

NORTHERN KEARNY FINNEY COUNTY LOCAL ENHANCED MANAGEMENT AREA (KFL)

March 15, 2017

AT THE LAST MEETING...

- Initial proposal of phased reductions over a 9-year period
 - Phase I: 10% reduction (years 1-3)
 - Phase II: 20% reduction (years 4-6)
 - Phase III: 30% reduction (years 7-9)
 - 18 inch ceiling/8 inch floor
- Role of vested water rights in the LEMA proposal
- Role of non-irrigation uses in the LEMA proposal
- Groundwater movement within the District and within the LEMA boundary
- Alternate proposals including a 15% reduction over 5-year period
- Due consideration for past conservation – KFL Advisory Panel, example guidelines
- Flexibilities
 - Roll over a portion of unused quantity
 - Move LEMA allocations (management units v. more widely across area)




VESTED WATER RIGHTS

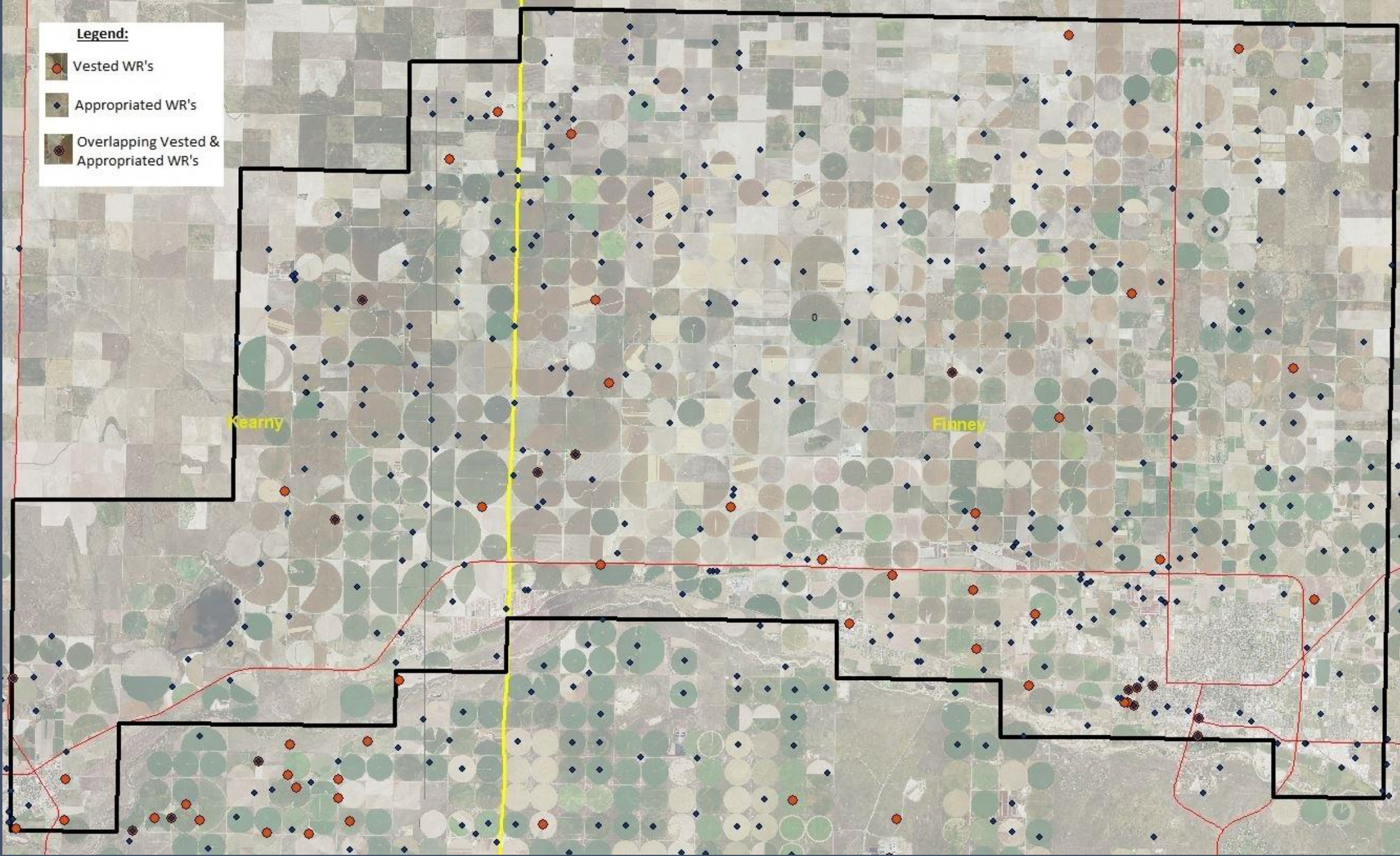
Northern Kearny Finney County
Local Enhanced Management Area (KFL)

VESTED WATER RIGHTS

- Pursuant to K.S.A.82a-703 nothing affects a vested right. Pursuant to K.S.A. 82a-104(a)(5) a LEMA must be consistent with state law. Vested rights may participant voluntarily.
- Summary of water rights within the proposed LEMA boundary:
 - 216 total water rights
 - 32 water rights are not in use
 - 184 total active water rights
 - 137 total active vested water rights
 - 112 vested water rights in Finney County
 - 25 vested water rights in Kearny County
- Note – There are vested water rights that overlap with other vested rights, as well as vested rights that overlap with appropriated rights
- Average water use based on all reports of any points of diversion with a vested right associated ~ 27,810 AF (2013-2015), represents about 24% of the total average reported use within the LEMA boundary

Legend:

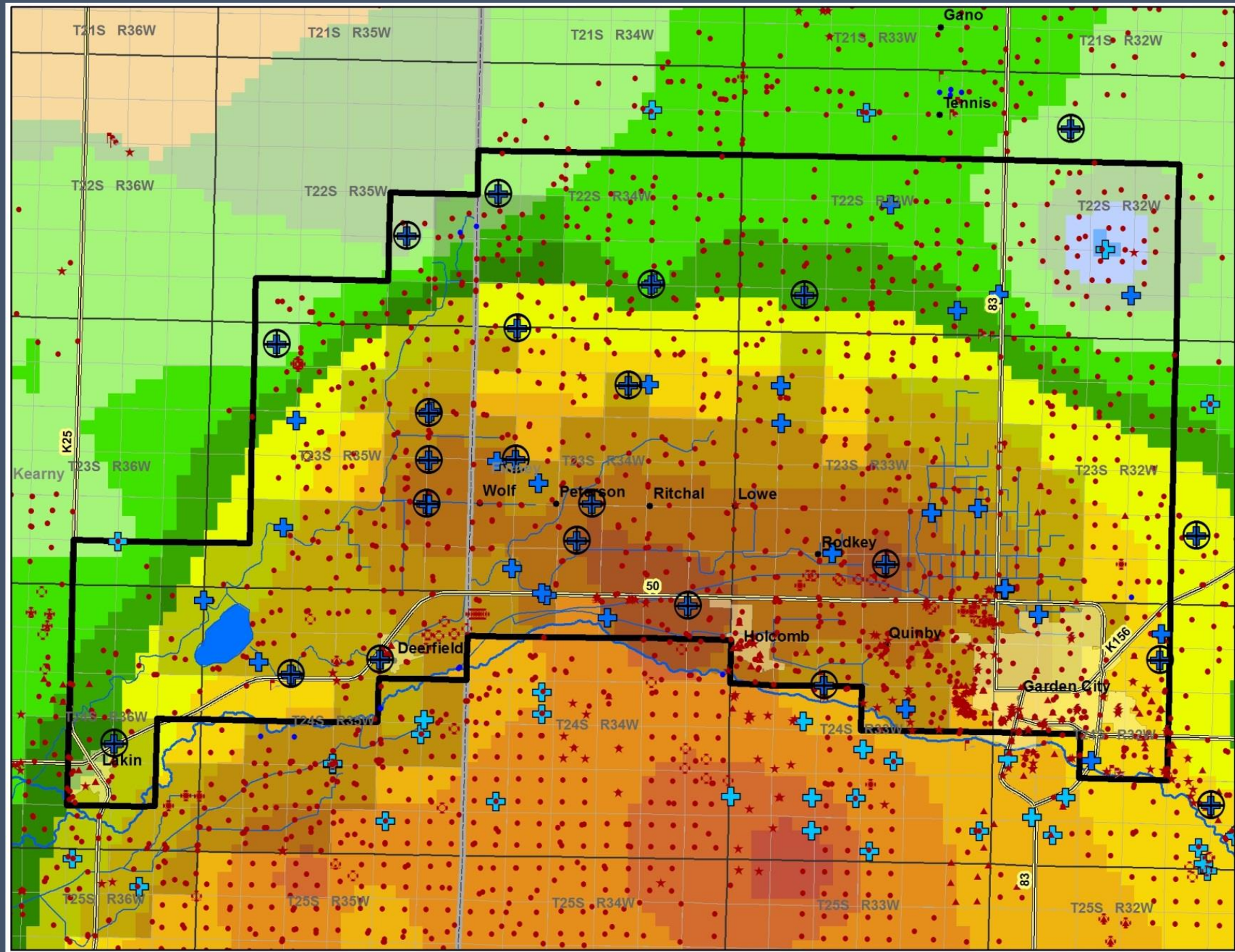
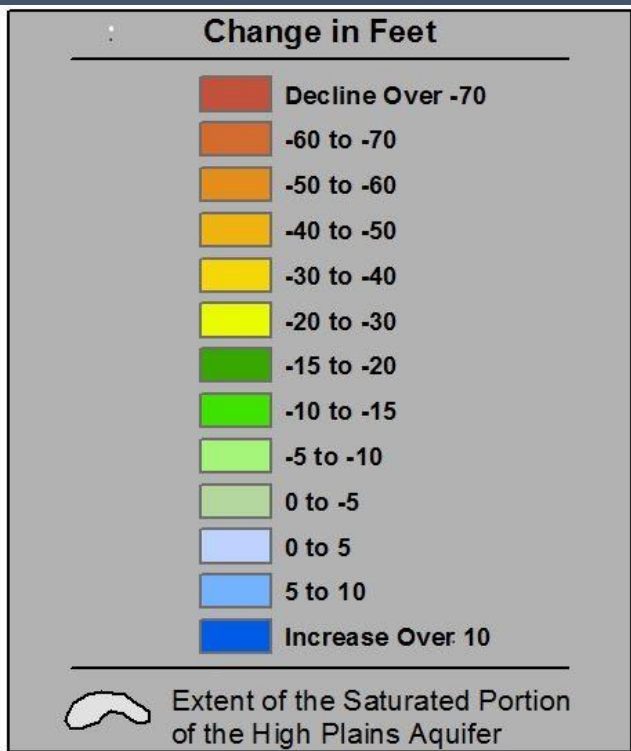
-  Vested WR's
-  Appropriated WR's
-  Overlapping Vested & Appropriated WR's



