

GSC Open File 8923, Appendix A: Field observations, BC16

Core sample #	Site	Borehole #	Sampling date and time	Sampler	Trip # at nominal depth	Nominal depth top ft	Nominal depth bottom ft	Nominal depth top m	Nominal depth bottom m	Approx. push length in	Difficulty to push	Wait time before retrieval min	Resistance to break/pull core	Sampling observations	Approximate core recovery measured at drill rig in	Depth to top of core in field lab cm	Depth to bottom of core in field lab cm	Recovered core length (field lab calculated) cm	Recovered core length (field lab calculated) in	Pocket penetrometer measurement depth(s) cm above base	Pocket penetrometer measurement(s) ton/sq ft or kg/cm2	Measured depth to top of sediment in borehole, after casing advance ft, in	Casing advance observations (note that casing is advanced after core is retrieved)
	GSC-BC16	1	Mon, 07-10-2019 10:28	A-rod	1	0	2	0.00	0.61		hard, could not push Shelby tube			Hard fill	0	no recovery	no recovery	0.0	0.0				Advanced casing, then removed casing to drive Shelby tube (R-001)
R-001	GSC-BC16	1	Mon, 07-10-2019 10:48	A-rod	1	2	4	0.61	1.22	24	hard	1		Hard fill, Shelby tube edge bent, slough and water at top		12.3	0.0	63.9	25.2	base	2.7		
R-002	GSC-BC16	1	Mon, 07-10-2019 11:05	A-rod	1	4	6	1.22	1.83	20	hard	0		Fill, hit something hard, rig lifted, Shelby tube edge bent		48.0	0.0	28.2	11.1				
R-003	GSC-BC16	1	Mon, 07-10-2019 11:22	A-rod	1	6	8	1.83	2.44			0		Fill at base of Shelby tube, hit hard layer half way, then soft, geotextile liner (?) at base, Shelby tube bent		52.8	0.0	23.4	9.2				Setting up water for the A-rods and piston sampler
R-004	GSC-BC16	1	Mon, 07-10-2019 12:19	piston	1	8	10	2.44	3.05	24		7		Lost 12" from bottom of tube. Shelby tube bent at bottom. Slough is gritty		24.0	31.8	20.4	8.0				
	GSC-BC16	1	Mon, 07-10-2019 13:15	piston	1	10	12	3.05	3.66	3		12	no resistance	Piston did not extend, only 3". Retried to deploy piston sampler. Seems to have deployed but the A-rod dropped almost 2 feet (unexplained)		no recovery	no recovery	0.0	0.0				Casing not advanced since piston did not extend. Will attempt to retrieve sample again
	GSC-BC16	1	Mon, 07-10-2019 13:36	piston	2	10	12	3.05	3.66	24		19		Shelby tube empty, bottom dented. Sample still downhole.		no recovery	no recovery	0.0	0.0			10'4"	Casing not advanced, will attempt to retrieve sample again
	GSC-BC16	1	Mon, 07-10-2019 13:43	piston	3	10	12	3.05	3.66	24				Shelby tube empty		no recovery	no recovery	0.0	0.0			10'4"	Casing not advanced, will attempt to retrieve sample with a SS
	GSC-BC16	1	Mon, 07-10-2019 13:56	SS (H sized)	4	10	12	3.05	3.66	24		0		red brick, roots, soupy mud, gravel, fill, not sampled									Casing not advanced, smaller SS sample (R-005) will be taken through larger SS sampling hole
R-005	GSC-BC16	1	Mon, 07-10-2019 14:03	SS (N sized)	1	12	14	3.66	4.27	24		0		N sized SS, 3-4-6-8 blow counts. Gravel fill at top, clay (undisturbed ?) at base		47.0	0.0	29.2	11.5	7.5, 15, 26, 33.5, 40.5	2.2, 1.7, 3.25, 3.6, 2.4		Casing advanced to 14'. Drilled easily, hard clay
	GSC-BC16	1	Mon, 07-10-2019 14:20	piston	1	14	16	4.27	4.88	24		0		Shelby tube almost empty, root		no recovery	no recovery	0.0	0.0				Casing not advanced, will retrieve sample with a SS
