

**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\_1104 9.00-9.50m Specimen depth: 9.45-9.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 20/08/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of sand; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/3\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100

**SOIL PROPERTIES**

| Specimen Dimensions:                                                           |       |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) | 1.98 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.90 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.55 |
| Initial height (mm):                                                           | 20.00 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 1.73 |
| Final height (mm):                                                             | 17.83 |  | Initial Void Ratio               | eo                      | 0.76 |
| Initial mass of sample (g):                                                    | 77.62 |  | Final Void Ratio                 | ef                      | 0.57 |
| 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 <sup>3</sup> )  | 2.72 |
|                                                                                |       |  | INITIAL Water Content            | Wi (%)                  | 28.4 |
|                                                                                |       |  | FINAL Water Content              | Wf (%)                  | 22.7 |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 0.737            | 33.901              | 1.10                                         | 1.3                                             | 1.4 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 0.728            | 14.189              | 0.41                                         | 3                                               | 1.2 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 0.712            | 11.429              | 0.36                                         | 3.7                                             | 1.3 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 0.688            | 10.751              | 0.28                                         | 3.9                                             | 1.1 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 0.652            | 9.473               | 0.21                                         | 4.3                                             | 9.0 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 0.606            | 8.233               | 0.14                                         | 4.8                                             | 6.6 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.553            | 5.521               | 0.08                                         | 6.7                                             | 5.4 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.573            | -                   | -                                            | -                                               |                                 |  |
| 100 - 200            | 100                     | 0.569            | 1.557               | 0.03                                         | 23                                              | 6.0 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |

| 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 : 02-12/10/25  
 Date reported : 16/10/25

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

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



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# ONE DIMENSIONAL CONSOLIDATION PROPERTIES TEST RESULT REPORT



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 Location: Section 2 Te Hana to Port Marsden Highway, Section 2B GI  
 Client : NZTA C/- Aurecon & WSP NZ Ltd.  
 Sample Location ID: BH2B\_1104 9.00-9.50m Specimen depth: 9.45-9.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 20/08/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of sand; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/3\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100

## SOIL PROPERTIES

| Specimen Dimensions:                                                           |       |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) | 1.98 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.90 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.55 |
| Initial height (mm):                                                           | 20.00 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 1.73 |
| Final height (mm):                                                             | 17.83 |  | Initial Void Ratio               | eo                      | 0.76 |
| Initial mass of sample (g):                                                    | 77.62 |  | Final Void Ratio                 | ef                      | 0.57 |
| 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 <sup>3</sup> )  | 2.72 |
|                                                                                |       |  | INITIAL Water Content            | Wi (%)                  | 28.4 |
|                                                                                |       |  | FINAL Water Content              | Wf (%)                  | 22.7 |

## CONSOLIDATION PROPERTIES

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t50 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year | Coeff. of Secondary Compr. (Csec) |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|-----------------------------------|
| 0 - 12               | 12                      | 0.737            | 8.250               | 1.10                                         | 1.3                                             | 1.3 x 10 <sup>-2</sup>          | 0.00048                           |
| 12 - 25              | 13                      | 0.728            | 5.500               | 0.41                                         | 1.8                                             | 8.0 x 10 <sup>-3</sup>          | 0.00086                           |
| 25 - 50              | 25                      | 0.712            | 4.690               | 0.36                                         | 2.1                                             | 8.0 x 10 <sup>-3</sup>          | 0.0012                            |
| 50 - 100             | 50                      | 0.688            | 3.980               | 0.28                                         | 2.5                                             | 7.0 x 10 <sup>-3</sup>          | 0.0015                            |
| 100 - 200            | 100                     | 0.652            | 3.260               | 0.21                                         | 2.9                                             | 6.0 x 10 <sup>-3</sup>          | 0.0019                            |
| 200 - 400            | 200                     | 0.606            | 2.910               | 0.14                                         | 3.1                                             | 4.0 x 10 <sup>-3</sup>          | 0.0022                            |
| 400 - 800            | 400                     | 0.553            | 1.920               | 0.08                                         | 4.5                                             | 4.0 x 10 <sup>-3</sup>          | 0.0026                            |
| 800 - 100            | -                       | 0.573            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 0.569            | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |

| 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 : 02-12/10/25  
 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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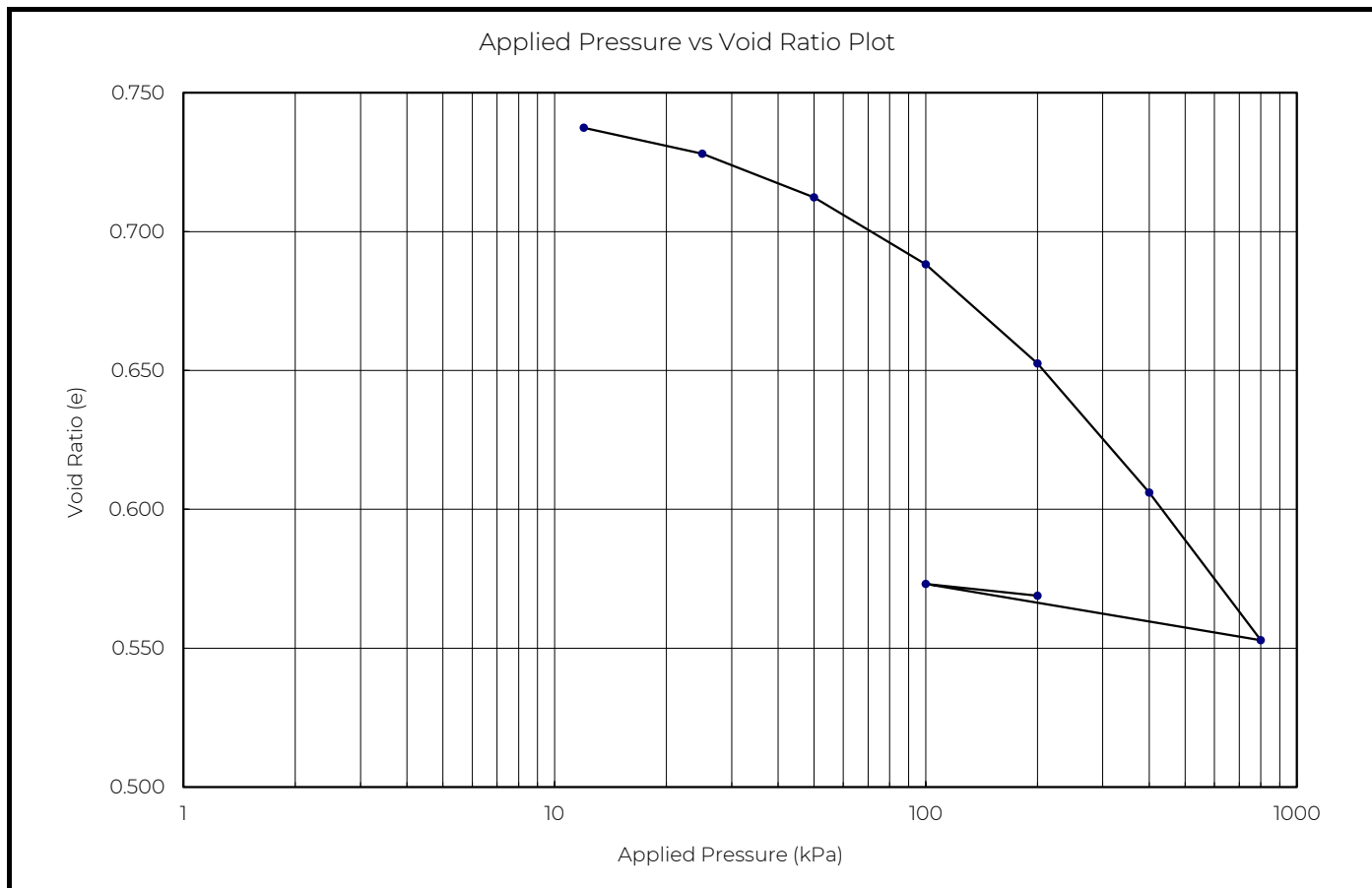
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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\_1104 9.00-9.50m Specimen depth: 9.45-9.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 20/08/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of sand; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/3\_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<br>Void ratio is not IANZ Accredited due to assumed Solid Density value. |

Date tested : 02-12/10/25  
 Date reported : 16/10/25

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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\_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 <sup>3</sup> ) | 1.92 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.92 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.46 |
| Initial height (mm):                                                           | 19.90 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 0.835            | 5.028               | 0.25                                         | 8.7                                             | 2.2 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 0.812            | 5.140               | 0.24                                         | 8.4                                             | 2.0 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 0.746            | 9.512               | 0.37                                         | 4.4                                             | 1.6 x 10 <sup>-2</sup>          |  |
| 200 - 400            | 200                     | 0.696            | 11.386              | 0.14                                         | 3.4                                             | 4.8 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.626            | 8.410               | 0.10                                         | 4.4                                             | 4.4 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.653            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 0.648            | 1.296               | 0.03                                         | 27                                              | 8.2 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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

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**Approved Signatory**

Designation : 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\_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 <sup>3</sup> ) | 1.92 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.92 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.46 |
| Initial height (mm):                                                           | 19.90 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-2</sup>          | 0.00056                           |
| 25 - 50              | 25                      | 0.835            | 2.590               | 0.25                                         | 3.9                                             | 1.0 x 10 <sup>-2</sup>          | 0.00092                           |
| 50 - 100             | 50                      | 0.812            | 2.190               | 0.24                                         | 4.6                                             | 1.1 x 10 <sup>-2</sup>          | 0.0016                            |
| 100 - 200            | 100                     | 0.746            | -                   | -                                            | -                                               | -                               | -                                 |
| 200 - 400            | 200                     | 0.696            | 3.820               | 0.14                                         | 2.4                                             | 3.0 x 10 <sup>-3</sup>          | 0.003                             |
| 400 - 800            | 400                     | 0.626            | 2.610               | 0.10                                         | 3.3                                             | 3.0 x 10 <sup>-3</sup>          | 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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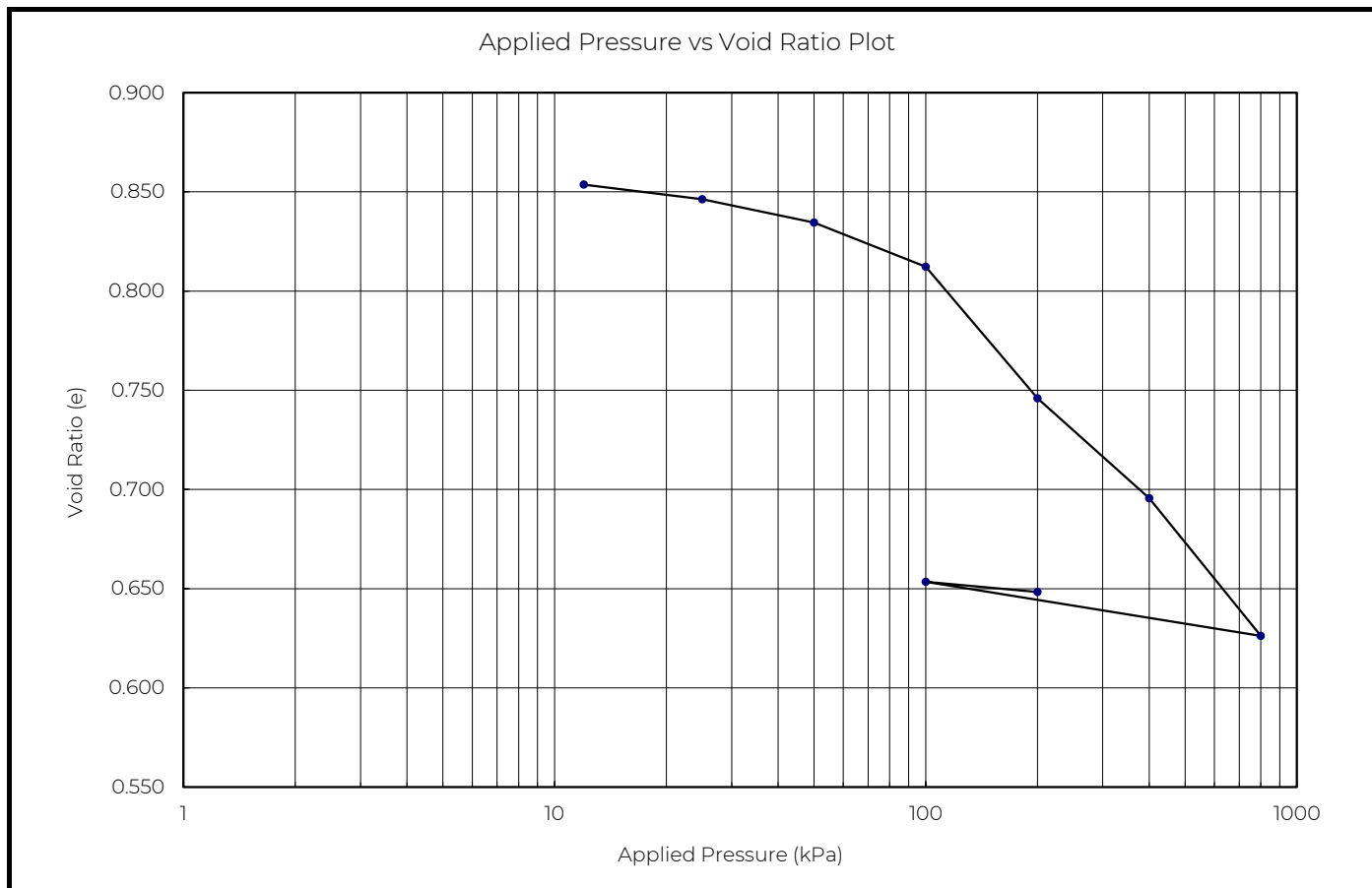
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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 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<br>Void ratio is not IANZ Accredited due to assumed Solid Density value. |

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OEDOMETER APPARATUS No: S103

