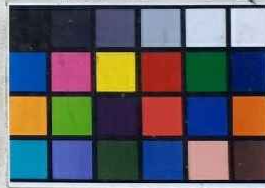


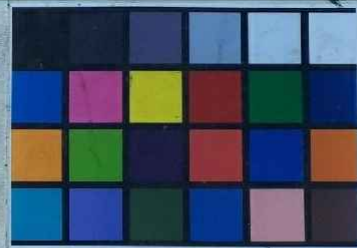
Job Name: IARNRÓD ÉIREANN
CORK LINE
XC219
Job No.: 19-135
BH: CPRC05

Depth: 240 to 390 m
Box: 1 of 7
Date: 12/3/20
Depth To: 13.10 m



Job Name: IARNRÓD ÉIREANN
CORK LINE
XC219
Job No.: 19-135
BH: CPRC05

Depth: 390 to 5.05 m
Box: 2 of 7
Date: 12/3/20
Depth To: 13.10 m



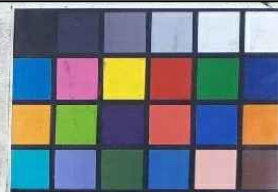
Job Name: IARNRÓD ÉIREANN
CORK LINE
XC219
Job No.: 19-135
BH: CPRC05

Depth: 5.05 to 6.60 m
Box: 3 of 7
Date: 12/3/20
Depth To: 13.10 m



Job Name: IARNRÓD ÉIREANN
CORK LINE
XC219
Job No.: 19-135
BH: CPRC05

Depth: 6.60 to 8.15 m
Box: 4 of 7
Date: 12/3/20
Depth To: 13.10 m



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	C.P/R.C05
	Rock Core Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	Feb-March & Jun-Sep 2020

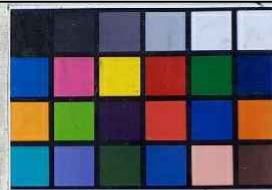
Job Name: IARNRÓD ÉIREANN
CORK LINE
XC219
Job No.: 19-135
BH: CPRC05

Depth: 8.15 to 9.75 m
Box: 5 of 7
Date: 12/3/20
Depth To: 13.10 m



Job Name: IARNRÓD ÉIREANN
CORK LINE
XC219
Job No.: 19-135
BH: CPRC05

Depth: 9.75 to 11.30 m
Box: 6 of 7
Date: 12/3/20
Depth To: 13.10 m



Job Name: IARNRÓD ÉIREANN
CORK LINE
XC219
Job No.: 19-135
BH: CPRC05

Depth: 11.30 to 13.10 m
Box: 7 of 7
Date: 12/3/20
Depth To: 13.10 m

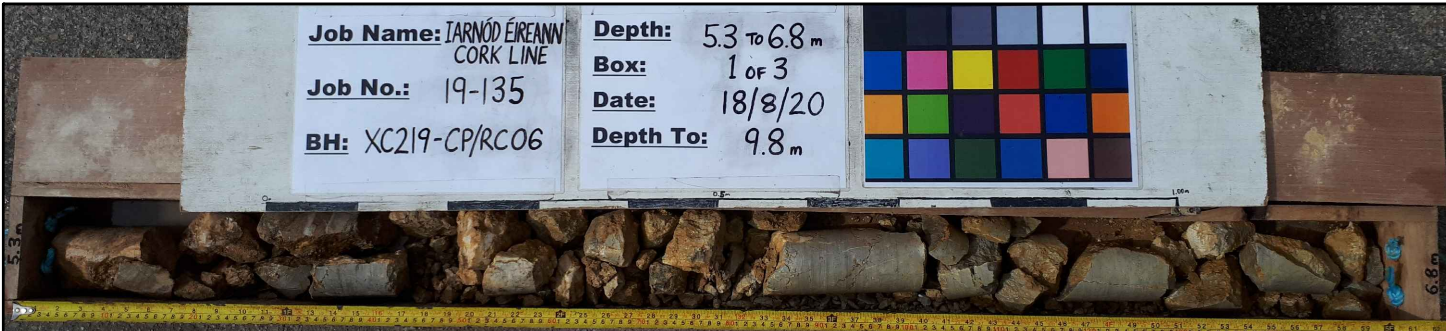


Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	C.P/R.C05
	Rock Core Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	Feb-March & Jun-Sep 2020

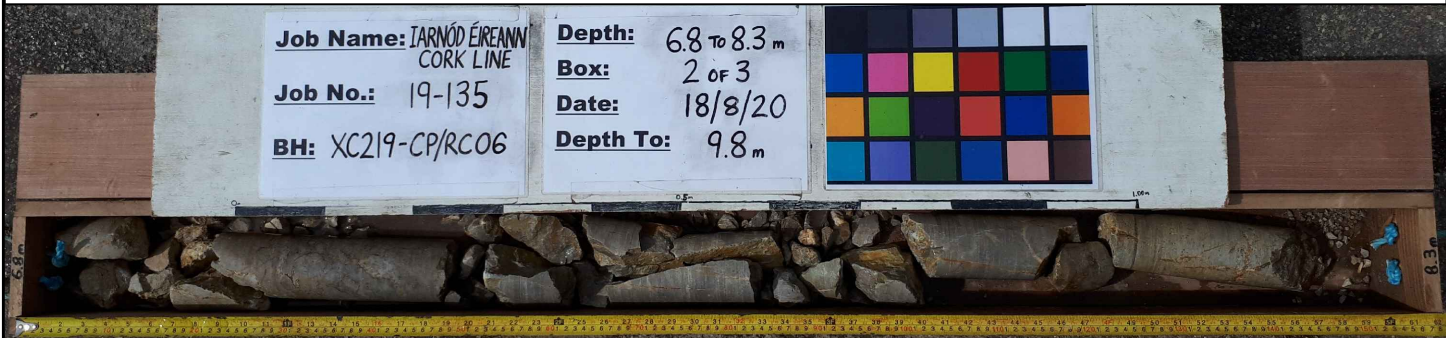
Job Name: IARNÓD ÉIREANN
CORK LINE
Job No.: 19-135
BH: XC219-CP/RC06

Depth: 5.3 To 6.8 m
Box: 1 of 3
Date: 18/8/20
Depth To: 9.8 m



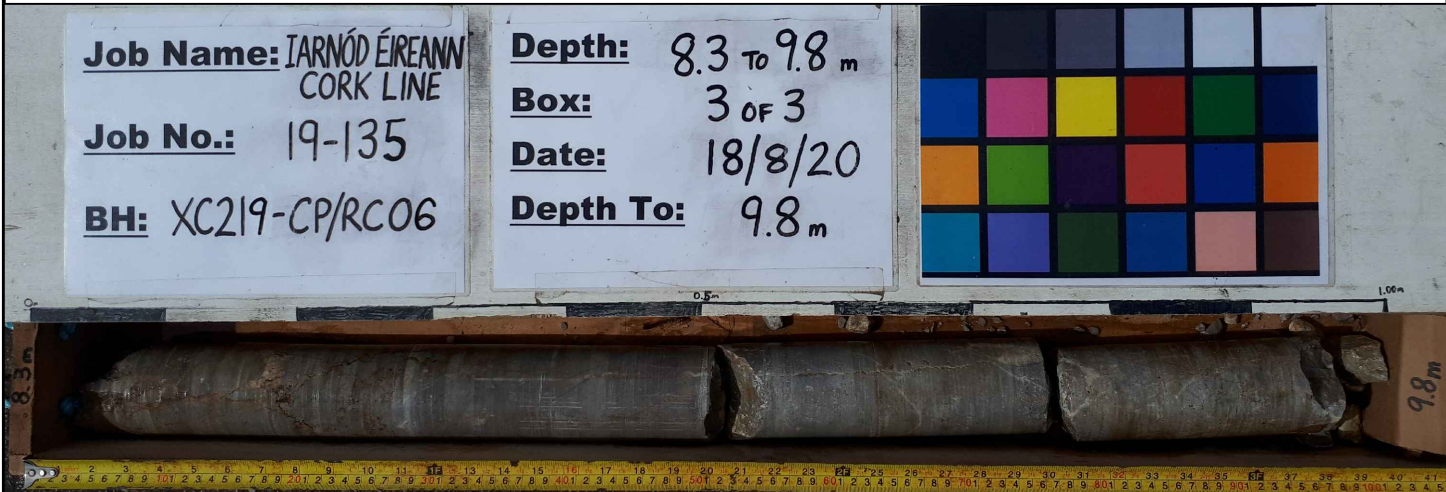
Job Name: IARNÓD ÉIREANN
CORK LINE
Job No.: 19-135
BH: XC219-CP/RC06

Depth: 6.8 To 8.3 m
Box: 2 of 3
Date: 18/8/20
Depth To: 9.8 m



Job Name: IARNÓD ÉIREANN
CORK LINE
Job No.: 19-135
BH: XC219-CP/RC06

Depth: 8.3 To 9.8 m
Box: 3 of 3
Date: 18/8/20
Depth To: 9.8 m



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	C.P/R.C06
	Rock Core Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	Feb-March & Jun-Sep 2020

