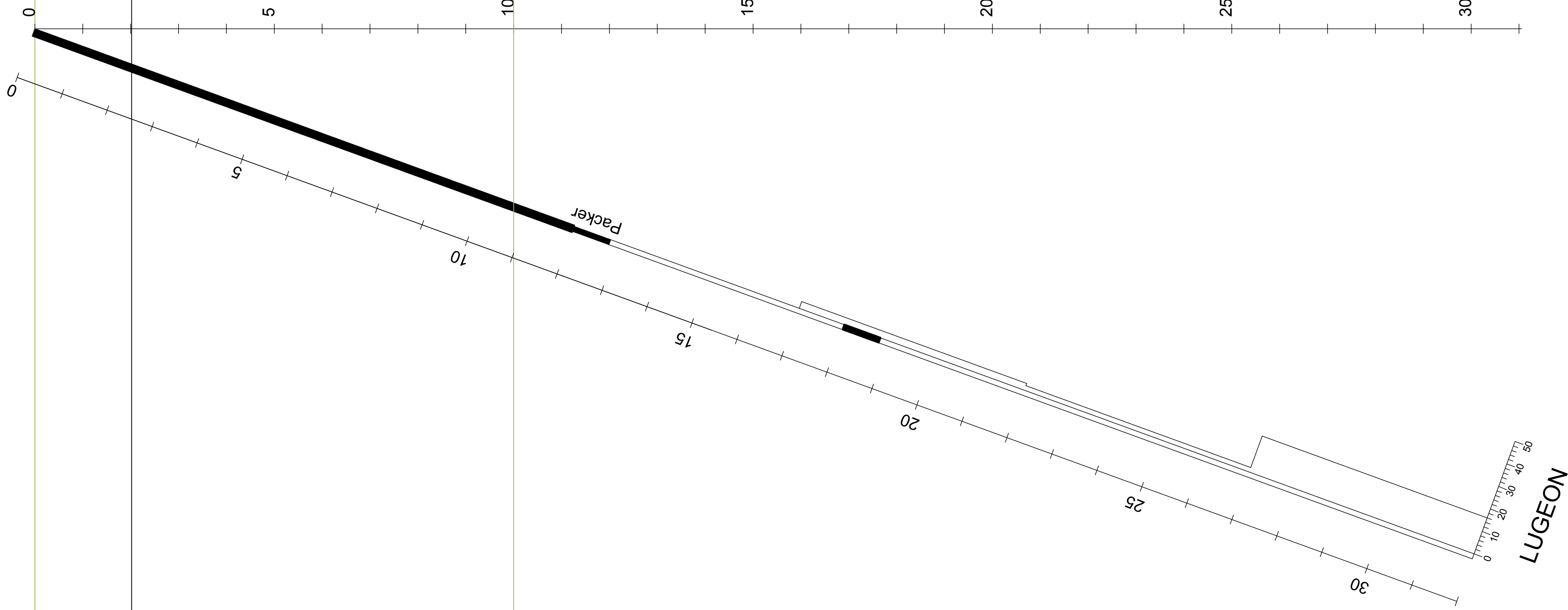


IW_2A

Surface level

GWL

Transition soil/rock



WELL ID: IW_2A

[illegible]

COMMENTS:

*Lugeon value is calculated by subtracting the flow of the lower sections. This requires the same pressure for all sections.

Lugeon value is corrected to the standard reference pressure of 10 bar.

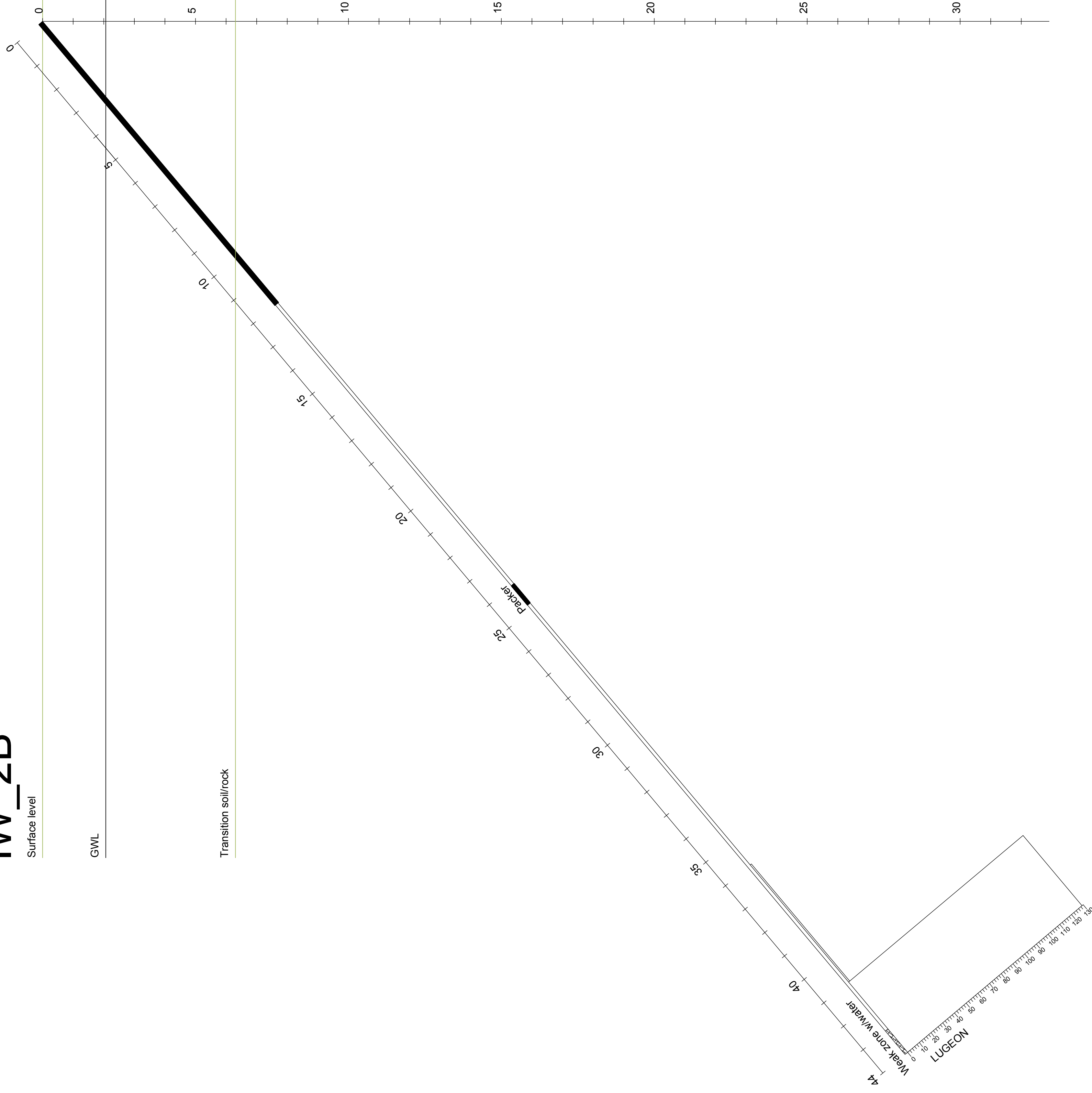
[illegible]

