

# Maple Cross

DQRA and PMSRA review ,Telemetry system

Groundwater flow in the piling zone, turbidity transport

Report to Affinity Water

12 January 2021

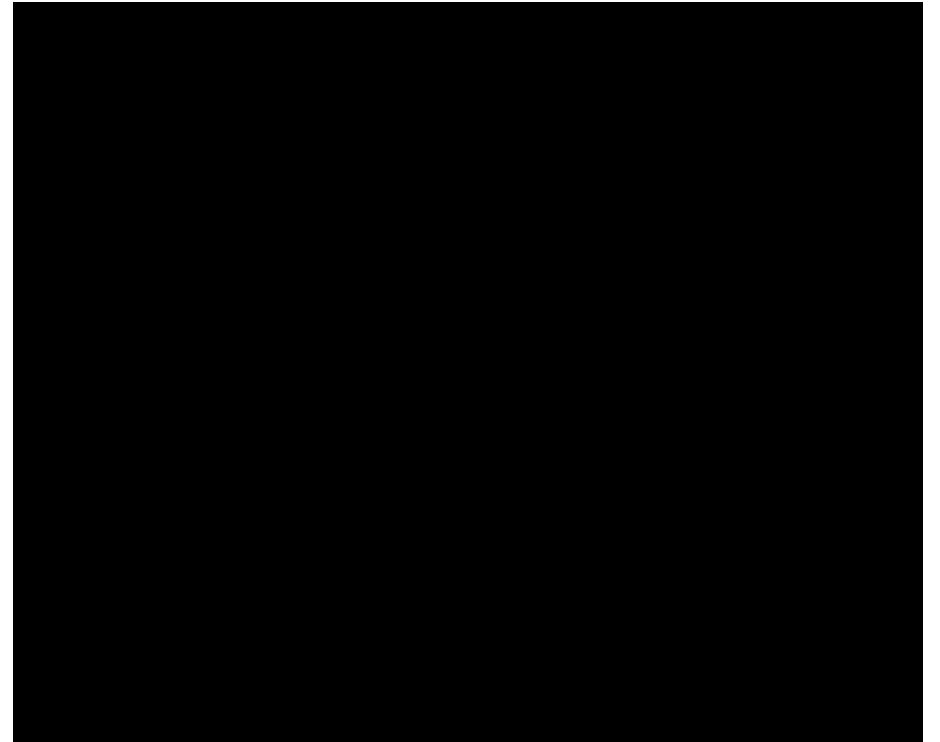


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# Agenda


- Preliminary DQRA review
- Piling risk assessment review
- Telemetry – data update
- Telemetry – [REDACTED] signal test
- Alkalinity data requested (awaited).
- Groundwater flow in the piling zone
- Turbidity transport
- Planning timetable





# Preliminary DQRA review


- Tracker spreadsheet
- <https://hfraserconsulting.sharepoint.com/sites/HFraserConsultingLtd/Shared%20Documents/HFCL/Projects/30422%20Maple%20Cross%20Piling/Reports/Piling%20method%20statement/DRAFT%202020.01.05%20AW%20comments%20tracker%20-%20Piling%20MSRA%20and%20DQRA.xlsx>

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**Maple Cross**  
**Preliminary DQRA**  
**(detailed quantitative risk assessment)**

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# Piling method statement and risk assessment review

- Tracker spreadsheet
- <https://hfraserconsulting.sharepoint.com/sites/HFraserConsultingLtd/Shared%20Documents/HFCL/Projects/30422%20Maple%20Cross%20Piling/Reports/Piling%20method%20statement/DRAFT%202020.01.05%20AW%20comments%20tracker%20-%20Piling%20MSRA%20and%20DQRA.xlsx>