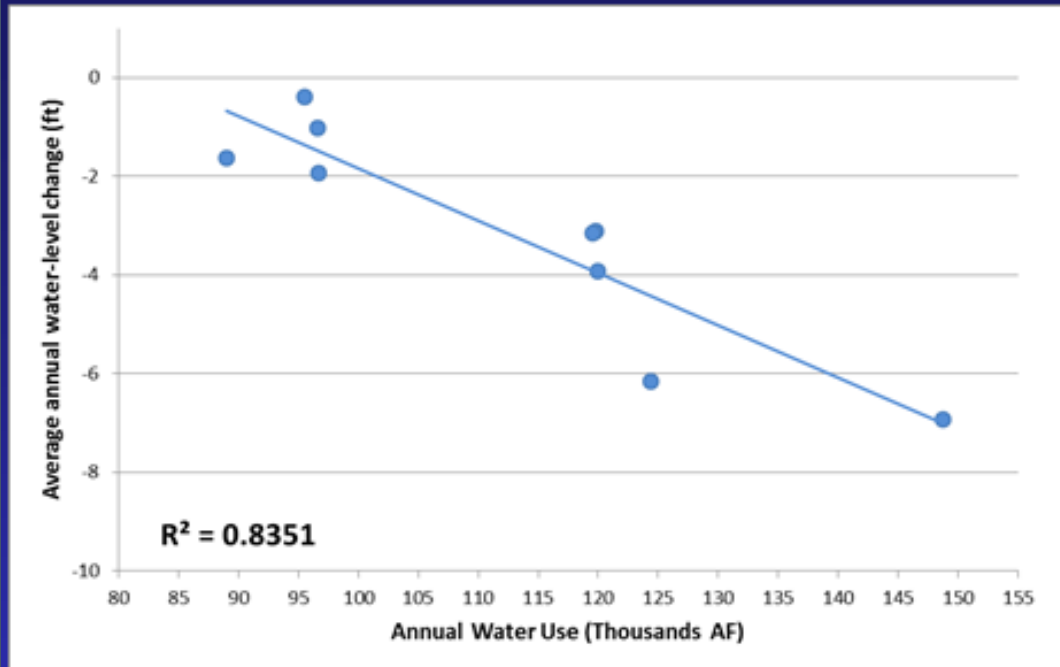
WATER LEVEL CHANGES

Northern Kearny Finney County
Local Enhanced Management Area (KFL)

WATER LEVEL CHANGES (2005-2016)



Q Stable- Lake McKinney Area, excluding 2010-2011



Average Groundwater Use = 112,249 AF

Average Water Level Decline = 3.13 ft

Based on this relationship, using averages, on the short term:

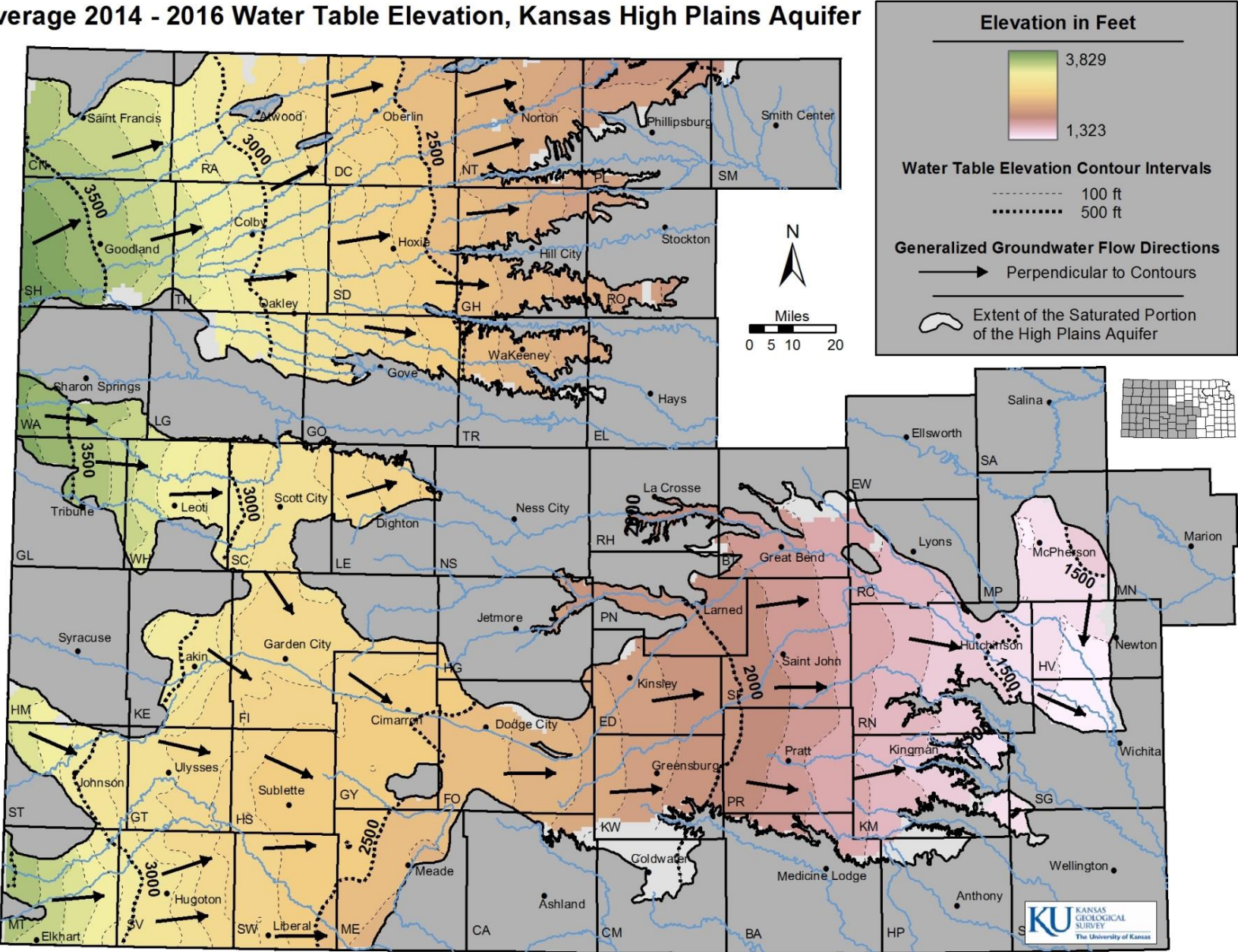
- 26.3% reduction in average use = Stable water levels = Sustainable
- 20% reduction in average use = 0.76 ft annual decline = decline reduced by 76%
- 10% reduction in average use = 1.95 annual decline = decline reduced by 38%

