10. Appendix 2 Core Samples (Opus, Sept. 04)

BORE HOLE LOG

Bore Hole No: 1

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**4.5**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples: Number	Samples: Type	Samples: Recovery %	Failure Stress (kPa)
Lost core.	0.00		1		0	

BORE HOLE LOG

Bore Hole No: 2

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**9.0**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples: Number	Samples: Type	Samples: Recovery %	Failure Stress (kPa)
Brown/orange/white, coarse GRAVEL/BOULDERS, max size 900mm sub angular-sub rounded, moist, loose, non plastic.	0.00		1	Core	40	
Grey/brown, pumiceous coarse SAND/fine GRAVEL, saturated, loose, non plastic.	0.50	0.5				
Grey pumiceous fine SAND, saturated, dense, non plastic.	1.00	1				
		1.5				
Cream, fine-medium SAND some medium Gravels, dry, loose, non plastic.	1.60		2	Bag	10	
		2				
Grey brown, coarse Sandy fine to coarse GRAVEL, moist, loose, non plastic. Becoming dense.	7.30		2	Core	35	
	7.70					
Fine organic SILT layer.	8.00	8				
Grey pumiceous fine SAND and some fine pumice Gravels, saturated, dense, non plastic.	8.10					
Brown/black organic SILT, moist, slightly plastic, firm.	8.20					
Grey medium SAND some fine pumice Gravels, trace of Silt saturated, dense, non plastic.	8.40	8.5				
End of borehole.	9.00					
		9				
		9.5				
		10				

Driller :	Prodrill	OPUS		Date
Started :			Logged By : S Amoore	29/09/04
Finished :			Drawn By : S Amoore	29/09/04

BORE HOLE LOG

Bore Hole No: 1A

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**3.0**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples			Failure Stress (kPa)
			Number	Type	Recovery %	
Lost core	0.00		1		0	
Grey medium river run SAND, some orange subangular Gravel saturated, loose, non plastic.	1.50		2	Core	20	
Grey Silty fine SAND wet, dense, non plastic-slightly plastic.	2.00					
End of borehole.	3.00					

Driller :	Prodrill	OPUS		Date
Started :			Logged By : S Amoore	29/09/04
Finished :			Drawn By : S Amoore	29/09/04

BORE HOLE LOG

Bore Hole No: **2A**

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**4.5**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples: Number	Samples: Type	Samples: Recovery %	Failure Stress (kPa)
Lost core.	0.00		1		0	
			2		0	
Grey mottled SAND some fine pumice Gravels wet, loose, non plastic.	3.00		3	Core	30	
White fine -coarse subrounded pumice GRAVEL wet, loose, non plastic.	3.50					
Grey medium SAND and pumice GRAVELS saturated, loose, non plastic.	3.70					
Grey fine SAND, trace of Silt saturated, dense, non plastic.	4.00					
End of borehole.	4.50					

Driller :	Prodrill			Date
Started :		OPUS	Logged By : S Amoore	29/09/04
Finished :			Drawn By : S Amoore	29/09/04

Bore 1 Lost core.

Bore 2

Bore 1A

Bore 2A

BORE HOLE LOG — Bore Hole No: 3

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**4.5**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples: Number	Samples: Type	Samples: Recovery %	Failure Stress (kPa)
Brown SILT, some Organic material, some fine Sand bands @0.1m and medium sand band @0.25, moist, firm, slightly plastic.	0.00		1	core	100	
Grey green mottled Clayey SILT, trace of Sand moist, firm, slightly plastic-moderately plastic.	0.40	0.5				
As above but Sandy SILT, slightly plastic	0.85					
Brown Silty SAND moist-wet, loose to dense, non plastic-slightly plastic. Changing to dark brown some medium Sand beds 10mm thick.	0.95 / 1.10	1				
Grey green mottled medium Sandy SILT moist, firm, slightly plastic.	1.40	1.5	2	core	100	
Dark brown SILT, moist, firm, slightly plastic.	1.65					
Brown medium to coarse SAND, trace of Silt, wet, dense, non plastic.	2.10	2				
Greenish brown SILT, some clay, moist-wet, firm, slightly plastic-moderately plastic.	2.20	2.5				
Greenish grey-brown interbedded Silty SAND and SILT moist-wet, dense and firm, non plastic-slightly plastic	2.70	3	3	core	100	
Greyish green SILT, trace of Clay, moist, firm, slightly plastic-moderately plastic.	3.60	3.5				
Turning brown	4.10	4				
Fine white SAND with some brown mottles saturated, moderately dense, non plastic	4.20					
Grading to brown Greenish grey mottled SILT, trace of clay, moist, firm, slightly plastic	4.30					
End of borehole.	4.50	4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5				

				Date
Driller :	Prodrill	OPUS	Logged By : S Amoore	29/09/04
Started :			Drawn By : S Amoore	29/09/04
Finished :				

BORE HOLE LOG

Bore Hole No: 3A

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**4.5**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples			Failure Stress (kPa)
			Number	Type	Recovery %	
Grey/white river run medium SAND uniformaly graded, sub angular saturated, loose, non plastic	0.50		1	Bag	10	
Grey white fine to medium pumiceous SAND saturated, loose, non plastic.	3.00		2	Bag	20	
End of borehole.	4.50					

Driller : Prodrill				Date
Started :	OPUS	Logged By :	S Amoore	29/09/04
Finished :		Drawn By :	S Amoore	29/09/04

BORE HOLE LOG

Bore Hole No: 4

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**4.5**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

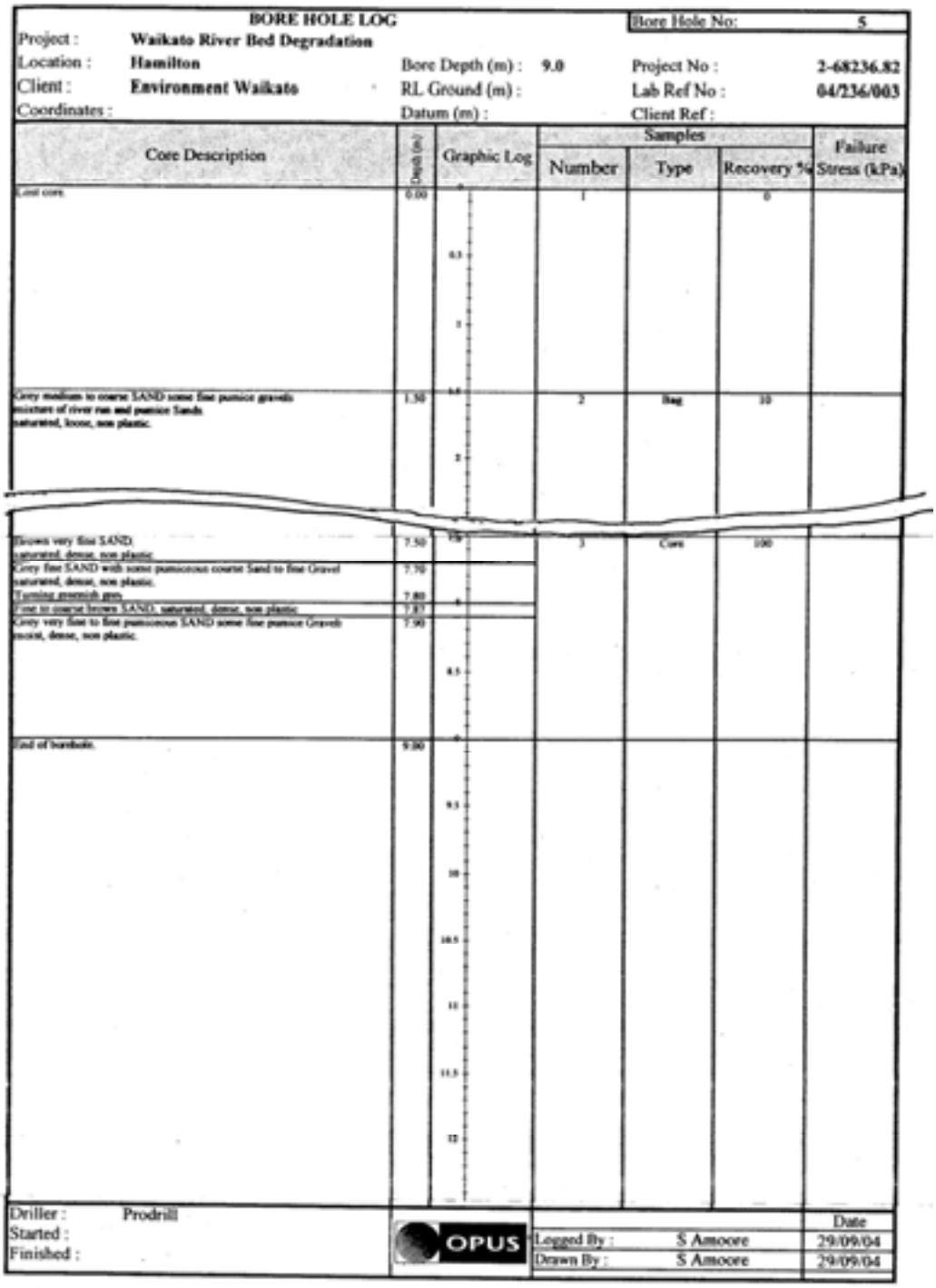
Core Description	Depth (m)	Graphic Log	Samples			Failure Stress (kPa)
			Number	Type	Recovery %	
Lost core.	0.00		1		0	
			2		0	
Grey medium to coarse river run SAND, trace of sub rounded to rounded coarse Gravels and minor Silt saturated, loose, non plastic.	3.00		3	Core	27	
End of Borehole.	4.50					

					Date
Driller :	Prodrill	OPUS	Logged By :	S Amoore	29/09/04
Started :			Drawn By :	S Amoore	29/09/04
Finished :					

Bore 3

Bore 3A

Bore 4



BORE HOLE LOG

Bore Hole No: 5

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**9.0**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples: Number	Samples: Type	Samples: Recovery %	Failure Stress (kPa)
Lost core.	0.00		1		0	
Grey medium to coarse SAND some fine pumice gravels mixture of river run and pumice Sands saturated, loose, non plastic.	1.50		2	Bag	10	
Brown very fine SAND. saturated, dense, non plastic	7.50		3	Core	100	
Grey fine SAND with some pumiceous coarse Sand to fine Gravel saturated, dense, non plastic.	7.70					
Turning greenish grey.	7.80					
Fine to coarse brown SAND, saturated, dense, non plastic	7.85					
Grey very fine to fine pumiceous SAND some fine pumice Gravels moist, dense, non plastic.	7.90					
End of borehole.	9.00					

Driller :	Prodrill	OPUS		Date
Started :			Logged By : S Amoore	29/09/04
Finished :			Drawn By : S Amoore	29/09/04

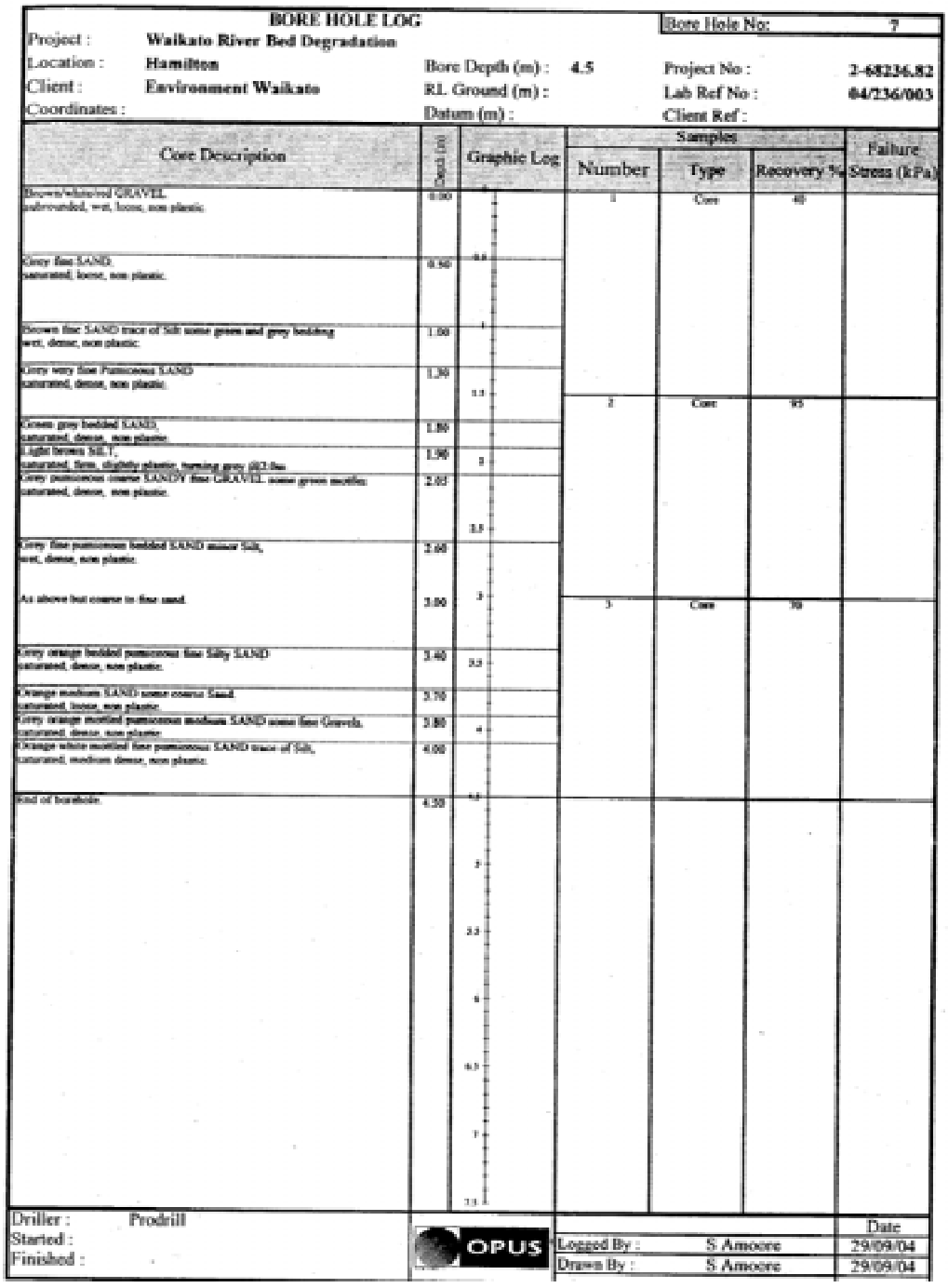
BORE HOLE LOG

Bore Hole No: 6

Project :	**Waikato River Bed Degradation**				
Location :	**Hamilton**	Bore Depth (m) :	**4.5**	Project No :	**2-68236.82**
Client :	**Environment Waikato**	RL Ground (m) :		Lab Ref No :	**04/236/003**
Coordinates :		Datum (m) :		Client Ref :	