IW 2B

Surface level

GWL

Transition soil/rock



WELL ID: IW_2B

[illegible]

COMMENTS:

*Lugeon value is calculated by subtracting the flow of the lower sections.

This requires the same pressure for all sections.

Lugeon value is corrected to the standard reference pressure of 10 bar.

DEFINED SCALE APPLIES TO A1 FORMAT									
Rev.	Issue for information only Reason for issue	Date	26-02-2017	Drawn by DCC	PM	VC	Approved by		
01	Issue for information only Reason for issue			Drawn by DCC	PM	VC	Approved by		
<p>TITLE Follobanen Tunnel</p> <p>Recharge wells system</p> <p>Simplified tugent test</p> <p>Infiltration well 2B</p>									
<p>PROJECT: The Follo Line Project, EPC TBM</p> <p>AREA: 30-Follobanen Tunnel</p>									
<p>BANE NOR</p>									

IW_2C

Surface level

GWL

Transition soil/rock

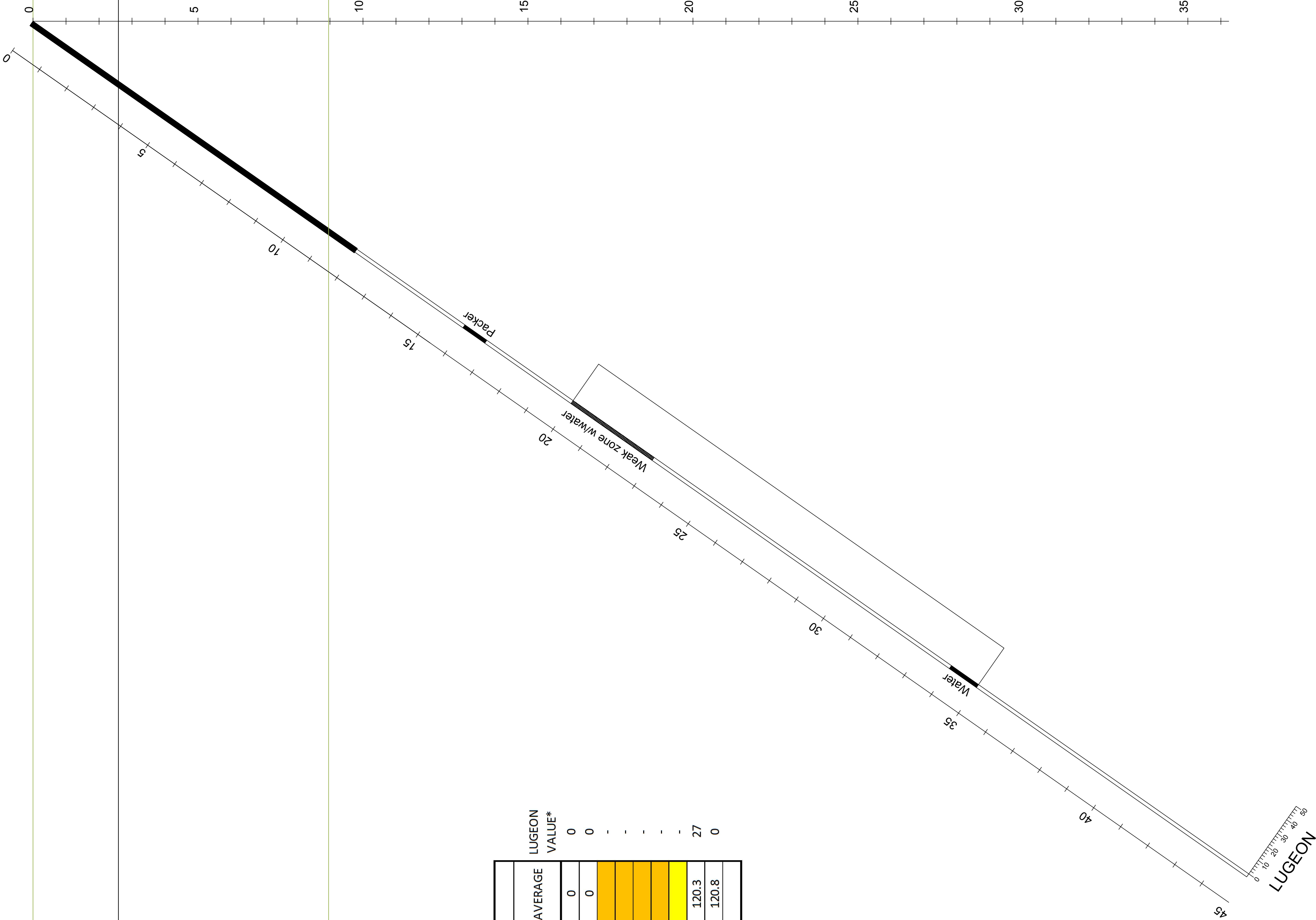
WELL ID: IW_2C

SECTION	FROM (M)	TO (M)	PRESSURE (BAR)	FLOWMETER READING (L)					FLOW (L/MIN)					LUGEON VALUE*	