R-006	GSC-BC16	1	Mon, 07-10-2019 14:29	SS (H sized)	2	14	16	4.27	4.88	24		0		Root at top, rest mud				61.0	24.0	9.5, 25.5, 36.5, 45	1.5, 1.0, 1.25, 1.5	16'0"	
	GSC-BC16	1	Mon, 07-10-2019 15:01	piston	1	16	18	4.88	5.49	24	Lower pressure (300 kPa) to drive piston	14		1" recovery, appears Shelby tube cut hole but did not recover the sample. Suspect sampler did not break base of core									Casing not advanced since piston did not extend. Will attempt to retrieve sample again with A-rod sampler
R-007	GSC-BC16	1	Mon, 07-10-2019 15:28	A-rod	2	16	18	4.88	5.49	24						21.5	1.5	53.2	20.9	base	0.3		
R-008	GSC-BC16	1	Mon, 07-10-2019 15:46	piston	1	18	20	5.49	6.10	24		9		Piston went to full extension, sample slipped in Shelby tube, 18.5" from top, 7.25" to bottom	4.25	46.5	19.0	10.7	4.2				Casing not advanced. Will attempt to recover rest of core with A-rod sampler
	GSC-BC16	1	Mon, 07-10-2019 16:15	A-rod	2	18	20	5.49	6.10	24				Attempted recovery of remainder of core, Shelby tube empty		no recovery	no recovery	0.0	0.0				Advanced casing on 8-10-2019
R-009	GSC-BC16	1	Tue, 08-10-2019 08:00	A-rod	1	20	22	6.10	6.71	24		10			26.75	8.5	0.0	67.7	26.7	base	0.1		
	GSC-BC16	1	Tue, 08-10-2019 08:22	A-rod	1	22	24	6.71	7.32	24		9		Shelby tube empty		no recovery	no recovery	0.0	0.0				Casing not advanced. Will attempt to recover core with A-rod sampler
	GSC-BC16	1	Tue, 08-10-2019 08:39	A-rod	2	22	24	6.71	7.32	24		16		Shelby tube empty		no recovery	no recovery	0.0	0.0				Casing not advanced. Will attempt to recover core with SS sampler
R-010	GSC-BC16	1	Tue, 08-10-2019 08:45	SS	3	22	24	6.71	7.32	24		0		Partially remolded				61.0	24.0	10, 20, 60	0.1, 0.1, 0.1		
R-011	GSC-BC16	1	Tue, 08-10-2019 09:20	A-rod	1	24	26	7.32	7.92		easy	30		Pushed Shelby tube by hand		10.0	0.0	66.2	26.1	base	0.1		Adding clamps to casing (to prevent casing from sinking due to its own weight)
	GSC-BC16	1	Tue, 08-10-2019 10:08	A-rod	1	26	28	7.92	8.53		easy	25		Soft, Shelby tube empty		no recovery	no recovery	0.0	0.0				Casing not advanced. Will attempt to recover core with SS sampler
R-012	GSC-BC16	1	Tue, 08-10-2019 10:11	SS (H sized)	2	26	28	7.92	8.53	24		0		Increased clay in core catcher - appears undisturbed				61.0	24.0	base	0.3		

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	GSC-BC16	1	Tue, 08-10-2019 11:01	piston (old)	1	28	30	8.53	9.14			34		Used an old piston sampler, did not extend/deploy		no recovery	no recovery	0.0	0.0				Casing not advanced since piston did not extend. Will attempt to retrieve sample again with old piston sampler
	GSC-BC16	1	Tue, 08-10-2019 11:54	piston (old)	2	28	30	8.53	9.14			30		Used an old piston sampler, did not extend/deploy again		no recovery	no recovery	0.0	0.0				Casing not advanced since piston did not extend. Will attempt to retrieve sample again with new piston sampler
R-013	GSC-BC16	1	Tue, 08-10-2019 12:29	piston	3	28	30	8.53	9.14	24		24		Used the previous (new) piston sampler, cone imprint at top.	23.5	17.0	0.0	59.2	23.3	base	0.6		
R-014	GSC-BC16	1	Tue, 08-10-2019 13:17	piston	1	30	32	9.14	9.75	24		30		Cone imprint at top, 16.5" lost at bottom	10.5	7.6	42.5	26.1	10.3				