Core Description	Depth (m)	Graphic Log	Samples			Failure Stress (kPa)
			Number	Type	Recovery %	
White grey coarse Sandy fine GRAVEL wet, loose, non plastic.	0.00		1	Bag	10	
End of borehole.	4.50					

Driller :	Prodrill			Date
Started :		OPUS	Logged By : S Amoore	29/09/04
Finished :			Drawn By : S Amoore	29/09/04



BORE HOLE LOG

Bore Hole No: 7

Project : Waikato River Bed Degradation

Location : Hamilton — Bore Depth (m) : 4.5 — Project No : 2-68236.82

Client : Environment Waikato — RL Ground (m) : — Lab Ref No : 04/236/003

Coordinates : — Datum (m) : — Client Ref :

Core Description	Depth (m)	Graphic Log	Samples: Number	Samples: Type	Samples: Recovery %	Failure Stress (kPa)
Brown/white/red GRAVEL unbounded, wet, loose, non plastic.	0.00		1	Core	40	
Grey fine SAND. saturated, loose, non plastic.	0.60					
Brown fine SAND trace of Silt some green and grey bedding wet, dense, non plastic.	1.00					
Grey very fine Pumiceous SAND saturated, dense, non plastic.	1.30		2	Core	95	
Green grey bedded SAND, saturated, dense, non plastic.	1.80					
Light brown SILT, saturated, firm, slightly plastic, turning grey @2.0m	1.90					
Grey pumiceous coarse SANDY fine GRAVEL some green mottles saturated, dense, non plastic.	2.65					
Grey fine pumiceous bedded SAND minor Silt, wet, dense, non plastic. As above but coarse to fine sand.	2.60 3.00		3	Core	70	
Grey orange bedded pumiceous fine Silty SAND saturated, dense, non plastic.	3.40					
Orange mottled SAND some coarse Sand saturated, loose, non plastic.	3.70					
Grey orange mottled pumiceous medium SAND some fine Gravels, saturated, dense, non plastic.	3.80					
Orange white mottled fine pumiceous SAND trace of Silt, saturated, medium dense, non plastic.	4.00					
End of borehole.	4.50					

Driller : Prodrill

Started :

Finished :

OPUS

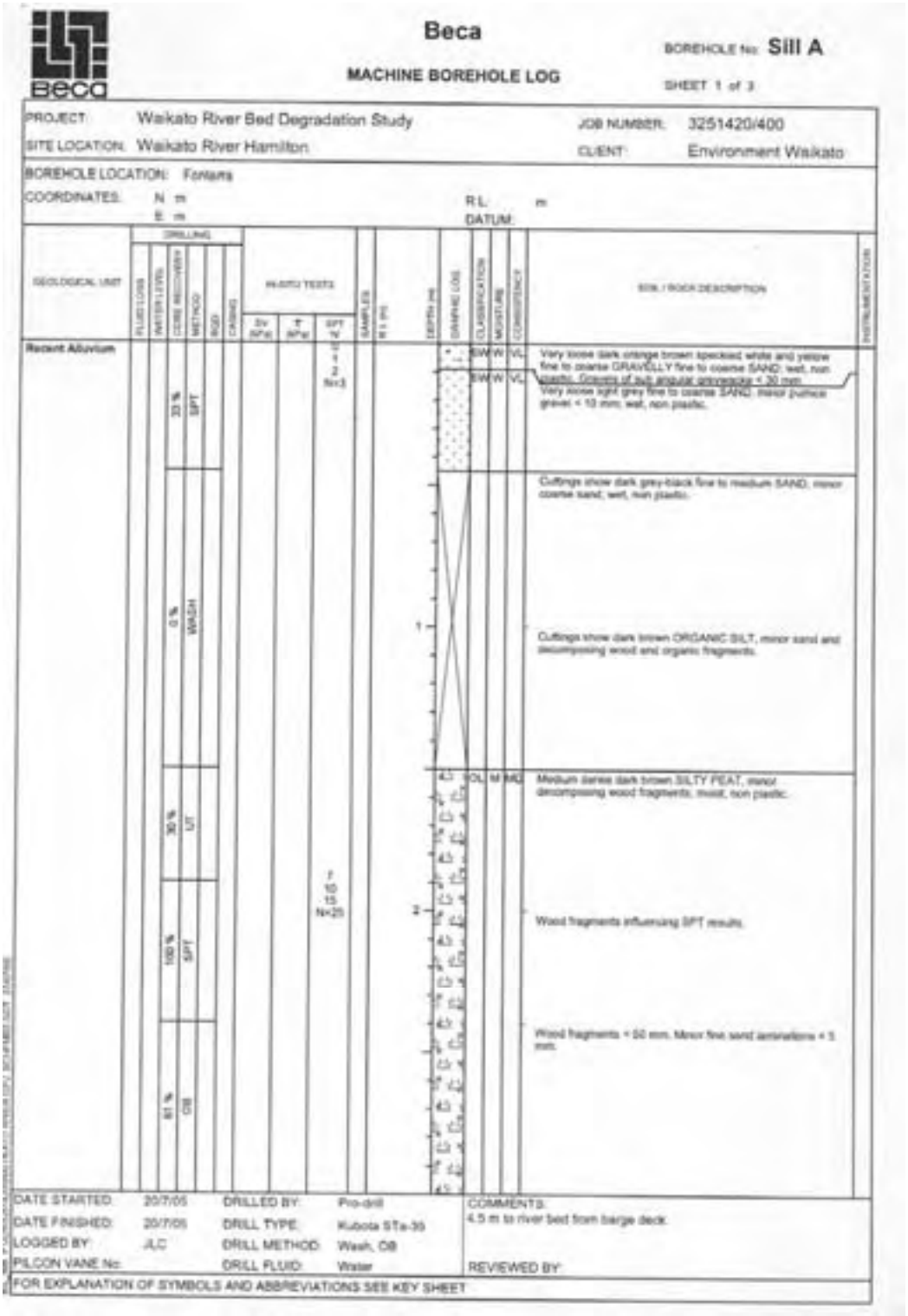
		Date
Logged By :	S Amoore	29/09/04
Drawn By :	S Amoore	29/09/04

Bore 5

Bore 6

Bore 7

11. Appendix 3 Core Samples (Beca, July 05)



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: SIII A

SHEET 1 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: Fonterra

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	WATER LEVEL	CORE RECOVERY	METHOD	RQD	CASING	IN-SITU TESTS: SV (kPa)	φ (kPa)	SPT 'N'	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	DISTINGUISHING
Recent Alluvium			33 %	SPT					4 4 5 N=13				SW	W	VL	Very loose dark orange brown speckled white and yellow fine to coarse GRAVELLY fine to coarse SAND; wet, non plastic. Gravels of sub angular pumiceous < 30 mm.	
													SW	W	VL	Very loose light grey fine to coarse SAND. Minor pumice gravel < 10 mm; wet, non plastic.	
			0 %	WASH							1					Cuttings show dark grey-black fine to medium SAND, minor coarse sand; wet, non plastic.	
																Cuttings show dark brown ORGANIC SILT, minor sand and decomposing wood and organic fragments.	
			30 %	UT									PT	SOL	M	MD	Medium dense dark brown SILTY PEAT, minor decomposing wood fragments; moist, non plastic.
			100 %	SPT					7 15 N=25		4					Wood fragments influencing SPT results.	
			81 %	CB												Wood fragments < 50 mm. Minor fine sand laminations < 5 mm.	

DATE STARTED: 20/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 20/7/05 — DRILL TYPE: Kubota STa-35

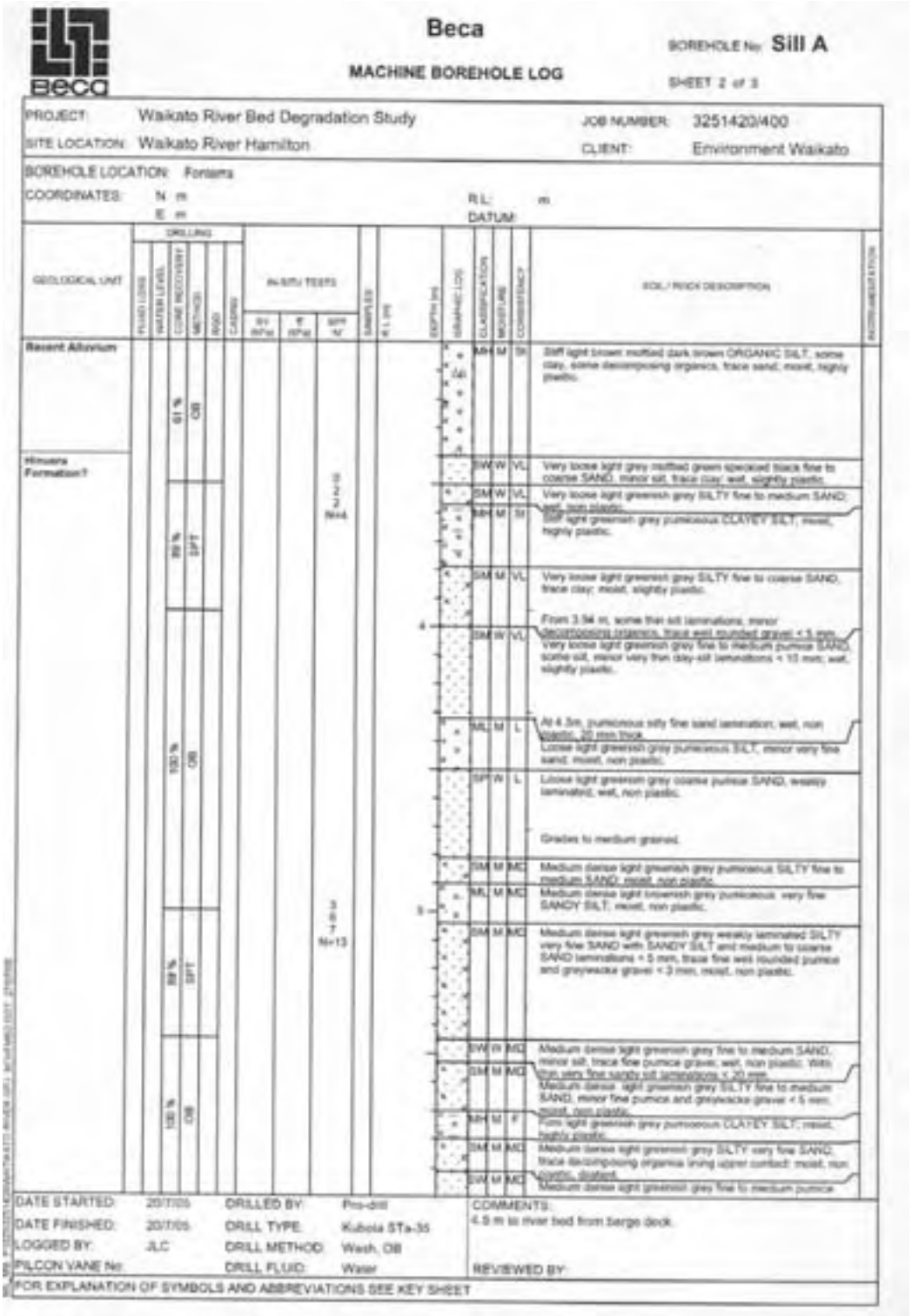
LOGGED BY: JLC — DRILL METHOD: Wash, CB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 4.5 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Sill A

