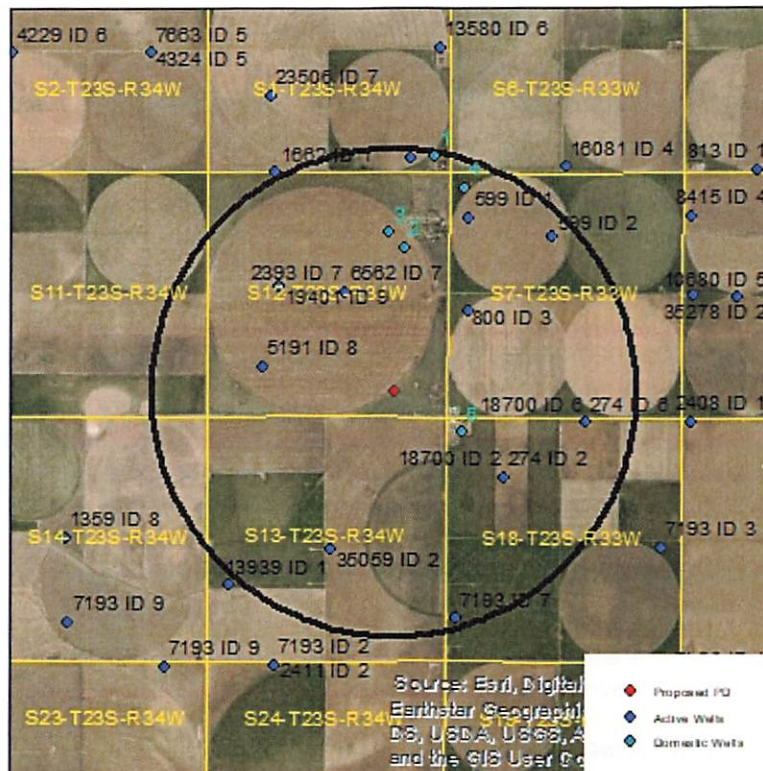


Evaluation of proposed move for Water Right Nos 2393, 5191, 6562, and 19401

Proposed: Move water right nos. 2393 & 6562 to a new well location a distance of 2,392 ft to the southeast. Move water right no. 19401 to the well location currently authorized by water right nos. 2393 & 6562. Move water right no. 5191 to the well location currently authorized by water right no. 19401.



Wells within 1 mile: 7334, 800, 599 ID 1, 599 ID 2, 274 & 18700 ID 2, 274 & 18700 ID 6, 7193, 35059, and 5 domestic wells, numbered on the above map.

The saturated thickness at the proposed well location is estimated to be 106 ft, based upon the driller's log and an observation well in section 7-23-33. For saturated thickness between 100 ft and 125 ft, the drawdown allowance is 2.5 ft.

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

$S = 0.259$, $T = 4387.6 \text{ ft}^2/\text{day}$, $tp_{\text{current}} = 170 \text{ days}$, $Q_{\text{current}} = 100 \text{ gpm}$, $tp_{\text{proposed}} = 168 \text{ days}$, $Q_{\text{proposed}} = 860 \text{ gpm}$ (Note that this evaluation is treated as if the well shutting off, 5191, is moving to the new well location.)

Theis drawdowns were calculated as follows:

7334: Drawdown from current location = 0.52 ft
 Drawdown from proposed location = 4.62 ft
 Net drawdown = 4.1 ft

800: Drawdown from current location = 0.58 ft
Drawdown from proposed location = 7.18 ft
Net drawdown = **6.6 ft**

599 ID 1: Drawdown from current location = 0.52 ft
Drawdown from proposed location = 5.29 ft
Net drawdown = **4.8 ft**

599 ID 2: Drawdown from current location = 0.44 ft
Drawdown from proposed location = 4.77 ft
Net drawdown = **4.3 ft**

274 & 18700 ID 2: Drawdown from current location = 0.50 ft
Drawdown from proposed location = 6.29 ft
Net drawdown = **5.8 ft**

274 & 18700 ID 6: Drawdown from current location = 0.43 ft
Drawdown from proposed location = 5.19 ft
Net drawdown = **4.8 ft**

7193: Drawdown from current location = 0.44 ft
Drawdown from proposed location = 4.62 ft
Net drawdown = **4.2 ft**