				0 MIN	5 MIN	10 MIN	15 MIN	20 MIN	0 - 5 MIN	5 - 10 MIN	10 - 15 MIN	15 - 20 MIN	AVERAGE		
1	40	45	3	24800	24800	24800				0	0			0	0
2	35	45	3	24800	24800	24800				0	0			0	0
3	30	45	3	Water flowing above packer and out of IW_2C											
4	29	45	3	Water flowing above packer and out of IW_2C											
5	27	45	3	Water flowing above packer and out of IW_2C											
6	25	45	3	Water flowing above packer and out of IW_2C											
7	20	45	3	Water flowing out of IW_2A**											
8	20	45	3	26340	26942	27543				120.4	120.2			120.3	27
9	15	45	3	27757	28362	28965				121	120.6			120.8	0
10															

COMMENTS:

* Lugeon value is calculated by subtracting the flow of the lower sections. This requires the same pressure for all sections.
Lugeon value is corrected to the standard reference pressure of 10 bar.

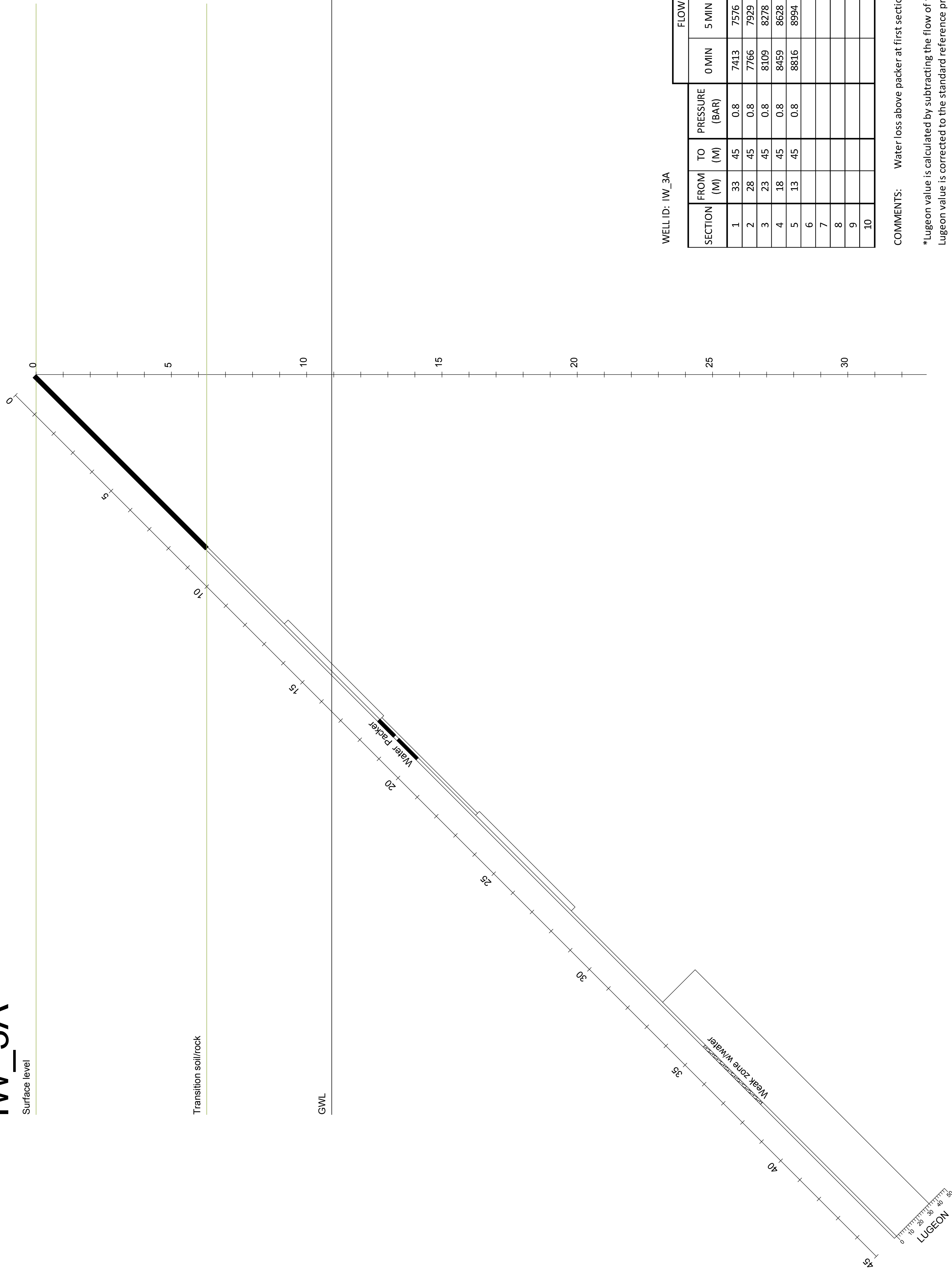
**Water was flowing out of nearby well (IW_2A). A packer was placed in IW_2A, successfully stopping the unwanted water flow from IW_2C and out of IW_2A.