	GSC-BC16	1	Tue, 08-10-2019 14:15	piston	1	32	34	9.75	10.36	24		30		Piston sampler returned to surface only deployed 2" but driller noted flow (from A-rods) back to surface which suggested full deployment. Shelby tube empty		no recovery	no recovery	0.0	0.0				Casing not advanced. Will attempt to recover core with A-rod sampler
R-015	GSC-BC16	1	Tue, 08-10-2019 14:52	A-rod	2	32	34	9.75	10.36	24		31		Recovered with A-rod. Sample partially slid out of tube (3.25" sticking out bottom)	15.25	47.0	-7.0	36.2	14.3	base	0.7		
R-016	GSC-BC16	1	Tue, 08-10-2019 15:47	piston	1	34	36	10.36	10.97	24		30	Sudden jerk of rods on initial pull	Maintained water flow in rods while waiting to ensure full deployment of Shelby tube		16.5	0.0	59.7	23.5	base	0.8		Casing advanced on 9-10-2019. Soft
R-017	GSC-BC16	1	Wed, 09-10-2019 08:30	piston	1	36	38	10.97	11.58	24		31		Maintained gravity flow (from water truck) on piston sampler during wait time	23.5	17.5	0.0	58.7	23.1	base	0.5		
R-018	GSC-BC16	1	Wed, 09-10-2019 09:20	piston	1	38	40	11.58	12.19	24		32		Maintained gravity flow on piston sampler (can hear flow in pump). Not overflowing casing.	23.5	16.7	-0.2	59.7	23.5	base	0.4		Casing breaks at ground surface. Lifted casing to break it. Soft, a little stiffer at bottom
R-019	GSC-BC16	1	Wed, 09-10-2019 10:13	piston	1	40	42	12.19	12.80	24		30		Maintained gravity flow on sampler	23.0	17.5	0.2	58.5	23.0	base	0.25		
R-020	GSC-BC16	1	Wed, 09-10-2019 11:00	piston	1	42	44	12.80	13.41	24		30		Sample slipped out of Shelby tube before reaching measurement table (fell on grass). Waxed core out of Shelby tube.		Sample slipped out	Sample slipped out	21.0	8.3			43'2"	Stiffer at bottom. Measured depth with weighted line. Washing out again. Still approx. 1' clay. Could not wash out clay in the bottom of the casing. Will advance the piston sampler to 44' and then extend the Shelby tube. Approx. 10" of stiff clay inside casing
R-021	GSC-BC16	1	Wed, 09-10-2019 12:15	piston	1	44	46	13.41	14.02	24		32	Took a higher water pressure (200kPa instead of 150 kPa) to advance the Shelby tube	Advanced piston sampler through sediment to 44' before deploying. Maintained gravity flow on sampler. More silty	23.0	18.0	0.0	58.2	22.9	base	0.8		
R-022	GSC-BC16	1	Wed, 09-10-2019 13:17	piston	1	46	48	14.02	14.63	24		30	Sudden jerk of rods on initial pull. Driller filled casing with water when pulled.	Maintained gravity flow on sampler	22.75	18.0	0.0	58.2	22.9	base	1.25		
R-023	GSC-BC16	1	Wed, 09-10-2019 14:14	piston	1	48	50	14.63	15.24	24	Soft, less pressure to deploy/extend piston sampler.	31	Sudden jerk of rods on initial pull	Maintained gravity flow on sampler	23.0	18.0	0.0	58.2	22.9	base	1.4		

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	GSC-BC16	1	Wed, 09-10-2019 15:20	piston	1	50	52	15.24	15.85	24		30	No resistance to pull	Shelby tube empty, no sample		no recovery	no recovery	0.0	0.0				
R-024	GSC-BC16	1	Wed, 09-10-2019 16:14	piston	1	52	54	15.85	16.46	24		29	Harder pull than 50'-52'	Stiffer	19.0	28.5	-0.2	47.9	18.9	base	1.3		Casing advanced on 10-10-2019
R-025	GSC-BC16	1	Thu, 10-10-2019 08:22	piston	1	54	56	16.46	17.07	24	easy	30	Initial pull shows torque on A-rod then sudden jerk up 6"		23.0	18.0	0.0	58.2	22.9	base	0.25		Temporary backflow from casing at 55'
