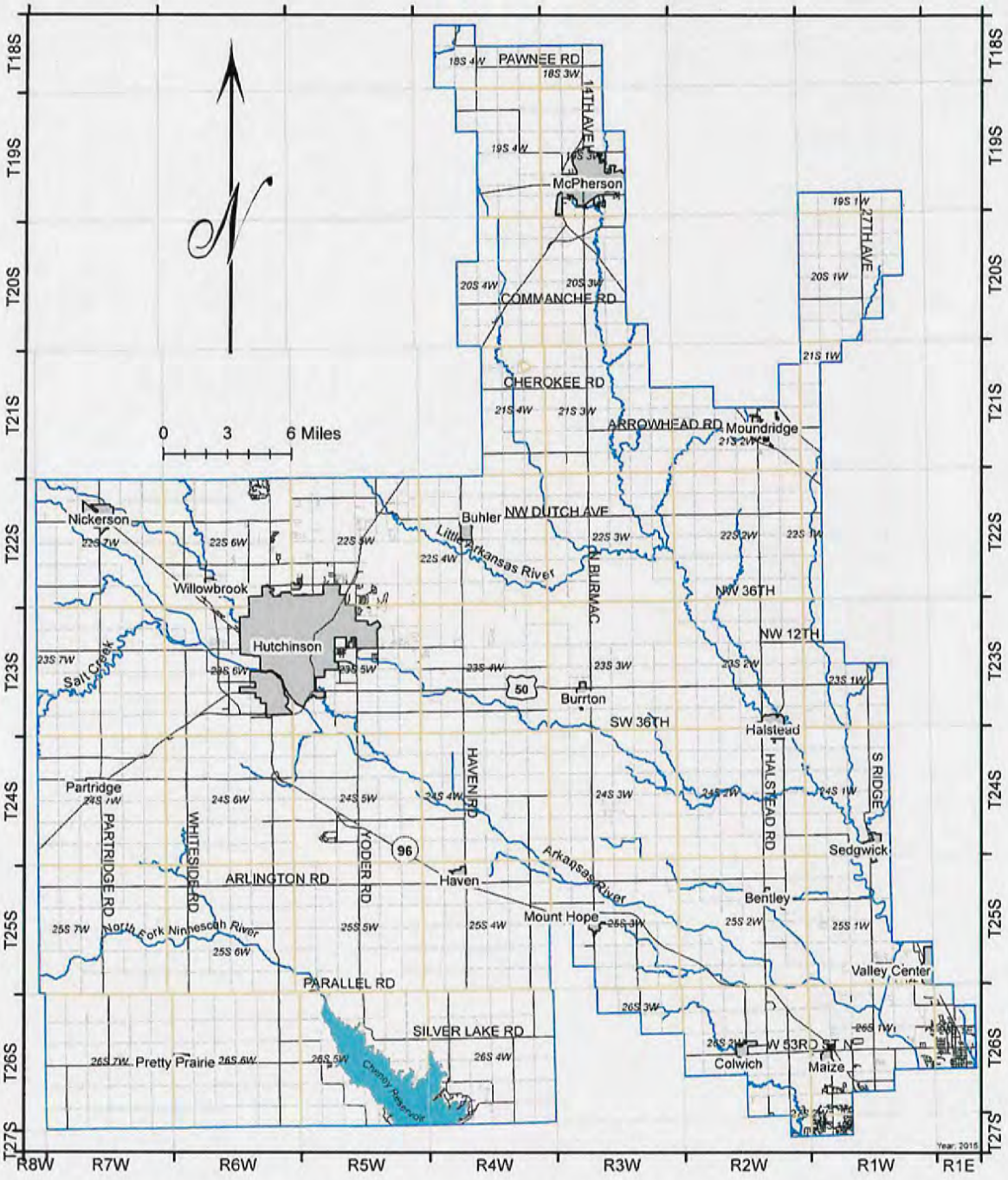
Equus Beds Groundwater Management District
Board of Directors Meeting
August 9, 2017
David Barfield, Chief Engineer



313 Spruce Street • Halstead, Kansas 67056-1925
Phone: 316 835-2224 • Fax : 316 835-2225
E-mail: equusbeds@gmd2.org • Website: www.gmd2.org

PROPOSED AGENDA
BOARD OF DIRECTORS MEETING

EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2

Wednesday, August 9, 2017
9:30 a.m.

313 Spruce Street • Halstead, KS 67056-1925
Phone: (316) 835-2224 • Fax: (316) 835-2225 • E-mail: equusbeds@gmd2.org

1. **APPROVAL OF MINUTES**
   a) July 12, 2017 Meeting
   b) July 12, 2017 Budget Hearing
2. **APPROVAL OF AGENDA**
3. **FINANCIAL REPORT**
4. **APPROVAL OF EXPENDITURES**
5. **PUBLIC FORUM** – *Persons may present written or verbal comments concerning non-agenda business. Please limit presentation to five minutes.*
6. **APPEAL REVIEW - None Pending**
7. **OLD BUSINESS**
   a) Oath of Office
8. **NEW BUSINESS**
   a) Certification of 2016 Land and Water Assessments to County Clerks
   b) Review Safe Yield Calculations for Expansion Areas
9. **AGENCY & COMMITTEE REPORTS**
   a) Division of Water Resources
   b) Kansas Water Authority
   c) Equus - Walnut Regional Advisory Committee
10. **MANAGER'S REPORT**
    a) ASR Project Report
    b) Administrative and Field Tasks
    c) Review of Term Permit Applications
    d) Monthly Information and Service Report
11. **ADDITIONS TO THE AGENDA**
12. **BOARD ROUND TABLE DISCUSSION**

Notice: All Board of Directors meeting and any portion thereof are open to the public, except for closed or executive meetings, as prescribed by K.S.A. 75-4319. Please complete a meeting notice form, if you wish to be notified of Board of Directors meetings, hearings, work sessions or other business meetings. Notice forms may be obtained by contacting the Equus Beds Groundwater Management District No. 2.

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EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2
JULY 12, 2017

The Board of Directors for the Equus Beds Groundwater Management District No. 2 held a monthly meeting July 12, 2017, in the conference room of the Equus Beds Groundwater Management District No. 2 in Halstead, Kansas. President Jeff Winter called the meeting to order at 9:31 a.m.

Directors and staff present during all or portions of the meeting:

Jeff Winter, President
Mike McGinn, Treasurer
Joe Pajor, Member
David Stroberg, Member
Tim Boese, Manager
Rebecca Wilson, Admin. Assistant
Vin Kissick, Vice President
David Bogner, Member
Dale Schmidt, Member
Tom Adrian, Attorney
Steve Flaherty, Hydrogeologist

Directors absent: Alan Burghart, Bob Seiler

Others attending the meeting or portions thereof were:

Cameron Conant, KDA - DWR Stafford
Daniel Clement, Burns & McDonnell
Byron Warta, Equus-Walnut RAC

ITEM 1 -- APPROVAL OF JUNE 21ST MEETING MINUTES

Moved by David Bogner and seconded by David Stroberg to approve the Minutes. Motion carried with 6 Directors for, 0 Directors against, 0 Directors abstained, and 3 Directors absent.

ITEM 2 -- APPROVAL OF AGENDA

Moved by Joe Pajor and seconded by David Bogner to add Agenda Item 8(c) – KDA/DWR Regulatory Changes Update and to approve the Agenda as amended. Motion carried with 6 Directors for, 0 Directors against, 0 Directors abstained, and 3 Directors absent.

ITEM 3 -- FINANCIAL REPORT

June Financial Report

Moved by Vin Kissick and seconded by Dale Schmidt to approve the June Financial Report as amended. Motion carried with 6 Directors for, 0 Directors against, 0 Directors abstained, and 3 Directors absent.

ITEM 4 -- APPROVAL OF EXPENDITURES

Moved by Joe Pajor and seconded by David Stroberg to approve the July expenditures. Motion carried with 7 Directors for, 0 Directors against, 0 Directors abstained, and 2 Directors absent.

ITEM 5 -- PUBLIC FORUM - NONE

ITEM 6 -- APPEAL REVIEW - NONE

ITEM 7 -- OLD BUSINESS

a) REVIEW ADOPTED 2017 BUDGET & DRAFT FY 2018 BUDGET

Manager Tim Boese reviewed with the Board possible expenditures and funding for the 2017, 2018, and 2019 fiscal years and informed the Board that the Halstead Bank is willing to loan the District 80% of the value of the District office building, approximately $60,000, to repair the District office building and/or purchase the building next door. Tim reviewed the details of a possible five, ten, and fifteen year loan with the Board. Tim

informed the Board that he met with the owner of the building next door to tour the building. The owner is asking $45,000 for the building, but is willing to consider other offers. Discussion by the Board followed. Attorney Tom Adrian researched regarding the District acquiring a loan, and he confirmed that the Board can commit to a loan with installment payments over a period of time. Vice President Vin Kissick asked Manager Tim Boese to present a plan to the Board for the use of the building/lot next door if the District purchases it. President Jeff Winter suggested that the Board take a tour of the current District office to see where updates could be made. Member Joe Pajor suggested that a decision regarding the purchase of the building next door be held until later in the Board meeting. Moved by Mike McGinn and seconded by David Bogner to add Agenda Item 13 - Executive Session. Motion carried with 7 Directors for, 0 Directors against, 0 Directors abstained, and 2 Directors absent.

Manager Tim Boese also reviewed the Draft 2018 Budget and the Draft FY 2018 Financial Statement with the Board.

b) KGS GMD2 MODELING – PHASE II

Manager Tim Boese informed the Board that KGS confirmed that they will be flexible with the payment schedule for Phase II of the KGS GMD2 Model. Manager Tim Boese recommended going forward with Phase II of the modeling with a plan to pay $30,000 in 2017, $0 in 2018, and $27,500 in 2019. Discussion by the Board followed, including various uses of the Model over time and the possibility of connecting to the GMD5 groundwater model. Joe Pajor suggested that the District provide some wording in the contract with KGS to ensure that GMD5 will not have to change their groundwater model or incur any additional expenses. Moved by Vin Kissick and seconded by Joe Pajor to proceed with the proposed KGS contract outlined by Manager Tim Boese with the additional clarification protecting GMD5, and giving Tim authority to sign the contract once received from KGS. Motion carried with 6 Directors for, 1 Director against, 0 Directors abstained, and 2 Directors absent.

ITEM 8 -- NEW BUSINESS

a) KANSAS WATER CONGRESS 2017 SUMMER CONFERENCE – JULY 27 & 28

Manager Tim Boese reviewed the Conference agenda and registration with the board. Tim plans to attend the Conference and indicated that expenses would include registration of $90 per person as well as hotel accommodations for two nights. Vice President Vin Kissick indicated that he was interested in attending the Conference, but he will first see if the Kansas Water Office will pay any of his expenses. Moved by Joe Pajor and seconded by Mike McGinn to authorize expenses not to exceed $700 for Manager Tim Boese and Vice President Vin Kissick to attend the Conference. Motion carried with 6 Directors for, 0 Directors against, 1 Director abstained, and 2 Directors absent.

b) RESOLUTION ME-2017-1 ADOPTION OF LAND AND WATER ASSESSMENT RATES

Manager Tim Boese reviewed the proposed Resolutions with the Board. Moved by Joe Pajor and seconded by David Stroberg to adopt the Resolution that includes the Out-of-District water being assessed at $1.50 per acre-foot, as well as direct the District Manager to work with other interested parties to craft proposed legislation that would:

1. Raise the In-District place of use cap on water assessments to $2.00 per acre-foot,

2. Change state law to categorize water assessment rate caps based on the point of use as being in state or out-of-state to replace the existing In-District and Out-of-District designations,

3. Raise the out-of-state cap to $3.00 per acre-foot, and

4. Maintain current language of state law that recognizes the ability of any water rights holder to utilize verified claims to pay the water assessment based on the actual amount

of water pumped in a given year. Discussion by the Board followed. Moved by Vin Kissick and seconded by Mike McGinn to amend the motion to only adopt the Resolution to increase the Out-of-District water assessment rate to $1.50 per acre foot, and not vote on the additional items 1-4 today. Motion carried with 4 Directors for, 2 Directors against, 1 Director abstained, and 2 Directors absent. Amended motion carried with 4 Directors for, 2 Directors against, 1 Director abstained, and 2 Directors absent. Mike McGinn asked District staff to review the proposed assessment cap legislation with the other GMDs and report to the Board, as well as research and provide any clarification of the In-District/Out-of-District and In-State/Out-of-State history.

c) KDA/DWR REGULATORY CHANGES

Manager Tim Boese informed the Board that a hearing on K.A.R. 5-05-09, K.A.R. 5-05-10, and K.A.R. 5-05-16 (Calculation of Consumptive Use of a Water Right) and K.A.R. 5-14-11 (Civil Penalty on a Delinquent Water Use Report) has been scheduled for July 25, 2017. Tim provided the Board with the proposed new map for the calculation of consumptive use with the Board. Tim also informed the Board that it has been proposed that the penalty for not submitting a water use report increase from $250 to $1,000, with a possibility of reduced penalty of $250 if received by June 1st of the same year. Discussion by the Board followed. Moved by Joe Pajor and seconded by Vin Kissick for Manager Tim Boese to enter written testimony in support of increasing Civil Penalties on a Delinquent Water Use Report. Motion carried with 7 Directors for, 0 Directors against, 0 Directors abstained, and 2 Directors absent.