**SOIL PROPERTIES**

| Specimen Dimensions:                                                           |       |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) | 1.92 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.92 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.46 |
| Initial height (mm):                                                           | 19.90 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 0.835            | 5.028               | 0.25                                         | 8.7                                             | 2.2 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 0.812            | 5.140               | 0.24                                         | 8.4                                             | 2.0 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 0.746            | 9.512               | 0.37                                         | 4.4                                             | 1.6 x 10 <sup>-2</sup>          |  |
| 200 - 400            | 200                     | 0.696            | 11.386              | 0.14                                         | 3.4                                             | 4.8 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.626            | 8.410               | 0.10                                         | 4.4                                             | 4.4 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.653            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 0.648            | 1.296               | 0.03                                         | 27                                              | 8.2 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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 <sup>3</sup> ) | 1.92 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.92 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.46 |
| Initial height (mm):                                                           | 19.90 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-2</sup>          | 0.00056                           |
| 25 - 50              | 25                      | 0.835            | 2.590               | 0.25                                         | 3.9                                             | 1.0 x 10 <sup>-2</sup>          | 0.00092                           |
| 50 - 100             | 50                      | 0.812            | 2.190               | 0.24                                         | 4.6                                             | 1.1 x 10 <sup>-2</sup>          | 0.0016                            |
| 100 - 200            | 100                     | 0.746            | -                   | -                                            | -                                               | -                               | -                                 |
| 200 - 400            | 200                     | 0.696            | 3.820               | 0.14                                         | 2.4                                             | 3.0 x 10 <sup>-3</sup>          | 0.003                             |
| 400 - 800            | 400                     | 0.626            | 2.610               | 0.10                                         | 3.3                                             | 3.0 x 10 <sup>-3</sup>          | 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  
 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



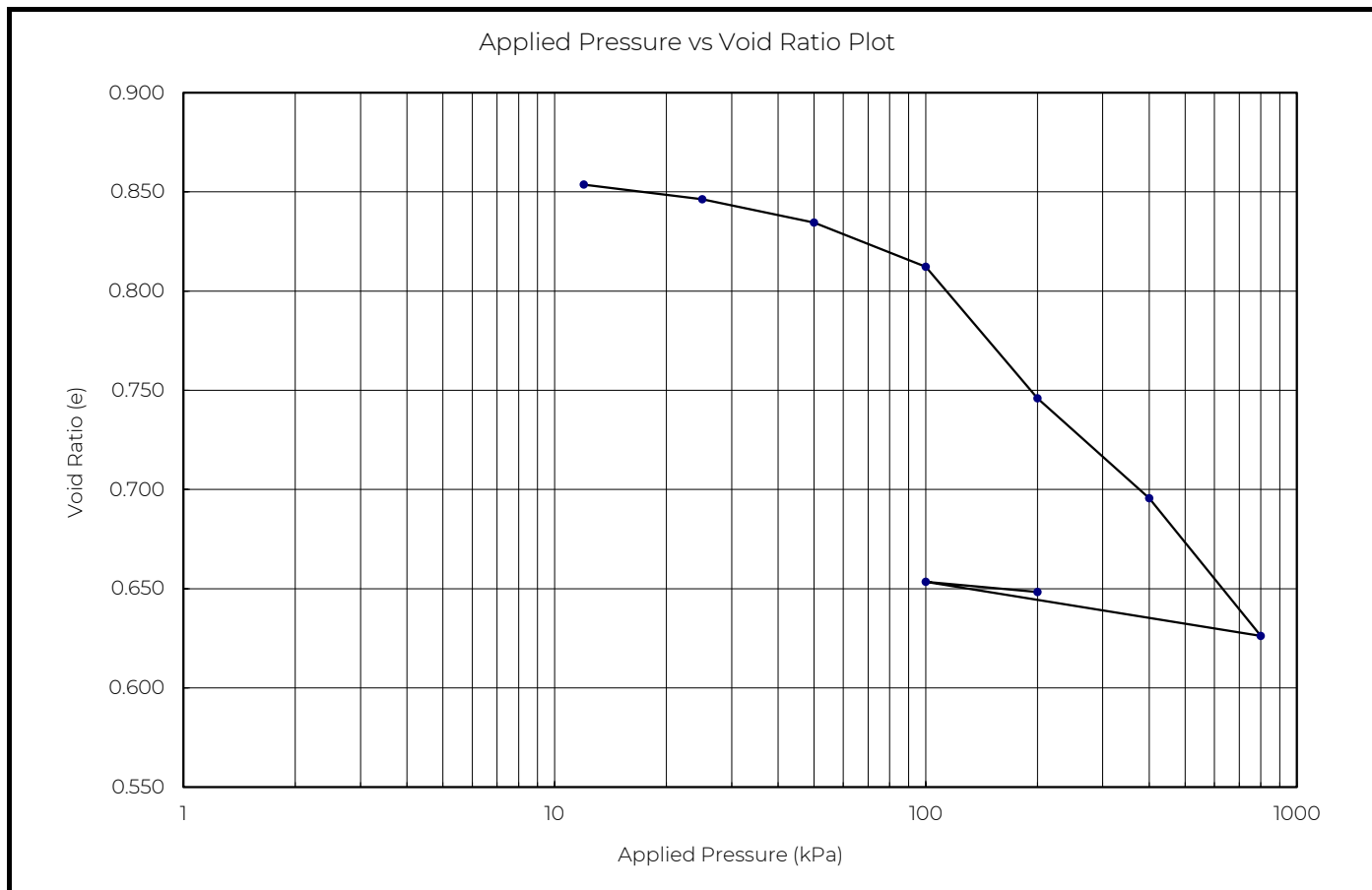
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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<br>Void ratio is not IANZ Accredited due to assumed Solid Density value. |

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

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 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\_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 <sup>3</sup> ) 1.52 |
| Initial height (mm):                                                           | 20.10 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) 0.89 |
| Final height (mm):                                                             | 15.32 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) 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 <sup>3</sup> ) 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.980            | 21.569              | 1.80                                         | 2.1                                             | 3.7 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 1.951            | 26.553              | 0.76                                         | 1.6                                             | 1.2 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.901            | 19.522              | 0.68                                         | 2.2                                             | 1.4 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.809            | 11.831              | 0.63                                         | 3.4                                             | 2.1 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 1.655            | 28.325              | 0.55                                         | 1.3                                             | 7.2 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 1.463            | 27.065              | 0.36                                         | 1.3                                             | 4.5 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 1.263            | 23.368              | 0.20                                         | 1.3                                             | 2.5 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 1.332            | -                   | -                                            | -                                               |                                 |  |
| 100 - 200            | 100                     | 1.322            | 4.504               | 0.04                                         | 5.8                                             | 2.5 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |

| 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.  
 Date reported : 11/11/2025 This report may only be reproduced in full

Approved Signatory

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



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\_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 <sup>3</sup> ) | 1.52 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.92 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 0.89 |
| Initial height (mm):                                                           | 20.10 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-2</sup>          | 0.0013                            |
| 12 - 25              | 13                      | 1.951            | 9.190               | 0.76                                         | 1.1                                             | 8.0 x 10 <sup>-3</sup>          | 0.0019                            |
| 25 - 50              | 25                      | 1.901            | 6.130               | 0.68                                         | 1.6                                             | 1.1 x 10 <sup>-2</sup>          | 0.0031                            |
| 50 - 100             | 50                      | 1.809            | 9.860               | 0.63                                         | 0.97                                            | 6.0 x 10 <sup>-3</sup>          | 0.0052                            |
| 100 - 200            | 100                     | 1.655            | 8.240               | 0.55                                         | 1.1                                             | 6.0 x 10 <sup>-3</sup>          | 0.0095                            |
| 200 - 400            | 200                     | 1.463            | 8.060               | 0.36                                         | 0.99                                            | 4.0 x 10 <sup>-3</sup>          | 0.0084                            |
| 400 - 800            | 400                     | 1.263            | 7.410               | 0.20                                         | 0.93                                            | 2.0 x 10 <sup>-3</sup>          | 0.0066                            |
| 800 - 100            | -                       | 1.332            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 1.322            | 1.410               | 0.04                                         | 4.4                                             | 2.0 x 10 <sup>-3</sup>          | 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. |

Date tested : 23/10/25-03/11/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.  
 Date reported : 11/11/2025 This report may only be reproduced in full

Approved Signatory

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



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

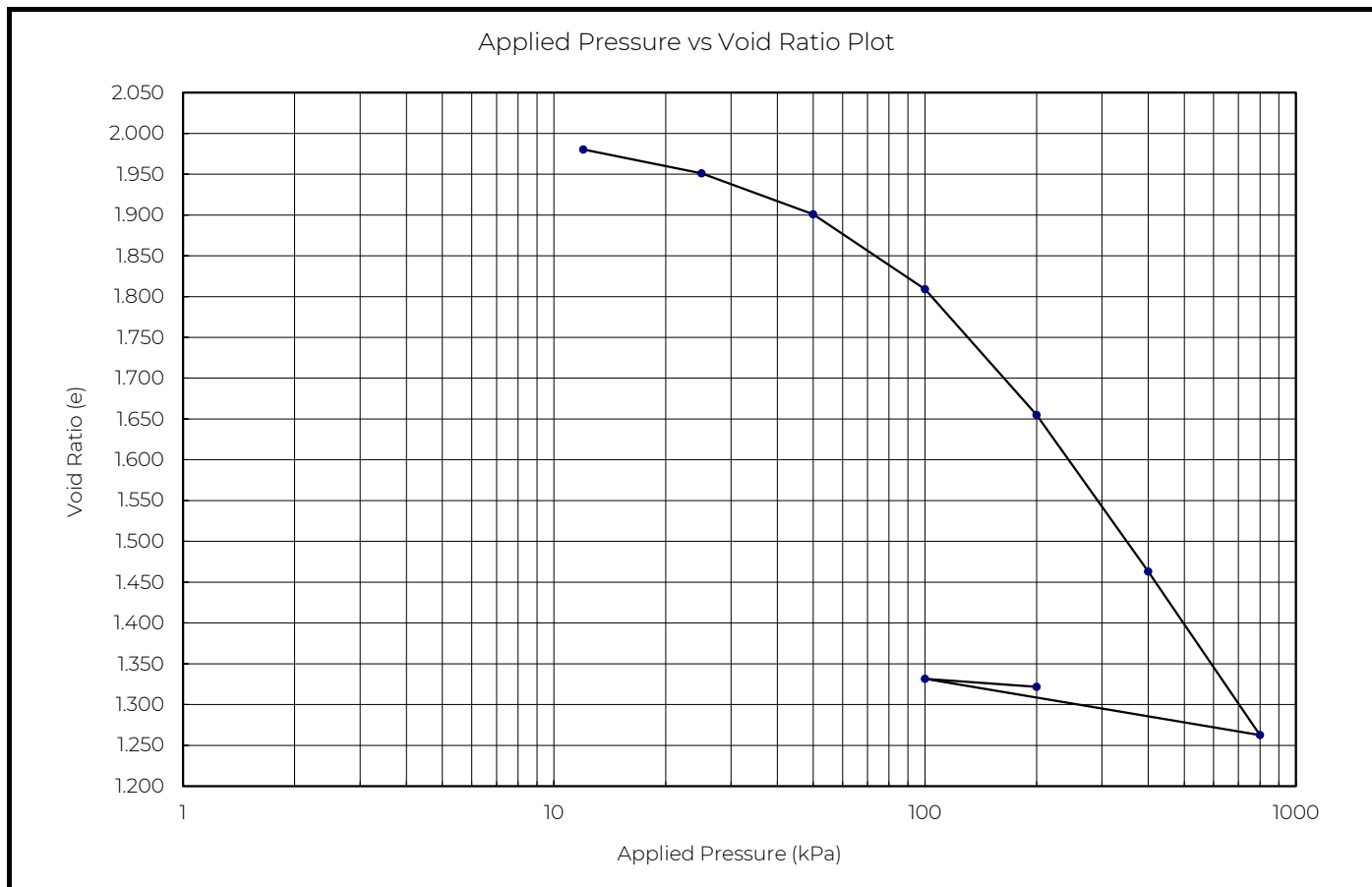
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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<br>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.  
 Date reported : 11/11/2025 This report may only be reproduced in full

Approved Signatory

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



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\_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:                                                           |       |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) | 1.72 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.90 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.17 |
| Initial height (mm):                                                           | 20.00 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 1.38 |
| Final height (mm):                                                             | 16.93 |  | Initial Void Ratio               | eo                      | 1.32 |
| Initial mass of sample (g):                                                    | 67.36 |  | Final Void Ratio                 | ef                      | 0.97 |
| Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value. |       |  | Initial Degree of Saturation     | Si (%)                  | 97   |
|                                                                                |       |  | Final Degree of Saturation       | Sf (%)                  | 100  |
|                                                                                |       |  | Solid Particle Density (Assumed) | Gs (t/m <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.314            | 5.500               | 0.33                                         | 8.1                                             | 2.6 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 1.295            | 8.766               | 0.64                                         | 5                                               | 3.1 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.272            | 10.399              | 0.41                                         | 4.2                                             | 1.7 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.233            | 16.131              | 0.34                                         | 2.6                                             | 8.7 x 10 <sup>-3</sup>          |  |
| 100 - 200            | 100                     | 1.164            | 22.699              | 0.31                                         | 1.8                                             | 5.5 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 1.047            | 27.636              | 0.27                                         | 1.4                                             | 3.7 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.915            | 23.625              | 0.16                                         | 1.5                                             | 2.3 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.978            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 0.967            | 4.419               | 0.06                                         | 7.3                                             | 4.2 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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  
 Date reported : 23/10/25

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

Approved Signatory

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



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\_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 <sup>3</sup> ) 1.72 |
| Initial height (mm):                                                           | 20.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) 1.17 |
| Final height (mm):                                                             | 16.93 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) 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 <sup>3</sup> ) 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-3</sup>          | 0.001                             |
| 12 - 25              | 13                      | 1.295            | 4.450               | 0.6371                                       | 2.319                                           | 1.4 x 10 <sup>-2</sup>          | 0.001                             |
| 25 - 50              | 25                      | 1.272            | 5.090               | 0.4130                                       | 1.994                                           | 8.1 x 10 <sup>-3</sup>          | 0.002                             |
| 50 - 100             | 50                      | 1.233            | 4.820               | 0.3355                                       | 2.062                                           | 6.8 x 10 <sup>-3</sup>          | 0.002                             |
| 100 - 200            | 100                     | 1.164            | 7.740               | 0.3126                                       | 1.241                                           | 3.8 x 10 <sup>-3</sup>          | 0.003                             |
| 200 - 400            | 200                     | 1.047            | 8.800               | 0.2704                                       | 1.025                                           | 2.7 x 10 <sup>-3</sup>          | 0.004                             |
| 400 - 800            | 400                     | 0.915            | 7.500               | 0.1611                                       | 1.076                                           | 1.7 x 10 <sup>-3</sup>          | 0.004                             |
| 800 - 100            | -                       | 0.978            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 0.967            | 1.920               | 0.0582                                       | 3.926                                           | 2.2 x 10 <sup>-3</sup>          | 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  
 Date reported : 23/10/25

