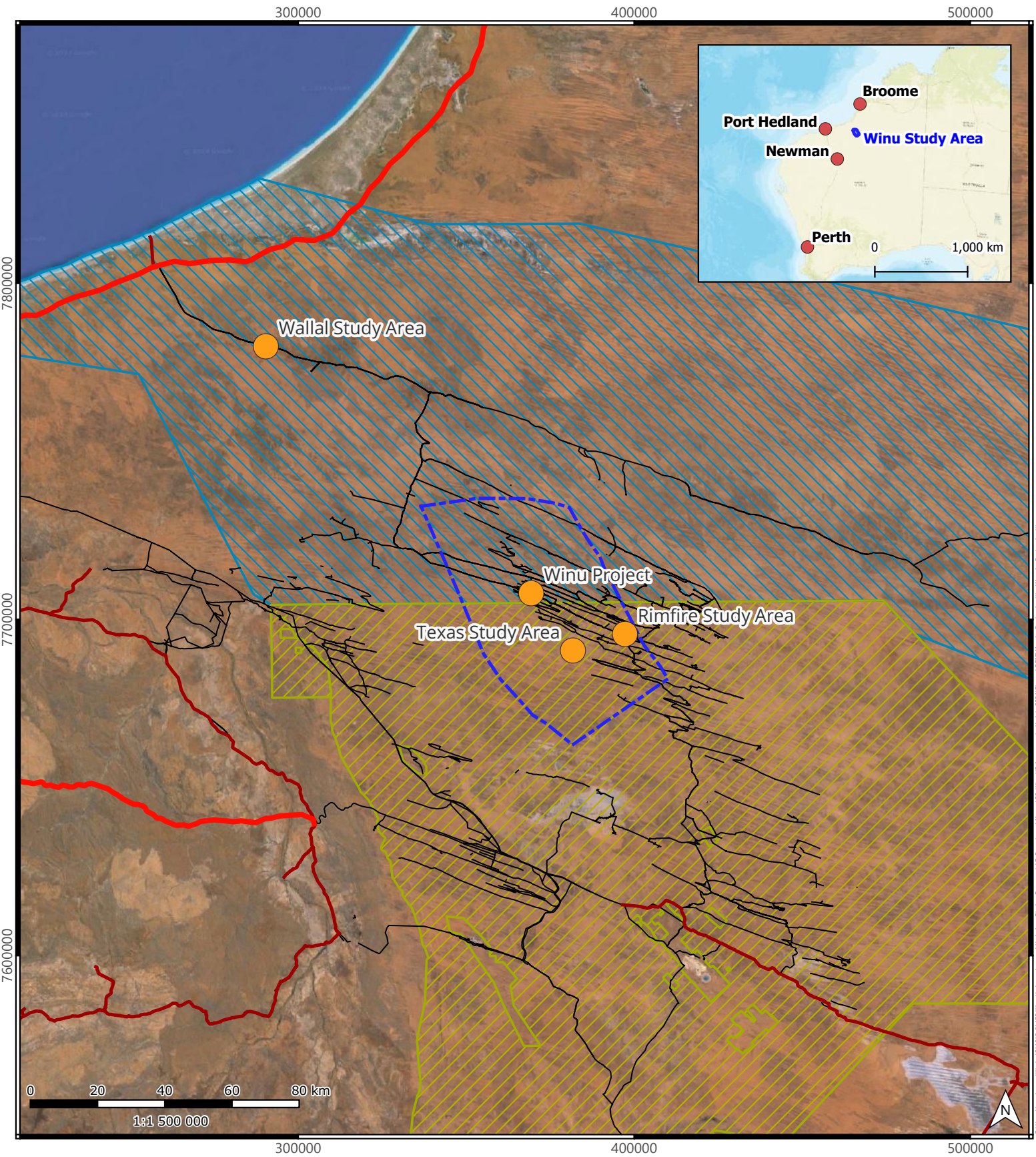
Appendix A. Mapbook



Legend

- Site Locations
- Winu Model Boundary
- Local Road
- State Road
- Winu Tracks

Native_Title_Determination

- MARTU (AREA A)
- NYANGUMARTA PEOPLE (PART A)

Regional Setting

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 1

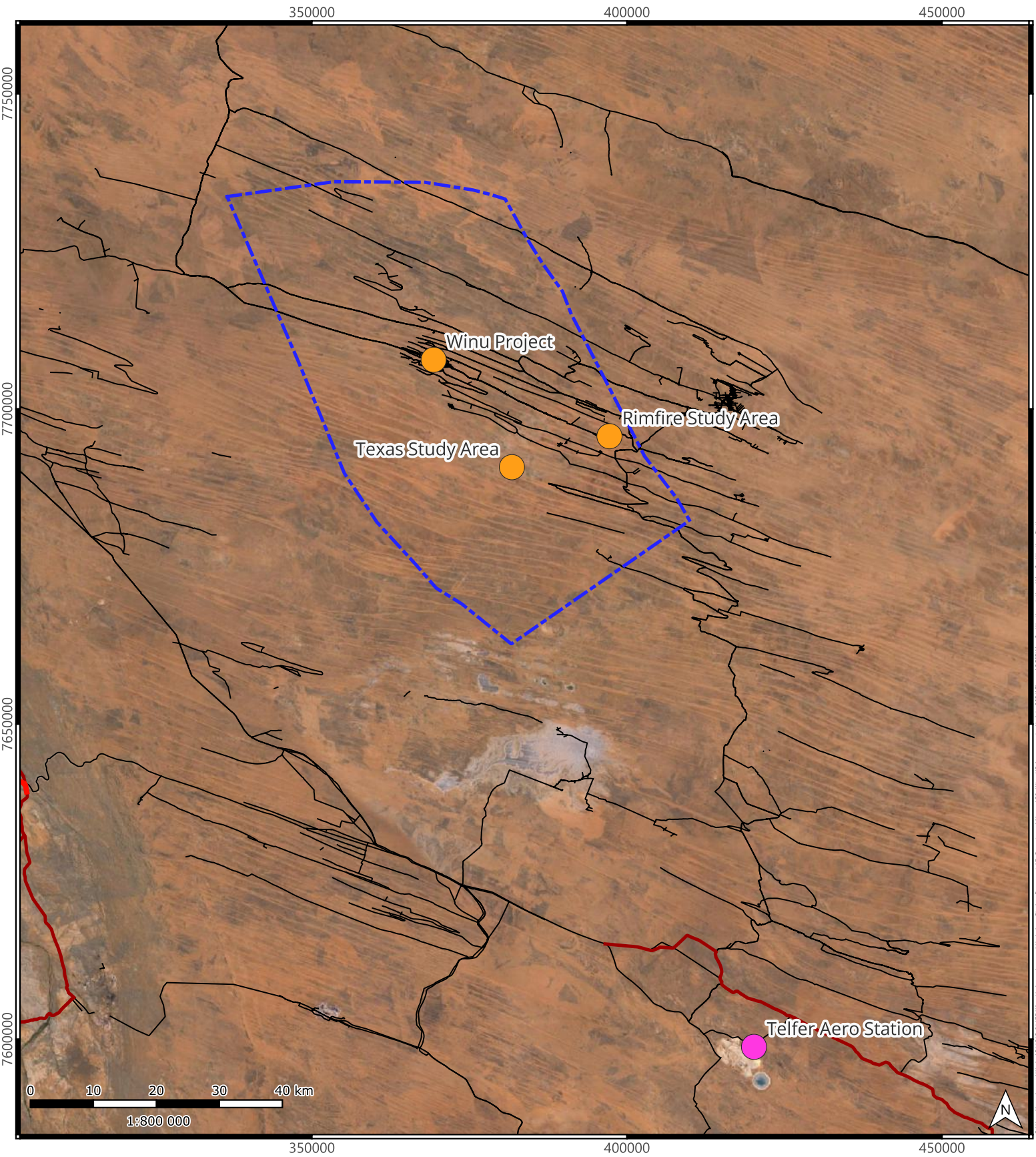
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References
-

Consultant: worley consulting

Client: RioTinto

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Legend

- Site Locations
- Winu Model Boundary
- Local Road
- State Road
- Winu Tracks
- Telfer Aero Station

Weather Stations

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 2

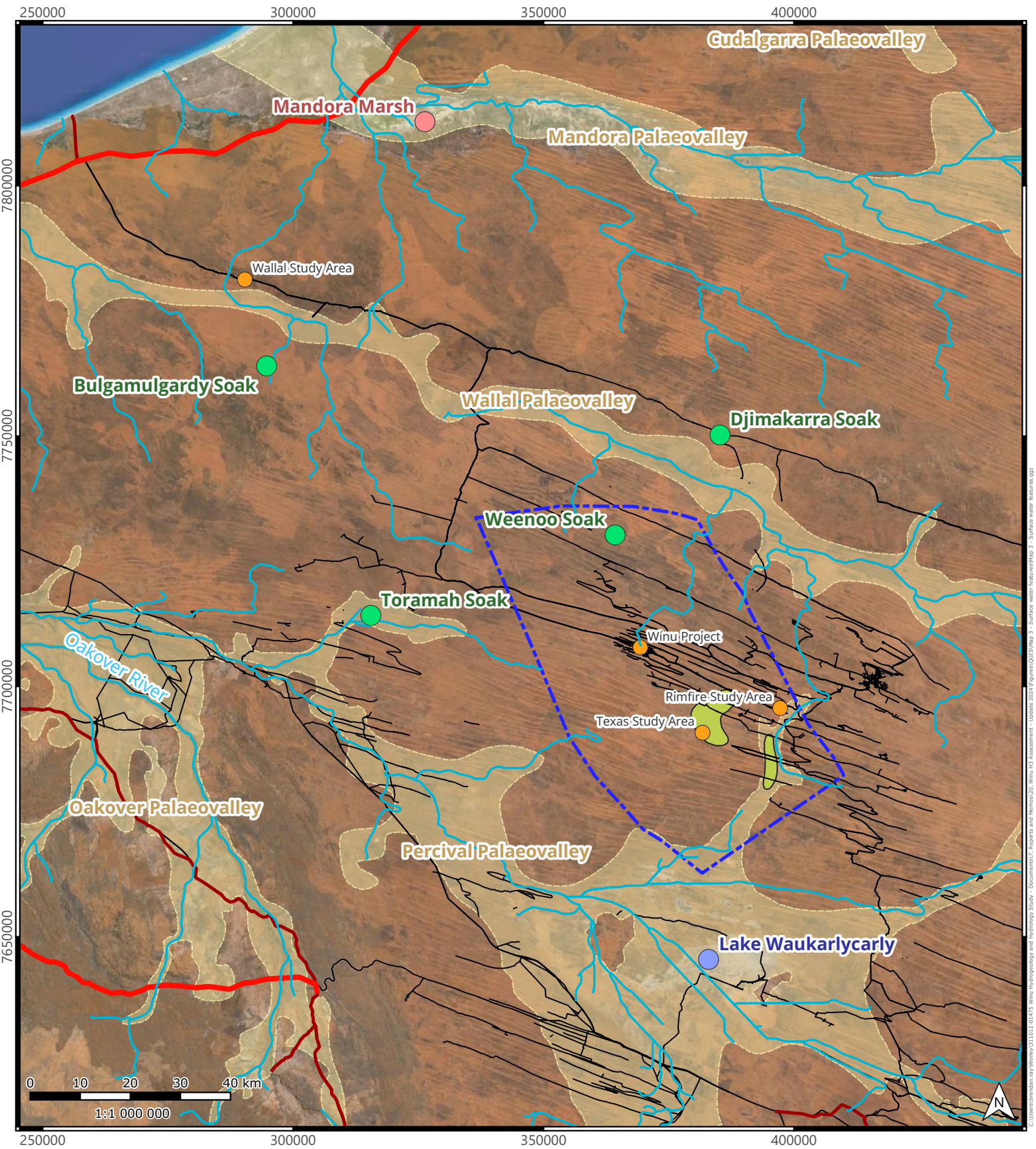
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References
-

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Legend

- Site Locations
- Winu Model Boundary
- Local Road
- State Road
- Winu Tracks
- Soaks
- Mandora Marsh
- Lake Waukarlycarly
- Claypan Occurrence Area
- WASANT Palaeovalleys (2012)

Surface Water Features

Winu Hydrology/Hydrogeology Study

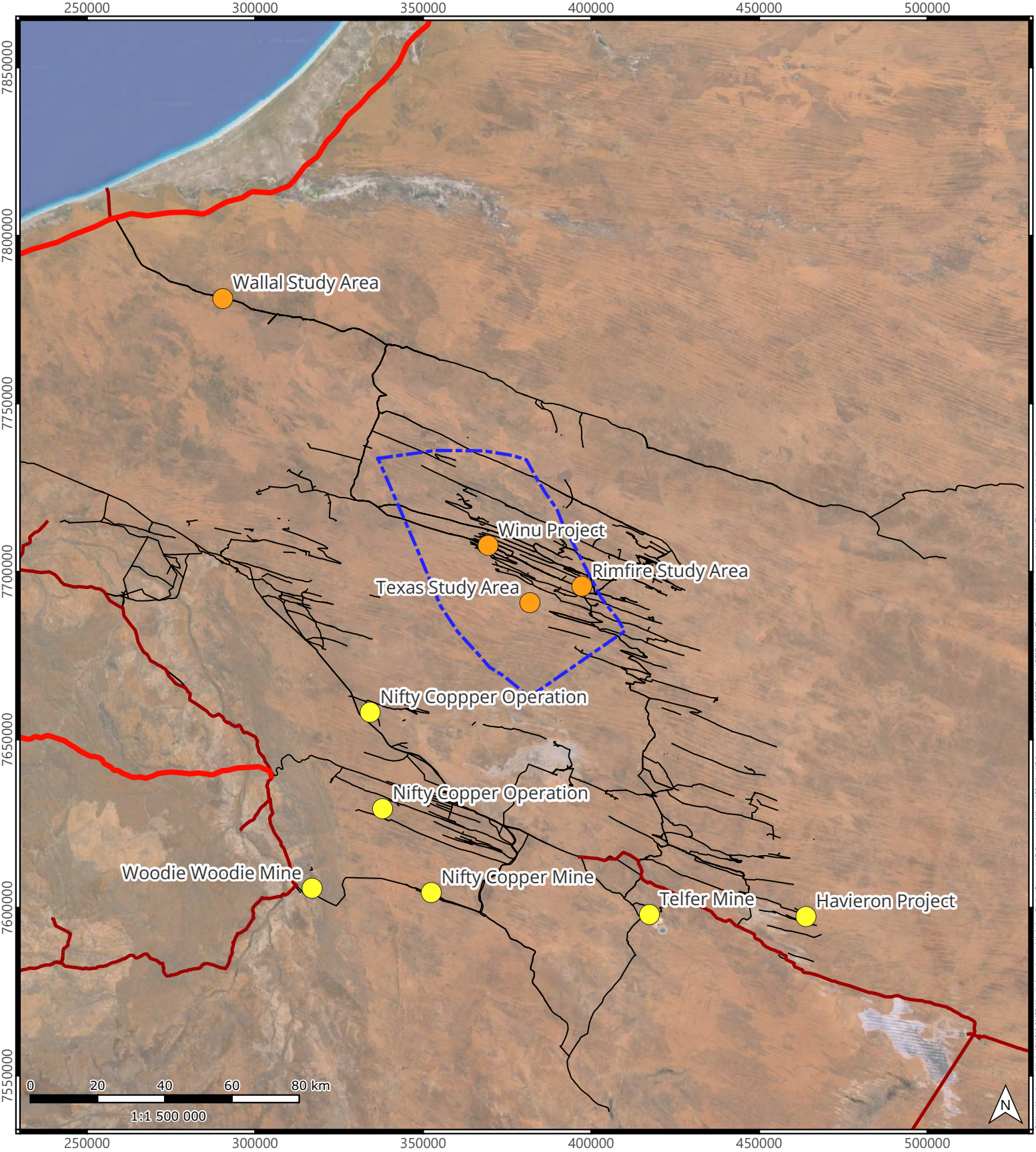
Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 3

Notes:
Project CRS: GDA94 / MGA zone 51
Last Saved: 15/05/2024, 14:40

References
WASANT Palaeovalleys, 2012

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Client: RioTinto

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Legend

- Site Locations
- Winu Model Boundary
- Local Road
- State Road
- Winu Tracks
- Third Party Mining Operations

Third Party Mining Operations

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 4

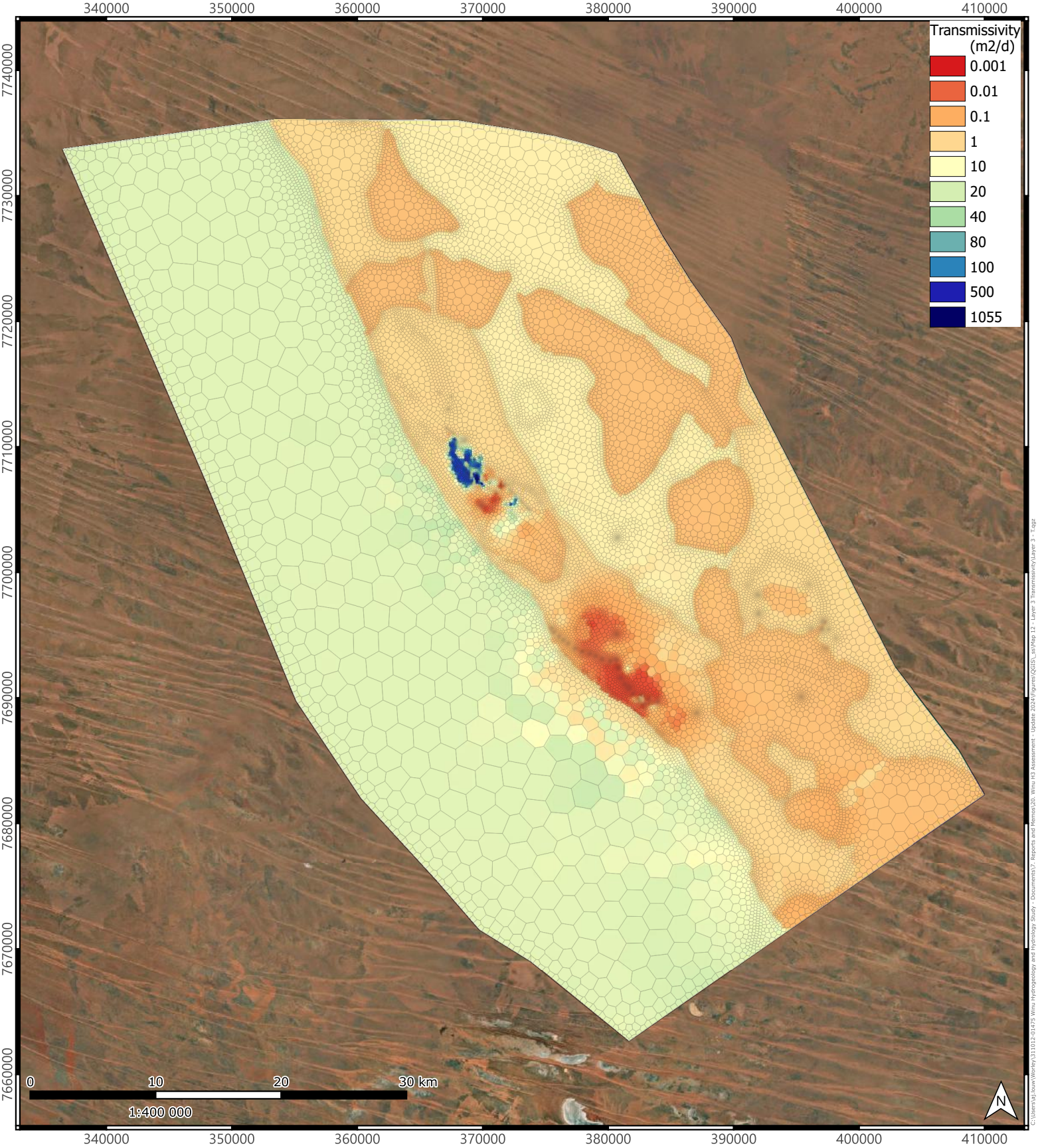
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References
RTX, 2022

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Client: RioTinto

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Legend

Model grid

Layer 3 Transmissivity

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 5

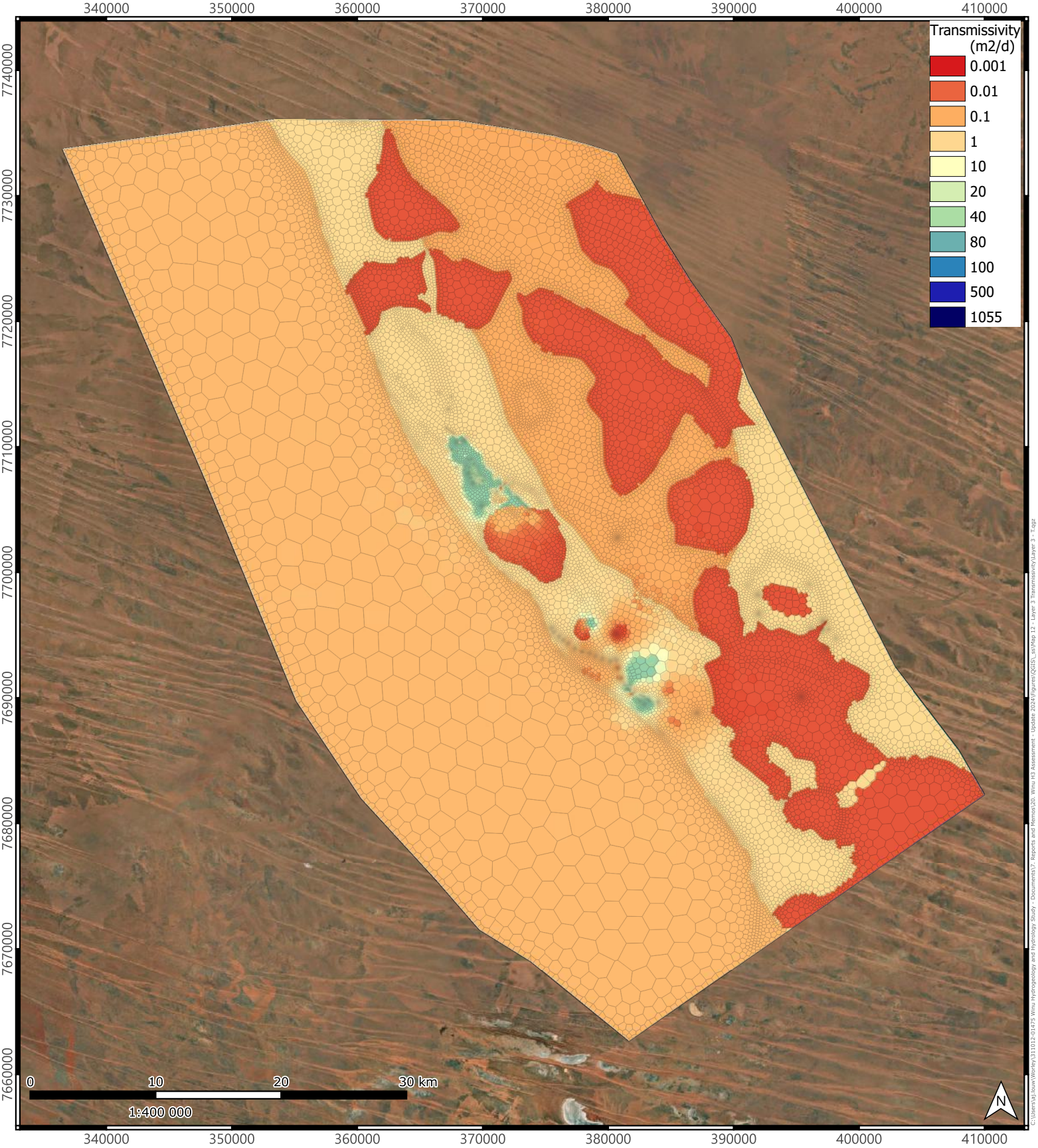
Notes:
Project CRS: GDA94 / MGA zone 51
Last Saved: 30/05/2024, 11:53

References

Consultant: worley consulting

Client: RioTinto

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Legend

Model grid

Layer 4 Transmissivity

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 6

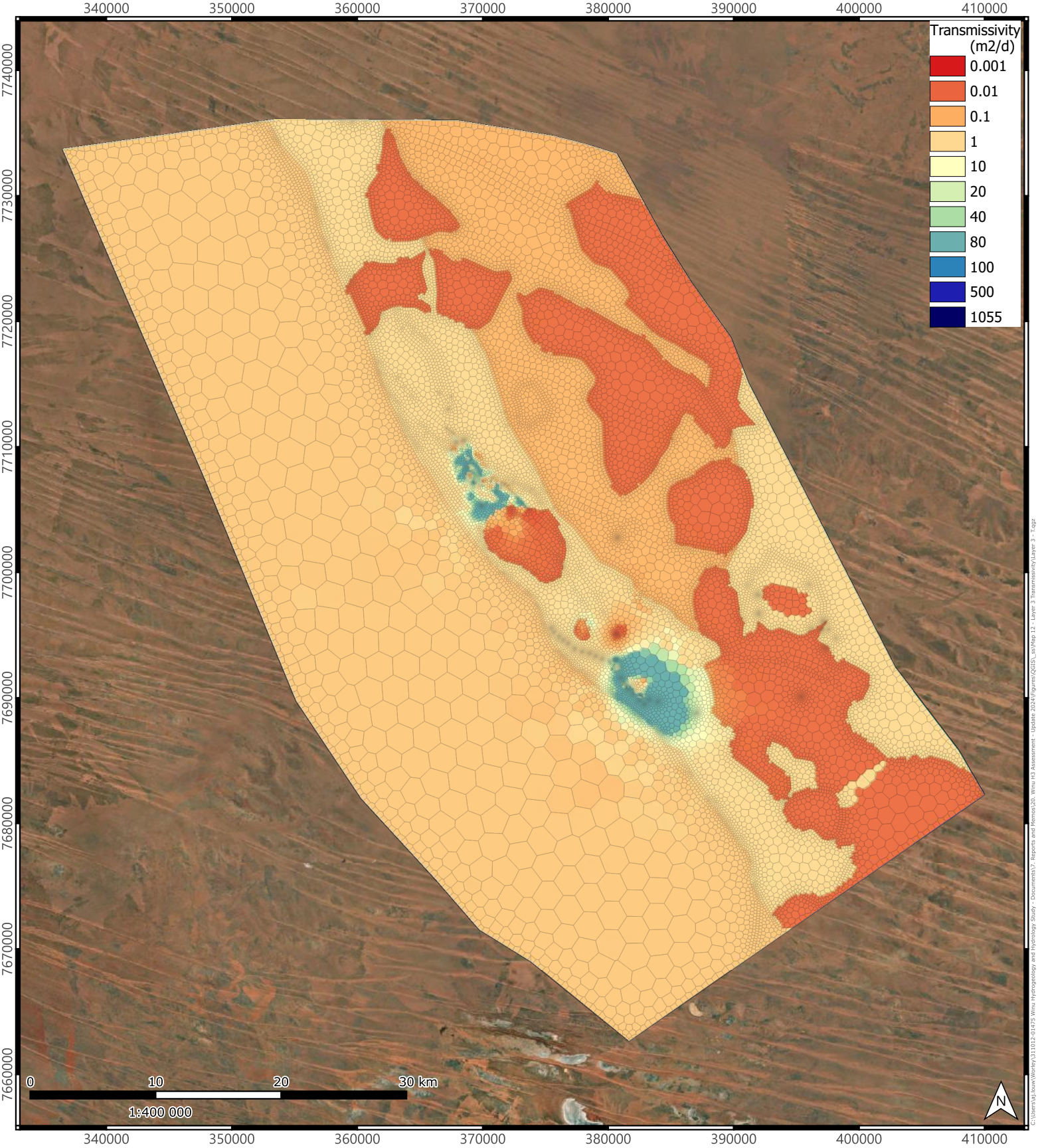
Notes:
Project CRS: GDA94 / MGA zone 51
Last Saved: 30/05/2024, 11:53

References

Consultant worley consulting

Client RioTinto

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Legend

Model grid

Layer 5 Transmissivity

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 7

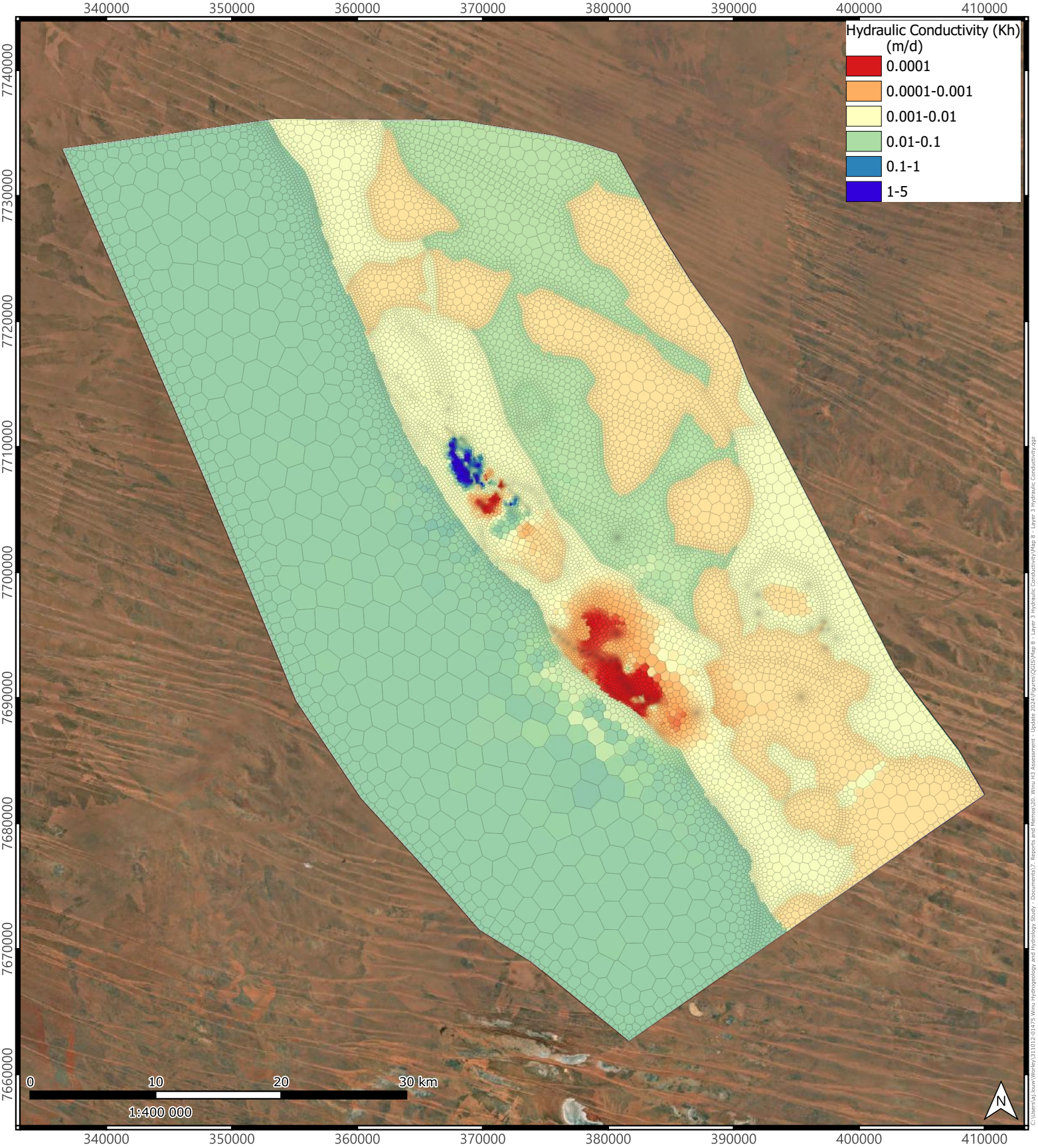
Notes:
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Last Saved: 30/05/2024, 11:53

References

Consultant: worley consulting

Client: RioTinto

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Legend

Model grid

Layer 3 Hydraulic conductivity

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 8

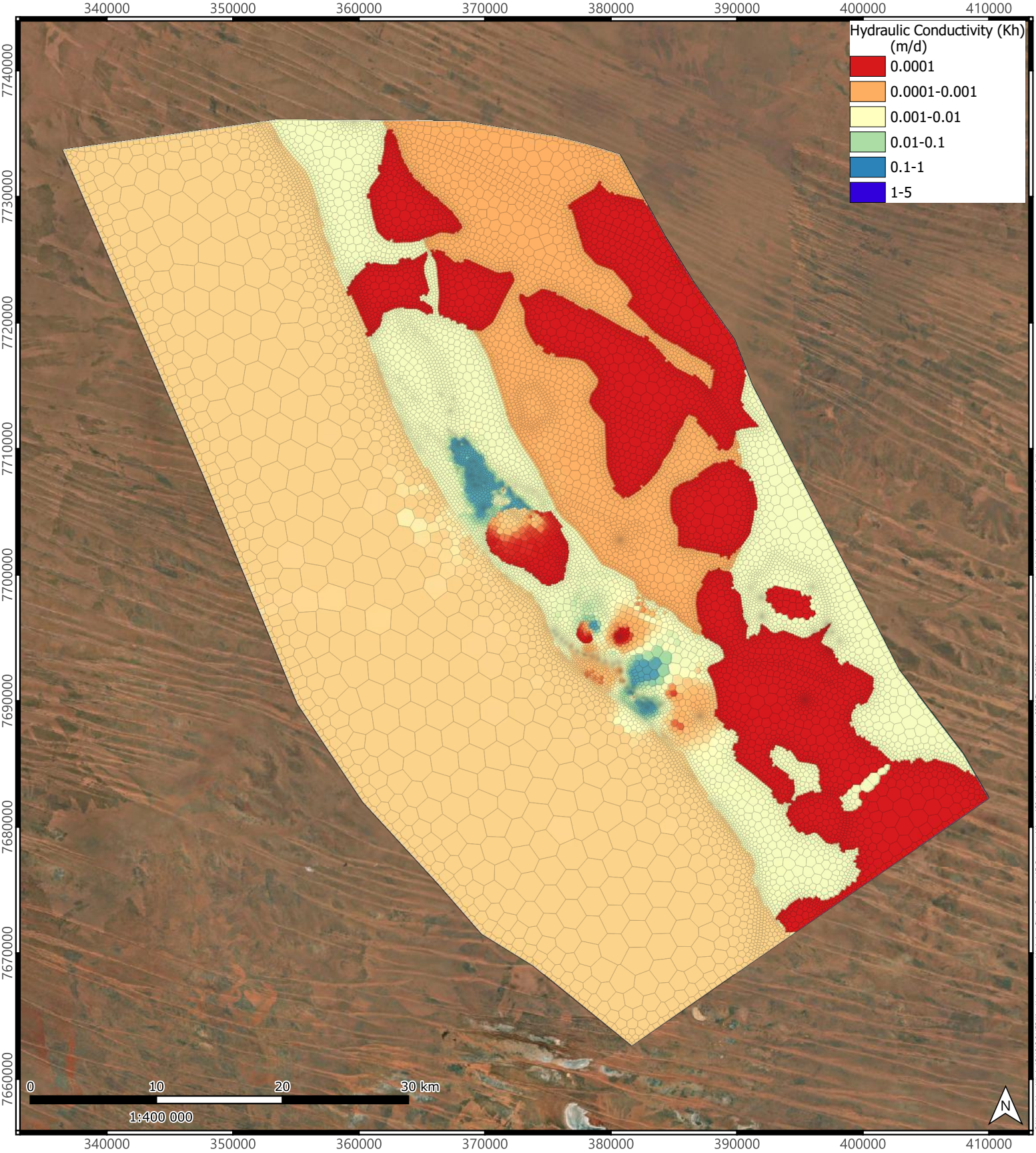
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References

Consultant worley consulting

Client RioTinto

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Legend

Model grid

Layer 4 Hydraulic conductivity

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 9

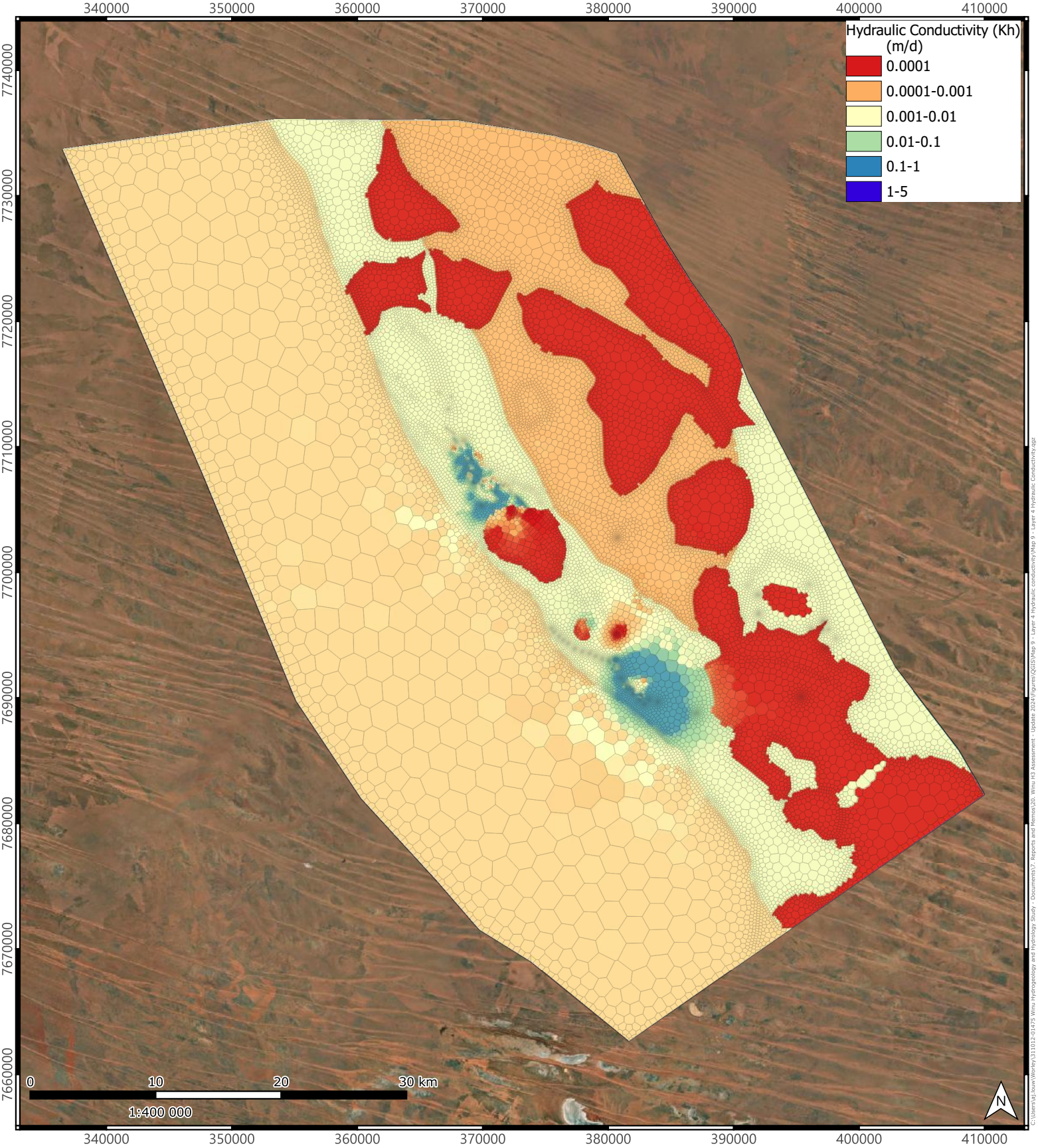
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Project CRS: GDA94 / MGA zone 51
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References

Consultant worley consulting

Client RioTinto

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Legend

Model grid

Layer 5 Hydraulic conductivity

Winu Hydrology/Hydrogeology Study

Project No.	Client	Figure No.
311012-01475	Rio Tinto Copper	Map 10

Notes:
Project CRS: GDA94 / MGA zone 51
Last Saved: 03/06/2024, 08:10

References

Consultant worley consulting

Client RioTinto

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Appendix B. Surface water chemistry

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EP2106108**	Page	: 1 of 5
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Perth
Contact	: ROCHELLE IRWIN	Contact	: Lauren Biagioni
Address	: PO BOX 1914 WEST PERTH WA 6872	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1307
Project	: EP/882/20	Date Samples Received	: 31-May-2021 15:15
Order number	: P030891	Date Analysis Commenced	: 31-May-2021
C-O-C number	: ----	Issue Date	: 10-Jun-2021 17:08
Sampler	: Gerhard Jacobs		
Site	: ----		
Quote number	: EP/882/20_V3		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Brisbane, NATA Site No. 818.
- ED037-P (Alkalinity): Sample EP2106108-1 was centrifuged before analysis to reduce possible interference from sediment which may consume the alkalinity titrant.
- TDS by method EA-015 may bias high for sample #1 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised for sample Toromah (EP2106108-001) due to matrix interference.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- It is recognised that ED040T (Major Anions - Total) is less than ED040F (Major Anions - Dissolved by ICP-AES) for Sample Toromah (EP2106108-001). However, the difference is within experimental variation of the methods.
- EG035T-LL (Total Mercury by FIMS – Low Level): Limit of reporting raised for sample Toromah(EP2106108-001) due to matrix interference.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Toromah	----	----	----	----
				Sampling date / time	25-May-2021 13:01	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2106108-001	--------	--------	--------	--------
					Result	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**9.42**	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**11800**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**8370**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**94700**	----	----	----	----
EA041: Colour (True)									
Colour (True)	----	1	PCU		**3000**	----	----	----	----
pH Colour	----	0.01	pH Unit		**9.52**	----	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		**46800**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		**968**	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**2380**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**3350**	----	----	----	----
ED040F: Dissolved Major Anions									
Sulfur as S	63705-05-5	1	mg/L		**348**	----	----	----	----
Silicon	7440-21-3	0.05	mg/L		**16.5**	----	----	----	----
ED040T: Total Major Anions									
Sulfur as S	63705-05-5	1	mg/L		**326**	----	----	----	----
Silicon	7440-21-3	0.05	mg/L		**476**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**977**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**1930**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**2**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		<1	----	----	----	----
Sodium	7440-23-5	1	mg/L		**2450**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**431**	----	----	----	----
ED093F: SAR and Hardness Calculations									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Toromah	----	----	----	----
				Sampling date / time	25-May-2021 13:01	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2106108-001	--------	--------	--------	--------
					Result	----	----	----	----
ED093F: SAR and Hardness Calculations - Continued									
Total Hardness as CaCO3	----	1	mg/L		**5**	----	----	----	----
EG020T: Total Metals by ICP-MS									
Niobium	7440-03-1	0.001	mg/L		**0.014**	----	----	----	----
Caesium	7440-46-2	0.001	mg/L		**0.012**	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L		**2.62**	----	----	----	----
Bromine	7726-95-6	0.1	mg/L		**5.3**	----	----	----	----
Tungsten	7440-33-7	0.001	mg/L		<0.005	----	----	----	----
Tantalum	7440-25-7	0.001	mg/L		<0.005	----	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00200	----	----	----	----
EG094T: Total metals in Fresh water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		**488000**	----	----	----	----
Antimony	7440-36-0	0.2	µg/L		**7.2**	----	----	----	----
Arsenic	7440-38-2	0.2	µg/L		**832**	----	----	----	----
Barium	7440-39-3	0.5	µg/L		**15300**	----	----	----	----
Beryllium	7440-41-7	0.1	µg/L		**15.9**	----	----	----	----
Boron	7440-42-8	5	µg/L		**5850**	----	----	----	----
Bismuth	7440-69-9	0.05	µg/L		**6.01**	----	----	----	----
Cadmium	7440-43-9	0.05	µg/L		**1.58**	----	----	----	----
Chromium	7440-47-3	0.2	µg/L		**1940**	----	----	----	----
Cobalt	7440-48-4	0.1	µg/L		**452**	----	----	----	----
Copper	7440-50-8	0.5	µg/L		**1110**	----	----	----	----
Iron	7439-89-6	2	µg/L		**1010000**	----	----	----	----
Lead	7439-92-1	0.1	µg/L		**525**	----	----	----	----
Lithium	7439-93-2	0.5	µg/L		**140**	----	----	----	----
Manganese	7439-96-5	0.5	µg/L		**21300**	----	----	----	----
Molybdenum	7439-98-7	0.1	µg/L		**32.0**	----	----	----	----
Selenium	7782-49-2	0.2	µg/L		**37.6**	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		**650**	----	----	----	----
Silver	7440-22-4	0.1	µg/L		**6.5**	----	----	----	----
Strontium	7440-24-6	1	µg/L		**28700**	----	----	----	----
Thallium	7440-28-0	0.02	µg/L		**10.2**	----	----	----	----
Thorium	7440-29-1	0.1	µg/L		**336**	----	----	----	----
Tin	7440-31-5	0.2	µg/L		**5.1**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Toromah	----	----	----	----
				Sampling date / time	25-May-2021 13:01	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2106108-001	--------	--------	--------	--------
					Result	----	----	----	----
EG094T: Total metals in Fresh water by ORC-ICPMS - Continued									
Titanium	7440-32-6	1	µg/L		**4130**	----	----	----	----
Uranium	7440-61-1	0.05	µg/L		**23.3**	----	----	----	----
Vanadium	7440-62-2	0.2	µg/L		**2960**	----	----	----	----
Zinc	7440-66-6	1	µg/L		**2690**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**4.2**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**5.89**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**1.24**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**7.13**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**5.96**	----	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**142**	----	----	----	----
ø Total Cations	----	0.01	meq/L		**118**	----	----	----	----
ø Ionic Balance	----	0.01	%		**9.26**	----	----	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	----	----	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(WATER) EG094T: Total metals in Fresh water by ORC-ICPMS

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EG035T: Total Mercury by FIMS

(WATER) ED040T: Total Major Anions

Appendix C. Bore and drilling logs

MB18WIN0003 PITA bore

HOLEID	From (m)	To(m)	Lithology	Colour		Co ord									
RC18WIN0003	0	9	Sand	Red		EAST	NORTH	RL	GRIDNAME						
RC18WIN0003	9	17	Sand	Yellow		369113	7707562	248.3	GDA94_MGA_51						
RC18WIN0003	17	25	Sand	White											
RC18WIN0003	25	38	Sand	White											
RC18WIN0003	38	47	Sand	White		Casing									
RC18WIN0003	47	51	Sand	Red		**Collar:** 3m depth - 400.4mm OD steel									
RC18WIN0003	51	65	Clay	Yellow		Hole: 12 1/4" with mud rotary then 15" blade to 38m									
RC18WIN0003	65	73	Sand	Brown		**Outer casing:** 273.1mm OD steel casing 39.6m from surface									
RC18WIN0003	73	82	Clay	Brown		Hammer drilled 9 3/4" to 130m									
RC18WIN0003	82	86	Clay	Red		**Inner casing:** 100mm class 12 PVC - 6m sump with end cap-60m slotted-56m solid from surface.									
RC18WIN0003	86	90	Clay	Brown		**Head works:** 8" steel 1m above ground with lockable cap, 1m x 1m x 200mm cement slab									
RC18WIN0003	90	106	Sand	Brown											
RC18WIN0003	106	116	Psammite	Grey		Standing water 49.5m from ground									
RC18WIN0003	116	130	Psammite with minor sulphid	Grey											
						Bore Nam	PITA Bore								

WIDI0001

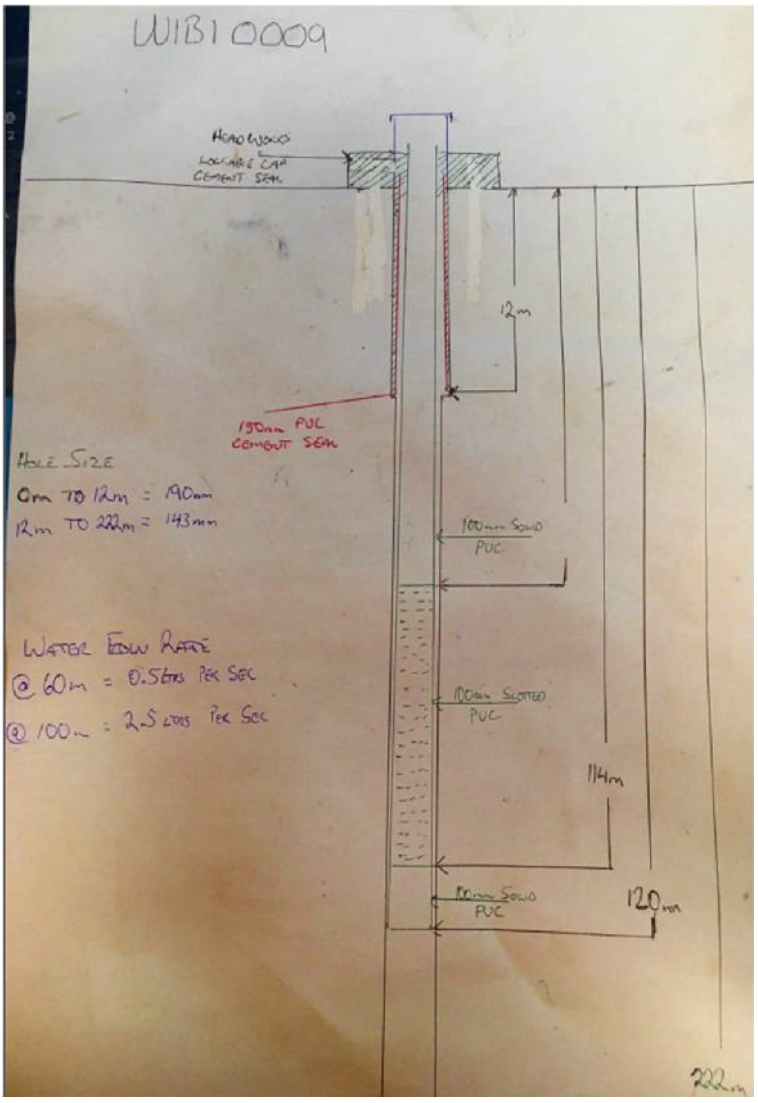
HOLEID	From (m)	To (m)	Lithology			Co ord							
WIDI0001	0	2	Sand			EAST	NORTH	RL	GRIDNAME				
WIDI0001	2	6	Sand			371756	7707036	260	GDA94_MGA_51				
WIDI0001	6	12	Sand										
WIDI0001	12	24	Silcrete										
WIDI0001	24	49	Conglomerate			Casing							
WIDI0001	49	59	Conglomerate		**Hole Casing**	150mm PVC Collar to 5.5m Class 12							
WIDI0001	59	69	Mudstone		**Bore Casing**	+0.75 - 60m Class 12 100mm Solid PVC							
WIDI0001	69	94	Psammite			60-120m Class 12 100mm slotted PVC							
WIDI0001	94	103	Psammite		**Head works**	Cemented form work and lockable steel casing painted white (1m long-800mm							
WIDI0001	103	113	Psammite			out of ground). Unsure of size around 250mm OD							
WIDI0001	113	240	Psammite			Standing water at 42.5m							
					Bore Name:	Brone Bore							

WIDI0008 Russ bore

HOLEID	From (m)	To (m)	Lithology			Co ord					
WIDI0008	0	9	Sand	Red		Easting	Northing	Elevation			
WIDI0008	9	12	Sand	Red		371747	7707047	248			
WIDI0008	12	20	Sand	Yellow							
WIDI0008	20	38	Sand	White		Casing					
WIDI0008	38	48	Sand	Green		**Hole Casing**	13m of 150mm PVC casing				
WIDI0008	48	53	Clay	Yellow		**Bore Casing**	+1 - 54m Class 12 100mm solid PVC				
WIDI0008	53	54	Sand	Black			54-114m Class 12 100mm slotted PVC				
WIDI0008	54	63	Clay	Green		**Head works**	10" Steel 1.3m above ground with lockable cap				
WIDI0008	63	83	Sand	Ochre			1m x 1m x 200mm Cement slab				
WIDI0008	83	101	Arkose	Red							
WIDI0008	101	115	Arkose	Brown							
WIDI0008	115	246	Arkose	Grey							
						Bore Name	Russ's Bore				

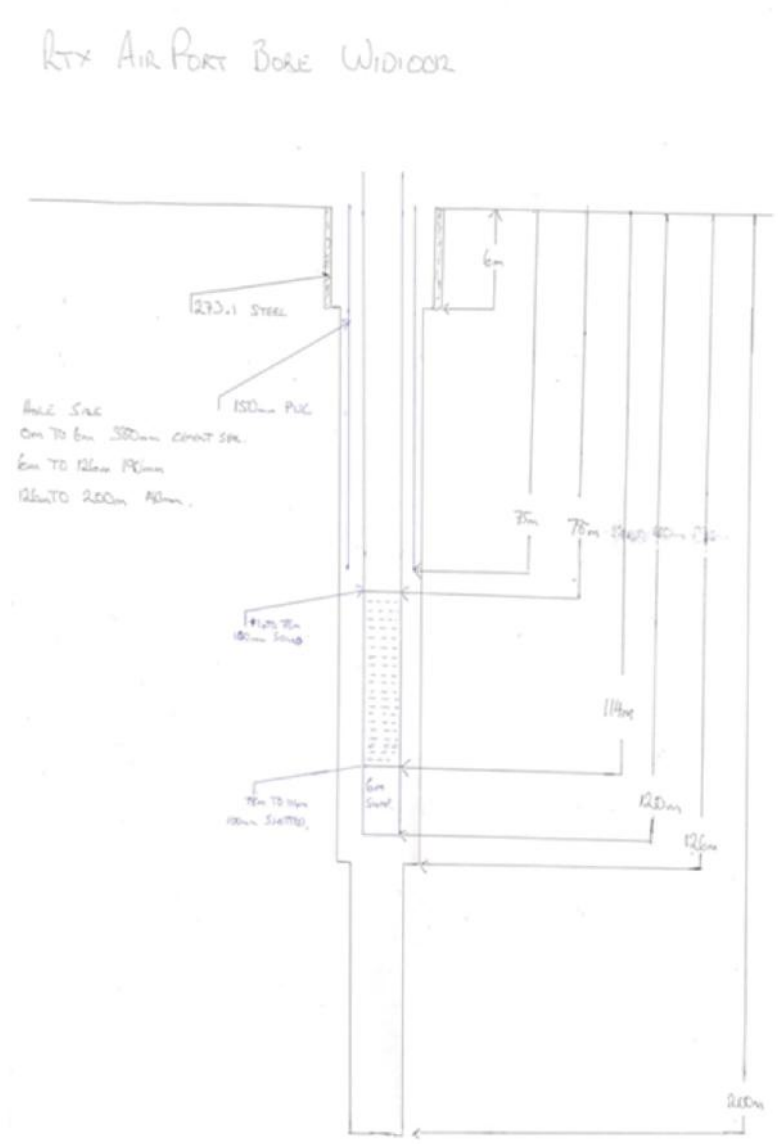
WIDI0009

HOLEID	From (m)	To (m)	Lithology	Colour		Co ord											
WIDI0009	0	6	Sand	Red		EAST	NORTH	RL	GRIDNAME	Depth							
WIDI0009	6	13	Sand	Orange		370696	7707126	285	GDA94_MGA_51	222							
WIDI0009	13	24	Sand	White													
WIDI0009	24	33	Sand	White													
WIDI0009	33	42	Sand	White		Casing						Hole Size			Driller	Drill Company	
WIDI0009	42	43	Sand	Red		**Hole Casing**	0-12m 150mm PVC cemented					0-12m	190mm		Adrian Pe	McKay Drilling	
WIDI0009	43	47	Clay	White								12-222m	143mm				
WIDI0009	47	58	Clay	Maroon		**Bore Casing**	+1 - 59m Class 12 100mm solid PVC										
WIDI0009	58	68	Clay	Brown			59-114m Class 12 100mm slotted PVC										
WIDI0009	68	83	MetaSandstone	Grey			114-120m Class 12 100mm solid PVC with sump										
WIDI0009	83	106	MetaSiltstone	Grey													
WIDI0009	106	120	MetaSiltstone	Grey													
WIDI0009	120	125	MetaSandstone	Grey		**Head works**	200mm Steel 0.75m above ground with lockable cap										
WIDI0009	125	222	MetaSiltstone	Grey			1m x 1m x 200mm Cement slab										
						Water Table	60m										
						Water Flow Rate	60m 0.5L/s										
							100m 2.5L/s										



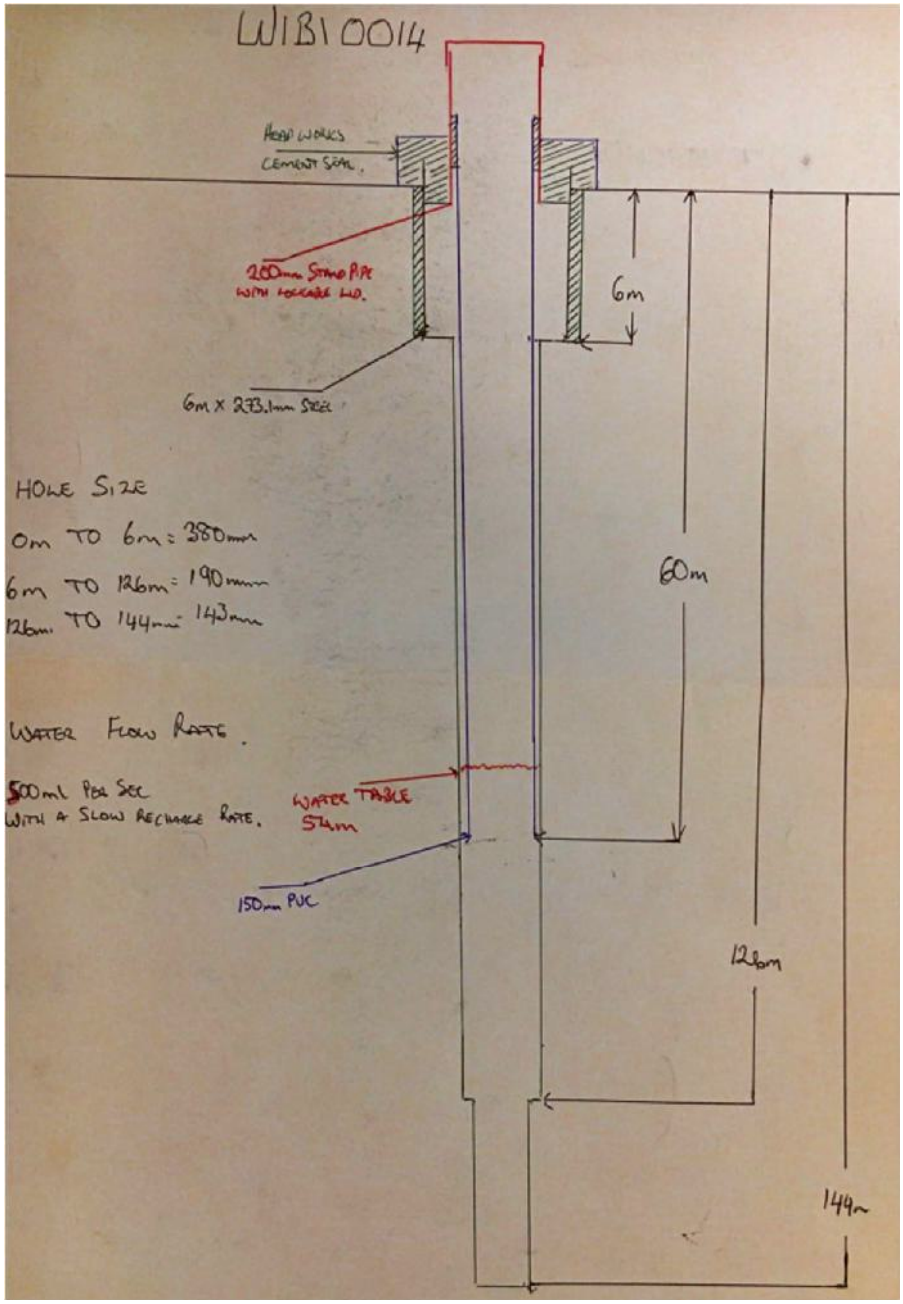
WIDI0012

HOLEID	From (m)	To (m)	Lithology	Colour		Co ord											
WIDI0012	0	1	Sand	Red		EAST	NORTH	RL	GRIDNAME	Depth							
WIDI0012	1	8	Sandstone	White		380633	7702508	265	GDA94_MGA_51	200							
WIDI0012	8	11	Sand	Red													
WIDI0012	11	30	Conglome	Tan													
WIDI0012	30	36	Conglome	White		Casing						Hole Size			Driller	Drill Company	
WIDI0012	36	91	Sandstone	Pink		**Hole Casing**	0-6m 273.1mm steel casing cemented					0-6m	380mm		Adrian Pearse	McKay Drilling	
WIDI0012	91	95	Schist	Green			0-75m 150mm solid PVC					6-126m	190mm				
WIDI0012	95	108	Skarn	Grey		**Bore Casing**	+1 - 78m Class 12 100mm solid PVC					126-200m	143mm				
WIDI0012	108	129	Skarn	Grey			78-114m Class 12 100mm slotted PVC										
WIDI0012	129	153	Schist	Grey			114-120m Class 12 100mm solid PVC with sump										
WIDI0012	153	156	Schist	Grey		**Head works**	200mm Steel 0.75m above ground with lockable cap										
WIDI0012	156	200	Schist	Grey			1m x 1m x 200mm Cement slab										
						Water Table											
						Water Flow Rate											



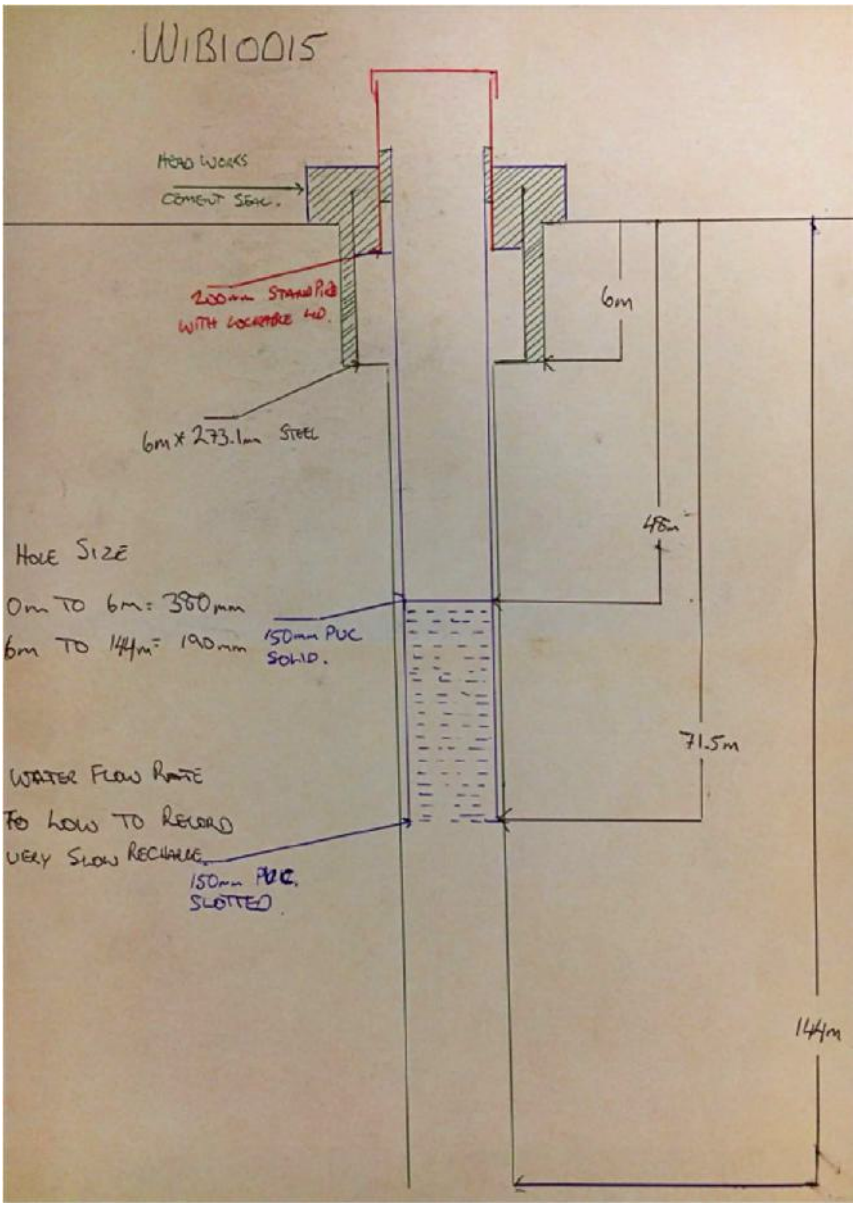
WIDI0014

HOLEID	From (m)	To (m)	Lithology	Colour		Co ord											
WIDI0014	0	2	Sand	Red		EAST	NORTH	RL	GRIDNAME	Depth							
WIDI0014	2	6	Sandstone	White		381010	7702298	270	GDA94_MGA_51	144							
WIDI0014	6	54	Sandstone	Tan													
WIDI0014	54	65	Sandstone	White													
WIDI0014	65	96	Sandstone	Tan		Casing						Hole Size			Driller	Drill Company	
WIDI0014	96	111	Schist	Brown		**Hole Casing**	0-6m 273.1mm steel casing cemented					0-6m	380mm		Adrian Pearse	McKay Drilling	
WIDI0014	111	127	Skarn	Grey								6-126m	190mm				
WIDI0014	127	144	Schist	Grey		**Bore Casing**	+1 - 60m Class 12 150mm solid PVC					126-144m	143mm				
						Head works	200mm Steel 0.75m above ground with lockable cap										
							1m x 1m x 200mm Cement slab										
						Water Table	54m										
						Water Flow Rate	0.5L/s										



WIDI0015

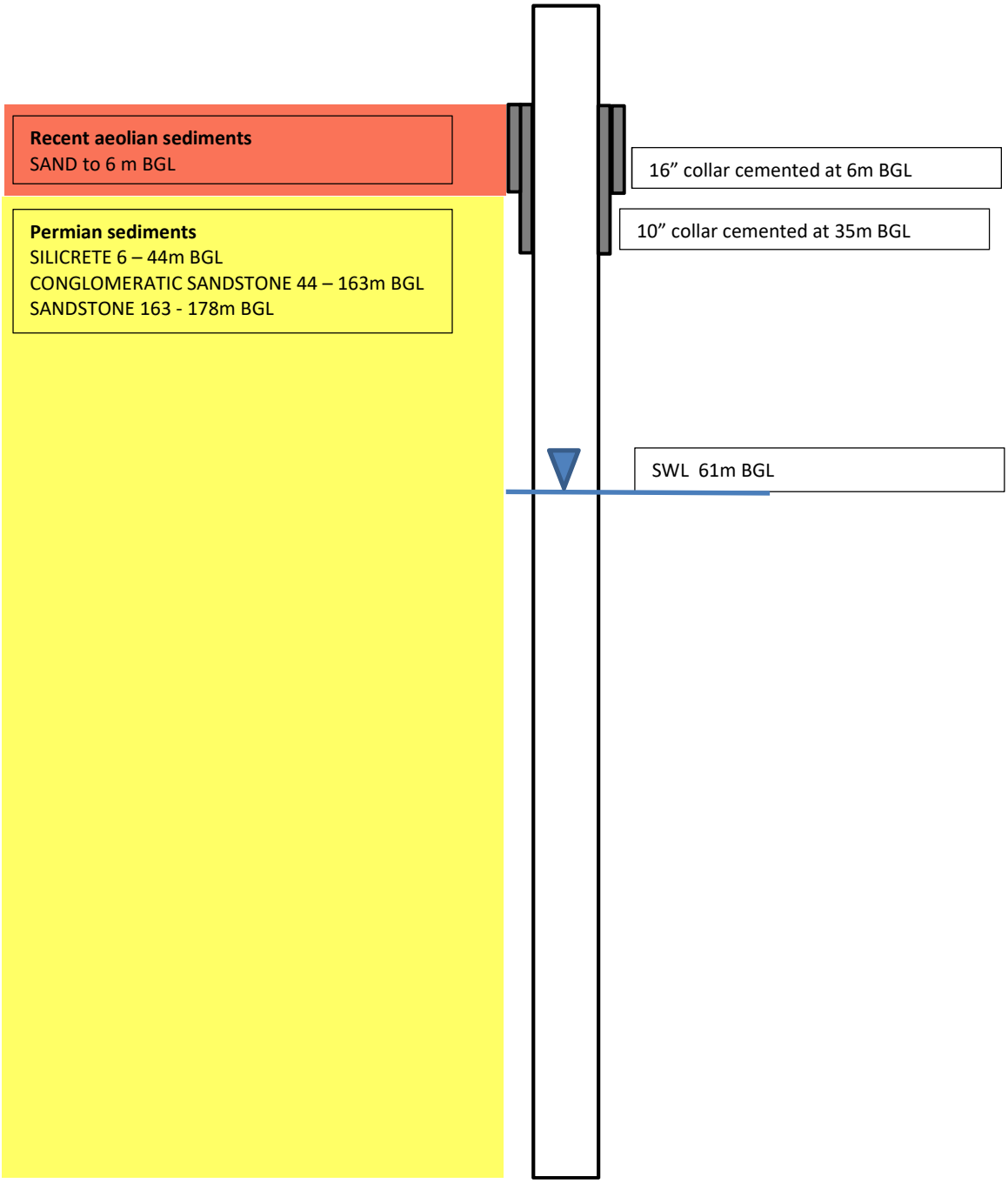
HOLEID	From (m)	To (m)	Lithology	Colour		Co ord												
WIDI0015	0	2	Sand	Red		EAST	NORTH	RL	GRIDNAME	Depth								
WIDI0015	2	8	Sand	Tan		381373	7702086	268	GDA94_MGA_51	144								
WIDI0015	8	20	Sand	Pink														
WIDI0015	20	32	Sand	Clear														
WIDI0015	32	41	Sand	Maroon		Casing						Hole Size			Driller	Drill Company		
WIDI0015	41	50	Sand	Orange		**Hole Casing**	0-6m 273.1mm steel casing cemented					0-6m	380mm		Adrian Pe	McKay Drilling		
WIDI0015	50	59	Sand	Maroon								6-144m	190mm					
WIDI0015	59	84	Schist	White		**Bore Casing**	+1 - 48m Class 12 150mm solid PVC											
WIDI0015	84	101	MetaSand	Grey			48-71.5m Class 12 150mm slotted PVC											
WIDI0015	101	109	MetaSand	Grey														
WIDI0015	109	144	MetaSand	Grey		**Head works**	200mm Steel 0.75m above ground with lockable cap											
							1m x 1m x 200mm Cement slab											
						Water Table												
						Water Flow Rate	To low to record											



WIDI0016

HOLEID	From (m)	To (m)	Lithology	Colour		Co ord												
WIDI0016	0	2	Sand	Red		EAST	NORTH	RL	GRIDNAME	Depth								
WIDI0016	2	8	Sandstone	White		380724	7702787	267	GDA94_MGA_51	180								
WIDI0016	8	22	Sandstone	Brown														
WIDI0016	22	55	Sandstone	Red														
WIDI0016	55	64	Sandstone	White		Casing						Hole Size			Driller	Drill Company		
WIDI0016	64	88	Sandstone	Brown		**Hole Casing**	0-6m 273.1mm steel cemented					0-6m 14"			Adrian Pearse	McKay Drilling		
WIDI0016	88	103	MetaSand	Grey								6-180m 190mm						
WIDI0016	103	108	MetaSand	Grey		**Bore Casing**	+0.5-56.5m 150mm solid PVC											
WIDI0016	108	128	Skarn	Grey			56.5-80m 150mm slotted PVC											
WIDI0016	128	168	MetaSand	Grey			80-86m 150mm solid PVC											
WIDI0016	168	180	MetaSand	Grey														
						Head works	200mm Steel 0.75m above ground with lockable cap											
							1m x 1m x 200mm Cement slab											
						Water Table	70m											
						Water Flow Rate	70m 1L/s											
							108m 1.75L/s											
							150m 3 L/s											

Well name: WIDI0017	**Drilling start date**: 1st March 2019	**Coords**: E 380 725, N 7 702 790
Drilling contractor: Easternwell	**Total depth**: 179m BGL	**Coord sys**: GDA94 MGA Zone 51
Rig: HYD007	**Hole diameter**: 9 5/8" (244.5mm)	**Completion date**: plugged and abandoned
Hydrogeologist: India Cywinski-	**Casing**: N/A	**Surface elevation**: 267m ADL
Jan & Craig Bunting	**Screen depth**: N/A	**Top of csg elevation**: N/A

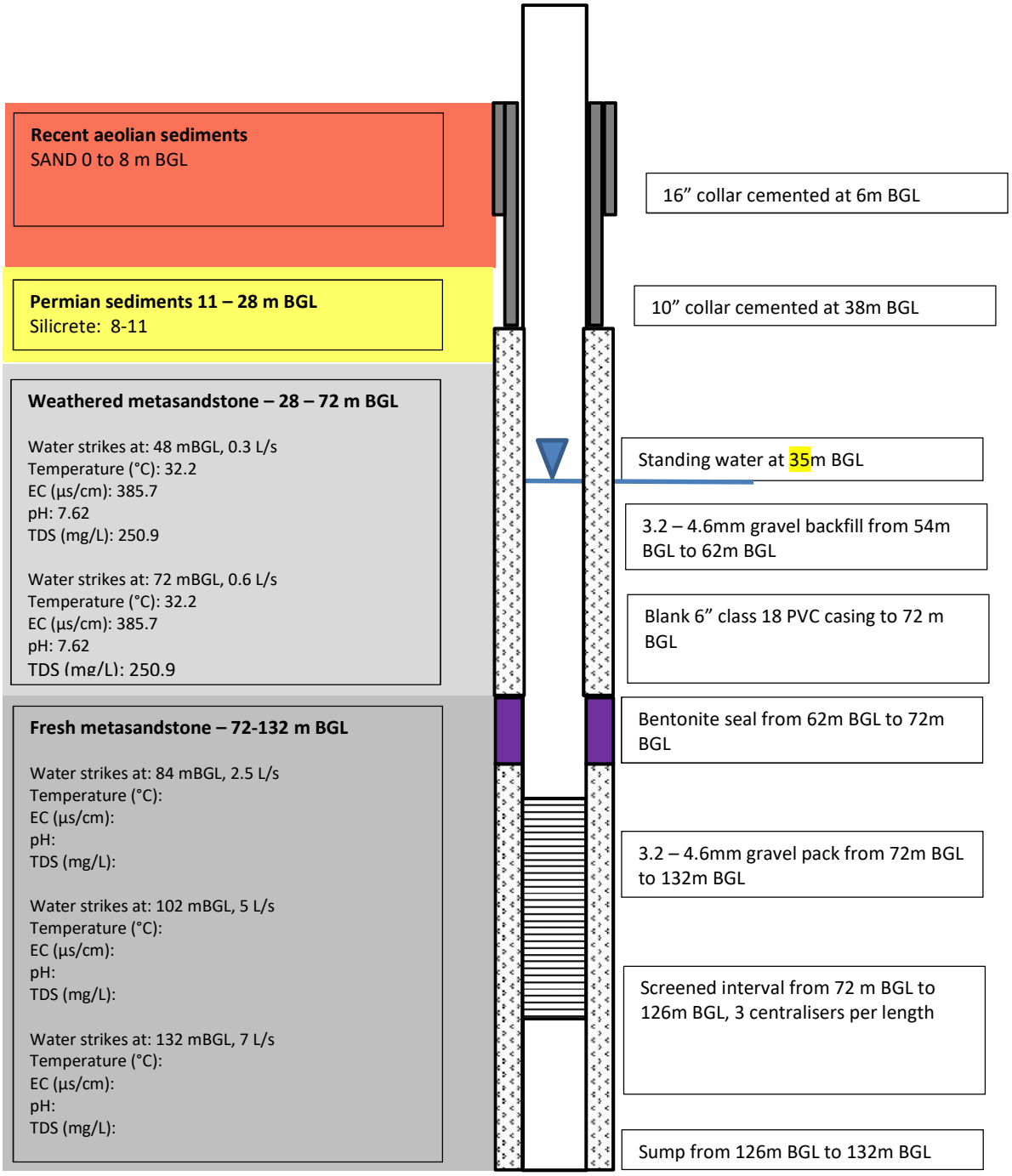


From	To	Lithology	Description
0	6	SAND	SAND: red, orange, medium grained, subangular, subelongate, well-sorted, loose.
6	44	SILICRETE	SILICRETE: medium to coarse-grained, sub-rounded, spherical to occ. elongate, poorly sorted, silicified, filled matrix.
44	163	Conglomeratic SANDSTONE	CONGLOMERATIC SANDSTONE: fine gravel, sub-angular, spherical to elongate, poorly sorted, abundant kaolinite matrix, very friable, interbedded with thin medium-grained dark grey SANDSTONES grading to MUDSTONE in part.
163	178	SANDSTONE	SANDSTONE: coarse-grained, sub-rounded, spherical to occ. elongate, poorly sorted, abundant kaolinite matrix, very friable with interbedded SANDSTONE as above.

End of Rod Water Strike Quality Data :

Depth		Flow	Discharge Colour	Discharge Viscosity	Temperature	Specific Conductance	pH	TDS	Salinity	Dissolved Oxygen	ORP
From	To	(L/s)			(°C)	(µS/cm)	(Units)	(mg/L)	(ppt)	(mg/L)	(mV)
66	72	0.61	Grey	-	32.4	171.6	6.26	111.8	0.08	6.42	140.2
84	90	0.61	Grey	-	34.2	207.3	6.8	134.5	0.1	6.68	124.6
90	96	1	Grey	-	33.4	191.3	7.67	124.1	0.09	6.62	104.1
96	102	-	-	-	34.5	309	7.59	200.8	0.14	6.19	103.8
102	108	-	Grey	-	34.7	889	7.57	578.5	0.43	6.25	105.4
114	120	2.5	-	-	34.3	222.4	7.93	144.3	0.1	6.81	81.2
120	126	2.69	-	-	35.4	311	7.82	202.1	0.14	6.3	87.1
126	132	1.3	-	-	32.3	275.1	8.07	178.7	0.13	6.84	188.9
144	151	0.75	Pale BRN	-	33	190	7.25	-	-	-	-
151	157	1.5	-	-	33	221	7.04	-	-	-	-
157	163	-	-	-	33	103	7.04	-	-	-	-
173	179	<1.0	-	-	34.5	0.8	7.55	-	-	-	-

Well name: WIDI0018	Drilling start date 25th March 2019	Coords: E 371,731 N 7,706,923 (Provisional)
Drilling contractor: Easternwell	Total depth (mBGL): 132	Coord sys: GDA94 MGA Zone 51
Rig: Hyd07	Hole diameter: 9" 5/8'	Completion date
Drillers: Mark Foster/Shaun Johnston	Casing: 150 NB Class 18 Blank uPVC	Surface elevation
Hydrogeologist: India Cywinski-	Screen: 150 NB Class 18 Slotted uPVC + Sump	Top of csg elevation
Jan & Craig Bunting	Method: air-drilling	



Depth		Lithology	Description
From	To		
0	11	Aeolian sands	Red-Orange unconsolidate medium grained aeolian sands
11	15	Clay	
15	26	Interbedded sandstone & Siltstone	
26	28	Permian silificied sands	
28	51	Sandstone	
51	54	Clay	
54	71	Sandstone	
71	132	Metasandstone	

End of Rod Water Strike Quality Data :

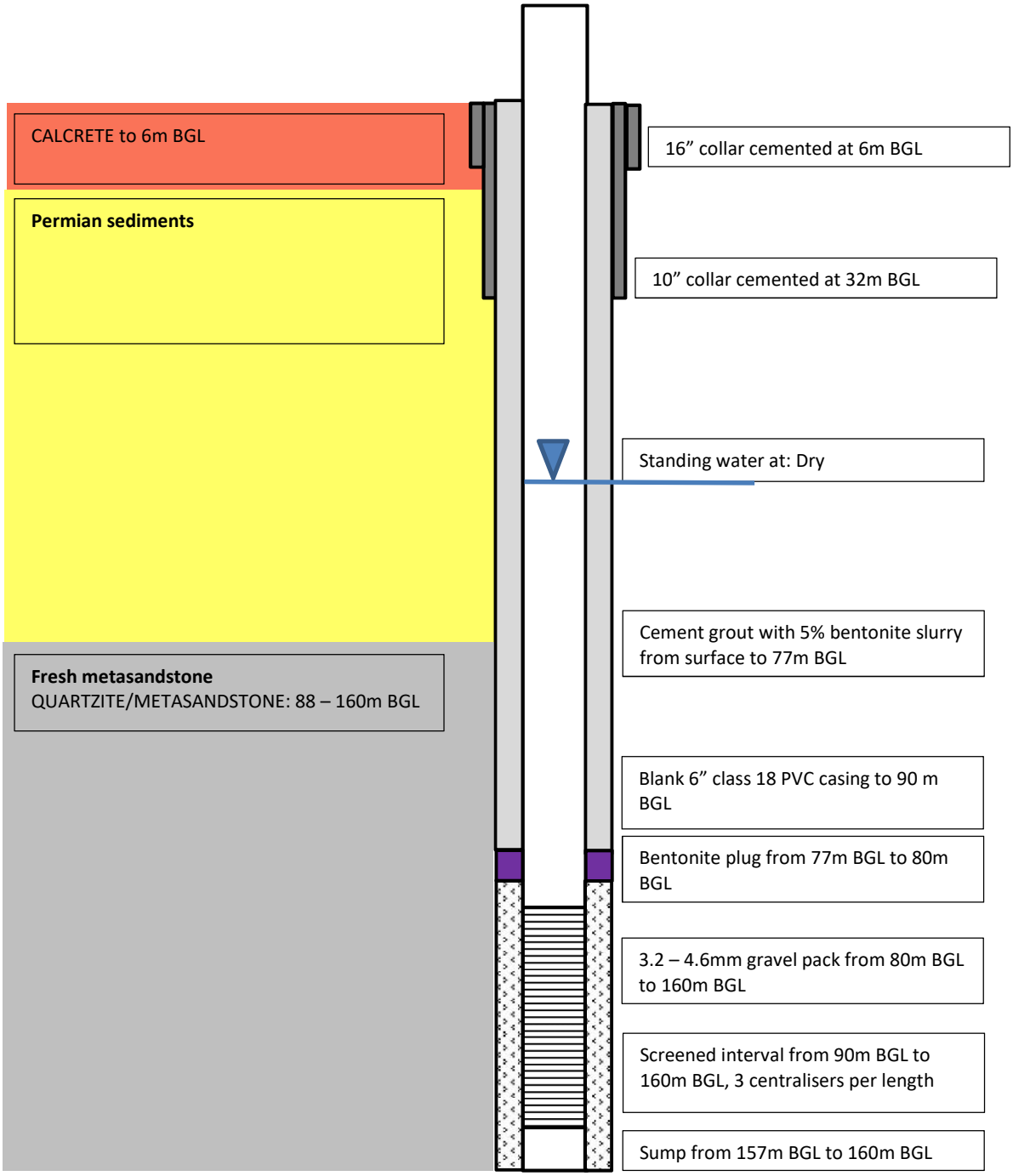
Depth From (m)	Depth To (m)	Method	Flow (L/s)	Discharge Viscosity	Discharge colour	Temperature (°C)	Specific Conductance (µS/cm)	pH (Units)	TDS (mg/L)	Salinity (ppt)	Dissolved Oxygen (mg/L)	ORP (mV)
44	48	EST	0.3	BR	WTR							
48	54	BKT	0.4	BR	WTR	32.20	385.70	7.62	165.49	0.18	4.71	116.4
54	60	BKT	0.4	LtTan	WTR	33.60	435.00	7.84	286.00	0.21	4.52	115.8
60	66	BKT	0.6	LtTan	WTR	32.30	526.00	7.67	344.50	0.25	5.33	122.4
66	72	BKT	0.6	LtTan	WTR	32.30	532.00	7.76	344.50	0.25	4.81	113.3
72	78	BKT	0.7	LtTan	WTR	32.50	544.00	7.82	351.00	0.26	4.79	104.9
78	84	BKT	2.5	LtTan	WTR	31.30	598.00	7.62	390.00	0.29	6.24	122.4
84	90	BKT	4	LtTan	WTR							
90	96	BKT	4	Cloudy	WTR	32.00	599.00	7.70	390.00	0.29	5.17	121.2
96	102	BKT	5	BR	WTR	32.70	676.00	7.74	442.00	0.32	5.14	125.1
102	108	BKT	5	LtTan	WTR	32.60	824.00	7.80	533.00	0.4	4.97	117
108	114	BKT	6	LtTan	WTR							
114	120	BKT	6	LtTan	WTR	32.60	1011.00	7.92	656.50	0.49	5.13	109.9
120	126	BKT	7	LtTan	WTR	32.70	1042.00	7.85	676.00	0.51	4.38	110
126	132	BKT	7	LtTan	WTR	33.40	1155.00	7.83	754.00	0.56	4.08	114

Bore Development Airlift Water Quality Data:

Time (24:00)	Method	Flow (L/s)	Discharge Viscosity	Discharge colour	Temperature (°C)	Specific Conductance (µS/cm)	pH (Units)	TDS (mg/L)	Salinity (ppt)	Dissolved Oxygen (mg/L)	ORP (mV)	Sediment Load (mg/ 20L)

=

Well name: WIDI0019	**Drilling start date**: 26th April 2019	**Coords**:
Drilling contractor: Easternwell	**Total depth**: 160 m BGL	**Coord sys**: GDA94 MGA Zone 51
Rig: Hyd 07	**Hole diameter**: 9 5/8"	**Completion date**:
Drillers: Mark Foster	**Casing:** 150 NB Class 18 Blank uPVC	**Surface elevation**:
Hydrogeologist: India Cywinski-Jan	**Screen:** 150 NB Class 18 Slotted uPVC + Sump	**Top of csg elevation**:
	Method: Mud rotary	



From	To	Lithology	Description
0	6	SILICRETE	SILICRETE : white with increased Fe staining with depth, fine-medium grained, angular-sub-angular, sub-spherical to elongate, well sorted, filled matrix (silica, chert), very hard.
6	16	SANDSTONE	SANDSTONE: light yellow - black, fine –medium grained, angular-sub-angular, spherical-elongate, poorly sorted, filled matrix, hard.
16	24	SAND	SAND: clear, black and red sands, medium, angular to rounded, sub-spherical to sub-elongate, well sorted, open matrix.
24	29	SANDSTONE	SANDSTONE: yellow, black, beige, fine to medium, fine-grained gravel in part, angular to sub-rounded, sub-spherical to elongate, poorly sorted, hard. Increasing yellow clay matrix with depth.
29		SAND	SAND: red, medium grained, sub-angular-sub-rounded, sub-spherical, poorly sorted with red clays present.
88	160	METASANDSTONE	METASANDSTONE : grey and black, medium grained, angular to subangular , elongate, poorly sorted, hard. Highly contaminated with Permian sands from above the unconformity.

REPORT OF BOREHOLE: WIDI0020

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 367879.950 m E 7708358.310 m N MGA94 51 K
SURFACE RL: 252.59 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 244 mm HOLE DEPTH: 142.00 m

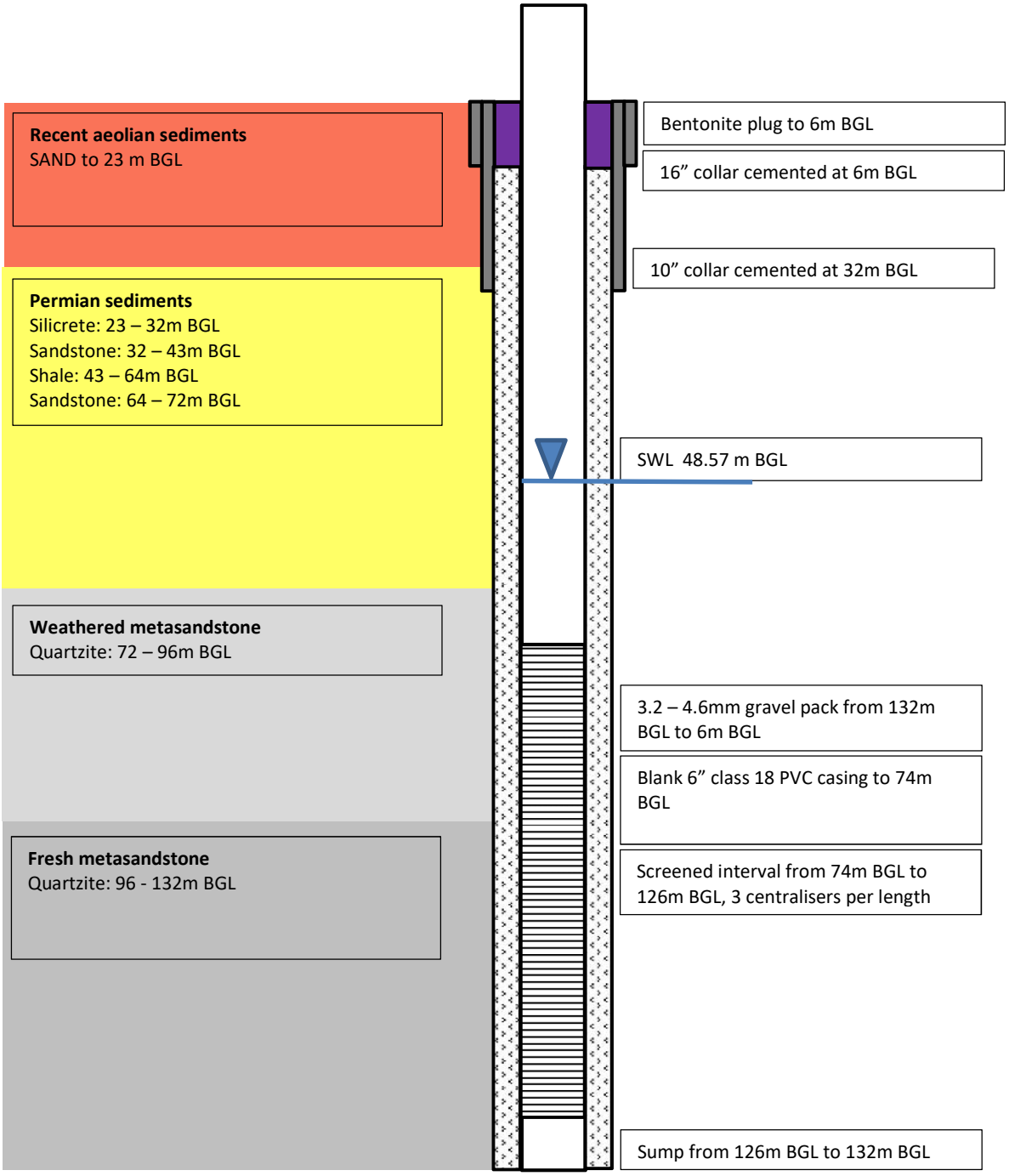
DRILL RIG: HYD07
CONTRACTOR: Easternwell
LOGGED: IC DATE: 28-5-19
CHECKED: AP DATE: 4-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RAB	61.61 mbgl , 30-05-19	0	252.59				AEOLIAN SANDS		0- 6m: Bentonite/cement plug
			8.00						
			244.59				SANDSTONE Patchy siliceous. Becoming cemented with depth		0 - 42m: 12" Collar casing
		20	20.00 232.59				Common patchy silicification, common kaolinite on grains		0 - 42m: 150mm blank PVC Class 18
			37.00						
		40	40.00 212.59				Slight colour change, common traces of kaolinite on grains Drilling with mud rotary. Formation change, increasing grainsize		6 - 78m: 4 - 6mm gravel pack
			52.00 200.59				Interval of medium to fine gravel at 56m BGL, common kaolinite on grains		42 - 66m: 150mm slotted class 18 PVC, 1mm aperture
			58.00 194.59				Increased kaolinite on grains with depth		
		60	62.00 64.00 188.59				Slight light orange at 62m BGL. Slight content of limonite. Possible water-induced alteration.		
			69.00 71.00				Clayey, occasionally purple/red. Silicified. Shattered quartz vein		
			181.59				Fine sandstone interbedded with shale, purple MUDSTONE Cavings		66 - 78m: 150mm blank class 18 PVC, 1mm aperture
		80	82.00 170.59				More cohesive cuttings, less dispersive, becoming dark purple/black with depth		PVC end cap 78 - 81m: Bentonite plug
			90.00 162.59				Change in colour. Massive, amorphous, possible palaeo-watertable interface		
		100							81 - 142m: Backfill
		120	121.00 131.59				Increasing hardness		
			130.00 122.59				Moderately hard in part, 10% cuttings platy at 132m below ground level		
			137.00 115.59				Clay returns to being amorphous		
		140	142.00 110.59				END OF BOREHOLE @ 142.00 m TARGET DEPTH STANDPIPE INSTALLED Golder supervision only for casing installation. Drilling and design not under Golder's supervision		
		160							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:22 8.30.002 Datgel Tools

Well name: WINU0047	**Drilling start date**: 16th March 2019	**Coords**: E 369 258, N 7 707 869 (prov)
Drilling contractor: Easternwell	**Total depth**: 132m BGL	**Coord sys**: GDA94 MGA Zone 51
Rig: HYD07	**Hole diameter**: 9 5/8"	**Completion date**: 24th March 2019
Drillers: Mark Foster	**Casing:** 150 NB Class 18 Blank uPVC	**Surface elevation**:
Hydrogeologist: Craig Bunting	**Screen**: 150 NB Class 18 Slotted uPVC + Sump	**Top of csg elevation**:
	Method: air-drilling	



From	To	Lithology	Description
0	23	SAND	SAND: red, fine-medium, subspherical-elongate, poorly sorted, alluvial, friable
23	32	SILICRETE	SILICRETE: Cream, coarse to medium gravel, angular, breccia, smashed by bit action, grading to SANDSTONE in part.
32	43	SANDSTONE	SANDSTONE: cream to light grey, medium-coarse, angular to sub-angular, sub-spherical, poorly sorted, partially filled matrix, conglomeratic, common chert, silicified in part.
43	64	SHALE	SHALE: light beige, common red haematitic bands, haematite-red increases with depth, also purple, light brown and black.
64	72	SANDSTONE	SANDSTONE: light purple becoming light tan with depth, medium to fine-gravel, angular to sub-rounded, spherical to sub-spherical, moderately sorted, filled matrix, 10% malachite occurring in veins or replacement matrix, abundant shattered quartz.
72	96	QUARTZITE	QUARTZITE (weathered), light tan to purple in part, medium, sub-angular, sub-spherical, well sorted, filled matrix, common shattered quartz, common fracture surfaces, occasionally grades to PELITE.
96	132	QUARTZITE	QUARTZITE (fresh rock), alternating light khaki/light grey, medium, sub-angular, sub-spherical, well sorted, filled matrix, common fractures surfaces with occasional goethite/haematite alteration, occasional white mineral on fracture surfaces, no reaction to HCl, 10% shattered quartz at 128m BGL.

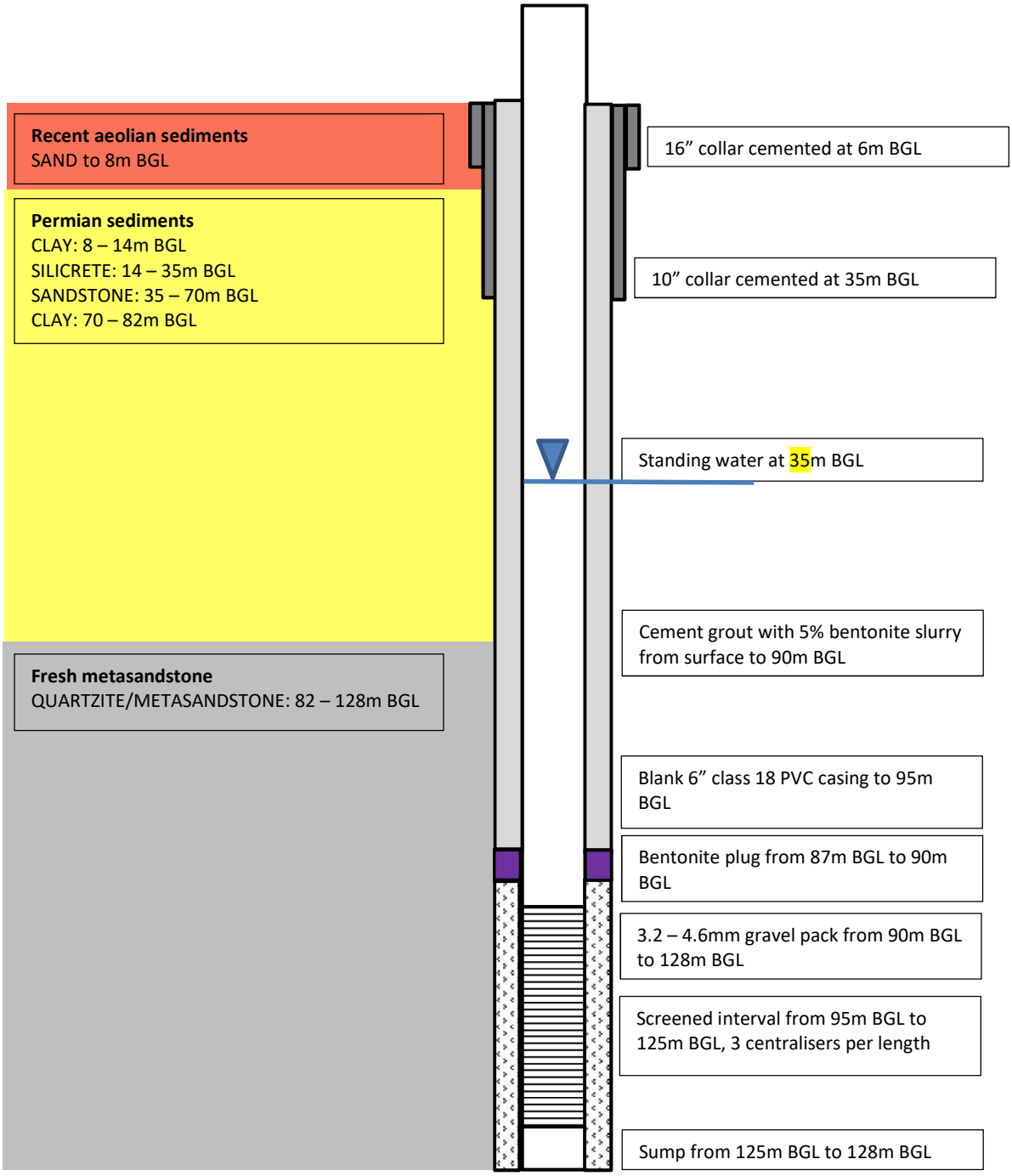
End of Rod Water Strike Quality Data :

Depth From (m)	Depth To (m)	Method	Flow (L/s)	Discharge Viscosity	Discharge colour	Temperature (°C)	Specific Conductance (µS/cm)	pH (Units)	TDS (mg/L)	Salinity (ppt)	Dissolved Oxygen (mg/L)	ORP (mV)
44	48	EST	0.3	BR	WTR							
48	54	BKT	0.4	BR	WTR	32.20	385.70	7.62	165.49	0.18	4.71	116.4
54	60	BKT	0.4	LtTan	WTR	33.60	435.00	7.84	286.00	0.21	4.52	115.8
60	66	BKT	0.6	LtTan	WTR	32.30	526.00	7.67	344.50	0.25	5.33	122.4
66	72	BKT	0.6	LtTan	WTR	32.30	532.00	7.76	344.50	0.25	4.81	113.3
72	78	BKT	0.7	LtTan	WTR	32.50	544.00	7.82	351.00	0.26	4.79	104.9
78	84	BKT	2.5	LtTan	WTR	31.30	598.00	7.62	390.00	0.29	6.24	122.4
84	90	BKT	4	LtTan	WTR							
90	96	BKT	4	Cloudy	WTR	32.00	599.00	7.70	390.00	0.29	5.17	121.2
96	102	BKT	5	BR	WTR	32.70	676.00	7.74	442.00	0.32	5.14	125.1
102	108	BKT	5	LtTan	WTR	32.60	824.00	7.80	533.00	0.4	4.97	117
108	114	BKT	6	LtTan	WTR							
114	120	BKT	6	LtTan	WTR	32.60	1011.00	7.92	656.50	0.49	5.13	109.9
120	126	BKT	7	LtTan	WTR	32.70	1042.00	7.85	676.00	0.51	4.38	110
126	132	BKT	7	LtTan	WTR	33.40	1155.00	7.83	754.00	0.56	4.08	114

Bore Development Airlift Water Quality Data:

Time (24:00)	Method	Flow (L/s)	Discharge Viscosity	Discharge colour	Temperature (°C)	Specific Conductance (µS/cm)	pH (Units)	TDS (mg/L)	Salinity (ppt)	Dissolved Oxygen (mg/L)	ORP (mV)	Sediment Load (mg/ 20L)

Well name: WINU0050	**Drilling start date**: 5th April 2019	**Coords**:
Drilling contractor: Easternwell	**Total depth**: 128m BGL	**Coord sys**: GDA94 MGA Zone 51
Rig: HYD07	**Hole diameter**: 9 5/8"	**Completion date**:
Drillers: Mark Foster	**Casing**:150 mm NB Class 18 uPVC	**Surface elevation**:
Hydrogeologist: Craig Bunting	**Screen**: 150 mm NB Class 18 Slotted uPVC	**Top of csg elevation**:
	Method: Air/Mud rotary	



From	To	Lithology	Description
0	8	SAND	SAND: red, medium-coarse, angular-subangular, spherical to elongate, moderately sorted, open matrix, friable.
8	14	CLAY	CLAY: light orange, sandy.
14	35	SILICRETE	SILICRETE: biege becoming light grey with depth, medium, fine in part, angular to sub-angular, sub-spherical to sub-elongate, well sorted, filled matrix (silica/chert), hard.
35	70	SANDSTONE	SANDSTONE: light grey, beige, red, tan, fine to medium, fine-grained gravel in part, angular to sub-angular, bedded, sub-spherical to elongate, well-sorted to poorly sorted in part, kaolinite matrix in part, hard. Trace of malachite at 37-38m BGL.
70	82	CLAY	CLAY: tan, beige, dark red, commonly pulverised into slurry by bit, 50% silicified.
82	128	METASANDSTONE/ QUARTZITE	METASANDSTONE: dark grey, fine grained, commonly grading to PELITE, angular to sub-angular, massive, sub-spherical, well-sorted, filled matrix, very hard, from 82-94m BGL abundant fracture surfaces on cutting with dark red oxidation/haematite or yellow/limonite, 114-116m BGL trace arseno-pyrite and rare fracture surfaces with sericite alteration, rare fracture surface with carbonate at 122-128m BGL.

