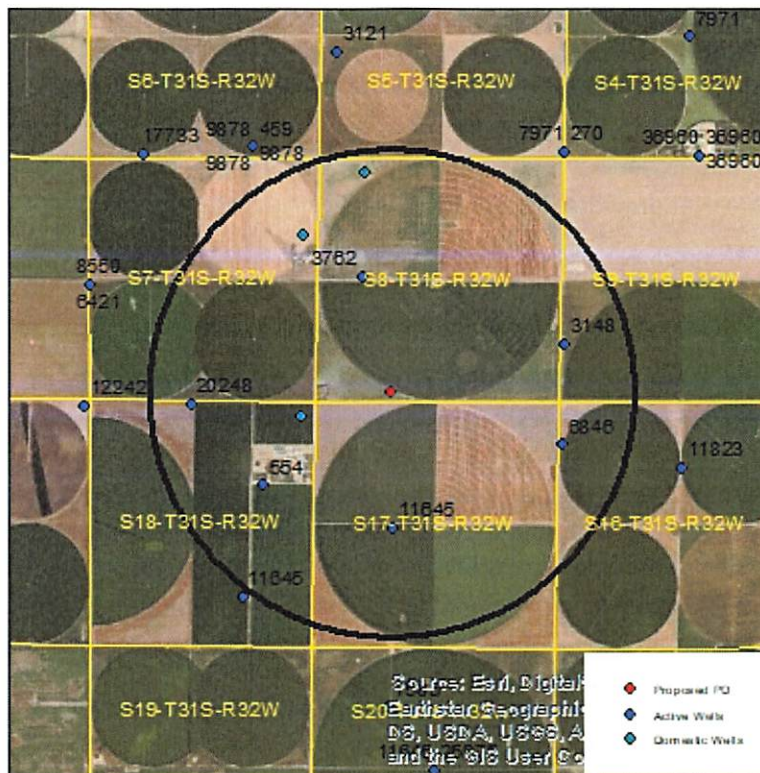## Evaluation of proposed move for Water Right No. 3762

Proposed: Move water right no. 3762 to a new well location, 2609 ft to the southeast.

Wells within 1 mile: 3148, 20248, 554, 11645, 6846, a domestic well in section 7-31-32, a domestic well in section 8-31-32, and a domestic well in section 18-31-32.

The saturated thickness at the proposed well location is estimated to be 162 ft, based upon the GMD3 model. For saturated thickness between 150 ft and 200 ft, the drawdown allowance is 3.5 ft.

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

$S = 0.1869$, $T = 11,411$ ft^2/day, $tp_{current} = 144$ days, $Q_{current} = 550$ gpm, $tp_{proposed} = 161$ days, $Q_{proposed} = 1800$ gpm

Theis drawdowns were calculated as follows:

3148:	Drawdown from current location = 1.52 ft
	Drawdown from proposed location = 6.09 ft
	Net drawdown = **4.6 ft**
20248:	Drawdown from current location = 1.51 ft
	Drawdown from proposed location = 5.68 ft
	Net drawdown = **4.2 ft**

554: Drawdown from current location = 1.45 ft

Drawdown from proposed location = 6.55 ft

Net drawdown = **5.1 ft**

11645: Drawdown from current location = 1.37 ft

Drawdown from proposed location = 7.14 ft

Net drawdown = **5.8 ft**

6846: Drawdown from current location = 1.34 ft

Drawdown from proposed location = 6.11 ft

Net drawdown = **4.8 ft**

Domestic 7-31-32: Drawdown from current location = 2.80 ft

Drawdown from proposed location = 6.05 ft

Net drawdown = **3.3 ft**

Domestic 8-31-32: Drawdown from current location = 2.32 ft

Drawdown from proposed location = 5.41 ft

Net drawdown = **3.1 ft**

Domestic 18-31-32: Drawdown from current location = 1.85 ft

Drawdown from proposed location = 8.70 ft

Net drawdown = **6.8 ft**

Net drawdown exceeds the drawdown allowance of 3.5 ft for all irrigation wells within 1 mile of the proposed location, and the domestic well in section 18-31-32. Critical well analysis was performed on those wells.