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



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

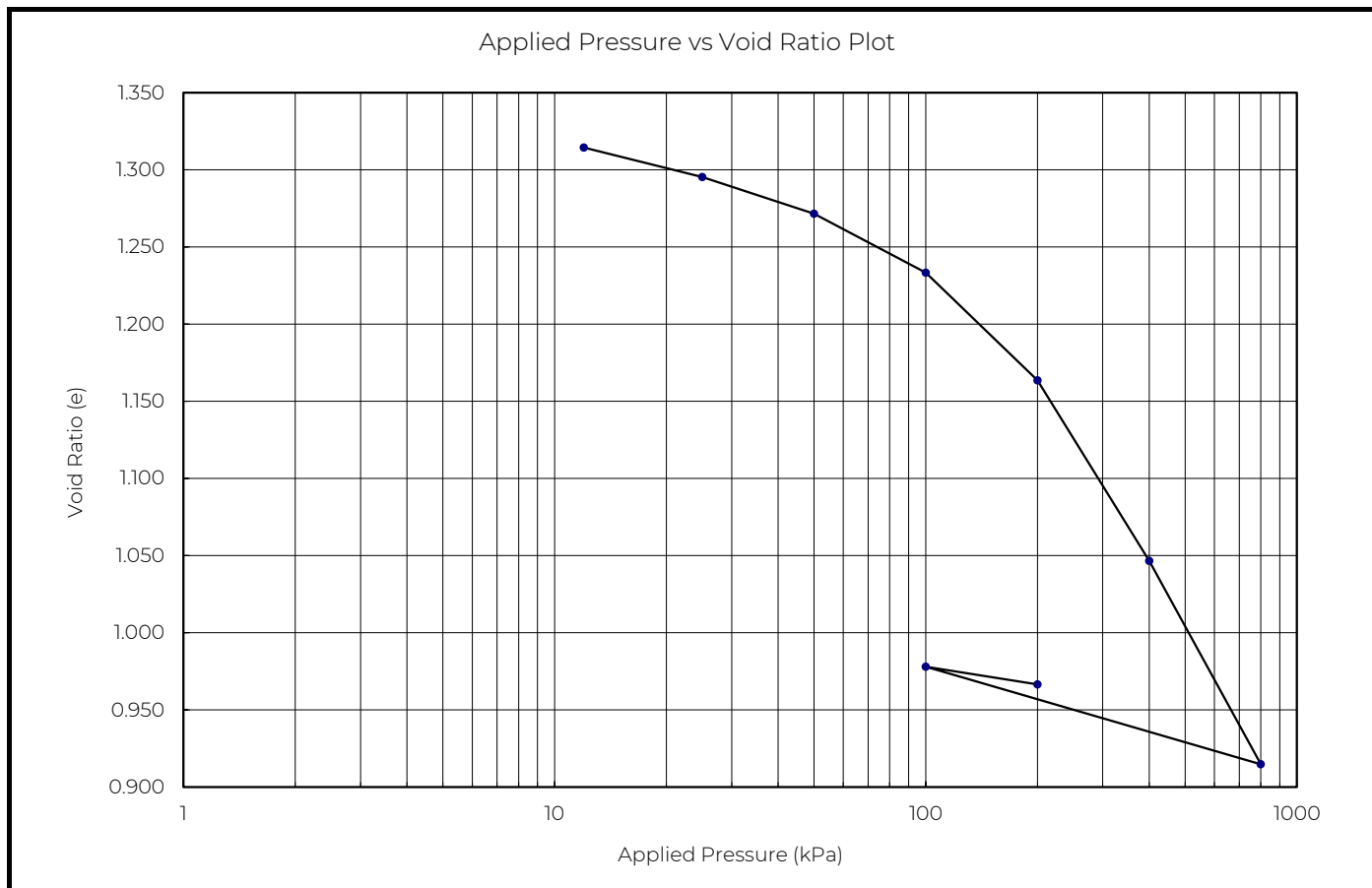
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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<br>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.  
 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



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\_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 <sup>3</sup> ) | 1.60 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.90 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 0.95 |
| Initial height (mm):                                                           | 20.00 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-1</sup>          |  |
| 25 - 50              | 25                      | 1.822            | 1.185               | 0.39                                         | 37                                              | 1.4 x 10 <sup>-1</sup>          |  |
| 50 - 100             | 50                      | 1.773            | 1.615               | 0.35                                         | 27                                              | 9.2 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 1.685            | 1.703               | 0.32                                         | 24                                              | 7.6 x 10 <sup>-2</sup>          |  |
| 200 - 400            | 200                     | 1.530            | 2.845               | 0.29                                         | 14                                              | 3.9 x 10 <sup>-2</sup>          |  |
| 400 - 800            | 400                     | 1.328            | 3.671               | 0.20                                         | 9.4                                             | 1.8 x 10 <sup>-2</sup>          |  |
| 800 - 100            | -                       | 1.417            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 1.405            | 1.505               | 0.05                                         | 21                                              | 9.8 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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**

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



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

LHF2419 (12/23)

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WSP  
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 Quality Management Systems Certified to ISO 9001

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 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 <sup>3</sup> ) | 1.60 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 49.90 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 0.95 |
| Initial height (mm):                                                           | 20.00 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-2</sup>          | 0.00044                           |
| 25 - 50              | 25                      | 1.822            | 0.490               | 0.39                                         | 21                                              | 8.1 x 10 <sup>-2</sup>          | 0.00078                           |
| 50 - 100             | 50                      | 1.773            | 0.520               | 0.35                                         | 19                                              | 6.7 x 10 <sup>-2</sup>          | 0.00085                           |
| 100 - 200            | 100                     | 1.685            | 0.620               | 0.32                                         | 16                                              | 4.9 x 10 <sup>-2</sup>          | 0.0019                            |
| 200 - 400            | 200                     | 1.530            | 0.810               | 0.29                                         | 11                                              | 3.2 x 10 <sup>-2</sup>          | 0.0029                            |
| 400 - 800            | 400                     | 1.328            | 1.320               | 0.20                                         | 6.1                                             | 1.2 x 10 <sup>-2</sup>          | 0.0044                            |
| 800 - 100            | -                       | 1.417            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 1.405            | 0.370               | 0.05                                         | 20                                              | 9.0 x 10 <sup>-3</sup>          | 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

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 : 16/10/25



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

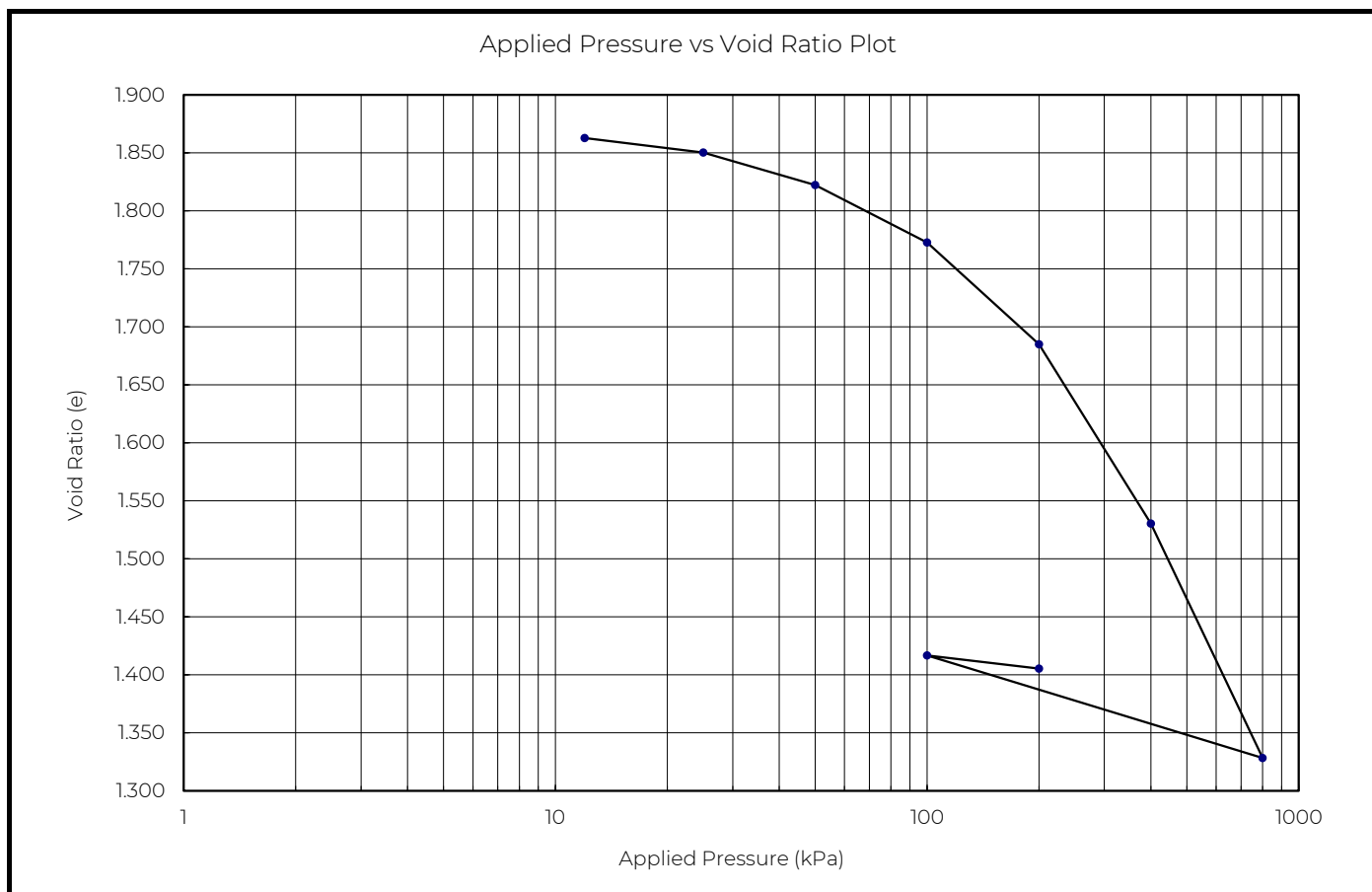
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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<br>Void ratio is not IANZ Accredited due to assumed Solid Density value. |

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

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



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\_1122 6.00-6.50m Specimen depth: 6.17-6.22m  
 Sampled by : NC Site Team  
 Date sampled: 22/09/2025  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty SAND with traces of clay; grey; moist

Project No: 1-C2466.16  
 Lab Ref No: WL4708/121-Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

**SOIL PROPERTIES**

| Specimen Dimensions:                                                           |       |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) | 2.00 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 50.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.60 |
| Initial height (mm):                                                           | 19.96 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 1.78 |
| Final height (mm):                                                             | 17.87 |  | Initial Void Ratio               | eo                      | 0.69 |
| Initial mass of sample (g):                                                    | 78.24 |  | Final Void Ratio                 | ef                      | 0.51 |
| Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value. |       |  | Initial Degree of Saturation     | Si (%)                  | 98   |
|                                                                                |       |  | Final Degree of Saturation       | Sf (%)                  | 98   |
|                                                                                |       |  | Solid Particle Density (Assumed) | Gs (t/m <sup>3</sup> )  | 2.70 |
|                                                                                |       |  | INITIAL Water Content            | Wi (%)                  | 25.0 |
|                                                                                |       |  | FINAL Water Content              | Wf (%)                  | 18.6 |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 0.645            | 35.690              | 2.20                                         | 1.2                                             | 2.7 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 0.631            | 15.548              | 0.65                                         | 2.7                                             | 1.7 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 0.616            | 7.220               | 0.37                                         | 5.7                                             | 2.1 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 0.597            | 6.778               | 0.23                                         | 6                                               | 1.4 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 0.571            | 4.129               | 0.16                                         | 9.6                                             | 1.5 x 10 <sup>-2</sup>          |  |
| 200 - 400            | 200                     | 0.542            | 3.372               | 0.09                                         | 11                                              | 1.0 x 10 <sup>-2</sup>          |  |
| 400 - 800            | 400                     | 0.507            | 3.228               | 0.06                                         | 11                                              | 6.2 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.515            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 0.514            | 2.267               | 0.01                                         | 16                                              | 1.9 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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 : 29/10/25-06/11/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.  
 Date reported : 11/11/2025 This report may only be reproduced in full

**Approved Signatory**

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



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

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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\_1122 6.00-6.50m Specimen depth: 6.17-6.22m  
 Sampled by : NC Site Team  
 Date sampled: 22/09/2025  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty SAND with traces of clay; grey; moist

Project No: 1-C2466.16  
 Lab Ref No: WL4708/121-Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

**SOIL PROPERTIES**

| Specimen Dimensions:                                                           |       |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) | 2.00 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 50.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.60 |
| Initial height (mm):                                                           | 19.96 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 1.78 |
| Final height (mm):                                                             | 17.87 |  | Initial Void Ratio               | eo                      | 0.69 |
| Initial mass of sample (g):                                                    | 78.24 |  | Final Void Ratio                 | ef                      | 0.51 |
| Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value. |       |  | Initial Degree of Saturation     | Si (%)                  | 98   |
|                                                                                |       |  | Final Degree of Saturation       | Sf (%)                  | 98   |
|                                                                                |       |  | Solid Particle Density (Assumed) | Gs (t/m <sup>3</sup> )  | 2.70 |
|                                                                                |       |  | INITIAL Water Content            | Wi (%)                  | 25.0 |
|                                                                                |       |  | FINAL Water Content              | Wf (%)                  | 18.6 |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t50 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year | Coeff. of Secondary Compr. (Csec) |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|-----------------------------------|
| 0 - 12               | 12                      | 0.645            | 8.220               | 2.20                                         | 1.3                                             | 2.8 x 10 <sup>-2</sup>          | 0.0024                            |
| 12 - 25              | 13                      | 0.631            | 4.850               | 0.65                                         | 2                                               | 1.3 x 10 <sup>-2</sup>          | 0.00042                           |
| 25 - 50              | 25                      | 0.616            | 1.590               | 0.37                                         | 6.1                                             | 2.2 x 10 <sup>-2</sup>          | 0.0015                            |
| 50 - 100             | 50                      | 0.597            | 2.170               | 0.23                                         | 4.4                                             | 1.0 x 10 <sup>-2</sup>          | 0.0012                            |
| 100 - 200            | 100                     | 0.571            | 1.360               | 0.16                                         | 6.8                                             | 1.1 x 10 <sup>-2</sup>          | 0.0018                            |
| 200 - 400            | 200                     | 0.542            | 0.980               | 0.09                                         | 9.1                                             | 9.0 x 10 <sup>-3</sup>          | 0.0017                            |
| 400 - 800            | 400                     | 0.507            | 1.070               | 0.06                                         | 8.1                                             | 4.0 x 10 <sup>-3</sup>          | 0.002                             |
| 800 - 100            | -                       | 0.515            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 0.514            | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |

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

Date tested : 29/10/25-06/11/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.  
 Date reported : 11/11/2025 This report may only be reproduced in full

Approved Signatory

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



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

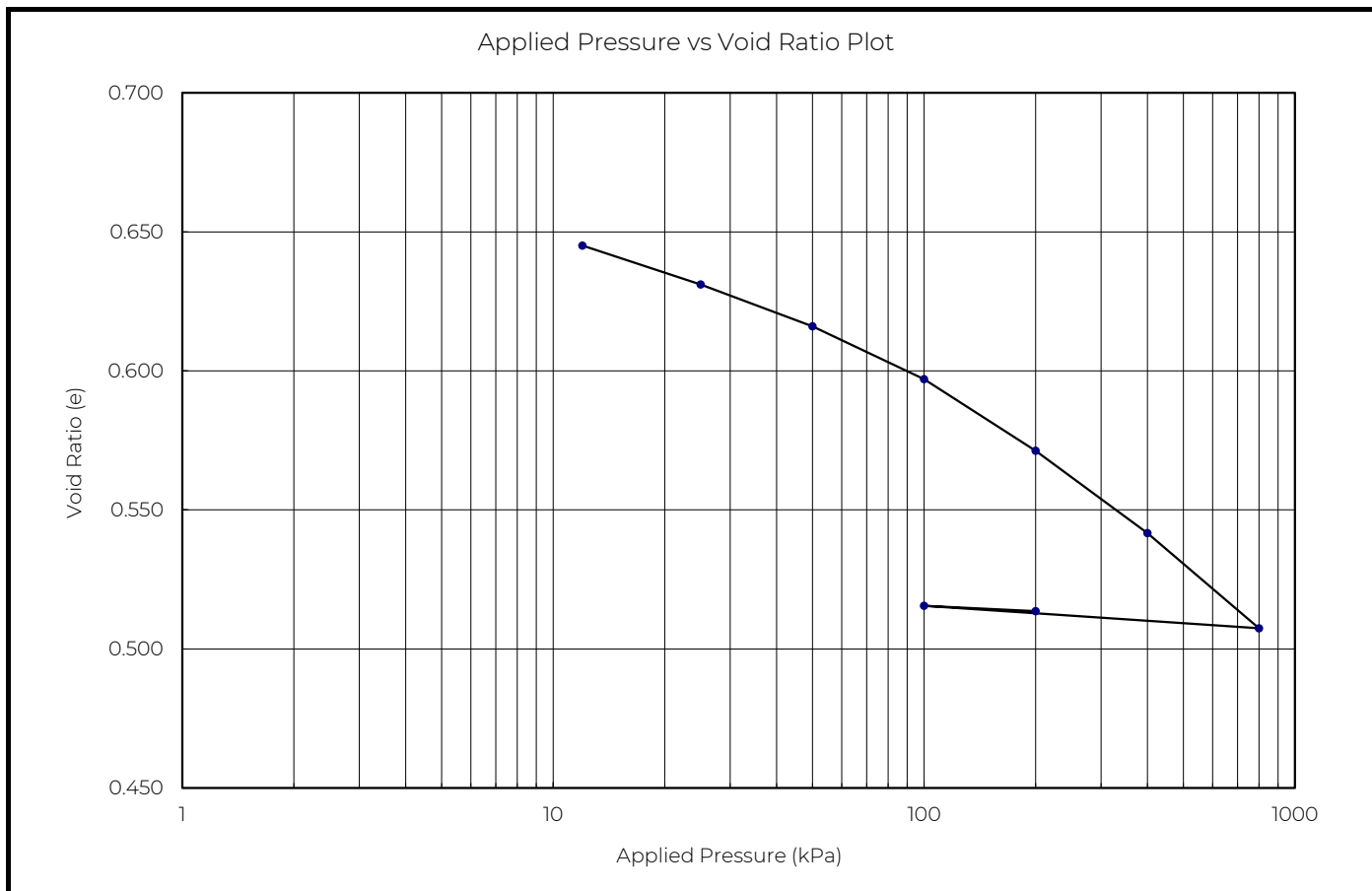
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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\_1122 6.00-6.50m Specimen depth: 6.17-6.22m  
 Sampled by : NC Site Team  
 Date sampled: 22/09/25 -  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty SAND with traces of clay; grey; moist

Project No: 1-C2466.16  
 Lab Ref No: WL4708/121-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<br>Void ratio is not IANZ Accredited due to assumed Solid Density value. |

Date tested : 29/10/25-06/11/25 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.  
 Date reported : 11/11/2025 This report may only be reproduced in full

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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\_1122 3.00-3.50m Specimen depth: 3.13-3.18m  
 Sampled by : NC\_Site Team  
 Date sampled: 22/09/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of sand; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/119\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102

**SOIL PROPERTIES**

**Specimen Dimensions:**

|                             |       |
|-----------------------------|-------|
| Diameter (mm):              | 50.00 |
| Initial height (mm):        | 20.10 |
| Final height (mm):          | 17.53 |
| Initial mass of sample (g): | 75.50 |

|                                   |                         |      |
|-----------------------------------|-------------------------|------|
| Initial Wet Density               | pbi (t/m <sup>3</sup> ) | 1.91 |
| Initial Dry Density               | pdi (t/m <sup>3</sup> ) | 1.46 |
| Final Dry Density                 | pdf (t/m <sup>3</sup> ) | 1.67 |
| Initial Void Ratio                | eo                      | 0.86 |
| Final Void Ratio                  | ef                      | 0.63 |
| Initial Degree of Saturation      | Si (%)                  | 98   |
| Final Degree of Saturation        | Sf (%)                  | 100  |
| Solid Particle Density (Measured) | Gs (t/m <sup>3</sup> )  | 2.72 |
| INITIAL Water Content             | Wi (%)                  | 31.1 |
| FINAL Water Content               | Wf (%)                  | 24.4 |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 0.844            | 39.441              | 0.93                                         | 1.1                                             | 1.0 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 0.832            | 40.217              | 0.48                                         | 1.1                                             | 5.1 x 10 <sup>-3</sup>          |  |
| 25 - 50              | 25                      | 0.810            | 31.277              | 0.48                                         | 1.4                                             | 6.5 x 10 <sup>-3</sup>          |  |
| 50 - 100             | 50                      | 0.775            | 33.017              | 0.40                                         | 1.3                                             | 5.0 x 10 <sup>-3</sup>          |  |
| 100 - 200            | 100                     | 0.726            | 27.458              | 0.28                                         | 1.5                                             | 4.0 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 0.666            | 17.627              | 0.17                                         | 2.2                                             | 3.7 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.601            | 15.938              | 0.10                                         | 2.2                                             | 2.2 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.631            | -                   | -                                            | -                                               |                                 |  |
| 100 - 200            | 100                     | 0.626            | 4.001               | 0.03                                         | 8.6                                             | 2.6 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |

**Test Methods:**

One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1  
 Water Content NZS 4402:1986 Test 2.1

**Notes:**

Sample is saturated during test.  
**Load Increments applied at 24 hr intervals**  
 Root time fitting method was used for Cv calculations.

Date tested : 05-14/11/25  
 Date reported : 19/11/25

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 : 19/11/2025



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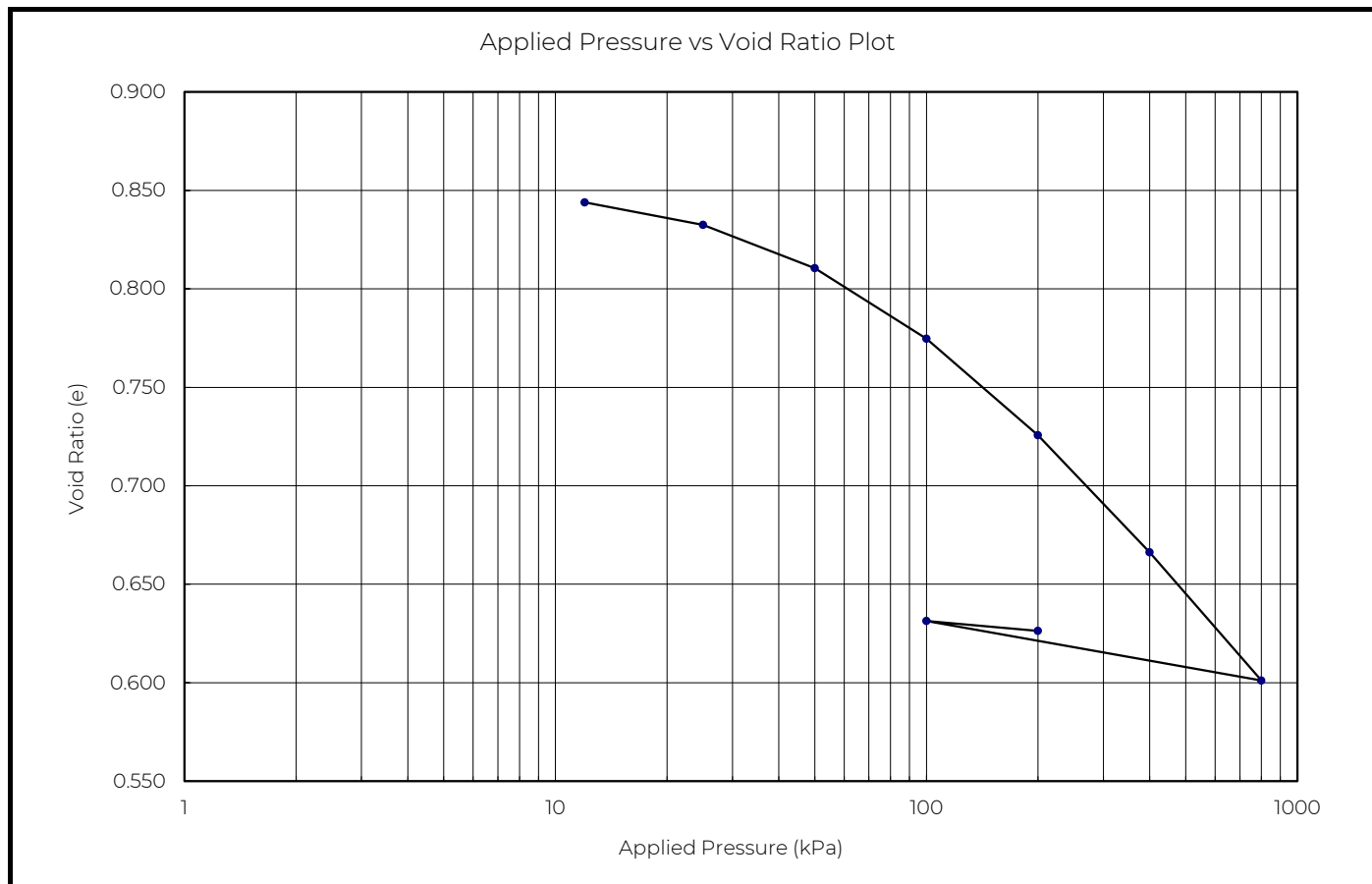
ONE DIMENSIONAL CONSOLIDATION PROPERTIES  
Applied Pressure vs Void Ratio TEST REPORT



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\_1122 3.00-3.50m Specimen depth: 3.13-3.18m  
Sampled by : NC\_Site Team  
Date sampled: 22/09/25  
Sampling method : Pushtube  
Sample condition : As Received  
Sample description : Silty CLAY with traces of sand; grey; moist; plastic

Project No: 1-C2466.16  
Lab Ref No: WL4708/119\_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 |

Date tested : 05-14/11/25  
Date reported : 19/11/25

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  
19/11/2025



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

LHF2419 (12/23)

Page 2 of 2

WSP  
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Quality Management Systems Certified to ISO 9001

7A Ride Way, Albany  
Private Bag 101982, NS Mail Centre, North  
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Telephone 09 415 4660  
Website [www.wsp.com/nz](http://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\_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 <sup>3</sup> ) | 1.91 |
| Initial height (mm):                                                           | 20.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.46 |
| Final height (mm):                                                             | 17.85 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 0.848            | 27.590              | 0.25                                         | 1.6                                             | 4.0 x 10 <sup>-3</sup>          |  |
| 12 - 25              | 13                      | 0.839            | 18.916              | 0.39                                         | 2.3                                             | 8.8 x 10 <sup>-3</sup>          |  |
| 25 - 50              | 25                      | 0.824            | 14.360              | 0.34                                         | 3                                               | 1.0 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 0.798            | 8.757               | 0.28                                         | 4.9                                             | 1.4 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 0.756            | 14.450              | 0.23                                         | 2.9                                             | 6.5 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 0.698            | 14.453              | 0.17                                         | 2.8                                             | 4.5 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.630            | 9.667               | 0.10                                         | 3.9                                             | 3.7 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.660            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 0.654            | 1.883               | 0.04                                         | 19                                              | 6.4 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.  
 Date reported : 11/11/2025 This report may only be reproduced in full

