Eastern Busway

LOG OF DRILLHOLE

HOLE IDENTIFICATION **DH307**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411494.80mE 795054.36mN
Orientation -90° Elevation 8.86m
Location 262 Ti Rakau Drive - Chinatown
Feature Bridge Abutment/Pier

GEOLOGICAL DESCRIPTION (Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).)	Test Records: Shear Vane/SPT; SPT N Values 0 - 50	Drilling Method / Casing remarks	Core Loss/Lift 0 - 100%	Relative Strength (S, MS, W, VW)	Rock Weathering (SW, MW, HW)	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm) 500 100 50 10	SOIL PROPERTIES / DEFECT DESCRIPTION (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	Instrumentation
EAST COAST BAYS FORMATION 20.0m: Slightly weathered, grey, fine to coarse SANDSTONE. Very weak.		HQ3				21		100 [100]		20.0m: DB, 0°	
		HQ3				22		100 [100]		20.9m: DB, 0° 21.0 to 22.5m: Recovered as silty fine to medium SAND. Flush very silty with core stuck to the split.	
						23				DH307 terminated at 22.5m Depth Criteria Achieved	
						24					
						25					
						26					
						27					
						28					
						29					

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)
Date Time Drilled Depth Casing Depth Fluid Depth

Hand Held Shear Vane
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876
vane shear strength per NZGS guideline

RELATIVE STRENGTH
VS - Very strong
S - Strong
MS - Moderately strong
W - Weak
VW - Very weak
EW - Extremely weak

WEATHERING
UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

Date logged 23/06/2022
Logged IR
Checked GP

Remarks
Hole backfilled with grout upon completion.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 23/06/2022
Finished 23/06/2022
Drill Rig N119
Core Boxes 7

Eastern Busway

PHOTOGRAPHIC LOG OF DRILLHOLE

Project Eastern Busway

Location 262 Ti Rakau Drive - Chinatown

HOLE IDENTIFICATION **DH307**

Box: 1 of 7 - Depth: 01.50m to 04.50m of 22.50m

Date Drilled 23/06/2022 to 23/06/2022 - Date Photographed: 23/06/2022

Box: 2 of 7 - Depth: 04.50m to 07.60m of 22.50m

Date Drilled 23/06/2022 to 23/06/2022 - Date Photographed: 23/06/2022

Box: 3 of 7 - Depth: 07.60m to 10.75m of 22.50m

Date Drilled 23/06/2022 to 23/06/2022 - Date Photographed: 23/06/2022

Box: 4 of 7 - Depth: 10.75m to 13.85m of 22.50m

Date Drilled 23/06/2022 to 23/06/2022 - Date Photographed: 23/06/2022

Box: 5 of 7 - Depth: 13.85m to 16.80m of 22.50m

Date Drilled 23/06/2022 to 23/06/2022 - Date Photographed: 23/06/2022

Box: 6 of 7 - Depth: 16.80m to 19.50m of 22.50m

Date Drilled 23/06/2022 to 23/06/2022 - Date Photographed: 23/06/2022

Eastern Busway

PHOTOGRAPHIC LOG OF DRILLHOLE

Project Eastern Busway

Location 262 Ti Rakau Drive - Chinatown

HOLE IDENTIFICATION **DH307**

Box: 7 of 7 - Depth: 19.50m to 22.50m of 22.50m

Date Drilled 23/06/2022 to 23/06/2022 - Date Photographed: 23/06/2022

LOG OF DRILLHOLE

Eastern Busway

HOLE IDENTIFICATION **DH308**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411510.79mE 795065.64mN
Orientation -90° Elevation 8.88m
Location 262 Ti Rakau Drive - China Town
Feature Bridge Abutment

GEOLOGICAL DESCRIPTION	Test Records	Drilling Method	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).	Shear Vane/ SPT; SPT N Values 0 - 50	Casing remarks	0 - 100%	S MS W VW	SW MW HW				500 100 50 10	Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc. (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	

FILL

0.0m: FILL comprising silty gravel, cobbles and boulders.

VAC EX — 0

0.0m: Vacuum excavation
0.0 to 0.15m: Concrete (car park).
0.15 to 0.75m: Silty fine to coarse GRAVEL with some cobbles and boulders. Densely packed, moist. Gravel, cobbles and boulders are subangular basalt.

AUCKLAND VOLCANIC FIELD

0.75m: SW, dark grey, BASALT. Moderately strong. Highly vesicular (<20%), vesicles typically 5-10mm and up to 60mm. Some iron staining in vesicles.

HQ3 — 100 [100]

1.5 to 2.22m: J, 80°, Ud, Ro, Sn, Fe

1.7m: Slightly weathered, vesicular, dark grey, BASALT. Strong. Slightly vesicular (<2%). Vesicles up to 5mm.

114 HWT
HQ3 — 88 [59]

1.95m: 114mm diameter HWT casing to 1.95m.
2.1 to 2.16m: J, 45°, Ud, Ro, Sn, Fe
2.14 to 2.2m: J, 45°, Ud, Ro, Sn, Fe
2.14 to 2.17m: DB, 60°, Ud, Ro, Sn, Fe
2.27 to 2.46m: J, 85°, Ud, Ro, Sn, Fe
2.46 to 2.49m: J, 20°, Ud, Ro, MN, P, Cl, Stn, Fe.
2.46 to 2.78m: J, 70°, Ud, Ro, Sn, Fe

HQ3 — 100 [100]

4.23 to 4.35m: J, 60°, Ud, Ro, Sn, Fe
4.24 to 4.36m: J, 60°, Ud, Ro, Sn, Fe
4.5 to 4.58m: J, 60°, Ud, Ro, Sn, Fe
4.58 to 4.66m: J, 55°, Ud, Ro, VN, Sn, Fe

4.45 to 4.75m: Slightly vesicular (<5%).

TAURANGA GROUP

4.75m: ALLUVIUM comprising clay, silt, peat and sand.

UTP
HQ3 — 100 [18]

4.75m: Silty CLAY with trace organics; brown mottled orange. Very stiff, moist, high plasticity.

5.3 to 5.6m: Pinkish grey mottled orange.

128/41 ss 1,1,1, 1,2,3 N=7
SPT — 100

188/35
HQ3 — 100

7.3m: CLAY; bluish grey with some orange mottling. Stiff, moist, high plasticity.

ss 1,1,1, 1,2,2 N=6
SPT — 100

8.1 to 8.15m: Clayey fine SAND.

HQ3 — 100

8.15m: Silty CLAY with some fine sand; bluish grey. Firm, moist, high plasticity.

