Evaluation of proposed move for Water Right No. 12130

Proposed: Move water right no. 12130 to a location 1,792 ft west.

Wells within 1 mile: 3384 & 16349, 1207, 3582, 28025, 12763, 25275, 9327 & 41445, 15049 & 29566, 21985, 19542, and eight domestic wells, numbered on the above map.

The saturated thickness at the proposed well location is estimated to be 194 ft, based upon the driller's log and an observation well in section 36-27-31. Observation wells and driller's logs indicate that saturated thickness in the area ranges from 70 ft to 267 ft. Saturated thickness and drawdown allowance is listed at each well location below.

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

S = 0.25, T = 3436.1 ft^2/day, tp$_{current}$ = 36.5 days, Q$_{current}$ = 200 gpm, tp$_{proposed}$ = 96.5 days, Q$_{proposed}$ = 900 gpm

Theis drawdowns were calculated as follows:

3384 & 16349:   Saturated thickness = 70 ft

Drawdown allowance = 1.5 ft

Drawdown from current location = 0.32 ft

Drawdown from proposed location = 3.88 ft

Net drawdown = **3.6 ft**

1207:

Saturated Thickness = 159 ft

Drawdown allowance = 3.5 ft

Drawdown from current location = 0.32 ft

Drawdown from proposed location = 3.39 ft

Net drawdown = **3.1 ft**

3582:

Saturated Thickness = 197 ft

Drawdown allowance = 3.5 ft

Drawdown from current location = 0.23 ft

Drawdown from proposed location = 3.44 ft

Net drawdown = **3.2 ft**

28025:

Saturated thickness = 213 ft

Drawdown allowance = 4.0 ft

Drawdown from current location = 0.32 ft

Drawdown from proposed location = 5.49 ft

Net drawdown = **5.2 ft**

12763:

Saturated thickness = 224 ft

Drawdown allowance = 4.0 ft

Drawdown from current location = 0.26 ft

Drawdown from proposed location = 3.69 ft

Net drawdown = **3.4 ft**

25275:

Saturated thickness = 117

Drawdown allowance = 2.5 ft

Drawdown from current location = 0.36 ft

Drawdown from proposed location = 3.29 ft

Net drawdown = **2.9 ft**

9327 & 41445:	Saturated thickness = 193 ft
	Drawdown allowance = 3.5 ft
	Drawdown from current location = 0.23 ft
	Drawdown from proposed location = 3.38 ft
	Net drawdown = **3.1 ft**
15049 & 29566:	Saturated thickness = 250 ft
	Drawdown allowance = 4.0 ft
	Drawdown from current location = 0.25 ft
	Drawdown from proposed location = 3.59 ft
	Net drawdown = **3.3 ft**
21985:	Saturated thickness = 231 ft
	Drawdown allowance = 4.0 ft
	Drawdown from current location = 0.61 ft
	Drawdown from proposed location = 5.28 ft
	Net drawdown = **4.7 ft**
19542:	Saturated thickness = 231 ft
	Drawdown allowance = 4.0 ft
	Drawdown from current location = 0.41 ft
	Drawdown from proposed location = 4.87 ft
	Net drawdown = **4.4 ft**
Domestic 1:	Saturated thickness = 213 ft
	Drawdown allowance = 4.0 ft
	Drawdown from current location = 0.35 ft
	Drawdown from proposed location = 6.36 ft
	Net drawdown = **6.0 ft**

Domestic 2:

Saturated thickness = 108 ft

Drawdown allowance = 2.5 ft

Drawdown from current location = 0.28 ft

Drawdown from proposed location = 3.40 ft

Net drawdown = **3.1 ft**

Domestic 3:

Saturated thickness = 222 ft

Drawdown allowance = 4.0 ft

Drawdown from current location = 0.34 ft

Drawdown from proposed location = 4.64 ft

Net drawdown = **4.3 ft**

Domestic 4:

Saturated thickness = 193 ft

Drawdown allowance = 3.5 ft

Drawdown from current location = 0.40 ft

Drawdown from proposed location = 8.57 ft

Net drawdown = **8.2 ft**

Domestic 5:

Saturated thickness = 267 ft

Drawdown allowance = 4.0 ft

Drawdown from current location = 0.29 ft

Drawdown from proposed location = 3.94 ft

Net drawdown = **3.6 ft**

Domestic 6:

Saturated thickness = 231 ft

Drawdown allowance = 4.0 ft

Drawdown from current location = 0.26 ft

Drawdown from proposed location = 3.35 ft

Net drawdown = **3.1 ft**

Domestic 7:	Saturated thickness = 231 ft
	Drawdown allowance = 4.0 ft
	Drawdown from current location = 0.37 ft
	Drawdown from proposed location = 5.29 ft
	Net drawdown = **4.9 ft**
Domestic 8:	Saturated thickness = 177 ft
	Drawdown allowance = 3.5 ft
	Drawdown from current location = 0.38 ft
	Drawdown from proposed location = 3.43 ft
	Net drawdown = **3.0 ft**

Net drawdown exceeds the drawdown allowance for water right numbers 3384 & 16349, 28025, 25275, 21985, 19542, and domestic wells 1, 2, 3, 4, and 7. Critical well analysis was performed for those wells.