R-026	GSC-BC16	1	Thu, 10-10-2019 09:22	piston	1	56	58	17.07	17.68	24		30		Sampler and rods sank to 55'7" under weight of rods. Pushed piston sampler down to 56' before deploying. Gas bubbling in water.	14.75	38.5	0.3	37.5	14.7	base	1.4		
	GSC-BC16	1	Thu, 10-10-2019 11:21	piston	1	58	60	17.68	18.29	24		30	No resistance to pull	Shelby tube empty		no recovery	no recovery	0.0	0.0				
R-027a	GSC-BC16	1	Thu, 10-10-2019 11:21	piston	1	60	62	18.29	18.90	24		30	Some resistance to pull.	2-3" recovery, Shelby tube dented. Angular pebble in clay matrix. Minor grit. No salty taste. Sample not preserved in Shelby tube.	2.5	not in Shelby tube	not in Shelby tube	7.0	2.8				Casing not advanced. Will attempt to recover rest of core with SS sampler.
R-027B	GSC-BC16	1	Thu, 10-10-2019 11:40	SS (H sized)	2	60	62	18.29	18.90	24		0		All clay/silt in SS, 1-1-2-1 blow counts				58.2	22.9	20, 35, 55	1.2, 1.0, 0.8		Did not advance casing. Piston sample taken through hole made by SS sampler.
R-028	GSC-BC16	1	Thu, 10-10-2019 12:30	piston	1	62	64	18.90	19.51	24		35		Casing at 60', pushed piston sampler to 62'. Maintained gravity flow on sampler. 14" to sample bottom	9.5	18.0	35.5	22.7	8.9				Casing advanced from 60' to 64'
R-029	GSC-BC16	1	Thu, 10-10-2019 13:34	A-rod	1	64	66	19.51	20.12	24		31		Used a new, but rusty Shelby tube to help prevent sample sliding out (more internal resistance). Used A-rod to break the sample. 65' to base of hole after sampling.	27.75	5.0	0.0	71.2	28.0	base	1.1	65' after sampling	8" sediment at base after advancing casing. Washed again.
	GSC-BC16	1	Thu, 10-10-2019 14:37	A-rod	1	66	68	20.12	20.73	20	Push from weight of rods	30	Hard to break	Shelby tube full at 20" of push with weight of rods. No water flow in rods during sampling. A-rods sank about 3-4" when sample broke. Shelby tube empty.		no recovery	no recovery	0.0	0.0				Casing not advanced. Will attempt to recover core with SS sampler
R-030	GSC-BC16	1	Thu, 10-10-2019 14:49	SS (H sized)	2	66	68	20.12	20.73	24		0						58.9	23.2	20, 28, 50	0.6, 1.0, 0.8		
R-031	GSC-BC16	1	Thu, 10-10-2019 15:50	A-rod	1	68	70	20.73	21.34	24		30		Used a rusty Shelby tube. No water flow in rods during sampling. Water level 6' below ground surface.	28.0	5.0	0.0	71.2	28.0	base	0.9		Casing advanced on 11-10-2019
R-032	GSC-BC16	1	Fri, 11-10-2019 08:18	A-rod	1	70	72	21.34	21.95	22	Push from weight of rods	30		Used a slightly rusty Shelby tube, fine sand on top of sample (slough?)	27.25	6.0	0.0	70.2	27.6	base	1.5		Washes out well
R-033	GSC-BC16	1	Fri, 11-10-2019 09:10	A-rod	1	72	74	21.95	22.56	22	Push from weight of rods	30		Used a slightly rusty Shelby tube	28.0	5.0	0.0	71.2	28.0	base	1.2		
R-034	GSC-BC16	1	Fri, 11-10-2019 10:12	piston	1	74	76	22.56	23.16	24	Pressure to 175 kPa to deploy Shelby tube	31	Pull out with resistance, two jerks	Used a slightly rusty Shelby tube	22.75	19.0	0.0	57.2	22.5	base	1.3		Casing sank. Disturbed sediment to 95' to recover casing
	GSC-BC16	2	Tue, 15-10-2019 14:00	A-rod	1	18	20	5.49	6.10		hard, did not push			Shelby tube bent on something hard within 1-2", no sample		no recovery	no recovery	0.0	0.0				Advanced casing to 18' in new borehole prior to sampling attempt.

