Evaluation of proposed move for Water Right No. 22057

Proposed: Move water right no. 22057 to a new well location a distance of 2,414 ft to the southeast.



Wells within 1 mile: 18201, 8924 & 21292, 131 & 972 ID6, 131 & 972 ID7, 20176, 3463 & 45619, 34358, 8924, a domestic well in section 20-28-38, a domestic well in section 21-28-38, and a domestic well in section 29-28-38.

The saturated thickness in the vicinity of the proposed well location ranges from 95 ft to 143 ft, based upon the GMD3 model. For saturated thickness between 75 ft and 100 ft, the drawdown allowance is 2.0 ft. For saturated thickness between 100 ft and 125 ft, the drawdown allowance is 2.5 ft. For saturated thickness between 125 ft and 150 ft, the drawdown allowance is 3.0 ft.

50 year Theis Analysis: The following values were used to run the analysis:

$$S = 0.1382$$
, $T = 11,357$ ft²/day, $tp_{current} = 357$ days, $Q_{current} = 100$ gpm, $tp_{proposed} = 105$ days, $Q_{proposed} = 1100$ gpm

Theis drawdowns were calculated as follows:

18201: Saturated thickness = 124 ft

Drawdown from current location = 0.68 ft

Drawdown from proposed location = 3.73 ft

Net drawdown = 3.0 ft

8924 & 21292: Saturated thickness = 131 ft

Drawdown from current location = 0.63 ft

Drawdown from proposed location = 2.58 ft

Net drawdown = 1.9 ft

131 & 972 ID6: Saturated thickness = 95 ft

Drawdown from current location = 0.87 ft

Drawdown from proposed location = 2.52 ft

Net drawdown = 1.7 ft

131 & 972 ID7: Saturated thickness = 95 ft

Drawdown from current location = 0.79 ft

Drawdown from proposed location = 3.51 ft

Net drawdown = 2.7 ft

20176: Saturated thickness = 113 ft

Drawdown from current location = 0.57 ft

Drawdown from proposed location = 2.31 ft

Net drawdown = 1.7 ft

3463 & 45619: Saturated thickness = 128 ft

Drawdown from current location = 0.55 ft

Drawdown from proposed location = 2.32 ft

Net drawdown = 1.8 ft

34358: 128 ft

Drawdown from current location = 0.54 ft

Drawdown from proposed location = 2.31 ft

Net drawdown = 1.8 ft

8924: Saturated thickness = 143 ft

Drawdown from current location = 0.57 ft

Drawdown from proposed location = 2.47 ft

Net drawdown = 1.9 ft

Domestic 20-28-38: Saturated thickness = 95 ft

Drawdown from current location = 0.75 ft

Drawdown from proposed location = 3.04 ft

Net drawdown = 2.3 ft

Domestic 21-28-38: Saturated thickness = 124 ft

Drawdown from current location = 0.67 ft

Drawdown from proposed location = 3.17 ft

Net drawdown = 2.5 ft

Domestic 29-28-38: Saturated thickness = 113 ft

Drawdown from current location = 0.73 ft

Drawdown from proposed location = 3.65 ft

Net drawdown = 2.9 ft

Net drawdown exceeds the drawdown allowance for water right numbers 18201, 131 & 972 ID7, and each of the domestic wells. This means that it is likely that well to well interaction from the proposed well location will produce a noticeable effect on neighboring wells. Critical well analysis was performed on the three domestic wells. Analysis was not performed on 18201 and 131 & 972 ID7 because those wells are owned and operated by the applicant.

Critical Well Evaluation:

Domestic 20-28-38:

Water Column = 95 ft

DP = 2.7 ft (Net drawdown from the proposal indicated above)

DE = 38.8 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 41.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 124 ft = 38 ft

Physical Drawdown Constraint (PDC) = 95 ft - 20 ft = 75 ft

Total drawdown of 41.5 ft is greater than the EDC, so this well is critical.

Domestic 21-28-38:

Water Column = 124 ft

DP = 3.5 ft (Net drawdown from the proposal indicated above)

DE = 45.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 48.9 ft

Economic Drawdown Constraint (EDC) = 0.4 * 124 ft = 49.6 ft

Physical Drawdown Constraint (PDC) = 124 ft - 20 ft = 104 ft

Total drawdown of 48.9 ft does not exceed the EDC or PDC, so this well is not critical.