47/15
PT — 100

9.5 to 9.8m: Micaceous fine sandy SILT lenses.

ss 0,0,1, 1,0,0 N=2
SPT — 100

Depth: 1 2 3 4 5 6 7 8 9

Instrumentation: 2.56 ▽ 4.59 ▽ 5.5 5.4 ▽

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)

Date Time	Drilled Depth	Casing Depth	Fluid Depth
17/06/2022 16:30	07.95	2.0	2.56
20/06/2022 07:00	07.95	2.0	4.59
20/06/2022 15:45	27.00	2.0	5.45
21/06/2022 07:00	27.00	2.0	5.5

Hand Held Shear Vane
DR2272: 19mm blade: Calibrated 02/22: Correction Factor = 1.595
vane shear strength per NZGS guideline

RELATIVE STRENGTH
VS - Very strong
S - Strong
MS - Moderately strong
W - Weak
VW - Very weak
EW - Extremely weak

WEATHERING
UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

Date logged 20/06/2022
Logged IR/GS
Checked GP

Remarks
Flush 50 mm standpipe piezometer installed on completion.
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876 used for hand shear vane measurments 9.0m and deeper.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 17/06/2022
Finished 20/06/2022
Drill Rig N119
Core Boxes 10

2021 EB DRILLHOLE LOG 2022-08-04 MASTER.GPJ BASE.GDT 07/08/22

7/08/2022

Eastern Busway

LOG OF DRILLHOLE

HOLE IDENTIFICATION **DH308**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411510.79mE 795065.64mN
Orientation -90° Elevation 8.88m
Location 262 Ti Rakau Drive - China Town
Feature Bridge Abutment

GEOLOGICAL DESCRIPTION	Test Records	Drilling Method	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).	Shear Vane/ SPT; SPT N Values 0 - 50	Casing remarks	0 - 100%	S MS W VW	SW MW HW				500 100 50 10	Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc. (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	

TAURANGA GROUP

HQ3 — 100
38/11 — PT — 100
ss 1,0,1, 1,2,3 N=7 — SPT — 100
HQ3 — 100
131/38 ss 0,1,1, 1,2,1 N=5 — SPT — 100

8.15m: Silty CLAY with some fine sand; bluish grey. Firm, moist, high plasticity. *(continued)*

10.5m: Water return in basalt. No return in alluvium.

10.75m: Fibrous PEAT; black. Firm, moist, moderately decomposed wood fragments.

11.0m: Organic CLAY; brown. Firm, moist, high plasticity.

11.2m: CLAY with trace indistinct organics; light bluish grey. Very stiff, moist, high plasticity.

EAST COAST BAYS FORMATION

12.6m: HW, grey, fine to medium SANDSTONE. EW.
12.8m: MW, grey, fine to medium SANDSTONE. VW.

HQ3 — 100

12.4m: With some fine sand.

12.6m: Fine to medium SAND; grey.

13.35m: HW, grey, SILTSTONE. EW.
13.6m: MW, grey, fine SANDSTONE. Very weak.
13.9m: Slightly weathered, grey, SILTSTONE. Very weak.
14.53m: Slightly weathered, grey, fine SANDSTONE. Very weak.

225/* ss 3,8,12, 15,16,7 for 25mm N>50 — SPT — 100
HQ3 — 100

13.35m: Clayey SILT with trace fine siltstone gravel; grey

13.9m: Gently inclined very thinly to moderately thinly bedded.
13.9 to 15m: DB, 5°, 6 No.

ss 9,14,18, 20,12 for 50mm N>50 — SPT — 100
HQ3 — 100 [100]

15.3m: Slightly weathered, grey, SILTSTONE. Very weak. Gently inclined, very to moderately thinly bedded.

15.35 to 16.5m: DB, 0°, 3 No.
15.4 to 15.5m: Fine sandy SILTSTONE.

16.1m: Slightly weathered, grey, thickly bedded, fine to medium SANDSTONE. Very weak.

sc 15,35 for 70mm N>50 — SPT — 0
HQ3 — 100 [73]

16.02m: BP, 5°, VN, C, Slt
16.15 to 16.35m: Very thin silt beds.

17.4 to 17.55m: Recovered as silty fine to medium SAND.

sc 16,34 for 45mm N>50 — SPT — 75
HQ3 — 100 [12]

18.2 to 18.93m: Extremely weak.

18.2 to 18.93m: Recovered as fine SAND.
19.25 to 19.5m: DB, 5°, 4 No.

18.93 to 19.06m: SILTSTONE bed.

19.2m: Very thin carbonaceous bed.

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)
Date Time Drilled Depth Casing Depth Fluid Depth

Hand Held Shear Vane
DR2272: 19mm blade: Calibrated 02/22: Correction Factor = 1.595
vane shear strength per NZGS guideline

RELATIVE STRENGTH
VS - Very strong
S - Strong
MS - Moderately strong
W - Weak
VW - Very weak
EW - Extremely weak

WEATHERING
UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

Date logged 20/06/2022
Logged IR/GS
Checked GP

Remarks
Flush 50 mm standpipe piezometer installed on completion.
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876 used for hand shear vane measurments 9.0m and deeper.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 17/06/2022
Finished 20/06/2022
Drill Rig N119
Core Boxes 10

Eastern Busway

LOG OF DRILLHOLE

HOLE IDENTIFICATION **DH308**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411510.79mE 795065.64mN
Orientation -90° Elevation 8.88m
Location 262 Ti Rakau Drive - China Town
Feature Bridge Abutment

GEOLOGICAL DESCRIPTION	Test Records	Drilling Method	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).	Shear Vane/ SPT; SPT N Values 0 - 50	Casing remarks	0 - 100%	S MS W VW	SW MW HW				500 100 50 10	Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc. (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	

EAST COAST BAYS FORMATION

16.1m: Slightly weathered, grey, thickly bedded, fine to medium SANDSTONE. Very weak. *(continued)*

20.68m: SW, grey, SILTSTONE. Very weak.

20.94m: Slightly weathered, grey, fine SANDSTONE. Very weak.

22.3m: Slightly weathered, grey, SILTSTONE. Very weak.

22.67m: Slightly weathered, grey, thickly bedded, fine SANDSTONE. Very weak.

26.7 to 27.0m: Siltstone

HQ3 — 100 [90]

HQ3 — 100 [93]

HQ3 — 100 [67]

HQ3 — 100 [25]

HQ3 — 100 [100]

21

22

23

24

25

26

27

28

29

21.0 to 22.5m: DB, 0°, 2 No.
21.05 to 21.15m: Recovered as subangular SILTSTONE gravel.
21.2m: SILTSTONE clast, 50mm long.

22.3 to 22.4m: Thinly laminated.
22.5m: Subrounded SILTSTONE clast, 20mm.

23.5 to 25.5m: Subhorizontal, thinly to moderately thinly bedded with thin laminations or partings of mudstone. Drilling breaks infilled with mud.

25.5 to 27m: DB, 0°, 4 No.

26.7 to 27.0m: Thinly laminated.