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	GSC-BC16	2	Tue, 15-10-2019 14:39	A-rod	1	58	60	17.68	18.29	20		30		Shelby tube dented on bottom and side, no sample recovery		no recovery	no recovery	0.0	0.0				Advanced casing to 58' in 2nd borehole prior to sampling attempt. After casing advanced to 60', 1' of sediment inside casing, tried washing it out, then there was 3' of sediment. Push through sediment with piston corer (R-027C)
R-027C	GSC-BC16	2	Tue, 15-10-2019 15:49	piston	1	60	62	18.29	18.90	24		29		Pushed through sediment to sample depth. Uneven top of sediment, some sediment stuck to cone. 11" missing at bottom.	12.5	16.5	28.2	31.5	12.4				Casing advanced to 76' after sampling.
R-035	GSC-BC16	2	Wed, 16-10-2019 08:10	A-rod	1	76	78	23.16	23.77	20	hand pushed	16		2" slough	28.0	5.0	0.0	71.2	28.0	base	1.5		
	GSC-BC16	2	Wed, 16-10-2019 08:55	A-rod	1	78	80	23.77	24.38	20	push with rig	17	No resistance to pull	Shelby tube empty		no recovery	no recovery	0.0	0.0				
	GSC-BC16	2	Wed, 16-10-2019 09:40	A-rod	1	80	82	24.38	24.99	20	push with rig		resistance to turn and pull	Recovered 3 concretions and a little clay.		no sample in Shelby tube	no sample in Shelby tube	0.0	0.0				Casing not advanced. Will attempt to recover core with SS sampler
R-036	GSC-BC16	2	Wed, 16-10-2019 10:00	SS (H sized)	2	80	82	24.38	24.99	24		0		Recovered clay with 1 (sheared) concretion. Hard areas and black patches. Can smell hydrogen sulphide.				65.0	25.6	10, 30, 50	0.9, 0.9, 0.9		
	GSC-BC16	2	Wed, 16-10-2019 10:51	A-rod	1	82	84	24.99	25.60		soft, sank from weight of rods	17		Shelby tube empty		no recovery	no recovery	0.0	0.0				Sand washing up to surface
R-037	GSC-BC16	2	Wed, 16-10-2019 11:49	A-rod	1	84	86	25.60	26.21	20	had to push last few inches	21	resistance to turn		28.0	5.0	0.0	71.2	28.0	base	1.3		Water drained quickly from casing (clear?)
R-038	GSC-BC16	2	Wed, 16-10-2019 12:55	A-rod	1	86	88	26.21	26.82		sank on weight of rods	30		Slough had some sandy grit in it. Base of core non-cohesive (did not roll), sticky, grit felt in teeth, no salty taste	23.0	14.3	0.0	61.9	24.4	base	1.2		
R-039	GSC-BC16	2	Wed, 16-10-2019 13:55	A-rod	1	88	90	26.82	27.43	20	push with rig	33	some resistance to turn	Shelby tube full, sediment protrusion into adaptor	28.0	5.0	0.0	71.2	28.0	base	1.8	89'6", then washed more	
R-040	GSC-BC16	2	Wed, 16-10-2019 14:58	A-rod	1	90	92	27.43	28.04	20	push with rig	23	resistance to turn	Shelby tube full, sediment protrusion into adaptor	28.0	5.0	0.0	71.2	28.0	base	1.7		
	GSC-BC16	2	Wed, 16-10-2019 15:24	A-rod	1	92	94	28.04	28.65					Shelby tube on A-rods would not go in. Rotated A-rods and dented Shelby tube. Lower casing disconnected. Had to tap casing to recover it. May have disturbed sediment 92' to 94'.		no recovery	no recovery	0.0	0.0				Casing separated at approximately 60'. Driller managed to put A-rods (without sampler) to base of hole. 17-10-2019. Removed upper 60' of casing. Tapped into lower casing and removed it. May have pushed casing deeper than 92'. Advanced casing to 94' without sampling.