ITEM 9 -- AGENCY & COMMITTEE REPORTS

a) DIVISION OF WATER RESOURCES

Cameron Conant, DWR - Stafford, stated that his only report was regarding the closing of Great Plains McCrometer in Aurora, Nebraska. Cameron stated that this closing would leave a large void in repairing and ordering meters and their various parts, as DWR had a good relationship with Great Plains. Manager Tim Boese reported that the District also had a good working relationship with Great Plains McCrometer, and that Hydrologic Technician David Randolph is certified to repair McCrometer meters until 2018. Tim is unsure whether or not the District will remain certified after that time, but more will be known once the District begins working with the California McCrometer office.

b) KANSAS WATER AUTHORITY

Board Vice President, Vin Kissick, informed the Board that the next meeting is scheduled for August 16th and 17th in Pittsburg. Vin stated that he would look into adding proposed GMD assessment cap legislation, including the City of Wichita's proposed language, as an agenda item to discuss at the meeting. Vin would also like Manager Tim Boese to attend a future KWA meeting to present the assessment cap issue and proposed legislation.

c) EQUUS – WALNUT REGIONAL ADVISORY COMMITTEE

Joe Pajor, Member, informed the Board that the next meeting will be the Central Kansas Joint RAC Lower Quality Water Summit on July 18th at 10:00 a.m. at the Water Treatment Plant in Hutchinson. Joe reviewed the agenda for the Board. Manager Tim Boese will attend the Summit and will provide a map and information regarding current contamination sites within the District.

ITEM 10 -- MANAGER'S REPORT

a) ASR Project Report

Tim Boese, Manager, advised the Recharge for June was: 0 acre-feet recharged in Phase I and Phase II. Cheney Reservoir: Conservation pool is 100% full and Flood pool is 1.88% full. Cheney release is 0 CFS. Flow today: Little Ark - Highway 50 is 20 CFS; Valley Center is at 43 CFS.

GMD2 staff met with the City of Wichita staff, the City of Wichita consultant, and DWR on June 21, 2017, regarding ASR permit condition modifications; including lowering the minimum Index levels and establishing ASR Aquifer Maintenance Credits (recharge credits for sending treated Little Ark water directly to town when the aquifer is full). A letter and draft report regarding the proposed modification to Minimum Index Levels was received by GMD2 on July 3, 2017. Proposed changes range from lowering the level from 9.1 feet to 23.42 feet. GMD2 staff will evaluate the letter and draft report prior to meeting with the City of Wichita again on July 19, 2017.

District staff previously reviewed the 2015 ASR Accounting Report and found multiple errors with additional information/clarification needed. District staff sent a letter to the City and to the consultant. A response letter was received from the consultant on April 13, 2017. A corrected 2015 report has not yet been furnished to the District.

b) ADMINISTRATIVE FIELD TASKS

Tim Boese, Manager, reported that in June, staff reviewed 5 new/change applications, completed 10 water permit consultations, and processed a total of 55 files including VI cards, new applications, approvals, dismissals, and certificates. Staff began sampling water permits in the Burrton and Hollow Nikkel areas. Staff also continues to update the assessment database, as well as continues working on a new GMD2 website.

Manager Tim Boese reported to the Board that the GMD2 Boundaries Expansion was approved on July 7, 2017. Staff will begin working on new maps, creating water permit files, updating databases, and developing safe yield calculations for new areas.

Manager Tim Boese provided the Board with an update to the monitoring well issue in the Eagle Drainage District. District staff is working with the City of Wichita to develop a plan to repair the wells, but the groundwater level is currently too high to begin work.

c) REVIEW OF TERM PERMIT APPLICATIONS

Tim Boese, Manager, advised that there were no term permit replacement/renewal applications reviewed by District staff in June.

d) MONTHLY INFORMATION & SERVICE REPORT

Tim Boese, Manager, presented customer service requests for the month of June.

ITEM 11 -- ADDITIONS TO THE AGENDA - NONE

ITEM 12 -- BOARD ROUND TABLE DISCUSSION – JEFF WINTER, PRESIDENT

Manager Tim Boese informed the Board that Great Plains McCrometer in Nebraska is closing this week, so the District will now be buying meters and parts from the McCrometer office in California. Vin Kissick questioned how this could affect District members regarding sales and service. Tim stated that as long as David can get the parts he needs, he is certified until 2018 to repair the McCrometer meters. Tim is hopeful that the California office will pick up the records from Nebraska and provide parts and service as quickly as possible.

Vice President Vin Kissick informed the Board that Byron Warta informed him today that there will be a conference today or tomorrow ran by the Trump administration to look at uses for the Arkansas River.

David Bogner mentioned that there was an article in The Wichita Eagle regarding the Crystal Prairie Lake project. This sandpit area is owned by the City of Wichita, and Manager Tim Boese met with the consultant several years ago. Tim will contact the consultant to check into the current progress.

ITEM 13 -- EXECUTIVE SESSION -

Moved by Vin Kissick and seconded by David Bogner to recess into Executive Session for 15 minutes to discuss property acquisition with the District's attorney for the purpose of protecting the privacy of that information. Motion carried with 7 Directors for, 0 Directors against, 0 Directors abstained, and 2 Directors absent. Those present during this Executive Session were the members of the Board; Tim Boese, Manager; and Tom Adrian, Legal Counsel.

Time in Executive Session: 12:06 p.m.
Time out of Executive Session: 12:21 p.m.

Moved by Joe Pajor and seconded by David Bogner to recess back into Executive Session for an additional 10 minutes for the same purpose as before. Motion carried with 7 Directors for, 0 Directors against, 0 Directors abstained, and 2 Directors absent.

Time in Executive Session: 12:21 p.m.
Time out of Executive Session: 12:31 p.m.

No action was taken as a result of the Executive Session.

Moved by David Stroberg and seconded by Dale Schmidt to adjourn the meeting. Motion carried with 7 Directors for, 0 Directors against, 0 Directors abstained, and 2 Directors absent. Jeff Winter, President, adjourned the Board meeting at 12:32 p.m.

Alan Burghart
Secretary
AB/TDB/rsw

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EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2
BUDGET HEARING
July 12, 2017

The Board of Directors for the Equus Beds Groundwater Management District No. 2 held a budget hearing July 12, 2017, in the conference room of the Equus Beds Groundwater Management District No. 2 in Halstead, Kansas. President Jeff Winter called the hearing to order at 10:30 a.m.

Directors and staff present during all or portions of the meeting:

Jeff Winter, President	Vin Kissick, Vice-President
Mike McGinn, Treasurer	David Bogner, Member
Joe Pajor, Member	Dale Schmidt, Member
David Stroberg, Member	Tom Adrian, Attorney
Tim Boese, Manager	Steve Flaherty, Hydrogeologist
Rebecca Wilson, Admin. Assistant	

Directors absent: Alan Burghart, Bob Seiler

Vin Kissick, Vice President, advised the legal notices were published in the following local newspapers on June 9, 2017: The Hutchinson News, The McPherson Sentinel, The Newton Kansan, and The Wichita Eagle.

Mike McGinn, Treasurer, and Tim Boese, Manager, presented two proposed FY 2018 budgets for review and discussion.

The first FY 2018 budget proposed an assessment rate of $1.00 per acre-foot of water both In-District and Out-of-District, and a proposed assessment rate of $0.05 per acre of land, for a total assessment revenue of $371,780. Expenditures would total $484,241.

The second FY 2018 budget proposed an assessment rate of $1.00 per acre-foot of water In-District, $1.50 per acre-foot of water Out-of-District, and $0.05 per acre of land, for a total assessment revenue of $393,189. Expenditures would total $484,241.

President Jeff Winter asked if the audience had any comments. There were none.

President Jeff Winter adjourned the hearing at 10:32 a.m.

Respectfully submitted,

Alan Burghart
Secretary

AB/TDB/rw

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EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2
EXPENDITURES TO APPROVE
July 2017

LINE ITEM CODE NO.	DESCRIPTION				GENERAL FUND	CAFETERIA FUND	GRANT FUND	CK #
106	CAFETERIA ACCOUNT (FSA HEALTH & DCAP)				$50.00			
505	BLUE CROSS & BLUE SHIELD OF KANSAS				$1,933.42			
506	EFTPS - (FED W/H, FICA & MEDICARE)				$4,299.66			
506	KANSAS WITHHOLDING - MAY				$570.00			
509	KPERS (RETIREMENT)				$2,711.26			
	FIRST NATIONAL BANK OMAHA	Fuel	601	$373.99				
		Meals	603	$71.57				
		Vehicle Maintenance	607	$178.50				
		Office Building Maintenance	701	$71.96				
		Postage	713	$24.99				
		Computer	718	$16.00				
		Water Quality Monitoring	804	$55.61				
					$792.62			
701	NATHAN BOESE				$175.00			
701	SPRING VALLEY LAWN & LANDSCAPES				$125.00			
702	CITY OF HALSTEAD				$63.42			
702	WESTAR ENERGY				$235.27			
703	QUILL				$313.47			
703	HALSTEAD MARKET				$38.31			
711	ADRIAN & PANKRATZ				$1,618.00			
715	EVERBANK COMMERCIAL FINANCE				$369.95			
	AT & T		718	$80.85	$80.85			
			719	$137.38				
			814	$203.25	$340.63			
809	McCROMETER				$3,376.75			
813	DARLING DRILLING				$100.00			
814	CENTURYLINK	620-543-2902–HV Co., Acct #313780808			$83.57			
	EMPLOYEE SALARIES:							
501	TIMOTHY D BOESE	(SALARY 07/14/17)			$2,392.74			
501	TIMOTHY D BOESE	(SALARY 07/31/17)			$2,392.74			
502	REBECCA S WILSON	(SALARY 07/14/17)			$1,208.16			
502	REBECCA S WILSON	(SALARY 07/31/17)			$1,208.18			
507	DAVID D RANDOLPH	(SALARY 07/14/17)			$1,323.10			
507	DAVID D RANDOLPH	(SALARY 07/31/17)			$1,323.11			
508	STEPHEN T FLAHERTY	(SALARY 07/14/17)			$1,913.84			
508	STEPHEN T FLAHERTY	(SALARY 07/31/17)			$1,913.85			
	EMPLOYEE OR DIRECTOR REIMBURSEMENTS:							
719	TIM BOESE - CELL PHONE REIMBURSEMENT (2nd QTR)				$250.00			
719	REBECCA WILSON - CELL PHONE REIMBURSEMENT (2nd QTR)				$60.00			
719	DAVID RANDOLPH - CELL PHONE REIMBURSEMENT (2nd QTR)				$60.00			
719	STEVE FLAHERTY - CELL PHONE REIMBURSEMENT (2nd QTR)				$60.00			
				TOTAL	**$31,382.90**	**$0.00**	**$0.00**	

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EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2
ACTUAL EXPENDITURES
July 2017

LINE ITEM CODE NO.	DESCRIPTION				GENERAL FUND	CAFETERIA FUND	GRANT FUND	CK #
106	CAFETERIA ACCOUNT (FSA HEALTH & DCAP)				$50.00			17537
505	BLUE CROSS & BLUE SHIELD OF KANSAS				$1,933.42			17538
506	EFTPS - (FED W/H, FICA & MEDICARE)				$4,299.66			EFT
506	KANSAS WITHHOLDING - MAY				$570.00			EFT
509	KPERS (RETIREMENT)				$2,711.26			EFT
	FIRST NATIONAL BANK OMAHA	Fuel	601	$373.99				
		Meals	603	$71.57				
		Vehicle Maintenance	607	$178.50				
		Office Building Maintenance	701	$71.96				
		Postage	713	$24.99				
		Computer	718	$16.00				
		Water Quality Monitoring	804	$55.61				
					$792.62			17539
701	NATHAN BOESE				$175.00			17540
701	SPRING VALLEY LAWN & LANDSCAPES				$125.00			17541
702	CITY OF HALSTEAD				$63.42			17542
702	WESTAR ENERGY				$235.27			17543
703	QUILL				$313.47			17544
703	HALSTEAD MARKET				$38.31			17545
707	KANSAS WATER CONGRESS SUMMER CONFERENCE				**$180.00**			17565
711	ADRIAN & PANKRATZ				$1,618.00			17546
712	HARVEY COUNTY REGISTER OF DEEDS				**$102.00**			17566
712	MCPHERSON COUNTY REGISTER OF DEEDS				**$102.00**			17569
712	RENO COUNTY REGISTER OF DEEDS				**$102.00**			17567
712	SEDGWICK COUNTY REGISTER OF DEEDS				**$102.00**			17568
715	EVERBANK COMMERCIAL FINANCE				$369.95			17547
	AT & T		718	$80.85	$80.85			17548
			719	$137.38				
			814	$203.25	$340.63			17549
809	McCROMETER				$3,376.75			17550
813	DARLING DRILLING				$100.00			17551
814	CENTURYLINK	620-543-2902–HV Co., Acct #313780808			$83.57			17552
	EMPLOYEE SALARIES:							
501	TIMOTHY D BOESE	(SALARY 07/14/17)			$2,392.74			17553
501	TIMOTHY D BOESE	(SALARY 07/31/17)			$2,392.74			17557
502	REBECCA S WILSON	(SALARY 07/14/17)			$1,208.16			17556
502	REBECCA S WILSON	(SALARY 07/31/17)			$1,208.18			17560
507	DAVID D RANDOLPH	(SALARY 07/14/17)			$1,323.10			17555
507	DAVID D RANDOLPH	(SALARY 07/31/17)			$1,323.11			17559
508	STEPHEN T FLAHERTY	(SALARY 07/14/17)			$1,913.84			17554
508	STEPHEN T FLAHERTY	(SALARY 07/31/17)			$1,913.85			17558
	EMPLOYEE OR DIRECTOR REIMBURSEMENTS:							
719	TIM BOESE - CELL PHONE REIMBURSEMENT (2nd QTR)				$250.00			17561
719	REBECCA WILSON - CELL PHONE REIMBURSEMENT (2nd QTR)				$60.00			17562
719	DAVID RANDOLPH - CELL PHONE REIMBURSEMENT (2nd QTR)				$60.00			17564
719	STEVE FLAHERTY - CELL PHONE REIMBURSEMENT (2nd QTR)				$60.00			17563
				TOTAL	**$31,970.90**	**$0.00**	**$0.00**	

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Equus Beds Groundwater Management District #2
Budget vs. Actual
THROUGH JULY 2017