35059: Drawdown from current location = 0.61 ft
Drawdown from proposed location = 5.64 ft
Net drawdown = **5.0 ft**

Domestic 1: Drawdown from current location = 0.50 ft
Drawdown from proposed location = 4.58 ft
Net drawdown = **4.1 ft**

Domestic 2: Drawdown from current location = 0.63 ft
Drawdown from proposed location = 6.20 ft
Net drawdown = **5.6 ft**

Domestic 3: Drawdown from current location = 0.63 ft
Drawdown from proposed location = 5.84 ft
Net drawdown = **5.2 ft**

Domestic 4: Drawdown from current location = 0.50 ft
Drawdown from proposed location = 4.87 ft
Net drawdown = **4.4 ft**

Domestic 5: Drawdown from current location = 0.58 ft
Drawdown from proposed location = 8.75 ft
Net drawdown = **8.2 ft**

Net drawdown exceeds the drawdown allowance of 2.5 ft for all wells within 1 mile of the proposed location. Critical well analysis is necessary on those wells.

Critical Well Evaluation:

7334:

Water Column = 106 ft

DP = 4.1 ft (Net drawdown from the proposal indicated above)

DE = 41.3 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 11.3 ft (S = 0.2197, T = 75,760 gpd/ft, Q = 472 gpm, tp = 72 days, efficiency = 70%)

DT = 61.5 ft

Economic Drawdown Constraint (EDC) = $0.4 * 106 \text{ ft} = 42.4 \text{ ft}$

Physical Drawdown Constraint (PDC) = $106 \text{ ft} - 60 \text{ ft} = 46 \text{ ft}$

Total drawdown of 61.5 ft is greater than the EDC and PDC, so this well is **critical**.

800:

Water Column = 117 ft

DP = 6.6 ft (Net drawdown from the proposal indicated above)

DE = 32.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 37.9 ft (S = 0.1696, T = 29,654 gpd/ft, Q = 444 gpm, tp = 100 days, efficiency = 70%)

DT = 76.9 ft

Economic Drawdown Constraint (EDC) = $0.4 * 117 \text{ ft} = 46.8 \text{ ft}$

Physical Drawdown Constraint (PDC) = $117 \text{ ft} - 60 \text{ ft} = 57 \text{ ft}$

Total drawdown of 76.9 ft exceeds both the EDC and PDC, so this well is **critical**.

599 ID 1:

Water Column = 117 ft

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

DE = 32.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 0 ft (Well has not reported use in over 10 years)

DT = 37.2 ft

Economic Drawdown Constraint (EDC) = $0.4 * 117 \text{ ft} = 46.8 \text{ ft}$

Physical Drawdown Constraint (PDC) = $117 \text{ ft} - 60 \text{ ft} = 57 \text{ ft}$

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

599 ID 2:

Water Column = 117 ft

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

DE = 32.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 47.0 ft (S = 0.1696, T = 29,654 gpd/ft, Q = 552 gpm, tp = 96 days, efficiency = 70%)

DT = 83.7 ft

Economic Drawdown Constraint (EDC) = $0.4 * 117 \text{ ft} = 46.8 \text{ ft}$

Physical Drawdown Constraint (PDC) = $117 \text{ ft} - 60 \text{ ft} = 57 \text{ ft}$

Total drawdown of 83.7 ft exceeds both the EDC and PDC, so this well is **critical**.

274 & 18700 ID 2:

Water Column = 111 ft

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

DE = 39.8 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 18.1 ft (S = 0.2651, T = 62,525 gpd/ft, Q = 457 gpm, tp = 55 days, efficiency = 70%)

DT = 63.7 ft

Economic Drawdown Constraint (EDC) = $0.4 * 111 \text{ ft} = 44.4 \text{ ft}$

Physical Drawdown Constraint (PDC) = $111 \text{ ft} - 60 \text{ ft} = 51 \text{ ft}$

Total drawdown of 63.7 ft is greater than both the EDC and PDC, so this well is **critical**.

274 & 18700 ID 6:

Water Column = 132 ft

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

DE = 39.8 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 20.3 ft (S = 0.2651, T = 62,525 gpd/ft, Q = 507 gpm, tp = 58 days, efficiency = 70%)

DT = 64.9 ft

Economic Drawdown Constraint (EDC) = $0.4 * 132 \text{ ft} = 52.8 \text{ ft}$

Physical Drawdown Constraint (PDC) = $132 \text{ ft} - 60 \text{ ft} = 72 \text{ ft}$

Total drawdown of 64.9 ft is greater than the EDC, so this well is **critical**.