R-041	GSC-BC16	2	Thu, 17-10-2019 11:45	A-rod	1	94	100	28.65	30.48		sank on weight of rods			Shelby tube sank to 100' on weight of rods. Sediment disturbance may have been deeper than 94'.	28.0	5.0	-2.5	73.7	29.0	sticking out, on cut face	0.75, 1.2		Casing advanced to 100', temporary backflow from the casing. Added 5' of casing. Drill water came up about 8". When casing was removed, flow was greatly reduced.
	GSC-BC16	2	Thu, 17-10-2019 13:10	A-rod	1	101.75	103.75	31.01	31.62		had to push with rig when hard surface was finally encountered	20	low resistance to turn	Driller indicated that there was no sediment at 100' and advanced to 101'9" before a hard surface was encountered. Shelby tube empty		no recovery	no recovery	0.0	0.0				Did not advance casing. Casing still at 100'

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R-042	GSC-BC16	2	Thu, 17-10-2019 13:28	SS (H sized)	1	103.5	105.5	31.55	32.16					Blow counts (weight of hammer, 3,5,6). Driller noted that borehole #1 hit something hard at approx. 100'. Mostly clay, concretion at top				65.0	25.6	18, 35, 53	0.8, 1.0, 1.0		Advanced casing to 106' prior to sampling (R-043). Temporary backflow from casing 4' above ground surface.
R-043	GSC-BC16	2	Thu, 17-10-2019 15:16	A-rod	1	105.5	107.17	32.16	32.66		weight of rods first 4", 5" by hand (2 men), 11" by rig	20	hard to turn		28.0	6.0	0.0	70.2	27.6	base	2.1	105'6", measured prior to sampling	Casing advanced to 108' on 18-10-2019
R-044	GSC-BC16	2	Fri, 18-10-2019 08:20	A-rod	1	108	110	32.92	33.53	19	6" weight of rods, 13" pushed with rig	21		Stiff, concretion on top of sample, no salty taste	28.0	5.0	0.0	71.2	28.0	base	2.0		
R-045	GSC-BC16	2	Fri, 18-10-2019 09:09	A-rod	1	110	112	33.53	34.14		hand pushed	24	less resistance to turn	Stiff, but hand pushed (softer than 110')	27.0	6.5	0.0	69.7	27.4	base	2.1	112'	Measured, wash a little more.
R-046	GSC-BC16	2	Fri, 18-10-2019 10:15	A-rod	1	112	114	34.14	34.75	19	Push with rig	23	very hard to turn	Stiff	28.0	4.8	0.0	71.4	28.1	base	1.75		Casing not flowing at 114'
R-047	GSC-BC16	2	Fri, 18-10-2019 10:59	A-rod	1	114	116	34.75	35.36	15	Push with rig, stiff	10		Shelby tube felt full to driller. Water level very low in casing (>20 ft)	28.0	5.5	0.0	70.7	27.8	base	1.3		
	GSC-BC16	2	Fri, 18-10-2019 11:51	A-rod	1	116	118	35.36	35.97	15	Push 10" by hand and 5" with rig. Rig pushed through a hard spot and then got easier	12		Shelby tube empty		no recovery	no recovery	0.0	0.0			117'5"	Measured 6-8" of stiff clay at base of casing. Forms like a cylinder and water washes around it. Wash some more.
R-048	GSC-BC16	2	Fri, 18-10-2019 12:48	A-rod	1	118	120	35.97	36.58	18	Push 6" by hand, rest with rig. Felt hard spots	12	Moderate resistance to turn		28.0	5.0	0.0	71.2	28.0	base	2.5	120'	When advancing casing, the driller pushed 1" into clay, pressure builds up and then is released as observed in return flow. No backflow at 120'.