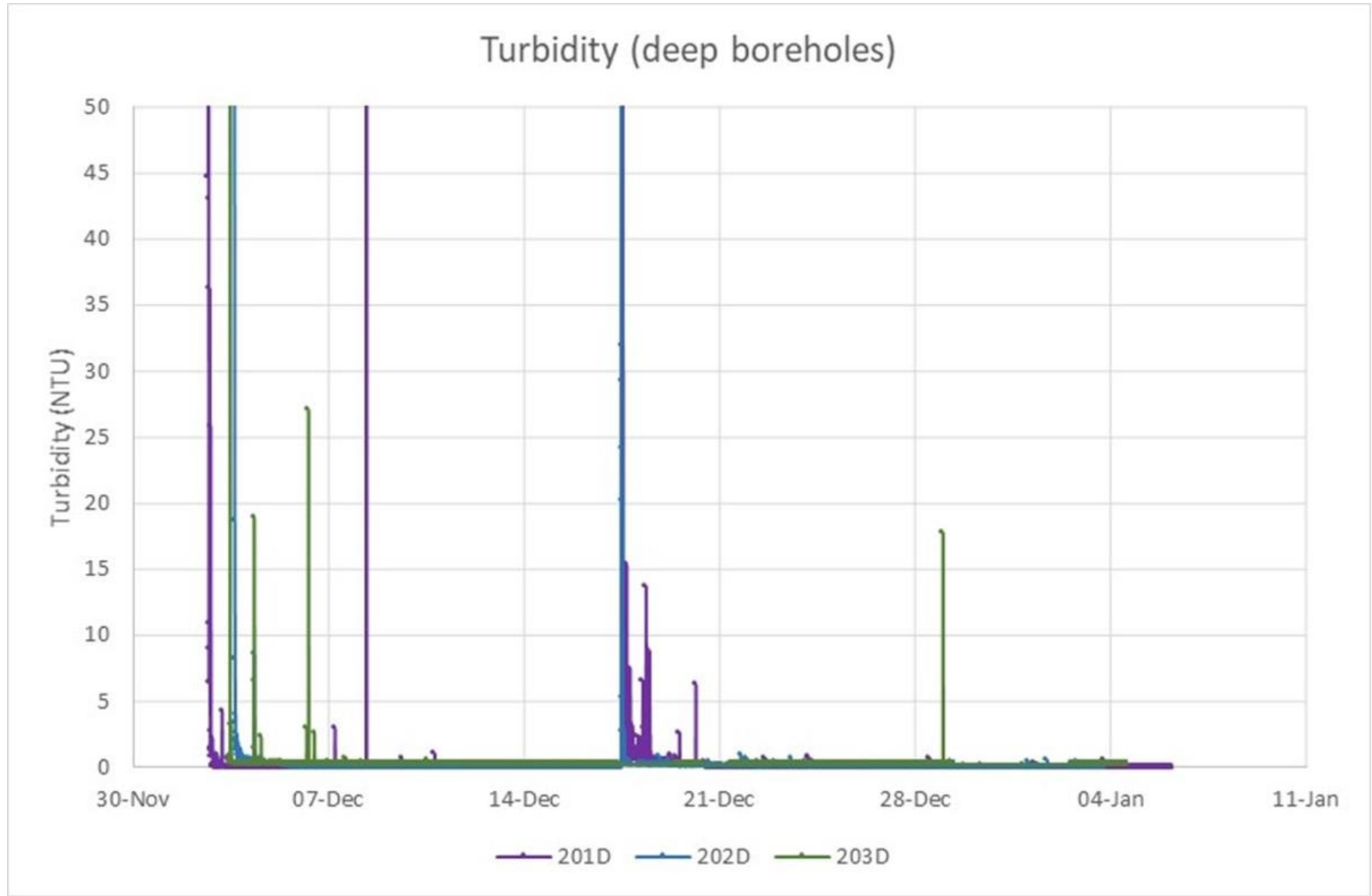
# Telemetry