DEFINED SCALE APPLIES TO A1 FORMAT									
01	Issue for information only	23-05-2017	DDC	FM	V/C				
Rev	Reason for issue	Date	Drawn by	Controlled by	Approved by				
TITLE Follobanen Tunnel Recharge wells system Simplified lugeon test Infiltration well 2C						Scale	2130		
						System	AGJ		
						Area	324.325.326.327		
						Produced by	AGJ		
						Prod. des. no.	AGJ-GA-S-00321_01.dwg		
PROJECT: The Follo Line Project, EPC TBM AREA: 30-Follobanen Tunnel						Revised by			
						Drawing number	AGJ-GA-S-00321	Rev	01
Jernbaneverket						Operator's document number		Rev	

IW 3A

Surface level





WELL ID: IW 3A

[illegible]

COMMENTS: Water loss above packer at first section. First section was changed to 12 m length to make sure water loss above packer.

*Lugeon value is calculated by subtracting the flow of the lower sections. This requires the same pressure for all sections.

Lugeon value is corrected to the standard reference pressure of 10 bar.

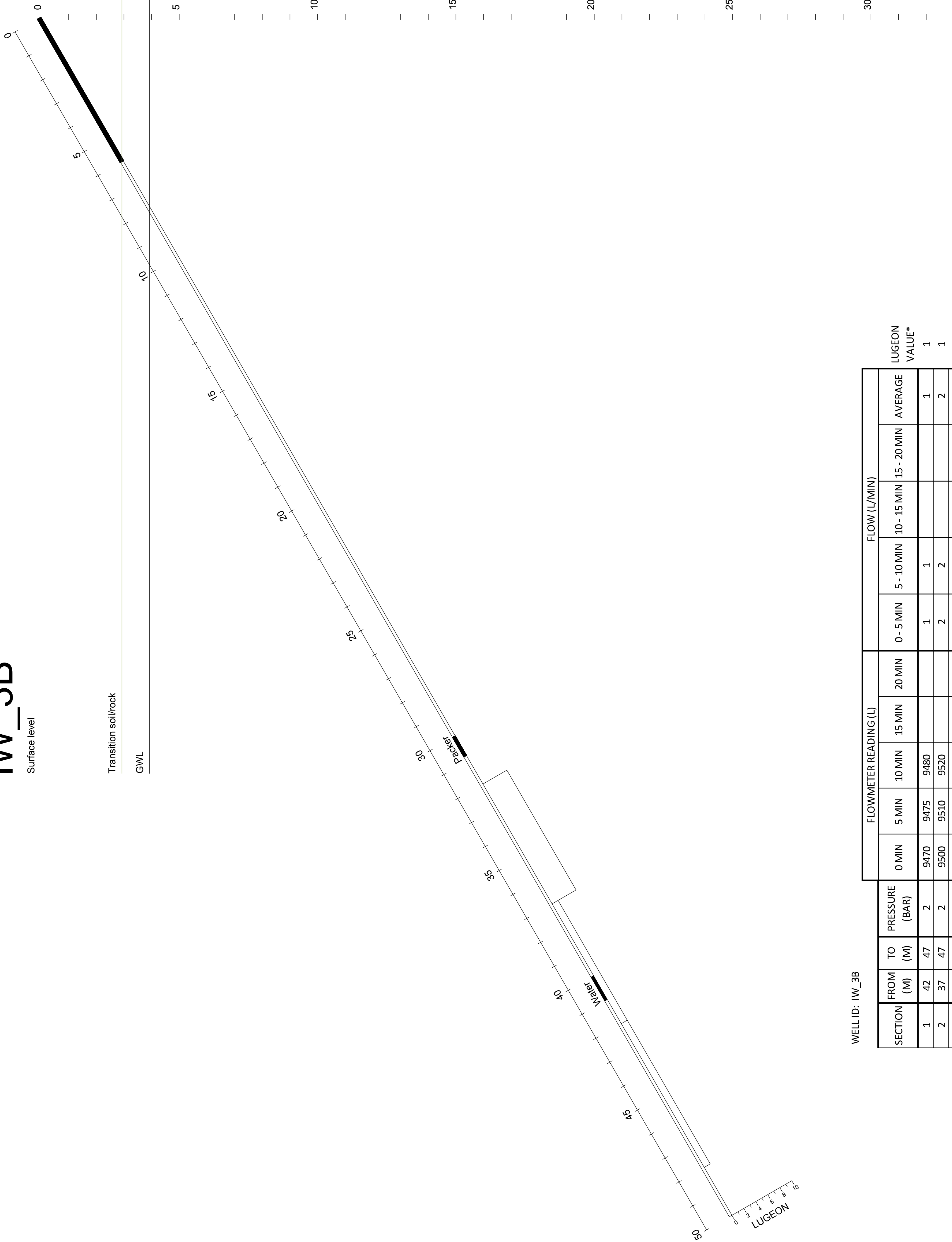
DEFINED SCALE APPLIES TO A1 FORMAT									
01	Issue for information only Reason for issue	22-05-2017	DDC	FM	VC				
		Date	Drawn by	Checked by	Approved by				
		Scale	Phase	System	2150				
			Area	324, 325, 326, 327					
		Produced by	AG J / 						
		Print day no	AGJ-GA-S-00322_01.dwg						
		Replaces							
		Replaced by							
		Drawing number:	AGJ - GA - S - 00322			01			
		Operator's document number:							
		 Jernbaneverket							