DH308 terminated at 27.0m
Depth Criteria Achieved

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)

Date Time	Drilled Depth	Casing Depth	Fluid Depth

RELATIVE STRENGTH

VS - Very strong
S - Strong
MS - Moderately strong
W - Weak
VW - Very weak
EW - Extremely weak

WEATHERING

UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

Date logged 20/06/2022
Logged IR/GS
Checked GP

Driller McMillan
Started 17/06/2022
Finished 20/06/2022
Drill Rig N119
Core Boxes 10

Hand Held Shear Vane
DR2272: 19mm blade: Calibrated 02/22: Correction Factor = 1.595
vane shear strength per NZGS guideline

Remarks

Flush 50 mm standpipe piezometer installed on completion.
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876 used for hand shear vane measurments 9.0m and deeper.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Box: 1 of 10 - Depth: 00.75m to 03.10m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 17/06/2022

Box: 2 of 10 - Depth: 03.10m to 05.90m of 27.00m

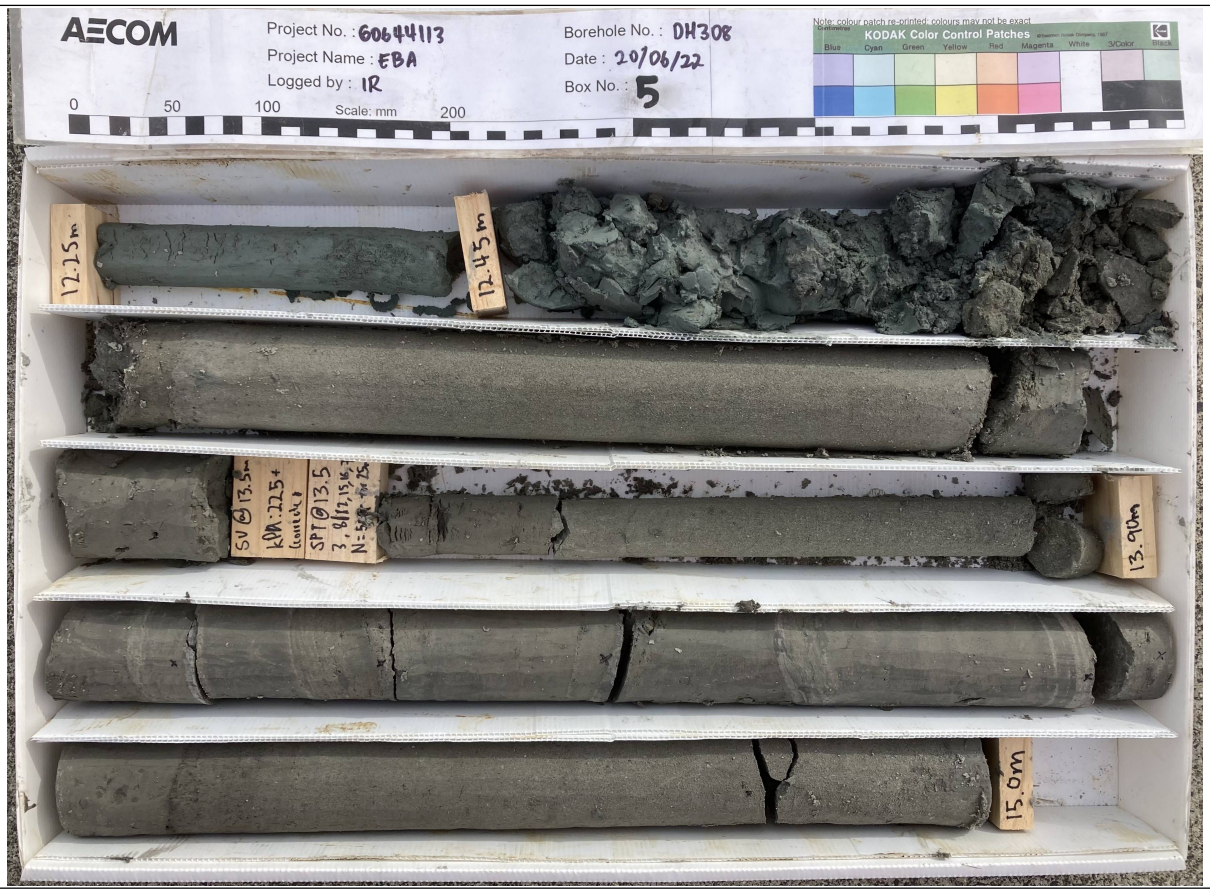
Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 17/06/2022

Box: 3 of 10 - Depth: 05.90m to 08.75m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022

Box: 4 of 10 - Depth: 08.75m to 12.25m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022

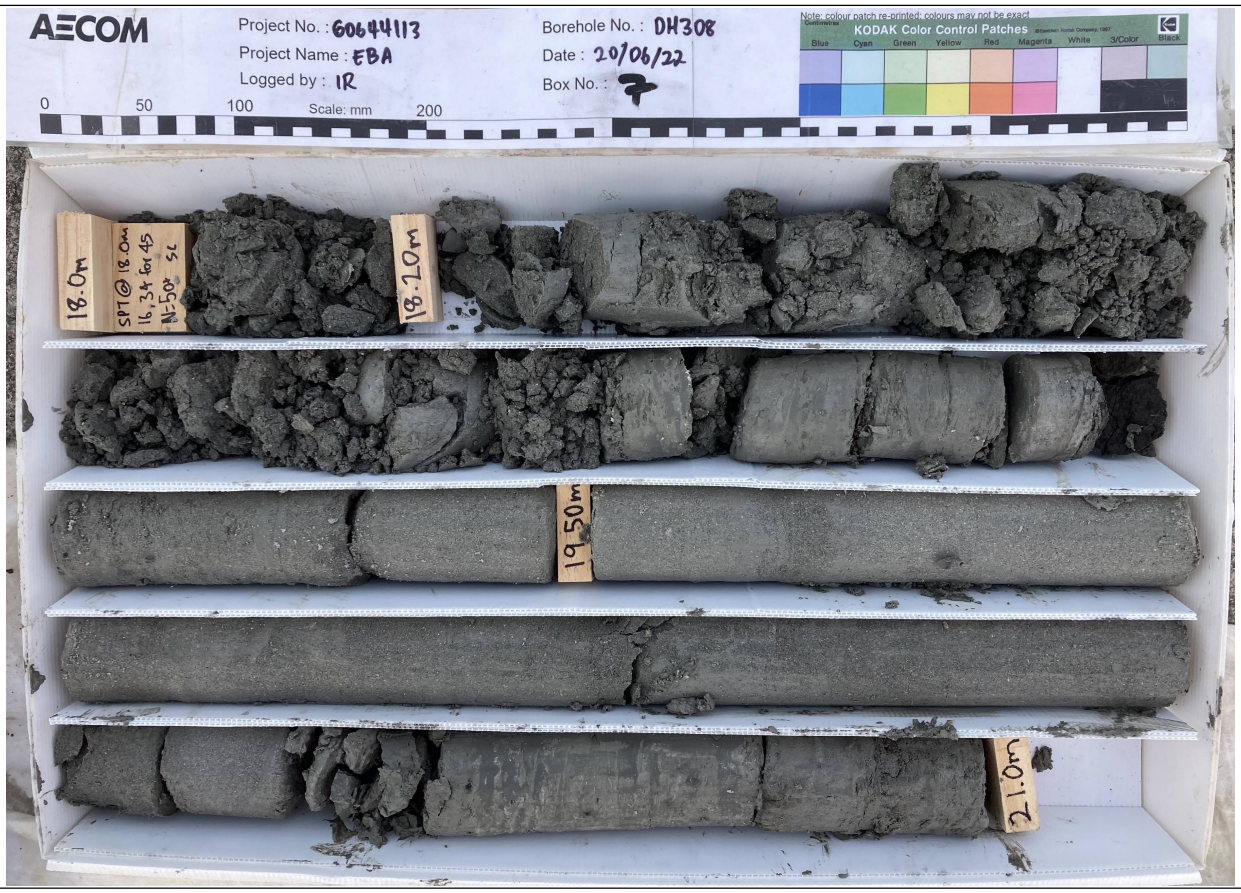


Box: 5 of 10 - Depth: 12.25m to 15.00m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022

Box: 6 of 10 - Depth: 15.00m to 18.00m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022