GROUNDWATER FLOW

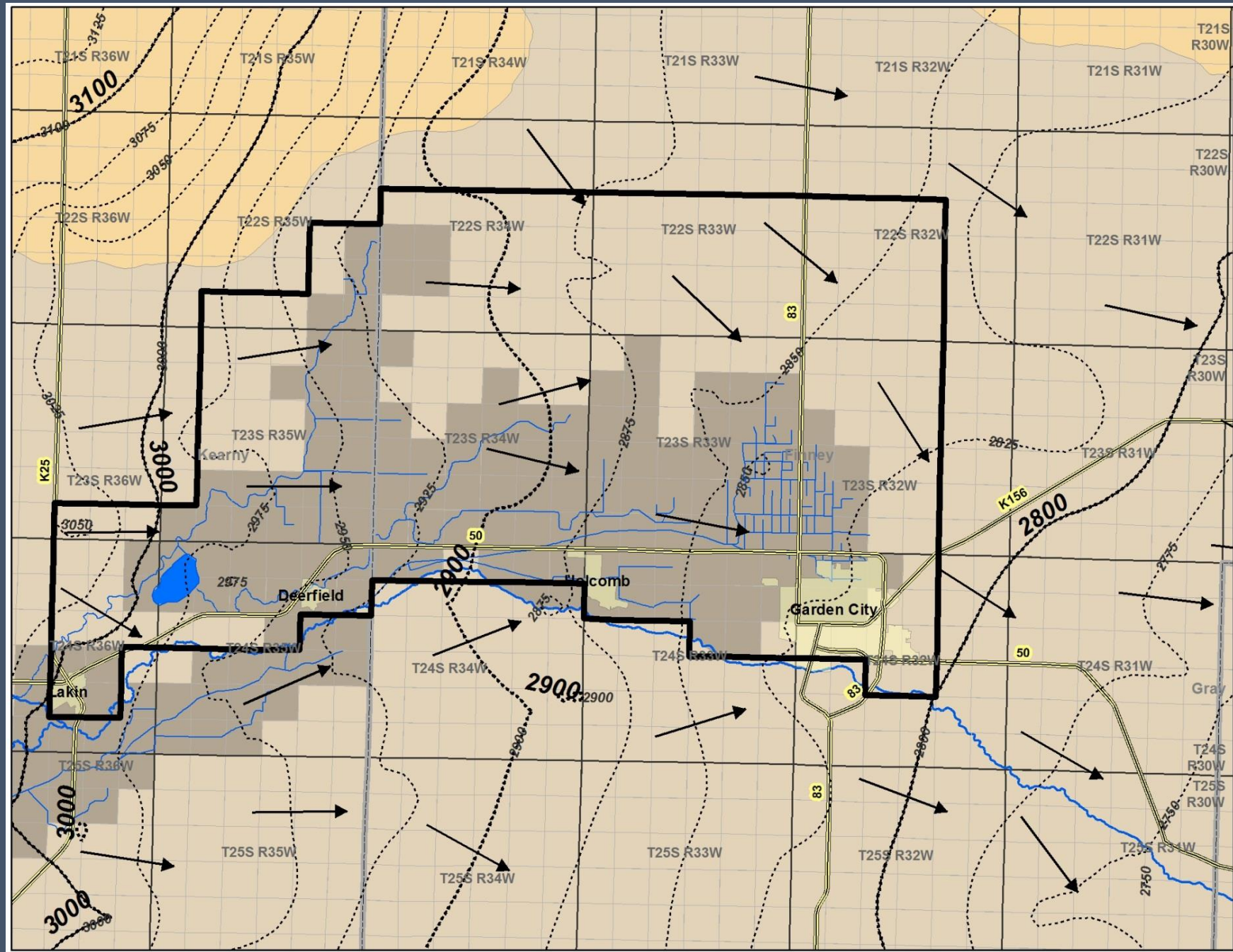
Northern Kearny Finney County
Local Enhanced Management Area (KFL)