IW_3B

Surface level

Transition soil/rock

GWL



WELL ID: IW_3B

SECTION	FROM (M)	TO (M)	PRESSURE (BAR)	FLOWMETER READING (L)					FLOW (L/MIN)					LUGEON VALUE*
				0 MIN	5 MIN	10 MIN	15 MIN	20 MIN	0 - 5 MIN	5 - 10 MIN	10 - 15 MIN	15 - 20 MIN	AVERAGE	
1	42	47	2	9470	9475	9480			1	1			1	1
2	37	47	2	9500	9510	9520			2	2			2	1
3	32	47	2	9565	9595	9625			6	6			6	4
4	27	47	2	9650	9680	9710			6	6			6	0
5	22	47	2	9750	9780	9810			6	6			6	0
6	17	47	2	9850	9880	9910			6	6			6	0
7	12	47	2	9950	9980	10010			6	6			6	0
8														
9														
10														

COMMENTS: 42 - 47 m, 3 bar: 3 l/min 32 - 47 m, 3 bar: 9 l/min

*Lugeon value is calculated by subtracting the flow of the lower sections. This requires the same pressure for all sections.
Lugeon value is corrected to the standard reference pressure of 10 bar.

DEFINED SCALE APPLIES TO A1 FORMAT

01	Issue for information only	29-06-2017	Date	DDC	FM	V/C						
Rev	Reason for issue	Drawn by	Checked by	Approved by								
TITLE Follobanen Tunnel												
Recharge wells system												
Simplified lugeon test												
Infiltration well 3B												
Produced by		System		Phase		Rev						
Prod. log no.		Area		AGJ- GA- S-00335_01.dwg								
Replaces:		AGJ- GA- S-00335_01.dwg		AGJ- GA- S-00335_01.dwg								
PROJECT: The Follo Line Project, EPC TBM												
AREA: 30-Follobanen Tunnel												
Drawing number:												
AGJ- GA- S-00335												
Operator's document number:												
01												
Rev												