End of Rod Water Strike Quality Data :

Depth From (m)	Depth To (m)	Method	Flow (L/s)	Discharge Viscosity	Discharge colour	Temperature (°C)	Specific Conductance (µS/cm)	pH (Units)	TDS (mg/L)	Salinity (ppt)	Dissolved Oxygen (mg/L)	ORP (mV)
80	86	BKT	4	Tan	SLV	33.5	241.3	7.19	156.6	0.11	6.84	155
86	92	BKT	4	Tan	WTR	33	1188	7.39	773.5	0.58	5.99	142.5
92	98	BKT	2.8	D Biege	WTR	34.4	839	7.27	546	0.4	4.89	136.1
98	104	BKT	3.3	Bi	WTR	34	1083	7.23	702	0.53	5.75	135.9
104	110	BKT	4	Bi	WTR	33.3	1121	7.43	728	0.55	5.83	123.3
110	116	BKT	4	Bi	WTR	33	1930	7.67	1254.5	0.97	4.9	109.7
116	122	BKT	5	Bi	WTR	33.5	2744	7.89	1781	1.4	5.85	82.2
122	128	BKT	6.7	Translucent	WTR	32.9	4495	7.41	2925	2.36	5.53	89.9

Bore Development Airlift Water Quality Data:

Time (24:00)	Method	Flow (L/s)	Discharge Viscosity	Discharge colour	Temperature (°C)	Specific Conductance (µS/cm)	pH (Units)	TDS (mg/L)	Salinity (ppt)	Dissolved Oxygen (mg/L)	ORP (mV)	Sediment Load (mg/ 20L)

REPORT OF BOREHOLE: WINU0070

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 370010.680 m E 7707304.760 m N MGA94 51 K
SURFACE RL: 247.09 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 244 mm HOLE DEPTH: 150.00 m

DRILL RIG: HYD07
CONTRACTOR: Easternwell
LOGGED: JE DATE: 30-1-19
CHECKED: AP DATE: 21-8-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RAB	47.74 mbgl, 08-06-19	0	247.09				SAND Aeolian sands dark red/brown in colour; Rounded to well rounded fine to very coarse grains of predominantly quartz (<95%); Poor sample returned from 8-15m		0 - 4.5m: Cement plug 0 - 6m: 12" ND Steel collar casing (cemented in place)
			18.00						
		20	20.00 227.09				CONGLOMERATE Conglomerate tan/grey/purple in colour; Clasts of quartz and other lithics up to 7mm in size; Matrix is pastel orange in colour and porous		0 - 69.5m: 150mm blank class 18 PVC; 1 centraliser per length
			26.00 221.09				SANDSTONE Siliciclastic sandstone tan/grey/purple/orange in colour; Mainly medium to very coarse quartz grains; Hematitic and goethitic oxidation		
			33.00 214.09				26-36m: Granule to pebble sized quartz clasts		
			38.00 209.09				33-36m: Very thin mudstone beds		
		40	45.00 202.09				38-40m: Very pure siliciclastic sandstone; well sorted, medium to coarse grained		
			49.00 198.09				MUDSTONE Tan/white in colour; ~1% of sample is oxidised quartz grains		
			53.00 194.09	53.00 m 616 us/cm; pH 6.15			SANDSTONE White/grey/tan. Siliciclastic, medium to coarse grained; Highly oxidised	0.5	0 - 53m: 10" ND Steel surface casing (cemented in place)
			60.00	60.00 m No test, clayey "slop" returned			50-52m: Interbedded with mudstone, ~30% of sample		4.5 - 135.5m: 3.2 - 4.6mm Gravel pack
		60	63.00 184.09	66.00 m No test, clayey "slop" returned			MUDSTONE cream and purple interbedded layers occasional lithic clasts set within		
			72.00 175.09	72.00 m No test, clayey "slop" returned			BRECCIA lithoclasts are dark purple in colour; Minor quartz viens; Silt/clay component is ~90% of sample but not clear if contamination from further up borehole		
							METASANDSTONE Dark yellow/brown in colour (Leach cap material); Minor clay component which may be clay alteration/fracture fill or contamination; Goethitic and hematitic oxidation; Sample is deeply weathered making fragments friable		
		80	87.00 180.09				Section of soft deeply weathered metasandstone? Yellow in colour	1	
			158.09	90.00 m 563 us/cm; pH 6.92			89-90m: Deeply weathered friable metasandstone, orange/yellow in colour (does not occupy full 1m interval)	3	
		100		102.00 m 505 us/cm; pH 6.95				4.5	69.5 - 135.5m: 150mm slotted Class 18 PVC, 1mm aperture
			108.00					4.5	
			110.00 137.09	108.00 m 951 us/cm; pH 6.32			108-110m grades into more fresh meta-sandstones with surface oxidation only; Driller notes penetration rates decrease at 108m		
				114.00 m 615 us/cm; pH 7.3			METASANDSTONE Dark grey to grey in colour interbedded with Green/grey in colour; fine grained; Surface oxidiation present; 20-30% of sample is goethitic fragments ~1-2mm in size but may be contamination; Minor pyrites	4.5, 5	
		120	120.00 127.09	120.00 m 563 us/cm; pH 7.11			120-126m: Drillers comment: "few fractures in rod"	4.5	
				126.00 m 727 us/cm; pH 7.21				5.5	
				132.00 m				6.6, 4.4	
			136.00 111.09	627 us/cm; pH 7.36			136-138m: Drillers comment: "few fractures"		PVC end cap
		140		138.00 m No test sump filling up and prioritise drilling 1 more rod over measurements					135.5 - 150m: Fallback from collapsing section further up hole
			148.00 99.09				148-149m: Possible fracture; Small quartz vien		
			97.09				END OF BOREHOLE @ 150.00 m TARGET DEPTH PRODUCTION WELL EOH @ 150m due to hole stability issues between 65-70m; converted to mud rotary to keep hole open but could only clear to 136m; PVC casing installed to 135.5m; SWL 47.3m bgl measured on 03/06/2019		
		160							

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:22 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0076

SHEET: 1 OF 1

CLIENT:	Rio Tinto Exploration	COORDS: 368917.800 m E 7707892.500 m N MGA94 51 K	DRILL RIG: HYD07
PROJECT:	WINU Water Studies	SURFACE RL: 245.71 m DATUM: AHD	CONTRACTOR: Easternwell
LOCATION:	East Pilbara - WINU	INCLINATION: -90°	LOGGED: AC DATE: 16-6-19
JOB NO:	19117831	HOLE DEPTH: 157.00 m	CHECKED: AP DATE: 4-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	49.53 mbgl . 25-06-19	0	245.71				SAND Dark red/red-brown sand/soil, fine to medium grained, rounded to well rounded. Mostly quartz		0 - 5m: Cement plug
			8.00 237.71						
			11.00 234.71				8 - 10m: Trace clays		0 - 77m: 12" ND Steel collar casing
		20					Aeolian free running sands, colour grades from red/brown to tan-pale yellow/orange. Unconsolidated fine to medium grained sand, rounded to well rounded. Predominantly quartz		
			31.00 214.71						0 - 83m: Blank 8" Steel casing
			35.00 210.71				Off-white to cream, coarse grained sand with some weakly to moderately cemented sandstone. Subangular to subrounded quartz.		
		40					SANDSTONE Off-white to pale red/orange, quartz rich sandstone, medium to coarse grained, siliciclastic sandstone, angular, ferruginised. 35 - 42m some orange pale chips (10-20%)		
			56.00 58.00 60.00 185.71				56 - 58m: Minor hematite and goethite oxidation. Losing mud during drilling - cavity/fracture?		4 - 137m: 3.2 - 6.4mm Gravel pack
		60					MUDSTONE/SANDSTONE Fine grained to medium grained sandstone interbedded with tan mudstone, friable/planar chips, angular		
			67.00 73.00 74.00 171.71				MUDSTONE Friable/platy grey-cream mudstone with some trace sandstone, minor oxidation (goethitic), low plasticity, hard		
							Minor cream/grey mudstone in predominantly highly plastic purple clay. Geothitic oxidation		
		80					METASANDSTONE Unconformity. Transition zone from mudstone to metasandstone. Increase in drilling hardness. 20% metasandstone chips		
RAB			85.00 160.71	84.00 m 1981 uS/cm; pH = 8.03				1	
			92.00 153.71	90.00 m 1720 uS/cm; pH = 7.95			Grey to dark grey metasandstone, hard angular chips with minor purple-red clay 74 - 77m. Quartz veins throughout 85m: Coarse blocky quartz veins	2.8	
				96.00 m 2000 uS/cm; pH = 7.84			92m: Increase in quartz veining	5	
		100	102.00 143.71	102.00 m 1950 uS/cm; pH = 8.17			102m: Minor oxidised chips (5%). Losing water - possible fracture?	5	83 - 137m: 8" Stainless steel screen, 0.5mm aperture
								6.7	
			114.00 131.71	114.00 m No sample collected; flow rate too high to sample			114m: Oxidised zone (goethite)	7+	
		120	123.00				Oxidation zone and enhanced enrichment of pyrite/chalcopyrite. Driller noted soft ground at 124m	7+	
								7+	
								7+	
		140	140.00 105.71				Massive quartz veining (40 - 60% sample), 140 - 142m minor goethite oxidation	7+	8" Steel end cap
			155.00 157.00						137 - 157m: Fallback
		160	88.71				END OF BOREHOLE @ 157.00 m TARGET DEPTH PRODUCTION WELL EOH @ 157m. Sump size limiting depth. Borehole drilled with mud from 0 - 77m, and conventional air from 77 - 157m		

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0080

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 369528.470 m E 7707686.720 m N MGA94 51 K
SURFACE RL: 246.05 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 244 mm HOLE DEPTH: 150.00 m

DRILL RIG: HYD07
CONTRACTOR: Easternwell
LOGGED: JE DATE: 3-7-19
CHECKED: AP DATE: 4-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	47.34 mbgl, 08-07-19	0	246.05				SAND Red/brown in colour; medium to very coarse grained; sub-angluar to subrounded grains of predominantly quartz (<95%), and a few dark grains (>5%)		0 - 6m: 17" Steel collar casing. Hole was filled with cement and drilled through with 17" rock roller
			17.00						
		20	228.05				17 - 18m: Transition to sandstone		0 - 94m: Blank 8" steel casing
			22.00				SANDSTONE Tan/brown/purple in colour; siliciclastic sandstone; medium to very coarse grained; matrix supported; predominantly quartz grains (99%) and occasional ferruginous sandstone fragments (~1%)		
			224.05						
			28.00						
			218.05				22 - 23m: 99% Very coarse gravel sized quartz grains; subangular; very weak cementation inferred		6 - 91m: 3.2 - 6.4mm Gravel pack
			35.00						
			38.00				28 - 31m: Minor silcrete bands (~1% of sample); an increase in proportion of pure qtz grains inferred to be weakly cemented		
		40	208.05				35m: Drillers comment = "Drilling rate slowed"		
			44.00				MUDSTONE 38 - 60m: Cream in colour; contaminated with fine grained siliceous sandstone (~50%)		
			202.05						
			54.00				44 - 46m: Tan/grey/purple/orange in colour; interbedded; occasional lithoclasts of quartz or sandstone within sample, not clear if contamination or lithoclasts		0 - 92m: 12" ND Steel collar casing
			192.05						
			60.00				54 - 60m: 10% of sample is ferruginous metasediments; angular chips returned; possibley lithoclasts set within mudstone		
		60	186.05				60 - 66m: Mudstone/clay maroon in colour; metasediment and cream mudstone fragments account for 40% of sample		
			66.00						
			178.05				METASANDSTONE Hematite enriched leach cap material; fine grained; dark grey/purple in colour; drillers comment = "drilling rate slowed"		
			72.00						
			174.05				68 - 72m: Quartz vien in sample (~5%); ground condition varying clay in sample		
		80					72 - 83m: Quartz vien in sample (~50%); highly weathered meta sediments; goethite and hematite frequent; chips frequently crumble in hand		
			90.00						
			154.05				90m: 20% of sample highly weathered to clay/silt		91 - 92m: Bentonite seal
			95.00				92 - 95m: Highly oxidised weathered measediments; dark grey - grey; quartz viening ~20% sample (clear, cream, or smokey quartz); fine grained; Cu oxides ~1% of sample;	3	
			151.05						
			150.05						94 - 100m: 8" Vertical slotted steel casing, 1mm aperture
		100	101.00				95 - 102m: Highly oxidised as per 92 - 95m interval but ~30 - 50% quartz viening	5	
			145.05						
			105.00				96m: Degree of oxidation increases; fracture planes evident		
			141.05				101m: Thick iron deposition around quartz vien contacts	7	
			113.00				105 - 109m: 5 - 10% highly weathered metasediments; light green; kaolinised; biotite speckles		92 - 148m: 3.2 - 6.4mm Gravel pack
			133.05					7	
							113 - 114m: Drillers comment "ground softer"		
			120.00						
RAB		120	126.05				120m: ~50% of sample is grey and friable in hand; level of quartz viening reduces to ~5%	7+	100 - 130m: 8" Stainless steel slotted casing, 1.5mm aperture
			125.00						
			121.05				125 - 126m: Large fragments >40mm returned	7+	
			131.00						
			115.05				131 - 150m: K-feldspar very coarse crystals; ~1% - 5% of sample		
		140						7+	130 - 148m: 8" Vertical slotted steel casing, 1mm aperture
								10	
			150.00						Steel end cap
			96.05				END OF BOREHOLE @ 150.00 m TARGET DEPTH PRODUCTION WELL EOH @ target depth 150m. Sump size limiting drill depth. Borehole drilled with mud from 0 - 92m, and conventional air from 92 - 150m; Sample was highly contaminated from 92 - EOH.		148 - 150m: Fallback
		160							

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0166

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 369564.470 m E 7707683.480 m N MGA94 51 K
SURFACE RL: 246.26 m DATUM: AHD
INCLINATION: -85° DIRECTION: 265°
HOLE DIA: 140/190 mm HOLE DEPTH: 252.00 m

DRILL RIG: McKay 41
CONTRACTOR: McKay Drilling
LOGGED: SB DATE: 25-7-19
CHECKED: AP DATE: 4-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	48.06 mbgl , 26-09-19	0	246.26				SAND Red medium to coarse aeolian sands. Subangular to subrounded		0 - 1m: Cement plug
			15.00						0m-48m: 150mm blank class 18 PVC surface casing. Annulus between collar casing and hole wall cemented
			18.00				Pink-white coarse uncemented sands transitioning to sandstones		
		20	228.33				SANDSTONE White-pink coarse silicoclastic sandstone		0m - 55m: Backfilled with gravel 3.2mm - 6.4mm
			24.00				White coarse quartz-silcrete sandstones		
			222.35						
		40	41.00						0m - 88.75m: 50mm Class 18 blank PVC
			205.42				MUDSTONE White silty clayey mudstone		
			48.00						
			198.44				Pink brown silty clayey mudstone. Ferruginous band between 51m and 54m		
			54.00						
			192.47				FERRICRETE Ferricrete. Red		55m - 69m: Bentonite seal
		60	61.00						
			185.49				METASANDSTONE white grey quartz silcrete medum to fine gravelly metasediments. Goethite leach cap		
		80							69m - 100.75m: 1.2mm - 3.4mm gravel pack
									88.75m - 100.75m: 50mm slotted class 18 PVC, 1mm aperture
		100							50mmPVC end cap
			120.00						
		120	126.72				METASANDSTONE Tan		
		140							
			160.00						100.75m - 252m: 3.2mm - 6.4mm gravel pack from 252m up to 100m
		160	86.87				METASANDSTONE Grey		
		180							
		200							
		220							
		240							
			252.00						
			-4.78				END OF BOREHOLE @ 252.00 m TARGET DEPTH STANDPIPE INSTALLED Drilled in June as RC hole under Rio Tinto Supervision. End of hole 265m. Backfilled to 100m and completed as monitoring bore		
		260							

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REPORT OF BOREHOLE: WINU0213

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 368913.290 m E 7707924.550 m N MGA94 51 K
SURFACE RL: 245.73 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 140/190 mm HOLE DEPTH: 106.00 m

DRILL RIG: Ranger 4
CONTRACTOR: Ranger Drilling
LOGGED: PC DATE: 19-7-19
CHECKED: AP DATE: 4-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	50.01 mbgl , 22-09-19	0	245.73				SAND Red, fine to coarse aeolian sands		0 - 1m: Cement plug (AB Foam below)
			11.00						
			234.73				Yellow, fine to coarse sands		0 - 36m: 150mm blank class 18 PVC collar casing. Annulus between collar casing and hole cemented
			16.00						
			229.73				SANDSTONE Consolidated yellow coarse sandstone		
		20	20.00						
			225.73				Yellow-white coarse sandstones. Medium to high quartz content		
			25.00						
			220.73				yellow-red sandstones		
			30.00						
			215.73				White-pink coarse sandstones		
			38.00						
		40	207.73				white coarse sandstones. High quartz content		
									0 - 87.36m: 50mm blank class 18 PVC
			55.00						
			190.73				White-yellow sandstones transitioning to mudstone. Increasing content of white-yellow clay and increasing plasticity. Slighlty moist to dry	0.3	
			58.00						
			187.73						
		60	61.00				MUDSTONE Yellow-white mudstone. High content of white clays and medium to low plasticity. Slightly to no moist		
			184.73				White pink mudstone. High to medium content of white pink clay, low goethite content, low plasticity, slightly moist		Hole collapsed. Tagged annulus after accomodating 50mm PVC casing down the hole and found blockage at around 70m (15/7/2019). Tagged annulus again on 25/7/2019 and found blockage at 54m below surface
			70.00						
			72.00				Pink-orange mudstone		
			74.00				Transition mudstones to metasandstones. Yellow-orange mudstones, medium to high goethite content. Medium to low plasticity	0.3	
			170.73						
		80					METASANDSTONE Unconformity. Grey white coarse metasandstones. Slightly moist to dry		
			86.00				Grey-white coarse metasandstones. Medium to high quartz content. Low pyrite content		
			159.73				Low shales content, slightly plastic		
			97.00						87.36 - 105.36m: 50mm slotted class 18 PVC slotted, 1mm aperture. No gravel pack installed owing to blocakge between 54m and 70m below surface
							Very high quartz content. No shales and low plasticity		
		100	146.73				Increasing shales content. Increasing plasticity	1.3	
							Medium grey shales content. Low plasticity		
			106.00					0.3	50mm PVC end cap
			139.73				END OF BOREHOLE @ 106.00 m TARGET DEPTH STANDPIPE INSTALLED Hole not completed and left open from the collapsed section to surface. It was decided to do so to avoid the risk of having more material collapsing down to the screens sections, mud included		
		120							

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0214

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 368914.460 m E 7707907.160 m N MGA94 51 K
SURFACE RL: 245.64 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 140 mm HOLE DEPTH: 53.40 m

DRILL RIG: Ranger 4
CONTRACTOR: Ranger Drilling
LOGGED: PC DATE: 20-7-19
CHECKED: AP DATE: 4-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	50.63 mbgl . 22-09-19	0	245.64				SAND Red, uncemented, fine to coarse aeolian sands		0 - 1m : Cement Plug
		10	11.00 234.64				Yellow, uncemented fine to coarse sands		0m - 36m: 150mm collar casing. Annulus between surface casing and hole wall cemented
			16.00 229.64				SANDSTONE Cemeneted yellow coarse sandstone		0m - 41.34m: 50mm blank class 18 PVC
		20	20.00 225.64				Yellow-white coarse sandstones. Medium to high quartz content		
			25.00 220.64				Yellow-red coarse sandstones		
		30	30.00 215.64				White-pink coarse sandstones		1m - 53.4m: 1.2mm - 3.4mm gravel pack
			38.00 207.64				White coarse sandstones. High quartz content		
		40							41.34m - 53.34m: 50mm slotted class 18 PVC, 1mm aperture
		50	53.40 192.24				END OF BOREHOLE @ 53.40 m TARGET DEPTH STANDPIPE INSTALLED		50mm PVC End cap
		60							

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0216

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 368871.050 m E 7707872.390 m N MGA94 51 K
SURFACE RL: 246.16 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 140/190 mm HOLE DEPTH: 53.20 m

DRILL RIG: Ranger 4
CONTRACTOR: Ranger Drilling
LOGGED: PC DATE: 20-7-19
CHECKED: AP DATE: 3-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	51.055 mbgl , 22-09-19	0	246.16				SAND Red orange aeolian sands		0 - 1m: Cement Plug
		10	11.00 235.16				Yellow-orange coarse quartz sands		0m - 28m: 150mm collar casing. Annulus between collar casing and hole wall cemented
			17.00 229.16				Yellow quartz-silcrete; coarse sand to fine gravel		
		20	20.00 226.16				SANDSTONE White coarse quartz silcretic sands, unconsolidated-semiconsolidated		0m - 41.2m: 50mm blank class 18 PVC
		30	33.00 213.16				White coarse quartz silcretic sandstones, consolidated		1m - 53.2m: 1.2 - 3.4mm gravel pack
		40	40.00 206.16				White coarse quartz silcretic sandstones, friable, white silty matrix		41.2m - 53.2m: 50mm slotted class 18 PVC, 1mm aperture
		50	53.20 192.96				END OF BOREHOLE @ 53.20 m TARGET DEPTH STANDPIPE INSTALLED		PVC End cap
		60							
		70							

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0219

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 368862.060 m E 7707871.160 m N MGA94 51 K
SURFACE RL: 246.15 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 140/190 mm HOLE DEPTH: 117.66 m

DRILL RIG: Ranger 4
CONTRACTOR: Ranger Drilling
LOGGED: PC DATE: 25-7-19
CHECKED: AP DATE: 4-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	50.21 mbgl . 22-09-19	0	246.15				SAND Red to orange aeolian sands		0 - 1m: Cement Plug
			11.00						
			235.15				Yellow to orange coarse quartz sands		0m-78m: 150mm collar casing. Annulus between surface casing and hole wall cemented
			17.00						
			229.15				Yellow quartz-silcrete coarse sand to fine gravel		
		20	20.00 226.15				SANDSTONE White coarse quartz silcretic sands, unconsolidated-semiconsolidated		
			33.00						0m - 84.12m: 3.2mm - 6.4mm gravel pack
			213.15				White coarse quartz silcretic sandstones, consolidated		
		40	40.00 206.15				Friable, white silty matrix		
			59.00					0.3	0m - 105.66m: 50mm blank class 18 PVC
		60	187.15				MUDSTONE White pink mudtsone-siltstone, low to medium plasticity, low clay content. Slightly to no moisture		
			63.00 183.15				Pink to yellow mudstone, friable, low moisture content, low plasticity		
			67.00 179.15				Pink ochreous mudstones, friable, low moisture content, low plasticity		
			70.00 176.15				Pink yellow mudstones, friable, low moisture content, low plasticity		
			77.00						
			79.00				Yellow ochreous goethitic mudstones, increasing plasticity, low moisture		
		80	81.00 165.15				Ochreous grey goethitic mudstones, low moisture content, low to medium plasticity		
							Grey reduced clays, low to medium plastcity, low moisture content		84.12m - 96.16m: Bentonite seal
			96.00						
			98.00 148.15				MUDSTONE/METASANDSTONE Grey mudstone transitioning to metasandstones. Unconformity at 98m. Slightly to no moisture		
		100					Grey coarse quartz metasandstones. Slightly to no moist		96.16m - 117.66m: 1.2mm - 3.4mm gravel pack
			111.00						
			135.15				Grey coarse quartz metasandstones. Yellow slightly weathered - possible fracture zone		105.66m - 117.66m: 50mm slotted class 18 PVC, 1mm aperture
			117.66 129.15				Grey coarse quartz metasandstones. Chalcopyrite content.		50mm PVC end cap
		120					END OF BOREHOLE @ 117.66 m TARGET DEPTH STANDPIPE INSTALLED		

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0241

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 369548.010 m E 7707681.140 m N MGA94 51 K
SURFACE RL: 246.19 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 140/190 mm HOLE DEPTH: 40.10 m

DRILL RIG: Ranger 4
CONTRACTOR: Ranger Drilling
LOGGED: PC DATE: 25-7-19
CHECKED: AP DATE: 3-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC		0	246.19				SAND Red medium to coarse aeolian sands - subangular to subrounded		0 - 1m: Cement Plug
		5							0m - 33.76m: 50mm blank class 18 PVC
		10							0m - 20m: 150mm collar casing. Annulus between collar casing and hole wall cemented
		15	15.00 231.19				Pink-white coarse cemented sands transitioning to sandstones		1-10m: 3.2mm - 6.4mm gravel pack. 10-20m: 1.2mm - 3.4mm gravel pack
		20	18.00 228.19				SANDSTONE White-pink coarse cemented silicoclastic sandstone		
		25	24.00 222.19				White coarse cemented quartz-silcrete sandstones		20m - 39.17m: Annulus blocked. Tagged annulus after accomodating 50m PVC casing down the hole. Found annulus blocked at 20m
		30							
		35							33.76 - 39.76m: 50mm slotted class 18 PVC, 1mm aperture
		40	40.10 206.09				END OF BOREHOLE @ 40.10 m TARGET DEPTH STANDPIPE INSTALLED		50mm PVC end cap Fallback
		45							
		50							

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GAP gINT FN. F05
RL3

GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0261

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 369095.321 m E 7708999.035 m N MGA94 51 K
SURFACE RL: 246.501 m DATUM: AHD
INCLINATION: -85° DIRECTION: 265°
HOLE DIA: 143 mm HOLE DEPTH: 185.00 m

DRILL RIG: MKY13
CONTRACTOR: McKay Drilling
LOGGED: AC DATE: 10-10-19
CHECKED: AP DATE: 31-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	53.46 mbgl, 13-10-19	0	246.50				AEOLIAN SANDS red, rounded aeolian sands		0 - 0.5m: Cement plug
			10.00						
			236.54				FERRUGINISED SILCRETE silcrete concretions/nodules, reddish brown		0 - 21m: 150mm collar casing. Annulus between collar casing and hole wall cemented
		20	20.00						
			226.58				SANDSTONE oxidised Permian sandstone		
		40							0 - 56m: 50mm blank class 18 blank PVC 0.5 - 63m: 3.2-6.4mm gravel pack
			59.00						56 - 61m: 50mm slotted class 18 PVC
		60	187.73				MUDSTONE purple-red mudstone, oxidised		61 - 62m: 50mm blank class 18 PVC 50mm PVC end cap
			73.00				reduced		63 - 185m: Fallback
			173.78						
		80	85.00						
			161.82				METASANDSTONE moderately weathered		
		100							
			113.00						
			133.93				fresh		
		120							
		140							
		160							
		180							
			185.00						
			62.20				END OF BOREHOLE @ 185.00 m TARGET DEPTH STANDPIPE INSTALLED		

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0318

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 368750.102 m E 7707681.140 m N MGA94 51 K
SURFACE RL: 245.901 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 126/200 mm HOLE DEPTH: 57.00 m

DRILL RIG: TLD28
CONTRACTOR: Titeline Drilling
LOGGED: AC DATE: 21-9-19
CHECKED: AP DATE: 3-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
PQ3		0	245.90				SAND Red sand/silty sand, uncemented		ID Static Water Level WINU0318 Reference Point WINU0318 Cement - bentonite mix. Fully grouted to surface VWP installed @ 54.95m bgl
			18.00						
			227.90				SILTSTONE Very fine grained silt, some fine grained quartz sand		
			21.00						
			224.90				SAND/SANDSTONE Grey coarse to medium grained sand, rounded/subrounded, weakly cemented		
			42.00						
			203.90				MUDSTONE Purple-grey mudstone, tight, high plasticity, slow drilling		
			45.00				Sandy lense, coarse grained grey sand		
			200.90						
			48.00				Purple, high plasticity mudstone		
			197.90						
			57.00						
			188.90				END OF BOREHOLE @ 57.00 m TARGET DEPTH PIEZOMETER INSTALLED Drilled with PCD		

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0319

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 368900.898 m E 7707913.325 m N MGA94 51 K
SURFACE RL: 246.348 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 126/200 mm HOLE DEPTH: 71.60 m

DRILL RIG: TLD28
CONTRACTOR: Titeline Drilling
LOGGED: AC DATE: 23-9-19
CHECKED: AP DATE: 3-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
PQ3		0	246.35				SAND Red, rounded sand and silt		ID Static Water Level WINU0319 Reference Point WINU0319
		10							
		20	*20.00* 226.35				Transition from red aeolian sands to Permian quartz sand/sandstone		
			29.00 217.35				SANDSTONE Coarse grained to fine grained sand, slightly to moderately cemented sandstone, lenses of very coarse grained sand		Cement - bentonite mix. Fully grouted to surface
		30							
		40							
		50							
			59.00 187.35				MUDSTONE Purple-pink mudstone, high plasticity, hard drilling		
		60							
		70	*71.60* 174.75				END OF BOREHOLE @ 71.60 m TARGET DEPTH PIEZOMETER INSTALLED Drilled with PCD		VWP installed @ 68.40m bgl
		80							
		90							
		100							

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0320

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 368868.655 m E 7707876.824 m N MGA94 51 K
SURFACE RL: 246.600 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 126/200 mm HOLE DEPTH: 80.00 m

DRILL RIG: TLD28
CONTRACTOR: Titeline Drilling
LOGGED: AC DATE: 25-9-19
CHECKED: AP DATE: 3-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
PQ3		0	246.60				SAND Red, rounded, aeolian sands, very loose, uncemented		ID Static Water Level WINU0320 Reference Point WINU0320
		10							
			15.00 231.60				Mix of aeolian sand and white quartz sand. Fine-coarse grained, moderately sorted, subangular grains		
		20	21.00 225.60				White chips of siltstone (powdery/friable)		
			24.00 222.60				White/cream, fine grained, subrounded-subangular, moderately sorted, slightly to moderately cemented		
		30							Cement - bentonite mix. Fully grouted to surface
			33.00 213.60				SANDSTONE/CONGLOMERATE Coarse grained sand and lithic fragments, subrounded		
			36.00 210.60				SANDSTONE Coarse grained sandstone, white to cream quartz sand, angular, poorly sorted, moderately cemented		
		40							
			45.00 201.60				Fine to coarse grained quartz sand, subangular to subrounded, predominantly coarse grained sand, slightly to moderately cemented		
		50							
			60.00 186.60				MUDSTONE Mix of mudstone and sandstone. Coarse grained white quartz sand with cream mudstone		
			63.00 183.60				Reddish-purple mudstone, high plasticity, moist, hard drilling		
		70							VWP installed @ 74.02 m bgl
		80	80.00 166.60				END OF BOREHOLE @ 80.00 m TARGET DEPTH PIEZOMETER INSTALLED Drilled with PCD		79 - 80m: 1m Fallback
		90							
		100							

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GAP gINT FN. F05
RL3

GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0342

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 368995.0 m E 7707551.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 65° DIRECTION: 225°
HOLE DEPTH: 252.60 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION
ID Static Water Level Reference Point
C 245.00 m AHD
B 245.00 m AHD
A 245.00 m AHD

DEPTH (metres)	DEPTH RL	SOIL/ROCK MATERIAL DESCRIPTION
0		Silty SAND poorly graded, sub-rounded to sub-angular, red
	31.50	
		SANDSTONE medium grained, highly weathered
	51.50	
		moderately weathered
	66.00	
		CLAY fine, brown, grey
	93.00	
		MUDSTONE fine grained, moderately weathered
	125.00	
	127.90	
		METASEDIMENT medium grained, highly weathered
		slightly weathered
	147.60	
		fresh rock
	252.50	
		END OF BOREHOLE @ 252.60 m TARGET DEPTH PIEZOMETER INSTALLED

HQ3
PQ3

Cement - bentonite mix.
Fully grouted to surface

VWP_WINU0342_C
installed @ 78m bgl

VWP_WINU0342_B
installed @ 104m bgl

VWP_WINU0342_A
installed @ 190m bgl

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GAP gINT FN. F05
RL3

GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 07-12-2020 12:33 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0343

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 369166.0 m E 7707466.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 70° DIRECTION: 200°
HOLE DEPTH: 306.60 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION
ID Static Water Level Reference Point
C 245.00 m AHD
B 245.00 m AHD
A 245.00 m AHD

DEPTH (metres)	DEPTH RL	SOIL/ROCK MATERIAL DESCRIPTION
0		Silty SAND poorly graded, sub-rounded to sub-angular, red
33.00	33.00	
		SANDSTONE medium grained, moderately weathered
43.70	43.70	
		slightly weathered
66.70	66.70	
		MUDSTONE fine grained, moderately weathered
79.90	79.90	
		METASEDIMENT fine grained, moderately weathered
117.06	117.06	
		slightly weathered
181.85	181.85	
		fresh rock
306.60	306.60	
		END OF BOREHOLE @ 306.60 m TARGET DEPTH COMPLETION NOT APPLICABLE VWP SENSORS DAMAGED DURING INSTALLATION

HQ3
PQ3

Cement - bentonite mix, Fully grouted to surface

VWP_WINU0343_C installed @ 75m bgl

VWP_WINU0343_B installed @ 207m bgl

VWP_WINU0343_A installed @ 300m bgl

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GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 16-07-2020 09:27 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0369

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 369438.0 m E 7707697.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 70° DIRECTION: 090°
HOLE DEPTH: 350.00 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION
ID Static Water Level — Reference Point
C — 245.00 m AHD
B — 245.00 m AHD
A — 245.00 m AHD

DEPTH (metres)	DEPTH RL	SOIL/ROCK MATERIAL DESCRIPTION
0		Silty SAND poorly graded, sub-rounded to sub-angular, red
20	21.70	
		SANDSTONE medium grained
	39.70	
40	47.40	MUDSTONE fine grained, moderately weathered highly weathered
60	63.40	
	68.30	METASEDIMENT fine grained, moderately weathered
	75.80	highly weathered
80	81.40	moderately weathered highly weathered
100	106.90	moderately weathered
120		
140	149.10	slightly weathered
160		
180		
200	209.28	fresh rock
220		
240		
260		
280		
300	306.50	slightly weathered
	318.70	fresh rock
320		
340	350.00	END OF BOREHOLE @ 350.00 m TARGET DEPTH PIEZOMETER INSTALLED
360		

PQ3

Cement - bentonite mix.
Fully grouted to surface

VWP_WINU0369_C
installed @ 57m bgl

VWP_WINU0369_B
installed @ 159m bgl

VWP_WINU0369_A
installed @ 340m bgl

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GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 16-07-2020 09:27 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0373

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 369139.0 m E 7707864.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 70° DIRECTION: 090°
HOLE DEPTH: 350.00 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION
ID Static Water Level — Reference Point
C — 245.00 m AHD
B — 245.00 m AHD
A — 245.00 m AHD

PQ3

DEPTH (metres)	DEPTH RL	SOIL/ROCK MATERIAL DESCRIPTION
0		Silty SAND poorly graded, sub-rounded to sub-angular, red
	31.15	
		SANDSTONE medium grained, moderately weathered
	50.86	
		MUDSTONE fine grained, slightly weathered
	72.40	
		BRECCIA coarse grained
		MUDSTONE fine grained, moderately weathered
	100.38	
		METASEDIMENT fine grained, slightly weathered
	201.50	
		fresh rock
	225.60	
		slightly weathered
	240.50	
		fresh rock
	350.00	
		END OF BOREHOLE @ 350.00 m TARGET DEPTH PIEZOMETER INSTALLED

Cement - bentonite mix. Fully grouted to surface

VWP_WINU0373_C installed @ 70m bgl

Casing lost from 69.8 to 96.8 m bgl

VWP_WINU0373_B installed @ 133m bgl

VWP_WINU0373_A installed @ 206m bgl

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GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 16-07-2020 09:27 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0374

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 368976.0 m E 7708407.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 70° DIRECTION: 000°
HOLE DEPTH: 250.50 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION
ID Static Water Level — Reference Point
C — 245.00 m AHD
B — 245.00 m AHD
A — 245.00 m AHD

DEPTH (metres)	DEPTH RL	SOIL/ROCK MATERIAL DESCRIPTION
0		Silty SAND poorly graded, sub-rounded to sub-angular, red
	40.80	
		SANDSTONE medium grained, moderately weathered
	53.90	
		highly weathered
	78.23	
		moderately weathered
	102.86	
		BRECCIA coarse grained
		SANDSTONE medium grained, slightly weathered
	126.48	
		moderately weathered
	133.30	
		BRECCIA coarse grained
	148.75	
		METASEDIMENT fine grained, slightly weathered
	176.50	
		fresh rock
	250.50	
		END OF BOREHOLE @ 250.50 m TARGET DEPTH PIEZOMETER INSTALLED

PQ3

Cement - bentonite mix.
Fully grouted to surface

VWP_WINU0374_C
installed @ 66m bgl

VWP_WINU0374_B
installed @ 83m bgl

VWP_WINU0374_A
installed @ 155m bgl

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GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 16-07-2020 09:27 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0376

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 369748.0 m E 7707393.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 70° DIRECTION: 100°
HOLE DEPTH: 300.10 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION

ID	Static Water Level	Reference Point
C		245.00 m AHD
B		245.00 m AHD
A		245.00 m AHD

PQ3

0

Silty SAND
poorly graded, sub-rounded to sub-angular, red

33.40

SANDSTONE
medium grained, highly weathered

49.43

MUDSTONE
fine grained

75.10

METASEDIMENT
fine grained, moderately weathered

179.70

slightly weathered

241.70

BRECCIA
coarse grained

METASEDIMENT
fine grained, slightly weathered

300.10

END OF BOREHOLE @ 300.10 m
TARGET DEPTH
PIEZOMETER INSTALLED

Cement - bentonite mix.
Fully grouted to surface

VWP_WINU0376_C
installed @ 62m bgl

VWP_WINU0376_B
installed @ 105m bgl

VWP_WINU0376_A
installed @ 250m bgl

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GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 16-07-2020 09:27 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0379

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 369122.0 m E 7708166.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 70° DIRECTION: 010°
HOLE DEPTH: 350.00 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION
ID Static Water Level Reference Point
C 245.00 m AHD
B 245.00 m AHD
A 245.00 m AHD

DEPTH (metres)	DEPTH RL	SOIL/ROCK MATERIAL DESCRIPTION
0		Silty SAND poorly graded, sub-rounded to sub-angular, red
20	23.60	
		SANDSTONE medium grained, moderately weathered
40	52.70	
60	59.57	MUDSTONE fine grained, moderately weathered
		highly weathered
		METASEDIMENT fine grained, slightly weathered
80		
100		
120		
140	139.30	fresh rock
160		
180		
200		
220		
240		
260	261.40	BRECCIA coarse grained
		METASEDIMENT fine grained, fresh rock
280		
300	302.90	slightly weathered
320		
340		
350	350.00	END OF BOREHOLE @ 350.00 m TARGET DEPTH PIEZOMETER INSTALLED
360		

PQ3

Cement - bentonite mix.
Fully grouted to surface

VWP_WINU0379_C
installed @ 60m bgl

VWP_WINU0379_B
installed @ 183m bgl

VWP_WINU0379_A
installed @ 230m bgl

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GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 16-07-2020 09:27 8.30.002 Datgel Tools

REPORT OF BOREHOLE: VWP_WINU0381

SHEET: 1 OF 1

CLIENT: Rio Tinto Winu
PROJECT: Winu Mine Geotechnical - VWP Installation
LOCATION: Winu
JOB NO: 19135779

COORDS: 368834.0 m E 7707853.0 m N MGA94 56
SURFACE RL: DATUM: AHD
INCLINATION: 70° DIRECTION: 275°
HOLE DEPTH: 250.00 m

DRILL RIG: UDR
CONTRACTOR: McKay Drilling
LOGGED: GJ DATE: 13-7-20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION

CONSTRUCTION
ID Static Water Level — Reference Point
C — 245.00 m AHD
B — 245.00 m AHD
A — 245.00 m AHD

PQ3

0
20
33.80 — Silty SAND
poorly graded, sub-rounded to sub-angular, red
40
52.60 — SANDSTONE
medium grained, slightly weathered
highly weathered
60
62.90 — MUDSTONE
fine grained, slightly weathered
80
100
118.70 — METASEDIMENT
fine grained, fresh rock
120
140
160
180
200
220
240
250.00 — END OF BOREHOLE @ 250.00 m
TARGET DEPTH
PIEZOMETER INSTALLED
260

Cement - bentonite mix.
Fully grouted to surface

VWP_WINU0381_C
installed @ 76m bgl

VWP_WINU0381_B
installed @ 110m bgl

VWP_WINU0381_A
installed @ 175m bgl

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GAP 8_16.8 LIB.GLB Log GAP WELL VWP_LOGS_MASTER.GPJ <<DrawingFile>> 16-07-2020 09:27 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0472

SHEET: 1 OF 1

CLIENT: Rio Tinto Exploration
PROJECT: WINU Water Studies
LOCATION: East Pilbara - WINU
JOB NO: 19117831

COORDS: 369101.304 m E 7707994.317 m N MGA94 51 K
SURFACE RL: 246.590 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 143 mm HOLE DEPTH: 122.14 m

DRILL RIG: MKY13
CONTRACTOR: McKay Drilling
LOGGED: AC DATE: 12-10-19
CHECKED: AP DATE: 31-10-19

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RC	51.85 mbgl, 13-10-19	0	246.59				AEOLIAN SAND red, rounded, oxidised aeolian sand		0 - 1m: Cement plug (AB foam plug below)
			6.00						
			240.59				slight increase clay content (5%)		0 - 42m: 150mm PVC surface casing. Annulus between collar casing and hole wall cemented
			14.00						
			232.59				FERRUGINISED SILCRETE grey-brown, hard, angular gravels of silcrete in a sandy matrix		
		20	20.00						0 - 110.14m: 50mm Class 18 blank PVC
			226.59				SANDSTONE white to pale brown, fine to coarse grained sand, poorly to moderately cemented quartz sand, oxidised Permian sandstone		Annulus left open above collapse
		40							
		60							
			73.00						
			173.59				MUDSTONE red with a blank tinge in zones, sandy, reduced?		40 - 122.14m: Annulus blocked - fallback. Tagged anulus after installing 50mm PVC
		80							
			88.00						
			158.59				METASANDSTONE grey/brown chips of metasandstone, oxidised		
		100							
			104.00						
			142.59				fresh, hard, grey		110.14 - 122.14m: 50mm Class 18 slotted 1mm apperture PVC
		120							
			122.14						50mm End cap
			124.45				END OF BOREHOLE @ 122.14 m TARGET DEPTH STANDPIPE INSTALLED		

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GAP 8_16.8 LIB.GLB Log GAP WELL WINU-PTH1-L-PCALAFA1 - REV0.GPJ <<DrawingFile>> 19-12-2020 12:23 8.30.002 Datgel Tools

REPORT OF BOREHOLE: WINU0701

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 368990.730 m E 7708347.655 m N MGA94 51
SURFACE RL: 245.27 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/304/381 mm HOLE DEPTH: 118.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: AC DATE: 16/7/20
CHECKED: RI DATE: 22/9/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	50.6 mbgl , 10/08/20	0	245.27				SILTY SAND coarse grained, sub-angular to sub-rounded, red (minor oxidation)		0 - 11.7m: 12 3/4" Schedule 40 steel casing surface casing tremie grouted with GP cement / 5% bentonite (SG 1.6)
			4.50						
			240.77				SILTY SAND fine, sub-angular to sub-rounded, red (Fe oxides) to orange (goethite)		
			17.00						
			19.00				SILCRETE trace white sandstone, pisoliths		
		20	226.27				SANDSTONE fine - coarse grained, white, clear quartz grains, sub-rounded, slightly clayey in parts, trace angular chips of quartzite.		0 - 72m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
			34.00						
			211.27				5% oxidised sandstone chips (orange), angular, quartz sand		
		40	42.00						0 - 72.38m: 8" Schedule 40 Steel casing
			203.27				pale orange staining on chips (60%), oxidation increasing with depth		
			55.00						0 - 72.38m: GP cement / 5% bentonite (SG 1.42) pressure-cemented using float shoe
			190.27				METASANDSTONE fine grained, pale grey - grey, crystalline chips, highly weathered		
		60	61.00						
			184.27			Qz	QUARTZ VEIN white - grey, angular, predominantly quartz vein (80% sample), moderately sorted		0 - 106m: 50mm ND Schedule 80 steel casing - blank
			66.00			Qz			
			179.27				METASANDSTONE fine grained, orange-brown, trace clay, highly weathered, minor quartz		
			74.00						
			171.27				pale grey - brown, moderately weathered, chips stained with hematite and goethite, 98% metasediment 2% quartz vein		
		80	87.00						
			158.27	88.00 m pH = 6.71, EC = 2084 uS/cm, T = 28.8°C			brown, hematite and goethite staining on chips, slightly weathered, native copper found throughout (trace)	1.5	72 - 118m: 1.6 - 3.2mm gravel pack
RAB			93.00						
			152.27	94.00 m pH = 8.00, EC = 2196 uS/cm, T = 30.9°C			white quartz vein (20%), slightly weathered	1.5	
			97.00						
			148.27				dark grey to brown, quartz vein (10%), minor pyrite mineralisation (5%), transition from weathered to fresh metasandstone	2.8	
		100	100.00						
			145.27	100.00 m pH = 8.11, EC = 2541 uS/cm, T = 30.6°C			fresh metasandstone, grey, fine grained, quartz vein (10%), pyrite (2%)	3.8	
				106.00 m pH = 8.07, EC = 3214 uS/cm, T - 30.4°C				4.5	106 - 118m: 50mm ND Schedule 80 steel casing - slotted (1mm aperture). Welded 50mm steel end cap at 118m
				112.00 m pH = 7.99, EC 3244 uS/cm, T = 30.6°C					
			118.00					4.5	
			127.27				END OF BOREHOLE @ 118.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 7.7, EC = 5163 uS/cm, T = 31.7°C		
		120							

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GAP gINT FN. F05
RL3

GAP 10.0.5 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 09/06/2021 08:38 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0702

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 371041.556 m E 7705656.827 m N MGA94 51
SURFACE RL: 255.46 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/304/381 mm HOLE DEPTH: 154.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: AC DATE: 8/7/20
CHECKED: RI DATE: 22/9/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	45.85 mbgl , 18/08/20	0	255.46				SILTY SAND fine to medium grained, poorly graded, sub-angular, red, aeolian sand		0 - 5.7m: 12 3/4" Schedule 10 steel casing. Tremie grouted GP cement /bentonite to surface
			5.00						
			250.46				SILCRETE red/brown, pisolites and ferruginous clasts, angular, highly weathered		
			9.00						
			246.46				SANDSTONE coarse grained, poorly cemented, white, minor gravels, minor orange straining, silcrete cement		
			14.00						
			~~241.46~~				highly weathered / 100% chips iron oxide stained		
		20	240.46				moderately weathered (50% oxidised chips)		
			21.00						
			~~238.46~~				20% white clay with gravels of sandstone		
			232.46						
			38.00						0 - 55m: 8" Schedule 40 steel
			~~39.00~~						
		40	216.46				hard 1m band well cemented sandstone gravels		0 - 55m: Pressure grouted GP cement / bentonite (SG 1.42)
							SAND white, coarse grained, subrounded - subangular, loose poorly sorted sand, trace clay, orange staining on chips, similar to beach sand, gravels of sandstone throughout		
			53.00						
			202.46				CLAY high plasticity, brown/red, massive, trace fine grained sand, high strength clay		
		60	61.00						0 - 128m: Tremie grouted GP cement / 5% bentonite
			~~194.46~~				gravels of low plasticity clay (30%), white		
			193.46				red/brown, high plasticity, sticky, 10% fine grained sand lenses throughout		
			77.00						
			178.46				yellow/brown, organic, 20% fine grained sand, trace angular metasediment chips		
		80							
		100							0 - 142m: 50mm ND Schedule 80 blank steel
		120							
			126.00						125 - 128m: Bentonite seal
			129.46				CLAY/METASEDIMENT brown, highly weathered, predominantly clay with 10-40% highly weathered metasediment chips		
			140.00						128m - 152.8m: 1.6 - 3.2mm gravel pack
		140	115.46				METASEDIMENT slightly to moderately weathered, brown, orange geothite staining on fractures, angular, fine grained, trace quartzite and sandstone chips		140.8 - 152.8m: 50mm ND Schedule 80 slotted steel. Welded steel end cap on base
			149.00						
			106.46				slightly weathered, decrease in drilling rate		
			154.00						152.8 - 154m: Fallback
			101.46				END OF BOREHOLE @ 154.00 m TARGET DEPTH STANDPIPE INSTALLED Drilling with mud - no downhole water samples/yields collected Development Water Quality: pH = 8.69, EC = 2591 uS/cm, T = 30.7°C		
		160							

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GAP 10.0.5 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 09/06/2021 08:41 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0703

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 371258.56 m E 7708233.09 m N MGA94 51
SURFACE RL: 254.72 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/311/381 mm HOLE DEPTH: 122.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: PC DATE: 31/8/20
CHECKED: RI DATE: 9/12/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
	58.4 mbgl , 21/10/20	0	254.72				SILTY SAND coarse well graded aeolian sand		0 - 12m: 12 3/4" Schedule 10 steel casing surface casing tremie grouted with GP cement / 5% bentonite (SG 1.6)
			7.00						
			247.72				SAND uniform coarse aeolian sand		
			11.00						
			243.72				SANDSTONE coarse tan well-graded sandstone		
			18.00						0 - 108m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
		20	236.72				SANDSTONE weakly cemented coarse poorly graded sandstone with minor coarser quartz clasts and pink clay		
			37.00						
			217.72				SANDSTONE coarse tan poorly graded sandstone with 5% oxidized sandstone particles, some quartz clasts		0 - 76m: 8" Schedule 40 Steel casing
		40	48.00						
			206.72				SANDSTONE coarse gray, weakly cemented poorly graded sandstone, high quartz content		0 - 76m: GP cement / 5% bentonite (SG 1.42) pressure-cemented using float shoe
		60	66.00						0 - 116m: 50mm ND Schedule 80 steel casing - blank
			188.72				MUDSTONE fine tan mudstone, medium to high plasticity		
			75.00						
			179.72				MUDSTONE fine pale brown mudstone, medium to high plasticity		
		80							
			94.00						
			160.72				MUDSTONE fine, grey, medium to highly plastic mudstone		
			100.00						
		100	154.72				SILTY MUDSTONE medium, grey mudstone with 5% metasediments		
			103.00						
			151.72				MUDSTONE grey, medium to highly plastic clay with 40% metasediment particles		
			106.00						
			148.72				METASEDIMENT green fresh poorly graded metasediments, platy. Slight content of pale pink/pale red qartz and feldpars. Hard		108 - 111m: Bentonite seal
			116.00						111 - 122m: 1.6 - 3.2mm gravel pack
			138.72				METASEDIMENT green fresh poorly graded metasediments, platy. Hard		116 - 122m: 50mm ND Schedule 80 steel casing - slotted (1mm aperture). Welded 50mm steel end cap at 122m
		120	122.00						
			132.72				END OF BOREHOLE @ 122.00 m TARGET DEPTH STANDPIPE INSTALLED Drilling with mud - no downhole water samples/yields collected. Development Water Quality: pH = 8.87, EC = 2580 uS/cm, T = 29.6°C		

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP gINT FN. F05
RL3

GAP 10.0.5 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 09/06/2021 08:43 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0704

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369074.25 m E 7709028.85 m N MGA94 51
SURFACE RL: 246.15 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 203/375/508 mm HOLE DEPTH: 224.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: AC DATE: 26/9/20
CHECKED: RI DATE: 9/12/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	52.32 mbgl, 04/11/20	0	246.15				SAND red, fine to medium aeolian sand		0 - 12m: 16" Schedule 20 steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
			13.00						
			233.15				SANDSTONE red-yellow, fine gravelly sand, slightly cemented		0 - 89.6m: 10" Schedule 40 steel casing + float shoe
		20	33.00						
			213.15				pink-red coloured sand grains		
			37.00						
			209.15				white-red, fine gravelly quartz and feldspar sand, sub-rounded, moderately weathered, slightly cemented		0 - 89.6m: Pressure grouted GP cement/ 5% bentonite mix (SG 1.42) using float shoe
		40	50.00						
			196.15				SAND pale red, fine grained, quartz, loose		
			59.00						
		60	187.15				SANDSTONE red, fine grained quartz sand, moderately cemented, increasing moist white clay content		0 - 83m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
			68.00						
			178.15				MUDSTONE Pale red, fine oxidised silt and clay, moist, moderately plastic		
			74.00						
			172.15				grey silty clay, moist, plastic		0 - 150.75m: 50mm ND Schedule 80 steel casing - blank
		80	90.00						
RAB			156.15				METASEDIMENT grey-green, fine grained, angular, fresh		
		100	111.00						
			135.15	110.00 m pH = 8.27, EC = 1962 uS/cm, T = 33.7°C			quartz veining (20%) and trace pyrite	0.8 1.6	
		120	122.00						
			124.15				quartz veining (15%)	1.6	
			126.00						
			120.00				with some plastic clay (brown-orange)	3	
			117.15	128.00 m pH = 8.55, EC = 2467 uS/cm, T = 32.4°C			grey/green, fine grained, fresh, massive		
			136.00					3	
			110.15				60% oxidised chips	3.5	83m - 162.75m 1.6 - 3.2mm gravel pack
		140	149.00					4	
			97.15	146.00 m pH = 8.43, EC = 3349 uS/cm, T = 33.5°C			40% oxidised chips	5	
			160.00					7.5	
		160	86.15	158.00 m pH = 8.3, EC = 5308 uS/cm, T = 31.6°C			very broken and loose - fault zone. Increase in flow up to approx 40 L/s		150.75m - 162.75m: 50mm ND Schedule 80 steel - slotted with welded 50mm end cap at 162.75m
			164.00						
			82.15				grey, fresh, zones of blocky chips (fractured), trace pyrite		
		180		182.00 m pH = 8.31, EC = 6948 uS/cm, T = 33.3°C				60	
		200		200.00 m pH = 7.84, EC = 6855 uS/cm, T = 35.2°C				60 65	162.75 - 224m: Fallback
			212.00	206.00 m pH = 8.25, EC = 7070 uS/cm, T = 37.6°C					
			34.15				massive / unbroken metasediments	65 65	
		220	224.00						
			22.15	224.00 m pH = 8.2, EC = 7152 uS/cm, T = 34.7°C			END OF BOREHOLE @ 224.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.04, EC = 8126 uS/cm, T = 32.3°C		
		240							

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GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0705

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369905.46 m E 7707002.86 m N MGA94 51
SURFACE RL: 248.86 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 203/375/508 mm HOLE DEPTH: 200.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: GJ DATE: 14/10/20
CHECKED: RI DATE: 11/12/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	52.12 mbgl , 16/10/20	0	248.86				SILTY SAND medium to coarse grained, red, loose, aeolian sand, with some root matter, highly weathered		0 - 12m: 16" Schedule 20 steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
			4.00						
			8.00						
			240.86				coarse grained, loose, trace lithic fragments, moist, 20% silt (cohesive)		
			19.00				FERRICRETE fine grained, red, gravels of moderately cemented sandstone, with some fine-medium grained sand, moist, dense, highly weathered		
		20	229.86						
			24.00				SILTY SAND fine grained, orange, with some coarse grained sand, 15% clay, loose, highly weathered		0 - 97m: 10" Schedule 40 steel casing + float shoe
			224.86						
			39.00				SANDSTONE coarse grained, tan, orange iron staining on quartz grains, moist, loose, moderately weathered		
		40	209.86						
			50.00				SAND medium grained, tan, orange staining on sand grains, loose, moderately weathered		0 - 97m: Pressure grouted GP cement/ 5% bentonite mix (SG 1.42) using float shoe
			201.86				MUDSTONE white, medium plasticity, wet, soft, slightly weathered		
			57.00						
			191.86				NO SAMPLE lost circulation		
		60	61.00						0 - 91m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
			187.86				MUDSTONE white, medium plasticity, wet, soft, moderately weathered		
			73.00				yellow, sandy lens within the mudstone, with some coarse grained angular sand grains, minor clay (10%), silt (10%), medium dense, moist		
			175.86						
		80	81.00				white/purple, hematitic clay, low-medium plasticity, moist		0 - 188m: 50mm ND Schedule 80 steel casing - blank
			167.86				orange, geothitic mudstone, high plasticity		
			88.00				grey, high plasticity, reduced mudstones		
			160.86				orange brown, clay with fine sand, 35% sand becoming sand dominant with depth (diamictite?), soft		
			95.00						
			153.86				METASEDIMENT/MUDSTONE fine grained, grey brown, highly oxidised, highly weathered		
		100	103.00						
			145.86				METASEDIMENT grey, geothitic, fractured zone with large chips with oxidised staining, highly weathered to fresh	5	
			109.00	104.00 m pH = 7.86, EC = 1784 uS/cm, T = 30.9°C				6	
			139.86				some oxidation on chips	7	
			114.00						
			134.86				quartz veins <5%, oxidised staining on chips between 142-144, 157-160 and 177-179	7	
		120		116.00 m pH = 9.09, EC = 2006 uS/cm, T = 31.1°C					
				134.00 m pH = 8.76, EC = 2385 uS/cm, T = 30.6°C				8	91m - 200m 1.6 - 3.2mm gravel pack
		140						8	
				146.00 m pH = 8.66, EC = 2771 uS/cm, T = 30.5°C				10	
								10	
				158.00 m pH = 7.49, EC = 2914 uS/cm, T = 30.3°C				10	
		160						10	
				170.00 m pH = 7.96, EC = 3010 uS/cm, T = 30.4°C				11	
								11	
		180		182.00 m pH = 8.19, EC = 3009 uS/cm, T = 30.2°C				12	
								12	
				194.00 m pH = 8.39, EC = 3150 uS/cm, T = 30°C				12	188m - 200m: 50mm ND Schedule 80 steel - slotted with welded 50mm end cap at 200m
		200	200.00					12	
			48.86	200.00 m pH = 8.31, EC = 3179 uS/cm, T = 30.8°C			END OF BOREHOLE @ 200.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 7.53, EC = 7966 uS/cm, T = 30.8°C		
		220							

RAB

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GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0706

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369027.01 m E 7708404.09 m N MGA94 51
SURFACE RL: 246.99 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 431/558/711 mm HOLE DEPTH: 300.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: GJ DATE: 19/11/20
CHECKED: RI DATE: 11/12/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	50.68 mbgl, 01/11/20	0	246.99				Silty SAND fine to coarse grained, well graded, sub-rounded to sub-angular, red, aeolian sands		0 - 12m: 24" Schedule 20 steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
			12.00						
			234.99				SANDSTONE fine grained, orange, highly weathered to slightly weathered		0 - 74m: 18" Schedule 10 steel casing + float shoe
		20							
			34.00						0 - 74m: Pressure grouted GP cement/ 5% bentonite mix (SG 1.42) using float shoe
			212.99				SANDSTONE coarse grained, tan, Cross-laminated sands. Occasional larger clasts in the Cross-laminated sands. occasional larger clasts in the coarse sands		
		40							
									0 - 67.5m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
		60	62.00						
			184.99				MUDSTONE fine grained, pink, moderately weathered		67.5 - 69.5m: Bentonite seal
			70.00						
			176.99				METASEDIMENT fine grained, grey, some oxidation visible on joint surfaces, goethitic, moderately weathered to fresh		
			77.00						
			169.99				fine grained, pale red, jointed, hemathitic oxidation, clay coated		0 - 84m: 10" Schedule 40 steel casing - blank
		80		90.00 m EC = 4801 uS/cm				2	
								2	
		100	103.00					2	
			143.99	102.00 m EC = 4056 uS/cm			fine grained, pale red, jointed, slightly oxidized, predominantly hemathitic,moderately fresh	2	
			114.00					2	84 - 144m: 10" Schedule 40 steel casing - 3mm slotted
			132.99	114.00 m			fine grained, dark green, jointed	5	
		120	128.99	EC = 4455 uS/cm			coarse grained, grey green, medium quartz content	5	
				126.00 m				5	
			134.00	EC = 3516 uS/cm				5	
			112.99				medium grained, grey green, low red quartz content, jointed	5	
		140	140.00	138.00 m				5	
			106.99	EC = 3269 uS/cm			medium grained, grey green, slight red quartz content	5	
			150.00					5	
			96.99	150.00 m EC = 3448 uS/cm			medium to coarse grained, dark green, low to medium quartz content. slight content of pale red/pink quartz	4	
		160	160.00						
			86.99				medium grained, dark green, low quartz content.	4	
			82.99	165.00 m			fine grained, green, low quartz content, slightly oxidised, jointed		
			79.00	pH = 7.7, EC = 4259 uS/cm			medium grained, dark green, low quartz content	4	
			75.99				fine grained, dark green, jointed		
			72.99				medium grained, grey green	2.5	
		180	185.00	180.00 m			fine to medium grained, grey green, slightly mineralised	2.5	
			61.99	pH = 7.92, EC = 5302 uS/cm				2.5	
				192.00 m				2.5	
			201.00	pH = 7.75, EC = 6060 uS/cm				2.5	
		200	45.99				medium grained, grey green, slightly oxidized	2.5	
								2.5	
								2.5	
			219.00	216.00 m				2.5	
		220	27.99	pH = 7.69, EC = 6146 uS/cm, T = 31.2°C			fine to medium grained, grey green, oxidized	2.5	69.5m - 300m: 3.2 - 6.4mm gravel pack
								2.5	
			233.00					2.5	
			13.99				medium to coarse grained, grey green	2.5	
			238.00				fine grained, grey green	2.5	
		240	8.99	240.00 m			coarse grained, grey green	2.5	
			240.00	pH = 8.4, EC = 6365 uS/cm, T = 30.9°C			fine grained, grey	3	
			0.99					3	186 - 300m: 10" Schedule 40 steel casing (3mm slotted) with welded end cap at 300m
				252.00 m				3	
		260		pH = 8.23, EC = 3295 uS/cm, T = 29.8°C					
				264.00 m					
				pH = 8.26, EC = 2361 uS/cm, T = 33°C					
		280						3	
				282.00 m					
				pH = 8.13, EC = 4167 uS/cm, T = 29.9°C				3	
			300.00					3	
		300	-53.01	300.00 m pH = 7.94, EC = 4157 uS/cm, T = 31.4°C			END OF BOREHOLE @ 300.00 m TARGET DEPTH PRODUCTION WELL Development Water Quality: pH = 7.82, EC = 3835 uS/cm, T = 27.2°C		
		320							
RAB									

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GOLDER
MEMBER OF WSP

DRAFT REPORT OF BOREHOLE: WINU0707

SHEET: 1 OF 2

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369244.70 m E 7707163.64 m N MGA94 51
SURFACE RL: 250.54 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/374/558 mm HOLE DEPTH: 233.00 m

DRILL RIG: HY9
CONTRACTOR: Easternwell
LOGGED: PC DATE: 3/12/20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	4.00 246.54				Silty SAND fine to coarse grained, well graded, sub-rounded to sub-angular, red, aeolian sands		0 - 6m: 20" Schedule 20 steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
			7.00 243.54				SANDSTONE SILTSTONE coarse grained, red brown, hematitic, permian, moderately weathered to slightly weathered		
		20	23.00 227.54				medium grained, red brown		
							medium grained, white		0 - 96m: 10" Schedule 40 steel casing + float shoe
		40							0 - 96m: Pressure grouted GP cement/ 5% bentonite mix (SG 1.42) using float shoe
		60	71.00 179.54						
			75.00 175.54				MUDSTONE red, hematitic, moderately weathered to slightly weathered		
		80	80.00 170.54				yellow, geothite		
			87.00 163.54				brown		
			96.00 154.54				grey, high plasticity		
RAB		100	104.00 146.54	102.00 m pH = 7.71, EC = 1476.0 uS/cm, T = 45.0 °C			MUDSTONE METASEDIMENT white/grey, rounded claystone, high plasticity, slightly weathered	0.8	
			114.00 136.54	108.00 m pH = 7.67, EC = 1596.0 uS/cm, T = 37.1 °C			METASEDIMENT fine grained, grey, leached cap, trace quartz, moderately weathered to fresh	0.8	
			119.00 131.54				fine grained, grey, minor quartz (<5%), angular, fresh	1	
		120	125.00 125.54	114.00 m pH = 7.89, EC = 1741.0 uS/cm, T = 33.3 °C			fine grained, grey, slightly weathered	1	
				125.00 m pH = 8.3, EC = 2769.0 uS/cm, T = 39.4 °C			fine grained, grey, fault at 130m, fresh	2	
		140		131.00 m pH = 8.07, EC = 3296.0 uS/cm, T = 39.2 °C				5	
			150.00 100.54	137.00 m pH = 8.14, EC = 2406.0 uS/cm, T = 39.9 °C			fine grained, grey, slightly altered, minor quartz, trace sulfides (chalcopyrite/pyrite), angular, fresh	5	
		160	164.00					5	
			167.00 83.54	143.00 m pH = 8.09, EC = 3563.0 uS/cm, T = 39.2 °C			fine grained, white, chalcopyrite and pyrite mineralisation (5%), minor metasediments (20%), fresh	10	
							fine grained, grey, trace quartz veining (5%), chalcopyrite/pyrite (2%), fractured throughout, fresh	15	
		180		149.00 m pH = 8.04, EC = 4414.0 uS/cm, T = 39.2 °C				15	
			189.00 59.54	155.00 m pH = 8.01, EC = 4735.0 uS/cm, T = 38.9 °C				15	
							fine grained, white/grey, some fallback from above contaminating samples, trace quartz veining throughout, fresh	15	
		200		161.00 m pH = 7.99, EC = 5133.0 uS/cm, T = 38.9 °C			fine grained, grey, quartz veining throughout (<5%), fresh	15	
			209.00 41.54	173.00 m pH = 9.3, EC = 8868.0 uS/cm, T = 47.2 °C			DOLERITE fine grained, grey-green, pre-mineralisation mafic sill, fresh	15	
			219.00 31.54	179.00 m pH = 8.95, EC = 7922.0 uS/cm, T = 48.4 °C			fine grained, grey, metasiltstone layers, geothitised, layered, hard bands, black coloured water (manganese oxide), fresh	20	
		220						22	
			233.00 17.54	185.00 m pH = 8.55, EC = 9763.0 uS/cm, T = 50.9 °C			END OF BOREHOLE @ 233.00 m COLLAPSE BACKFILLED AND MARKER STAKE PLACED Currently collapsed at 96m	22	
		240		191.00 m pH = 8.38, EC =					

DRAFT

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GOLDER
MEMBER OF WSP

DRAFT REPORT OF BOREHOLE: WINU0707

SHEET: 2 OF 2

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369244.70 m E 7707163.64 m N MGA94 51
SURFACE RL: 250.54 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/374/558 mm HOLE DEPTH: 233.00 m

DRILL RIG: HY9
CONTRACTOR: Easternwell
LOGGED: PC DATE: 3/12/20
CHECKED: DATE:

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
		260		9605.0 uS/cm, T = 48.1 °C 197.00 m pH = 8.3, EC = 9143.0 uS/cm, T = 46.7 °C 203.00 m pH = 8.29, EC = 11686.0 uS/cm, T = 39.9 °C 209.00 m pH = 8.26, EC = 8638.0 uS/cm, T = 43.6 °C 214.00 m pH = 8.06, EC = 5294.0 uS/cm, T = 37.9 °C 220.00 m pH = 8.01, EC = 5766.0 uS/cm, T = 36.2 °C 226.00 m pH = 8.03, EC = 5813.0 uS/cm, T = 37.7 °C 233.00 m pH = 7.64, EC = 5855.0 uS/cm, T = 42.1 °C					
		280							
		300							
		320							
		340							
		360							
		380							
		400							
		420							
		440							
		460							
		480							
		500							

DRAFT

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GAP gINT FN. F05
RL3

GAP 10.0.5 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 09/06/2021 08:57 10.02.00.04 Datgel Tools

REPORT OF BOREHOLE: WINU0708

GOLDER
MEMBER OF WSP

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369743.59 m E 7707047.18 m N MGA94 51
SURFACE RL: 249.14 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 431/558/711 mm HOLE DEPTH: 300.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: AC DATE: 10/12/20
CHECKED: RI DATE: 15/12/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	249.14				Silty SAND fine to coarse grained, well graded, sub-rounded to sub-angular, red, aeolian sands		0 - 6m: 24" Schedule 20 steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
			8.00						
			241.14				SANDSTONE orange brown, laterite conglomerate 18m-20m, moderately weathered		
		20	25.00						0 - 92m: 18" Schedule 10 steel casing + float shoe
			224.14				medium grained, grey red		0 - 92m: Pressure grouted GP cement/ 5% bentonite mix (SG 1.42) using float shoe
		40	40.00						
			209.14				fine to medium grained, pale red to white		
			49.00						0 - 93m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
			200.14				DIAMICTITE fine grained, white, gravelly calcrete and silcrete clasts in a clayey matrix		
		60	60.00						
			189.14				fine grained, white, gravelly calcrete silcrete clasts in white sandy clayey matrix		
		80	80.00						0 - 112.8m: 10" Schedule 40 steel casing - blank
			169.14				fine grained, white, gravelly calcrete silcrete clasts in white sandy clayey matrix		
			93.00						93 - 96m: Bentonite seal
			97.00				LEACHED CAP fine grained, white, fine gravels of leached cap in a white sandy clay matrix, moderately weathered	1	
		100	152.00					2	
			148.14				METASEDIMENT fine grained, grey, hard chips of metasediment, green tinge - chlorite alteration, highly weathered to fresh	1	
								5	
		120					fine grained, grey, trace quartz veins, very hard/slow drilling, homogenous	5	
								5	
								7	112.8 - 298.8m: 10" Schedule 40 steel casing - 3mm slotted with welded steel end cap at 298.8m
			140.00					7	
		140	109.14				fine grained, grey, broken zone (fault), weathered brown chips, oxidation/staining on chips, coarse sized chips	8	
			148.00					8	
			101.14				fine grained, grey, homogenous, very hard/very fine chips	10	
		160						10	
								10	
								10	
		180	183.00						
RAB			63.14				METASEDIMENT BRECCIA fine grained, grey green, broken zone (fault), weathered section with fine sand material, oxidation/staining on chips, highly weathered	5	
		200					fine grained, dark grey	5	
								5	
			214.00						
			34.14				METASEDIMENT BRECCIA fine grained, grey green, broken zone (fault), weathered section with fine sand material, oxidation/staining on chips, highly weathered		96m - 300m: 3.2 - 6.4mm gravel pack
		220	221.00					8	
			28.14						
			27.14				fine grained, dark grey	8	
							fine grained, grey green, broken zone (fault), weathered section with fine sand material, oxidation/staining on chips	8	
		240						8	
							fine grained, dark grey	8	
								8	
								8	
		260						8	
			268.00						
			-18.86					8	
			-21.86				fine grained, grey green, broken zone (fault), weathered section with fine sand material	8	
		280					fine grained, dark grey	10	
								10	
			300.00					10	
		300	-50.86				END OF BOREHOLE @ 300.00 m TARGET DEPTH PRODUCTION WELL Development Water Quality: pH = 7.9, EC = 5100 uS/cm, T = 31.7°C		
		320							

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GAP 10.0.5 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 09/06/2021 08:59 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0709

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369516.01 m E 7707118.59 m N MGA94 51
SURFACE RL: 249.62 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 203/374/558 mm HOLE DEPTH: 259.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 31/3/21
CHECKED: AC DATE: 9/7/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	52.01 mbgl , 18/04/21	0	249.62				SAND silt to medium sand, subrounded to rounded, yellow-red, iron-oxide coated quartz grains, minor clay, unconsolidated, extremely weathered, weakly cemented from 4m, lateritised 10-14m		0 - 12m: 16" Schedule 20 steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
		20	*21.00* 228.62				SANDSTONE fine to medium sandstone, yellow-red to red-brown, angular fragments of white sandstone, weakly cemented, red-brown (goethitic) fine to medium sand. Colour grades from yellow-red to pale brown, white angular fragments		
		40	*42.00* 207.62				GRAVEL/SANDSTONE fine gravels of sandstone, moderately sorted, pale grey, subangular		
			49.00 200.62				SAND medium to coarse quartz sand with white clay, moderately sorted, subangular to subrounded, oxidised sand grains		
		60	*56.00* 193.62				CLAY white to pale brown clay, slightly micaceous, minor quartz sand		
			67.00 182.62				SAND/SANDSTONE coarse sand to fine gravels of sandstone, pale brown, granular quartz grains with angular, platy fragments of medium sandstone, white, thin 1-2mm laminae		
		80	*76.00* 173.62	82.00 m pH=7.75, EC=402 uS/cm, T=29 °C			METASEDIMENT leached cap, white to pale brown, white clay with highly angular chips of metasediments, lenticular fragments of clear to white quartz (vein quartz), minor calcite?, trace aphanitic ironstone		0 - 202m: 10" Schedule 40 steel casing (pressure grouted cement/5% bentonite mix (SG 1.42)
		100		94.00 m pH=7.84, EC=411 uS/cm, T=28.5 °C					
		120							
		140	*145.00* 104.62				METASEDIMENT leached cap, tan, goethitic		
		160							
		180							
		200	*202.00* ~~205.00~~				CLAY extremely weathered clay, with sandy clay lenses, goethetic	2	
RAB			***210.00*** 39.62	205.00 m pH=11.59, EC=1670 uS/cm, T=29.5 °C			METASEDIMENT highly weathered metasandstone, observed as pale grey angular chips, weathered down to sand in some areas, with white/clear quartz chips (vein)	3	
		220	*223.00* 26.62	211.00 m pH=11.56, EC=1285 uS/cm, T=32.4 °C				3	
				223.00 m pH=9.36, EC=952 uS/cm, T=39.7 °C			METASEDIMENT highly to moderately weathered metasandstone, observed as pale grey chips, weathered down to sand in some areas, with trace chalcopyrite, white quartz chips (vein)		202 - 259m: 8" Open Hole
		240	*244.00* 5.62	235.00 m pH=7.5, EC=600 uS/cm, T=25.8 °C			METASEDIMENT highly weathered pale grey-green metasandstone, angular, with some oxidation staining		
			259.00 -9.38	247.00 m pH=7.44, EC=584 uS/cm, T=26.1 °C			METASEDIMENT slightly to moderately weathered metasediment, pale grey-green, fine to medium grained, angular, pale brown	10	
		260		259.00 m pH=6.54, C=609 uS/cm, T=25.8 °C			END OF BOREHOLE @ 259.00 m TARGET DEPTH STANDPIPE INSTALLED		
		280							
		300							

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 13/01/2022 08:05 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0710

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 367845.1 m E 7710384.0 m N MGA94 51
SURFACE RL: 245.77 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/311/431/558 mm HOLE DEPTH: 241.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 13/8/21
CHECKED: AC DATE: 23/11/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	68.11 mbgl , 24/09/21	0	245.77				SANDY SILT fine grained, red, rounded to sub-rounded, well graded, aeolian		0 - 12m: 18 5/8" Schedule 10 NB steel surface casing, tremie grouted with GP cement/bentonite (SG 1.42)
			14.00						
			231.77				SANDSTONE fine grained, ochre, rounded to sub-rounded grains, poorly graded, highly weathered, hematitic alteration		
		20	27.00						
			218.77				SANDSTONE medium grained, red, rounded to sub-angular grains, poorly graded, highly weathered, hematitic alteration		
		40							
		60							0 - 127.5m: 12" NB steel protection casing & float shoe, pressure grouted with GP cement/bentonite (SG 1.42)
			75.00						
			80.00				SILTSTONE fine grained, grey, sub-angular chips, highly weathered, slightly oxidised		
		80	165.77				MUDSTONE brown, high plasticity, reduced		
			94.00						
			151.77				grey, high plasticity, banded, reduced		
		100							
		120							121 - 127.5m: M-packer assembly welded onto 6m of 8" NB steel riser
			127.00						
RAB			118.77				METASEDIMENTS pale/faded grey, moderately weathered, 5% oxidised chips between 134-136m		
		140	143.00						
			102.77				dark grey, 5% quartz chips between 227-229m, fresh		127.5 - 187.5m: 8" wirewound screens, 1mm aperture
		160							
		180		175.00 m pH = 10.66, EC = 1023 uS/cm, T = 34.2 °C				2.5	
		200		202.00 m pH = 9.3, EC = 1102 uS/cm, T = 34.2 °C					187.5 - 188m: J-latch assembly welded onto the bottom of the screens
		220		223.00 m pH = 8.61, EC = 3765 uS/cm, T = 25.4 °C				4.6	188 - 241m: 6 1/2" open hole
		240	241.00				END OF BOREHOLE @ 241.00 m TARGET DEPTH PRODUCTION WELL Development Water Quality: pH = 8.75, EC = 4219 uS/cm, T = 29.6°C		
			4.77						
		260							

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 08/12/2021 16:25 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0711

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 367897.1 m E 7710366.0 m N MGA94 51
SURFACE RL: 245.72 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/304/504 mm HOLE DEPTH: 152.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: SS/GJ DATE: 26/7/21
CHECKED: AC DATE: 23/11/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	63.85 mbgl , 01/08/21	0	245.72				SAND fine to coarse grained, orange-brown, sub-rounded, well graded, with silt		0 - 6m: 12" Schedule 40 NB steel surface casing, tremie grouted with GP cement/bentonite (SG 1.42)
			16.00						
			229.72				SILCRETE fine grained, orange-brown and grey, poorly graded, sub-rounded to sub-angular chips, 10% quartz, hematitic		
		20	*20.00*						
			225.72						
			24.00						
			221.72				SILCRETE/SANDSTONE fine to coarse grained, orange-brown and grey, sub-rounded to sub-angular, poorly graded, hematitic		
							SILCRETE fine grained, orange-brown, sub-angular to angular, poorly graded, <5% quartz		
			35.00						
			210.72				SANDSTONE medium to coarse grained, pale grey, sub-rounded to sub-angular, poorly graded, >20% silcrete chips reducing with depth		
		40							
		60							0 - 120m: 8" schedule 40 steel protection casing & float shoe, pressure grouted with GP cement/bentonite (SG 1.42)
			65.00				with siltstone chips and abundant silty sand		
			180.72						
			72.00						
			173.72				MUDSTONE massive, pale yellow and white, goethitic, leached		
		80	*84.00*						
			161.72				red, hematitic		
			88.00						
			157.72				grey with red, banded		0 - 144m: 50mm schedule 80 steel casing - blank
			95.00						
			150.72				grey with yellow, goethitic		
		100	*104.00*						
			141.72				grey		0 - 136m: Tremie grouted GP cement / 5% bentonite (mix SG 1.42) back to surface
			118.00						
RAB			*120.00*				METASEDIMENTS fine grained, dark grey, hard, fresh		
		120	125.72				very hard		
		140							136 - 139m: Bentonite pellets 139 - 150m: Graded gravel pack (3.2 or 6.4mm) 144 - 150m: 50mm schedule 80 steel casing - slotted 150 - 152m: Fallback
			152.00					1.5	
			93.72				END OF BOREHOLE @ 152.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.04, EC = 3922 uS/cm, T = 25.6°C		
		160							

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 14/12/2021 10:48 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0712

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 367893.8 m E 7710366.8 m N MGA94 51
SURFACE RL: 245.80 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/324 mm HOLE DEPTH: 72.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Aquadrill
LOGGED: SS DATE: 29/6/21
CHECKED: AC DATE: 23/11/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	63.25 mbgl , 08/08/21	0	245.80				SAND fine to coarse grained, red-brown, sub-rounded, well graded, with low plasticity silt, aeolian		0 - 12m: 8" NB Steel surface casing tremie grouted with GP cement/bentonite (SG 1.42) 0 - 6m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface above gravel pack
			8.00 237.80				SILTY SAND fine to coarse grained, red-brown, well graded, quartz rich, medium plasticity		
		10	15.00 230.80				SILCRETE fine grained, red-brown and grey, 10-40% quartz increasing with depth, with low plasticity silt, increasing clay content with depth, highly weathered, highly weathered		
			18.00 227.80				CLAYEY SANDSTONE medium to coarse grained, pale brown-grey, sub-rounded to sub-angular, well graded, medium plasticity, highly weathered to moderately weathered, highly weathered to moderately weathered		
		20	25.00 220.80				SILCRETE fine grained, red and grey, sub-angular to angular, poorly graded, <5% quartz, highly weathered to moderately weathered, highly weathered to moderately weathered		
		30	32.00 213.80				SANDSTONE medium to coarse grained, grey, sub-angular 30% silcrete chips, well graded, moderately weathered, moderately weathered		6 - 57m: 3.2 to 6.4mm gravel pack
			38.00 207.80				SILCRETE fine grained, red and grey, sub-angular to angular, poorly graded, 30% fine to coarse grained, highly weathered to moderately weathered, highly weathered to moderately weathered		
		40	40.00 205.80				SANDSTONE medium to coarse grained, white, sub-rounded, well graded, moderately weathered to slightly weathered, moderately weathered to slightly weathered		0 - 64m: 50mm Class 18 PVC casing - blank
		50	51.00 194.80				fine to medium grained		
		60	66.00 179.80				with 10-15% grey siltstone chips, minor fines, white clay in recovery with depth		57 - 59m: Bentonite seal 59 - 72m: 1.6 - 3.2mm gravel pack
		70	70.00 71.00 72.00 173.80				SILTSTONE fine grained, grey and yellow, sub-rounded to sub-angular, poorly graded, 30% sandstone chips, abundant low plasticity yellow clay in recovery, goethitic MUDSTONE grey with yellow, angular, goethitic, leached END OF BOREHOLE @ 72.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 9.36, EC = 4724 uS/cm, T = 26.2°C Low yielding		64 - 70m: 50mm Class 18 PVC - 1mm aperture
		80							
		90							
		100							

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 08/12/2021 16:25 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0713

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 368469.0 m E 7710533.2 m N MGA94 51
SURFACE RL: 246.28 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 311/445/610 mm HOLE DEPTH: 241.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: EJ/SS DATE: 18/9/21
CHECKED: AC DATE: 23/11/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	63.58 mbgl, 13/11/21	0	246.28				SAND medium to coarse grained sand, red/brown, subangular-rounded, iron oxidation		0 - 6m: 18 5/8" Schedule 10 NB steel surface casing, tremie grouted with GP cement/bentonite (SG 1.42)
			6.00						
			240.28				SANDSTONE coarse grained sand, yellow-orange, nodules cemented by clay		
			238.28				fine gravelly quartz and feldspar sand		
			17.00						
		20	229.28				SILCRETE coarse angular silcrete (white flakes), with some fine grained sand, highly weathered, moderate iron staining, increasing quartz content with depth from ~5% to ~30%		
			30.00						
			216.28				SANDSTONE fine to medium quartz sand, >50% quartz, minor silcrete		
		40							
		60							0 - 126m: 12" NB steel protection casing & float shoe, pressure grouted with GP cement/bentonite (SG 1.42)
			70.00						
			176.28				MUDSTONE/SILTSTONE fine grey/yellow silt and clay, orange/brown mudstone chips - oxidised		
		80	84.00						
			162.28				SILTSTONE grey siltstone with some red oxidation staining		
			90.00						
			154.28				METASANDSTONE some chips up to 2cm, grey, poorly sorted, ~15% quartz, some oxidation staining		
		100	105.00				CLAY/METASEDIMENTS leached cap, orange to grey clays with ~20% metasediment chips: grey, angular, moderately sorted, weathered, some oxidation		
			141.28				grey-green chips, yellow clay, ~10% quartz, oxidised dark grey chips with depth		
		120	120.00						118.5 - 125m: M-packer assembly welded onto 6m of 8" NB steel riser
			126.28				METASEDIMENTS grey, subangular to angular, ~2% quartz, highly altered		
			125.00						
			126.00				15-20% quartz, transition from weathered to fresh		
			118.28				dark grey, trace quartz, fresh, minor oxidation staining		
		140					NO SAMPLE		
			145.00				METASEDIMENTS fine grained, layered, pale green and dark grey, fresh, with hornfels		125 - 185m: 8" wirewound screens, 1mm aperture
			101.28				dark grey		
		160							
			174.00						
			172.28				pale green grey, large blocky chips, silica alteration		
			178.00						
RAB		180	68.28				green dark grey, zone of blocky altered chips at 181m, no significant changes, no quartz		185 - 185.7m: J-latch assembly welded onto the bottom of the screens
				205.00 m pH = 8.64, EC = 2451 uS/cm, Temp = 34°C				2	
		200							
		220							185.5 - 241m: 6 1/2" open hole
		240	241.00						
			5.28	241.00 m pH = 8.8, EC = 2453 uS/cm, Temp = 32°C			END OF BOREHOLE @ 241.00 m TARGET DEPTH PRODUCTION WELL Development Water Quality: pH = 8.87, EC = 2801 uS/cm, T = 31.8°C	2.3	
		260							

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GAP gINT FN. F05
RL3

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 08/12/2021 16:25 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0902

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 368520.3 m E 7710510.4 m N MGA94 51
SURFACE RL: 246.44 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/375/508 mm HOLE DEPTH: 151.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Aquadrill
LOGGED: SS DATE: 28/6/21
CHECKED: AC DATE: 23/11/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	63.5 mbgl , 08/08/21	0	246.44				SILTY SAND fine grained, red, sub-rounded to sub-angular, <30% silt, well graded, aeolian		0 - 6m: 12" NB steel plain surface casing tremie grouted with GP cement/bentonite (SG 1.42)
			14.00						
			232.44				SILCRETE fine grained, tan mottled yellow/red, sub-angular to angular, uniform, some oxidation staining on chips		0 - 95m: Pressure grouted GP cement/ 5% bentonite mix (SG 1.42) using float shoe
		20	28.00						
			218.44				SANDSTONE medium grained, grey, sub-rounded to rounded, well graded, hematitic, highly weathered to slightly weathered		
			31.00						
			215.44				grey/white, some oxidation staining on grains		0 - 84m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
		40							0 - 95m: 8" NB steel plain casing + float shoe
		60							0 - 107m: 50mm ND Schedule 80 steel casing - blank
			71.00						
			175.44				fine grained, yellow, sub-rounded		
		80	81.00						
			84.00				coarse grained, grey/white, sub-rounded to sub-angular, poorly graded, minor oxidation staining on some grains		84 - 86m: Bentonite seal
			162.44				MUDSTONE fine grained, pale yellow/beige becoming more yellow with depth, medium plasticity with some fine grained clasts, kaolinised		
			96.00						
RAB			149.44				DIAMICTITE fine grained, yellow, poorly graded, clasts of sandstone, metasediments and quartz, highly weathered		86 - 113m: 3.2 - 6.4mm gravel pack
		100					METASEDIMENTS fine grained, pale brown, at 99m blocky chips (possible fracture), quartz veining, chlorite alteration, oxidation staining, some weathering to clay, highly weathered to fresh		107 - 113m: 50mm NB threaded steel, 1mm-slotted screen - with welded 50mm end cap at 113m
			118.00						
			128.44				fine grained, dark grey, minor highly chlorite altered chips (10%), minor oxidation staining (Fe), slightly weathered		113 - 151m: Fallback
		120	123.00						
			123.44				trace oxidised chips, at 124m, 138m, and 141-143m quartz veining, fresh		
		140							
			151.00						
			95.44				END OF BOREHOLE @ 151.00 m TARGET DEPTH STANDPIPE INSTALLED pH = 10.42, EC = 3657 uS/cm, T = 29°C (development) Collapsed at 113m while attempting geophysics survey		
		160							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP gINT FN. F05
RL3

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 08/12/2021 16:25 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0903

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 368515.5 m E 7710511.9 m N MGA94 51
SURFACE RL: 246.63 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/311 mm HOLE DEPTH: 72.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 12/5/21
CHECKED: AC DATE: 23/11/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	63.32 mbgl 27/06/21	0	246.63				SAND fine to coarse grained, red, sub-rounded to sub-angular, poorly sorted, with plant and root material		0 - 6m: 8" NB Steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
			2.00						
			244.63				SILTY SAND fine to coarse grained, red orange, sub-rounded to sub-angular, (30%) silt, poorly sorted, high plasticity, with trace brown/black pisoliths		
			6.00						
			240.63				grout fragments observed - cement/bentonite contamination from seating surface casing		
			8.00						
			238.63				orange, colour of silt becoming orange/beige, increasing silt and fines content		
		10							
			14.00						
			232.63				SILCRETE fine-coarse grained, mottled yellow/red, sub-angular, silicified/cemented chips of sand, 10% tan/beige silt with moderate to high plasticity, strong, highly weathered		
			16.00						
			230.63				white grey, sub-angular to angular chips, some (>30%) yellow/red mottled chips, moderately weathered, reduction in silt/fines		
		20							
			22.00						
			224.63				grey, very fine grained, some (20%) mottled yellow/red/purple chips, large flat angular chips (2-20mm, mostly 3mm)		
			26.00						
			220.63				SANDSTONE clear/orange/pink, fine with some medium to coarse qtz grains, sub-rounded, well sorted, weakly cemented, with (>30%) very fine grained silcrete chips, grey with yellow/purple/red mottles on some fracture surfaces,moderately weathered		0 - 55m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
			28.00						
			218.63				mainly medium to coarse grains of quartz, clear, with some fine grained sandstone (pinkish orange), no more silcrete chips		
		30							
			36.00						
			210.63				no more fine grained pinkish orange sandstone, some large sub-rounded quartz grains observed (3-7mm)		
			40.00						
		40	206.63				silcrete chips observed (>30%), with some red silt lumps (5%)		
			44.00						
			202.63				reduction in silcrete chips observed (<5%), possibly contamination from above		0 - 65m: 50mm NB threaded steel (blank)
		50							
									55 - 68m: 3.2 - 6.4mm gravel pack
		60							
			67.00						
			68.00				SANDY MUDSTONE pink/orange, sub-rounded to sub-angular, moderately sorted, high plasticity, with (>30%) fine to coarse grained sand		65 - 68m: 50mm NB threaded steel, 1mm-slotted screen, with end-cap
			178.63						
			70.00						68 - 72m: Backfill with 3.2 - 6.4mm gravel
		70	176.63				pink/beige, sub-rounded to sub-angular, moderately sorted, high plasticity, with fine to coarse sand (50%)		
			72.00						
			174.63				sharp transition to yellow/tan colour mudstone		
							END OF BOREHOLE @ 72.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.72, EC = 1313 uS/cm, T = 31.6°C		
		80							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 08/12/2021 16:25 10.02.00.04 Datgel Tools

REPORT OF BOREHOLE: WINU0905

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 368523.6 m E 7710501.2 m N MGA94 51
SURFACE RL: 246.31 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/311/445 mm HOLE DEPTH: 150.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 4/8/21
CHECKED: AC DATE: 23/11/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	63.77 mbgl, 08/08/21	0	2.00 244.31				SAND coarse grains, reddish brown, rounded to sub-rounded, <5% minor ferricrete pisoliths, aeolian		0 - 6m: 12" NB steel surface casing tremie grouted with GP cement/bentonite (SG 1.42)
							SILTY SAND fine to coarse gains, reddish brown, rounded to sub-angular, 5-10% ferricrete pisoliths, silt increasing with depth, from 15% at 2m, to 30% at 12m, then dropping to 5-10% for 12-15m		
			15.00 231.31				SILCRETE mottled yellow/red, sub-angular to angular, some oxidation staining on chips, gradually becoming white/grey with depth		
		20							
			36.00 210.31				SANDSTONE medium to coarse grains, translucent white/grey quartz grains, sub-rounded to sub-angular, minor (<10%) silcrete chips, red/yellow mottles observed on silcrete chips		
		40							
		60							0 - 121m: 8" NB steel protection casing & float shoe, pressure grouted with GP cement/bentonite (SG 1.42)
			67.00 179.31				MUDSTONE high plasticity, mottled purple (67-68m) transitioning to white/grey (68-71m), dark brown (71-74m), tan/light brown (74-83m), no secondary inclusions between 67-73m, from 73-84m there starts to be ~20-40% quartz + weathered silcrete chips (brown)		
		80							0 - 143m: 50mm Class 18 PVC casing - blank
			83.00 163.31				METASEDIMENT light grey, angular chips, 2-4mm, some altered to red/purple/brown, 30-70% of chips show oxidation staining increasing with depth, silt/clay content 20% at the top and decreasing to 0% at the bottom, notable chip size increase to 5-12mm between 90-93m		
		100							
			118.00 128.31				grey with some yellow chips showing yellow mottled appearance, moderately weathered		0 - 136m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
RAB		120	130.00 116.31				grey, fresh metasediment		
		140		139.00 m pH = 9.65, EC = 1677 uS/cm, T = 31.7 °C 145.00 m pH = 9.15, EC = 1608 uS/cm, T = 32.7 °C					136 - 138m: Bentonite pellets 138 - 149m: Graded gravel pack (3.2-6.4mm) 143 - 149m: 50mm Class 18 PVC - 1mm slotted screen 149 - 150m: Fallback
			150.00 96.31	150.00 m pH = 8.93, EC = 1583 uS/cm, T = 32.8 °C			END OF BOREHOLE @ 150.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.5, EC = 1394 uS/cm, T = 18.9°C		
		160							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

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GOLDER
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REPORT OF BOREHOLE: WINU0906

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 364390.778 m E 7709734.469 m N MGA94 51
SURFACE RL: 260.40 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/311 mm HOLE DEPTH: 90.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 13-8-21
CHECKED: AC DATE: 10-1-21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	49.45 mbgl, 07-09-21	0	260.40				SAND rounded to subrounded, fine to coarse grains, reddish brown, aeolian		0 - 6m: 8" steel casing cemented with GP cement/bentonite mix (1.72 SG) 0 - 5m: tremie cemented with GP cement/bentonite mix (1.42 SG)
			6.00						
			254.40				SILCRETE fine grained, grey sand within a reddish grey matrix, up to 5% pink/red silt/clay in some areas		
		10							
		20							
		30							0 - 65m: 50mm PN18 PVC casing - blank
			32.00						
			228.40				SANDSTONE subrounded to subangular, medium to coarse grains, translucent white quartz with silcrete chips observed in some intervals ~ 5%		
		40							5 - 58m: gravel packed (3.2 - 6.4mm)
		50							
		60							58 - 60m: bentonite seal 60 - 73m: gravel packed (3.2 - 6.4mm)
			62.00						
			198.40				MUDSTONE high plasticity, mottled purple/white to 71m, then transitioning to mottled yellow/grey to 90m		65 - 71m: 50mm PN18 PVC casing - slotted (1mm aperture)
		70							71 - 73m: 50mm PN18 PVC casing - blank with endcap
								0.015	
		80							73 - 90m: open hole backfilled with gravel (3.2 - 6.4mm)
			90.00						
		90	170.40				END OF BOREHOLE @ 90.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.70, EC = 813 uS/cm, T = 24.1°C		
		100							

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 24-01-2022 12:51 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0907

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 364079.558 m E 7708839.145 m N MGA94 51
SURFACE RL: 256.10 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 165/311 mm HOLE DEPTH: 72.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 17-8-21
CHECKED: AC DATE: 10-1-21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	51.57 mbgl , 07-09-21	0	256.10				SAND rounded to subrounded, fine to coarse grains, reddish brown, aeolian		0 - 6m: 8" steel casing cemented with GP cement/bentonite mix (1.42 SG)
			4.00						
			252.10				SILCRETE fine grained sand within a red/grey matrix, with up to 5% pink/red silt/clay in some areas		0 - 5m: cemented with GP cement/bentonite mix (1.42 SG)
		10							
		20							0 - 49m: 50mm PN18 PVC casing - blank
			23.00						
			233.10				SANDSTONE subrounded to subangular, fine to coarse grains, translucent white quartz with minor reddish silcrete chips		5 - 44m: gravel packed (3.2 - 6.4mm)
			29.00						
		30	227.10				SILCRETE fine grained sand within a red/grey matrx, with up to 5% pink/red silt/clat in some areas		
			34.00						
			222.10				SANDSTONE subrounded to subangular, medium to coarse grains, translucent white quartz with minor reddish silcrete chips		
		40							44 - 46m: bentonite seal
			47.00						
			209.10				SILCRETE fine grained sand within a white/grey matrix, with some red silt/clay		46 - 57: gravel packed (3.2 - 6.4mm)
		50							49 - 55m: 50mm PN18 PVC casing - slotted (1mm aperture)
			53.00						
			203.10				SANDSTONE subrounded, coarse grained, translucent white quartz		55 - 57m: 50mm PN18 PVC casing - blank with endcap
			57.00					0.002	
			199.10				MUDSTONE high plasticity, mottled purple/white becoming yellow from 72m		
		60							
									57 - 72m: open hole backfilled with gravel (3.2 - 6.4mm)
		70	72.00						
			184.10				END OF BOREHOLE @ 72.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.88, EC = 1051 uS/cm, T = 27.7°C		
		80							

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 24-01-2022 12:52 10.02.00.04 Datgel Tools

REPORT OF BOREHOLE: WINU0908

GOLDER
MEMBER OF WSP

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369121.210 m E 7709122.260 m N MGA94 51
SURFACE RL: 245.28 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375/445 mm HOLE DEPTH: 150.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: EJ/SS DATE: 10-9-21
CHECKED: AC DATE: 21-1-21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	52.36 mbgl, 20-09-21	0	245.28				SAND red, very fine to coarse sand, subangular to subrounded, ~5-10% quartz in some intervals		0 - 6m: 16" surface NB steel casing, tremmie grouted with GP cement/bentonite (SG 1.42)
			7.00						
			238.28				SILTY SAND ~5% grey sand in a reddish orange silt matrix		
			14.00						
			231.28				SILCRETE/SANDSTONE silcrete chips, flaky white/yellow with oxidation staining, subangular to angular, coarsens with depth, sandstone present throughout		0 - 89.75m: 10" NB steel casing + float shoe
		20							
			30.00						
			215.28				as above, ~15-30% quartz grains (grey)		
			36.00						
			209.28				SANDSTONE quartz sand, clear grey subrounded grains, ~5-10% silcrete		
		40	207.28				reddish orange, 10% sandstone gravels made up of fine sand, subangular to angular, moderately sorted, 5-10% quartz, 5% silcrete		0 - 89.75m: Pressure grout GP cement / 5% bentonite mix (SG 1.42)
			45.00						
			200.28				quartz sand, decreasing silcrete content with depth, trace mudstone chips throughout		
			56.00						
			189.28				MUDSTONE mottled grey/purple/yellow, high plasticity, trace quartz up to 1cm		
		60							
			65.00						
			180.28				as above, mottled yellow/purple clay		
			71.00						
			174.28				dark grey/brown-purple mudstone, high plasticity		
			76.00						
			169.28				high plasticity, dark grey, reduced mudstones		
		80	81.00						0 - 105m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
			164.28				METASEDIMENTS grey black, weathered, mudstone contamination		
			85.00						
			160.28				green grey, minor oxidation staining, <0.5cm chip size, clay content decreases with depth		
			90.00						
			155.28				fine grained, dark grey, moderately weathered, some oxidised chips		
			94.00						
			151.28				green dark grey, slightly weathered, oxidised with minor chlorite alteration		0 - 136m: 50mm blank NB steel casing
			98.00						
			147.28				red dark grey, highly oxidised, blocky chips from 98 to 103m	3.5	
RAB		100							
			108.00						105 - 110m: bentonite seal
			137.28				green dark grey, fresh, silica alteration, large blocky chips	8	
			119.00						
			126.28				dark grey, slight silica alteration, minor quartz present, sulfides within quartz vein at 128m	12	110 - 148m: Backfill with 1.6 - 3.2mm gravel
		120						20	
				136.00 m pH = 8.12, EC = 5134 uS/cm, ORP = 119mV, DO = 5.1mg/L					
		140							136 - 148m: 50mm NB steel - 1mm slotted with welded 50mm end cap at 148m
			150.00						148 - 150m: fallback
			95.28				END OF BOREHOLE @ 150.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 7.5, EC = 6514 uS/cm, T = 29.6°C		
		160							

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GAP gINT FN. F05
RL3

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 27-01-2022 10:23 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0909

SHEET: 1 OF 1

CLIENT:	Rio Tino Winu	COORDS: 368597.010 m E 7709518.000 m N MGA94 51	DRILL RIG: Versadrill Advantage V2000NG
PROJECT:	Winu Final Study: 2020 Hydro Investigation	SURFACE RL: 244.23 m DATUM: AHD	CONTRACTOR: Acquadrill
LOCATION:	Winu, East Pilbara	INCLINATION: -90°	LOGGED: SS/EJ DATE: 9/10/21
JOB NO:	20136763	HOLE DIA: 216/375/445 mm HOLE DEPTH: 150.00 m	CHECKED: AC DATE: 21/1/21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	51.91 mbgl , 13/10/21	0	244.23				SAND fine to coarse grained, red, well graded, sub-rounded		0-6m: 16" NB steel surface casing, tremmie grouted with GP cement/bentonite (SG 1.44)
			5.00						
			239.23				SILTY SAND fine to coarse grained, mottled red and orange, moderately graded, sub-rounded		
			19.00						
		20	225.23				SILCRETE fine to medium grained, red and grey, poorly graded, sub-angular		0 - 101: Pressure grout GP cement / 5% bentonite mix (SG 1.42)
			35.00						
			209.23				SANDSTONE grey, with siltstone chips, very fine to medium grained, poorly graded, angular, moderately weathered		
		40							
			48.00						
			196.23				coarse grained, white, quartz, uniform, sub-rounded to rounded, moderately weathered, no siltstone		0-101m: 10" NB steel protection casing with float shoe
		60	60.00						
			184.23				pale grey, with siltstone, minor oxidation, minor high plasticity clay, highly weathered		
			68.00						
			176.23				MUDSTONE purple and grey, with siltstone, high plasticity clay in recovery, moderately weathered		
			72.00						
			172.23				yellow, no siltstone, goethitic		
		80							0-144m: 50mm NB blank steel casing
			84.00						
			160.23				purple and grey, oxidised		
			90.00						
			154.23				grey, reduced, high plasticity clay in recovery		
		100	101.00						
			143.23				METASEDIMENT grey and dark grey, minor oxidation, minor quartz, moderately weathered		
RAB			141.23						
			110.00				grey and dark grey, slightly weathered, trace quartz		
			134.23				dark grey, fresh, minor quartz at 118m, blocky intervals starting at 126m		
		120							0 - 135m: Tremmie grouted GP cement / 5% bentonite (1.42SG) back to surface
									135-137m: bentonite seal
		140							137-150m: gravel pack (1.6-3.2mm)
			150.00						144-150m: 50mm NB slotted steel (1mm apperture)
			94.23				END OF BOREHOLE @ 150.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.18, EC = 4219 uS/cm, T = 31.6°C		
		160							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 27/01/2022 15:03 10.02.00.04 Datgel Tools

REPORT OF BOREHOLE: WINU0910

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369097.650 m E 7709064.320 m N MGA94 51
SURFACE RL: 245.82 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 217/432/559/610 mm HOLE DEPTH: 243.40 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Aquadrill
LOGGED: EJ/SS DATE: 2-10-21
CHECKED: AC DATE: 21-1-21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	53.51 mbgl , 23-11-21	0	245.82				SILTY SAND fine to medium grained, red brown, well to moderately graded, subrounded to subangular		0 - 6m: 24" surface NB steel casing, pressure grouted with GP cement/bentonite (SG 1.44)
			13.00						
			232.82				SILCRETE fine to medium grained, red orange and grey, angular, moderately graded		
		20	23.00						
			222.82				SANDSTONE fine grained, pale red and grey, moderately to poorly graded, sub-angular to sub-rounded		
			31.00						
			214.82				up to 40% quartz, well to moderately graded		
			36.00						
			209.82				trace siltstone, <10% quartz, poorly graded, sub-rounded to angular		
		40							0 - 91.3m: 18" NB steel casing + float shoe, pressure grouted with GP cement/bentonite (SG 1.44)
			55.00						
			190.82				quartz, uniform, sub-angular to sub-rounded, moderately weathered, trace siltstone		
		60	61.00						
			184.82				CLAY/MUDSTONE grey, high plasticity clay, with minor mudstone		
			67.00						
			178.82				yellow, goethitic, mudstone chips in clay		
			72.00						
			173.82				purple/grey, oxidised		
		80	80.00						
			165.82				grey, reduced, high plasticity clay		
			87.00						87 - 90m: M-packer assembly welded onto 6m of 12" NB steel riser 86.4 - 92.4m: 12" blank NB steel riser
			158.82				METASEDIMENTS fine grained, grey, angular, oxidised, highly weathered		
			96.00						
			149.82					2.55	
		100	101.00	97.00 m pH = 9.12, EC = 1887 uS/cm, T = 32.6°C			fine grained, dark grey and red, oxidised, moderately weathered, blocky chips to 15mm		
			144.82				slightly oxidised, slightly weathered, angular, blocky chips at 105m, minor quartz and silica alteration	3.3	
			109.00						
			136.82	109.00 m pH = 8.75, EC = 1626 uS/cm, T = 32.7°C			dark grey, fresh, sub-angular, minor quartz, chips 2-10mm, fracture at 118 with chips to 25mm and quartz, sulphides at 126m with increase in yield	4.5	
				115.00 m pH = 8.68, EC = 1969 uS/cm, T = 33.2°C				5.8	
		120							
			129.00	121.00 m pH = 8.65, EC = 2159 uS/cm, T = 33.2°C				8	
			116.82				dark grey and green, blocky chips to 25mm, highly altered (chlorite), likely fracture		
			136.00						
			109.82				dark grey and pale green, minor quartz, blocky chips 141-143m and 147-151m, possible fractures, slightly altered		
		140						12	
								15	
				153.00 m pH = 8.08, EC = 4450 uS/cm, T = 33.1°C					
		160							
			167.00						
			78.82				grey and pale green, highly altered, blocky chips to 30mm		
								20	
				175.00 m					
		180	181.00	pH = 8.05, EC = 5824 uS/cm, T = 32.3°C					
			64.82				dark grey, slightly altered, quartz vein at 186m		
								24.4	
		200						35	92.4 - 242.4m: 25 lengths of 3m 12" Johnsons wire wound screens (3mm aperture)
			217.00						
			28.82					40	
		220	223.00				grey and green, slightly altered, fresh, high strength		
			22.82				dark grey, quartz vein 237-238m, very high strength, fresh		
		240	244.00						242.4 - 243.4m: J-latch assembly welded onto the bottom of the screens
RAB			1.82				END OF BOREHOLE @ 243.40 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.25, EC = 8296 uS/cm, T = 31.9°C		
		260							

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 27-01-2022 10:24 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

REPORT OF BOREHOLE: WINU0911

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Final Study: 2020 Hydro Investigation
LOCATION: Winu, East Pilbara
JOB NO: 20136763

COORDS: 369753.380 m E 7708994.120 m N MGA94 51
SURFACE RL: 249.21 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375/445 mm HOLE DEPTH: 151.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: EJ DATE: 22-10-21
CHECKED: AC DATE: 21-1-21

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF	58.56 mbgl , 24-11-21	0	249.21				SAND medium to coarse grained, red, subrounded to subangular, well sorted		0 - 6m: 16" surface NB steel casing, tremmie grouted with GP cement/bentonite (SG 1.42)
			8.00 241.21				SILCRETE red grey, subangular to angular chips, moderately sorted, minor subrounded quartz and sandstone chips		
		20	19.00 230.21				SANDSTONE fine grained, red grey, angular, poorly sorted, minor silcrete		0 - 93m: 10" NB steel casing + float shoe, pressure grouted with GP cement / 5% bentonite mix (SG 1.42)
			29.00 220.21				coarse grained, grey, quartz, subangular to subrounded, slightly weathered, ~2% sandstone chips, well sorted		
			38.00 211.21				grey, minor siltstone, 10-15% quartz, subanglar, poorly sorted		
		40	44.00 205.21				coarse grained, grey, subangular to subrounded, slightly weathered, well sorted		
		60	62.00 187.21				coarse grained, brown, moderately weathered quartz, goethitic, subangular to angular, well sorted		
			70.00 179.21				DIAMICTITE/MUDSTONE yellow grey, highly weathered, oxidized (hematitic and goethitic)		
		80	81.00 168.21				METASEDIMENTS brown grey, angular chips, highly weathered, goethitic		0 - 134m: Tremie grouted GP cement / 5% bentonite mix (SG 1.42) back to surface
			91.00 158.21				grey to dark grey, angular chips, moderately weathered		
RAB							dark red, oxidised (hematitic, goethitic), highly weathered, subrounded-angular chips, M-H rock strength. 750um to 20mm size chips	3.5	0 - 144m: 50mm blank NB steel casing
		100						5	
								5	
								5	
		120	120.00 129.21				~10mm size, 1% yellow chips	5	
								5	
			130.00 117.21				quartz clasts (<1%) quartz clasts (~10-15%) weakly veined	5	134 - 136m: bentonite seal
		140						5	136 - 150m: Backfill with 1.6 - 3.2mm gravel
								5	144 - 150m: 50mm NB steel - 1mm slotted with welded 50mm end cap
			151.00 98.21				END OF BOREHOLE @ 151.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.06, EC = 3580 uS/cm, T = 34.6°C	5	150 - 151m: Fallback
		160							

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GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0912

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 371483.400 m E 7707011.830 m N MGA94 51
SURFACE RL: 248.13 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375/572 mm HOLE DEPTH: 150.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: SS DATE: 26/10/21
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	248.13				SAND fine to coarse grained, red, well graded, sub-rounded		0 - 6m: 16" steel casing cemented with GP cement/bentonite mix (1.42 SG)
			6.00						
			242.13				SILTY SAND fine to medium grained, red, moderately graded, sub-rounded, increasing silt with depth		
			10.00						
			238.13				SILCRETE red with grey, hard, angular, moderately weathered		
			16.00						
			232.13				white with red, angular, moderately weathered, platey chips		
		20	22.00						
			226.13				coarse grained, pale orange and grey, poorly graded, sub-rounded to sub-angular, moderately weathered, increasing quartz content with depth		0 - 88m: Pressure grout GP cement / 5% bentonite mix (SG 1.42)
			34.00						
			214.13				SANDSTONE fine to coarse grained, grey and pale orange, moderately graded, sub-rounded to sub-angular, moderately weathered		
		40	41.00						
			207.13				coarse grained, grey, poorly graded, sub-rounded		
			47.00						
			50.00				SILTSTONE / SANDSTONE fine grained, dark purple and yellow, abundant clay, oxidised (hematitic and goethitic)		0 - 88m: 10" NB steel protection casing with float shoe
			198.13						
			54.00				MUDSTONE pale purple and grey, abundant clay, oxidised		
			194.13						
			60.00				yellow and purple, high plasticity clay, goethitic		
		60	62.00				mottled red and yellow, goethitic and hematitic		
			186.13				grey and dark red, reduced, abundant high plasticity clay		
			73.00						0 - 118m: Tremie grouted GP cement/5%
			175.13				dark red, oxidised, abundant high plasticity clay		
			78.00						
			170.13				METASEDIMENT red and grey, leached cap, highly oxidised and broken		
		80						1	
			94.00						
			154.13				brown, highly altered, high-moderate strength, orange/brown staining on chips, recovered as clayey chips (very weathered)	1	
RAB		100						1	0 - 138.5m: 50mm NB blank steel casing
								1	
								1	
								1	
		120						1	118 - 120m: Bentonite seal
								1	
								2.5	120 - 144.5m: Graded gravel pack (3.2-6.4mm)
			139.00						
		140	109.13				grey brown, moderately-highly weathered, trace quartz, orange-brown oxidation staining on chips, purple stained chips at 143m		138.5 - 144.5m: 50mm NB slotted steel (1mm aperture)
				145.00 m pH = 9.08, EC = 659 uS/cm, T = 30.4°C				3	
			150.00						144.5 - 150m: Fallback
			98.13	150.00 m pH = 8.30, EC = 489 uS/cm, T = 30.3°C			END OF BOREHOLE @ 150.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.2, EC = 624 uS/cm, T = 24.5°C	3	
		160							

44.15 mbgl , 20/11/21

PRELIMINARY

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GAP gINT FN. F05
RL3

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GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0913

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 371476.0 m E 7706940.0 m N MGA94 51
SURFACE RL: 248.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 375/559/660 mm HOLE DEPTH: 243.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: EJ/JL DATE: 19/2/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	248.00				SAND fine to coarse grained, red, well graded, subrounded		0 - 6m: 24" NB steel, tremie grouted cement / 5% bentonite mix (1.42 SG)
			8.00						
			240.00				SANDY SILT fine grained, red orange, up to 20% quartz sand, moderately graded, subangular		
		20	20.00						
			228.00				SILT/SANDSTONE fine grained, orange grey, 5-50% sandstone and quartz granules, moderately graded, subangular		
			29.00						
			219.00				SANDSTONE orange grey, 30-50% quartz, minor siltstone, moderately to well graded, subangular to angular		
		40	46.00						
			202.00				MUDSTONE purple, high clay content, oxidised, highly weathered		0 - 120m: 16" NB steel protection casing with float shoe, pressure grouted cement / 5% bentonite mix (1.43 SG)
			53.00						
			195.00				yellow and purple, goethitic		
			59.00						
RMF	43.2 mbgl , 19/03/22	60	189.00				MUDSTONE/DIAMICTITE grey, reduced, high plasticity clay in recovery, highly weathered		
			72.00						
			176.00				brown, minor rounded clasts, subrounded to subangular mudstone chips		
		80	81.00						
			167.00				LEACHED CAP brown, recovered as clayey chips, highly altered, poorly sorted, subangular to angular, highly weathered, oxidised		
		100							
			108.00						
			140.00				fine chip size, angular, well graded, very hard, no clay, very minor quartz chips observed		112.5 - 119m: M-packer assembly welded onto 6m of 10" NB steel riser
		120	121.00						
			127.00				METASEDIMENTS brown, yellow brown, red brown, fine to coarse chip size, rounded to angular chips, moderately to well graded, highly weathered, oxidised (goethitic and hematitic)		
		140							
			145.00						
			103.00				dark brown, red brown, chip size increased to coarse (2-5mm), less goethetic oxidation, more hematitic oxidation	5	
		160	161.00						
			87.00				well graded		
			177.00						
			71.00						
		180	70.00				chip size decreased to fine to medium, chips are sub-rounded to angular		
							chip size increased to coarse (<1cm)	9	
			201.00						119 - 239m: 10" Johnsons wire wound screens (3mm aperture)
		200	47.00						
			208.00				medium to large chips, slightly weathered to fresh, hard, trace quartz veined, gap graded		
			40.00				dark grey, grey, small to medium chips, fresh		
							poorly graded		
		220							
			239.00						239 - 240m: J-latch assembly
		240	9.00						240 - 243m: Fallback
RAB			243.00				lightly quartz veined <5%	6	
			5.00	243.00 m pH = 8.46, EC = 700 uS/cm, T = 30.2°C			END OF BOREHOLE @ 243.00 m TARGET DEPTH PRODUCTION WELL Development Water Quality: pH = 8.23, EC = 635 uS/cm, T = 34.1°C		
		260							

PRELIMINARY

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GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0914

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 370718.0 m E 7707474.0 m N MGA94 51
SURFACE RL: 252.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375/572 mm HOLE DEPTH: 151.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: EJ DATE: 22/1/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	251.00				SAND red grey, 30% quartz		0 - 6m: 16" steel casing, tremie grouted cement / 5% bentonite mix (1.42 SG)
			13.00				FERRICRETE/SILCRETE grey and red, subrounded to angular chips up to 1.5cm, very poorly graded, with quartz grains cemented in matrix, vitreous		
			239.00				SANDSTONE/SILCRETE fine grained, grey, subangular to angular, moderately graded, minor quartz, 10% ferricrete at 13-15m decreasing wih depth		
		20	20.00 232.00				SANDSTONE fine grained, red and grey, subangular to angular, moderately to poorly graded, moderately weathered - less weathered with depth, minor quartz		0 - 112m: Pressure grouted cement / 5% bentonite mix (1.42 SG)
			35.00 217.00				grey, quartz - average ~0.2cm, minor siltstone and sandstone, moderately weathered		
		40	48.00						
			208.00 201.00				SANDSTONE/MUDSTONE grey and purple, purple mudstone chips, 5% sandstone, 10% quartz and minor siltstone, poorly graded		0 - 112m: 10" NB steel casing + float shoe
RMF	20/01/22, 54.48 mbtoc (stickup TBC)						MUDSTONE yellow, mottled purple, moderately graded, goethitic		
		60	63.00 189.00				purple, high clay content, minor metasediment chips MUDSTONE/DIAMICTITE grey, subrounded to subangular, minor very rounded chips, poorly graded, 0.1-3cm chip size		0 - 139m: Tremie grouted cement / 5% bentonite mix (1.42 SG)
		80	82.00 170.00				METASEDIMENT red brown, angular, poorly sorted, larger 1cm chips, hematitic, highly weathered		
			90.00 162.00 160.00				grey brown, highly weathered quartz vein, >50% quartz, 0.5cm chips up to 1cm, angular, hematite staining		0 - 145m: 50mm NB steel casing
		100					red brown, hematitic, minor quartz, highly weathered, moderately sorted, angular, slightly goethitic at 100-102m		
			109.00 143.00				grey brown, highly oxidised, no clay, moderately weathered		
RAB		120							
		140						1 1.4	139 - 142m: Bentonite seal 142 - 151m: Graded gravel pack (3.2-6.4mm)
			148.00 104.00 151.00				dark grey, slightly weathered to fresh metasediment, moderately oxidised	1.7	145 - 151m: 50mm NB steel - 1mm slotted with welded 50mm end cap
			101.00	151.00 m pH = 8.80, EC = 766 uS/cm, T = 27.2°C			END OF BOREHOLE @ 151.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 7.93, EC = 581 uS/cm, T = 28.2°C		
		160							

PRELIMINARY

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GAP gINT FN. F05
RL3

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 21/06/2022 11:30 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0915

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 371445.0 m E 7706696.0 m N MGA94 51
SURFACE RL: 248.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 248/375/559 mm HOLE DEPTH: 150.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 3/3/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	248.00				SAND fine to coarse grained, red, poorly to well graded, sub-rounded		0 - 10.5m: 16" steel casing, tremie grouted cement / 5% bentonite mix (1.42 SG)
			8.00						
			240.00				SILT red, poorly graded		
			239.00						
			13.00				fine to coarse grained, orange, yellow, well graded. sub-rounded		
			235.00						
			17.00				SILCRETE fine to coarse grained, pale yellow, orange grey, 5-30% sandstone and quartz granules, moderately graded, subangular		
			231.00						
		20	20.00						
			228.00				SANDSTONE fine grained, grey, angular, poorly graded, trace quartz		
							moderately graded, 10-30% quartz, trace siltstone		
			30.00						0 - 93m: Pressure grouted cement / 5% bentonite mix (SG 1.42)
			218.00				subangular, intervals of very fine loose sand		
			38.00						
		40	40.00				very fine grained, 10% of chips weathered to red/brown, subrounded-subangular		
			208.00				MUDSTONE purple, grey, oxidised, subangular to angular, increasing clay content with depth		
RMF	10/04/22, 44.21 mbtoc (stickup TBC)								0 - 93m: 10" NB steel casing + float shoe
			58.00						
		60	190.00				purple, yellow, high plasticity clay in recovery		
			63.00						
			185.00				dark grey, reduced, trace quartz, trace metasediment chips		
									0 - 137m: Tremie grouted cement / 5% bentonite mix (SG 1.42)
			74.00						
			174.00				METASEDIMENTS yellow, grey, leached cap, highly oxidised, subangular to angular, poorly graded		
		80							
			84.00						
			164.00				grey, highly oxidised		
									0 - 144m: 100mm blank PVC casing
								1.5	
		100	101.00						
			147.00				brown grey, large quartz chips (10%)	2	
			106.00	104.00 m pH = 9.51, EC = 763 uS/cm, T = 37.9°C					
			142.00				trace quartz chips (<1%)	2	
								2	
				116.00 m pH = 8.84, EC = 614 uS/cm, T = 40.6°C				2	
			119.00						
		120	129.00				dark grey, weakly oxidised, highly oxidised along fractures, slightly weathered	2	
				122.00 m pH = 9.24, EC = 644 uS/cm, T = 40.3°C				2	
								2	
			135.00						
			113.00	134.00 m pH = 8.64, EC = 591 uS/cm, T = 38.6°C			brown grey, highly oxidised	2	
		140		140.00 m pH = 8.67, EC = 553 uS/cm, T = 37.2°C				2	
								3	
			150.00						137 - 139m: Bentonite seal
								4	139 - 150m: Graded gravel pack (3.2 - 6.4mm)
			98.00	150.00 m pH = 8.58, EC = 574 uS/cm, T = 33.8°C			END OF BOREHOLE @ 150.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.26, EC = 531 uS/cm, T = 28.2°C		144 - 150m: 100mm wire-wound steel - 1mm slotted with end cap
RAB		160							

PRELIMINARY

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GAP gINT FN. F05
RL3

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GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0916

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 372072.0 m E 7706966.0 m N MGA94 51
SURFACE RL: 250.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375/559 mm HOLE DEPTH: 151.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 3/3/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	250.00				NO SAMPLE samples lost due to cyclone		0 - 6m: 16" steel surface casing, tremie grouted GP cement / bentonite mix (1.72 SG)
			18.00						
		20	21.00 229.00				SAND fine grained, red, aeolian		
			28.00				SILCRETE fine grained, red, grey		
			222.00				subangular to angular, increasing quartz content with depth (up to 10%)		
			32.00						
			218.00				SANDSTONE grey, quartz grains, minor oxidation, subrounded to subangular		
							up to 50% quartz, trace siltstone, well to moderately graded		
		40							
			44.00						
RMF			206.00				>50% quartz, minor oxidation (goethite and hematite)		
			51.00						0 - 84m: 10" steel protection casing + float shoe, pressure grouted GP cement / bentonite mix (1.42 SG)
			199.00				grey, brown, yellow, moderately graded, decreasing quartz content with depth, significant oxidation staining		
			56.00						
			194.00				SANDSTONE/SILCRETE fine to coarse grained, quartz grains cemented in sand matrix, up to 2cm chip size, minor silcrete, trace siltstone, moderately to poorly graded		
		60	64.00						
			186.00				METASEDIMENT brown, yellow, leached cap, variable chip size, angular, minor sandstone, poorly graded, highly weathered, oxidation staining (hematite and goethite)		
			75.00						
			175.00				grey, brown, as above but becoming fresher, variable chip size, angular, poorly graded, moderately weathered		
		80	80.00						0 - 145m: 50mm NB blank steel casing
			170.00				grey, yellow, brown, increasing chip size with depth (>1cm)		
			84.00						
			166.00				light grey, 0.5cm to 2cm chip size, minor quartz		
			87.00						
			163.00				dark grey, highly variable chip size (1mm to 3cm), slightly to moderately weathered, oxidation staining (hematite and goethite)		
				91.00 m pH = 9.38, EC = 1051 uS/cm, T = 34.6°C				0.5	
								0.5	
		100							0 - 137m: Tremie grouted GP cement / bentonite mix (1.42 SG)
				103.00 m pH = 8.69, EC = 828 uS/cm, T = 30.9°C				2	
								2.5	
			113.00						
			137.00				dark grey, slightly weathered to fresh, minor quartz	3	
				115.00 m pH = 8.40, EC = 906 uS/cm, T = 30.5°C				4	
		120							
				127.00 m pH = 8.44, EC = 1533 uS/cm, T = 29.9°C				5	
								6	
			139.00						
		140	111.00	139.00 m pH = 8.19, EC = 1589 uS/cm, T = 29.8°C			fresh metasediment chips	6	137 - 139m: Bentonite seal
								6.5	139 - 151m: Graded gravel pack (3.2 - 6.4mm)
			151.00					7	145-151m: 50mm NB steel - 1mm slotted with end cap
			99.00	151.00 m pH = 8.09, EC = 1526 uS/cm, T = 30.0°C			END OF BOREHOLE @ 151.00 m TARGET DEPTH STANDPIPE INSTALLED Not yet airlifted (as of 23/06/22)		
		160							

RAB

44.22 mbgl , 12/06/22

PRELIMINARY

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GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 21/06/2022 11:30 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0917

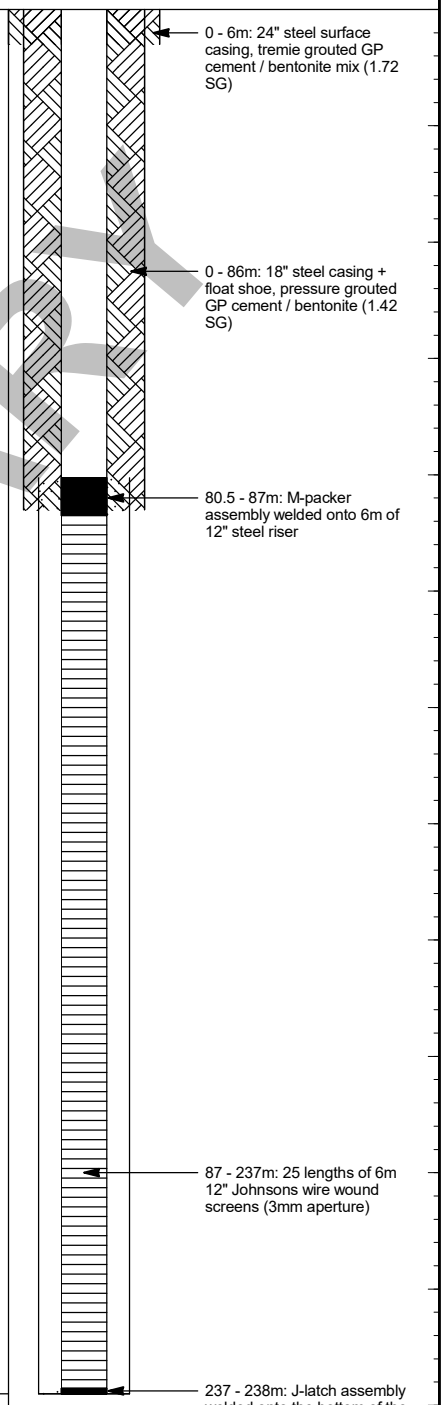
SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 369357.0 m E 7708865.0 m N MGA94 51
SURFACE RL: 248.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 432/559/660 mm HOLE DEPTH: 238.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 5/4/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	248.00						
			8.00				SAND fine to medium grained, red, brown, aoeolian sand, typically 0.5-1.5mm, minor silt		
			13.00				SANDSTONE fine to coarse grained, orange sandstone grains, intermixed with minor silcrete chips, silcrete increasing with depth, minor silt		
		20	235.00				SILCRETE medium to coarse grained, silcrete chips with minor sandstone/quartz grains, orange/white, typically 1-3mm chips		
			40.00						
		40	208.00				SANDSTONE medium to coarse grained, clear/white, minor silcrete chips, typically 1-4mm		
			54.00						
	55.08 mbgl , 12/06/22		194.00				SILCRETE medium to coarse grained, orange/red/white, medium to coarse grained chips, typically 3-6mm, increasing silt/clay with depth		
		60	61.00						
			187.00				MUDSTONE/SILCRETE medium to coarse grained, orange/red, mudstone with silcrete chips, medium to coarse grained chips, typically 3-6mm, clay becoming more grey with depth		
			69.00						
			72.00						
			176.00				MUDSTONE/METASEDIMENT medium to coarse grained, grey/tan, mudstone with weathered metasediment (leached cap?) and silcrete chips, medium to coarse grained chips, typically 3-6mm, mudstone becoming more reduced (grey) with depth		
		80							
		100					METASEDIMENT fine grained, brown/grey, moderately graded, angular, highly weathered, hematitic oxidation staining very pervasive, some goethitic oxidation visible on 5% of chips		
				115.00 m pH = 7.47, EC = 2785 uS/cm, T = 33.5°C				5	
RAB			120.00						
		120	128.00				fine grained, grey, slightly weathered, some hematitic oxidation staining observed on 20% of chip surfaces, quartz chips observed between 127-138m, K-feldspar chips observed between 134-138m	8.5	
		140							
			151.00						
			97.00				fine grained, fresh dark grey metasediments with intervals of grey/green (chlorite/sericite altered?) metasediment chips, some k-feldspar and quartz veining noted within 214-234m interval	20	
		160							
		180							
		200							
		220							
			238.00					~50	
		240	10.00				END OF BOREHOLE @ 238.00 m TARGET DEPTH PRODUCTION WELL Development Water Quality: pH = 7.88, EC = 7532 uS/cm, T = 29.9°C		
		260							



PRELIMINARY

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GAP gINT FN. F05
RL3

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GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0918

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 365396.0 m E 7710655.0 m N MGA94 51
SURFACE RL: 245.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375 mm HOLE DEPTH: 72.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: EJ DATE: 23/4/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	245.00				SAND medium to coarse grained, red, subangular to subrounded, well graded		0 - 6m: 10" steel surface casing, tremie grouted GP cement / bentonite mix (1.42 SG) 0 - 6m: Tremie grouted GP cement / bentonite mix (1.42 SG) above gravel pack
			9.00						
		10	236.00				SANDSTONE fine grained, grey, red, brown, subangular to angular, moderately to poorly graded, increasing quartz content with depth (up to 5%)		
			13.00						
			232.00				fine to medium grained, grey, orange, increasing quartz content to 20%, moderately to well graded		
		20							0 - 63m: 100mm blank PVC casing, threaded
			26.00						
			219.00				fine to medium grained, grey, purple, quartz sand, hematitc oxidation staining, subrounded to subangular		
			29.00						
		30	216.00				fine to medium grained, grey, purple, yellow, angular, moderately graded		6 - 57m: Graded gravel pack (3.2 - 6.4mm)
			36.00						
RMF			209.00				fine to medium grained, grey, brown, quartz sand, trace siltstone, subangular, moderately to well graded		
		40							
		50							
			56.00						
			189.00				grey, medium quartz grains (5%)		57 - 59m: Bentonite seal
		60							59 - 69m: Graded gravel pack (3.2 - 6.4mm)
			65.00						
			180.00				grey, quartz sandstone, increasing clay content with depth		63 - 69m: 100mm slotted PVC casing (1mm aperture), threaded, with end cap
			68.00						
			177.00				MUDSTONE red, purple, high clay content, reddish purple to brown, angular chips		
		70	*71.00*						
			72.00				LEACHED CAP yellow, poorly graded chips, angular, highly weathered		69 - 72m: Open hole backfilled with gravel (3.2 - 6.4mm)
			173.00				END OF BOREHOLE @ 72.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: Not recorded, pumped water and surged.		
	66.53 mbgl , 12/06/22	80							

PRELIMINARY

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GAP gINT FN. F05
RL3

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GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0919

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 367530.0 m E 7709788.0 m N MGA94 51
SURFACE RL: 245.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375 mm HOLE DEPTH: 71.50 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 9/4/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	245.00				SAND red/brown, minor silt, moderately graded, rounded to sub-rounded, fine to medium grained		0 - 6m: 10" steel surface casing, tremie grouted GP cement / bentonite mix (1.42 SG) 0 - 6m: Tremie grouted GP cement / bentonite mix (1.42 SG) above gravel pack
		10							
			13.00 232.00				red/brown, unconsolidated, moderate silt (20%), poorly graded, sub-rounded to sub-angular, fine to coarse grained		
		20							0 - 56.5m: 100mm blank PVC casing, threaded
			25.00 220.00				SILCRETE/SAND white/purple, silcrete and sandstone chips with some quartz grains, chips typically between 2-4mm, medium to coarse grained, increased chip size between 29-32m of 2-8mm		
		30	32.00 213.00				SANDSTONE quartz grains/sand, mostly clear with some white chips, medium to coarse grained, typically 2-4mm, silt/clay band between 40-42m with ~30% silt/clay		6 - 50m: Graded gravel pack (3.2 - 6.4mm)
RMF		40							
		50							50 - 52m: Bentonite seal 50 - 62.5m: Graded gravel pack (3.2 - 6.4mm)
	58.19 mbgl , 12/06/22	60	64.00 181.00						56.5 - 62.5m: 100mm slotted PVC casing (1mm aperture), threaded, with end cap
			66.00 179.00				SILCRETE/SANDSTONE mottled red/yellow/purple, silcrete chips with some quartz grains, medium to coarse grained, chips typically between 2-5mm, increasing silt with depth		
		70	71.50 173.50				MUDSTONE/SILCRETE mudstone chips and clay, intermixed with silcrete and coarse quartz grains, white/pink at 66m progressively getting more pink/red with depth		62.5 - 71.5m: Open hole backfilled with gravel (3.2 - 6.4mm)
							END OF BOREHOLE @ 71.50 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: Not recorded, pumped water and surged.		
		80							

PRELIMINARY

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GAP gINT FN. F05
RL3

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 21/06/2022 11:30 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0920

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 369909.0 m E 7705330.0 m N MGA94 51
SURFACE RL: 261.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 241/375/559 mm HOLE DEPTH: 170.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: EJ DATE: 15/5/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	261.00				SAND red, fine to coarse grained, well graded, subrounded to rounded		0 - 6m: 16" steel surface casing, tremie grouted GP cement / bentonite mix (1.44 SG)
			4.00						
			257.00				SILCRETE moderately graded, angular to subangular, 2-5mm silcrete and minor sandstone chips, white with mottled orange/red, pink silt from 22-25m		
		20							
			25.00						
			236.00				SANDSTONE purple, well graded, medium to coarse grained, subrounded to rounded, 2-4mm sandstone/quartz grains, minor silcrete chips observed		
			35.00						
			226.00				generally white/clear, increasing yellow goethitic staining from 61-66m		
		40							
		60							0 - 107m: 10" NB steel casing + float shoe, pressure grouted GP cement / bentonite mix (1.44 SG)
			66.00						
			195.00				CLAY mottled purple/yellow/red, very little to no inclusions/chips		
			76.00						
			185.00				red/brown, progressively becoming more reduced (grey)		
		80							0 - 164m: 100mm blank PVC casing, threaded
			83.00						
			178.00				grey, reduced		
		100							
			106.00						
			153.00						
			109.00				METASEDIMENTS dark grey, angular, slightly weathered, minor pyrite visible (2%)		
			152.00				fresh, well graded chip size distribution		
		120							
			123.00						
			138.00						
			128.00				fracture noted (driller comment)		
			135.00				minor quartz observed, fracture noted (driller comment)		
			136.00						
			125.00				fracture noted (driller comment)		
		140							0 - 157m: Tremie grouted GP cement / bentonite mix (1.42 SG)
			145.00					4	
			116.00				fracture noted (driller comment)		
			152.00						
			109.00				fracture noted (driller comment)		
		160							157 - 159m: Bentonite seal
									159 - 170m: Graded gravel pack (3.2 - 6.4mm)
			170.00					6	164 - 170m: 100mm slotted PVC casing (1mm aperture), threaded, with end cap
			91.00				END OF BOREHOLE @ 170.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.56, EC = 584 uS/cm, T = 24.2°C		
		180							
RAB	11/06/22, 138.37 mbtoc (stickup TBC)			144.00 m pH = 8.55, EC = 630 uS/cm, T = 26.3°C					

PRELIMINARY

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP gINT FN. F05
RL3

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 21/06/2022 11:30 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0921

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 366690.0 m E 7706264.0 m N MGA94 51
SURFACE RL: 260.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/241/375 mm HOLE DEPTH: 63.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: TKD DATE: 27/5/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	260.00				SAND red, well graded, fine to coarse grained, sub-rounded to angular		0 - 6m: 10" steel surface casing, tremie grouted GP cement / bentonite mix (1.44 SG)
			4.00						0 - 6m: Tremie grouted GP cement / bentonite mix (1.42 SG) above gravel pack
			256.00				SILCRETE/SANDSTONE light grey/white, moderately sorted, fine to medium grained, sub-angular to angular		
		10							
			14.00						
RAB			246.00				SANDSTONE red/brown, moderate silt, poorly graded, medium to coarse grained, sub-rounded to sub-angular		
			19.00						
		20	241.00				SILCRETE/SANDSTONE light grey/white, minor sandstone/quartz grains, typically 1-3mm chips, moderately graded, fine to medium grained, sub-angular to angular		0 - 53m: 100mm blank PVC casing, threaded
			22.00						
			238.00				SANDSTONE light grey, 70% smokey quartz grains, moderately graded, medium to coarse grained, sub-rounded to sub-angular		
		30							6 - 47m: Graded gravel pack (3.2 - 6.4mm)
		40							
			46.00						
RMF			214.00				CLAY/SILCRETE purple/pink clay, with sand and silcrete (40%) which decreases with depth		47 - 49m: Bentonite seal
	11/06/22, 47.43 mbtoc (stickup TBC)		50.00						
		50	210.00				CLAY pink clay, with minor inclusions of sand and silcrete (20%)		49 - 59m: Graded gravel pack (3.2 - 6.4mm)
			54.00						
			206.00				MUDSTONE dry pink/white mudstone chips		53 - 59m: 100mm slotted PVC casing (1mm aperture), threaded, with end cap
			58.00						
			202.00				MUDSTONE/SAND red/brown, with fine to medium grained quartz grains (10%) and minor silt		
		60							59 - 63m: Open hole backfilled with gravel (3.2 - 6.4mm)
			63.00						
			197.00				END OF BOREHOLE @ 63.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.53, EC = 1524 uS/cm, T = 25.5°C		
		70							

PRELIMINARY

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GAP gINT FN. F05
RL3

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GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0922

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 368082.0 m E 7708715.0 m N MGA94 51
SURFACE RL: 251.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 216/375 mm HOLE DEPTH: 80.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: TKD DATE: 7/6/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	251.00				SAND red, fine to coarse grained, well graded, sub-rounded to rounded		0 - 6m: 10" steel surface casing, tremie grouted GP cement / bentonite mix (1.44 SG) 0 - 6m: Tremie grouted GP cement / bentonite mix (1.44 SG) above gravel pack
			4.00						
			247.00				SANDSTONE 2-4mm orange sandstone chips, moderately graded, sub-rounded to angular, becoming white from 13m, pink clay from 20-24m		
		10							
		20							0 - 63m: 100mm blank PVC casing, threaded
			24.00						
			227.00				CLAY pink clays, with moderately graded, sub-rounded to rounded sandstone/quartz grains (30%)		
		30	31.00						6 - 55m: Graded gravel pack (3.2 - 6.4mm)
			220.00				SANDSTONE/CLAY white/clear quartz grains, moderately graded, sub-rounded to rounded, with pink/white clays (30%)		
		40	42.00						
RMF			209.00				SANDSTONE white/clear, 2-3mm medium quartz grains, poorly graded, sub-rounded to rounded		
		50							
	56.45 mbgl , 14/06/22								55 - 57m: Bentonite seal
		60							57 - 69m: Graded gravel pack (3.2 - 6.4mm)
			66.00						
			185.00				CLAY/SILCRETE/SANDSTONE yellow/white clay with inclusions of silcrete and sandstone (40%), clay becoming pink with depth, silcrete and sandstone reducing with depth to 20%		63 - 69m: 100mm slotted PVC casing (1mm aperture), threaded, with end cap
		70	70.00						
			181.00				CLAY pink hematitic clay, becoming yellow with depth (goethite), minor silcrete/sandstone inclusions (5-10%)		69 - 80m: Open hole backfilled with gravel (3.2 - 6.4mm)
			80.00						
		80	171.00				END OF BOREHOLE @ 80.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.81, EC = 2169 uS/cm, T = 25.0°C		
		90							

PRELIMINARY

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GAP gINT FN. F05
RL3

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 21/06/2022 11:30 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0923

SHEET: 1 OF 1

CLIENT: Rio Tino Winu
PROJECT: Winu Project
LOCATION: East Pilbara
JOB NO: 20136763

COORDS: 366061.0 m E 7709573.0 m N MGA94 51
SURFACE RL: 251.00 m DATUM: AHD
INCLINATION: -90°
HOLE DIA: 251/375 mm HOLE DEPTH: 60.00 m

DRILL RIG: Versadrill Advantage V2000NG
CONTRACTOR: Acquadrill
LOGGED: BR DATE: 13/6/22
CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	251.00				SAND fine to medium grained, red/brown, particle size reducing with depth, poorly graded, sub-rounded to rounded		0 - 6m: 10" steel surface casing, tremie grouted GP cement / bentonite mix (1.42 SG) 0 - 6m: Tremie grouted GP cement / bentonite mix (1.42 SG) above gravel pack
		10	12.00 239.00				SAND/SILT orange/brown, increasing silt content with depth to 20m (from 15-30%), some hematitic/goethitic pisoliths observed (2%, 2-4mm)		
		20	20.00 231.00				SANDSTONE fine to medium, orange/brown, moderately graded, sub-rounded to angular, some large sandstone chips present 3-8mm, some hematitic/goethitic pisolith chunks present (5%, 2-7mm)		0 - 49m: 100mm blank PVC casing, threaded
RMF		30	25.00 226.00				SANDSTONE fine to medium, interbedded sandstone and silcrete, moderately graded, sub-rounded to sub-angular, generally white with mottled purple/red/brown, some large hematitic/goethitic oxidised chips present between 30-32m		6 - 41m: Graded gravel pack (1.6 - 3.2mm) 41 - 43m: Bentonite seal
		40	45.00 206.00				SANDSTONE sandstone (clear/smokey quartz) with minor silcrete chips, well graded, sub-rounded to rounded		43 - 55m: Graded gravel pack (1.6 - 3.2mm)
	49.44 mbgl , 21/06/22	50	54.00 197.00				CLAY/SILCRETE pink/red clay (60%) with chips of silcrete (30%) and minor sandstone (10%), clay content increasing with depth and becoming slightly purple		49 - 55m: 100mm slotted PVC casing (1mm aperture), threaded, with end cap 55 - 60m: Open hole backfilled with gravel (1.6 - 3.2mm)
		60	60.00 191.00				END OF BOREHOLE @ 60.00 m TARGET DEPTH STANDPIPE INSTALLED Development Water Quality: pH = 8.48, EC = 1608 uS/cm, T = 27.0°C		
		70							

PRELIMINARY

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 21/06/2022 11:30 10.02.00.04 Datgel Tools

GOLDER
MEMBER OF WSP

PRELIMINARY REPORT OF BOREHOLE: WINU0924

SHEET: 1 OF 1

CLIENT:	Rio Tino Winu	COORDS: 368236.0 m E 7707051.0 m N MGA94 51	DRILL RIG: Versadrill Advantage V2000NG
PROJECT:	Winu Project	SURFACE RL: 259.00 m DATUM: AHD	CONTRACTOR: Acquadrill
LOCATION:	East Pilbara	INCLINATION: -90°	LOGGED: BR DATE: 18/6/22
JOB NO:	20136763	HOLE DIA: 216/375 mm HOLE DEPTH: 72.00 m	CHECKED: BR DATE: 22/6/22

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
RMF		0	259.00				SAND fine to coarse grained, red/brown sand, aeolian, moderate silt conent (20%)		0 - 6m: 10" steel surface casing, tremie grouted GP cement / bentonite mix (1.44 SG)
			2.00						
			257.00				SAND as above, with 2-3mm goethitic clay nodules (15%), 2mm calcrete chips (15%), and silt (10%)		0 - 6m: Tremie grouted GP cement/bentonite mix (1.42 SG) above gravel pack
			5.00						
			254.00				SILCRETE fine to medium grained, white/red/pink chips of silcrete, typically 2-7mm, strong hematitic oxidation between 5-10m with some pisoliths, oxidation reducing significantly with depth		
		10							
		20							0 - 53m: 100mm blank PVC casing, threaded
			22.00						
			237.00				SILCRETE/CLAY fine to medium grained, white silcrete chips, 2-7mm chips, with pink clay/silt (30%), clay content increasing to 60% with depth		
			26.00						
			233.00				CLAY pink clay (70%), with inclusions of silcrete and quartz grains (30%), becoming dark pink with depth		
		30							6 - 45m: Graded gravel pack (3.2 - 6.4mm)
			35.00						
			224.00				CLAY as above, with very fine sandstone/siltstone grains (gritty clay), sandstones increasing with depth to 20%		
RMF		40							
			41.00						
			218.00				SANDSTONE sandstone/quartz grains, with some high plasticity clay (15%), white/beige, clay content reducing with depth to 5%		45 - 48m: Bentonite seal
		50							48 - 65m: Graded gravel pack (3.2 - 6.4mm)
		60							53 - 65m: 100mm slotted PVC casing (1mm aperture), threaded, with end cap
			64.50						
			194.50				SILTSTONE gritty siltstone (very fine sand/coarse silt), comptent chips, friable, with minor clays, mottled white and purple, yellow from 67-69m		
			69.00						65 - 72m: Open hole backfilled with gravel (3.2 - 6.4mm)
		70	190.00				SILTSTONE as above but with 25% sandstone/quartz grains		
			72.00						
			187.00				END OF BOREHOLE @ 72.00 m TARGET DEPTH STANDPIPE INSTALLED Not yet airlifted (as of 21/06/22)		
		80							

PRELIMINARY

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for hydrogeological purposes only, without attempt to assess geotechnical properties or possible contamination. Any reference to geotechnical properties or potential contamination are for information only and do not necessarily indicate the presence or absence of the properties stated.