Job Name: IARNÓD ÉIREANN
CORK LINE

Job No.: 19-135

BH: XC219-CP/RC07

Depth: 3.7 To 5.2 m

Box: 1 OF 4

Date: 24/8/20

Depth To: 9.7 m



Job Name: IARNÓD ÉIREANN
CORK LINE

Job No.: 19-135

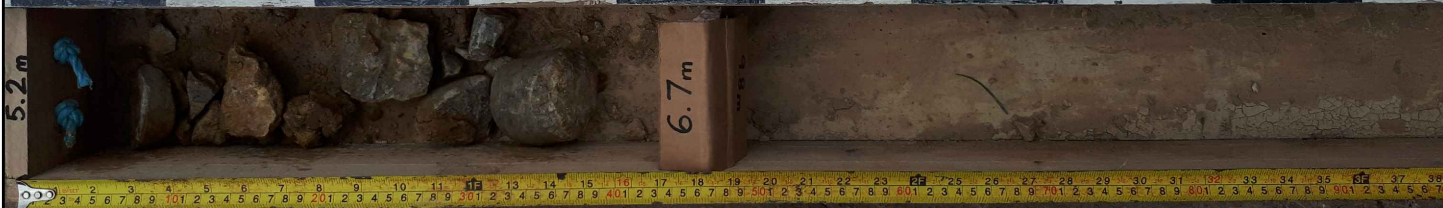
BH: XC219-CP/RC07

Depth: 5.2 To 6.7 m

Box: 2 OF 4

Date: 24/8/20

Depth To: 9.7 m



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

C.P/R.C07

Rock Core Photographs

Client:

Iarnród Éireann

Engineer:

Jacob's

Date:

Feb-March & Jun-Sep 2020

Job Name: IARNÓD ÉIREANN
CORK LINE
Job No.: 19-135
BH: XC219-CP/RC07

Depth: 6.7 TO 8.2 m
Box: 3 OF 4
Date: 24/8/20
Depth To: 9.7 m



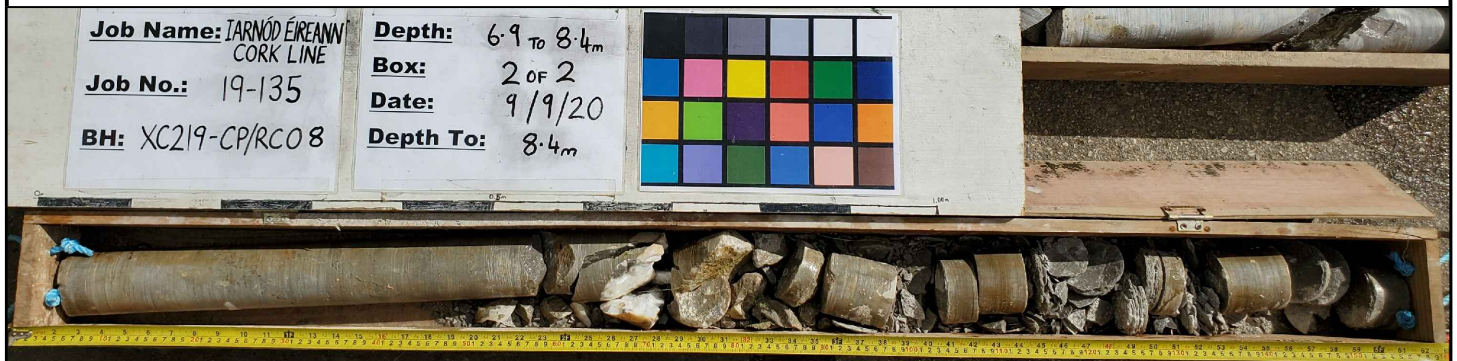
Job Name: IARNÓD ÉIREANN
CORK LINE
Job No.: 19-135
BH: XC219-CP/RC07

Depth: 8.2 TO 10.7 m
Box: 4 OF 4
Date: 24/8/20
Depth To: 9.7 m



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	C.P/R.C07
	Rock Core Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	Feb-March & Jun-Sep 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	C.P/R.C08
	Rock Core Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	Feb-March & Jun-Sep 2020

Appendix D

Trial Pit Logs



Project No.: 19-135	Project Name: Cork Line Level Crossings	Trial Pit No.: XC219-TP01
Co-ordinates: 553103.46 E	Client: Iarnród Éireann / Irish Rail	Sheet 1 of 1
Method: Excavation	Client's Representative: JACOBS	Scale: 1:20
Plant: Kobelco SK140SRLC	Ground Level: 82.78 mOD	Driver: AL
	Date: 03/07/2020	Logger: MN

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
0.05	ES1			(0.20)		TOPSOIL: Soft dark brown slightly sandy silty CLAY with occasional gravel and frequent rootlets, moist	
0.20 - 0.50	B2		82.58	0.20		Firm to stiff light brownish grey and orange brown mottled slightly sandy silty CLAY with occasional gravel and occasional rootlets, moist. Sand fine to coarse. Gravel mostly fine to medium.	
0.20 - 0.50	D3			(0.30)			
0.40		HVP=56, HVR=20					
0.40		HVP=57, HVR=16					
0.40		HVP=68, HVR=18	82.28	0.50		Stiff orange brown with a little light grey to light brownish grey slightly sandy slightly gravelly silty CLAY with occasional rootlets, moist. Lens of orange brown slightly silty fine to medium sand from 0.8m to 1.0m in southern portion of trial pit.	0.5
0.50	ES4						
0.50 - 1.00	B5						
0.50 - 1.00	D6			(0.50)			
0.70		HVP=74, HVR=21					
0.70		HVP=77, HVR=20					
0.70		HVP=78, HVR=17					
1.00	ES7		81.78	1.00		Stiff orange brown slightly sandy silty CLAY, moist. Sand mostly fine.	1.0
1.20 - 1.70	B8						
1.20 - 1.70	D9			(0.80)			1.5
1.80 - 2.30	B10						
1.80 - 2.30	D11		80.98	1.80		Firm greyish brown to brownish grey silty CLAY locally thinly interlaminated with slightly fine sandy slightly clayey silt, moist. (Potential Alluvium Deposit)	2.0
				(0.50)			
2.30 - 2.50	B12		80.48	2.30		Brownish grey sandy clayey GRAVEL with low cobble content, wet. Sand fine to coarse. Gravel and cobbles angular to subangular predominantly limestone.	2.5
2.30 - 2.50	D13	Rapid inflow		(0.20)			
			80.28	2.50		End of trial pit at 2.500m	2.5
							3.0
							3.5

Remarks	Water Strikes:		Stability: Good to 2.3m; collapsing below 2.3m Width: 1.10 Length: 3.80
	Struck at (m):	Remarks:	
	2.30	Rapid inflow	

Trial Pit terminated at 2.50m due to rapid water inflow from 2.3m leading to gravel slumping into the pit below this depth.



Project No.: 19-135	Project Name: Cork Line Level Crossings	Trial Pit No.: XC219-TP02
Co-ordinates: 553224.96 E	Client: Iarnród Éireann / Irish Rail	Sheet 1 of 2
Method: Excavation	Client's Representative: JACOBS	Scale: 1:20
Plant: Kobelco SK140SRu	Ground Level: 84.45 mOD	Date: 17/02/2020
		Driver: TS
		Logger: MN

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
0.05	ES1			(0.30)		TOPSOIL: Soft dark brown slightly gravelly slightly silty CLAY with frequent rootlets, moist.	
0.50 0.50 - 1.00 0.50 - 1.00 0.60	ES2 B3 B4	HVP=64, HVR=26	84.15	0.30 (0.50)		Soft to firm yellowish brown slightly gravelly sandy silty CLAY with occasional charcoal fragments and rootlets, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular.	0.5
1.00 1.10	ES5	HVP=86, HVR=37	83.65	0.80 (0.50)		Stiff yellowish brown sandy slightly gravelly silty CLAY with charcoal fragments and rootlets, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular.	1.0
1.30 - 1.80	B6		83.15	1.30 (0.50)		Stiff yellowish brown slightly sandy slightly gravelly silty CLAY with low cobble and small boulder content, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular. Cobbles and boulders are angular to subangular limestone.	1.5
		Steady inflow - No rise	82.65	1.80		Stiff yellowish brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular. Cobbles and boulders are angular to subangular limestone. <i>At 1.80m: Slightly sandy GRAVEL lens.</i>	2.0
		Steady inflow - No rise					
2.50 - 3.00	B7						2.5
3.00	ES8			(2.50)			3.0
3.50 - 4.00	B9						3.5

Continued on Next Page

Remarks	Water Strikes:		Stability:
	Struck at (m):	Remarks:	Sides collapsing
	1.80	Steady inflow - No rise	Width: 2.00
	2.20	Steady inflow - No rise	Length: 4.70

Trial Pit terminated at 4.30m due to pit walls collapsing.