Critical Well Evaluation:

3148:

Water Column = 154 ft

DP = 4.6 ft (Net drawdown from the proposal indicated above)

DE = 52.1 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 74.8 ft (S = 0.2412, T = 38,781 gpd/ft, Q = 1184 gpm, tp = 66 days, efficiency = 70%)

DT = 131.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 154 ft = 61.6 ft

Physical Drawdown Constraint (PDC) = 154 ft – 60 ft = 94 ft

Total drawdown of 131.5 ft is greater than the EDC and PDC, so this well **is critical.**

20248:

Water Column = 171 ft

DP = 4.2 ft (Net drawdown from the proposal indicated above)

DE = 52.0 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 51.2 ft (S = 0.1376, T = 43,530 gpd/ft, Q = 859 gpm, tp = 80 days, efficiency = 70%)

DT = 107.4 ft

Economic Drawdown Constraint (EDC) = 0.4 * 171 ft = 68.4 ft

Physical Drawdown Constraint (PDC) = 171 ft – 60 ft = 111 ft

Total drawdown of 107.4 ft is greater than the EDC, so this well **is critical.**

554:

Water Column = 171 ft

DP = 5.1 ft (Net drawdown from the proposal indicated above)

DE = 52.0 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 56.0 ft (S = 0.1376, T = 43,530 gpd/ft, Q = 944 gpm, tp = 75 days, efficiency = 70%)

DT = 113.1 ft

Economic Drawdown Constraint (EDC) = 0.4 * 171 ft = 68.4 ft

Physical Drawdown Constraint (PDC) = 171 ft – 60 ft = 111 ft

Total drawdown of 113.1 ft is greater than the EDC and PDC, so this well **is critical.**

11645:

Water Column = 159 ft

DP = 5.8 ft (Net drawdown from the proposal indicated above)

DE = 51.2 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 35.5 ft (S = 0.1982, T = 63,607 gpd/ft, Q = 850 gpm, tp = 115 days, efficiency = 70%)

DT = 92.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 159 ft = 63.6 ft

Physical Drawdown Constraint (PDC) = 159 ft – 60 ft = 99 ft

Total drawdown of 92.5 ft is greater than the EDC, so this well **is critical.**

6846:

Water Column = 152 ft

DP = 4.8 ft (Net drawdown from the proposal indicated above)

DE = 42.0 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 57.4 ft (S = 0.2453, T = 41,948 gpd/ft, Q = 957 gpm, tp = 93 days, efficiency = 70%)

DT = 104.2 ft

Economic Drawdown Constraint (EDC) = 0.4 * 152 ft = 60.8 ft

Physical Drawdown Constraint (PDC) = 152 ft – 60 ft = 92 ft

Total drawdown of 104.2 ft is greater than the EDC and PDC, so this well **is critical.**

Domestic 18-31-32:

Water Column = 171 ft

DP = 6.8 ft (Net drawdown from the proposal indicated above)

DE = 51.8 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 58.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 171 ft = 68.4 ft

Physical Drawdown Constraint (PDC) = 171 ft – 20 ft = 151 ft

Total drawdown of 58.6 ft is less than the EDC and PDC, so this well **is not critical.**

Conclusion:

The proposed move is in an area currently supporting strong wells, but with water level declines projected to exceed 2 ft per year. These declines are likely to diminish the pumping capacity of local wells 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 of the neighboring wells. Critical well analysis shows that most of the neighboring wells are critical because after accounting for well drawdown effects, more than 40% of the remaining aquifer will be lost over the next 25 years. Concerned neighbors can contact GMD3 at (620) 275-7147 or the Division of Water Resources at (620) 276-2901.
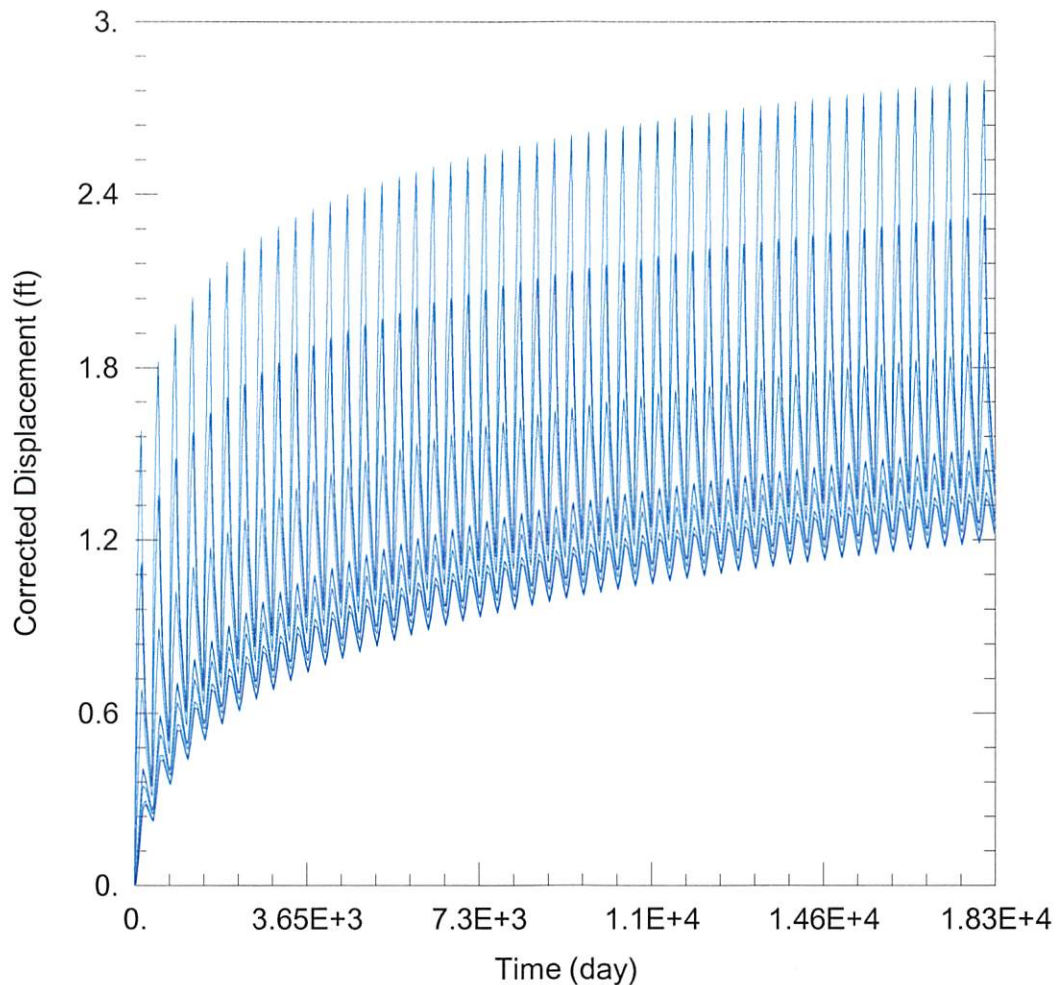
WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\3762\3762 Current.aqt
Date: 06/30/22   Time: 14:15:30