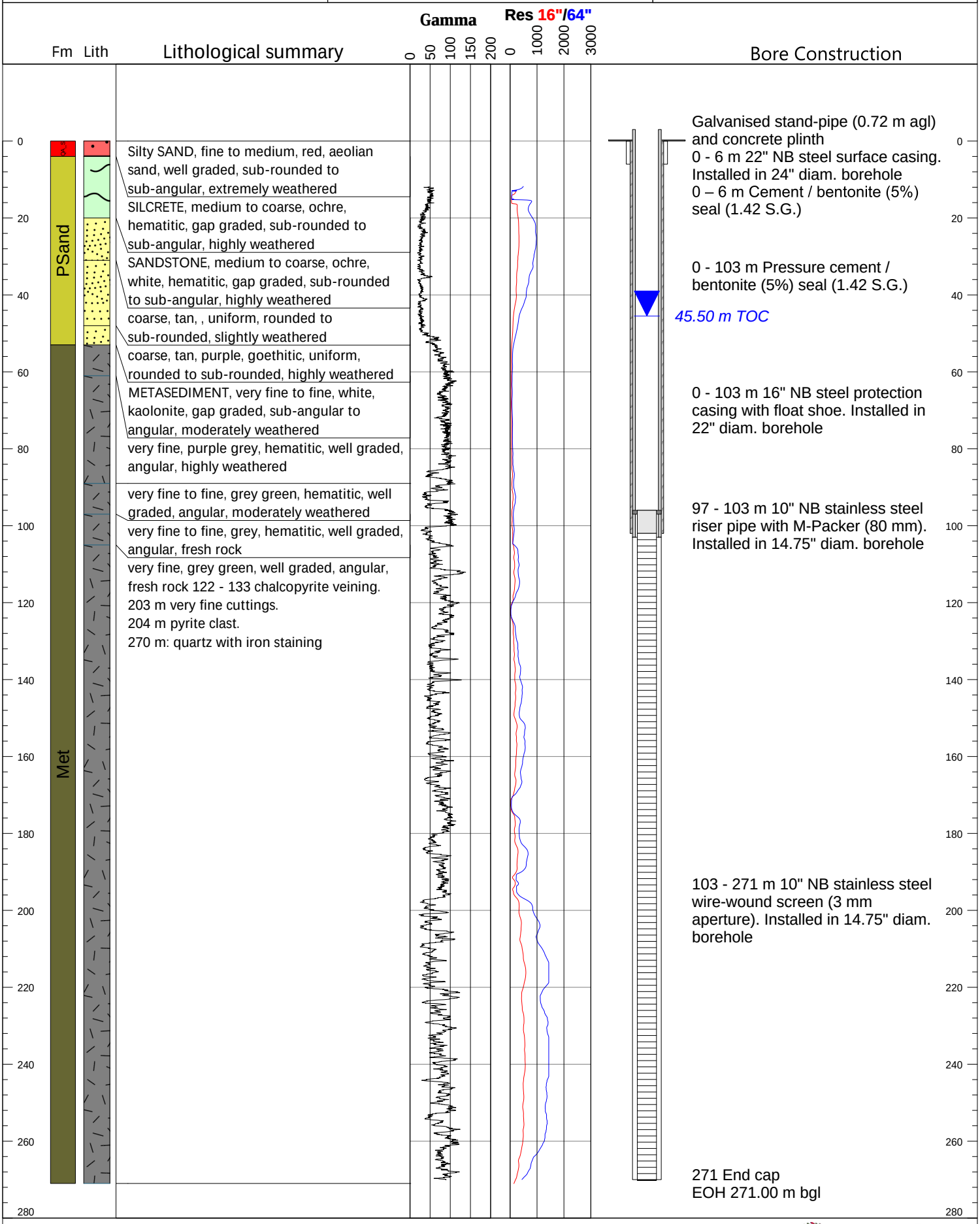
GAP 10.0.6 LIB.GLB Log GAP WELL 20136763 GINT 10.GPJ <<DrawingFile>> 21/06/2022 11:30 10.02.00.04 Datgel Tools

WINU0925 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 371948.24 mE / 7706932.62 mN
Elevation: 249.61 m AHD (RL = TOC)

Construction start date: 19/06/2022
Construction end date: 16/08/2022
Inclination: -90°
Depth drilled: 271 m BGL

Final airlift yield: 4.0 L/s
EC: 1642 µS/cm
pH: 8.8
Temp: 30.0 °C
Static Water Level: 45.50 m TOC



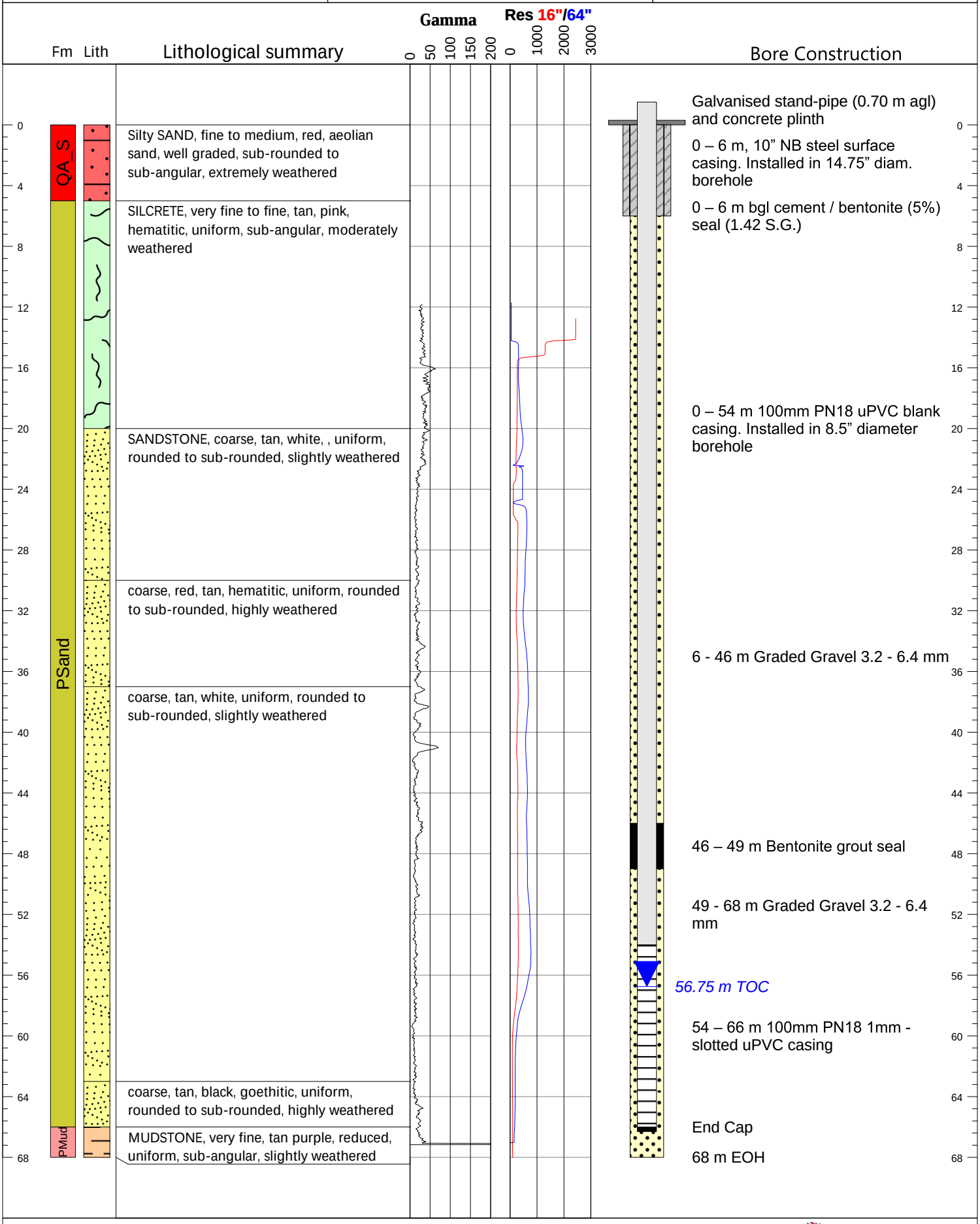
Additional notes:

WINU0926 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 368139.82 mE / 7707778.38 mN
Elevation: 253.97 m AHD (RL = TOC)

Construction start date: 23/06/2022
Construction end date: 27/06/2022
Inclination: -90°
Depth drilled: 68 m BGL

Final airlift yield: 0.2 L/s
EC: 1335 µS/cm
pH: 9.3
Temp: 20.0 °C
Static Water Level: 56.75 m TOC



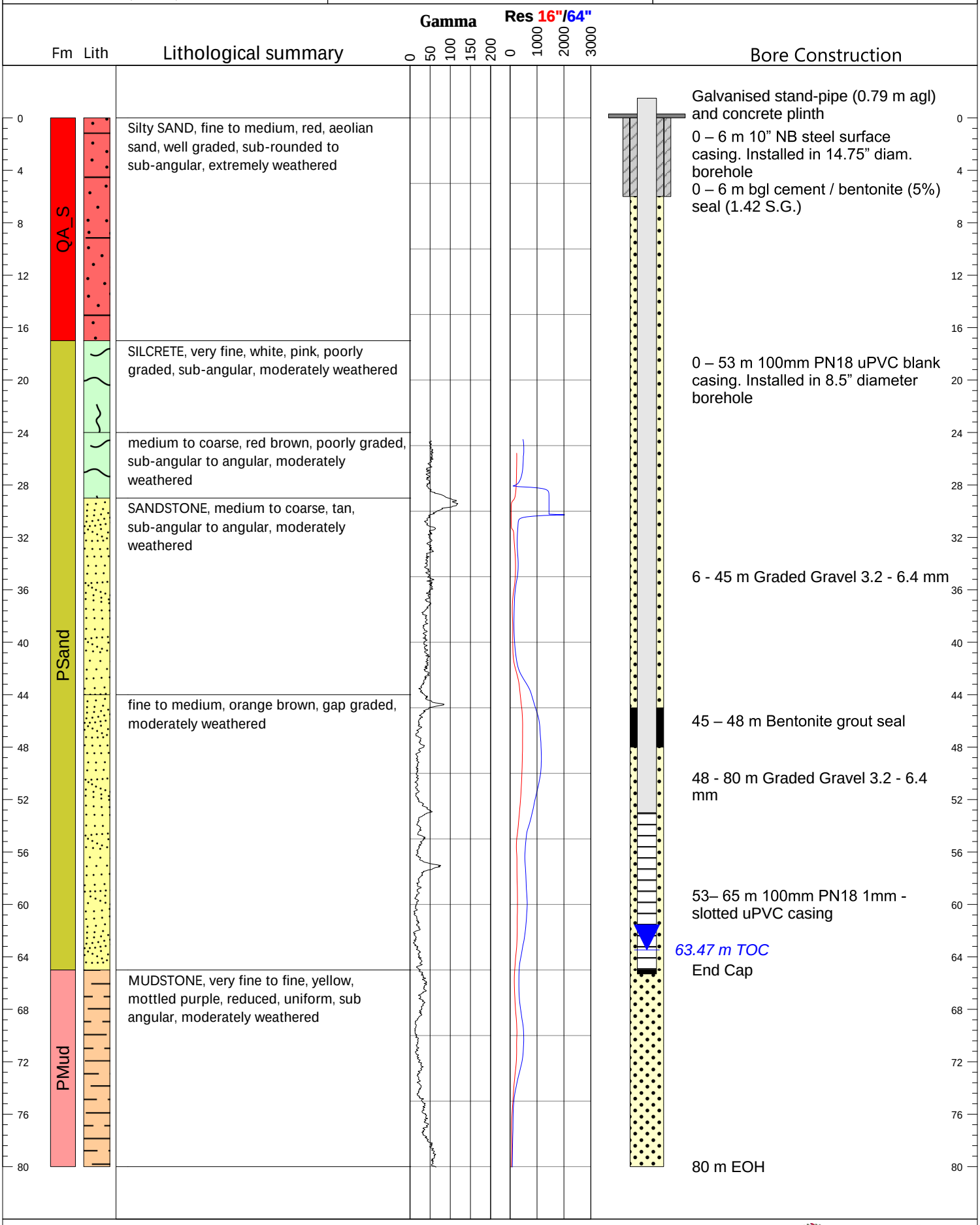
Additional notes:

WINU0927 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 366743.24 mE / 7709287.18 mN
Elevation: 251.71 m AHD (RL = TOC)

Construction start date: 02/07/2022
Construction end date: 27/07/2022
Inclination: -90°
Depth drilled: 80 m BGL

Final airlift yield: 0.1 L/s
EC: 1331 µS/cm
pH: 8
Temp: 28.0 °C
Static Water Level: 63.47 m TOC



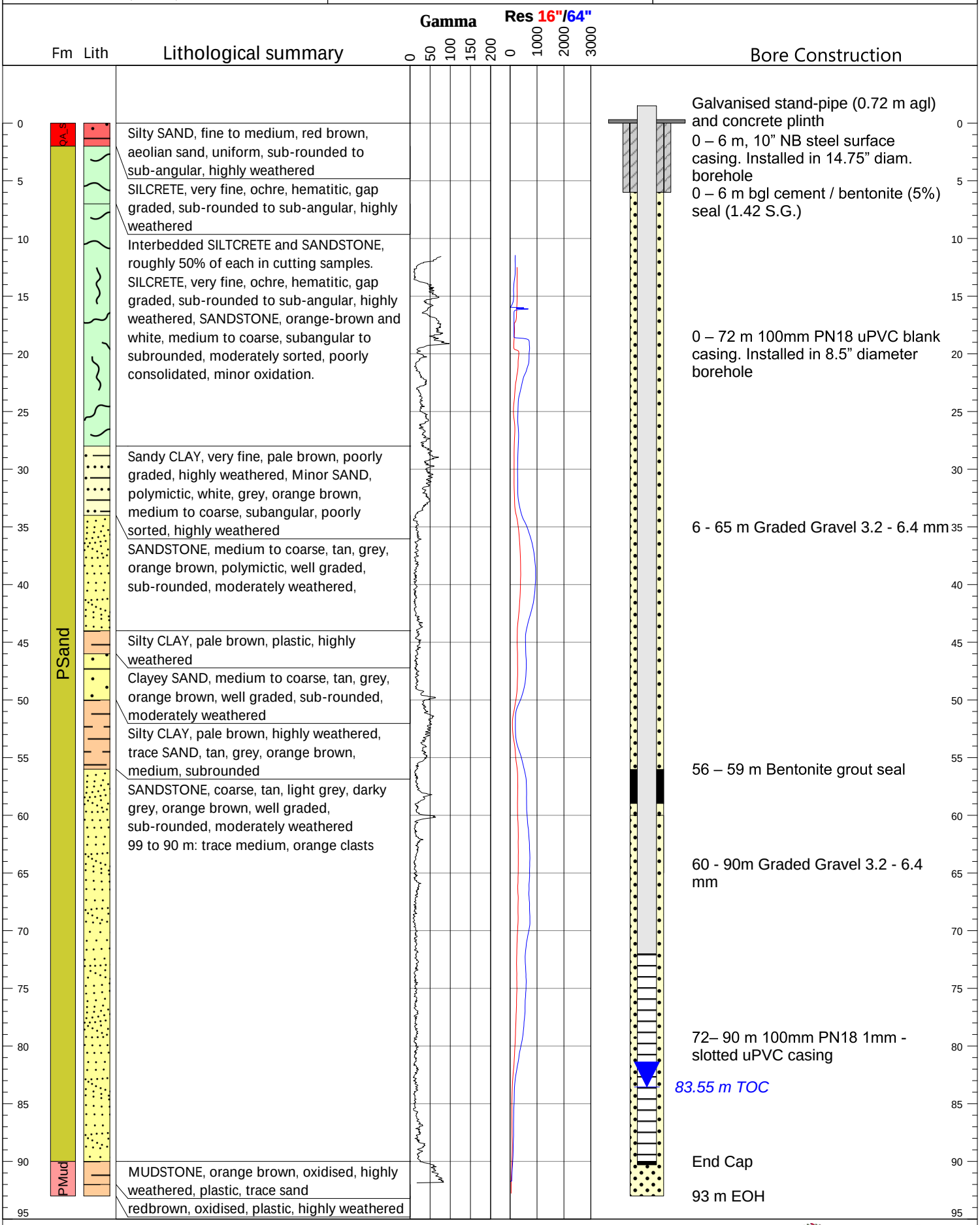
Additional notes:

WINU0928 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 367284.60 mE / 7712998.83 mN
Elevation: 257.06 m AHD (RL = TOC)

Construction start date: 30/07/2022
Construction end date: 06/08/2022
Inclination: -90°
Depth drilled: 93 m BGL

Final airlift yield: 0.0 L/s
EC: 1894 µS/cm
pH: 7.9
Temp: 29.0 °C
Static Water Level: 83.55 m TOC



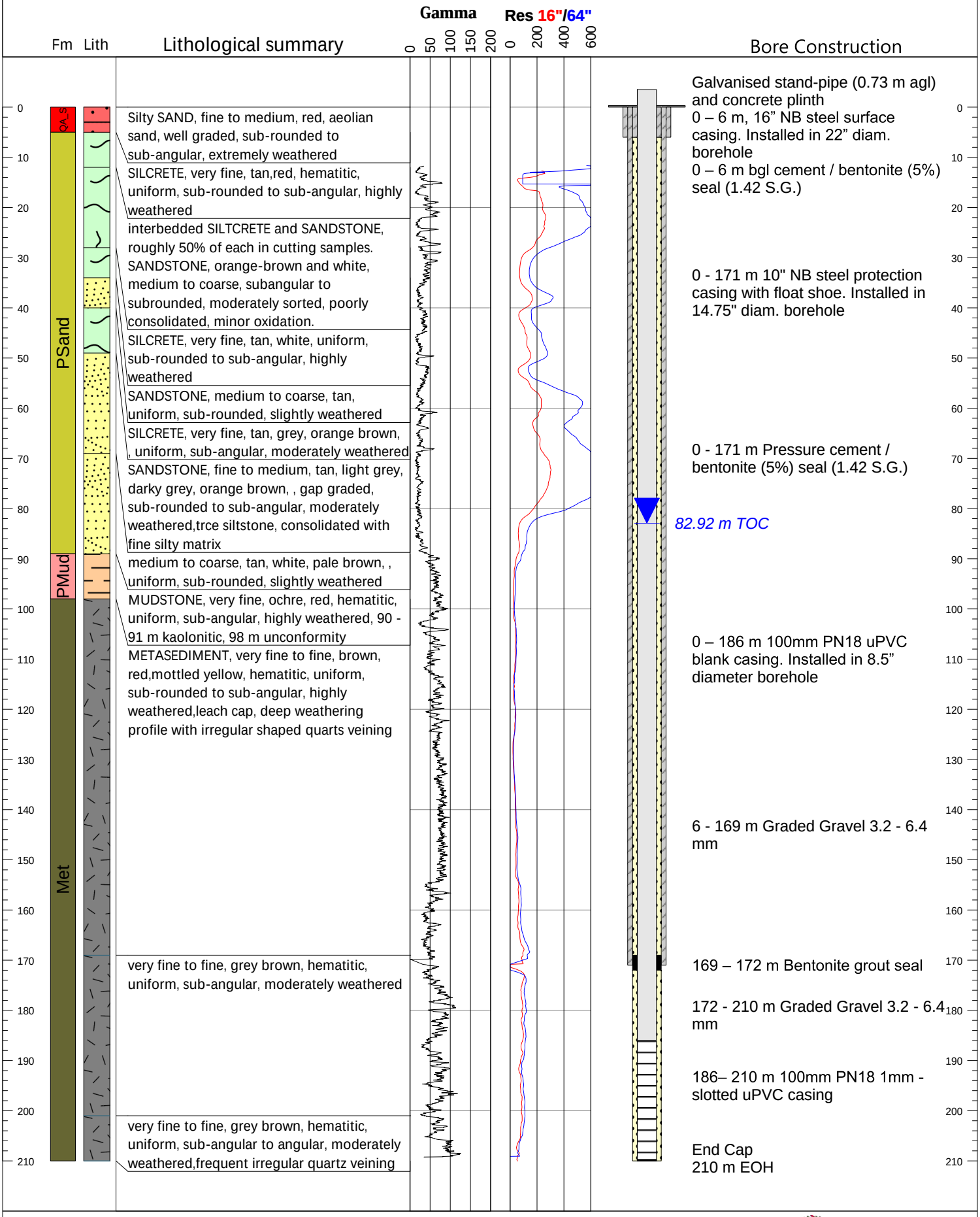
Additional notes:

WINU0929 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 367342.99 mE / 7712981.65 mN
Elevation: 256.79 m AHD (RL = TOC)

Construction start date: 07/08/2022
Construction end date: 15/09/2022
Inclination: -90°
Depth drilled: 210 m BGL

Final airlift yield: 0.1 L/s
EC: 2452 µS/cm
pH: 7.9
Temp: 22.0 °C
Static Water Level: 82.92 m TOC



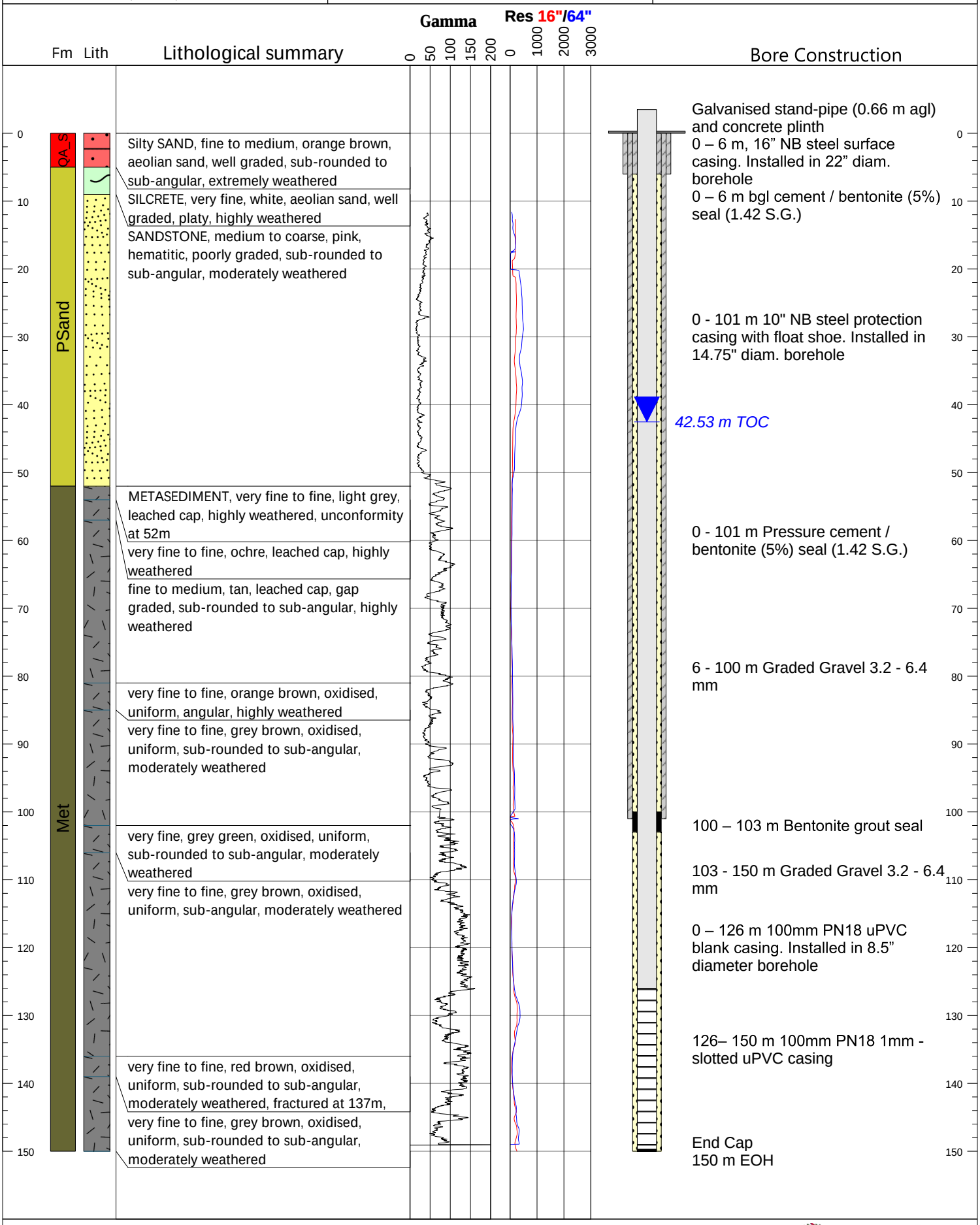
Additional notes:

WINU0930 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 372216.86 mE / 7706544.34 mN
Elevation: 250.29 m AHD (RL = TOC)

Construction start date: 26/08/2022
Construction end date: 13/09/2022
Inclination: -90°
Depth drilled: 150 m BGL

Final airlift yield: 2.0 L/s
EC: 1708 µS/cm
pH: 8.1
Temp: 24.1 °C
Static Water Level: 42.53 m TOC



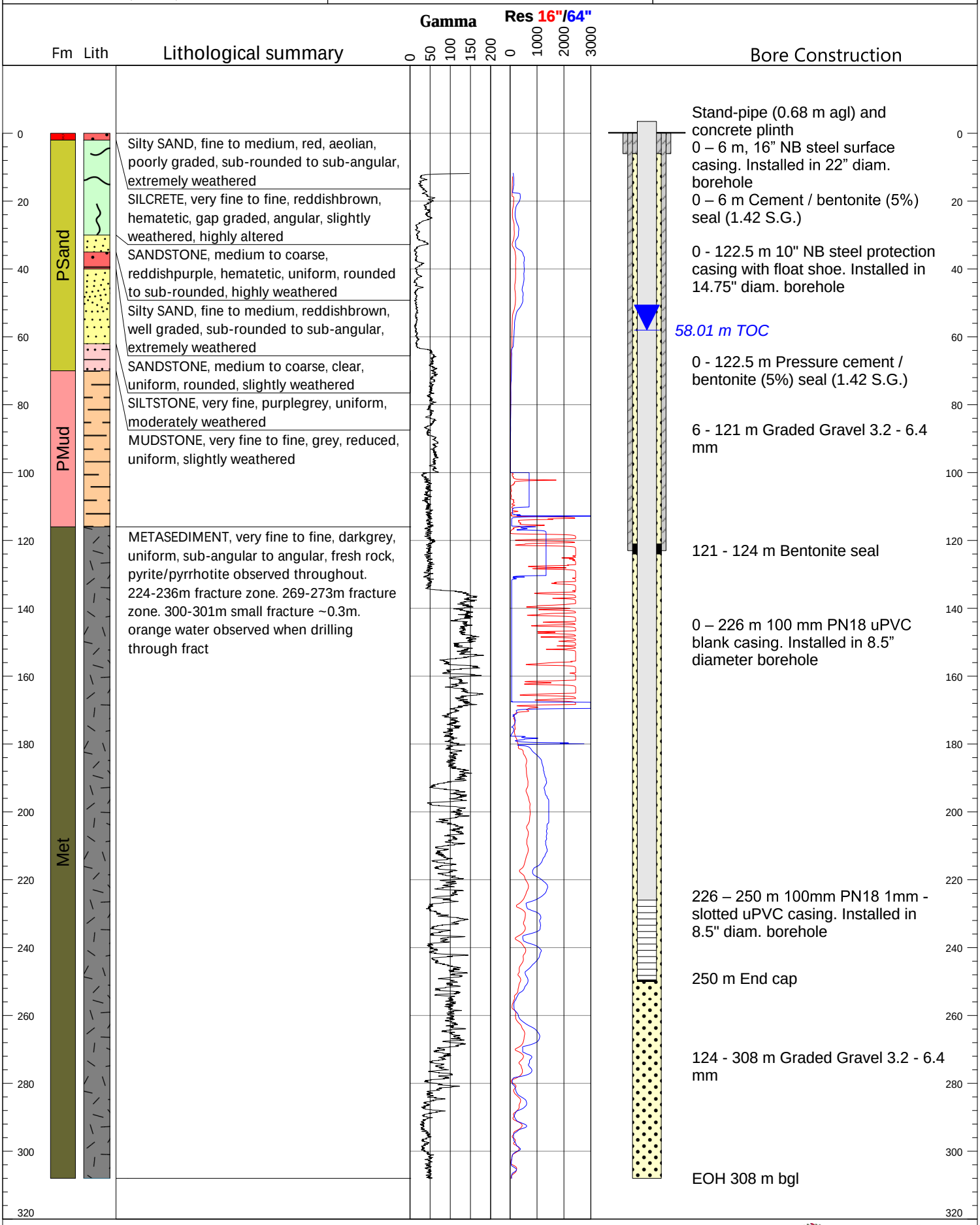
Additional notes:

WINU0932 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 369833.20 mE / 7706256.89 mN
Elevation: 255.08 m AHD (RL = TOC)

Construction start date: 18/08/2023
Construction end date: 22/09/2023
Inclination: -90°
Depth drilled: 308 m BGL

Final airlift yield: 0.5 L/s
EC: 2269 µS/cm
pH: 8.4
Temp: 29.0 °C
Static Water Level: 58.01 m TOC



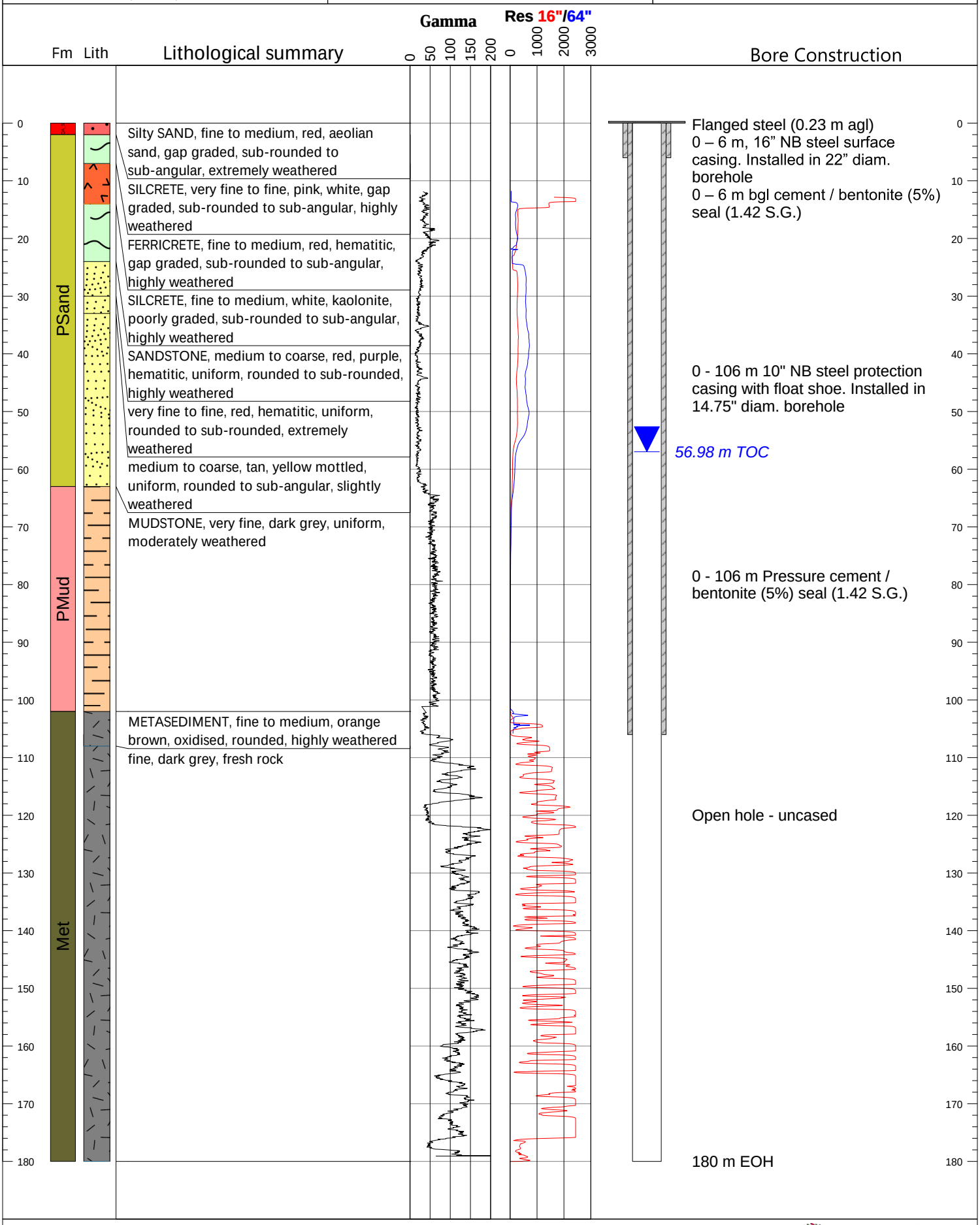
Additional notes:

WINU0933 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 369907.55 mE / 7705333.95 mN
Elevation: 260.77 m AHD (RL = TOC)

Construction start date: 19/09/2022
Construction end date: 11/10/2022
Inclination: -90°
Depth drilled: 180 m BGL

Final airlift yield: 0.0 L/s
EC: µS/cm
pH:
Temp: °C
Static Water Level: 56.98 m TOC



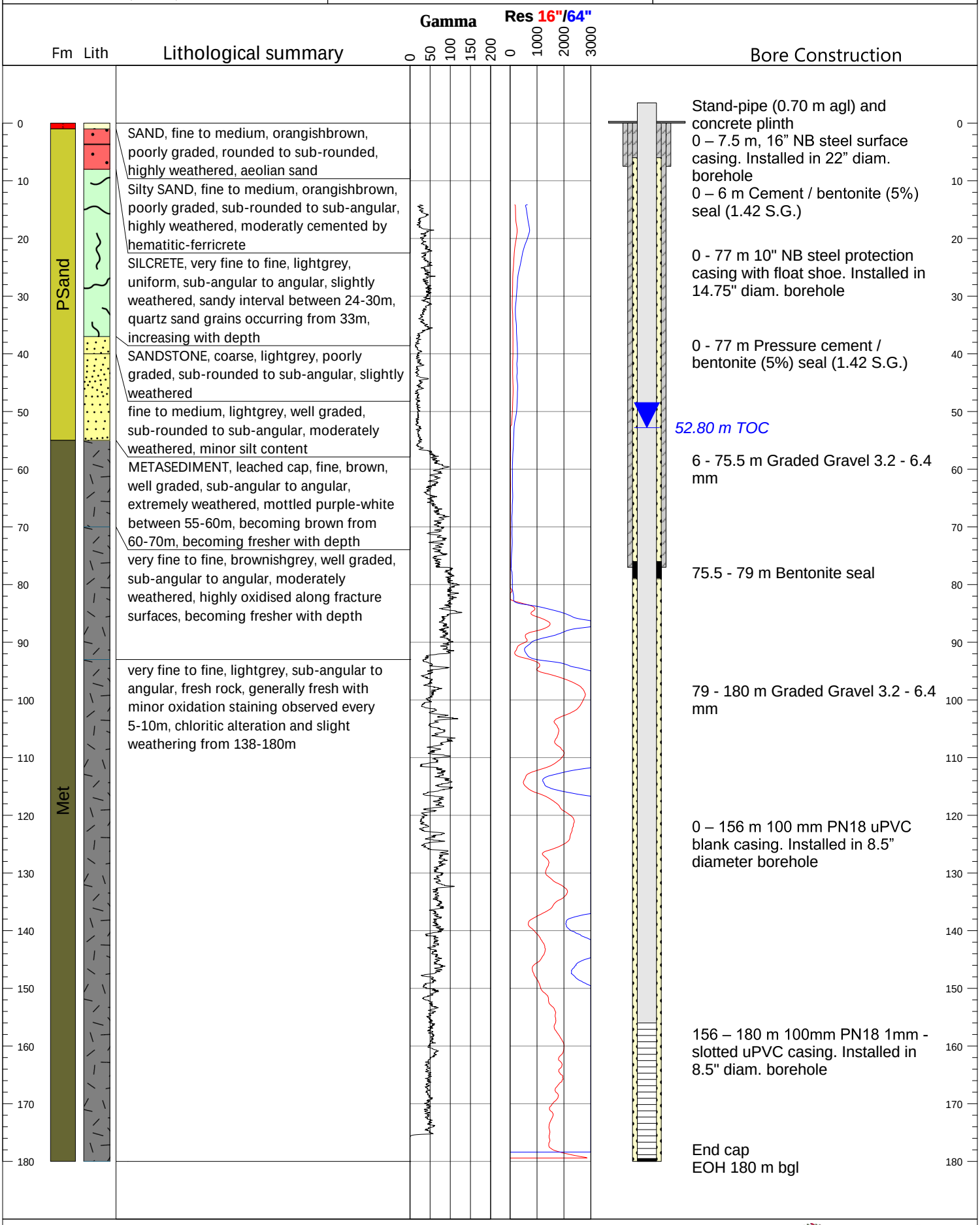
Additional notes:

WINU0934 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 372571.00 mE / 7707518.00 mN
Elevation: 250.00 m AHD (RL = TOC)

Construction start date: 25/08/2023
Construction end date: 23/09/2023
Inclination: -90°
Depth drilled: 180 m BGL

Final airlift yield: 0.2 L/s
EC: 1021 µS/cm
pH: 8.1
Temp: 23.2 °C
Static Water Level: 52.80 m TOC



Additional notes:

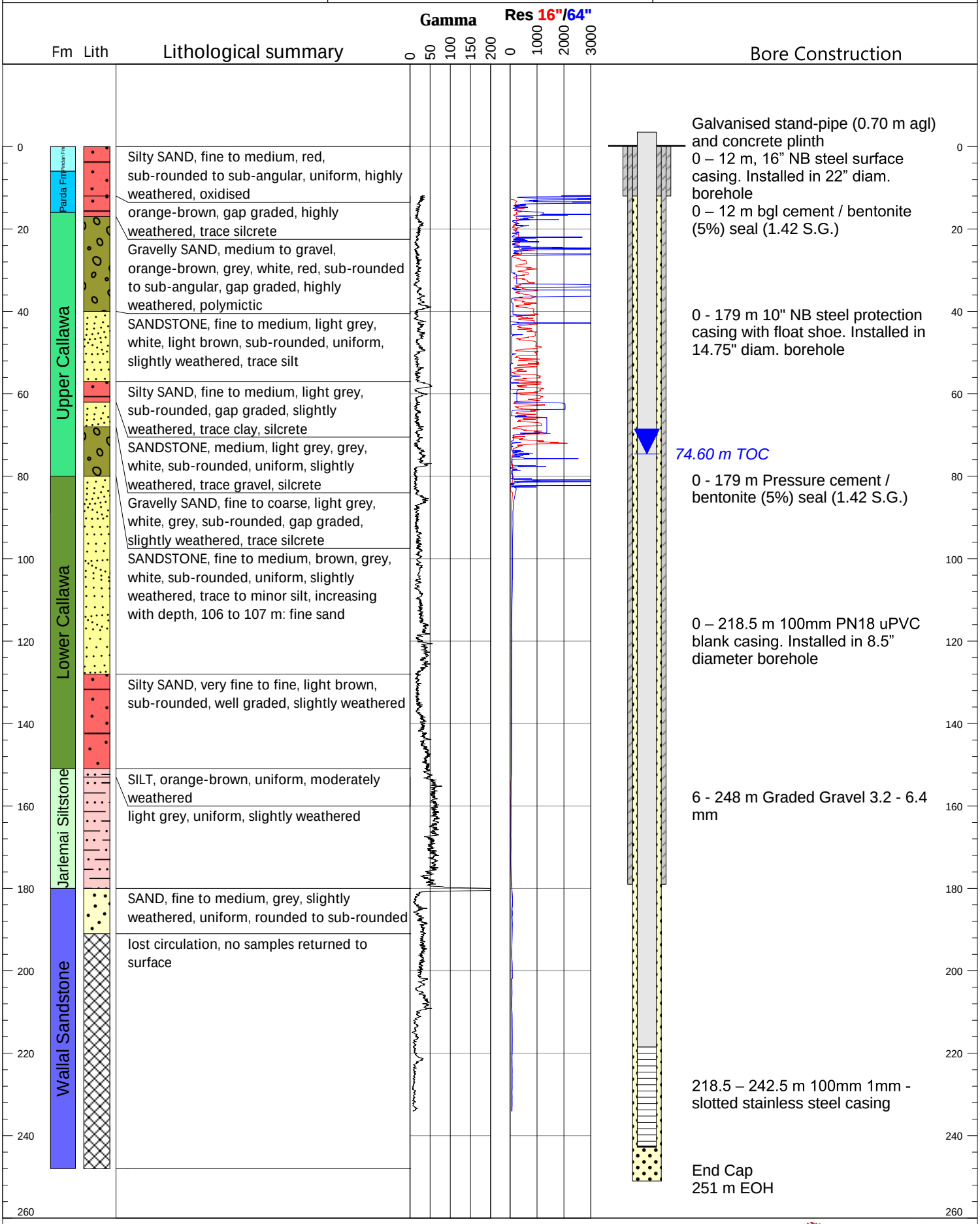
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WINU0935 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 292989.33 mE / 7780575.50 mN
Elevation: 125.83 m AHD (RL = TOC)

Construction start date: 22/10/2022
Construction end date: 27/11/2022
Inclination: -90°
Depth drilled: 248 m BGL

Final airlift yield: 8.0 L/s
EC: 661 µS/cm
pH: 8.3
Temp: 31.4 °C
Static Water Level: 74.60 m TOC



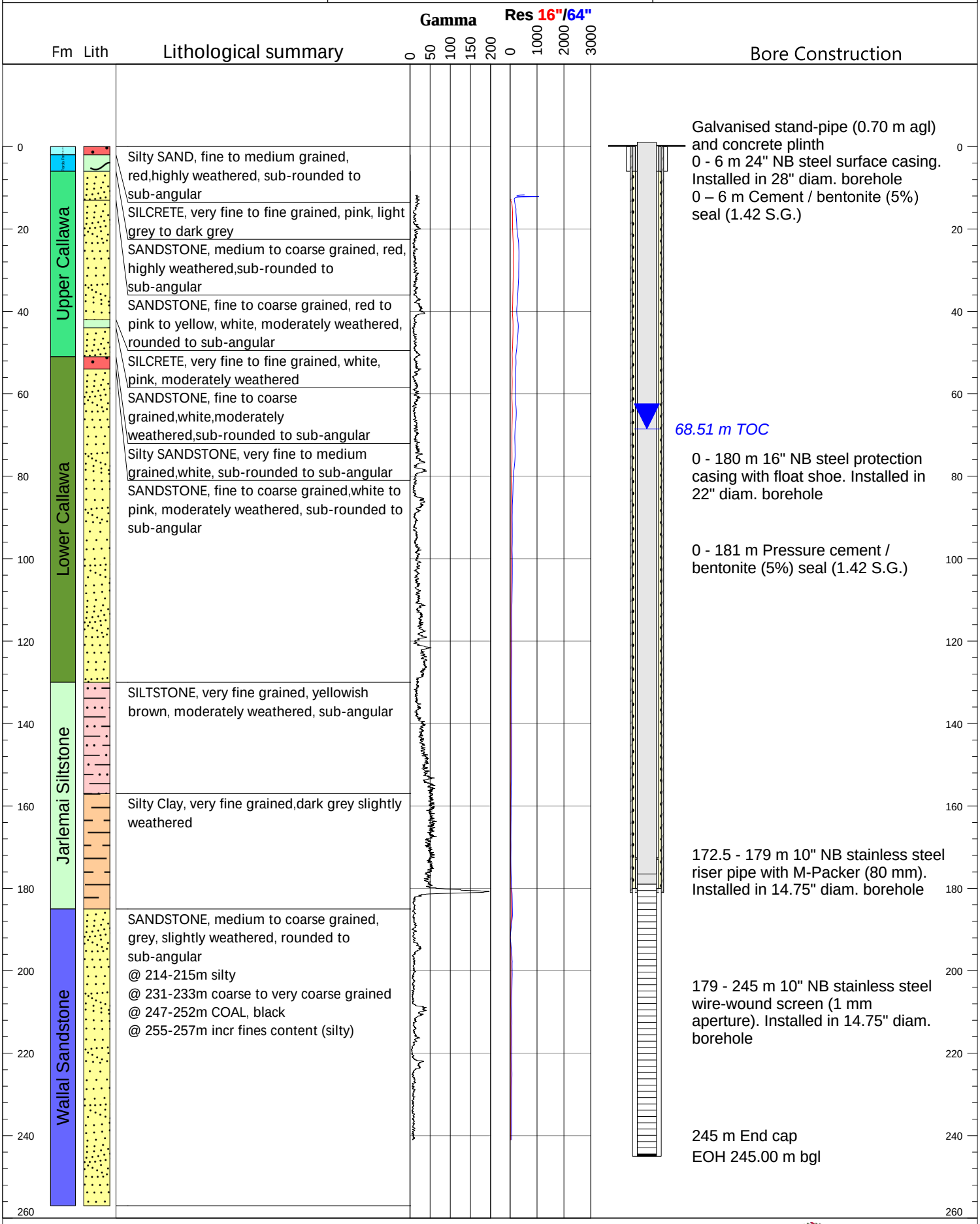
Additional notes:

WINU0936 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 293016.09 mE / 7780646.76 mN
Elevation: 126.67 m AHD (RL = TOC)

Construction start date: 22/10/2022
Construction end date: 30/04/2023
Inclination: -90°
Depth drilled: 257 m BGL

Final airlift yield: 50.0 L/s
EC: 576 µS/cm
pH: 7.8
Temp: 23.3 °C
Static Water Level: 68.51 m TOC



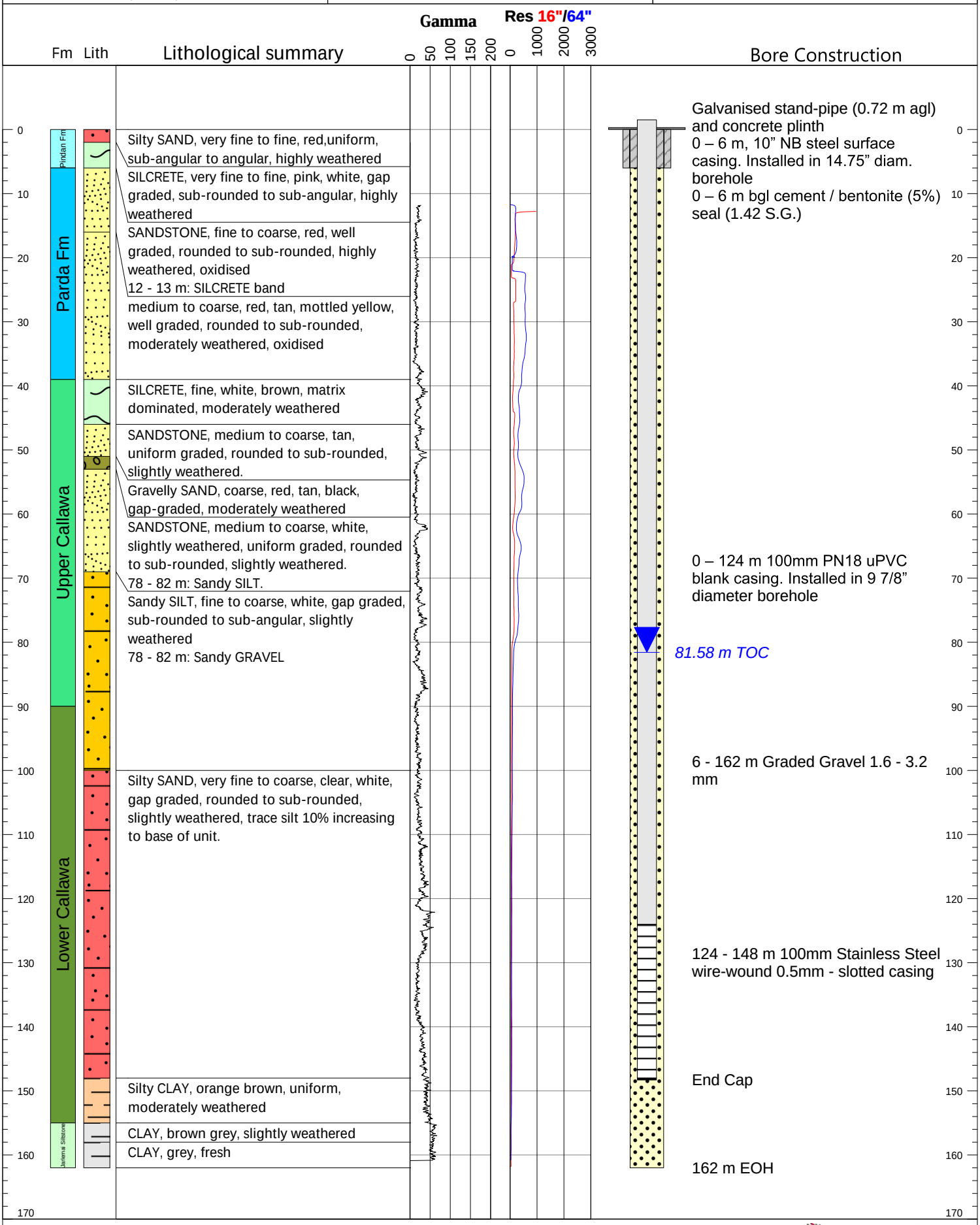
Additional notes:

WINU0937 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 293045.57 mE / 7780719.57 mN
Elevation: 126.82 m AHD (RL = TOC)

Construction start date: 18/10/2022
Construction end date: 11/01/2022
Inclination: -90°
Depth drilled: 162 m BGL

Final airlift yield: 4.0 L/s
EC: 617 µS/cm
pH: 8.4
Temp: 30.4 °C
Static Water Level: 81.58 m TOC



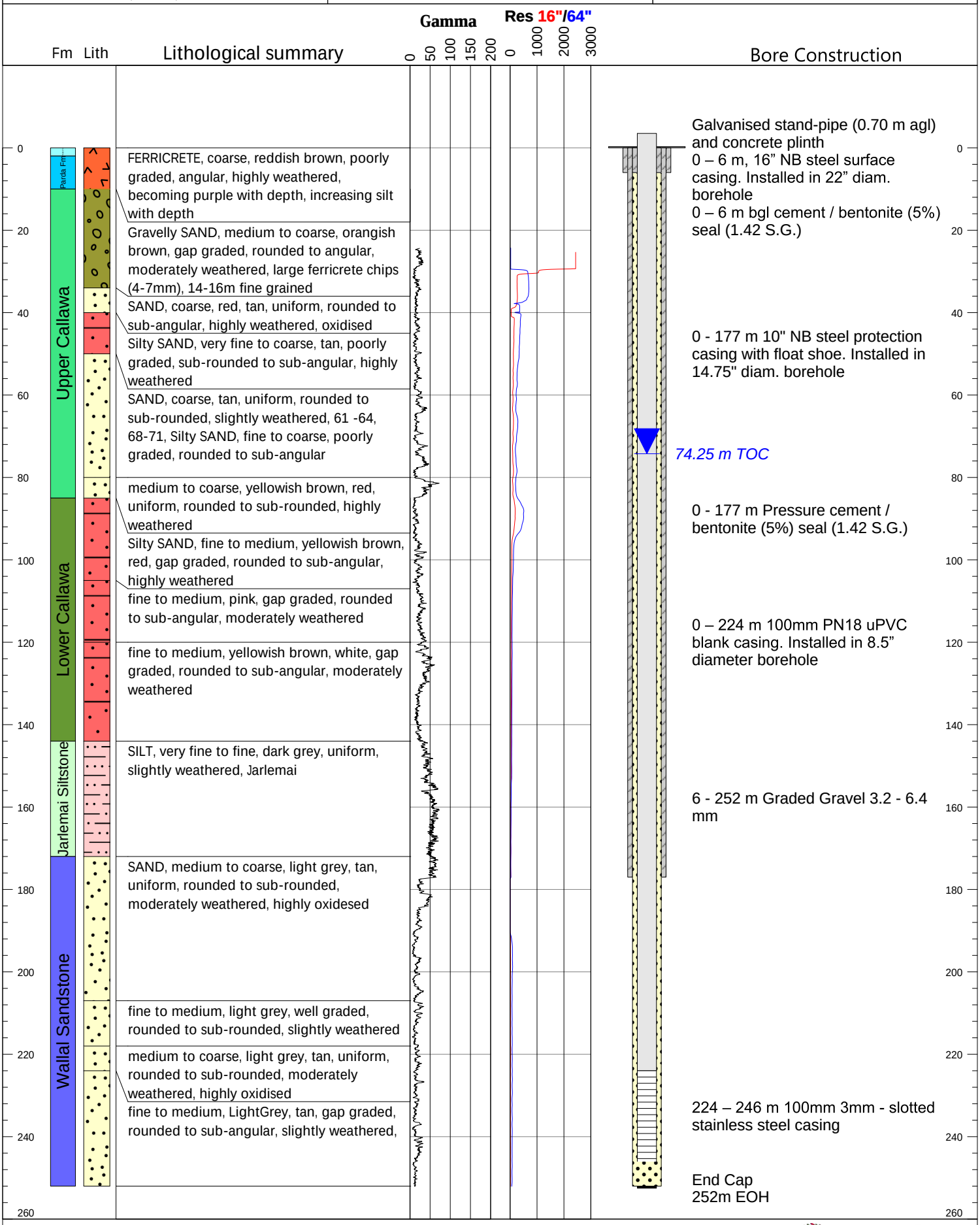
Additional notes:

WINU0938 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 297191.24 mE / 7779091.05 mN
Elevation: 131.89 m AHD (RL = TOC)

Construction start date: 05/11/2022
Construction end date: 14/12/2022
Inclination: -90°
Depth drilled: 252 m BGL

Final airlift yield: 7.0 L/s
EC: 532 µS/cm
pH: 8.1
Temp: 21.3 °C
Static Water Level: 73.13 m TOC



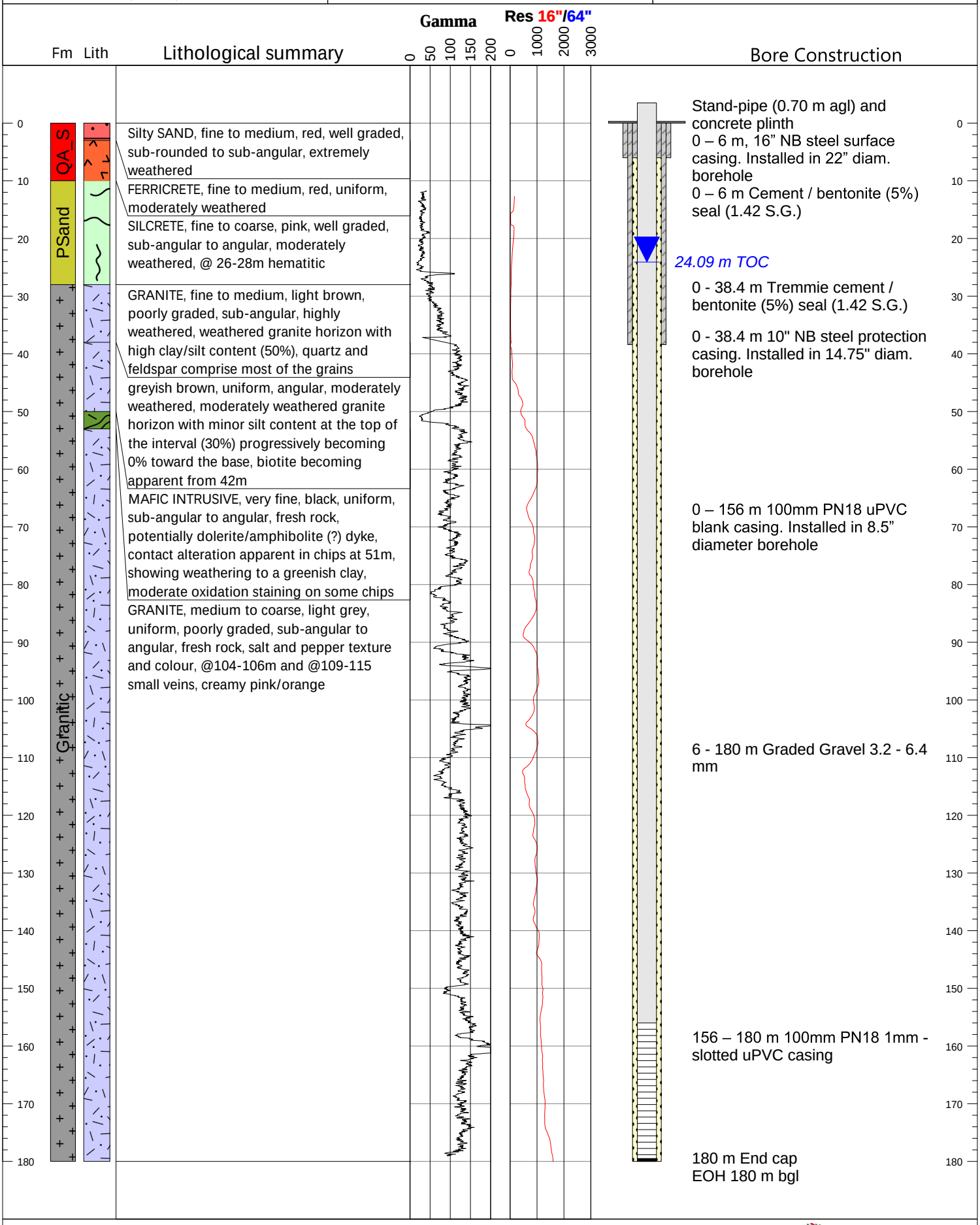
Additional notes:

WINU0940 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 397033.72 mE / 7695450.79 mN
Elevation: 262.05 m AHD (RL = TOC)

Construction start date: 20/03/2023
Construction end date: 13/05/2023
Inclination: -90°
Depth drilled: 180 m BGL

Final airlift yield: 2.0 L/s
EC: 1254 µS/cm
pH: 8
Temp: 20.6 °C
Static Water Level: 24.09 m TOC



Additional notes:

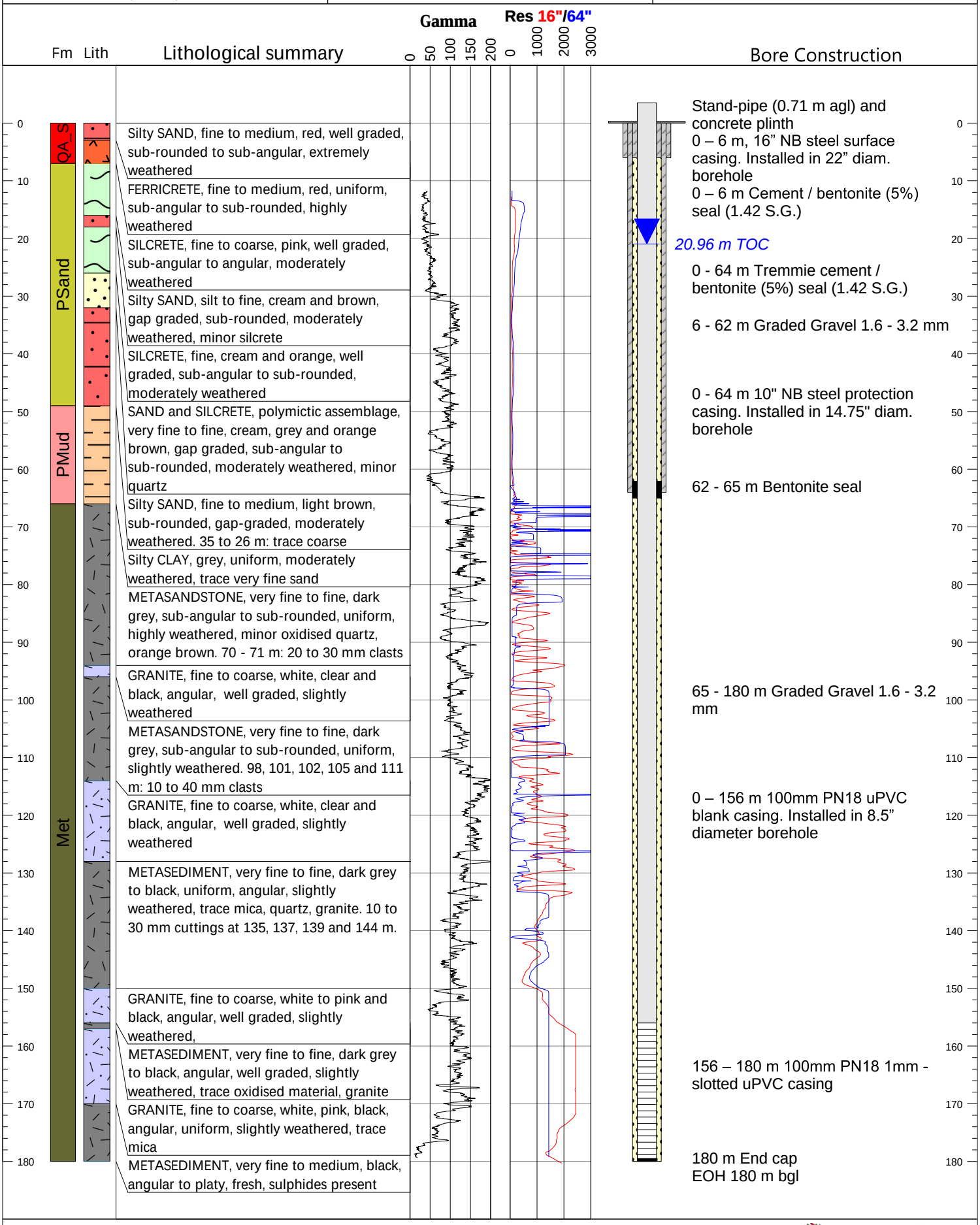
worley consulting

WINU0941 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 397549.76 mE / 7695463.72 mN
Elevation: 259.02 m AHD (RL = TOC)

Construction start date: 16/05/2023
Construction end date: 24/06/2023
Inclination: -90°
Depth drilled: 180 m BGL

Final airlift yield: 0.1 L/s
EC: 674 µS/cm
pH: 8.3
Temp: 27.7 °C
Static Water Level: 20.96 m TOC



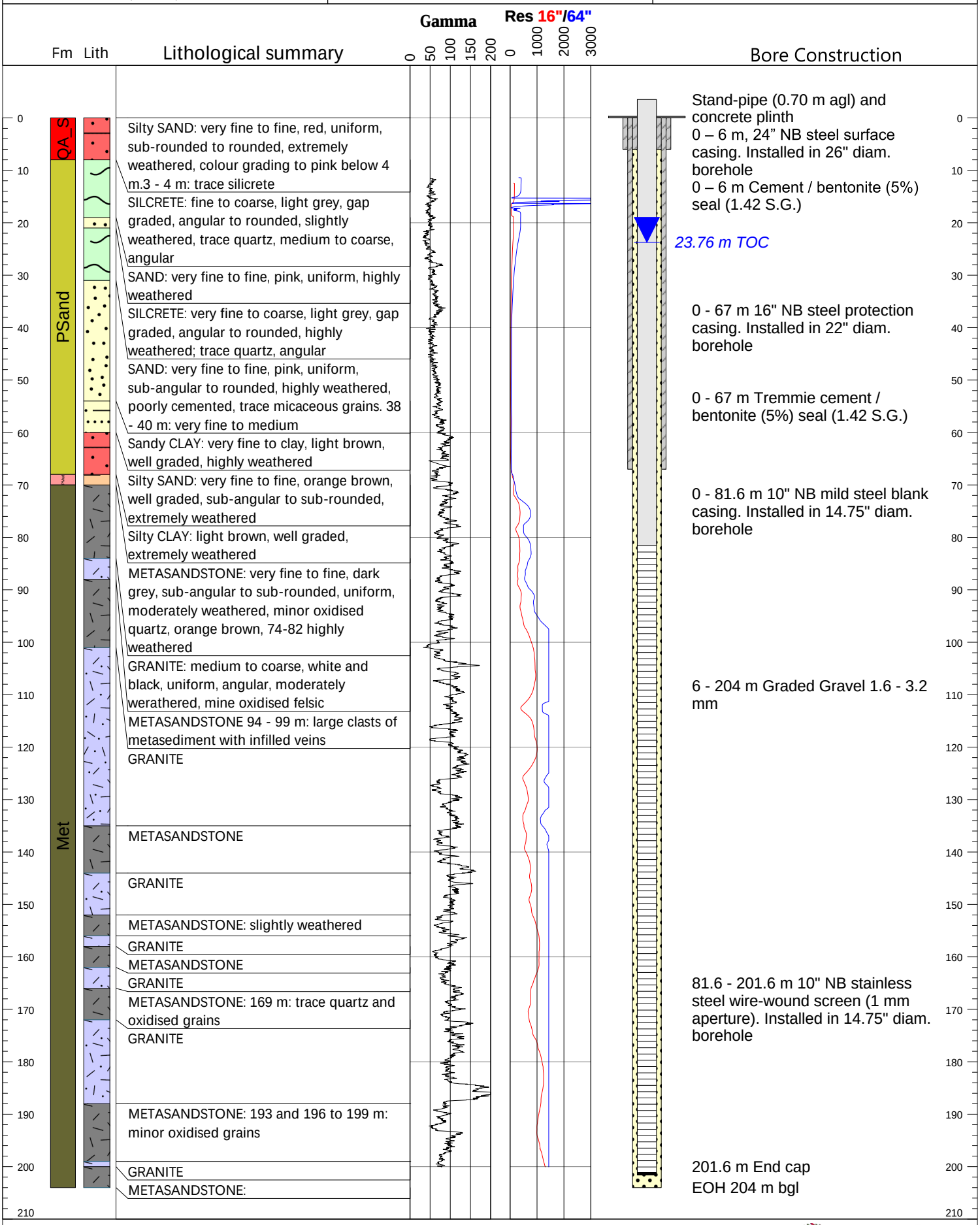
Additional notes:

WINU0942 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 397140.09 mE / 7696127.52 mN
Elevation: 261.35 m AHD (RL = TOC)

Construction start date: 13/05/2023
Construction end date: 24/06/2023
Inclination: -90°
Depth drilled: 204 m BGL

Final airlift yield: 5.0 L/s
EC: 814 µS/cm
pH: 8.2
Temp: 31.1 °C
Static Water Level: 24.03 m TOC



Additional notes:

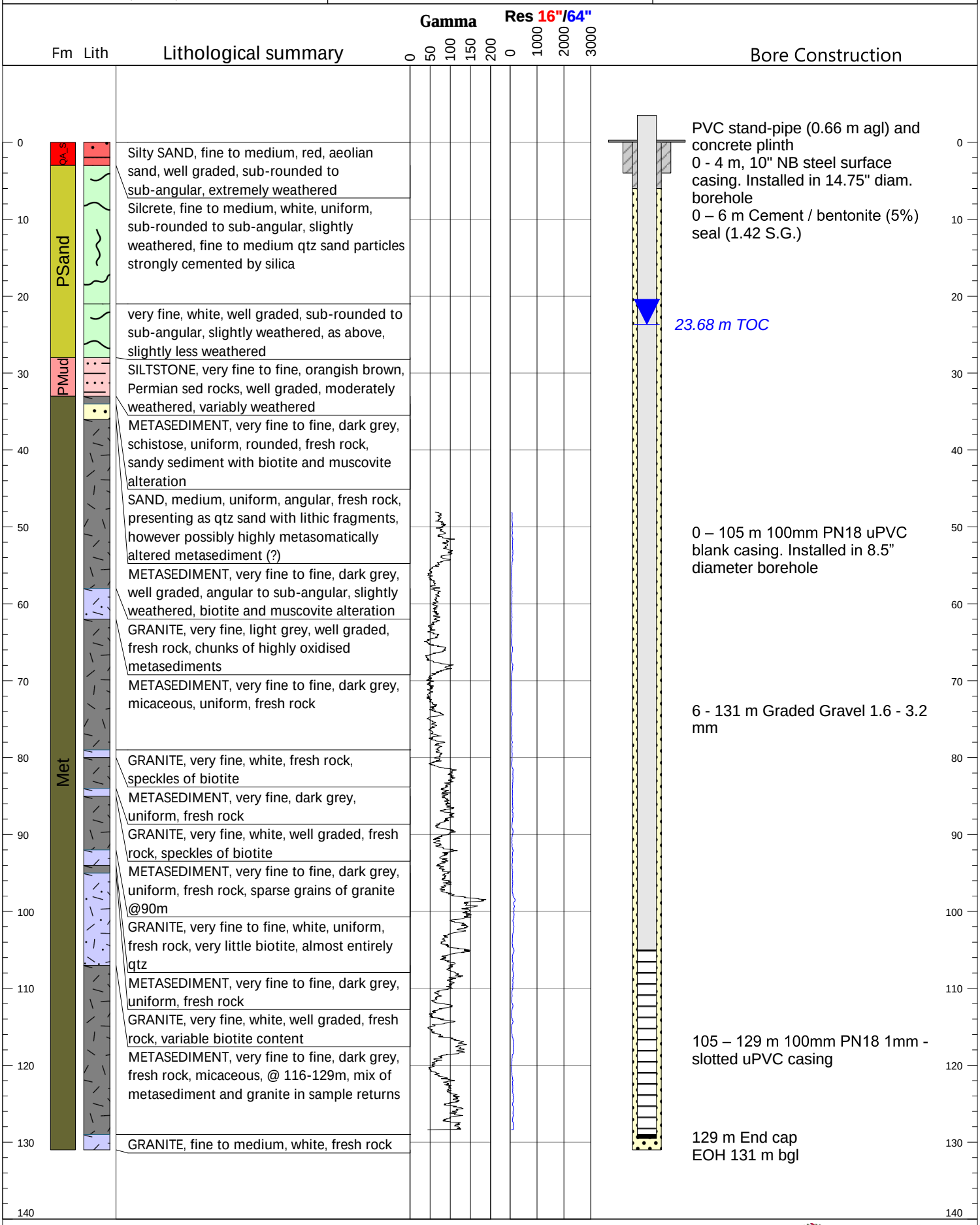
worley consulting

WINU0943 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 397148.59 mE / 7696059.79 mN
Elevation: 261.32 m AHD (RL = TOC)

Construction start date: 21/02/2023
Construction end date: 02/07/2023
Inclination: -90°
Depth drilled: 131 m BGL

Final airlift yield: 1.3 L/s
EC: 899 µS/cm
pH: 8.1
Temp: 30.8 °C
Static Water Level: 23.68 m TOC



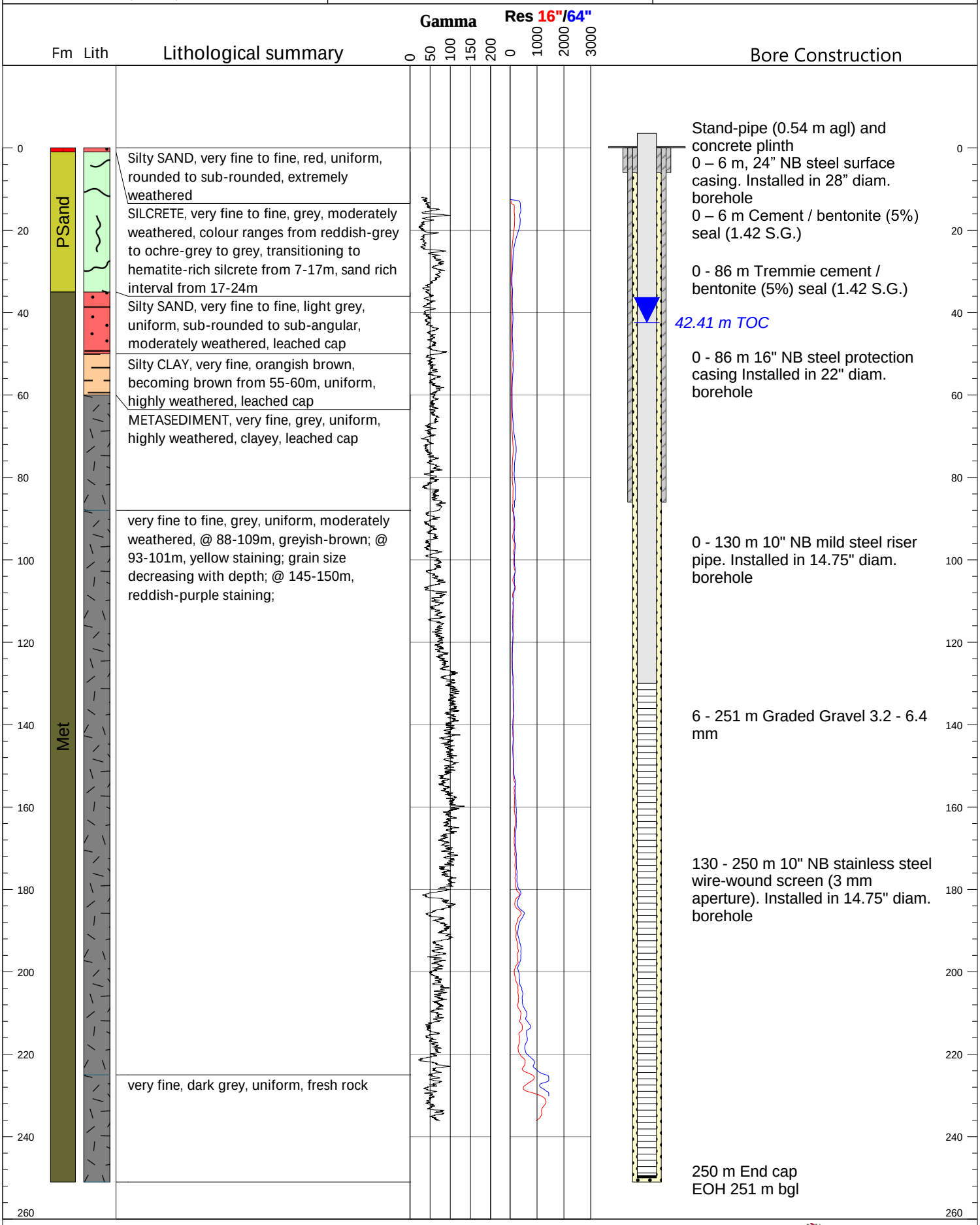
Additional notes:

WINU0944 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 381664.00 mE / 7690790.05 mN
Elevation: 292.07 m AHD (RL = TOC)

Construction start date: 15/05/2023
Construction end date: 19/07/2023
Inclination: -90°
Depth drilled: 251 m BGL

Final airlift yield: 8.0 L/s
EC: 322 µS/cm
pH: 7.9
Temp: 24.2 °C
Static Water Level: 42.41 m TOC



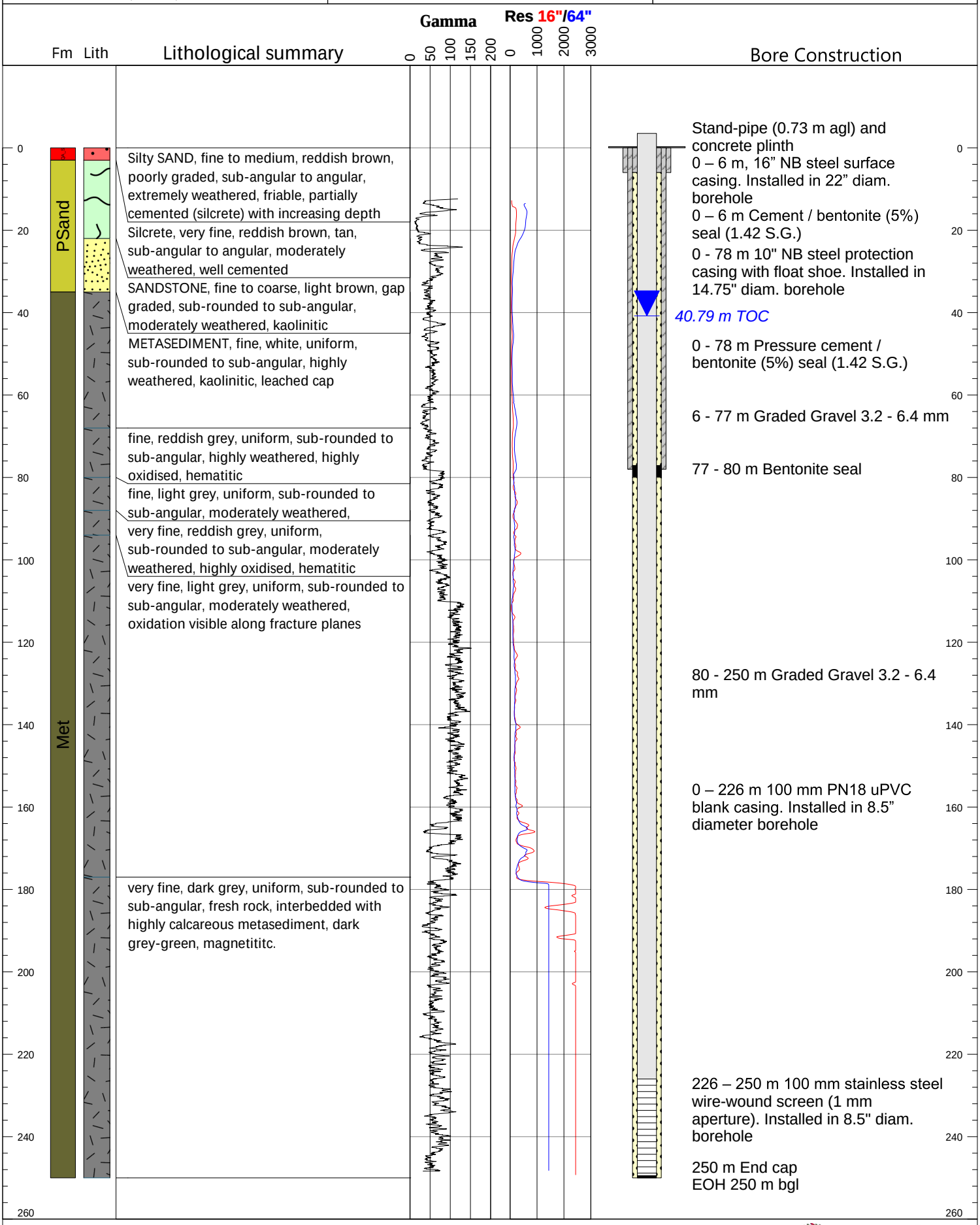
Additional notes:

WINU0945 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 381620.01 mE / 7690844.88 mN
Elevation: 292.38 m AHD (RL = TOC)

Construction start date: 23/07/2023
Construction end date: 15/08/2023
Inclination: -90°
Depth drilled: 250 m BGL

Final airlift yield: 1.5 L/s
EC: 321 µS/cm
pH: 8.3
Temp: °C
Static Water Level: 40.79 m TOC



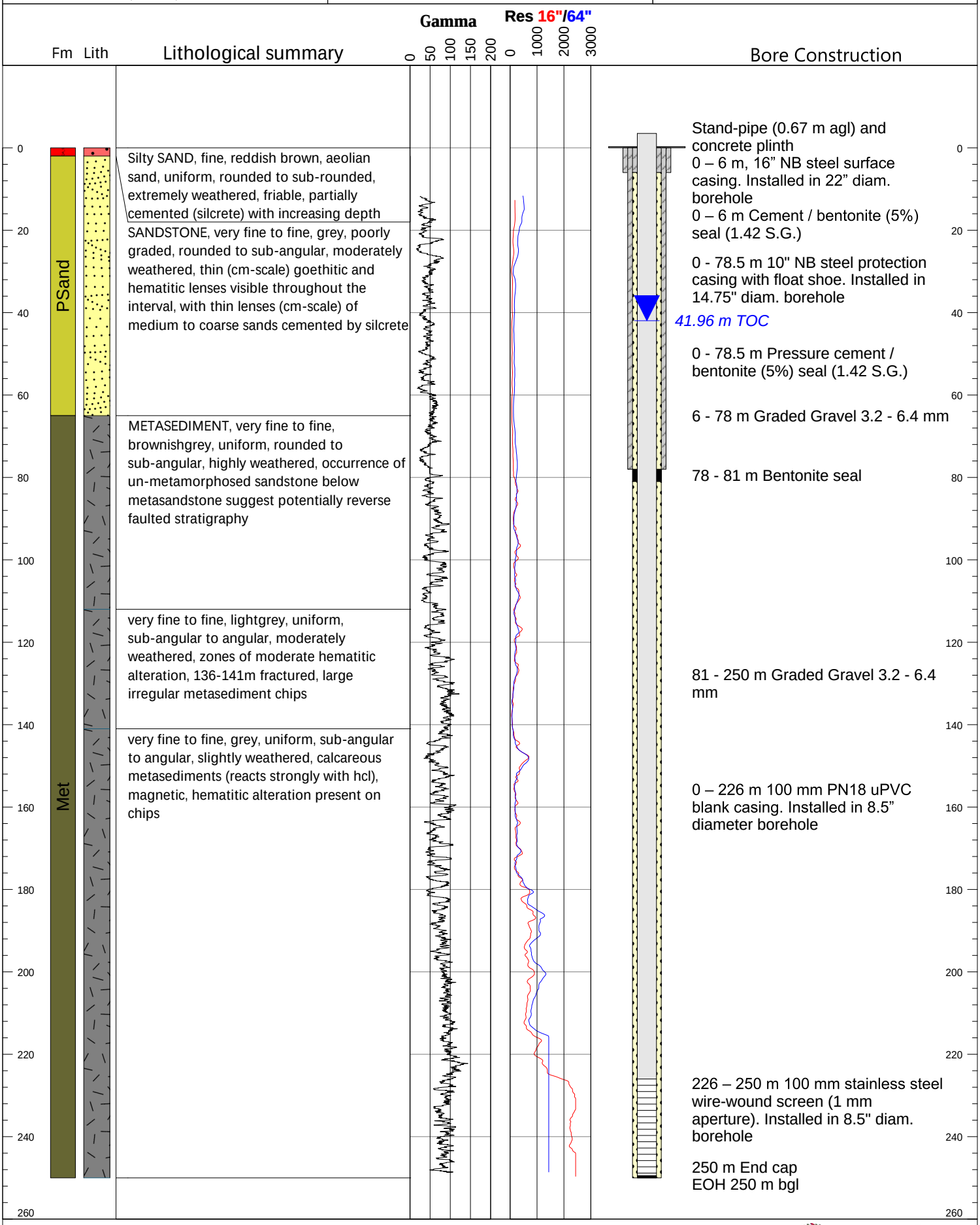
Additional notes:

WINU0946 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 381977.73 mE / 7690374.92 mN
Elevation: 293.21 m AHD (RL = TOC)

Construction start date: 08/07/2023
Construction end date: 05/08/2023
Inclination: -90°
Depth drilled: 250 m BGL

Final airlift yield: 4.0 L/s
EC: 694 µS/cm
pH: 8.3
Temp: °C
Static Water Level: 41.96 m TOC



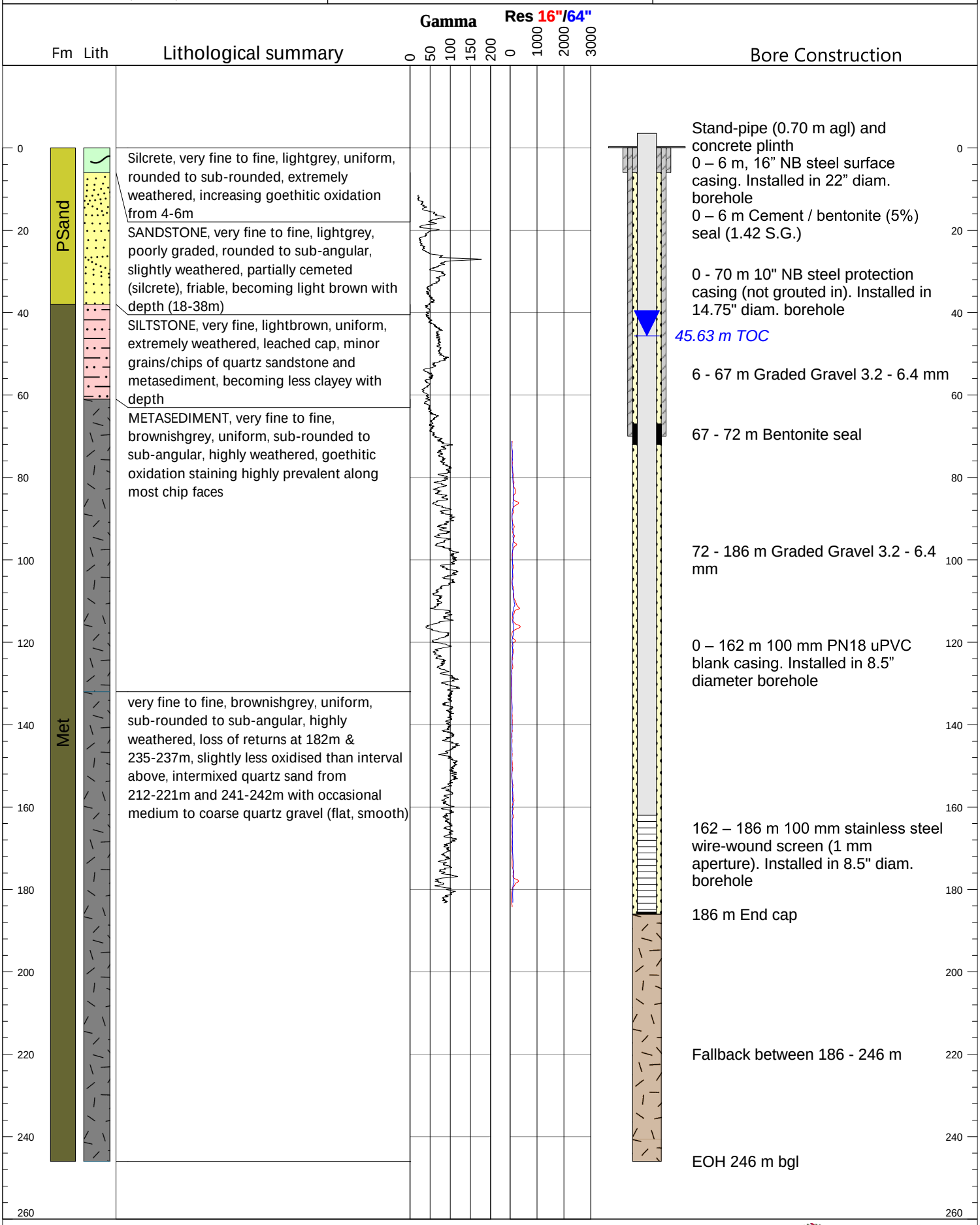
Additional notes:

WINU0947 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 380581.72 mE / 7693093.24 mN
Elevation: 291.01 m AHD (RL = TOC)

Construction start date: 02/07/2023
Construction end date: 23/07/2023
Inclination: -90°
Depth drilled: 246 m BGL

Final airlift yield: 4.0 L/s
EC: 442 µS/cm
pH: 7.7
Temp: 31.3 °C
Static Water Level: 45.63 m TOC



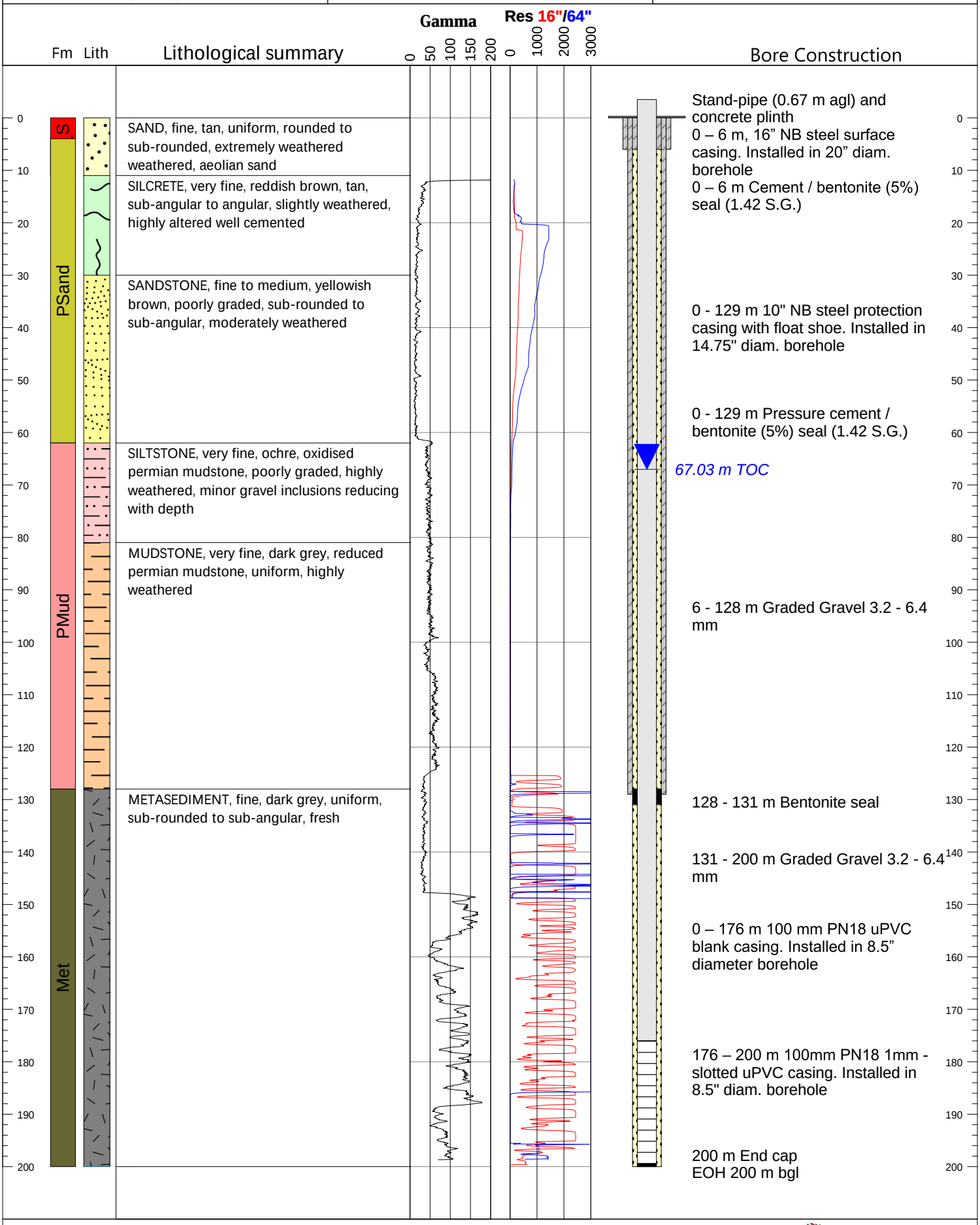
Additional notes:

WINU0948 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 368798.48 mE / 7707620.69 mN
Elevation: 249.01 m AHD (RL = TOC)

Construction start date: 30/07/2023
Construction end date: 21/08/2023
Inclination: -90°
Depth drilled: 200 m BGL

Final airlift yield: 0.1 L/s
EC: 1137 µS/cm
pH: 8.1
Temp: 31.9 °C
Static Water Level: 67.03 m TOC



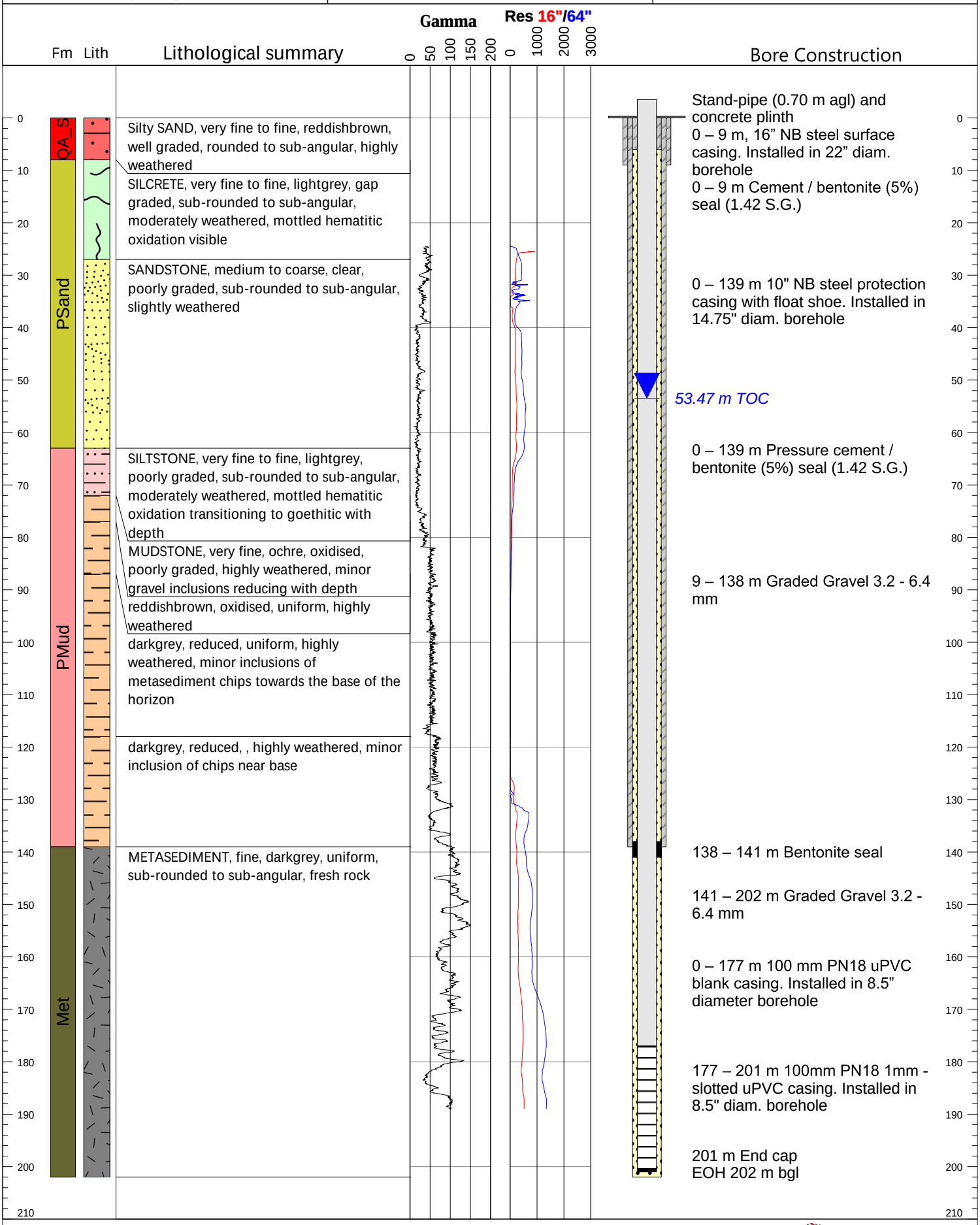
Additional notes:

WINU0949 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 368570.46 mE / 7708141.20 mN
Elevation: 247.70 m AHD (RL = TOC)

Construction start date: 07/08/2023
Construction end date: 05/09/2023
Inclination: -90°
Depth drilled: 202 m BGL

Final airlift yield: 1.0 L/s
EC: 6782 µS/cm
pH: 8.2
Temp: 22.1 °C
Static Water Level: 53.47 m TOC



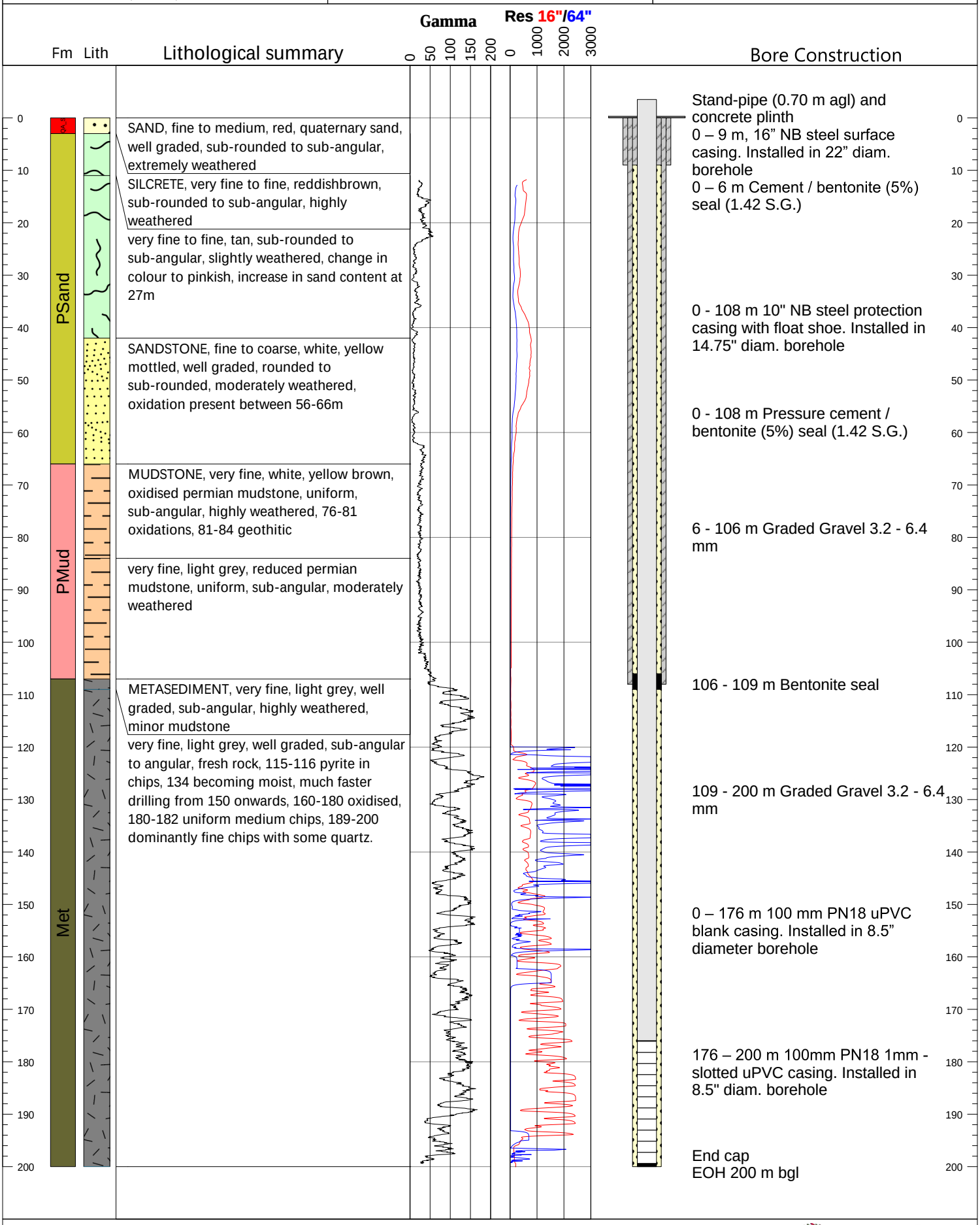
Additional notes:

WINU0950 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 370031.47 mE / 7704833.54 mN
Elevation: 263.84 m AHD (RL = TOC)

Construction start date: 07/09/2023
Construction end date: 08/10/2023
Inclination: -90°
Depth drilled: 200 m BGL

Final airlift yield: 0.1 L/s
EC: 7368 µS/cm
pH: 8.9
Temp: 30.2 °C
Static Water Level: 55.67 m TOC



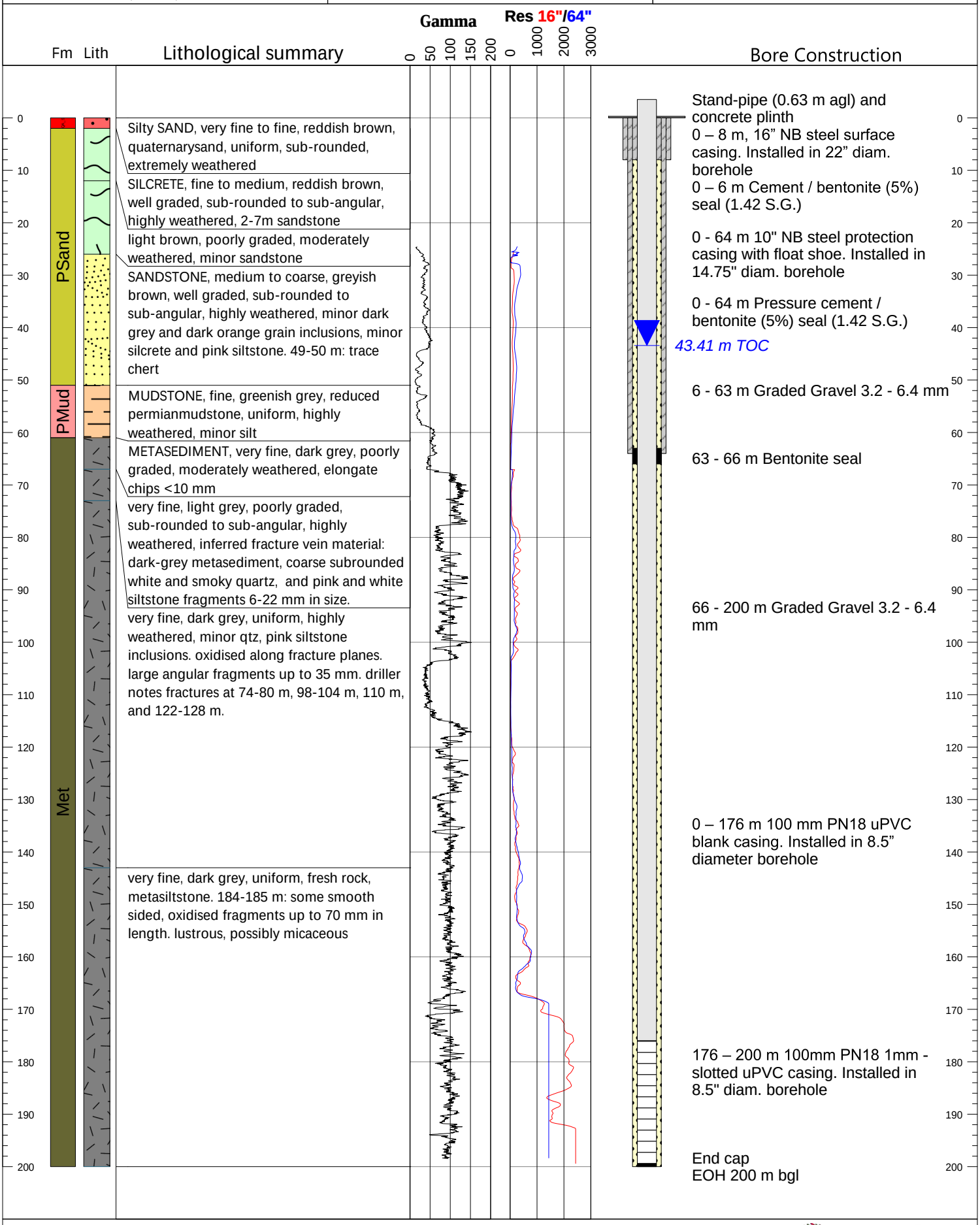
Additional notes:

WINU1301 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 376734.00 mE / 7704700.00 mN
Elevation: 250.00 m AHD (RL = TOC)

Construction start date: 24/09/2023
Construction end date: 18/10/2023
Inclination: -90°
Depth drilled: 200 m BGL

Final airlift yield: 2.0 L/s
EC: 525 µS/cm
pH: 8.1
Temp: 28.1 °C
Static Water Level: 43.41 m TOC



Additional notes:

worley consulting

WINU1302 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 381038.27 mE / 7699210.97 mN
Elevation: 275.54 m AHD (RL = TOC)

Construction start date: 29/09/2023
Construction end date: 01/11/2023
Inclination: -90°
Depth drilled: 204 m BGL

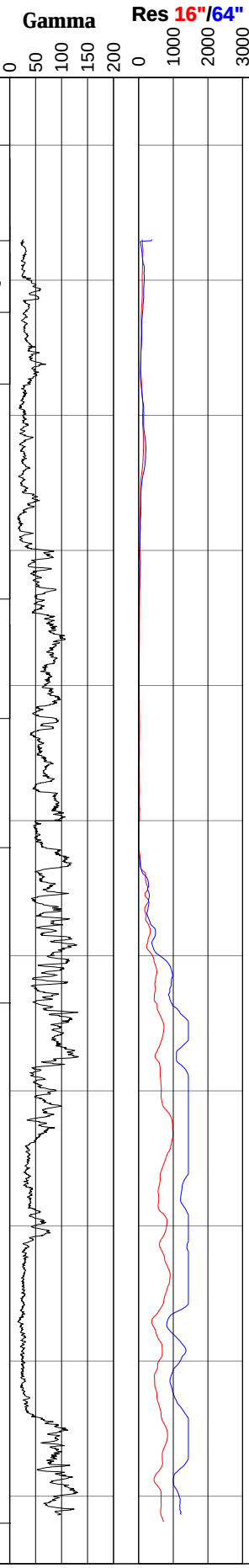
Final airlift yield: 0.1 L/s
EC: 2102 µS/cm
pH: 8.5
Temp: 34.7 °C
Static Water Level: 50.08 m TOC

Fm Lith

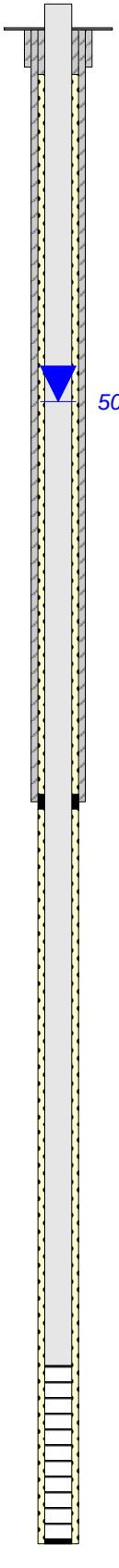
Lithological summary

- LATERITE, medium to coarse, reddish brown, well graded, sub-angular, extremely weathered, laterite gravels with aeolian silt and sand
- SILCRETE, very fine to fine, white, to purple and yellow-brown silcrete, fine-grained sand, some laterite gravels
- LATERITE, medium to coarse, reddishbrown, well graded, laterite gravels, minor weathered sandstone and silcrete fragments
- SANDSTONE, fine to medium, brownishgrey, well graded, sub-rounded to sub-angular, highly weathered, minor silcrete and siltstone inclusions. 27 - 30m, light, porous cemented nodules with tubular trace fossils, non-reactive with hcl - inferred zeolite nodules. 35 - 36 m: clayey band. 40 - 51 m: colour change to dark orange, goethitic. 51 - 59 m: grey
- MUDSTONE, very fine, grey, reduced permian mudstone, highly weathered, plastic. 61 - 65 m: pinkish-grey gravelly mudstone, fine-medium grained rounded to subangular gravels.
- very fine, greyish brown, oxidisedpermianmudst, uniform, moderately weathered, mottled dark purple, oxidised, high plasticity
- METASEDIMENT, very fine, dark grey, uniform, moderately weathered, oxidised, chips up to 30 mm diameter
- very fine, darkgrey, uniform, fresh rock, lustrous, inferred biotite alteration

PSand
PMud
Met



Bore Construction



Stand-pipe (0.61 m agl) and concrete plinth
0 – 5 m, 16” NB steel surface casing. Installed in 22” diam. borehole
0 – 6 m Cement / bentonite (5%) seal (1.42 S.G.)

0 - 104 m 10" NB steel protection casing with float shoe. Installed in 14.75" diam. borehole

50.08 m TOC

0 - 104 m Pressure cement / bentonite (5%) seal (1.42 S.G.)