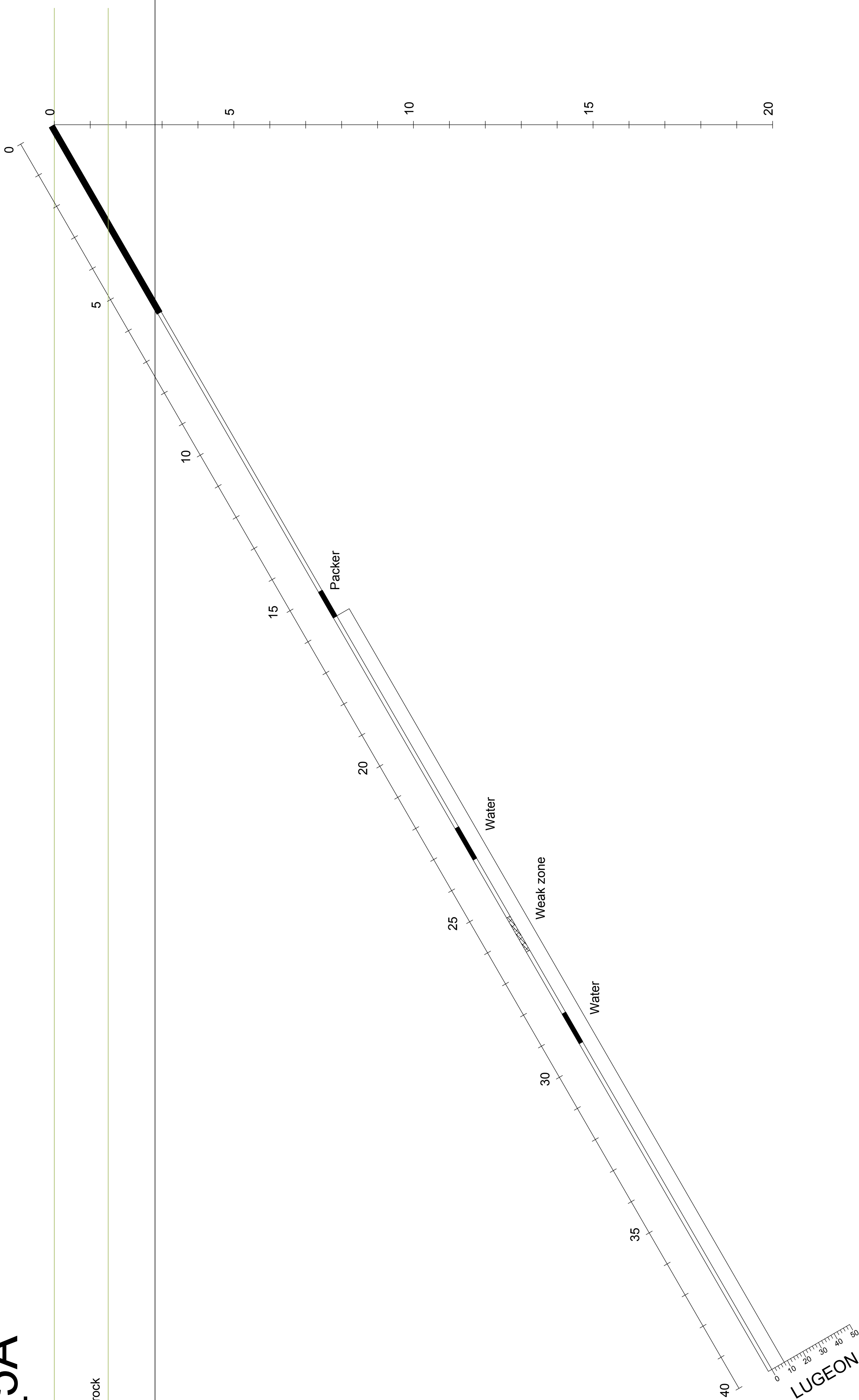


IW__5A

Surface level

Transition soil/rock

GWL



WELL ID: IW_5A

SECTION	FROM (M)	TO (M)	PRESSURE (BAR)	FLOWMETER READING (L)						FLOW (L/MIN)			LUGEON VALUE
				0 MIN	5 MIN	10 MIN	15 MIN	20 MIN	0 - 5 MIN	5 - 10 MIN	10 - 15 MIN	15 - 20 MIN	
1	40	16	2	901	1105	1308			40.8	40.6			40.7
2													
3													
4													
5													
6													
7													
8													
9													
10													

COMMENTS: The borehole was not sectioned due to a collapse at 23 m. The test was done for only one section from 40 to 16 m.

