Evaluation of proposed move for Water Right No. 19257

Proposed: Move water right no. 19257 ID1 in section 21-28-28 to a new well location, 1,331 ft to the northwest.

Wells within 1 mile: 25412, 22778, 19721, 25024, 19257 ID1, 19257 ID2, 20561, 14937, 24742, and five domestic wells, numbered on the above map.

The saturated thickness at the proposed well location is estimated to be 96 ft, based upon the GMD3 model. For saturated thickness between 75 ft and 100 ft, the drawdown allowance is 2.0 ft. Note that the model shows a bit more saturated thickness in section 16-26-28, and the drawdown allowance there is 2.5 ft.

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

S = 0.241, T = 2975.4 ft^2/day, $tp_{current}$ = 56.7 days, $Q_{current}$ = 150 gpm, $tp_{proposed}$ = 85.7 days, $Q_{proposed}$ = 710 gpm

Theis drawdowns were calculated as follows:

25412: Drawdown from current location = 0.35 ft

Drawdown from proposed location = 2.98 ft

Net drawdown = **2.6 ft**

22778:	Drawdown from current location = 0.33 ft
	Drawdown from proposed location = 2.58 ft
	Net drawdown = **2.3 ft**
19721:	Drawdown from current location = 0.33 ft
	Drawdown from proposed location = 2.63 ft
	Net drawdown = **2.3 ft**
25024:	Drawdown from current location = 0.44 ft
	Drawdown from proposed location = 3.99 ft
	Net drawdown = **3.5 ft**
19257 ID1:	Drawdown from current location = 0.35 ft
	Drawdown from proposed location = 2.64 ft
	Net drawdown = **2.3 ft**
19257 ID2:	Drawdown from current location = 0.54 ft
	Drawdown from proposed location = 4.03 ft
	Net drawdown = **3.5 ft**
20561:	Drawdown from current location = 0.44 ft
	Drawdown from proposed location = 2.85 ft
	Net drawdown = **2.4 ft**
14937:	Drawdown from current location = 0.42 ft
	Drawdown from proposed location = 2.55 ft
	Net drawdown = **2.1 ft**
24742:	Drawdown from current location = 0.44 ft
	Drawdown from proposed location = 2.64 ft
	Net drawdown = **2.2 ft**
Domestic 1:	Drawdown from current location = 0.36 ft
	Drawdown from proposed location = 3.04 ft
	Net drawdown = **2.7 ft**

Domestic 2:	Drawdown from current location = 1.09 ft
	Drawdown from proposed location = 4.35 ft
	Net drawdown = **3.3 ft**
Domestic 3:	Drawdown from current location = 0.69 ft
	Drawdown from proposed location = 4.49 ft
	Net drawdown = **3.8 ft**
Domestic 4:	Drawdown from current location = 0.48 ft
	Drawdown from proposed location = 4.51 ft
	Net drawdown = **4.0 ft**
Domestic 5:	Drawdown from current location = 0.64 ft
	Drawdown from proposed location = 3.38 ft
	Net drawdown = **2.7 ft**

Net drawdown exceeds the drawdown allowance for water right numbers 25412, 19721, 25024, 19257 ID1, 19257 ID2, 20561, 14937, 24742, and each of the five domestic wells. Critical well analysis was conducted for those wells.

Critical Well Evaluation:

25412:

Water Column = 102 ft

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

DE = 32.8 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 49.1 ft (S = 0.2421, T = 29,665 gpd/ft, Q = 600 gpm, tp = 77 days, efficiency = 70%)

DT = 84.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 102 ft = 40.8 ft

Physical Drawdown Constraint (PDC) = 102 ft – 60 ft = 62.0 ft

Total drawdown of 84.6 ft is greater than the EDC and PDC, so this well **is critical.**

19721:

Water Column = 91 ft

DP = 2.3 ft (Net drawdown from the proposal indicated above)

DE = 35.9 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 26.3 ft (S = 0.2493, T = 48,661 gpd/ft, Q = 504 gpm, tp = 92 days, efficiency = 70%)

DT = 64.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 91 ft = 36.4 ft

Physical Drawdown Constraint (PDC) = 91 ft – 60 ft = 31.0 ft

Total drawdown of 64.5 ft is greater than the EDC and PDC, so this well **is critical.**

25024:

Water Column = 91 ft

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

DE = 35.9 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 34.4 ft (S = 0.2493, T = 48,661 gpd/ft, Q = 674 gpm, tp = 66 days, efficiency = 70%)

DT = 73.8 ft

Economic Drawdown Constraint (EDC) = 0.4 * 91 ft = 36.4 ft

Physical Drawdown Constraint (PDC) = 91 ft – 60 ft = 31.0 ft

Total drawdown of 73.8 ft is greater than the EDC and PDC, so this well **is critical.**