Average 2014 - 2016 Water Table Elevation, Kansas High Plains Aquifer

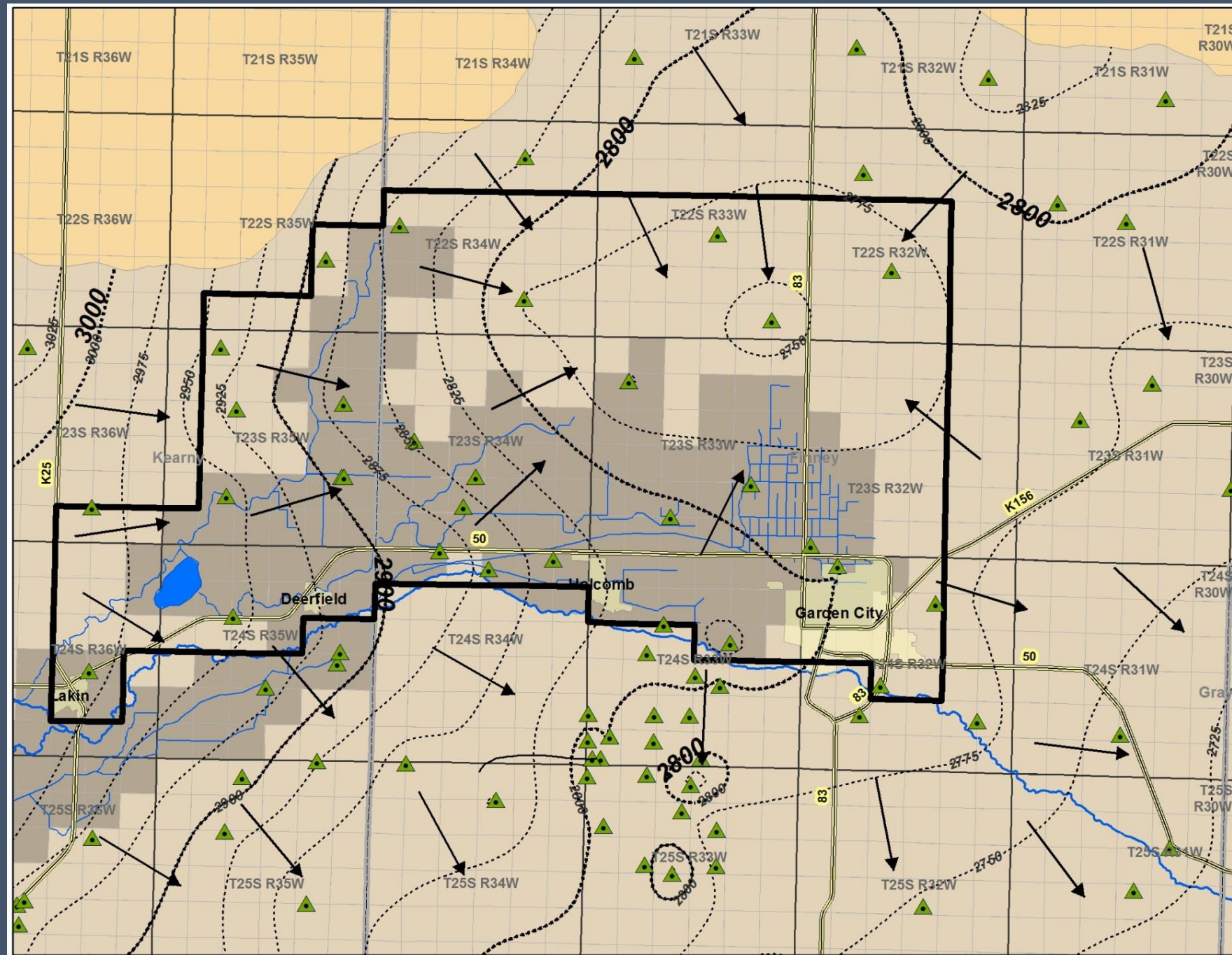
WATER TABLE ELEVATION, KANSAS HIGH PLAINS AQUIFER



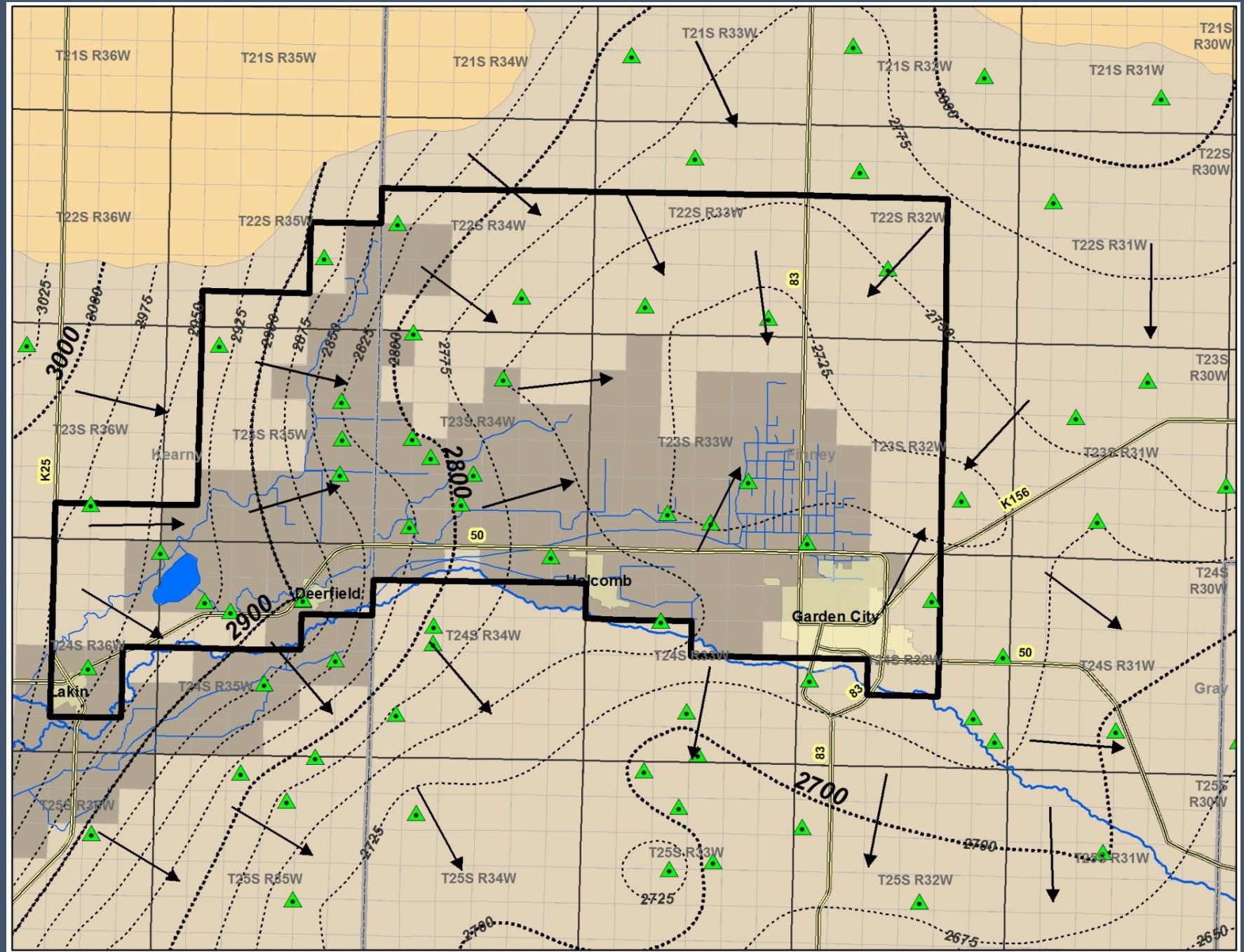
WATER TABLE ELEVATION, PREDEVELOPMENT



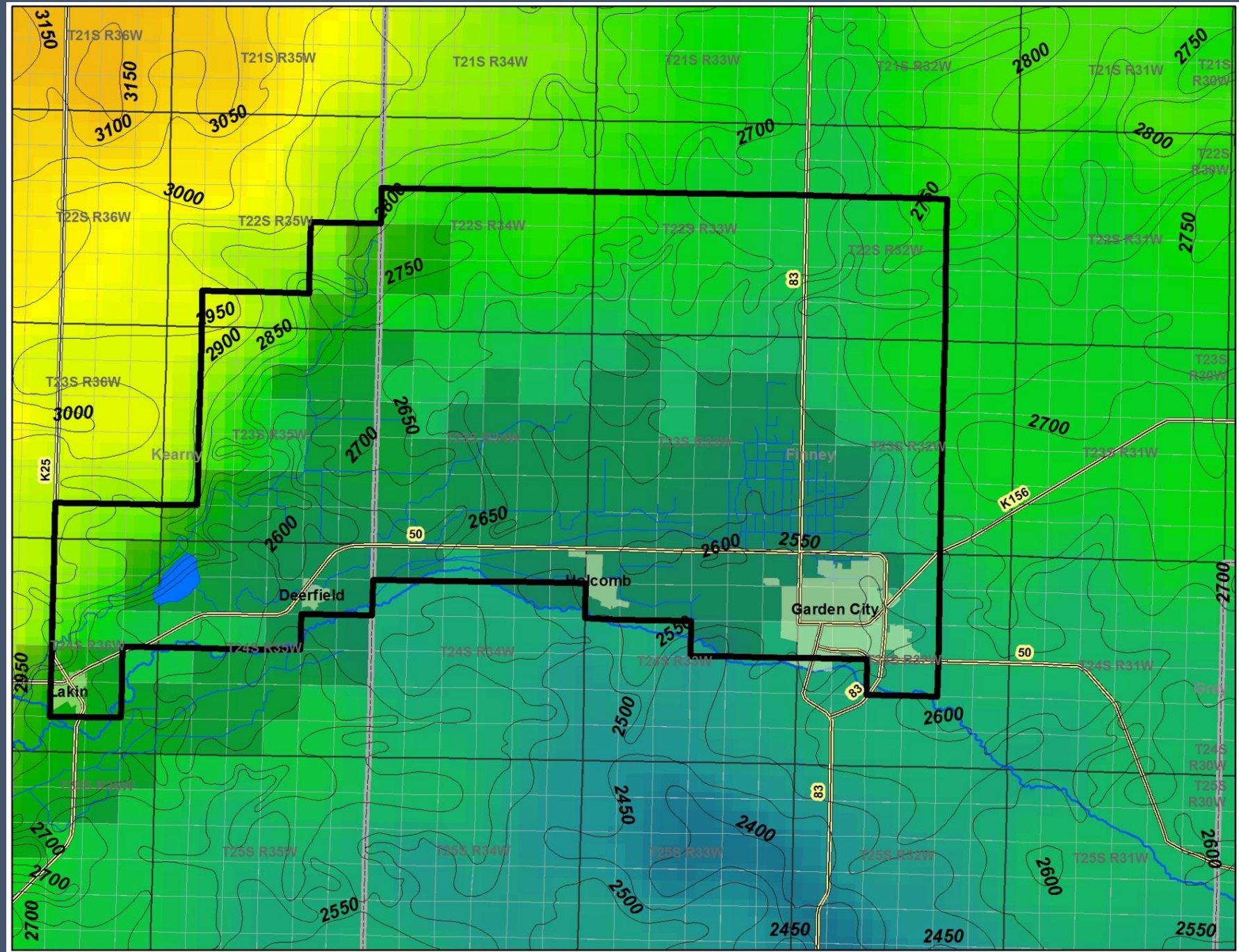
WATER TABLE ELEVATION, 1994-1996



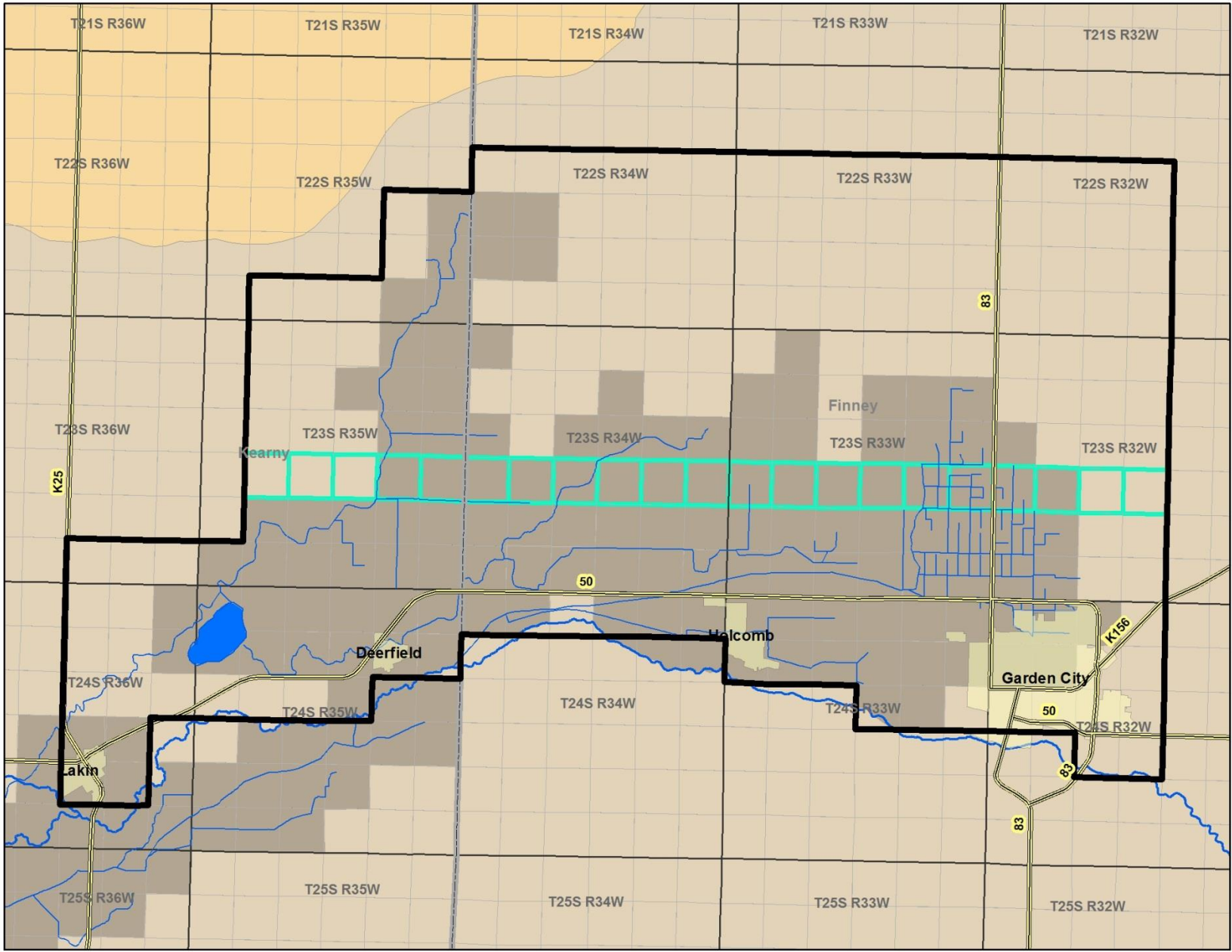