Box: 7 of 10 - Depth: 18.00m to 21.00m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022

Box: 8 of 10 - Depth: 21.00m to 23.65m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022

Eastern Busway

PHOTOGRAPHIC LOG OF DRILLHOLE

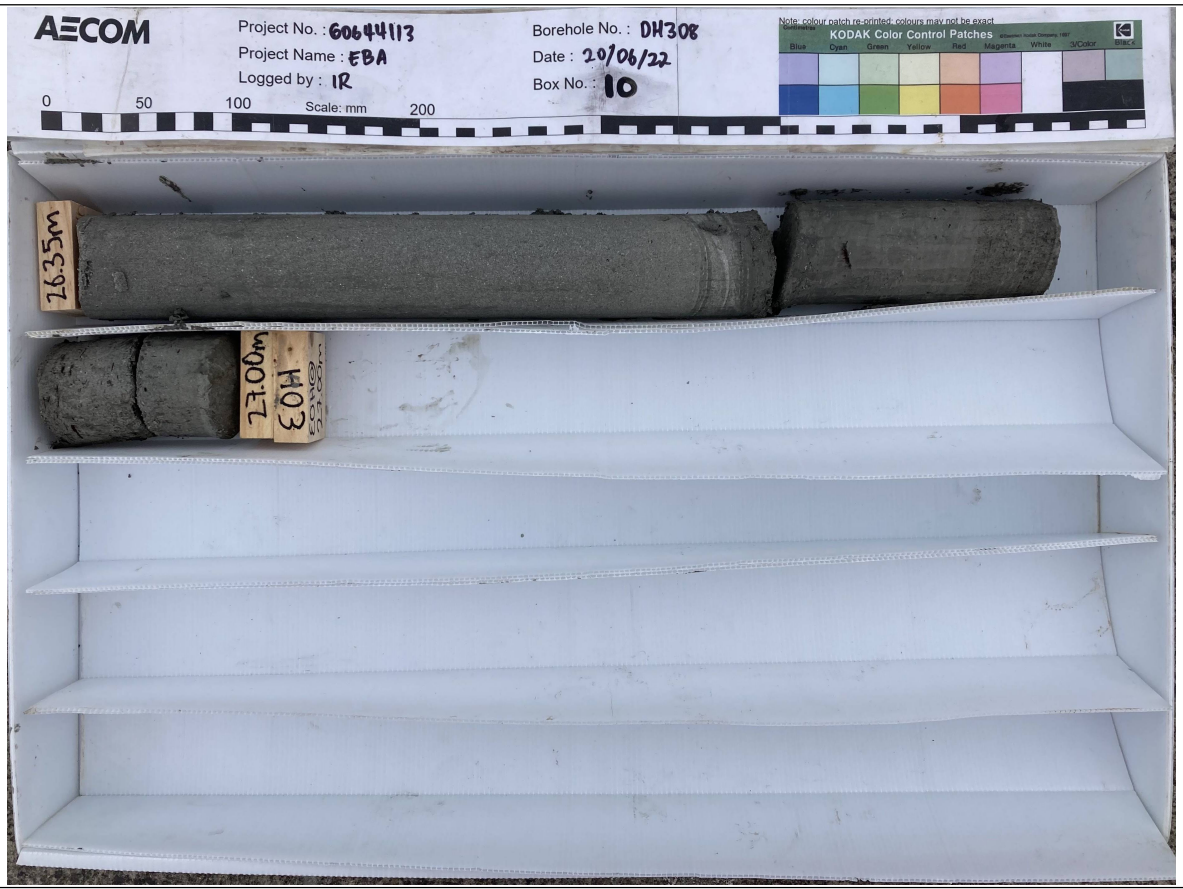
Project Eastern Busway

Location 262 Ti Rakau Drive - China Town

HOLE IDENTIFICATION **DH308**

Box: 9 of 10 - Depth: 23.65m to 26.35m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022



Box: 10 of 10 - Depth: 26.35m to 27.00m of 27.00m

Date Drilled 17/06/2022 to 20/06/2022 - Date Photographed: 20/06/2022

Eastern Busway

LOG OF DRILLHOLE

HOLE IDENTIFICATION **DH-CPT308**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411510.88mE 795064.0mN
Orientation -90° Elevation 8.81m
Location 262 Ti Rakau Drive - China Town
Feature Bridge Abutment

GEOLOGICAL DESCRIPTION	Test Records	Drilling Method	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).	Shear Vane/ SPT; SPT N Values 0 - 50	Casing remarks	0 - 100%	S MS W VW	SW MW HW				(mm) 500 100 50 10	Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc. (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	
FILL: 0.0m: FILL.		VAC EX				1		0		0.0m: Vacuum excavation not witnessed.	
AUCKLAND VOLCANIC FIELD: 1.2m: Slightly weathered, grey speckled light grey, BASALT. Moderately strong. Highly vesicular, vesicles typically 2 to 20mm. Iron staining in some vesicles. 1.35 to 4.4m: Strong. Moderately vesicular with vesicles up to 10mm. 2.14 to 2.72m: Becomes slightly vesicular with vesicles up to 3mm.		HQ3				2		100 [100]		1.26 to 1.33m: Large vesicle, 70mm, limonite and silt infill.	
		HQ3				3		100 [100]		1.64m: DB, 20° 1.92m: DB, 0° 2.25m: J, 0°, Ud, Ro, VN, Sn, Fe 2.5m: J, 10°, Ud, Ro, N, Sn, Fe 1.2 to 4.7m: Used 1.5m3 of water 3.0m: J, 0°, Ud, Ro, VN, Sn, Fe 3.02 to 3.21m: J, 90°, Ud, Ro, N, Sn, Fe & Slt 3.12 to 3.28m: J, 70°, Ud, Ro, VN, Sn, Fe	
		HQ3				4		93 [90]		4.26m: DB, 0°	
TG: 4.4m: ALLUVIUM comprising silt, clay and fine gravel.		WASH				5				4.4m: Silty CLAY with some fine gravel; dark grey. Very stiff, moist, high plasticity. 4.48m: Fine gravel ceases, becomes dark brown. 4.55 to 4.7m: Light brown. 4.7 to 9.0m: Wash drill for piezometer install.	
						6					
						7					
						8					
						9				DH-CPT308 terminated at 9.0m Depth Criteria Achieved	

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)
Date Time Drilled Depth Casing Depth Fluid Depth

Hand Held Shear Vane

vane shear strength per NZGS guideline

RELATIVE STRENGTH
VS - Very strong
S - Strong
MS - Moderately strong
W - Weak
VW - Very weak
EW - Extremely weak

WEATHERING
UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

Date logged 21/06/2022
Logged IR
Checked GP

Remarks
Drilling through basalt to form starter hole; investigation continued with cone penetration test. Hole wash drilled to 9m depth upon completion of CPT and piezometer installed. No groundwater encountered.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 21/06/2022
Finished 21/06/2022
Drill Rig N119
Core Boxes 2