Critical Well Evaluation:

3384 & 16349:

Water Column = 70 ft

DP = 3.6 ft (Net drawdown from the proposal indicated above)

DE = 32.9 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 57.1 ft (S = 0.25, T = 25,702 gpd/ft, Q = 461 gpm, tp = 114 days, efficiency = 70%)

DT = 93.6 ft

Total 25 year drawdown exceeds the remaining saturated thickness, so the well **is critical.**

28025:

Water Column = 213 ft

DP = 5.2 ft (Net drawdown from the proposal indicated above)

DE = 54.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 15.1 ft (S = 0.2067, T = 163,666 gpd/ft, Q = 907 gpm, tp = 71 days, efficiency = 70%)

DT = 74.7 ft

Economic Drawdown Constraint (EDC) = 0.4 * 213 ft = 85.2 ft

Physical Drawdown Constraint (PDC) = 213 ft – 60 ft = 153 ft

Total drawdown of 74.7 ft is less than the EDC and PDC, so this well **is not critical.**

25275:

Water Column = 117 ft

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

DE = 50 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 0 ft (Well has been ordered to not operate due to impairment complaint)

DT = 52.9 ft

Economic Drawdown Constraint (EDC) = 0.4 * 117 ft = 46.8 ft

Physical Drawdown Constraint (PDC) = 117 ft – 60 ft = 57 ft

Total drawdown of 52.9 ft exceeds the EDC, so this well **is critical.**

21985:

Water Column = 231 ft

DP = 4.7 ft (Net drawdown from the proposal indicated above)

DE = 69.0 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 40.0 ft (S = 0.2539, T = 28,531 gpd/ft, Q = 464 gpm, tp = 98 days, efficiency = 70%)

DT = 113.7 ft

Economic Drawdown Constraint (EDC) = 0.4 * 231 ft = 92.4 ft

Physical Drawdown Constraint (PDC) = 231 ft – 60 ft = 171 ft

Total drawdown of 113.7 ft exceeds the EDC, so this well **is critical.**

19542:

Water Column = 231 ft

DP = 4.5 ft (Net drawdown from the proposal indicated above)

DE = 69.0 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 33.3 ft (S = 0.2539, T = 28,531 gpd/ft, Q = 381 gpm, tp = 124 days, efficiency = 70%)

DT = 106.8 ft

Economic Drawdown Constraint (EDC) = 0.4 * 231 ft = 92.4 ft

Physical Drawdown Constraint (PDC) = 231 ft – 60 ft = 171 ft

Total drawdown of 106.8 ft exceeds the EDC, so this well **is critical.**

Domestic 1:

Water Column = 213 ft

DP = 6.0 ft (Net drawdown from the proposal indicated above)

DE = 54.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 60.4 ft

Economic Drawdown Constraint (EDC) = 0.4 * 213 ft = 85.2 ft

Physical Drawdown Constraint (PDC) = 213 ft – 20 ft = 193 ft

Total drawdown of 60.4 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 2:

Water Column = 108 ft

DP = 3.1 ft (Net drawdown from the proposal indicated above)

DE = 32.9 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 36.0 ft

Economic Drawdown Constraint (EDC) = 0.4 * 108 ft = 43.2 ft

Physical Drawdown Constraint (PDC) = 108 ft – 20 ft = 88 ft

Total drawdown of 36.0 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 3:

Water Column = 222 ft

DP = 4.3 ft (Net drawdown from the proposal indicated above)

DE = 32.9 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 37.2 ft

Economic Drawdown Constraint (EDC) = 0.4 * 222 ft = 88.8 ft

Physical Drawdown Constraint (PDC) = 222 ft – 20 ft = 202 ft

Total drawdown of 37.2 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 4:

Water Column = 193 ft

DP = 8.2 ft (Net drawdown from the proposal indicated above)

DE = 52.6 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 60.8 ft

Economic Drawdown Constraint (EDC) = 0.4 * 193 ft = 77.2 ft

Physical Drawdown Constraint (PDC) = 193 ft – 20 ft = 173 ft

Total drawdown of 60.8 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 7:

Water Column = 231 ft

DP = 4.9 ft

DE = 69.0 ft

DT = 73.9 ft

Economic Drawdown Constraint (EDC) = 0.4 * 231 ft = 92.4 ft

Physical Drawdown Constraint (PDC) = 231 ft – 20 ft – 211 ft

Total drawdown of 73.9 ft is less than the EDC and PDC, so this well **is not critical.**

Conclusion:

The proposed well location is within an area that the GMD3 model predicts will have large water level declines over the next 25 years. This regional decline is likely to significantly reduce the pumping capacity of some neighboring wells. If the proposed well is operated at its full authorized rate and quantity, some nearby wells that have been identified as critical will likely have noticeable effects to their well operation. It may be possible to mitigate these effects by either limiting the move to a distance of 300 ft or limiting the rate and quantity at the proposed well location to keep drawdown effects at critical well locations within the drawdown allowances listed above. 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 put their concerns on record. Otherwise, the application may be approved as proposed.
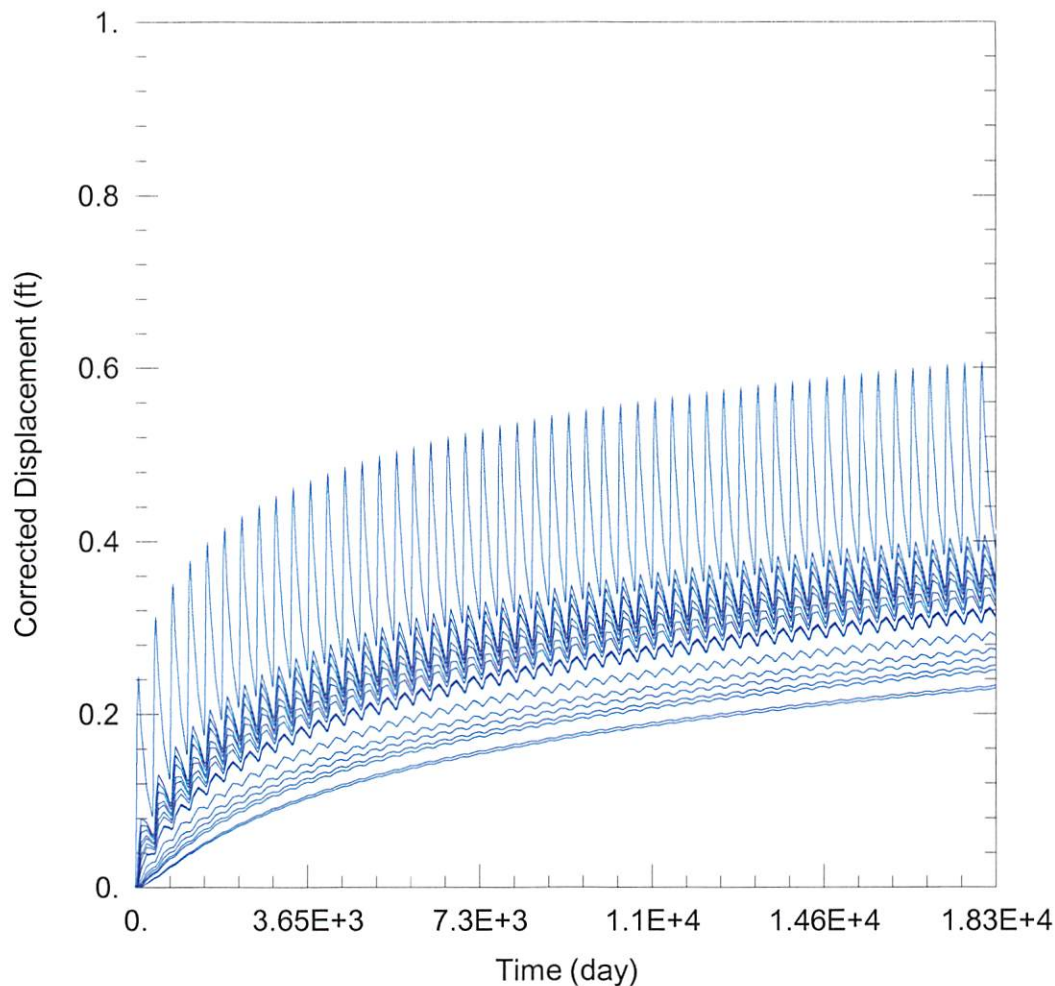
WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\12130\12130 Current.aqt
Date: 07/29/21   Time: 14:35:25