	GSC-BC16	2	Fri, 18-10-2019 13:28	A-rod	1	120	122	36.58	37.19	18	Sank 10" weight of rods, 8" push with rig	1	Moderate resistance to turn	Shelby tube empty		no recovery	no recovery	0.0	0.0				Blew out clay plug in casing (likely unrecovered core)
R-049	GSC-BC16	2	Fri, 18-10-2019 14:27	A-rod	1	122	124	37.19	37.80	16	Pushed 12" by hand, 4" with rig.	10	Nice break, moderate resistance to turn	Sample extends 2" out bottom of Shelby tube	21.5	26.6	-4.0	53.6	21.1	base	2.3		Return flow varied as casing was raised and lowered at 124' to wash out cuttings. Water level dropped rapidly when drill head was disconnected from casing.
R-050	GSC-BC16	2	Fri, 18-10-2019 15:17	A-rod	1	124	126	37.80	38.40	17	Pushed 4" by hand, 13" with rig	11	Moderate to high resistance to turn	Approx. 1/2 in of core lost at bottom of Shelby tube	27.5	4.6	0.5	71.1	28.0	base	2.2	126'3"	Casing advanced on 21-10-2019. Stiff from 124-126'. Water draining readily. Measured to base at 126'3". 3" deeper than casing
R-051	GSC-BC16	2	Mon, 21-10-2019 08:23	A-rod	1	126	128	38.40	39.01	17	Pushed with rig	10	Moderate pressure with snipe on pipewrench to turn (i.e. getting harder to turn).	No salty taste	28.0	5.0	0.0	71.2	28.0	base	1.8		
R-052	GSC-BC16	2	Mon, 21-10-2019 09:15	A-rod	1	128	130	39.01	39.62	17	Pushed with rig	9	Moderate resistance to turn with snipe	No salty taste	28.0	4.9	1.0	70.3	27.7	base	2.4		
R-053	GSC-BC16	2	Mon, 21-10-2019 10:02	A-rod	1	130	132	39.62	40.23	15	Pushed with rig	6	Low resistance to turn	No salty taste	28.0	4.8	0.0	71.4	28.1	base	3.2	131'8"	Borehole taking water, water dropped quickly. Sediment measured 4" inside casing at 132', stiff

GSC Open File 8923, Appendix A: Field observations, BC16

Core sample #	Site	Borehole #	Sampling date and time	Sampler	Trip # at nominal depth	Nominal depth top ft	Nominal depth bottom ft	Nominal depth top m	Nominal depth bottom m	Approx. push length in	Difficulty to push	Wait time before retrieval min	Resistance to break/pull core	Sampling observations	Approximate core recovery measured at drill rig in	Depth to top of core in field lab cm	Depth to bottom of core in field lab cm	Recovered core length (field lab calculated) cm	Recovered core length (field lab calculated) in	Pocket penetrometer measurement depth(s) cm above base	Pocket penetrometer measurement(s) ton/sq ft or kg/cm2	Measured depth to top of sediment in borehole, after casing advance ft, in	Casing advance observations (note that casing is advanced after core is retrieved)
R-054	GSC-BC16	2	Mon, 21-10-2019 10:58	A-rod	1	132	134	40.23	40.84	20	Pushed with rig, 4" of push inside casing.	11	Moderate resistance to turn with snipe	Sample extends 1" out bottom	28.5	6.6	-2.0	71.6	28.2	base	2.3	133'0"	Casing appears to be cutting into the clay, leaving an intact cylinder in the casing. Stiffer clay may be enabling this. Sediment measured at 133'. Wash out some more.