Project No.: 19-135	Project Name: Cork Line Level Crossings	Trial Pit No.: XC219-TP02
Co-ordinates: 553224.96 E	Client: Iarnród Éireann / Irish Rail	Sheet 2 of 2
Method: Excavation	Client's Representative: JACOBS	Scale: 1:20
Plant: Kobelco SK140SRu	Ground Level: 84.45 mOD	Driver: TS
	Date: 17/02/2020	Logger: MN

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
			80.15	4.30		End of trial pit at 4.300m	
							4.5
							5.0
							5.5
							6.0
							6.5
							7.0
							7.5

Remarks Trial Pit terminated at 4.30m due to pit walls collapsing.	Water Strikes:		Stability: Sides collapsing
	Struck at (m):	Remarks:	
	1.80	Steady inflow - No rise	Width: 2.00
2.20	Steady inflow - No rise	Length: 4.70	



Project No.: 19-135	Project Name: Cork Line Level Crossings	Trial Pit No.: XC219-TP03
Co-ordinates: 553405.28 E	Client: Iarnród Éireann / Irish Rail	Sheet 1 of 1
Method: Excavation	Client's Representative: JACOBS	Scale: 1:20
Plant: Kobelco SK140SRu	Ground Level: 90.02 mOD	Driver: TS
	Date: 17/02/2020	Logger: MN

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
0.05	ES1			(0.30)		TOPSOIL: Soft dark brown slightly sandy silty CLAY with occasional gravel and frequent rootlets, very moist.	
0.30 - 0.55 0.35	B2	HVP=39, HVR=18	89.72	0.30 (0.25)		Soft to firm yellowish brown slightly sandy to sandy slightly gravelly silty CLAY with occasional rootlets, moist.	
0.50	ES3		89.47	0.55		Soft to firm yellowish brown slightly sandy slightly gravelly silty CLAY with medium to high cobble and boulder content, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular. Cobbles and boulders are subangular, predominately limestone.	0.5
0.70 - 1.20	B4						
1.00 1.00	ES5	HVP=34, HVR=16		(1.15)		<i>At 1.10m on West side of pit: Large 800mm dia subangular limestone boulder.</i>	1.0
			88.32	1.70		Yellowish brown slightly clayey very silty very gravelly SAND with low to medium cobble content and low boulder content, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular. Cobbles and boulders are angular to subangular, limestone.	1.5
2.00 - 2.50	B6			(1.10)			2.0
							2.5
2.80 - 3.00	B7		87.22	2.80 (0.20)		Firm brown slightly sandy gravelly silty CLAY with high cobble and boulder content, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular. Cobbles and boulders are angular to subangular, limestone.	3.0
			87.02 87.02	(0.00)		Strong grey closely fractured slightly weathered fine grained micritic LIMESTONE. End of trial pit at 3.000m	3.5

Remarks Trial Pit terminated at 3.00m on probable bedrock.	Water Strikes:		Stability: Sides spalling
	Struck at (m):	Remarks:	
		None Encountered	Width: 1.70 Length: 3.70



Project No.: 19-135	Project Name: Cork Line Level Crossings	Trial Pit No.: XC219-TP04
Co-ordinates: 553468.36 E	Client: Iarnród Éireann / Irish Rail	Sheet 1 of 1
Method: Excavation	Client's Representative: JACOBS	Scale: 1:20
Plant: Kobelco SK140SRu	Ground Level: 87.65 mOD	Date: 17/02/2020
		Driver: TS
		Logger: MN

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water
0.05	ES1	HVP=32, HVR=18	87.35	(0.30)		TOPSOIL: Soft dark brown slightly sandy silty CLAY with occasional gravel and frequent rootlets, moist.	
0.30 - 0.80	B2			0.30		Soft to firm yellowish brown slightly gravelly sandy silty CLAY with occasional rootlets, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular.	0.5
0.45	ES3			(0.60)			
0.50				0.90			
1.00	ES4			86.75	(1.00)		Firm yellowish brown sandy silty gravelly CLAY with high cobble content and low boulder content, moist. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular. Cobbles and boulders are angular to subangular, limestone.
1.00 - 1.50	B5	(1.90)					1.5
			85.75			Strong light grey closely to medium fractured slightly weathered fine grained micritic LIMESTONE bedrock.	2.0
			85.75			End of trial pit at 1.900m	2.0
							2.5
							3.0
							3.5

Remarks Trial Pit terminated at 1.90m on probable bedrock.	Water Strikes:		Stability: Sides collapsing
	Struck at (m):	Remarks:	
		None Encountered	Width: 2.40 Length: 4.60

Appendix E

Trial Pit Photographs



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



19-135
XC219
TP01



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT1
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
 Cork Line Level Crossings
 XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT2
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
 Cork Line Level Crossings
 XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT3
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
 Cork Line Level Crossings
 XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



19-135
XC219
TP04



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020



Iarnród Éireann
Cork Line Level Crossings
XC219 (19-135-5)

	T.PIT4
	Trial Pit Photographs
Client:	Iarnród Éireann
Engineer:	Jacob's
Date:	February & July 2020

Appendix F

Indirect CBR Test Results

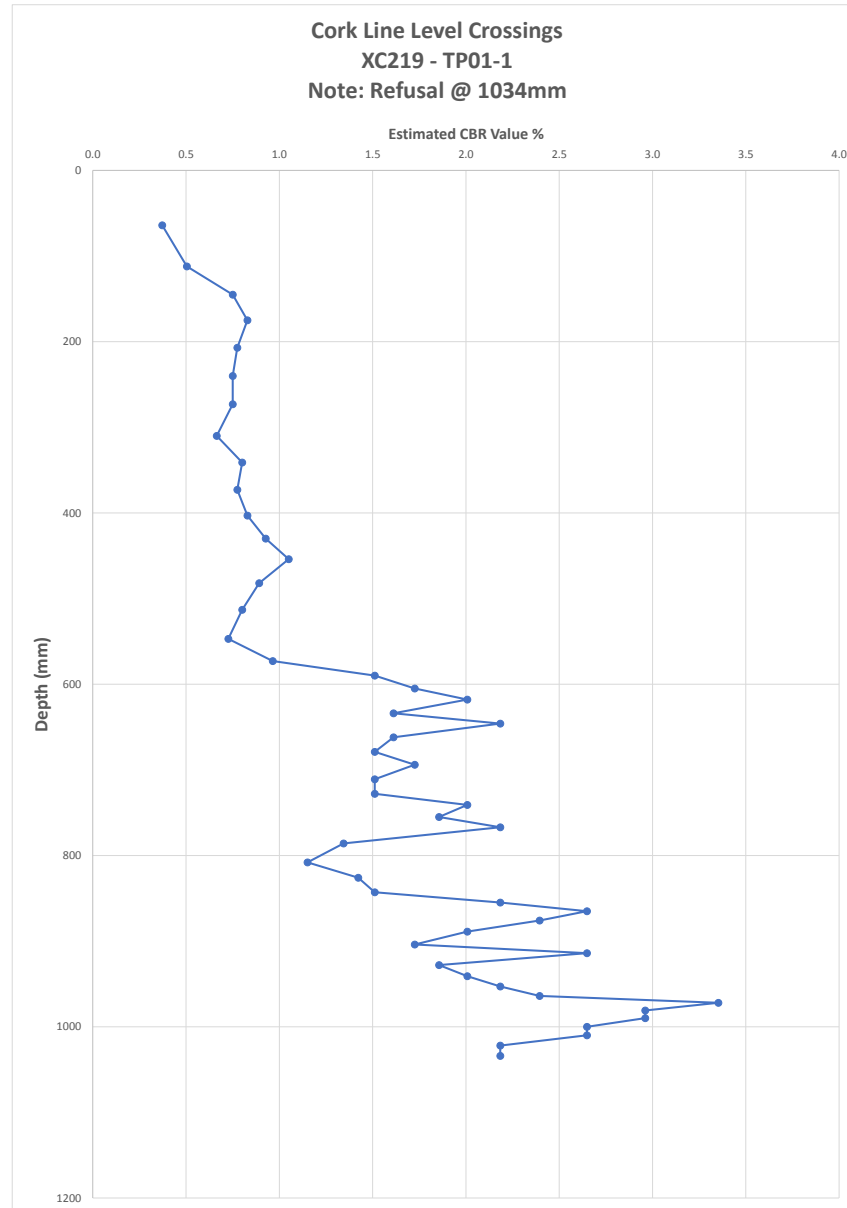
Cork Line Level Crossings - Irish Rail
 Transport Research Laboratory - Dynamic Cone Penetrometer Data

Location	XC219 - TP01-1	Job No	19-135
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Easting	Northing	Elevation

Test Start Depth	0	mm/bgl	DATE
Start Reading:	1132	mm	14/07/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1068	64	64	0.4
2	1020	48	112	0.5
3	987	33	145	0.7
4	957	30	175	0.8
5	925	32	207	0.8
6	892	33	240	0.7
7	859	33	273	0.7
8	822	37	310	0.7
9	791	31	341	0.8
10	759	32	373	0.8
11	729	30	403	0.8
12	702	27	430	0.9
13	678	24	454	1.0
14	650	28	482	0.9
15	619	31	513	0.8
16	585	34	547	0.7
17	559	26	573	1.0
18	542	17	590	1.5
19	527	15	605	1.7
20	514	13	618	2.0
21	498	16	634	1.6
22	486	12	646	2.2
23	470	16	662	1.6
24	453	17	679	1.5
25	438	15	694	1.7
26	421	17	711	1.5
27	404	17	728	1.5
28	391	13	741	2.0
29	377	14	755	1.9
30	365	12	767	2.2
31	346	19	786	1.3
32	324	22	808	1.2
33	306	18	826	1.4
34	289	17	843	1.5
35	277	12	855	2.2
36	267	10	865	2.6
37	256	11	876	2.4
38	243	13	889	2.0
39	228	15	904	1.7
40	218	10	914	2.6
41	204	14	928	1.9
42	191	13	941	2.0
43	179	12	953	2.2
44	168	11	964	2.4
45	160	8	972	3.4
46	151	9	981	3.0
47	142	9	990	3.0
48	132	10	1000	2.6
49	122	10	1010	2.6
50	110	12	1022	2.2
51	98	12	1034	2.2