SHEET 2 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: Fonterra

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RIG	DRILLING: CASING	IN-SITU TESTS: SPT N*	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	ADDITIONAL OBSERVATION
Recent Alluvium			61 %	OB								MH	M	St	Stiff light brown mottled dark brown ORGANIC SILT; some clay, some decomposing organics, trace sand; moist, highly plastic.	
Hinuera Formation?			89 %	SPT			N=10					SW	W	VL	Very loose light grey mottled green speckled black fine to coarse SAND; minor silt, trace clay; wet, slightly plastic.	
							N=4					SM	W	VL	Very loose light greenish grey SILTY fine to medium SAND; wet, non plastic.	
												MH	M	St	Stiff light greenish grey pumiceous CLAYEY SILT; moist, highly plastic.	
												SM	M	VL	Very loose light greenish grey SILTY fine to coarse SAND; trace clay; moist, slightly plastic.	
										4					From 3.94 m, some thin silt laminations, minor decomposing organics, trace well rounded gravel < 5 mm.	
			100 %	OB								SM	W	VL	Very loose light greenish grey fine to medium pumice SAND; some silt, minor very thin clay-silt laminations < 10 mm; wet, slightly plastic.	
												ML	M	L	At 4.3m, pumiceous silty fine sand lamination; wet, non plastic, 20 mm thick. Loose light greenish grey pumiceous SILT; minor very fine sand; moist, non plastic.	
												SP	W	L	Loose light greenish grey coarse pumice SAND, weakly laminated; wet, non plastic. Grades to medium grained.	
												SM	M	MD	Medium dense light greenish grey pumiceous SILTY fine to medium SAND; moist, non plastic.	
												ML	M	MD	Medium dense light brownish grey pumiceous very fine SANDY SILT; moist, non plastic.	
										8		SM	M	MD	Medium dense light greenish grey weakly laminated SILTY very fine SAND with SANDY SILT and medium to coarse SAND laminations < 5 mm, trace fine well rounded pumice and greywacke gravel < 3 mm; moist, non plastic.	
			89 %	SPT			N=13					SW	W	MD	Medium dense light greenish grey fine to medium SAND; minor silt, trace fine pumice gravel; wet, non plastic. With thin very fine sandy silt laminations < 20 mm.	
												SM	M	MD	Medium dense light greenish grey SILTY fine to medium SAND; minor fine pumice and greywacke gravel < 5 mm; moist, non plastic.	
			100 %	OB								MH	M	F	Firm light greenish grey pumiceous CLAYEY SILT; moist, highly plastic.	
												SM	M	MD	Medium dense light greenish grey SILTY very fine SAND; trace decomposing organics lining upper contact; moist, non plastic, dotted.	
												SW	M	MD	Medium dense light greenish grey fine to medium pumice	

DATE STARTED: 20/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 20/7/05 — DRILL TYPE: Kubota STa-35

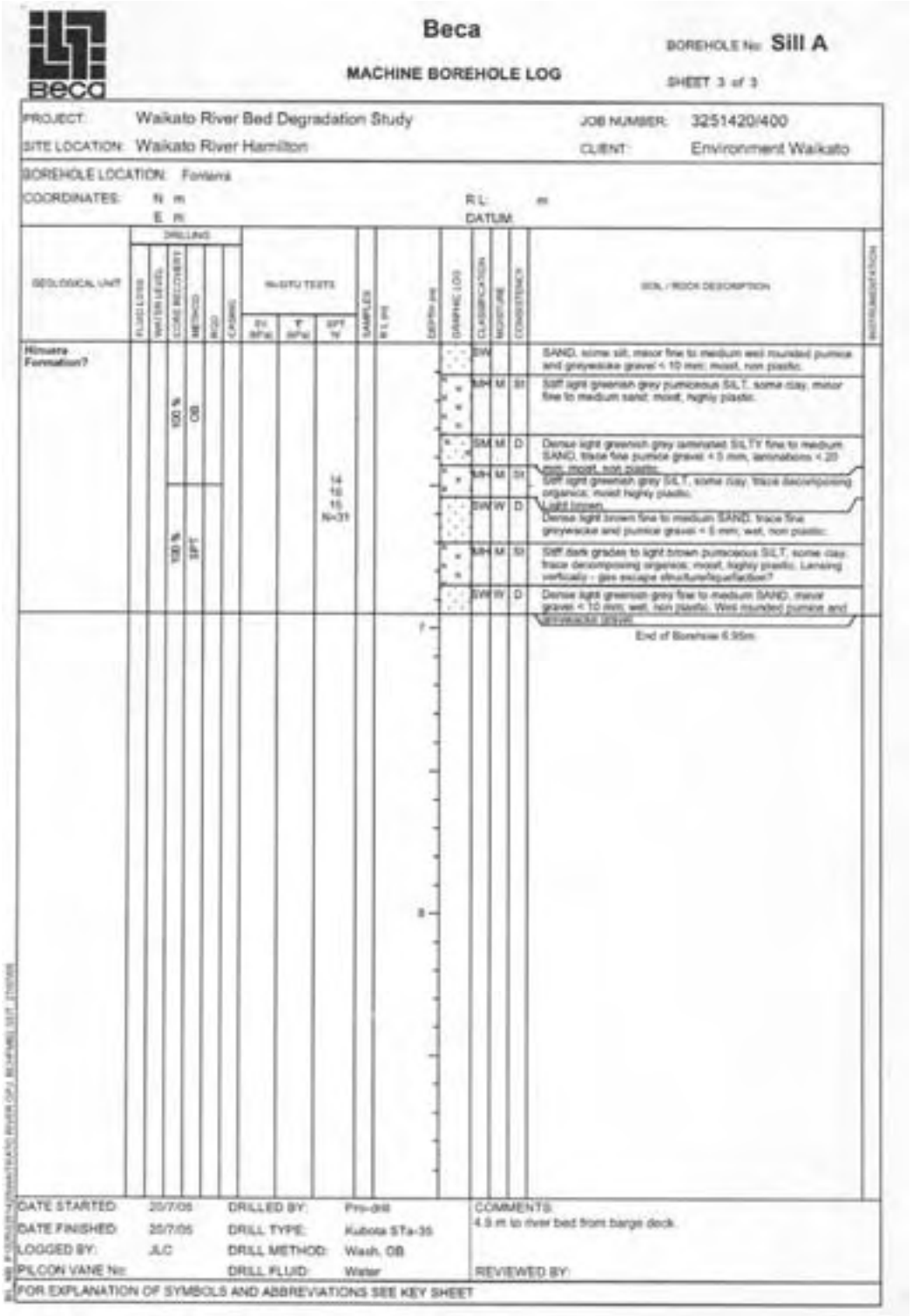
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 4.9 m to river bed from barge dock.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Sill A

SHEET 3 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: Fonterra

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RQD	DRILLING: CASING	IN-SITU TESTS: SPT N	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	WEATHERING/ALTERATION
Hinuera Formation?			100 %	OB								SW			SAND, some silt, minor fine to medium well rounded pumice and greywacke gravel < 10 mm; moist, non plastic.	
												MH	M	St	Soft light greenish grey pumiceous SILT, some clay, minor fine to medium sand; moist, highly plastic.	
												SM	M	D	Dense light greenish grey laminated SILTY fine to medium SAND, trace fine pumice gravel < 5 mm, laminations < 20 mm; moist, non plastic.	
							14					MH	M	St	Stiff light greenish grey SILT, some clay, trace decomposing organics; moist highly plastic. Light brown.	
			100 %	SPT			16 15 N=31					SW	W	D	Dense light brown fine to medium SAND, trace fine greywacke and pumice gravel < 5 mm; wet, non plastic.	
												MH	M	St	Stiff dark grades to light brown pumiceous SILT, some clay, trace decomposing organics; moist, highly plastic. Laminating vertically - gas escape structure/liquefaction?	
												SW	W	D	Dense light greenish grey fine to medium SAND, minor gravel < 10 mm; wet, non plastic. Well rounded pumice and greywacke gravel.	
															End of Borehole 6.95m	

DATE STARTED: 20/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 20/7/05 — DRILL TYPE: Kubota STa-35

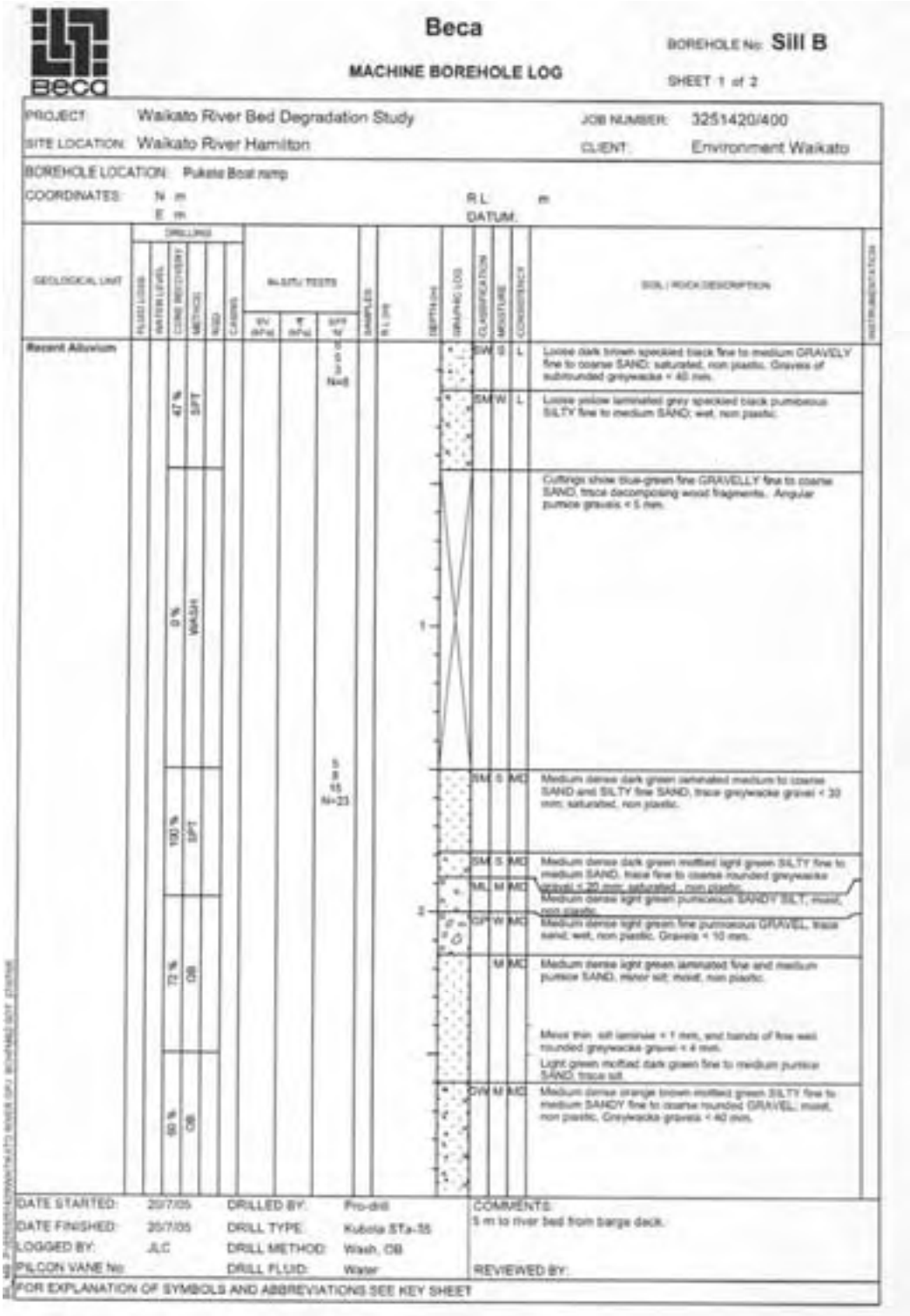
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 4.9 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: SIII B

SHEET 1 of 2

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: Pukete Boat ramp

COORDINATES: N m, E m — R.L. m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RISE	DRILLING: CASING	IN-SITU TESTS: Vs (m/s)	IN-SITU TESTS: ϕ (m/s)	IN-SITU TESTS: SPT N	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	HISTOGRAM/DESCRIPTION
Recent Alluvium			47 %	SPT					5 in 6 N=8					SW	S	L	Loose dark brown speckled black fine to medium GRAVELLY fine to coarse SAND; saturated, non plastic. Gravels of subrounded greywacke < 40 mm.	
														SM	W	L	Loose yellow laminated grey speckled black pumiceous SILTY fine to medium SAND; wet, non plastic.	
			0 %	WASH								1					Cuttings show blue-green fine GRAVELLY fine to coarse SAND, trace decomposing wood fragments. Angular pumice gravels < 5 mm.	
			100 %	SPT					5 in 15 N=23					SM	S	MD	Medium dense dark green laminated medium to coarse SAND and SILTY fine SAND, trace greywacke gravel < 30 mm; saturated, non plastic.	
														SM	S	MD	Medium dense dark green mottled light green SILTY fine to medium SAND, trace fine to coarse rounded greywacke gravel < 20 mm; saturated , non plastic.	
														ML	M	MD	Medium dense light green pumiceous SANDY SILT; moist, non plastic.	
			72 %	OB								2		GP	W	MD	Medium dense light green fine pumiceous GRAVEL, trace sand; wet, non plastic. Gravels < 10 mm.	
															M	MD	Medium dense light green laminated fine and medium pumice SAND, minor silt; moist, non plastic.	
																	Minor thin silt laminae < 1 mm, and bands of fine well rounded greywacke gravel < 4 mm.	
																	Light green mottled dark green fine to medium pumice SAND, trace silt.	
			60 %	OB										GW	M	MD	Medium dense orange brown mottled green SILTY fine to medium SANDY fine to coarse rounded GRAVEL; moist, non plastic. Greywacke gravels < 40 mm.	