6 - 103 m Graded Gravel 3.2 - 6.4 mm

103 - 105 m Bentonite seal

105 - 204 m Graded Gravel 3.2 - 6.4 mm

0 – 180 m 100 mm PN18 uPVC blank casing. Installed in 8.5” diameter borehole

180 – 204 m 100mm PN18 1mm - slotted uPVC casing. Installed in 8.5" diam. borehole

End cap
EOH 204 m bgl

Additional notes:

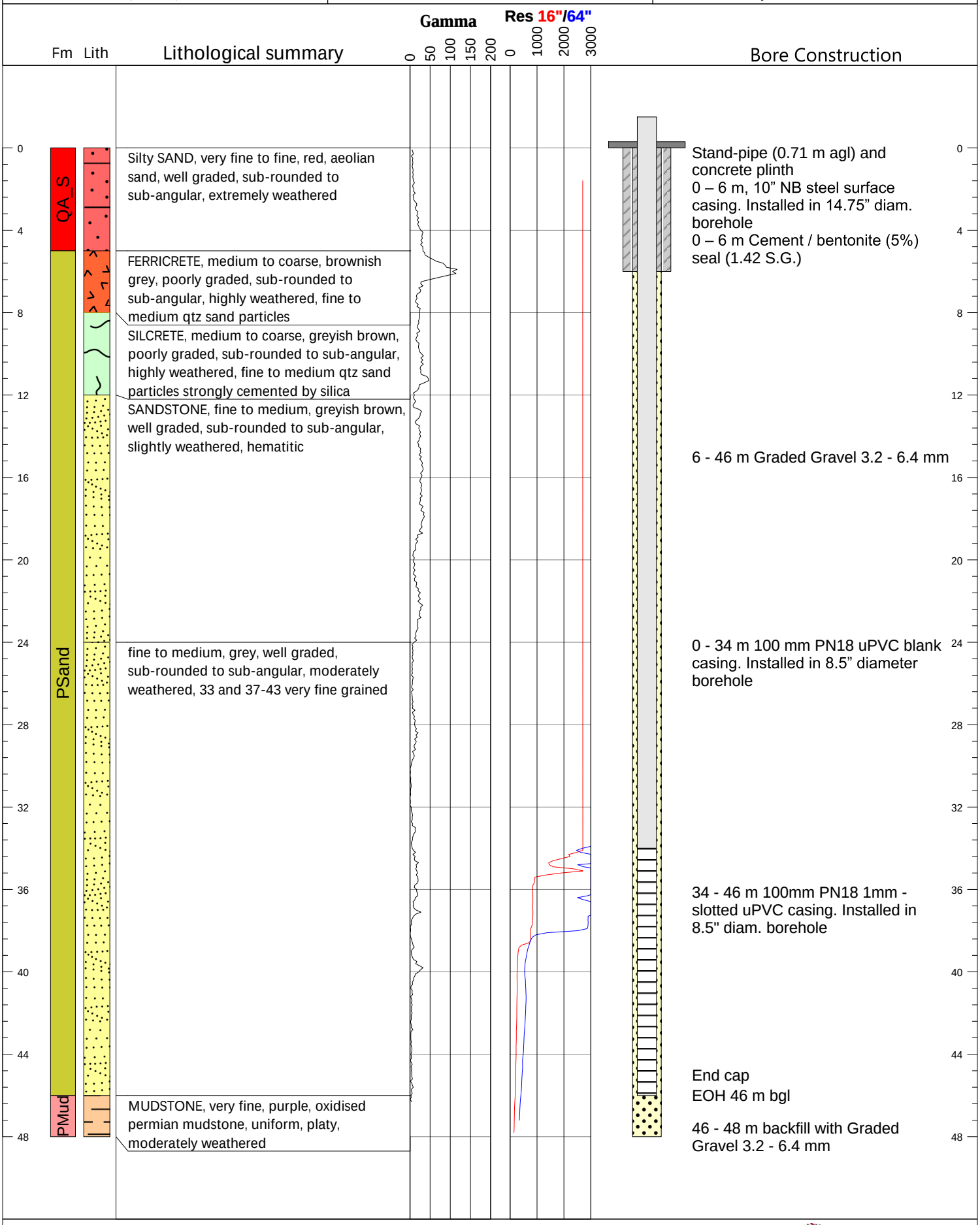
worley consulting

WINU1303 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 365386.00 mE / 7709308.00 mN
Elevation: 250.00 m AHD (RL = TOC)

Construction start date: 28/11/2023
Construction end date: 12/12/2023
Inclination: -90°
Depth drilled: 48 m BGL

Final airlift yield: 0.1 L/s
EC: 1181 µS/cm
pH: 8.4
Temp: 30.7 °C
Static Water Level: Dry m TOC



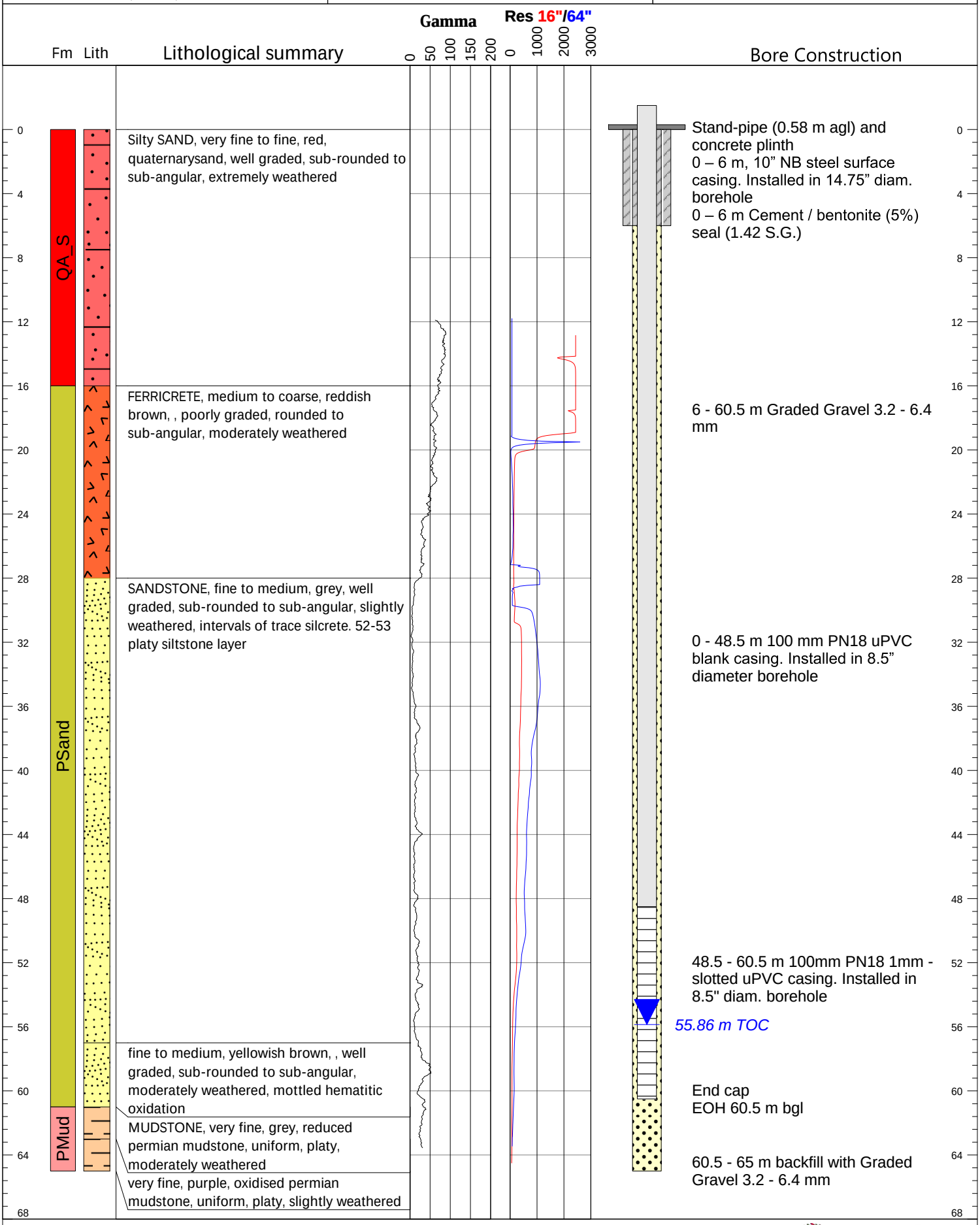
Additional notes:

WINU1304 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 363293.00 mE / 7710026.00 mN
Elevation: 250.00 m AHD (RL = TOC)

Construction start date: 02/12/2023
Construction end date: 11/12/2023
Inclination: -90°
Depth drilled: 65 m BGL

Final airlift yield: 0.1 L/s
EC: 1147 µS/cm
pH: 8.6
Temp: 26.8 °C
Static Water Level: 55.86 m TOC



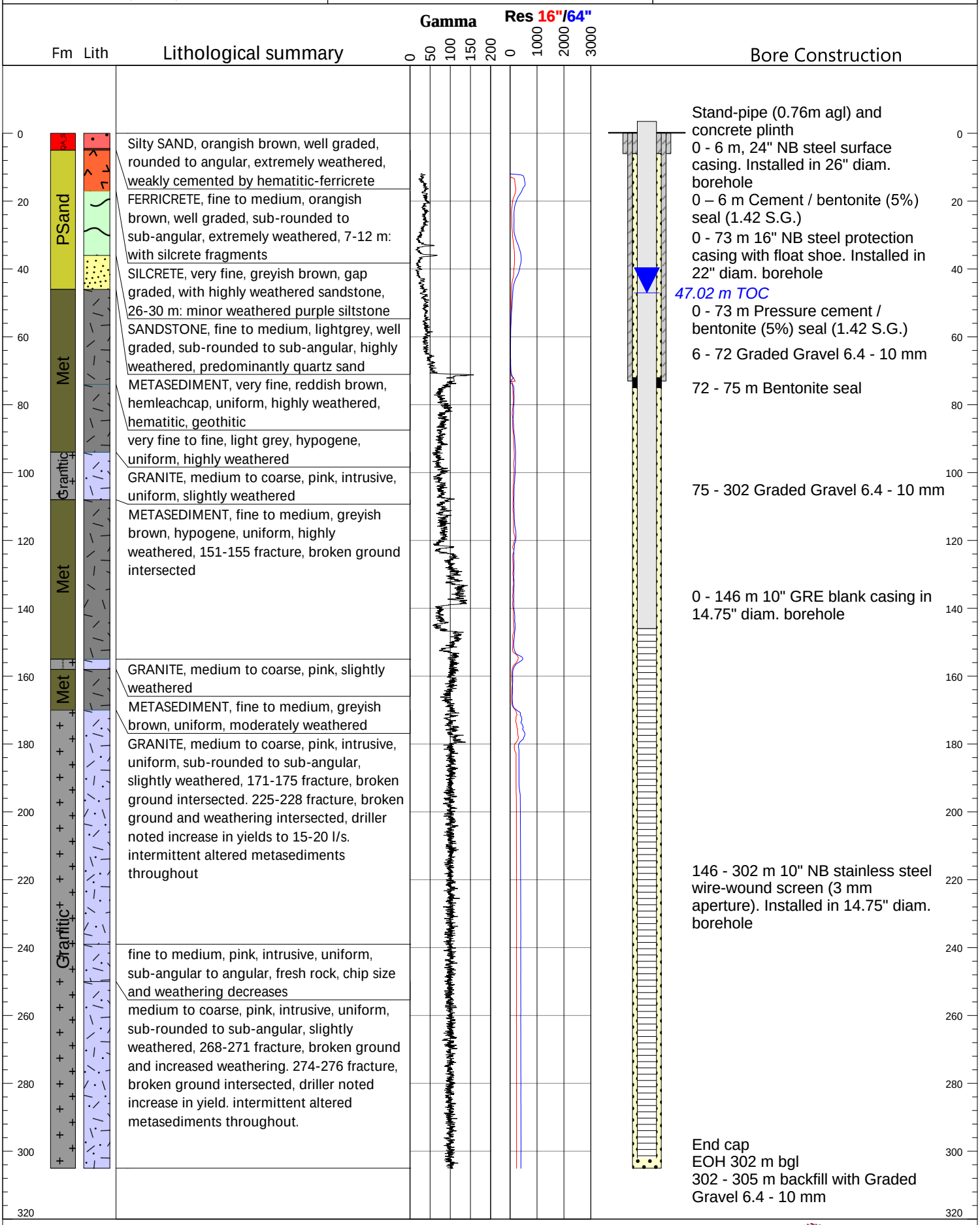
Additional notes:

WINU1305 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 372013.09 mE / 7705335.74 mN
Elevation: 257.21 m AHD (RL = TOC)

Construction start date: 24/10/2023
Construction end date: 07/03/2024
Inclination: -90°
Depth drilled: 305 m BGL

Final airlift yield: 20.0 L/s
EC: 1091 µS/cm
pH: 8
Temp: 35.6 °C
Static Water Level: 47.02 m TOC



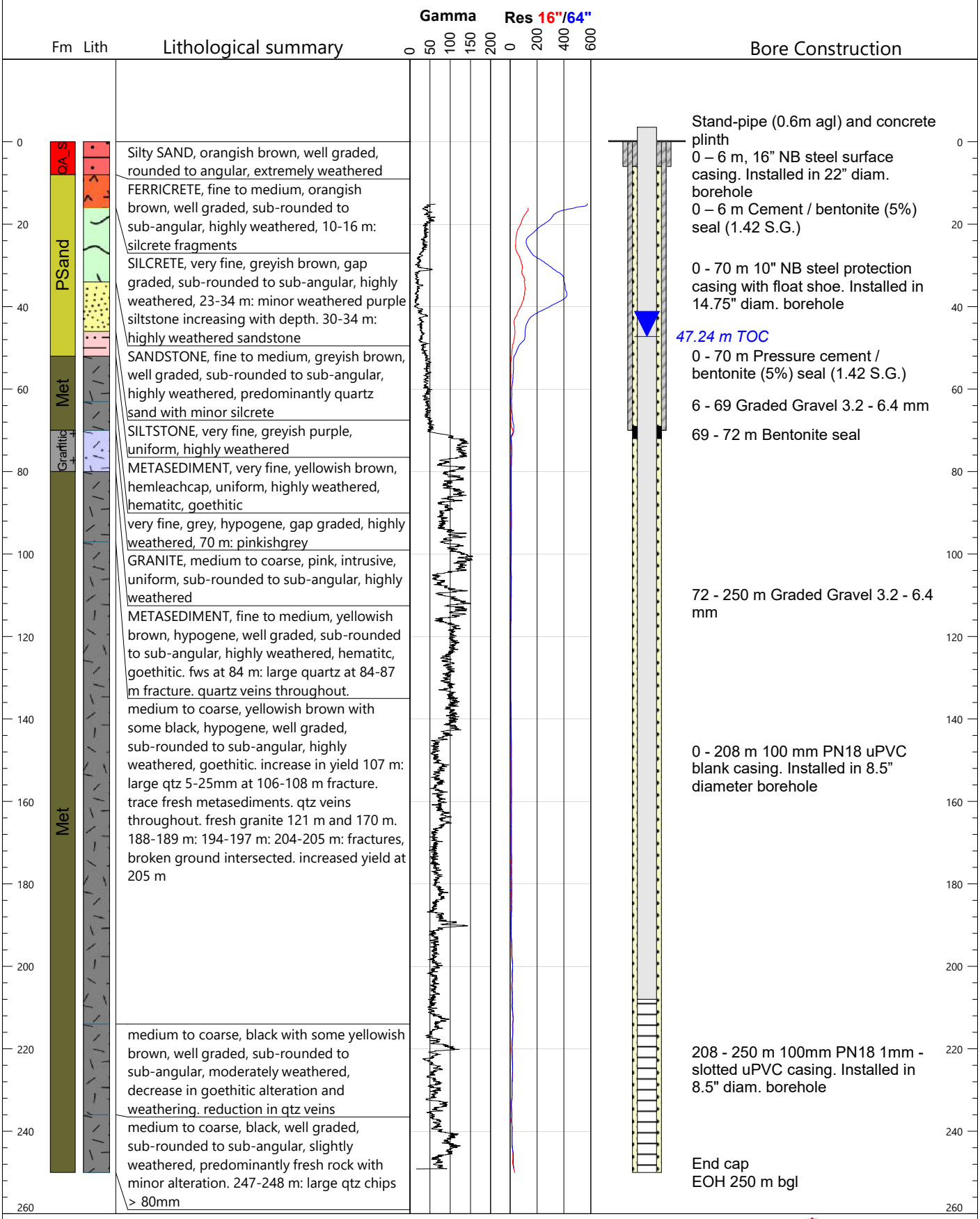
Additional notes:

WINU1307 - Composite Bore Log

Project: Winu Hydrogeological Investigation Program
Client: Rio Tinto
CRS: GDA94 MGA51
Coordinates: 371925.08 mE / 7705390.03 mN
Elevation: 257.28 m AHD (RL = TOC)

Construction start date: 22/11/2023
Construction end date: 28/02/2024
Inclination: -90°
Depth drilled: 250 m BGL

Final airlift yield: 8.0 L/s
EC: 658 µS/cm
pH: 8.3
Temp: 34.0 °C
Static Water Level: 47.24 m TOC



Additional notes:

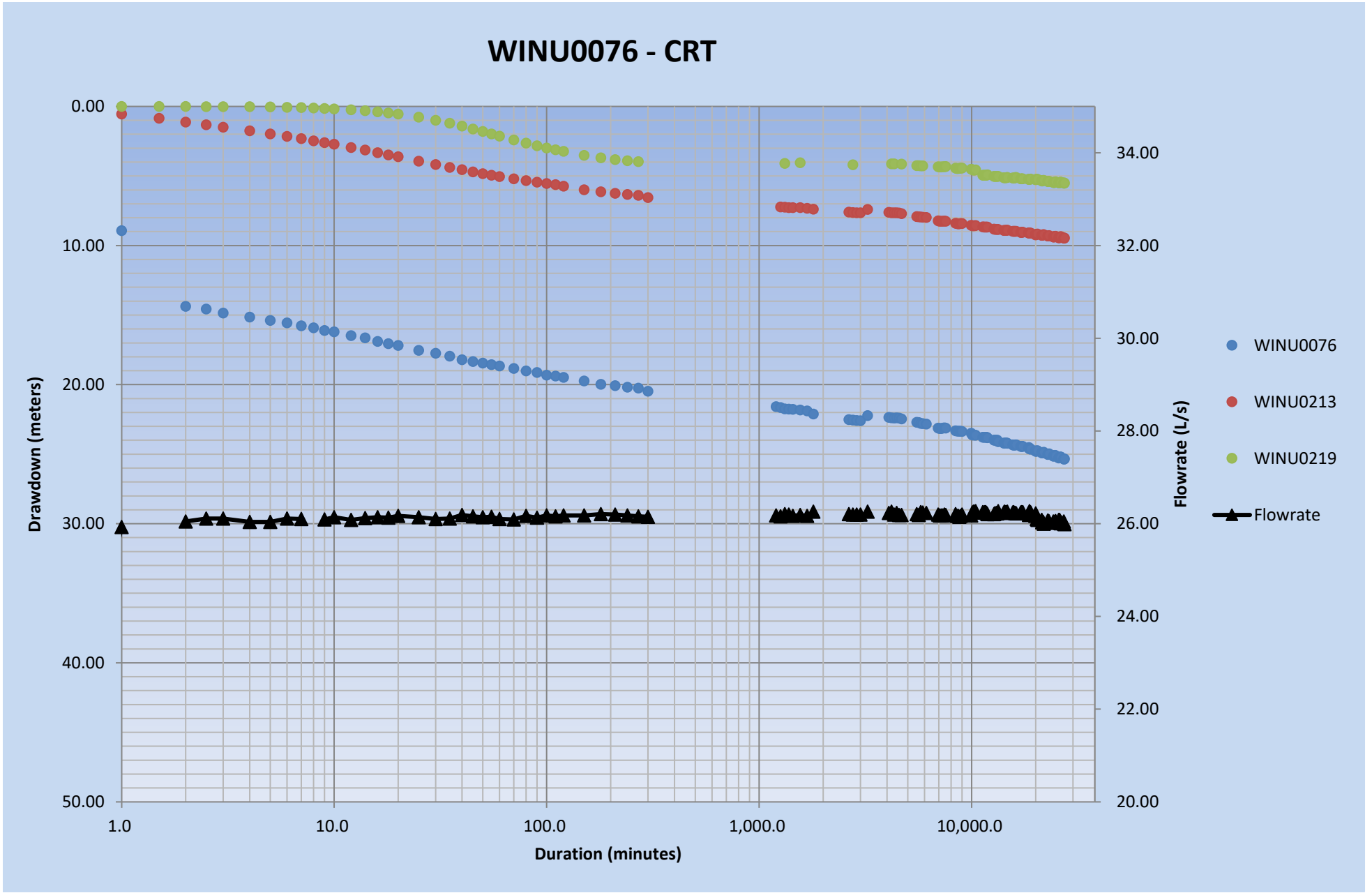
Appendix D. Summary tables of production bores, monitoring bores, pressure loggers, and VWPs

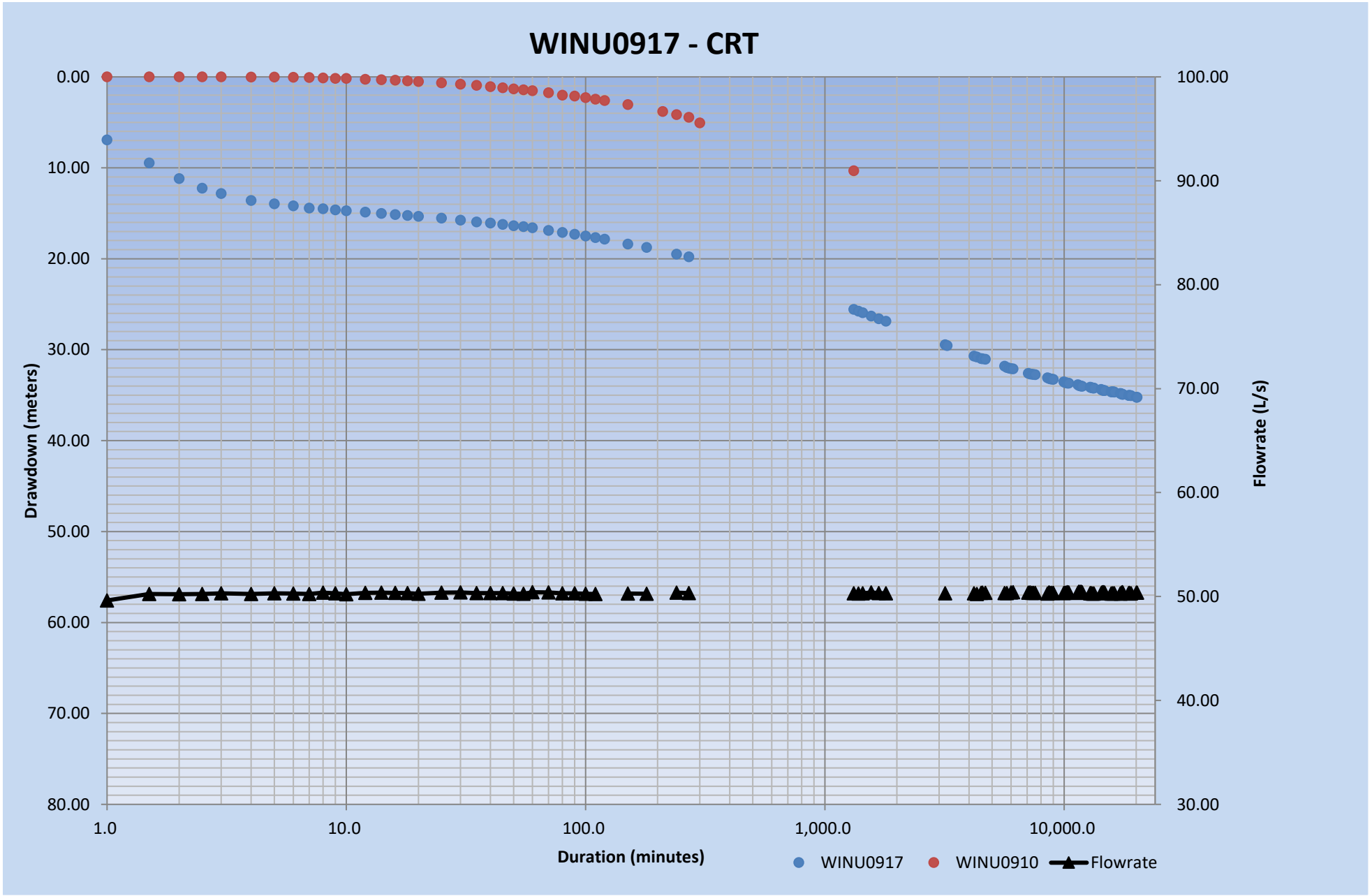
BH_ID	Monitoring Site	Easting	Northing	Bore Depth (m)	Screen from (mbgl)	Screen to (mbgl)	Screened Aquifer
WIDI0008	Dewatering	371747	7707044	114	54	114	Permian Sandstone/Metasediment
WINU0076	Dewatering	368918	7707893	137	83	137	Metasediment - Confined
WINU0080	Dewatering	369528	7707687	148	94	148	Metasediment - Confined
WINU0261	Dewatering	369095	7708999	62	56	61	Permian Sandstone
WINU0472	Dewatering	369103	7708995	122.14	110.14	122.14	Metasediment - Confined
WINU0703	Dewatering	371259	7708233	122	116	122	Metasediment - Confined
WINU0706	Dewatering	369027	7708404	300	84	300	Metasediment - Confined
WINU0708	Dewatering	369744	7707047	300	112.8	299	Metasediment - Confined
WINU0909	Dewatering	368597	7709518	150	144	150	Metasediment - Confined
WINU0910	Dewatering	369098	7709064	243.4	92.4	242.4	Metasediment - Confined
WINU0911	Dewatering	369753	7708994	150	144	150	Metasediment - Confined
WINU0912	Dewatering	371483	7707012	144.5	138.5	144.5	Metasediment - Confined
WINU0914	Dewatering	370718	7707474	151	145	151	Metasediment - Confined
WINU0915	Dewatering	371445	7706696	150	144	150	Metasediment - Confined
WINU0917	Dewatering	369357	7708865	238	88	238	Metasediment - Confined
WINU0925	Dewatering	371948	7706933	271	103	271	Metasediment - Unconfined
WINU0930	Dewatering	372222	7706560	150	126	150	Metasediment - Unconfined
WINU0933	Dewatering	369908	7705334	180	0	0	Metasediment - Confined
WINU1305	Dewatering	372019	7705340	305	146	302	Metasediment / Granite - Winu South
WINU1307	Dewatering	371924	7705392	250	208	250	Metasediment / Granite - Winu South
WIDI0020	Land fill, Processing Plant and Ore Stockpiles	367880	7708358	78	42	66	Permian Sandstone
WINU0214	Land fill, Processing Plant and Ore Stockpiles	368914	7707907	53.34	41.34	53.34	Permian Sandstone
WINU0216	Land fill, Processing Plant and Ore Stockpiles	368871	7707872	53.2	41.2	53.2	Permian Sandstone
WINU0702	Land fill, Processing Plant and Ore Stockpiles	371042	7705657	154	140.8	152.8	Metasediment - Confined
WINU0924	Land fill, Processing Plant and Ore Stockpiles	368233	7707049	72	53	65	Permian Sandstone
WINU0926	Land fill, Processing Plant and Ore Stockpiles	368140	7707778	68	54	66	Permian Sandstone
WINU0907	Land fill, Processing Plant and Ore Stockpiles	364080	7708839	72	49	55	Permian Sandstone
WINU0921	Land fill, Processing Plant and Ore Stockpiles	366689	7706260	59	53	59	Permian Sst/Mudstone transition
WINU1303	Land fill, Processing Plant and Ore Stockpiles	365386	7709308	48	34	46	Permian Sandstone
WB18WIN0003	Operational	369110	7707564	122	56	116	Weathered Metasediment - Confined
WIDI0001	Operational	371817	7707078	120	60	120	Metasediment - Confined
WIDI0009	Operational	370702	7707124	120	59	114	Metasediment - Confined
WIDI0018	Operational	371723	7706918	132	72	126	Metasediment - Unconfined
WINU0047	Operational	369254	7707851	132	74	126	Metasediment - Confined
WINU0050	Operational	369197	7709139	122	95	125	Metasediment - Confined
WINU0070	Operational	370011	7707305	135.5	69.5	135.5	Metasediment - Confined
WINU0710	Regional	367845	7710384	241	127.5	187.5	Metasediment - Confined
WINU0713	Regional	368469	7710533	241	125	185	Metasediment - Confined

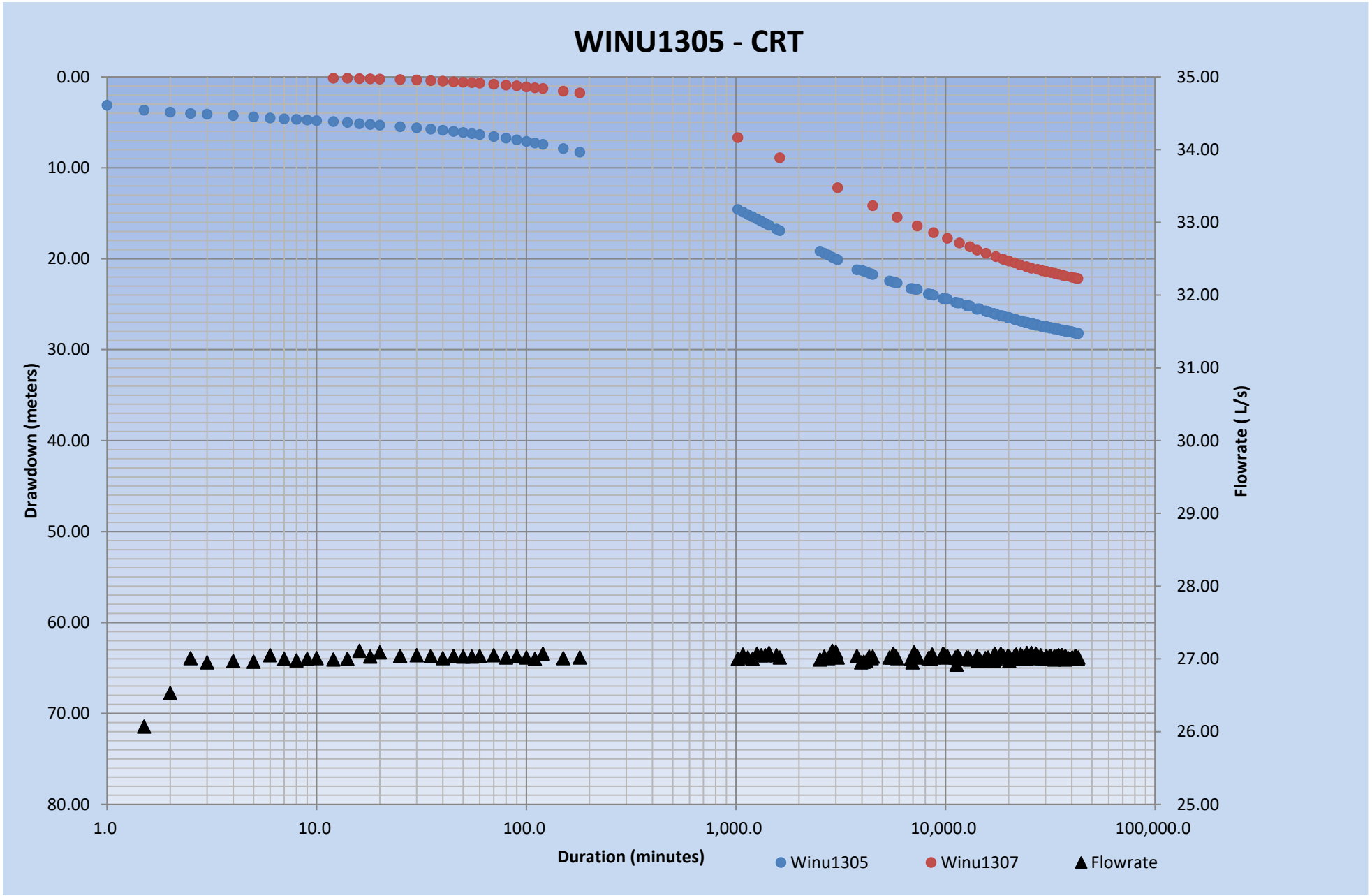
BH_ID	Monitoring Site	Easting	Northing	Bore Depth (m)	Screen from (mbgl)	Screen to (mbgl)	Screened Aquifer
WINU0928	Regional	367285	7712999	93	72	90	Permian Sandstone
WINU0929	Regional	367281	7713000	210	186	210	Metasediment - Confined
WINU0935	Regional	292989	7780576	251	218.5	242.5	Wallal Sandstones - Wallal
WINU0937	Regional	293046	7780720	162	124	148	Lower Callawa - Wallal
WINU0938	Regional	297191	7779091	252	224	246	Wallal Sandstones - Wallal
WIDI0016	Regional	380725	7702789	86	56.5	80	Metasediment - Unconfined
WINU0940	Regional	397034	7695451	180	156	180	Granite - Rimfire
WINU0941	Regional	397550	7695464	180	156	180	Granite / Metasediment - Rimfire
WINU0943	Regional	397149	7696060	129	105	129	Granite / Metasediment - Rimfire
WINU0945	Regional	381620	7690845	250	226	250	Metasediment - Texas
WINU0946	Regional	381978	7690375	250	226	250	Metasediment - Texas
WINU0947	Regional	380582	7693093	246	162	186	Metasediment - Texas
WINU0950	Regional	370166	7704790	200	176	200	Metasediment - Confined
WINU1301	Regional	376734	7704700	200	176	200	Metasediment - Confined
WINU1302	Regional	381042	7699214	204	180	204	Metasediment - Confined
WINU0906	TSF	364391	7709734	90	65	71	Permian Sandstone
WINU0918	TSF	365396	7710655	72	63	69	Permian Sandstone
WINU0923	TSF	366060	7709572	55	49	55	Permian Sandstone
WINU1304	TSF	363293	7710026	65	48.5	60.5	Permian Sandstone
WINU1306	TSF	365339	7711669	85	64	76	Permian Sandstone
WINU0318	VWP	369515	7707712	57			Mudstone
WINU0319	VWP	368901	7707913	71.6			Mudstone
WINU0320	VWP	368869	7707877	80			Mudstone
WINU0342	VWP	368995	7707551	252.6			Permian Sandstone/Mudstone/Metasediment
WINU0369	VWP	369438	7707697	350			Permian Sandstone/Mudstone/Metasediment
WINU0373	VWP	369139	7707864	350			Permian Sandstone/Mudstone/Metasediment
WINU0374	VWP	368976	7708407	250.5			Permian Sandstone/Mudstone/Metasediment
WINU0376	VWP	369748	7707393	300.1			Permian Sandstone/Mudstone/Metasediment
WINU0379	VWP	369122	7708166	350			Permian Sandstone/Mudstone/Metasediment
WINU0381	VWP	368834	7707853	250			Permian Sandstone/Mudstone/Metasediment
WINU0748	VWP	368909	7707435	180	0	0	Mudstone/Metasediment
WINU0749	VWP	369398	7707520	365	0	0	Permian Sandstone/Mudstone/Metasediment
WINU0758	VWP	368697	7708095	108.3	0	0	Permian Sandstone/Mudstone/Metasediment
WINU0760	VWP	368921	7707825	212.3	0	0	Permian Sandstone/Mudstone/Metasediment
WINU0763	VWP	369244	7707163	160	0	0	Permian Sandstone/Mudstone/Metasediment
WINU0765	VWP	369318	7707865	270	0	0	Mudstone/Metasediment
WINU0766	VWP	369219	7708318	296	0	0	Mudstone/Metasediment
WINU0777	VWP	368759	7707850	138	0	0	Mudstone/Metasediment

BH_ID	Monitoring Site	Easting	Northing	Bore Depth (m)	Screen from (mbgl)	Screen to (mbgl)	Screened Aquifer
WINU0780	VWP	369803	7707498	284.2	0	0	Permian Sandstone/Mudstone/Metasediment
WINU0791	VWP	369307	7708637	798.3	0	0	Mudstone/Metasediment
WINU0800	VWP	369241	7708899	518.3	0	0	Mudstone/Metasediment
WINU0922	Waste Rock Landform	368082	7708715	69	63	69	Permian Sandstone
WINU0712	Waste Rock Landform	367894	7710367	72	64	70	Permian Sandstone
WINU0903	Waste Rock Landform	368515	7710512	72	65	68	Permian Sandstone
WINU0919	Waste Rock Landform	367530	7709788	62.5	56.5	62.5	Permian Sandstone
WINU0927	Waste Rock Landform	366743	7709287	80	53	65	Permian Sandstone

Appendix E. Pumping test plots

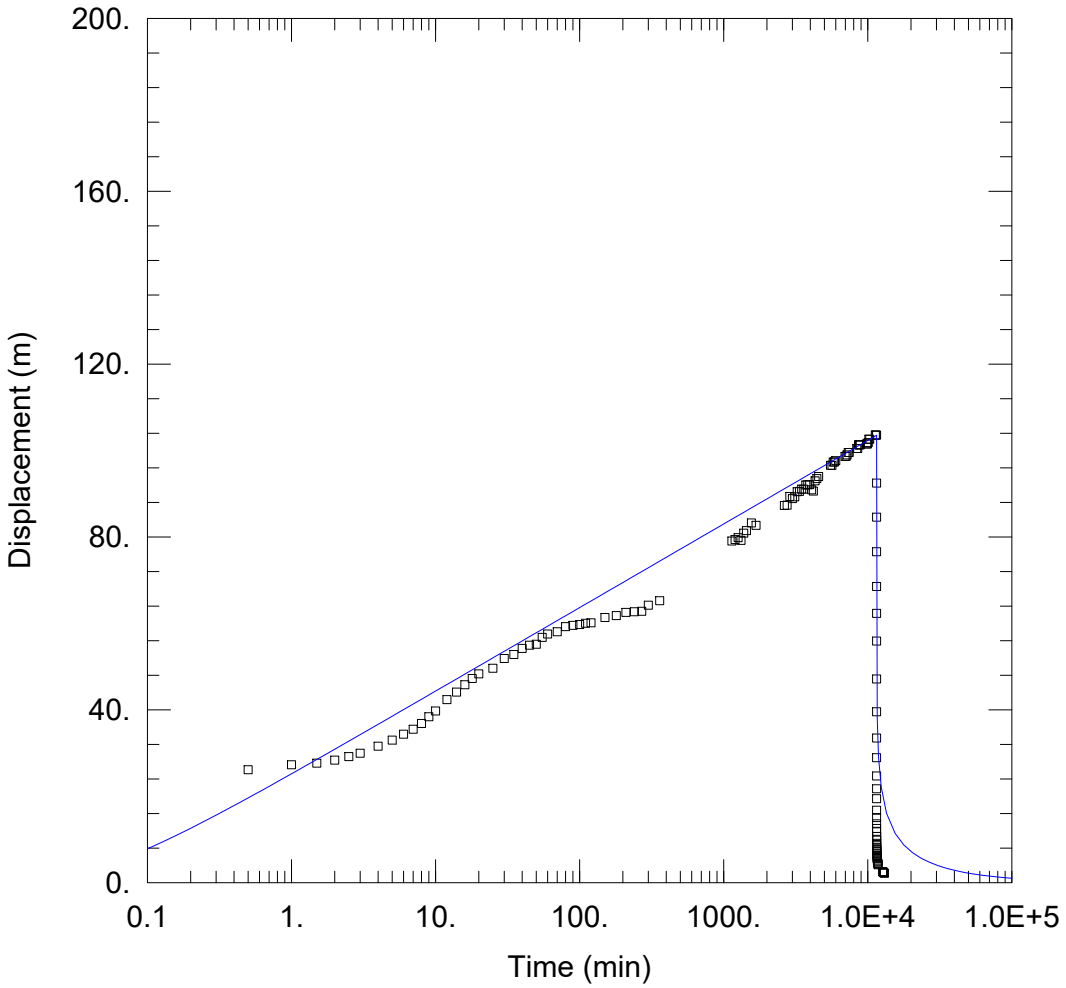

WINU0076 - CRT
0.00
10.00
20.00
30.00
40.00
50.00
Drawdown (meters)
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
Flowrate (L/s)
1.0
10.0
100.0
1,000.0
10,000.0
Duration (minutes)
WINU0076
WINU0213
WINU0219
Flowrate


WINU0917 - CRT
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Drawdown (meters)
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
Flowrate (L/s)
1.0
10.0
100.0
1,000.0
10,000.0
Duration (minutes)
WINU0917
WINU0910
Flowrate


WINU1305 - CRT
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Drawdown (meters)
35.00
34.00
33.00
32.00
31.00
30.00
29.00
28.00
27.00
26.00
25.00
Flowrate (L/s)
1.0
10.0
100.0
1,000.0
10,000.0
100,000.0
Duration (minutes)
Winu1305
Winu1307
Flowrate

Appendix F. Aqtesolv Analysis Plots

WINU0706 Aqtesolv Analysis Plots



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_PB_Recovery.aqt
Date: 07/13/21 Time: 12:13:56

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

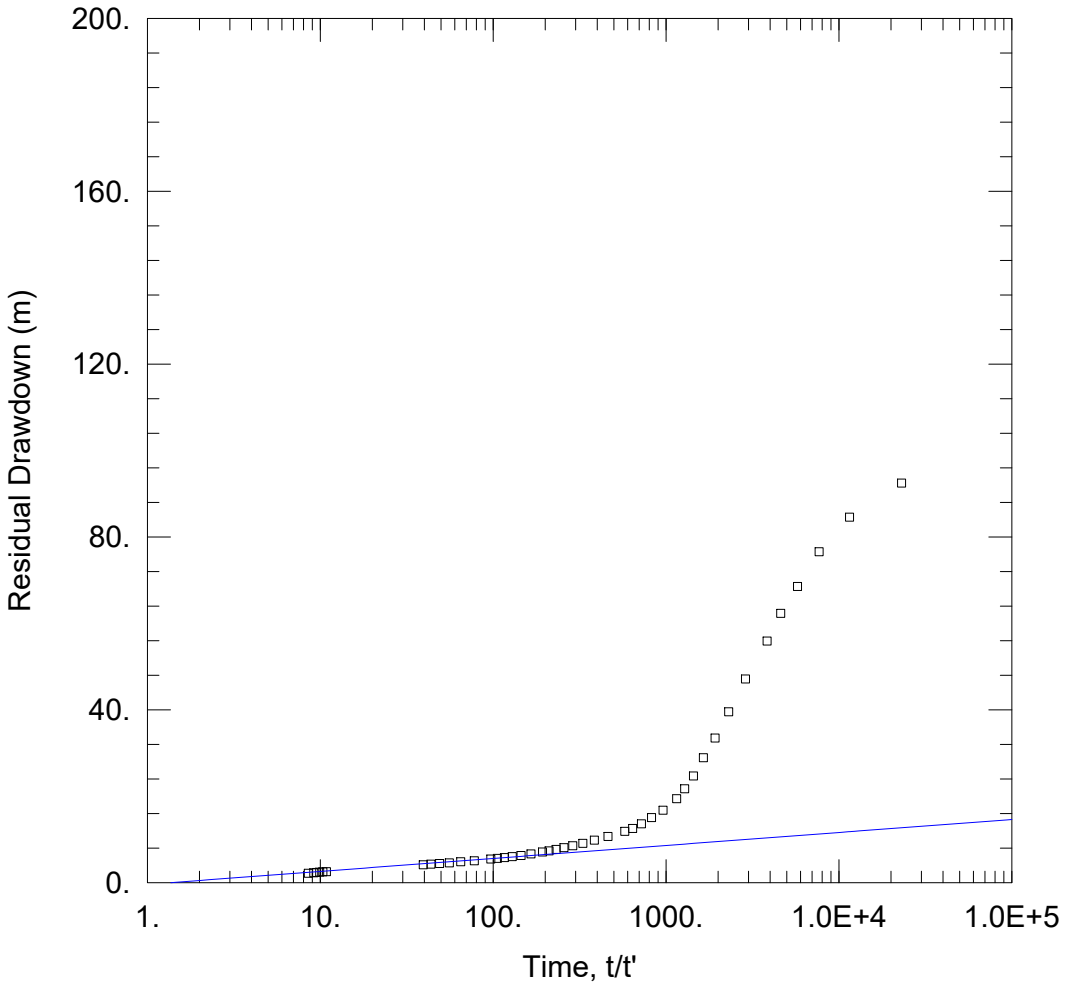
Observation Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 10.88 m^2/day
S = 0.0187
Kz/Kr = 1.
b = 200. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_PB_Recovery.aqt
Date: 05/26/21 Time: 11:24:18

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

AQUIFER DATA

Saturated Thickness: 200. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

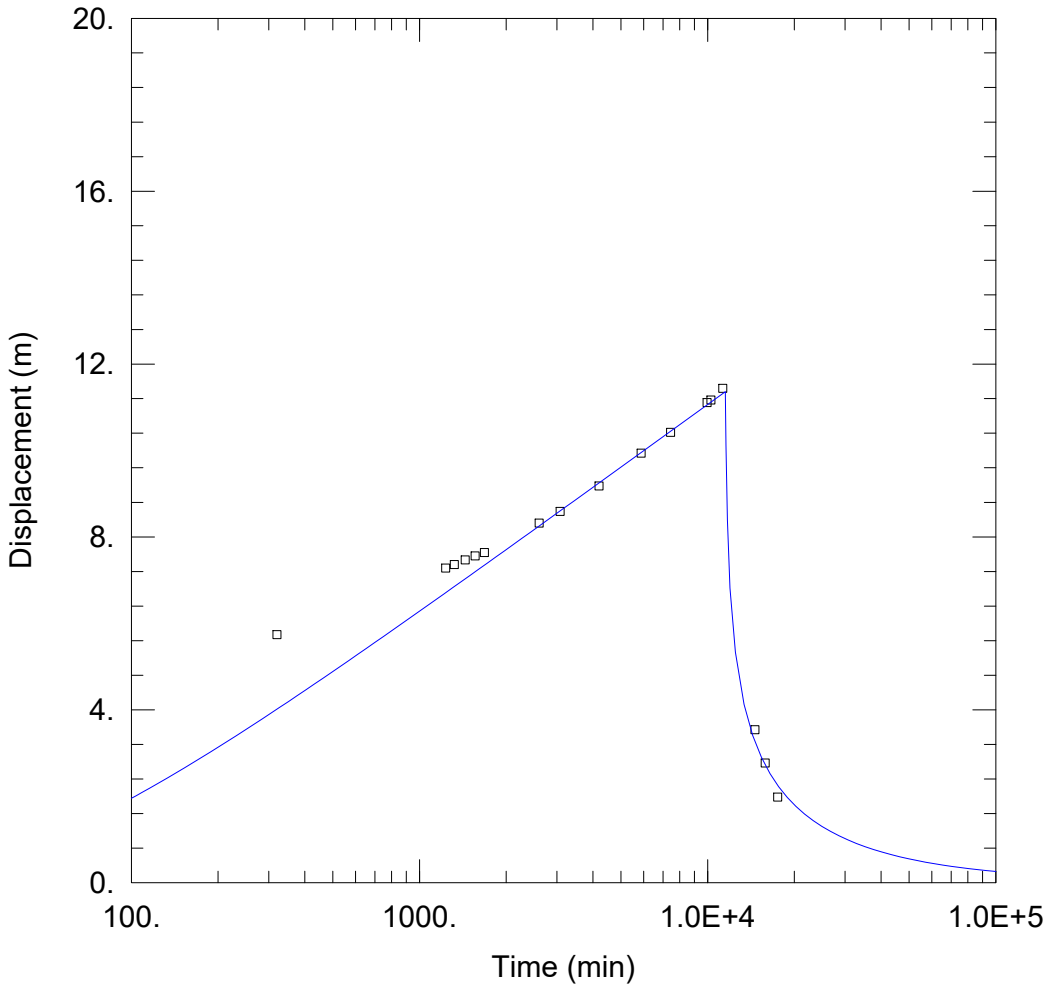
Observation Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 70.13 m^2/day S/S' = 1.366



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_WINU0701ONLY.aqt
Date: 05/26/21 Time: 11:26:33

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

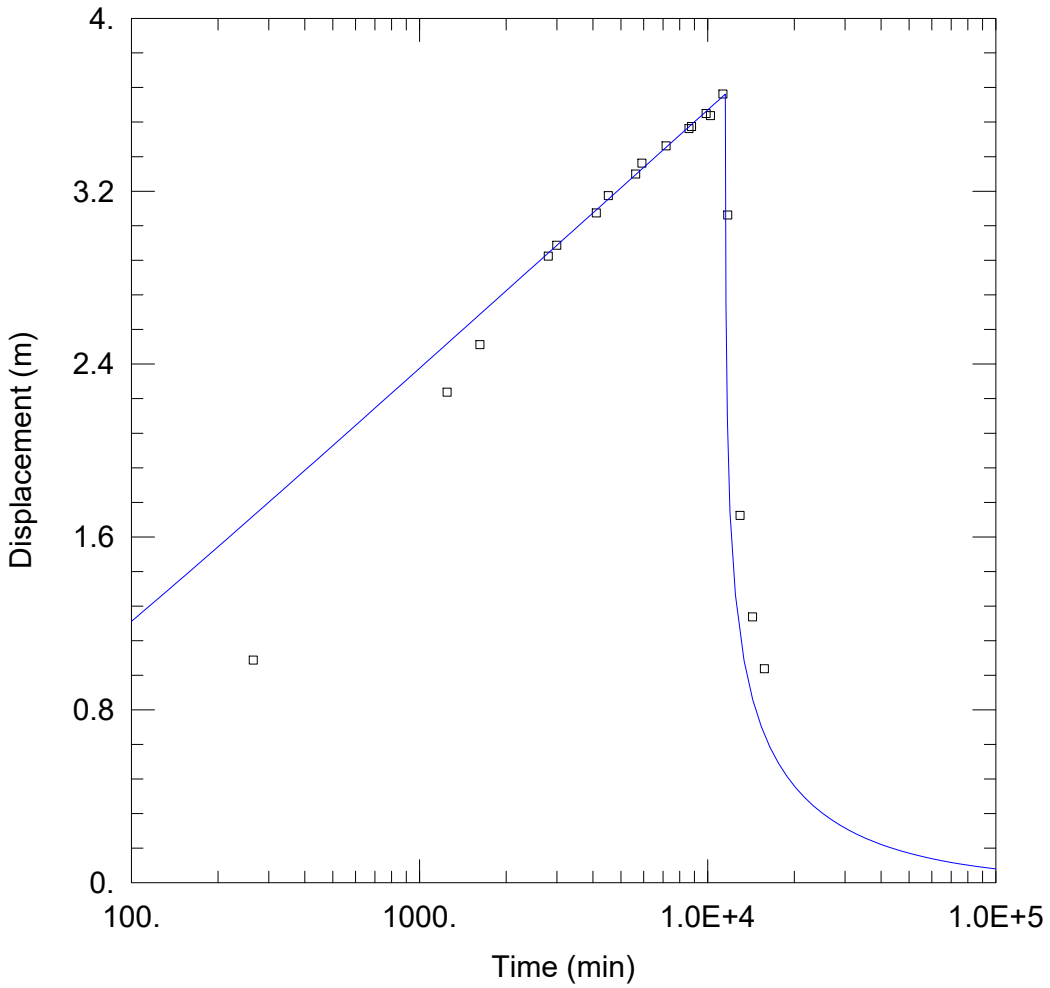
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0701	368990.73	7708347.655

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 43.52 m^2/day
S = 0.0007828
Kz/Kr = 1.
b = 200. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_WINU0704.aqt
Date: 05/26/21 Time: 11:28:15

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

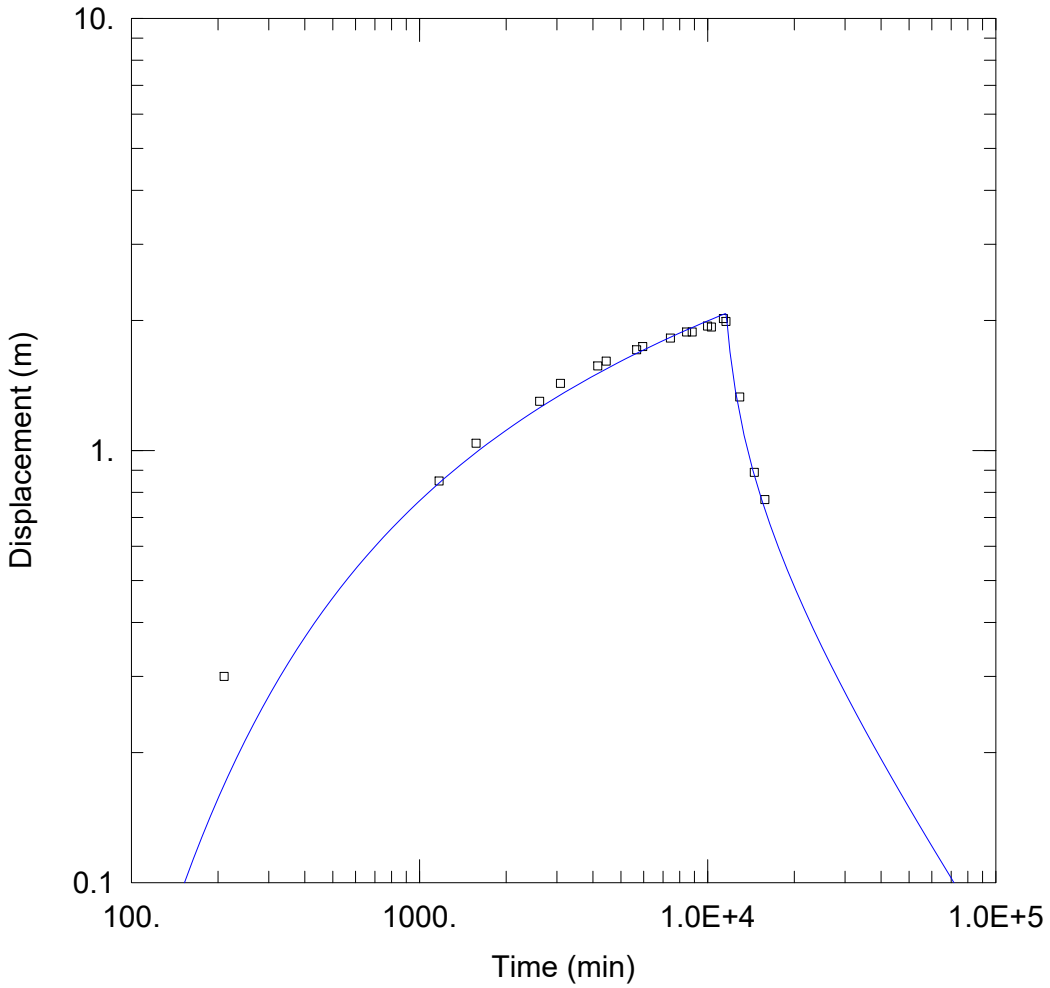
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0704	369074.251	7709028.85

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 175.7 m^2/day
S = 7.242E-6
Kz/Kr = 1.
b = 200. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_WINU0166.aqt
Date: 05/26/21 Time: 11:52:07

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

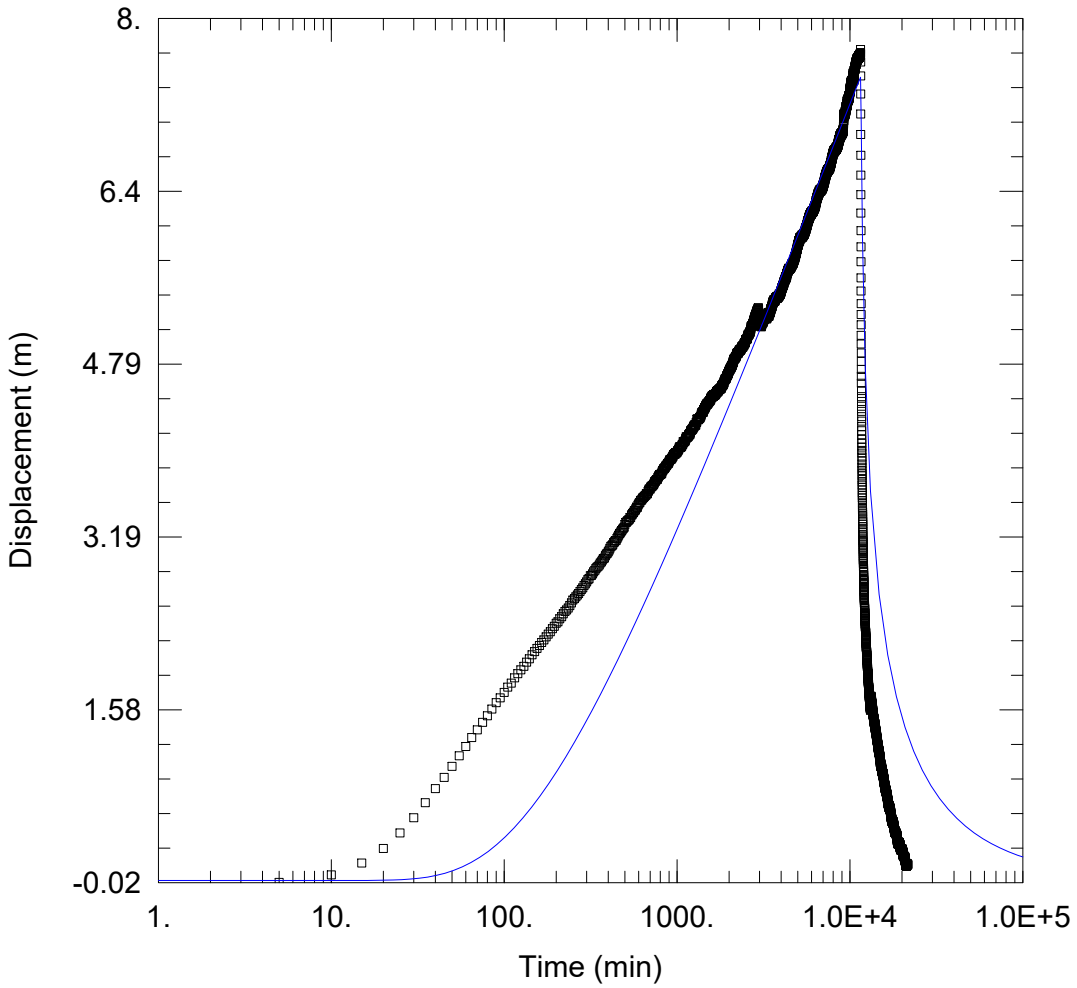
Observation Wells

Well Name	X (m)	Y (m)
□ WINU0166	369564.47	7707683.48

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 160. m^2/day
S = 9.571E-5
Kz/Kr = 1.
b = 200. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_WINU0374.aqt
Date: 05/26/21 Time: 11:30:38

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

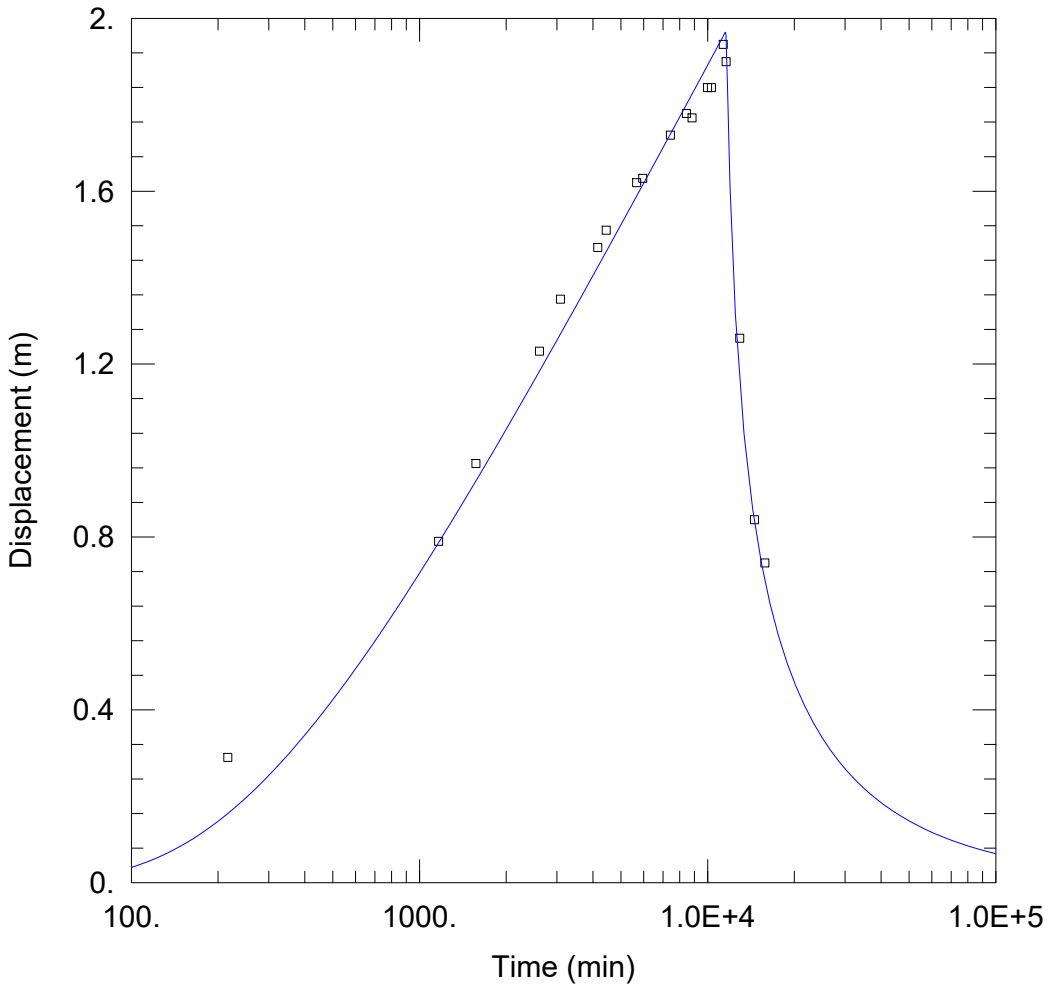
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0374A	368976	7708407

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 51.32 m^2/day
S = 0.00543
Kz/Kr = 1.
b = 200. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_WINU0080.aqt
Date: 05/26/21 Time: 11:29:39

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

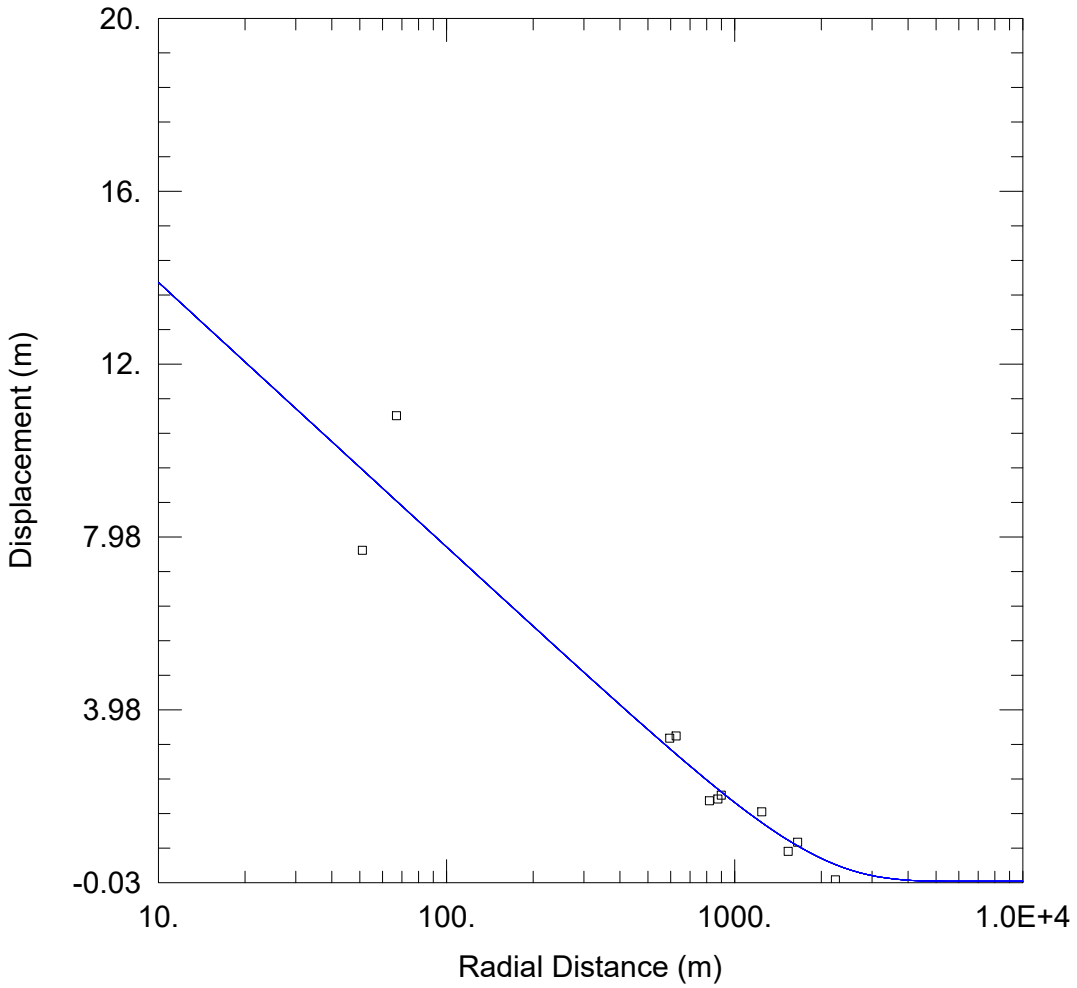
Observation Wells

Well Name	X (m)	Y (m)
□ WINU0080	369528.47	7707686.72

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 167.1 m^2/day
S = 0.0001092
Kz/Kr = 1.
b = 200. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0706_TestPumping_ALLData.aqt
Date: 05/26/21 Time: 11:32:31

PROJECT INFORMATION

Company: Golder
Client: RTX
Location: Winu
Test Well: WINU0706
Test Date: 11/02/21

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0706	369027	7708404

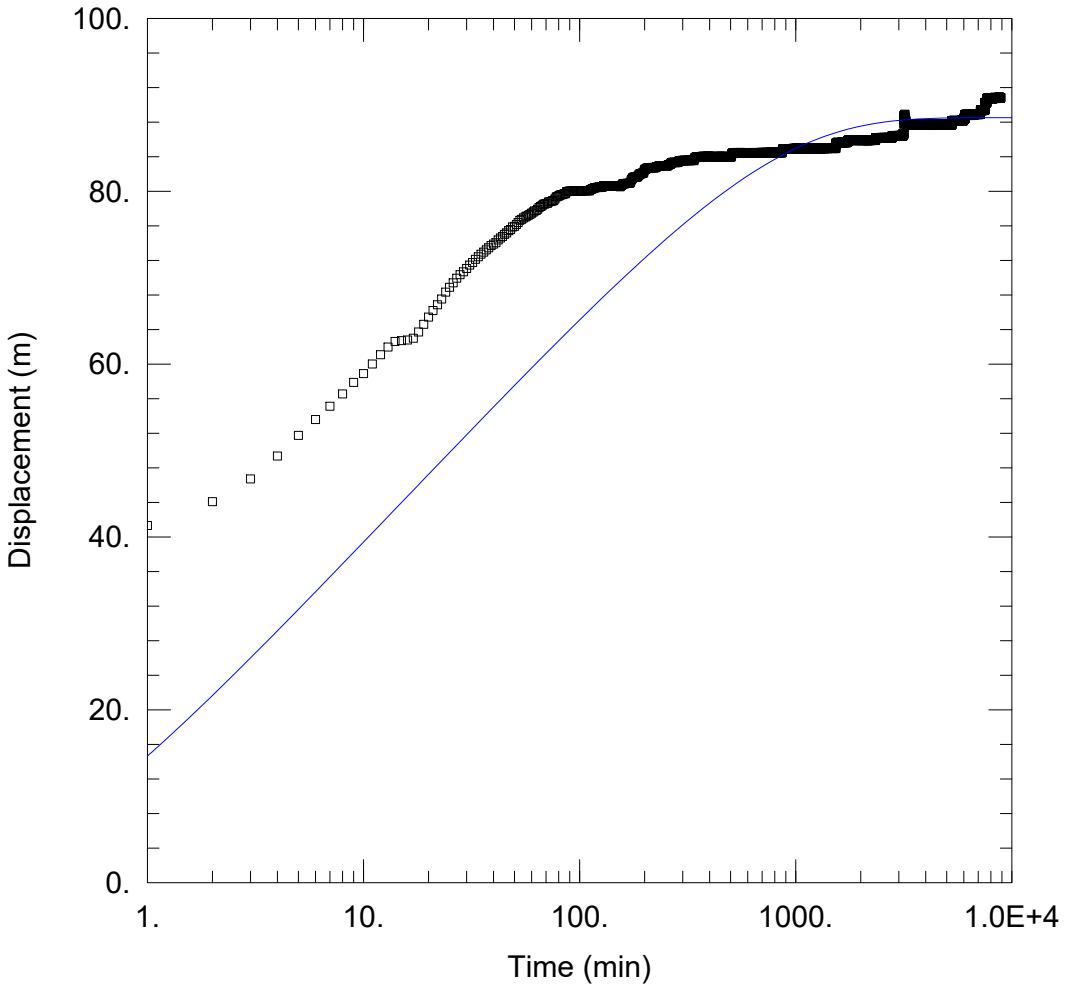
Observation Wells

Well Name	X (m)	Y (m)
WINU0080	369528.47	7707686.72
WINU0166	369564.47	7707683.48
WINU0472	369102.8	7708994.6
WINU0701	368990.73	7708347.655
WINU0703	371258.56	7708233.09
WINU0704	369074.251	7709028.85
WINU0705	369905.46	7707002.86
WINU0708	369743.59	7707047.18
WINU0369A	369438	7707697
WINU0374A	368976	7708407
WINU0376A	369748	7707393

SOLUTION

Aquifer Model: Confined Solution Method: Theis

WINU0708 Aqtesolv Analysis Plots



WELL TEST ANALYSIS

Data Set: C:\...\CRT_PB02_CRT&Recovery_8880mins_Leaky.aqt
Date: 07/13/21 Time: 11:31:15

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047

Observation Wells

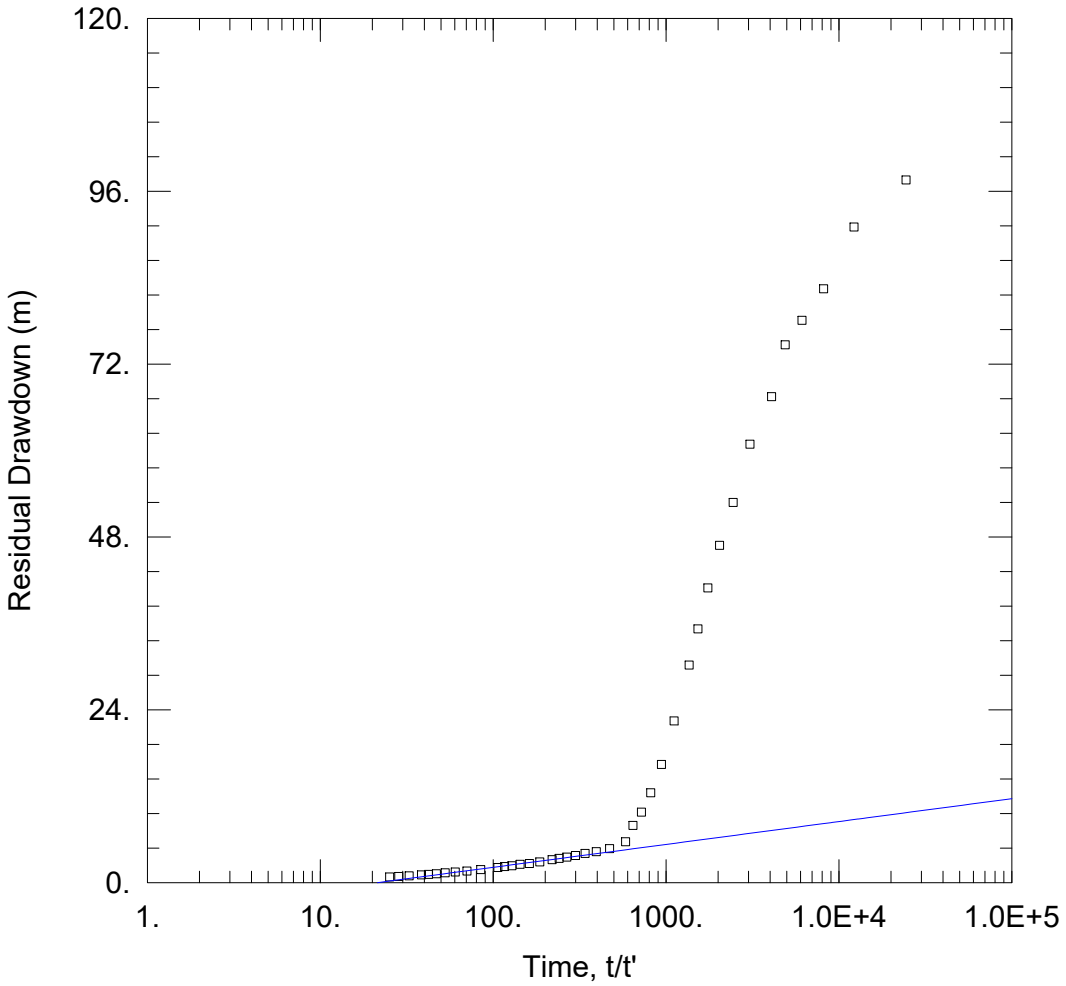
Well Name	X (m)	Y (m)
▫ WINU0708	369743.59	7707047

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.51 m^2/day
r/B = 0.02479
b = 248.4 m

S = 0.06278
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\CRT_PB02_Recovery.aqt
Date: 05/26/21 Time: 12:19:13

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

AQUIFER DATA

Saturated Thickness: 248.4 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047

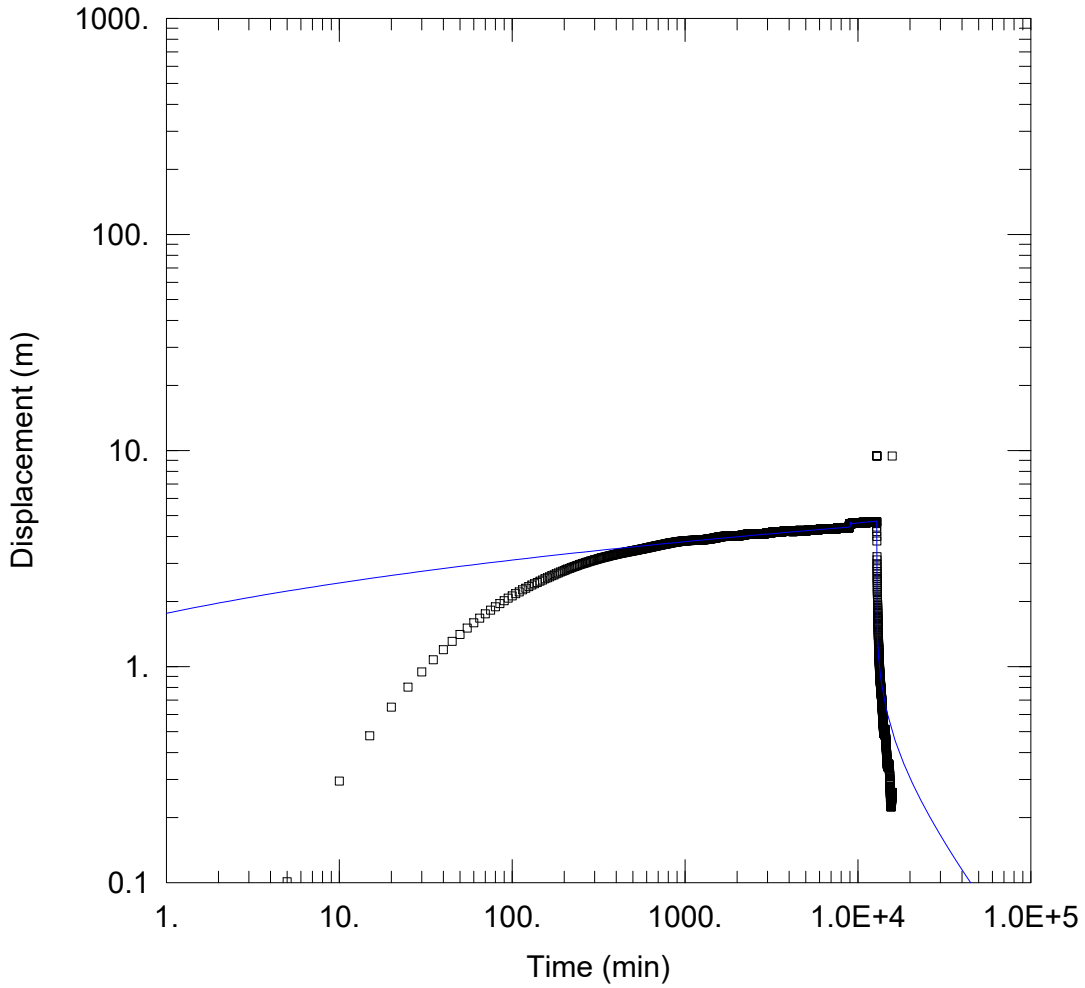
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0708	369743.59	7707047

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 48.35 m^2/day S/S' = 21.42



PB02 CRT

Data Set: C:\...\CRT_PB02_WINU0705_Theis.aqt
Date: 05/26/21 Time: 12:20:17

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

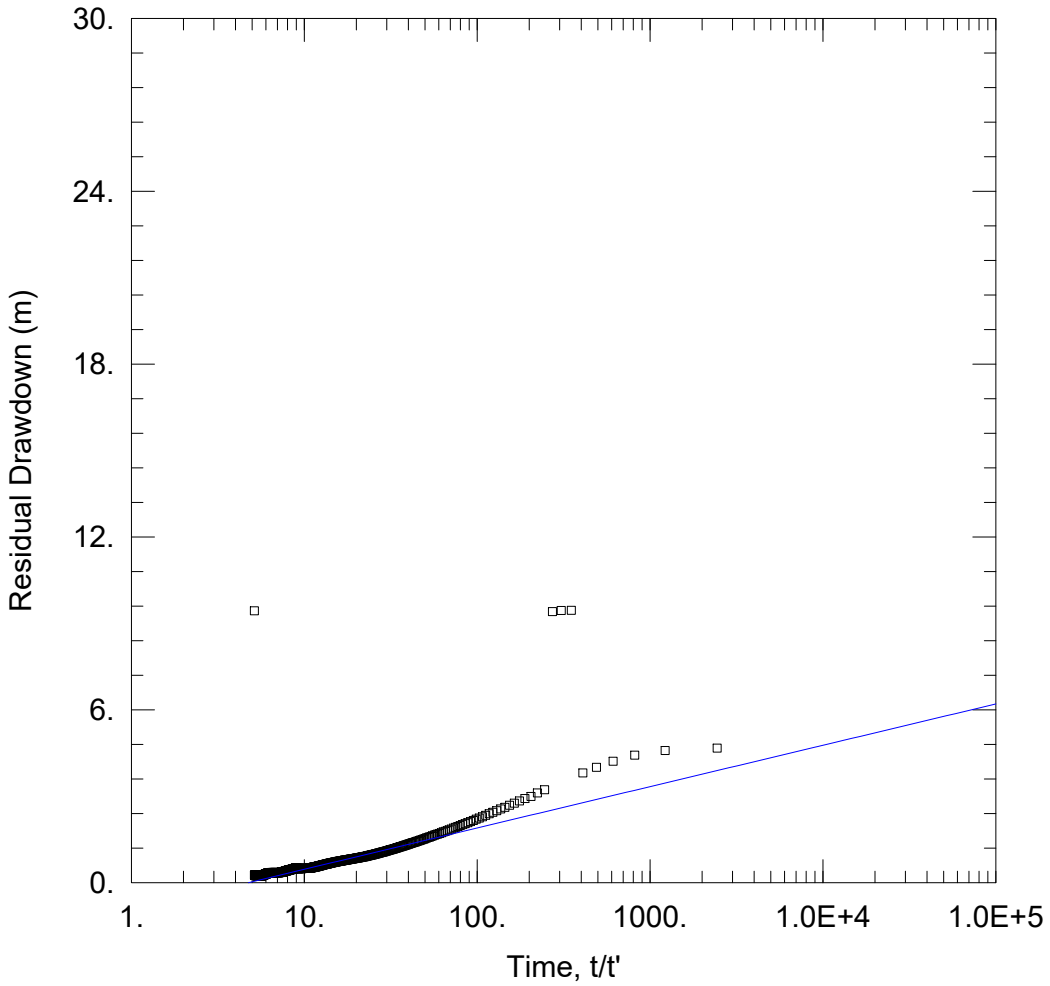
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0705	369905.46	7707002.86

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 218.7 m^2/day
S = 2.901E-8
Kz/Kr = 1.
b = 248.4 m



PB02 CRT

Data Set: C:\...\CRT_PB02_WINU0705_Recovery.aqt
Date: 05/26/21 Time: 12:25:02

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

AQUIFER DATA

Saturated Thickness: 248.4 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

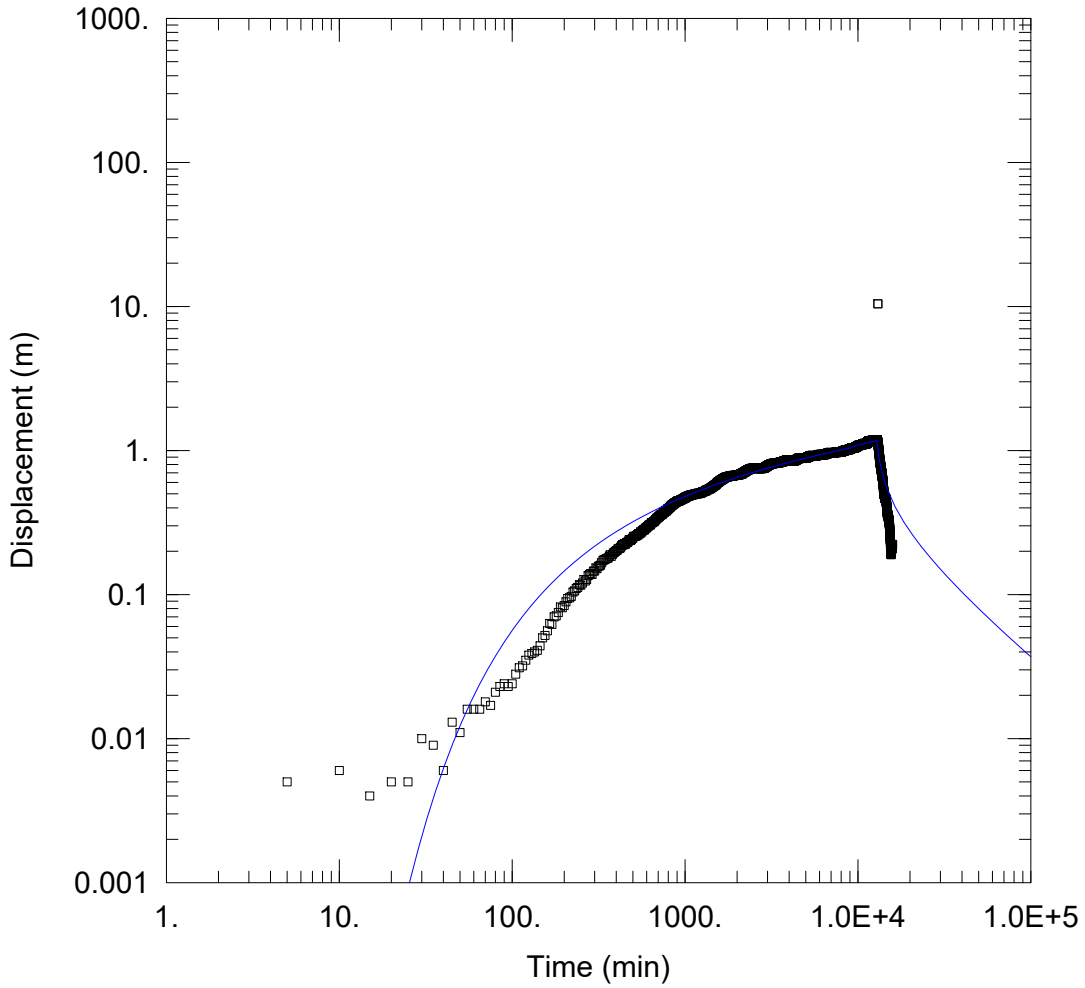
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0705	369905.46	7707002.86

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 107. m^2/day S/S' = 4.76



PB02 CRT

Data Set: C:\...\CRT_PB02_WINU0166_Theisv2.aqt
Date: 05/26/21 Time: 12:25:47

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

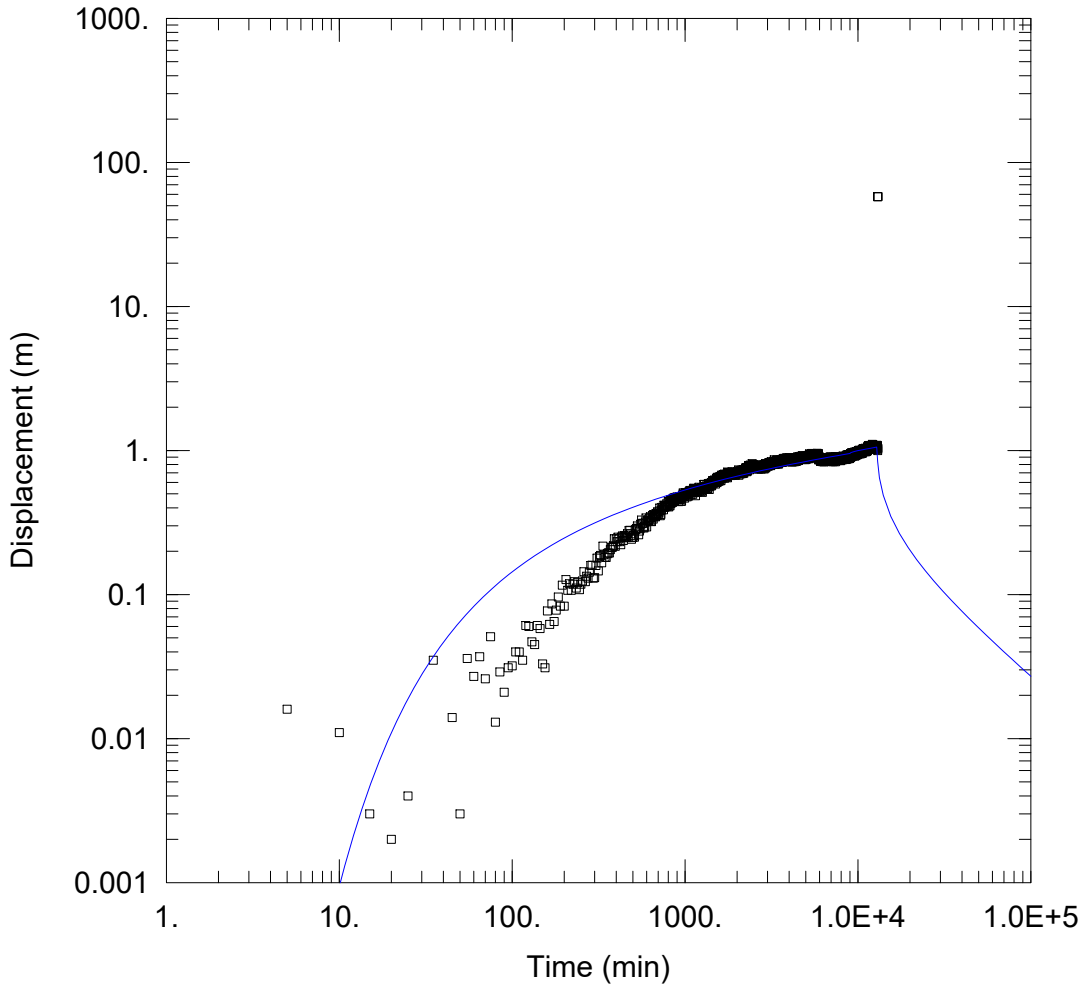
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0166	369564.47	7707683.48

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 240.7 m^2/day
S = 0.0001561
Kz/Kr = 1.
b = 248.4 m



PB02 CRT

Data Set: C:\...\CRT_PB02_WINU0080_Theis.aqt
Date: 05/27/21 Time: 09:59:11

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

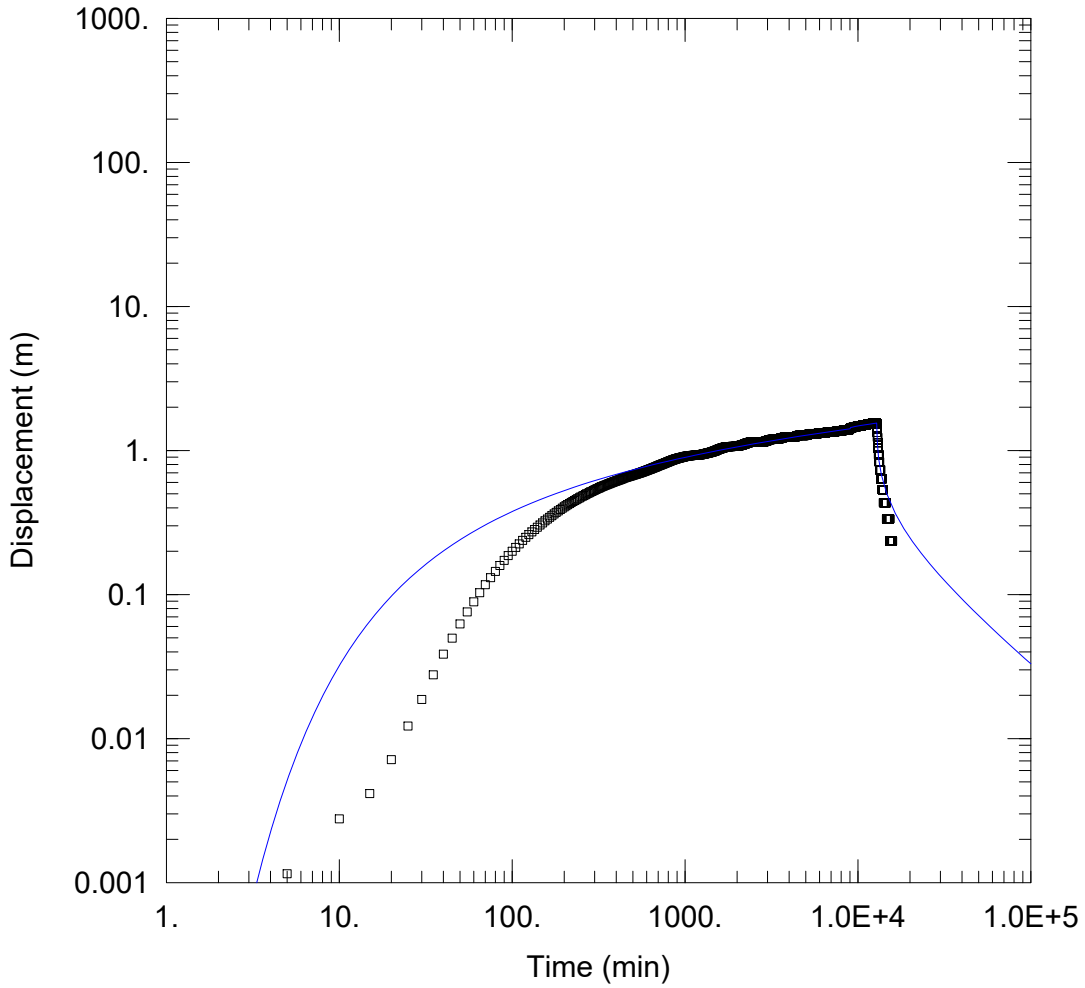
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0080	357681	7711211

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 328.4 m^2/day
S = 2.126E-7
Kz/Kr = 1.
b = 248.4 m



PB02 CRT

Data Set: C:\...\CRT_PB02_VWPWINU0376_BTheis.aqt
Date: 05/26/21 Time: 12:29:47

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

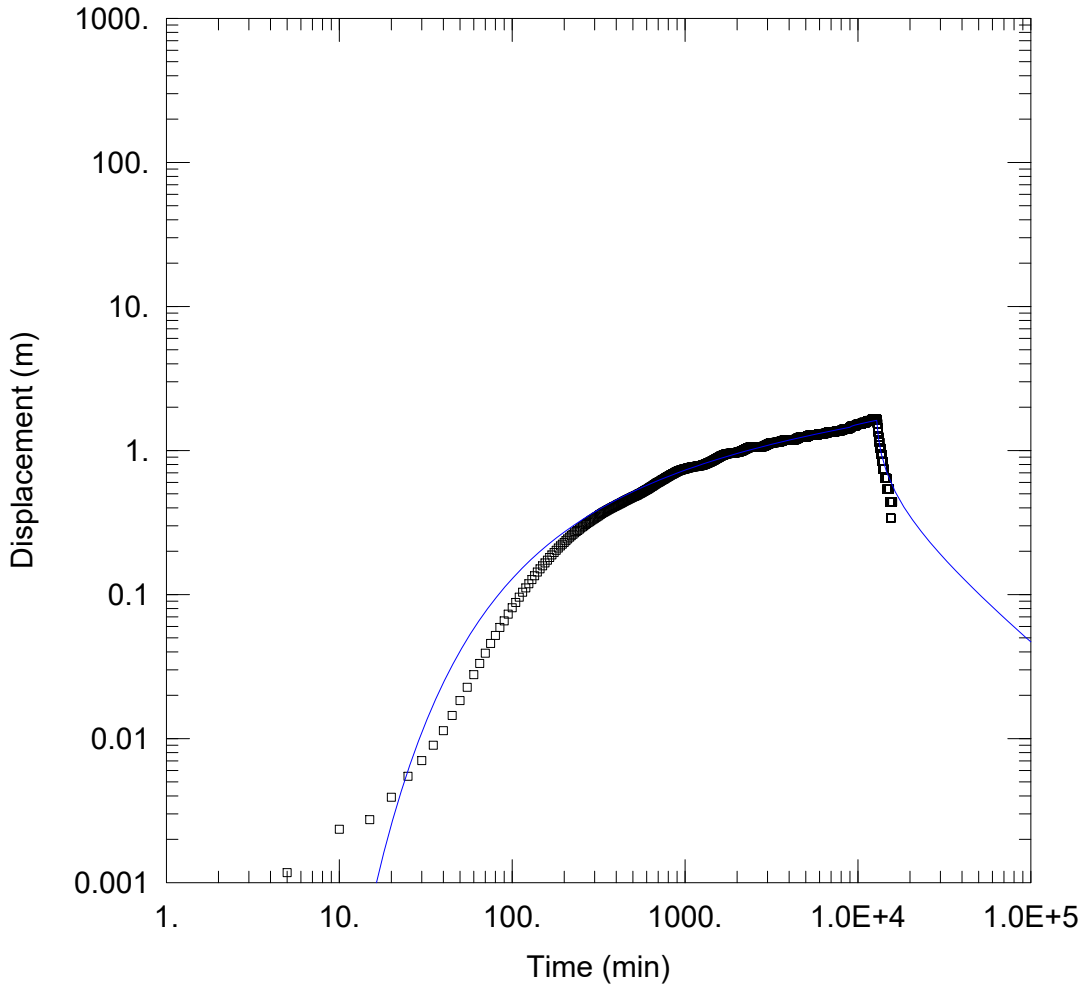
Observation Wells

Well Name	X (m)	Y (m)
▫ VWP_WINU0376_B	369166	7707466

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 269.5 m^2/day
S = 1.915E-5
Kz/Kr = 1.
b = 248.4 m



PB02 CRT

Data Set: C:\...\CRT_PB02_VWPWINU0376A_Theis.aqt
Date: 05/26/21 Time: 12:28:07

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

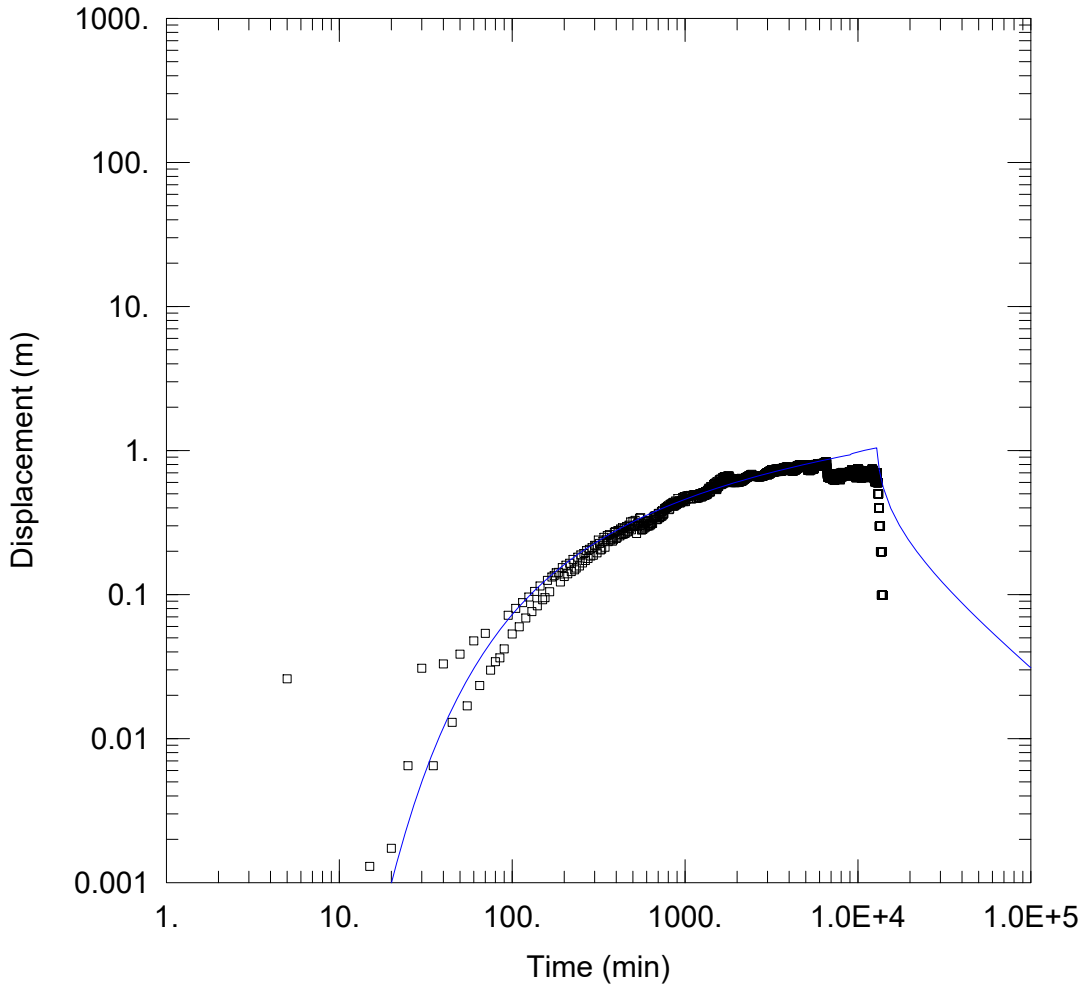
Observation Wells

Well Name	X (m)	Y (m)
▫ VWP_WINU0376_A	369748	7707393

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 189.7 m^2/day
S = 0.0003034
Kz/Kr = 1.
b = 248.4 m



PB02 CRT

Data Set: C:\...\CRT_PB02_VWPWINU0369_ATheis_Rev0.aqt
Date: 05/30/21 Time: 19:38:53

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

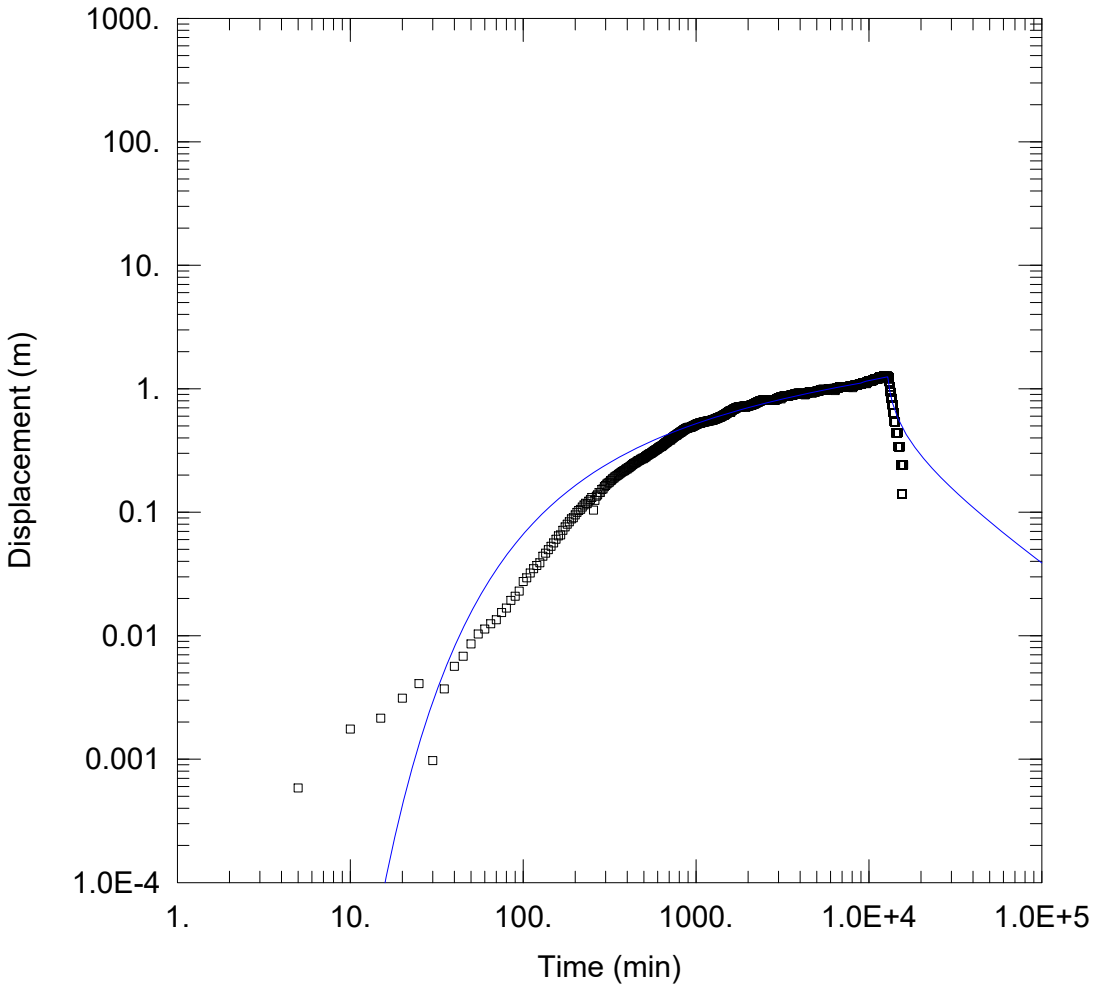
Observation Wells

Well Name	X (m)	Y (m)
VWP_WINU0369_A	369438	7707697

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 287. m^2/day
S = 0.0001196
Kz/Kr = 1.
b = 248.4 m



PB02 CRT

Data Set: C:\...\CRT_PB02_VWPWINU03769_BTheis.aqt
Date: 05/26/21 Time: 12:31:33

PROJECT INFORMATION

Company: Rio Tinto Winu
Client: Rio Tinto Winu
Project: 20136763
Location: Winu
Test Well: WINU0708
Test Date: 17-03-2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0708	369743.59	7707047.18

Observation Wells

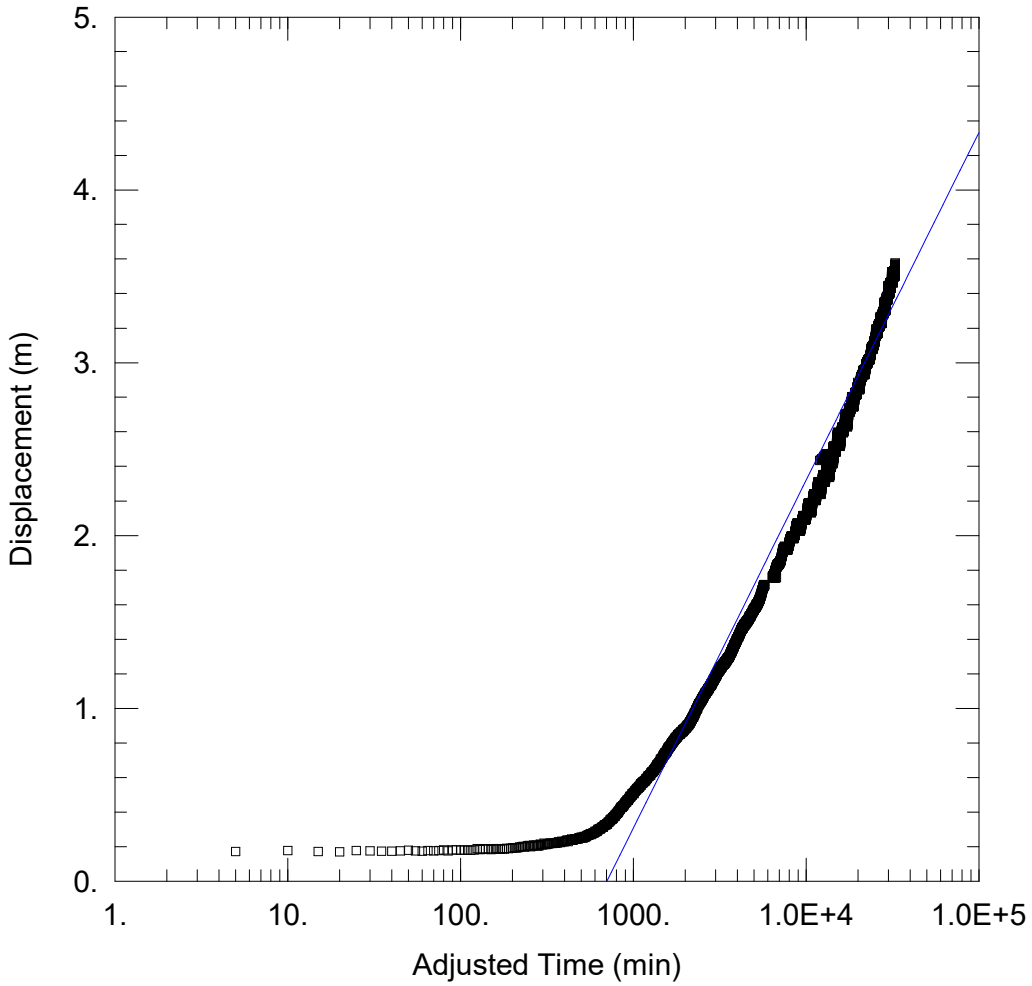
Well Name	X (m)	Y (m)
▫ VWP_WINU0369_B	369438	7707697

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 228.8 m^2/day
S = 0.0001176
Kz/Kr = 1.
b = 248.4 m

WINU0910 Aqtesolv Analysis Plots



WELL TEST ANALYSIS

Data Set: C:\...\WINU0166_Cooper-Jacob.aqt
Date: 02/11/22 Time: 18:09:47

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

AQUIFER DATA

Saturated Thickness: 150. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

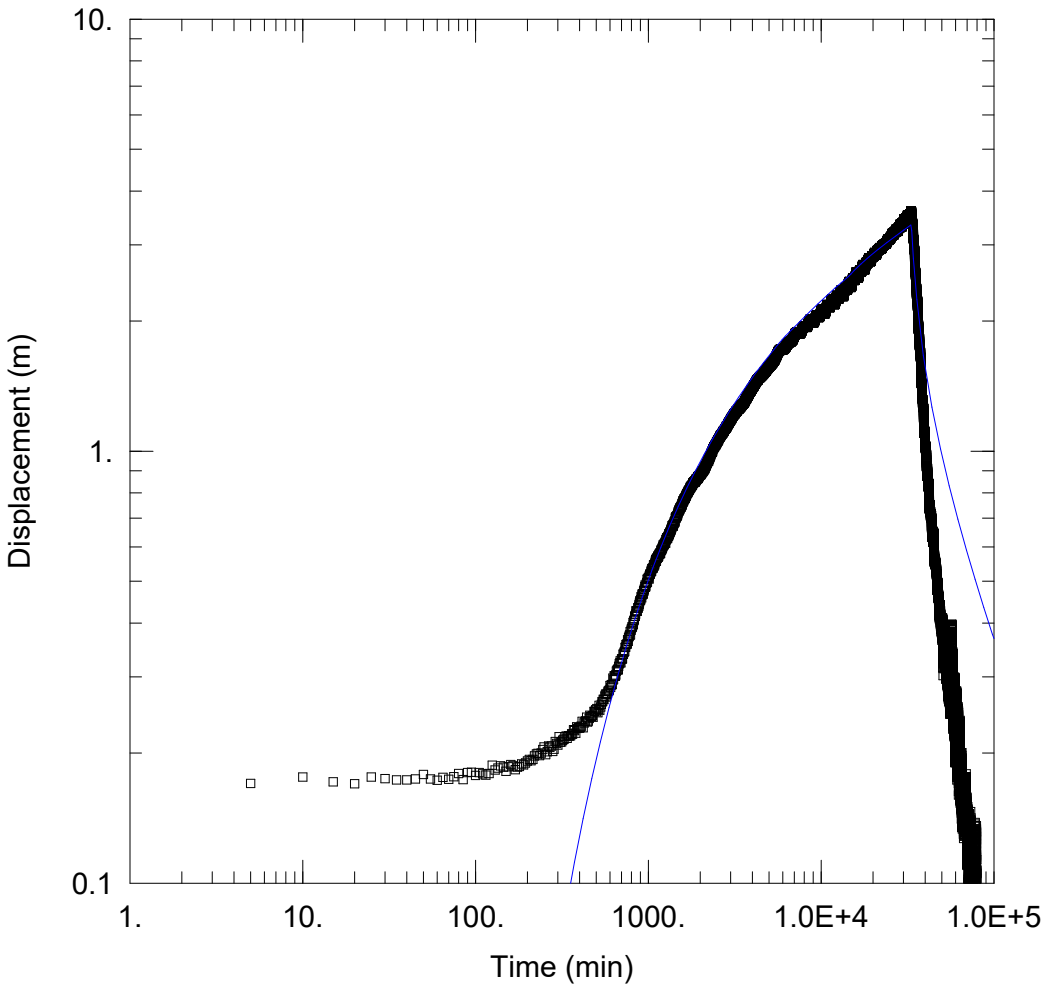
Observation Wells

Well Name	X (m)	Y (m)
WINU0166	369564.47	7707683.48

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 288.9 m^2/day S = 0.0001492



WELL TEST ANALYSIS

Data Set: C:\...\WINU0166_Theis.aqt
Date: 02/11/22 Time: 17:49:49

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

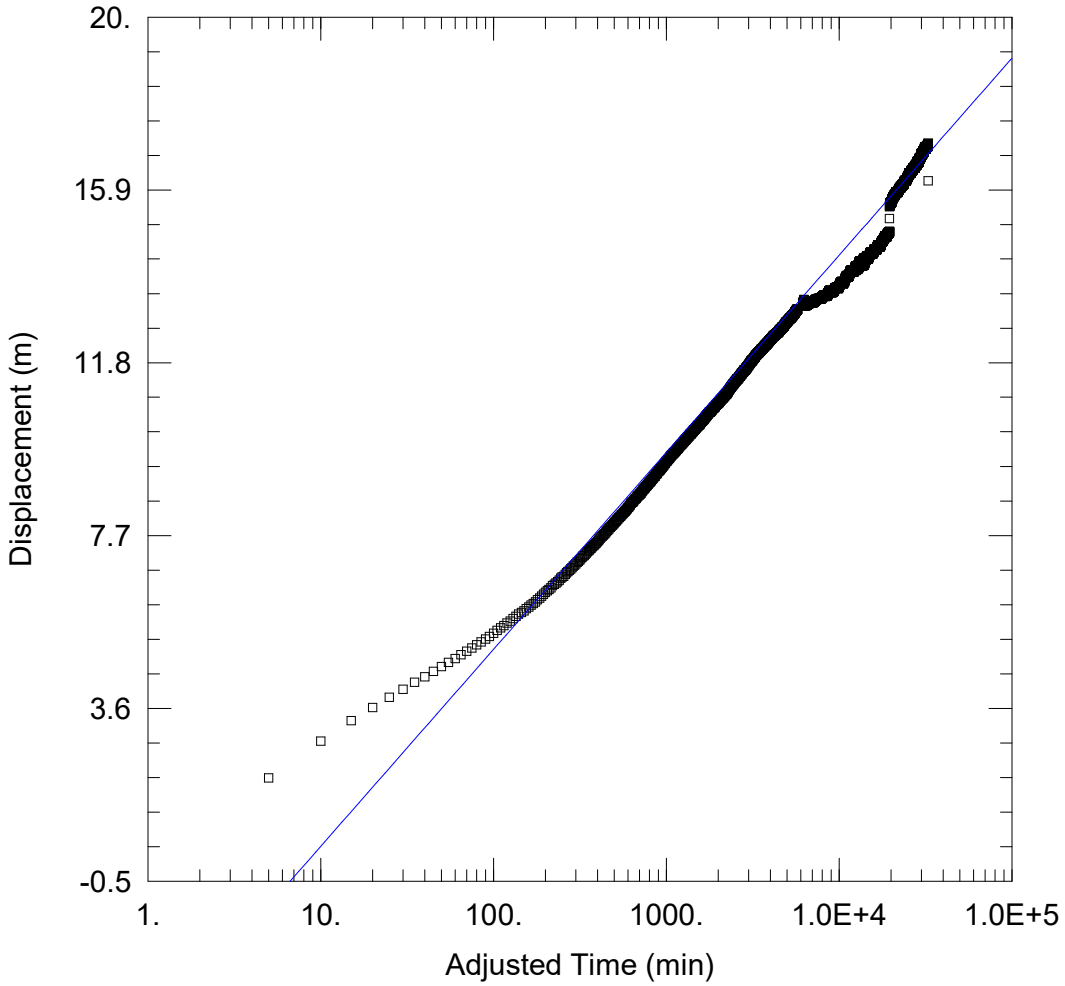
Observation Wells

Well Name	X (m)	Y (m)
WINU0166	369564.47	7707683.48

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 271.9 m^2/day
S = 0.0001826
Kz/Kr = 1.
b = 150. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0472_CooperJacob.aqt
Date: 02/11/22 Time: 17:34:29

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

AQUIFER DATA

Saturated Thickness: 150. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

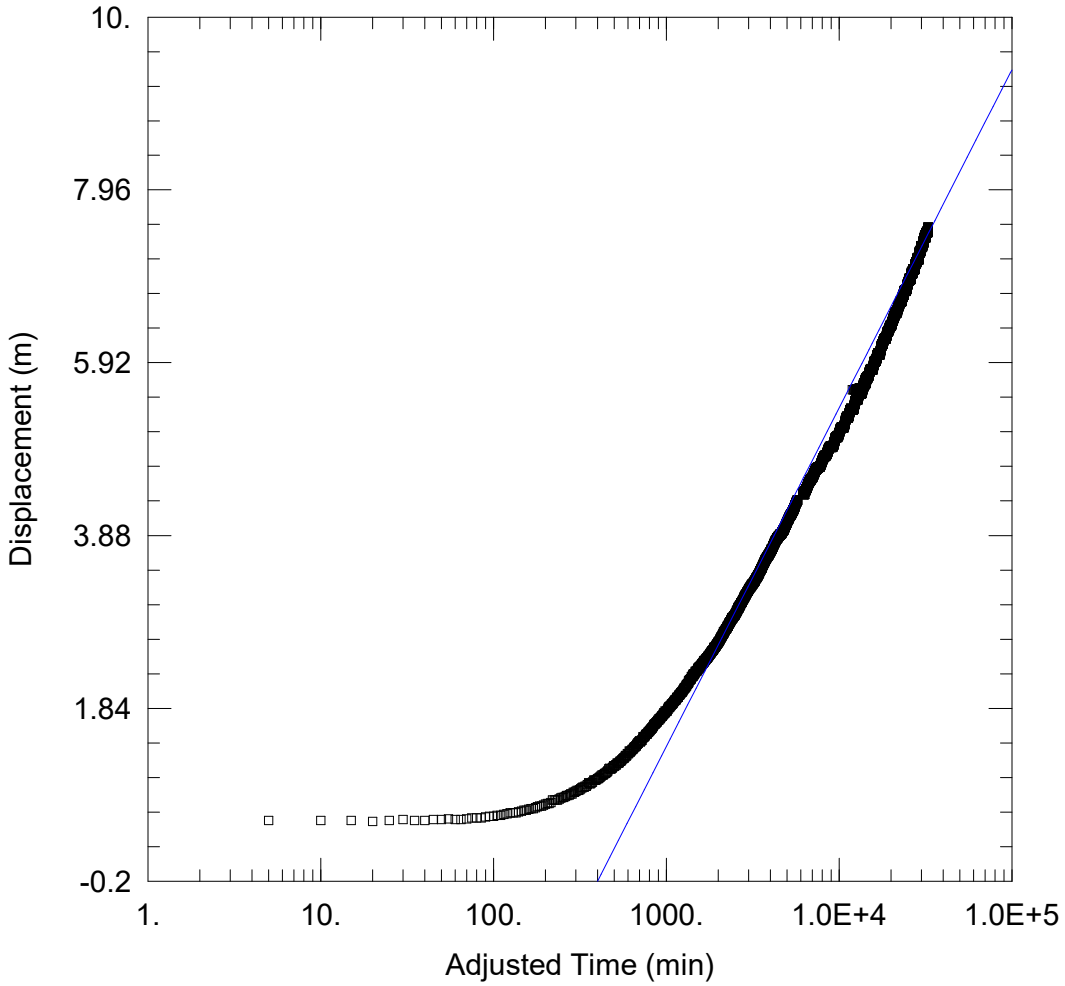
Observation Wells

Well Name	X (m)	Y (m)
WINU0472	369101.304	7708994.317

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 124.3 m^2/day S = 0.0003362



WELL TEST ANALYSIS

Data Set: C:\...\WINU0701_CooperJacob.aqt
Date: 02/11/22 Time: 17:31:40

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

AQUIFER DATA

Saturated Thickness: 150. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

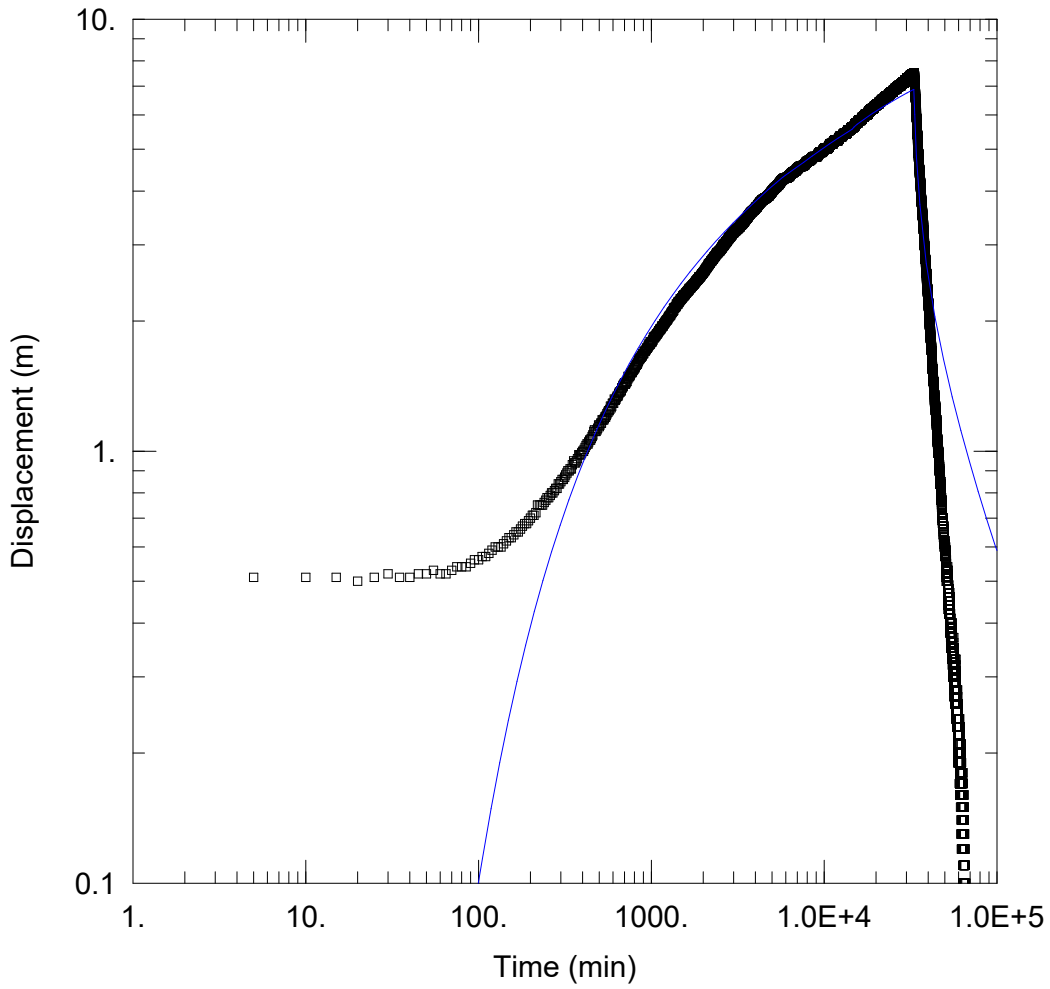
Observation Wells

Well Name	X (m)	Y (m)
WINU0701	368990.73	7708347.655

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 145.5 m^2/day S = 0.000194



WELL TEST ANALYSIS

Data Set: C:\...\WINU0701_Theis.aqt
Date: 02/11/22 Time: 17:22:35

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

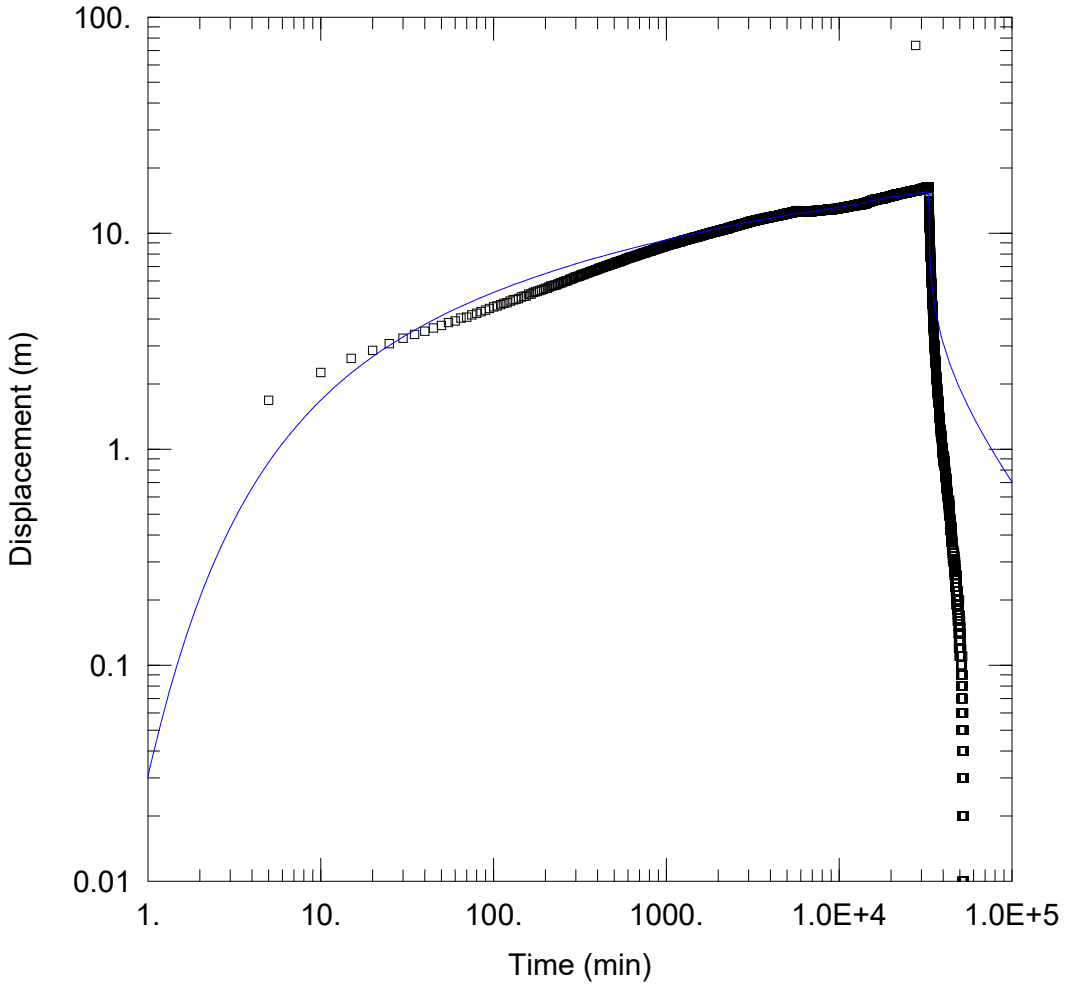
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0701	368990.73	7708347.655

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 170.7 m^2/day
S = 0.0001588
Kz/Kr = 1.
b = 150. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0704_Theis.aqt
Date: 02/11/22 Time: 17:04:48

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

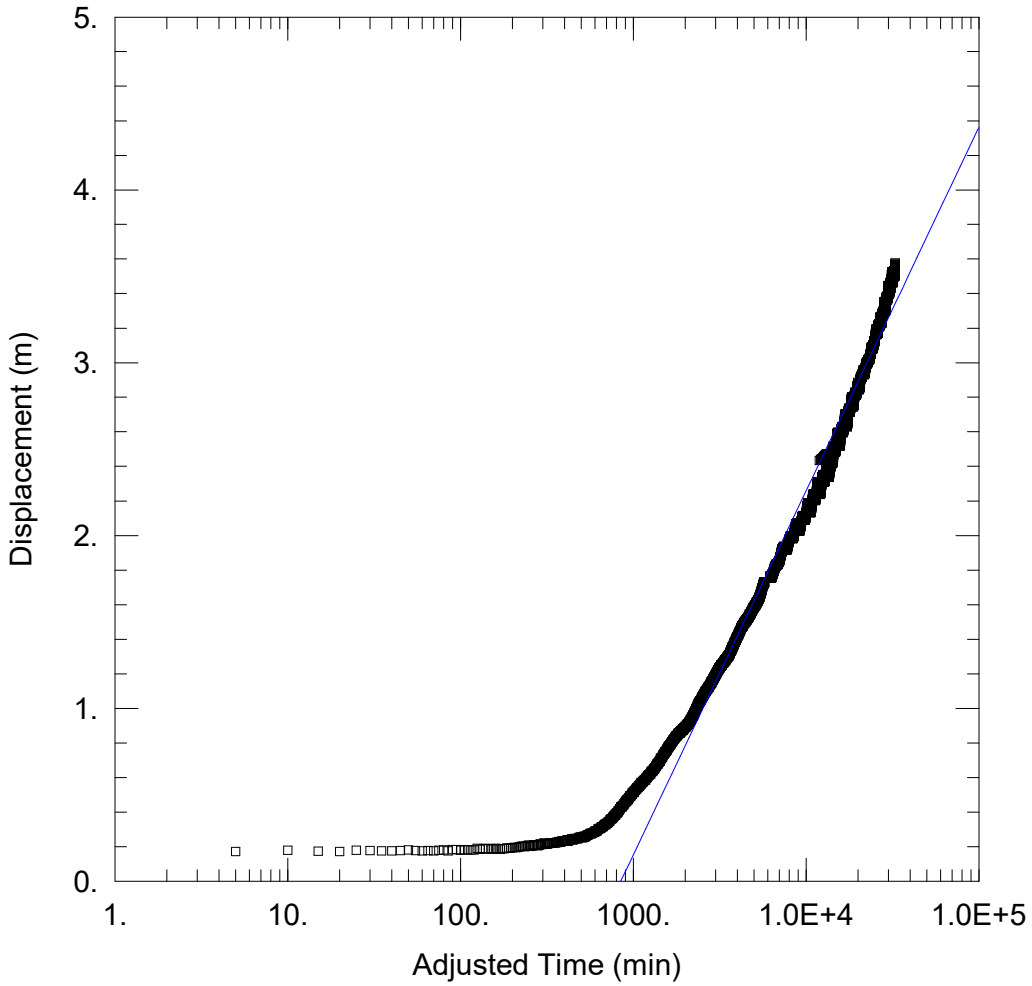
Observation Wells

Well Name	X (m)	Y (m)
WINU0704	369074.25	7709028.85

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 142.5 m^2/day
S = 0.0006096
Kz/Kr = 1.
b = 150. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0705_CooperJacob.aqt
Date: 02/11/22 Time: 16:58:02