	Jan - Jul 17	Budget	$ Over Budget	% of Budget
Expense				
500 · Personnel Expenditures				
501 · Manager	50,458.38	88,046.00	-37,587.62	57.31%
502 · Administrative Assistant	23,733.38	41,600.00	-17,866.62	57.05%
503 · Temporary Employees	0.00	5,000.00	-5,000.00	0.0%
504 · Payroll Tax Expense	9,816.23	17,658.00	-7,841.77	55.59%
505 · Health Insurance Benefits	10,769.72	25,000.00	-14,230.28	43.08%
506 · Employment Withholding Taxes	68.70			
507 · Hydrologic Technician	25,083.38	42,535.00	-17,451.62	58.97%
508 · Hydrologist	32,375.00	53,642.00	-21,267.00	60.35%
509 · Employee Retirement	11,930.79	24,840.00	-12,909.21	48.03%
511 · Employee Educational Assistance	0.00	5,000.00	-5,000.00	0.0%
Total 500 · Personnel Expenditures	164,235.58	303,321.00	-139,085.42	54.15%
600 · Transportation Expenditures				
601 · Fuel	2,511.35	10,000.00	-7,488.65	25.11%
602 · Mileage Reimbursement	0.00	2,000.00	-2,000.00	0.0%
603 · Travel Meals	593.50	1,000.00	-406.50	59.35%
604 · Travel Lodging	745.43	4,000.00	-3,254.57	18.64%
605 · Vehicle Insurance and Fees	2,159.50	2,500.00	-340.50	86.38%
607 · Vehicle Maintenance	322.85	2,000.00	-1,677.15	16.14%
Total 600 · Transportation Expenditures	6,332.63	21,500.00	-15,167.37	29.45%
700 · Administrative Expenditures				
701 · Office Maintenance	2,518.44	5,000.00	-2,481.56	50.37%
702 · Utilities	1,946.63	3,500.00	-1,553.37	55.62%
703 · Office Supplies	2,134.24	4,500.00	-2,365.76	47.43%
704 · Office Equipment & Maintenance	0.00	1,000.00	-1,000.00	0.0%
705 · Publications	698.13	1,000.00	-301.87	69.81%
706 · Printing	1,383.05	3,500.00	-2,116.95	39.52%
707 · Memberships & Conference Fees	907.29	4,000.00	-3,092.71	22.68%
708 · Insurance - Office	4,717.00	5,000.00	-283.00	94.34%
710 · Insurance - Prof Liability	0.00	1,500.00	-1,500.00	0.0%
711 · Legal Fees	8,906.50	20,000.00	-11,093.50	44.53%
712 · Other Professional Fees	4,121.00	5,000.00	-879.00	82.42%
713 · Postage	1,610.93	5,000.00	-3,389.07	32.22%
714 · Miscellaneous	40.00	1,000.00	-960.00	4.0%
715 · Digital Imaging System	3,174.11	6,000.00	-2,825.89	52.9%
716 · KS Unemployment	112.00	1,000.00	-888.00	11.2%
717 · Insurance - Workers Comp	514.00	1,500.00	-986.00	34.27%
718 · Computer	1,290.79	5,000.00	-3,709.21	25.82%
719 · Telephone Service	1,816.54	4,000.00	-2,183.46	45.41%
720 · Laboratory	0.00	200.00	-200.00	0.0%
722 · Budgeted Reserve	0.00	20,000.00	-20,000.00	0.0%
Total 700 · Administrative Expenditures	35,890.65	97,700.00	-61,809.35	36.74%
800 · District Project Expenditures				
804 · Water Quality Monitoring	89.54	10,000.00	-9,910.46	0.9%
808 · Water Meter Service	2,589.50	20,000.00	-17,410.50	12.95%
809 · Water Meter Purchases	10,810.84	20,000.00	-9,189.16	54.05%
811 · Groundwater Level Monitoring	0.00	1,000.00	-1,000.00	0.0%
812 · Information & Education	0.00	500.00	-500.00	0.0%
813 · Abandoned / Inactive wells	100.00	1,000.00	-900.00	10.0%
814 · Automated Data Collection	2,179.83	5,000.00	-2,820.17	43.6%
815 · ASR Project	0.00	25,000.00	-25,000.00	0.0%
816 · District Modeling	0.00	30,000.00	-30,000.00	0.0%
Total 800 · District Project Expenditures	15,769.71	112,500.00	-96,730.29	14.02%
Total Expense	222,228.57	535,021.00	-312,792.43	41.54%

Equus Beds Groundwater Management District #2

Budget vs. Actual w/o Meters

THROUGH JULY 2017

	Jan - Jul 17	Budget	$ Over Budget	% of Budget
Expense				
500 · Personnel Expenditures				
501 · Manager	50,458.38	88,046.00	-37,587.62	57.31%
502 · Administrative Assistant	23,733.38	41,600.00	-17,866.62	57.05%
503 · Temporary Employees	0.00	5,000.00	-5,000.00	0.0%
504 · Payroll Tax Expense	9,816.23	17,658.00	-7,841.77	55.59%
505 · Health Insurance Benefits	10,769.72	25,000.00	-14,230.28	43.08%
506 · Employment Withholding Taxes	68.70			
507 · Hydrologic Technician	25,083.38	42,535.00	-17,451.62	58.97%
508 · Hydrologist	32,375.00	53,642.00	-21,267.00	60.35%
509 · Employee Retirement	11,930.79	24,840.00	-12,909.21	48.03%
511 · Employee Educational Assistance	0.00	5,000.00	-5,000.00	0.0%
Total 500 · Personnel Expenditures	164,235.58	303,321.00	-139,085.42	54.15%
600 · Transportation Expenditures				
601 · Fuel	2,511.35	10,000.00	-7,488.65	25.11%
602 · Mileage Reimbursement	0.00	2,000.00	-2,000.00	0.0%
603 · Travel Meals	593.50	1,000.00	-406.50	59.35%
604 · Travel Lodging	745.43	4,000.00	-3,254.57	18.64%
605 · Vehicle Insurance and Fees	2,159.50	2,500.00	-340.50	86.38%
607 · Vehicle Maintenance	322.85	2,000.00	-1,677.15	16.14%
Total 600 · Transportation Expenditures	6,332.63	21,500.00	-15,167.37	29.45%
700 · Administrative Expenditures				
701 · Office Maintenance	2,518.44	5,000.00	-2,481.56	50.37%
702 · Utilities	1,946.63	3,500.00	-1,553.37	55.62%
703 · Office Supplies	2,134.24	4,500.00	-2,365.76	47.43%
704 · Office Equipment & Maintenance	0.00	1,000.00	-1,000.00	0.0%
705 · Publications	698.13	1,000.00	-301.87	69.81%
706 · Printing	1,383.05	3,500.00	-2,116.95	39.52%
707 · Memberships & Conference Fees	907.29	4,000.00	-3,092.71	22.68%
708 · Insurance - Office	4,717.00	5,000.00	-283.00	94.34%
710 · Insurance - Prof Liability	0.00	1,500.00	-1,500.00	0.0%
711 · Legal Fees	8,906.50	20,000.00	-11,093.50	44.53%
712 · Other Professional Fees	4,121.00	5,000.00	-879.00	82.42%
713 · Postage	1,610.93	5,000.00	-3,389.07	32.22%
714 · Miscellaneous	40.00	1,000.00	-960.00	4.0%
715 · Digital Imaging System	3,174.11	6,000.00	-2,825.89	52.9%
716 · KS Unemployment	112.00	1,000.00	-888.00	11.2%
717 · Insurance - Workers Comp	514.00	1,500.00	-986.00	34.27%
718 · Computer	1,290.79	5,000.00	-3,709.21	25.82%
719 · Telephone Service	1,816.54	4,000.00	-2,183.46	45.41%
720 · Laboratory	0.00	200.00	-200.00	0.0%
722 · Budgeted Reserve	0.00	20,000.00	-20,000.00	0.0%
Total 700 · Administrative Expenditures	35,890.65	97,700.00	-61,809.35	36.74%
800 · District Project Expenditures				
804 · Water Quality Monitoring	89.54	10,000.00	-9,910.46	0.9%
811 · Groundwater Level Monitoring	0.00	1,000.00	-1,000.00	0.0%
812 · Information & Education	0.00	500.00	-500.00	0.0%
813 · Abandoned / Inactive wells	100.00	1,000.00	-900.00	10.0%
814 · Automated Data Collection	2,179.83	5,000.00	-2,820.17	43.6%
815 · ASR Project	0.00	25,000.00	-25,000.00	0.0%
816 · District Modeling	0.00	30,000.00	-30,000.00	0.0%
Total 800 · District Project Expenditures	2,369.37	72,500.00	-70,130.63	3.27%
Total Expense	208,828.23	495,021.00	-286,192.77	42.19%

EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2

Revenue Report
3rd Quarter, 2017

REVENUE	JULY	AUGUST	SEPTEMBER	YTD TOTAL	BUDGET	DIFF.	PERCENT
ASSESSMENTS	$ -	$ -	$ -	$ 357,631.90	$ 355,000.00	$ 2,631.90	100.74%
INTEREST	$ 277.05	$ -	$ -	$ 1,448.64	$ 500.00	$ 948.64	289.73%
REIMBURSEMENTS	$ 5,293.99	$ -	$ -	$ 26,512.98	$ 46,000.00	$ (19,487.02)	57.64%
GRANTS	$ -	$ -	$ -	$ -	$ -	$ -	#DIV/0!
TOTAL MONTH	$ 5,571.04	$ -	$ -	$ 385,593.52	$ 401,500.00	$ (15,906.48)	96.04%
TOTAL QUARTER			$ 5,571.04				
TOTAL YEAR TO DATE			$ 385,593.52				

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EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2
EXPENDITURES TO APPROVE
August 2017

LINE ITEM CODE NO.	DESCRIPTION				GENERAL FUND	CAFETERIA FUND	GRANT FUND	CK #
106	CAFETERIA ACCOUNT (FSA HEALTH & DCAP)				$50.00			
505	BLUE CROSS & BLUE SHIELD OF KANSAS				$1,933.42			
506	EFTPS - (FED W/H, FICA & MEDICARE)				$4,299.72			
506	KANSAS WITHHOLDING - MAY				$570.00			
509	KPERS (RETIREMENT)				$2,711.26			
	FIRST NATIONAL BANK OMAHA	Fuel	601	$504.57				
		Meals	603	$22.79				
		Postage	713	$143.34				
		Computer	718	$38.97				
		Water Quality Monitoring	804	$48.15				
					$757.82			
701	NATHAN BOESE				$175.00			
701	SPRING VALLEY LAWN & LANDSCAPES				$100.00			
702	CITY OF HALSTEAD				$63.22			
702	WESTAR ENERGY				$274.85			
703	HALSTEAD MARKET				$30.58			
703	QUILL				$78.44			
711	ADRIAN AND PANKRATZ				$1,774.50			
713	POSTMASTER				$225.00			
715	EVERBANK COMMERCIAL FINANCE				$369.95			
	AT & T		718	$80.85	$80.85			
			719	$143.66				
			814	$219.10	$362.76			
809	McCROMETER				$4,178.18			
814	CENTURYLINK	620-543-2902--HV Co., Acct #313780808			$83.69			
	EMPLOYEE SALARIES:							
501	TIMOTHY D BOESE		(SALARY 8/15/17)		$2,376.74			
501	TIMOTHY D BOESE		(SALARY 8/31/17)		$2,376.75			
502	REBECCA WILSON		(SALARY 8/15/17)		$1,200.17			
502	REBECCA WILSON		(SALARY 8/31/17)		$1,200.16			
507	DAVID D RANDOLPH		(SALARY 8/15/17)		$1,314.11			
507	DAVID D RANDOLPH		(SALARY 8/31/17)		$1,314.10			
508	STEPHEN T FLAHERTY		(SALARY 8/15/17)		$1,909.84			
508	STEPHEN T FLAHERTY		(SALARY 8/31/17)		$1,909.85			
				TOTAL	**$31,720.96**	**$0.00**		

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2016 WATER USE / LAND ASSESSMENT TOTALS		
	WATER ASSESSMENT	LAND ASSESSMENT
Harvey	$94,317.54	$7,106.38
McPherson	$56,641.05	$5,748.51
Reno	$121,360.50	$19,071.90
Sedgwick	$87,858.50	$3,688.5
TOTAL	**$360,177.59**	**$35,615.29**

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Meeting Agenda

BURNS McDONNELL

Meeting Subject:	City of Wichita ASR Program
Meeting Date:	June 21st 2017
Start Time:	1:30 PM
End Time:	3:30 PM
Location:	GMD2 Office, Halstead KS

Invitee	Organization	Title
Tim Boese	GMD2	District Manager
Steve Flaherty	GMD2	District Hydrologist
David Barfield	Division of Water Resources	Chief Engineer
Lane Letourneau	Division of Water Resources	Water Appropriations Program Manager
Jeff Lanterman	Division of Water Resources	Water Commissioner, Stafford KS
Don Henry	City of Wichita	Assistant Director of Public Works & Utilities
Joe Pajor	City of Wichita	Deputy Director of Public Works & Utilities
Scott Macey	City of Wichita	Water Resources Engineer
Brian Meier	Burns & McDonnell	Project Manager & Wichita Office Manager
*Daniel Clement	Burns & McDonnell	Hydrogeologist

* indicates meeting organizer

Agenda:

1. **ASR Minimum Index Levels**
   a. The role of ASR during drought
   b. 1993 Water Level Restrictions – ASR Minimum Index Level
      i. Recovery of ASR recharge credits during drought
      ii. Statewide ASR regulation change
   c. Proposed Changes to ASR Minimum Index Levels
      i. Drought simulation and modeling effort
      ii. Alternative Minimum Index Elevations

2. **ASR Flexibility and Aquifer Management Goals**
   a. Current Aquifer Conditions & ASR Operations
      i. Outcome based management of water resources
      ii. High groundwater levels near predevelopment
      iii. Limited aquifer capacity for physical recharge
   b. Opportunity to maintain groundwater levels at optimal levels
      i. Continued development of ASR Credits
      ii. Preparation for drought
   c. Discussion of Aquifer Maintenance Credits
      i. Concepts and benefits
      ii. Accounting and distribution discussion

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Equus Beds Groundwater Management District No.