2021 EB DRILLHOLE LOG 2022-08-04 MASTER.GPJ BASE.GDT 04/08/22

4/08/2022

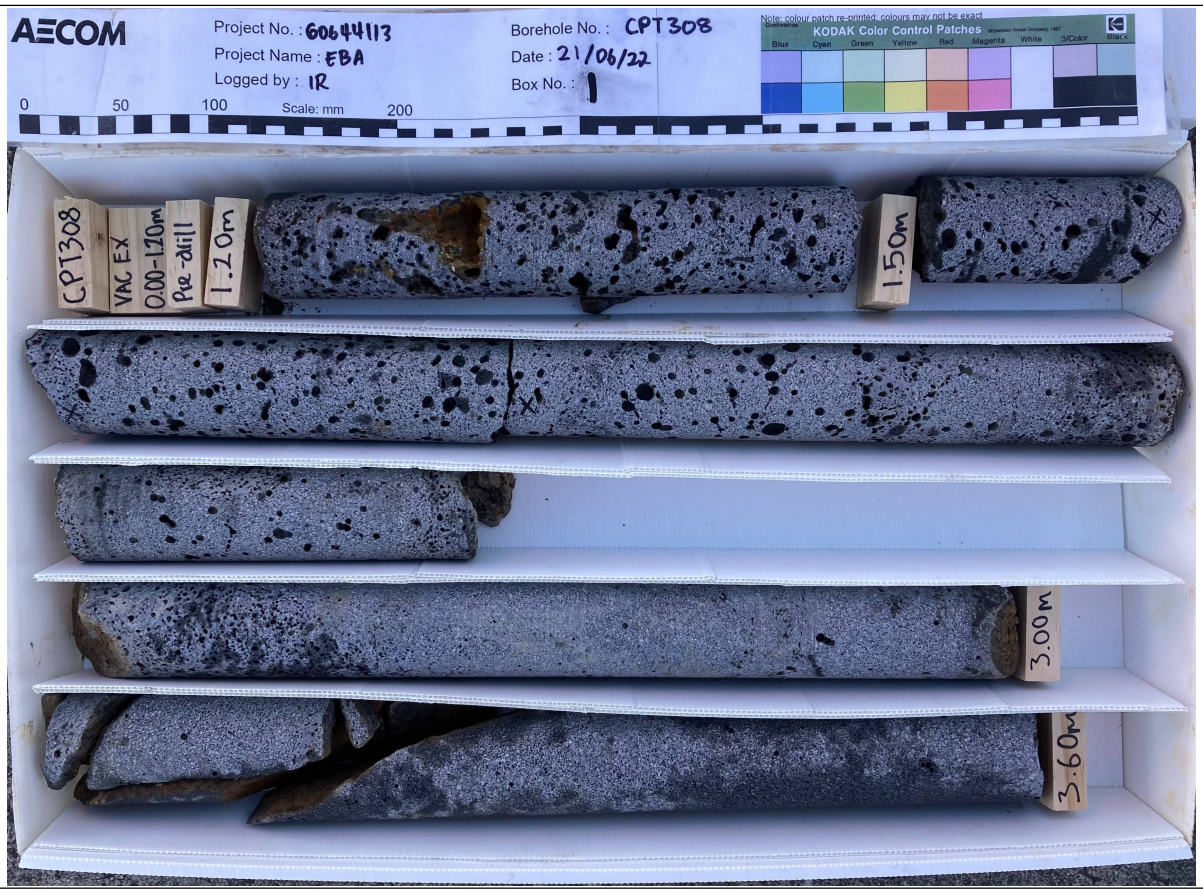
Eastern Busway

PHOTOGRAPHIC LOG OF DRILLHOLE

Project Eastern Busway

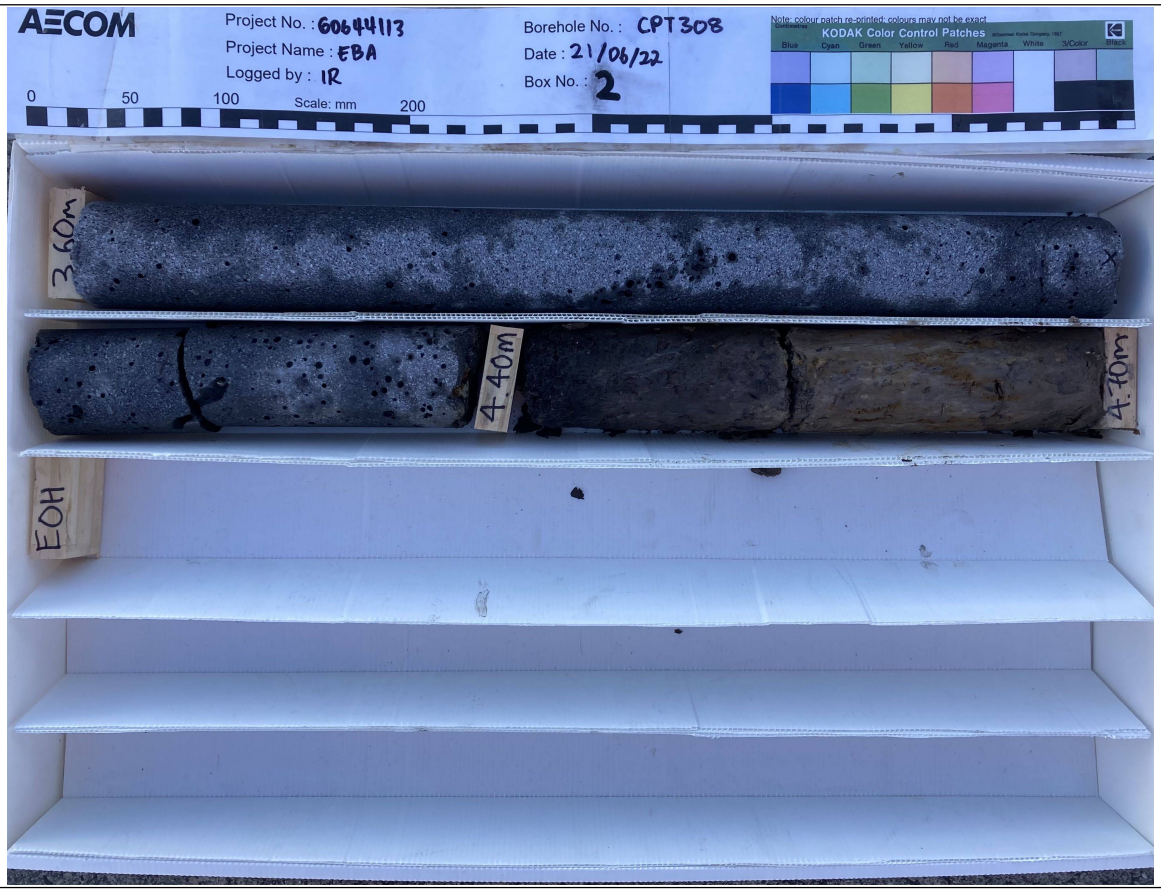
Location 262 Ti Rakau Drive - China Town

HOLE IDENTIFICATION **DH-CPT308**



Box: 1 of 2 - Depth: 01.20m to 03.60m of 9.00m

Date Drilled 21/06/2022 to 21/06/2022 - Date Photographed: 21/06/2022



Box: 2 of 2 - Depth: 03.60m to 04.70m of 9.00m

Date Drilled 21/06/2022 to 21/06/2022 - Date Photographed: 21/06/2022

Eastern Busway

LOG OF DRILLHOLE

HOLE IDENTIFICATION **DH-sCPT308**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411512.14mE 795064.65mN
Orientation -90° Elevation 8.81m
Location 262 Ti Rakau Drive - China Town
Feature Bridge Abutment