Approved Signatory

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



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\_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 <sup>3</sup> ) | 1.91 |
| Initial height (mm):                                                           | 20.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 1.46 |
| Final height (mm):                                                             | 17.85 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-3</sup>          | 0.00066                           |
| 25 - 50              | 25                      | 0.824            | 4.090               | 0.34                                         | 2.5                                             | 8.0 x 10 <sup>-3</sup>          | 0.001                             |
| 50 - 100             | 50                      | 0.798            | 3.580               | 0.28                                         | 2.8                                             | 8.0 x 10 <sup>-3</sup>          | 0.0016                            |
| 100 - 200            | 100                     | 0.756            | 3.800               | 0.23                                         | 2.6                                             | 6.0 x 10 <sup>-3</sup>          | 0.0024                            |
| 200 - 400            | 200                     | 0.698            | 3.640               | 0.17                                         | 2.6                                             | 4.0 x 10 <sup>-3</sup>          | 0.0031                            |
| 400 - 800            | 400                     | 0.630            | 3.000               | 0.10                                         | 2.9                                             | 3.0 x 10 <sup>-3</sup>          | 0.0032                            |
| 800 - 100            | -                       | 0.660            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 0.654            | 0.750               | 0.04                                         | 11                                              | 4.0 x 10 <sup>-3</sup>          | 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

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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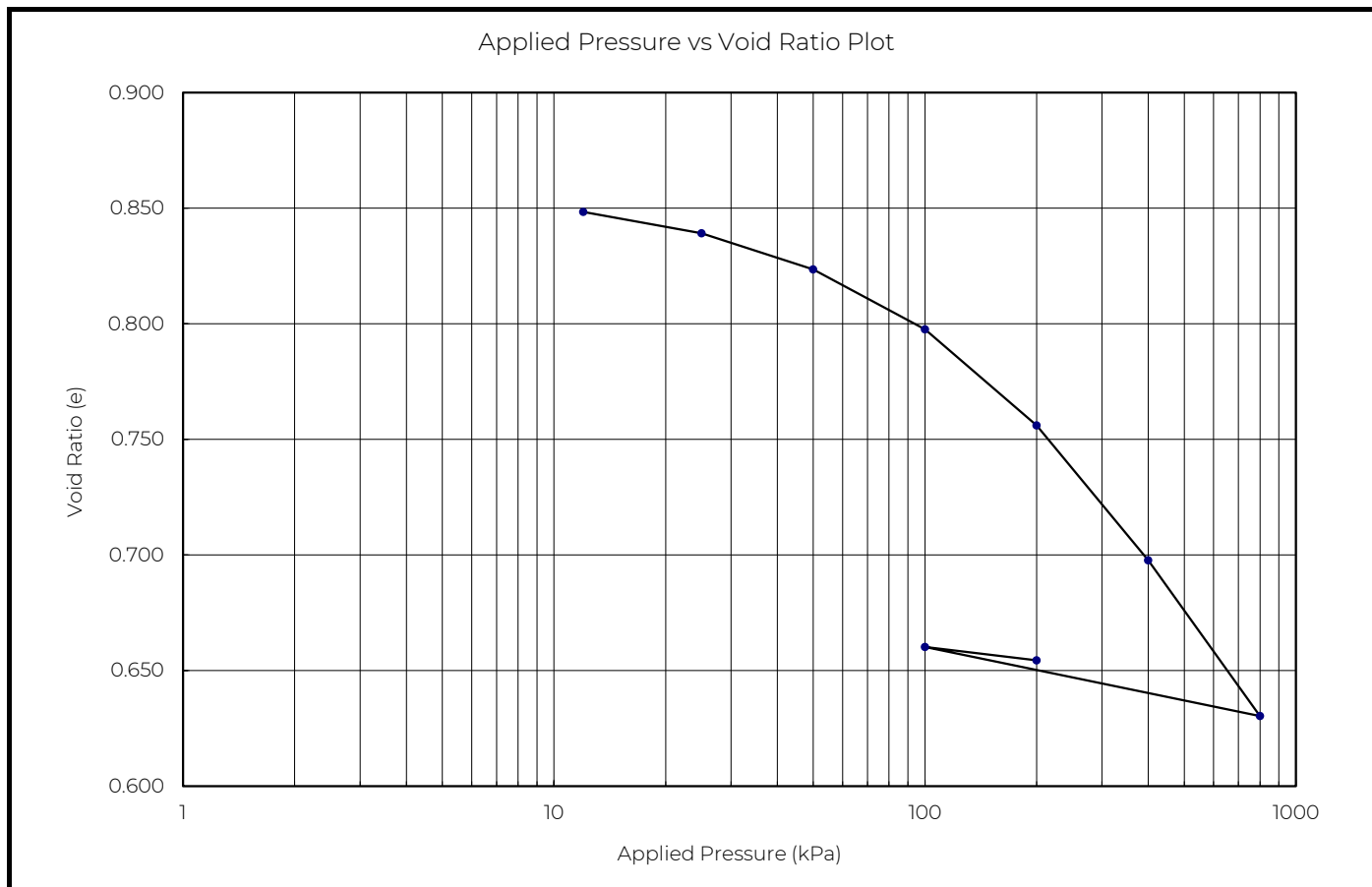
ONE DIMENSIONAL CONSOLIDATION PROPERTIES  
Applied Pressure vs Void Ratio TEST REPORT



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<br>Void ratio is not IANZ Accredited due to assumed Solid Density value. |

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

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  
11/11/2025



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\_1142 6.00-6.50m Specimen depth: 6.30-6.35m  
 Sampled by : NC\_Site Team  
 Date sampled: 03/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY; grey; moist

Project No: 1-C2466.16  
 Lab Ref No: WL4708/149\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S101

## SOIL PROPERTIES

| Specimen Dimensions:        |       |  | Initial Wet Density               | pbi (t/m <sup>3</sup> ) | 1.80 |
|-----------------------------|-------|--|-----------------------------------|-------------------------|------|
| Diameter (mm):              | 49.90 |  | Initial Dry Density               | pdi (t/m <sup>3</sup> ) | 1.26 |
| Initial height (mm):        | 20.00 |  | Final Dry Density                 | pdf (t/m <sup>3</sup> ) | 1.48 |
| Final height (mm):          | 17.08 |  | Initial Void Ratio                | eo                      | 1.16 |
| Initial mass of sample (g): | 70.21 |  | Final Void Ratio                  | ef                      | 0.85 |
|                             |       |  | Initial Degree of Saturation      | Si (%)                  | 99   |
|                             |       |  | Final Degree of Saturation        | Sf (%)                  | 100  |
|                             |       |  | Solid Particle Density (Measured) | Gs (t/m <sup>3</sup> )  | 2.73 |
|                             |       |  | INITIAL Water Content             | Wi (%)                  | 42.2 |
|                             |       |  | FINAL Water Content               | Wf (%)                  | 32.9 |

## CONSOLIDATION PROPERTIES

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.157            | 6.145               | 0.25                                         | 7.2                                             | 1.8 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 1.142            | 8.322               | 0.51                                         | 5.3                                             | 2.7 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.120            | 7.713               | 0.41                                         | 5.6                                             | 2.3 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.082            | 8.117               | 0.36                                         | 5.3                                             | 1.9 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 1.006            | 23.051              | 0.36                                         | 1.8                                             | 6.4 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 0.904            | 23.527              | 0.25                                         | 1.6                                             | 4.0 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.800            | 18.609              | 0.14                                         | 1.8                                             | 2.5 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.858            | -                   | -                                            | -                                               |                                 |  |
| 100 - 200            | 100                     | 0.847            | 7.093               | 0.06                                         | 4.6                                             | 2.5 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |

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

Date tested : 06-18/11/25  
 Date reported : 25/11/25

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 : 26/11/2025



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

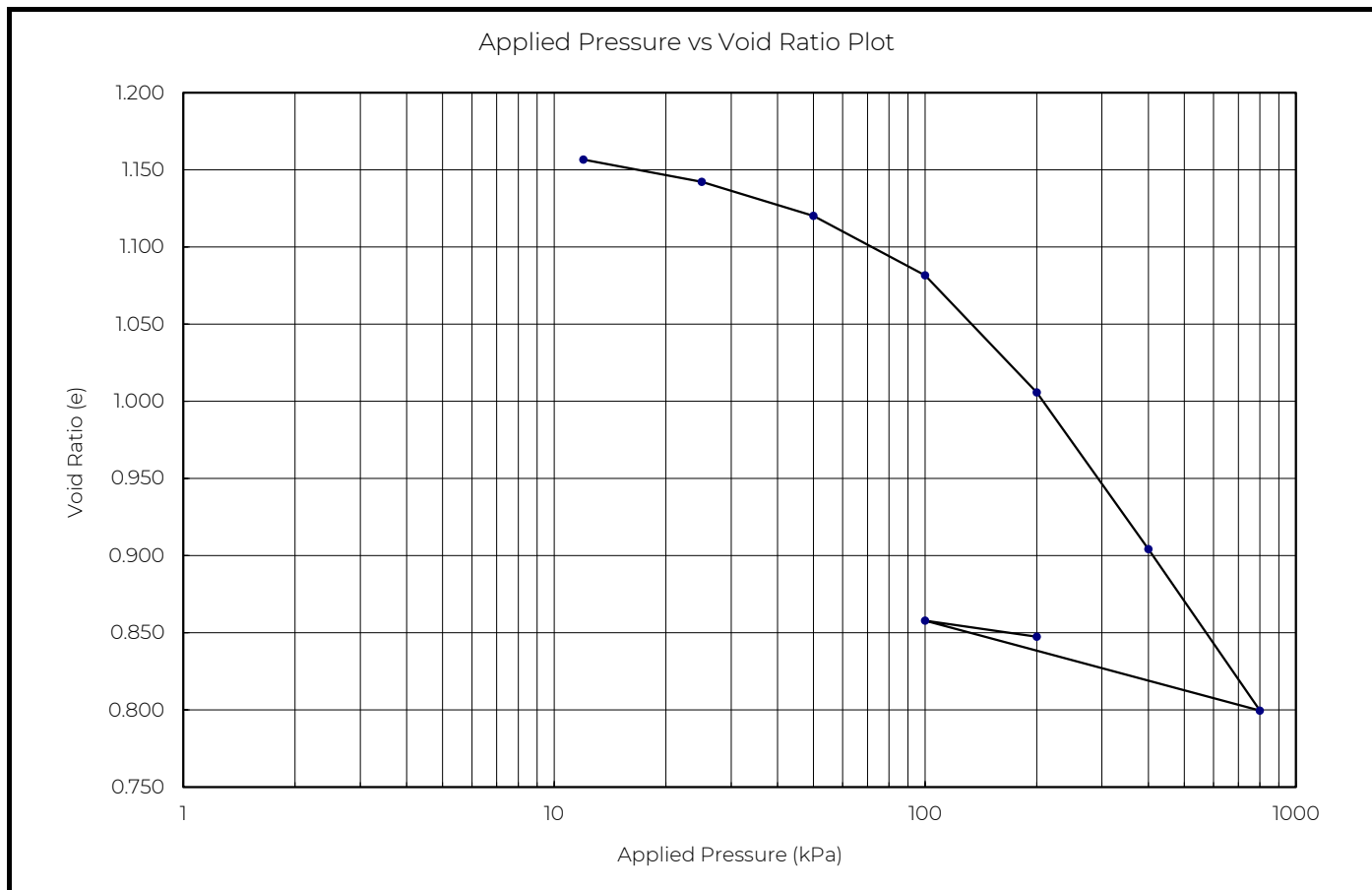
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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\_1142 6.00-6.50m Specimen depth: 6.30-6.35m  
 Sampled by : NC\_Site Team  
 Date sampled: 03/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY; grey; moist

Project No: 1-C2466.16  
 Lab Ref No: WL4708/149\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S101



| Test Method:                                               | Notes:                                     |
|------------------------------------------------------------|--------------------------------------------|
| One Dimensional Consolidation Test: NZS 4402:1986 Test 7.1 | Load Increments applied at 24 hr intervals |

Date tested : 06-18/11/25  
 Date reported : 25/11/25

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Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 26/11/2025



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\_1142 12.00-12.50m Specimen depth: 12.45-12.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 03/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/146\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100

**SOIL PROPERTIES**

| Specimen Dimensions:        |       |  |                                   |                              |
|-----------------------------|-------|--|-----------------------------------|------------------------------|
| Diameter (mm):              | 49.96 |  | Initial Wet Density               | pbi (t/m <sup>3</sup> ) 1.65 |
| Initial height (mm):        | 20.00 |  | Initial Dry Density               | pdi (t/m <sup>3</sup> ) 1.04 |
| Final height (mm):          | 15.75 |  | Final Dry Density                 | pdf (t/m <sup>3</sup> ) 1.32 |
| Initial mass of sample (g): | 64.85 |  | Initial Void Ratio                | eo 1.61                      |
|                             |       |  | Final Void Ratio                  | ef 1.05                      |
|                             |       |  | Initial Degree of Saturation      | Si (%) 99                    |
|                             |       |  | Final Degree of Saturation        | Sf (%) 100                   |
|                             |       |  | Solid Particle Density (Measured) | Gs (t/m <sup>3</sup> ) 2.72  |
|                             |       |  | INITIAL Water Content             | Wi (%) 58.5                  |
|                             |       |  | FINAL Water Content               | Wf (%) 40.7                  |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.602            | -                   | -                                            | -                                               |                                 |  |
| 12 - 25              | 13                      | 1.586            | 4.720               | 0.45                                         | 9.4                                             | 4.1 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.553            | 7.885               | 0.52                                         | 5.5                                             | 2.8 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.503            | 6.865               | 0.39                                         | 6.2                                             | 2.4 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 1.406            | 6.437               | 0.38                                         | 6.4                                             | 2.4 x 10 <sup>-2</sup>          |  |
| 200 - 400            | 200                     | 1.199            | 26.557              | 0.43                                         | 1.4                                             | 6.0 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.985            | 11.967              | 0.24                                         | 2.6                                             | 6.3 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 1.065            | -                   | -                                            | -                                               |                                 |  |
| 100 - 200            | 100                     | 1.053            | 7.140               | 0.06                                         | 3.9                                             | 2.2 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |

| 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 : 01-10/12/25  
 Date reported : 19/12/25

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Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 22/12/2025



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\_1142 12.00-12.50m Specimen depth: 12.45-12.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 03/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/146\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100