DATE STARTED: 20/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 20/7/05 — DRILL TYPE: Kubota STa-55

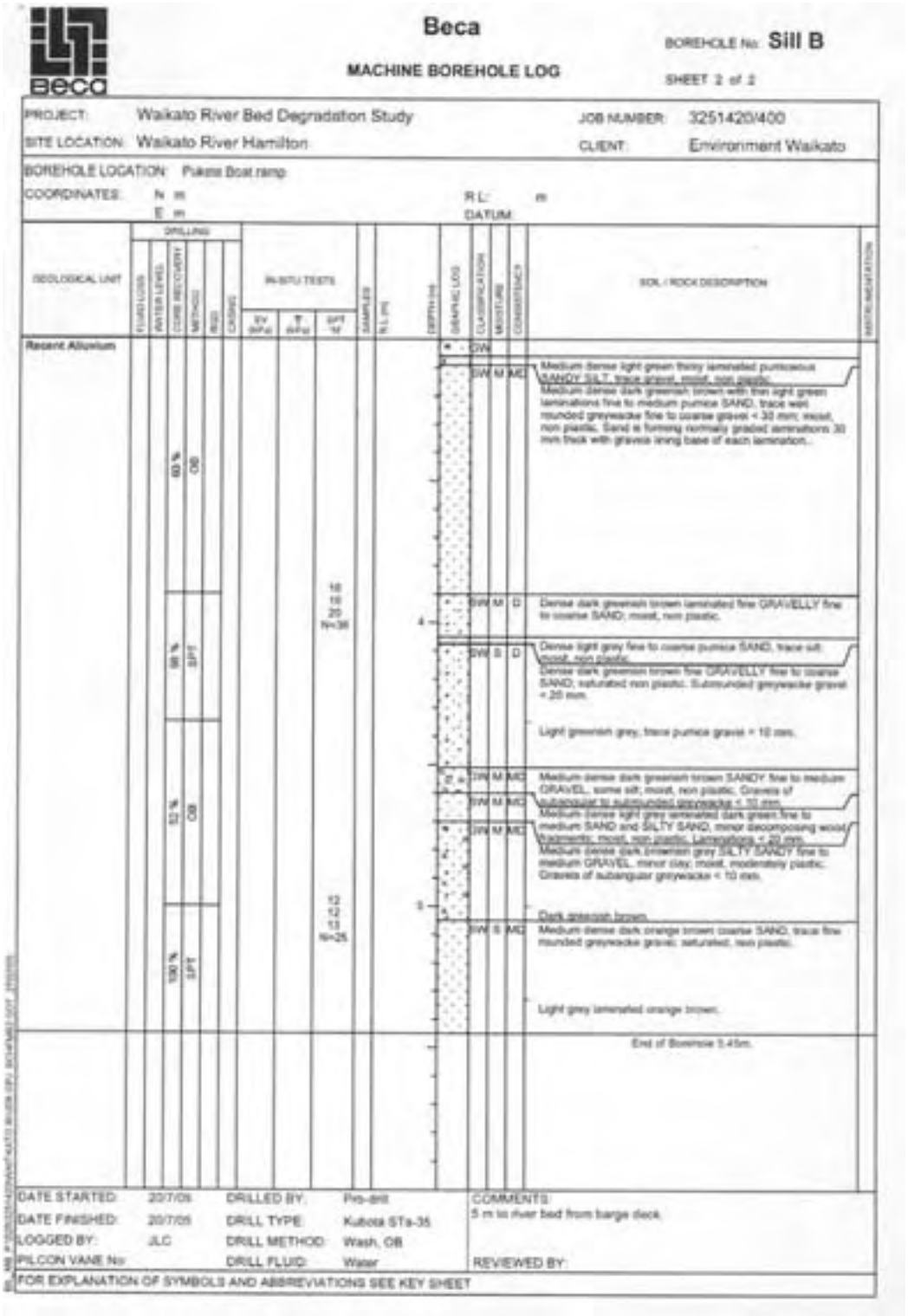
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PENETROMETER / SCPT / SCPTU / FIELD VANE No: — DRILL FLUID: Water

COMMENTS: 5 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Sill B

SHEET 2 of 2

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: Pukete Boat ramp

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	WATER LEVEL	CORE RECOVERY	METHOD	RQD	CASING	IN-SITU TESTS: SV (kPa)	T (kPa)	SPT 'N'	SAMPLES: NO.	NO. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	WEATHERING
Recent Alluvium			63 %	OB								0		GW				
														SW	M	MD	Medium dense light green thinly laminated pumiceous SANDY SILT, trace gravel, moist, non plastic. Medium dense dark greenish brown with thin light green laminations fine to medium pumice SAND, trace well rounded greywacke fine to coarse gravel < 30 mm; moist, non plastic. Sand is forming normally graded sensations 30 mm thick with gravels lining base of each lamination..	
			98 %	SPT					16 16 20 N=36			4		SW	S	D	Dense dark greenish brown laminated fine GRAVELLY fine to coarse SAND; moist, non plastic.	
														SW	S	D	Dense light grey fine to coarse pumice SAND, trace silt; moist, non plastic. Dense dark greenish brown fine GRAVELLY fine to coarse SAND, saturated non plastic. Subrounded greywacke gravel < 25 mm. Light greenish grey, trace pumice gravel < 10 mm.	
			52 %	OB										SW	M	MD	Medium dense dark greenish brown SANDY fine to medium GRAVEL, some silt; moist, non plastic. Gravels of subangular to subrounded greywacke < 10 mm.	
														SW	M	MD	Medium dense light grey laminated dark green fine to medium SAND and SILTY SAND, minor decomposing wood fragments; moist, non plastic. Laminations < 20 mm.	
														SW	M	MD	Medium dense dark brownish grey SILTY SANDY fine to medium GRAVEL, minor clay; moist, moderately plastic. Gravels of subangular greywacke < 10 mm.	
			100 %	SPT					12 12 12 N=25			8					Dark greenish brown.	
														SW	S	MD	Medium dense dark orange brown coarse SAND, trace fine rounded greywacke gravel; saturated, non plastic.	
																	Light grey laminated orange brown.	
																	End of Borehole 9.45m.	

DATE STARTED: 20/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 20/7/05 — DRILL TYPE: Kubota STa-35

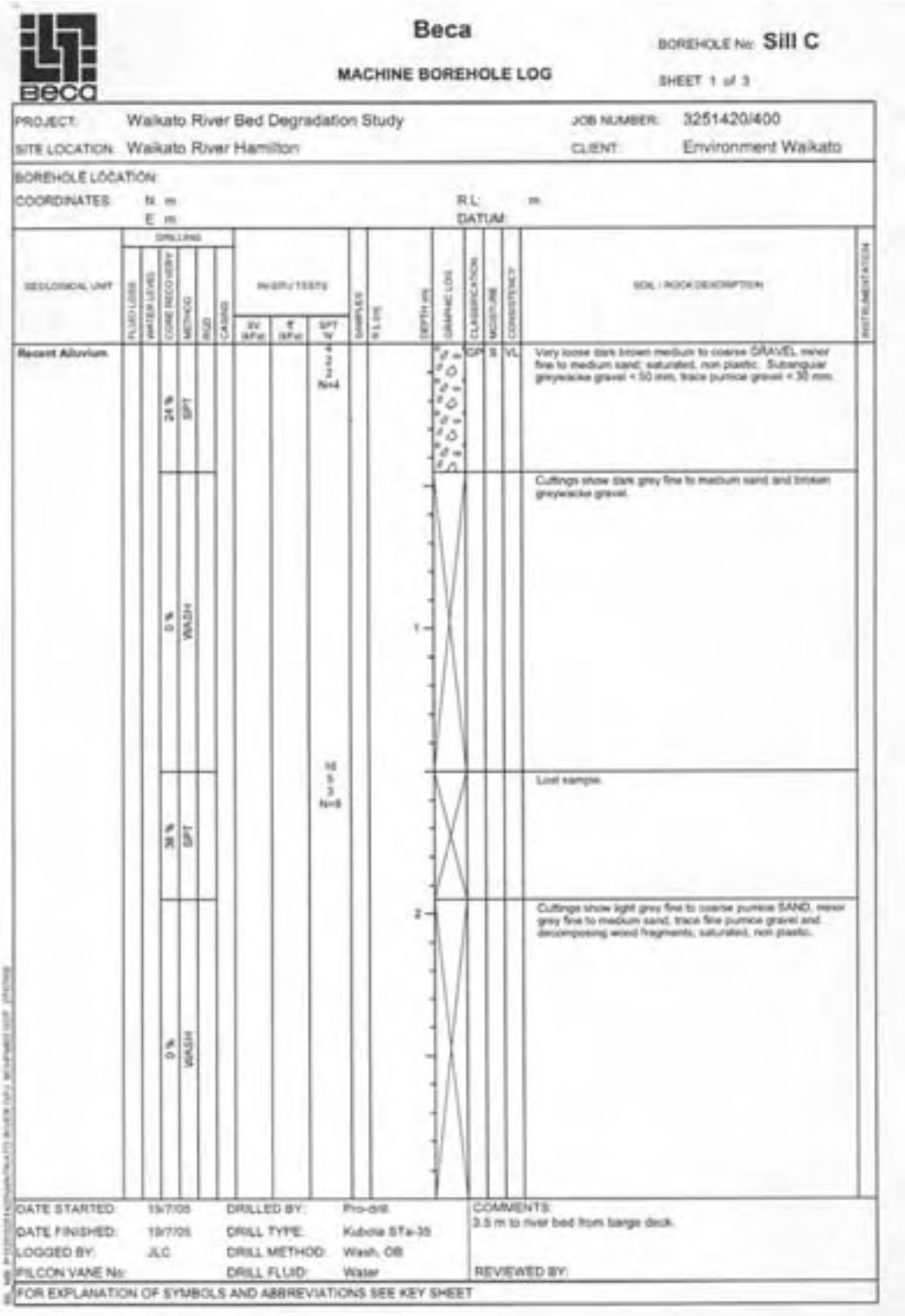
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 5 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: SIII C

SHEET 1 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION:

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RQD	DRILLING: CASING	IN-SITU TESTS: SV (kPa)	IN-SITU TESTS: φ (kPa)	IN-SITU TESTS: SPT 'N'	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	INSTRUMENTATION
Recent Alluvium			24 %	SPT					5+7+4 N=4					GP	S	VL	Very loose dark brown medium to coarse GRAVEL minor fine to medium sand; saturated, non plastic. Subangular greywacke gravel < 50 mm, trace pumice gravel < 30 mm.	
			0 %	WASH								1					Cuttings show dark grey fine to medium sand and broken greywacke gravel.	
			38 %	SPT					16 5 3 N=8								Lost sample.	
			0 %	WASH								2					Cuttings show light grey fine to coarse pumice SAND, minor grey fine to medium sand, trace fine pumice gravel and decomposing wood fragments, saturated, non plastic.	