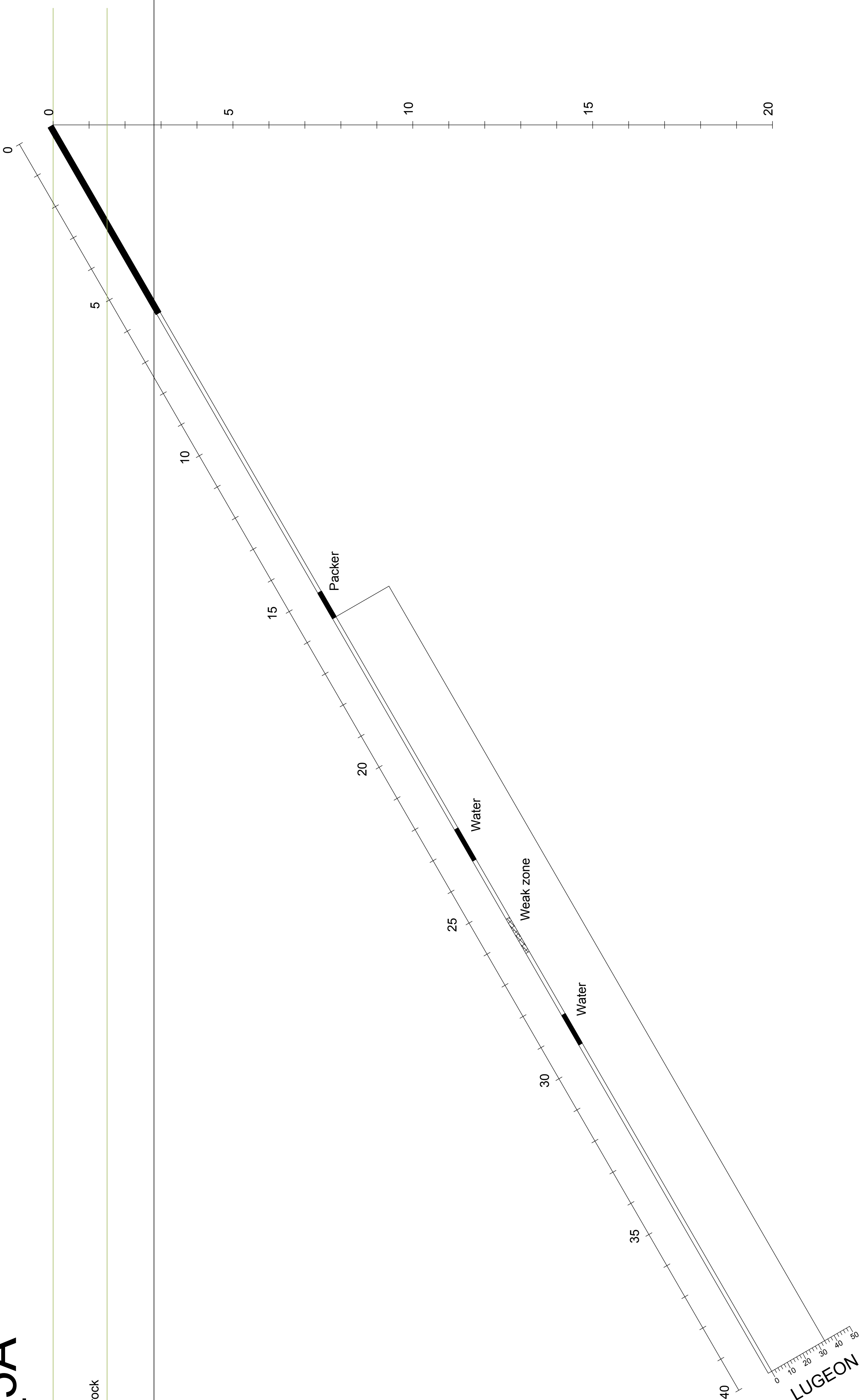
DEFINED SCALE APPLIES TO A1 FORMAT											
02	Issue for update	01-01-2017	DDC	FM	V/C						
01	Issue for information only	23-05-2017	DDC	FM	V/C						
Rev	Reason for issue	Date	Drawn by	Controlled by	Approved by						
			Scale	System	2130						
			Produced by	Area	324.325.326.327						
			Prod. des. no.		AGJ-GA-S-00323_02.dwg						
			Replaces								
			Replaced by								
			Drawing number								
			AGJ-GA-S-00323								
			Operator's document number								