PROJECT INFORMATION

Company: GMD 3
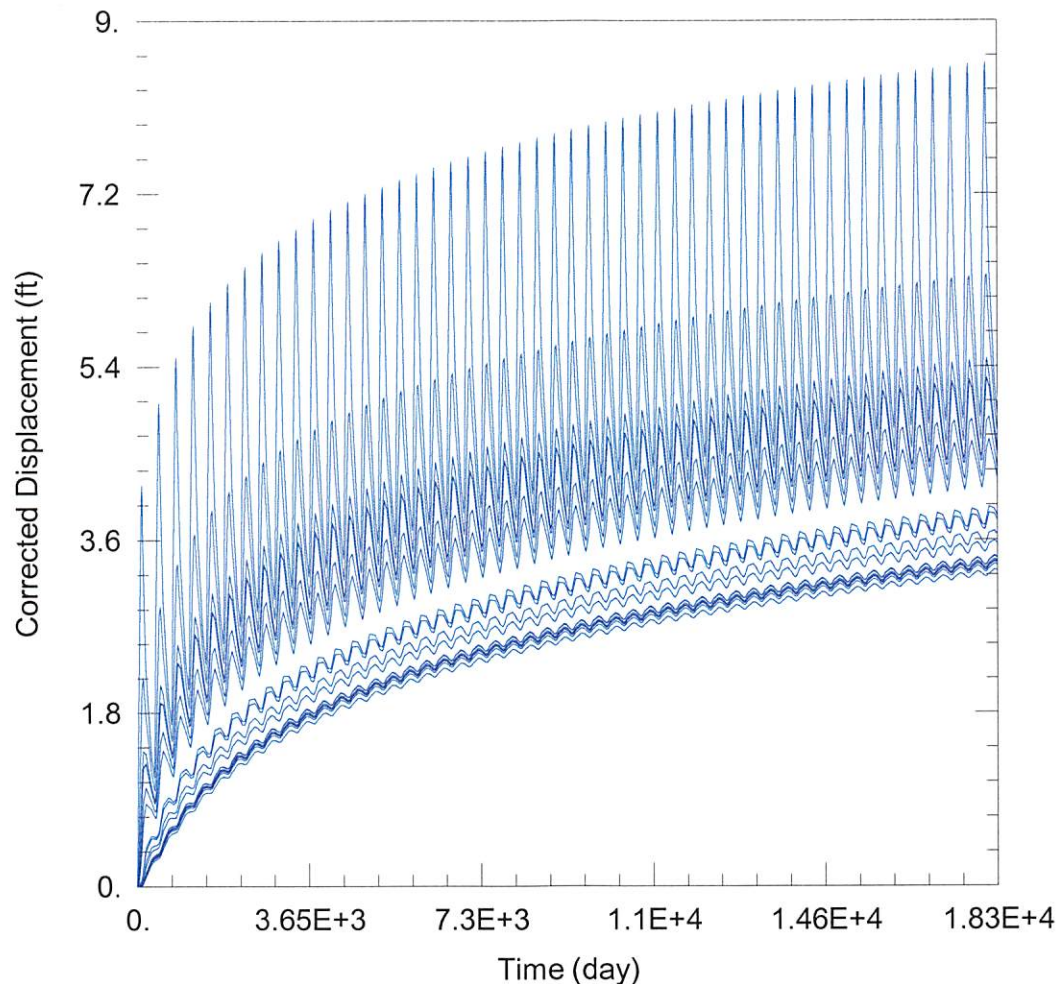Project: 12130
Location: Haskell County

WELL DATA

Pumping Wells			Observation Wells		
Well Name	X (ft)	Y (ft)	Well Name	X (ft)	Y (ft)
Proposed_PD	34662	287251	□	34662	287251
			□ 3384 & 16349	33586	291161
			□ 1207	35960	291142
			□ 3582	28033	287561
			□ 28025	30581	287283
			□ 12763	29536	289987
			□ 25275	38049	287292
			□ 9327 & 41445	27918	286712
			□ 15049 & 29566	29426	284350
			□ 21985	34664	285638
			□ 19542	33624	284628
			□ Domestic 1	31079	287546
			□ Domestic 2	32987	292186
			□ Domestic 3	32353	290203

WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\12130\12130 Proposed.aqt
Date: 07/29/21   Time: 14:35:34

PROJECT INFORMATION

Company: GMD 3
Project: 12130
Location: Haskell County

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Proposed_PD	32870	287262

Observation Wells

Well Name	X (ft)	Y (ft)
□	32870	287262
□ 3384 & 16349	33586	291161
□ 1207	35960	291142
□ 3582	28033	287561
□ 28025	30581	287283
□ 12763	29536	289987
□ 25275	38049	287292
□ 9327 & 41445	27918	286712
□ 15049 & 29566	29426	284350
□ 21985	34664	285638
□ 19542	33624	284628
□ Domestic 1	31079	287546
□ Domestic 2	32987	292186
□ Domestic 3	32353	290203