BURNS McDONNELL

Introduction to Modified ASR Lower Index Levels

Since the implementation of the Integrated Local Water Supply Plan (ILWSP) in 1993 the City of Wichita (City) has been continuously reviewing ways to improve existing water supplies through infrastructure upgrades and outcome based management of water resources. In Spring of 2014 a comprehensive water supply planning evaluation was reviewed by the Wichita City Council which included how the elements of future projected demand and current water resources relate to extended drought. Based on the evaluation, the Wichita City Council has chosen to utilize a 1% designed drought for the evaluation of drought yields from existing and future water resources. The City has been reviewing the permit conditions that regulate the operation of the City's Aquifer Storage and Recovery (ASR) project, one of which restricts recharge credit recovery to periods when water levels are above an established minimum index water level. The minimum index water level elevations for the City's ASR project currently based on the historic water levels recorded in January of 1993. At the time that ASR Phase I regulations were developed, the1993 levels were the lowest water levels recorded in the aquifer. Through extensive data analysis and predictive modeling, the City has confirmed that during prolonged drought, groundwater level elevations will drop below the current minimum index water level restriction, preventing the withdrawal of ASR credits when they are needed most. This finding requires the City to seek a reasonable alternative minimum index level for the existing ASR project so that established recharge credits are available throughout periods of long-term drought.

Modeling Aquifer Response During Drought

To calculate alternative minimum index level elevations for the City's ASR project, the City completed a series of professional engineering evaluations and simulations to project how the aquifer will respond to the demands of a long-term drought. The same groundwater model utilized for the current ASR credit accounting process has been utilized to input the variables of a 1% drought (precipitation, natural aquifer recharge, evapotranspiration, river flows, projected City of Wichita demands, and agricultural demands). The inputs used for the simulation are summarized in the table below.

Model Simulation Year	1	2	3	4	5	6	7	8	9	10
Future Demand Planning Year	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Simulated Hydrologic Year	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Streamflows	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Precipitation & Recharge	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Evapotranspiration	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Irrigation, Industrial, Other Well Pumping	2011 DWR Reported	2012 DWR Reported	2011 DWR Reported	2012 DWR Reported	2011 DWR Reported	2012 DWR Reported	2011 DWR Reported	2012 DWR Reported	2010 DWR Reported	2010 DWR Reported
Total EBWF & ASR (AF)	34,202	45,651	59,907	46,732	56,579	41,980	39,308	39,491	19,411	19,411
City of Wichita ASR Credit Pumping (AF)	0	5,651	19,907	6,732	15,552	1,980	0	0	0	0
Cheney Reservoir Pumping (AF)	47,060	26,841	11,209	25,158	14,233	28,831	31,808	31,173	Not Simulated	Not Simulated
City of Wichita Drought Conservation Stage	Normal	Stage 1	Stage 1	Stage 2	Stage 2	Stage 2	Stage 2	Stage 2	Not Simulated	Not Simulated
Cheney % of Conservation Pool 12 Month Simulated AVG at Beginning of Year	110%	92%	62%	59%	62%	53%	53%	63%	Not Simulated	Not Simulated
Total City of Wichita Demand EBWF + Cheney (AF)	81,262	72,492	71,116	71,890	70,812	70,811	71,116	70,664	Not Simulated	Not Simulated

BURNS McDONNELL

Groundwater Modeling Results

The results of groundwater modeling indicate that groundwater levels within the EBWF are projected to fall below the currently permitted ASR minimum index levels at an average of only two to three years into the simulated drought.

EBEWWF 1% Drought Simulation Statistics	Drought Year 1 (SP1)	Drought Year 2 (SP2)	Drought Year 3 (SP3)	Drought Year 4 (SP4)	Drought Year 5 (SP5)	Drought Year 6 (SP6)	Drought Year 7 (SP7)	Drought Year 8 (SP8)	Recovery Year 1 (SP9)	Recovery Year 2 (SP10)
ASR Basin Storage Area (BSA) Average Water Level Change from Starting Conditions (ft)	-1.84	-3.38	-5.23	-6.12	-7.33	-7.70	-7.93	-8.19	-6.07	-4.65
USGS Central Wellfield Study Area (CWSA) Average Water Level Change from Starting Conditions (ft)	-2.06	-4.44	-7.73	-8.87	-10.98	-11.19	-11.40	-11.59	-8.59	-6.35
ASR Basin Storage Area (BSA) Average Saturated Thickness as Percentage of Predevelopment (94% Initial Conditions)	93%	92%	91%	90%	90%	90%	90%	89%	91%	91%
USGS Central Wellfield Study Area (CWSA) Average Saturated Thickness as Percentage of Predevelopment (91% Initial Conditions)	90%	89%	87%	87%	86%	86%	86%	86%	87%	88%

Modified ASR Lower Index Levels

The State of Kansas Division of Water Resources (DWR) recently modified statewide ASR regulations in acknowledgement that additional flexibility was needed statewide for the defined bottom of an ASR basin storage area. This regulation allows for a minimum index level of 20 feet above bedrock or an alternatively proposed minimum elevation. While the current ASR minimum index water levels based on observed levels in January of 1993 represent a historic low, the aquifer during that time was still on average 88% full across the City's central wellfield area, and 92% full across the entire ASR Basin Storage Area. The results of drought simulation and groundwater modeling indicate that alternative minimum index elevations representing approximately 80% full conditions across the City's central wellfield would ensure that ASR recharge credits remain available throughout prolonged drought.

BURNS McDONNELL

Figure 10 – *Proposed minimum index groundwater elevations for the City of Wichita Aquifer Storage & Recovery Project*

Index Cell Number	Existing ASR Minimum Index Level USGS. DWR. GMD2 Jointly Developed January 1993 Interpolated Groundwater Elevations	Proposed ASR Minimum Index Groundwater Elevation	Difference Between Existing and Proposed Minimum Index Level Elevation
	*Lower Aquifer	*Lower Aquifer	*Lower Aquifer
1	1413.42	1390	-23.42
2	1410.52	1397	-13.52
3	1396.93	1380	-16.93
4	1417.60	1410	-7.60
5	1407.23	1398	-9.23
6	1388.74	1370	-18.74
7	1369.95	1363	-6.95
8	1417.56	1408	-9.56
9	1394.10	1385	-9.10
10	1375.09	1358	-17.09
11	1363.75	1355	-8.75
12	1365.78	1361	-4.78
13	1418.27	1407	-11.27
14	1396.56	1377	-19.56
15	1369.75	1354	-15.75
16	1360.21	1344	-16.21
17	1360.59	1353	-7.59
18	1421.40	1407	-14.40
19	1398.95	1386	-12.95
20	1376.05	1363	-13.05
21	1363.04	1342	-21.04
22	1354.92	1344	-10.92
23	1355.55	1347	-8.55
24	1418.96	1406	-12.96
25	1407.27	1393	-14.27
26	1374.89	1371	-3.89
27	1360.92	1353	-7.92
28	1349.14	1334	-15.14
29	1349.51	1340	-9.51
30	1379.77	1376	-3.77
31	1366.06	1366	-0.06
32	1356.51	1353	-3.51
33	1344.68	1339	-5.68
34	1344.24	1335	-9.24
35	1366.76	1364	-2.76
36	1360.13	1353	-7.13
37	1350.51	1343	-7.51
38	1344.65	1333	-11.65

*Groundwater elevations sourced from: Revised Shallow and Deep Water-Level and Storage-Volume Changes in the Equus Beds Aquifer near Wichita, Kansas, Predevelopment to 1993 USGS Scientific Investigations Report 2013-5170 (Hansen C.V., Lanning-Rush J.L., and Ziegler A.C., 2013

BURNS McDONNELL

Introduction to ASR Aquifer Maintenance Credits

Water levels within the Equus Beds Wellfield (EBWF) and surrounding area have recovered to nearly 100% full levels. The historic recovery in water levels provides significant benefits to the City and other groundwater users, however it has become clear that higher groundwater levels also directly limit the physical recharge capacity of the City's ASR program. The ability to establish and recover ASR credits remains a critical part of the City's ability to meet demands during extended drought. To continue to incentivize groundwater conservation and to address the challenges of establishing physical recharge credits in an aquifer that has recovered to levels near pre-development, the City is proposing an alternative procedure for establishing ASR credits during periods of high groundwater levels.

Rather than shutting down the ASR diversion system or implementing a groundwater pumping strategy that re-develops physical ASR recharge capacity, the Little Arkansas River diversions that cannot be physically recharged could be sent to the City's Main Water Treatment Plant (MWTP) to directly meet City water demands. The Little Arkansas River water that is sent to the to the City's MWTP directly offsets diversions that would otherwise be required from the EBWF. The water left in storage as a result of utilizing Little Arkansas River flows would be considered an ASR aquifer maintenance credit (AMC) with similar characteristics to current ASR recharge credits:

- Direct diversions to the City of above-baseflow water from the Little Arkansas River to meet City water demands during periods of limited physical ASR recharge capacity would result in the generation of an AMC in an amount established by an accounting process.
- The total AMCs generated during a given year would be calculated from the total metered annual quantity of water diverted from the Little Arkansas River and sent directly to the City's MWTP minus a one-time five percent reduction.
- A uniform and even distribution of AMCs throughout the EBWF to index cells containing City wells could be utilized along with a straight-forward spreadsheet accounting process to track the annual allocation and accumulation of AMCs.
- Following uniform distribution throughout the EBWF, the full quantity of AMCs would continue to reside within the originally assigned index cell.
- The total available quantity of AMCs for any given index cell would be the cumulative total of AMCs accumulated from previous years minus any recovered quantity of AMCs from each index cell in previous years.

9400 Ward Parkway \ 25 \ Kansas City, MO 64114
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CITY OF
WICHITA

Department of Public Works & Utilities

June 26, 2017

Tim Boese
District Manager
Groundwater Management District No. 2
313 Spruce Street
Halstead, KS

RE: City of Wichita ASR Minimum Index Levels Draft Modeling Report

Dear Mr. Boese:

On December 23rd 2013, The City of Wichita (City) met with Division of Water Resources (DWR) staff to discuss the various permit conditions and limitations of the City's Aquifer Storage and Recovery (ASR) project. One of these permit conditions establishes the lowest vertical extent of the basin storage area (BSA), and allows the City to utilize ASR recharge as long as water levels are above a minimum index water level. The minimum index water levels for the City's ASR project are currently based on the lowest historic water levels recorded in January of 1993. It is now apparent that under this limitation, the City would not have access to recharge credits during periods of prolonged drought.

The City, having established a firm basis and quantified need for a modification to the current ASR minimum index levels, initiated distribution of initial findings and information to facilitate discussion on the permit modification process. From these initial findings and presentations DWR and the Groundwater Management District No. 2 (GMD2) agreed that additional groundwater modeling reflecting drought and simulated City demands would be the most useful tool in further clarifying and illustrating when and where ASR credits become unavailable during prolonged drought.

The City has engaged GMD2 throughout the development of the groundwater modeling process in order to facilitate full transparency and understanding of the inner workings of the groundwater model and the magnitude of the impact from simulated drought. In November of 2016, City Staff and the City's consultant concurred that a groundwater modeling package had been developed that could sufficiently model the effects of prolonged drought and ASR credit availability. The modeling package was reflective of the elements developed during a thorough and collaborative modeling process between the City and GMD2 Staff that involved months of work, multiple meetings, and assembly of extensive amounts of data. The outcome of this effort was a reasonable set of modeling parameters to form a representation of conditions likely to be experienced during extended drought. On November 15th 2016 the City provided GMD2 with a digital file package and a letter requesting that GMD2 provide a formal documented response detailing the District's concurrence with the groundwater modeling results.

Office of the Director

City Hall • Eighth Floor • 455 North Main • Wichita, Kansas 67202-1606

T 316.268.4422 W www.wichita.gov

On December 13th 2016, the GMD2 District Board of Directors reviewed a summary of the November 15th 2016 groundwater modeling results. Upon review of the information presented and discussed at the meeting and at the recommendation of District Staff, the GMD2 District Board of Directors found that the groundwater model and modeling results were inadequate for evaluating a modified Minimum Index Level for the City's ASR Project.

On December 14, 2016 the City received a letter from the GMD2 which provided a written response to the City's request for a review of the aquifer modeling results submitted to GMD2 on November 15th, 2016. The City continues to move forward with development of an ASR permit modification package, which will include the results and information of a detailed groundwater modeling report. The City has completed a draft version of a groundwater modeling report that quantifies the effects of prolonged drought on the aquifer and anticipated ASR alternative minimum index levels. The City has incorporated the District's comments from the December 14, 2016 letter where feasible throughout the groundwater modeling effort and during generation of the groundwater modeling report as summarized below.

The City has considered the comments provided in the District's December 14th 2016 letter during development of the groundwater modeling report and finds that the following items were either already implemented, have been included as supplemental information within the draft modeling report, or can be further verified with District Staff through simple data analysis:

- *Execution of quality control measures prior to resubmission of modeling results.*
- *Verification that recharge and precipitation through time match observed values.*
- *Verification that pumping through time matches observed values.*
- *Verification that other model inputs match observed values.*
- *Demonstration that Cheney Reservoir has the capacity throughout an eight-year drought to sustain the quantities indicated in the model inputs.*
- *Model two years of recovery following the drought.*

The City has found that the following comments within the District's December 14th 2016 letter represent impractical requests such that there is no valid reason to further pursue, or that if pursued, are expected to yield little, if any, improvement in the current accuracy or outcomes of the drought modeling results within the groundwater modeling report at a considerable effort:

- *Provide written explanation and justification for model inputs especially the drought scenario*
    - Extensive documentation has been previously provided to the District regarding the genesis of the selected drought years, the use of the Palmer Drought Severity Index (PDSI), relative PDSI values for the drought years of 2011 and 2012, and comparison to alternative historic drought years.
    - All previously submitted information on PDSI, drought duration, drought intensity, and selection of drought years for the model has been re-summarized within the draft modeling report as narratives and attachments.
- *Make starting water levels accurate, as starting heads in the sand hills are inaccurate. At a minimum, modify the starting heads in the sand hills region to conform to the lower portion of the aquifer to be consistent with the rest of the model.*
    - Modifying modeled water levels is not an appropriate means of resolving the described discrepancies in observed and modeled head values.