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

AQUIFER DATA

Saturated Thickness: 150. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

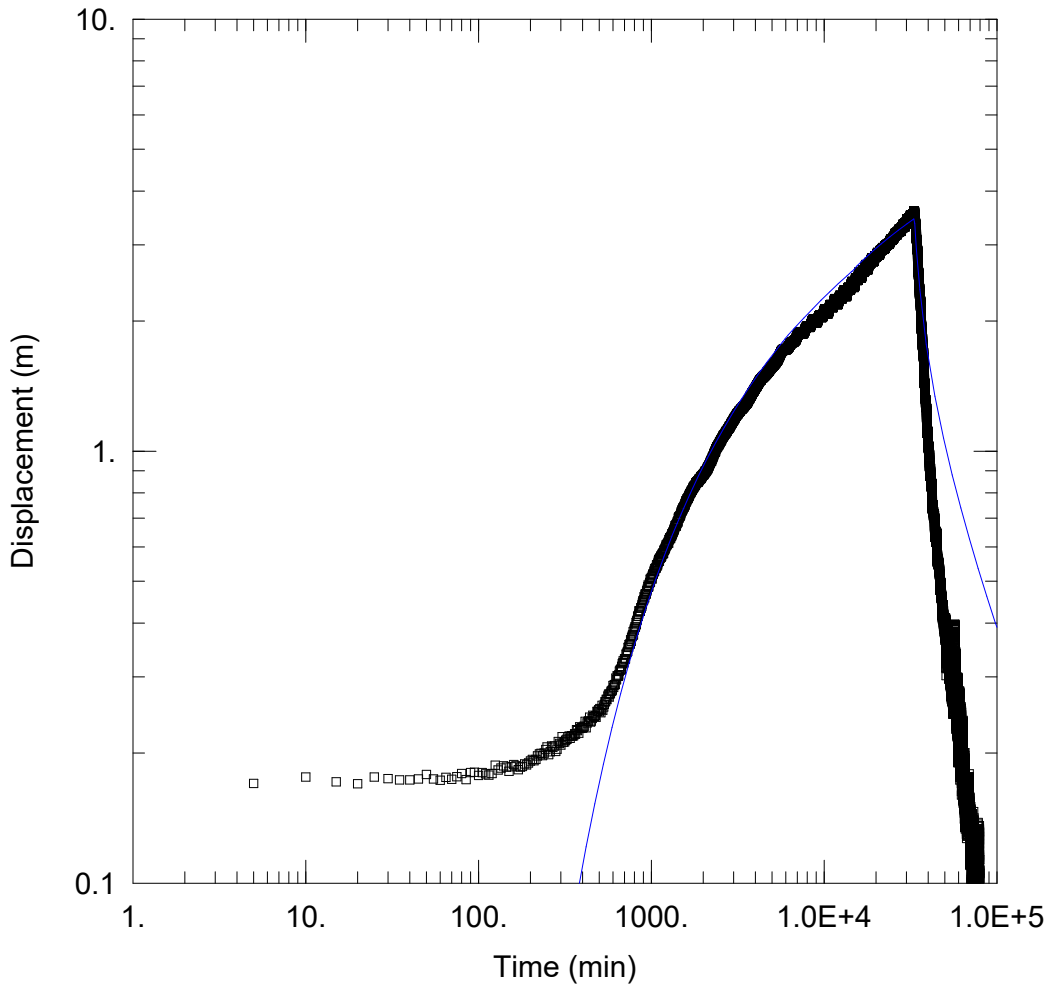
Observation Wells

Well Name	X (m)	Y (m)
WINU0705	369905.46	7707002.86

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 276.1 m^2/day S = 7.436E-5



WELL TEST ANALYSIS

Data Set: C:\...\WINU0705_Theis.aqt
Date: 02/11/22 Time: 18:04:58

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

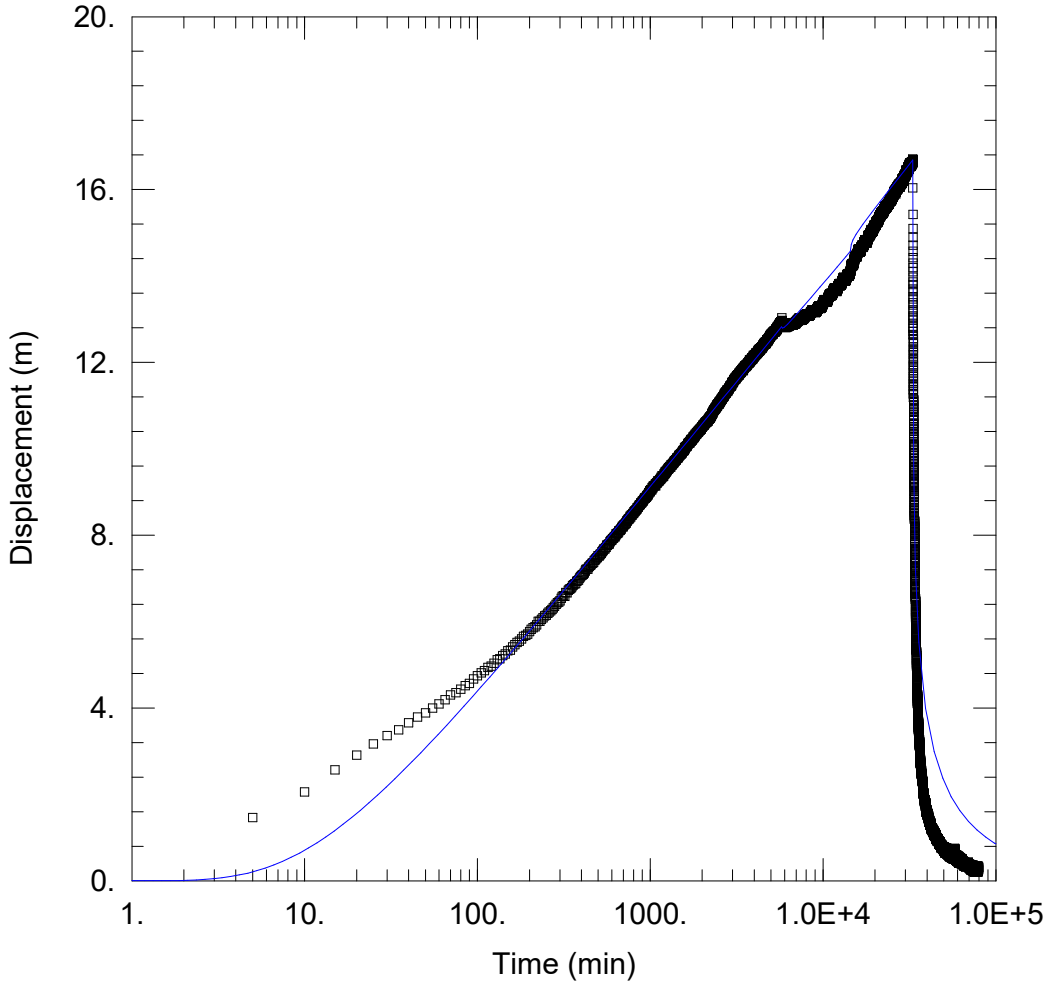
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0705	369905.46	7707002.86

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 255.7 m^2/day
S = 8.234E-5
Kz/Kr = 1.
b = 150. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0908_Theis.aqt
Date: 02/11/22 Time: 16:51:06

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

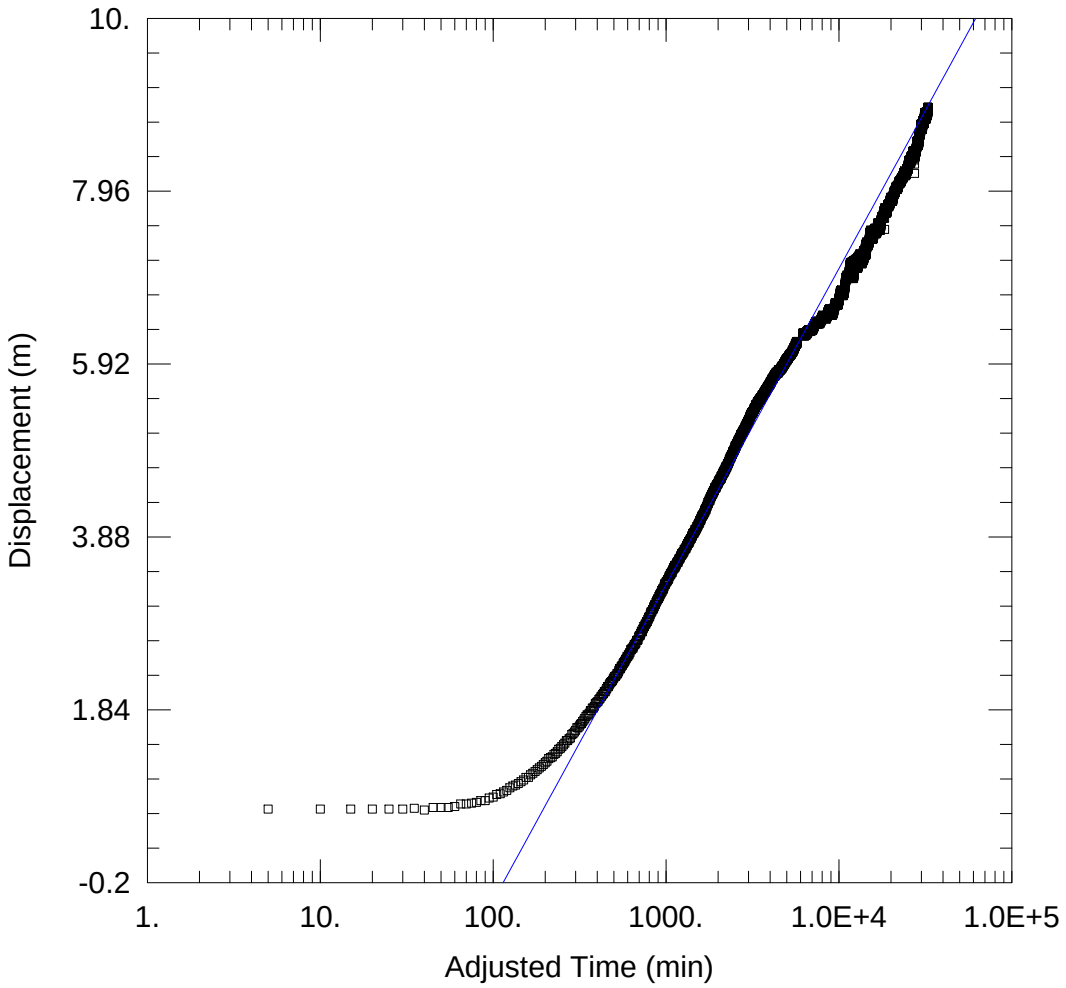
Observation Wells

Well Name	X (m)	Y (m)
WINU0908	369121.21	7709122.26

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 117.8 m^2/day
S = 0.0006372
Kz/Kr = 1.
b = 151. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0909_CopperJacob.aqt
Date: 01/25/22 Time: 15:14:16

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

AQUIFER DATA

Saturated Thickness: 150. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

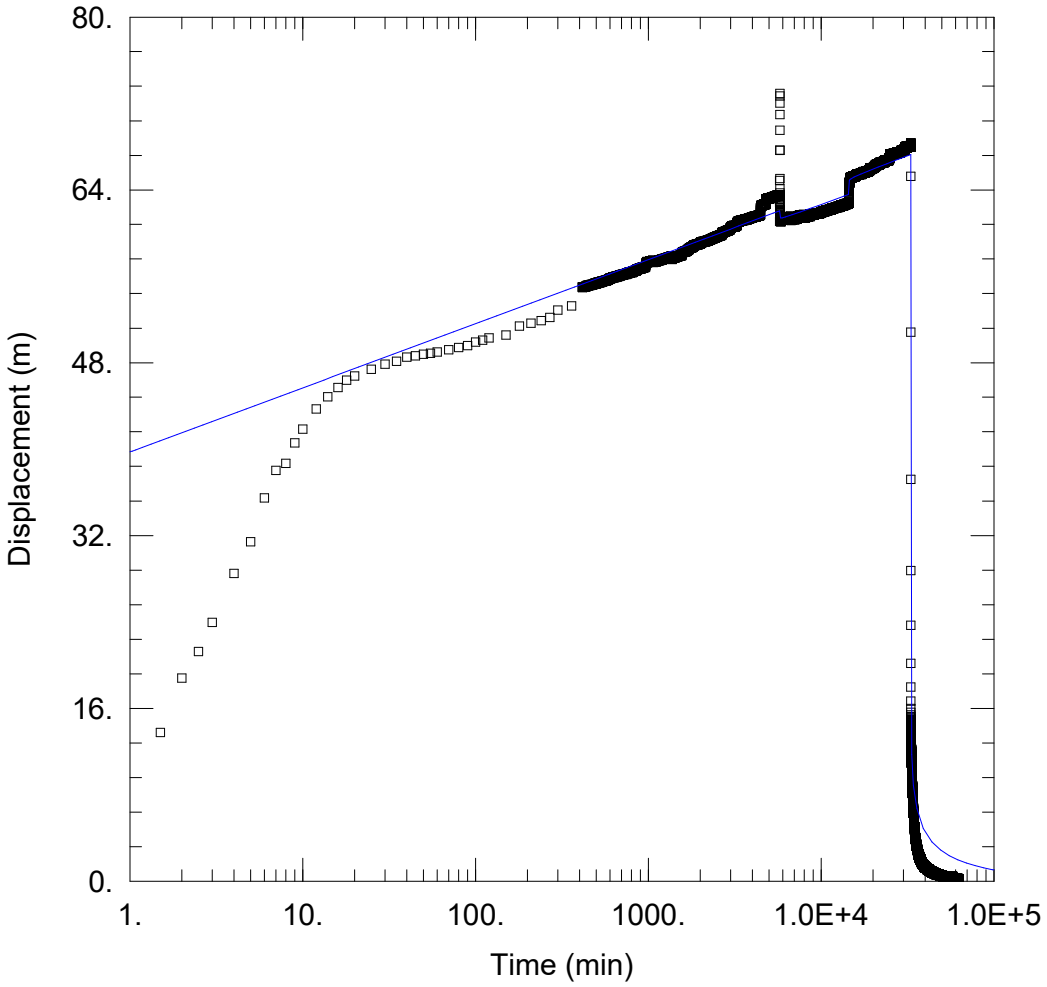
Observation Wells

Well Name	X (m)	Y (m)
WINU0909	368597.01	7709518

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 155.7 m^2/day S = 6.877E-5



WELL TEST ANALYSIS

Data Set: C:\...\WINU0910_ConfinedTheis.aqt
Date: 02/11/22 Time: 18:00:23

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
New Well	0	0

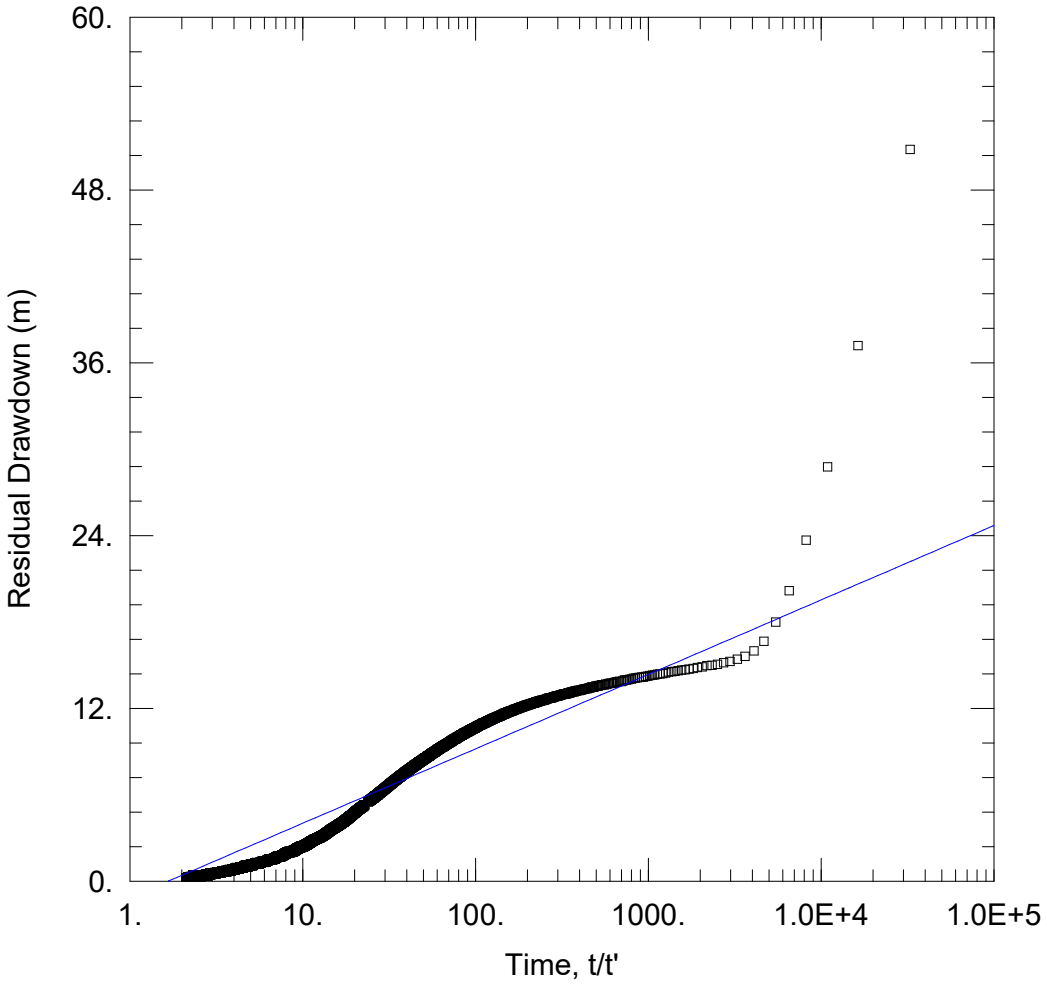
Observation Wells

Well Name	X (m)	Y (m)
New Well	0	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 96.77 m^2/day
S = 6.595E-7
Kz/Kr = 1.
b = 151. m



WELL TEST ANALYSIS

Data Set: C:\...\WINU0910_Recovery.aqt
Date: 02/11/22 Time: 17:55:53

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

AQUIFER DATA

Saturated Thickness: 151. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
New Well	0	0

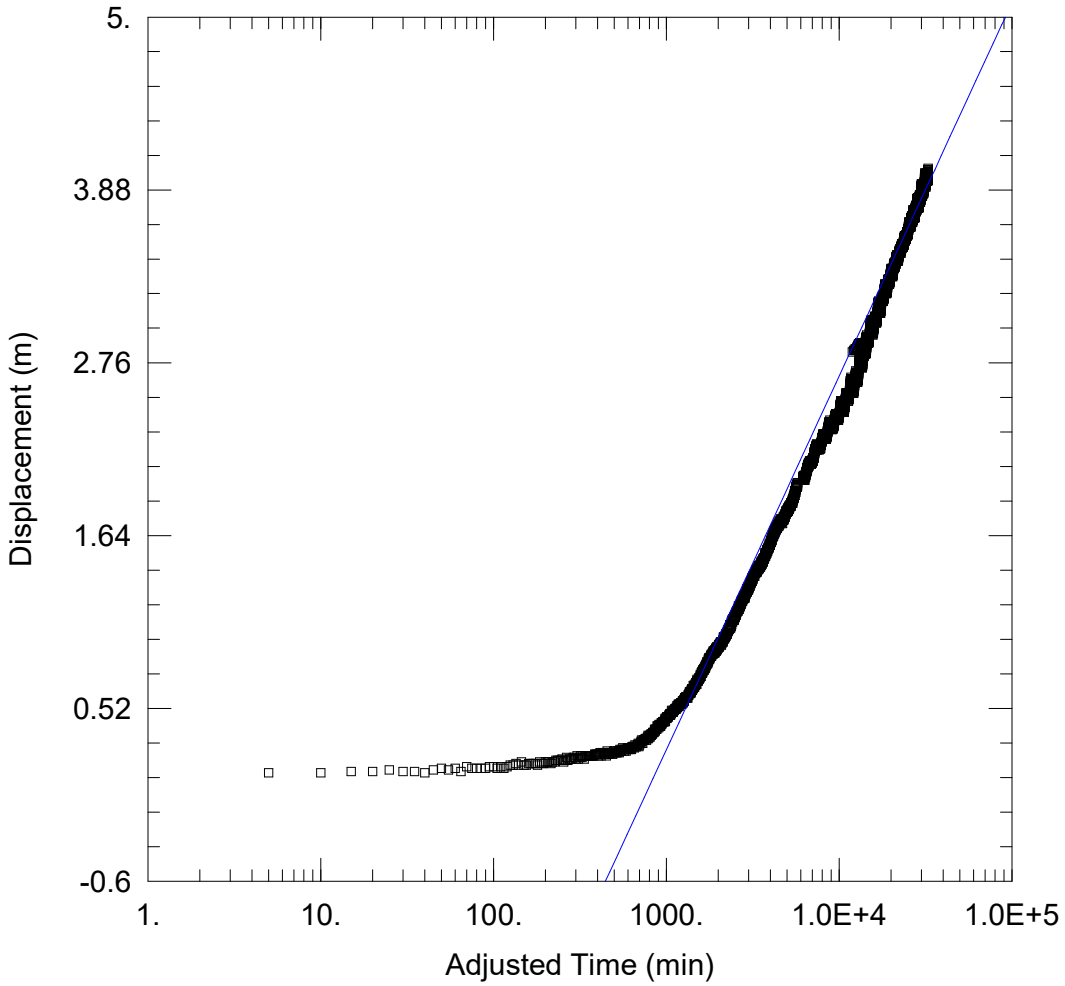
Observation Wells

Well Name	X (m)	Y (m)
New Well	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 112.5 m^2/day S/S' = 1.669



WELL TEST ANALYSIS

Data Set: C:\...\WINU0911_Cooper-Jacob.aqt
Date: 02/11/22 Time: 17:53:31

PROJECT INFORMATION

Company: Golder
Client: Rio Tinto
Project: 20136763
Location: Winu
Test Well: WINU0910
Test Date: 24/11/2021

AQUIFER DATA

Saturated Thickness: 150. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.32

Observation Wells

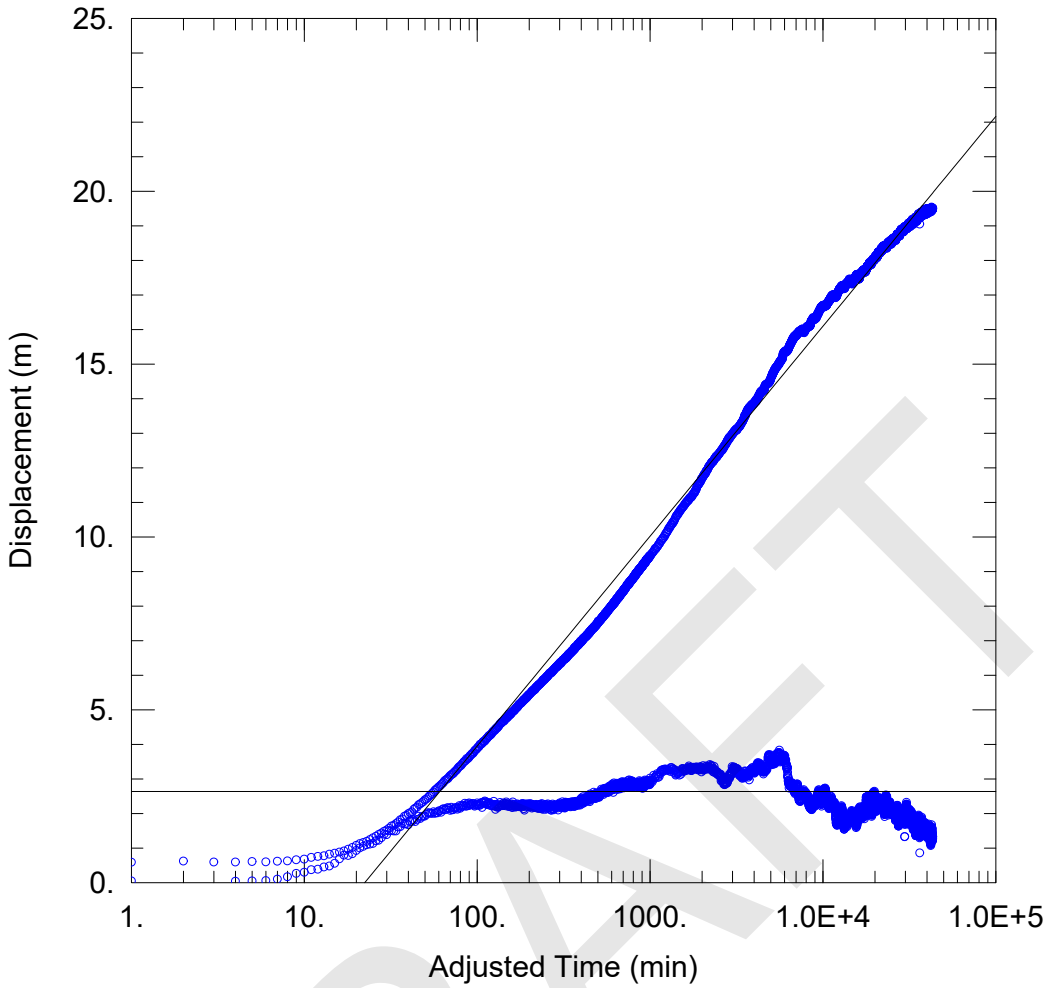
Well Name	X (m)	Y (m)
WINU0911	369753.38	7708994.12

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 240.2 m^2/day S = 0.0006779

WINU0913 Aqtesolv Analysis Plots



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0912_CJ_TKD.aqt
Date: 06/16/22 Time: 13:33:35

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

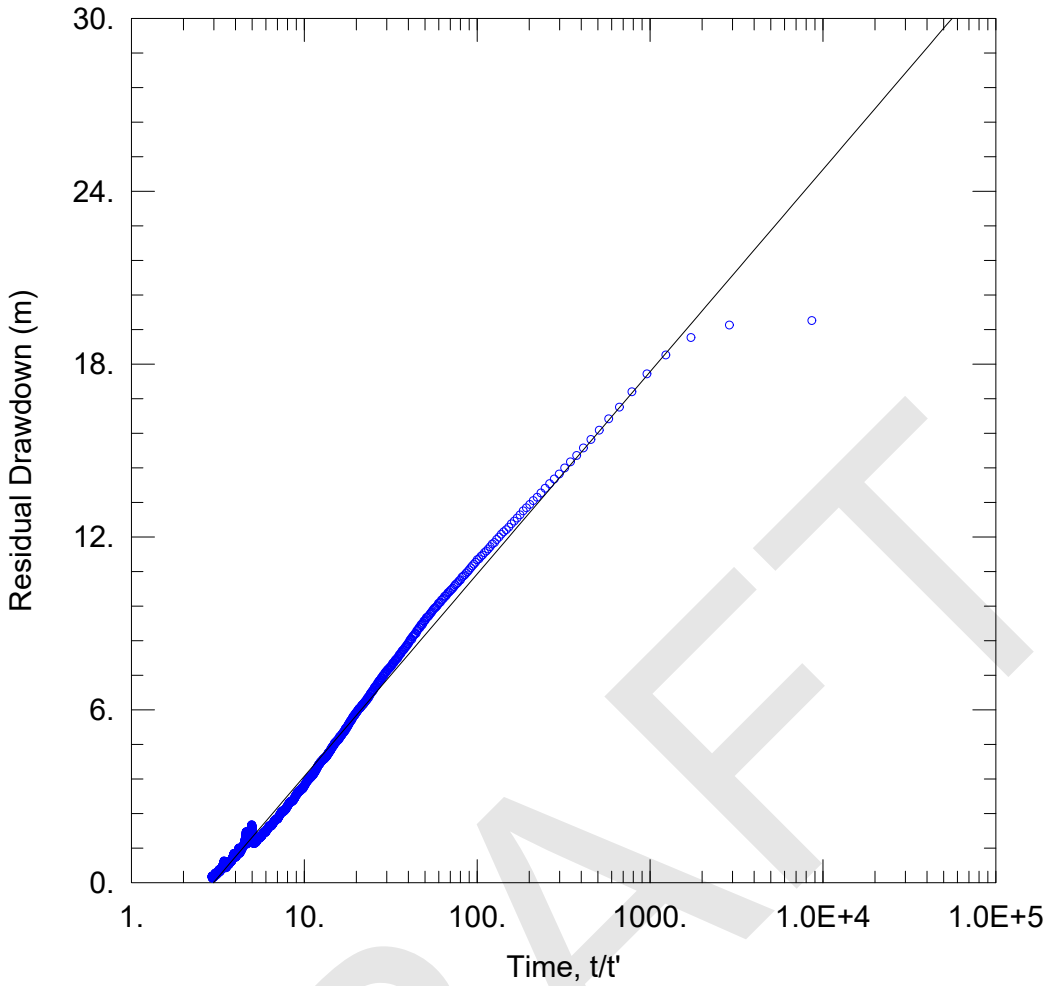
Observation Wells

Well Name	X (m)	Y (m)
◦ WINU0912	371483.401	7707011.826

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 23.46 m^2/day S = 0.0001571



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0912_Th_R_TKD.aqt
Date: 06/16/22 Time: 14:15:14

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

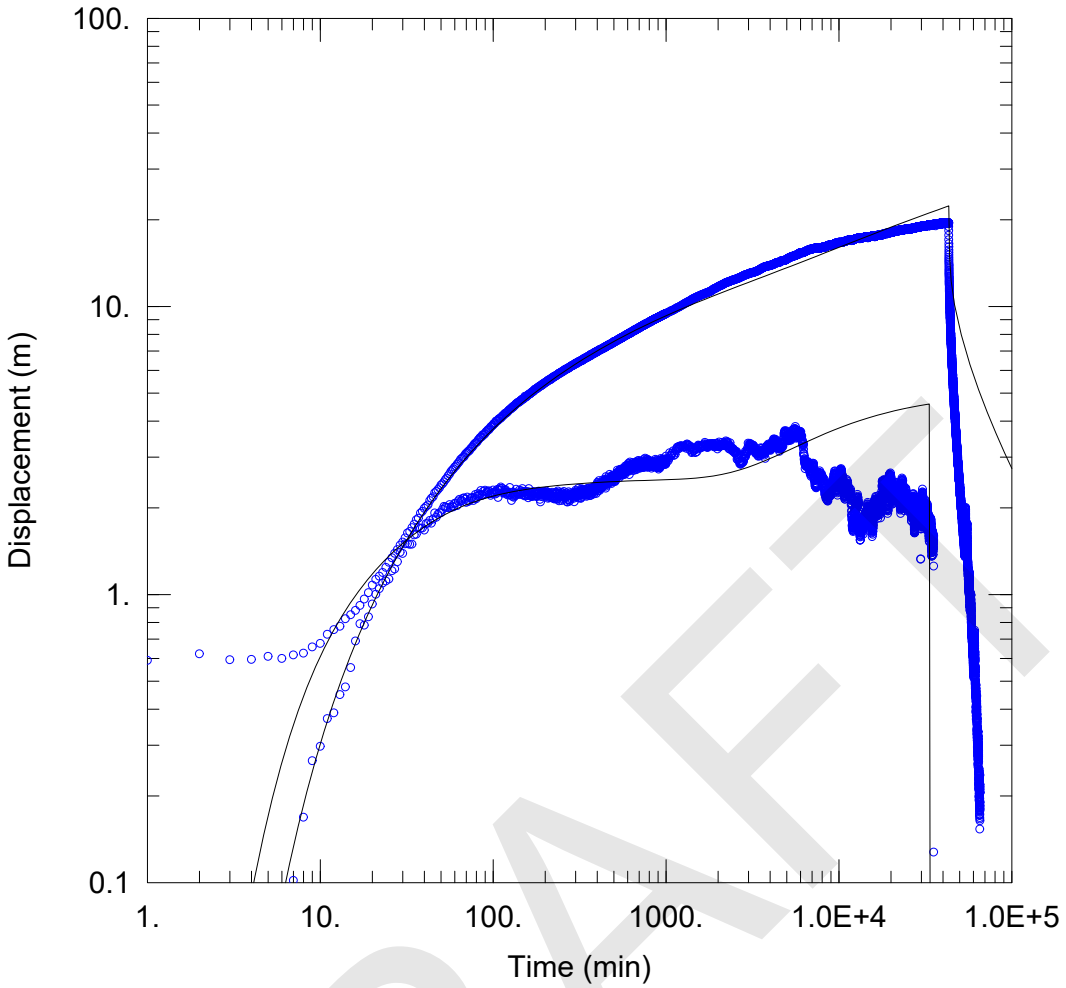
Observation Wells

Well Name	X (m)	Y (m)
○ WINU0912	371483.401	7707011.826

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 20.3 m^2/day S/S' = 2.98



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0912_Th_TKD.aqt
Date: 06/16/22 Time: 13:39:17

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

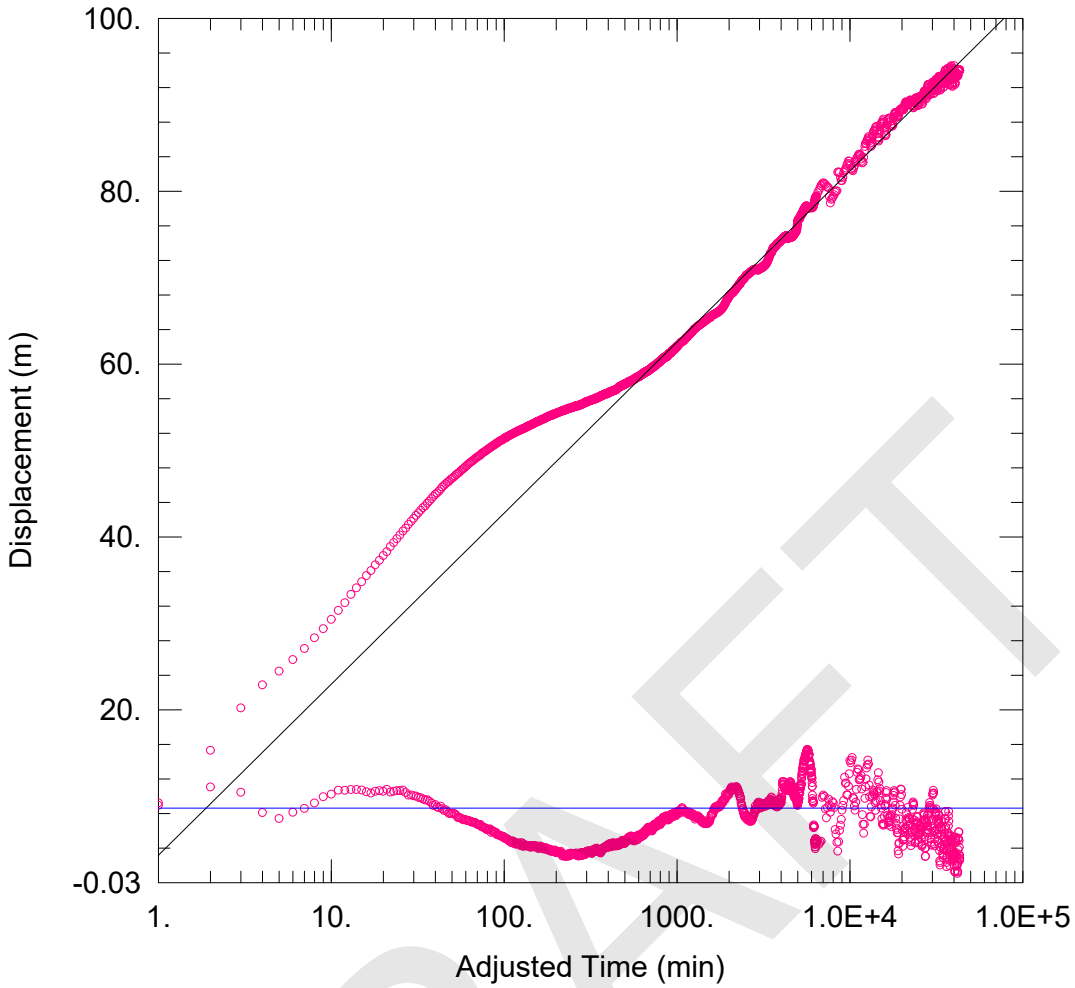
Observation Wells

Well Name	X (m)	Y (m)
○ WINU0912	371483.401	7707011.826

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 24.4 m^2/day
S = 0.0001788
Kz/Kr = 1.
b = 159. m



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0913_C_CooperJacob_Middle_TKD.aqt
Date: 06/16/22 Time: 11:49:59

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

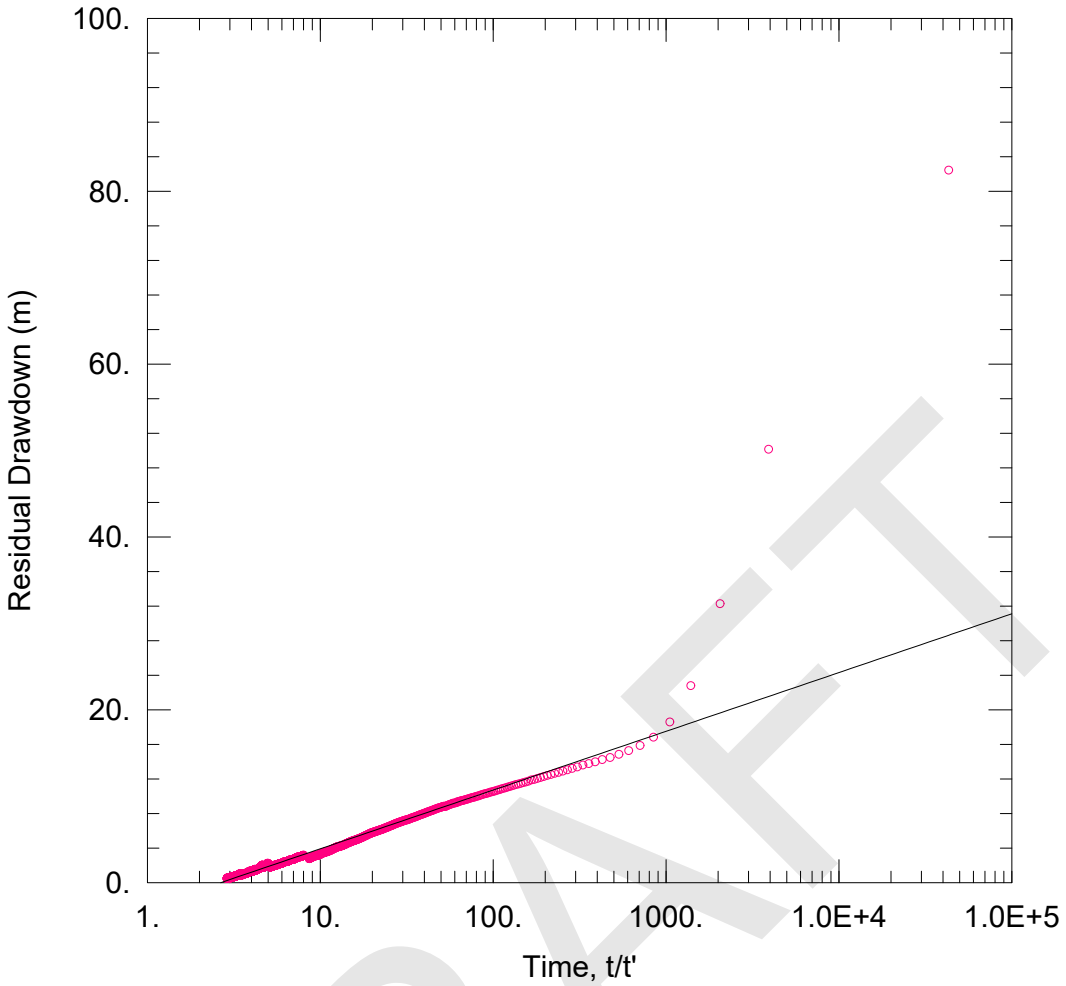
Observation Wells

Well Name	X (m)	Y (m)
○ WINU0913	371476	7706940

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 7.195 m^2/day S = 0.2229



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0913_Th_R_TKD.aqt
Date: 06/16/22 Time: 12:04:20

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

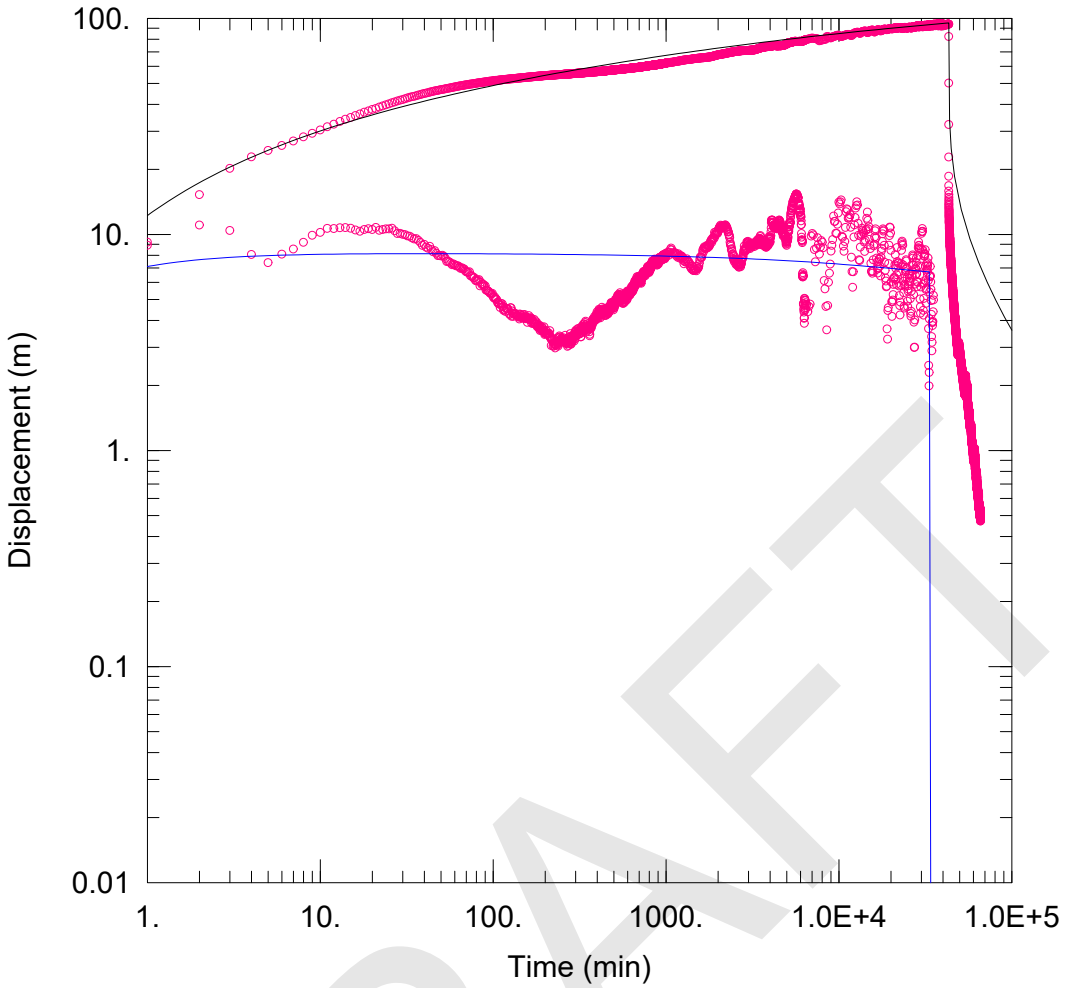
Observation Wells

Well Name	X (m)	Y (m)
○ WINU0913	371476	7706940

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 20.97 m^2/day S/S' = 2.656



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0913_Th_TKD.aqt
Date: 06/16/22 Time: 12:03:12

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

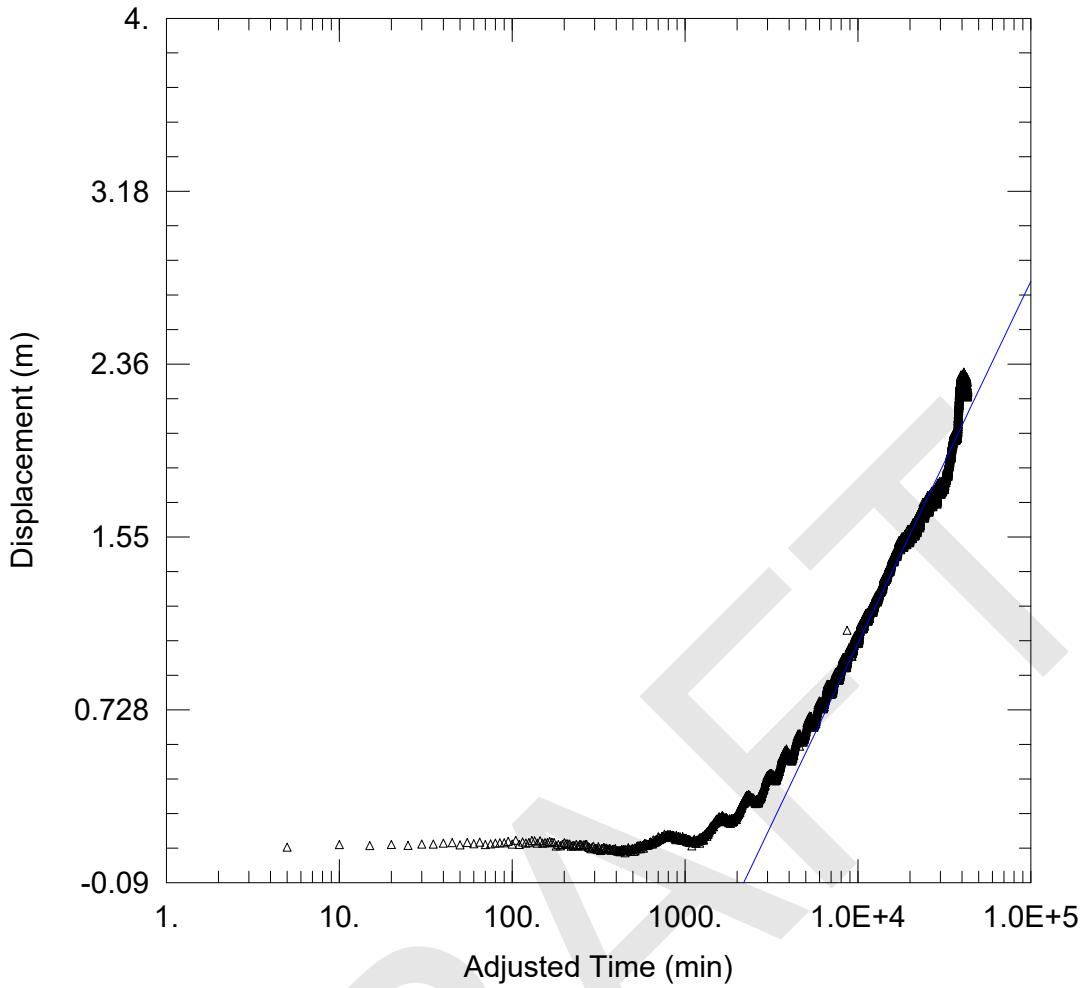
Observation Wells

Well Name	X (m)	Y (m)
○ WINU0913	371476	7706940

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 10.03 m^2/day
S = 0.1166
Kz/Kr = 1.
b = 159. m



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0914_CJ_TKD.aqt
Date: 06/16/22 Time: 15:51:50

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

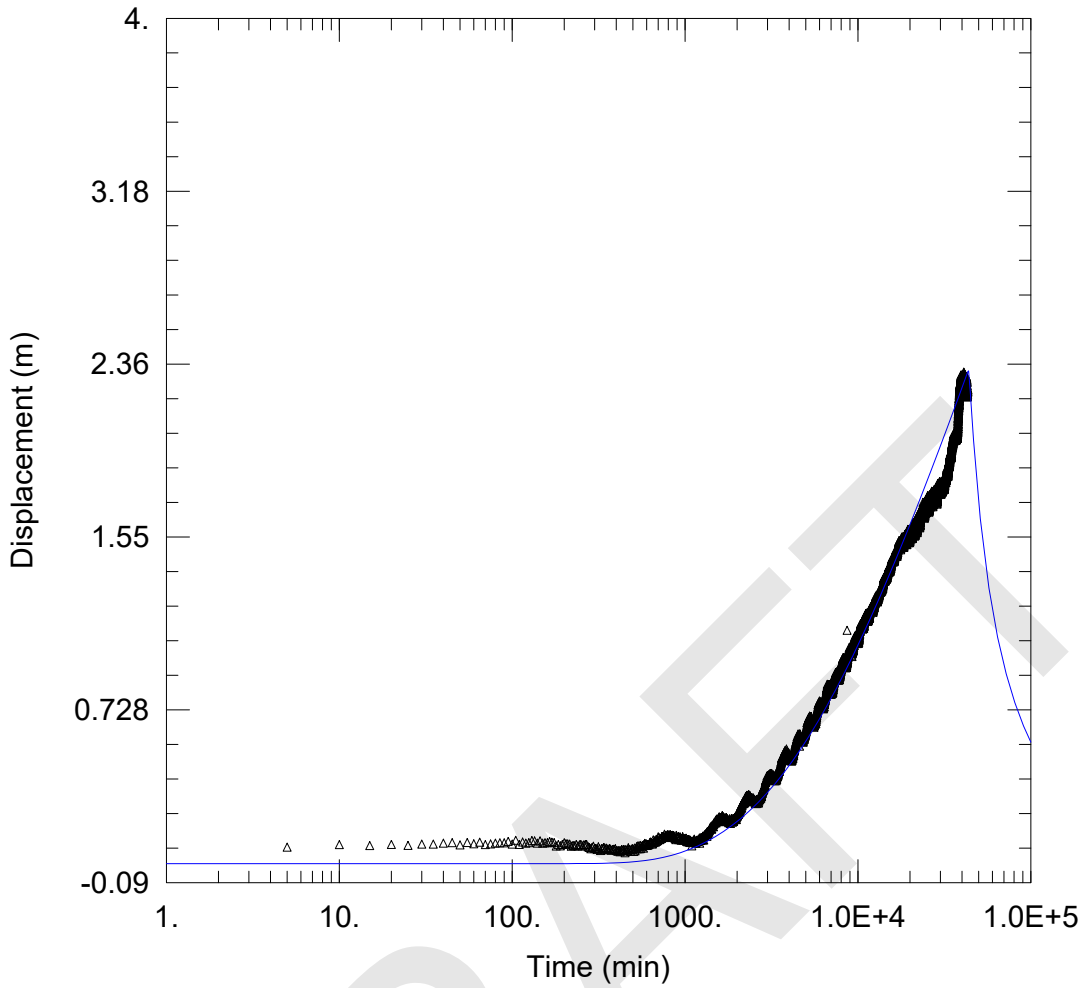
Observation Wells

Well Name	X (m)	Y (m)
▵ WINU0914	370718	7707474

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 83.16 m^2/day S = 0.0003719



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0914_Th_TKD.aqt
Date: 06/16/22 Time: 15:55:10

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

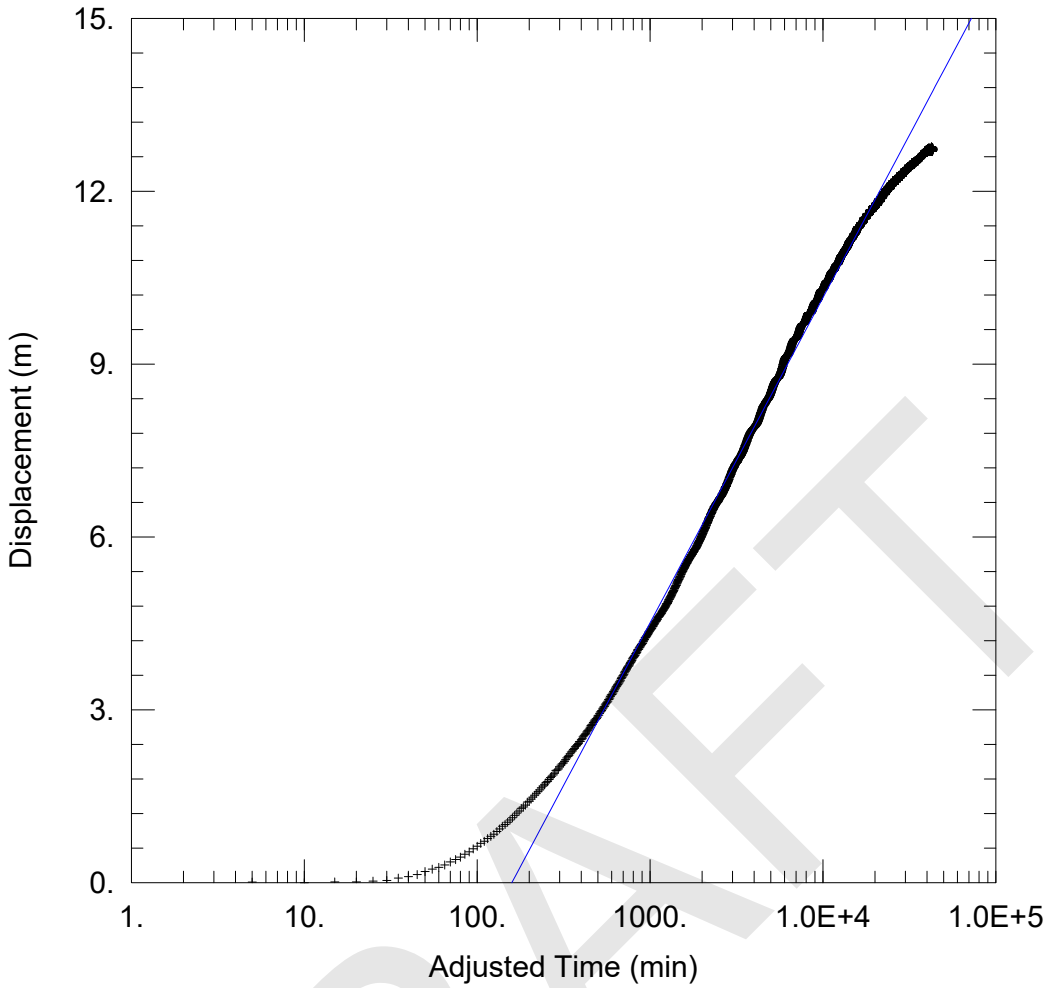
Observation Wells

Well Name	X (m)	Y (m)
△ WINU0914	370718	7707474

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 115.7 m^2/day
S = 0.0005362
Kz/Kr = 1.
b = 159. m



DRAFT

WELL TEST ANALYSIS

Data Set: C:\..._WINU0915_CJ_.aqt
Date: 06/15/22 Time: 12:42:33

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

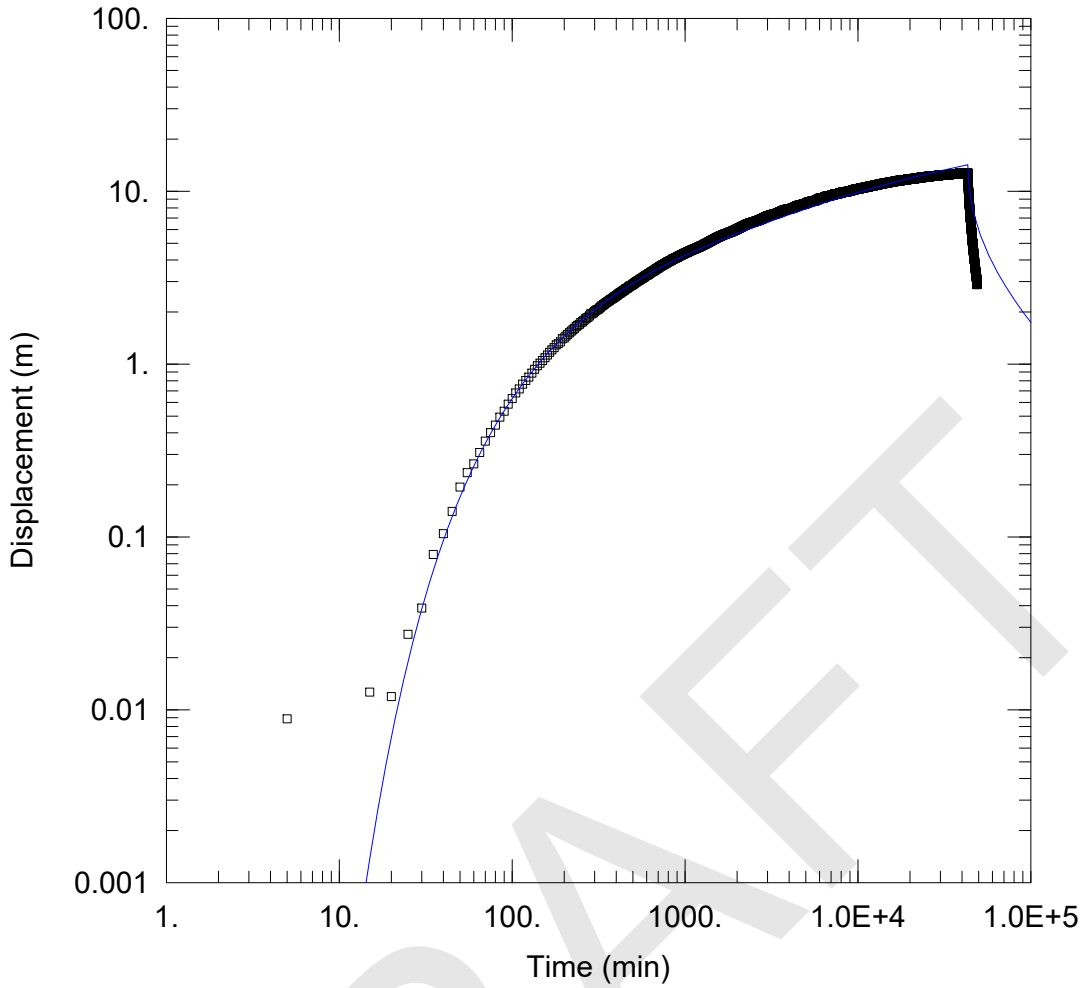
Observation Wells

Well Name	X (m)	Y (m)
+ WINU0915	371445	7706696

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 25.25 m^2/day S = 0.0001034



DRAFT

WELL TEST ANALYSIS

Data Set: C:\..._WINU0915_Th_.aqt
Date: 06/15/22 Time: 12:41:29

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

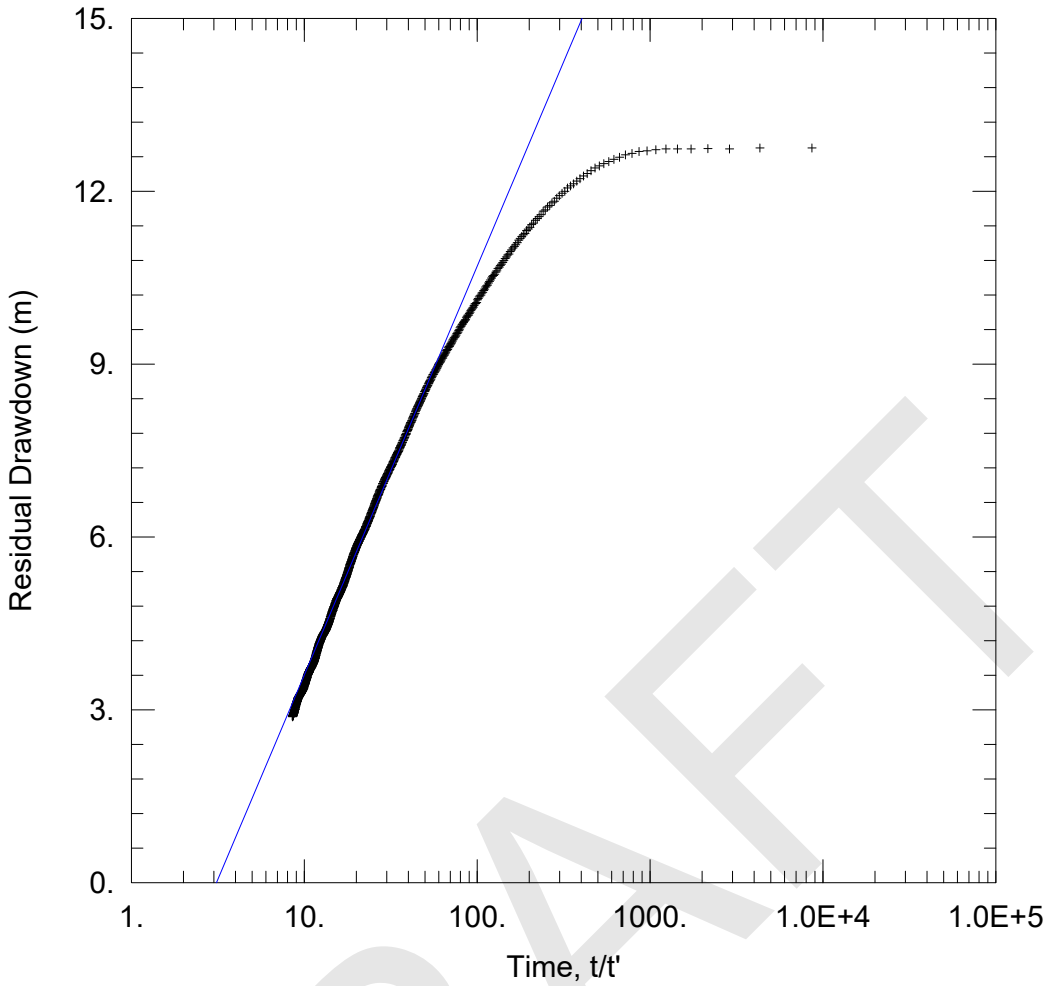
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0915	371445	7706696

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 38.95 m^2/day
S = 0.0001473
Kz/Kr = 0.001
b = 159. m



DRAFT

WELL TEST ANALYSIS

Data Set: C:\..._WINU0915_Th_R.aqt
Date: 06/15/22 Time: 12:35:27

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

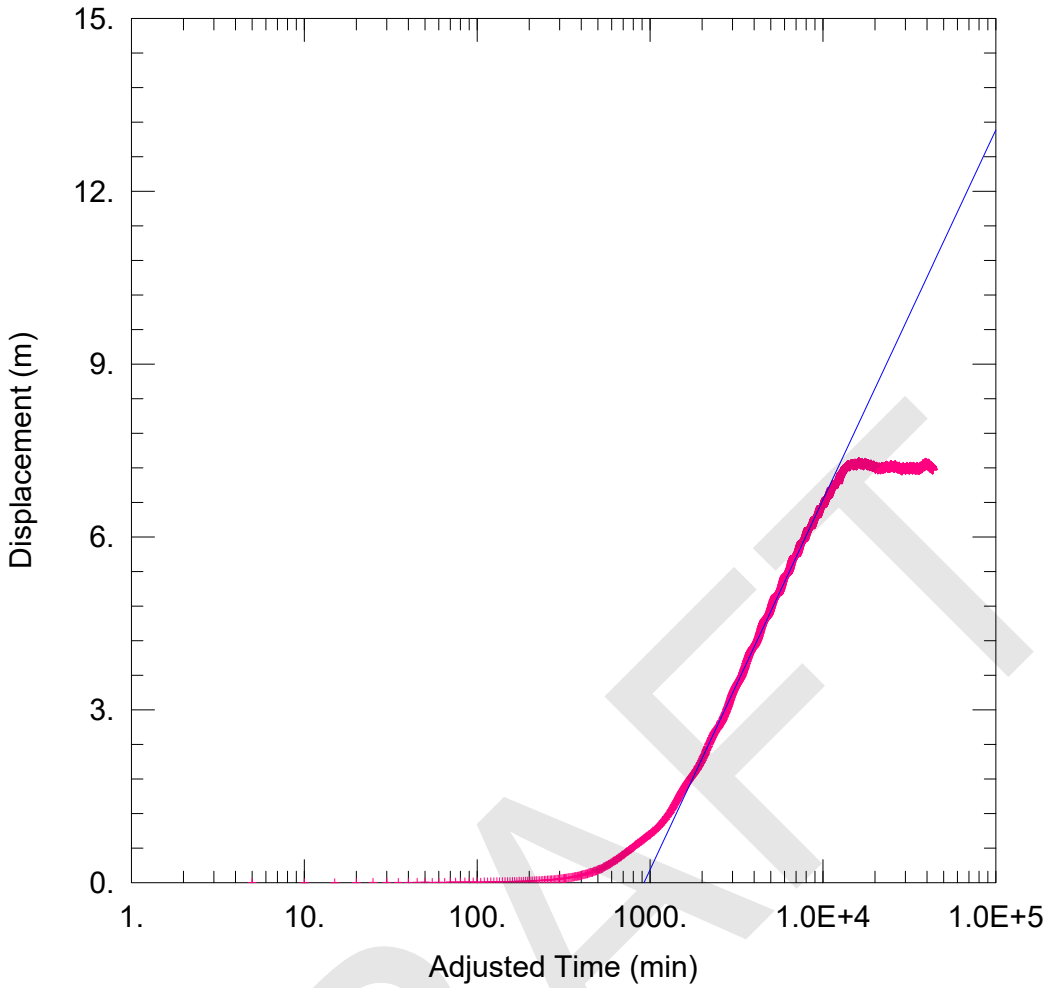
Observation Wells

Well Name	X (m)	Y (m)
+ WINU0915	371445	7706696

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 20.09 m^2/day S/S' = 3.104



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0997_CJ_.aqt
Date: 06/15/22 Time: 14:44:00

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

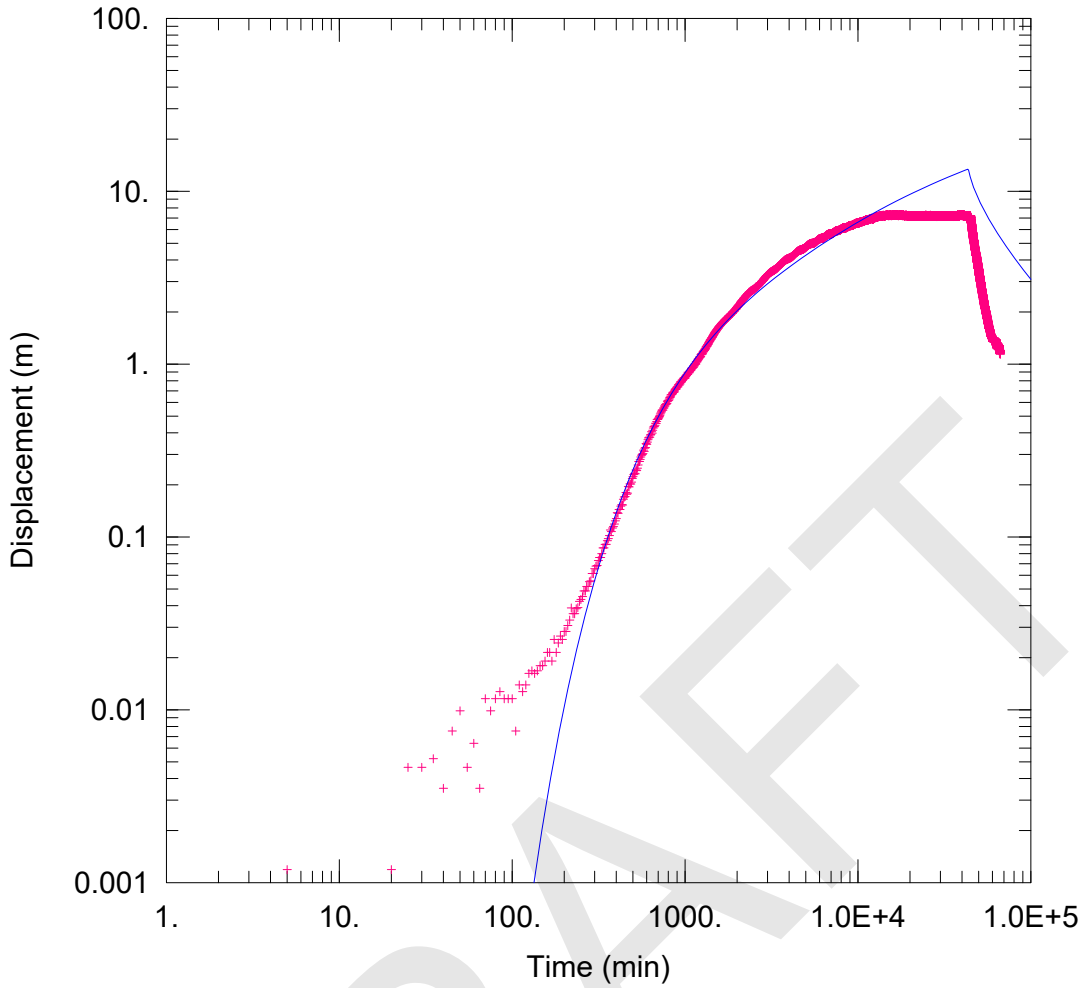
Observation Wells

Well Name	X (m)	Y (m)
+ WINU0997	371102.7	7707284.98

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 22.2 m^2/day S = 0.0001236



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0997_Th_.aqt
Date: 06/15/22 Time: 14:43:09

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

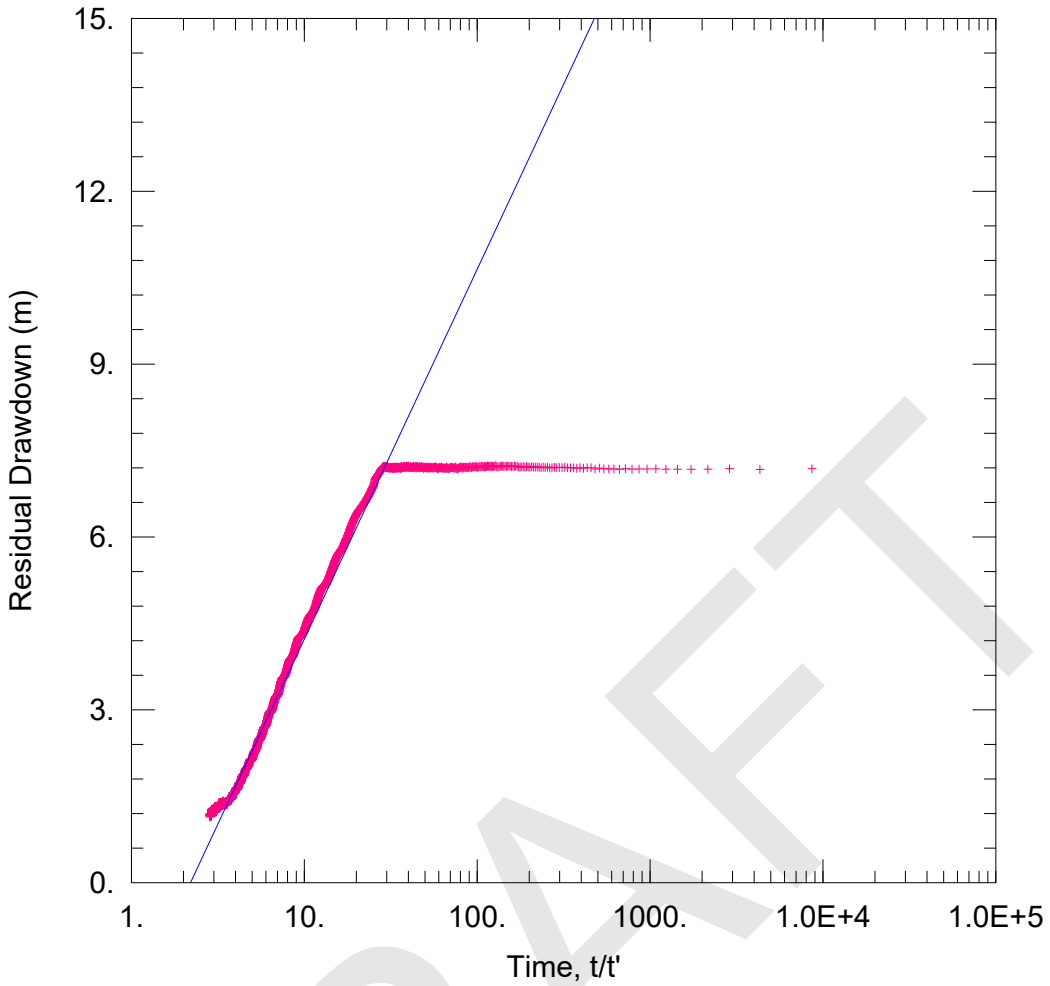
Observation Wells

Well Name	X (m)	Y (m)
+ WINU0997	371102.7	7707284.98

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 21.2 m^2/day
S = 0.0001844
Kz/Kr = 1.
b = 159. m



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0997_Th_R.aqt
Date: 06/15/22 Time: 14:42:23

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

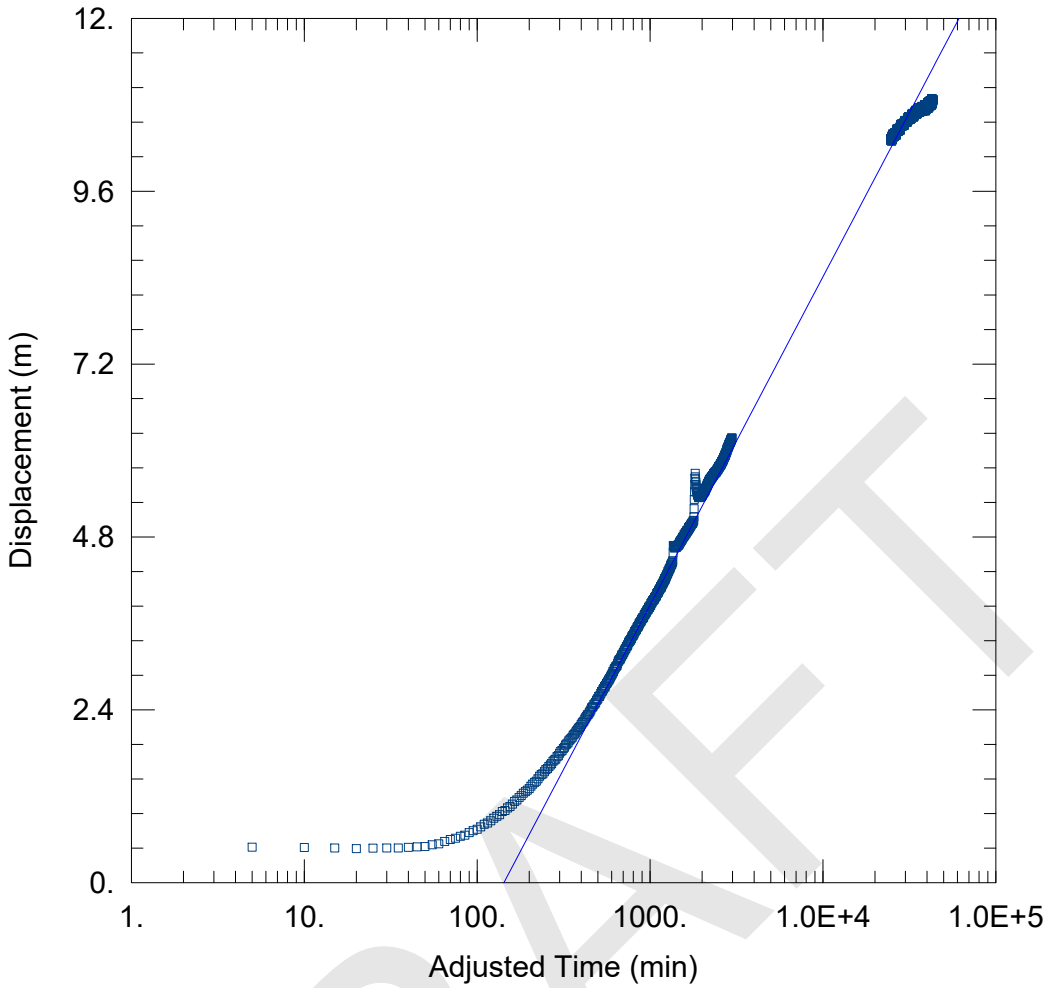
Observation Wells

Well Name	X (m)	Y (m)
+ WINU0997	371102.7	7707284.98

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 22.2 m^2/day S/S' = 2.197



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0542_CJ_TKD.aqt
Date: 06/20/22 Time: 14:58:55

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

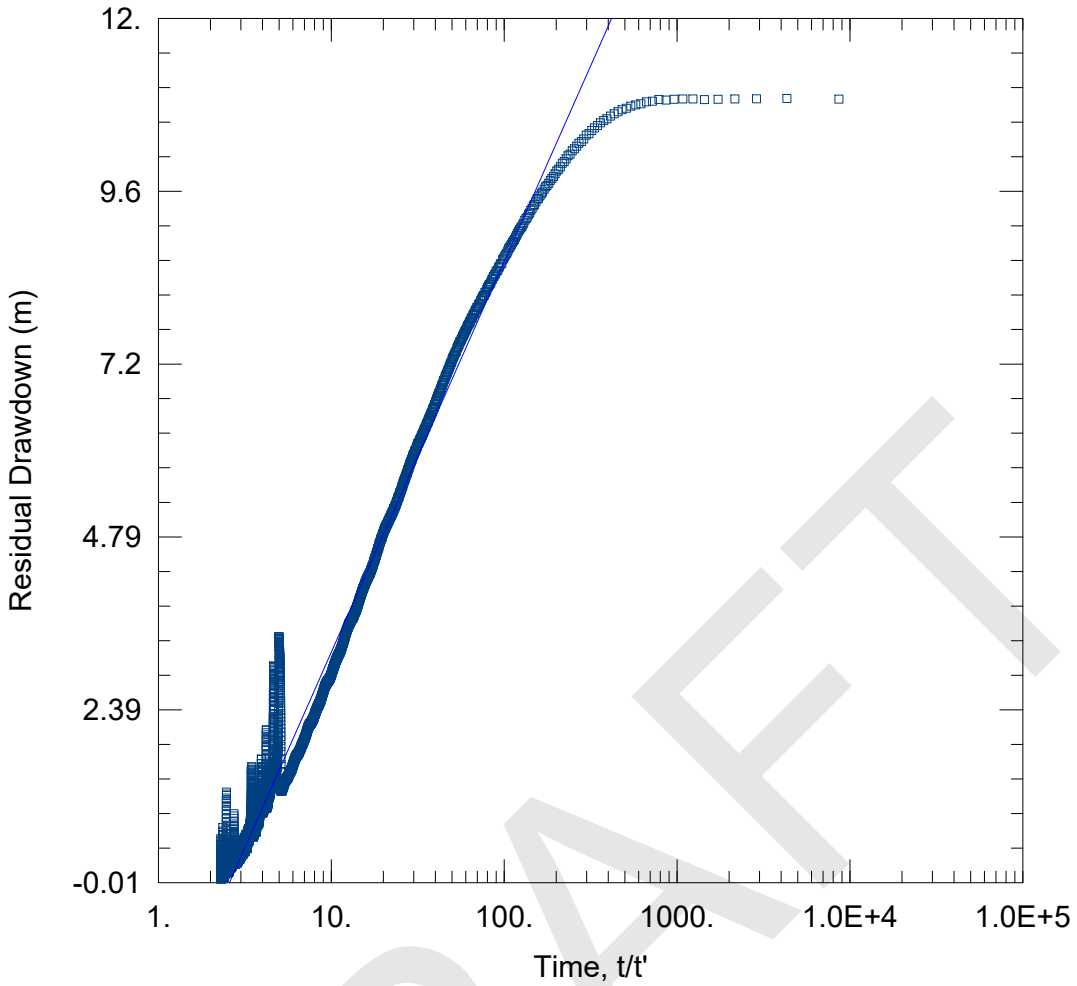
Observation Wells

Well Name	X (m)	Y (m)
WINU0542	371746	7706822

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 31.26 m^2/day S = 8.017E-5



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0542_Th_R_TKD.aqt
Date: 06/20/22 Time: 14:57:18

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

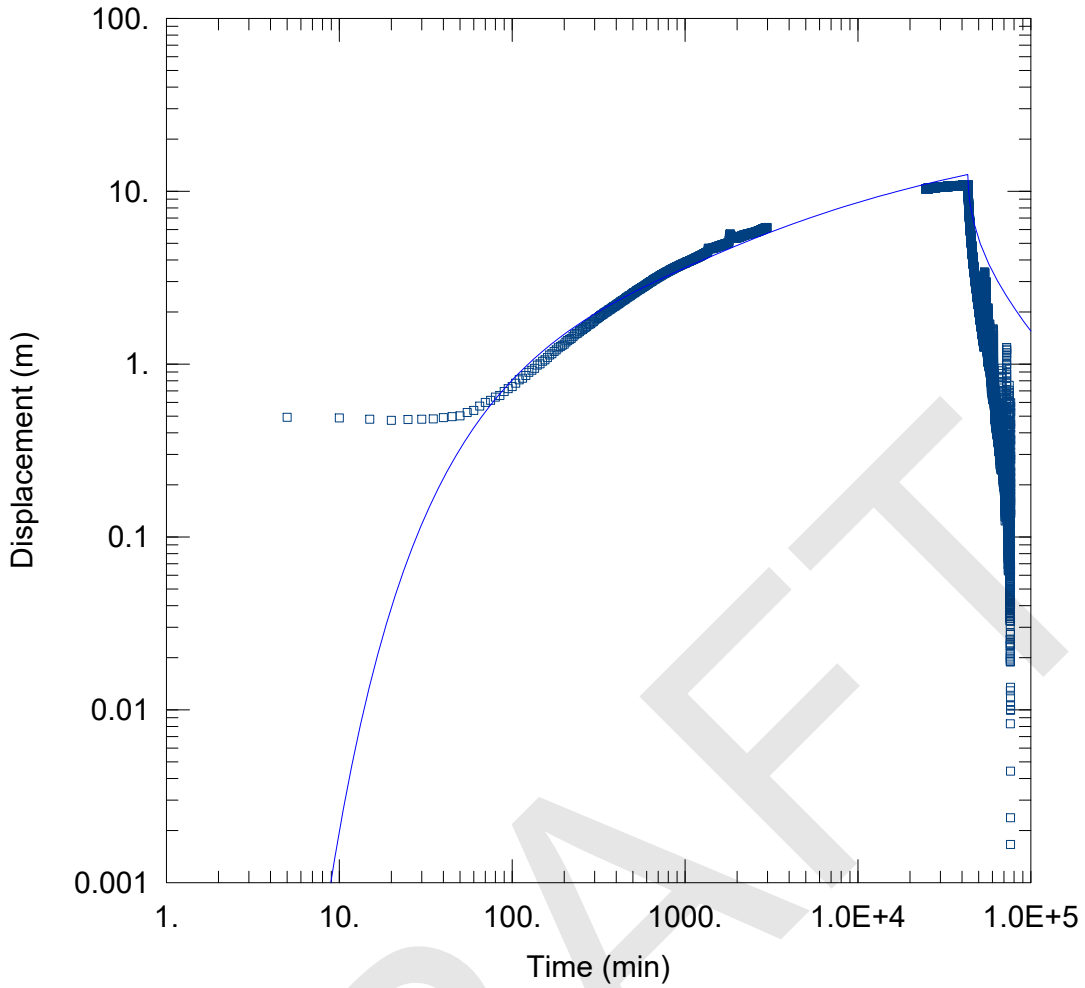
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0542	371746	7706822

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 26.23 m^2/day S/S' = 2.585



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0542_Th_TKD.aqt
Date: 06/20/22 Time: 14:55:14

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

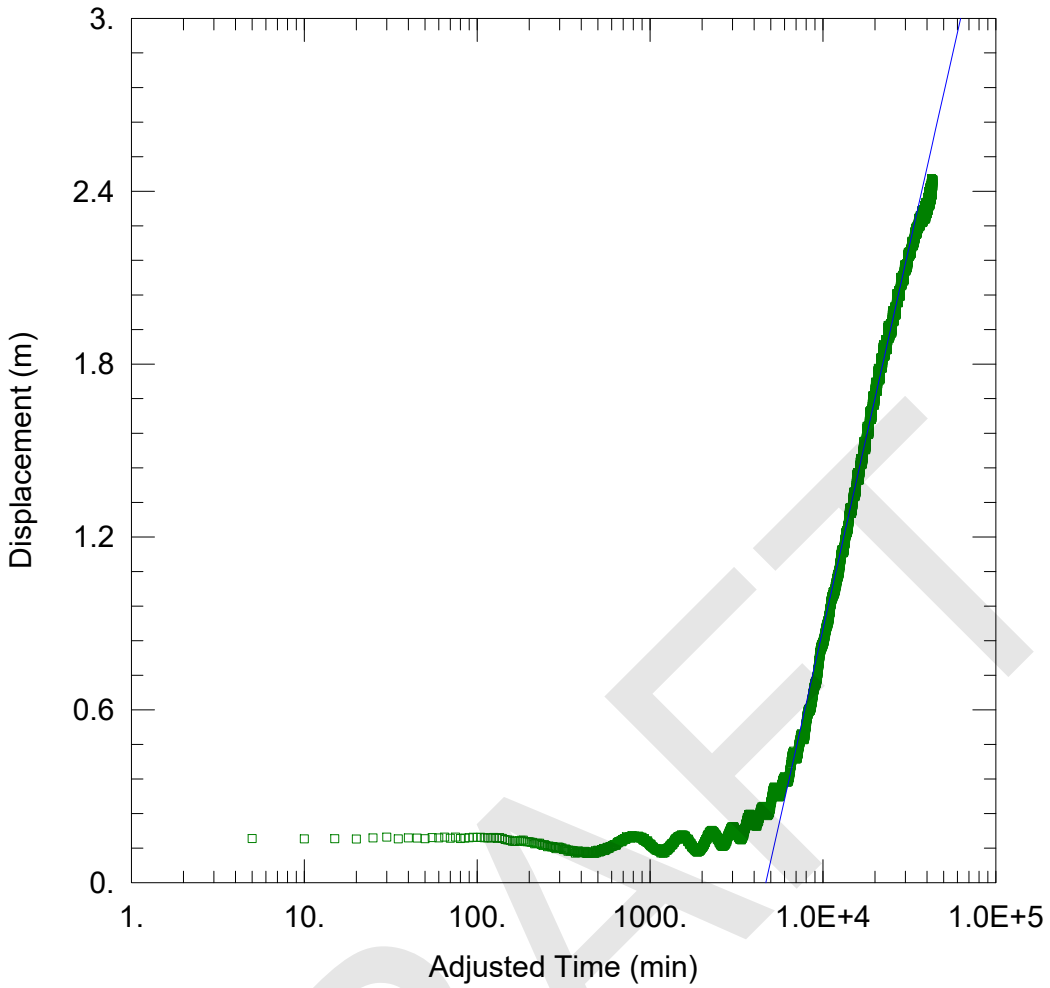
Observation Wells

Well Name	X (m)	Y (m)
WINU0542	371746	7706822

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 44.63 m^2/day
S = 6.878E-5
Kz/Kr = 1.
b = 159. m



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0702_CJ_TKD.aqt
Date: 06/20/22 Time: 17:55:35

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

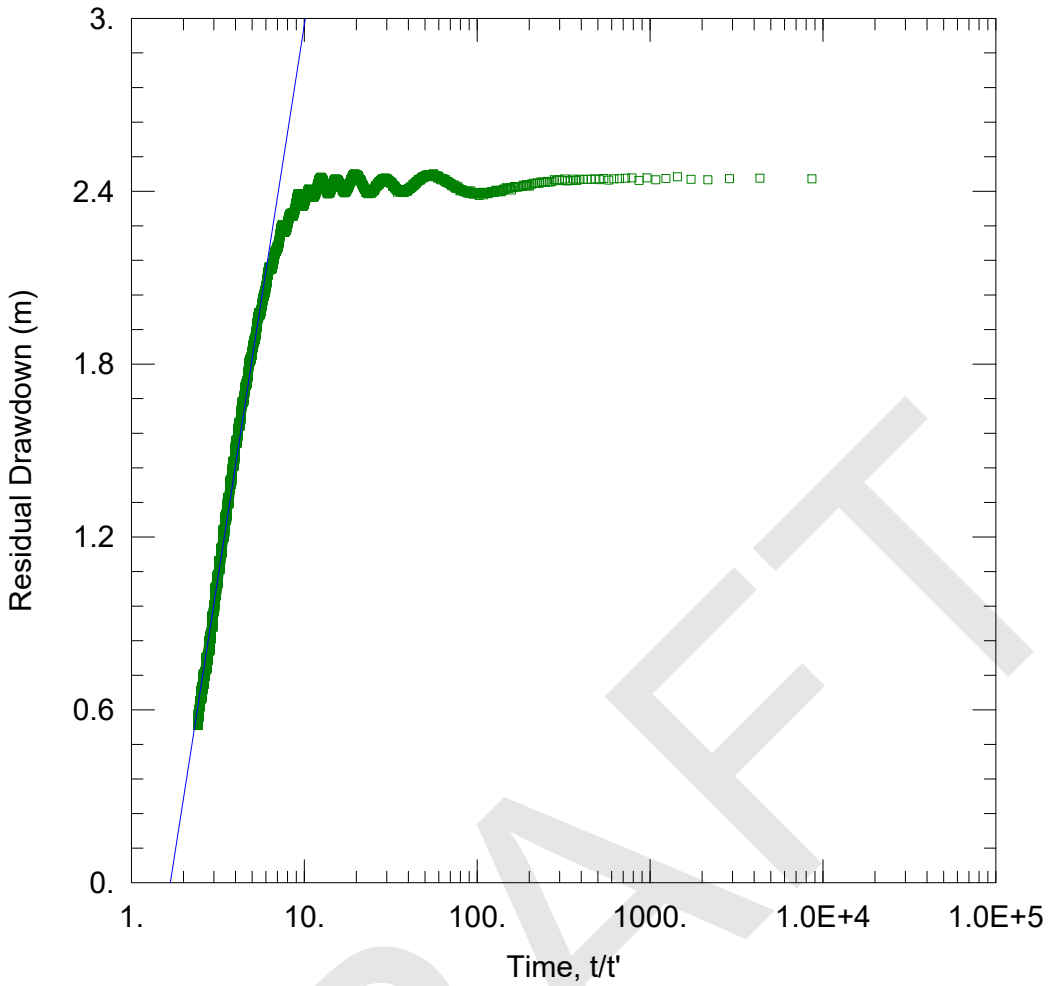
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0702	371049	7705678

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 53.54 m^2/day S = 0.0002198



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0702_Th_R_TKD.aqt
Date: 06/20/22 Time: 18:04:42

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

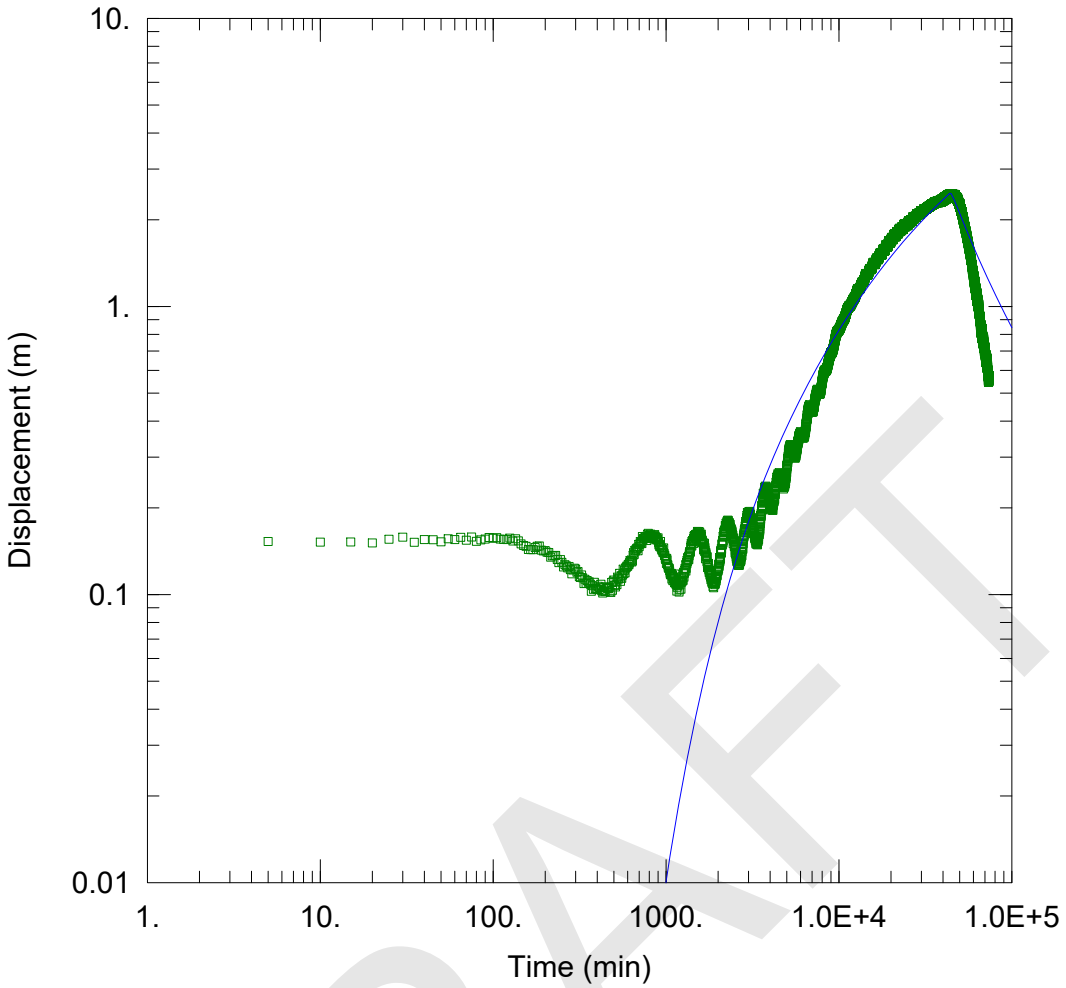
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0702	371049	7705678

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 37.11 m^2/day S/S' = 1.679



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0702_Th_TKD.aqt
Date: 06/20/22 Time: 18:01:25

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

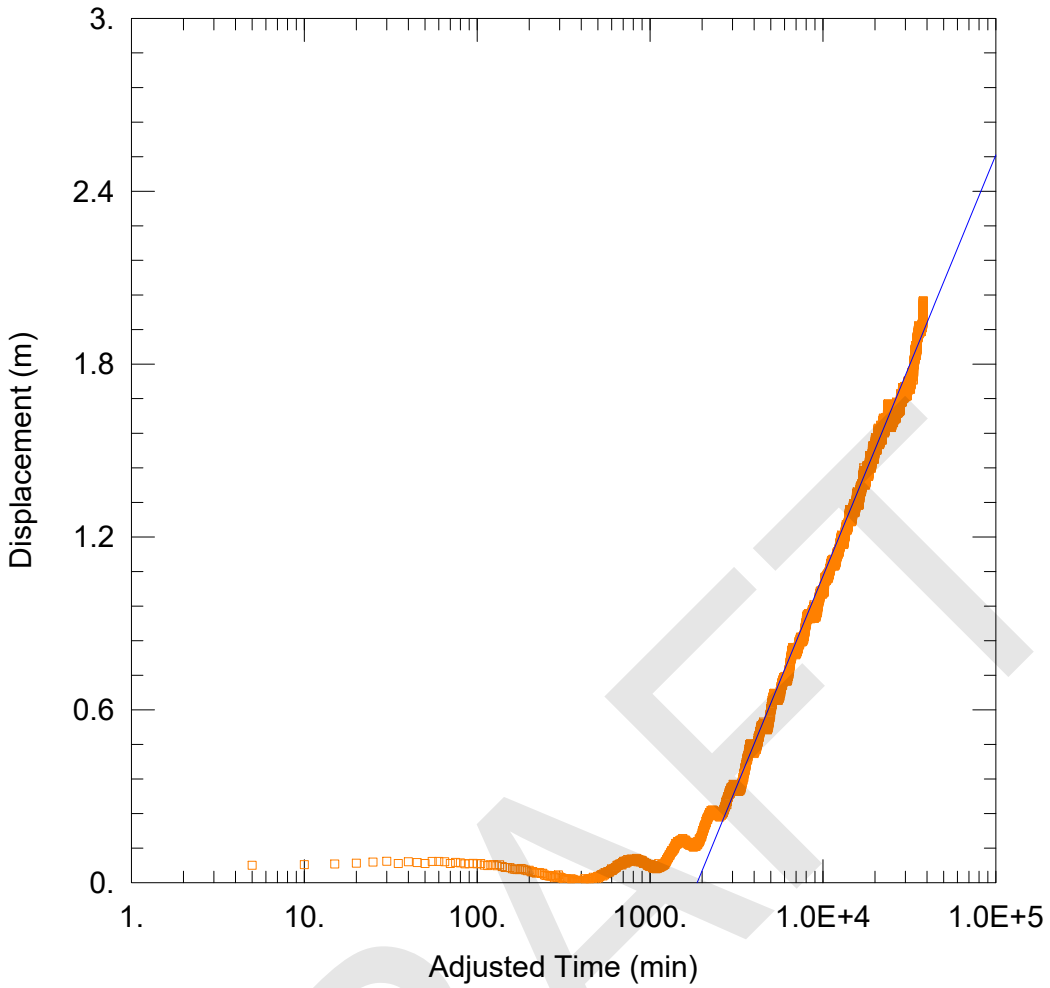
Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0702	371049	7705678

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 73.5 m^2/day
S = 0.0003524
Kz/Kr = 1.
b = 159. m



DRAFT

WELL TEST ANALYSIS

Data Set: C:\..._WINU0968_CJ_.aqt
Date: 06/21/22 Time: 13:04:29

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

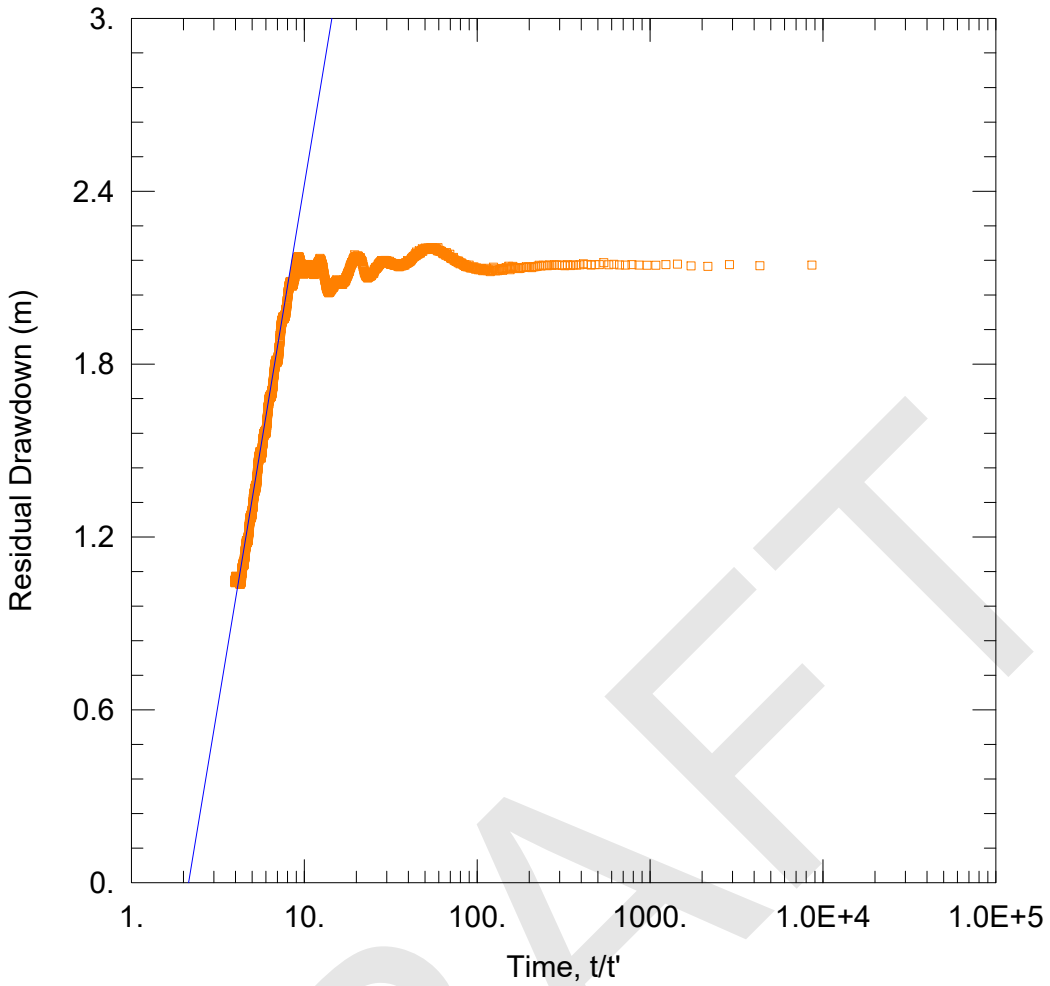
Observation Wells

Well Name	X (m)	Y (m)
WINU0968	370568.23	7707396.48

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 97.45 m^2/day S = 0.0002758



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0968_Th_R_TKD.aqt
Date: 06/21/22 Time: 13:09:24

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

AQUIFER DATA

Saturated Thickness: 159. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

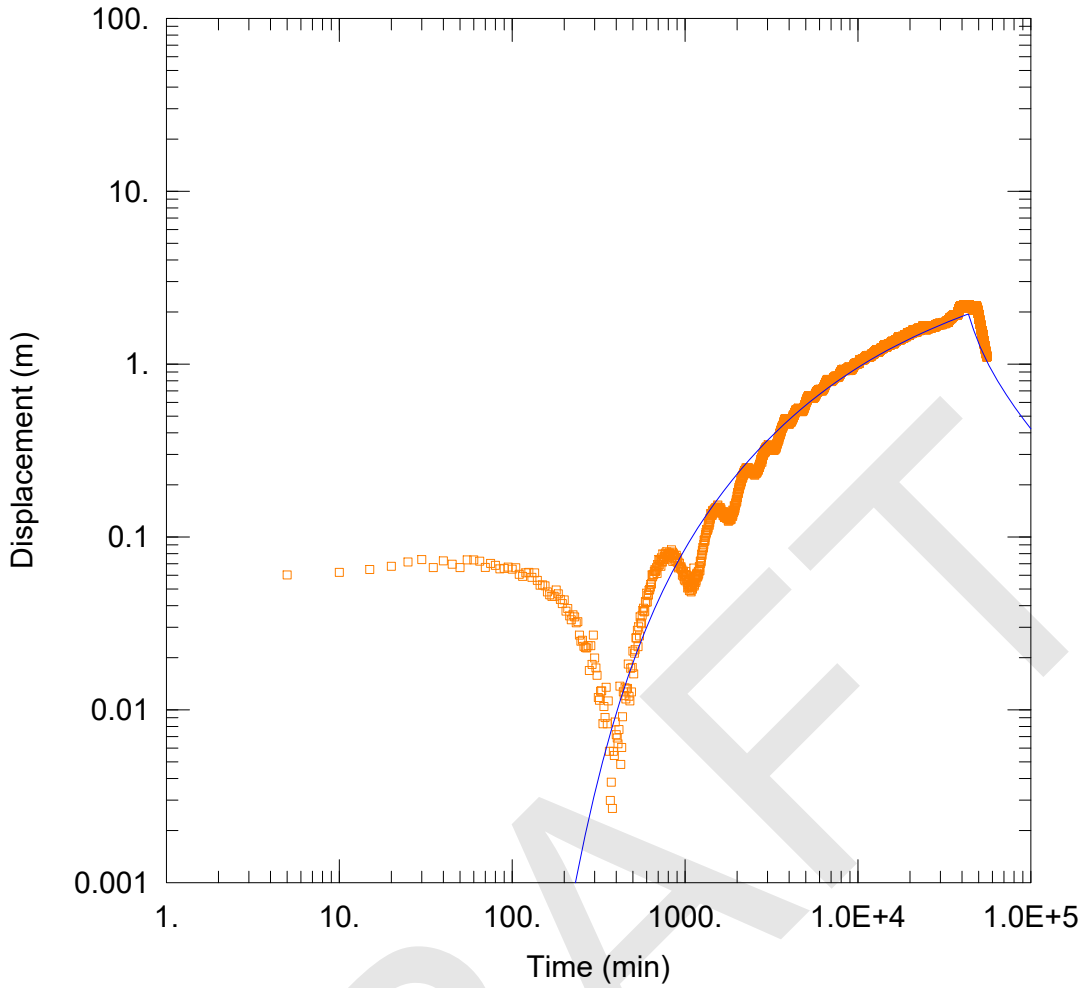
Observation Wells

Well Name	X (m)	Y (m)
WINU0968	370568.23	7707396.48

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 39.39 m^2/day S/S' = 2.141



DRAFT

WELL TEST ANALYSIS

Data Set: C:\...\WINU0968_Th_TKD.aqt
Date: 06/21/22 Time: 13:07:08

PROJECT INFORMATION

Company: Golder
Client: RT
Test Well: WINU0913

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0913	371476	7706940

Observation Wells

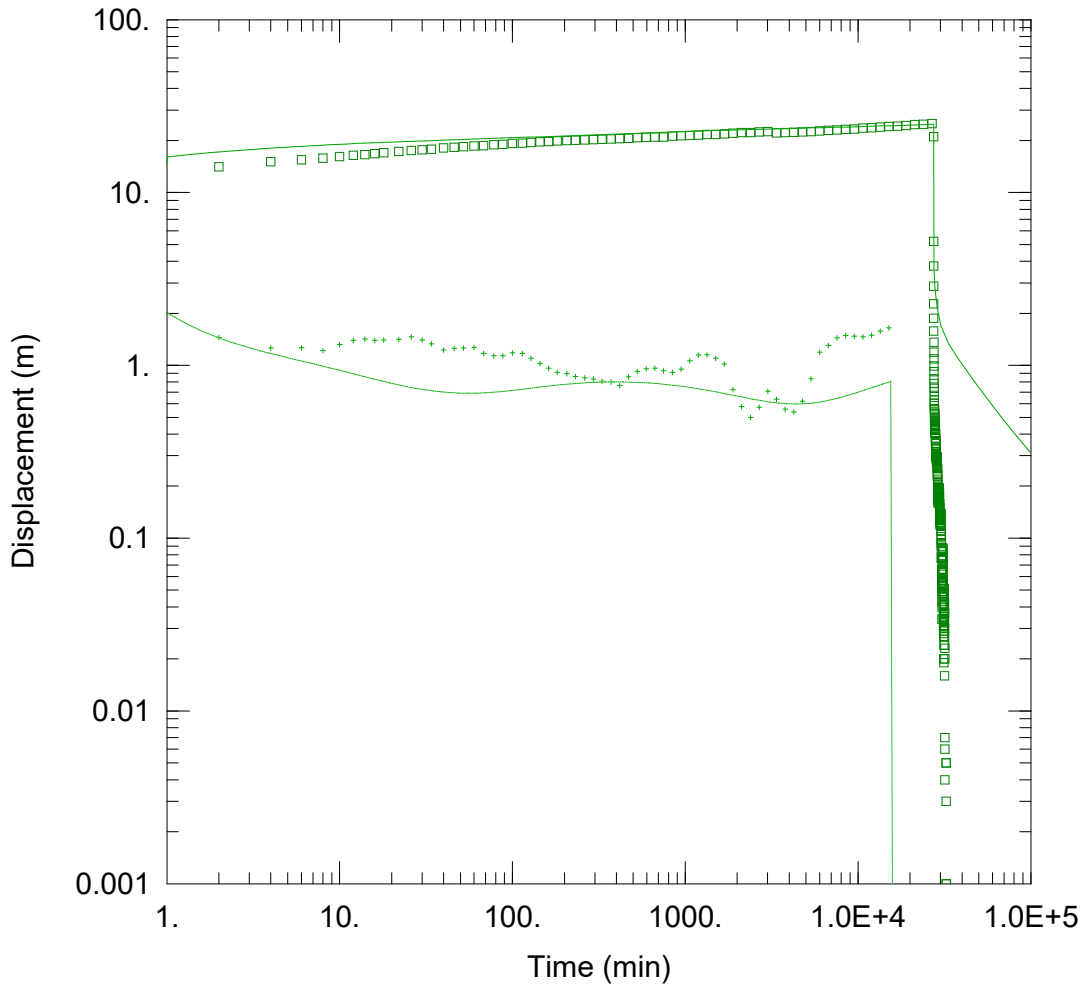
Well Name	X (m)	Y (m)
WINU0968	370568.23	7707396.48

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 160.2 m^2/day
S = 0.000432
Kz/Kr = 1.
b = 159. m

WINU0076 Aqtesolv Analysis Plots (2024)



WELL TEST ANALYSIS

Data Set: C:\...\0076_0076_MoenchSlab20m.aqt
Date: 05/07/24 Time: 16:02:04

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

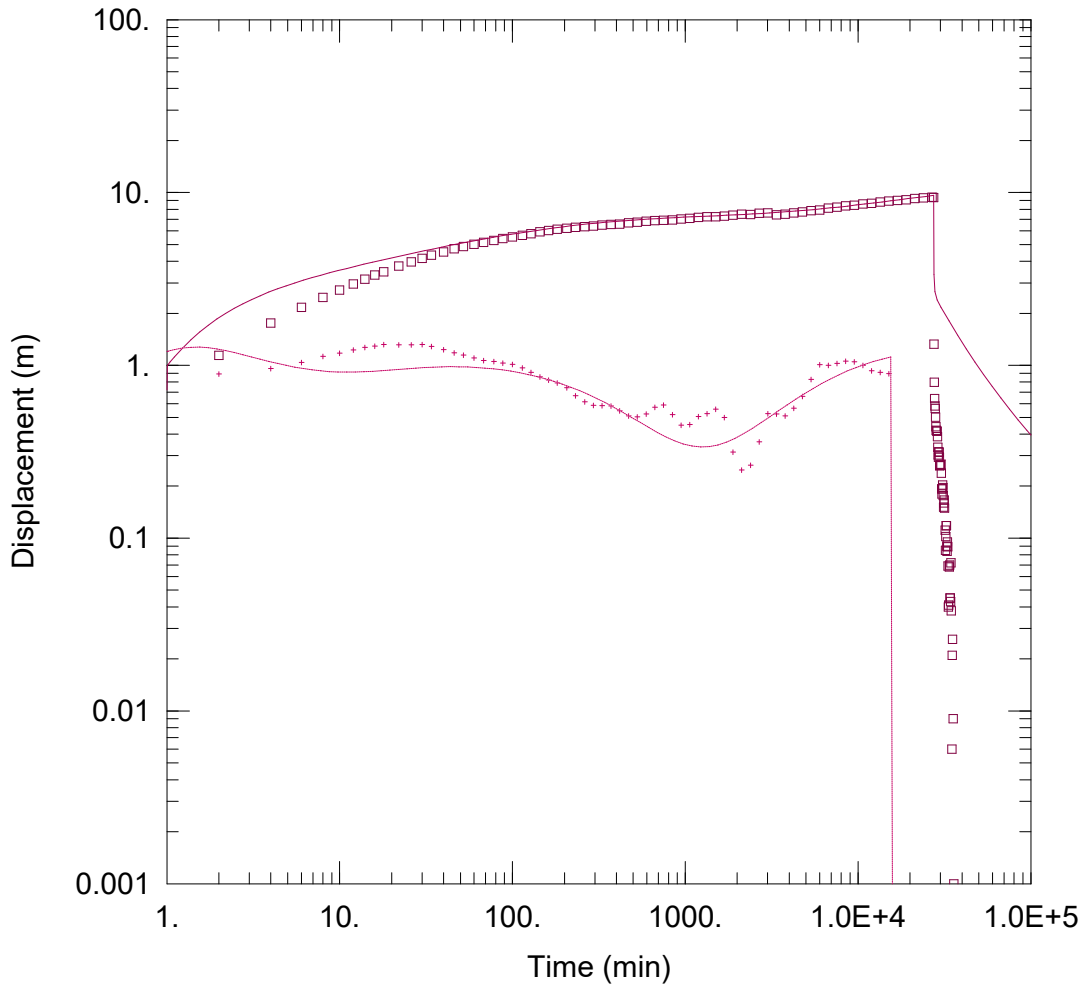
Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 2.024 m/day
K' = 0.0007406 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 1.0E-5 m^{-1}
Ss' = 2.046E-5 m^{-1}
Sf = 1.75
r(c) = 0.1016 m



WELL TEST ANALYSIS

Data Set: C:\...\0076_0213_MoenchSlab20m.aqt
Date: 05/07/24 Time: 16:02:22

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

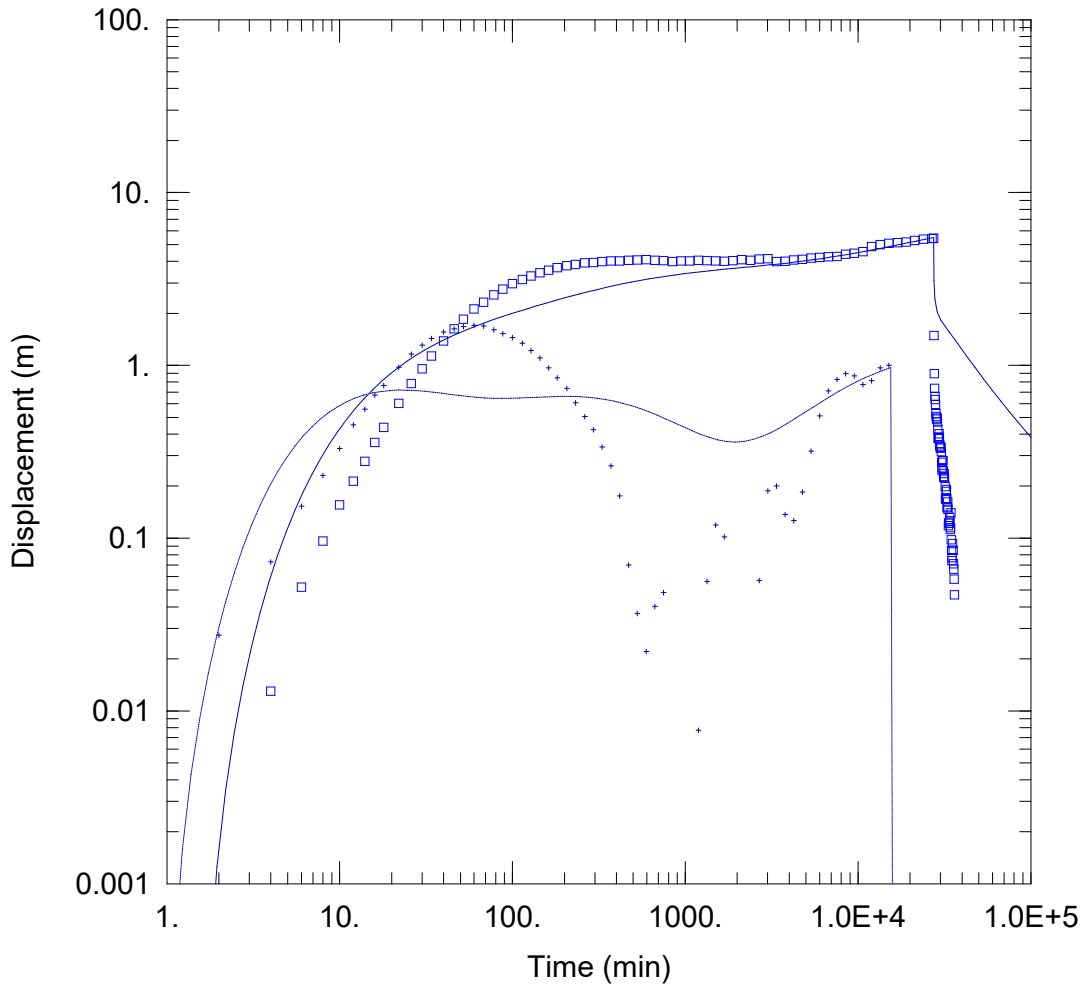
Well Name	X (m)	Y (m)
WINU0213	368913.29	7707924.55

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 1.591 m/day
K' = 0.0008516 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 1.282E-6 m^{-1}
Ss' = 1.646E-5 m^{-1}
Sf = 1.75
r(c) = 0.1016 m



WELL TEST ANALYSIS

Data Set: C:\...\0076_0219_MoenchSlab20m.aqt
Date: 05/07/24 Time: 16:02:31

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

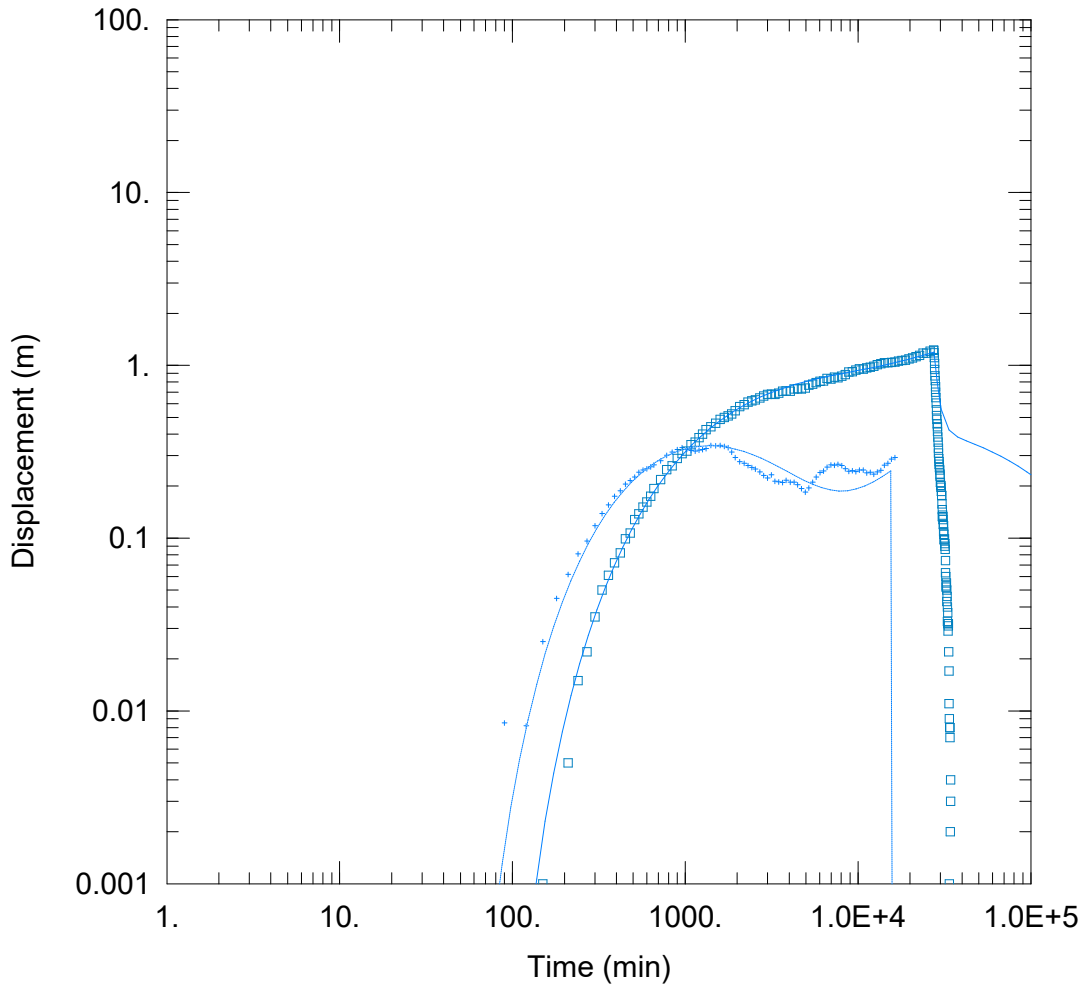
Well Name	X (m)	Y (m)
▫ WINU0219	368862.06	7707871.16