7193:

Water Column = 117 ft

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

DE = 39.8 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 20.1 ft (S = 0.2651, T = 62,525 gpd/ft, Q = 496 gpm, tp = 75 days, efficiency = 70%)

DT = 64.1 ft

Economic Drawdown Constraint (EDC) = $0.4 * 117 \text{ ft} = 46.8 \text{ ft}$

Physical Drawdown Constraint (PDC) = $117 \text{ ft} - 60 \text{ ft} = 57 \text{ ft}$

Total drawdown of 64.1 ft is greater than both the EDC and PDC, so this well is **critical**.

Domestic 1:

Water Column = 126 ft

DP = 4.1 ft

DE = 41.3 ft

DT = 45.4 ft

Economic Drawdown Constraint (EDC) = $0.4 * 126 \text{ ft} = 50.4 \text{ ft}$

Physical Drawdown Constraint (PDC) = $126 \text{ ft} - 20 \text{ ft} = 106 \text{ ft}$

Total drawdown of 45.4 ft is less than both the EDC and the PDC, so this well is **not critical**.

Domestic 2:

Water Column = 122 ft

DP = 5.6 ft

DE = 37.8 ft

DT = 43.4 ft

Economic Drawdown Constraint (EDC) = $0.4 * 122 \text{ ft} = 48.8 \text{ ft}$

Physical Drawdown Constraint (PDC) = $122 \text{ ft} - 20 \text{ ft} = 102 \text{ ft}$

Total drawdown of 43.4 ft is less than both the EDC and the PDC, so this well is **not critical**.

Domestic 3:

Water Column = 122 ft (note: Driller's log shows a water column of 61 ft. This well was drilled in 1976 and does not appear to be drilled to the bottom of local aquifer formation, so the water column on nearby domestic 2 was used for evaluation.)

DP = 5.2 ft

DE = 37.8 ft

DT = 43.0 ft

Economic Drawdown Constraint (EDC) = $0.4 * 122 \text{ ft} = 48.8 \text{ ft}$

Physical Drawdown Constraint (PDC) = $122 \text{ ft} - 20 \text{ ft} - 102 \text{ ft}$

Total drawdown of 43.0 ft is less than both the EDC and the PDC, so this well is **not critical**.

Domestic 4:

Water Column = 130 ft

DP = 4.4 ft

DE = 32.4 ft

DT = 36.8 ft

Economic Drawdown Constraint (EDC) = $0.4 * 130 \text{ ft} = 52.0 \text{ ft}$

Physical Drawdown Constraint (PDC) = $130 \text{ ft} - 20 \text{ ft} = 110 \text{ ft}$

Total drawdown of 36.8 ft is less than both the EDC and PDC, so this well is **not critical**.

Domestic 5:

Water Column = 111 ft

DP = 8.2 ft

DE = 39.8 ft

DT = 48.0 ft

Economic Drawdown Constraint (EDC) = $0.4 * 111 \text{ ft} = 44.4 \text{ ft}$

Physical Drawdown Constraint (PDC) = $111 \text{ ft} - 20 \text{ ft} = 91 \text{ ft}$

Total drawdown of 48.0 ft is greater than the EDC, so this well is **critical**.

Conclusion:

The proposed moves are located in an area with rapidly depleting aquifer and if the new well is operated at the proposed rate and quantity, it is likely to create noticeable effects on neighboring critical wells. GMD3 staff recommends a rate limitation of 500 gpm and a quantity limitation of 267 AF at the proposed new well location. This rate and quantity would produce the following net effects on neighboring critical wells:

7334: Net Drawdown = 1.4 ft

800: Net Drawdown = 2.5 ft

599 ID 2: Net Drawdown = 1.6 ft

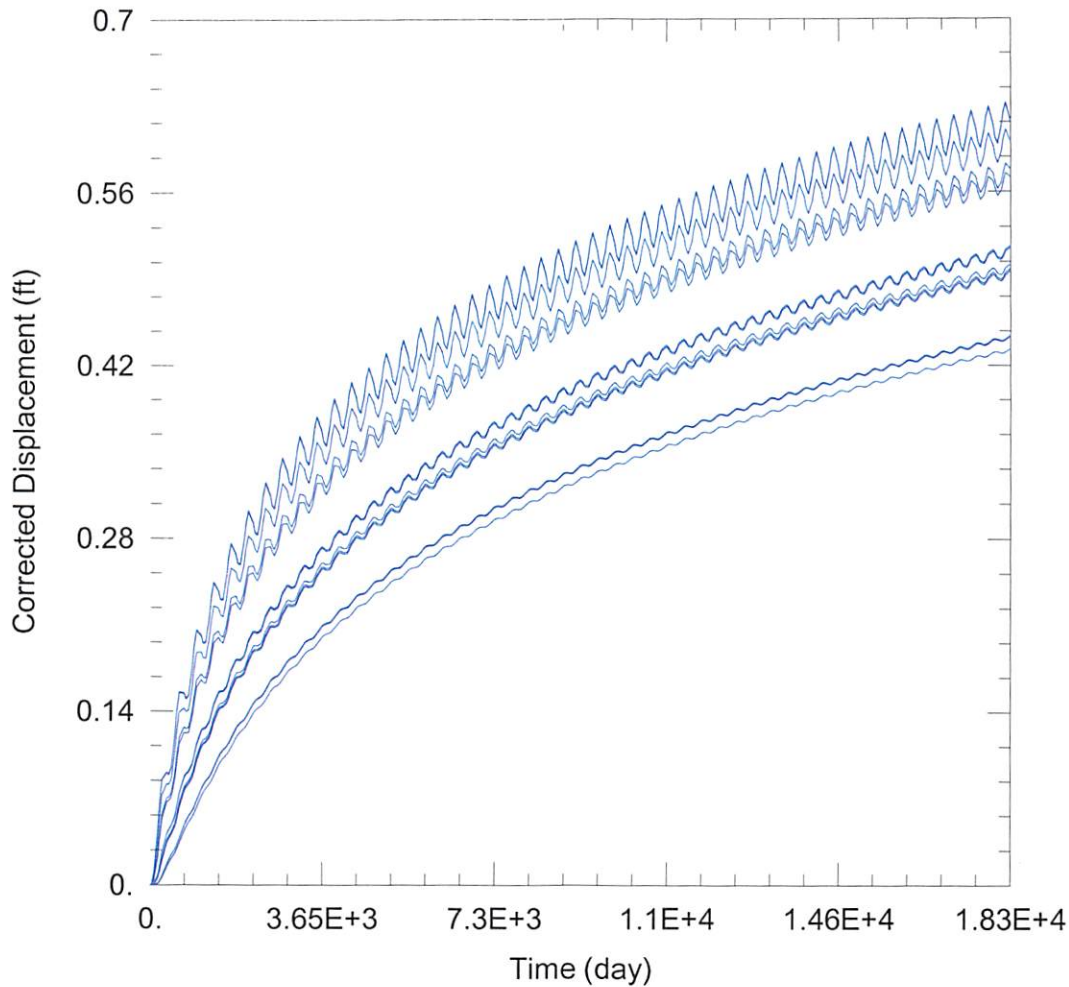
274 & 18700 ID 2: Net Drawdown = 2.2 ft

274 & 18700 ID 6: Net Drawdown = 1.8 ft

7193: Net Drawdown = 1.5 ft

Domestic 5: Net Drawdown = 3.3 ft

Note that while this effect on Domestic 5 would exceed the 2.5 ft drawdown allowance, the well would not be considered critical with a 3.3 ft drawdown effect.



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\2393_5191_6562_19401\2393 Current.aqt
 Date: 02/25/21 Time: 15:10:57