DATE STARTED: 19/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 19/7/05 — DRILL TYPE: Kubota STa-35

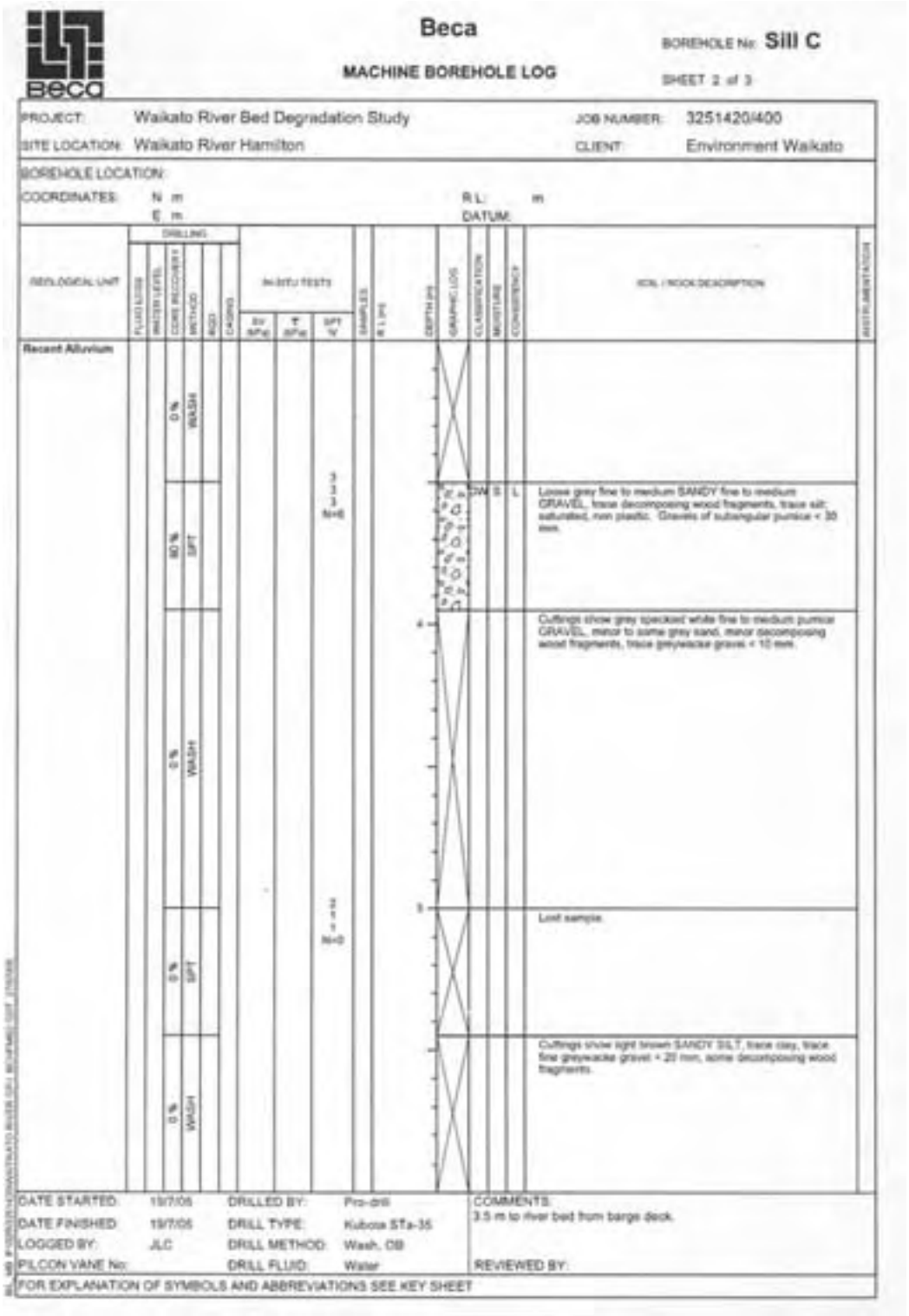
LOGGED BY: JLC — DRILL METHOD: Wash, OB

FILCON VANE No: — DRILL FLUID: Water

COMMENTS: 3.5 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: SIII C

SHEET 2 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION:

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	WATER LEVEL	CORE RECOVERY	METHOD	RQD	CASING	IN-SITU TESTS: SV (kPa)	T (kPa)	SPT 'N'	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	ADDITIONAL OBSERVATIONS
Recent Alluvium			0 %	WASH														
			80 %	SPT					1,2,3 N=6					SW	S	L	Loose grey fine to medium SANDY fine to medium GRAVEL, trace decomposing wood fragments, trace silt; saturated, non plastic. Gravels of subangular pumice < 30 mm.	
			0 %	WASH								4					Cuttings show grey speckled white fine to medium pumice GRAVEL, minor to some grey sand, minor decomposing wood fragments, trace greywacke gravel < 10 mm.	
			0 %	SPT					1,1,1 N=3			5					Lost sample.	
			0 %	WASH								6					Cuttings show light brown SANDY SILT, trace clay, trace fine greywacke gravel < 20 mm, some decomposing wood fragments.	

DATE STARTED: 19/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 19/7/05 — DRILL TYPE: Kubota STa-35

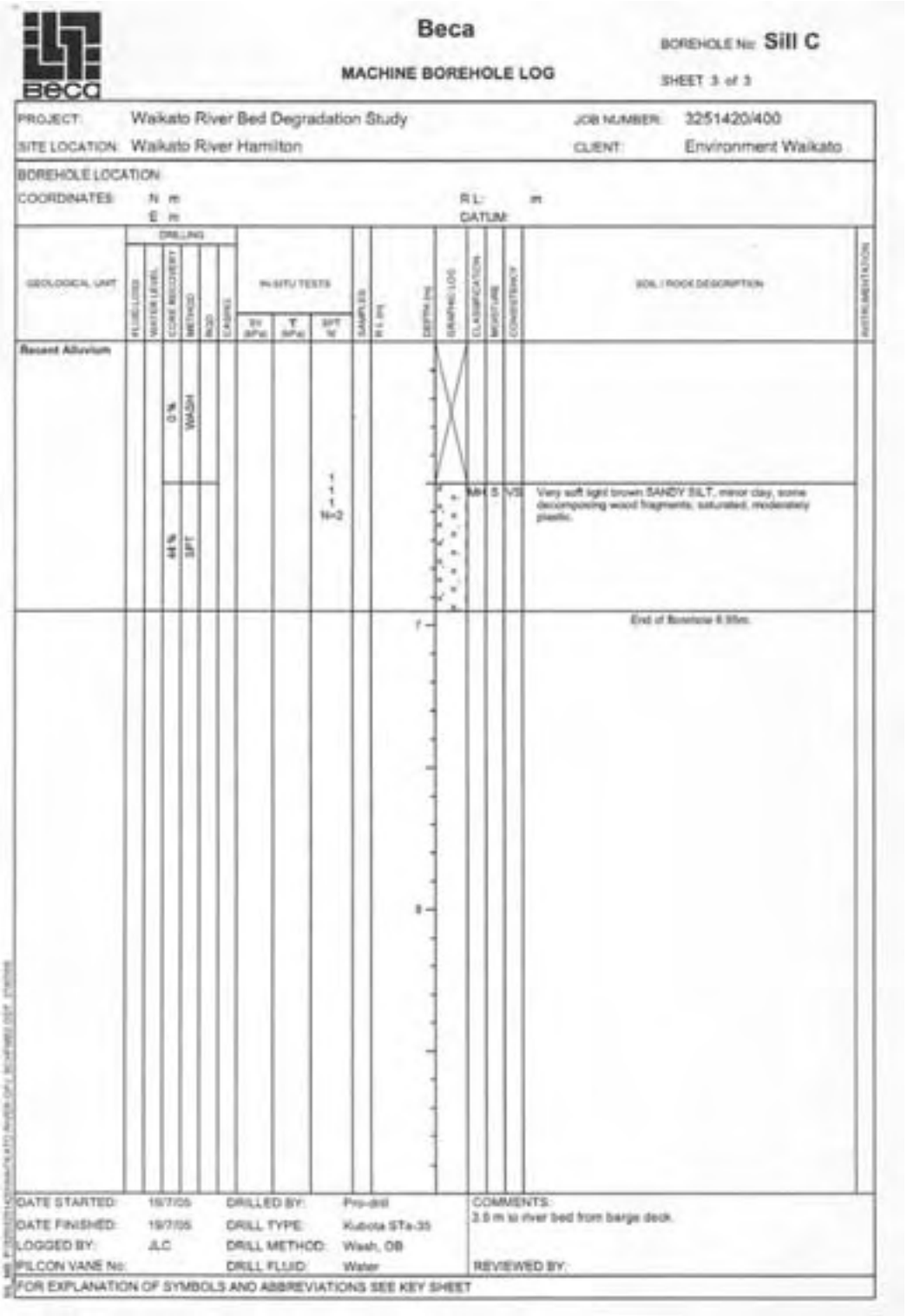
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 3.5 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Sill C

SHEET 3 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION:

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUSH LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: ROD	DRILLING: CASING	IN-SITU TESTS: Sv (kPa)	IN-SITU TESTS: T (kPa)	IN-SITU TESTS: SPT N	SAMPLES: R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	WEATHERING
Recent Alluvium			0 %	WASH													
			44 %	SPT					1 1 1 N=2				M-H	S	VS	Very soft light brown SANDY SILT, minor clay, some decomposing wood fragments, saturated, moderately plastic.	
											7					End of Borehole 6.95m	
											8						

DATE STARTED: 19/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 19/7/05 — DRILL TYPE: Kubota STa-35

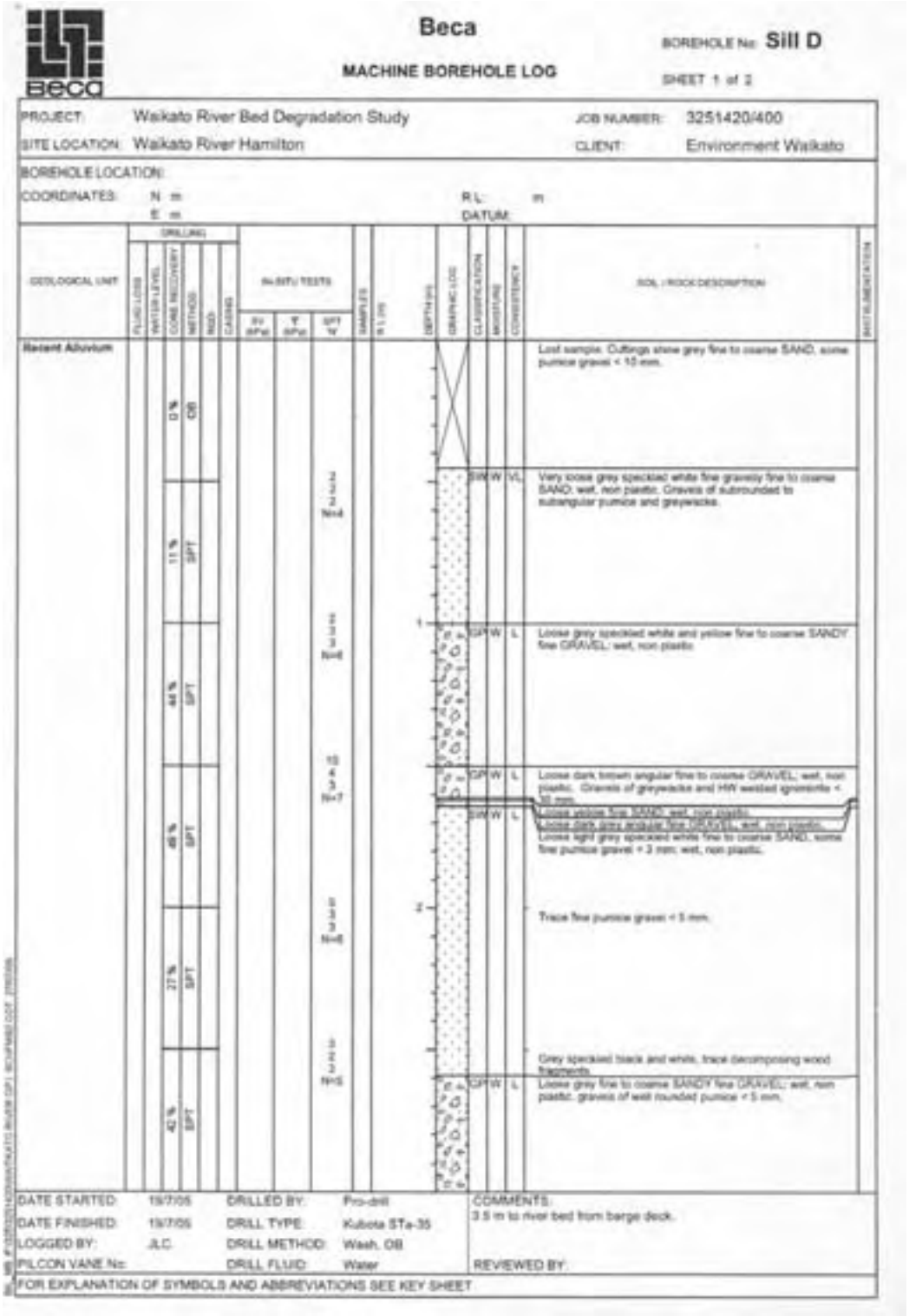
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 3.5 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: SIII D

SHEET 1 of 2

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION:

COORDINATES: N m; E m — R.L: m; DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	WATER LEVEL	CORE RECOVERY	METHOD	RQD	CASING	IN-SITU TESTS: SV (kPa)	V (kPa)	SPT N*	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	WEATHERING
Recent Alluvium			0 %	OB					N=4			0					Lost sample. Cuttings show grey fine to coarse SAND, some pumice gravel < 10 mm.	
			11 %	SPT										SW	W	VL	Very loose grey speckled white fine gravelly fine to coarse SAND, wet, non plastic. Gravels of subrounded to subangular pumice and greywacke.	
			44 %	SPT					N=6			1		SP	W	L	Loose grey speckled white and yellow fine to coarse SANDY fine GRAVEL; wet, non plastic	
			45 %	SPT					3 4 10 N=7					GP	W	L	Loose dark brown angular fine to coarse GRAVEL; wet, non plastic. Gravels of greywacke and HW vested ignimbrite < 10 mm.	
														SW	W	L	Loose yellow fine SAND; wet, non plastic.	
																	Loose dark grey angular fine GRAVEL; wet, non plastic.	
			27 %	SPT					3 4 4 N=8			2					Loose light grey speckled white fine to coarse SAND, some fine pumice gravel < 3 mm; wet, non plastic.	
																	Trace fine pumice gravel < 5 mm.	
			42 %	SPT					2 3 2 N=5			3					Grey speckled black and white, trace decomposing wood fragments.	
														GP	W	L	Loose grey fine to coarse SANDY fine GRAVEL; wet, non plastic, gravels of well rounded pumice < 5 mm.	