**SOIL PROPERTIES**

| Specimen Dimensions:        |       |  |                                   |                              |
|-----------------------------|-------|--|-----------------------------------|------------------------------|
| Diameter (mm):              | 49.96 |  | Initial Wet Density               | pbi (t/m <sup>3</sup> ) 1.65 |
| Initial height (mm):        | 20.00 |  | Initial Dry Density               | pdi (t/m <sup>3</sup> ) 1.04 |
| Final height (mm):          | 15.75 |  | Final Dry Density                 | pdf (t/m <sup>3</sup> ) 1.32 |
| Initial mass of sample (g): | 64.85 |  | Initial Void Ratio                | eo 1.61                      |
|                             |       |  | Final Void Ratio                  | ef 1.05                      |
|                             |       |  | Initial Degree of Saturation      | Si (%) 99                    |
|                             |       |  | Final Degree of Saturation        | Sf (%) 100                   |
|                             |       |  | Solid Particle Density (Measured) | Gs (t/m <sup>3</sup> ) 2.72  |
|                             |       |  | INITIAL Water Content             | Wi (%) 58.5                  |
|                             |       |  | FINAL Water Content               | Wf (%) 40.7                  |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t50 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year | Coeff. of Secondary Compr. (Csec) |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|-----------------------------------|
| 0 - 12               | 12                      | 1.602            | -                   | -                                            | -                                               | -                               | -                                 |
| 12 - 25              | 13                      | 1.586            | 2.390               | 0.45                                         | 4.3                                             | 1.9 x 10 <sup>-2</sup>          | 0.001                             |
| 25 - 50              | 25                      | 1.553            | 2.460               | 0.52                                         | 4.2                                             | 2.1 x 10 <sup>-2</sup>          | 0.0015                            |
| 50 - 100             | 50                      | 1.503            | 1.600               | 0.39                                         | 6.2                                             | 2.4 x 10 <sup>-2</sup>          | 0.0029                            |
| 100 - 200            | 100                     | 1.406            | 2.840               | 0.38                                         | 3.4                                             | 1.3 x 10 <sup>-2</sup>          | 0.0055                            |
| 200 - 400            | 200                     | 1.199            | 5.200               | 0.43                                         | 1.7                                             | 7.0 x 10 <sup>-3</sup>          | 0.016                             |
| 400 - 800            | 400                     | 0.985            | 2.830               | 0.24                                         | 2.6                                             | 6.0 x 10 <sup>-3</sup>          | 0.021                             |
| 800 - 100            | -                       | 1.065            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 1.053            | 1.910               | 0.06                                         | 3.4                                             | 2.0 x 10 <sup>-3</sup>          | 0.00065                           |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               | -                                 |

| 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 : 01-10/12/25  
 Date reported : 19/12/25

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Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 22/12/2025



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

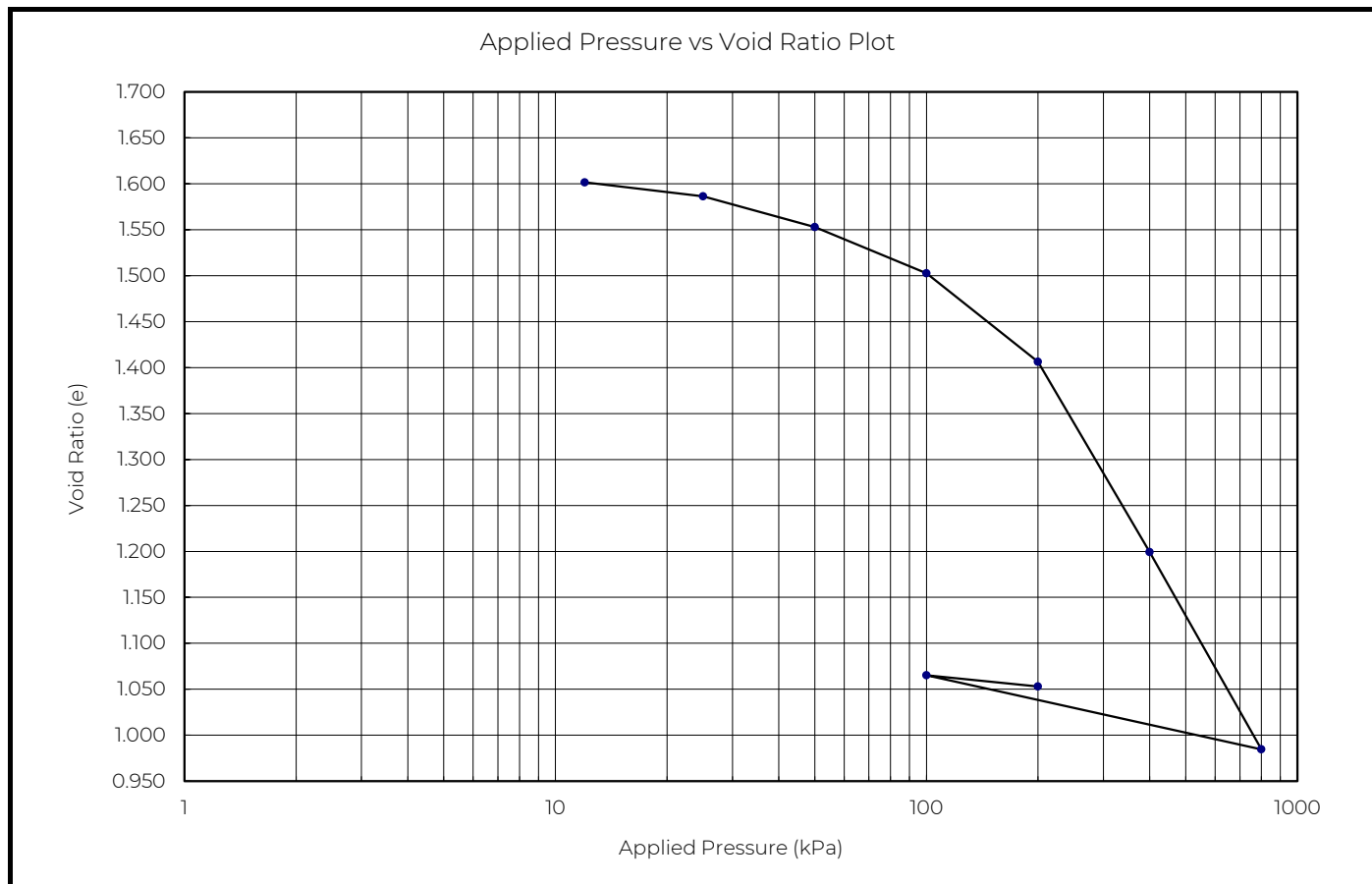
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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\_1142 12.00-12.50m Specimen depth: 12.45-12.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 03/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/146\_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 |

Date tested : 01-10/12/25      Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.  
 Date reported : 19/12/25      This report may only be reproduced in full

Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 22/12/2025



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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\_1143 3.00-3.50m Specimen depth: 3.45-3.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 23/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of organics; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/170\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

**SOIL PROPERTIES**

**Specimen Dimensions:**

|                             |       |
|-----------------------------|-------|
| Diameter (mm):              | 49.90 |
| Initial height (mm):        | 20.00 |
| Final height (mm):          | 16.67 |
| Initial mass of sample (g): | 63.93 |

|                                   |                         |      |
|-----------------------------------|-------------------------|------|
| Initial Wet Density               | pbi (t/m <sup>3</sup> ) | 1.63 |
| Initial Dry Density               | pdi (t/m <sup>3</sup> ) | 1.02 |
| Final Dry Density                 | pdf (t/m <sup>3</sup> ) | 1.22 |
| Initial Void Ratio                | eo                      | 1.68 |
| Final Void Ratio                  | ef                      | 1.23 |
| Initial Degree of Saturation      | Si (%)                  | 99   |
| Final Degree of Saturation        | Sf (%)                  | 100  |
| Solid Particle Density (Measured) | Gs (t/m <sup>3</sup> )  | 2.72 |
| INITIAL Water Content             | Wi (%)                  | 60.7 |
| FINAL Water Content               | Wf (%)                  | 45.9 |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.673            | -                   | -                                            | -                                               |                                 |  |
| 12 - 25              | 13                      | 1.656            | 22.158              | 0.51                                         | 2                                               | 1.0 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.641            | 9.349               | 0.23                                         | 4.7                                             | 1.0 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.603            | 2.975               | 0.29                                         | 15                                              | 4.1 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 1.539            | 7.929               | 0.24                                         | 5.3                                             | 1.3 x 10 <sup>-2</sup>          |  |
| 200 - 400            | 200                     | 1.348            | 34.404              | 0.38                                         | 1.2                                             | 4.3 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 1.147            | 30.709              | 0.21                                         | 1.1                                             | 2.3 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 1.242            | -                   | -                                            | -                                               |                                 |  |
| 100 - 200            | 100                     | 1.230            | 8.368               | 0.05                                         | 3.7                                             | 1.9 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |
| -                    | -                       | -                | -                   | -                                            | -                                               |                                 |  |

**Test Methods:**

One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1  
 Water Content NZS 4402:1986 Test 2.1

**Notes:**

Sample is saturated during test.  
 Load Increments applied at 24 hr intervals  
 Root time fitting method was used for Cv calculations.

Date tested : 11-19/11/25  
 Date reported : 28/11/25

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**Approved Signatory**

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 28/11/2025



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LHF2419 (12/23)

Page 1 of 2

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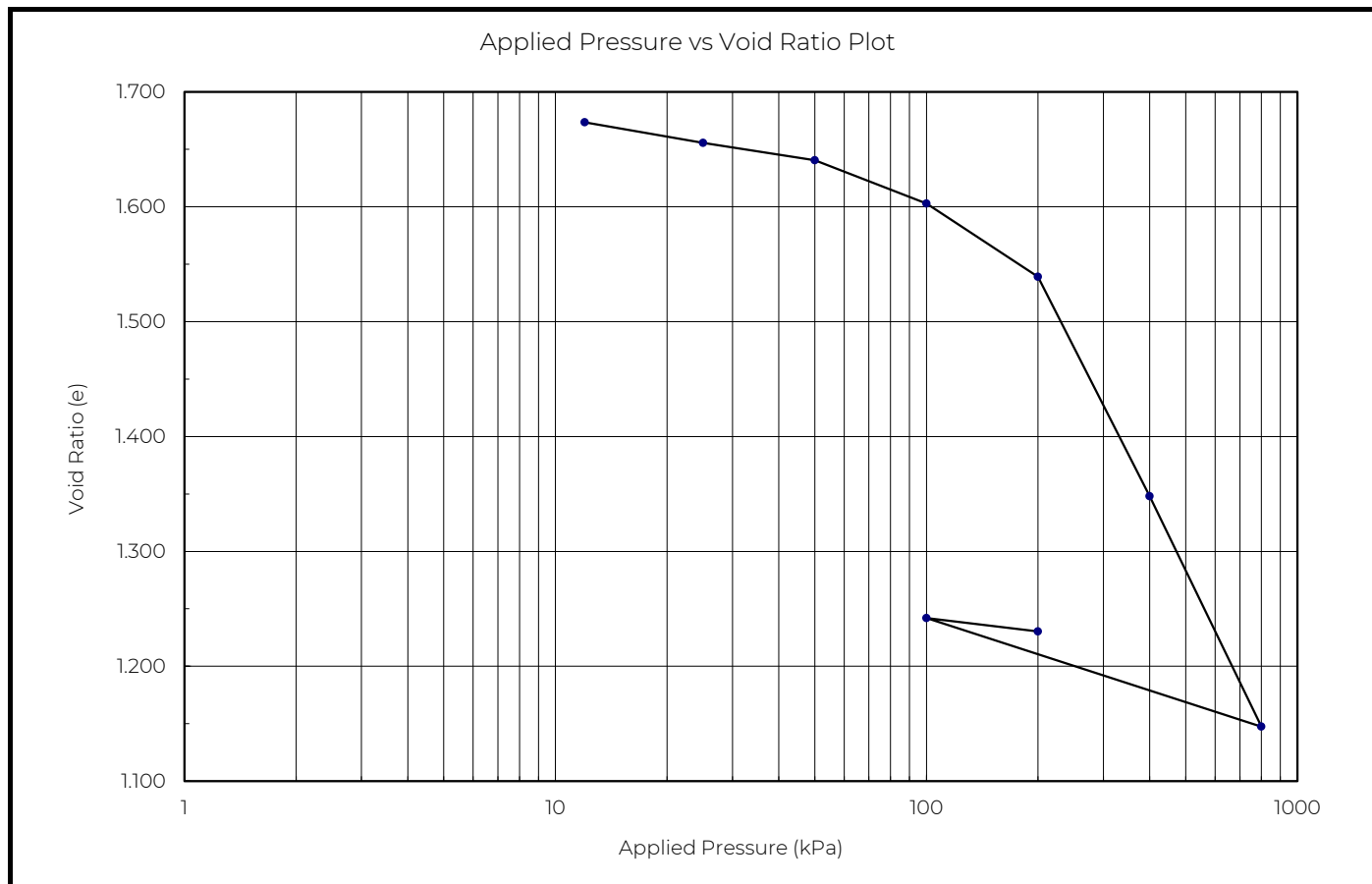
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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\_1143 3.00-3.50m Specimen depth: 3.45-3.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 23/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of organics; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/170\_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 |

Date tested : 11-19/11/25  
 Date reported : 28/11/25

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Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 28/11/2025



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\_1143 6.00-6.50m Specimen depth: 6.40-6.45m  
 Sampled by : NC\_Site Team  
 Date sampled: 23/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of organics; grey mottled brown; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/172\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S100