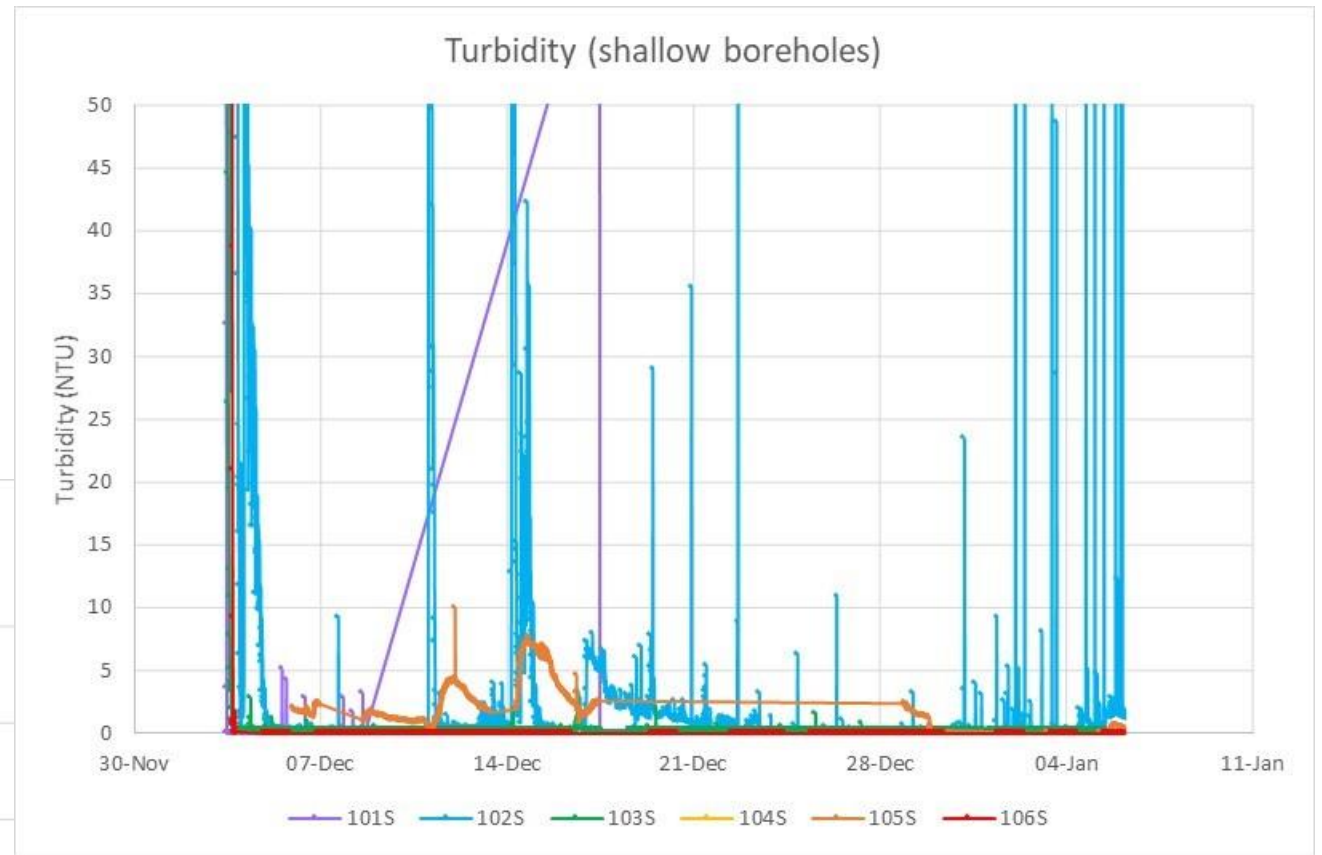