DATE STARTED: 19/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 19/7/05 — DRILL TYPE: Kubota STa-35

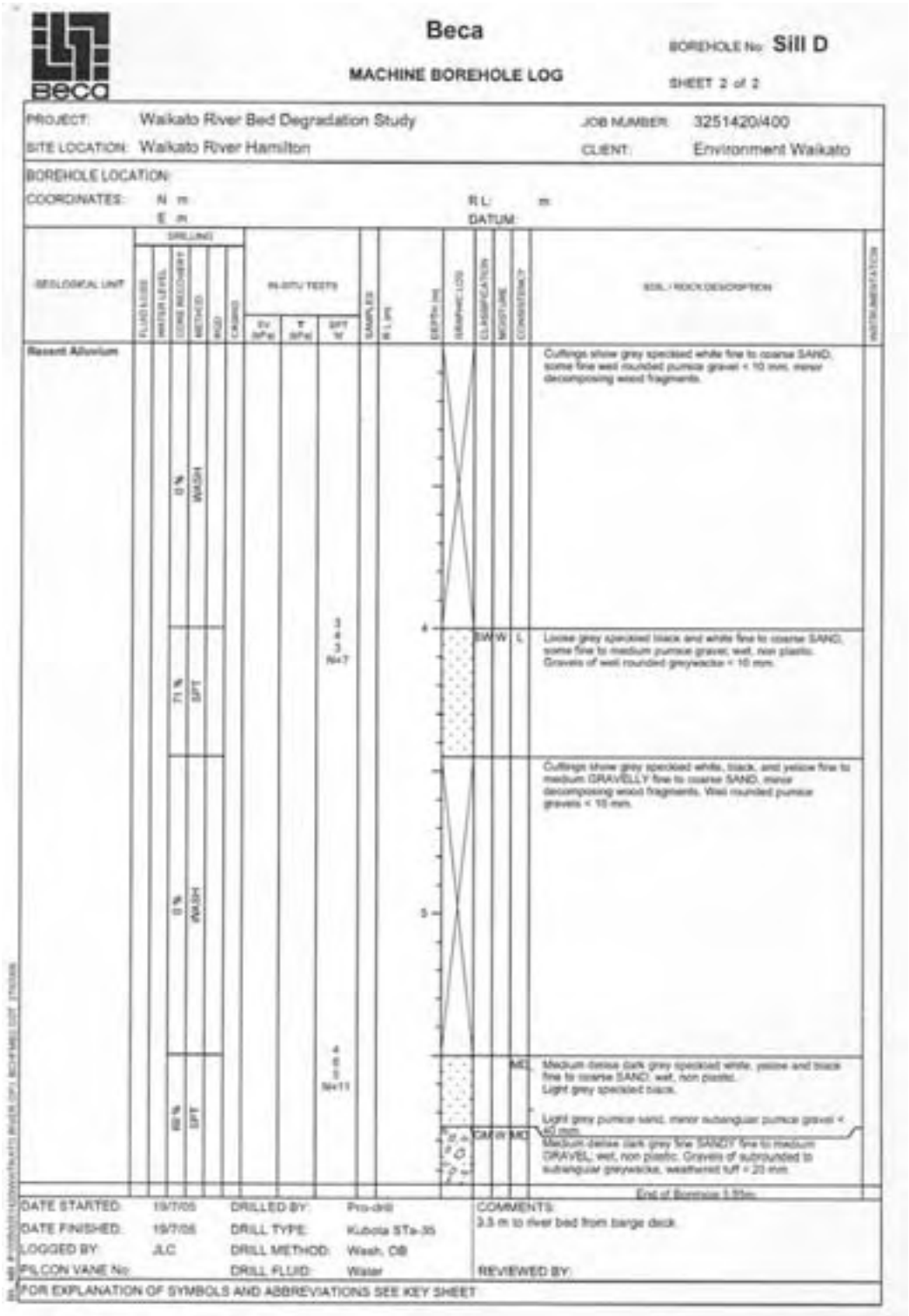
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 3.5 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: SIII D

SHEET 2 of 2

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION:

COORDINATES: N m E m — R.L: m DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RQD	DRILLING: CASING	IN-SITU TESTS: Sv (kPa)	IN-SITU TESTS: T (kPa)	IN-SITU TESTS: SPT 'N'	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	WATER OBSERVATION
Recent Alluvium			0 %	WASH													Cuttings show grey speckled white fine to coarse SAND, some fine well rounded pumice gravel < 10 mm, minor decomposing wood fragments.	
			71 %	SPT					3 4 3 N=7			4		SW	W	L	Loose grey speckled black and white fine to coarse SAND, some fine to medium pumice gravel, wet, non plastic. Gravels of well rounded greywacke < 10 mm.	
			0 %	WASH								5					Cuttings show grey speckled white, black, and yellow fine to medium GRAVELLY fine to coarse SAND, minor decomposing wood fragments. Well rounded pumice gravels < 10 mm.	
			85 %	SPT					4 6 5 N=11						M	MD	Medium dense dark grey speckled white, yellow and black fine to coarse SAND, wet, non plastic. Light grey speckled black.	
														SW	W	MD	Light grey pumice sand, minor subangular pumice gravel < 40 mm.	
														GW	W	MD	Medium dense dark grey fine SANDY fine to medium GRAVEL, wet, non plastic. Gravels of subrounded to subangular greywacke, weathered tuff < 20 mm.	
																	End of Borehole 5.55m	

DATE STARTED: 19/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 19/7/05 — DRILL TYPE: Kubota STa-35

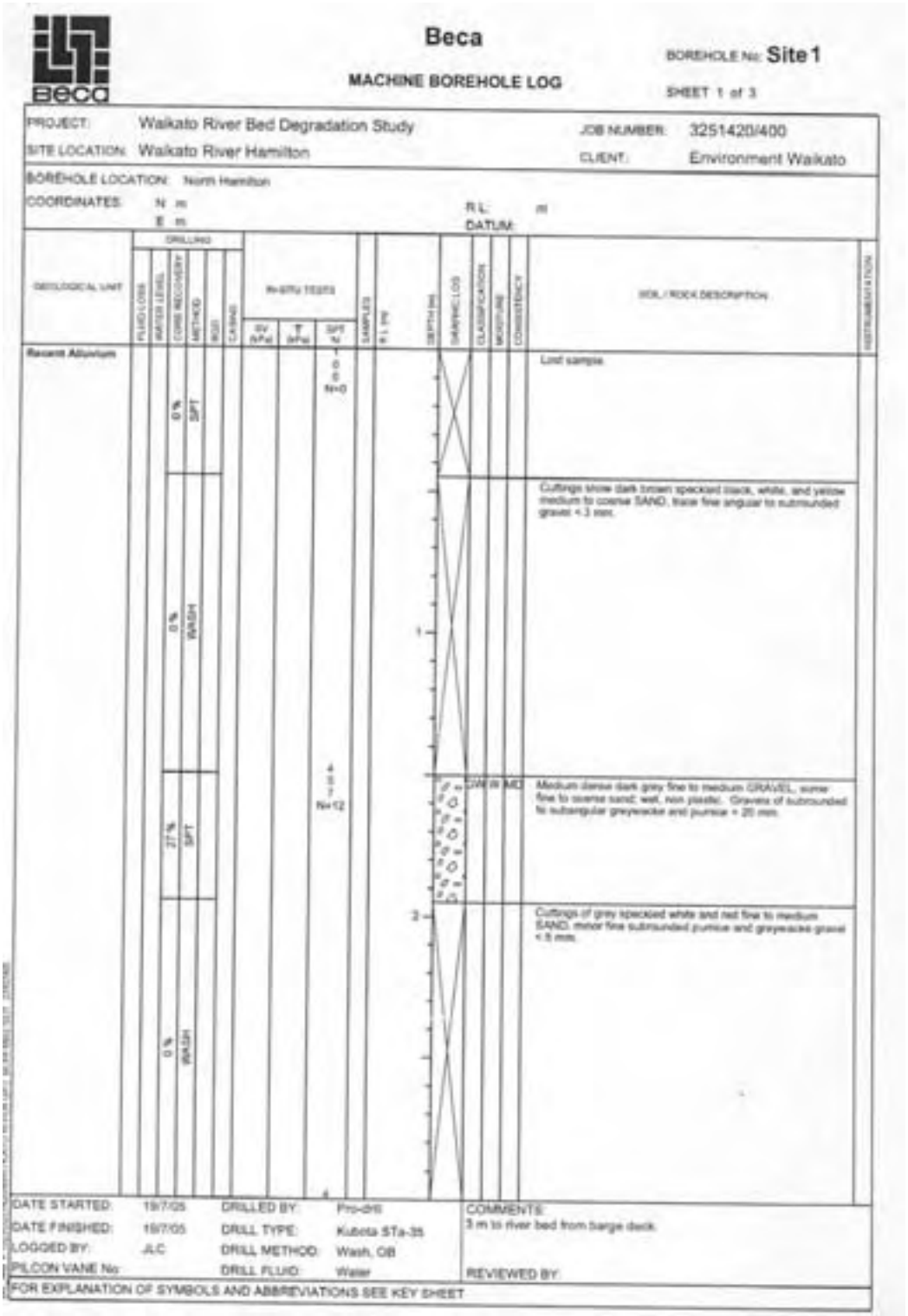
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PS,CON VANE No: — DRILL FLUID: Water

COMMENTS: 3.5 m to river bed from barge deck

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Site 1

SHEET 1 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: North Hamilton

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RQD	DRILLING: CASING	IN-SITU TESTS: SV (kPa)	IN-SITU TESTS: T (kPa)	IN-SITU TESTS: SPT 'N'	SAMPLES	PID (ppm)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	DISTURBANCE
Recent Alluvium			0 %	SPT					N=0			0					Lost sample.	
			0 %	WASH								1					Cuttings show dark brown speckled black, white, and yellow medium to coarse SAND, trace fine angular to subrounded gravel < 3 mm.	
			27 %	SPT					N=12			2		GW	W	MD	Medium dense dark grey fine to medium GRAVEL, some fine to coarse sand; wet, non plastic. Gravels of subrounded to subangular greywacke and pumice < 20 mm.	
			0 %	WASH													Cuttings of grey speckled white and red fine to medium SAND, minor fine subrounded pumice and greywacke gravel < 5 mm.	

DATE STARTED: 19/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 19/7/05 — DRILL TYPE: Kubota STa-35

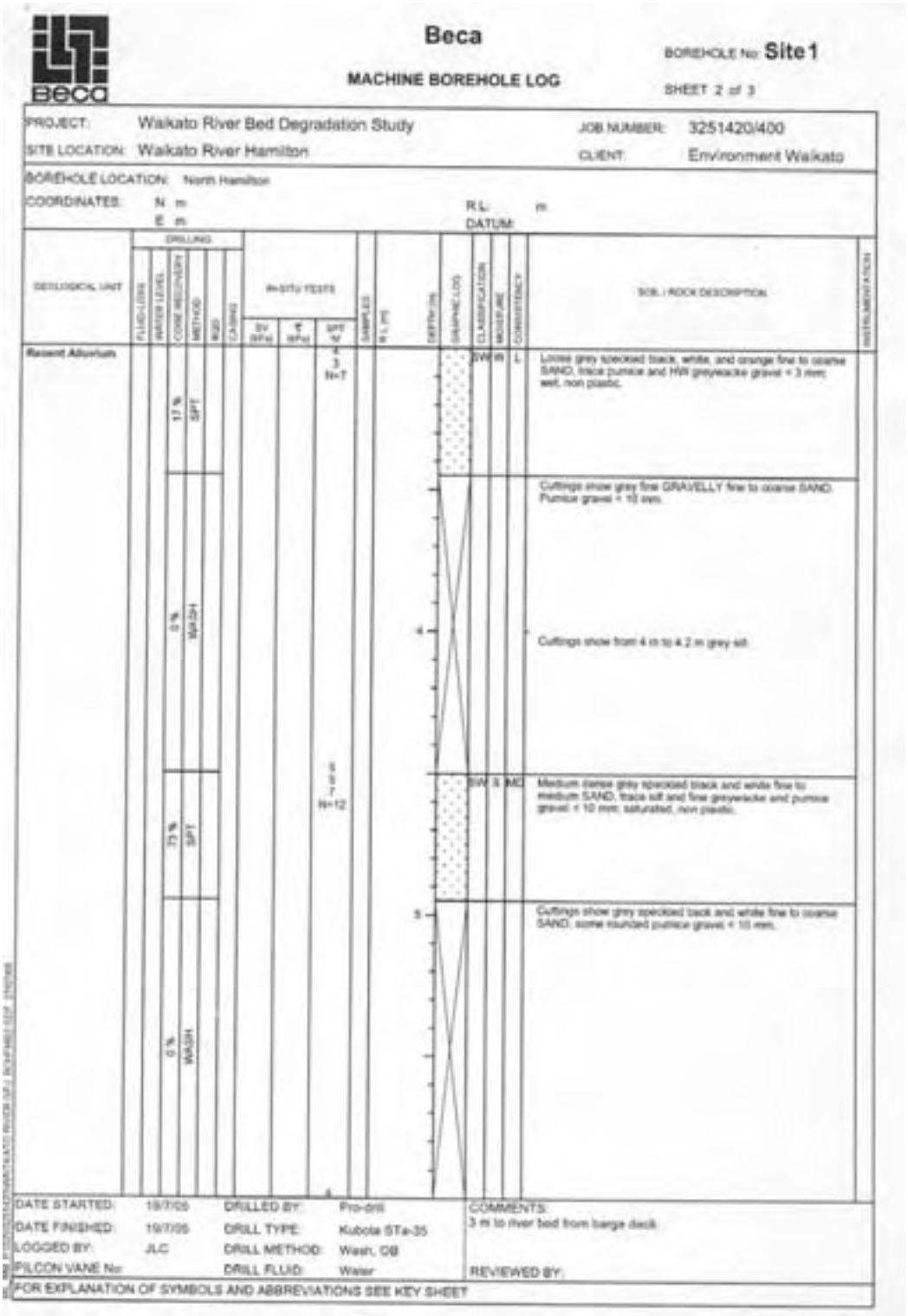
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 3 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Site 1

SHEET 2 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: North Hamilton

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RQD	DRILLING: CASING	IN-SITU TESTS: SV (kPa)	IN-SITU TESTS: φ (kPa)	IN-SITU TESTS: SPT 'N'	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	INSTRUMENTATION
Recent Alluvium			17 %	SPT					4 3 N=7					SW	m	L	Loose grey speckled black, white, and orange fine to coarse SAND, trace pumice and HW greywacke gravel < 3 mm; wet, non plastic.	
			0 %	WASH													Cuttings show grey fine GRAVELLY fine to coarse SAND. Pumice gravel < 10 mm.	
												4					Cuttings show from 4 m to 4.2 m grey silt.	
			75 %	SPT					6 7 N=12					SW	S	MD	Medium dense grey speckled black and white fine to medium SAND, trace silt and fine greywacke and pumice gravel < 10 mm; saturated, non plastic.	
			0 %	WASH								5					Cuttings show grey speckled back and white fine to coarse SAND, some rounded pumice gravel < 10 mm.	