PROJECT INFORMATION

Company: GMD 3
Project: 3762
Location: Seward County

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
3762	-8996	178879

Observation Wells

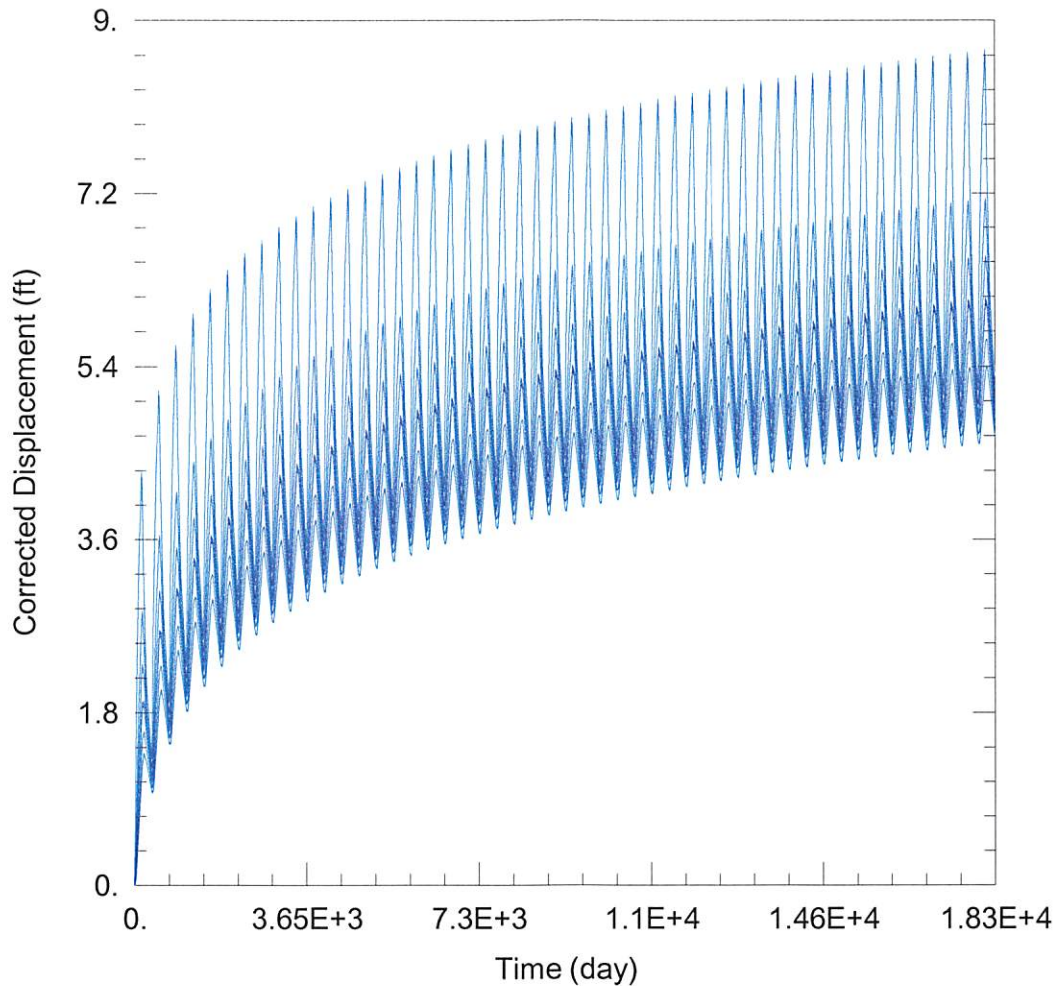| Well Name	X (ft)	Y (ft)
□	-8996	178879
□ 3148	-4608	177385
□ 20248	-12747	176080
□ 554	-11178	174339
□ 11645	-8330	173391
□ 6846	-4667	175200
□ Domestic 7-31-32	-10284	179788
□ Domestic 8-31-32	-8954	181108
□ Domestic 18-31-32	-10328	175819

SOLUTION

Aquifer Model: Unconfined   Solution Method: Theis

T   = 1.141E+4 ft^2/day   S   = 0.1869

WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\3762\3762 Proposed.aqt
Date: 06/30/22   Time: 15:31:46

PROJECT INFORMATION

Company: GMD 3
Project: 3762
Location: Seward County

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
3762	-8367	176347

Observation Wells

Well Name	X (ft)	Y (ft)
▫	-8367	176347
▫ 3148	-4608	177385
▫ 20248	-12747	176080
▫ 554	-11178	174339
▫ 11645	-8330	173391
▫ 6846	-4667	175200
▫ Domestic 7-31-32	-10284	179788
▫ Domestic 8-31-32	-8954	181108
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SOLUTION

Aquifer Model: Unconfined   Solution Method: Theis

T   = 1.141E+4 ft^2/day   S   = 0.1869