- There has been extremely limited improvement in observed data density in this area since the model was compiled in 2008 by the United States Geological Survey (USGS) which inherently reduces the capacity and scientific value in attempting further calibration of aquifer parameters in this area without additional physical investigation methods.

The City has also reviewed the comment within the District's December 14th 2016 letter that requested the City calibrate the groundwater model or use an existing calibrated groundwater model. The City finds this request to be both unreasonable and unrepresentative of information submitted to the District such that further pursuit of model refinements would offer no scientific value or enhancement of drought modeling results:

- The existing model has been calibrated to observed data over the period of 1935 through 2008, yielding a relatively low Root Mean Square (RMS) error of 2.74 feet within the Basin Storage Area (BSA). This means the model-simulated results are reproducing the observed results throughout the model to within established reasonable standards.
- Further calibration efforts based on inclusion of more recent observation data is unlikely to significantly enhance the accuracy of the current modeling results.
- The current modeling efforts incorporate a hypothetical climate and pumping scenario thus, the model cannot be calibrated during the hypothetical period, as no observed conditions exist to calibrate to.

A draft version of the ASR minimum index level groundwater modeling report has been attached to this letter to facilitate preliminary comments and discussion prior to the meeting between the City, GMD2 Staff, and DWR scheduled for July 19th 2017. We look forward to working with the District and the DWR during the permit modification process.

Sincerely,

Alan King
Director of Public Works & Utilities

cc: David Barfield, P.E., Division of Water Resources
Lane Letourneau, P.G., Division of Water Resources
Joseph T. Pajor, Deputy Director, Public Works & Utilities
Don Henry, Assistant Director, Public Works & Utilities
Scott Macey, Assistant Division Manager, Public Works & Utilities
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DRAFT – 6-26-2017

David Barfield
Chief Engineer
Kansas Department of Agriculture
Division of Water Resources
1320 Research Park Drive
Manhattan, Kansas 66502

Re: City of Wichita – Aquifer Storage and Recovery (ASR) Project
Minimum Index Water Level Permit Modification

Dear Mr. Barfield:

Introduction

Since the implementation of the Integrated Local Water Supply Plan (ILWSP) in 1993 the City of Wichita (City) has been continuously reviewing ways to improve existing water supplies through infrastructure upgrades and integrated water resources management. In Spring of 2014 a comprehensive water supply planning evaluation was reviewed by the Wichita City Council. This planning included consideration of future projected demand, drought, current water resources, and enhancements to existing water supply. Based on that review, the City Council decided in April of 2014 to utilize a 1% exceedance probability designed drought for current water resource planning and the consideration of future water supplies. As a result of this decision City staff initiated a series of studies, professional engineering evaluations, and permit reviews, to ensure that existing and planned water resources are adequate to meet the demands of a 1% drought.

The City has been reviewing the permit conditions that regulate the operation of the City's Aquifer Storage and Recovery (ASR) project. One of these permit conditions restricts recharge credit recovery to periods when water levels are above an established minimum index water level. The minimum index water level elevations for the City's ASR project and the Basin Storage Area (BSA) are currently based on the historic water levels recorded in January of 1993. At the time that ASR Phase I regulations were developed, the1993 levels were the lowest water levels recorded in the aquifer. The evaluation of current ASR permit conditions relative to drought has made it apparent that this limitation will restrict the City's access to ASR recharge credits after only a few short years of drought for the majority of Index Cells in the center of the well field. Through extensive data analysis and predictive modeling, the City has confirmed that during prolonged drought, groundwater level elevations will drop below the current minimum index water level restriction, preventing the withdrawal of ASR credits when they are needed most. This finding requires the City to seek a reasonable alternative minimum index level for the existing ASR project so that recharge credits are available throughout periods of long-term drought.

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The State of Kansas Division of Water Resources (DWR) recently modified K.A.R. 5-12-1 in acknowledgement that additional flexibility was needed statewide for ASR projects with respect to the defined bottom of a basin storage area. To calculate a more appropriate minimum index level elevation for the City's ASR project, the City and Burns & McDonnell (BMcD) have completed a series of evaluations and simulations to project how the aquifer will respond to long-term drought. The same groundwater model utilized for the current ASR credit annual tracking and accounting process has been adapted to facilitate the input of 1% drought hydrologic variables, future City demand, the City's drought response plan, and long-term water resource management goals. The content of this letter report includes a table of minimum index groundwater elevations for review and consideration. The background information, explanations, and calculations utilized to develop the 1% drought inputs are attached for reference.

City of Wichita - Drought Response Plan (DRP)

The City relies on Cheney Reservoir and the Equus Beds Well Field (EBWF) as its two main sources of raw water supply. To extend the viability of these resources during prolonged drought the City developed and adopted a formal Drought Response Plan (DRP) on October 8th, 2013. This plan formalized various levels of water conservation measures throughout the City based on the condition of raw water resources (Attachment A). The EBWF, ASR Recharge Credits, and Cheney Reservoir must all be simultaneously available in order to meet normal day and peak day demands during future droughts. The City's DRP is based on a 12-month average percentage of the conservation pool at Cheney Reservoir. The DRP limits demand at the customer and utility level and has the effect of extending the viability of both Cheney Reservoir and the EBWF throughout prolonged drought (see Table 1 below).

Table 1 – *City of Wichita Drought Response Plan (DRP) taking various levels of conservation based on the condition of Cheney Reservoir*

Source: Attachment A, City of Wichita Drought Response Plan, 2013

Drought Response Stage	Drought Response & Customer Conservation Stage	Condition of Cheney Reservoir (% of Total Conservation Pool)
Normal	Continued Water Saving Inititatives	100% - 90%
Stage No. 1	Voluntary Conservation	89% - 70%
Stage No. 2	Irrigation 1-Day/Week Rotating Irrigation Quadrants	69% - 50%
Stage No. 3	All Outdoor Watering Banned	49% - 35%
Stage No. 4	Outdoor Watering Ban Mandatory 15% reduction to AWC	34% - 0%

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1% Extended Drought Reconstruction – Palmer Drought Severity Index (PDSI)
The classification of prolonged drought must be considered in the context of both magnitude (severity) and duration. In order to develop the statistical magnitude and duration of a 1% drought the City utilized the Palmer Drought Severity Index (PDSI). The PDSI was developed in 1965, and is used today as scale to reflect the relative wetness or dryness of a given period. The original paper developed by Wayne C. Palmer "*Meteorological Drought – Research Paper No. 45. Office of Climatology, Washington DC. 1965*" has been included for review as Attachment B. The PDSI is utilized by the National Oceanic and Atmospheric Administration (NOAA), the United States Department of Agriculture (USDA), the United States Drought Monitor (USDM), and other agencies to classify relative drought conditions. PDSI values are generally bounded by a range of -6 to +6 with a value of zero representing normal hydrologic conditions for a given area. Negative PDSI values represent time periods drier than normal, while positive PDSI values represent periods wetter than normal. The lower PDSI value the drier the period of consideration. For example, a drought year of with a PDSI value of -4.0 would be drier and considered more extreme than a drought year with a value of -3.0.

The City contracted High Country Hydrology, Inc. (HCH) to examine hydrologic data to quantify the duration and intensity of a drought with a 1% exceedance probability. During their review of hydrologic data, HCH found that estimates of the Palmer Drought Severity Index (PDSI) generated from tree ring chronology could be used to review historic droughts of record for their intensity and duration (Attachment C). HCH calculated that a 1% drought can be approximated by the drought of 1933 through 1940, as illustrated in Table 2 below.

Table 2 – *1% Drought Reconstruction from PDSI*
Source: Attachment C, HCH Technical Memorandum 4, March 14 2013, Table 1

Suggested Drought Intervals based on reconstructed PDSI (1640-2003)				Representative Historical Years	
Exceedence Probability	Duration (yrs)	Cumulative PDSI	Mean pdsi	Years	Actual Cum. PDSI
10%	2	-4.4	-2.20	1925-1926	-4.9
4.0%	4	-8.8	-2.21	1925-1926, 1981 x 2	-8.8
2.0%	6	-15.6	-2.60	1952-1956, 1959	-16.1
1.3%	7	-19.6	-2.80	1946, 1952-1956, 1981	-19.6
1.0%	8	-22.4	-2.80	1933-1940	-24.4
0.40%	10	-31.4	-3.14	1952-1956 x 2	-31.1
0.20%	12	-38.2	-3.18	1952-1956 x 2, 1963-1964	-38.4
0.10%	14	-45.0	-3.21	1925, 1933-1940, 1936-1937, 1937, 1940, 1976	-45.0

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City of Wichita - Future Raw Water Demand Assessment
The City's projected water demands were recently examined in a study completed by Science Applications International (SAIC) and Professional Engineering Consultants (PEC) in August of 2013 (Attachment D). This study indicates that by the year 2060 the City's normal annual water demands will be in the range of 71,370 acre-feet (AF) to 105,858 AF. Based on the three growth scenarios included within the study, the most likely scenario is anticipated to be the medium growth forecast and a projected demand of 87,597 AF by the year 2060. The City believes that the medium growth forecast raw water demands for 2060 may be further reduced to 81,690 AF by implementing planned water use conservation measures, and has utilized this future demand forecast during the groundwater modeling process.

Integrated Water Resources Management During a 1% Drought Using MODSIM-DSS
In order to evaluate the viability of existing and planned raw water resources versus the projected demands of 81,690 AF by the year 2060, the City developed a dynamic raw water resources model based on MODSIM-DSS. MODSIM-DSS is a water rights planning, water resources management, and river operations decision support system software that can simulate the effects that complex water resource management rules and strategies have on a set of networked raw water resources such as reservoirs, streams, or aquifers (Figure 1). MODSIM-DSS provides for input of variables such as integrated water resources management policy, water rights quantity limitations, water right rate limitations, raw water pipeline capacities, seasonal raw water resource preferences, reservoir conditions, streamflow levels, etc. Using MODSIM-DSS the City can optimize how raw water resources are utilized to meet demand based on any number of management criteria or outcome based goals.

To simulate how the raw water demands during a 1% drought should be distributed between Cheney Reservoir, the EBWF, and ASR system the City utilized the MODSIM-DSS model with the addition of updated drought variables:

1% Drought Simulation MODSIM-DSS Updates

- Raw water resources include Cheney Reservoir, EBWF, ASR Credits
  - Cheney Reservoir – existing water rights and starts at 110% full
  - EBWF – existing water rights of 40,000 AF
  - ASR Recharge Credits - 60,000 AF of credits not limited by current minimum index water level restriction
- Future projected 2060 demand of 81,690 AF
  - Raw water savings available through DRP added
  - Base demand is reduced depending on Cheney Reservoir condition and associated DRP triggers

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- Simulated 8-Year Drought Hydrologic Components
  - 1933-1940 stream flows for rivers and streams and Cheney Reservoir
    1933-1940 precipitation and evaporation
- Updated Outcome-Based Goals
  - Prevent economic distress of consumers due to occurrence of DRP Stages 3 and 4
  - Must maintain Cheney Reservoir and EBWF as resources at all times
  - Utilize 40,000 AF per year from EBWF prior to use of ASR Recharge Credits

By running MODSIM-DSS with the updated 1% drought simulation variables, an optimized daily raw water demand is generated for each water resource. The results of the 1% drought MODSIM-DSS simulation indicate that both the EBWF and Cheney Reservoir can be kept viable through the drought by utilizing ASR credits and the City's DRP (Table 3). Under these conditions the City must maintain the availability of all raw water resources (EBWF, ASR Recharge Credits, and Cheney Reservoir) to meet daily drought demands and prevent implementation of Stage 3 water restrictions. Further review of the reservoir accounting results indicates that Cheney Reservoir can be carefully balanced such that the calculated minimum reservoir condition during the eight-year drought period is only 42% of conservation pool, with an average of 62% (see Figure 2).

Table 3 – *MODSIM-DSS simulation results for the 1% drought resulting in an optimized raw water resource utilization strategy and the sustained viability of Cheney Reservoir*

MODSIM Variable	Drought Year 1	Drought Year 2	Drought Year 3	Drought Year 4	Drought Year 5	Drought Year 6	Drought Year 7	Drought Year 8
Baseline City Demand (AF)	81,690	81,690	81,690	81,690	81,690	81,690	81,690	81,690
Simulated Hydrologic Year of Drought	1933	1934	1935	1936	1937	1938	1939	1940
Revised Demand from Drought Response Plan (AF)	81,262	72,492	71,116	71,890	70,812	70,811	71,116	70,664
Cheney % of Conservation Pool 12 Month Average	110%	92%	62%	59%	62%	53%	53%	63%
Demand Assigned to EBWF & ASR	34,202	45,651	59,907	46,732	56,579	41,980	39,308	39,491
Demand Assigned to Cheney Reservoir	47,060	26,841	11,209	25,158	14,233	28,831	31,808	31,173

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Groundwater Modeling Setup - 1% Drought Simulation

In 2009, to better understand the regional Equus Beds Aquifer and the effects on water levels due to current and planned ASR activities, the City contracted a study by the United States Geological Survey (USGS). This study developed a three-dimensional finite-difference groundwater-flow model based on MODFLOW-2000. MODFLOW software is broadly recognized as the international standard for simulation and prediction of groundwater conditions. Details of the USGS Equus Beds Groundwater Flow Model (EBGWM), including information regarding the model setup, calibration, sensitivity analysis and results are contained in the public document "*Simulation of Groundwater Flow, Effects of Artificial Recharge, and Storage Volume Changes in the Equus Beds Aquifer near the City of Wichita, Kansas Well Field, 1935-2008,*" USGS Scientific Investigations Report 2013-5042 (Kelly, et al, 2013) which has been included as Attachment E. The model captures the areal extent of the City's ASR BSA, and is currently utilized as the approved method for accounting and tracking of ASR credits (Figure 3).