WATER TABLE ELEVATION, 2014-2016



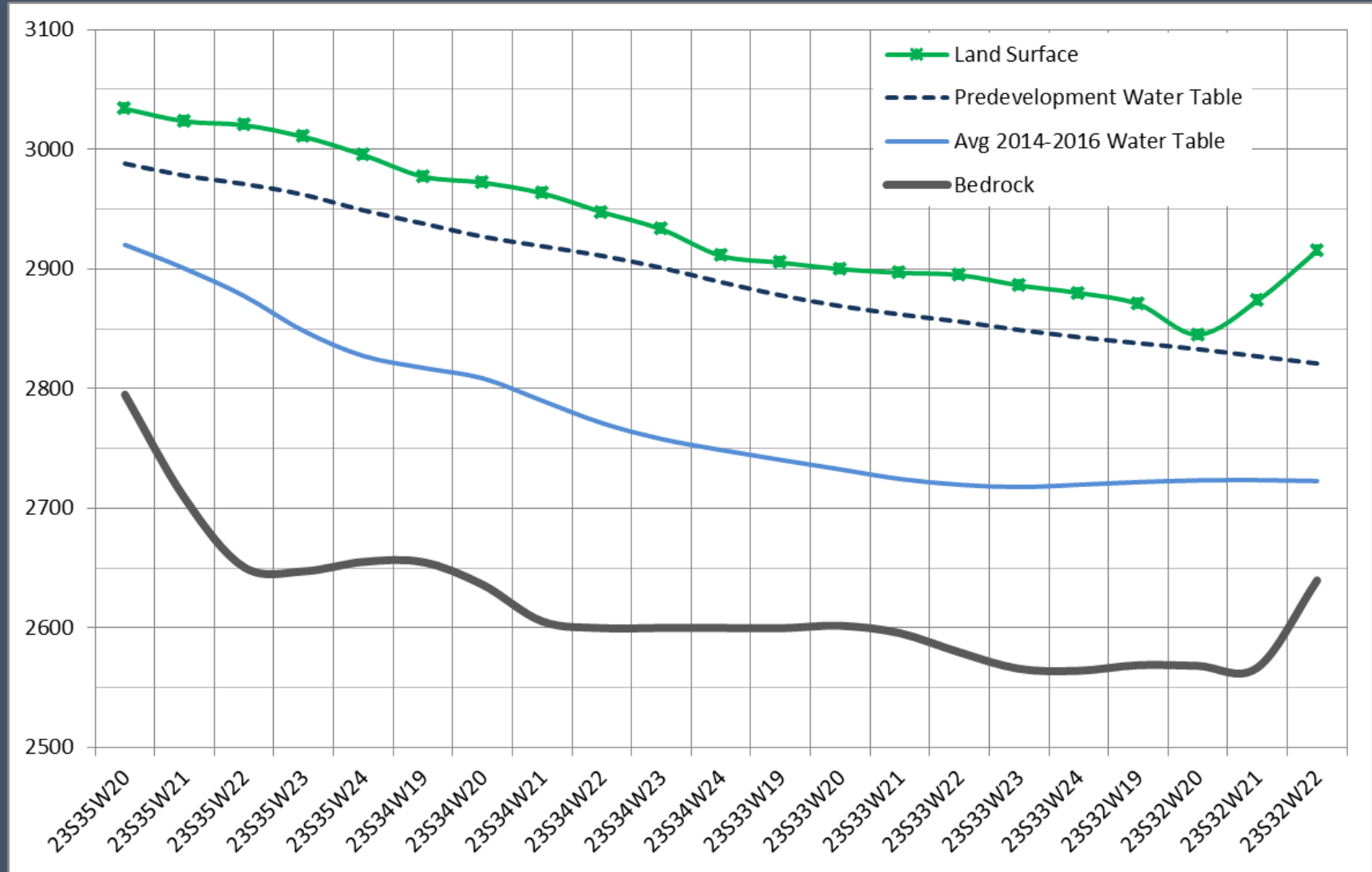
BEDROCK ELEVATIONS



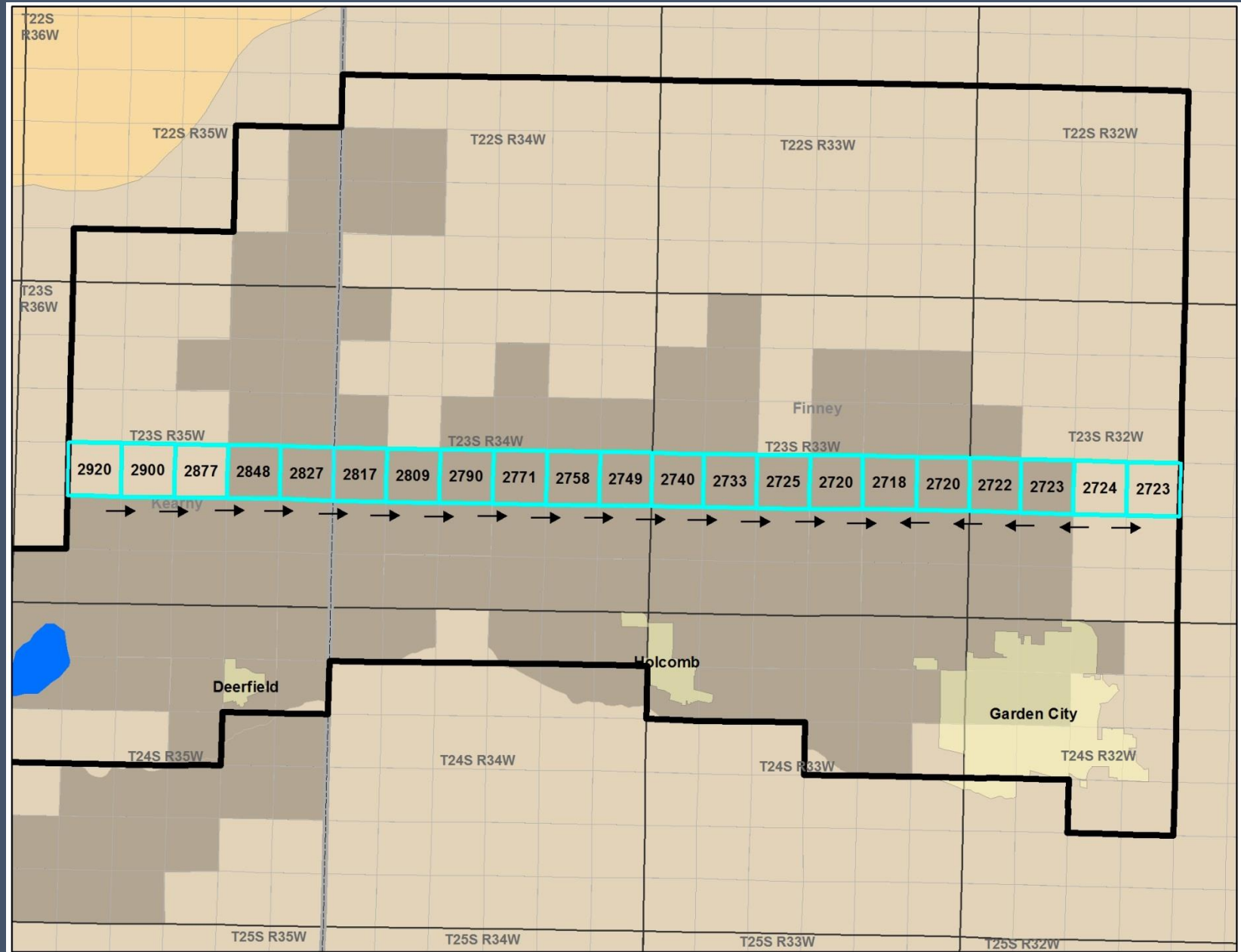
GROUNDWATER FLOW AND VELOCITIES EXAMPLE



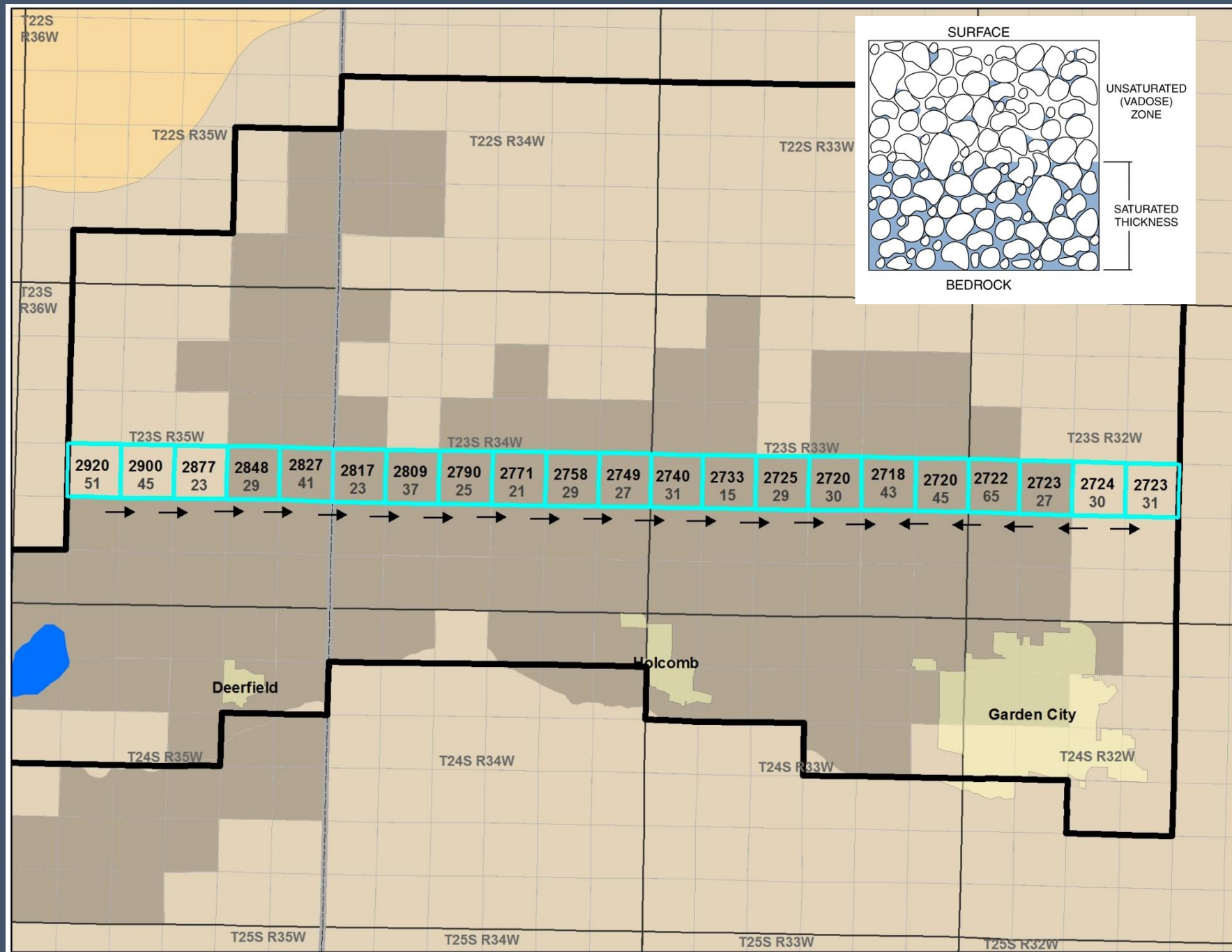
LAND SURFACE, WATER TABLE, AND BEDROCK PROFILES



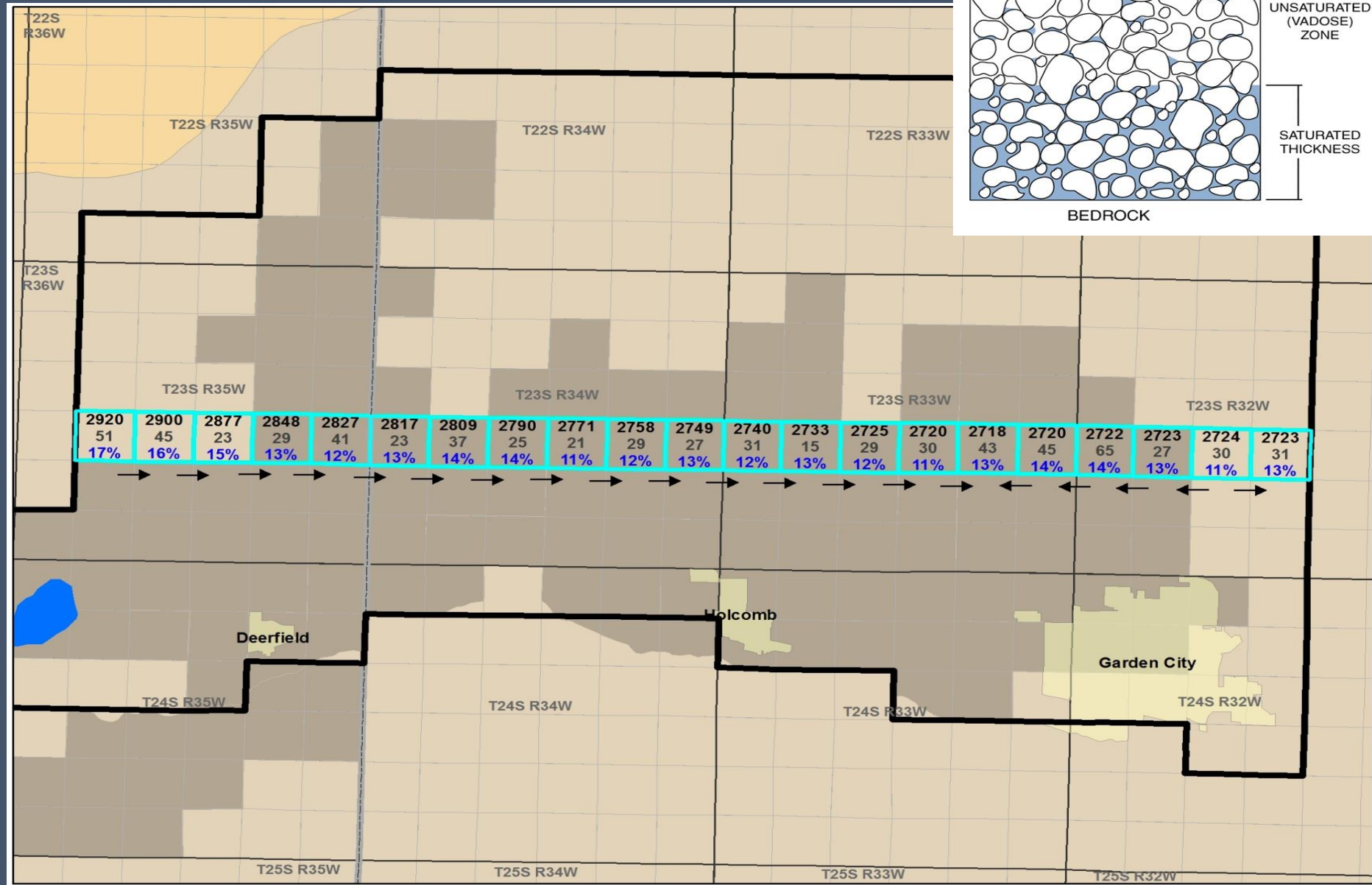
**VELOCITY
(FT/DAY) =