**SOIL PROPERTIES**

| Specimen Dimensions:        |       |  | Initial Wet Density               | pbi (t/m <sup>3</sup> ) | 1.80 |
|-----------------------------|-------|--|-----------------------------------|-------------------------|------|
| Diameter (mm):              | 49.90 |  | Initial Dry Density               | pdi (t/m <sup>3</sup> ) | 1.27 |
| Initial height (mm):        | 20.04 |  | Final Dry Density                 | pdf (t/m <sup>3</sup> ) | 1.45 |
| Final height (mm):          | 17.61 |  | Initial Void Ratio                | eo                      | 1.14 |
| Initial mass of sample (g): | 70.58 |  | Final Void Ratio                  | ef                      | 0.88 |
|                             |       |  | Initial Degree of Saturation      | Si (%)                  | 100  |
|                             |       |  | Final Degree of Saturation        | Sf (%)                  | 100  |
|                             |       |  | Solid Particle Density (Measured) | Gs (t/m <sup>3</sup> )  | 2.72 |
|                             |       |  | INITIAL Water Content             | Wi (%)                  | 41.8 |
|                             |       |  | FINAL Water Content               | Wf (%)                  | 34.0 |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.141            | -                   | -                                            | -                                               | -                               |  |
| 12 - 25              | 13                      | 1.136            | 2.476               | 0.18                                         | 18                                              | 3.2 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.117            | 12.225              | 0.34                                         | 3.6                                             | 1.2 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.086            | 11.612              | 0.30                                         | 3.8                                             | 1.1 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 1.031            | 17.618              | 0.26                                         | 2.4                                             | 6.2 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 0.941            | 19.715              | 0.22                                         | 2                                               | 4.4 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.831            | 20.006              | 0.14                                         | 1.8                                             | 2.5 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 0.891            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 0.881            | 8.291               | 0.05                                         | 4.2                                             | 2.1 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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 : 11-18/11/25  
 Date reported : 28/11/25

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

Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 28/11/2025



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

LHF2419 (12/23)

Page 1 of 2

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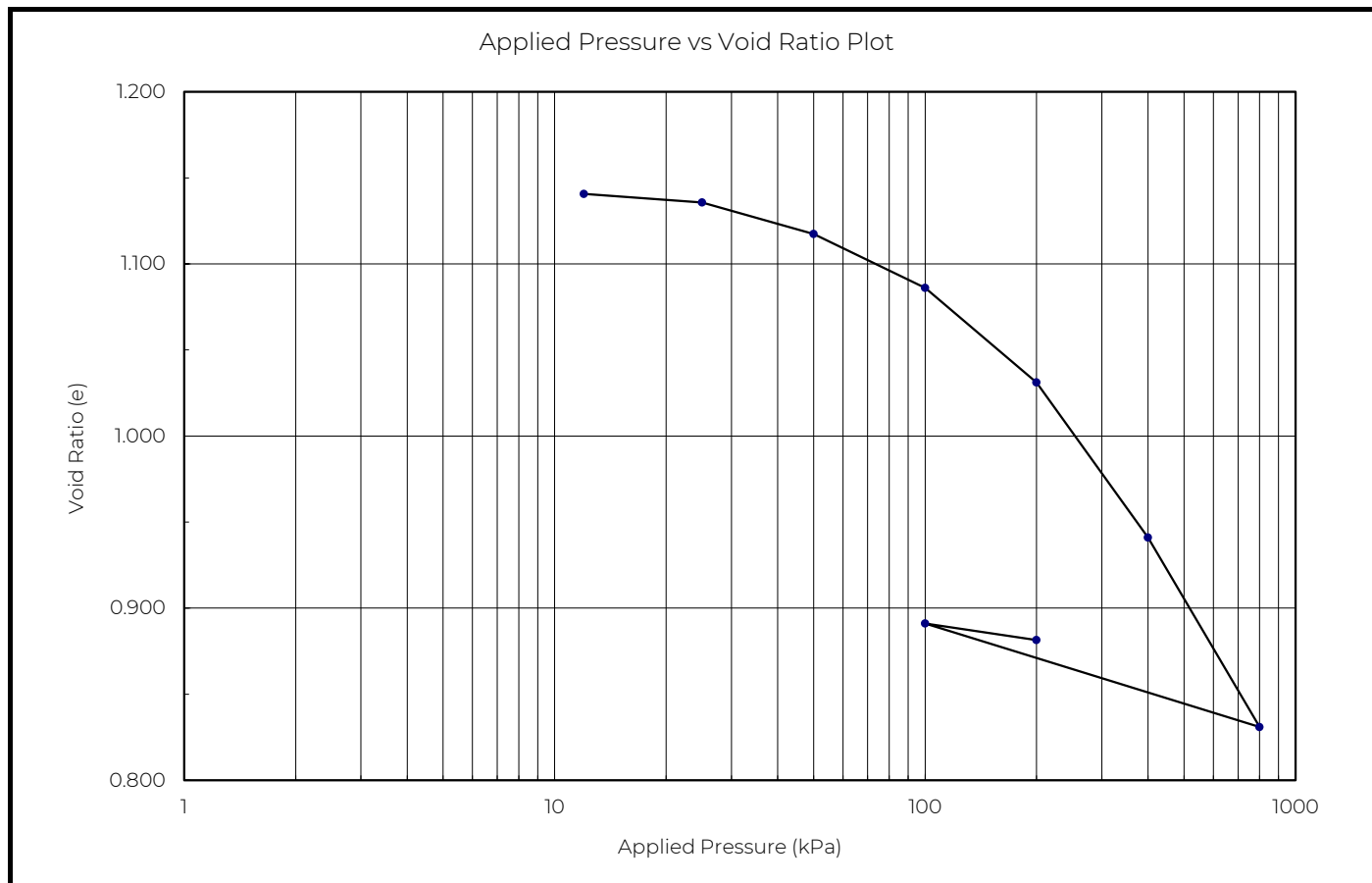
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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\_1143 6.00-6.50m Specimen depth: 6.40-6.45m  
 Sampled by : NC\_Site Team  
 Date sampled: 23/10/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY with traces of organics; grey mottled brown; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/172\_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 |

Date tested : 11-18/11/25  
 Date reported : 28/11/25  
 Approved Signatory:  Thirushen Pillay  
 Designation : Senior Civil Engineering Technician  
 Date : 28/11/2025

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



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: Alternative to Brynderwyn Hills Section  
 Client : NZTA C/- Aurecon & WSP NZ Ltd.  
 Sample Location ID: BH2B\_1146 3.00-3.50m Specimen depth: 3.45-3.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 24/11/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/206\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S102

**SOIL PROPERTIES**

| Specimen Dimensions:        |       |  |                                  |                              |
|-----------------------------|-------|--|----------------------------------|------------------------------|
| Diameter (mm):              | 49.90 |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) 1.72 |
| Initial height (mm):        | 20.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) 1.15 |
| Final height (mm):          | 17.28 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) 1.33 |
| Initial mass of sample (g): | 67.43 |  | Initial Void Ratio               | eo 1.37                      |
|                             |       |  | Final Void Ratio                 | ef 1.05                      |
|                             |       |  | Initial Degree of Saturation     | Si (%) 100                   |
|                             |       |  | Final Degree of Saturation       | Sf (%) 100                   |
|                             |       |  | Solid Particle Density (Assumed) | Gs (t/m <sup>3</sup> ) 2.72  |
|                             |       |  | INITIAL Water Content            | Wi (%) 50.0                  |
|                             |       |  | FINAL Water Content              | Wf (%) 40.9                  |

Note: \*\* Void ratio is not IANZ Accredited due to assumed Solid Density value.

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.359            | 0.378               | 0.26                                         | 120                                             | 3.0 x 10 <sup>-1</sup>          |  |
| 12 - 25              | 13                      | 1.351            | 2.040               | 0.28                                         | 22                                              | 5.9 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.335            | 9.719               | 0.28                                         | 4.5                                             | 1.2 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.293            | 17.664              | 0.35                                         | 2.4                                             | 8.4 x 10 <sup>-3</sup>          |  |
| 100 - 200            | 100                     | 1.214            | 24.291              | 0.35                                         | 1.7                                             | 5.8 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 1.109            | -                   | -                                            | -                                               | -                               |  |
| 400 - 800            | 400                     | 0.982            | 17.054              | 0.15                                         | 2.1                                             | 3.1 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 1.056            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 1.045            | 5.228               | 0.06                                         | 6.4                                             | 3.4 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

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

Date tested : 10-19/12/25  
 Date reported : 08/01/26

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

Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 9/01/2026



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

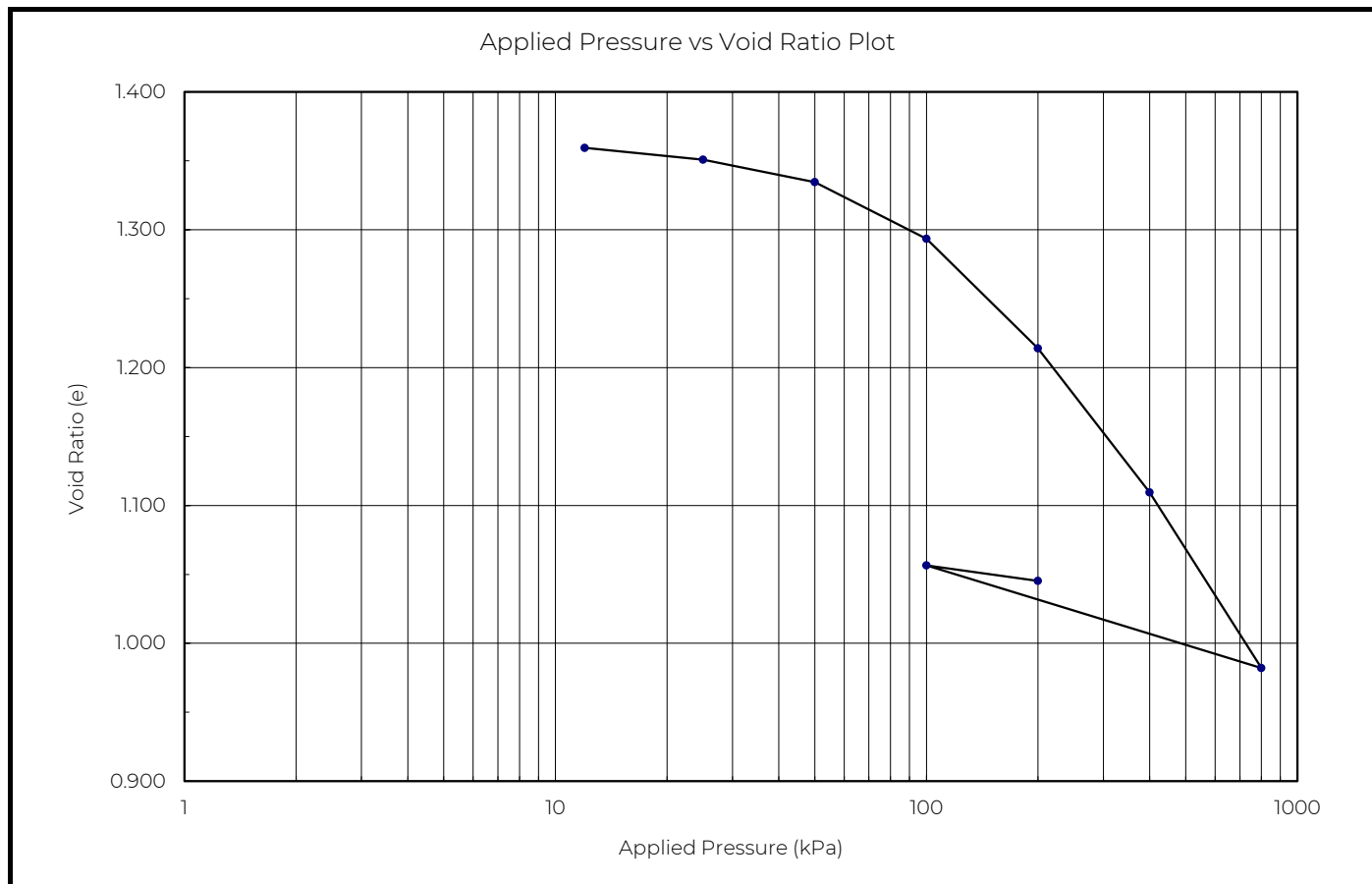
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



Project : Ground Investigation for Northland Corridor  
 Location: Alternative to Brynderwyn Hills Section  
 Client : NZTA C/- Aurecon & WSP NZ Ltd.  
 Sample Location ID: BH2B\_1146 3.00-3.50m Specimen depth: 3.45-3.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 24/11/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Silty CLAY; grey; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/206\_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 |

Date tested : 10-19/12/25  
 Date reported : 08/01/26  
 Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.  
 This report may only be reproduced in full

Approved Signatory

Thirushen Pillay  
 Senior Civil Engineering Technician  
 Date : 9/01/2026



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: Alternative to Brynderwyn Hills Section  
 Client : NZTA C/- Aurecon & WSP NZ Ltd.  
 Sample Location ID: BH2B\_1146 6.00-6.50m Specimen depth: 6.45-6.50m  
 Sampled by : NC\_Site Team  
 Date sampled: 24/11/25  
 Sampling method : Pushtube  
 Sample condition : As Received  
 Sample description : Organic CLAY; brown mottled black; moist; plastic

Project No: 1-C2466.16  
 Lab Ref No: WL4708/208\_Consol  
 Client Ref: 1-C2466.16

OEDOMETER APPARATUS No: S103

**SOIL PROPERTIES**

**Specimen Dimensions:**

|                             |       |
|-----------------------------|-------|
| Diameter (mm):              | 49.94 |
| Initial height (mm):        | 20.00 |
| Final height (mm):          | 12.59 |
| Initial mass of sample (g): | 53.86 |

Note: \*\* Void ratio is not IANZ Accredited due to assumed Solid Density value.

|                                  |                         |       |
|----------------------------------|-------------------------|-------|
| Initial Wet Density              | pbi (t/m <sup>3</sup> ) | 1.37  |
| Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 0.64  |
| Final Dry Density                | pdf (t/m <sup>3</sup> ) | 1.02  |
| Initial Void Ratio               | eo                      | 3.16  |
| Final Void Ratio                 | ef                      | 1.62  |
| Initial Degree of Saturation     | Si (%)                  | 96    |
| Final Degree of Saturation       | Sf (%)                  | 99    |
| Solid Particle Density (Assumed) | Gs (t/m <sup>3</sup> )  | 2.68  |
| INITIAL Water Content            | Wi (%)                  | 113.2 |
| FINAL Water Content              | Wf (%)                  | 59.4  |

**CONSOLIDATION PROPERTIES**

| PRESSURE RANGE (kPa) | Pressure Increment (dp) | **Void Ratio (e) | Intercept t90 (min) | Volume Compressibility Mv=m <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 3.005            | 49.884              | 3.00                                         | 0.89                                            | 2.7 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 2.893            | 38.908              | 2.10                                         | 1.1                                             | 2.2 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 2.715            | 47.391              | 1.80                                         | 0.82                                            | 1.5 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 2.428            | 94.624              | 1.50                                         | 0.37                                            | 5.7 x 10 <sup>-3</sup>          |  |
| 100 - 200            | 100                     | 2.108            | -                   | -                                            | -                                               | -                               |  |
| 200 - 400            | 200                     | 1.782            | 36.517              | 0.52                                         | 0.68                                            | 3.5 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 1.485            | 86.253              | 0.27                                         | 0.23                                            | 6.1 x 10 <sup>-4</sup>          |  |
| 800 - 100            | -                       | 1.641            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 1.617            | 13.988              | 0.09                                         | 1.3                                             | 1.1 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

**Test Methods:**

One Dimensional Consolidation Test. NZS 4402:1986 Test 7.1  
 Water Content NZS 4402:1986 Test 2.1

**Notes:**

Sample is saturated during test.  
 Load Increments applied at 24 hr intervals  
 Root time fitting method was used for Cv calculations.