The EBGWM is currently the best available forward analysis and prediction tool for simulating the total combined effects of a 1% drought on the local and regional water levels surrounding the City's ASR project. The EBGWM provides a method to simulate the effects of a 1% drought on the aquifer water levels by the input of simulated drought variables including increased agricultural irrigation pumping, additional City pumping, reduced aquifer recharge, reduced streamflow, and increased evapotranspiration.

As developed by the USGS, the EBGWM was calibrated to groundwater flow and water level changes from 1935 through 2008. Since publication of the model, BMcD has updated the model inputs to include the years 2009 through 2015 to generate the ASR annual accounting report. BMcD used a pre- and post-processing software package (Groundwater Vistas) to facilitate import of modeling files and analysis of results. Groundwater Vistas utilizes the same calculation packages used by the original EBGWM (MODFLOW-2000), and no changes were made to the original construction or hydrogeologic properties of the model. The only modifications to the EBGWM model for the purposes of simulating the effects of a 1% drought was to modify the number of stress periods and add the necessary data for the calendar years to be simulated. Model parameters such as boundary conditions, surface elevation, bedrock elevation, aquifer hydraulic conductivity, storativity, and hydrologic unit groups all remained as originally established by the USGS.

Stress Period Development

Hydrologic data from the NOAA, USGS, and other sources was queried and examined for the 1% drought occurrence years of 1933-1940. The availability of detailed hydrologic data for this period is extremely limited for evapotranspiration, stream flows, and precipitation, making generation of model inputs using the methods prescribed by the original groundwater model

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documentation unworkable. Rather than attempt interpolation from incomplete hydrologic data, the PDSI values from 1933 to 1940 were compared to more recent years to find and develop a complete hydrologic data set for simulating the duration of the 1% drought.

The data provided in Attachment C indicates that a 1% drought should extend for a total of approximately eight years and exhibit a cumulative PDSI of roughly -22.4 with a mean PDSI of -2.80. PDSI information for South Central Kansas from NOAA was queried to support comparison to more recent calendar years (Attachment F). The annual (12 Month) and seasonal (6 Month) intensities for recent years were then compared to the PDSI statistics of the target years of 1933 through 1940. The modern calendar years that best compare to the target years of 1933-1940 were 1991, 2002, 2006, 2011, and 2012. Years 2011 and 2012 were selected to repeat four times, making a total of 8 years to simulate the 1% drought. This approach results in a total seasonal cumulative PDSI of -23.45 with a mean PDSI of -2.93 (Table 4).

Table 4 – *PDSI values for South-Central Kansas during drought years 2011 and 2012 compared to 1% drought years of 1933-1940*

Drought Year	12 Month Annual PDSI Calculated NOAA South Central KS	6 Month Seasonal PDSI Calculated NOAA South Central KS
1934	-4.26	-4.78
1936	-2.71	-3.98
1933	-2.58	-3.96
2011	**-1.99**	**-3.68**
1937	-3.13	-2.90
1940	-3.10	-2.63
1939	-1.63	-2.55
2012	**-1.92**	**-2.18**
1935	-2.60	-1.48
1938	-1.08	0.69
1933-1940 AVG	-2.64	-2.70
2011-2012 AVG	-1.96	-2.93
1933-1940 Cumulative	-21.09	-21.58
2011-2012 Simulated 8 Year Cumulative	-15.64	-23.45

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DWR and Groundwater Management District No. 2 (GMD2) also requested that in addition to simulating a 1% drought, two years of aquifer recovery conditions be included in the modeling scenario. After examining the recent historic record of PDSI information, the year 2010 was chosen as a relatively wet calendar year to simulate aquifer recoveries based on a NOAA reported annual PDSI of +2.5 and a six-month seasonal PDSI of +1.56.

The groundwater modeling inputs utilized for each stress period of the simulated 1% drought are summarized in Table 5 and described in the paragraphs below:

Table 5 – *Inputs to the EBGWM utilized for simulating the effects of a 1% drought followed by two years of aquifer recovery conditions*

Model Simulation Year	1	2	3	4	5	6	7	8	9	10
Future Demand Planning Year	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Simulated Hydrologic Year	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Streamflows	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Precipitation & Recharge	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Evapotranspiration	2011	2012	2011	2012	2011	2012	2011	2012	2010	2010
Irrigation, Industrial, Other Well Pumping	2011 DWR Reported	2012 DWR Reported	2011 DWR Reported	2012 DWR Reported	2011 DWR Reported	2012 DWR Reported	2011 DWR Reported	2012 DWR Reported	2010 DWR Reported	2010 DWR Reported
Total City of Wichita EBWF & ASR (AF)	34,202	45,651	59,907	46,732	56,579	41,980	39,308	39,491	20,067	20,067
City of Wichita ASR Credit Pumping (AF)	0	5,651	19,907	6,732	15,552	1,980	0	0	0	0
Cheney Reservoir Pumping (AF)	47,060	26,841	11,209	25,158	14,233	28,831	31,808	31,173	Not Simulated	Not Simulated
City of Wichita Drought Conservation Stage	Normal	Stage 1	Stage 1	Stage 2	Stage 2	Stage 2	Stage 2	Stage 2	Not Simulated	Not Simulated
Cheney % of Conservation Pool 12 Month Simulated AVG at Beginning of Year	110%	92%	62%	59%	62%	53%	53%	63%	Not Simulated	Not Simulated
Total City of Wichita Demand EBWF + Cheney (AF)	81,262	72,492	71,116	71,890	70,812	70,811	71,116	70,664	Not Simulated	Not Simulated

Starting Groundwater Model Elevations

To establish the starting groundwater elevations for the 1% drought simulation BMcD and City staff reviewed historic, current, and future water resource management and ASR strategies. ASR recharge capacity is inversely related to groundwater levels, indicating that as groundwater levels rise physical recharge capacity is diminished in both recharge wells and recharge basins. Under current permit conditions, to allow physical recharge and generate the required quantity of ASR recharge credits to meet drought demands, the City will need to maintain an aquifer management strategy that results in an ASR recharge capacity of 30 million gallons per day (MGD) during periods of Little Arkansas River availability. The net result of this strategy is that the City will need to maintain water levels in the EBWF to allow physical recharge. To select initial head conditions for the 1% drought scenario, the simulated transient water levels provided by USGS in the original model report for 1935-2008 were compared against the designed recharge

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capacity of currently constructed ASR infrastructure. This comparison indicated that the simulated groundwater levels representing the end of the 1998 period were the best match for representing the minimum groundwater levels required to maintain 30 MGD of physical ASR recharge capacity. The simulated water levels from the end of the 1998 stress period from the USGS developed EBGWM were selected as the starting groundwater elevations for the 1% drought simulation. These initial water levels represent roughly 91% full conditions for the USGS Central Wellfield Study Area (CWSA) and 94% full conditions for the BSA as a percentage of predevelopment saturated thickness.

Groundwater Pumping – Agricultural Irrigation, Industrial Use, Other Municipal Users
The withdrawal of groundwater is regulated and tracked through a statewide metering and reporting program managed by the DWR. For the drought and drought recovery simulation, the model utilizes the matching DWR reported pumping values from calendar years 2010, 2011, and 2012. The DWR metered pumping values for industrial and other non-Wichita municipal pumping were utilized to develop the pumping inputs for the model.

During agricultural irrigation, some portion of the applied water returns to the aquifer as infiltration. To account for this infiltration, the DWR reported quantity for the target model years of 2010, 2011, and 2012 were adjusted as documented in the original groundwater model documentation (USGS Scientific Investigations Report 2013-5042). Net irrigation use within the CWSA is shown in Table 6.

Table 6 – Net irrigation Use in the 1% Drought Model

Drought Model Year	Representative Model Year	Net Irrigation in the CWSA (AF)	Net Irrigation in the BSA (AF)
1	2011	10,808	31,319
2	2012	10,190	22,706
3	2011	10,808	31,319
4	2012	10,190	22,706
5	2011	10,808	31,319
6	2012	10,190	22,706
7	2011	10,808	31,319
8	2012	10,190	22,706
9	2010	7,743	22,022
10	2010	7,743	22,022

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Groundwater Pumping – City of Wichita
The total simulated City of Wichita groundwater pumping for drought years 1 through 8 is based on the MODSIM-DSS 1% drought modeling work completed by the City. The City examined projected demands through 2060, the magnitude and duration of 1% drought, and the effects of the City's DRP on available water resources. From this information MODSIM-DSS was utilized to optimize the City's integrated water resources strategy and to formally quantify the amount of water that should be utilized from each major water resource during a 1% drought.

BMcD utilized the simulated demands directly from the City's MODSIM results as the City pumping inputs for the EBGWM during stress periods one through eight (see Table 7 below). City well pumping was distributed based on the actual water rights allocation for each well as a percentage of total authorized EBWF water rights. For the two requested recovery years, the actual City water use for the year 2010 was utilized (19,411 AF applied in model stress periods nine and ten).

Table 7 – Distributed City of Wichita raw water pumping for 1% drought followed by two years of wet hydrologic conditions

Raw Water Resource Name	Drought Year 1 (SP1)	Drought Year 2 (SP2)	Drought Year 3 (SP3)	Drought Year 4 (SP4)	Drought Year 5 (SP5)	Drought Year 6 (SP6)	Drought Year 7 (SP7)	Drought Year 8 (SP8)	Recovery Year 1 (SP9)	Recovery Year 2 (SP10)
Simulated Cheney Demand (AF)	47,060	26,841	11,209	25,158	14,233	28,831	31,808	31,173	Not Simulated	Not Simulated
Simulated EBWF + ASR Demand (AF)	34,202	45,651	59,907	46,732	56,579	41,980	39,308	39,491	20,067	20,067
Total Simulated City of Wichita Demand (AF)	81,262	72,492	71,116	71,890	70,812	70,811	71,116	70,664	Not Simulated	Not Simulated

Cheney Reservoir is not included within the bounds of the EBWGM and therefore has no direct simulated effect on groundwater elevations or the EBGWM results. The condition of Cheney Reservoir during 1% drought is only considered within the City's MODSIM-DSS model which generated the distribution of projected raw water resource demands throughout the simulated drought.

Streamflow – Arkansas River, Little Arkansas River, Cow Creek
Streamflow can contribute to aquifer recharge or discharge depending on river stage, river bed conductivity, and elevation of the underlying groundwater table. Variations in river stage and flow are considered in the groundwater model using the MODFLOW-2000 stream package, and smaller streams and tributaries were simulated using the drain package. The USGS maintains several gaging stations for each of the streams included in the groundwater flow model. Data from the USGS streamflow gages on the Arkansas River, Little Arkansas River, and Cow Creek were utilized to calculate an average annual stage for each river for the years 2010, 2011, and 2012. Stage elevation for the cells between gages were assigned by interpolation of the flow gradient consistent with the original groundwater model documentation (*USGS Scientific*

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Investigations Report 2013-5042). Figure 4 illustrates the location of available USGS stream gages, and Attachment G provides summary graphs of flows for the utilized calendar years at gaging stations above and below the BSA. For the 1% drought model runs, streamflow values were calculated for 2010, 2011, and 2012 applied to the respective model stress periods.

Precipitation & Natural Aquifer Recharge

A percentage of annual precipitation contributes to natural recharge within the EBGWM. The amount of natural recharge entering an aquifer system can be based on many factors including the amount of precipitation, surface soil texture, slope, and type and amount of groundcover. The EBGWM uses average precipitation from area weather stations and then distributes the recharge across the model to recharge zones grouped and developed based on soil type, ground cover and model calibration (*USGS Scientific Investigations Report 2013-5042*). For the 1% drought model, BMcD gathered data on precipitation for calendar years 2010, 2011, and 2012 and distributed natural recharge consistent with the original model documentation. The average precipitation and the distribution of natural recharge by recharge zone for each simulated model year is summarized below in Table 8.

Table 8 – Simulated natural aquifer recharge as a percentage of precipitation for calendar years 2010, 2011, and 2012

Calendar Year	Total Annual Precipitation (Inches)	Simulated Recharge Rates as % of Precipitation	Simulated Recharge Rates (in/year)
2010	32.10	5-32%	1.60 to 10.27
2011	20.90	5-32%	1.04 to 6.68
2012	22.80	5-32%	1.14 to 7.29

Evaporation & Transpiration

Evapotranspiration in the model simulates the groundwater losses to evaporation and transpiration by plants. Evapotranspiration is maximized at the surface, and set to zero at a depth of 10 feet below ground surface. The rate of evapotranspiration was calculated using the process set up by the USGS during development of the EBGWM. This process utilizes the Hamon equation to take the saturated vapor pressure, mean daily air temperature, and average number of daylight hours to calculate the maximum evapotranspiration rate. The calculated evapotranspiration rate for calendar years 2010, 2011, 2012 utilized in the groundwater model is 35.1, 36.8, and 36.9 inches per year, respectively.

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Groundwater Modeling Results – 1% Drought Simulation
The USGS established the current ASR minimum index level elevations and estimates of predevelopment groundwater levels (Attachment H – "*Revised Shallow and Deep Water-Level and Storage-Volume Changes in the Equus Beds Aquifer near Wichita, Kansas, Predevelopment to 1993*" USGS Scientific Investigations Report 2013-5170 (Hansen C.V., Lanning-Rush J.L., and Ziegler A.C., 2013). BMcD utilized Geographic Information System (GIS) software to geo-reference the groundwater elevation figures from this report for both predevelopment and January 1993. Using this approach, interpolated shallow aquifer groundwater elevation surfaces for predevelopment and January 1993 aquifer conditions were generated and assigned to model cells to facilitate relative comparison to simulated drought conditions.