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 1.624 m/day
K' = 0.003714 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 1.0E-5 m^{-1}
Ss' = 8.6E-5 m^{-1}
Sf = 1.75
r(c) = 0.1016 m



WELL TEST ANALYSIS

Data Set: C:\...\0076_0709_MoenchSlab20m.aqt
Date: 05/07/24 Time: 16:02:51

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

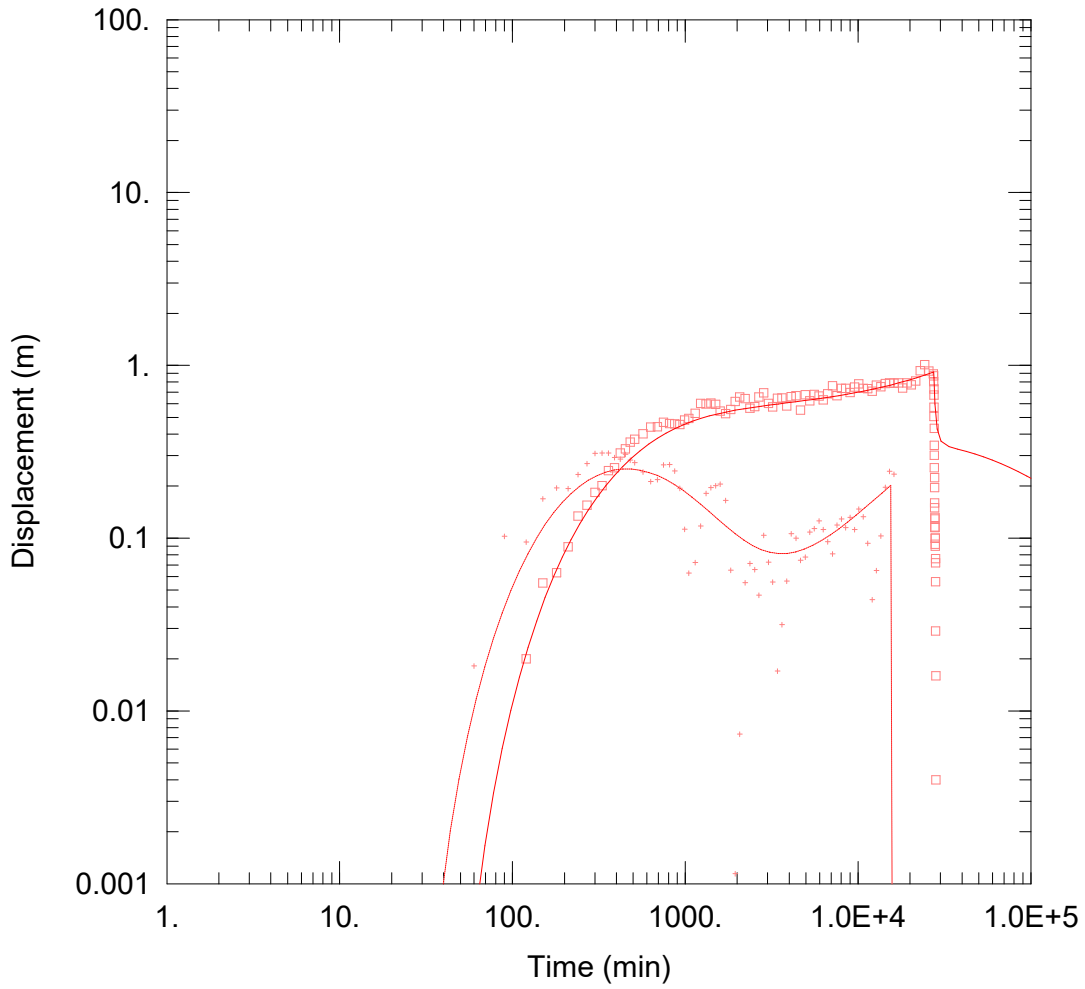
Well Name	X (m)	Y (m)
WINU0709	369516.013	7707118.586

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 2.017 m/day
K' = 0.000437 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 3.803E-6 m^{-1}
Ss' = 4.913E-5 m^{-1}
Sf = 1.75
r(c) = 0.1016 m



WELL TEST ANALYSIS

Data Set: C:\...\0076_0909_MoenchSlab20m.aqt
Date: 05/07/24 Time: 16:02:59

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

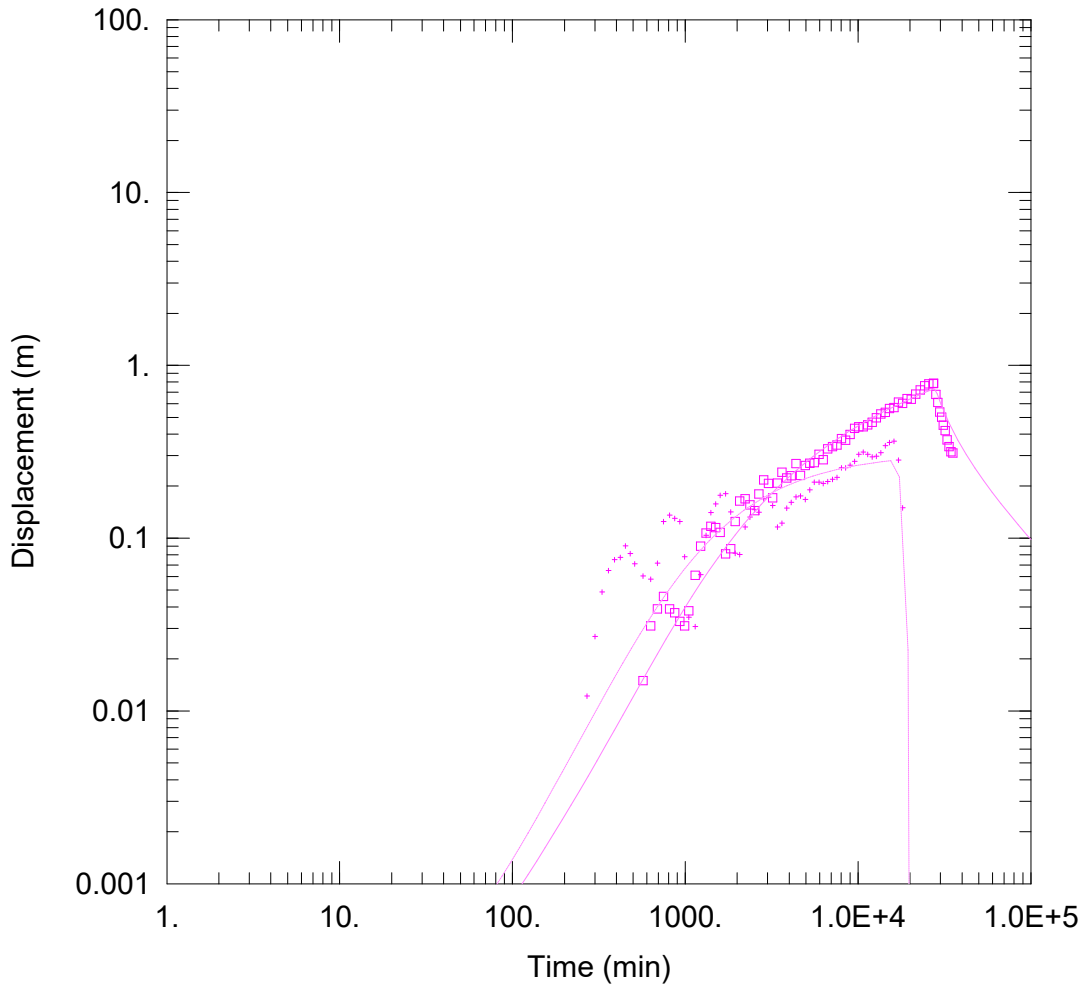
Well Name	X (m)	Y (m)
WINU0909	368597.009	7709517.996

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 1.839 m/day
K' = 0.0002459 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 5.687E-7 m^{-1}
Ss' = 2.952E-5 m^{-1}
Sf = 1.75
r(c) = 0.1016 m



WELL TEST ANALYSIS

Data Set: C:\...\0076_0949_MoenchSlab20m.aqt
Date: 05/07/24 Time: 16:03:13

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

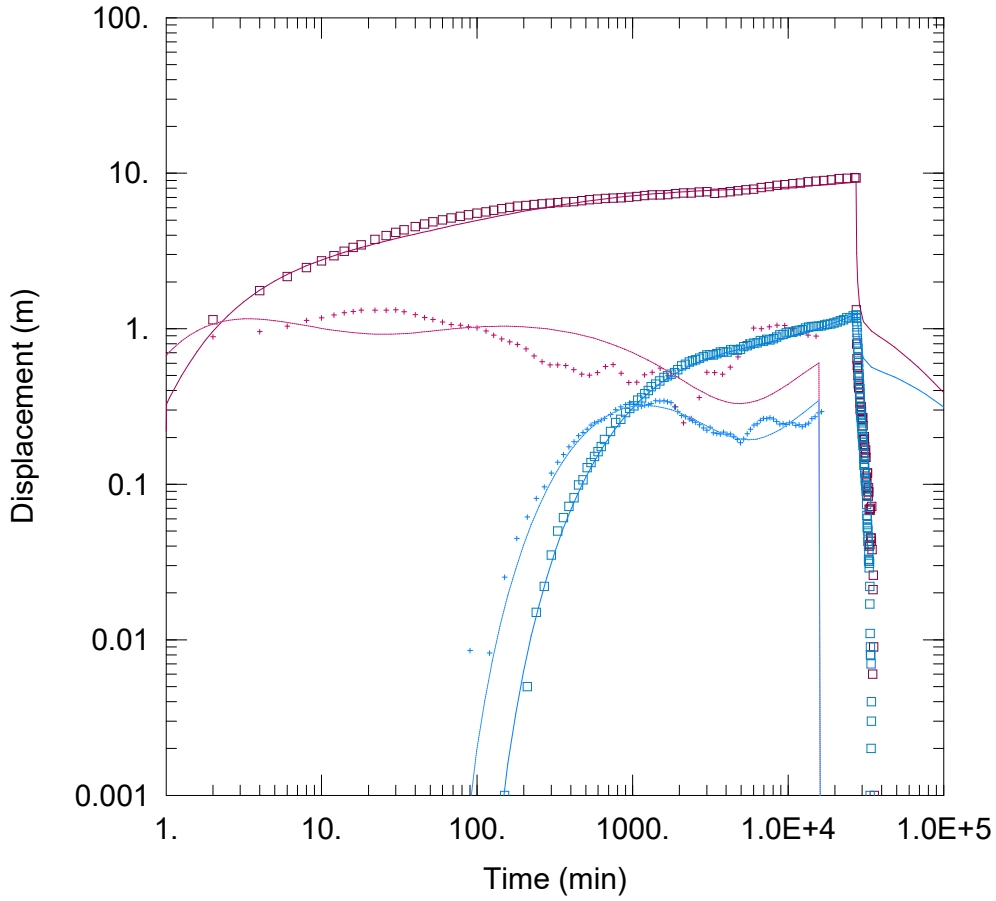
Well Name	X (m)	Y (m)
WINU0949	368574	7708138

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 6.284 m/day
K' = 0.3237 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 1.0E-5 m^{-1}
Ss' = 0.0001102 m^{-1}
Sf = 1.75
r(c) = 0.1016 m



WELL TEST ANALYSIS

Data Set: C:\...\0076_MoenchSlab20m_0213-0709.aqt
Date: 05/07/24 Time: 16:04:04

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

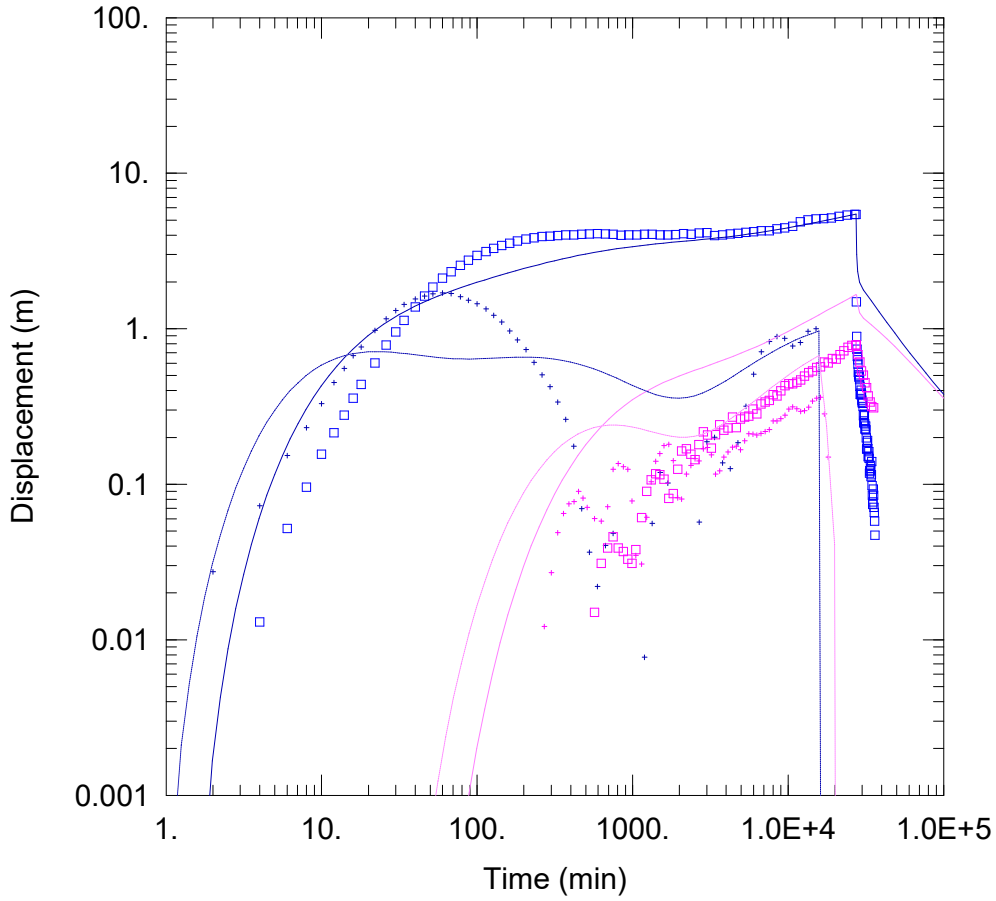
Well Name	X (m)	Y (m)
WINU0213	368913.29	7707924.55
WINU0709	369516.013	7707118.586

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 1.552 m/day
K' = 0.0005828 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 3.26E-6 m^{-1}
Ss' = 4.629E-5 m^{-1}
Sf = 1.75
r(c) = 0.1016 m



WELL TEST ANALYSIS

Data Set: C:\...\0076_MoenchSlab20m_0219-0949.aqt
Date: 05/07/24 Time: 16:04:40

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU0076
Test Well: WINU0076
Test Date: 23/11/2023 11am

AQUIFER DATA

Saturated Thickness: 183. m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0076	368917.8	7707892.5

Observation Wells

Well Name	X (m)	Y (m)
▫ WINU0219	368862.06	7707871.16
▫ WINU0949	368574	7708138

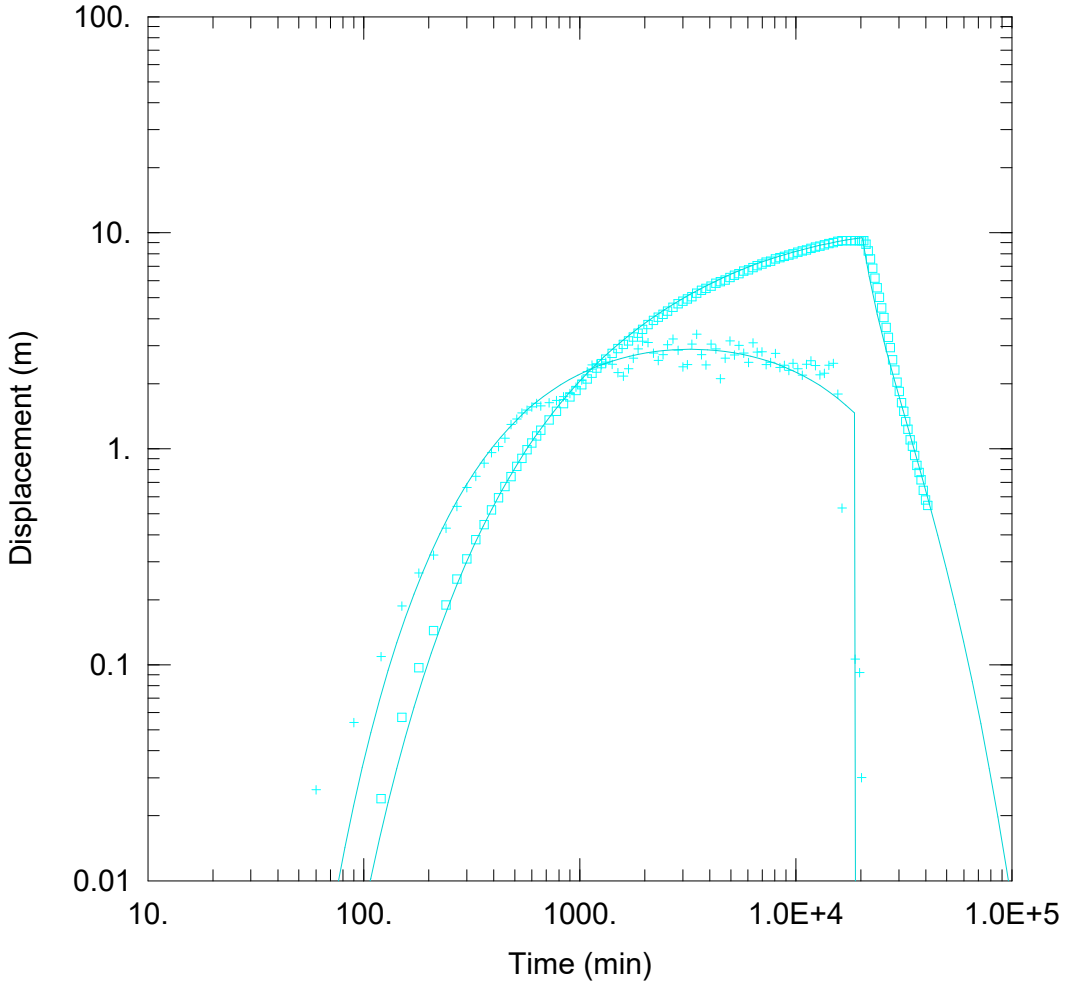
SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 1.64 m/day
K' = 0.003714 m/day
Sw = 0.1
r(w) = 0.1016 m

Ss = 1.0E-5 m^{-1}
Ss' = 8.6E-5 m^{-1}
Sf = 1.75
r(c) = 0.1016 m

WINU0917 Aqtesolv Analysis Plots



WELL TEST ANALYSIS

Data Set: C:\...\0917_0080_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:38:08

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

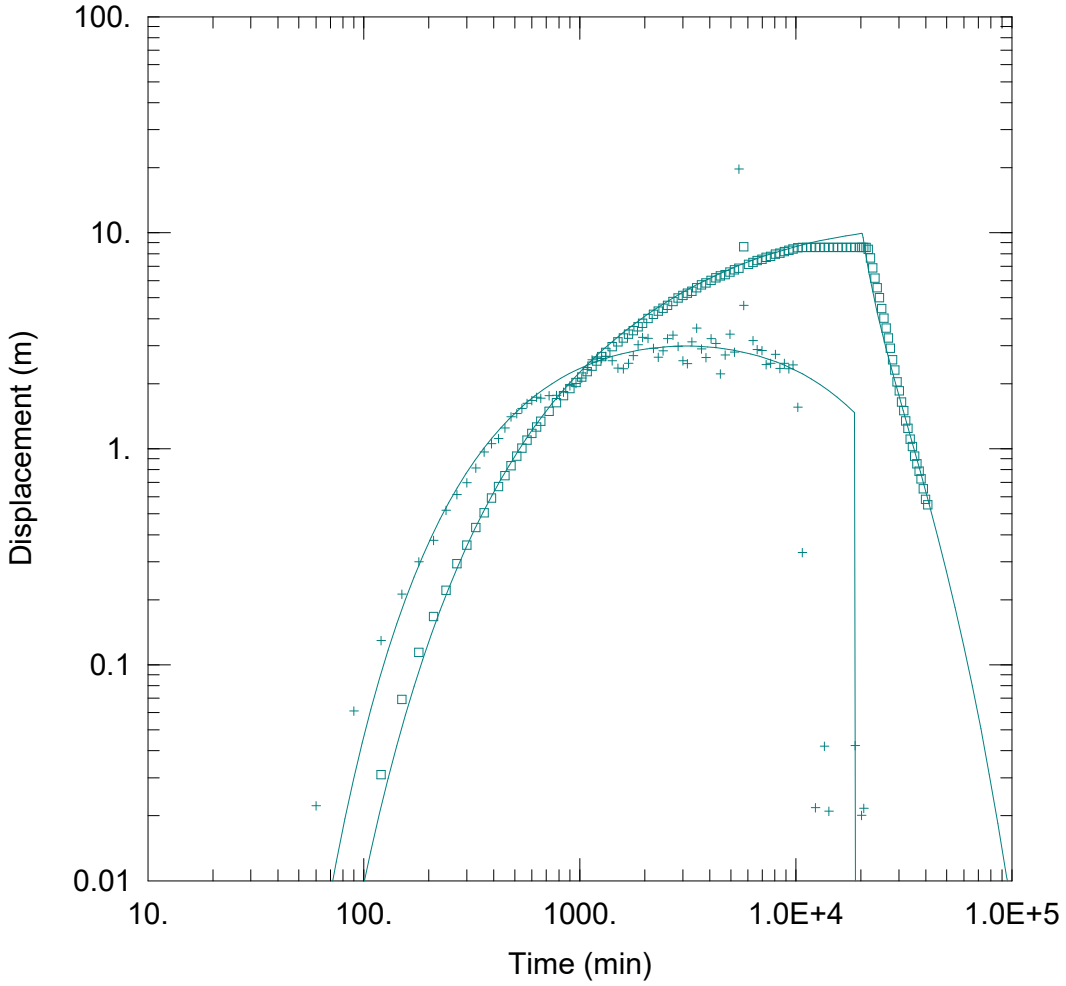
Well Name	X (m)	Y (m)
WINU0080	369528.47	7707686.72

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 169. m^2/day
1/B = 0.0002477 m^{-1}
b = 158. m

S = 0.0001348
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0166_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:24:16

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

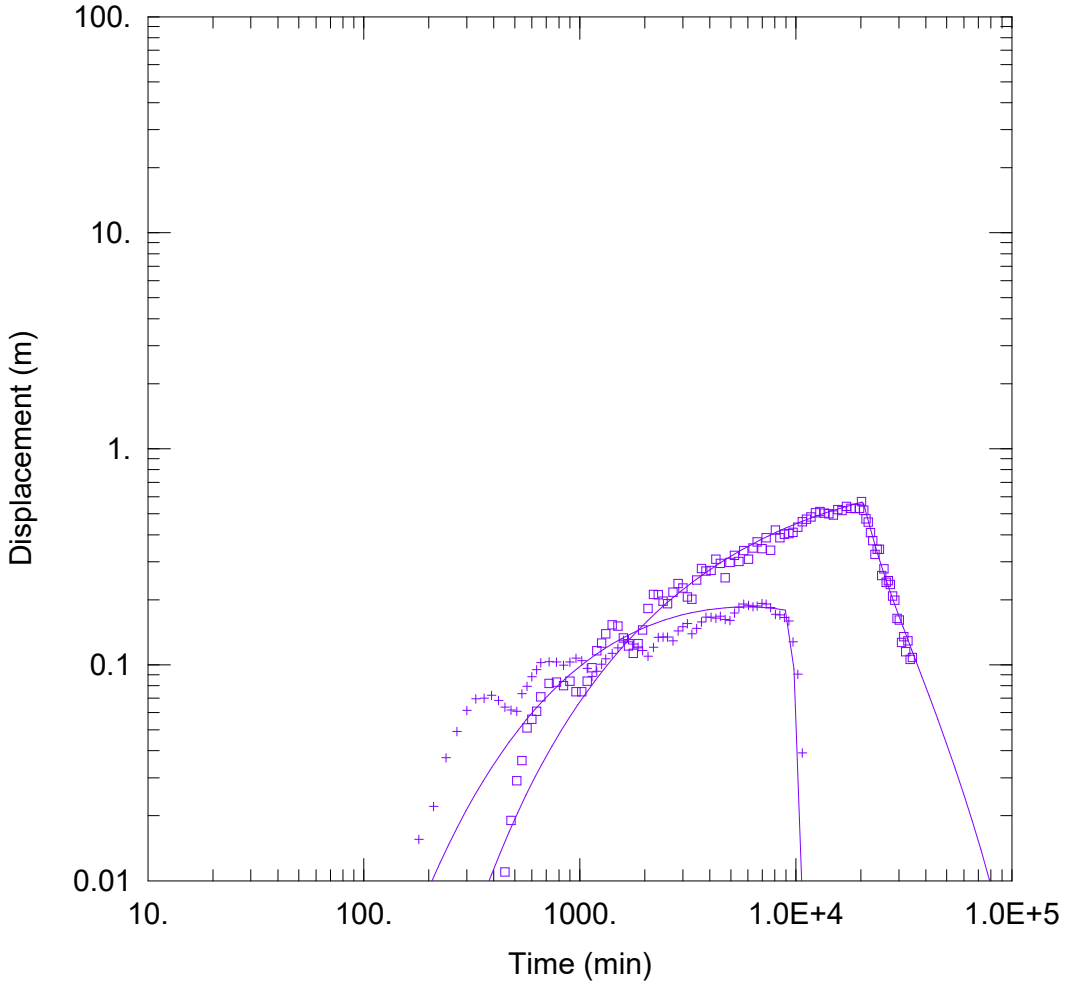
Well Name	X (m)	Y (m)
WINU0166	369564.47	7707683.48

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 164.6 m^2/day
1/B = 0.000242 m^{-1}
b = 158. m

S = 0.0001223
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0219_HantushJacobLeaky.aqt
Date: 05/09/24 Time: 21:19:32

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

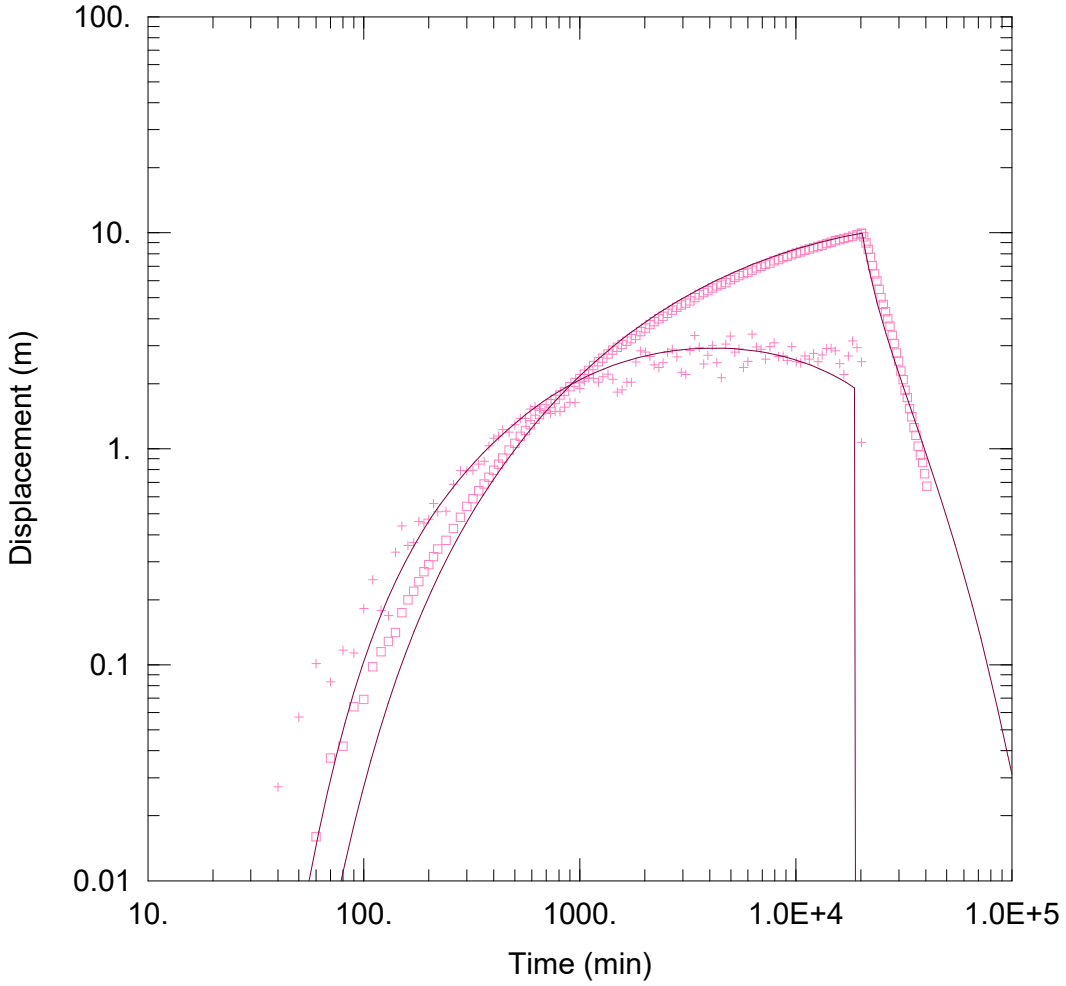
Well Name	X (m)	Y (m)
WINU0219	368862.06	7707871.16

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 2500. m^2/day
1/B = 0.0002571 m^{-1}
b = 158. m

S = 0.003748
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0701_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:38:46

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

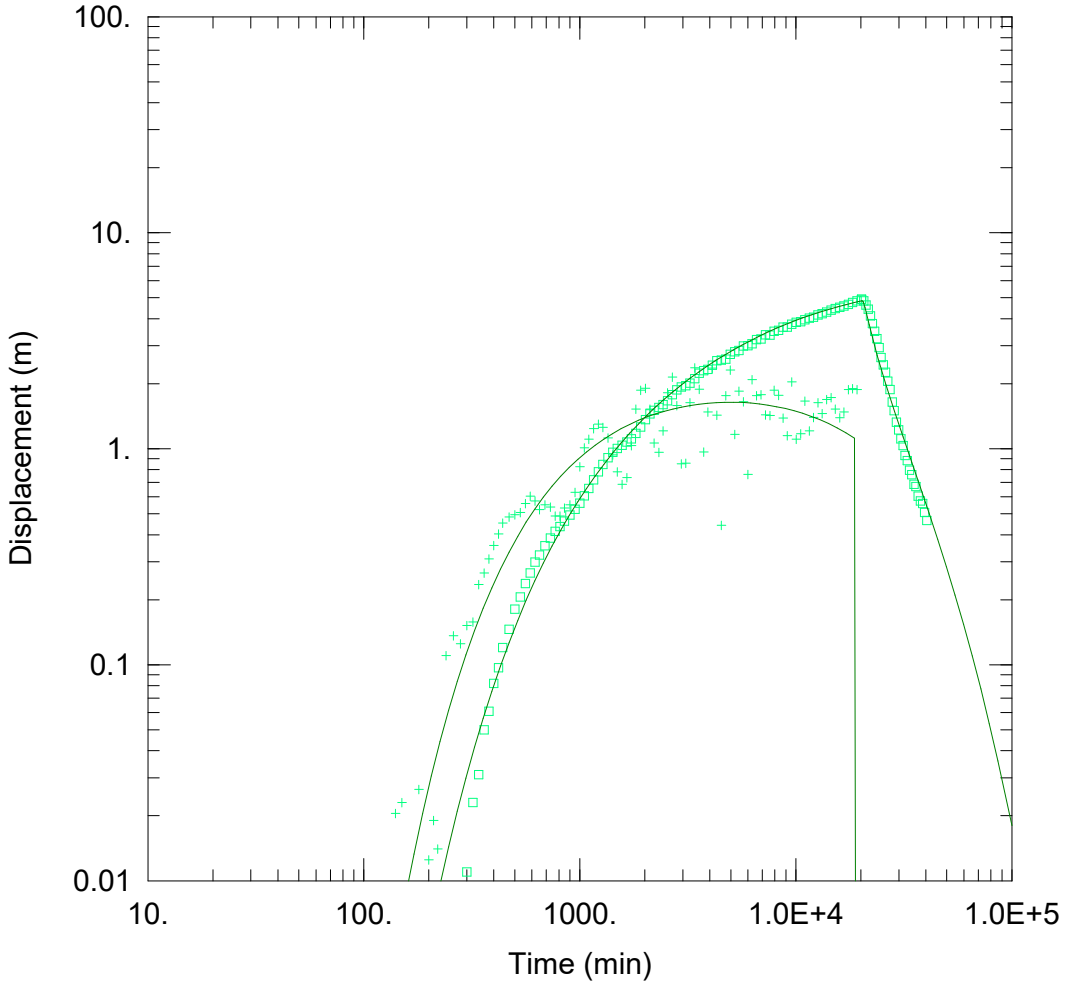
Well Name	X (m)	Y (m)
WINU0701	368990.73	7708347.655

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 171.6 m^2/day
1/B = 0.0003341 m^{-1}
b = 158. m

S = 0.0003514
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0705_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:29:09

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

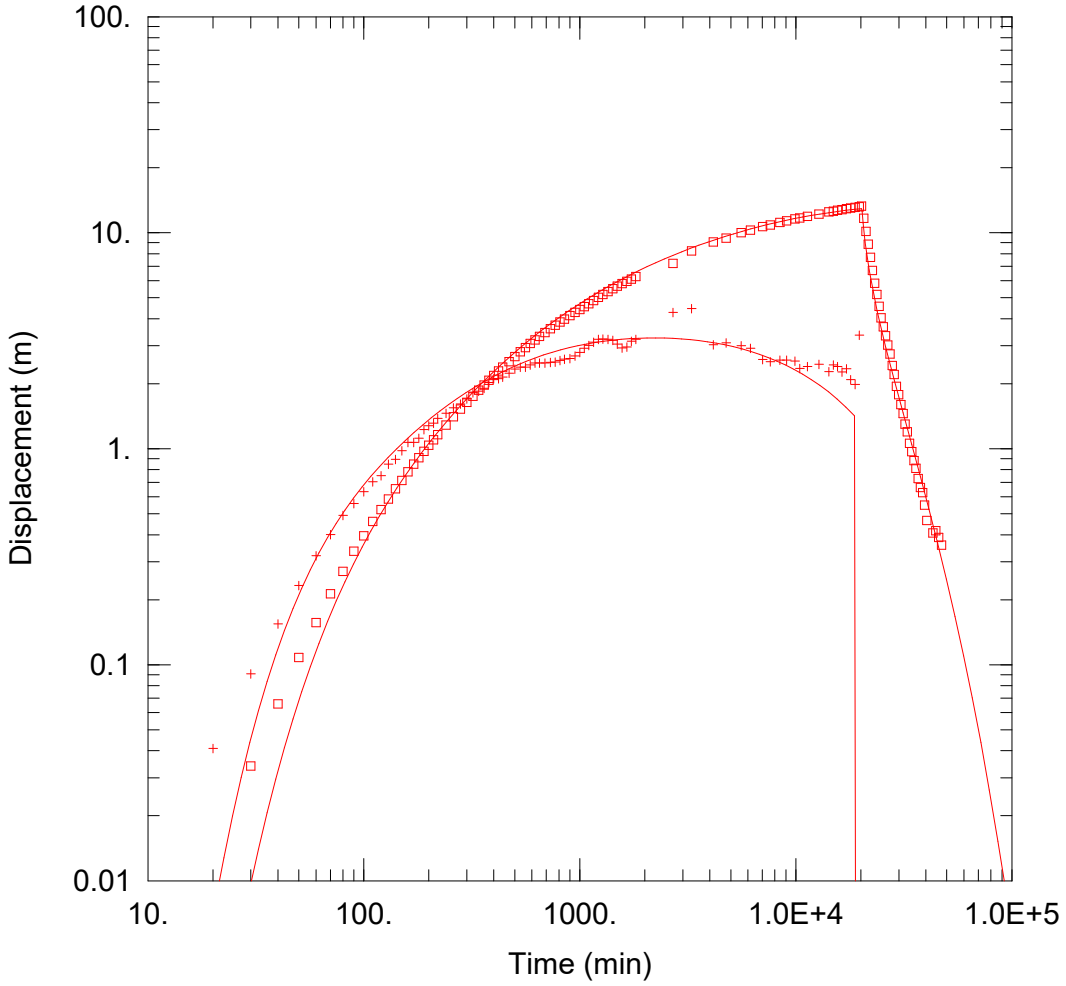
Well Name	X (m)	Y (m)
WINU0705	369905.46	7707002.86

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 288.4 m^2/day
1/B = 0.0001794 m^{-1}
b = 158. m

S = 0.0001691
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0706_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:29:34

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

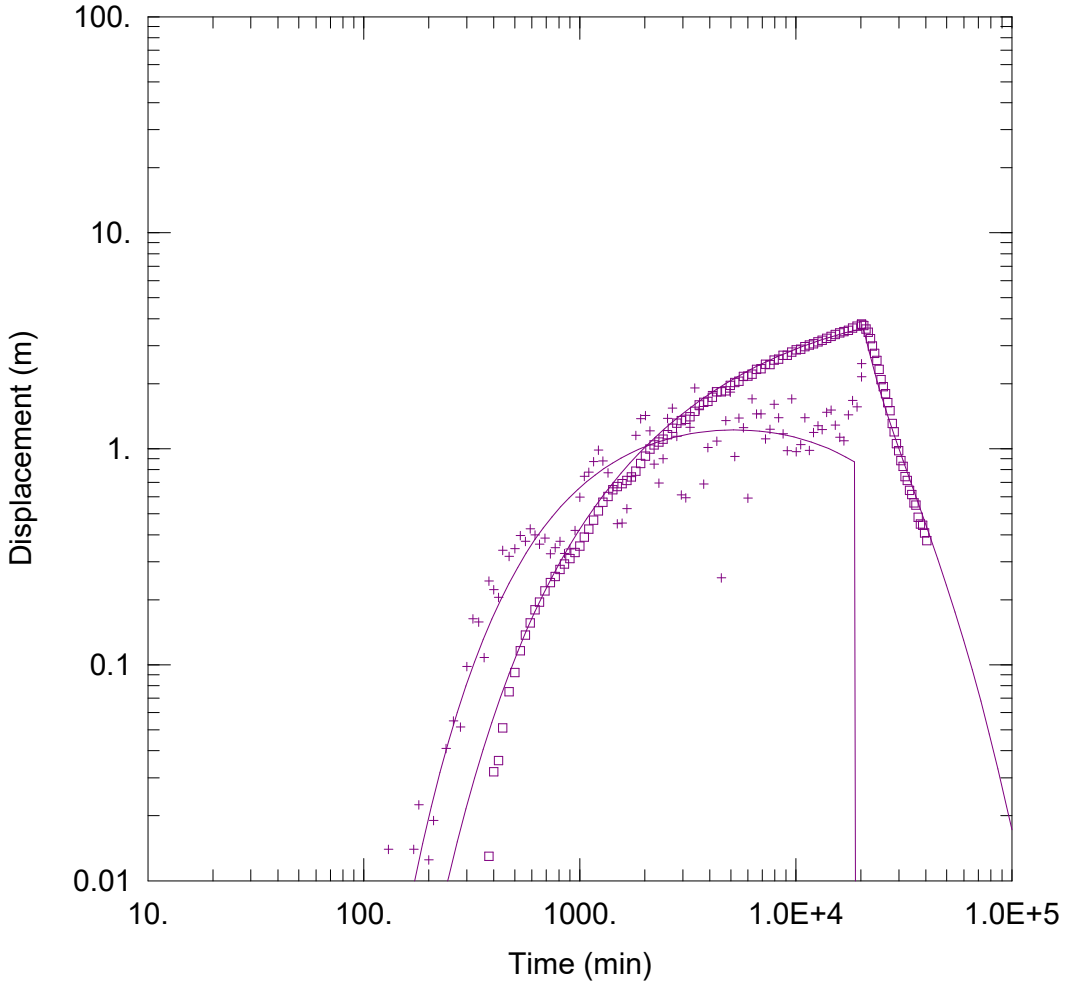
Well Name	X (m)	Y (m)
WINU0706	369027.01	7708404.09

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 163.9 m^2/day
1/B = 0.0002866 m^{-1}
b = 158. m

S = 0.0001629
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0708_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:30:10

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

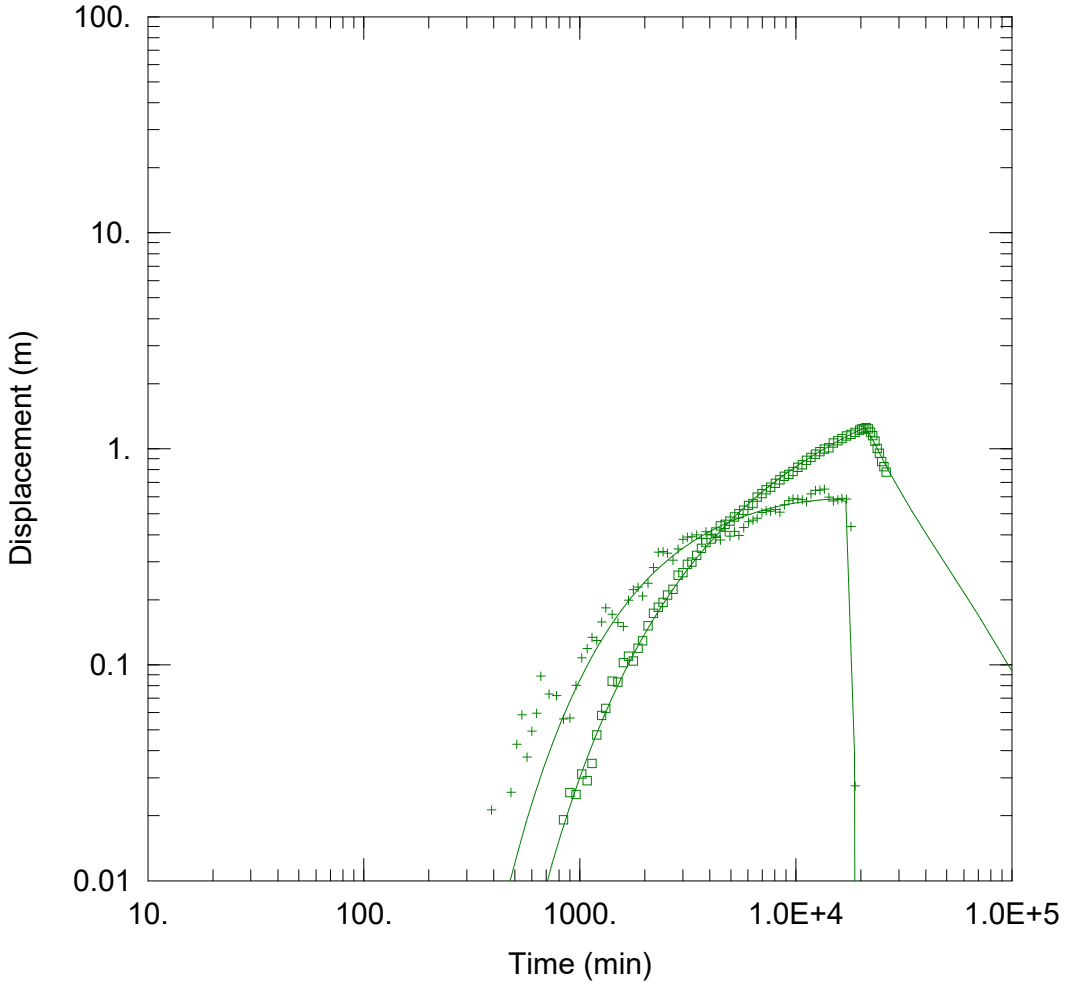
Well Name	X (m)	Y (m)
WINU0708	369743.793	7707047.054

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 392.1 m^2/day
1/B = 0.0001794 m^{-1}
b = 158. m

S = 0.0002494
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0709_HantushJacobLeaky.aqt
Date: 05/09/24 Time: 21:20:35

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

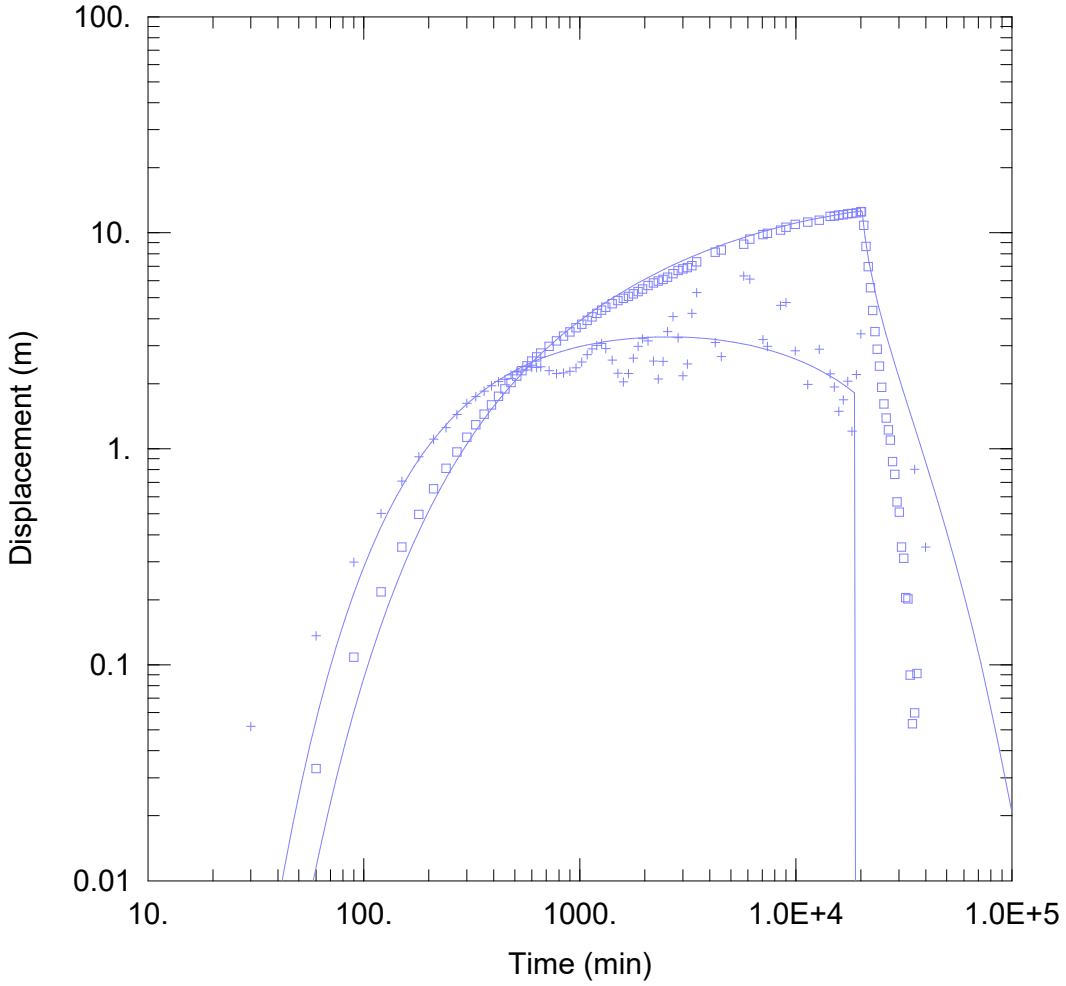
Well Name	X (m)	Y (m)
WINU0709	369516.013	7707118.586

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 919.4 m^2/day
1/B = 0.0001226 m^{-1}
b = 158. m

S = 0.001512
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0909_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:31:06

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

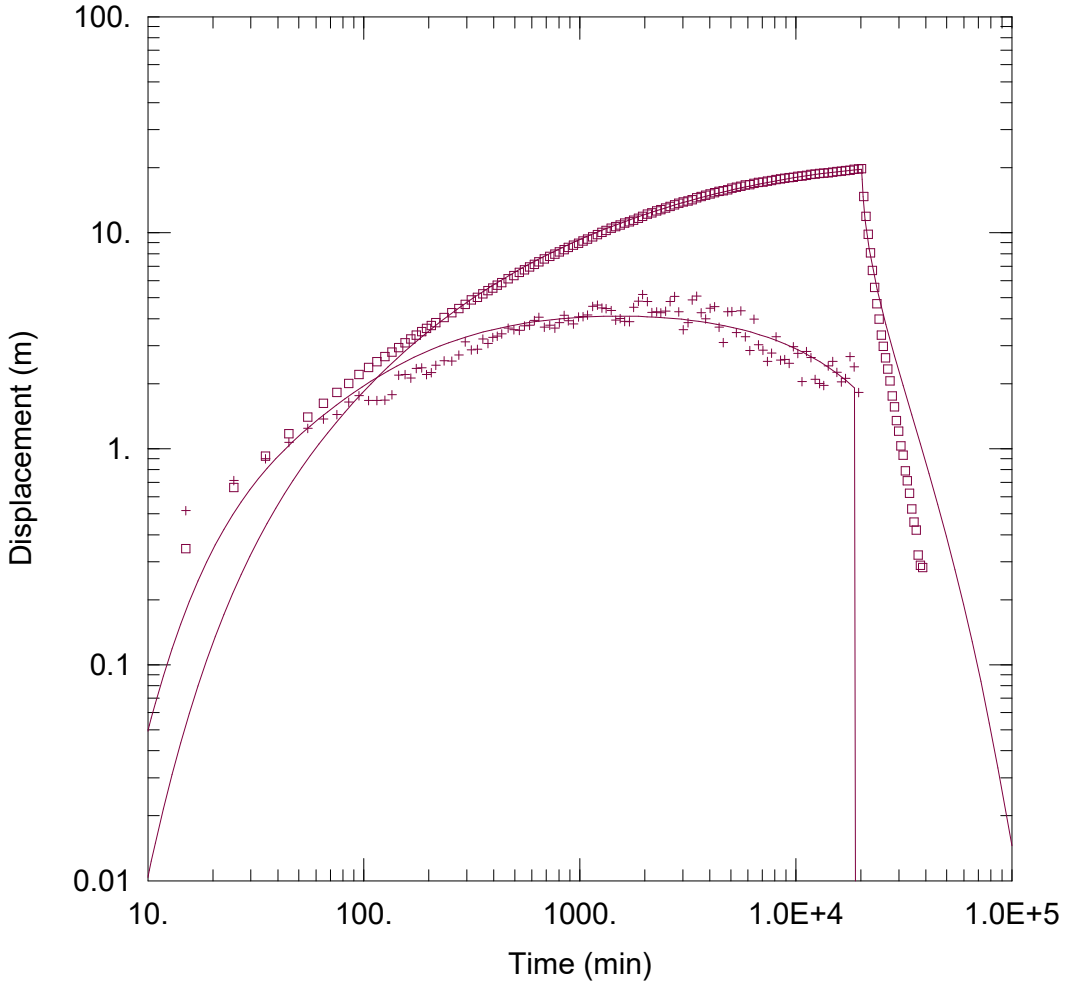
Well Name	X (m)	Y (m)
WINU0909	368597.009	7709517.996

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 168.8 m^2/day
1/B = 0.000196 m^{-1}
b = 158. m

S = 0.0001055
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0910_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:31:27

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

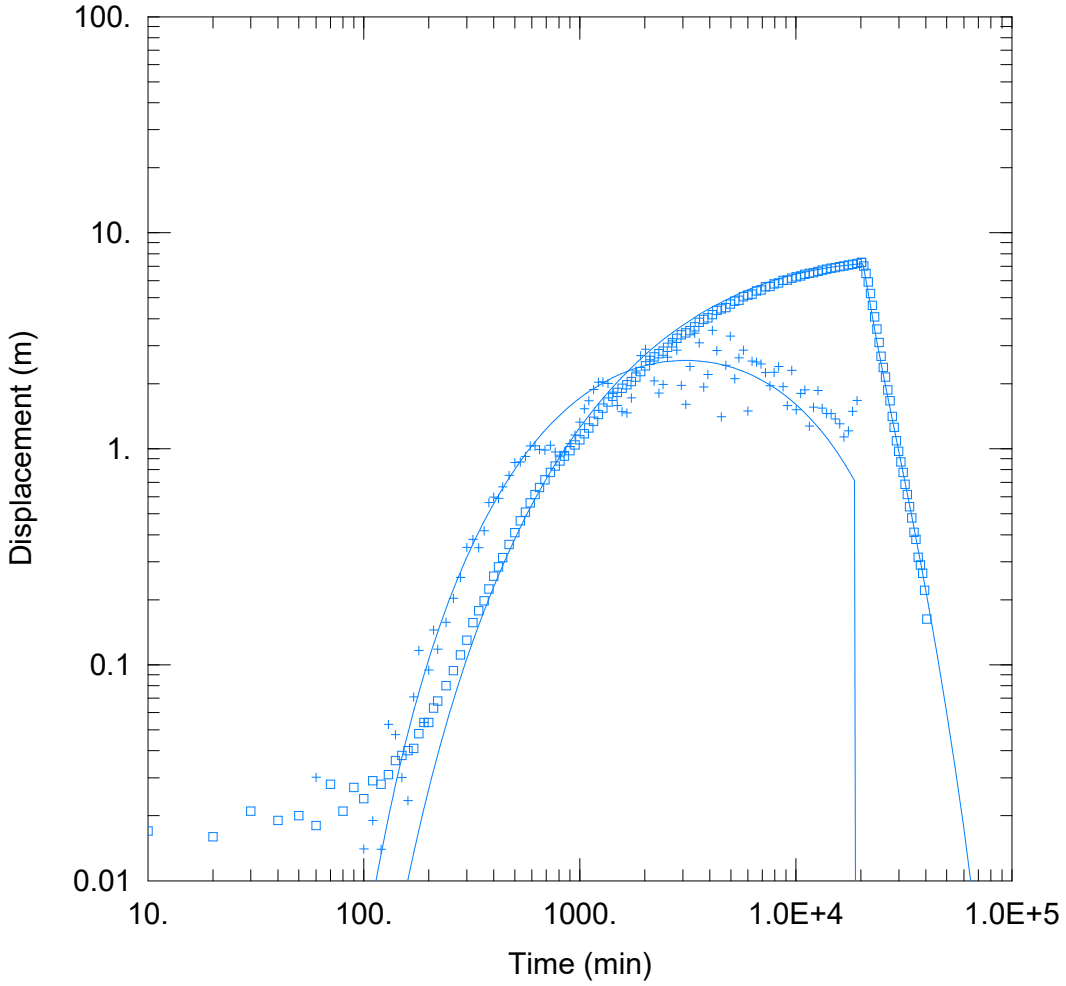
Well Name	X (m)	Y (m)
WINU0910	369097.65	7709064.316

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 145.1 m^2/day
1/B = 0.0002654 m^{-1}
b = 158. m

S = 0.0001463
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0911_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:32:01

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

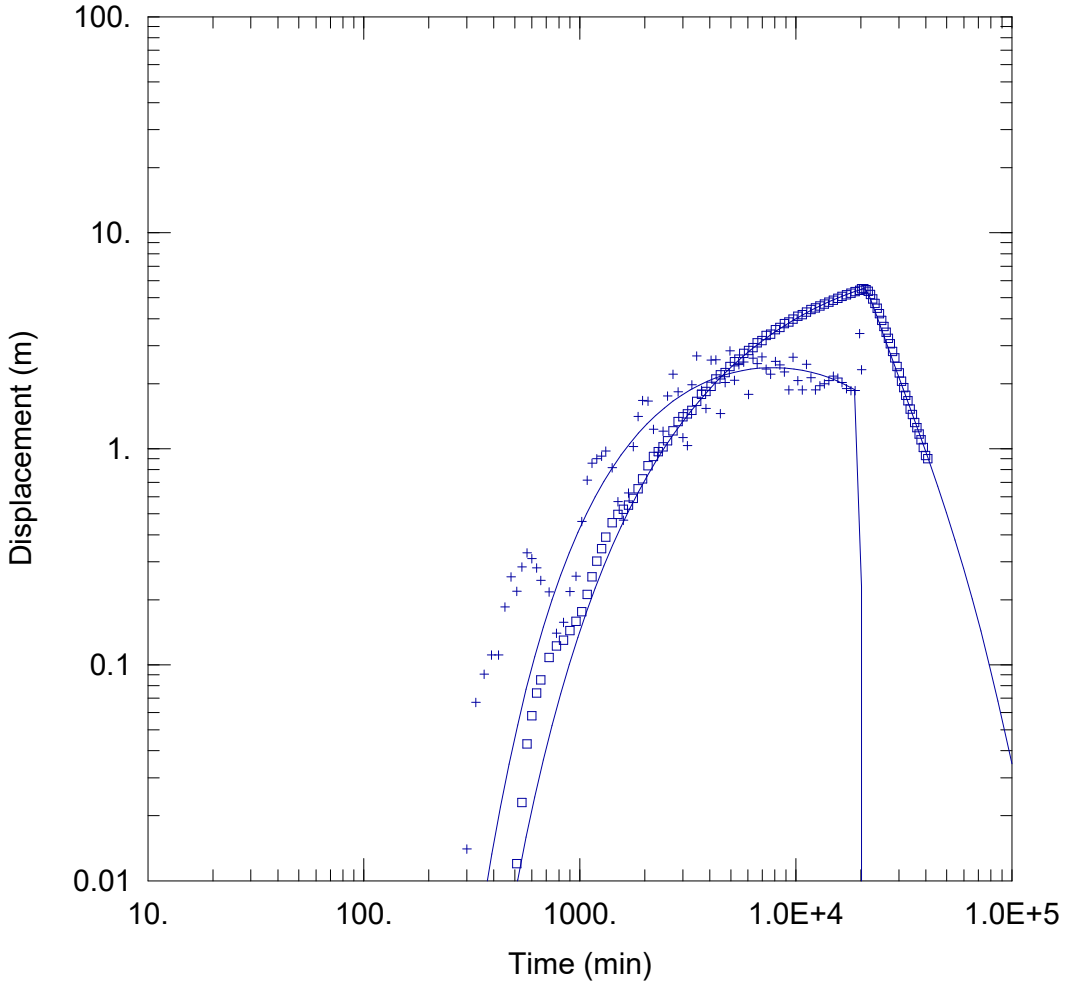
Well Name	X (m)	Y (m)
WINU0911	369753.376	7708994.115

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 145.5 m^2/day
1/B = 0.001754 m^{-1}
b = 158. m

S = 0.003148
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0914_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:32:20

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

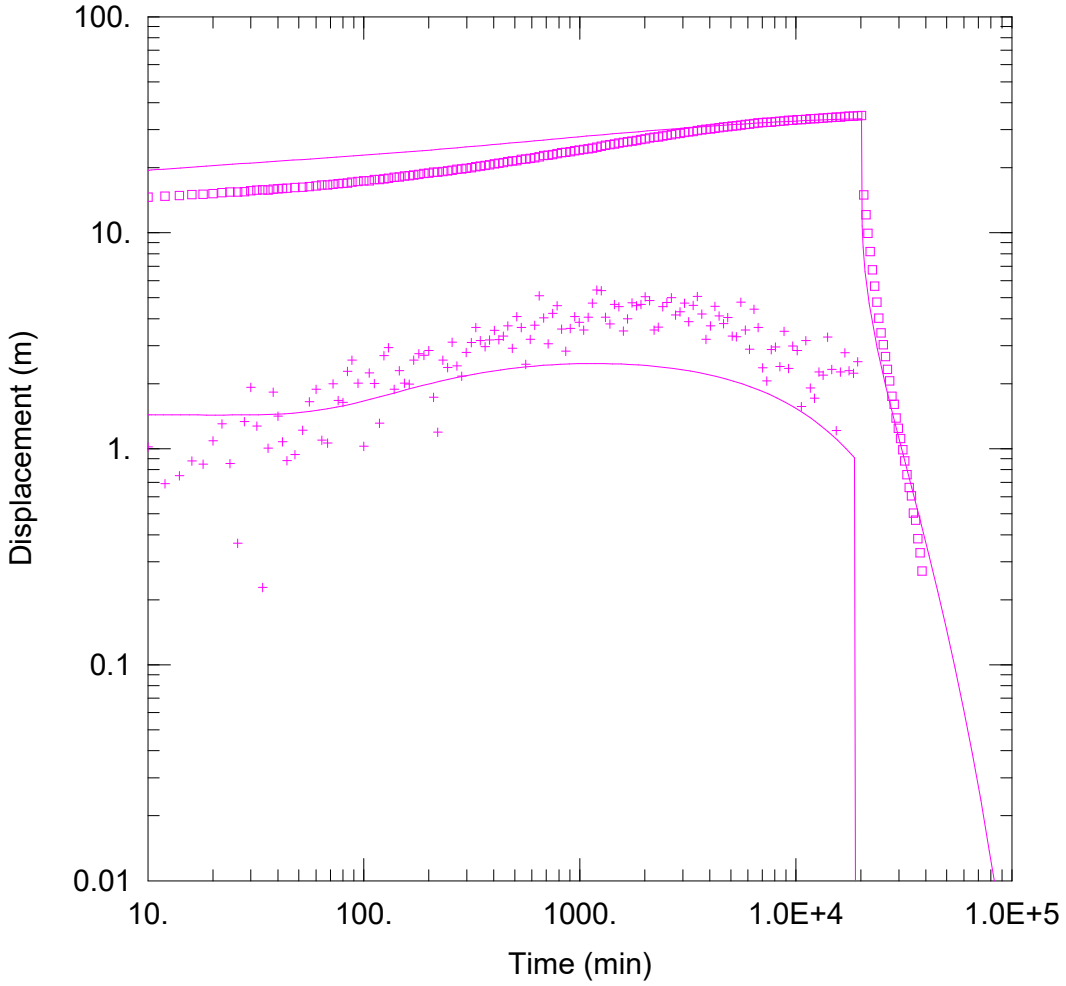
Well Name	X (m)	Y (m)
WINU0914	370718	7707474

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 163.6 m^2/day
1/B = 0.000291 m^{-1}
b = 158. m

S = 0.0002607
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_0917_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:34:02

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

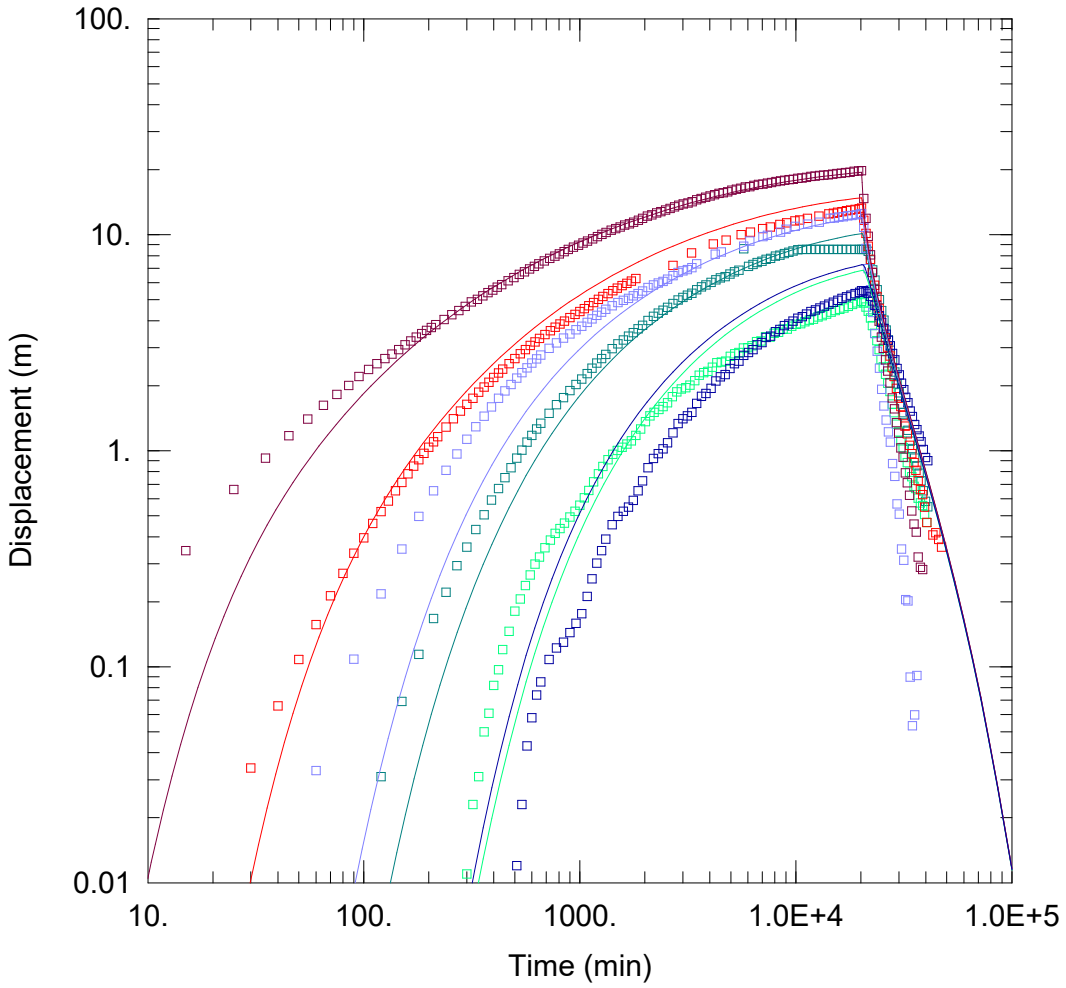
Well Name	X (m)	Y (m)
WINU0917	369357	7708865

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 241.3 m^2/day
1/B = 0.0003499 m^{-1}
b = 158. m

S = 0.0003344
Kz/Kr = 1.



WELL TEST ANALYSIS

Data Set: C:\...\0917_Group_HantushJacobLeaky.aqt
Date: 05/07/24 Time: 11:22:17

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0917

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0917	369357	7708865

Observation Wells

Well Name	X (m)	Y (m)
WINU0166	369564.47	7707683.48
WINU0705	369905.46	7707002.86
WINU0706	369027.01	7708404.09
WINU0909	368597.009	7709517.996
WINU0910	369097.65	7709064.316
WINU0914	370718	7707474

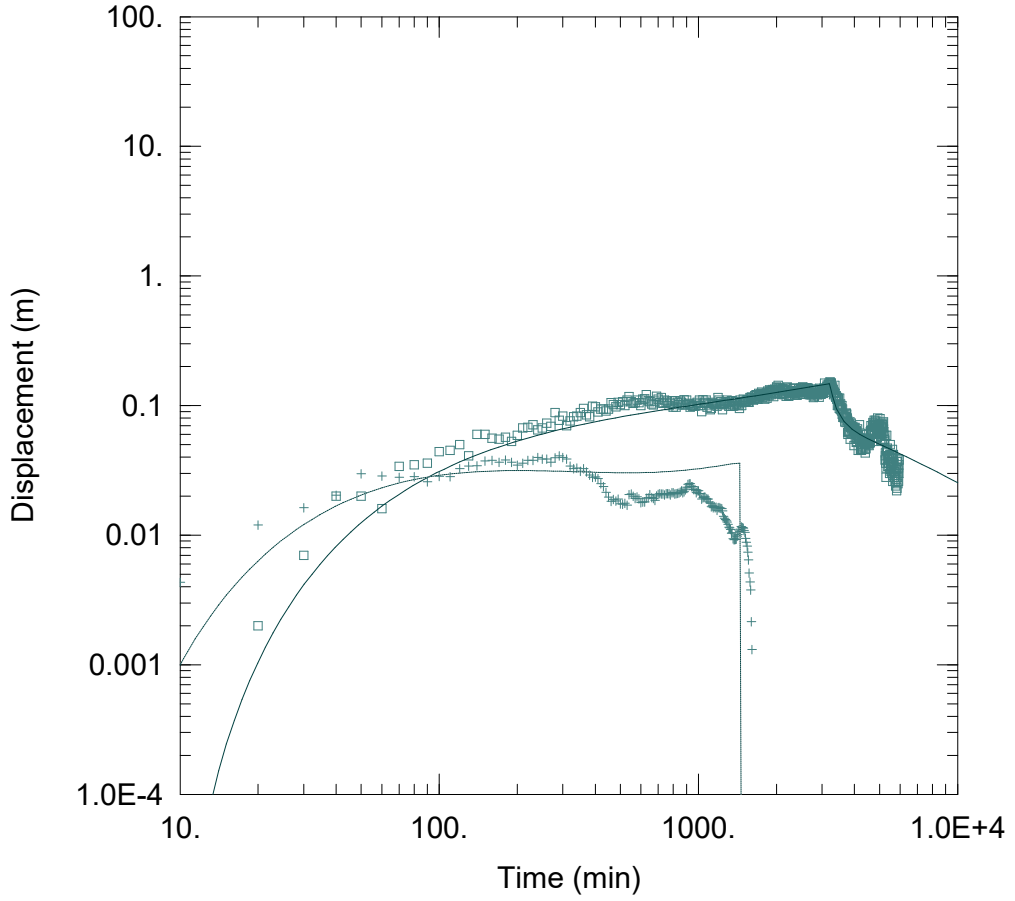
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 145.8 m^2/day
1/B = 0.0002716 m^{-1}
b = 158. m

S = 0.0001465
Kz/Kr = 1.

WINU0925 Aqtesolv Analysis Plots



WELL TEST ANALYSIS

Data Set: C:\...\0925_0008_MoenchSlab20m.aqt
Date: 05/09/24 Time: 15:52:23

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

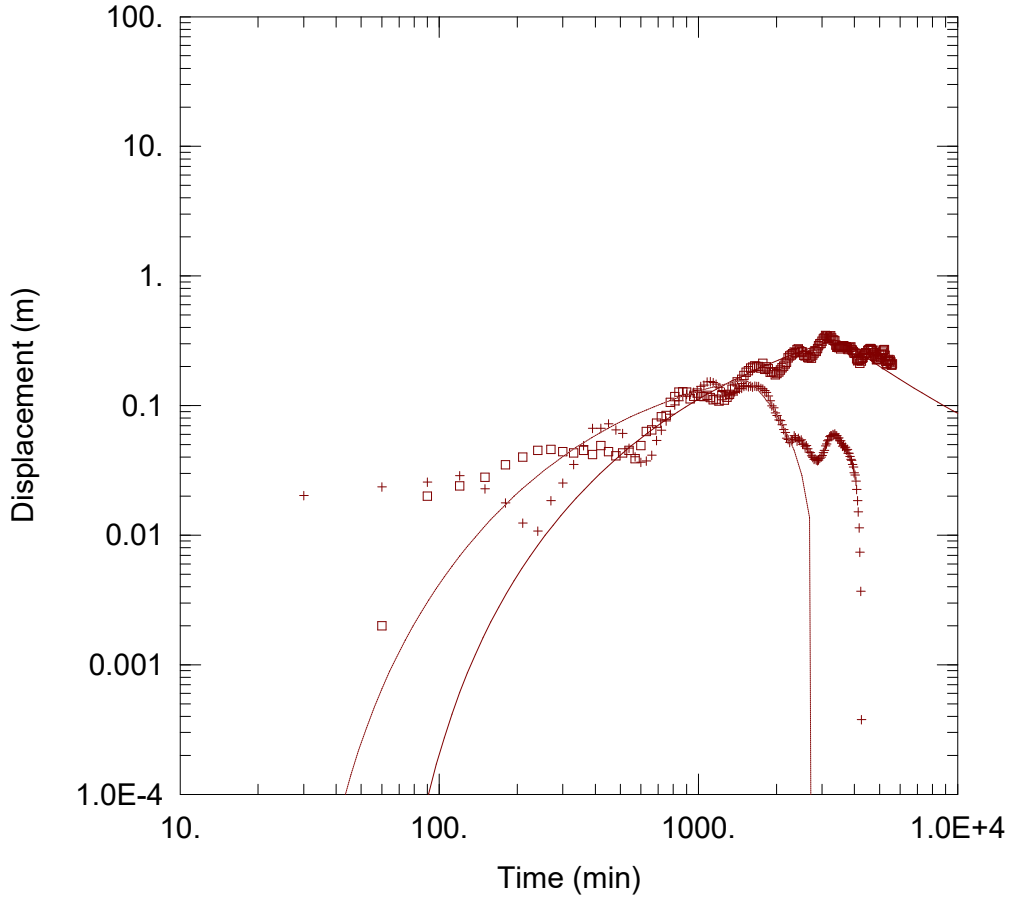
Well Name	X (m)	Y (m)
WIDI0008	371747.415	7707043.678

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 1.728 m/day
K' = 0.001107 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 4.409E-6 m^{-1}
Ss' = 2.0E-5 m^{-1}
Sf = 0.28
r(c) = 0.187 m



WELL TEST ANALYSIS

Data Set: C:\...\0925_0912_MoenchSlab20m.aqt
Date: 05/07/24 Time: 22:03:35

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

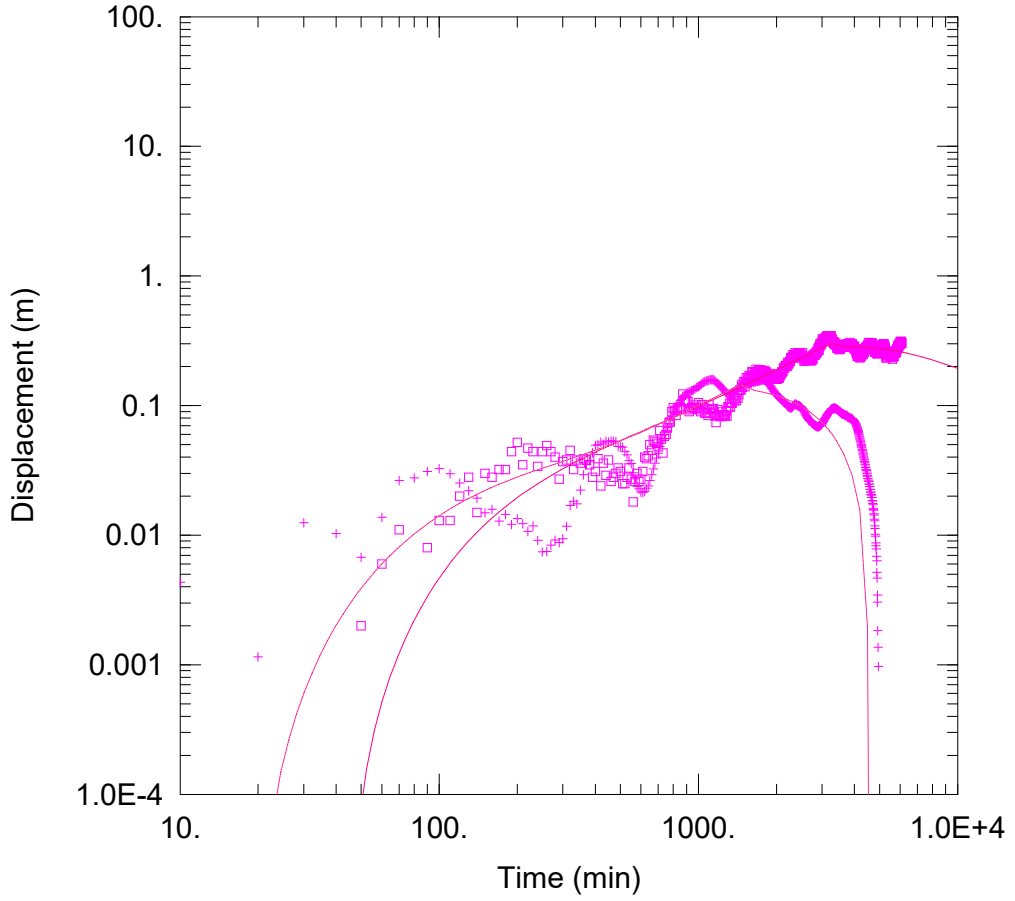
Well Name	X (m)	Y (m)
WINU0912	371483.401	7707011.826

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 0.5006 m/day
K' = 0.0009086 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 2.955E-6 m^{-1}
Ss' = 7.962E-7 m^{-1}
Sf = 0.28
r(c) = 0.187 m



WELL TEST ANALYSIS

Data Set: C:\...\0925_0913_MoenchSlab20m.aqt
Date: 05/07/24 Time: 22:03:57

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

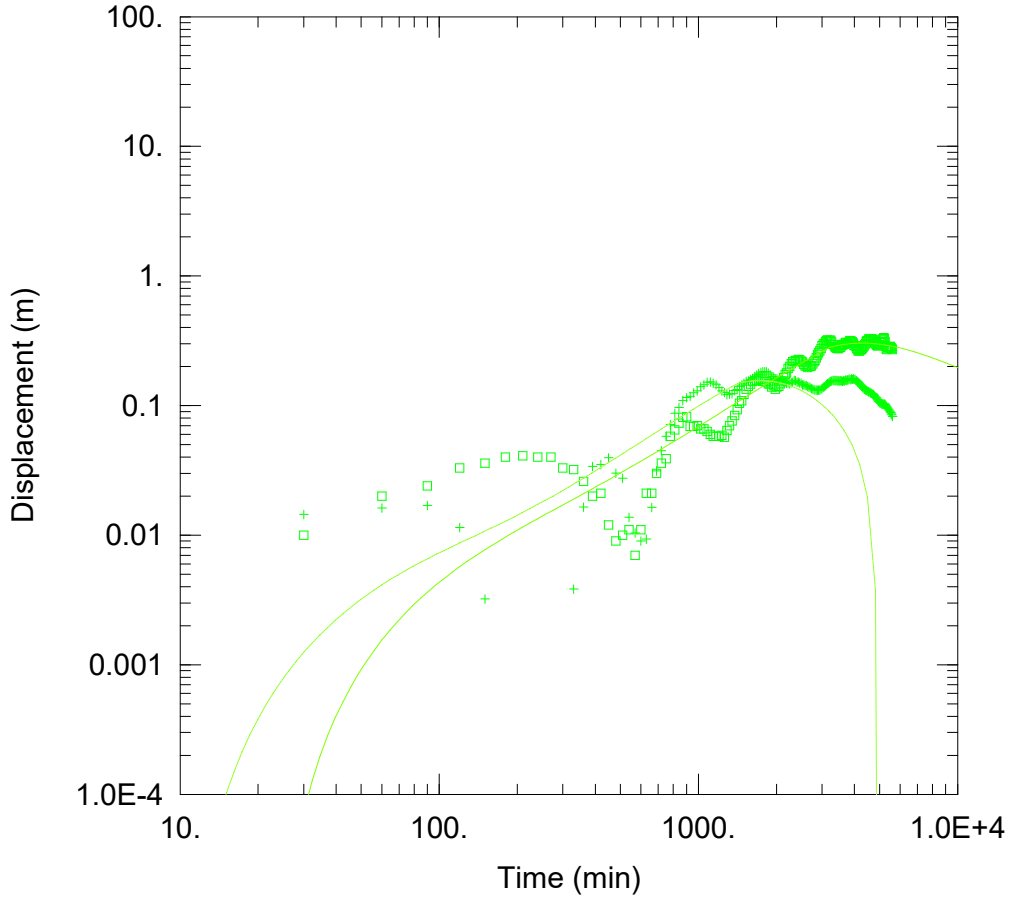
Well Name	X (m)	Y (m)
WINU0913	371476	7706940

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 0.17 m/day
K' = 0.0005132 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 4.805E-7 m^{-1}
Ss' = 4.701E-6 m^{-1}
Sf = 0.28
r(c) = 0.187 m



WELL TEST ANALYSIS

Data Set: C:\...\0925_0915_MoenchSlab20m.aqt
Date: 05/07/24 Time: 22:04:12

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

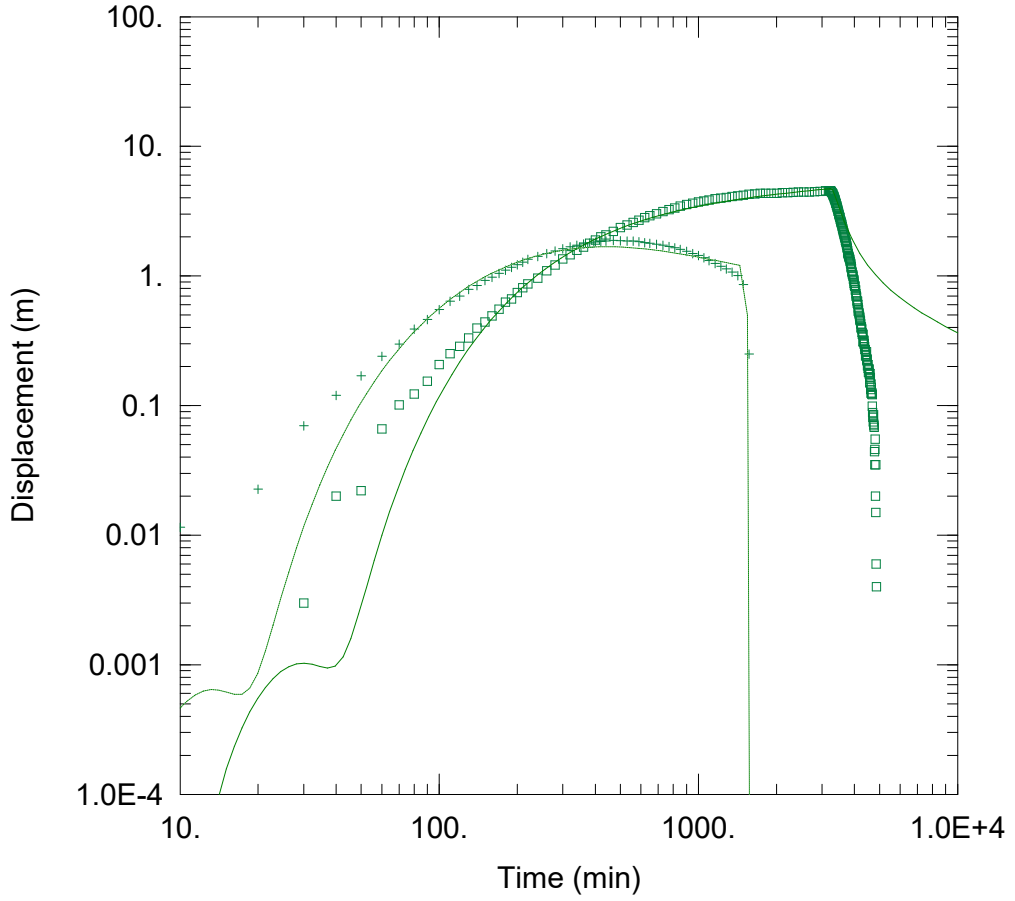
Well Name	X (m)	Y (m)
WINU0915	371445	7706696

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 0.1766 m/day
K' = 0.0007727 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 2.0E-7 m^{-1}
Ss' = 3.409E-6 m^{-1}
Sf = 0.28
r(c) = 0.187 m



WELL TEST ANALYSIS

Data Set: C:\...\0925_0916_MoenchSlab20m.aqt
Date: 05/07/24 Time: 22:04:29

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

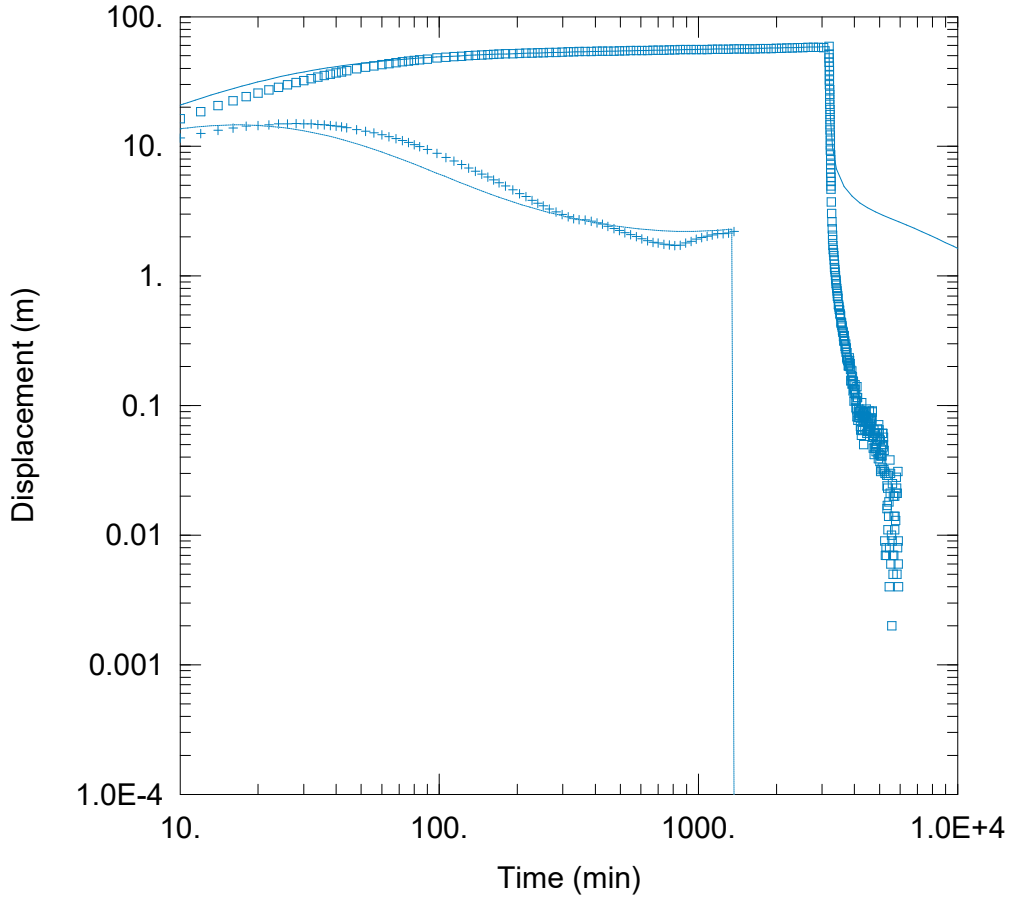
Well Name	X (m)	Y (m)
WINU0916	372081.528	7706960.44

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 0.03636 m/day
K' = 3.932E-5 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 7.211E-7 m^{-1}
Ss' = 2.0E-5 m^{-1}
Sf = 0.28
r(c) = 0.187 m



WELL TEST ANALYSIS

Data Set: C:\...\0925_0925_MoenchSlab20m.aqt
Date: 05/07/24 Time: 22:04:46

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

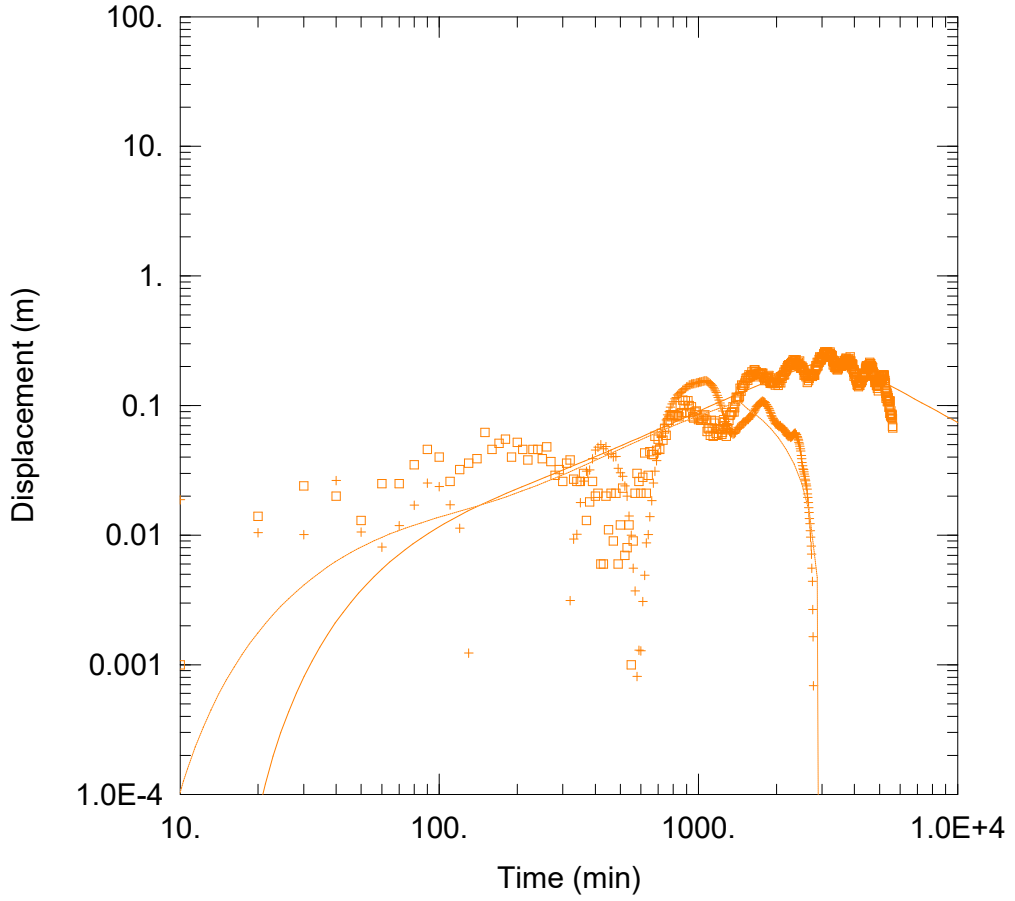
Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 0.02696 m/day
K' = 0.0006398 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 2.388E-6 m^{-1}
Ss' = 2.0E-5 m^{-1}
Sf = 0.28
r(c) = 0.187 m



WELL TEST ANALYSIS

Data Set: C:\...\0925_0930_MoenchSlab20m.aqt
Date: 05/07/24 Time: 22:05:03

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

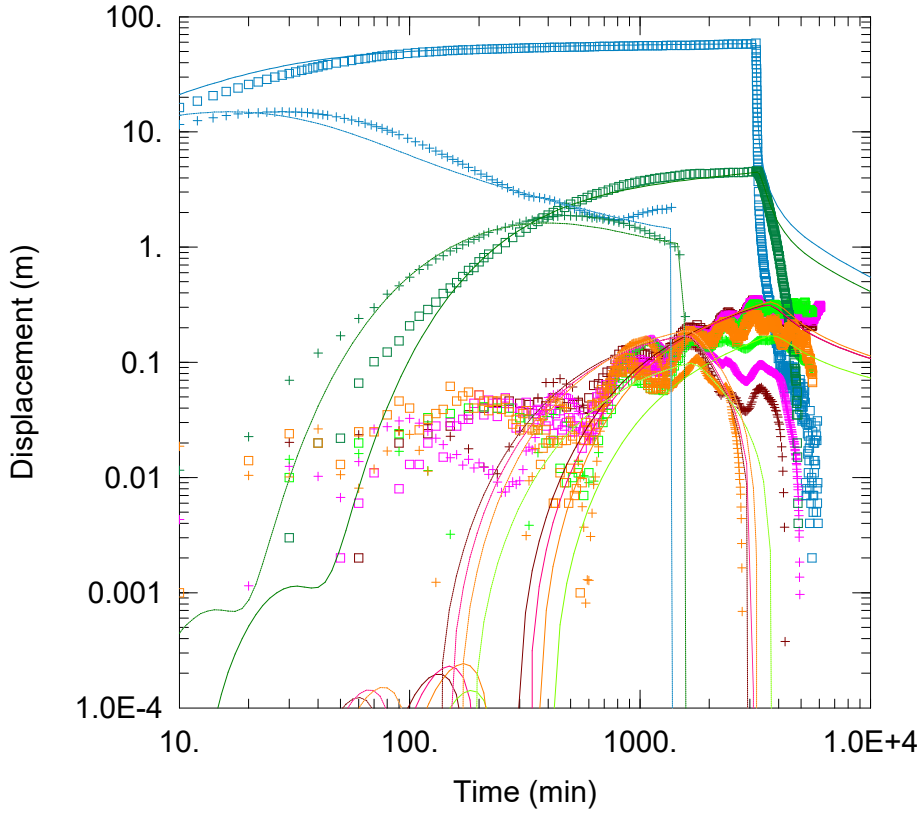
Well Name	X (m)	Y (m)
WINU0930	372222	7706560

SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 0.5715 m/day
K' = 0.001467 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 5.473E-7 m^{-1}
Ss' = 5.216E-6 m^{-1}
Sf = 0.28
r(c) = 0.187 m



WELL TEST ANALYSIS

Data Set: C:\...\0925_Group_MoenchSlab20m.aqt
Date: 05/10/24 Time: 09:32:54

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Test Well: WINU0925
Test Date: 27/02/2024

AQUIFER DATA

Saturated Thickness: 225.5 m Slab Block Thickness: 20. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616

Observation Wells

Well Name	X (m)	Y (m)
WINU0925	371948.239	7706932.616
WINU0912	371483.401	7707011.826
WINU0913	371476	7706940
WINU0915	371445	7706696
WINU0916	372081.528	7706960.44
WINU0930	372222	7706560

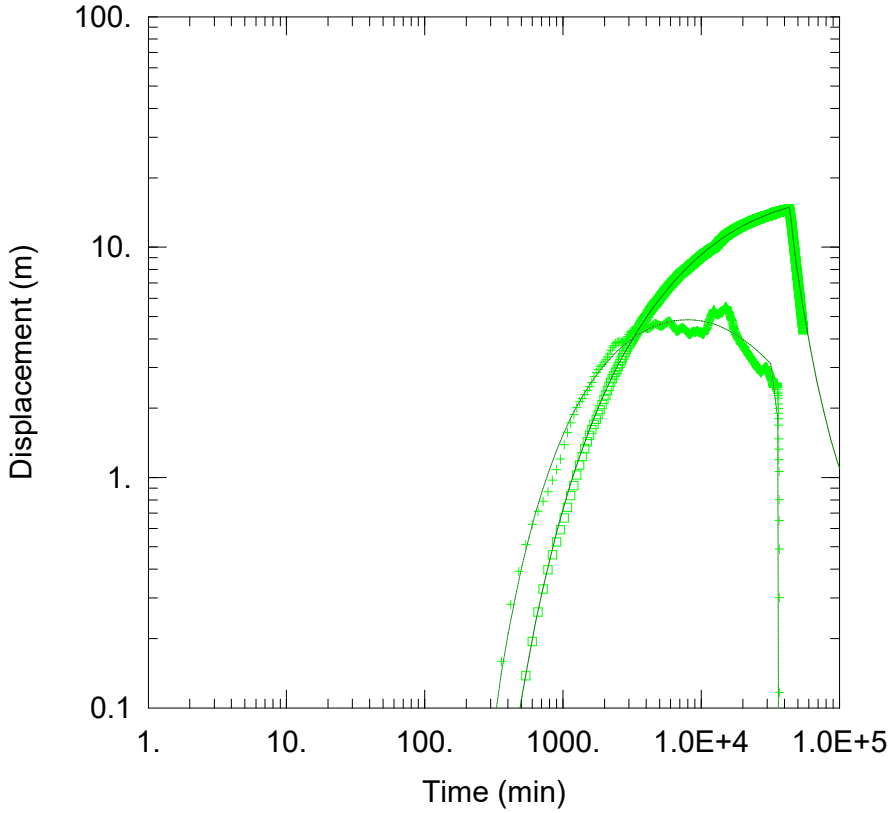
SOLUTION

Aquifer Model: Fractured
Solution Method: Moench w/slab blocks

K = 0.03052 m/day
K' = 5.599E-5 m/day
Sw = 0.38
r(w) = 0.187 m

Ss = 6.112E-7 m^{-1}
Ss' = 2.0E-5 m^{-1}
Sf = 0.28
r(c) = 0.187 m

WINU1305 Aqtesolv Analysis Plots



WELL TEST ANALYSIS

Data Set: C:\...\1305_0702_BarkerSlab5m.aqt
Date: 05/09/24 Time: 12:41:12

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU1305
Test Well: WINU1305
Test Date: 30/3/24 14:00

AQUIFER DATA

Saturated Thickness: 255. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU1305	372019	7705340

Observation Wells

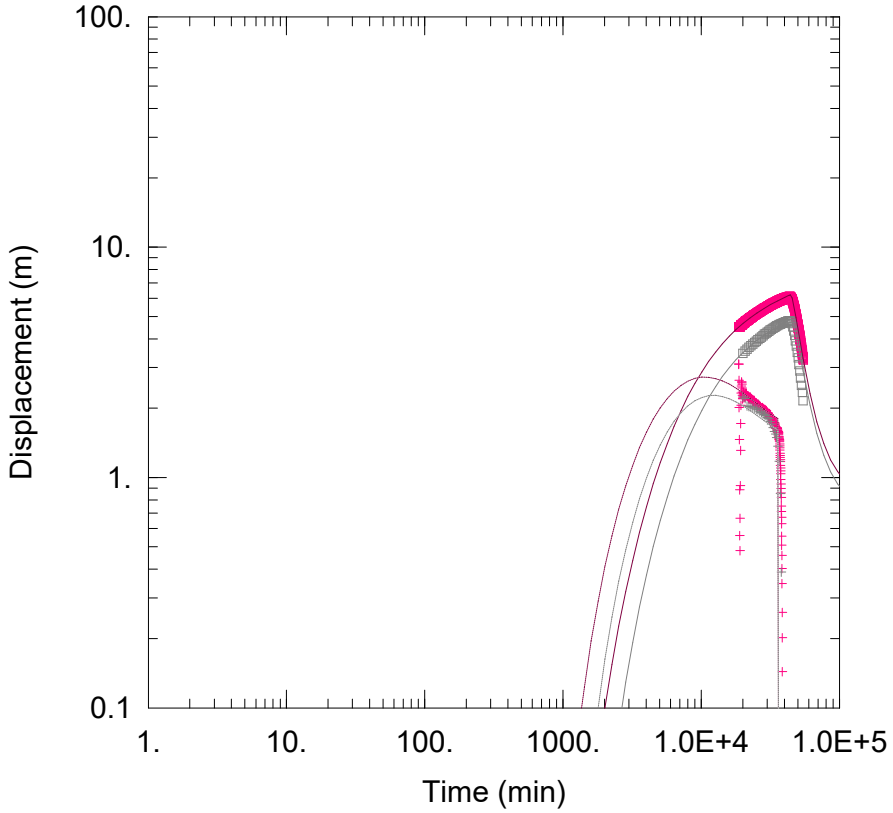
Well Name	X (m)	Y (m)
WINU0702	371041.556	7705656.827

SOLUTION

Aquifer Model: Fractured Solution Method: Barker

K = 0.2053 m/day
K' = 0.006109 m/day
n = 1.713
Sf = 1.
r(w) = 0.2365 m

Ss = 7.216E-7
Ss' = 2.0E-5 m^{-1}
b = 255. m
Sw = -4.95
r(c) = 0.127 m



WELL TEST ANALYSIS

Data Set: C:\...\1305_0913-0915_BarkerSlab5m.aqt
Date: 05/09/24 Time: 12:40:57

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU1305
Test Well: WINU1305
Test Date: 30/3/24 14:00

AQUIFER DATA

Saturated Thickness: 255. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU1305	372019	7705340

Observation Wells

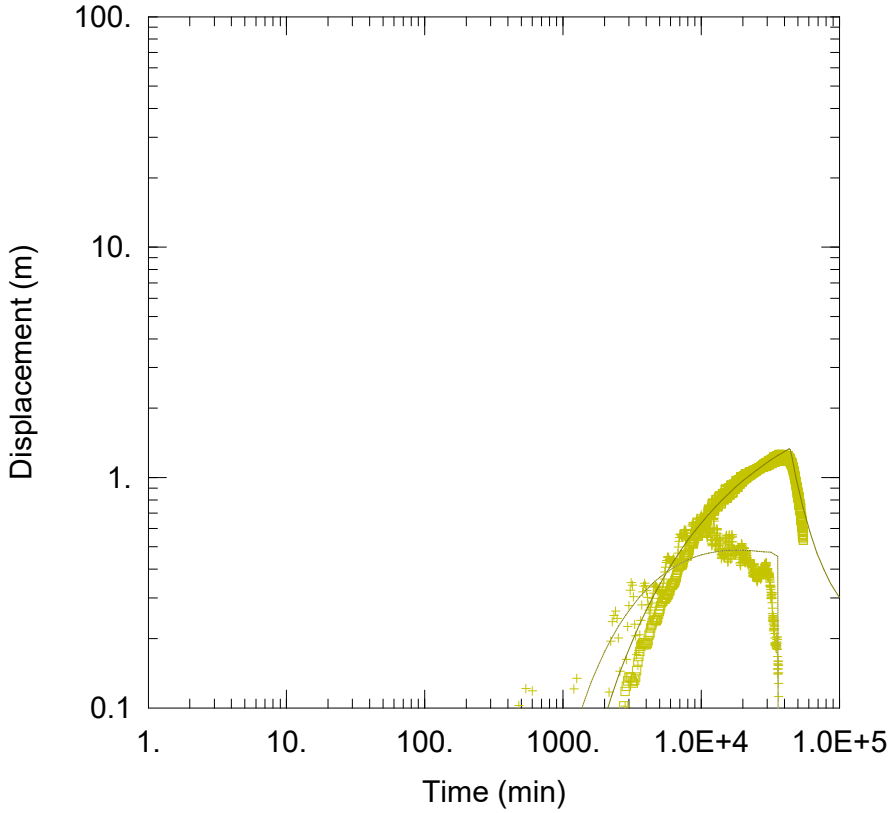
Well Name	X (m)	Y (m)
WINU0915	371445	7706696
WINU0913	371476	7706940

SOLUTION

Aquifer Model: Fractured
Solution Method: Barker

K = 0.133 m/day
K' = 0.0182 m/day
n = 1.713
Sf = 1.
r(w) = 0.2365 m

Ss = 1.031E-6
Ss' = 2.0E-5 m^{-1}
b = 255. m
Sw = -4.95
r(c) = 0.127 m



WELL TEST ANALYSIS

Data Set: C:\...\1305_0930_BarkerSlab20m.aqt
Date: 05/09/24 Time: 12:40:38

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU1305
Test Well: WINU1305
Test Date: 30/3/24 14:00

AQUIFER DATA

Saturated Thickness: 255. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU1305	372019	7705340

Observation Wells

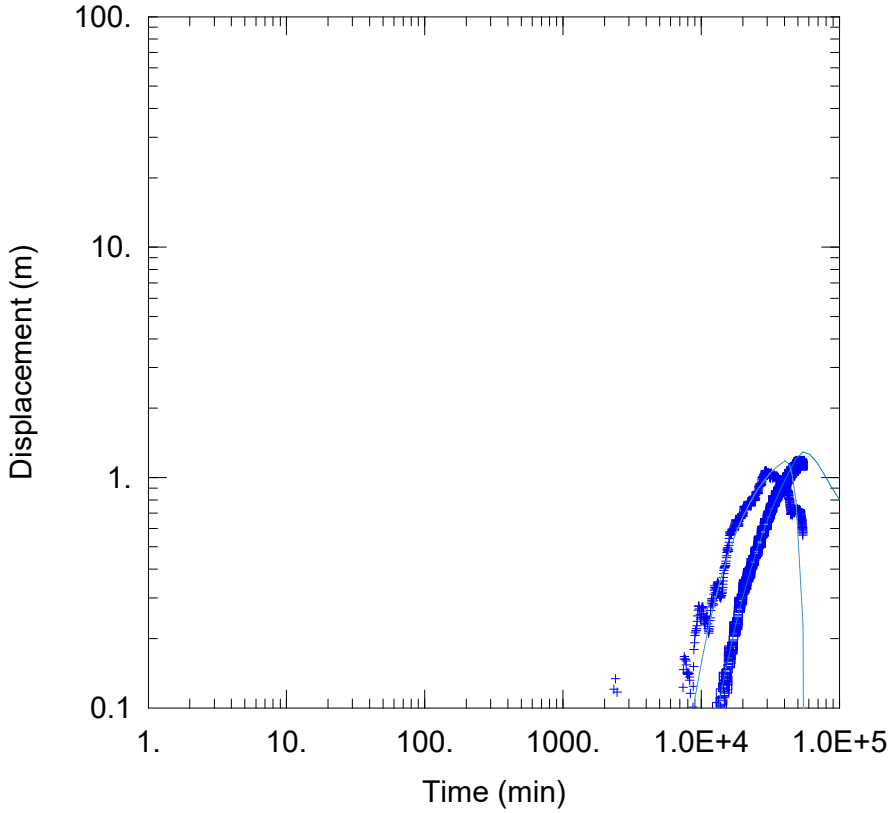
Well Name	X (m)	Y (m)
WINU0930	372222	7706560

SOLUTION

Aquifer Model: Fractured Solution Method: Barker

K = 2.195 m/day
K' = 0.9628 m/day
n = 1.713
Sf = 1.
r(w) = 0.2365 m

Ss = 9.402E-6
Ss' = 2.0E-5 m^{-1}
b = 255. m
Sw = -4.95
r(c) = 0.127 m



WELL TEST ANALYSIS

Data Set: C:\...\1305_0950_BarkerSlab20m.aqt
Date: 05/09/24 Time: 12:40:22

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU1305
Test Well: WINU1305
Test Date: 30/3/24 14:00

AQUIFER DATA

Saturated Thickness: 255. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU1305	372019	7705340

Observation Wells

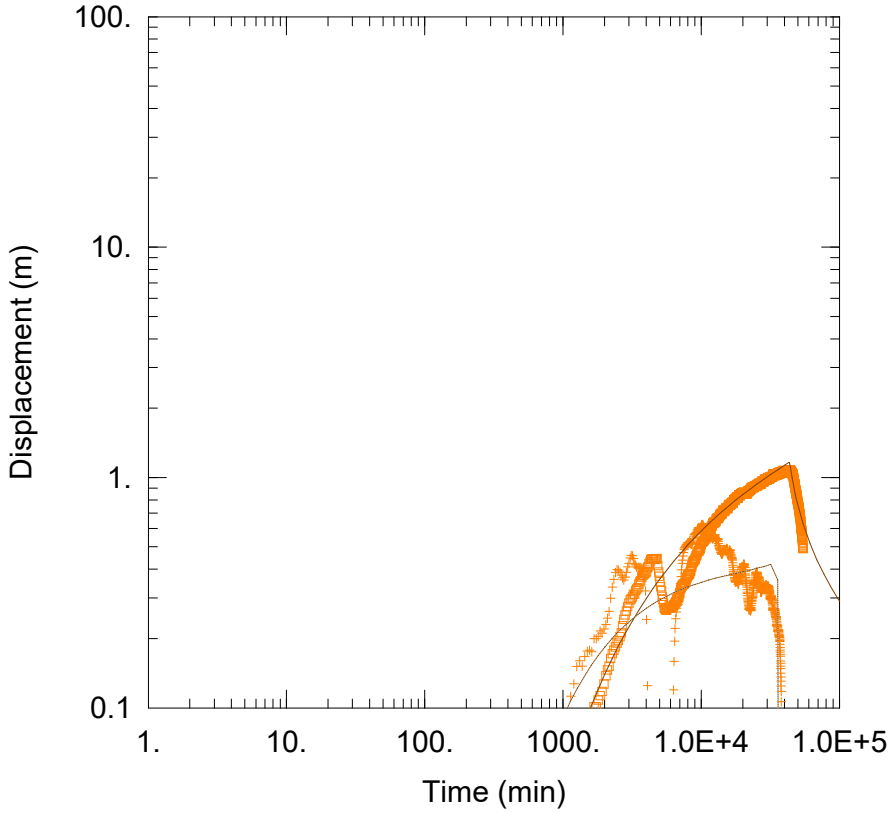
Well Name	X (m)	Y (m)
▫ WINU0950	370166	7704790

SOLUTION

Aquifer Model: Fractured Solution Method: Barker

K = 0.2267 m/day
K' = 0.5774 m/day
n = 1.713
Sf = 1.
r(w) = 0.2365 m

Ss = 5.719E-6
Ss' = 2.0E-5 m^{-1}
b = 255. m
Sw = -4.95
r(c) = 0.127 m



WELL TEST ANALYSIS

Data Set: C:\...\1305_1298_BarkerSlab20m.aqt
Date: 05/09/24 Time: 12:40:01

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU1305
Test Well: WINU1305
Test Date: 30/3/24 14:00

AQUIFER DATA

Saturated Thickness: 255. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU1305	372019	7705340

Observation Wells

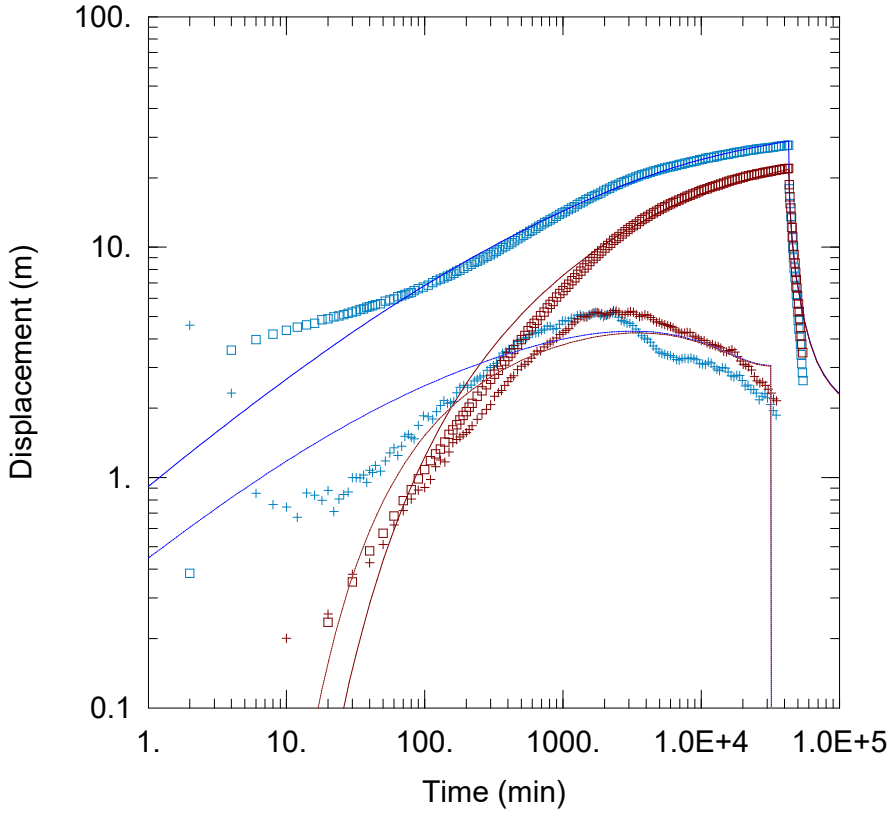
Well Name	X (m)	Y (m)
WINU1298	371550.17	7705597.06

SOLUTION

Aquifer Model: Fractured Solution Method: Barker

K = 3.105 m/day
K' = 2.507 m/day
n = 1.713
Sf = 1.
r(w) = 0.2365 m

Ss = 3.931E-5
Ss' = 2.0E-5 m^{-1}
b = 255. m
Sw = -4.95
r(c) = 0.127 m



WELL TEST ANALYSIS

Data Set: C:\...\1305_1305-1307_BarkerSlab5m.aqt
Date: 05/09/24 Time: 12:35:21

PROJECT INFORMATION

Company: Worley
Client: Rio Tinto
Project: 311012-01475
Location: WINU1305
Test Well: WINU1305
Test Date: 30/3/24 14:00

AQUIFER DATA

Saturated Thickness: 255. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WINU1305	372019	7705340

Observation Wells

Well Name	X (m)	Y (m)
▫ WINU1305	372019	7705340
▫ WINU1307	371924	7705392

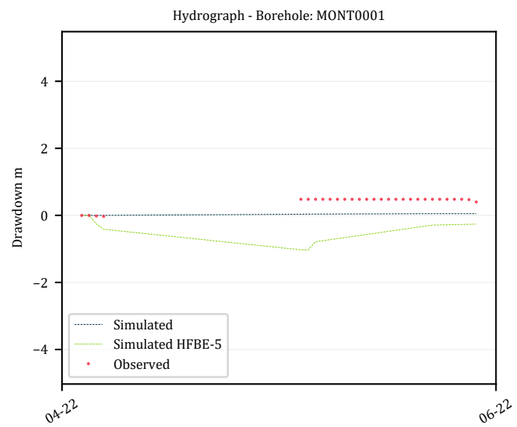
SOLUTION

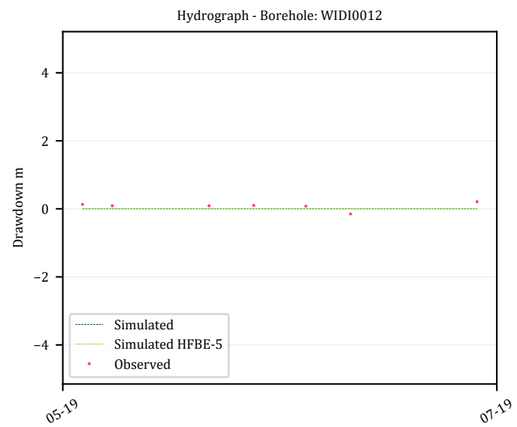
Aquifer Model: Fractured
Solution Method: Barker

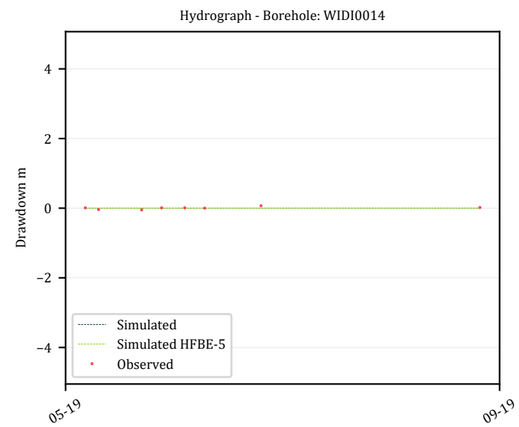
K = 0.208 m/day
K' = 0.0588 m/day
n = 1.713
Sf = 1.
r(w) = 0.2365 m

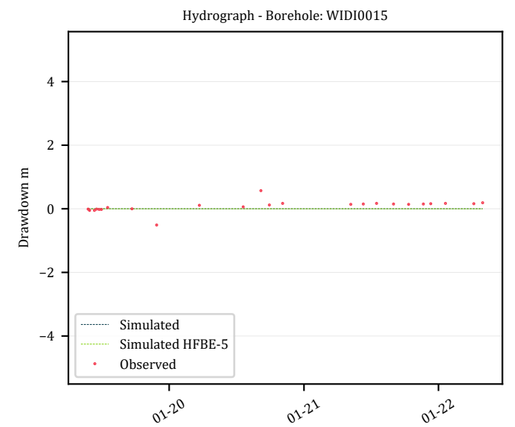
Ss = 4.415E-6
Ss' = 2.0E-5 m^{-1}
b = 255. m
Sw = -4.95
r(c) = 0.127 m

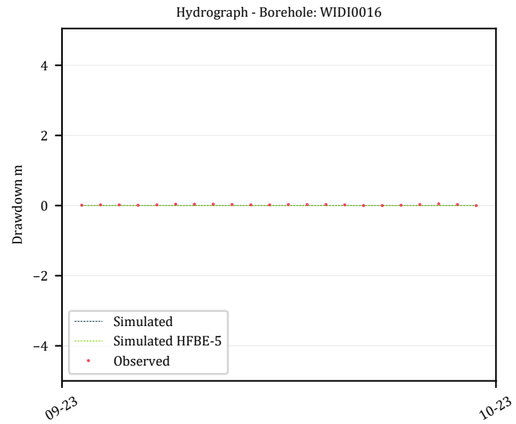
Appendix G. Calibration hydrographs

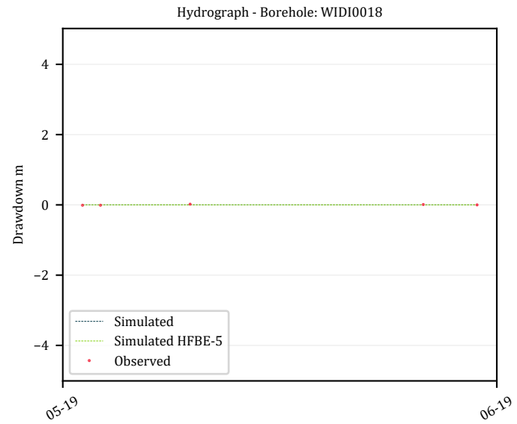

Hydrograph - Borehole: MONT0001
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
06-22

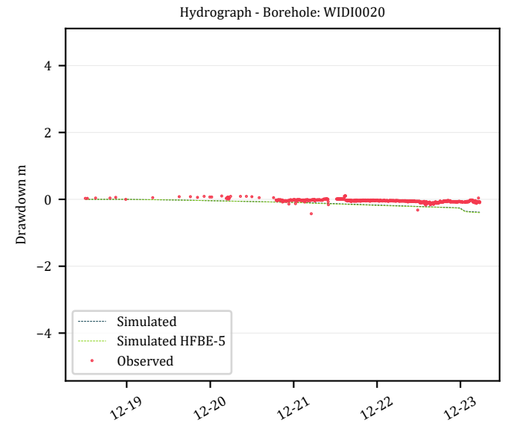

Hydrograph - Borehole: WIDI0012
Drawdown m
Simulated
Simulated HFBE-5
Observed
05-19
07-19

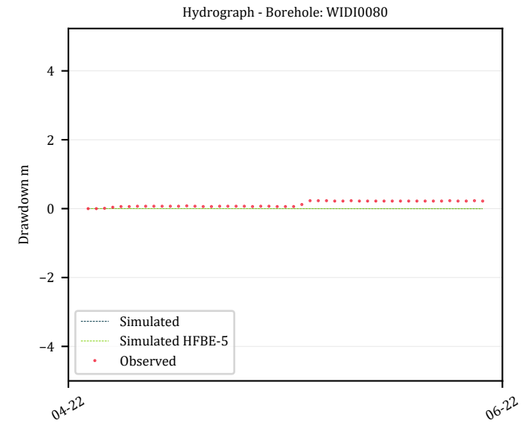

Hydrograph - Borehole: WIDI0014
Drawdown m
Simulated
Simulated HFBE-5
Observed
05-19
09-19

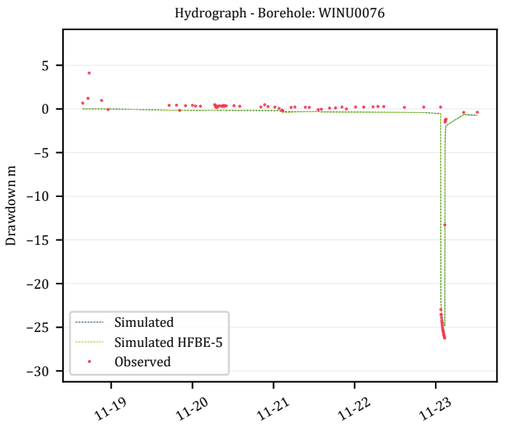

Hydrograph - Borehole: WIDI0015
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-20
01-21
01-22

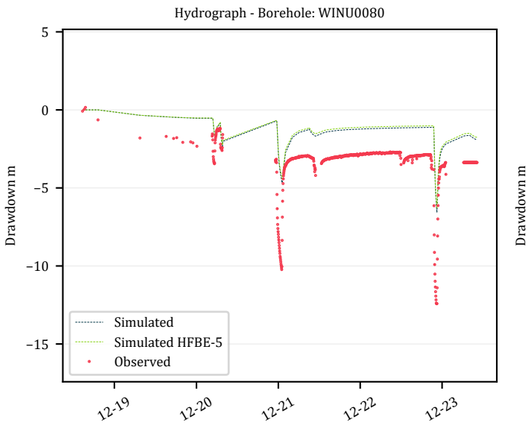

Hydrograph - Borehole: WIDI0016
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

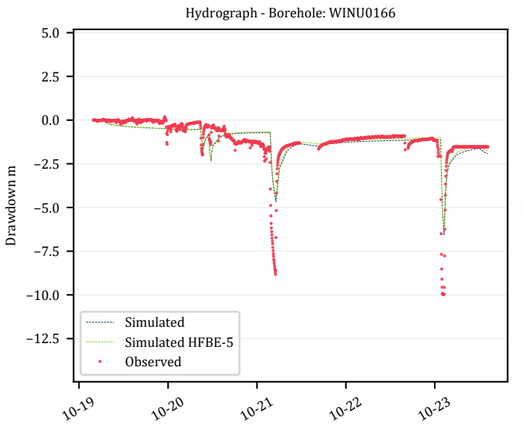

Hydrograph - Borehole: WIDI0018
Drawdown m
Simulated
Simulated HFBE-5
Observed
05-19
06-19