GRADIENT**



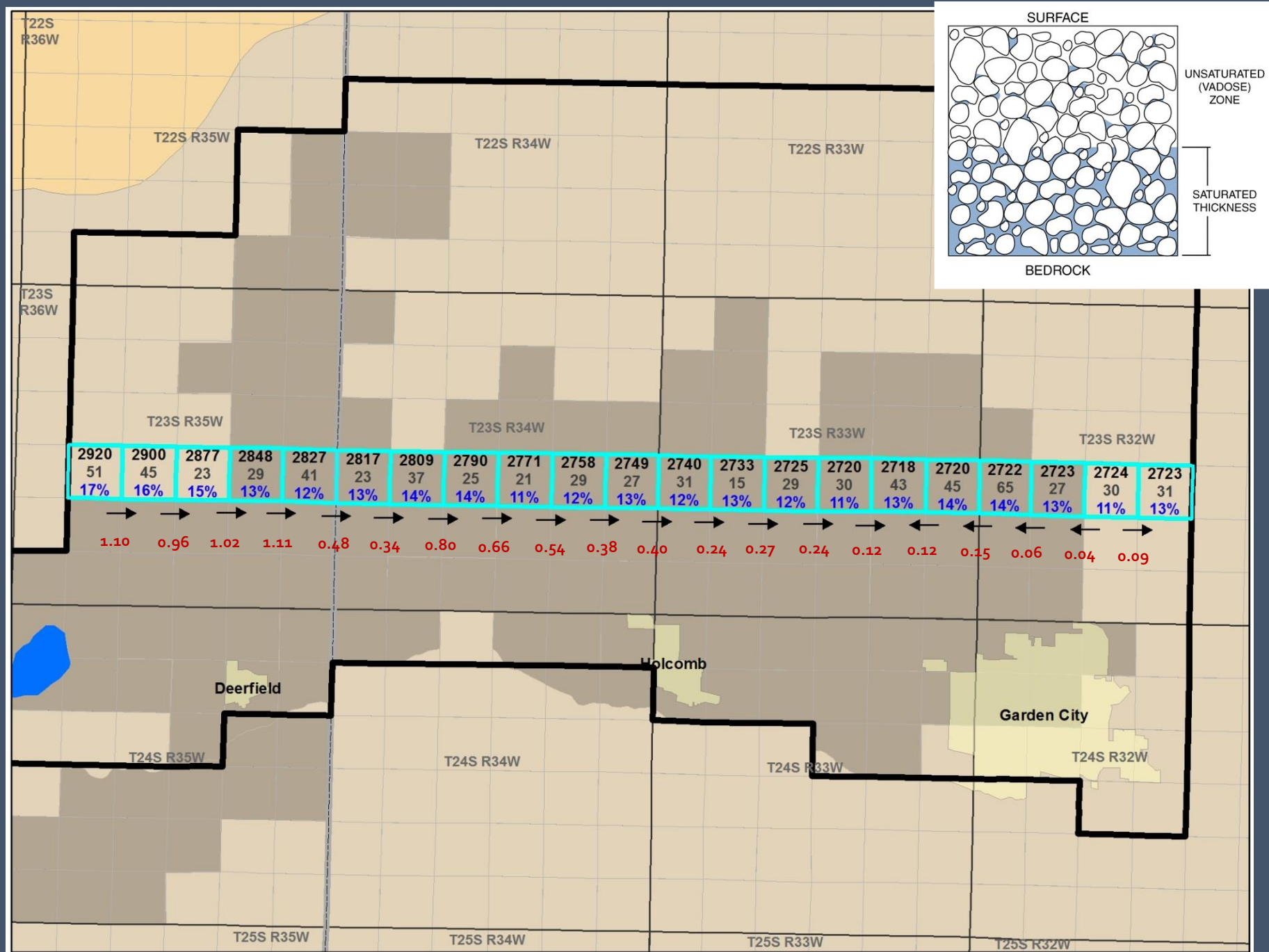
**VELOCITY
(FT/DAY) =
GRADIENT *
HYDRAULIC
CONDUCTIVITY
(FT/DAY)**



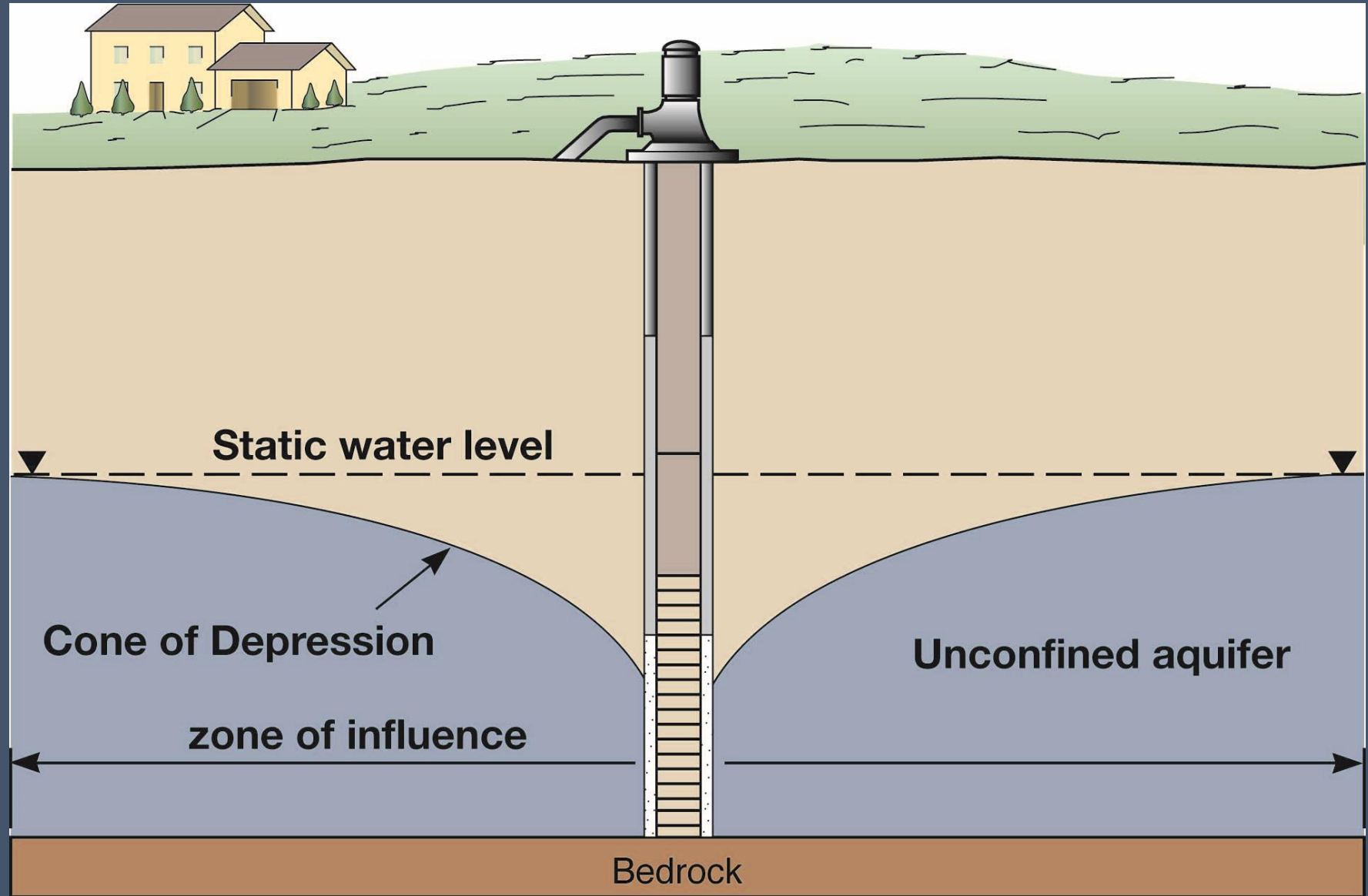
**VELOCITY
(FT/DAY) =
GRADIENT *
HYDRAULIC
CONDUCTIVITY
(FT/DAY) /
SPECIFIC YIELD**



VELOCITY (FT/DAY)
= GRADIENT * HYDRAULIC CONDUCTIVITY (FT/DAY) / SPECIFIC YIELD