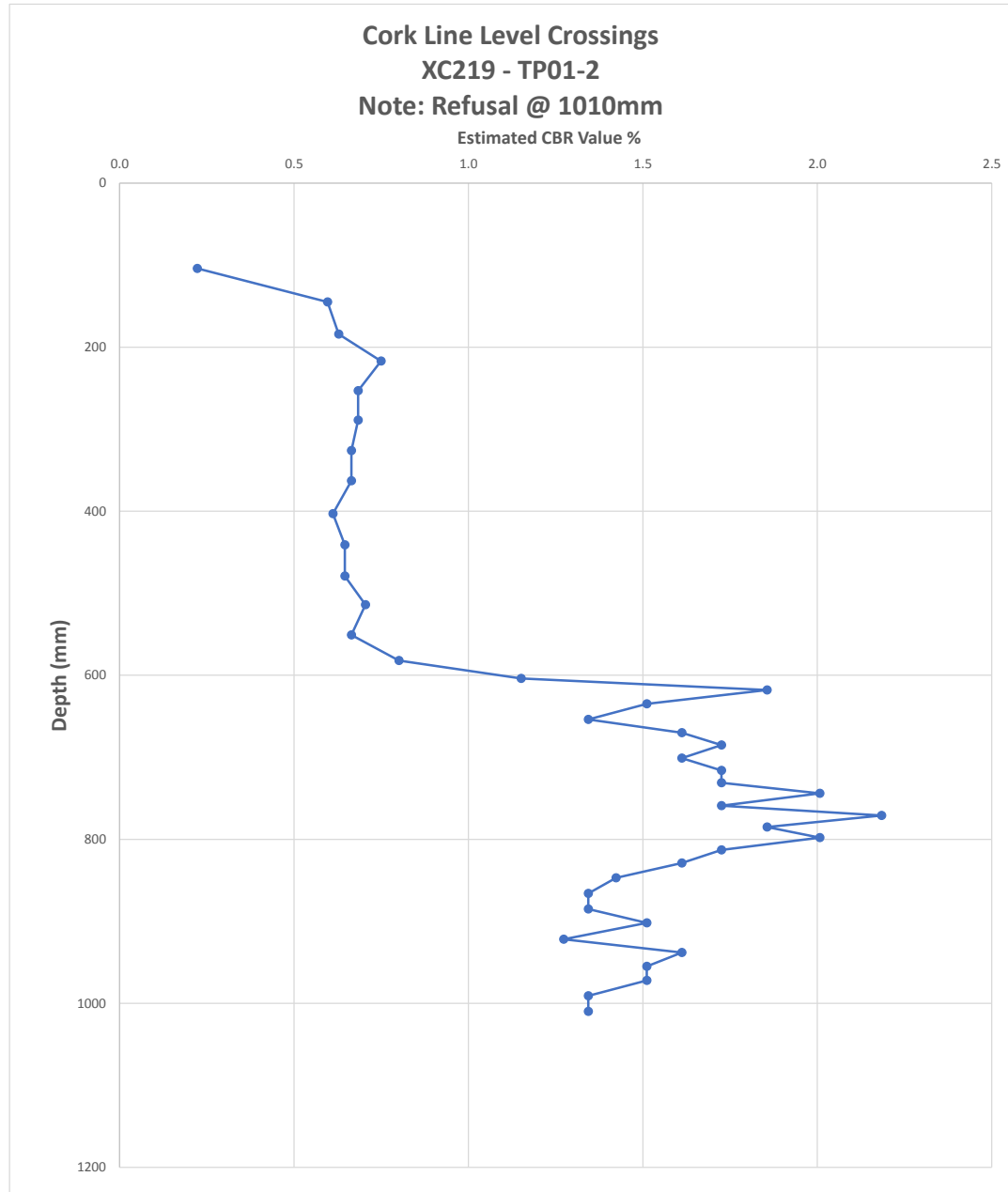


Location	XC219 - TP01-2	Job No	19-135
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Easting	Northing	Elevation

Test Start Depth	0	mm/bgl	DATE
Start Reading:	1125	mm	14/07/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1021	104	104	0.2
2	980	41	145	0.6
3	941	39	184	0.6
4	908	33	217	0.7
5	872	36	253	0.7
6	836	36	289	0.7
7	799	37	326	0.7
8	762	37	363	0.7
9	722	40	403	0.6
10	684	38	441	0.6
11	646	38	479	0.6
12	611	35	514	0.7
13	574	37	551	0.7
14	543	31	582	0.8
15	521	22	604	1.2
16	507	14	618	1.9
17	490	17	635	1.5
18	471	19	654	1.3
19	455	16	670	1.6
20	440	15	685	1.7
21	424	16	701	1.6
22	409	15	716	1.7
23	394	15	731	1.7
24	381	13	744	2.0
25	366	15	759	1.7
26	354	12	771	2.2
27	340	14	785	1.9
28	327	13	798	2.0
29	312	15	813	1.7
30	296	16	829	1.6
31	278	18	847	1.4
32	259	19	866	1.3
33	240	19	885	1.3
34	223	17	902	1.5
35	203	20	922	1.3
36	187	16	938	1.6
37	170	17	955	1.5
38	153	17	972	1.5
39	134	19	991	1.3
40	115	19	1010	1.3



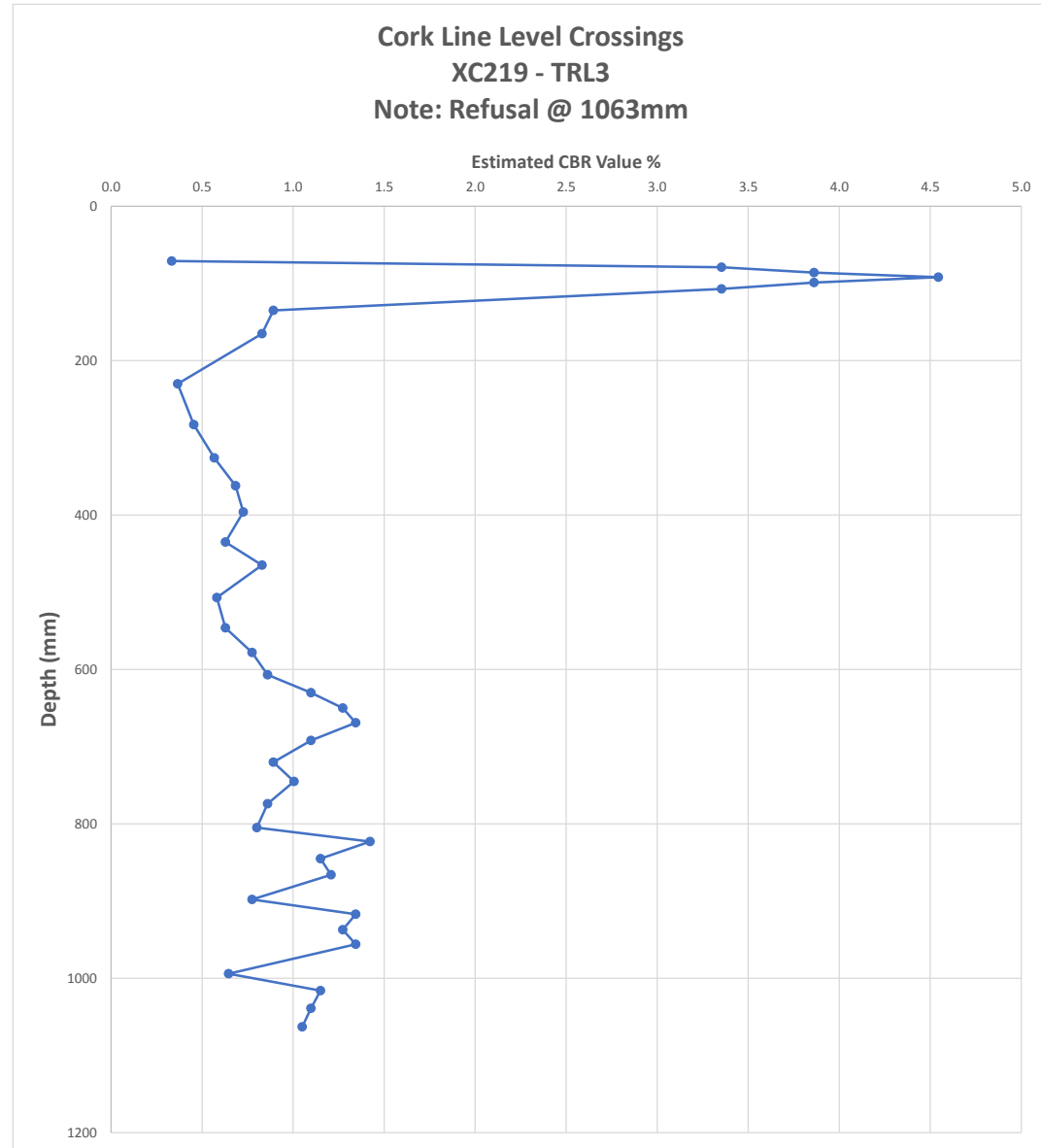
Cork Line Level Crossings - Irish Rail
 Transport Research Laboratory - Dynamic Cone Penetrometer Data

Location	XC219 - TRL3	Job No	19-135
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Easting	Northing	Elevation
553223.16	609814.655	84.527

Test Start Depth	0	mm/bgl	DATE
Start Reading:	1150	mm	25/02/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1079	71	71	0.3
2	1071	8	79	3.4
3	1064	7	86	3.9
4	1058	6	92	4.5
5	1051	7	99	3.9
6	1043	8	107	3.4
7	1015	28	135	0.9
8	985	30	165	0.8
9	920	65	230	0.4
10	867	53	283	0.5
11	824	43	326	0.6
12	788	36	362	0.7
13	754	34	396	0.7
14	715	39	435	0.6
15	685	30	465	0.8
16	643	42	507	0.6
17	604	39	546	0.6
18	572	32	578	0.8
19	543	29	607	0.9
20	520	23	630	1.1
21	500	20	650	1.3
22	481	19	669	1.3
23	458	23	692	1.1
24	430	28	720	0.9
25	405	25	745	1.0
26	376	29	774	0.9
27	345	31	805	0.8
28	327	18	823	1.4
29	305	22	845	1.2
30	284	21	866	1.2
31	252	32	898	0.8
32	233	19	917	1.3
33	213	20	937	1.3
34	194	19	956	1.3
35	156	38	994	0.6
36	134	22	1016	1.2
37	111	23	1039	1.1
38	87	24	1063	1.0
39				