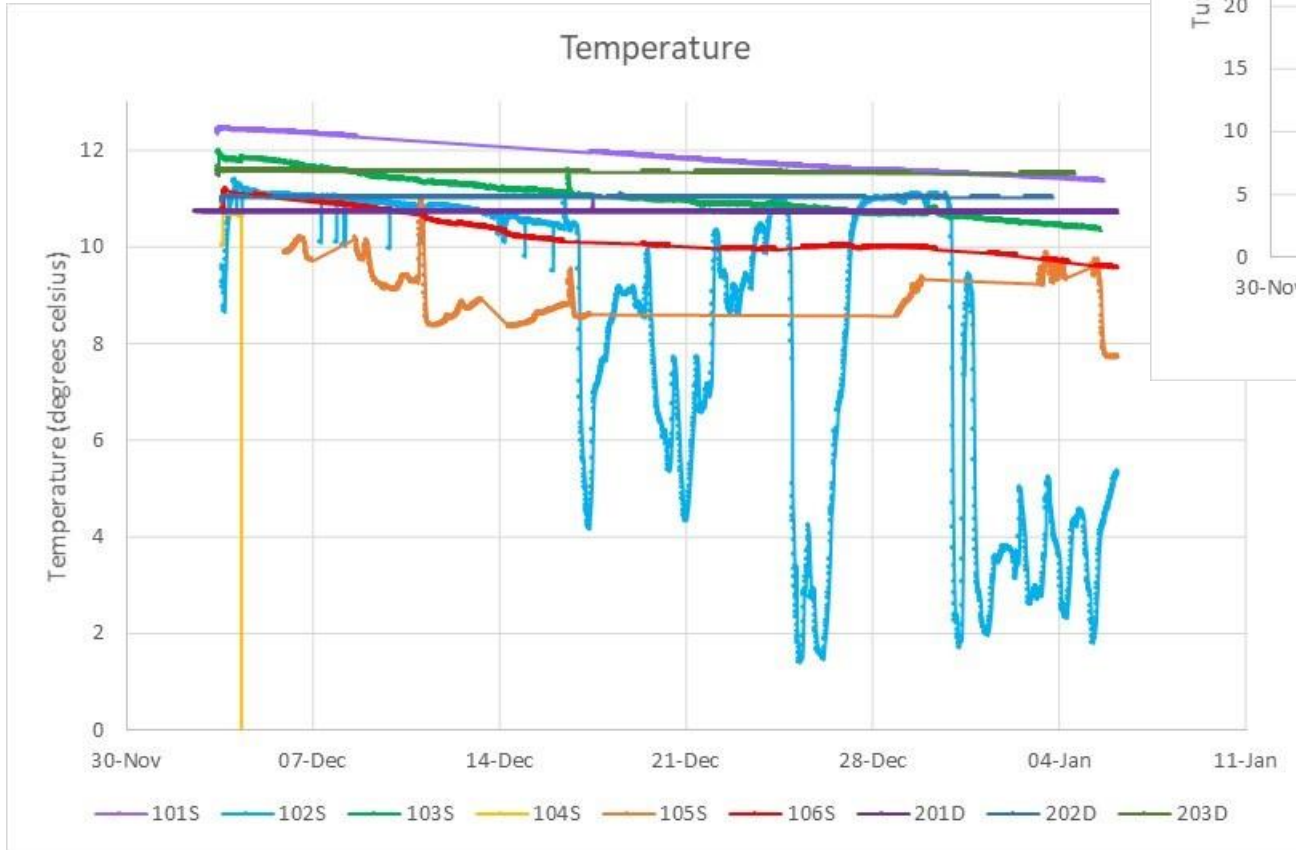
# Telemetry