The EBGWM simulated groundwater levels from model Layer 1 for starting conditions, the end of the drought (SP8), and the end of each simulated recovery year have been exported and as Figures 5 through 8. The average simulated water level change from initial model conditions to the end of the 8-year drought was -11.59 feet for model cells in the CWSA and -8.19 feet for model cells within the BSA. At the end of the 8-year simulated drought, the average remaining saturated thickness as a percentage of predevelopment was 86% across the CWSA and 89% for the entire BSA (Table 9). By contrast, the interpolated shallow water level elevations from January 1993 correlate to a calculated average of 88% within the CWA and 92% within the BSA of predevelopment saturated thickness (Figure 9).

Table 9 – Groundwater Modeling Results for 1% Drought Simulation, summary of changes in shallow groundwater elevations and relative aquifer conditions

1% Drought Simulation Statistics	Drought Year 1 (SP2)	Drought Year 2 (SP3)	Drought Year 3 (SP4)	Drought Year 4 (SP5)	Drought Year 5 (SP6)	Drought Year 6 (SP7)	Drought Year 7 (SP8)	Drought Year 8 (SP9)	Recovery Year 1 (SP9)	Recovery Year 2 (SP10)
ASR Basin Storage Area (BSA) Average Water Level Change from Starting Conditions (ft)	-1.84	-3.38	-5.23	-6.12	-7.33	-7.70	-7.93	-8.19	-6.07	-4.65
USGS Central Wellfield Study Area (CWSA) Average Water Level Change from Starting Conditions (ft)	-2.06	-4.44	-7.73	-8.87	-10.98	-11.19	-11.40	-11.59	-8.59	-6.35
ASR Basin Storage Area (BSA) Average Saturated Thickness as Percentage of Predevelopment (94% Initial Conditions)	93%	92%	91%	90%	90%	90%	90%	89%	91%	91%
USGS Central Wellfield Study Area (CWSA) Average Saturated Thickness as Percentage of Predevelopment (91% Initial Conditions)	90%	89%	87%	87%	86%	86%	86%	86%	87%	88%

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Hydrographs have also been generated for the model cells belonging to each of the existing ASR Index Well (IW) sites to record simulated water levels (Attachment I - Hydrographs 1 through 38). Further review of the hydrographs relative to January 1993 aquifer conditions indicates that groundwater levels within the EBWF are projected to fall below the currently permitted ASR minimum index levels at an average of only two years into the simulated drought.

Proposed Modifications to ASR Minimum Index Water Levels

The results of EBGWM 1% drought simulation confirm that after only a few years into the drought, pumping demands will cause groundwater levels within the EBWF to drop below the currently permitted ASR minimum index level restrictions. This requires the City to seek reasonable alternative minimum index water levels for the existing ASR project that ensure recharge credits continue to be available throughout periods of drought.

The results of the EBGWM 1% drought simulation were utilized to calculate the lowest encountered groundwater elevation for each IW site throughout the 8-year simulated drought. In order to account for variability in actual drought starting conditions, model inputs, and potential real world changes to the timing and density of City pumping, an additional ten feet was subtracted from the calculated lowest groundwater elevations for each IW site with the exception of IW1, and IW2. Figure 10 illustrates the proposed minimum index water level elevations for the City's ASR project based on the EBGWM 1% drought modeling results. The proposed ASR minimum index groundwater elevations correlate to roughly 80% full aquifer conditions across the BSA as a percentage of predevelopment saturated thickness.

Summary

The City of Wichita developed the ASR project with the goal of improving long-term aquifer sustainability and lowering drought vulnerability. Through extensive data analysis and groundwater modeling, the City has confirmed that groundwater levels will drop below the currently permitted ASR minimum index water levels during a drought, preventing the withdrawal of ASR credits when they are needed most. The groundwater modeling results indicate that at the end of a simulated 1% drought the aquifer will still be approximately 82% full across the City's wellfield area and 88% full across the entire project basin storage area. The currently permitted 1993 minimum index water levels are overly constricting and establish unnecessary restrictions on the operation of the City's ASR project. To address this concern, the alternative minimum index water level elevations illustrated in Figure 10 are submitted for consideration.

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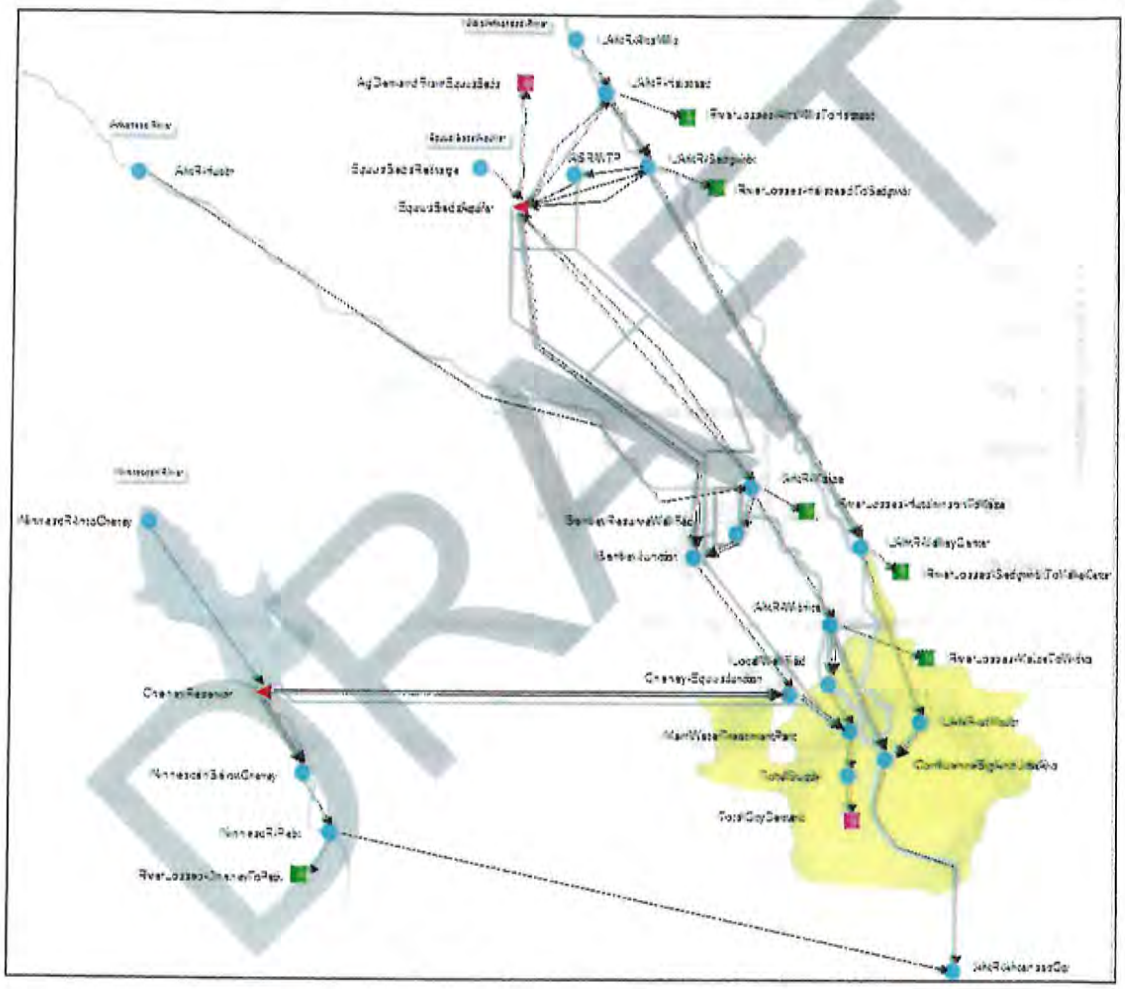
Figure 1 - *A computer screen capture of the graphical user interface of the City's MODSIM-DSS raw water resources model showing the network of simulated reservoirs, streams, aquifers, interconnections, and sources of demand.*



9400 Ward Parkway \ Kansas City, MO 64114
O 816-333-9400 \ F 816-333-3690 \ burnsmcd.com

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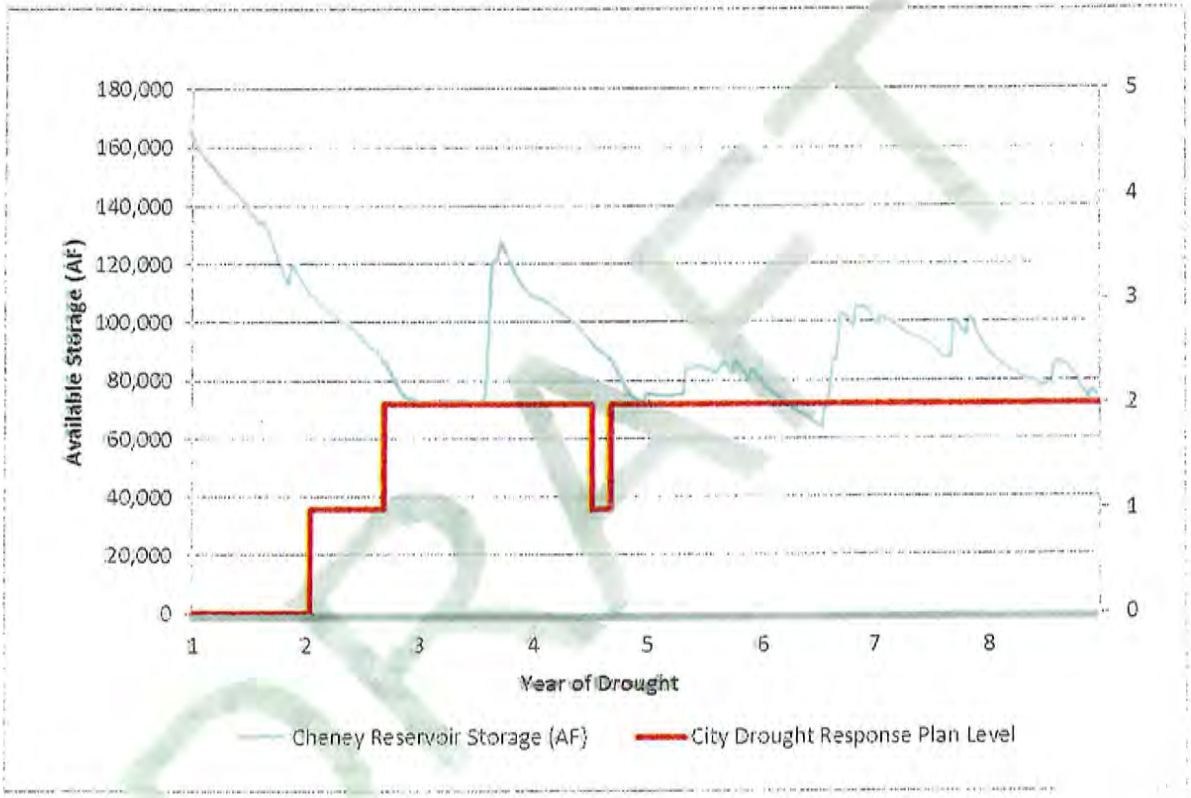
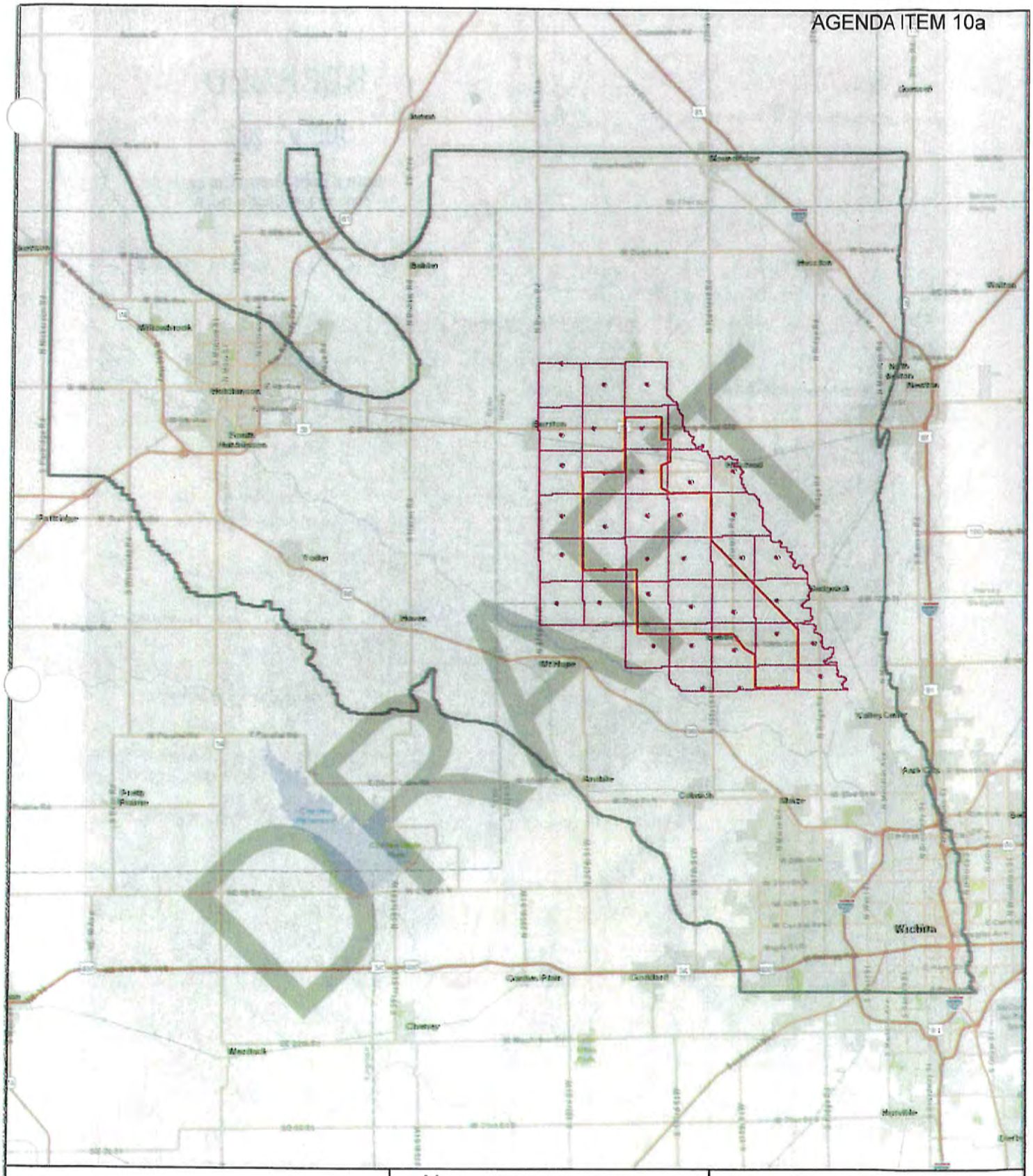
Figure 2 - *Results of 1% drought simulation using MODSIM-DSS, indicates Cheney Reservoir can be maintained viable through the drought utilizing by ASR credits and various levels of the City's adopted Drought Response Plan*