GEOLOGICAL DESCRIPTION (Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).)	Test Records: Shear Vane/ SPT	Test Records: SPT N Values 0 - 50	Drilling Method / Casing remarks	Core Loss/Lift 0 - 100%	Relative Strength S MS W VW	Rock Weathering SW MW HW	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm) 500 100 50 10	SOIL PROPERTIES / DEFECT DESCRIPTION (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	Instrumentation
FILL: 0.0m: FILL.			VAC EX						0		0.0m: Vacuum excavation not witnessed.	
AUCKLAND VOLCANIC FIELD: 0.8m: Slightly weathered, grey speckled light grey, BASALT. Moderately strong. Moderately vesicular, up to 50mm. Iron staining in some vesicles.			HQ3				1		100 [86]		0.8 to 5.1m: Used 2m3 of water. 1.08m: J, 52°, Ud, Ro, N, Sn, Fe & Slt	
2.0m: Becomes slightly vesicular. Vesicles up to 10mm.			HQ3				2		100 [100]		2.17m: J, 10°, Ud, Ro, N, Sn, Fe & Slt 2.1 to 2.2m: J, 60°, Ud, Ro, N, Sn, Fe & Slt 2.3 to 2.4m: J, 80°, Ud, Ro, N, Sn, Fe & Slt	
2.87 to 2.96m: Vesicles up to 50mm. 3.05 to 5.0m: Strong. Vesicles up to 5mm.			HQ3				3		100 [100]		3.1m: J, 45°, Ud, Ro, N, Sn, Fe 3.12 to 3.24m: J, 60°, Ud, Ro, N, Sn, Fe 3.23 to 3.36m: J, 80°, Ud, Ro, N, Sn, Fe	
			HQ3				4		100 [100]		3.9 to 5m: J, 90°, Ud, Ro, MN, C, Cl & Fe, some infill washed out.	
TC: 5.0m: ALLUVIUM comprising silt and clay.							5				5.0m: Silty CLAY; greyish brown. Moist, firm, high plasticity.	
							6				DH-sCPT308 terminated at 5.1m Depth Criteria Achieved	
							7					
							8					
							9					

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)
Date Time Drilled Depth Casing Depth Fluid Depth

Hand Held Shear Vane

vane shear strength per NZGS guideline

RELATIVE STRENGTH
VS - Very strong
S - Strong
MS - Moderately strong
W - Weak
VW - Very weak
EW - Extremely weak

WEATHERING
UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

Date logged 21/06/2022
Logged IR
Checked GP

Remarks
Drilling through basalt to form starter hole; investigation continued with seismic cone penetration test. Piezometer installed upon completion of sCPT.
No groundwater encountered.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 21/06/2022
Finished 21/06/2022
Drill Rig N119
Core Boxes 2

2021 EB DRILLHOLE LOG 2022-08-04 MASTER.GPJ BASE.GDT 04/08/22

4/08/2022

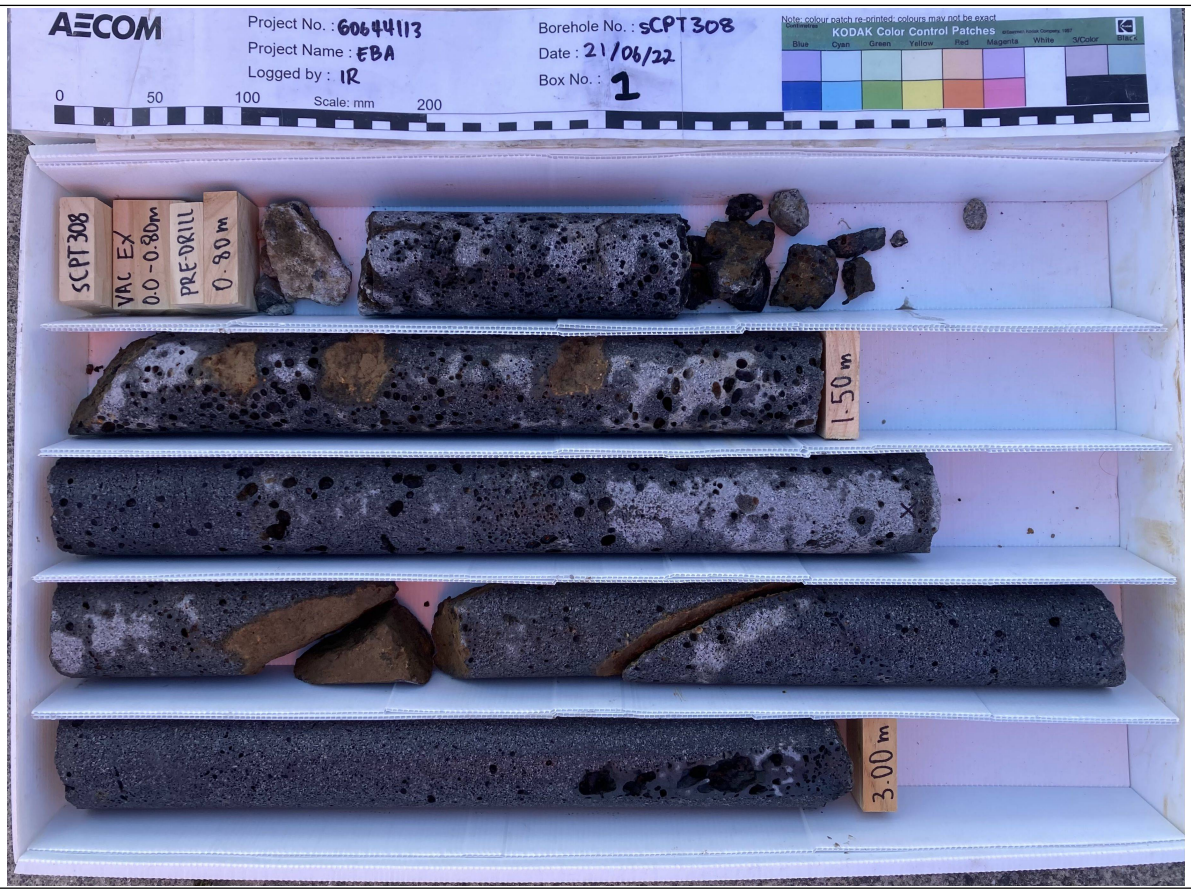
Eastern Busway

PHOTOGRAPHIC LOG OF DRILLHOLE

Project Eastern Busway

Location 262 Ti Rakau Drive - China Town

HOLE IDENTIFICATION **DH-sCPT308**



Box: 1 of 2 - Depth: 00.80m to 03.00m of 5.10m

Date Drilled 21/06/2022 to 21/06/2022 - Date Photographed: 21/06/2022

Box: 2 of 2 - Depth: 03.00m to 05.10m of 5.10m

Date Drilled 21/06/2022 to 21/06/2022 - Date Photographed: 21/06/2022

Eastern Busway

LOG OF DRILLHOLE

HOLE IDENTIFICATION **DH309_P**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411582.05mE 795072.05mN
Orientation -90° Elevation 8.195m
Location 209 Burswood Dr, Pakuranga
Feature Bridge/Embankment Design