DATE STARTED: 19/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 19/7/05 — DRILL TYPE: Kubota STa-35

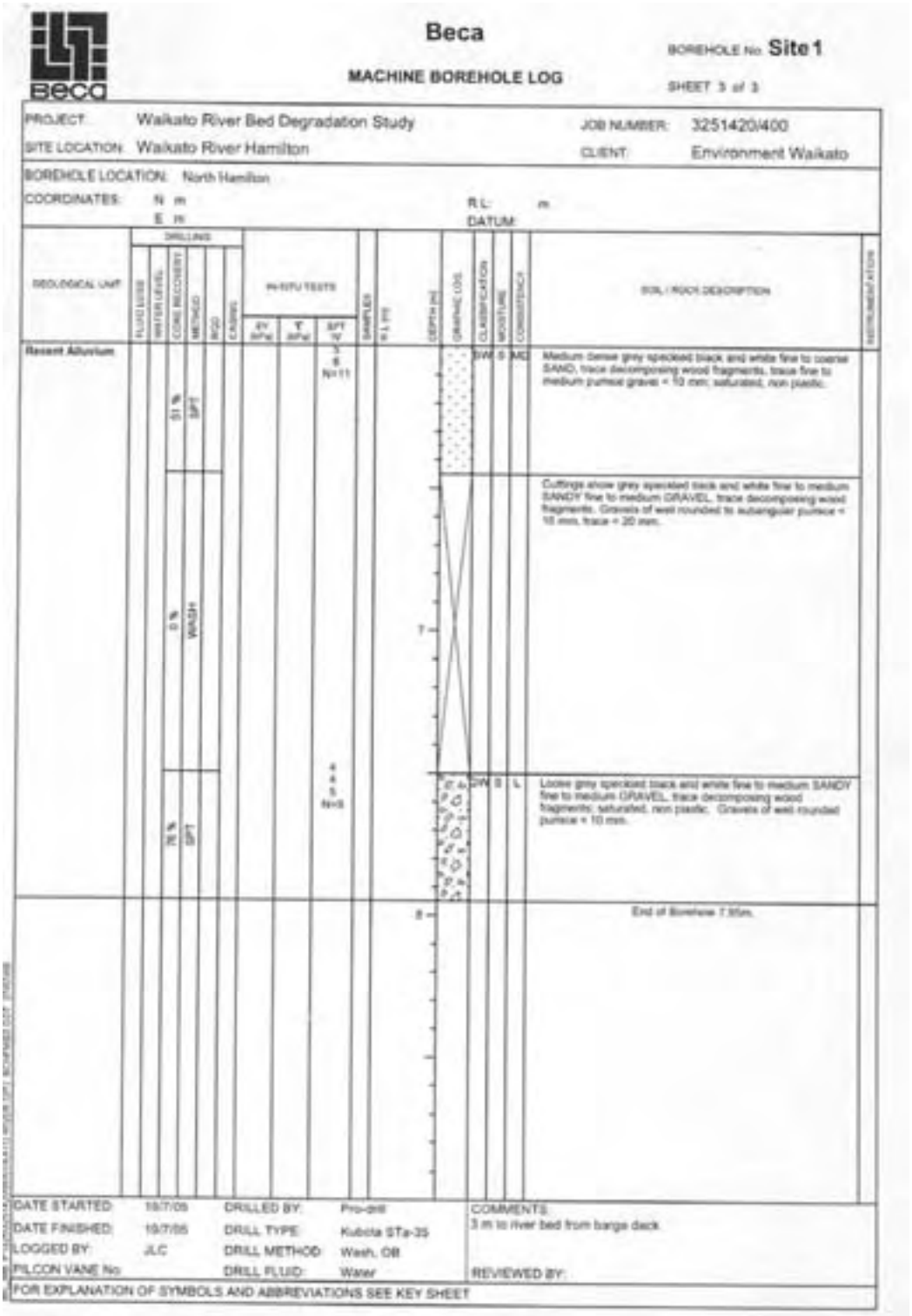
LOGGED BY: JLC — DRILL METHOD: Wash, OB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 3 m to river bed from barge deck

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No. Site 1

SHEET 3 of 3

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: North Hamilton

COORDINATES: N m, E m — R.L.: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RQD	DRILLING: CASING	IN-SITU TESTS: SY (kPa)	IN-SITU TESTS: T (kPa)	IN-SITU TESTS: SPT N	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	ESTIMATED STRENGTH
Recent Alluvium			51 % SPT						3 6 N=11					SW	S	MD	Medium dense grey speckled black and white fine to coarse SAND, trace decomposing wood fragments, trace fine to medium pumice gravel < 10 mm; saturated; non plastic.	
			0 % WASH									7					Cuttings show grey speckled black and white fine to medium SANDY fine to medium GRAVEL, trace decomposing wood fragments. Gravels of well rounded to subangular pumice < 10 mm, trace < 20 mm.	
			75 % SPT						4 4 5 N=9					SW	S	L	Loose grey speckled black and white fine to medium SANDY fine to medium GRAVEL, trace decomposing wood fragments; saturated, non plastic. Gravels of well rounded pumice < 10 mm.	
												8					End of Borehole 7.95m.	

DATE STARTED: 10/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 10/7/05 — DRILL TYPE: Kubota STa-35

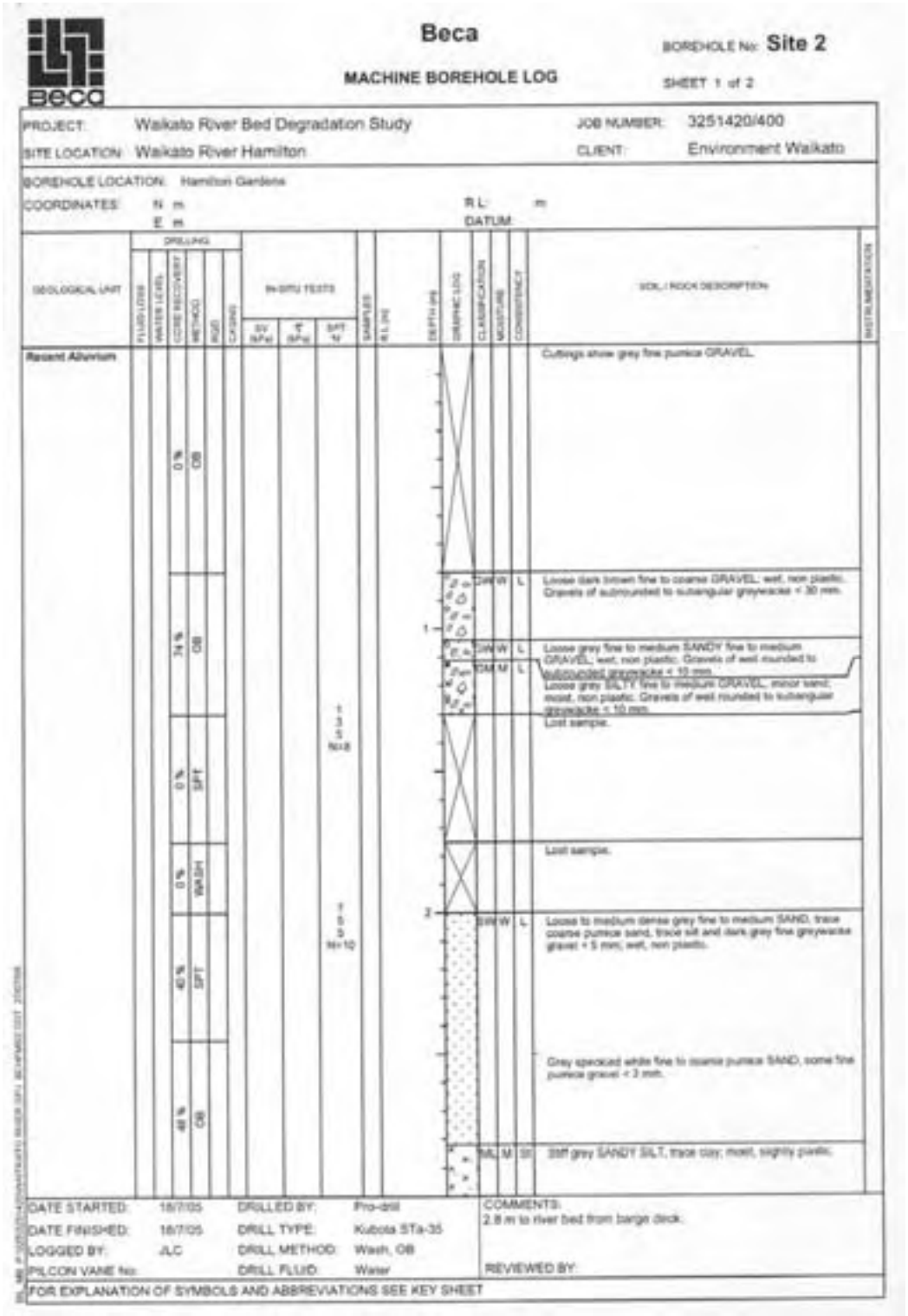
LOGGED BY: JLC — DRILL METHOD: Wash, OB

FILCON VANE No: — DRILL FLUID: Water

COMMENTS: 3 m to river bed from barge deck

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Site 2

SHEET 1 of 2

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: Hamilton Gardens

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	WATER LEVEL	CORE RECOVERY	METHOD	RQD	CASING	IN-SITU TESTS: SV (kPa)	φ (kPa)	SPT N	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	WEATHERING
Recent Alluvium			0 %	CB													Cuttings show grey fine pumice GRAVEL.	
			24 %	CB								1		GW	W	L	Loose dark brown fine to coarse GRAVEL, wet, non plastic. Gravels of subrounded to subangular greywacke < 30 mm.	
														GW	W	L	Loose grey fine to medium SANDY fine to medium GRAVEL, wet, non plastic. Gravels of well rounded to subrounded greywacke < 10 mm.	
														GM	M	L	Loose grey SILTY fine to medium GRAVEL, minor sand, moist, non plastic. Gravels of well rounded to subangular greywacke < 10 mm.	
			0 %	SPT					1 3 5 N=8								Lost sample.	
			0 %	WASH													Lost sample.	
			40 %	SPT					1 5 5 N=10			2		SW	W	L	Loose to medium dense grey fine to medium SAND, trace coarse pumice sand, trace silt and dark grey fine greywacke gravel < 5 mm, wet, non plastic.	
			48 %	CB													Grey speckled white fine to coarse pumice SAND, some fine pumice gravel < 3 mm.	
														ML	M	St	Stiff grey SANDY SILT, trace clay; moist, slightly plastic.	

