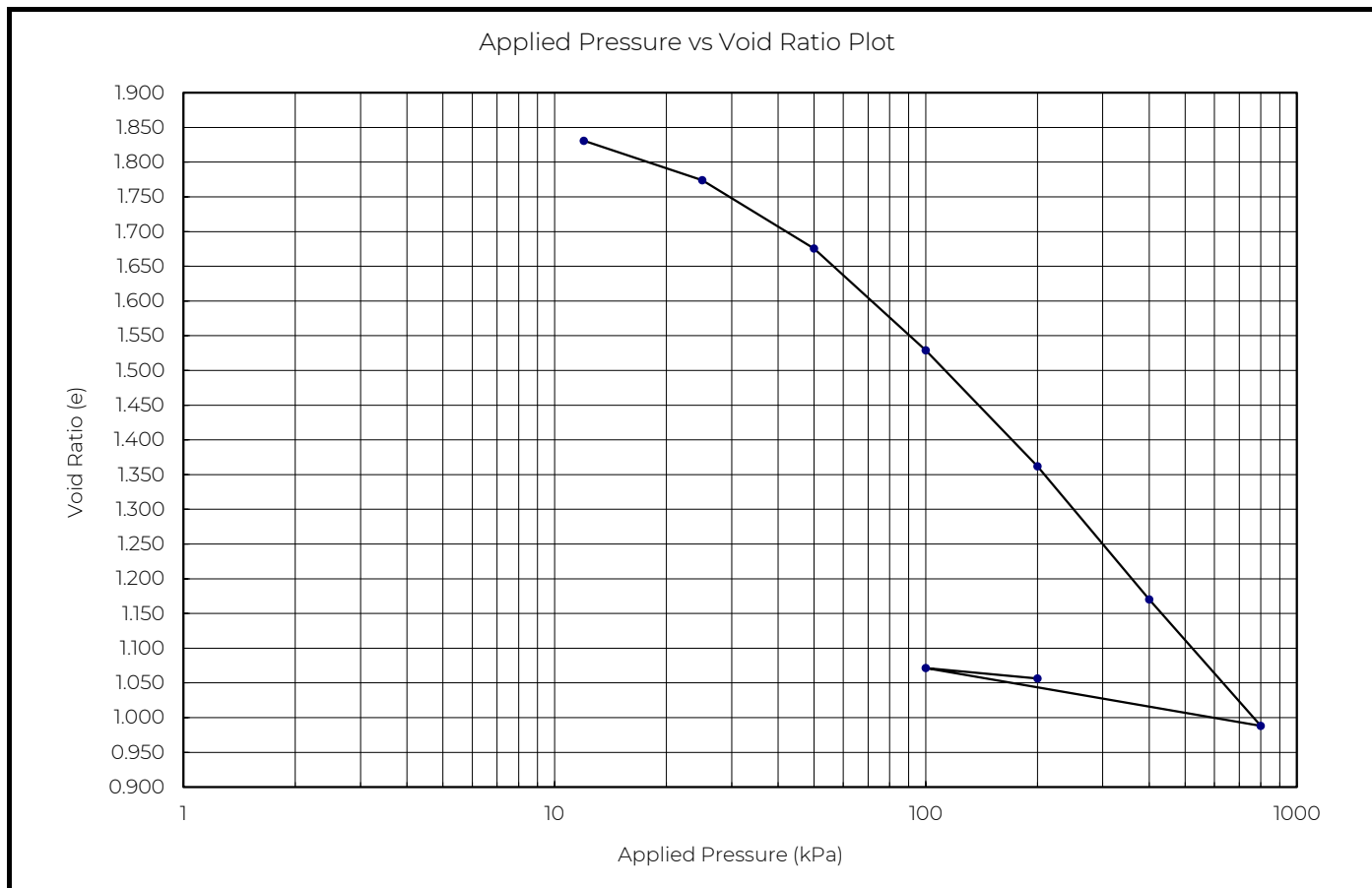
ONE DIMENSIONAL CONSOLIDATION PROPERTIES
Applied Pressure vs Void Ratio TEST REPORT



Project : Ground Investigation for Northland Corridor
 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI
 Client : NZTA C/- Aurecon & WSP NZ Ltd.
 Sample Location ID: BH2B_1150 2.00-2.50m Specimen depth: 2.30-2.35m
 Sampled by : NC_Site Team
 Date sampled: 18/08/25
 Sampling method : Pushtube
 Sample condition : As Received
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16
 Lab Ref No: WL4708/17_Consol
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102



Test Method:	Notes:
One Dimensional Consolidation Test: NZS 4402:1986 Test 7.1	Load Increments applied at 24 hr intervals Void ratio is not IANZ Accredited due to assumed Solid Density value.

Date tested : 25/09/25-06/10/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
 Date reported : 20/10/25 This report may only be reproduced in full

Approved Signatory

Thirushen Pillay
 Senior Civil Engineering Technician
 Date : 28/10/2025



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