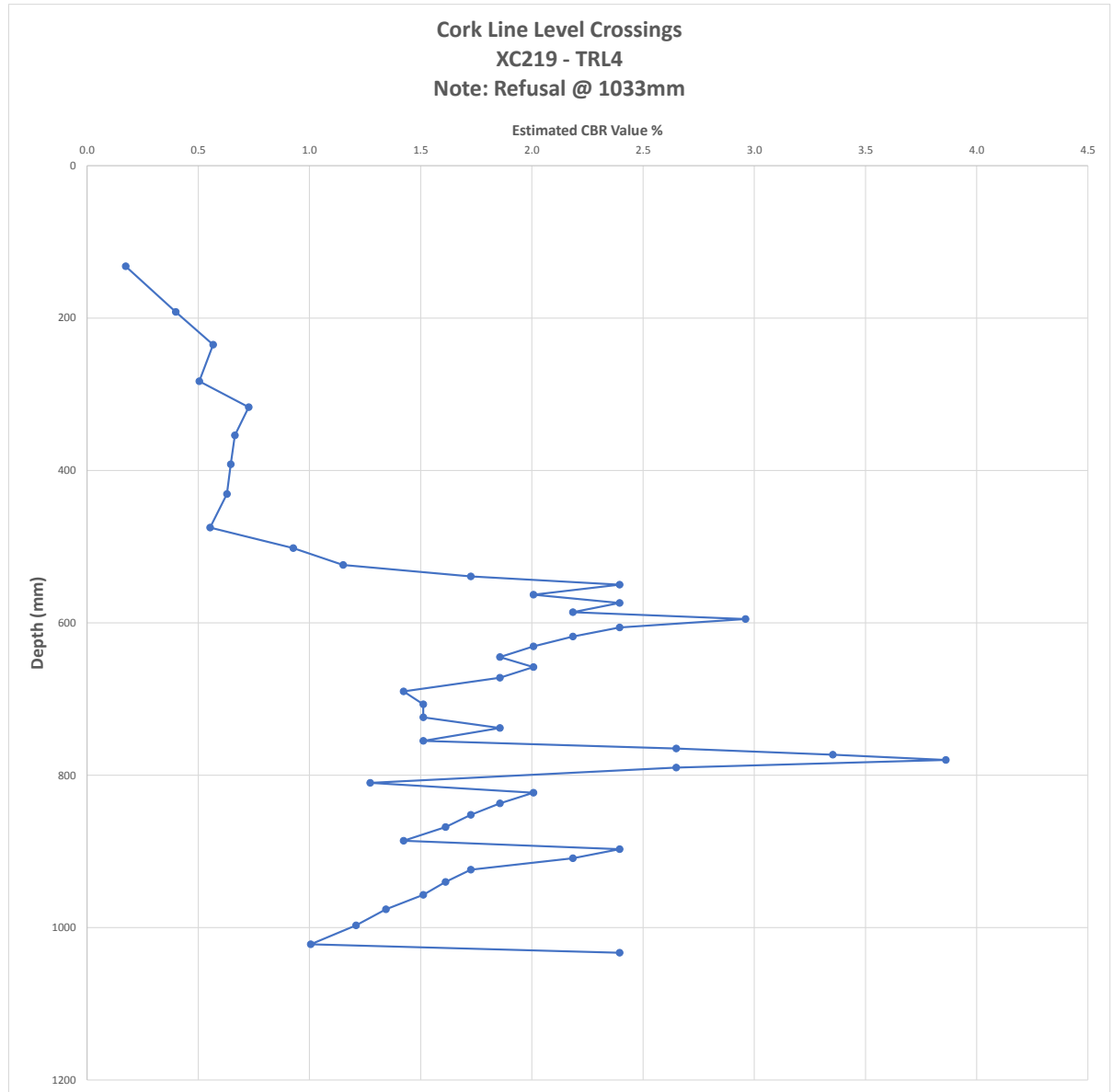
Cork Line Level Crossings - Irish Rail
 Transport Research Laboratory - Dynamic Cone Penetrometer Data

Location	XC219 - TRL4	Job No	19-135
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Easting	Northing	Elevation
553228.376	609818.474	84.536

Test Start Depth	0	mm/bgl	DATE
Start Reading:	1150	mm	25/02/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1018	132	132	0.2
2	958	60	192	0.4
3	915	43	235	0.6
4	867	48	283	0.5
5	833	34	317	0.7
6	796	37	354	0.7
7	758	38	392	0.6
8	719	39	431	0.6
9	675	44	475	0.6
10	648	27	502	0.9
11	626	22	524	1.2
12	611	15	539	1.7
13	600	11	550	2.4
14	587	13	563	2.0
15	576	11	574	2.4
16	564	12	586	2.2
17	555	9	595	3.0
18	544	11	606	2.4
19	532	12	618	2.2
20	519	13	631	2.0
21	505	14	645	1.9
22	492	13	658	2.0
23	478	14	672	1.9
24	460	18	690	1.4
25	443	17	707	1.5
26	426	17	724	1.5
27	412	14	738	1.9
28	395	17	755	1.5
29	385	10	765	2.6
30	377	8	773	3.4
31	370	7	780	3.9
32	360	10	790	2.6
33	340	20	810	1.3
34	327	13	823	2.0
35	313	14	837	1.9
36	298	15	852	1.7
37	282	16	868	1.6
38	264	18	886	1.4
39	253	11	897	2.4
40	241	12	909	2.2
41	226	15	924	1.7
42	210	16	940	1.6
43	193	17	957	1.5
44	174	19	976	1.3
45	153	21	997	1.2
46	128	25	1022	1.0
47	117	11	1033	2.4
48				



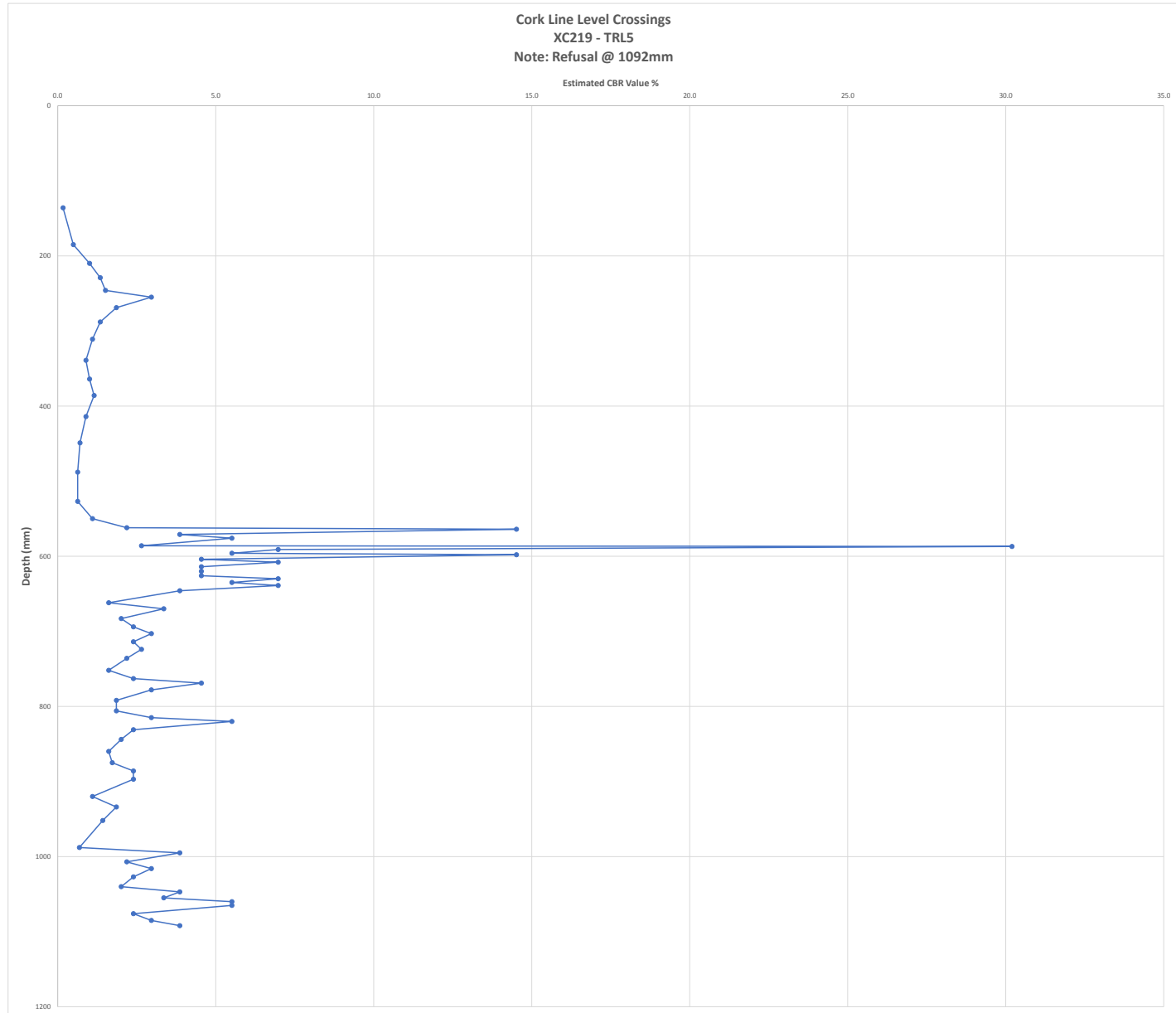
Cork Line Level Crossings - Irish Rail
Transport Research Laboratory - Dynamic Cone Penetrometer Data