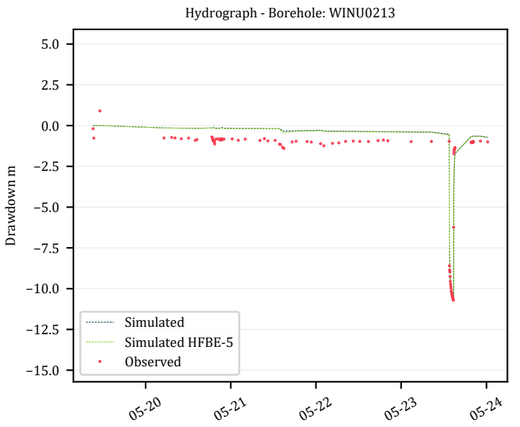

Hydrograph - Borehole: WIDI0020
Drawdown m
Simulated
Simulated HFBE-5
Observed
12-19
12-20
12-21
12-22
12-23

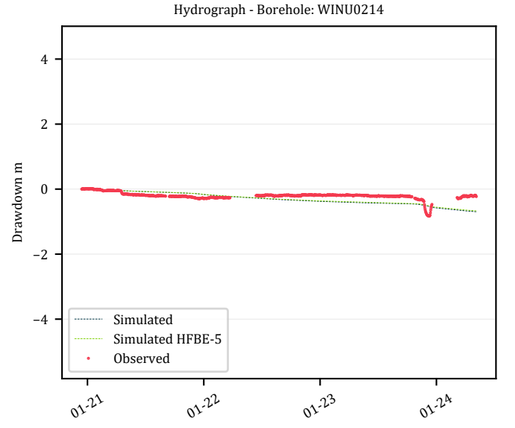

Hydrograph - Borehole: WIDI0080
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
06-22

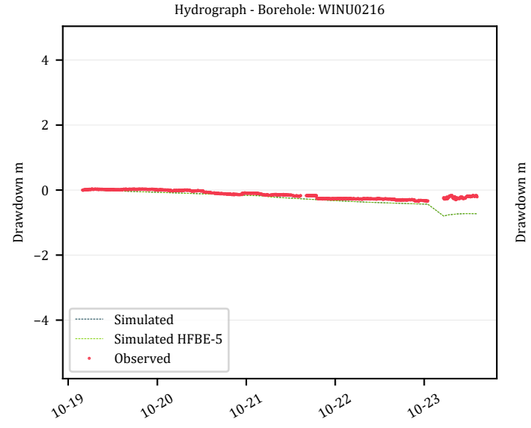

Hydrograph - Borehole: WINU0076
Drawdown m
Simulated
Simulated HFBE-5
Observed
11-19
11-20
11-21
11-22
11-23

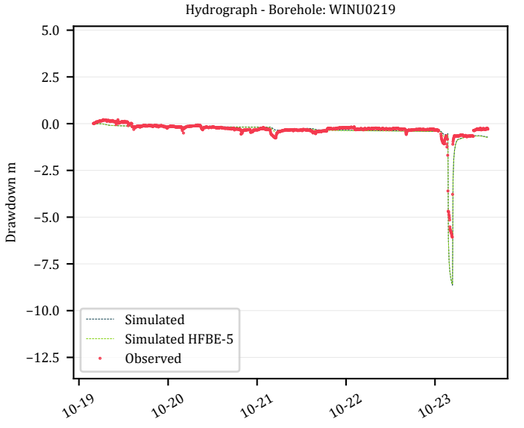

Hydrograph - Borehole: WINU0080
Drawdown m
Simulated
Simulated HFBE-5
Observed
12-19
12-20
12-21
12-22
12-23

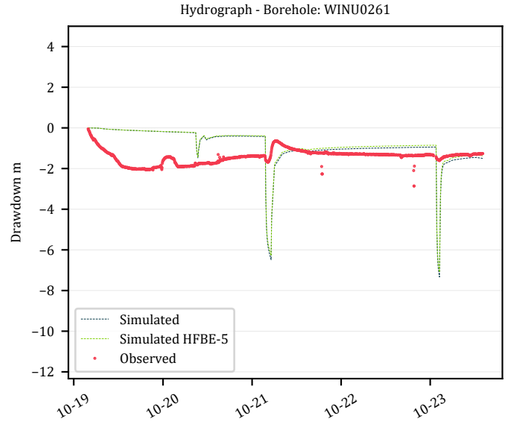

Hydrograph - Borehole: WINU0166
Drawdown m
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

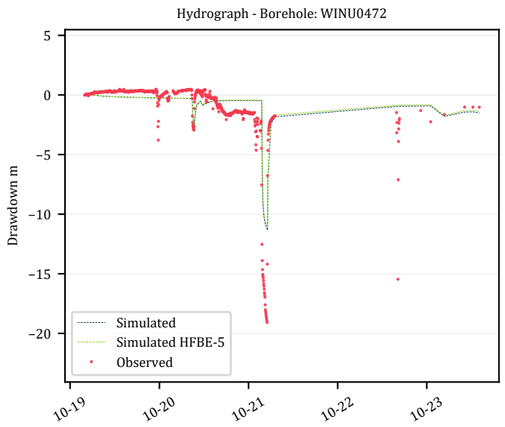

Hydrograph - Borehole: WINU0213
Drawdown m
Simulated
Simulated HFBE-5
Observed
05-20
05-21
05-22
05-23
05-24

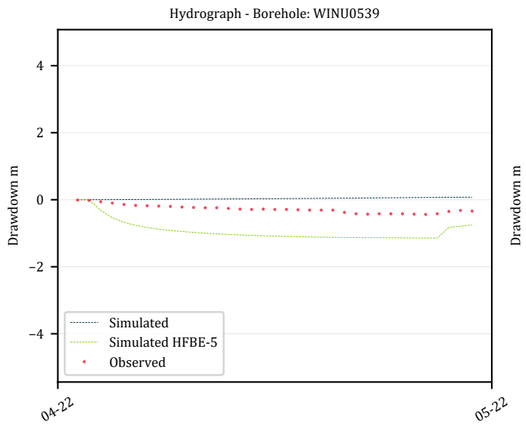

Hydrograph - Borehole: WINU0214
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-21
01-22
01-23
01-24

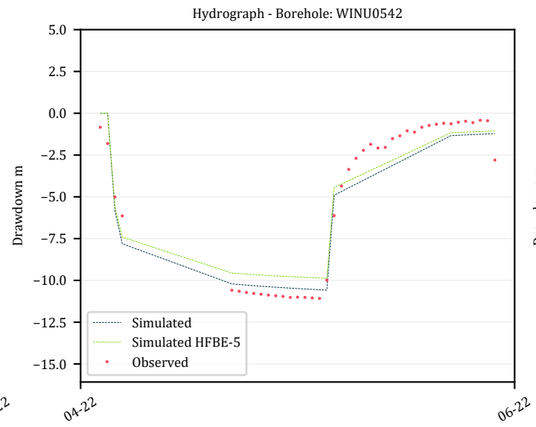

Hydrograph - Borehole: WINU0216
Drawdown m
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

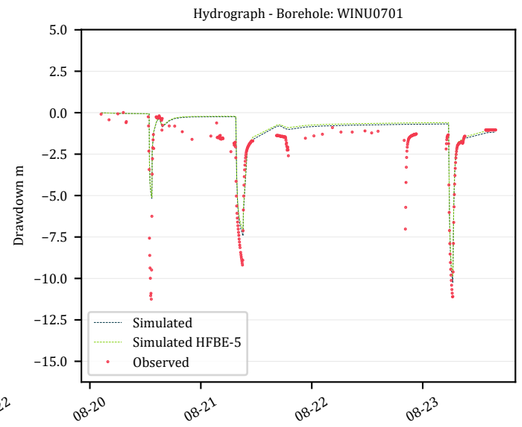

Hydrograph - Borehole: WINU0219
Drawdown m
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

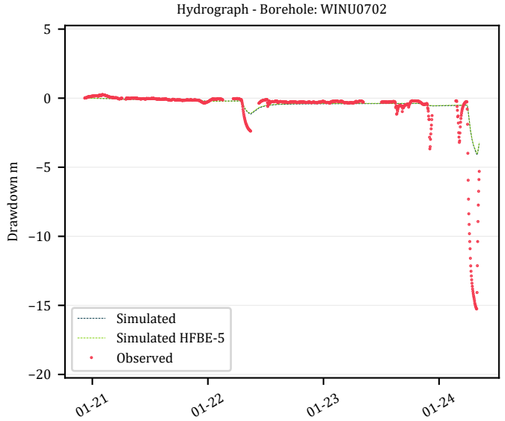

Hydrograph - Borehole: WINU0261
Drawdown m
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

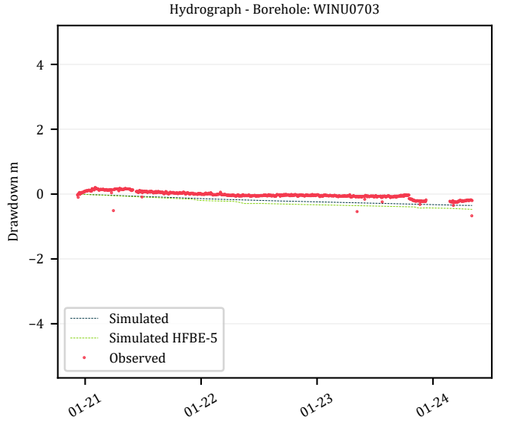

Hydrograph - Borehole: WINU0472
Drawdown m
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

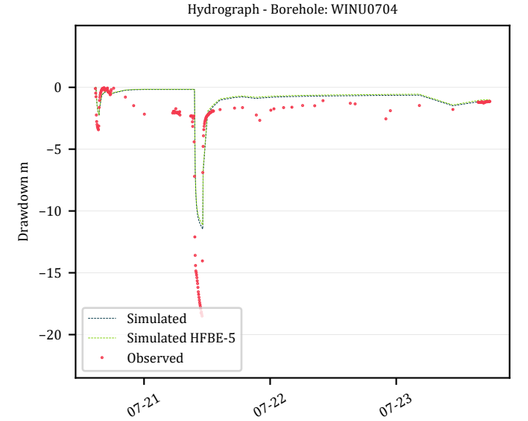

Hydrograph - Borehole: WINU0539
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
05-22

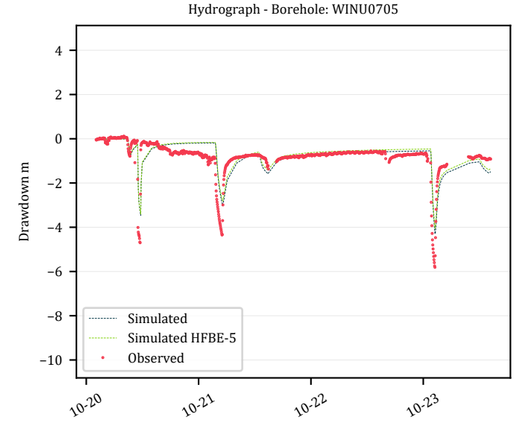

Hydrograph - Borehole: WINU0542
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
06-22

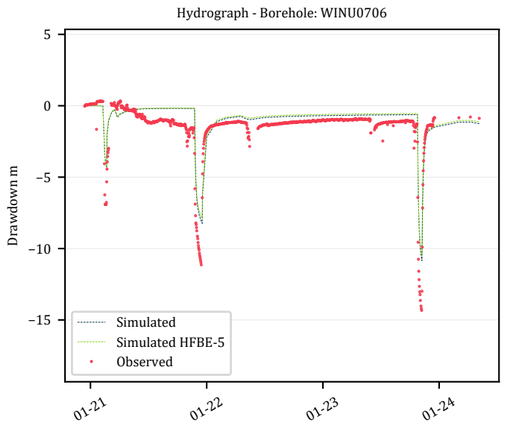

Hydrograph - Borehole: WINU0701
Drawdown m
Simulated
Simulated HFBE-5
Observed
08-20
08-21
08-22
08-23

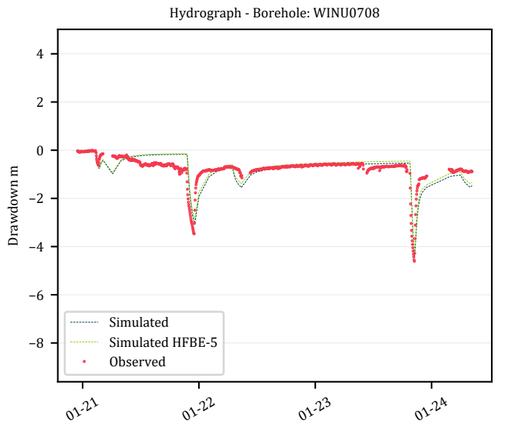

Hydrograph - Borehole: WINU0702
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-21
01-22
01-23
01-24

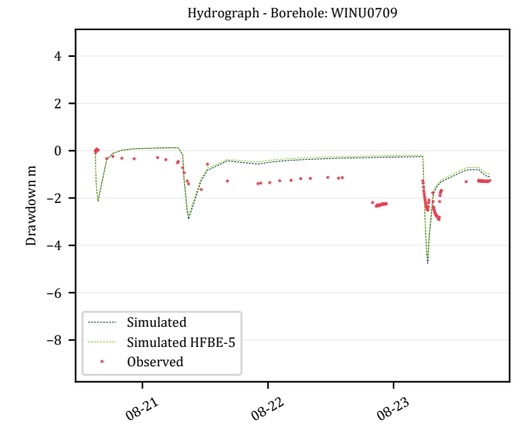

Hydrograph - Borehole: WINU0703
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-21
01-22
01-23
01-24

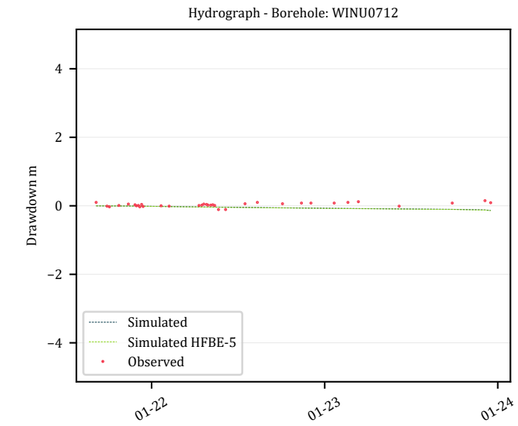

Hydrograph - Borehole: WINU0704
Drawdown m
Simulated
Simulated HFBE-5
Observed
07-21
07-22
07-23

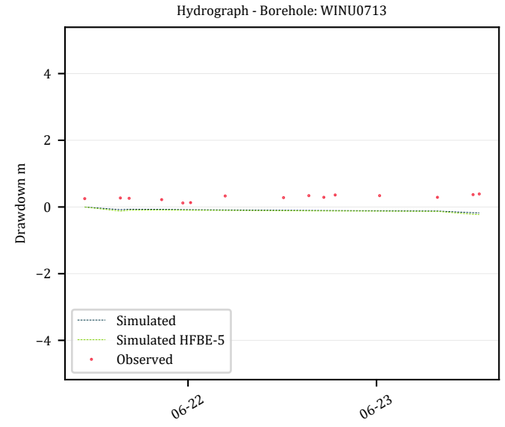

Hydrograph - Borehole: WINU0705
Drawdown m
Simulated
Simulated HFBE-5
Observed
10-20
10-21
10-22
10-23

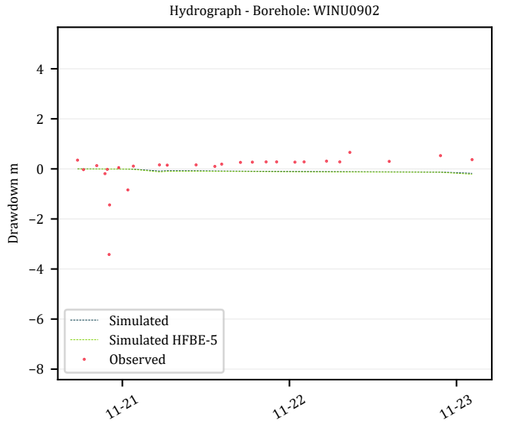

Hydrograph - Borehole: WINU0706
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-21
01-22
01-23
01-24

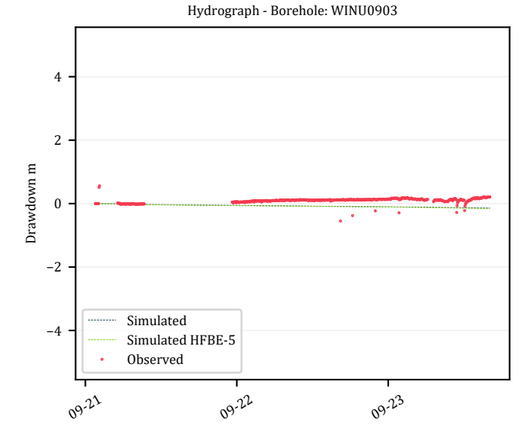

Hydrograph - Borehole: WINU0708
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-21
01-22
01-23
01-24

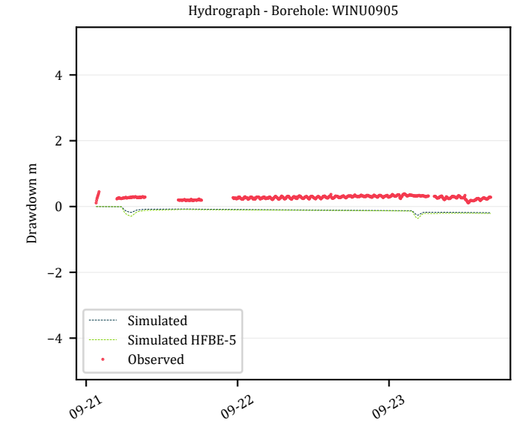

Hydrograph - Borehole: WINU0709
Drawdown m
Simulated
Simulated HFBE-5
Observed
08-21
08-22
08-23

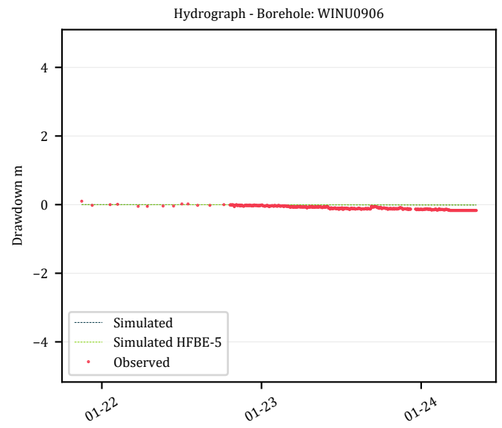

Hydrograph - Borehole: WINU0712
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

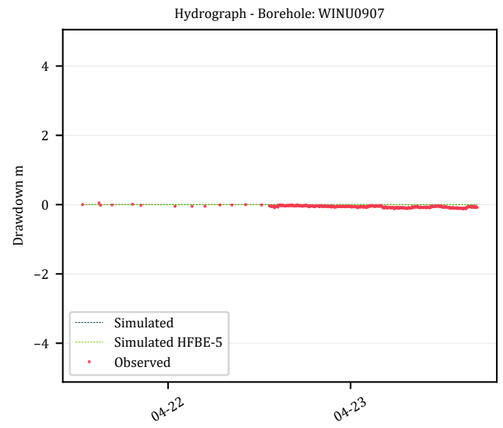

Hydrograph - Borehole: WINU0713
Drawdown m
Simulated
Simulated HFBE-5
Observed
06-22
06-23

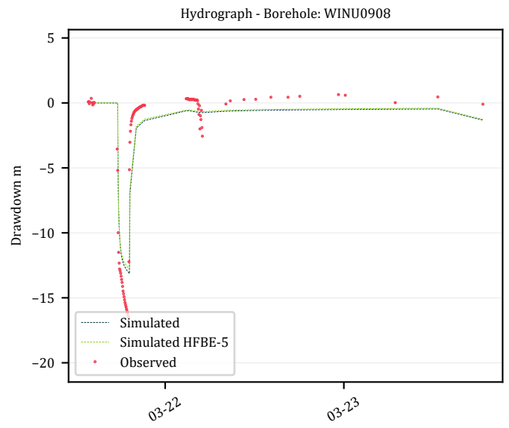

Hydrograph - Borehole: WINU0902
Drawdown m
Simulated
Simulated HFBE-5
Observed
11-21
11-22
11-23

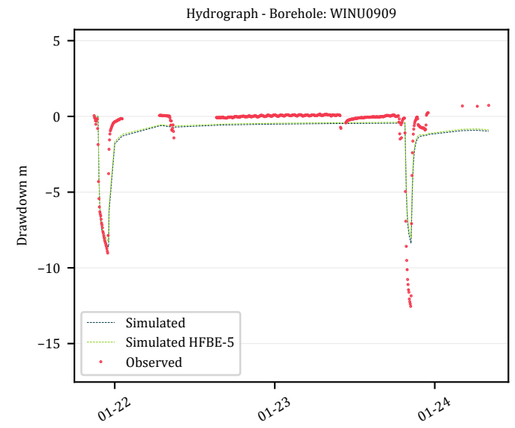

Hydrograph - Borehole: WINU0903
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-21
09-22
09-23

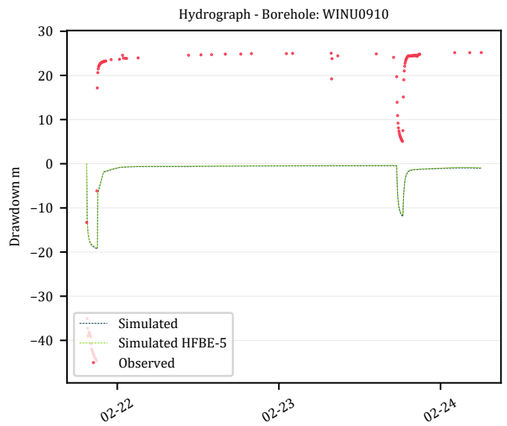

Hydrograph - Borehole: WINU0905
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-21
09-22
09-23

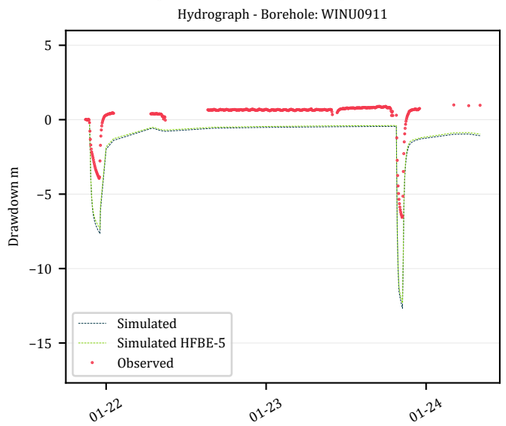

Hydrograph - Borehole: WINU0906
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

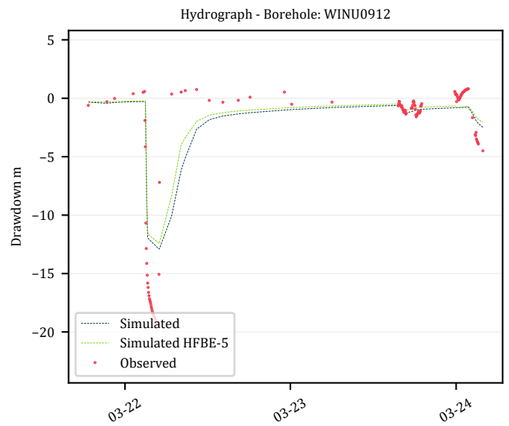

Hydrograph - Borehole: WINU0907
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
04-23

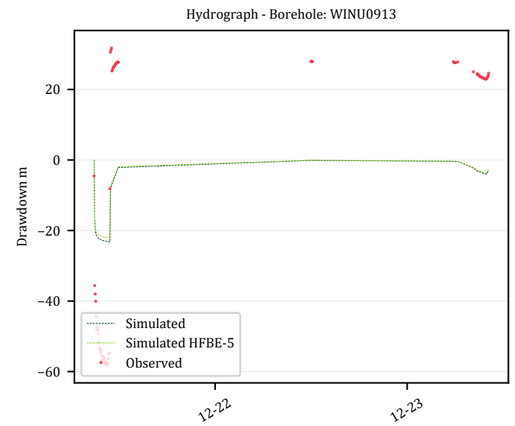

Hydrograph - Borehole: WINU0908
Drawdown m
Simulated
Simulated HFBE-5
Observed
03-22
03-23

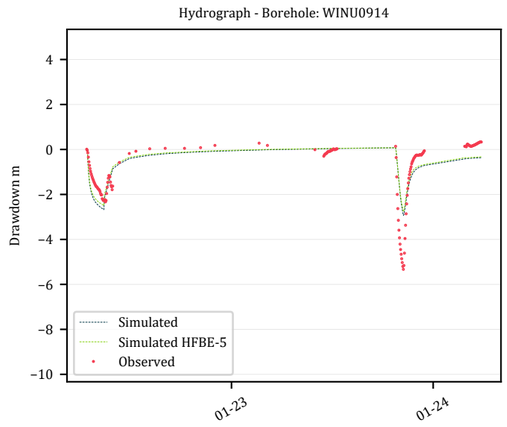

Hydrograph - Borehole: WINU0909
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

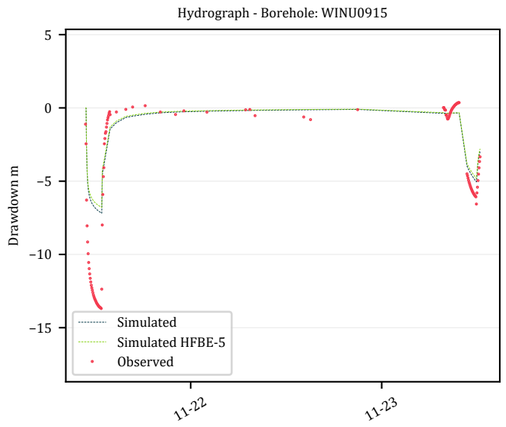

Hydrograph - Borehole: WINU0910
Drawdown m
Simulated
Simulated HFBE-5
Observed
02-22
02-23
02-24

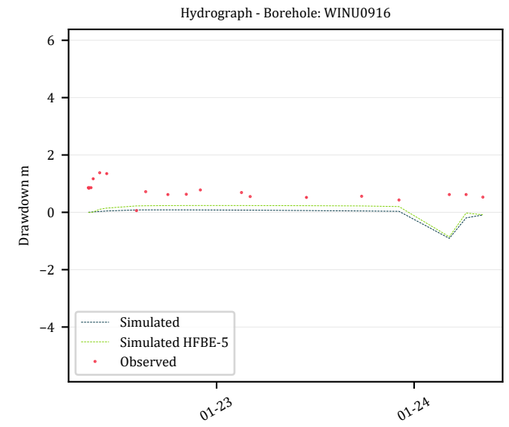

Hydrograph - Borehole: WINU0911
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

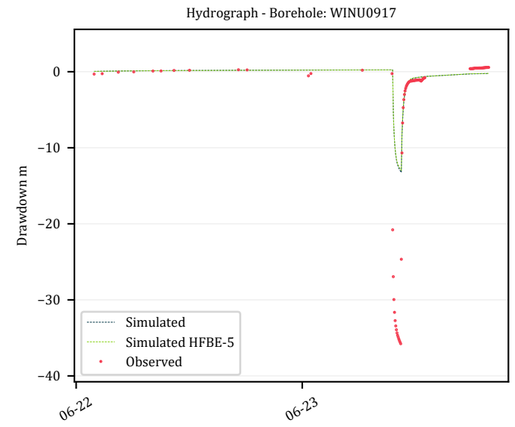

Hydrograph - Borehole: WINU0912
Drawdown m
Simulated
Simulated HFBE-5
Observed
03-22
03-23
03-24

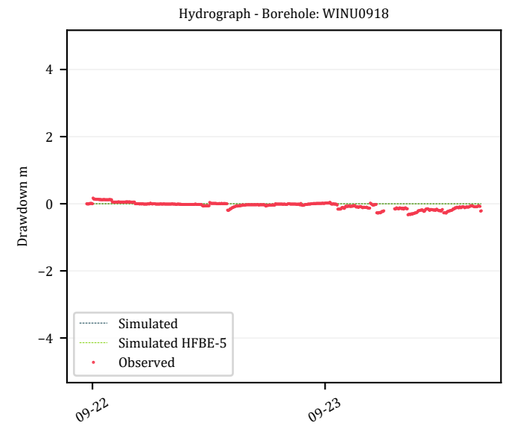

Hydrograph - Borehole: WINU0913
Drawdown m
Simulated
Simulated HFBE-5
Observed
12-22
12-23

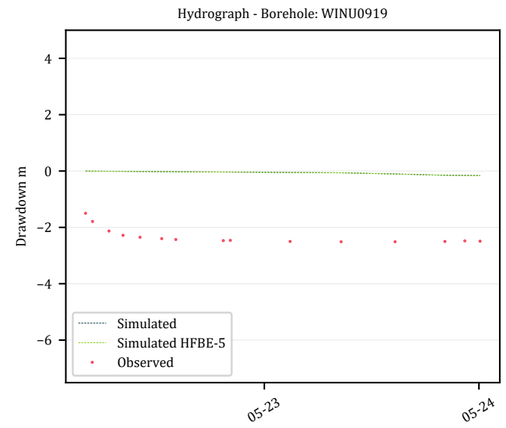

Hydrograph - Borehole: WINU0914
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-23
01-24

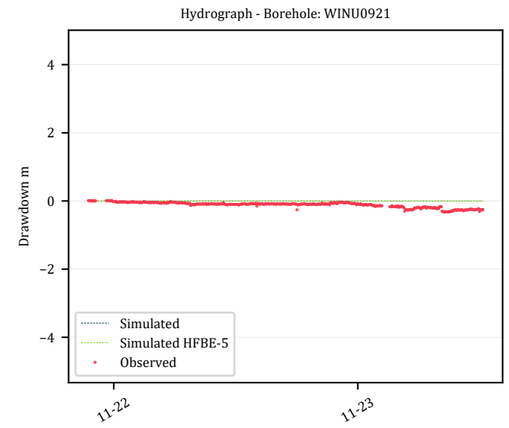

Hydrograph - Borehole: WINU0915
Drawdown m
Simulated
Simulated HFBE-5
Observed
11-22
11-23

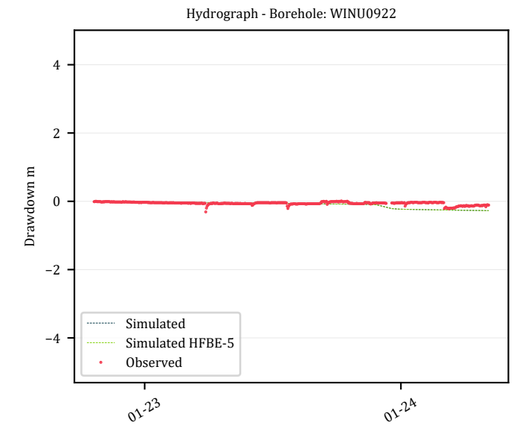

Hydrograph - Borehole: WINU0916
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-23
01-24

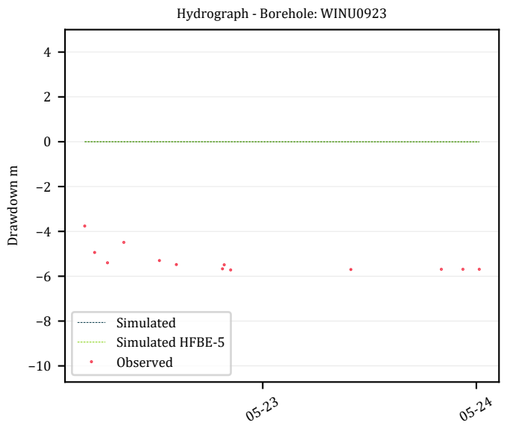

Hydrograph - Borehole: WINU0917
Drawdown m
Simulated
Simulated HFBE-5
Observed
06-22
06-23

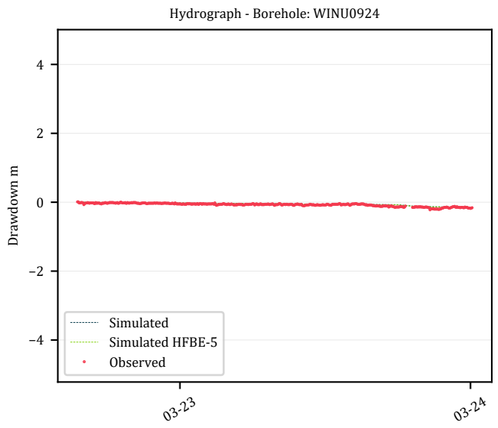

Hydrograph - Borehole: WINU0918
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-22
09-23

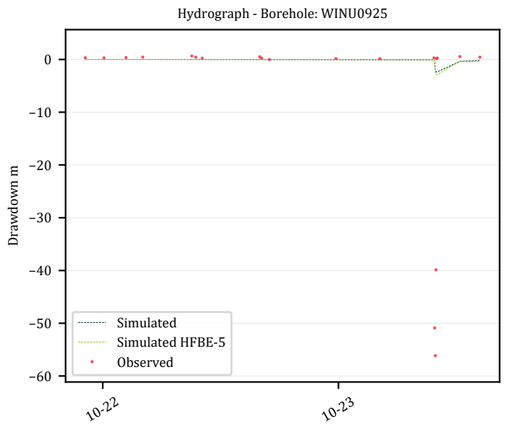

Hydrograph - Borehole: WINU0919
Drawdown m
Simulated
Simulated HFBE-5
Observed
05-23
05-24

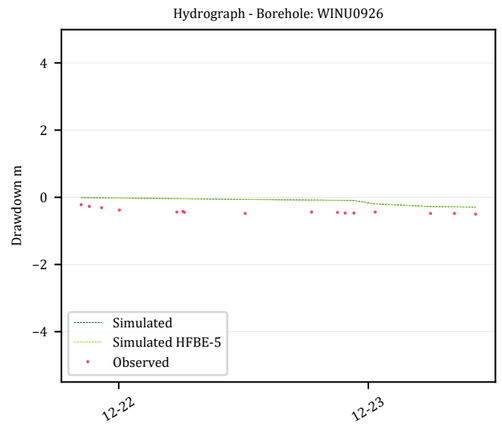

Hydrograph - Borehole: WINU0921
Drawdown m
Simulated
Simulated HFBE-5
Observed
11-22
11-23

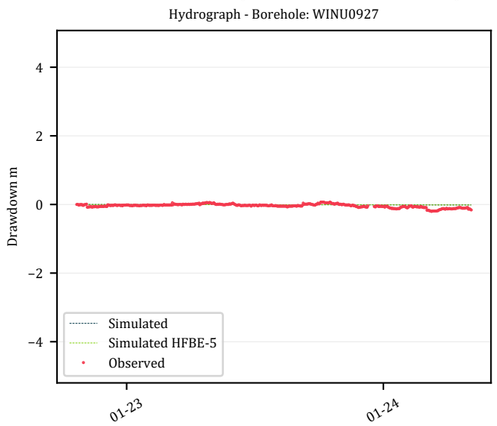

Hydrograph - Borehole: WINU0922
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-23
01-24

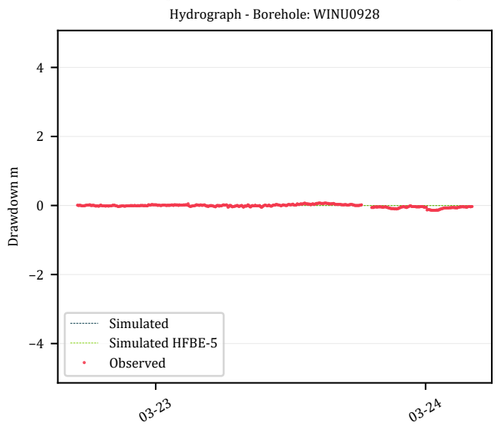

Hydrograph - Borehole: WINU0923
Drawdown m
Simulated
Simulated HFBE-5
Observed
05-23
05-24

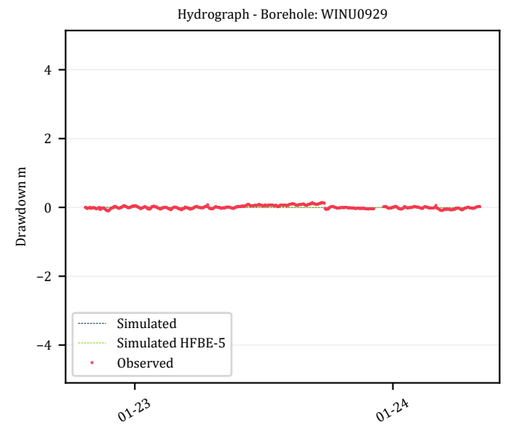

Hydrograph - Borehole: WINU0924
Drawdown m
Simulated
Simulated HFBE-5
Observed
03-23
03-24

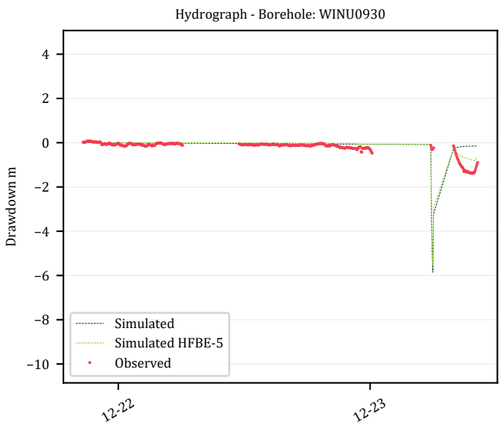

Hydrograph - Borehole: WINU0925
Drawdown m
Simulated
Simulated HFBE-5
Observed
10-22
10-23

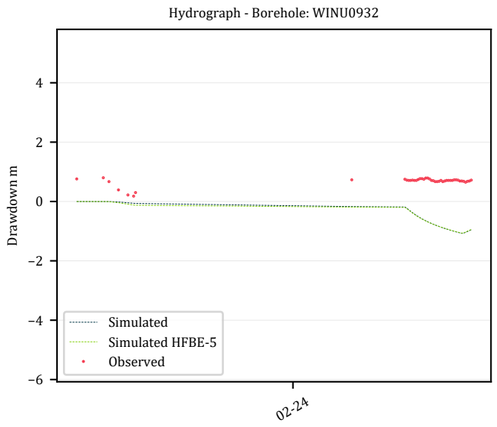

Hydrograph - Borehole: WINU0926
Drawdown m
Simulated
Simulated HFBE-5
Observed
12-22
12-23

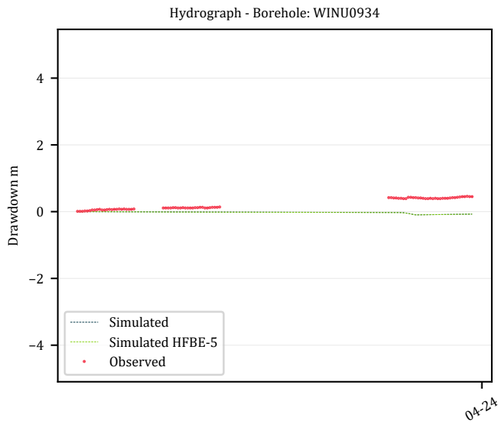

Hydrograph - Borehole: WINU0927
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-23
01-24

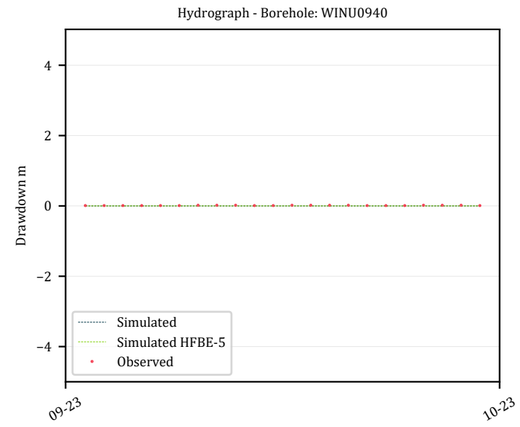

Hydrograph - Borehole: WINU0928
Drawdown m
Simulated
Simulated HFBE-5
Observed
03-23
03-24

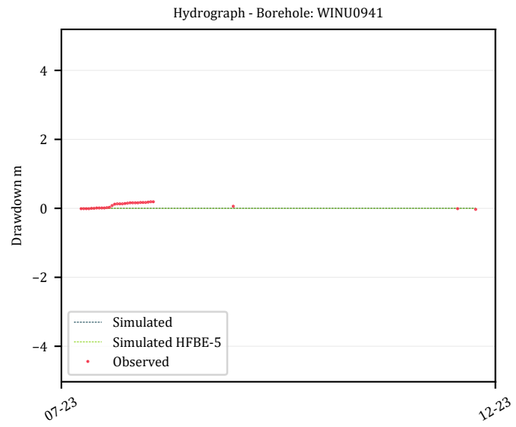

Hydrograph - Borehole: WINU0929
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-23
01-24

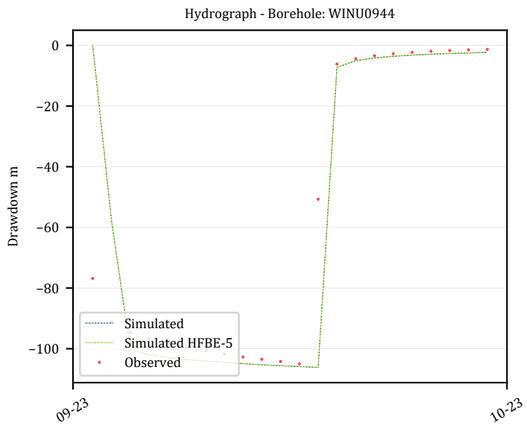

Hydrograph - Borehole: WINU0930
Drawdown m
Simulated
Simulated HFBE-5
Observed
12-22
12-23

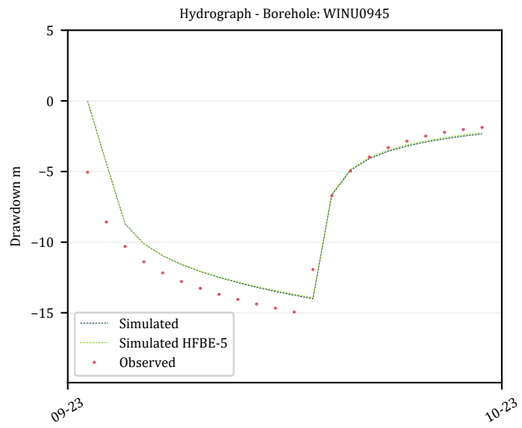

Hydrograph - Borehole: WINU0932
Drawdown m
Simulated
Simulated HFBE-5
Observed
02-24

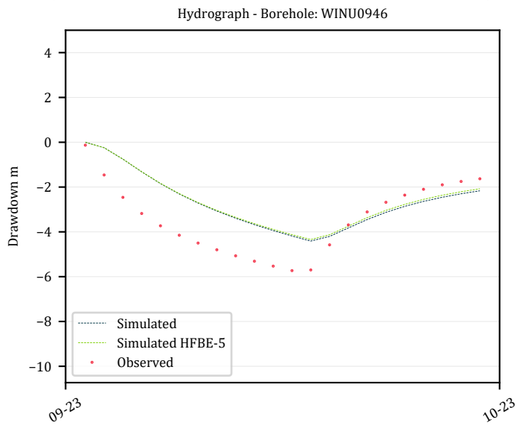

Hydrograph - Borehole: WINU0934
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-24

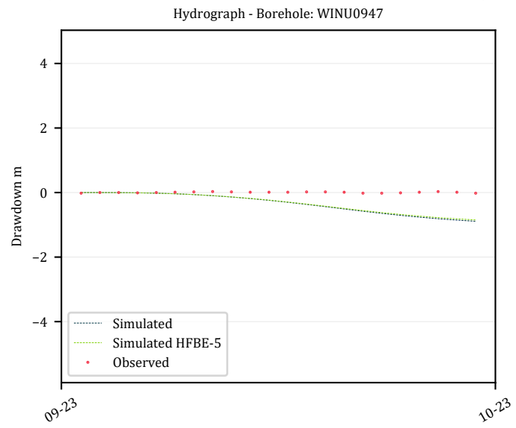

Hydrograph - Borehole: WINU0940
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

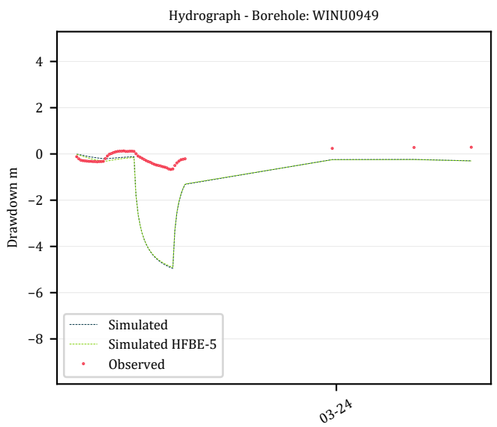

Hydrograph - Borehole: WINU0941
Drawdown m
Simulated
Simulated HFBE-5
Observed
07-23
12-23

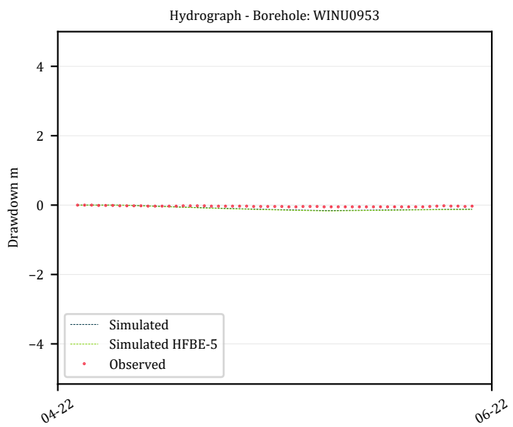

Hydrograph - Borehole: WINU0944
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

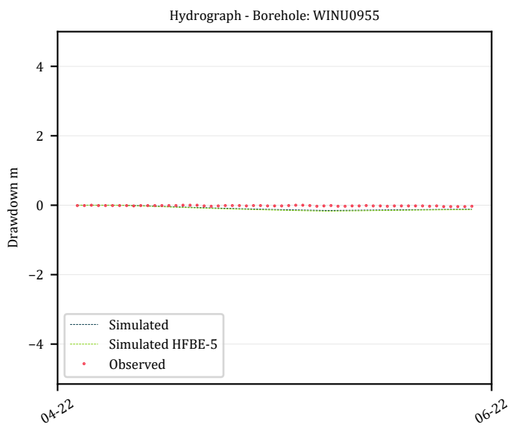

Hydrograph - Borehole: WINU0945
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

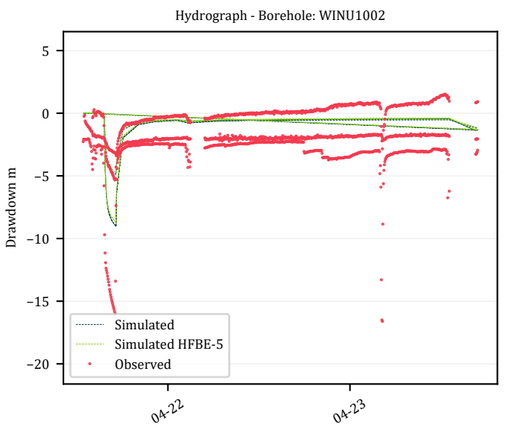

Hydrograph - Borehole: WINU0946
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

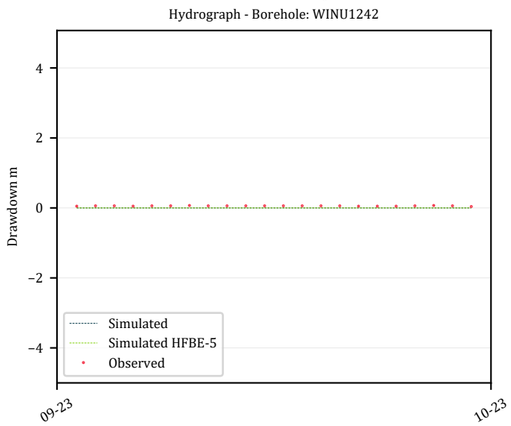

Hydrograph - Borehole: WINU0947
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

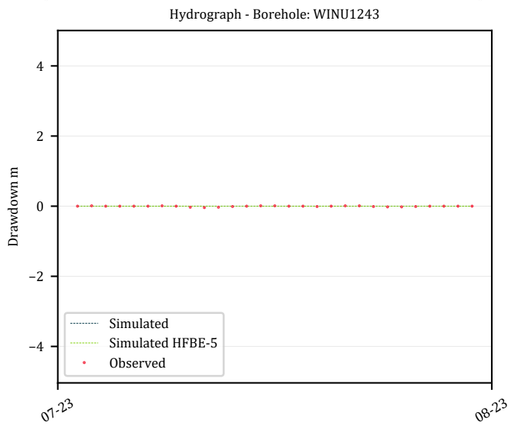

Hydrograph - Borehole: WINU0949
Drawdown m
Simulated
Simulated HFBE-5
Observed
03-24

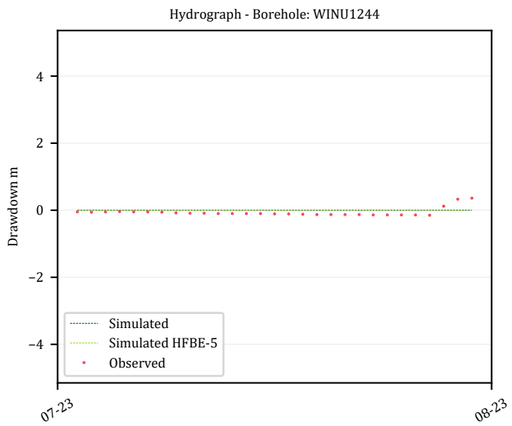

Hydrograph - Borehole: WINU0953
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
06-22

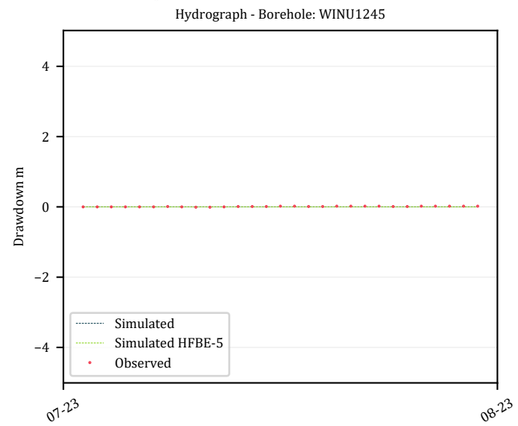

Hydrograph - Borehole: WINU0955
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
06-22

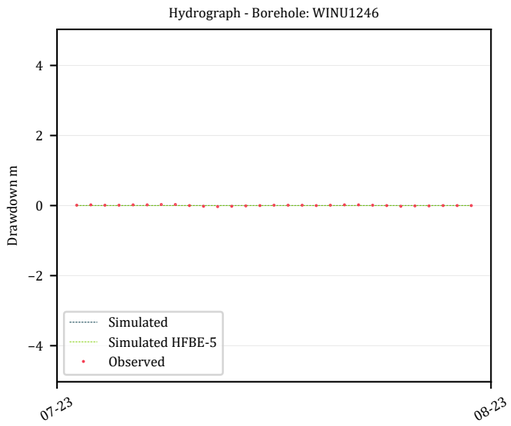

Hydrograph - Borehole: WINU1002
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
04-23

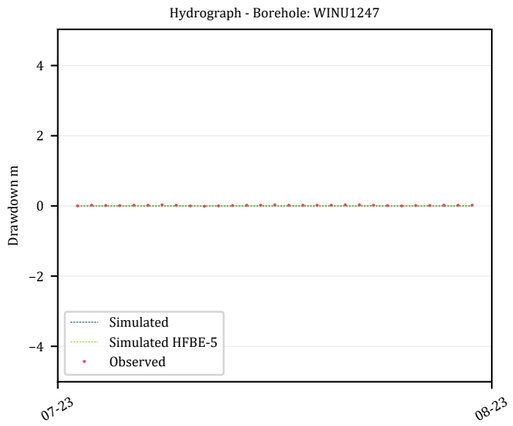

Hydrograph - Borehole: WINU1242
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

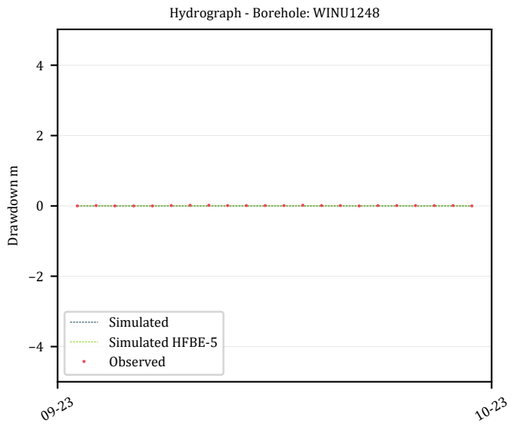

Hydrograph - Borehole: WINU1243
Drawdown m
Simulated
Simulated HFBE-5
Observed
07-23
08-23

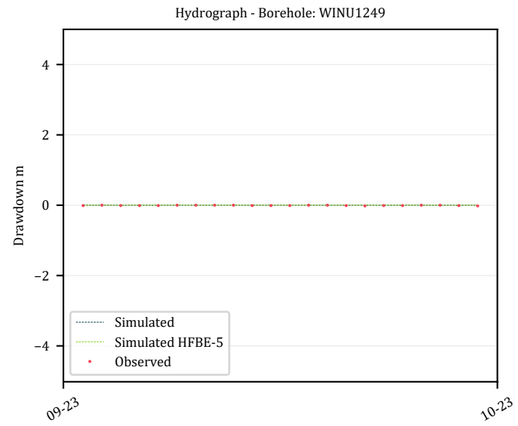

Hydrograph - Borehole: WINU1244
Drawdown m
Simulated
Simulated HFBE-5
Observed
07-23
08-23

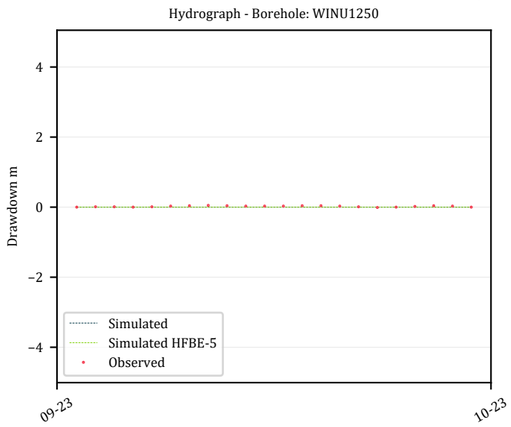

Hydrograph - Borehole: WINU1245
Drawdown m
Simulated
Simulated HFBE-5
Observed
07-23
08-23

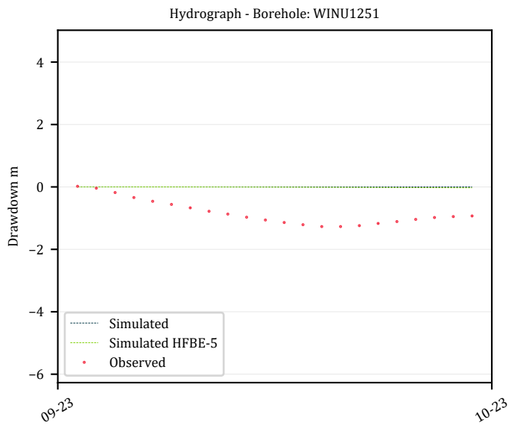

Hydrograph - Borehole: WINU1246
Drawdown m
Simulated
Simulated HFBE-5
Observed
07-23
08-23

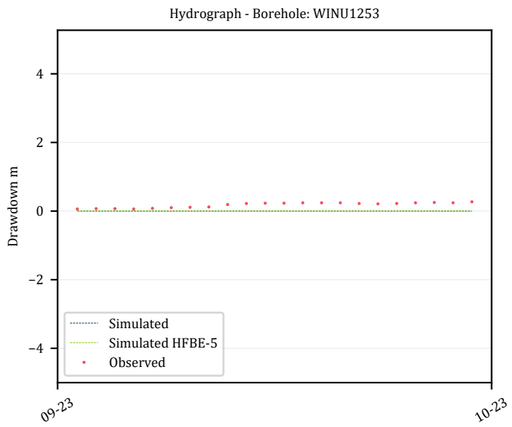

Hydrograph - Borehole: WINU1247
Drawdown m
Simulated
Simulated HFBE-5
Observed
07-23
08-23

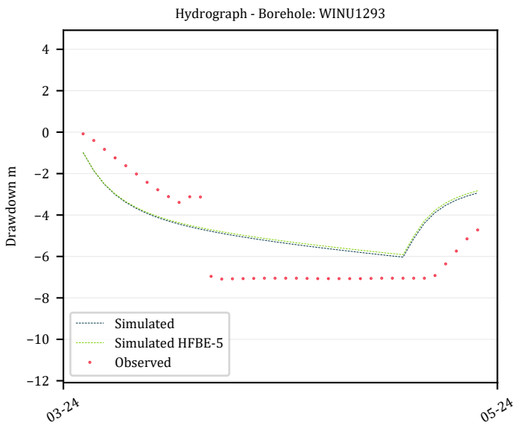

Hydrograph - Borehole: WINU1248
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

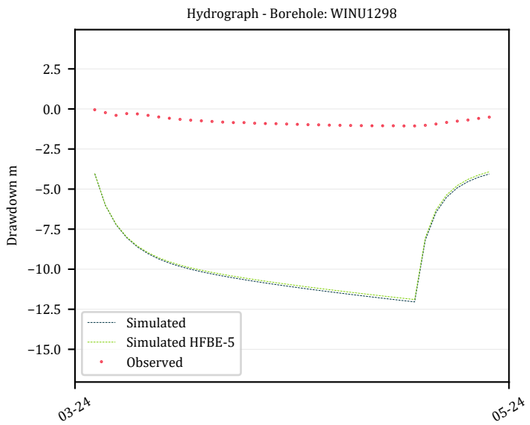

Hydrograph - Borehole: WINU1249
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

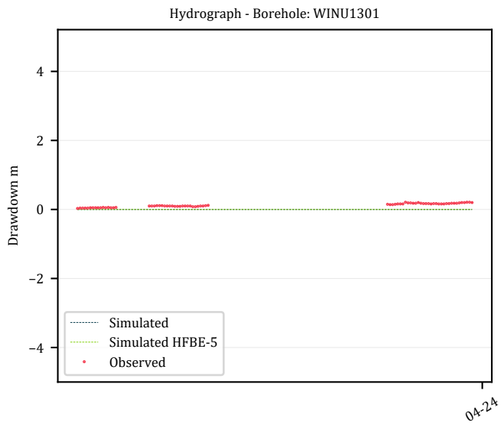

Hydrograph - Borehole: WINU1250
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

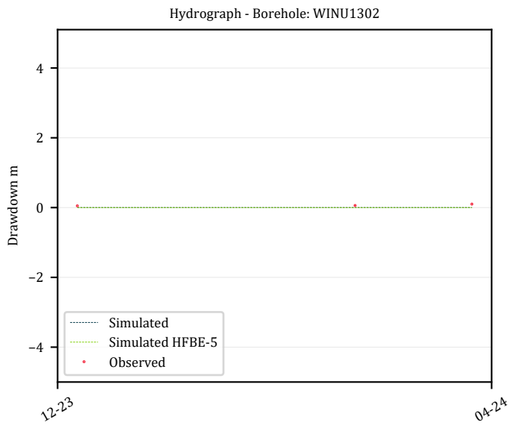

Hydrograph - Borehole: WINU1251
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

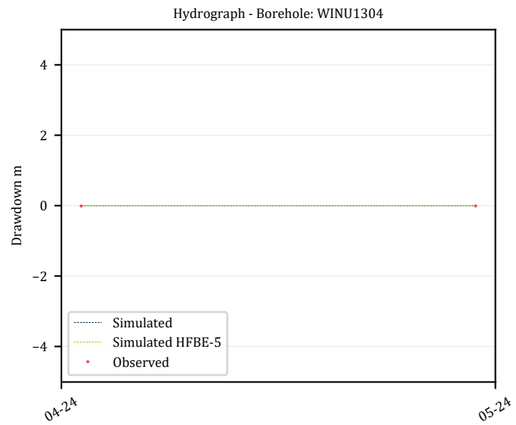

Hydrograph - Borehole: WINU1253
Drawdown m
Simulated
Simulated HFBE-5
Observed
09-23
10-23

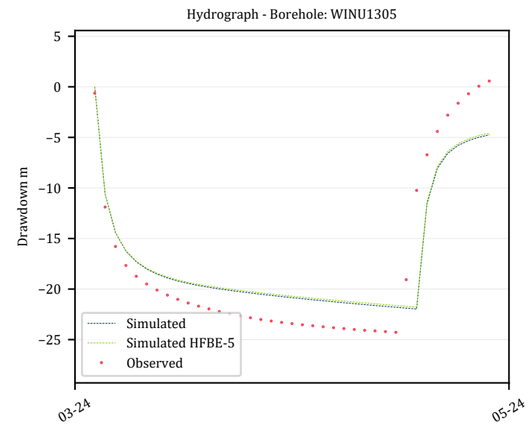

Hydrograph - Borehole: WINU1293
Drawdown m
Simulated
Simulated HFBE-5
Observed
03-24
05-24

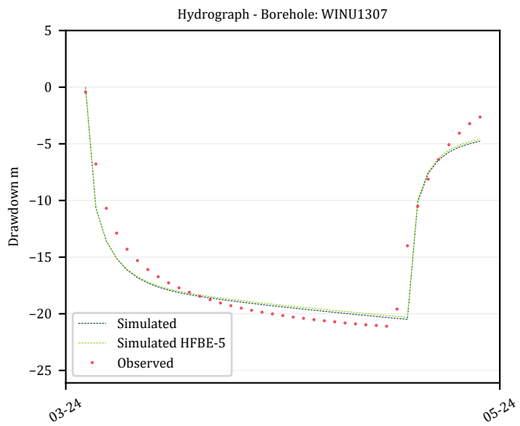

Hydrograph - Borehole: WINU1298
Drawdown m
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−12.5
−15.0
Simulated
Simulated HFBE-5
Observed
03-24
05-24

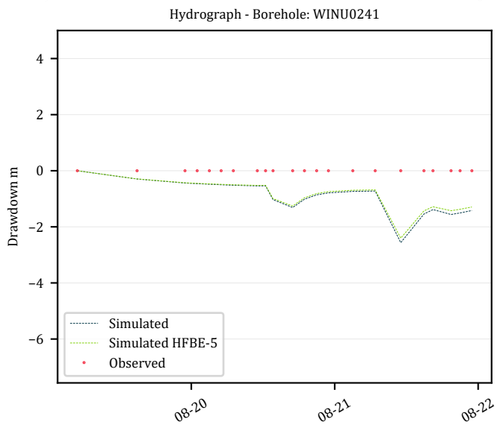

Hydrograph - Borehole: WINU1301
Drawdown m
4
2
0
−2
−4
Simulated
Simulated HFBE-5
Observed
04-24

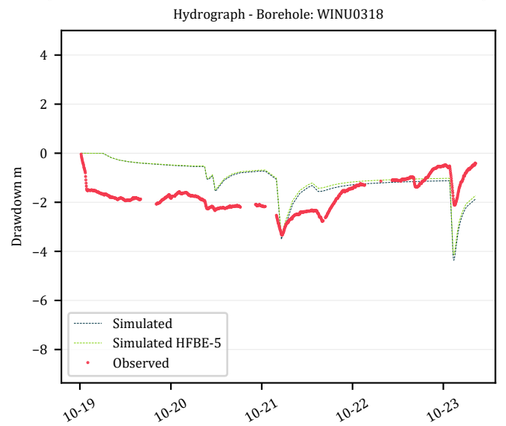

Hydrograph - Borehole: WINU1302
Drawdown m
4
2
0
−2
−4
Simulated
Simulated HFBE-5
Observed
12-23
04-24

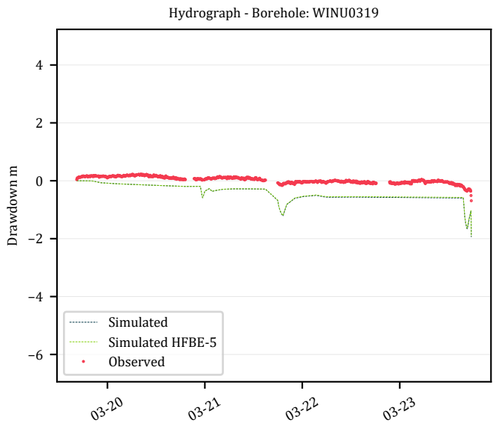

Hydrograph - Borehole: WINU1304
Drawdown m
4
2
0
−2
−4
Simulated
Simulated HFBE-5
Observed
04-24
05-24

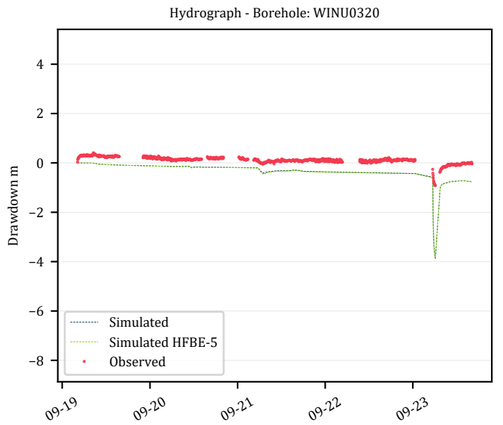

Hydrograph - Borehole: WINU1305
Drawdown m
5
0
−5
−10
−15
−20
−25
Simulated
Simulated HFBE-5
Observed
03-24
05-24

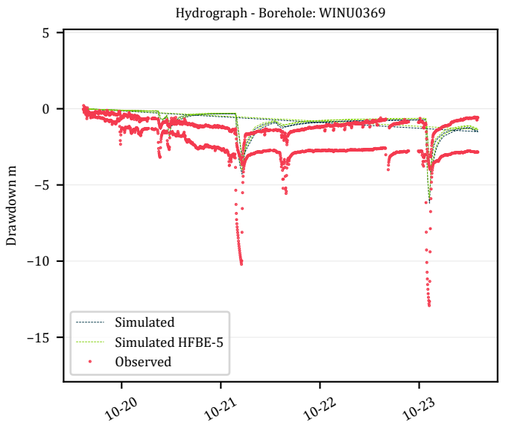

Hydrograph - Borehole: WINU1307
Drawdown m
5
0
−5
−10
−15
−20
−25
Simulated
Simulated HFBE-5
Observed
03-24
05-24

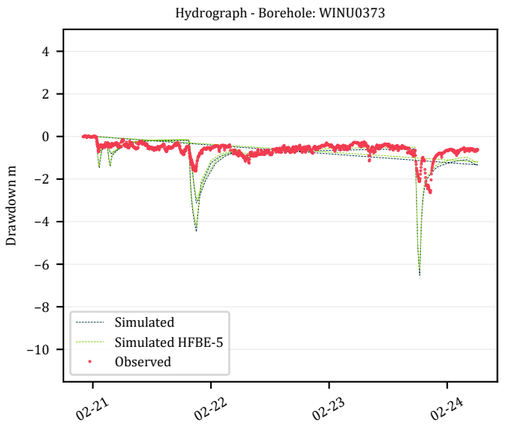

Hydrograph - Borehole: WINU0241
Drawdown m
4
2
0
−2
−4
−6
Simulated
Simulated HFBE-5
Observed
08-20
08-21
08-22

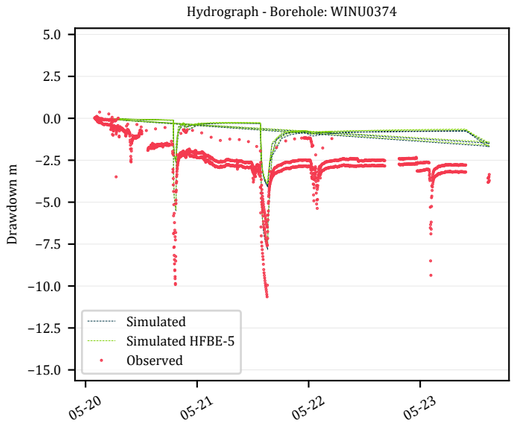

Hydrograph - Borehole: WINU0318
Drawdown m
4
2
0
−2
−4
−6
−8
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

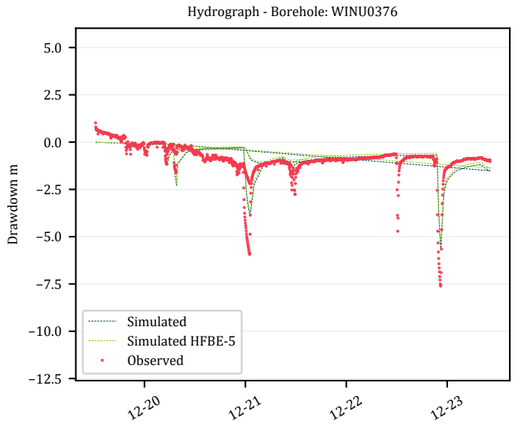

Hydrograph - Borehole: WINU0319
Drawdown m
4
2
0
−2
−4
−6
Simulated
Simulated HFBE-5
Observed
03-20
03-21
03-22
03-23

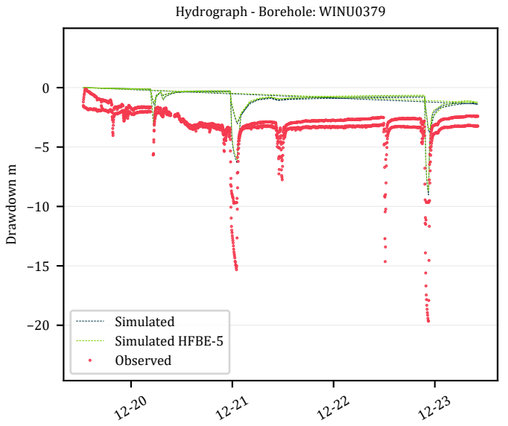

Hydrograph - Borehole: WINU0320
Drawdown m
4
2
0
−2
−4
−6
−8
Simulated
Simulated HFBE-5
Observed
09-19
09-20
09-21
09-22
09-23

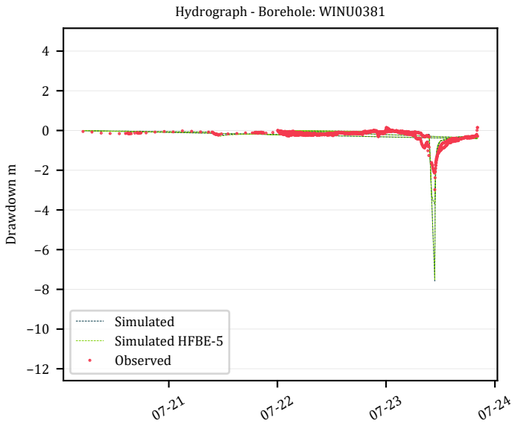

Hydrograph - Borehole: WINU0369
Drawdown m
5
0
−5
−10
−15
Simulated
Simulated HFBE-5
Observed
10-20
10-21
10-22
10-23

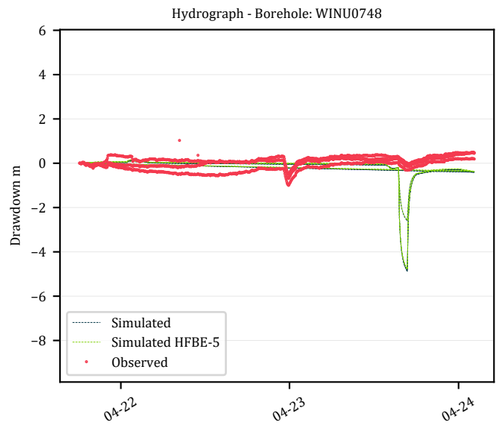

Hydrograph - Borehole: WINU0373
Drawdown m
4
2
0
−2
−4
−6
−8
−10
Simulated
Simulated HFBE-5
Observed
02-21
02-22
02-23
02-24

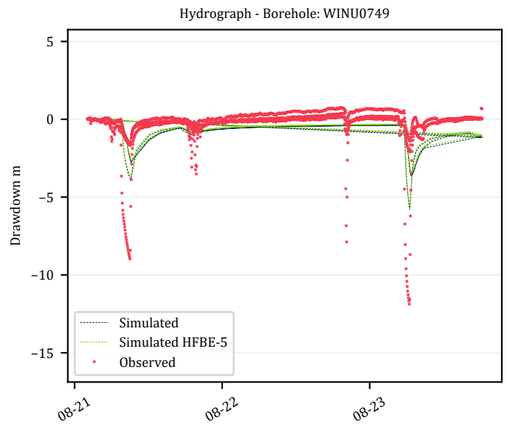

Hydrograph - Borehole: WINU0374
Drawdown m
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−12.5
−15.0
Simulated
Simulated HFBE-5
Observed
05-20
05-21
05-22
05-23

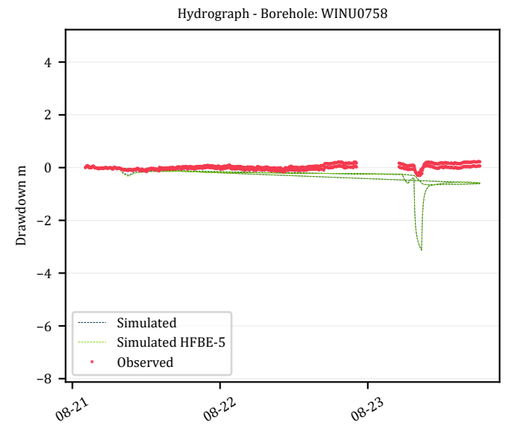

Hydrograph - Borehole: WINU0376
Drawdown m
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−12.5
Simulated
Simulated HFBE-5
Observed
12-20
12-21
12-22
12-23

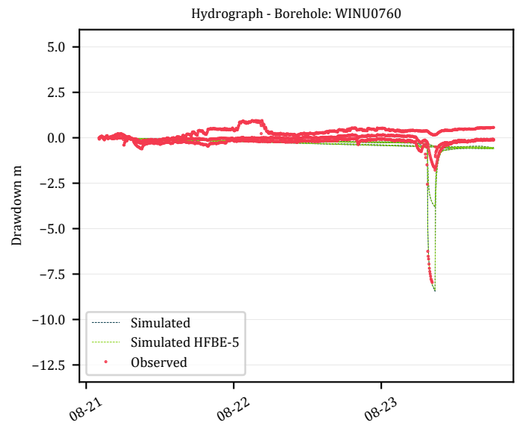

Hydrograph - Borehole: WINU0379
Drawdown m
0
−5
−10
−15
−20
Simulated
Simulated HFBE-5
Observed
12-20
12-21
12-22
12-23

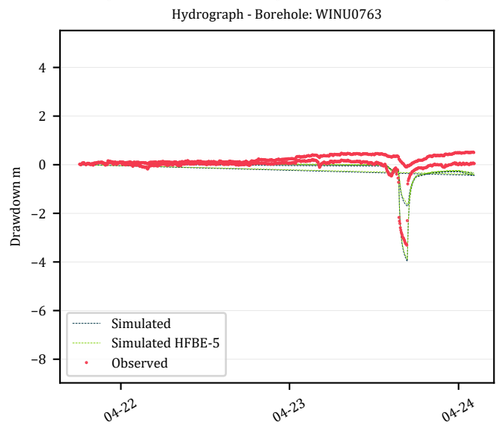

Hydrograph - Borehole: WINU0381
Drawdown m
4
2
0
−2
−4
−6
−8
−10
−12
Simulated
Simulated HFBE-5
Observed
07-21
07-22
07-23
07-24

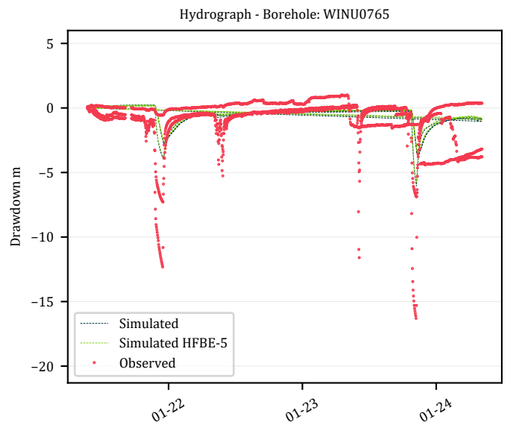

Hydrograph - Borehole: WINU0748
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
04-23
04-24

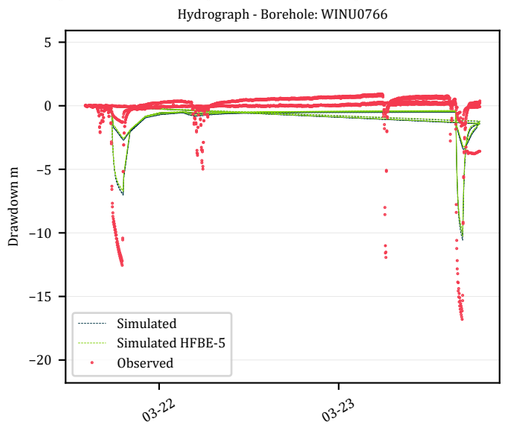

Hydrograph - Borehole: WINU0749
Drawdown m
Simulated
Simulated HFBE-5
Observed
08-21
08-22
08-23

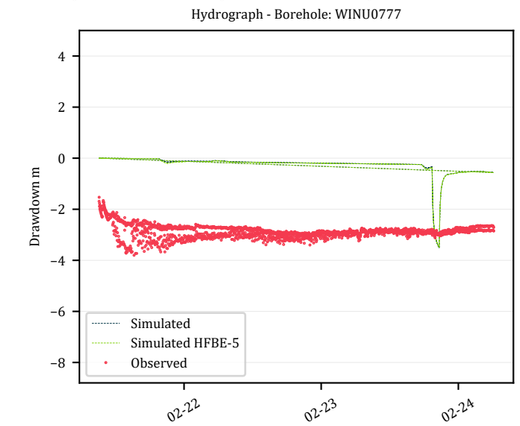

Hydrograph - Borehole: WINU0758
Drawdown m
Simulated
Simulated HFBE-5
Observed
08-21
08-22
08-23

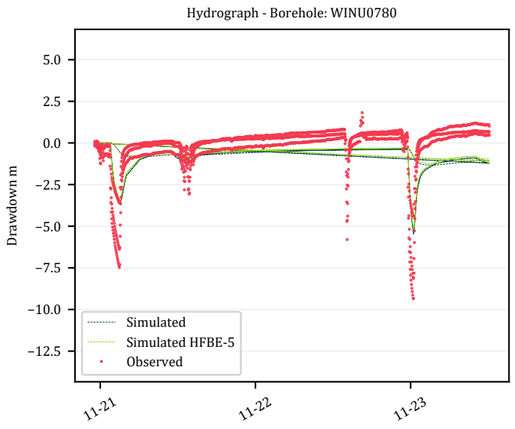

Hydrograph - Borehole: WINU0760
Drawdown m
Simulated
Simulated HFBE-5
Observed
08-21
08-22
08-23

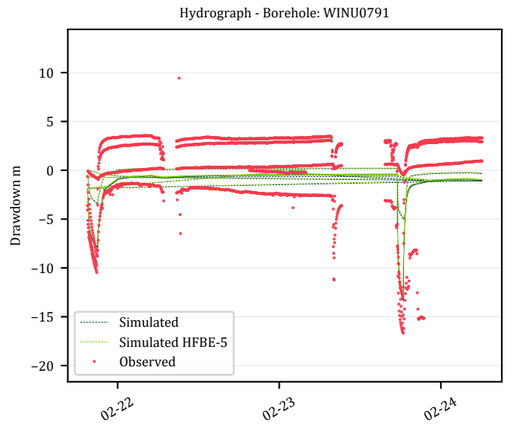

Hydrograph - Borehole: WINU0763
Drawdown m
Simulated
Simulated HFBE-5
Observed
04-22
04-23
04-24

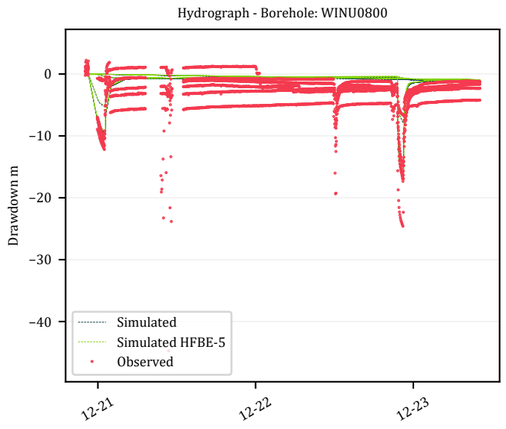

Hydrograph - Borehole: WINU0765
Drawdown m
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

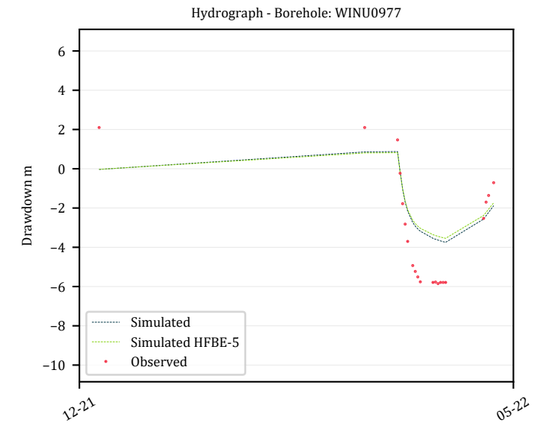

Hydrograph - Borehole: WINU0766
Drawdown m
Simulated
Simulated HFBE-5
Observed
03-22
03-23


Hydrograph - Borehole: WINU0777
Drawdown m
Simulated
Simulated HFBE-5
Observed
02-22
02-23
02-24

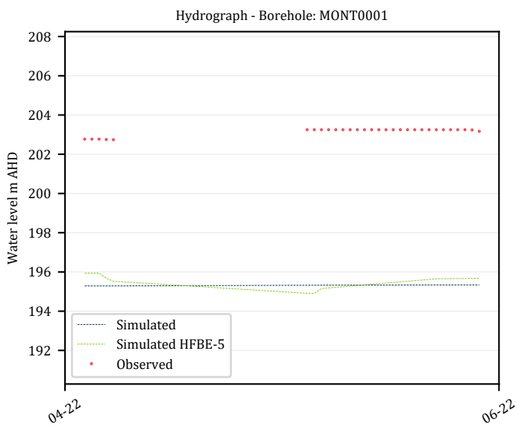

Hydrograph - Borehole: WINU0780
Drawdown m
Simulated
Simulated HFBE-5
Observed
11-21
11-22
11-23

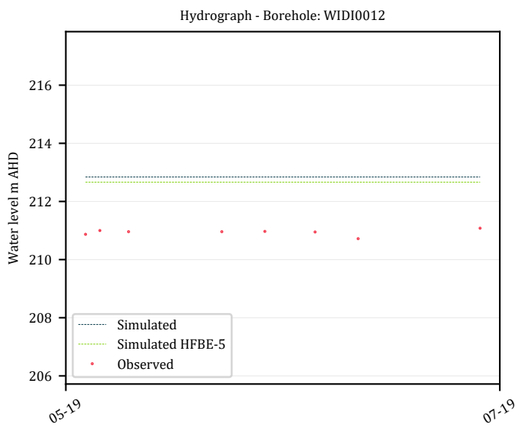

Hydrograph - Borehole: WINU0791
Drawdown m
Simulated
Simulated HFBE-5
Observed
02-22
02-23
02-24

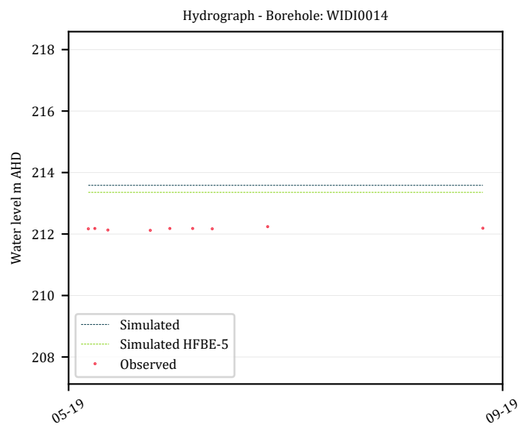

Hydrograph - Borehole: WINU0800
Drawdown m
Simulated
Simulated HFBE-5
Observed
12-21
12-22
12-23

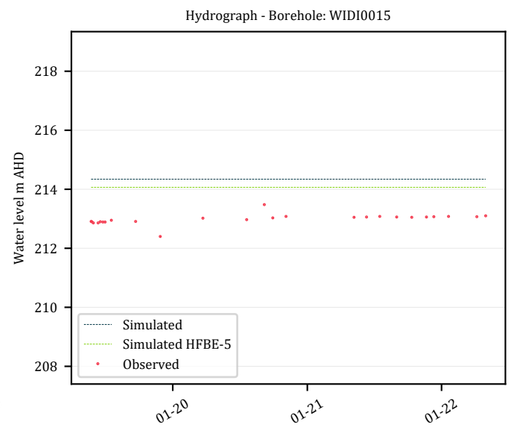

Hydrograph - Borehole: WINU0977
Drawdown m
Simulated
Simulated HFBE-5
Observed
12-21
05-22

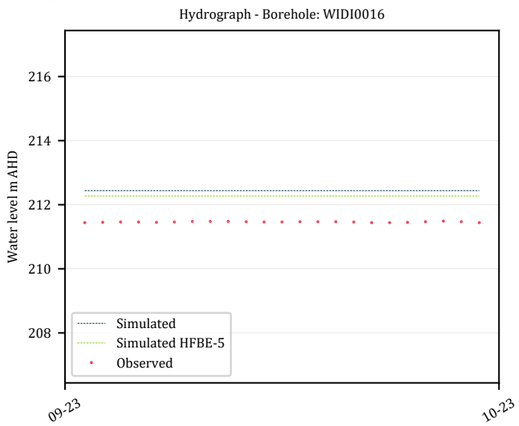
Appendix H. Water level hydrographs

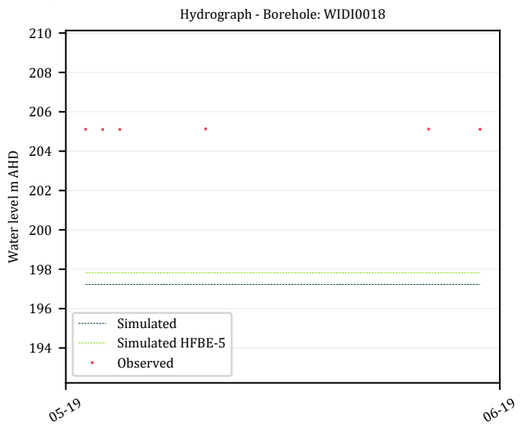

Hydrograph - Borehole: MONT0001
Water level m AHD
208
206
204
202
200
198
196
194
192
Simulated
Simulated HFBE-5
Observed
04-22
06-22

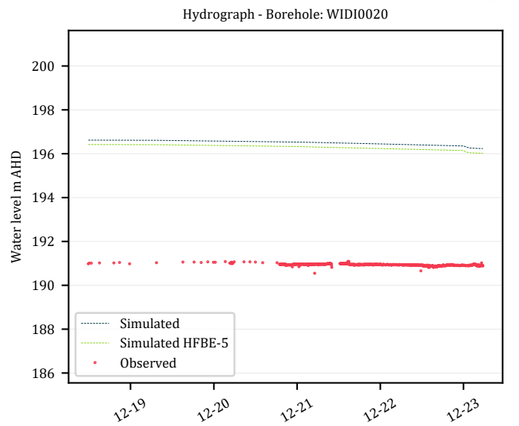

Hydrograph - Borehole: WIDI0012
Water level m AHD
216
214
212
210
208
206
Simulated
Simulated HFBE-5
Observed
05-19
07-19

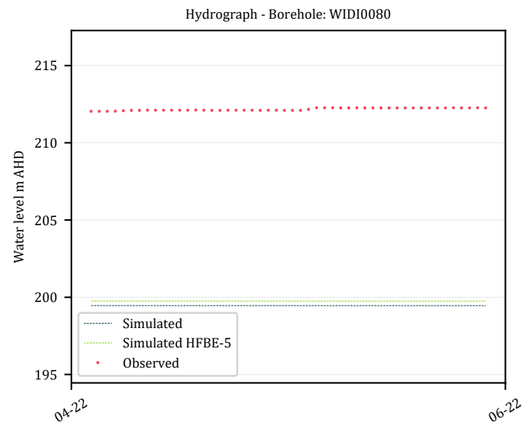

Hydrograph - Borehole: WIDI0014
Water level m AHD
218
216
214
212
210
208
Simulated
Simulated HFBE-5
Observed
05-19
09-19

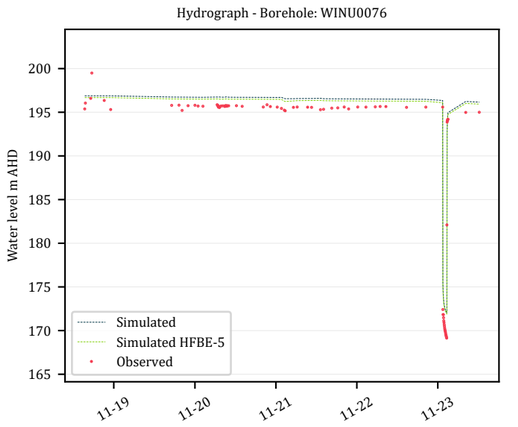

Hydrograph - Borehole: WIDI0015
Water level m AHD
218
216
214
212
210
208
Simulated
Simulated HFBE-5
Observed
01-20
01-21
01-22

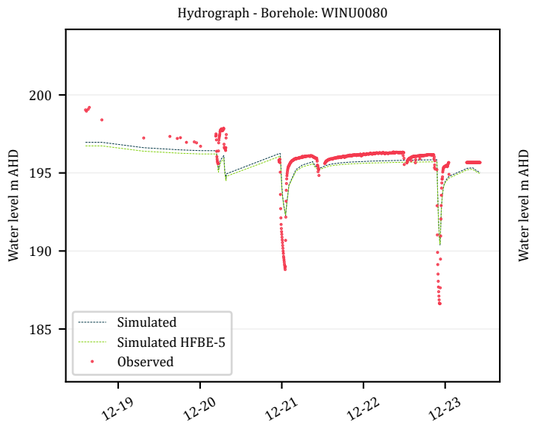

Hydrograph - Borehole: WIDI0016
Water level m AHD
216
214
212
210
208
Simulated
Simulated HFBE-5
Observed
09-23
10-23

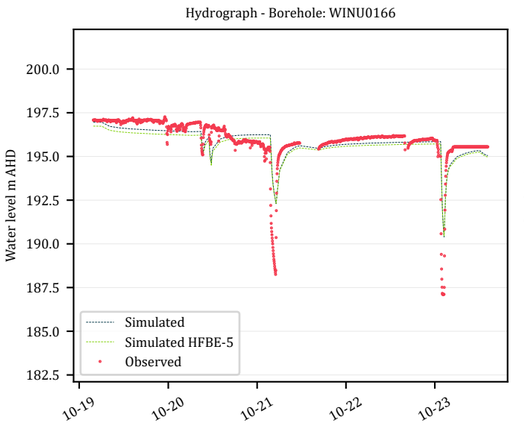

Hydrograph - Borehole: WIDI0018
Water level m AHD
210
208
206
204
202
200
198
196
194
Simulated
Simulated HFBE-5
Observed
05-19
06-19

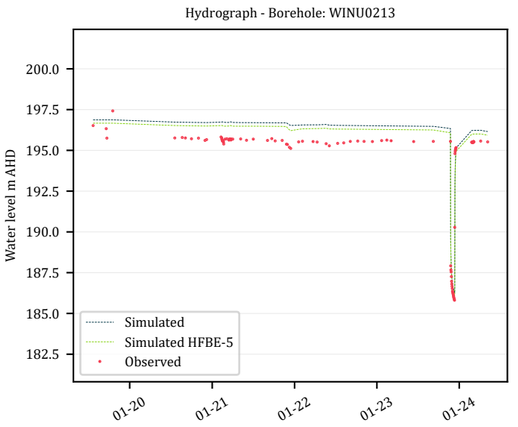

Hydrograph - Borehole: WIDI0020
Water level m AHD
200
198
196
194
192
190
188
186
Simulated
Simulated HFBE-5
Observed
12-19
12-20
12-21
12-22
12-23

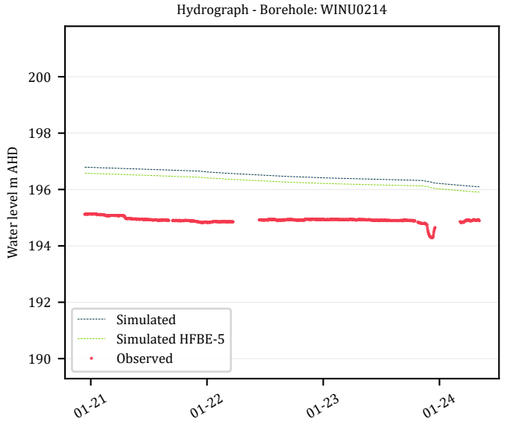

Hydrograph - Borehole: WIDI0080
Water level m AHD
215
210
205
200
195
Simulated
Simulated HFBE-5
Observed
04-22
06-22

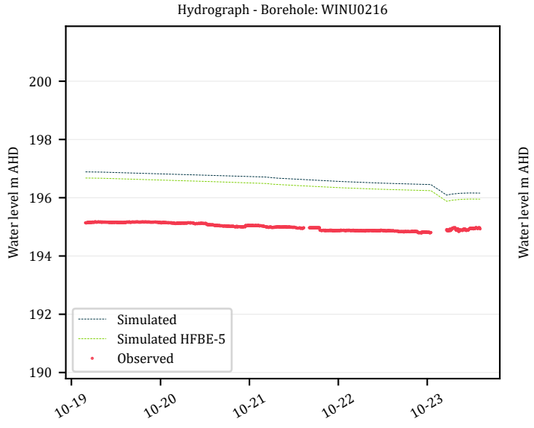

Hydrograph - Borehole: WINU0076
Water level m AHD
200
195
190
185
180
175
170
165
Simulated
Simulated HFBE-5
Observed
11-19
11-20
11-21
11-22
11-23

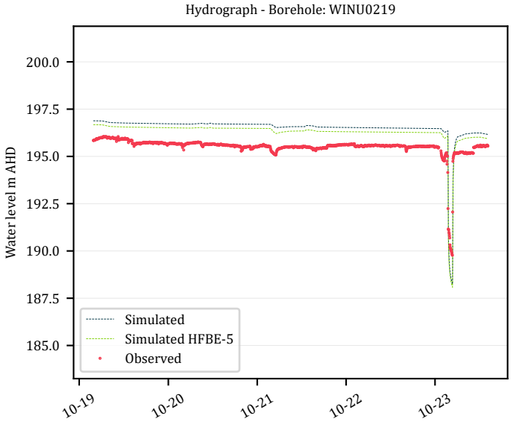

Hydrograph - Borehole: WINU0080
Water level m AHD
200
195
190
185
Simulated
Simulated HFBE-5
Observed
12-19
12-20
12-21
12-22
12-23

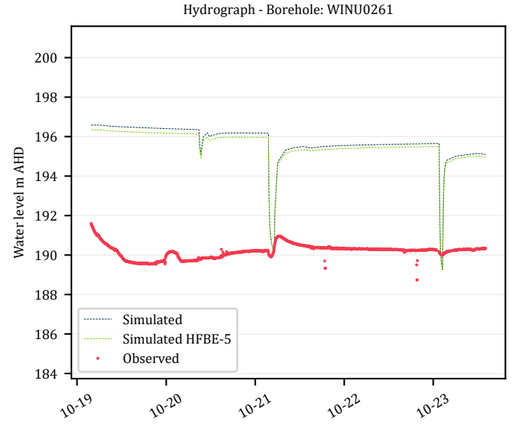

Hydrograph - Borehole: WINU0166
Water level m AHD
200.0
197.5
195.0
192.5
190.0
187.5
185.0
182.5
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

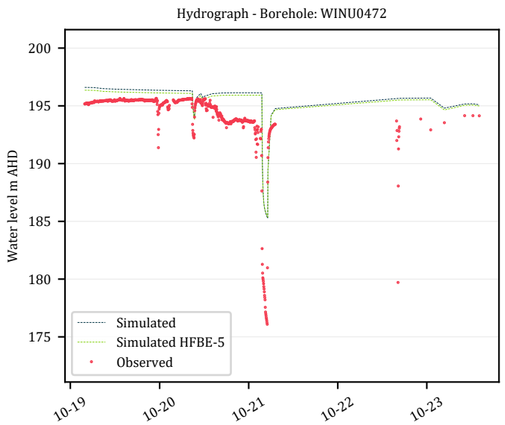

Hydrograph - Borehole: WINU0213
Water level m AHD
200.0
197.5
195.0
192.5
190.0
187.5
185.0
182.5
Simulated
Simulated HFBE-5
Observed
01-20
01-21
01-22
01-23
01-24

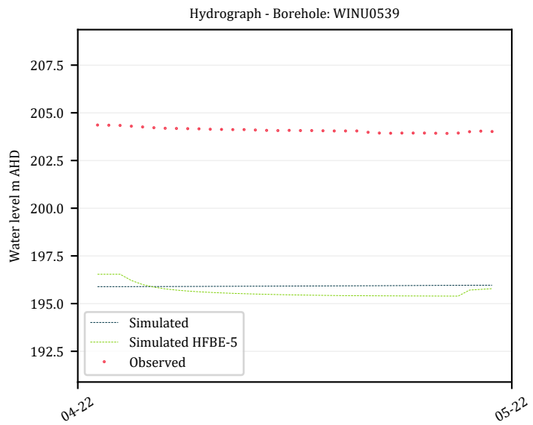

Hydrograph - Borehole: WINU0214
Water level m AHD
200
198
196
194
192
190
Simulated
Simulated HFBE-5
Observed
01-21
01-22
01-23
01-24

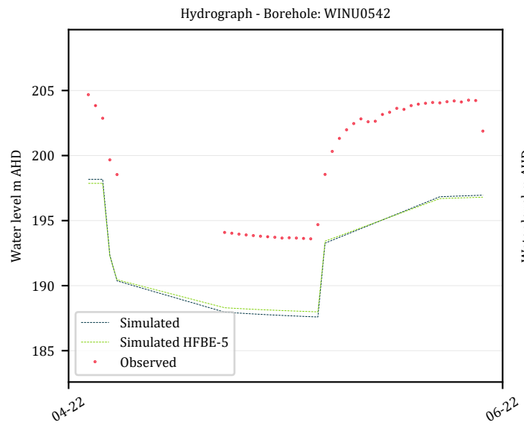

Hydrograph - Borehole: WINU0216
Water level m AHD
200
198
196
194
192
190
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

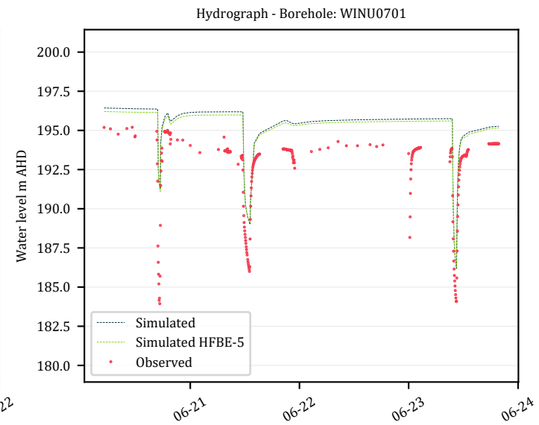

Hydrograph - Borehole: WINU0219
Water level m AHD
200.0
197.5
195.0
192.5
190.0
187.5
185.0
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

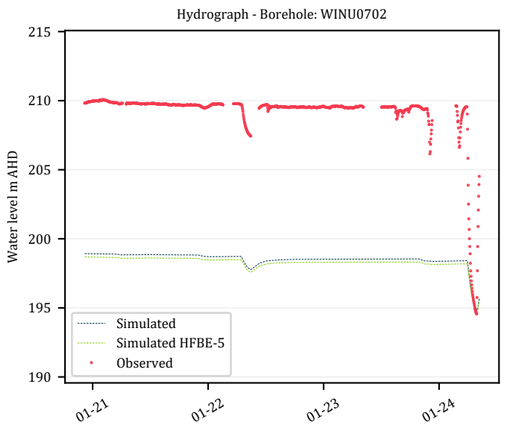

Hydrograph - Borehole: WINU0261
Water level m AHD
200
198
196
194
192
190
188
186
184
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

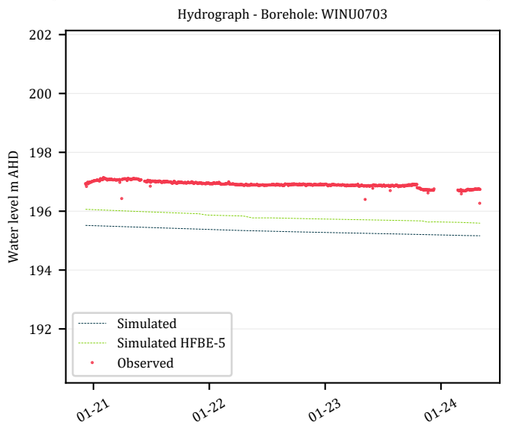

Hydrograph - Borehole: WINU0472
Water level m AHD
Simulated
Simulated HFBE-5
Observed

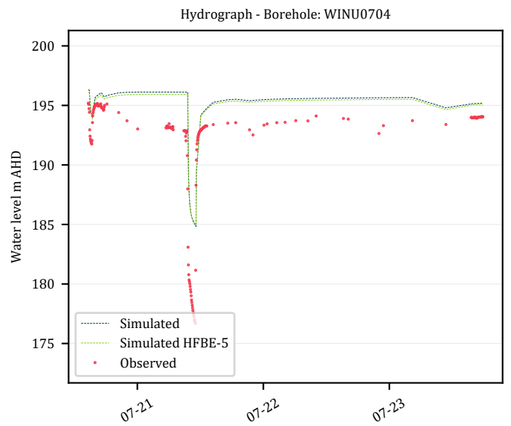

Hydrograph - Borehole: WINU0539
Water level m AHD
Simulated
Simulated HFBE-5
Observed

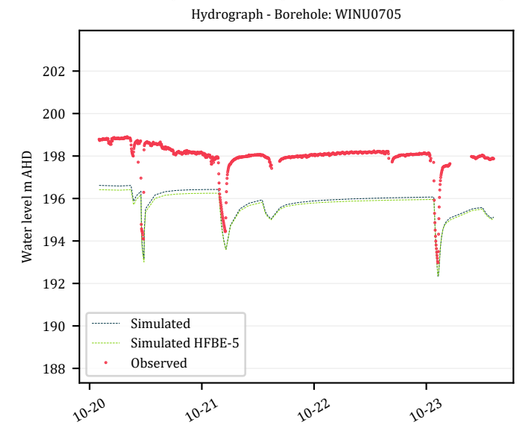

Hydrograph - Borehole: WINU0542
Water level m AHD
Simulated
Simulated HFBE-5
Observed

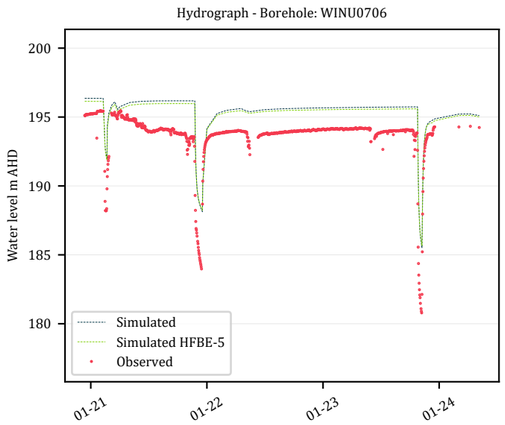

Hydrograph - Borehole: WINU0701
Water level m AHD
Simulated
Simulated HFBE-5
Observed

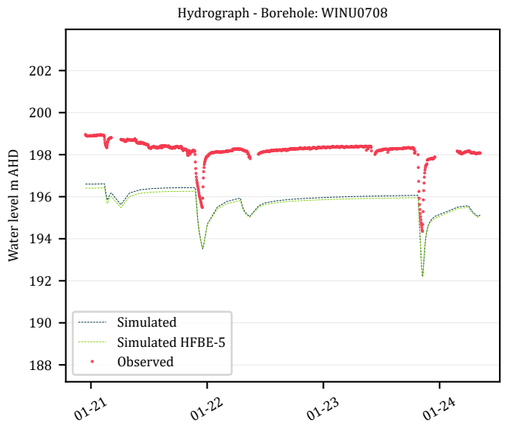

Hydrograph - Borehole: WINU0702
Water level m AHD
Simulated
Simulated HFBE-5
Observed

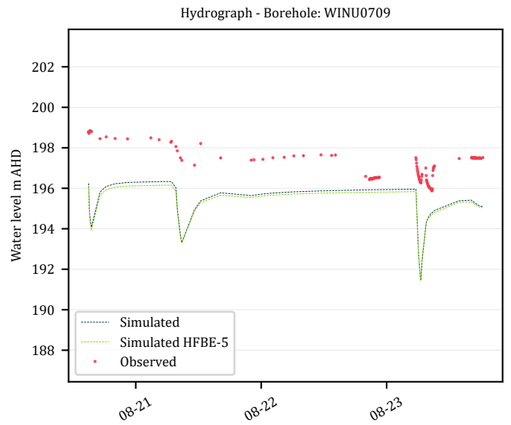

Hydrograph - Borehole: WINU0703
Water level m AHD
Simulated
Simulated HFBE-5
Observed

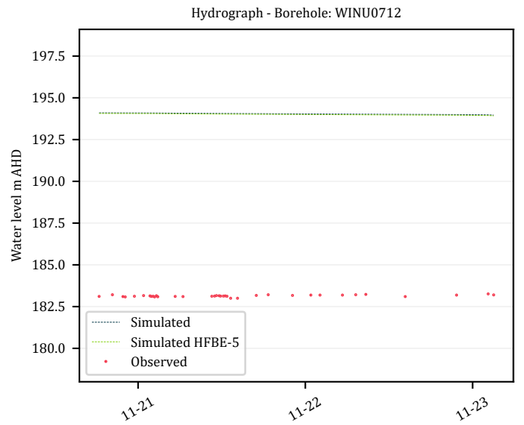

Hydrograph - Borehole: WINU0704
Water level m AHD
Simulated
Simulated HFBE-5
Observed

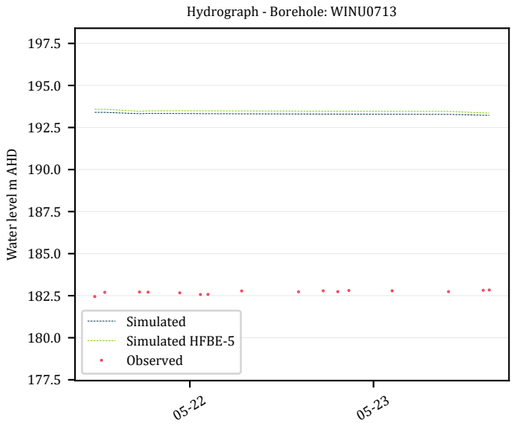

Hydrograph - Borehole: WINU0705
Water level m AHD
Simulated
Simulated HFBE-5
Observed

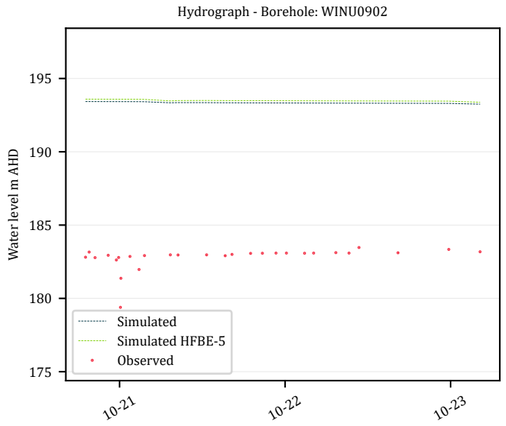

Hydrograph - Borehole: WINU0706
Water level m AHD
Simulated
Simulated HFBE-5
Observed

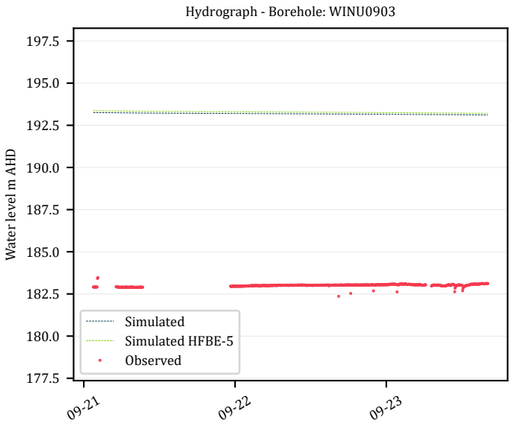

Hydrograph - Borehole: WINU0708
Water level m AHD
Simulated
Simulated HFBE-5
Observed

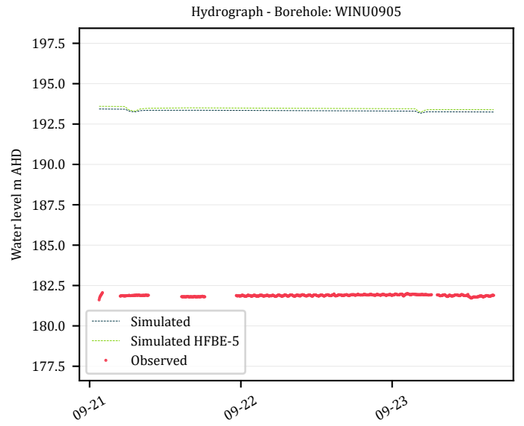

Hydrograph - Borehole: WINU0709
Water level m AHD
Simulated
Simulated HFBE-5
Observed

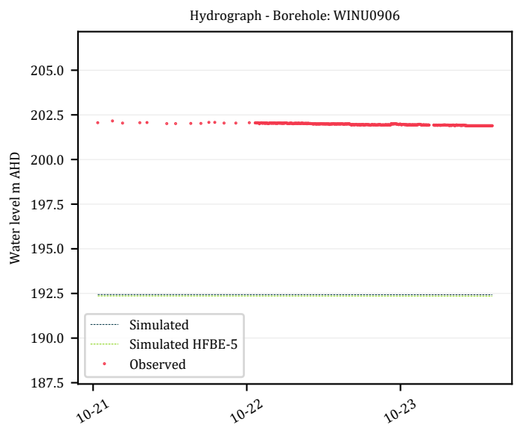

Hydrograph - Borehole: WINU0712
Water level m AHD
Simulated
Simulated HFBE-5
Observed

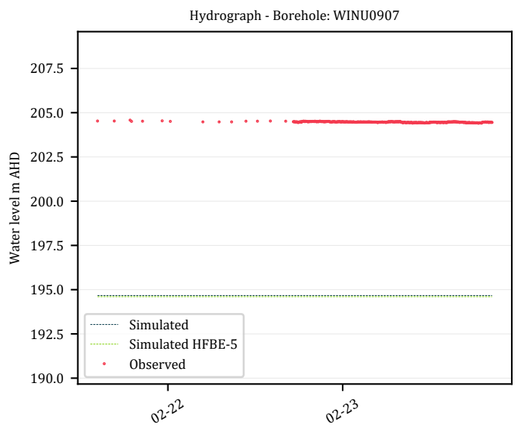

Hydrograph - Borehole: WINU0713
Water level m AHD
Simulated
Simulated HFBE-5
Observed

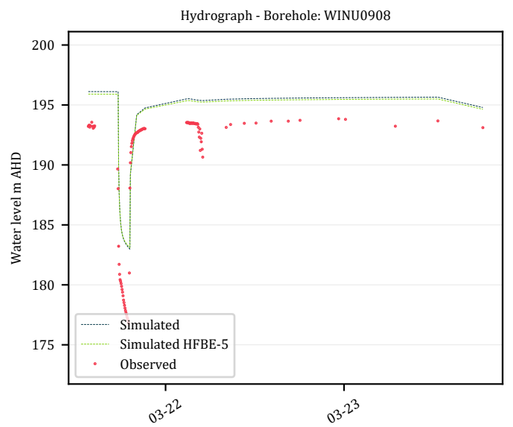

Hydrograph - Borehole: WINU0902
Water level m AHD
Simulated
Simulated HFBE-5
Observed

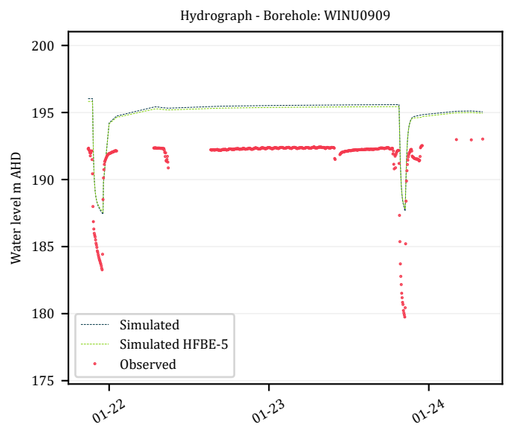

Hydrograph - Borehole: WINU0903
Water level m AHD
Simulated
Simulated HFBE-5
Observed

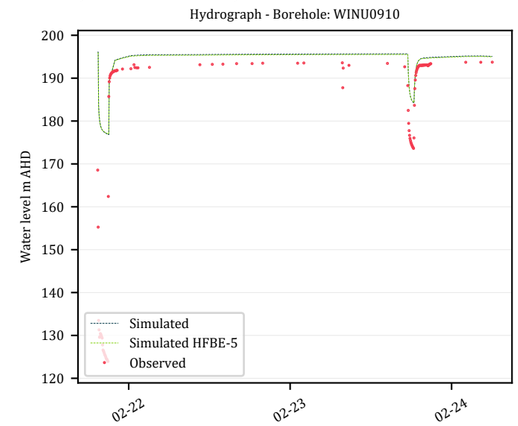

Hydrograph - Borehole: WINU0905
Water level m AHD
Simulated
Simulated HFBE-5
Observed

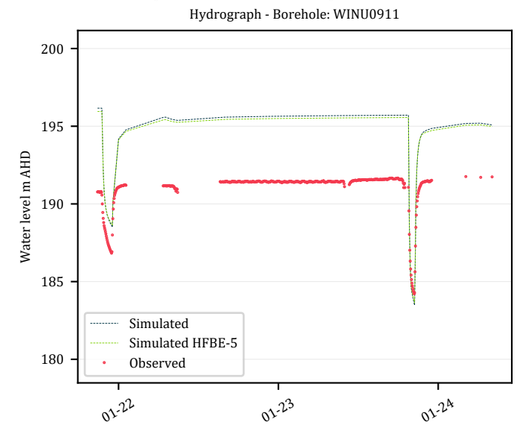

Hydrograph - Borehole: WINU0906
Water level m AHD
205.0
202.5
200.0
197.5
195.0
192.5
190.0
187.5
Simulated
Simulated HFBE-5
Observed
10-21
10-22
10-23

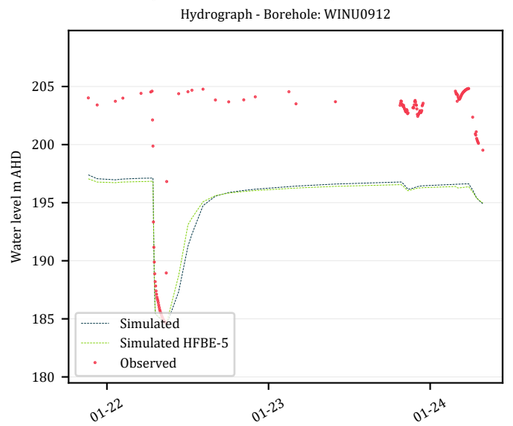

Hydrograph - Borehole: WINU0907
Water level m AHD
207.5
205.0
202.5
200.0
197.5
195.0
192.5
190.0
Simulated
Simulated HFBE-5
Observed
02-22
02-23

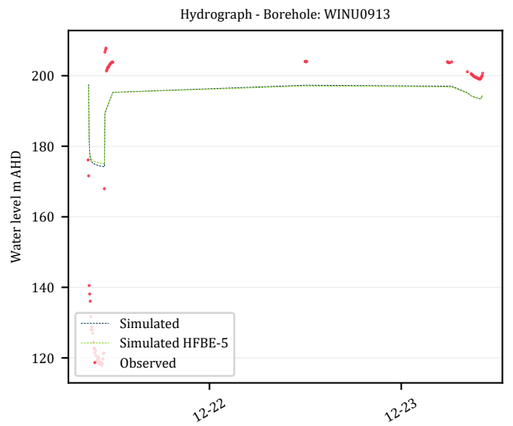

Hydrograph - Borehole: WINU0908
Water level m AHD
200
195
190
185
180
175
Simulated
Simulated HFBE-5
Observed
03-22
03-23

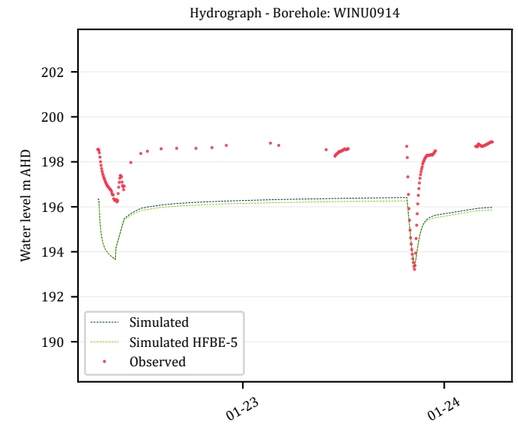

Hydrograph - Borehole: WINU0909
Water level m AHD
200
195
190
185
180
175
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

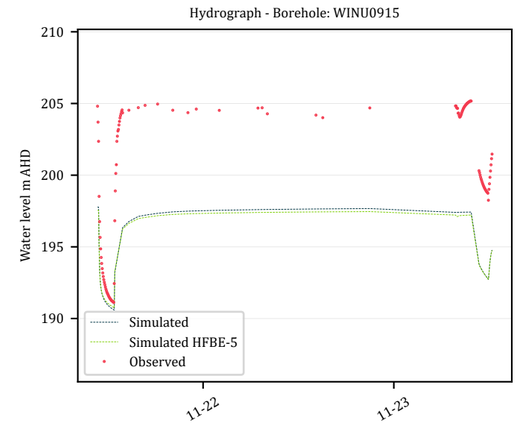

Hydrograph - Borehole: WINU0910
Water level m AHD
200
190
180
170
160
150
140
130
120
Simulated
Simulated HFBE-5
Observed
02-22
02-23
02-24

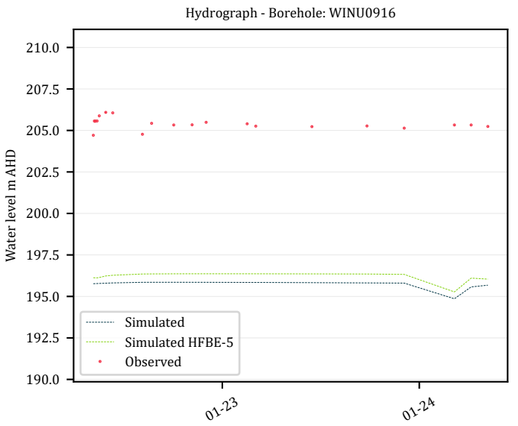

Hydrograph - Borehole: WINU0911
Water level m AHD
200
195
190
185
180
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

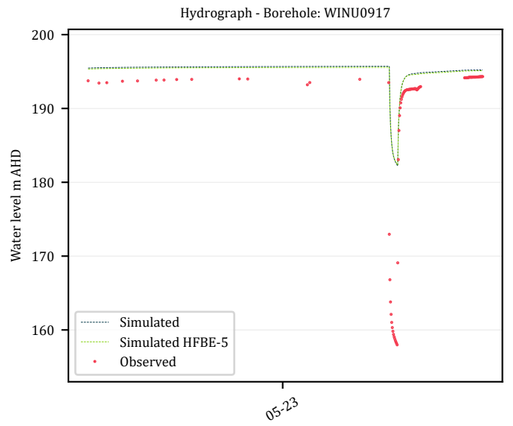

Hydrograph - Borehole: WINU0912
Water level m AHD
205
200
195
190
185
180
Simulated
Simulated HFBE-5
Observed
01-22
01-23
01-24

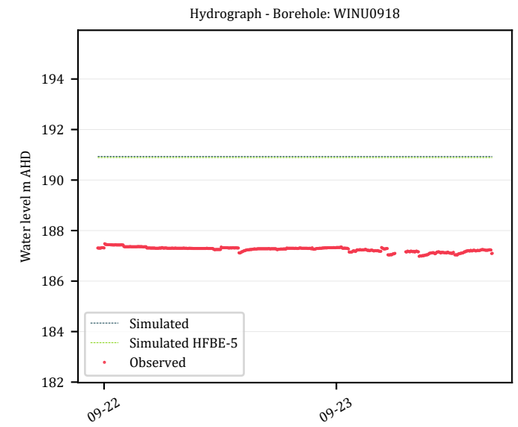

Hydrograph - Borehole: WINU0913
Water level m AHD
200
180
160
140
120
Simulated
Simulated HFBE-5
Observed
12-22
12-23