PROJECT INFORMATION

Company: GMD 3
 Project: 2393+
 Location: Finney County
 Test Well: 2393+

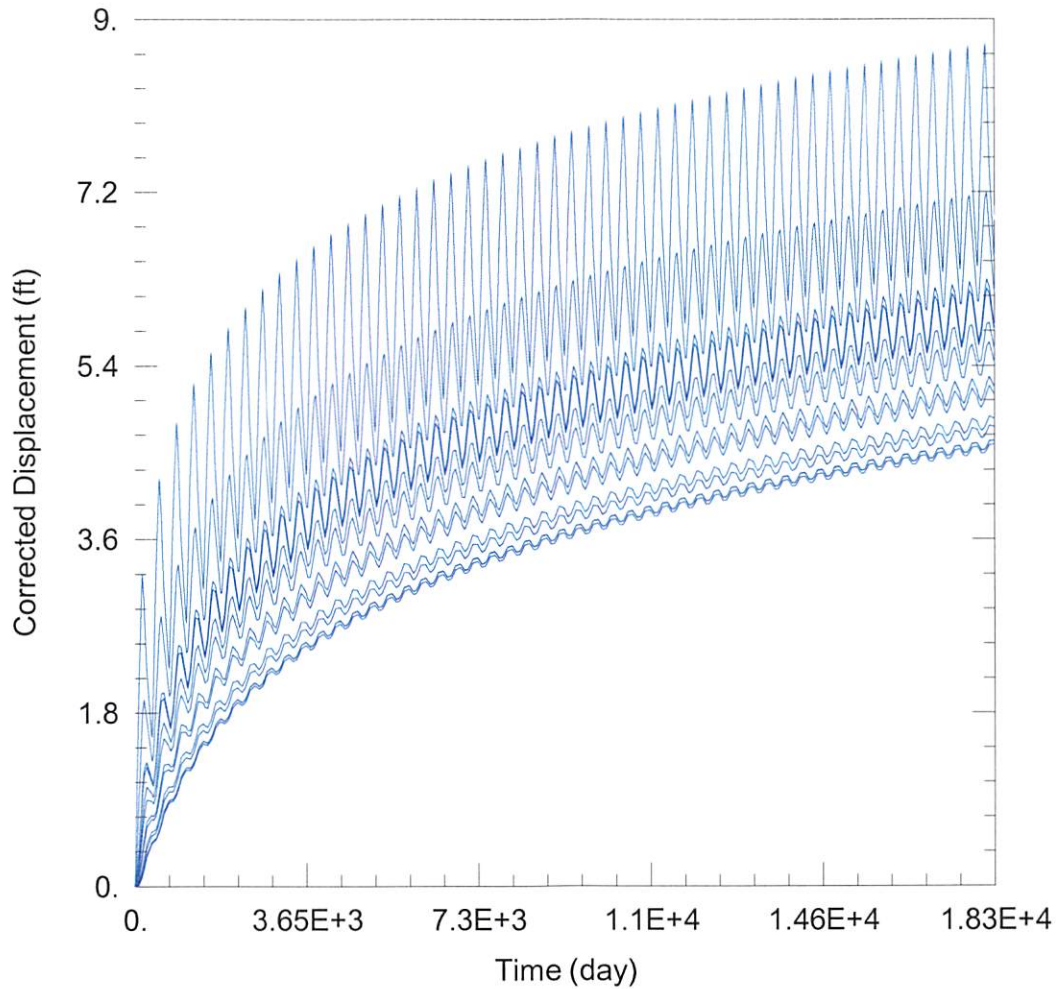
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
5191	-59750	433252

Observation Wells

Well Name	X (ft)	Y (ft)
□	-59750	433252
□ 7334	-56527	437773
□ 800	-55262	434474
□ 599 ID1	-55243	436453
□ 599 ID2	-53433	436065
□ 274 & 18700 ID2	-54490	430852
□ 274 & 18700 ID6	-52717	432055
□ 7193	-55520	427802
□ 35059	-58242	429300
□ Domestic 1	-56002	437781
□ Domestic 2	-56672	435802
□ Domestic 3	-56994	436132
□ Domestic 4	-55363	437120



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\2393_5191_6562_19401\2393 Proposed.aqt
 Date: 02/04/21 Time: 14:37:32

PROJECT INFORMATION

Company: GMD 3
 Project: 2393+
 Location: Finney County
 Test Well: 2393+

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
5191	-56892	432703

Observation Wells

Well Name	X (ft)	Y (ft)
□	-56892	432703
□ 7334	-56527	437773
□ 800	-55262	434474
□ 599 ID1	-55243	436453
□ 599 ID2	-53433	436065
□ 274 & 18700 ID2	-54490	430852
□ 274 & 18700 ID6	-52717	432055
□ 7193	-55520	427802
□ 35059	-58242	429300
□ Domestic 1	-56002	437781
□ Domestic 2	-56672	435802
□ Domestic 3	-56994	436132
□ Domestic 4	-55363	437120