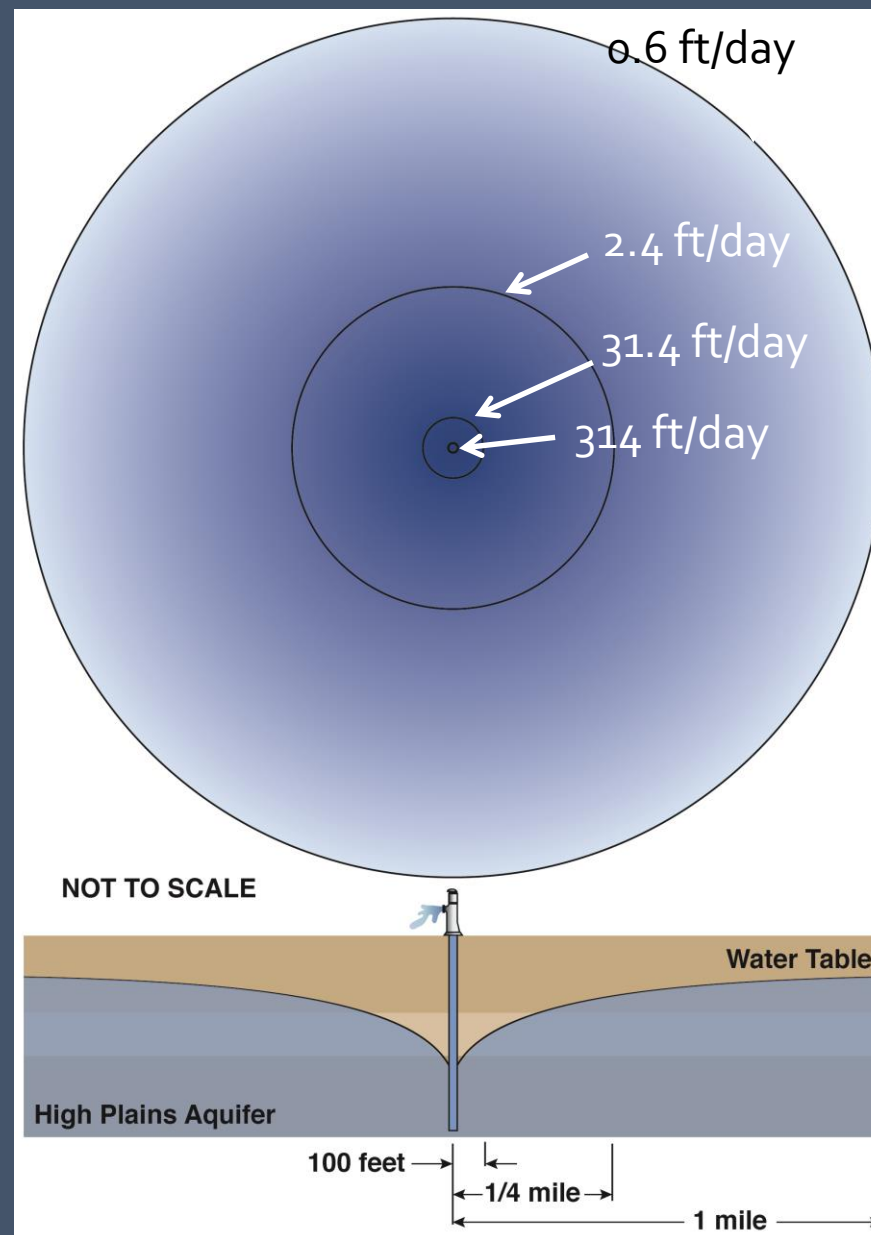


INFLUENCES FROM PUMPING WELLS



COMPUTED PUMPING VELOCITIES- THOMAS COUNTY INDEX WELL

- Pumping Rate 1000 gpm
- Saturated Thickness 65 ft
- Hydraulic Conductivity 100 ft/day
- Specific Yield 15%

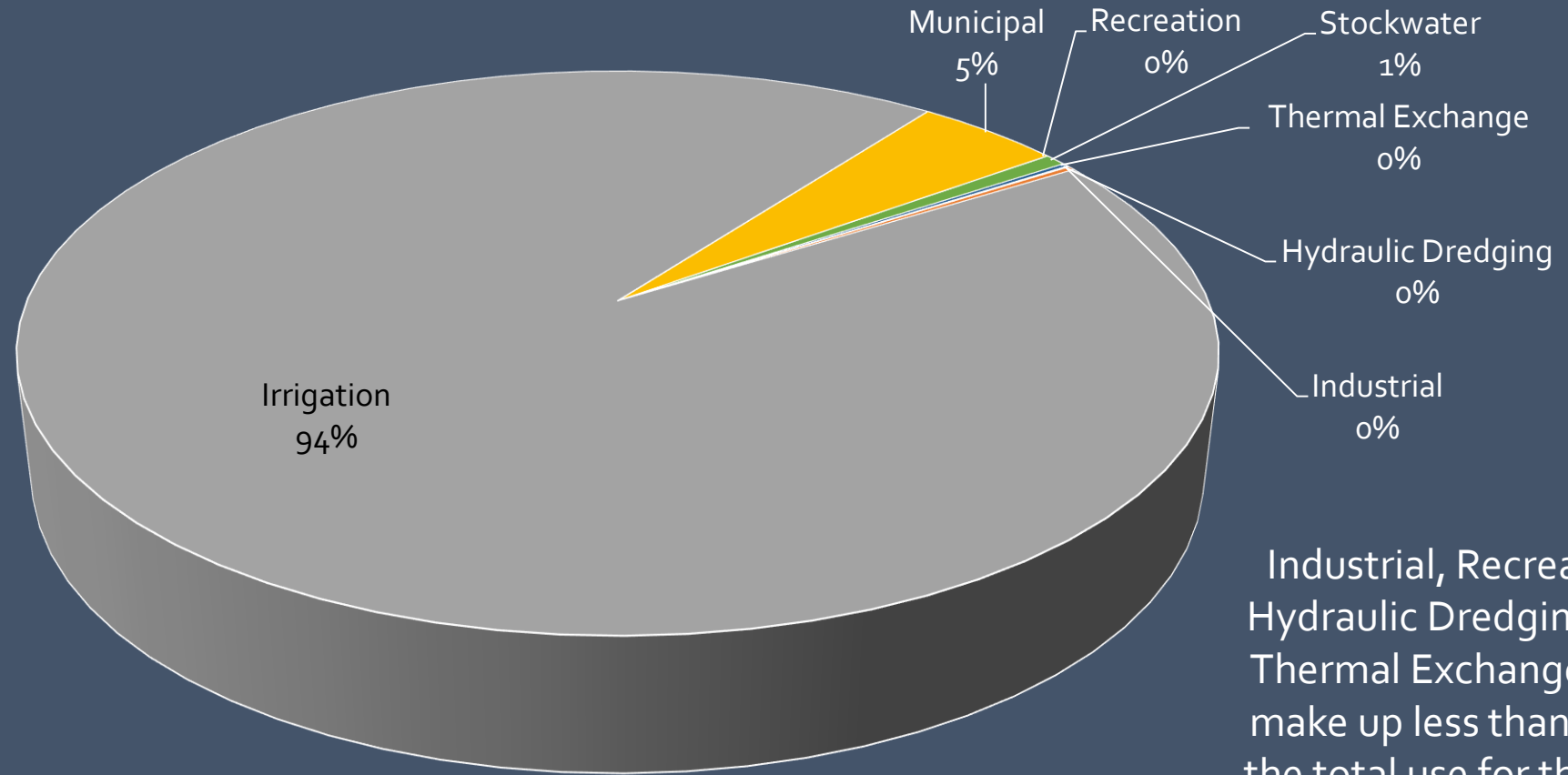


WATER USE

Northern Kearny Finney County
Local Enhanced Management Area (KFL)