Date tested : 10-19/12/25  
 Date reported : 09/01/26

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

Designation : Thirushen Pillay  
 Date : Senior Civil Engineering Technician  
 9/01/2026



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

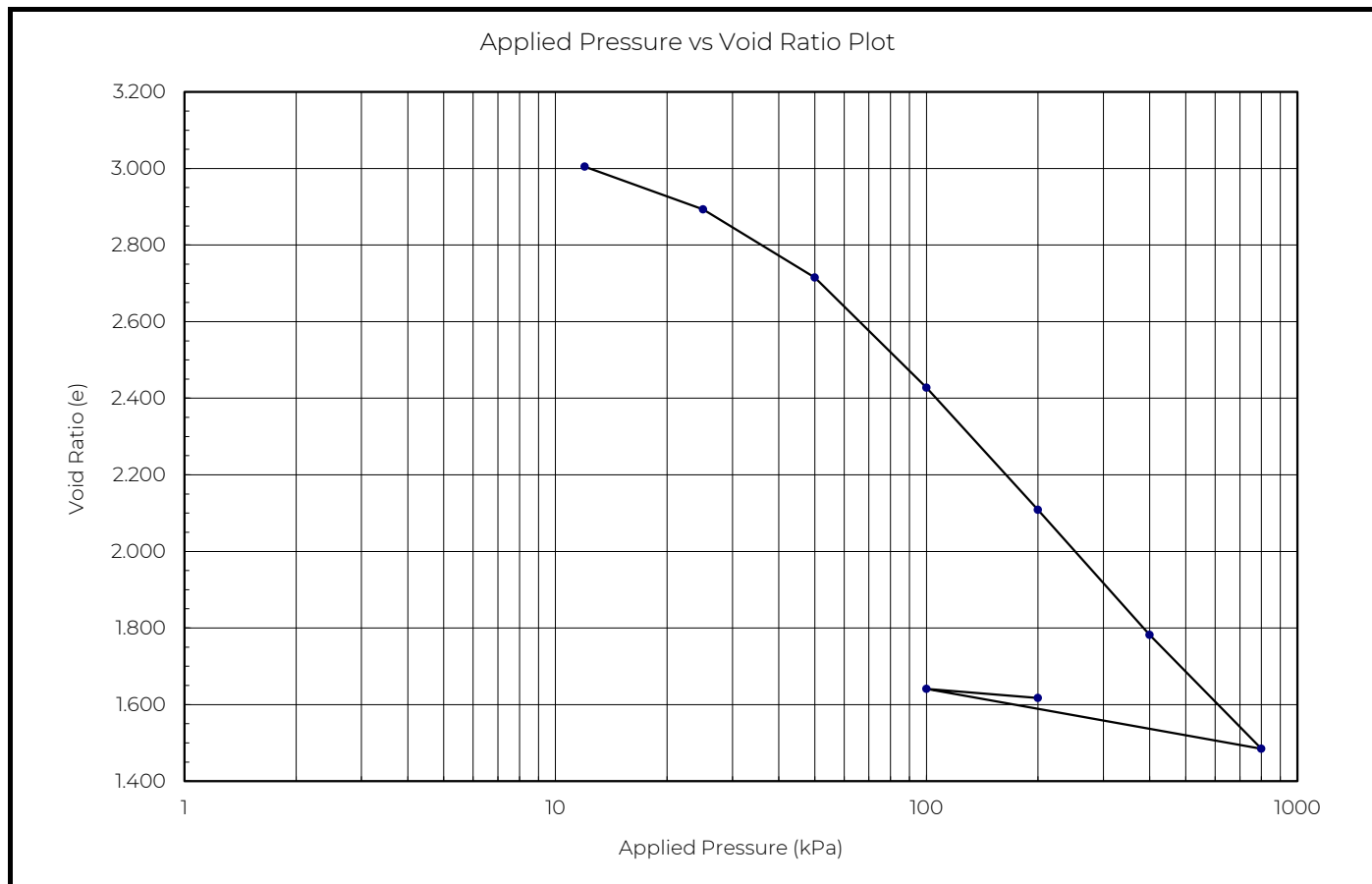
ONE DIMENSIONAL CONSOLIDATION PROPERTIES  
Applied Pressure vs Void Ratio TEST REPORT



Project : Ground Investigation for Northland Corridor  
Location: Alternative to Brynderwyn Hills Section  
Client : NZTA C/- Aurecon & WSP NZ Ltd.  
Sample Location ID: BH2B\_1146 6.00-6.50m Specimen depth: 6.45-6.50m  
Sampled by : NC\_Site Team  
Date sampled: 24/11/25  
Sampling method : Pushtube  
Sample condition : As Received  
Sample description : Organic CLAY; brown mottled black; moist; plastic

Project No: 1-C2466.16  
Lab Ref No: WL4708/208\_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 |

Date tested : 10-19/12/25  
Date reported : 09/01/26

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

Approved Signatory

Thirushen Pillay  
Senior Civil Engineering Technician  
9/01/2026



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

LHF2419 (12/23)

Page 2 of 2

**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:                                                           |       |  |                                  |                              |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|------------------------------|
| Diameter (mm):                                                                 | 50.00 |  | Initial Wet Density              | pbi (t/m <sup>3</sup> ) 1.57 |
| Initial height (mm):                                                           | 20.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) 0.94 |
| Final height (mm):                                                             | 14.14 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) 1.32 |
| Initial mass of sample (g):                                                    | 61.54 |  | Initial Void Ratio               | eo 1.91                      |
| Note: ** Void ratio is not IANZ Accredited due to assumed Solid Density value. |       |  | Final Void Ratio                 | ef 1.06                      |
|                                                                                |       |  | Initial Degree of Saturation     | Si (%) 96                    |
|                                                                                |       |  | Final Degree of Saturation       | Sf (%) 100                   |
|                                                                                |       |  | Solid Particle Density (Assumed) | Gs (t/m <sup>3</sup> ) 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /year | Coeff. of Permeability k=m/year |  |
|----------------------|-------------------------|------------------|---------------------|----------------------------------------------|-------------------------------------------------|---------------------------------|--|
| 0 - 12               | 12                      | 1.831            | 27.973              | 2.20                                         | 1.6                                             | 3.5 x 10 <sup>-2</sup>          |  |
| 12 - 25              | 13                      | 1.774            | 32.644              | 1.50                                         | 1.3                                             | 1.9 x 10 <sup>-2</sup>          |  |
| 25 - 50              | 25                      | 1.675            | 33.382              | 1.40                                         | 1.2                                             | 1.7 x 10 <sup>-2</sup>          |  |
| 50 - 100             | 50                      | 1.529            | 40.016              | 1.10                                         | 0.94                                            | 1.0 x 10 <sup>-2</sup>          |  |
| 100 - 200            | 100                     | 1.362            | 38.699              | 0.66                                         | 0.87                                            | 5.6 x 10 <sup>-3</sup>          |  |
| 200 - 400            | 200                     | 1.170            | 43.256              | 0.41                                         | 0.68                                            | 2.7 x 10 <sup>-3</sup>          |  |
| 400 - 800            | 400                     | 0.988            | 44.415              | 0.21                                         | 0.56                                            | 1.1 x 10 <sup>-3</sup>          |  |
| 800 - 100            | -                       | 1.071            | -                   | -                                            | -                                               | -                               |  |
| 100 - 200            | 100                     | 1.056            | 8.171               | 0.07                                         | 2.8                                             | 1.9 x 10 <sup>-3</sup>          |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |
| -                    | -                       | -                | -                   | -                                            | -                                               | -                               |  |

| 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 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



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\_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 <sup>3</sup> ) | 1.57 |
|--------------------------------------------------------------------------------|-------|--|----------------------------------|-------------------------|------|
| Diameter (mm):                                                                 | 50.00 |  | Initial Dry Density              | pdi (t/m <sup>3</sup> ) | 0.94 |
| Initial height (mm):                                                           | 20.00 |  | Final Dry Density                | pdf (t/m <sup>3</sup> ) | 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 <sup>3</sup> )  | 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 <sup>2</sup> /MN | Coeff. of Consolidation Cv=m <sup>2</sup> /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 <sup>-2</sup>          | 0.00275                           |
| 12 - 25              | 13                      | 1.774            | 13.840              | 1.540                                        | 0.712                                           | 1.1 x 10 <sup>-2</sup>          | 0.00422                           |
| 25 - 50              | 25                      | 1.675            | 13.120              | 1.420                                        | 0.721                                           | 1.0 x 10 <sup>-2</sup>          | 0.00682                           |
| 50 - 100             | 50                      | 1.529            | 13.640              | 1.100                                        | 0.645                                           | 6.9 x 10 <sup>-3</sup>          | 0.00876                           |
| 100 - 200            | 100                     | 1.362            | 15.180              | 0.660                                        | 0.518                                           | 3.4 x 10 <sup>-3</sup>          | 0.00669                           |
| 200 - 400            | 200                     | 1.170            | 16.810              | 0.406                                        | 0.408                                           | 1.6 x 10 <sup>-3</sup>          | 0.0073                            |
| 400 - 800            | 400                     | 0.988            | 17.000              | 0.210                                        | 0.341                                           | 7.0 x 10 <sup>-4</sup>          | 0.00683                           |
| 800 - 100            | -                       | 1.071            | -                   | -                                            | -                                               | -                               | -                                 |
| 100 - 200            | 100                     | 1.056            | 3.480               | 0.072                                        | 1.52                                            | 1.1 x 10 <sup>-3</sup>          | 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

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

Approved Signatory

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



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

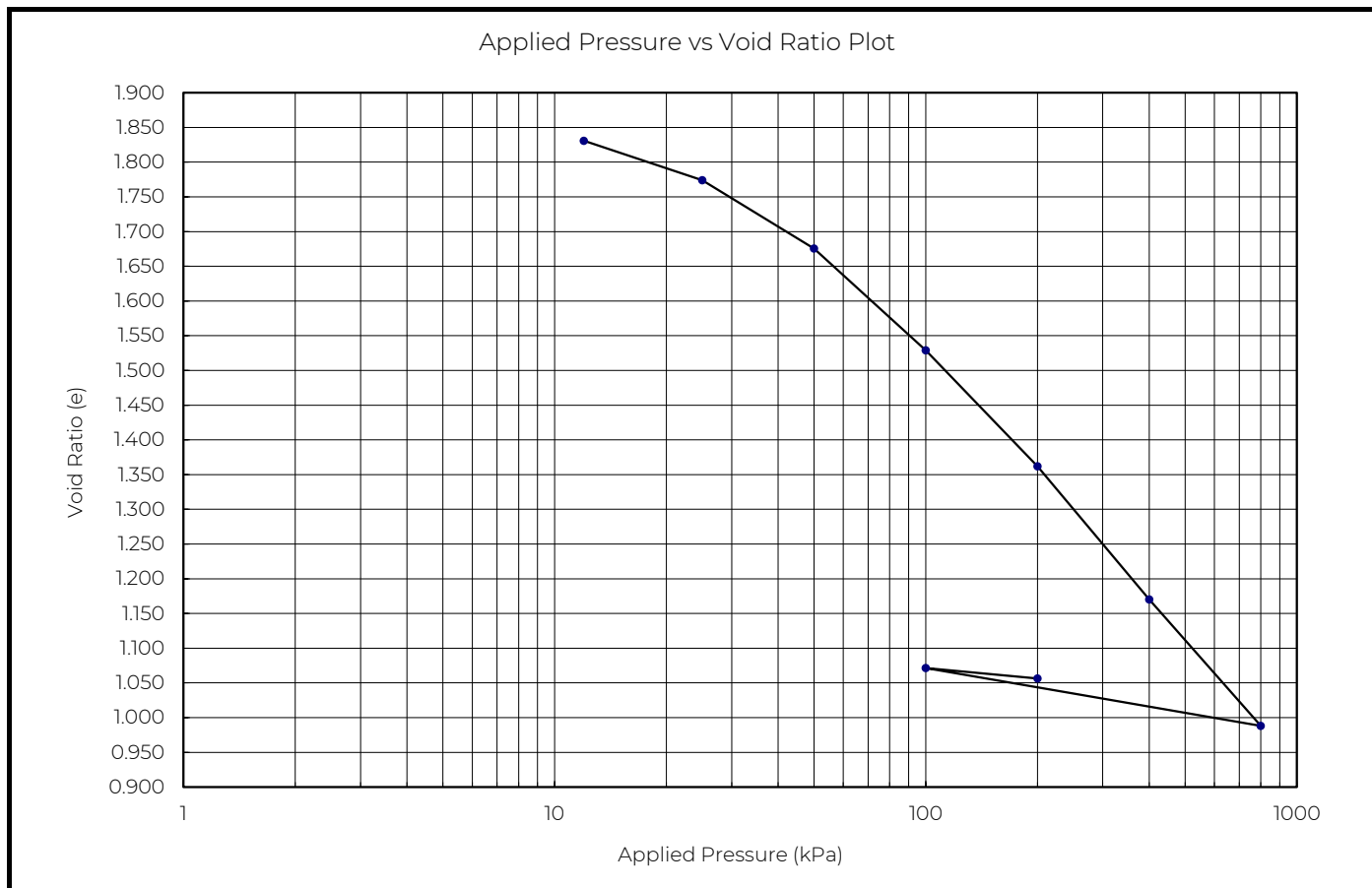
**ONE DIMENSIONAL CONSOLIDATION PROPERTIES**  
**Applied Pressure vs Void Ratio TEST REPORT**



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<br>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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