IW__5A

Surface level

Transition soil/rock


GWL



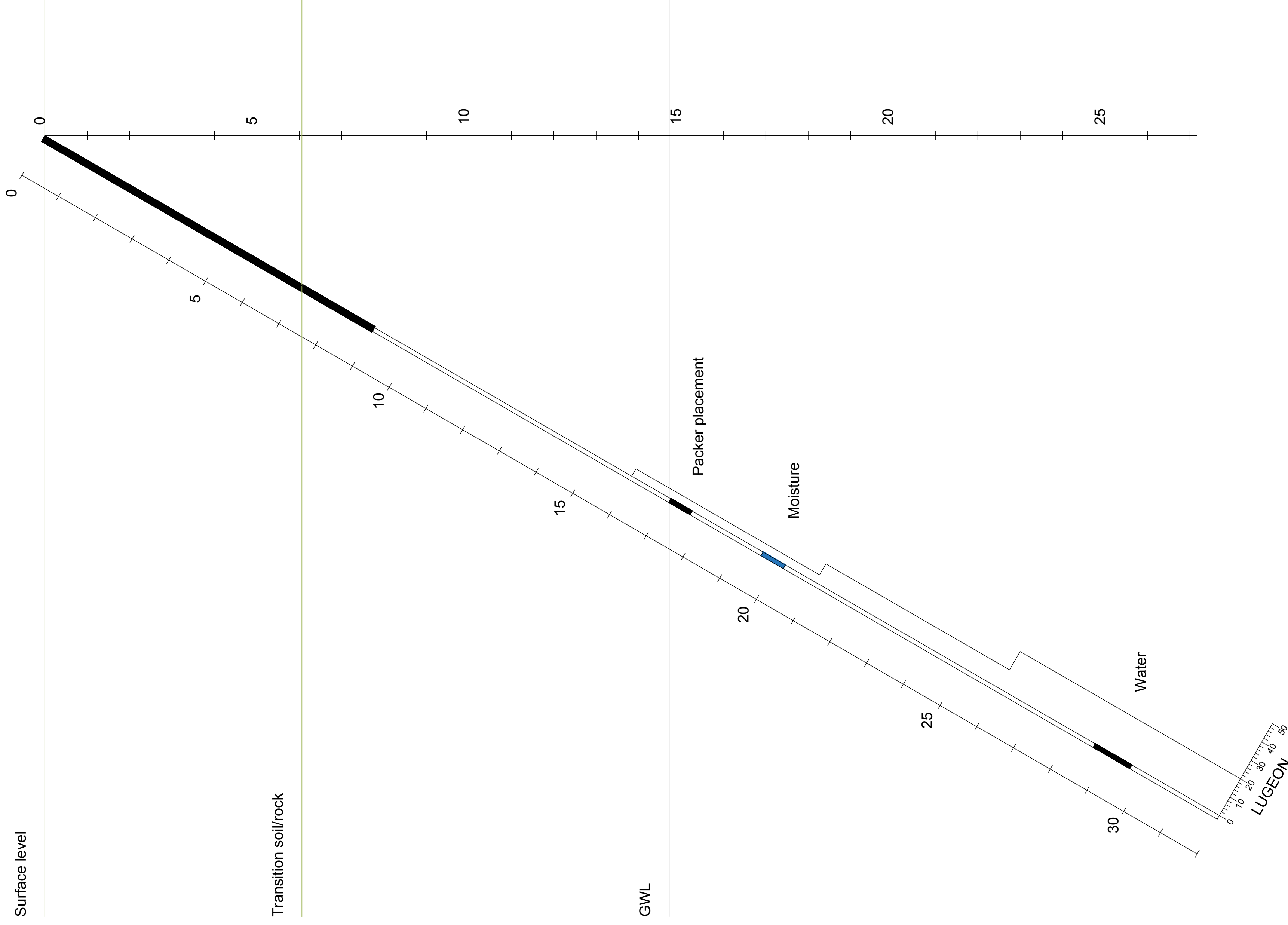
WELL ID: IW_5A

SECTION	FROM (M)	TO (M)	PRESSURE (BAR)	FLOWMETER READING (L)						FLOW (L/MIN)				LUGEON VALUE
				0 MIN	5 MIN	10 MIN	15 MIN	20 MIN	0 - 5 MIN	5 - 10 MIN	10 - 15 MIN	15 - 20 MIN	AVERAGE	
1	40	16	2	901	1105	1308			40.8	40.6			40.7	34
2														
3														
4														
5														
6														
7														
8														
9														
10														

COMMENTS: The borehole was not sectioned due to a collapse at 23 m. The test was done for only one section from 40 to 16 m.

DEFINED SCALE APPLIES TO A1 FORMAT											
01	Issue for information only			23-05-2017	DDC	FM	V/C				
Rev	Reason for issue			Date	Drawn by	Controlled by	Approved by				
TITLE Follobanen Tunnel Recharge wells system Simplified lugen test Infiltration well SA				Scale	Sheet	System	Phase				
				-		Area					
				Produced by:	324_325_326_327						
				Prod. des. no.	AGJ-GA-S-00323_01.dwg						
				Replaces:							
				Replaced by:				Rev:	01		
PROJECT: The Follo Line Project, EPC TBM AREA: 30-Follobanen Tunnel				Drawing number			AGJ- GA-S-00323				
 Jernbaneverket				Operator's document number						Rev:	

IW 5B





WELLID: IW_5B

[illegible]

COMMENTS: Reduced pressure at last section.

*Lugeon value is calculated by subtracting the flow of the lower sections. This requires the same pressure for all sections.

Lugeon value is corrected to the standard reference pressure of 10 bar.

DEFINED SCALE APPLIES TO A1 FORMAT									
01	Issue for information only Rev. Reason for issue	23-05-2017	DDC	PM	VC	Approved by			
<p>TITLE Follobanen Tunnel</p> <p>Recharge wells system</p> <p>Simplified lugen test</p> <p>Infiltration well 50</p>									
		Scale	Phase	2130					
		-	System	area					
		Produced by:		324.325.326.327					
		Printed day and		 AGJ/GA-S-00324_01.dwg					
		Replicates							
		Replicates by:							
PROJECT: The Follo Line Project, EPC TBM AREA: 30-Follobanen Tunnel					Rev:	01			
 Jernbaneverket					Operator's document number:				
					Rev:				

IW 3C

BH ID: 3C

Pressure: 1 bar

Section	From (m)	To (m)	Flow (l/5min)				Avg	Deviation (%)	L
			0 - 5 min	5 - 10 min	10 - 15 min	15 - 20 min			
1	60	50	5	5			5	0.0%	1.0
2	50	45	-	-			-	-	-
3	45	40	-	-			-	-	-
4	40	35	81	80			80.5	1.2%	10.1
5	35	30	81	80			80.5	1.2%	0.0
6	30	25	82	82			82	0.0%	0.6
7	25	20	81	82			81.5	1.2%	0.0
8	20	15	83	83			83	0.0%	0.6

IW13A

BH ID: 13A

Pressure: 5 bar

Section	From (m)	To (m)	Flow (l/5min)				Avg	Deviation (%)	L
			0 - 5 min	5 - 10 min	10 - 15 min	15 - 20 min			
1	70	65	0	0			0	0.0%	0.0
2	65	60	0	0			0	0.0%	0.0
3	60	55	0	0			0	0.0%	0.0
4	55	50	0	0			0	0.0%	0.0
5	50	45	0	0			0	0.0%	0.0
6	45	40	0	0			0	0.0%	0.0
7	40	35	0	0			0	0.0%	0.0
8	35	30	72	70			71	2.8%	5.7
9	30	25	70	70			70	0.0%	0.0
10	25	20	70	70			70	0.0%	0.0

IW 13 C

BH ID: 13C

Pressure: 5 bar

Section	From (m)	To (m)	Flow (l/5min)				Avg	Deviation (%)	L
			0 - 5 min	5 - 10 min	10 - 15 min	15 - 20 min			
1	70	65	0	0			0	0.0%	0.0
2	65	60	0						

IW 1A, 1B, 1C, 1D

ID	Flow	Section (m)*	Pressure	L	Date
1A	11.4	40	0.1	28.5	10/04/2018
1B	1	49	1.3	0.2	10/04/2018
1C	69.3	52	0.2	66.6	10/04/2018
1D	27	53	0.1	50.9	24/04/2018

*Packer placed 20 m deep into the borehole, measured from top of casing.

Infiltrasjonsbrønnene 1A, 1B, 1C og 1D kollapset under lugeontestingen ble hele borehullet målt under ett.

Det er ikke utført lugeontesting på

12A

12B

12C

På grunn av tørre brønner.

Det er heller ikke utført lugeontest på 13B og 13D.

Kommentarer:

BH 6-800 er infiltrasjonsbrønn 2D

BH 6+540 er infiltrasjonsbrønn 2E