# Telemetry



# Telemetry







# Telemetry and data

- [REDACTED] signal test
- Alkalinity data



# Groundwater flow in the piling zone

- Densification of soils due to compression caused by displacement piling
- Reduction in porosity → reduction in permeability from 41 m/d to 9.3m/d

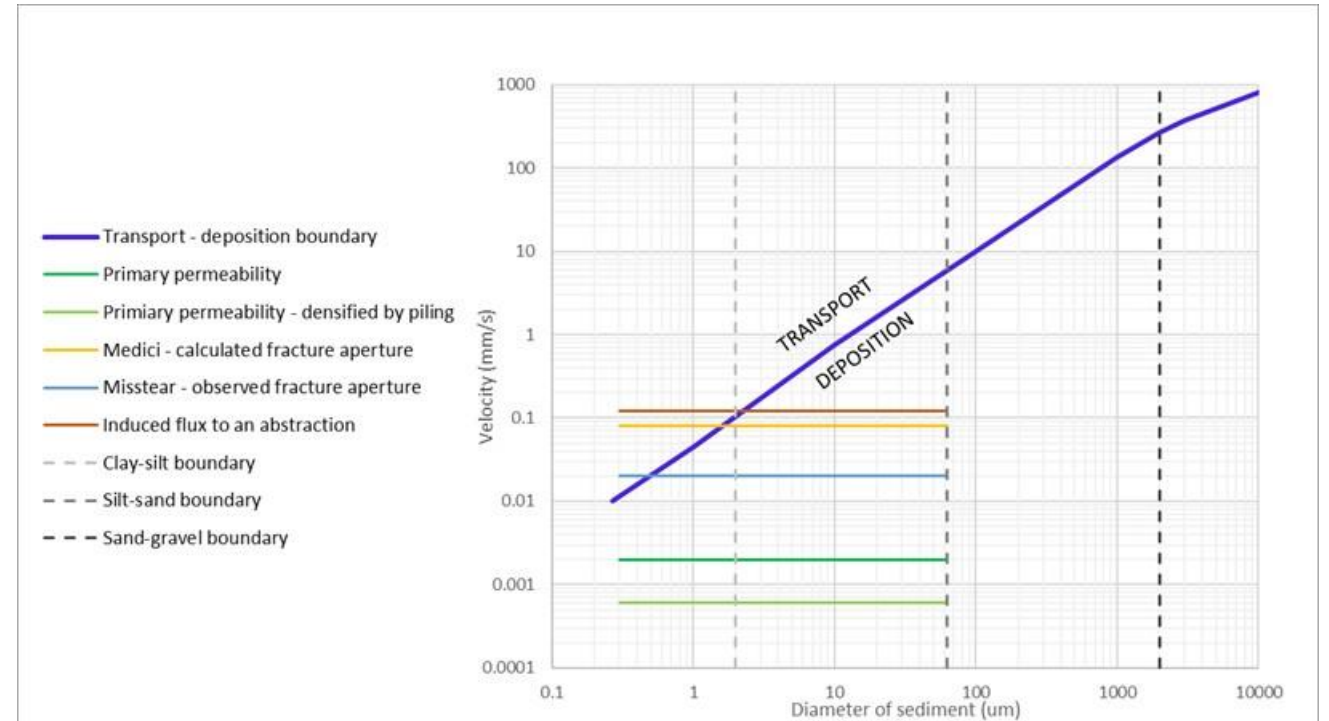
$$\frac{K_{sc}}{K_s} = \frac{n_c^3(1-n)^2}{n^3(1-n_c)^2}$$

Results	Units			
Groundwater flow through piled zone	MI/d	0.049	0.022	0.049
Volume of flow through the compacted piling zone	MI/d	0.011	0.005	0.011
Reduction in flow	MI/d	0.038	0.017	0.038
Reduction in flow as a % of ADA	%	0.91%	0.13%	0.28%
Reduction in flow as a % of MDA	%	0.30%	0.11%	0.21%