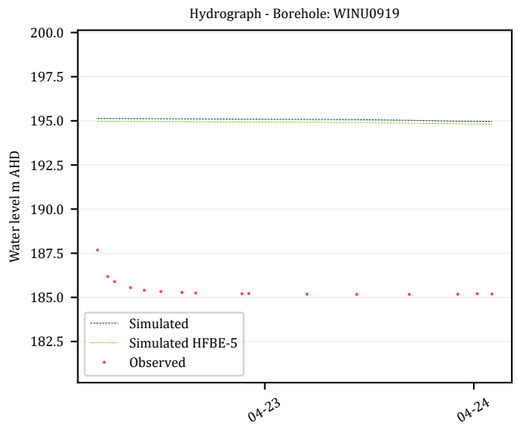

Hydrograph - Borehole: WINU0914
Water level m AHD
202
200
198
196
194
192
190
Simulated
Simulated HFBE-5
Observed
01-23
01-24

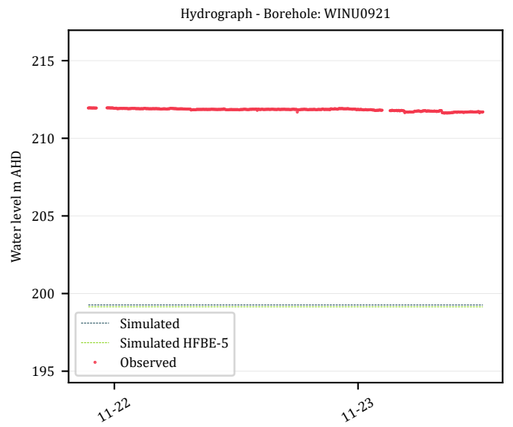

Hydrograph - Borehole: WINU0915
Water level m AHD
210
205
200
195
190
Simulated
Simulated HFBE-5
Observed
11-22
11-23

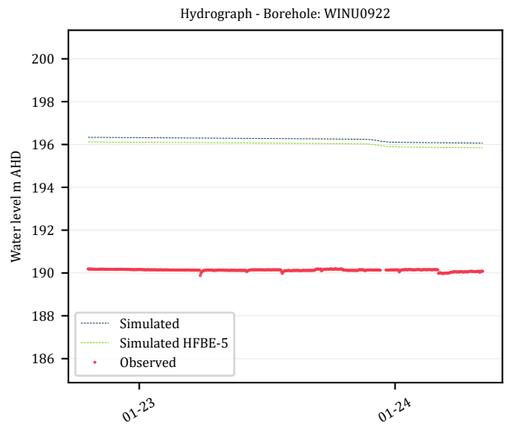

Hydrograph - Borehole: WINU0916
Water level m AHD
210.0
207.5
205.0
202.5
200.0
197.5
195.0
192.5
190.0
Simulated
Simulated HFBE-5
Observed
01-23
01-24

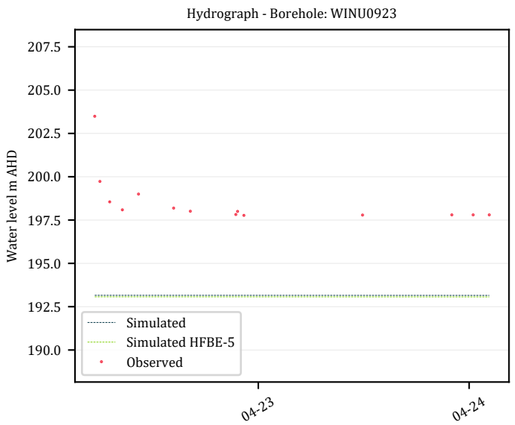

Hydrograph - Borehole: WINU0917
Water level m AHD
200
190
180
170
160
Simulated
Simulated HFBE-5
Observed
05-23

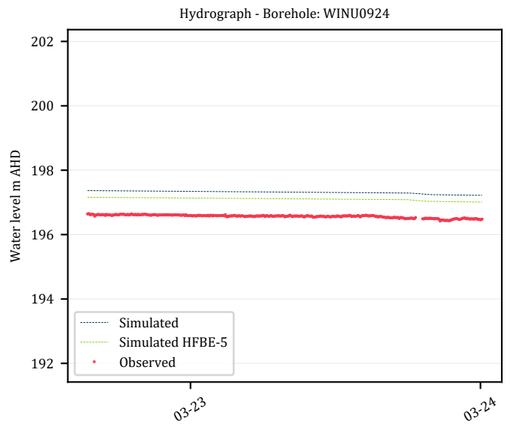

Hydrograph - Borehole: WINU0918
Water level m AHD
194
192
190
188
186
184
182
Simulated
Simulated HFBE-5
Observed
09-22
09-23

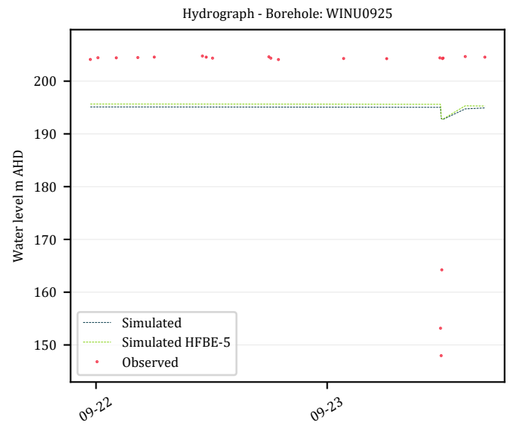

Hydrograph - Borehole: WINU0919
Water level m AHD
200.0
197.5
195.0
192.5
190.0
187.5
185.0
182.5
Simulated
Simulated HFBE-5
Observed
04-23
04-24

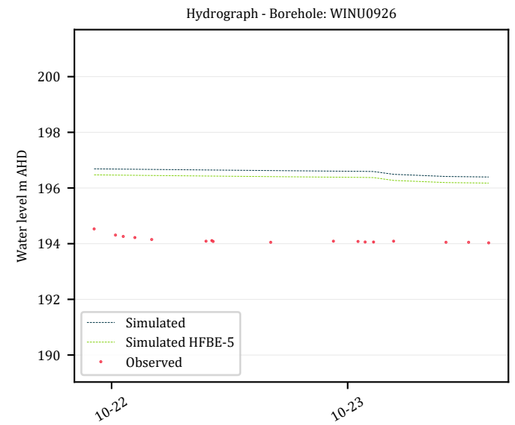

Hydrograph - Borehole: WINU0921
Water level m AHD
215
210
205
200
195
Simulated
Simulated HFBE-5
Observed
11-22
11-23

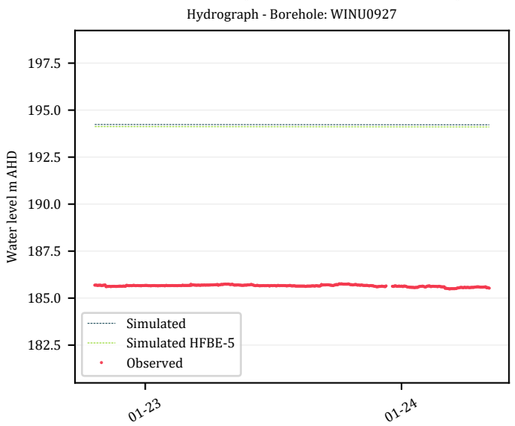

Hydrograph - Borehole: WINU0922
Water level m AHD
200
198
196
194
192
190
188
186
Simulated
Simulated HFBE-5
Observed
01-23
01-24

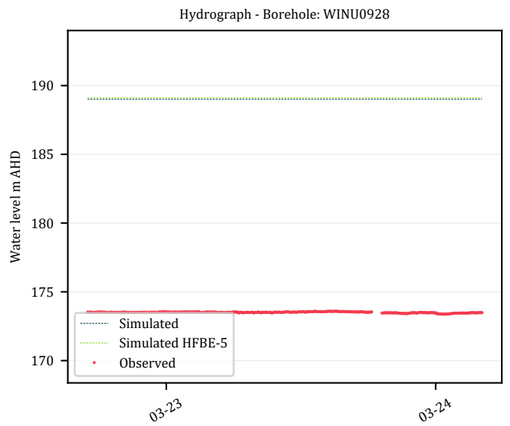

Hydrograph - Borehole: WINU0923
Water level m AHD
207.5
205.0
202.5
200.0
197.5
195.0
192.5
190.0
Simulated
Simulated HFBE-5
Observed
04-23
04-24

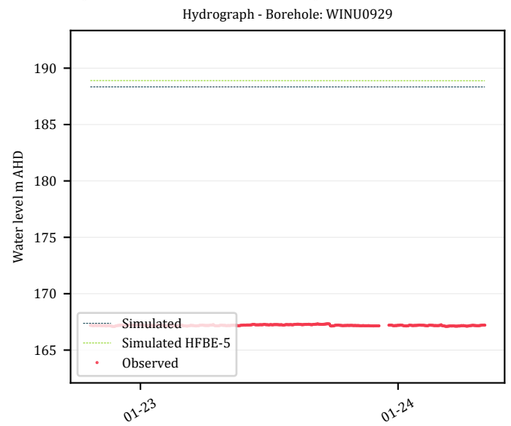

Hydrograph - Borehole: WINU0924
Water level m AHD
202
200
198
196
194
192
Simulated
Simulated HFBE-5
Observed
03-23
03-24

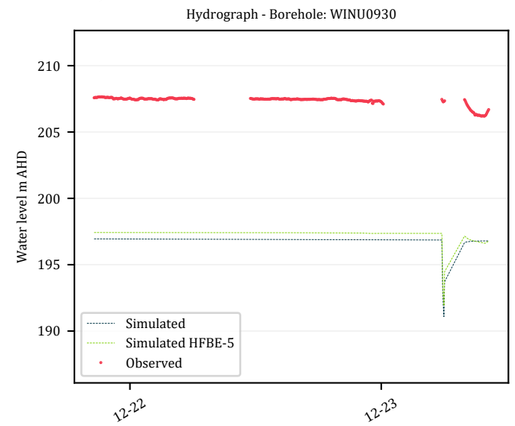

Hydrograph - Borehole: WINU0925
Water level m AHD
200
190
180
170
160
150
Simulated
Simulated HFBE-5
Observed
09-22
09-23

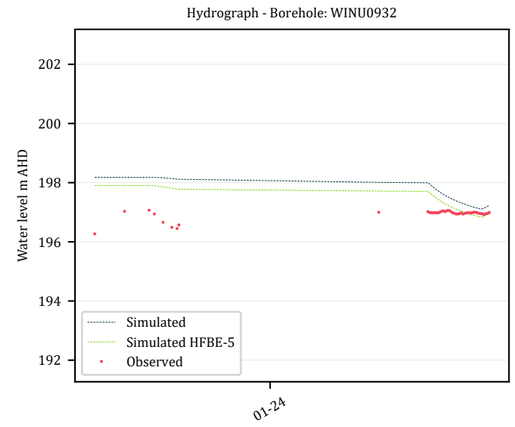

Hydrograph - Borehole: WINU0926
Water level m AHD
200
198
196
194
192
190
Simulated
Simulated HFBE-5
Observed
10-22
10-23

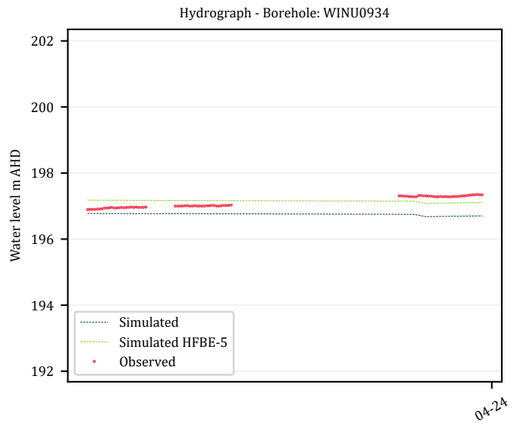

Hydrograph - Borehole: WINU0927
Water level m AHD
197.5
195.0
192.5
190.0
187.5
185.0
182.5
Simulated
Simulated HFBE-5
Observed
01-23
01-24

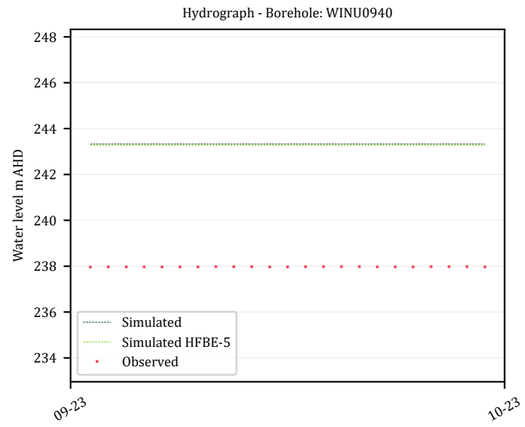

Hydrograph - Borehole: WINU0928
Water level m AHD
190
185
180
175
170
Simulated
Simulated HFBE-5
Observed
03-23
03-24

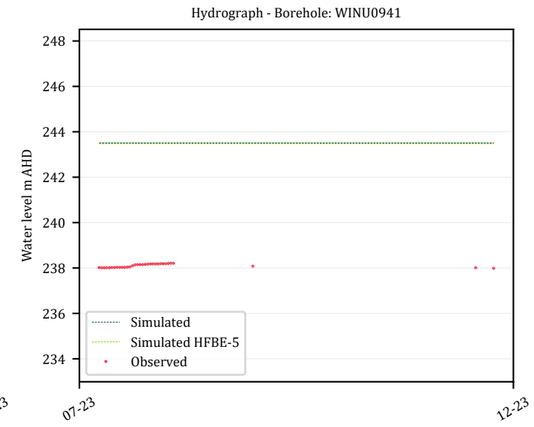

Hydrograph - Borehole: WINU0929
Water level m AHD
190
185
180
175
170
165
Simulated
Simulated HFBE-5
Observed
01-23
01-24

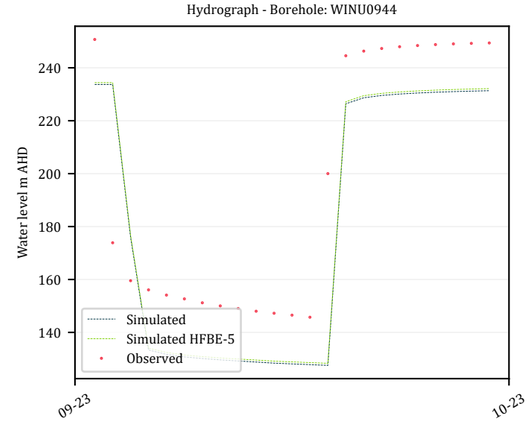

Hydrograph - Borehole: WINU0930
Water level m AHD
210
205
200
195
190
Simulated
Simulated HFBE-5
Observed
12-22
12-23

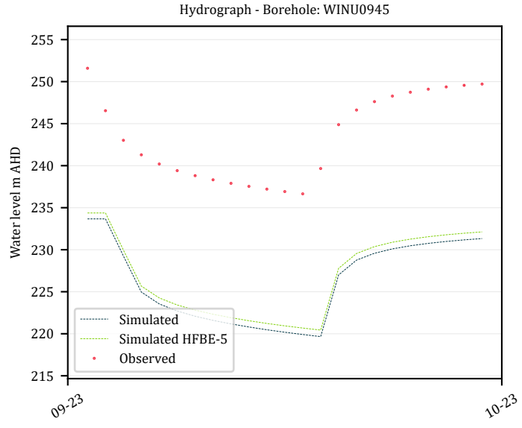

Hydrograph - Borehole: WINU0932
Water level m AHD
202
200
198
196
194
192
Simulated
Simulated HFBE-5
Observed
01-24

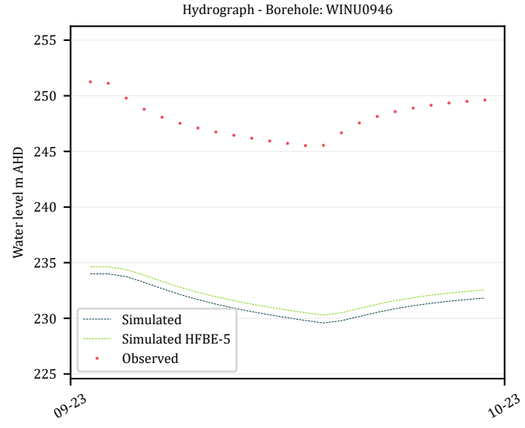

Hydrograph - Borehole: WINU0934
Water level m AHD
202
200
198
196
194
192
Simulated
Simulated HFBE-5
Observed
04-24

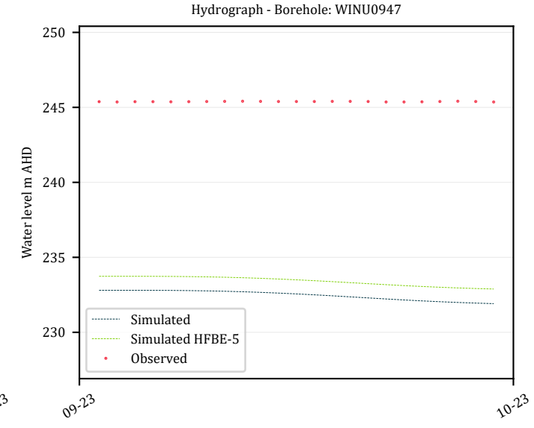

Hydrograph - Borehole: WINU0940
Water level m AHD
248
246
244
242
240
238
236
234
Simulated
Simulated HFBE-5
Observed
09-23
10-23

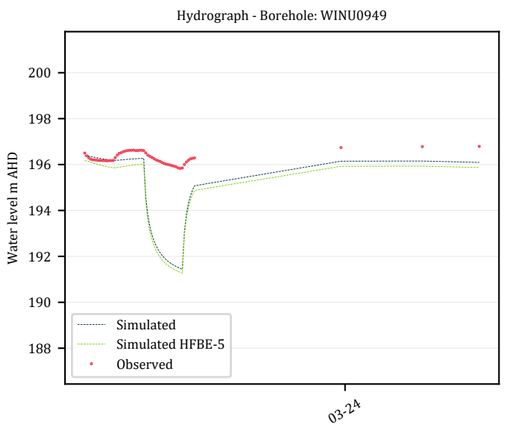

Hydrograph - Borehole: WINU0941
Water level m AHD
248
246
244
242
240
238
236
234
Simulated
Simulated HFBE-5
Observed
07-23
12-23

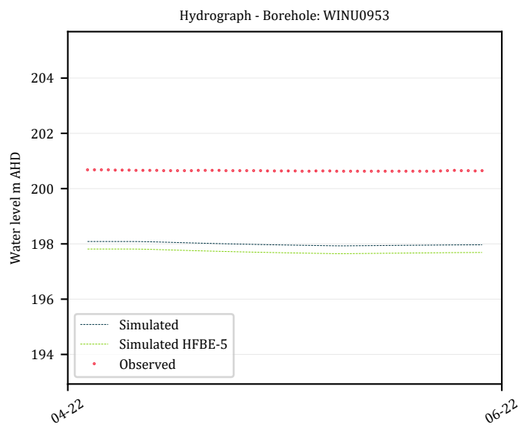

Hydrograph - Borehole: WINU0944
Water level m AHD
240
220
200
180
160
140
Simulated
Simulated HFBE-5
Observed
09-23
10-23

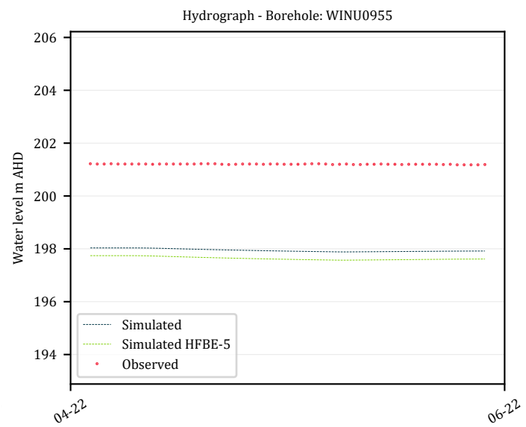

Hydrograph - Borehole: WINU0945
Water level m AHD
255
250
245
240
235
230
225
220
215
Simulated
Simulated HFBE-5
Observed
09-23
10-23

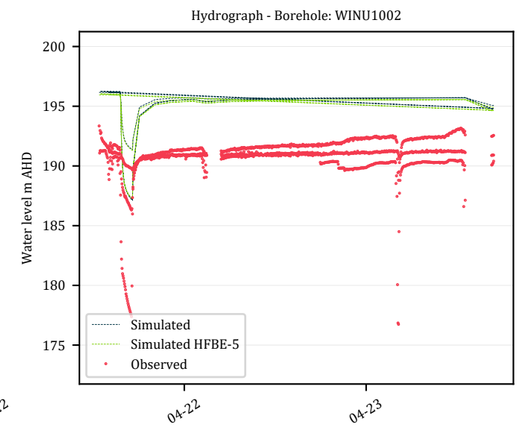

Hydrograph - Borehole: WINU0946
Water level m AHD
255
250
245
240
235
230
225
Simulated
Simulated HFBE-5
Observed
09-23
10-23

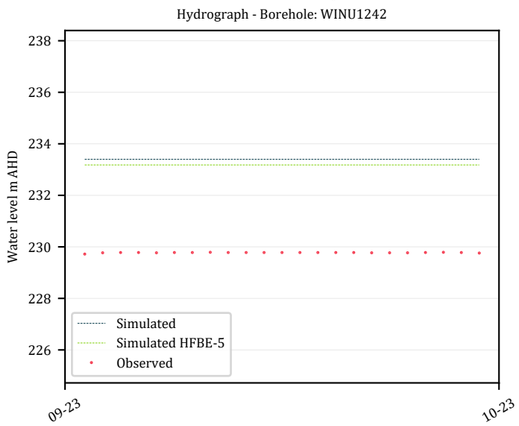

Hydrograph - Borehole: WINU0947
Water level m AHD
250
245
240
235
230
Simulated
Simulated HFBE-5
Observed
09-23
10-23

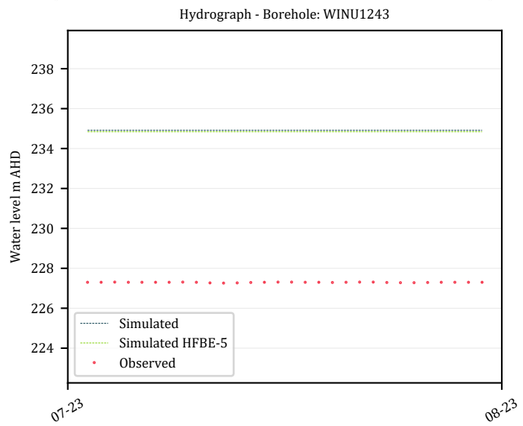

Hydrograph - Borehole: WINU0949
Water level m AHD
200
198
196
194
192
190
188
Simulated
Simulated HFBE-5
Observed
03-24

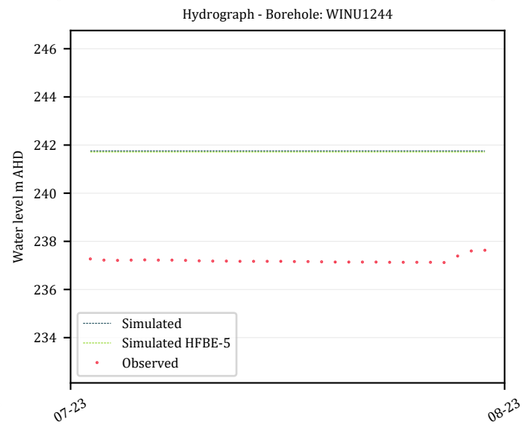

Hydrograph - Borehole: WINU0953
Water level m AHD
204
202
200
198
196
194
Simulated
Simulated HFBE-5
Observed
04-22
06-22

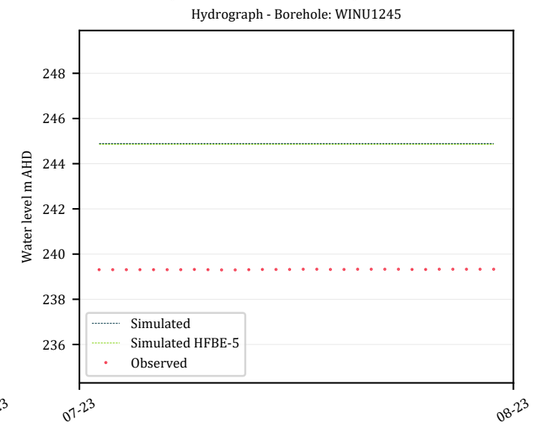

Hydrograph - Borehole: WINU0955
Water level m AHD
206
204
202
200
198
196
194
Simulated
Simulated HFBE-5
Observed
04-22
06-22

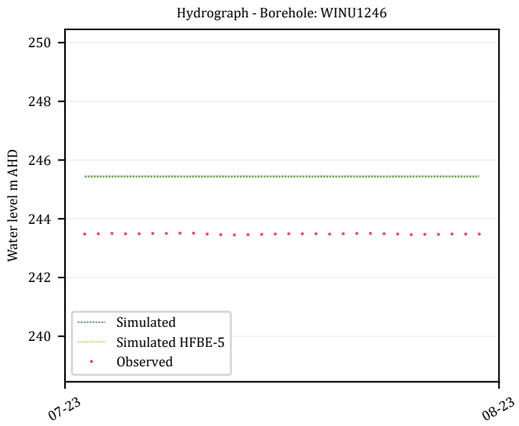

Hydrograph - Borehole: WINU1002
Water level m AHD
200
195
190
185
180
175
Simulated
Simulated HFBE-5
Observed
04-22
04-23

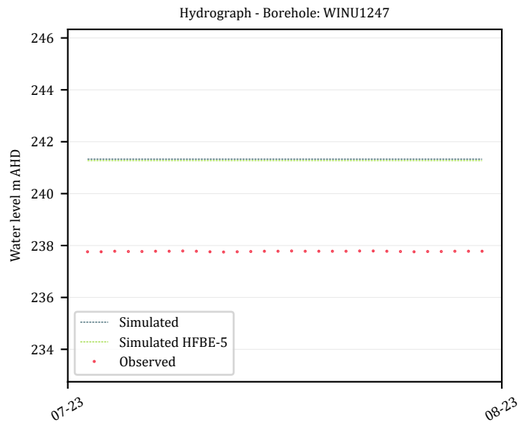

Hydrograph - Borehole: WINU1242
Water level m AHD
238
236
234
232
230
228
226
Simulated
Simulated HFBE-5
Observed
09-23
10-23

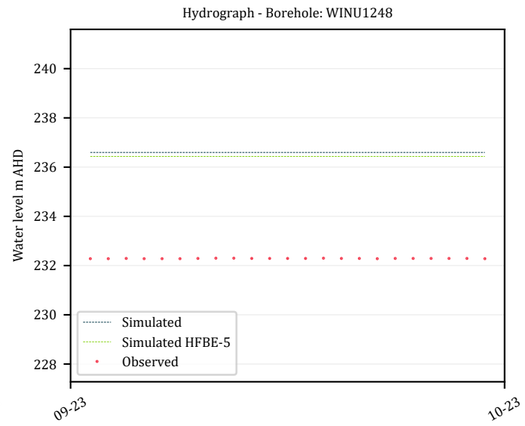

Hydrograph - Borehole: WINU1243
Water level m AHD
238
236
234
232
230
228
226
224
Simulated
Simulated HFBE-5
Observed
07-23
08-23

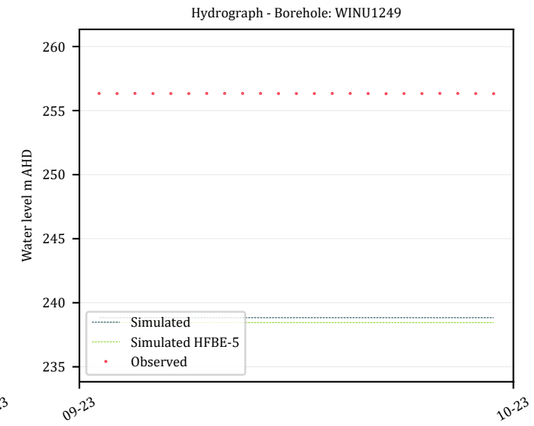

Hydrograph - Borehole: WINU1244
Water level m AHD
246
244
242
240
238
236
234
Simulated
Simulated HFBE-5
Observed
07-23
08-23

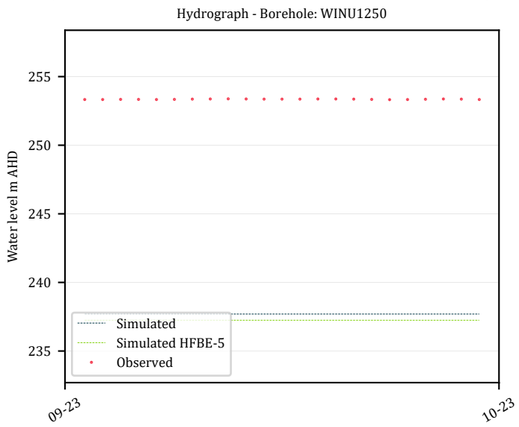

Hydrograph - Borehole: WINU1245
Water level m AHD
248
246
244
242
240
238
236
Simulated
Simulated HFBE-5
Observed
07-23
08-23

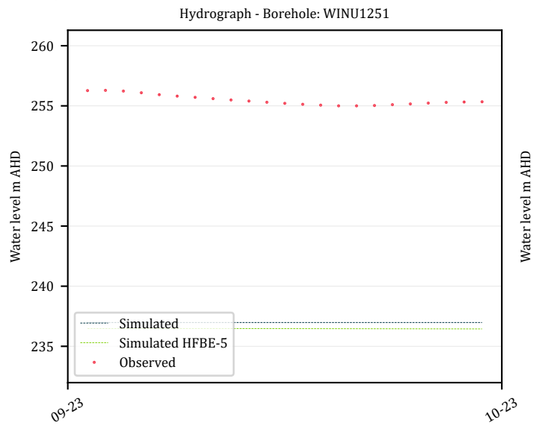

Hydrograph - Borehole: WINU1246
Water level m AHD
250
248
246
244
242
240
Simulated
Simulated HFBE-5
Observed
07-23
08-23

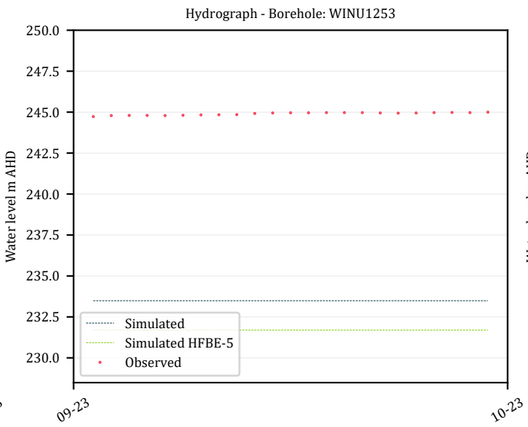

Hydrograph - Borehole: WINU1247
Water level m AHD
246
244
242
240
238
236
234
Simulated
Simulated HFBE-5
Observed
07-23
08-23

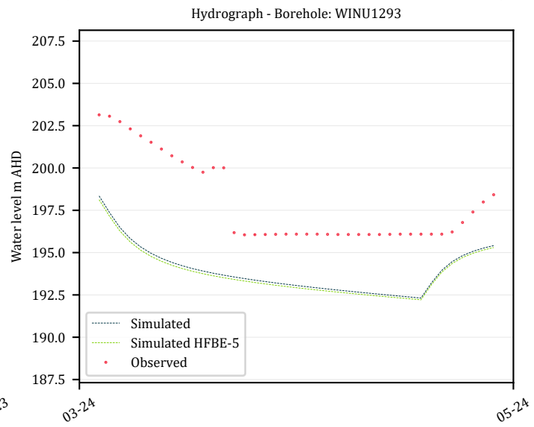

Hydrograph - Borehole: WINU1248
Water level m AHD
240
238
236
234
232
230
228
Simulated
Simulated HFBE-5
Observed
09-23
10-23

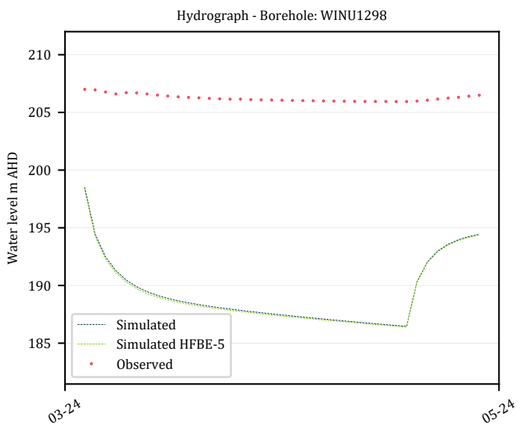

Hydrograph - Borehole: WINU1249
Water level m AHD
260
255
250
245
240
235
Simulated
Simulated HFBE-5
Observed
09-23
10-23

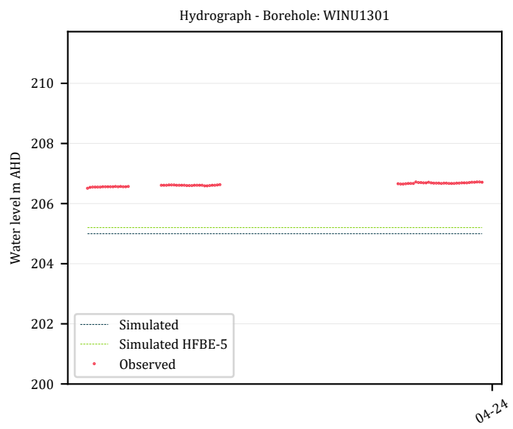

Hydrograph - Borehole: WINU1250
Water level m AHD
255
250
245
240
235
Simulated
Simulated HFBE-5
Observed
09-23
10-23

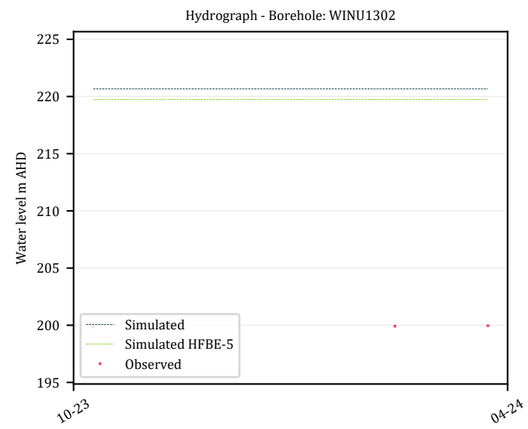

Hydrograph - Borehole: WINU1251
Water level m AHD
260
255
250
245
240
235
Simulated
Simulated HFBE-5
Observed
09-23
10-23

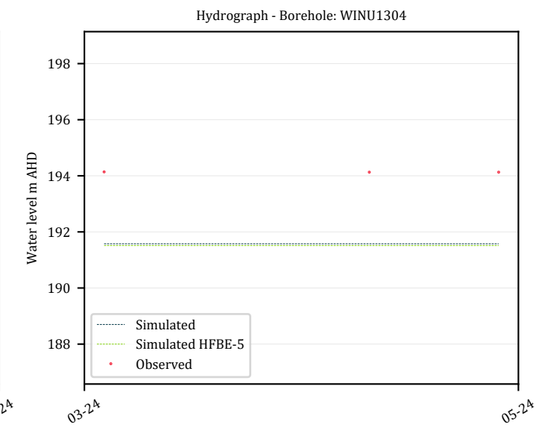

Hydrograph - Borehole: WINU1253
Water level m AHD
250.0
247.5
245.0
242.5
240.0
237.5
235.0
232.5
230.0
Simulated
Simulated HFBE-5
Observed
09-23
10-23

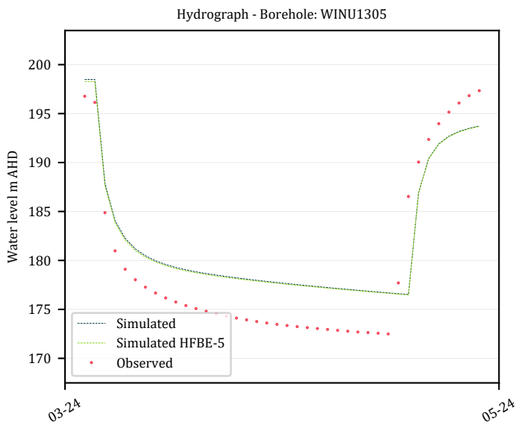

Hydrograph - Borehole: WINU1293
Water level m AHD
207.5
205.0
202.5
200.0
197.5
195.0
192.5
190.0
187.5
Simulated
Simulated HFBE-5
Observed
03-24
05-24

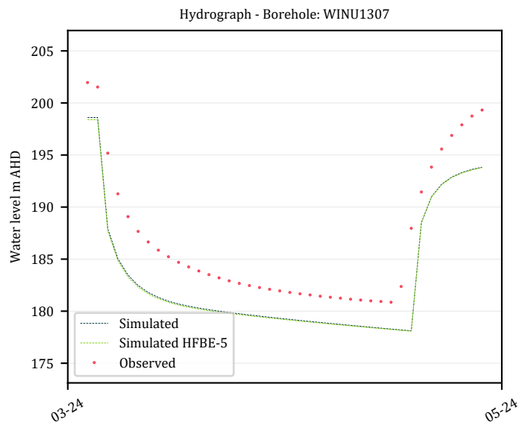

Hydrograph - Borehole: WINU1298
Water level m AHD
Simulated
Simulated HFBE-5
Observed
03-24
05-24

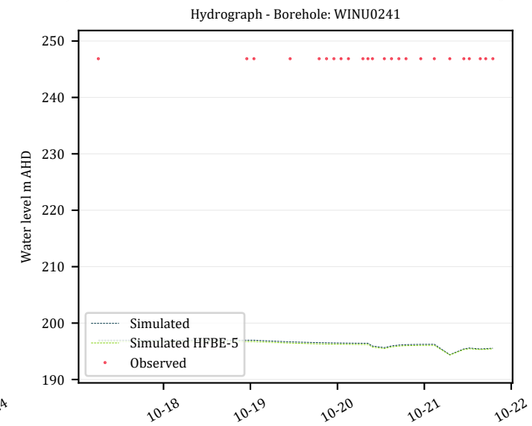

Hydrograph - Borehole: WINU1301
Water level m AHD
Simulated
Simulated HFBE-5
Observed
04-24

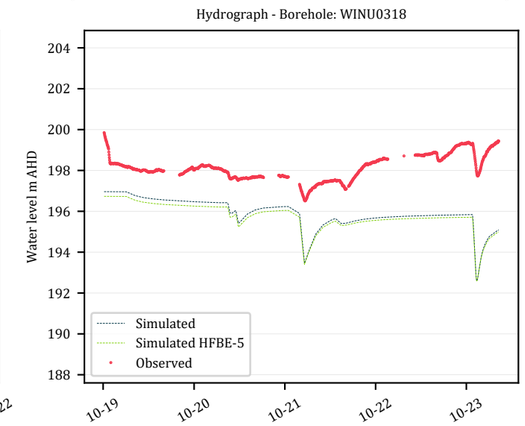

Hydrograph - Borehole: WINU1302
Water level m AHD
Simulated
Simulated HFBE-5
Observed
10-23
04-24

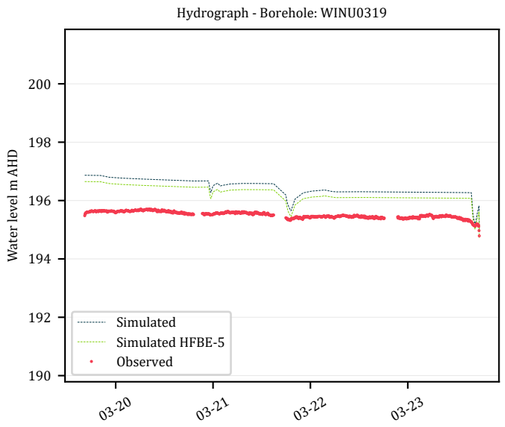

Hydrograph - Borehole: WINU1304
Water level m AHD
Simulated
Simulated HFBE-5
Observed
03-24
05-24

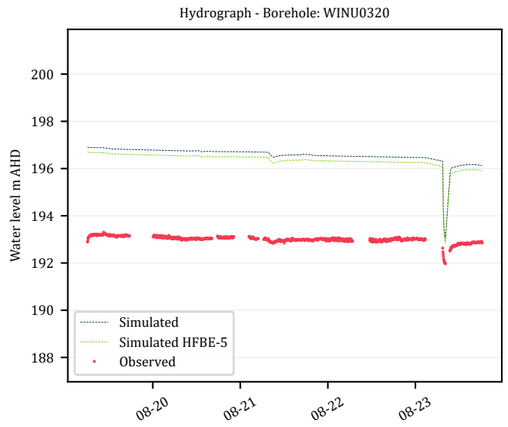

Hydrograph - Borehole: WINU1305
Water level m AHD
Simulated
Simulated HFBE-5
Observed
03-24
05-24

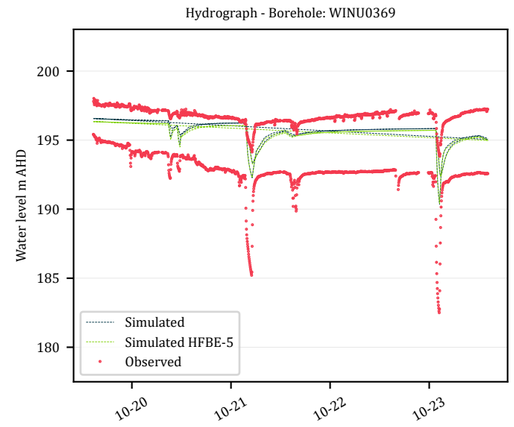

Hydrograph - Borehole: WINU1307
Water level m AHD
Simulated
Simulated HFBE-5
Observed
03-24
05-24

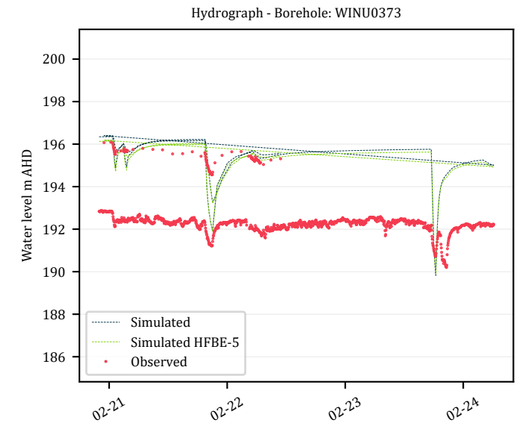

Hydrograph - Borehole: WINU0241
Water level m AHD
Simulated
Simulated HFBE-5
Observed
10-18
10-19
10-20
10-21
10-22

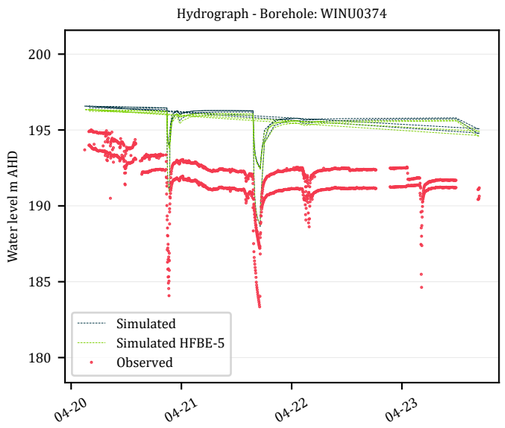

Hydrograph - Borehole: WINU0318
Water level m AHD
Simulated
Simulated HFBE-5
Observed
10-19
10-20
10-21
10-22
10-23

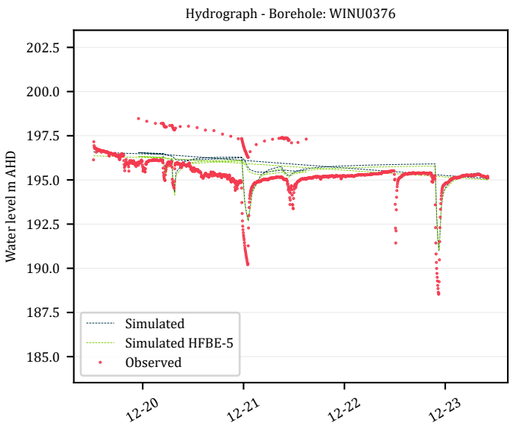

Hydrograph - Borehole: WINU0319
Water level m AHD
Simulated
Simulated HFBE-5
Observed
03-20
03-21
03-22
03-23

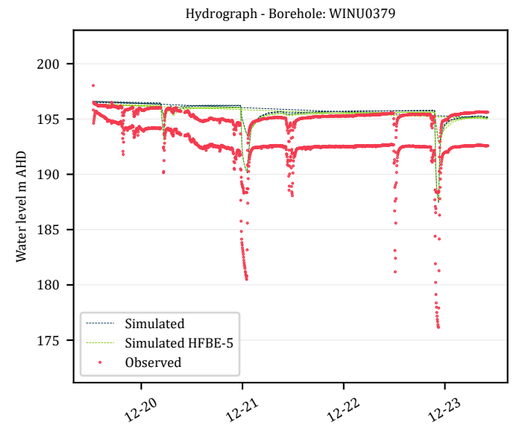

Hydrograph - Borehole: WINU0320
Water level m AHD
Simulated
Simulated HFBE-5
Observed
08-20
08-21
08-22
08-23

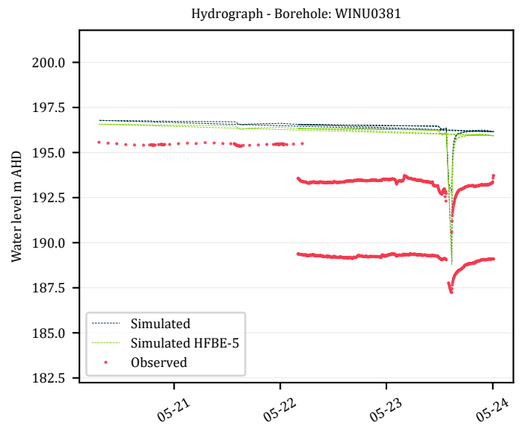

Hydrograph - Borehole: WINU0369
Water level m AHD
Simulated
Simulated HFBE-5
Observed
10-20
10-21
10-22
10-23

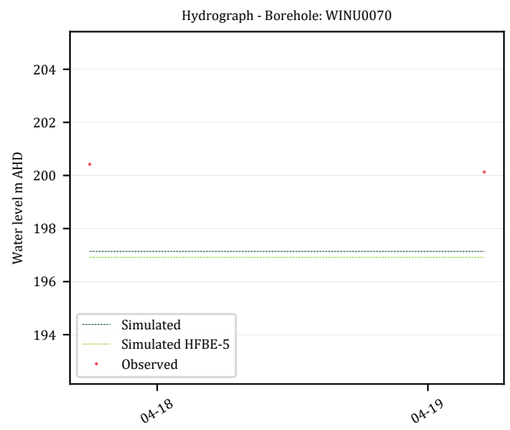

Hydrograph - Borehole: WINU0373
Water level m AHD
Simulated
Simulated HFBE-5
Observed
02-21
02-22
02-23
02-24

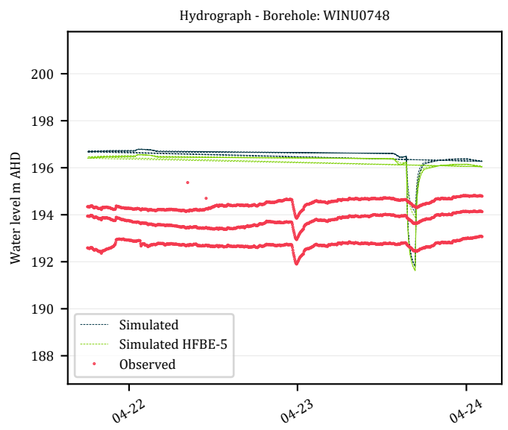

Hydrograph - Borehole: WINU0374
Water level m AHD
Simulated
Simulated HFBE-5
Observed
04-20
04-21
04-22
04-23

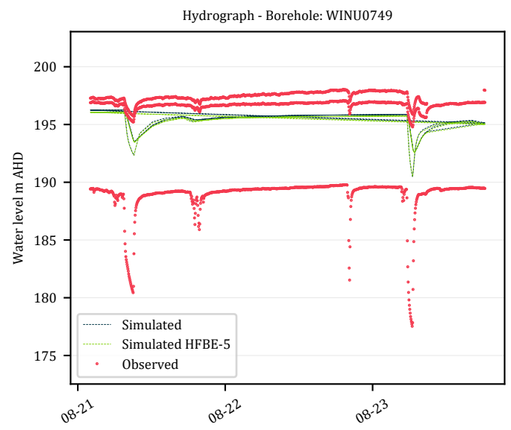

Hydrograph - Borehole: WINU0376
Water level m AHD
Simulated
Simulated HFBE-5
Observed
12-20
12-21
12-22
12-23

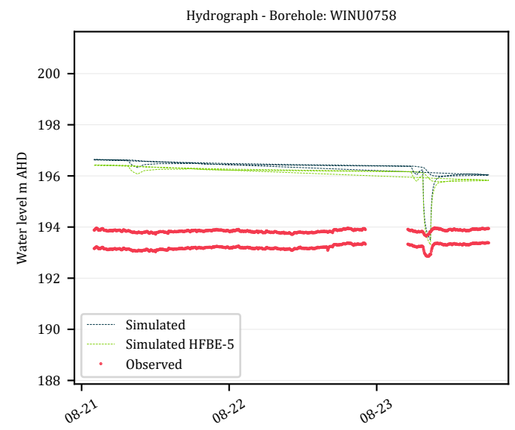

Hydrograph - Borehole: WINU0379
Water level m AHD
Simulated
Simulated HFBE-5
Observed
12-20
12-21
12-22
12-23

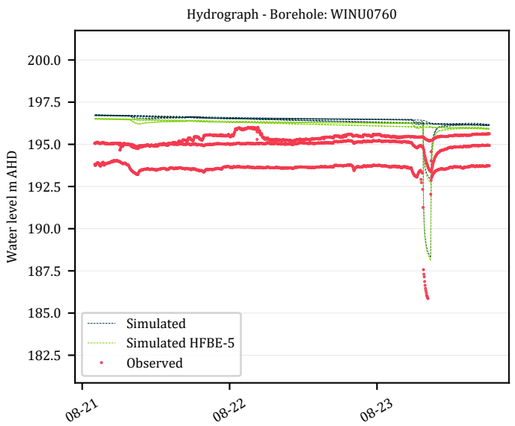

Hydrograph - Borehole: WINU0381
Water level m AHD
Simulated
Simulated HFBE-5
Observed
05-21
05-22
05-23
05-24

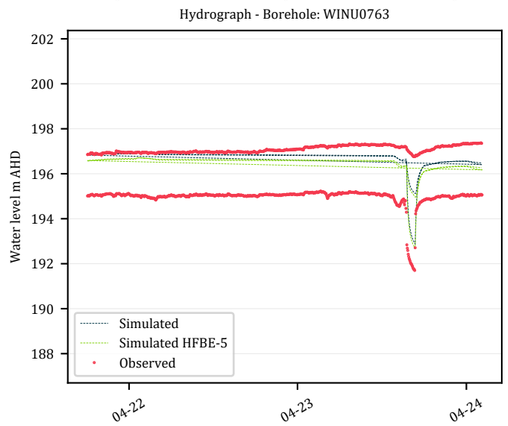

Hydrograph - Borehole: WINU0070
Water level m AHD
Simulated
Simulated HFBE-5
Observed

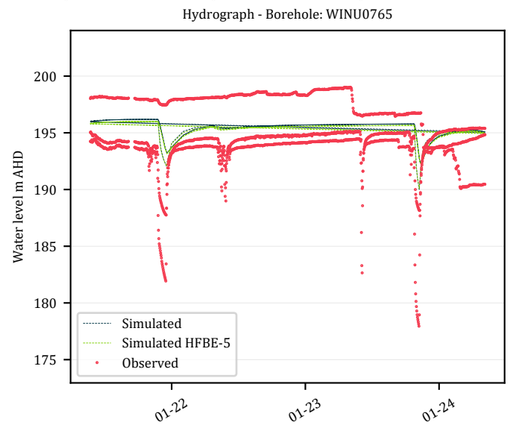

Hydrograph - Borehole: WINU0748
Water level m AHD
Simulated
Simulated HFBE-5
Observed

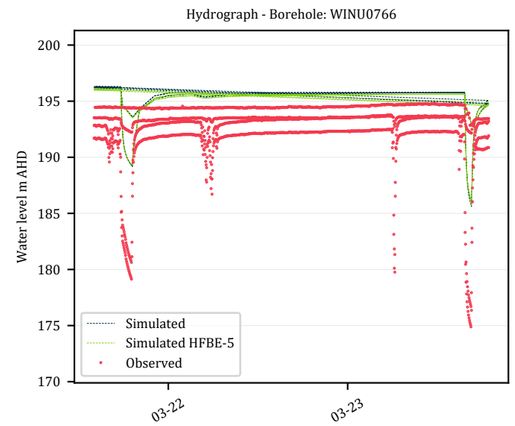

Hydrograph - Borehole: WINU0749
Water level m AHD
Simulated
Simulated HFBE-5
Observed

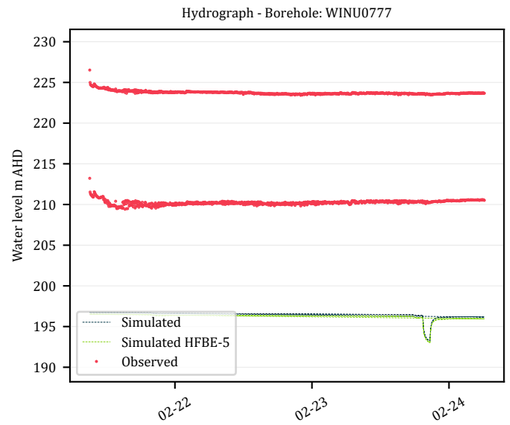

Hydrograph - Borehole: WINU0758
Water level m AHD
Simulated
Simulated HFBE-5
Observed

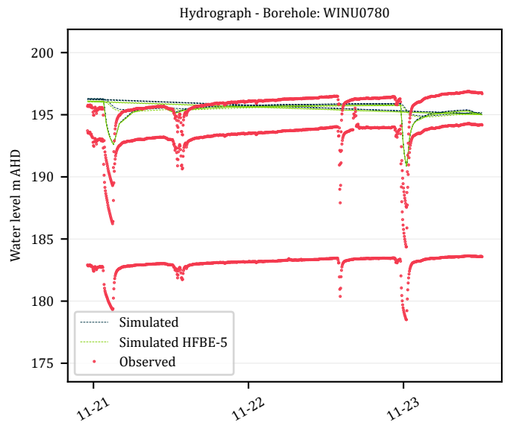

Hydrograph - Borehole: WINU0760
Water level m AHD
Simulated
Simulated HFBE-5
Observed

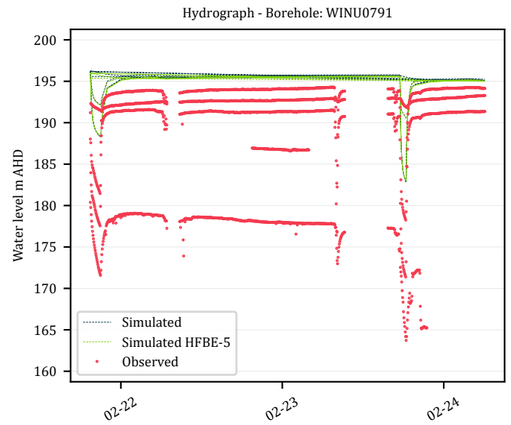

Hydrograph - Borehole: WINU0763
Water level m AHD
Simulated
Simulated HFBE-5
Observed

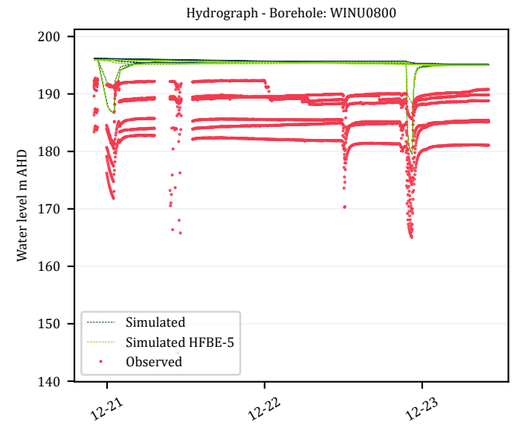

Hydrograph - Borehole: WINU0765
Water level m AHD
Simulated
Simulated HFBE-5
Observed

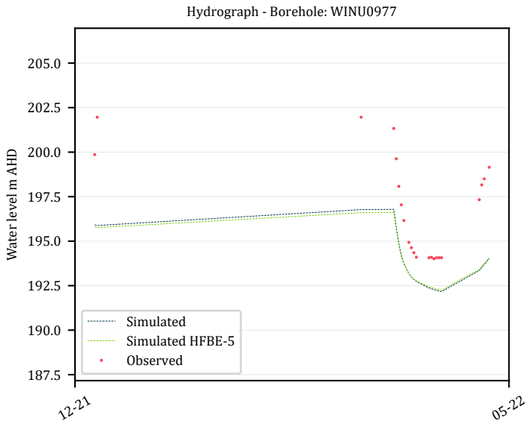

Hydrograph - Borehole: WINU0766
Water level m AHD
Simulated
Simulated HFBE-5
Observed


Hydrograph - Borehole: WINU0777
Water level m AHD
Simulated
Simulated HFBE-5
Observed


Hydrograph - Borehole: WINU0780
Water level m AHD
Simulated
Simulated HFBE-5
Observed


Hydrograph - Borehole: WINU0791
Water level m AHD
Simulated
Simulated HFBE-5
Observed


Hydrograph - Borehole: WINU0800
Water level m AHD
Simulated
Simulated HFBE-5
Observed

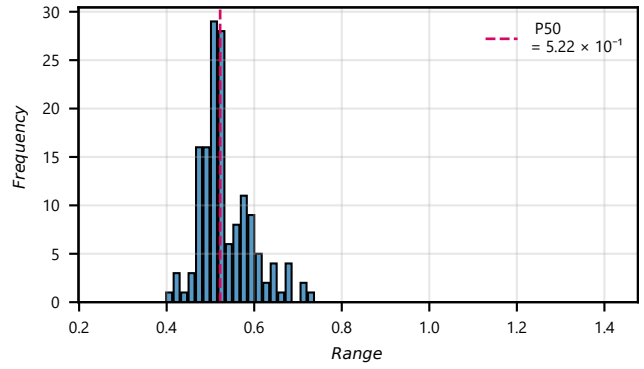

Hydrograph - Borehole: WINU0977
Water level m AHD
Simulated
Simulated HFBE-5
Observed

Appendix I. Model classification

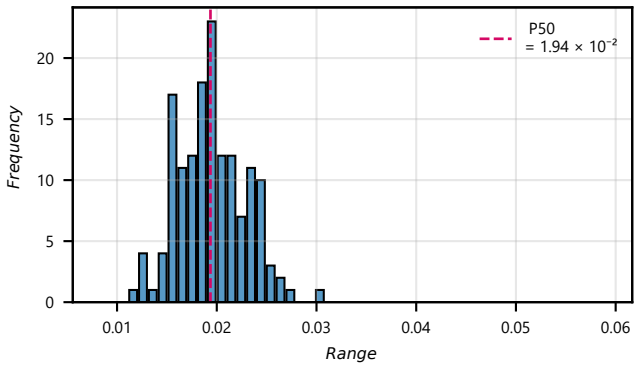
Confidence level	Data		Calibration		Prediction		Key Indicators	
Class 1	×	Poor groundwater head observations	×	Not possible	✓	Predictive >> Calibration	✓	Predictive > 10x calibration period
	×	Sparse metered observations and measurements	×	Unacceptable error statistic	~	Long stress periods	✓	Stresses > 5x higher
	×	No metered usage	×	Inadequate data distribution	×	Poor/no validation	×	Mass balance > 1% or exceeds 5% once off
	×	No local climate data	×	Targets incompatible with model purpose.	×	Transient prediction but steady-state calibration	×	Properties ranges outside onceptualisation
	×	Poor aquifer geometry					×	No review by Hydrogeologist
Class 2	✓	Average groundwater head observations	✓	Partial validation	×	Predictive > Calibration	×	Predictive 3-10x calibration period
	✓	Moderate metered observations and measurements	✓	Reasonable error statistic, partial errors	~	Long stress periods	×	Stresses = 2-5x higher
			×	Long-term trends not replicated	×	Ok validation	✓	Mass balance <1% of total
	~	Some baseflow and climatic data	×	Historic data match, not resent	✓	Transient calibration and rediction	×	Some properties range outside conceptualisation.
	✓	Some high-resolution topographic DEM &/or some aquifer geometry	~	No use of targets compatible with model purpose (heads & luxes)	×	Poor match to observations if tress is extended	~	Some coarse discretisation in key areas of grid or at key times
							✓	Reviewed by Hydrogeologist
Class 3	~	Good groundwater head observations	✓	Adequate performance stats	×	Predictive ~ Calibration	×	Predictive <3x calibration period
	×	Reliable metered observations and measurements	~	Most long-term trends eplicated	×	Similar stress periods to alibration	×	Stresses < 2x
	~	Local climate data	×	Seasonal fluctuation replicated	✓	Good validation	✓	Mass balance < 0.5% of total
	~	Aquifer testing	✓	Present day data targets	✓	Calibration & prediction consistent (transient or steady state).	✓	Properties range consistent with conceptualisation
	~	High resolution DEM all areas	✓	Head & Flux targets used to constrain calibration	×	Similar stresses to those in calibration.	~	No coarse discretisation in key areas (grid or time)
	~	Good aquifer geometry					✓	Review by experienced Hydrogeologist

Appendix J. Parameter frequency histograms

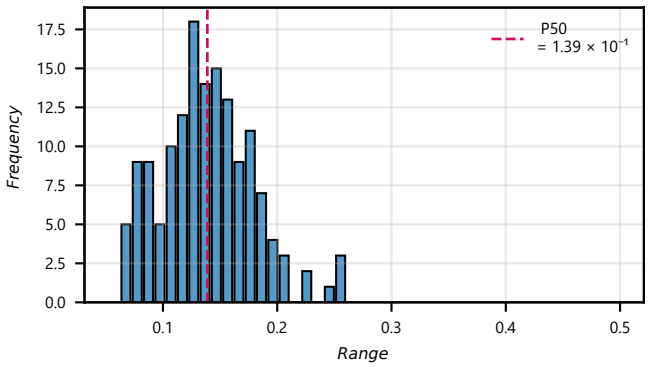
Kx_z1_Sandstone



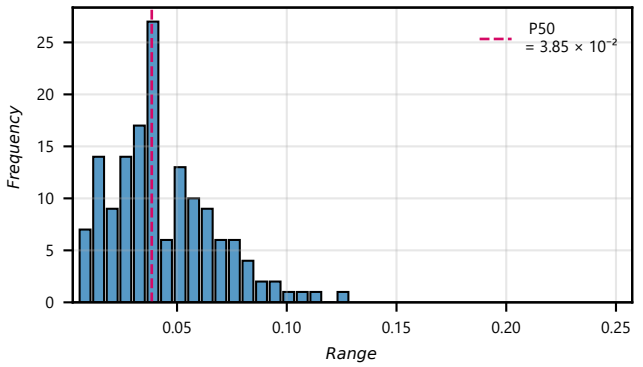
Kx_z2_Mudstone



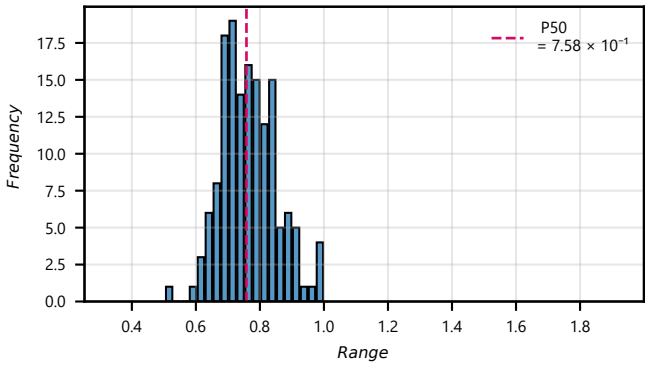
Kx_z3_W_Palaeozoic



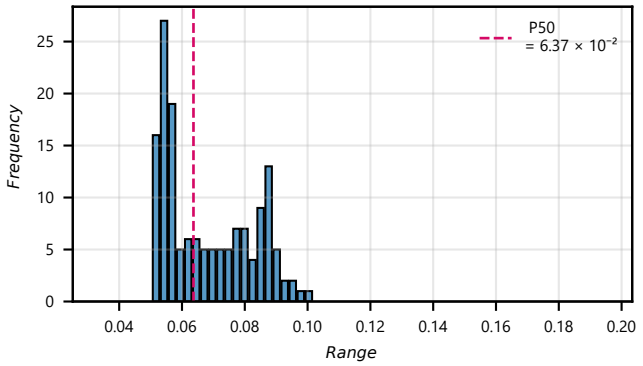
Kx_z4_W_Granites



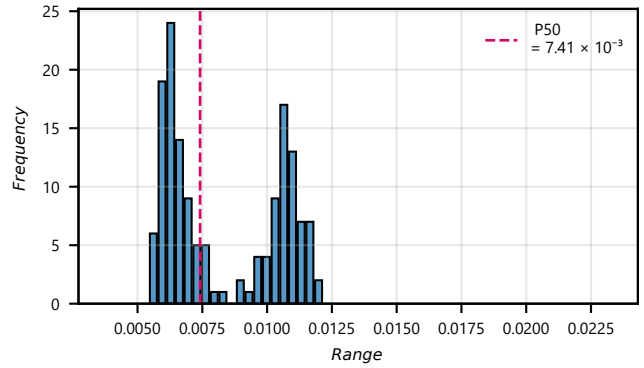
Kx_z5_W_Broadhurst_and_Malu



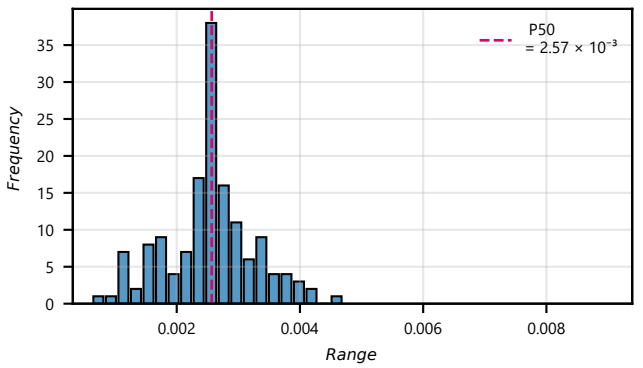
Kx_z6_W_Coolbro



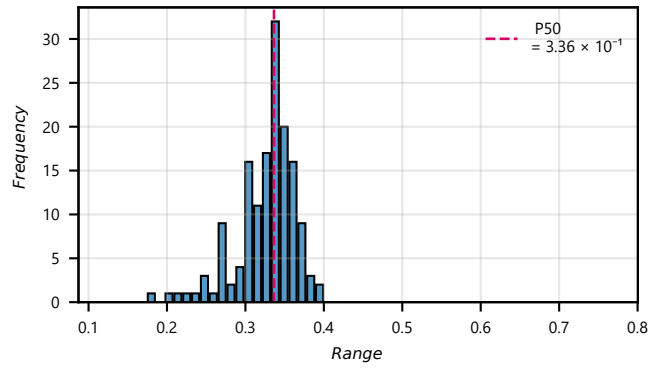
Kx_z7_F_Palaeozoic



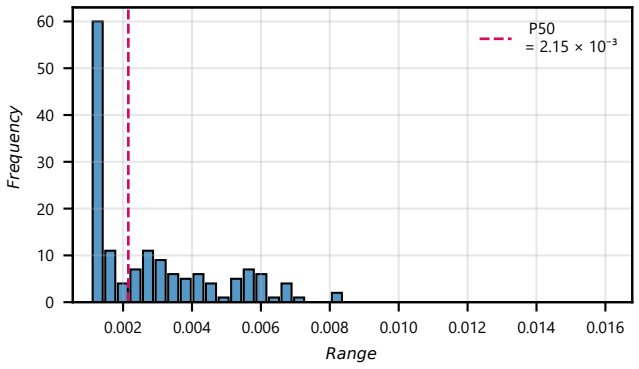
Kx_z8_F_Granites



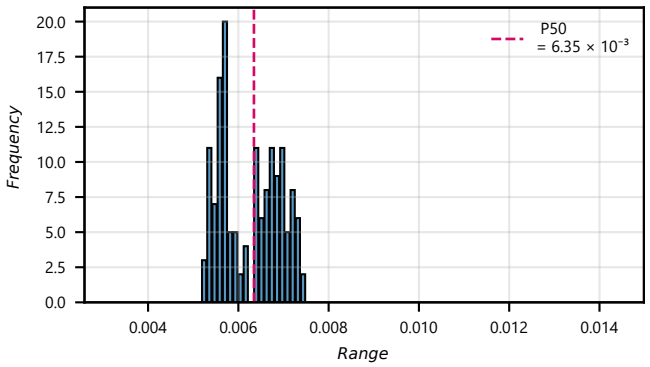
Kx_z9_F_Broadhurst_and_Malu



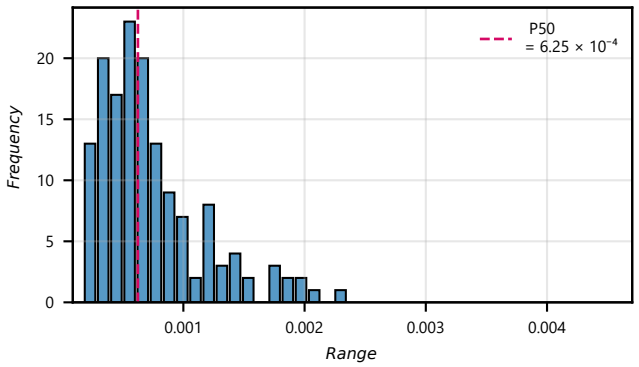
Kx_z10_F_Coolbro



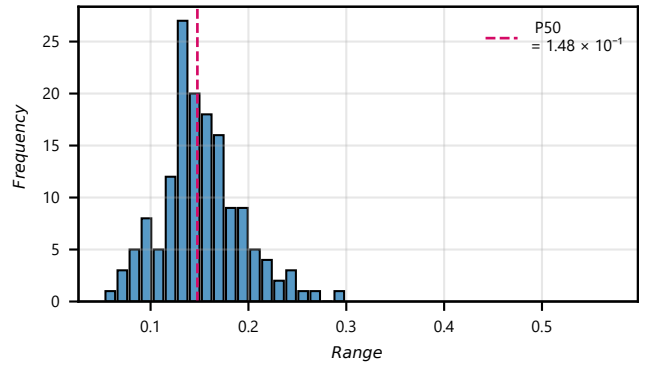
Kx_z11_VF_Palaeozoic



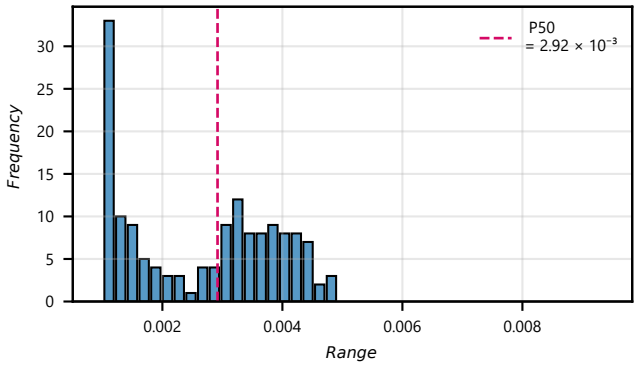
Kx_z12_VF_Granites



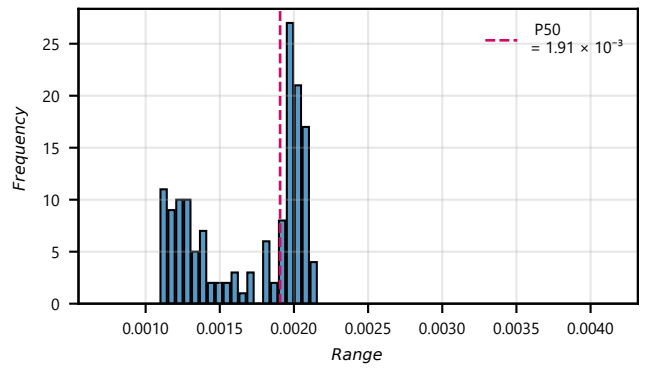
Kx_z13_VF_Broadhurst_and_Malu



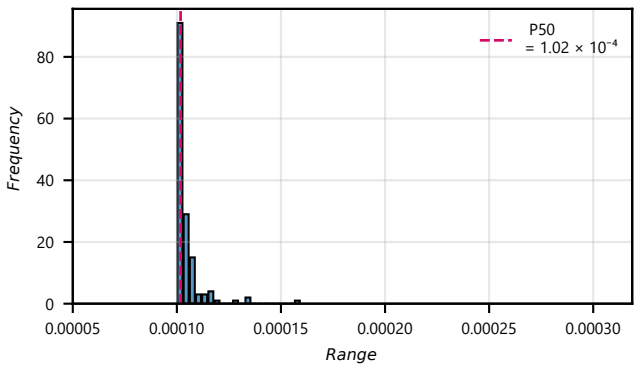
Kx_z14_VF_Coolbro



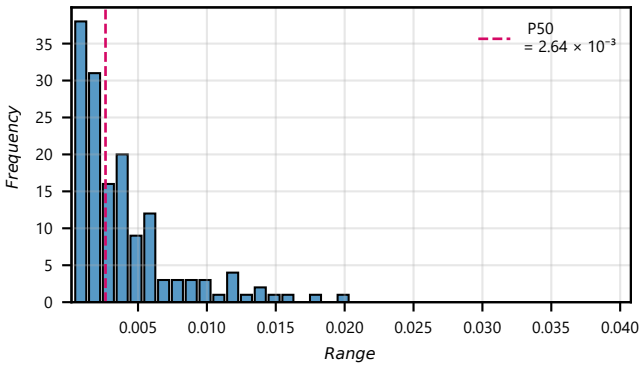
Kx_z15_VF_Palaeozoic



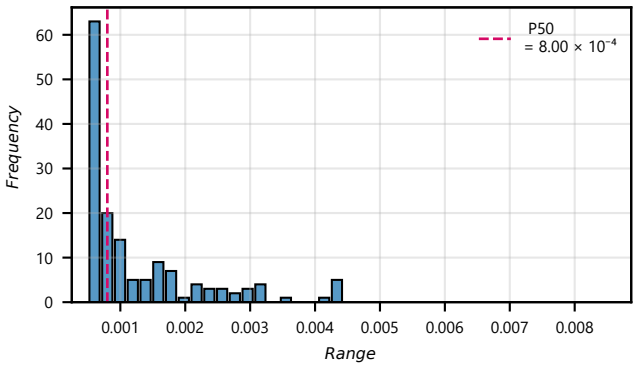
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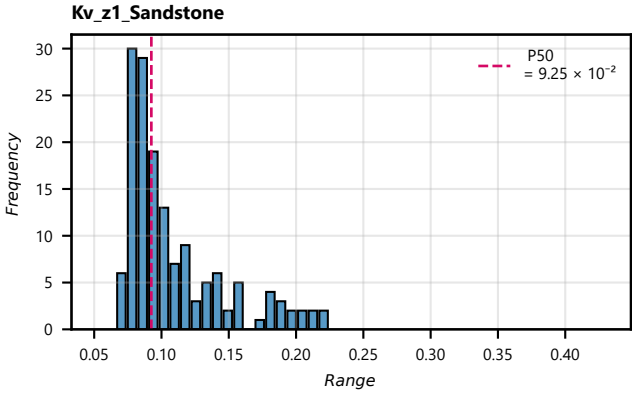
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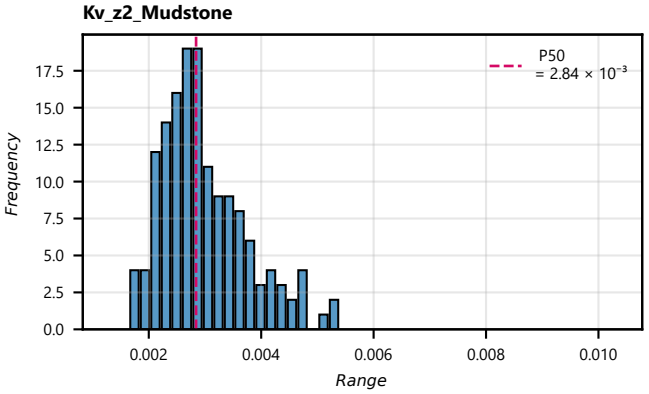
Kx_z18_VF_Coolbro



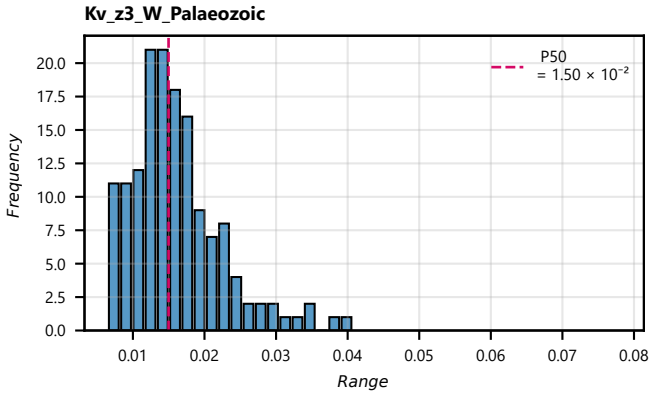
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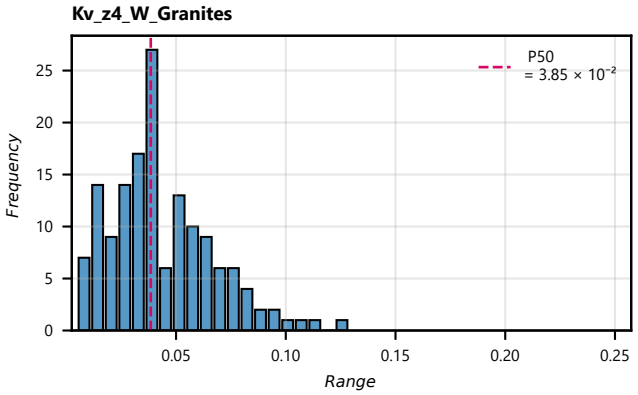
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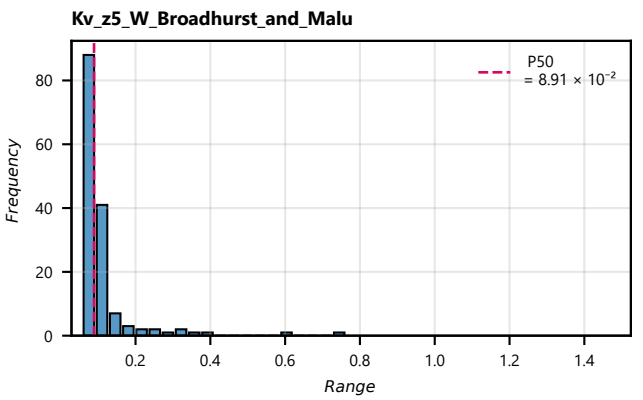
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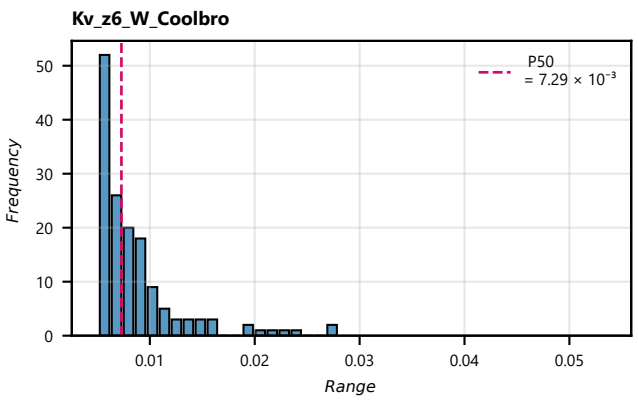
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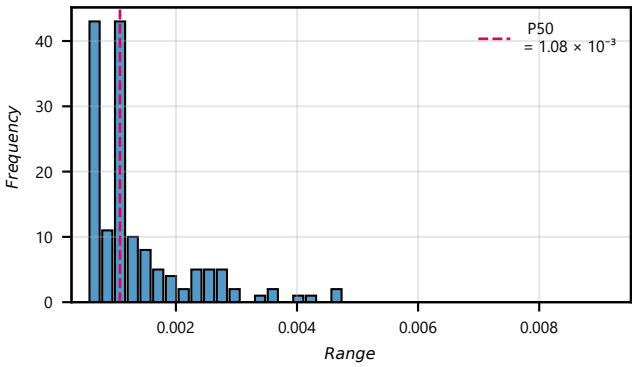
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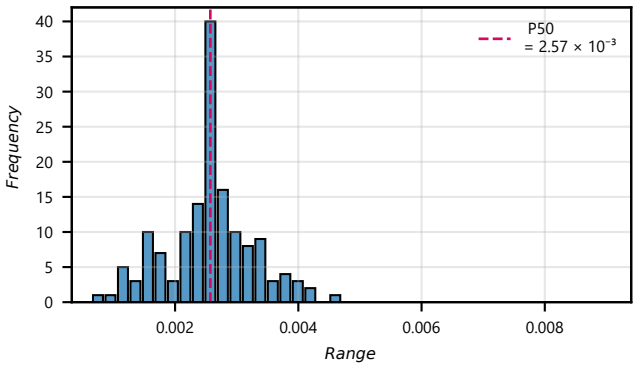
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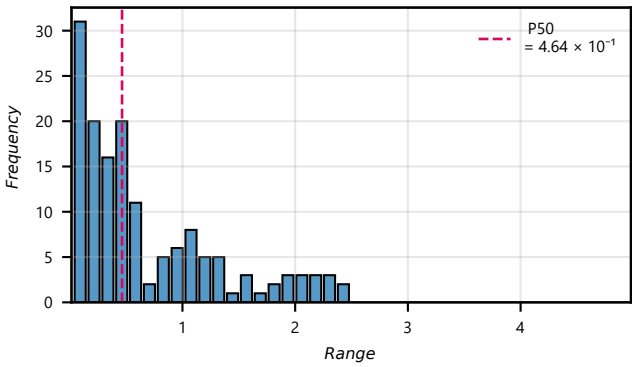
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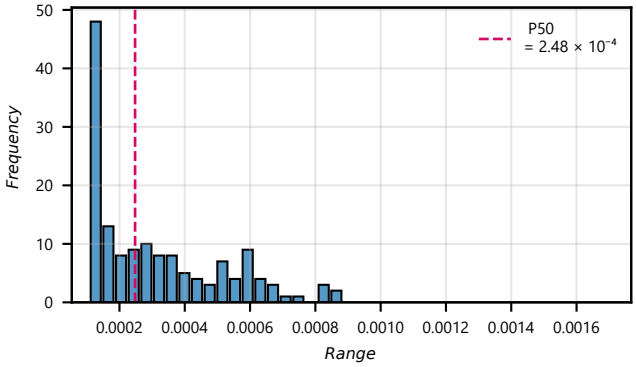
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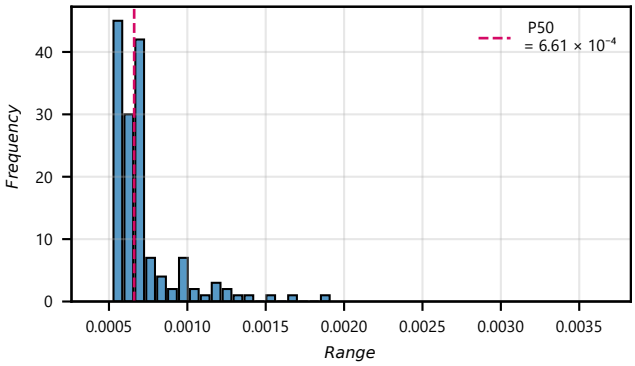
Kv_z9_F_Broadhurst_and_Malu



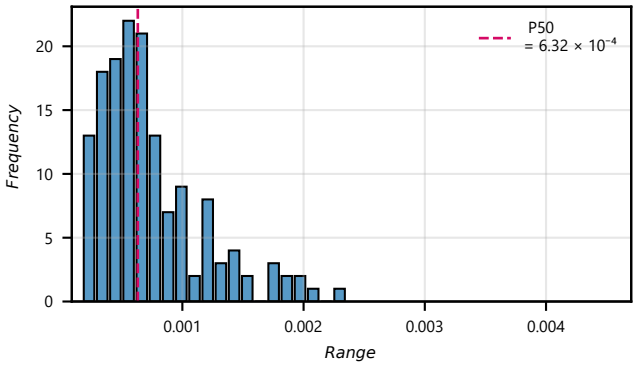
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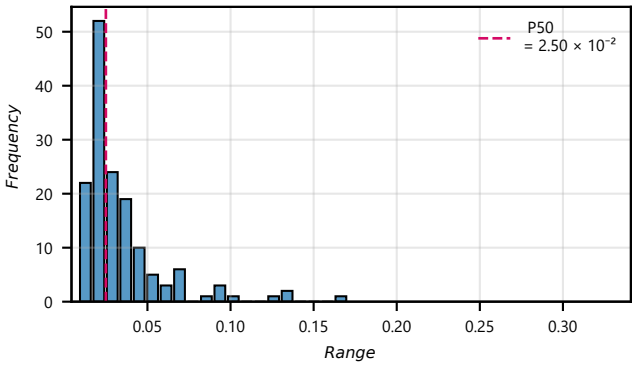
Kv_z11_VF_Palaeozoic



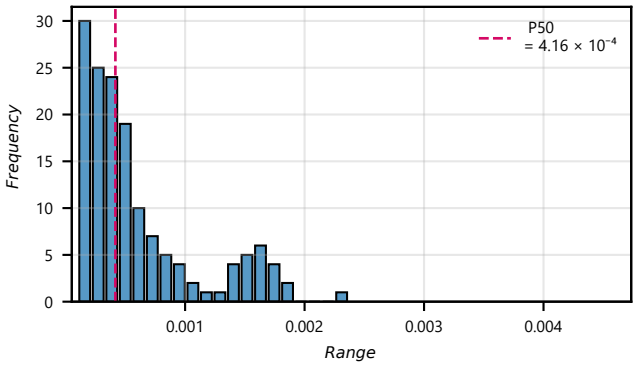
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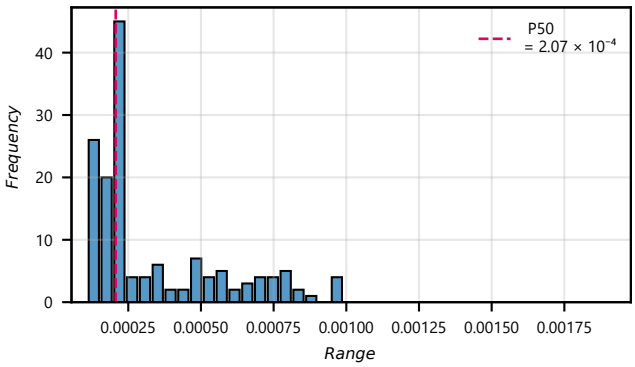
Kv_z13_VF_Broadhurst_and_Malu



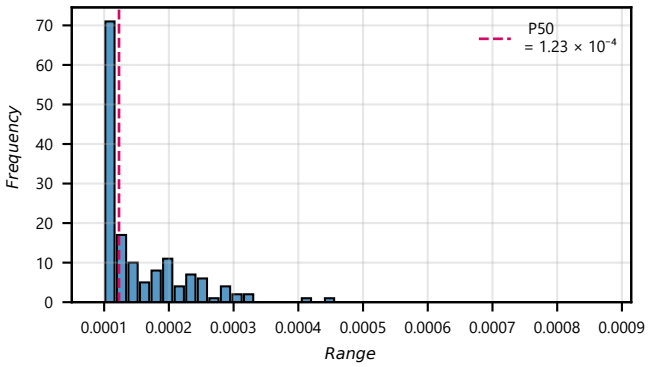
Kv_z14_VF_Coolbro



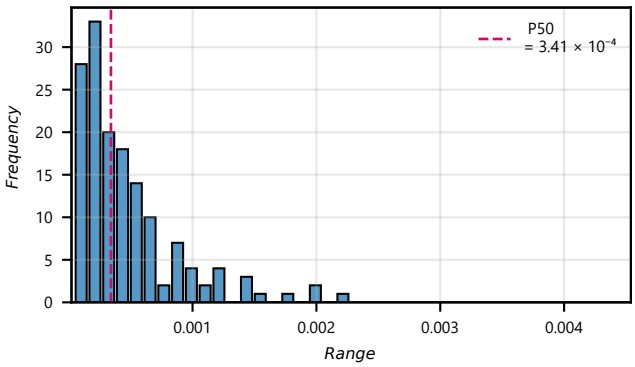
Kv_z15_VF_Palaeozoic



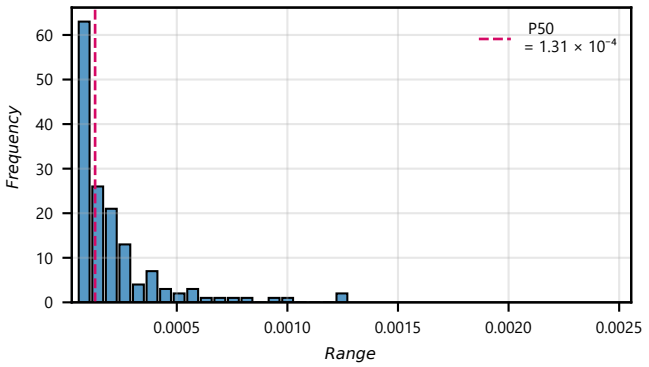
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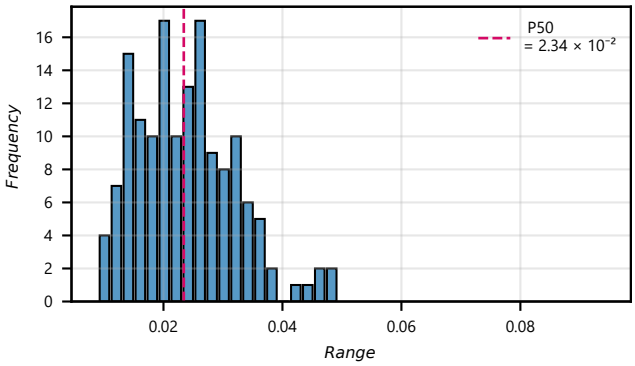
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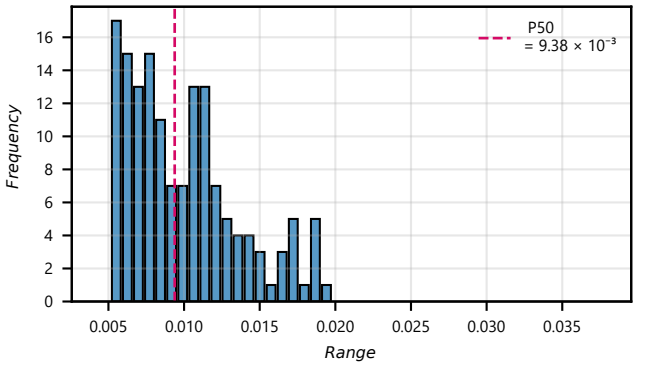
Kv_z18_VF_Coolbro



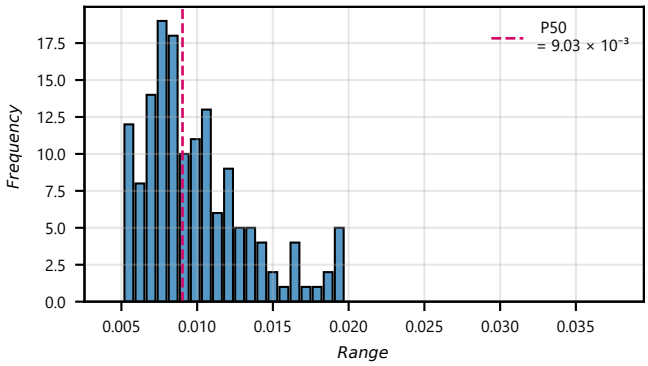
SY_z1_Sandstone



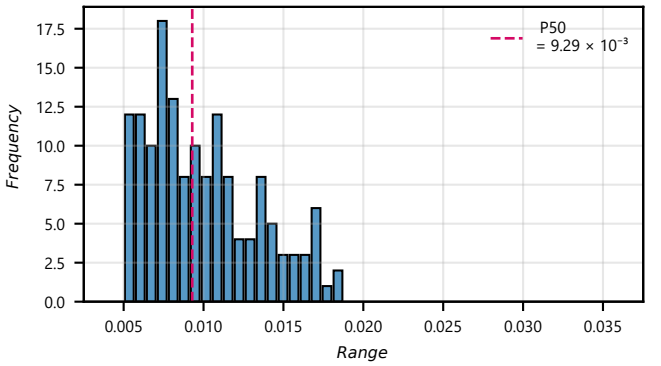
SY_z2_Mudstone



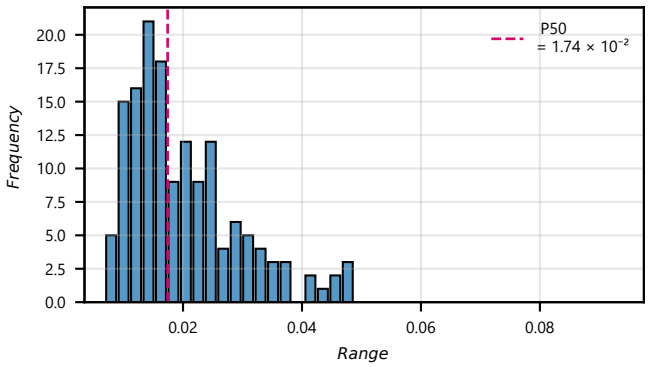
SY_z3_W_Palaeozoic



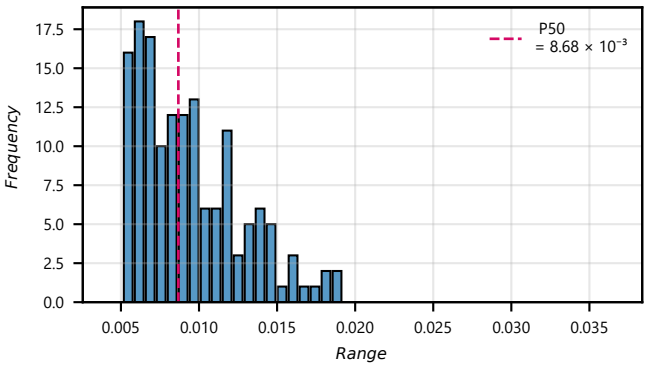
SY_z4_W_Granites



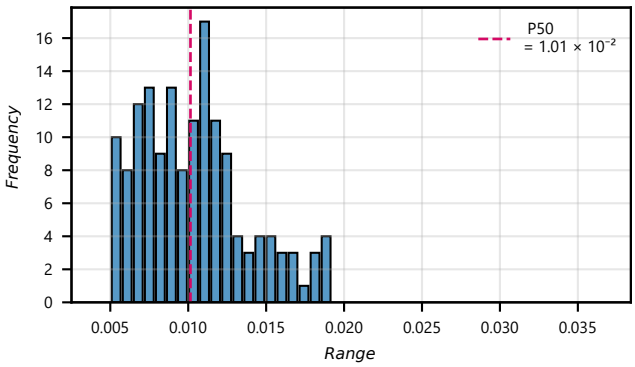
SY_z5_W_Broadhurst_and_Malu



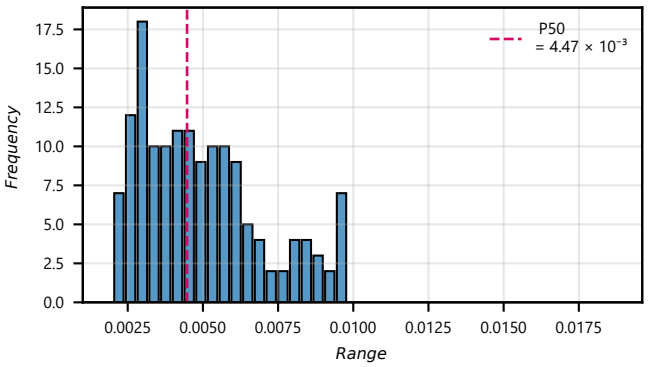
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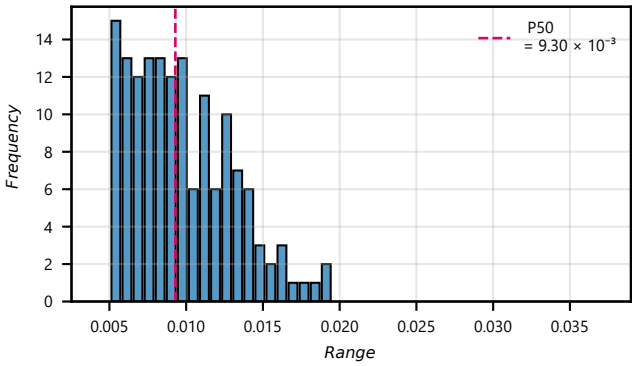
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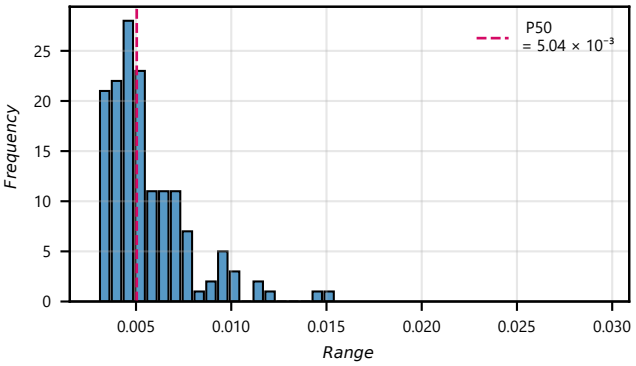
SY_z8_F_Granites



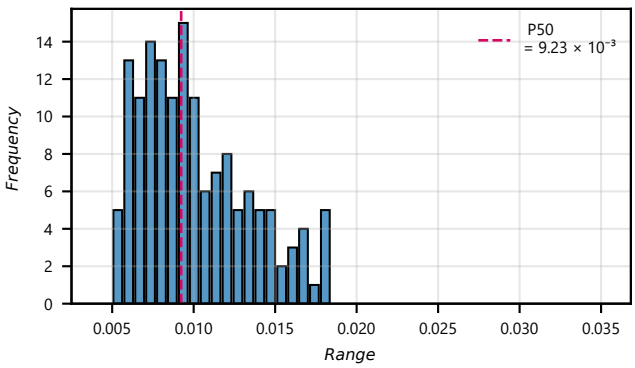
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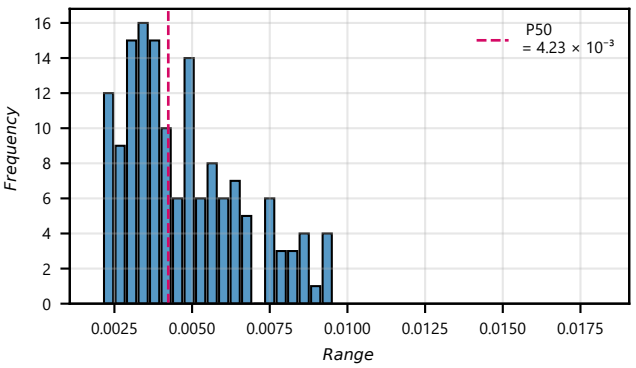
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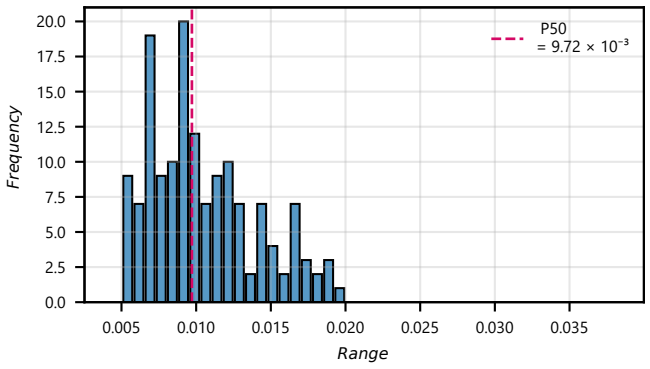
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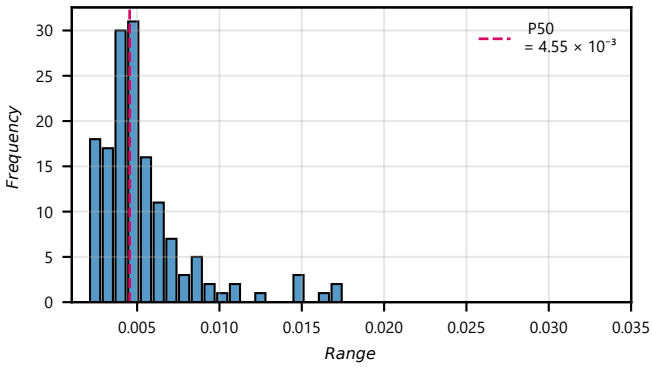
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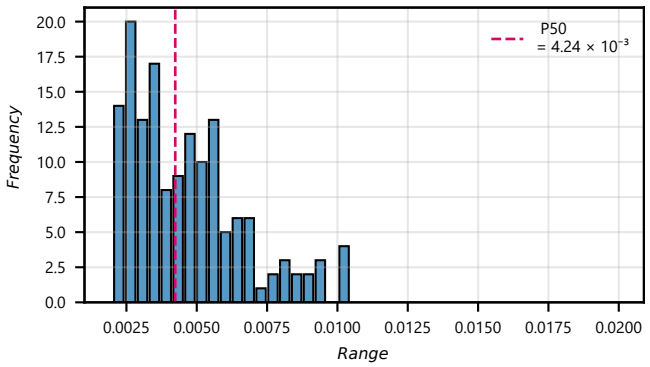
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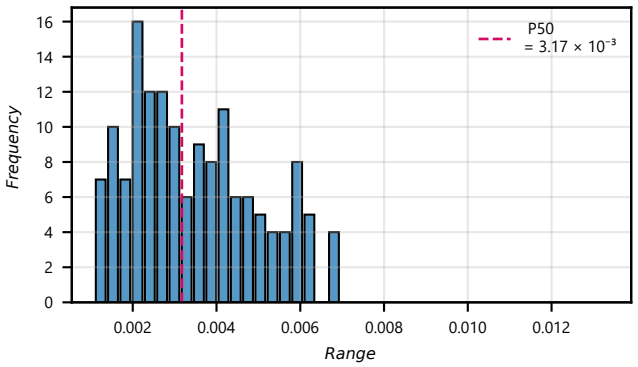
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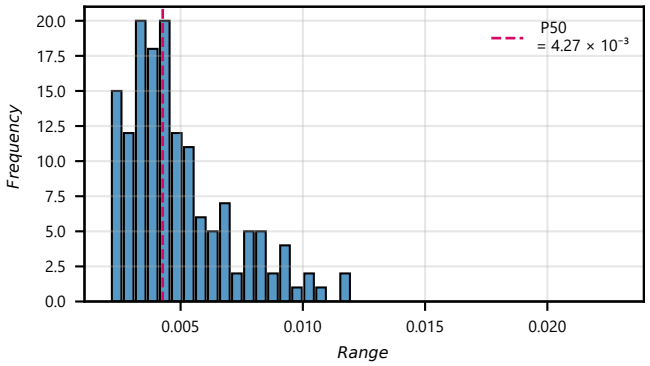
SY_z15_VF_Palaeozoic



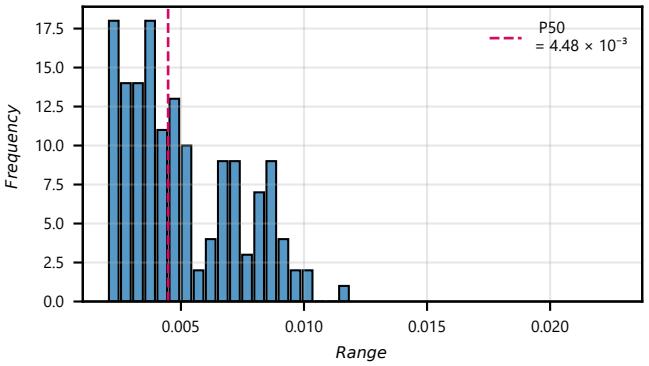
SY_z16_VF_Granites



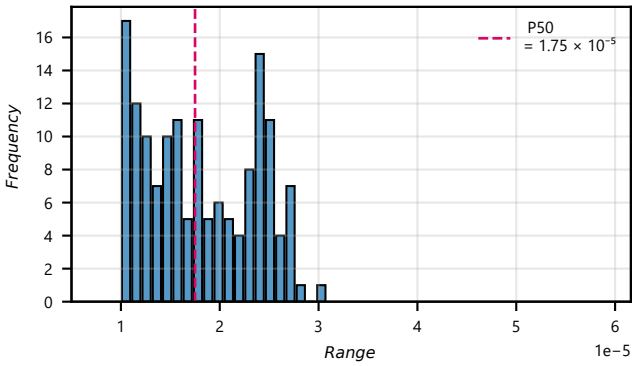
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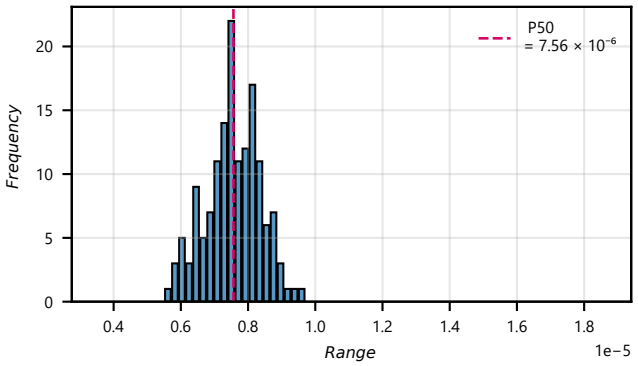
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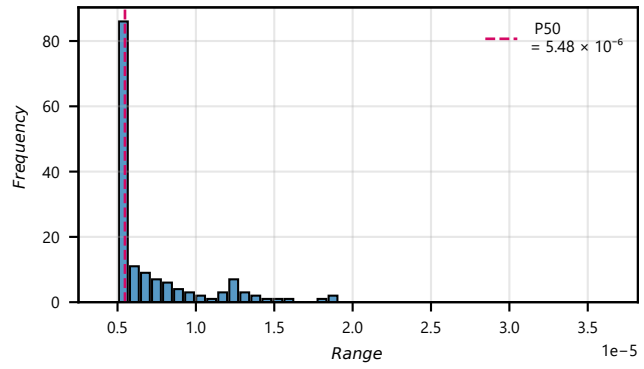
SS_z1_Sandstone



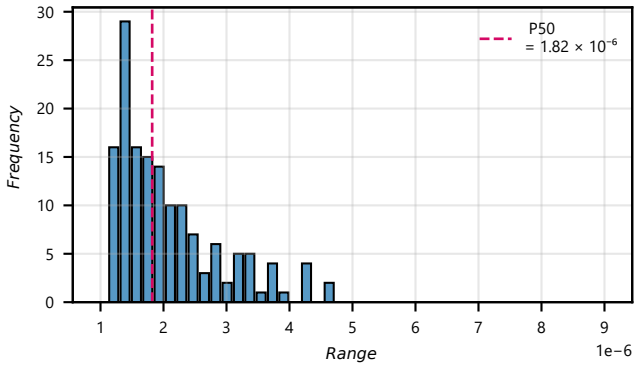
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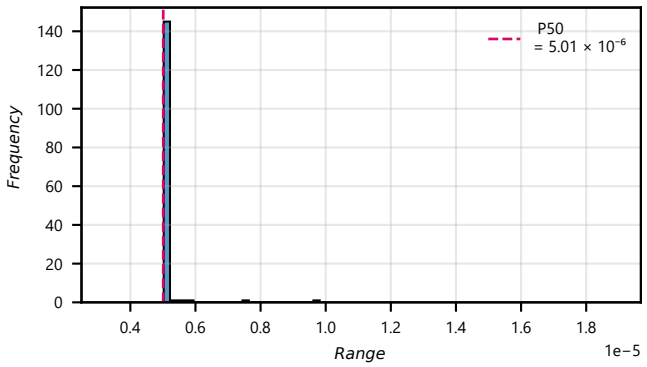
SS_z3_W_Palaeozoic



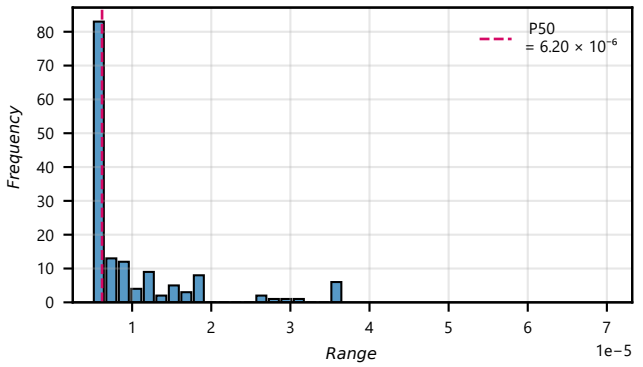
SS_z4_W_Granites



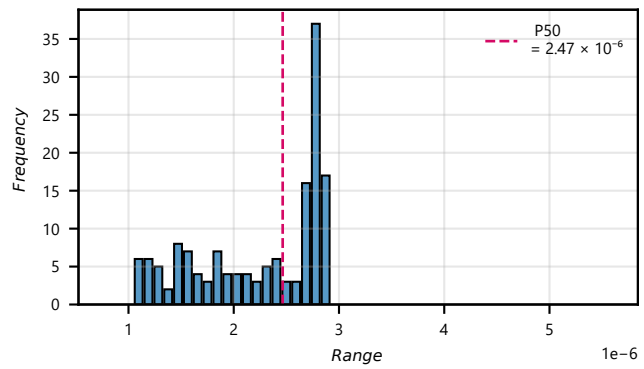
SS_z5_W_Broadhurst_and_Malu



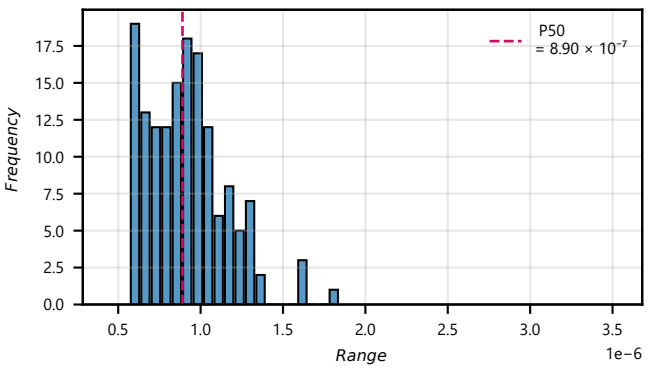
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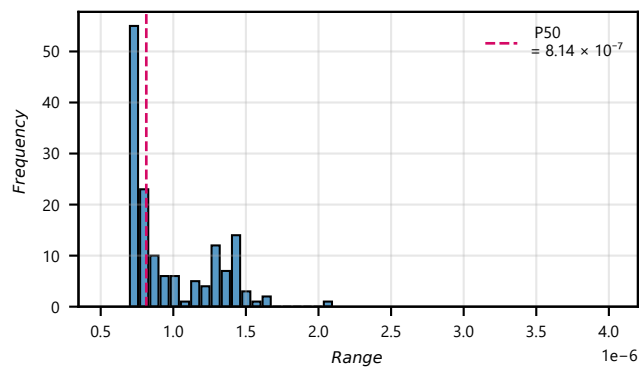
SS_z7_F_Palaeozoic



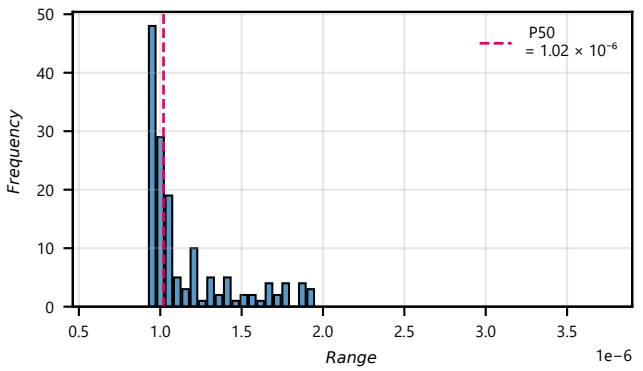
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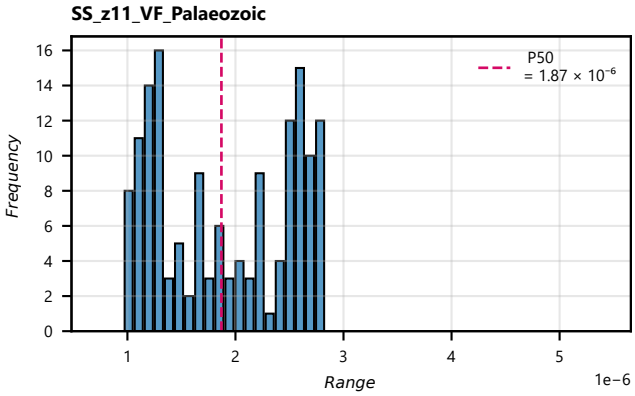


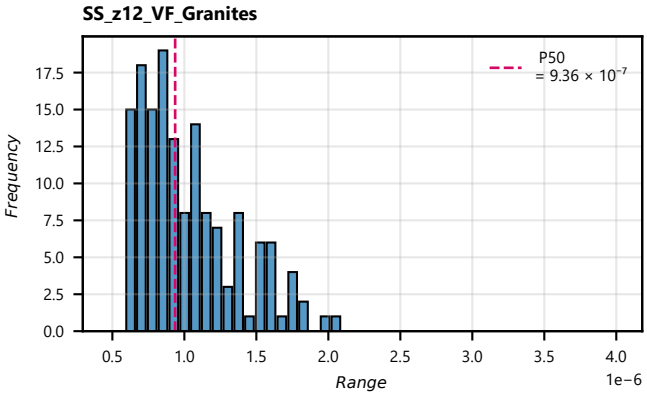
SS_z9_F_Broadhurst_and_Malu

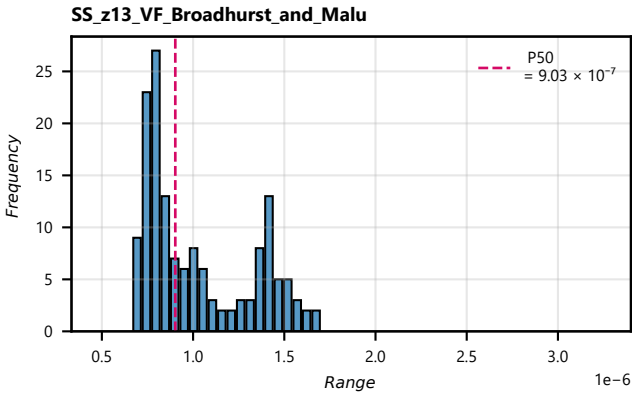


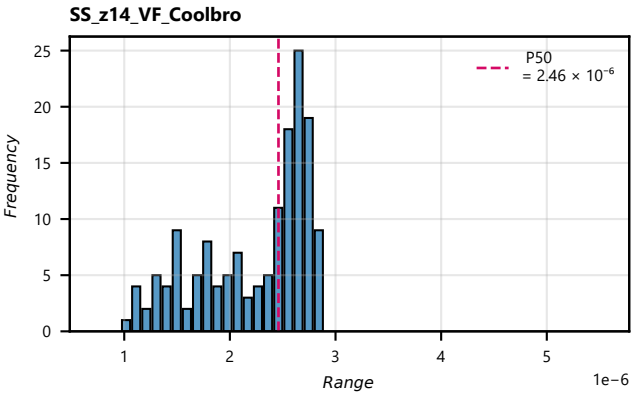
SS_z10_F_Coolbro

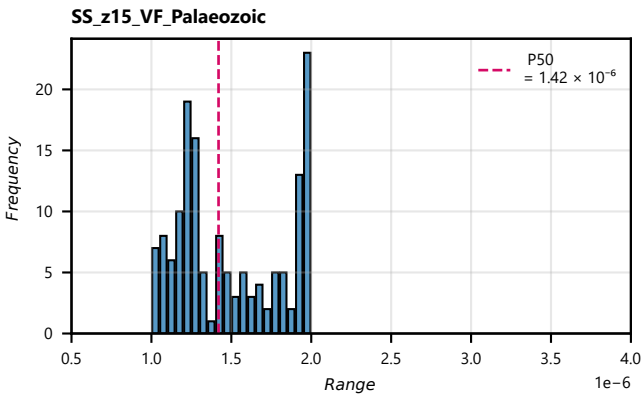


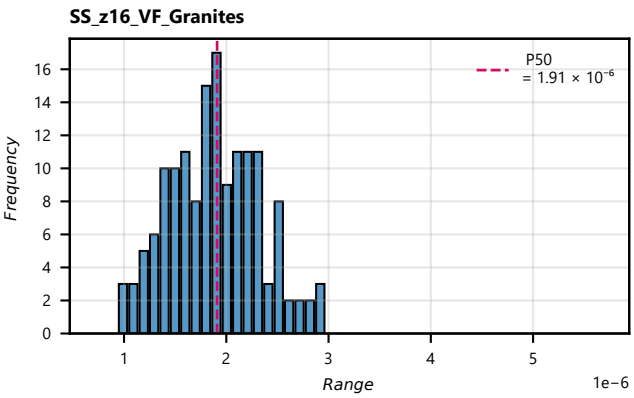

SS_z11_VF_Palaeozoic
P50
= 1.87 × 10⁻⁶
Frequency
Range
1e−6

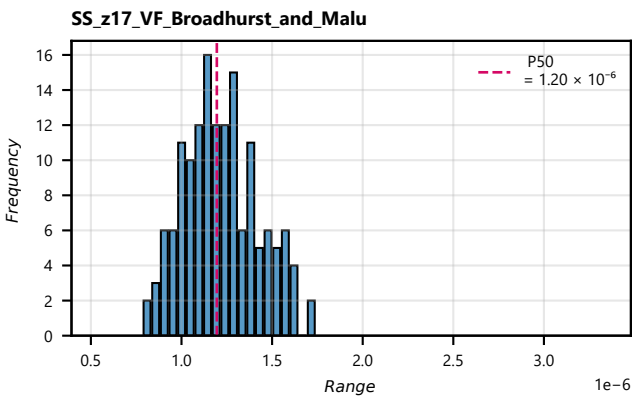

SS_z12_VF_Granites
P50
= 9.36 × 10⁻⁷
Frequency
Range
1e−6

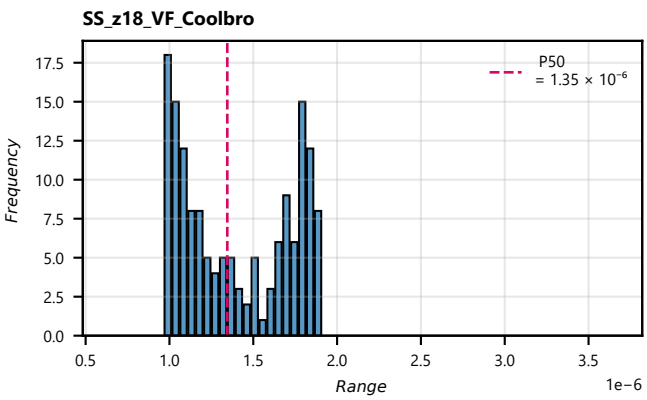

SS_z13_VF_Broadhurst_and_Malu
P50
= 9.03 × 10⁻⁷
Frequency
Range
1e−6


SS_z14_VF_Coolbro
P50
= 2.46 × 10⁻⁶
Frequency
Range
1e−6


SS_z15_VF_Palaeozoic
P50
= 1.42 × 10⁻⁶
Frequency
Range
1e−6


SS_z16_VF_Granites
P50
= 1.91 × 10⁻⁶
Frequency
Range
1e−6


SS_z17_VF_Broadhurst_and_Malu
P50
= 1.20 × 10⁻⁶
Frequency
Range
1e−6


SS_z18_VF_Coolbro
P50
= 1.35 × 10⁻⁶
Frequency
Range
1e−6