GEOLOGICAL DESCRIPTION	Test Records	Drilling Method	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
FILL: 0.0m: FILL comprising clay, silt and fine to coarse gravel.	143/34 105/23 111/17	VAC EX				1		0		0.0m: Silty CLAY with some fine to coarse gravel; light brown. Very stiff, moist, high plasticity. Gravel comprises slightly weathered, subangular, BASALT. (Noted during hyro-excavation)	
TAURANGA GROUP: 1.1m: ALLUVIUM comprising clay, silt, fine sand and organics.	158/90 161/21 ss 1,1,2, 2,2,3 N=9	SPT				2		100		1.1m: Silty CLAY; blueish grey. Very stiff, moist, high plasticity. 1.6 to 1.7m: Minor organic flecks, black. Becomes stiff.	2.1 2.27
		HQ3						100		2.5 to 3.05m: Some brown mottling.	
	116/23 ss 0,1,1, 1,1,1 N=4	SPT				3		100		3.05 to 4.95m: Greyish brown.	
		HQ3				4		100			3.95
	70/20 ss 0,0,1, 1,2,1 N=5	SPT						100			
		HQ3 114 HWT				5		100		4.95m: Blueish grey.	5.28
	120/26 ss 1,0,0, 0,1,1 N=2	SPT				6		100			
		HQ3				7		100		7.2m: Becomes firm.	
	48/9	PT						100			
	ss 0,0,0, 0,0,0 N=0 SUOW	SPT				8		100		8.0m: Silty CLAY; blueish grey. Soft to very soft, moist, high plasticity.	
		HQ3						100			
	9/3	PT				9		100			
	ss 0,0,0, 0,0,0 N=0 SUOW	SPT						100			

DEFECT DESCRIPTION (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)

Date Time	Drilled Depth	Casing Depth	Fluid Depth
27/09/2022 16:20	15.32	5.7	2.1
29/09/2022 09:21	15.32	5.7	3.95
29/09/2022 14:30	30.00	5.7	5.28
30/09/2022 08:12	30.00	5.7	2.27

Hand Held Shear Vane
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876
vane shear strength per NZGS guideline

RELATIVE STRENGTH
VS - Very strong
S - Strong
MS - Moderately strong
W - Weak
VW - Very weak
EW - Extremely weak

WEATHERING
UW - Unweathered
SW - Slightly weathered
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

Date logged 29/09/2022
Logged FK
Checked GP

Remarks
50 mm standpipe piezometer installed on completion.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 27/09/2022
Finished 29/09/2022
Drill Rig N119
Core Boxes 9

2021 EB DRILLHOLE LOG 2022-06-27 IR FIELD FILE (DH'S, HA'S).GPJ BASE.GDT 02/12/22

2/12/2022

LOG OF DRILLHOLE

Eastern Busway

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Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411582.05mE 795072.05mN
Orientation -90° Elevation 8.195m
Location 209 Burswood Dr, Pakuranga
Feature Bridge/Embankment Design

GEOLOGICAL DESCRIPTION	Test Records	Drilling Method	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).	Shear Vane/ SPT; SPT N Values 0 - 50	Casing remarks	0 - 100%	S MS W VW	SW MW HW				500 100 50 10 (mm)	Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc. (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	

TAURANGA GROUP

33/10 ss 0,0,0, 1,1,1 N=3 116/14 — HQ3 — 100
SPT — 100
HQ3 — 100
ss 1,0,1, 1,1,2 N=5 — SPT — 100

8.0m: Silty CLAY; blueish grey. Soft to very soft, moist, high plasticity. *(continued)*

10.55m: Spongy PEAT; black. Soft, moist, high plasticity.

10.75m: Silty CLAY; brown. Stiff, moist, high plasticity.

10.95m: Becomes blueish grey.

12.45 to 12.85m: Core Loss:

EAST COAST BAYS FORMATION

12.85m: Slightly weathered, grey, coarse SANDSTONE. Weak. Moderately thickly bedded. — HQ3 — 62 [62]

13.4m: Slightly weathered, grey, SILTSTONE. Very weak.

ss 9,7,6, 8,7,10 N=31 — SPT — 100

13.34 to 13.37m: J, 30°, Ud, Sm, Cg

14.3m: Slightly weathered, grey, fine to coarse SANDSTONE. Very weak. Weakly cemented. Very thickly bedded. — HQ3 — 100 [95]

ss 18,12,17, 23,10 for 25mm N>50 — SPT — 100

HQ3 — 100 [100]

16.28 to 16.85m: Recovered as silty fine to medium SAND; grey. Slightly packed.

16.65m: DB, 3 No.

sc 14,36 for 55mm N>50 — SPT — 0

HQ3 — 22 [22]

sc 9,18,30, 20 for 55mm N>50 — SPT — 0

18.28m: SW, grey, fine to medium SANDSTONE. EW. Moderately thickly bedded.

18.28m: Recovered as silty fine to medium SAND; grey. Loosely packed.

18.35 to 18.6m: Becomes very weak.

18.6m: Slightly weathered, grey, SILTSTONE, Very weak. — HQ3 — 100 [71]

19.4 to 19.9m: Thin fine to medium SAND bed.

sc 13,37 for 65mm N>50 — SPT — 0

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)
Date Time Drilled Depth Casing Depth Fluid Depth

Hand Held Shear Vane
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876
vane shear strength per NZGS guideline

RELATIVE STRENGTH
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WEATHERING
UW - Unweathered
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MW - Moderately weathered
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CW - Completely weathered

Date logged 29/09/2022
Logged FK
Checked GP

Remarks
50 mm standpipe piezometer installed on completion.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 27/09/2022
Finished 29/09/2022
Drill Rig N119
Core Boxes 9

LOG OF DRILLHOLE

Eastern Busway

HOLE IDENTIFICATION **DH309_P**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411582.05mE 795072.05mN
Orientation -90° Elevation 8.195m
Location 209 Burswood Dr, Pakuranga
Feature Bridge/Embankment Design

GEOLOGICAL DESCRIPTION	Test Records	Drilling Method	Core Loss/Lift	Relative Strength	Rock Weathering	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm)	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).	Shear Vane/ SPT; SPT N Values 0 - 50	Casing remarks	0 - 100%	S MS W VW	SW MW HW				500 100 50 10	Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc. (Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)	
EAST COAST BAYS FORMATION		HQ3				21		100 [85]		21.03 to 21.2m: DB, 3 No. 21.2 to 21.7m: , Drilling disturbed	
		HQ3				22		100 [67]		21.9 to 22.0m: Thin fine to medium SAND bed.	
		HQ3				23		100 [100]		22.5 to 24.45m: DB, Broken during handling	
24.3m: Slightly weathered, light grey, fine to medium SANDSTONE. Very weak. Weakly cemented. Very thickly bedded.		HQ3				24		100 [75]			
		HQ3				25		100 [100]		24.9 to 27.5m: DB, sub-horizontal, 19 No.	
26.65m: SW, light grey, fine to medium SANDSTONE. Moderately strong, Well cemented.		HQ3				26		100 [100]		26.65 to 26.85m: J, 80°, Ud, Sm	
27.0m: Slightly weathered, light grey, fine to medium SANDSTONE. Extremely weak. Very thickly bedded.		HQ3				27		77 [67]		27.55 to 27.85m: Core Loss: 27.9 to 29.72m: DB, 10 No.	
29.0m: SW, light grey, SILTSTONE. VW.		HQ3				28		100 [100]			
29.25m: SW, light grey, fine to medium SANDSTONE. VW. Well cemented.						29					