19257 ID1:

Water Column = 91 ft

DP = 2.3 ft (Net drawdown from the proposal indicated above)

DE = 35.9 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 9.0 ft (S = 0.2493, T = 48,661 gpd/ft, Q = 170 gpm, tp = 128 days, efficiency = 70%)

DT = 47.2 ft

Economic Drawdown Constraint (EDC) = 0.4 * 91 ft = 36.4 ft

Physical Drawdown Constraint (PDC) = 91 ft – 60 ft = 31.0 ft

Total drawdown of 47.2 ft is greater than the EDC and PDC, so this well **is critical.**

19257 ID2:

Water Column = 91 ft

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

DE = 35.9 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 8.0 ft (S = 0.2493, T = 48,661 gpd/ft, Q = 150 gpm, tp = 132 days, efficiency = 70%)

DT = 47.4 ft

Economic Drawdown Constraint (EDC) = 0.4 * 91 ft = 36.4 ft

Physical Drawdown Constraint (PDC) = 91 ft – 60 ft = 31.0 ft

Total drawdown of 47.4 ft is greater than the EDC and PDC, so this well **is critical.**

20561:

Water Column = 85 ft

DP = 2.4 ft (Net drawdown from the proposal indicated above)

DE = 35.0 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 30.3 ft (S = 0.2495, T = 44,257 gpd/ft, Q = 550 gpm, tp = 54 days, efficiency = 70%)

DT = 67.7 ft

Economic Drawdown Constraint (EDC) = 0.4 * 85 ft = 34.0 ft

Physical Drawdown Constraint (PDC) = 85 ft – 60 ft = 25.0 ft

Total drawdown of 67.7 ft is greater than the EDC and PDC, so this well **is critical.**

14937:

Water Column = 90 ft

DP = 2.1 ft (Net drawdown from the proposal indicated above)

DE = 33.7 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 5.6 ft (S = 0.2233, T = 46,894 gpd/ft, Q = 101 gpm, tp = 122 days, efficiency = 70%)

DT = 41.4 ft

Economic Drawdown Constraint (EDC) = 0.4 * 90 ft = 36.0 ft

Physical Drawdown Constraint (PDC) = 90 ft – 60 ft = 30.0 ft

Total drawdown of 41.4 ft is greater than the EDC and PDC, so this well **is critical.**

24742:

Water Column = 90 ft

DP = 2.2 ft (Net drawdown from the proposal indicated above)

DE = 33.7 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 10.6 ft (S = 0.2233, T = 46,894 gpd/ft, Q = 200 gpm, tp = 55 days, efficiency = 70%)

DT = 46.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 90 ft = 36.0 ft

Physical Drawdown Constraint (PDC) = 90 ft – 60 ft = 30.0 ft

Total drawdown of 46.5 ft is greater than the EDC and PDC, so this well **is critical.**

Domestic 1:

Water Column = 91 ft

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

DE = 35.9 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 38.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 91 ft = 36.4 ft

Physical Drawdown Constraint (PDC) = 91 ft – 20 ft = 71 ft

Total drawdown of 38.6 ft is greater than the EDC, so this well **is critical.**

Domestic 2:

Water Column = 98 ft

DP = 3.3 ft (Net drawdown from the proposal indicated above)

DE = 32.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 35.7 ft

Economic Drawdown Constraint (EDC) = 0.4 * 98 ft = 39.2 ft

Physical Drawdown Constraint (PDC) = 98 ft – 20 ft – 78.0 ft

Total drawdown of 35.7 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 3:

Water Column = 98 ft

DP = 3.8 ft (Net drawdown from the proposal indicated above)

DE = 32.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 36.2 ft

Economic Drawdown Constraint (EDC) = 0.4 * 98 ft = 39.2 ft

Physical Drawdown Constraint (PDC) = 98 ft – 20 ft = 78.0 ft

Total drawdown of 36.2 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 4:

Water Column = 98 ft

DP = 4.0 ft (Net drawdown from the proposal indicated above)

DE = 32.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 36.4 ft

Economic Drawdown Constraint (EDC) = 0.4 * 98 ft = 39.2 ft

Physical Drawdown Constraint (PDC) = 98 ft – 20 ft = 78 ft

Total drawdown of 36.4 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 5:

Water Column = 90 ft

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

DE = 33.7 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 36.4 ft

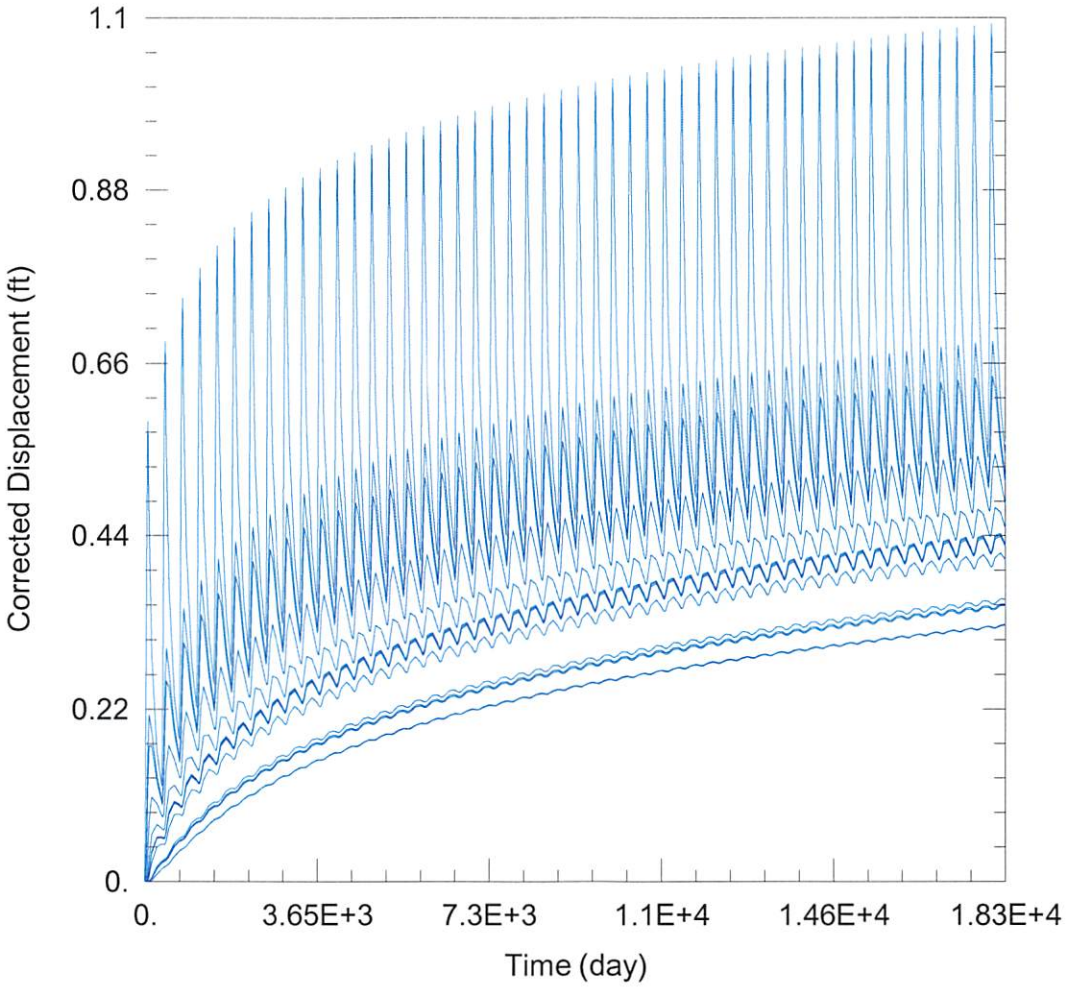
Economic Drawdown Constraint (EDC) = 0.4 * 90 ft = 36.0 ft

Physical Drawdown Constraint (PDC) = 90 ft – 20 ft = 70.0 ft

Total drawdown of 36.4 ft is greater than the EDC, so this well **is critical.**

Conclusion:

The proposed move is in an area with less than 100 ft saturated thickness, and the GMD3 model projects declines to exceed 1 ft per year over the next 25 years. If the proposed well were to pump its full authorized authority, there would likely be a noticeable drawdown effect on most neighboring wells. Critical well analysis shows that most of the neighboring wells are critical because there will likely not be enough saturated thickness to operate over the next 25 years without significant losses to productivity. Any neighboring well owners or operators concerned with the proposal can contact GMD3 at (620) 275-7147 or the Division of Water Resources at (620) 276-2901.