Location	XC219 - TRL5	Job No	19-135
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Easting	Northing	Elevation
553403.448	609802.921	90.162

Test Start Depth	0	mm/blow	DATE
Start Reading:	1150	mm	25/02/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1014	136	136	0.2
2	965	49	185	0.5
3	940	25	210	1.0
4	921	19	229	1.3
5	904	17	246	1.5
6	895	9	255	3.0
7	881	14	269	1.9
8	862	19	288	1.3
9	839	23	311	1.1
10	811	28	339	0.9
11	786	25	364	1.0
12	764	22	386	1.2
13	736	28	414	0.9
14	701	35	449	0.7
15	662	39	488	0.6
16	623	39	527	0.6
17	600	23	550	1.1
18	588	12	562	2.2
19	586	2	564	14.5
20	579	7	571	3.9
21	574	5	576	5.5
22	564	10	586	2.6
23	563	1	587	30.2
24	559	4	591	7.0
25	554	5	596	5.5
26	552	2	598	14.5
27	546	6	604	4.5
28	542	4	608	7.0
29	536	6	614	4.5
30	530	6	620	4.5
31	524	6	626	4.5
32	520	4	630	7.0
33	515	5	635	5.5
34	511	4	639	7.0
35	504	7	646	3.9
36	488	16	662	1.6
37	480	8	670	3.4
38	467	13	683	2.0
39	456	11	694	2.4
40	447	9	703	3.0
41	436	11	714	2.4
42	426	10	724	2.6
43	414	12	736	2.2
44	398	16	752	1.6
45	387	11	763	2.4
46	381	6	769	4.5
47	372	9	778	3.0
48	358	14	792	1.9
49	344	14	806	1.9
50	335	9	815	3.0
51	330	5	820	5.5
52	319	11	831	2.4
53	306	13	844	2.0
54	290	16	860	1.6
55	275	15	875	1.7
56	264	11	886	2.4
57	253	11	897	2.4
58	230	23	920	1.1
59	216	14	934	1.9
60	198	18	952	1.4
61	162	36	988	0.7
62	155	7	995	3.9
63	143	12	1007	2.2
64	134	9	1016	3.0
65	123	11	1027	2.4
66	110	13	1040	2.0
67	103	7	1047	3.9
68	95	8	1055	3.4
69	90	5	1060	5.5
70	85	5	1065	5.5
71	74	11	1076	2.4
72	65	9	1085	3.0
73	58	7	1092	3.9
74				



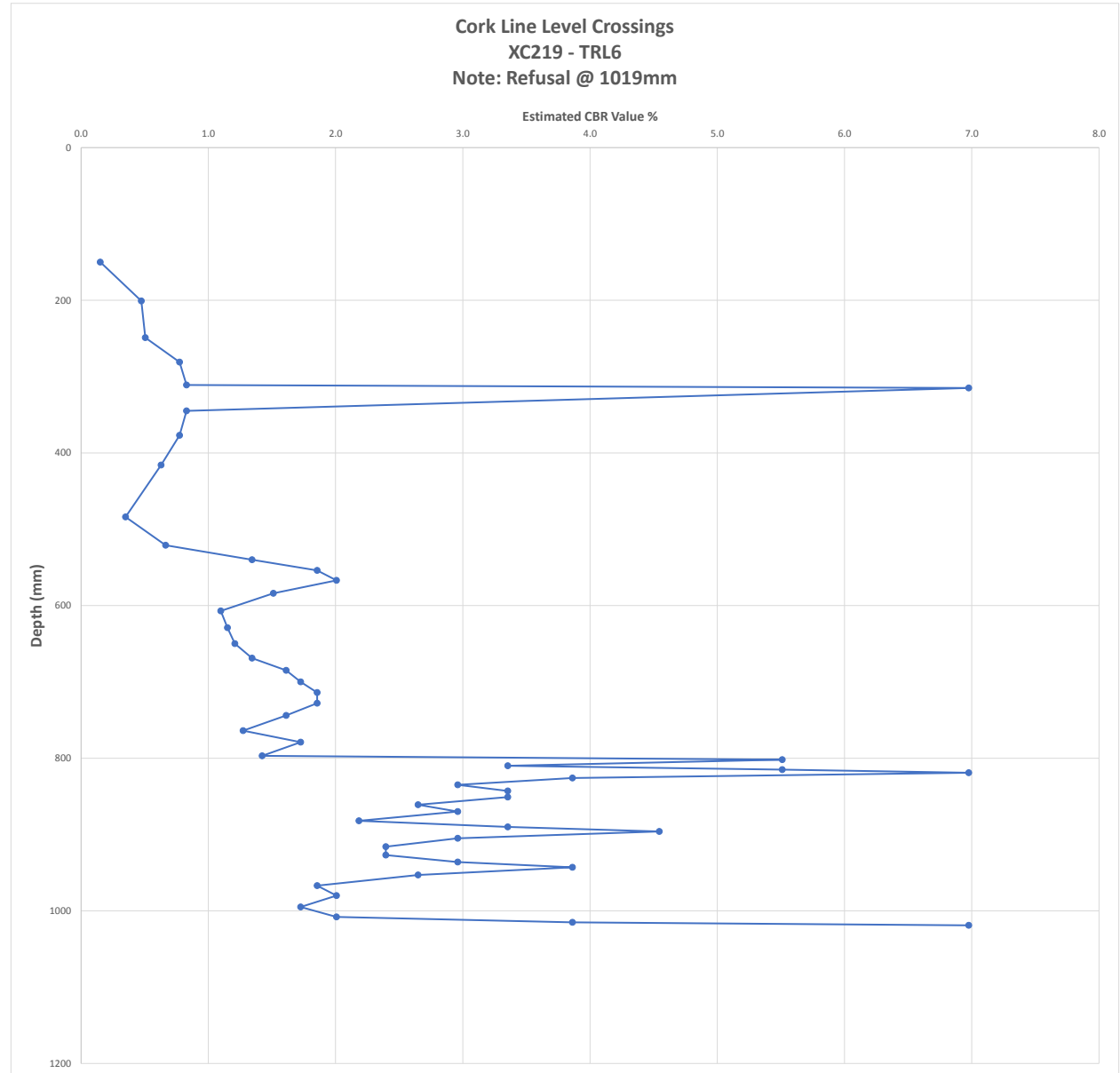
Cork Line Level Crossings - Irish Rail
 Transport Research Laboratory - Dynamic Cone Penetrometer Data

Location	XC219 - TRL6	Job No	19-135
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Easting	Northing	Elevation
553408.518	609804.892	89.805

Test Start Depth	0	mm/bgl	DATE
Start Reading:	1150	mm	25/02/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1000	150	150	0.2
2	949	51	201	0.5
3	901	48	249	0.5
4	869	32	281	0.8
5	839	30	311	0.8
6	835	4	315	7.0
7	805	30	345	0.8
8	773	32	377	0.8
9	734	39	416	0.6
10	666	68	484	0.3
11	629	37	521	0.7
12	610	19	540	1.3
13	596	14	554	1.9
14	583	13	567	2.0
15	566	17	584	1.5
16	543	23	607	1.1
17	521	22	629	1.2
18	500	21	650	1.2
19	481	19	669	1.3
20	465	16	685	1.6
21	450	15	700	1.7
22	436	14	714	1.9
23	422	14	728	1.9
24	406	16	744	1.6
25	386	20	764	1.3
26	371	15	779	1.7
27	353	18	797	1.4
28	348	5	802	5.5
29	340	8	810	3.4
30	335	5	815	5.5
31	331	4	819	7.0
32	324	7	826	3.9
33	315	9	835	3.0
34	307	8	843	3.4
35	299	8	851	3.4
36	289	10	861	2.6
37	280	9	870	3.0
38	268	12	882	2.2
39	260	8	890	3.4
40	254	6	896	4.5
41	245	9	905	3.0
42	234	11	916	2.4
43	223	11	927	2.4
44	214	9	936	3.0
45	207	7	943	3.9
46	197	10	953	2.6
47	183	14	967	1.9
48	170	13	980	2.0
49	155	15	995	1.7
50	142	13	1008	2.0
51	135	7	1015	3.9
52	131	4	1019	7.0