R-055	GSC-BC16	2	Mon, 21-10-2019 11:52	A-rod	1	134	136	40.84	41.45	15	Pushed with rig, getting stiff	12		Some grit on outside of Shelby tube	28.0	4.6	0.0	71.6	28.2	base	1.3		
	GSC-BC16	2	Mon, 21-10-2019 12:42	A-rod	1	136	138	41.45	42.06	20	Pushed with rig	11	Moderate resistance to turn	Shelby tube empty		no recovery	no recovery	0.0	0.0				
R-056	GSC-BC16	2	Mon, 21-10-2019 13:31	A-rod	1	138	140	42.06	42.67	18	Pushed with rig	11	Low resistance to turn			4.8	0.0	71.4	28.1	base	2.75	140'	Small flow on outside of casing, flow decreased with time
R-057	GSC-BC16	2	Mon, 21-10-2019 14:19	A-rod	1	140	142	42.67	43.28	20	10" weight of rods, 10" pushed with rig	10	Low resistance to turn	Flow out of borehole resumes but is small (when Shelby is pushed). 14:20 no flow from outside casing (during tripping out). Core sticking out 2.5" past bottom. 'Not salty to taste.	15.5	47.0	-4.0	33.2	13.1	base	2.4		Water at top of casing
R-058	GSC-BC16	2	Mon, 21-10-2019 15:11	A-rod	1	142	144	43.28	43.89	14	7" weight of rods, 7" pushed with rig	11	Low to moderate resistance to turn	Trickle flow @ 14:56. No flow 15:20 (during tripping).	28.0	4.7	0.0	71.5	28.1	base	1.0	143'	Measured about 1' of sediment inside casing, tried to wash out
R-059	GSC-BC16	2	Tue, 22-10-2019 07:30	A-rod	1	144	146	43.89	44.50	17	6" by hand, 11" pushed with rig	10			28.0	5.0	0.0	71.2	28.0	base	2.8		
R-060	GSC-BC16	2	Tue, 22-10-2019 08:23	A-rod	1	146	148	44.50	45.11	20	4" weight of rods, 16" pushed with rig	10			28.0	4.8	0.0	71.4	28.1	base	2.8	148'	
R-061	GSC-BC16	2	Tue, 22-10-2019 09:24	A-rod	1	148	150	45.11	45.72	19	Pushed with rig	12	Moderate resistance to turn	Shelby tube came out with sucking sound	28.0	5.6	0.0	70.6	27.8	base	2.1		
R-062	GSC-BC16	2	Tue, 22-10-2019 10:13	A-rod	1	150	152	45.72	46.33	17.5	Pushed with rig	12			23.25	17.8	0.0	58.4	23.0	base	2.5		
R-063	GSC-BC16	2	Tue, 22-10-2019 11:02	A-rod	1	152	154	46.33	46.94	14	Pushed with rig. Very hard, the rig lifted a little.	11		Dented base of Shelby tube	27.5	7.0	1.5	67.7	26.7	base	1.8		Felt hard sediment when advancing casing
	GSC-BC16	2	Tue, 22-10-2019 11:48	A-rod	1	154	154.08	46.94	46.96					Refusal of Shelby tube within 1". Hole was clean				76.2	30.0				Casing not advanced, still at 154'
R-064	GSC-BC16	2	Tue, 22-10-2019 12:40	SS (H sized)	2	154	156	46.94	47.55	24				Blow counts (10-20-17-19). Stone in tip of SS, blocking it. Sand	12.0			42.0	16.5				Casing not advanced, still at 154'. Smaller SS sample taken through H-sized SS hole.
R-065	GSC-BC16	2	Tue, 22-10-2019 13:20	SS (N sized)	1	156	158	47.55	48.16	24				Blow counts (6-7-8-8), Till				61.5	24.2				Casing advanced from 154'. Refusal at 158', 400 psi, wheels lifting on rig
R-066	GSC-BC16	2	Tue, 22-10-2019 14:00	SS (H sized)	1	158	160	48.16	48.77	24				Blow counts (10-12-17-16), Till, end of borehole				41.0	16.1				Advancing casing in till could make install more difficult as the stones can bind the casing. Chose to end casing at 158'
R-007B	GSC-BC16	3	Wed, 23-10-2019 14:00	A-rod	1	16	18	4.88	5.49					Shelby taken from GEMTEC sampling at BC16 (Adrian North) from monitoring well borehole		14.5	0.0	61.7	24.3	base	1.6		