KFL AVERAGE WATER USE PER YEAR, 2006-2015

| Use Made of Water | Average Acre-Feet |
|-------------------|-------------------|
| HYD | 77 |
| IND | 258 |
| IRR | 110,740 |
| MUN | 5,474 |
| REC | 9 |
| STK | 804 |
| THX | 221 |

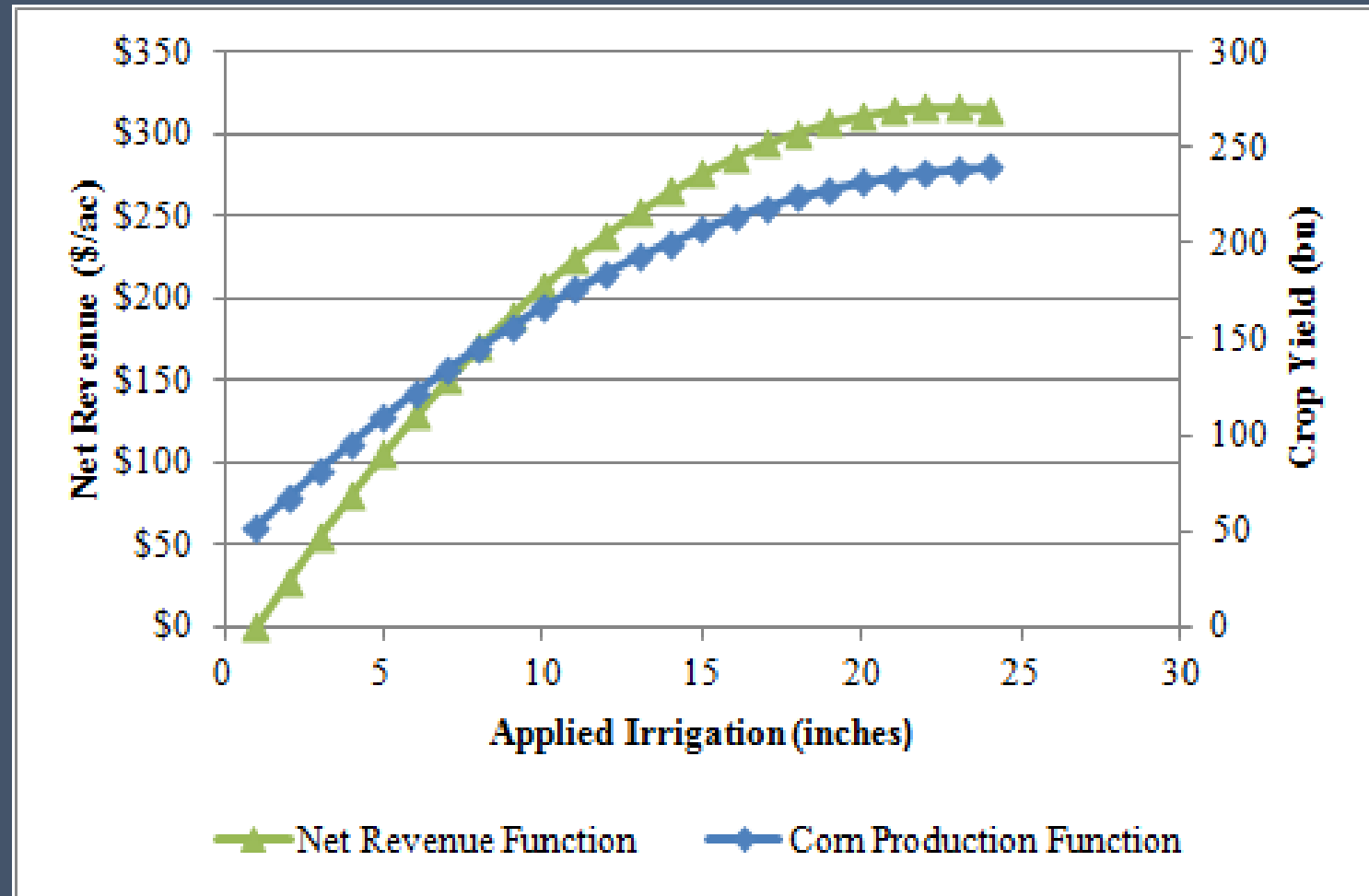


Industrial, Recreation, Hydraulic Dredging, and Thermal Exchange each make up less than 1% of the total use for the area

WHY VALUE REMAINING GROUNDWATER

From Bill Golden, KSU Economist:

- Example from Southwest Kansas: Both curves exhibit diminishing marginal returns to applied groundwater. Curves vary by crop, location, precipitation, and time
- 15-20% reduction in groundwater use will provide benefits to both the agricultural producer and rural communities



COMPARISON OF ALTERNATIVES

Northern Kearny Finney County
Local Enhanced Management Area (KFL)

COMPARISON OF ALTERNATE PROPOSALS

15% Reduction over a 5-Year Period

- Effective reduction over entire LEMA area = **11%** (assumes no vested water right participation)
- No Caps/No Ceilings
- 12,687 acre-feet saved annually
- Decline reduced by 42%

COMPARISON OF ALTERNATE PROPOSALS

20% Reduction over a 5-Year Period

- Effective reduction over entire LEMA area = **15%** (assumes no vested water right participation)
- No Caps/No Ceilings
- 17,049 acre-feet saved annually
- Decline reduced by 57%

COMPARISON OF ALTERNATE PROPOSALS

25% Reduction over a 5-Year Period

- Effective reduction over entire LEMA area = **19%** (assumes no vested water right participation)
- No Caps/No Ceilings
- 21,412 acre-feet saved annually
- Decline reduced by 72.3%

FLEXIBILITIES

Northern Kearny Finney County
Local Enhanced Management Area (KFL)

Water Right #1
Past Use: 75 AF
15%: 63.75

Water Right #2
Past Use: 100 AF
15%: 85

Water Right #3
Past Use: 60 AF
15%: 51 AF

Water Right #4
Past Use: 80 AF
15%: 68 AF

Potential Flexibility Scenarios

- All must stay within the LEMA allocation
- All will not exceed authorized quantity (no term permits)
- Requires tracking

Water Right #1
Past Use: 75 AF
~~15%: 63.75~~

Water Right #2
Past Use: 100 AF
~~15%: 85~~

Water Right #3
Past Use: 60 AF
~~15%: 51 AF~~

Water Right #4
Past Use: 80 AF
~~15%: 68 AF~~

267.75 AF

A: No Movement of Allocation

B: Movement of Allocation w/in a Management (Physically Tied Together)

Water Right #1
Past Use: 75 AF
15%: 63.75

Water Right #2
Past Use: 100 AF
15%: ~~85~~ 70 AF

Water Right #3
Past Use: 60 AF
15%: 51 AF

Water Right #4
Past Use: 80 AF
15%: ~~68~~ 83 AF

1/2 mile

Water Right #1
Past Use: 75 AF
~~15%: 63.75~~

Water Right X
267.75 AF

Water Right #2
Past Use: 100 AF
~~15%: 85~~

Water Right #3
Past Use: 60 AF
~~15%: 51 AF~~

Water Right Y

Water Right #4
Past Use: 80 AF
~~15%: 68 AF~~

C: Movement of Allocation within a Limited Distance

D: Movement of Allocation, Not Limited by Distance, Not Contiguous

ADDITIONAL ITEMS TO CONSIDER

- Recommendations to GMD on whether water right owners within the proposed LEMA boundary should vote on proposal? And if so, what that vote should look like?
- What additional items/information would the KFL group like to help with the LEMA proposal development?

TIMELINE

Northern Kearny Finney County
Local Enhanced Management Area (KFL)

TIMELINE:

GOAL - JANUARY 1, 2018 – IMPLEMENT LEMA

- April 12, 2017 – Propose LEMA to GMD#3 Board
- May - Hold stakeholder outreach meetings within proposed LEMA boundaries
- June – GMD formally requests LEMA; KDA reviews proposed LEMA
- July - Provide notice of initial public hearing
- September – Hold initial public hearing
- October – Provide notice of second public hearing
- November/December – Hold second public hearing
- End of 2017 – Chief engineer issues order of decision
- Early 2018 – Chief engineer issues order of designation

NEXT MEETINGS?

- Next week?
- March 28th at 1:00pm in Garden City
- April 12th – GMD#3 Board Meeting