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\19257\19257 Current.aqt
Date: 05/06/22 Time: 10:40:22

PROJECT INFORMATION

Company: GMD 3
Project: 19257
Location: Gray County

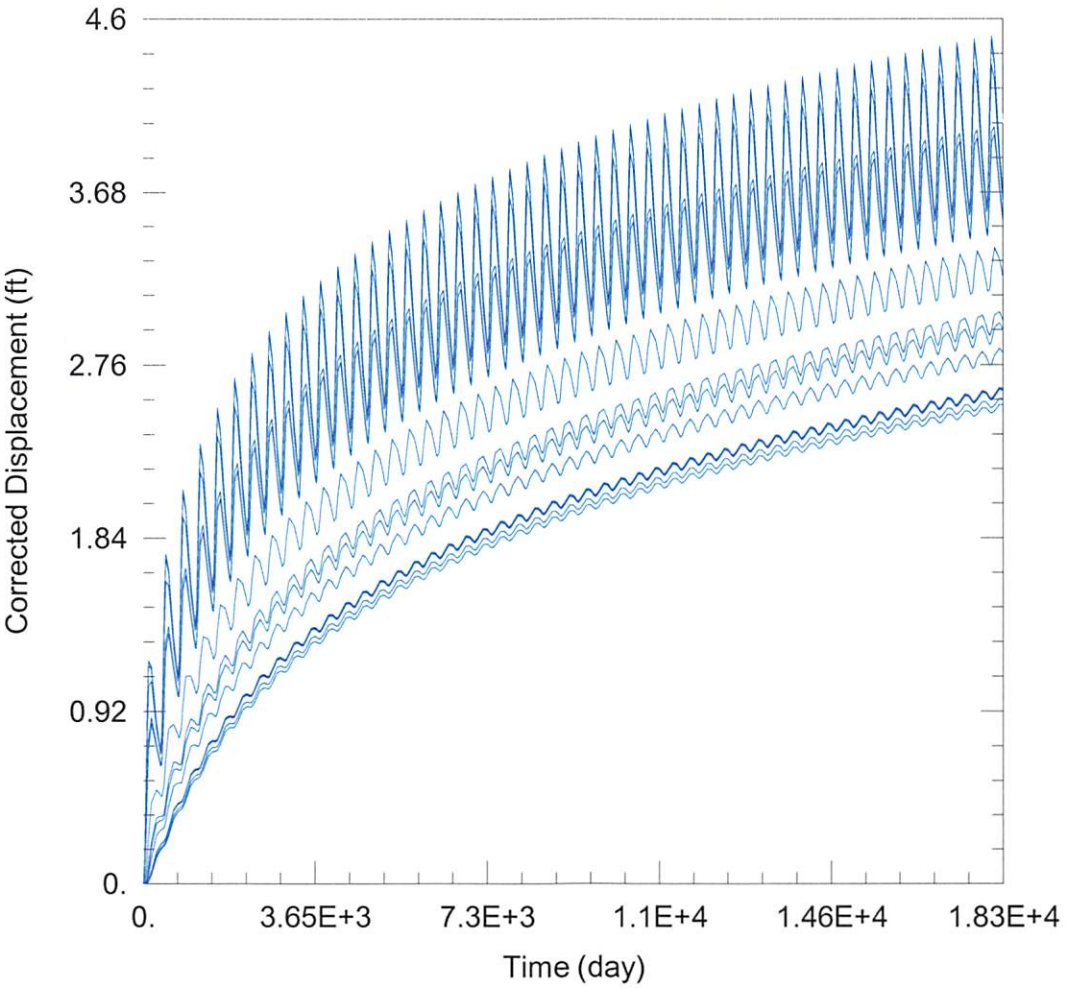
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
19257 S21	117659	326124

Observation Wells

Well Name	X (ft)	Y (ft)
▫	117659	326124
▫ 25412	117636	331423
▫ 22778	120237	331449
▫ 19721	112330	328731
▫ 25024	114989	328735
▫ 19257 ID1	112312	326098
▫ 19257 ID2	114971	326087
▫ 20561	114982	323480
▫ 14937	116751	322129
▫ 24742	120243	323463
▫ Domestic 1	113978	329748
▫ Domestic 2	117286	325120
▫ Domestic 3	119271	327133
▫ Domestic 4	117592	329425



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\19257\19257 Proposed.aqt
Date: 05/06/22 Time: 10:40:14

PROJECT INFORMATION

Company: GMD 3
Project: 19257
Location: Gray County

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
19257 S21	117139	327349

Observation Wells

Well Name	X (ft)	Y (ft)
▫	117139	327349
▫ 25412	117636	331423
▫ 22778	120237	331449
▫ 19721	112330	328731
▫ 25024	114989	328735
▫ 19257 ID1	112312	326098
▫ 19257 ID2	114971	326087
▫ 20561	114982	323480
▫ 14937	116751	322129
▫ 24742	120243	323463
▫ Domestic 1	113978	329748
▫ Domestic 2	117286	325120
▫ Domestic 3	119271	327133
▫ Domestic 4	117592	329425