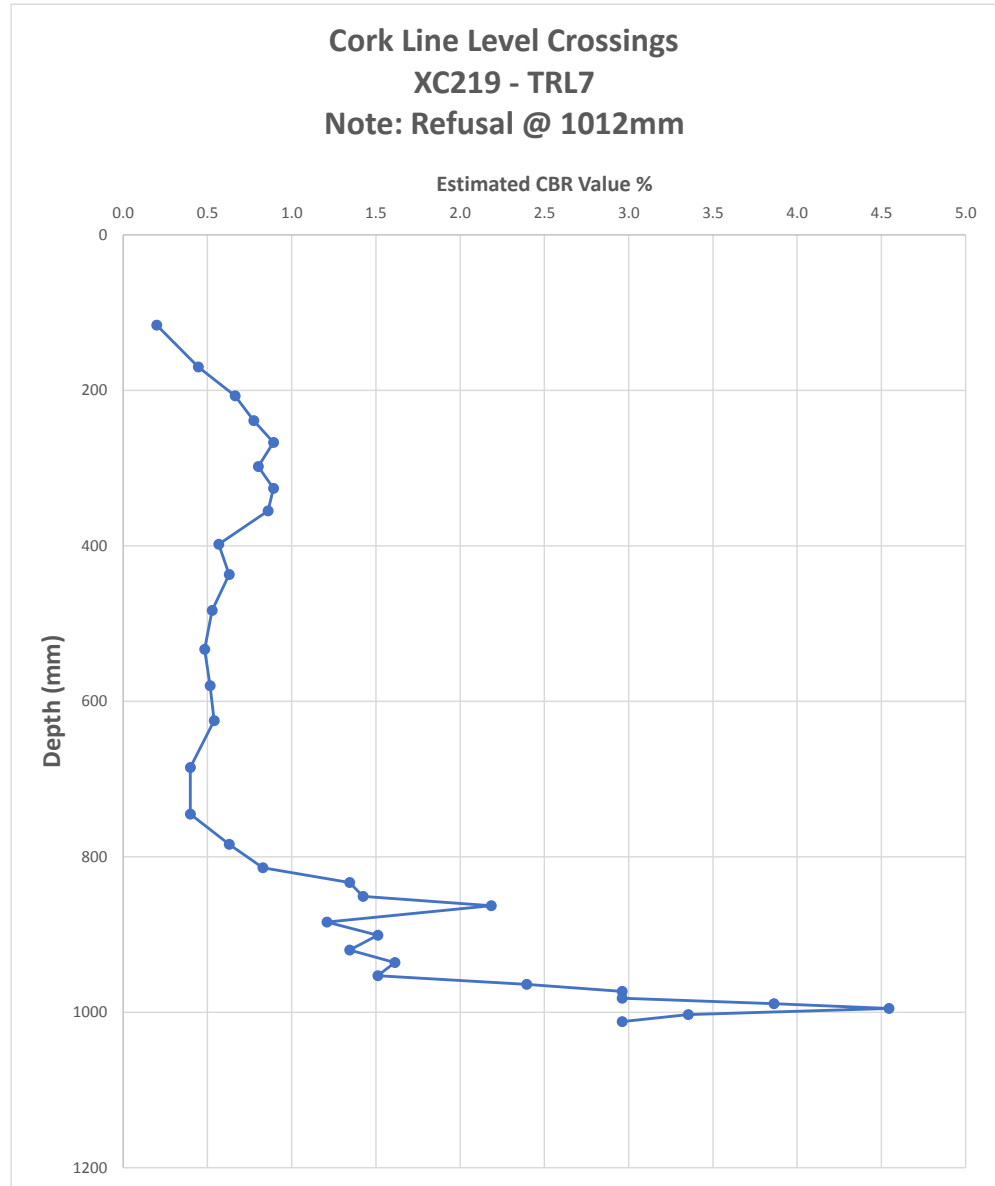
Cork Line Level Crossings - Irish Rail
Transport Research Laboratory - Dynamic Cone Penetrometer Data

Location	XC219 - TRL7	Job No	19-135
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Easting	Northing	Elevation
553465.441	609779.465	87.717

Test Start Depth	0	mm/bgl	DATE
Start Reading:	1150	mm	25/02/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1034	116	116	0.2
2	980	54	170	0.4
3	943	37	207	0.7
4	911	32	239	0.8
5	883	28	267	0.9
6	852	31	298	0.8
7	824	28	326	0.9
8	795	29	355	0.9
9	752	43	398	0.6
10	713	39	437	0.6
11	667	46	483	0.5
12	617	50	533	0.5
13	570	47	580	0.5
14	525	45	625	0.5
15	465	60	685	0.4
16	405	60	745	0.4
17	366	39	784	0.6
18	336	30	814	0.8
19	317	19	833	1.3
20	299	18	851	1.4
21	287	12	863	2.2
22	266	21	884	1.2
23	249	17	901	1.5
24	230	19	920	1.3
25	214	16	936	1.6
26	197	17	953	1.5
27	186	11	964	2.4
28	177	9	973	3.0
29	168	9	982	3.0
30	161	7	989	3.9
31	155	6	995	4.5
32	147	8	1003	3.4
33	138	9	1012	3.0
34				



Cork Line Level Crossings - Irish Rail

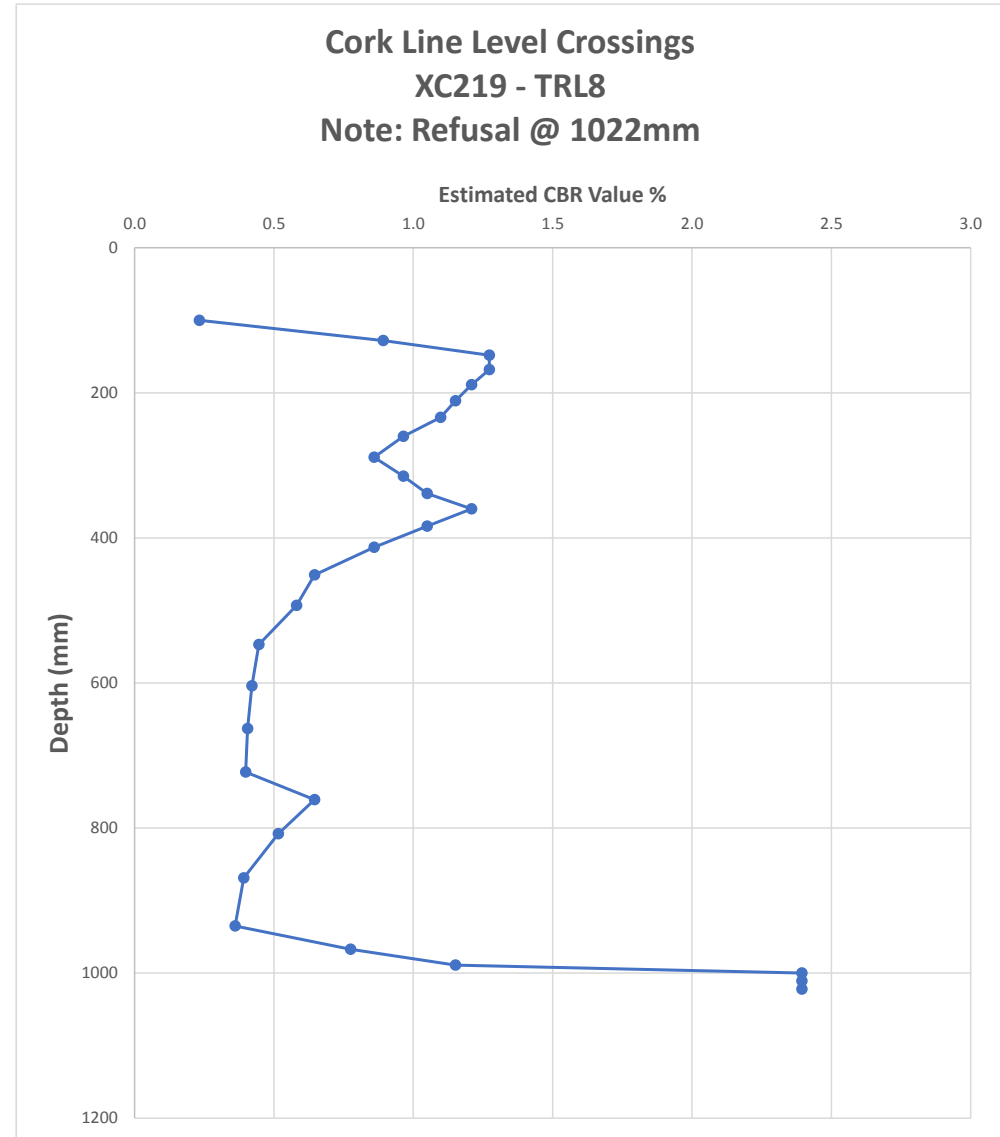
Transport Research Laboratory - Dynamic Cone Penetrometer Data

Location	XC219 - TRL8	Job No	19-135
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Easting	Northing	Elevation
553470.268	609778.864	87.71

Test Start Depth	0	mm/bgl	DATE
Start Reading:	1150	mm	25/02/2020

No. of Blows	READING (mm)	Penetration/blow (mm)	DEPTH	CBR %
1	1050	100	100	0.2
2	1022	28	128	0.9
3	1002	20	148	1.3
4	982	20	168	1.3
5	961	21	189	1.2
6	939	22	211	1.2
7	916	23	234	1.1
8	890	26	260	1.0
9	861	29	289	0.9
10	835	26	315	1.0
11	811	24	339	1.0
12	790	21	360	1.2
13	766	24	384	1.0
14	737	29	413	0.9
15	699	38	451	0.6
16	657	42	493	0.6
17	603	54	547	0.4
18	546	57	604	0.4
19	487	59	663	0.4
20	427	60	723	0.4
21	389	38	761	0.6
22	342	47	808	0.5
23	281	61	869	0.4
24	215	66	935	0.4
25	183	32	967	0.8
26	161	22	989	1.2
27	150	11	1000	2.4
28	139	11	1011	2.4
29	128	11	1022	2.4
30				



Appendix G

Water Purging Data and Logs

Job Name: I.E - Cork Line
 Job Nr: 19-135

h (m) 3
 r (m) 0.0505
 r2 0.00255025
 TWV (m3) 0.024035596

BH ID: <u>XC219-CPRC01A</u>	Theoretical Well Volume	24.04 ltrs
Depth to Response Zone: Top (mbgl) Bottom (mbgl)	TWV x3	72.11 ltrs
3 6		

Purge Start Time: 14:43	(mbgl)
Purge Finish Time: 16:00	Depth to Water 1.32
Depth to water after purging: 1.05 mbgl	Total Depth 5.1

	Time Taken to fill 25ltr container(mins)	Flow Rate l/min	Date
Reading 1:	4	5	05/08/2020
Reading 2:	4	5	
Reading 3:	4	5	

Nr of Containers filled:

Total Volume Purged: litres

	Temperature	pH	Electrical Conductivity	Dissolved Oxygen	Redox Potential
Reading 1	17.57	6.46	25.55	0.85	22
Reading 2	14.96	6.61	39	0.87	17.5
Reading 3	13.99	6.58	34.93	0.88	21
Reading 4	13.65	6.61	37.7	0.88	25.1
Reading 5	12.95	6.62	28.58	0.88	26.7
Reading 6	12.94	6.63	32.82	0.9	27.9
Reading 7	12.79	6.67	39.97	0.89	29.2
Reading 8	12.93	6.67	40.8	0.88	29.3
Reading 9	13	6.56	29.12	0.86	30.4
Reading 10	12.41	6.59	41.64	0.85	30.7

Job Name: Iarnród Éireann Cork Line		h (m)	3
		r (m)	0.0505
Job Nr: 19-135		r2	0.00255025
		TWV (m3)	0.024035596

BH ID: <u>X219-CPRC02</u>	Theoretical Well Volume	24.04 <i>ltrs</i>
Depth to Response Zone:	Top (mbgl)	Bottom m(bgl)
	0.5	3.5
		TWV x3
		72.11 <i>ltrs</i>

Purge Start Time:	09:30	
Purge Finish Time:	10:30	
		(mbgl)
Depth to water after purging:		1.23 mbgl
		Depth to Water
		Total Depth
		3.04

	Time Taken to fill 25ltr container(mins)	Flow Rate l/min	
			Date 26/03/2020
Reading 1:	4	6.25	
Reading 2:	4	6.25	
Reading 3:	4	6.25	

Nr of Containers filled:

Total Volume Purged: *litres*

	Temperature	pH	Electrical Conductivity	Dissolved Oxygen	Redox Potential
Reading 1 : Bailer	16.22	7.52	14.20	9.77	161.8
Reading 2	16.89	7.58	14.82	9.52	159.3
Reading 3	15.92	7.60	761.10	9.80	179.7
Reading 4: Pumping	14.76	7.35	772.68	9.91	177.2
Reading 5	13.56	7.55	794.01	10.53	138.7
Reading 6	13.66	7.24	739.89	10.78	143.8
Reading 7	14.60	7.59	721.36	9.92	142
Reading 8	16.35	7.58	657.27	9.51	127.3
Bailer 27/3/20	10.72	7.39	28.23	10.73	144.1

Job Name: Iarnród Éireann Cork Line	h (m)	5.2
	r (m)	0.0505
Job Nr: 19-135	r2	0.00255025
	TWV (m3)	0.0416617

BH ID: <u>X219-CPRC04</u>	Theoretical Well Volume	41.66 <i>ltrs</i>
Depth to Response Zone:	TWV x3	124.99 <i>ltrs</i>
<i>Top (mbgl)</i>		
<i>Bottom (mbgl)</i>		
3		8.2

Purge Start Time:	14:30	
Purge Finish Time:	15:05	
Depth to water after purging:	mbgl	
	(mbgl)	
	Depth to Water	6.98
	Total Depth	8.02

	Time Taken to fill 25ltr container(mins)	Flow Rate l/min		Date
Reading 1:			Bentonite muddy water. Pump stops working after approx 1 minute. Removed pump and clean off mud by pumping in IBC tank. Reattempt pumping in well again but pump stops working after another minute: Bentonite mud on pump when removed from well, repeat process.	07/08/2020
Reading 2:				
Reading 3:				

Nr of Containers filled:

Total Volume Purged: *litres*

	Temperature	pH	Electrical Conductivity	Dissolved Oxygen	Redox Potential
Reading 1					
Reading 2					
Reading 3					
Reading 4					
Reading 5					
Reading 6					
Reading 7					
Reading 8					
Reading 9					
Reading 10					

Job Name: I.E - Cork Line	h (m)	10
	r (m)	0.0505
	r2	0.00255025
Job Nr: 19-135	TWV (m3)	0.080118654

BH ID: <u>XC219-CPRC05</u>	Theoretical Well Volume	80.12 <i>ltrs</i>
Depth to Response Zone:	TWV x3	240.36 <i>ltrs</i>
<i>Top (mbgl)</i>		
<i>Bottom (mbgl)</i>		
3		13

Purge Start Time: 15:10		(mbgl)
Purge Finish Time: 16:25	Depth to Water	6.76
Depth to water after purging:	Total Depth	13.12
mbgl		

	Time Taken to fill 25ltr container(mins)	Flow Rate l/min	
Reading 1:	20	1	<i>Date</i> 07/08/2020
Reading 2:	22	0.9	
Reading 3:	18	1.1	

Nr of Containers filled:

Total Volume Purged: litres

	Temperature	pH	Electrical Conductivity	Dissolved Oxygen	Redox Potential
Reading 1	17.58	6.6	27.56	0.33	10.6
Reading 2	16.63	6.65	26.54	0.35	9.9
Reading 3	13.42	6.72	23.2	0.38	8.5
Reading 4	13.27	6.72	24.07	0.4	6.8
Reading 5	12.94	6.61	19.35	0.39	8.4
Reading 6	13.17	6.6	19.95	0.38	9.4
Reading 7	12.97	6.59	19.95	0.38	9.8
Reading 8	13.48	6.71	28.45	0.38	9.9
Reading 9	13.13	6.62	21.89	0.37	10.4
Reading 10	13.39	6.61	18.36	0.37	11.7
Reading 11	13.16	6.47	17.03	0.37	12.8
Reading 12	13.23	6.65	22.25	0.37	13
Reading 13	13.03	6.51	20.17	0.37	13.6

Appendix H Geotechnical Soil Laboratory Test Results

LABORATORY TEST REPORT

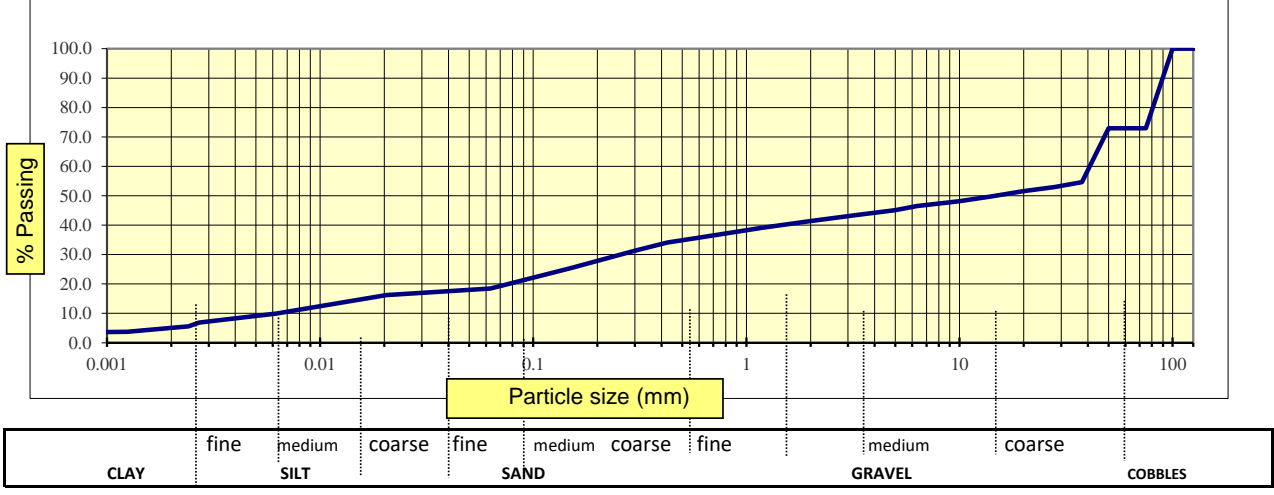
Determination of Particle Size Distribution - BS 1377 : Part 2 : 1990

Determination of Particle Size Distribution (Hydrometer Sedimentation) - BS 1377 : Part 2 : 1990 Cl. 9.5

Project:	Cork Line Level Crossings	Job No:	19-135
Client:	OCB Geotechnical Unit 1 Carrigogna Midleton	Lab Ref No.:	ST 93426
		Date Received:	09/03/2020
		Date Reported:	02/04/2020
		Date Tested:	31/03/2020
Order No:	2003-104	Material:	Soil
Originator:	Ian Holley	Visual Description	Cobbly Dark Clay, Sandy

Client Ref.	XC219-CPRC02 Type B Sample 3
Location:	XC219-CPRC02 Type B Sample 3
Supplier:	Bulk
Source:	Client Info.
Depth (m):	1.2-2.0m
Sampling Reason:	Client Request
Sampled By:	Client
Specification:	Client
Preparation Method:	Without Organics Preparation
Notes:	Disturbed sample from cleanout

BS Sieve Size	% Passing	Specification
300 mm	100	
125 mm	100	
100 mm	100	
75 mm	73	
63 mm	73	
50 mm	73	
37.5 mm	55	
28 mm	53	
20 mm	52	
14 mm	50	
10 mm	48	
6.3 mm	46	
5 mm	45	
3.35 mm	44	
2 mm	41	
1.18 mm	39	
0.6 mm	36	
0.425 mm	34	
0.3 mm	31	
0.15 mm	25	
0.063 mm	18	
0.020 mm	16	
0.006 mm	10	
0.003 mm	7	
0.002 mm	6	
0.001 mm	4	



Tested in accordance with BS 1377: Part 2 : 1990 Clause 9.2 and 9.5

The stated result only relates to the item/location tested, this report shall not be reproduced except in full.
 Sedimentation by Hydrometer - Not UKAS


 Approved Signature

JAMES FISHER TESTING SERVICES (IRELAND) LTD.
 James Ward, Operations Manager