Domestic 29-28-38:

Water Column = 113 ft

DP = 2.9 ft (Net drawdown from the proposal indicated above)

DE = 42.8 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 45.7 ft

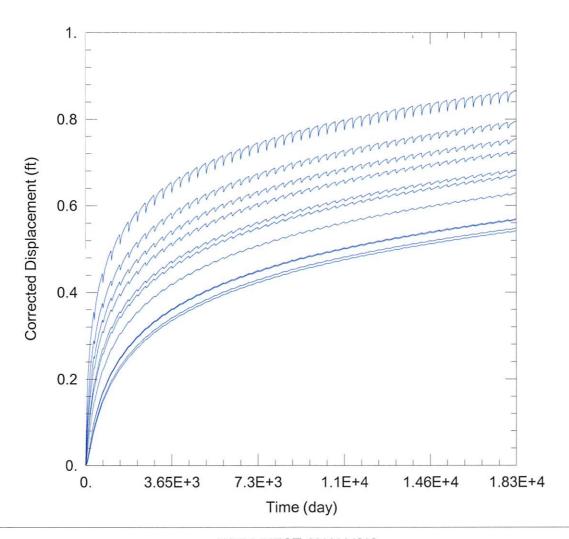
Economic Drawdown Constraint (EDC) = 0.4 * 113 ft = 45.2 ft

Physical Drawdown Constraint (PDC) = 113 ft -20 ft = 93 ft

Total drawdown of 45.7 ft is greater than the EDC, so this well is critical.

Conclusion:

The proposed move is located in an area with depleted aquifer and local wells have diminishing pumping capacities. If the new well is operated at the proposed rate and quantity, it is likely to create noticeable effects on neighboring critical wells. Concerned neighbors should contact either GMD3 at (620) 275-7147 or the Division of Water Resources at (620) 276-2901 if they would like to discuss options for mitigating effects. Otherwise, the move may be approved at full rate and quantity as it meets all rules and regulations.



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\22057\22057 Current.aqt

Date: 07/13/21 Time: 11:25:45

PROJECT INFORMATION

Company: GMD 3 Project: 22057

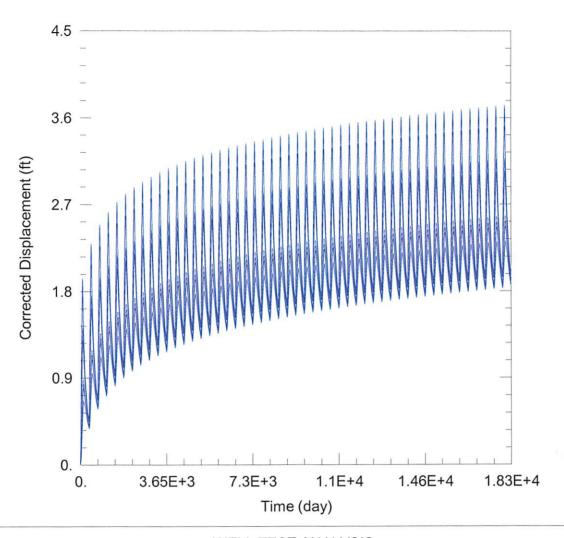
Location: Grant County

WELL DATA

Pumping Wells			
Well Name	X (ft)	Y (ft)	
22057	-200010	264143	

Observation Wells				
Well Name	X (ft)	Y (ft)		
	-200010	264143		
- 18201	-196475	261491		
8924 & 21292	-194716	263063		
□ 131 & 972 ID6	-201826	265442		
□ 131 & 972 ID7	-201651	261740		
20176	-201566	257508		
3463 & 45619	-199340	256844		
34358	-198325	256829		
8924	-194768	259873		
 Domestic 20-28-38 	-202377	261719		
 Domestic 21-28-38 	-195710	262428		
 Domestic 29-28-38 	-201062	260530		

SOLUTION



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\22057\22057 Proposed.aqt

Date: 07/13/21 Time: 11:25:54

PROJECT INFORMATION

Company: GMD 3 Project: 22057

Location: Grant County

WELL DATA

Pumping Wells			
Well Name	X (ft)	Y (ft)	
22057	-198925	261986	

Well Name	X (ft)	Y (ft)
	-198925	261986
- 18201	-196475	261491
8924 & 21292	-194716	263063
□ 131 & 972 ID6	-201826	265442
□ 131 & 972 ID7	-201651	261740
20176	-201566	257508
3463 & 45619	-199340	256844
34358	-198325	256829
· 8924	-194768	259873
 Domestic 20-28-38 	-202377	261719
 Domestic 21-28-38 	-195710	262428
 Domestic 29-28-38 	-201062	260530

SOLUTION