# Turbidity transport

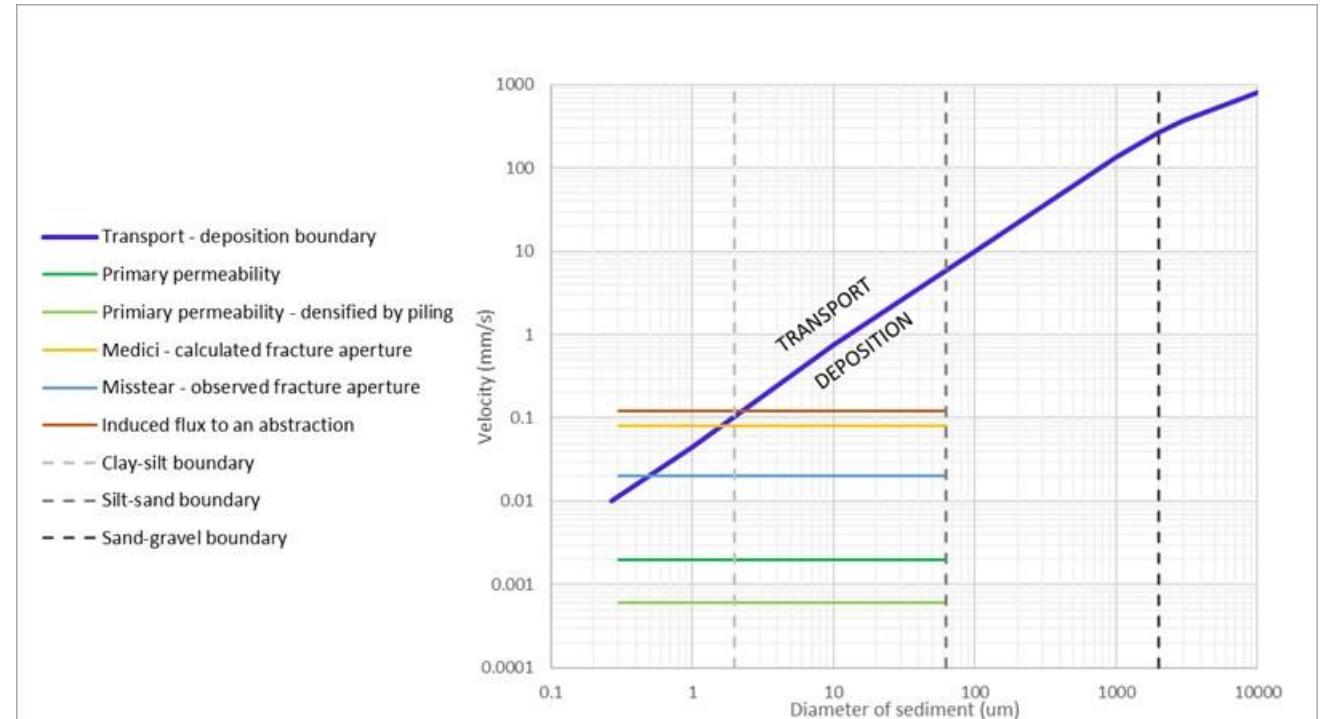
- Geology
  - No structured Chalk in upper 10m
  - Average of 4.8 m of structured Chalk at base of profile from 10 m – 20m bgl
- Reduction in porosity → reduction in permeability from 41 m/d to 9.3m/d
- Settling velocity
- Velocity calculations
  - Primary permeability, current and densified (unstructured Chalk
  - 3 methods of calculating fracture flow velocity (structured Chalk)





# Turbidity transport

- Size of turbidity particles unknown
- Can conclude that transport of turbidity in the piling zone can't be sustained
- Potential for transport of turbidity in the structured Chalk, depending on particle size
- Densification of the piling zone will reduce capacity for transport
- Use piling layout and programme to mitigate transport
- Sufficiently thick unstructured Chalk below the piling zone to mitigate risk to structured Chalk





# Planning timetable

- Planning submission imminent
- Affinity Water support
- Redacted DQRA and PMS
- LPA consultation

## February 2021

Wk	Sun	Mon	Tue	Wed	Thu	Fri	Sat
5		1	2	3	4	5	6
6	7						
7	14 Valentine's Day						
8	21						
9	28						

JANUARY							2021	
Mon	Tue	Wed	Thu	Fri	Sat	Sun		
					1	2	3	
3	4	5	6	7	8	9	10	
10	11	12	13	14	15	16	17	
17	18	19	20	21	22	23	24	
24	25	26	27	28	29	30	31	



# Ongoing work

- Further assessment
  - Enhanced ground model
  - Baseline water quality
    - Trigger values and action values for monitoring
- Continued engagement with AW
  - Next meeting (20<sup>th</sup> January): review turbidity and piling zone work, present full baseline and trigger/action values
  - Meeting w.c. 25<sup>th</sup> (28<sup>th</sup>): review comments on trigger/action values, discuss mitigation measures
- Re-issue draft DQRA and PMSRA 29<sup>th</sup> January for comment