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)
Date Time Drilled Depth Casing Depth Fluid Depth

Hand Held Shear Vane
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876
vane shear strength per NZGS guideline

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Date logged 29/09/2022
Logged FK
Checked GP

Remarks
50 mm standpipe piezometer installed on completion.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 27/09/2022
Finished 29/09/2022
Drill Rig N119
Core Boxes 9

Eastern Busway

LOG OF DRILLHOLE

HOLE IDENTIFICATION **DH309_P**

Client Auckland Transport
Project Eastern Busway
Project number 60644113

Co-ordinates 411582.05mE 795072.05mN
Orientation -90° Elevation 8.195m
Location 209 Burswood Dr, Pakuranga
Feature Bridge/Embankment Design

GEOLOGICAL DESCRIPTION (Weathering, Colour, Fabric, ROCK NAME. Strength, Discontinuities, Lithological Features (bedding, foliation, mineralogy, cement, etc).)	Test Records: Shear Vane/ SPT	Test Records: SPT N Values 0 - 50	Drilling Method / Casing remarks	Core Loss/Lift 0 - 100%	Relative Strength (S, MS, W, VW)	Rock Weathering (SW, MW, HW)	Depth	Graphic Log	TCR [RQD] (%)	Spacing of Natural Defects (mm) 500 100 50 10	SOIL PROPERTIES / DEFECT DESCRIPTION	Instrumentation
29.55m: Slighly weathered, light grey, SILTSTONE. Very weak.							31 32 33 34 35 36 37 38 39				DH309_P terminated at 30m Depth Criteria Achieved	

SOIL PROPERTIES
Subordinate MAJOR minor; colour, structure. Strength, moisture condition, grading, bedding, plasticity, sensitivity, major fraction description, subordinate fraction description, minor fraction description, additional structures, additional information, etc

DEFECT DESCRIPTION
(Joints, Bedding Seams, Shatter, Shear and Crush Zones, Foliation, Schistosity, Attitude, Spacing, continuity, roughness, infilling, etc.)

For explanation of symbols and observations, see key sheet

FLUID DEPTHS AND DRILLING PROGRESS (m)
Date Time Drilled Depth Casing Depth Fluid Depth

Hand Held Shear Vane
DR1980: 19mm blade: Calibrated Jun 2022: Correction Factor: 1.876
vane shear strength per NZGS guideline

RELATIVE STRENGTH
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Date logged 29/09/2022
Logged FK
Checked GP

Remarks
50 mm standpipe piezometer installed on completion.

Horizontal / Vertical Survey Datums: NZGD2000 - Mount Eden 2000 / New Zealand Vertical Datum 2016

Driller McMillan
Started 27/09/2022
Finished 29/09/2022
Drill Rig N119
Core Boxes 9

Box: 1 of 9 - Depth: P\DH309_P 00.00m to 04.50m of 30.00m

Date Drilled 27/09/2022 to 29/09/2022 - Date Photographed: 27/09/2022

Box: 2 of 9 - Depth: P\DH309_P 04.50m to 07.40 (Please retake)m of 30.00m

Date Drilled 27/09/2022 to 29/09/2022 - Date Photographed: 27/09/2022

Box: 3 of 9 - Depth: P\DH309_P 07.40m to 10.95m of 30.00m

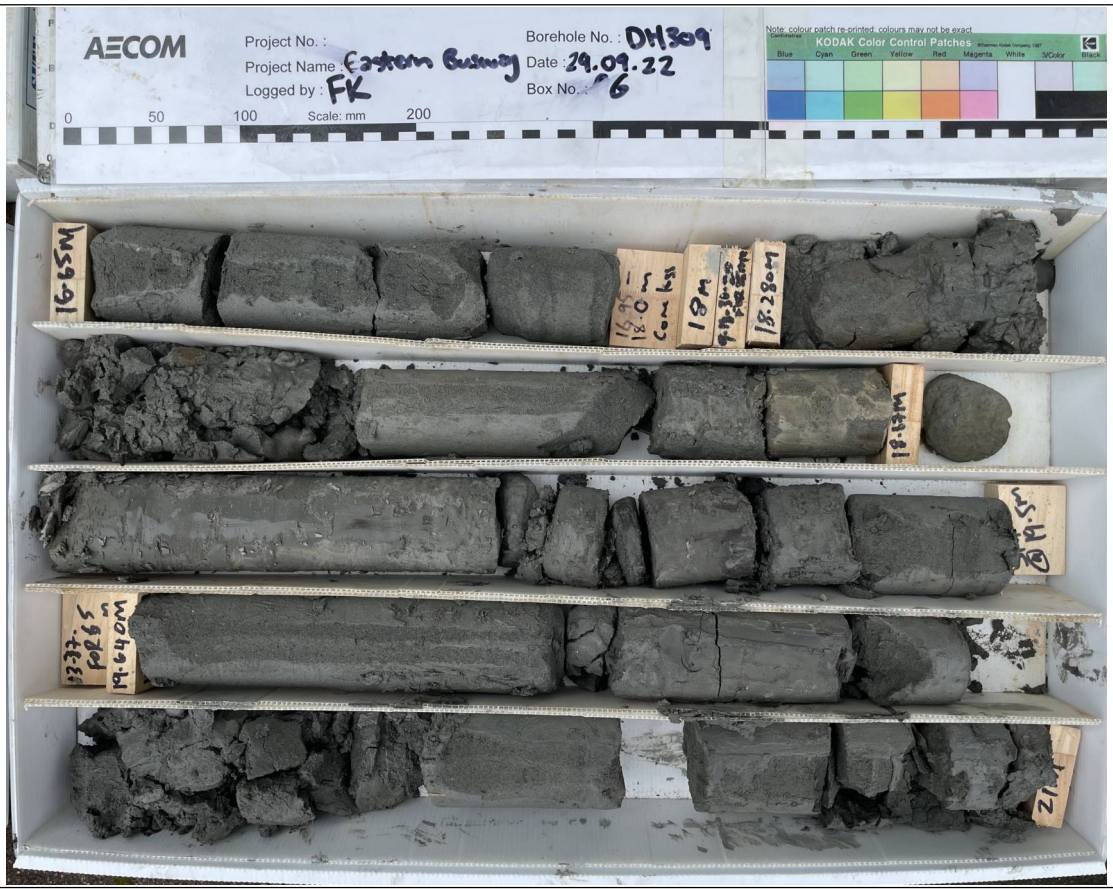
Date Drilled 27/09/2022 to 29/09/2022 - Date Photographed: 27/09/2022

Box: 4 of 9 - Depth: P\DH309_P 10.95m to 14.10m of 30.00m

Date Drilled 27/09/2022 to 29/09/2022 - Date Photographed: 27/09/2022

Box: 5 of 9 - Depth: P\DH309_P 14.10m to 16.65m of 30.00m

Date Drilled 27/09/2022 to 29/09/2022 - Date Photographed: 29/09/2022



Box: 6 of 9 - Depth: P\DH309_P 16.65m to 21.00m of 30.00m

Date Drilled 27/09/2022 to 29/09/2022 - Date Photographed: 29/09/2022