DATE STARTED: 18/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 18/7/05 — DRILL TYPE: Kubota STa-35

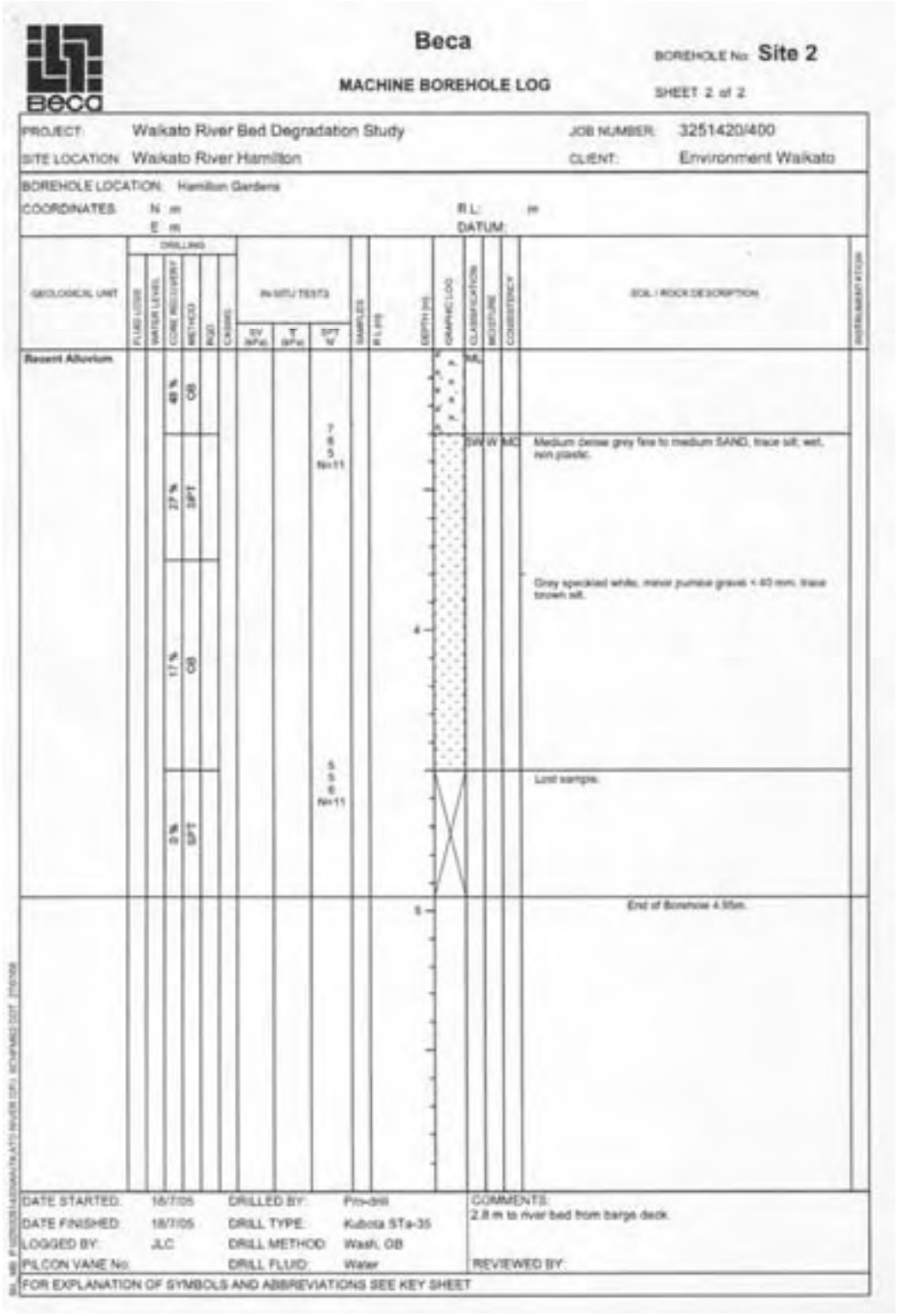
LOGGED BY: JLC — DRILL METHOD: Wash, CB

PILCON VANE No: — DRILL FLUID: Water

COMMENTS: 2.8 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET



Beca

MACHINE BOREHOLE LOG

BOREHOLE No: Site 2

SHEET 2 of 2

PROJECT: Waikato River Bed Degradation Study — JOB NUMBER: 3251420/400

SITE LOCATION: Waikato River Hamilton — CLIENT: Environment Waikato

BOREHOLE LOCATION: Hamilton Gardens

COORDINATES: N m, E m — R.L: m, DATUM:

GEOLOGICAL UNIT	DRILLING: FLUID LOSS	DRILLING: WATER LEVEL	DRILLING: CORE RECOVERY	DRILLING: METHOD	DRILLING: RQD	DRILLING: CASING	IN-SITU TESTS: SV (kPa)	IN-SITU TESTS: ϕ (kPa)	IN-SITU TESTS: SPT N	SAMPLES	R.L (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION	MOISTURE	CONSISTENCY	SOIL / ROCK DESCRIPTION	INSTRUMENTATION
Recent Alluvium			49 %	CB					7 6 5 N=11			0		TOPSOIL				
			27 %	SPT										SW	W	MD	Medium dense grey fine to medium SAND, trace silt; wet, non plastic.	
			17 %	CB								4					Grey speckled white, minor pumice gravel <40 mm, trace brown silt.	
			0 %	SPT					5 5 6 N=11								Lost sample.	
												5					End of Borehole 4.95m.	

DATE STARTED: 18/7/05 — DRILLED BY: Pro-drill

DATE FINISHED: 18/7/05 — DRILL TYPE: Kubota STa-35

LOGGED BY: JLC — DRILL METHOD: Wash, CB

FILCON VANE No: — DRILL FLUID: Water

COMMENTS: 2.8 m to river bed from barge deck.

REVIEWED BY:

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET

12. Appendix 4 Carbon Dating (University of Waikato, August 05)

The University of Waikato

Radiocarbon Dating Laboratory

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Report on Radiocarbon Age Determination for Wk- 17431

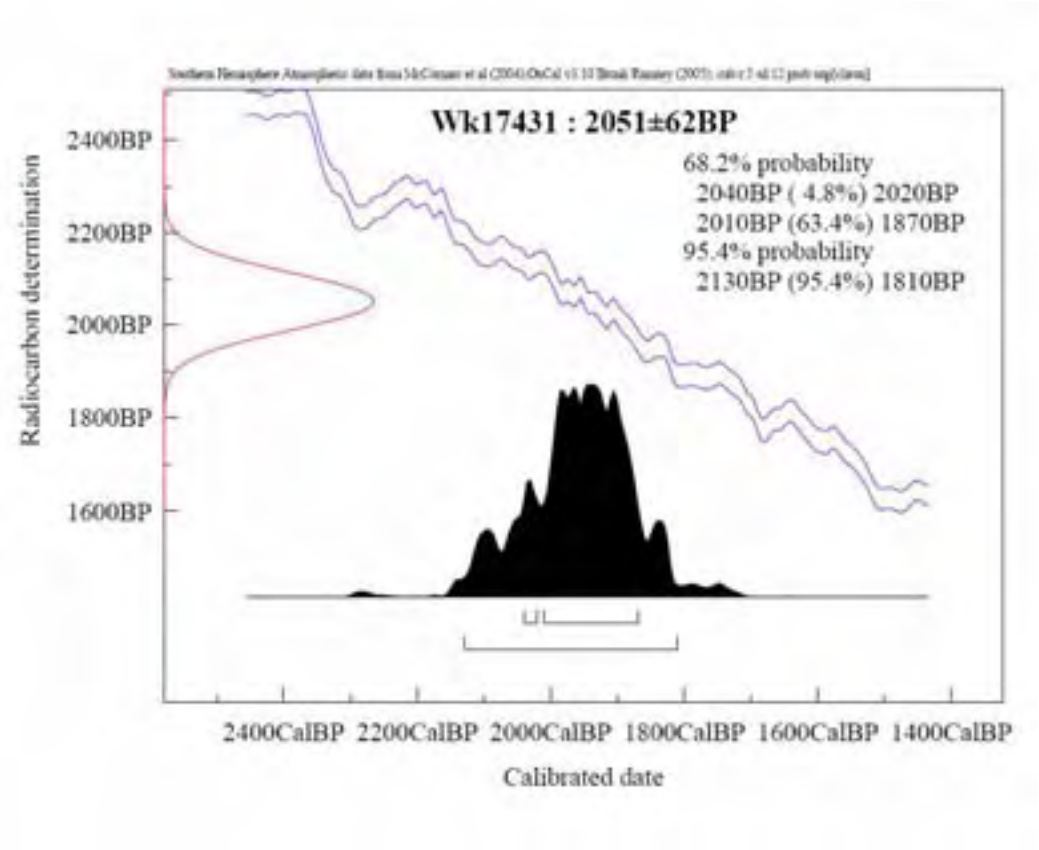
Submitter	WM Mulholland
Submitter's Code	SITE 1
Site & Location	Waikato River, New Zealand
Sample Material	Waikato River
Physical Pretreatment	Possible contaminants were removed. Washed in ultrasonic bath.
Chemical Pretreatment	Sample washed in hot 10% HCl, rinsed and treated with hot 0.5% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed and dried.

$d^{14}C$	-227.5 ± 5.9	‰
$\delta^{13}C$	-26.4 ± 0.2	‰
$D^{14}C$	-225.4 ± 6.0	‰
% Modern	77.5 ± 0.6	%
Result	**2051 ± 62 BP**	

Comments

AGHogg
29/8/05

- Result is *Conventional Age or % Modern* as per Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier of 1
- The isotopic fractionation, $\delta^{13}C$, is expressed as ‰ wrt PDB.
- Results are reported as *% Modern* when the conventional age is younger than 200 yr BP.


Wk17431 : 2051±62BP
68.2% probability
2040BP (4.8%) 2020BP
2010BP (63.4%) 1870BP
95.4% probability
2130BP (95.4%) 1810BP
Radiocarbon determination
2400BP
2200BP
2000BP
1800BP
1600BP
2400CalBP 2200CalBP 2000CalBP 1800CalBP 1600CalBP 1400CalBP
Calibrated date

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Report on Radiocarbon Age Determination for Wk- 17430

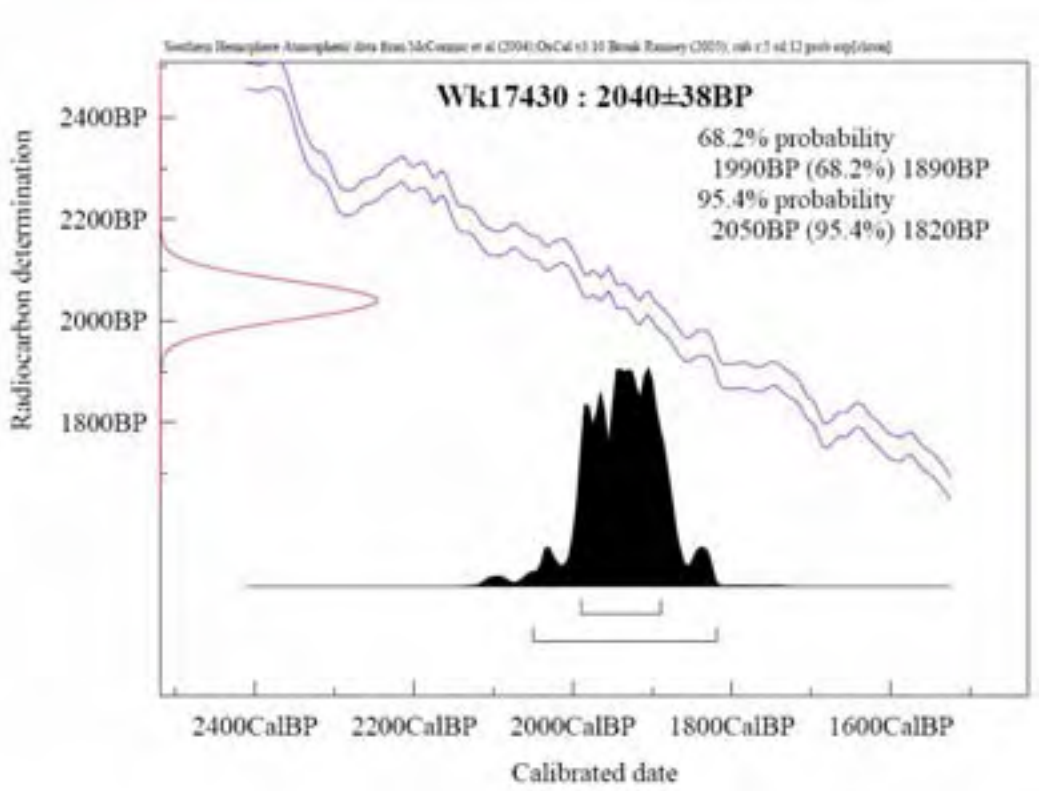
Submitter	WM Mulholland
Submitter's Code	SILL D
Site & Location	Waikato River, New Zealand
Sample Material	From the bed of the Waikato River
Physical Pretreatment	Surfaces scraped clean. The wood was washed in ultrasonic bath, then ground.
Chemical Pretreatment	Sample was washed in hot 10% HCl, rinsed and treated with hot 1/2% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed and dried.

$d^{14}C$	-224.1 ± 3.6	‰
$\delta^{13}C$	-24.8 ± 0.2	‰
$D^{14}C$	-224.3 ± 3.6	‰
% Modern	77.6 ± 0.4	%
Result	**2040 ± 38 BP**	

Comments

29/8/05

- Result is *Conventional Age or % Modern* as per Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier of 1 .
- The isotopic fractionation, $\delta^{13}C$, is expressed as ‰ wrt PDB.
- Results are reported as % *Modern* when the conventional age is younger than 200 yr BP.


Wk17430 : 2040±38BP
68.2% probability
1990BP (68.2%) 1890BP
95.4% probability
2050BP (95.4%) 1820BP
Radiocarbon determination
2400BP
2200BP
2000BP
1800BP
2400CalBP
2200CalBP
2000CalBP
1800CalBP
1600CalBP
Calibrated date