Legend

- Boundary of Active Groundwater Model
- USGS Central Wellfield Study Area
- ASR Index Cells
- ASR Index Monitoring Wells

N

1:375,000

0 2 4 8

Miles

CITY OF WICHITA

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Figure 3
USGS Equus Beds
Groundwater Flow Model
Active Mocel Boundary

AGENDA ITEM 10a

Legend

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0 1.5 3 6
Miles

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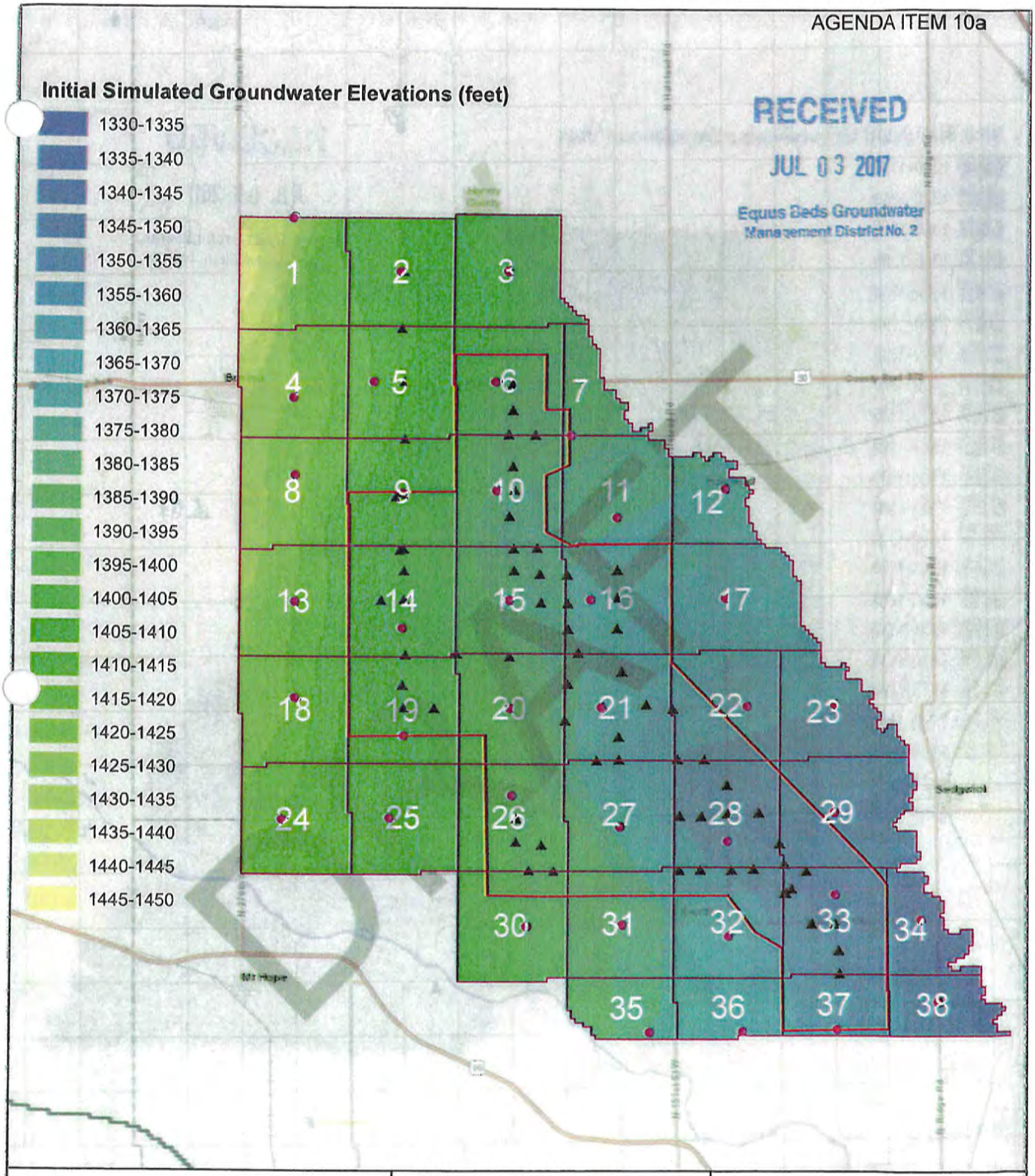
Figure 4
USGS Stream Gage Stations Within ASR BSA



Legend

- Boundary of Active Groundwater Model
- USGS Central Wellfield Study Area
- ASR Index Cells (Numbered)
- ASR Index Cell Monitoring_Wells
- City of Wichita Groundwater Wells

N

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0 0.5 1 2

Miles

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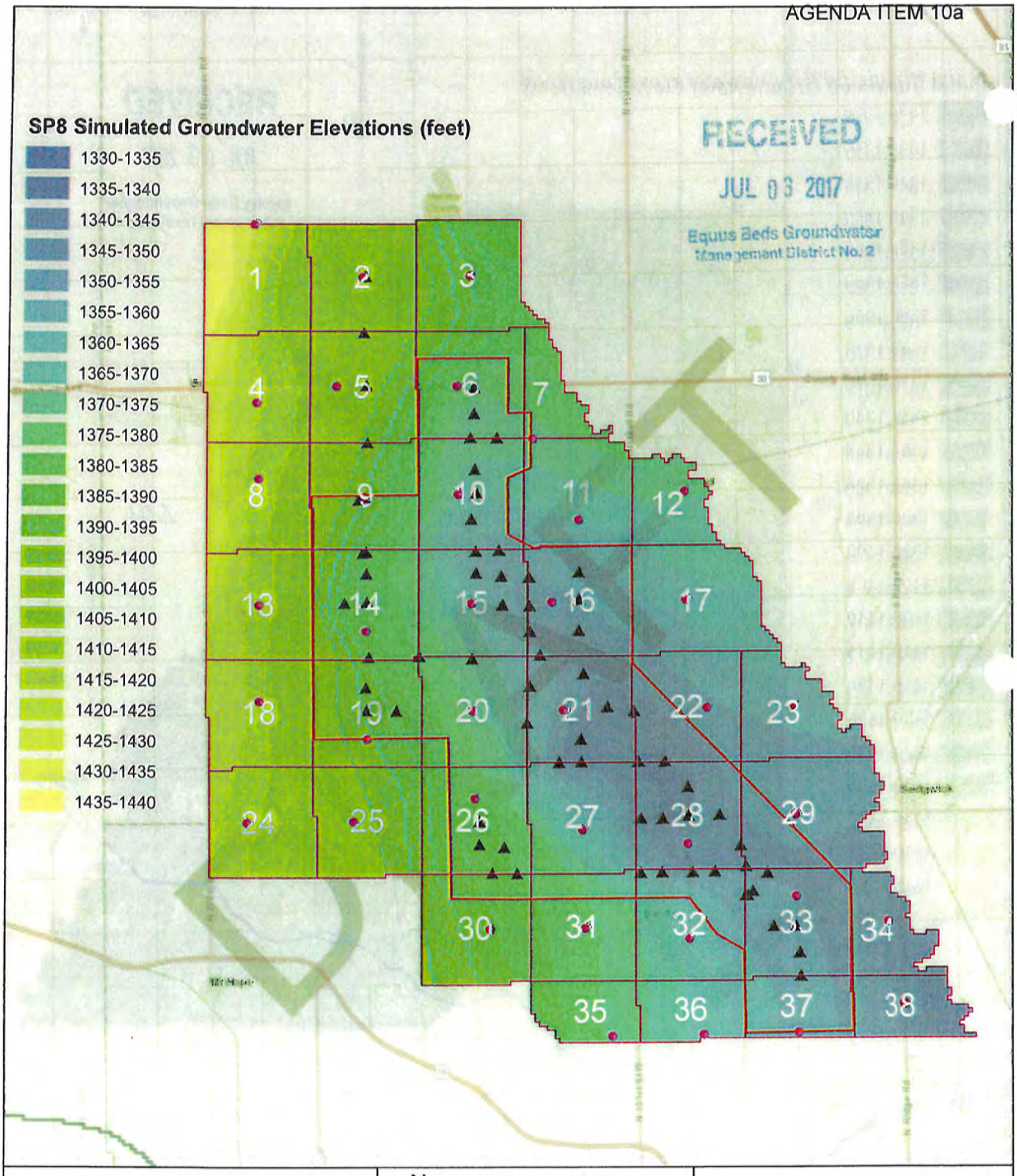
Figure 5
Simulated Drought
Starting Model Heads
(January of 1998)
Clipped to ASR BSA



Legend

- Boundary of Active Groundwater Model
- USGS Central Wellfield Study Area
- ASR Index Cells (Numbered)
- ASR Index Cell Monitoring Wells
- City of Wichita Groundwater Wells

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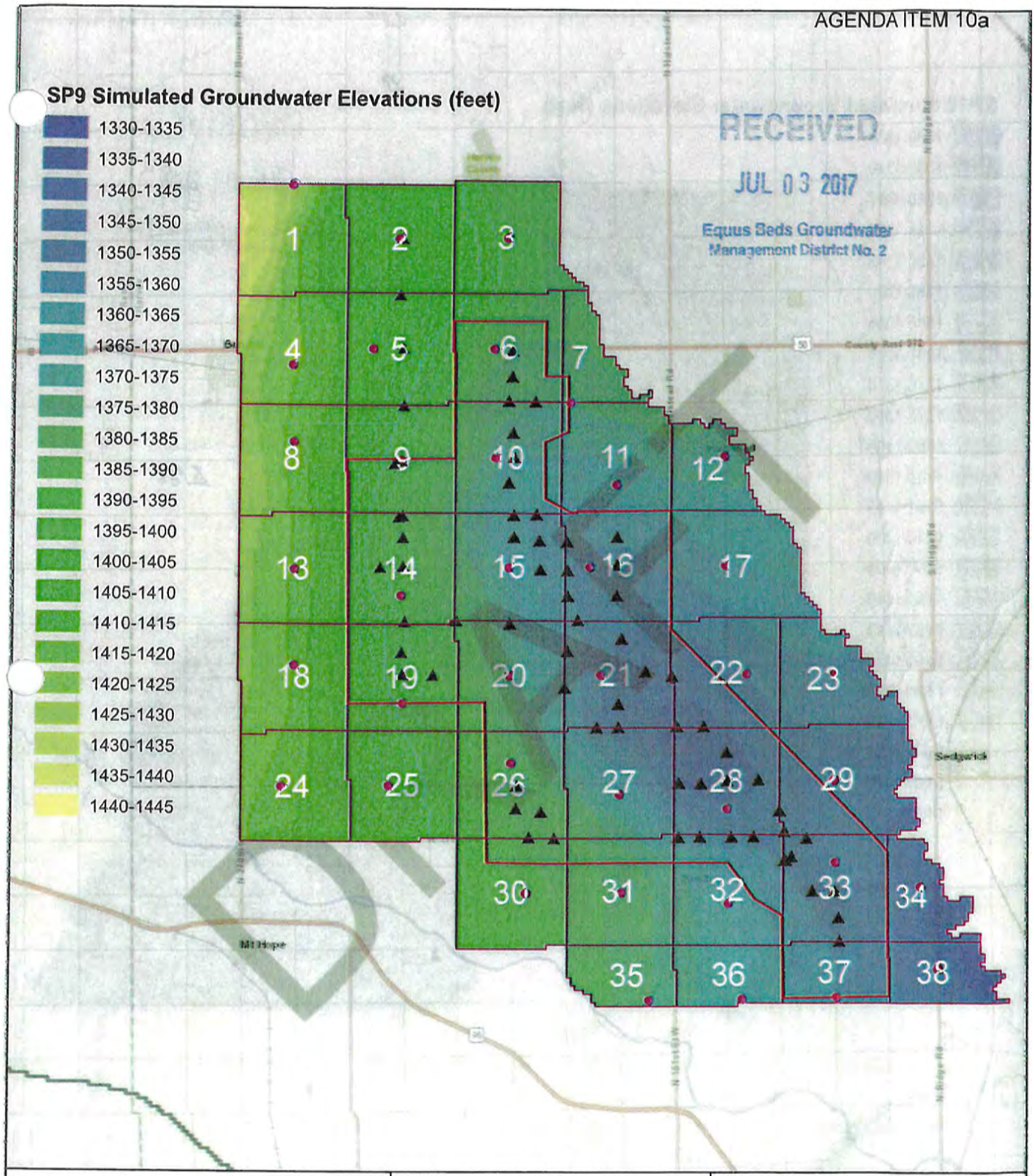
Figure 6
Simulated Groundwater Elevations
End of Drought Year 8 (SP8)
Results Clipped to ASR BSA



Legend

- Boundary of Active Groundwater Model
- USGS Central Wellfield Study Area
- ASR Index Cells (Numbered)
- ASR Index Cell Monitoring Wells
- City of Wichita Groundwater Wells

N

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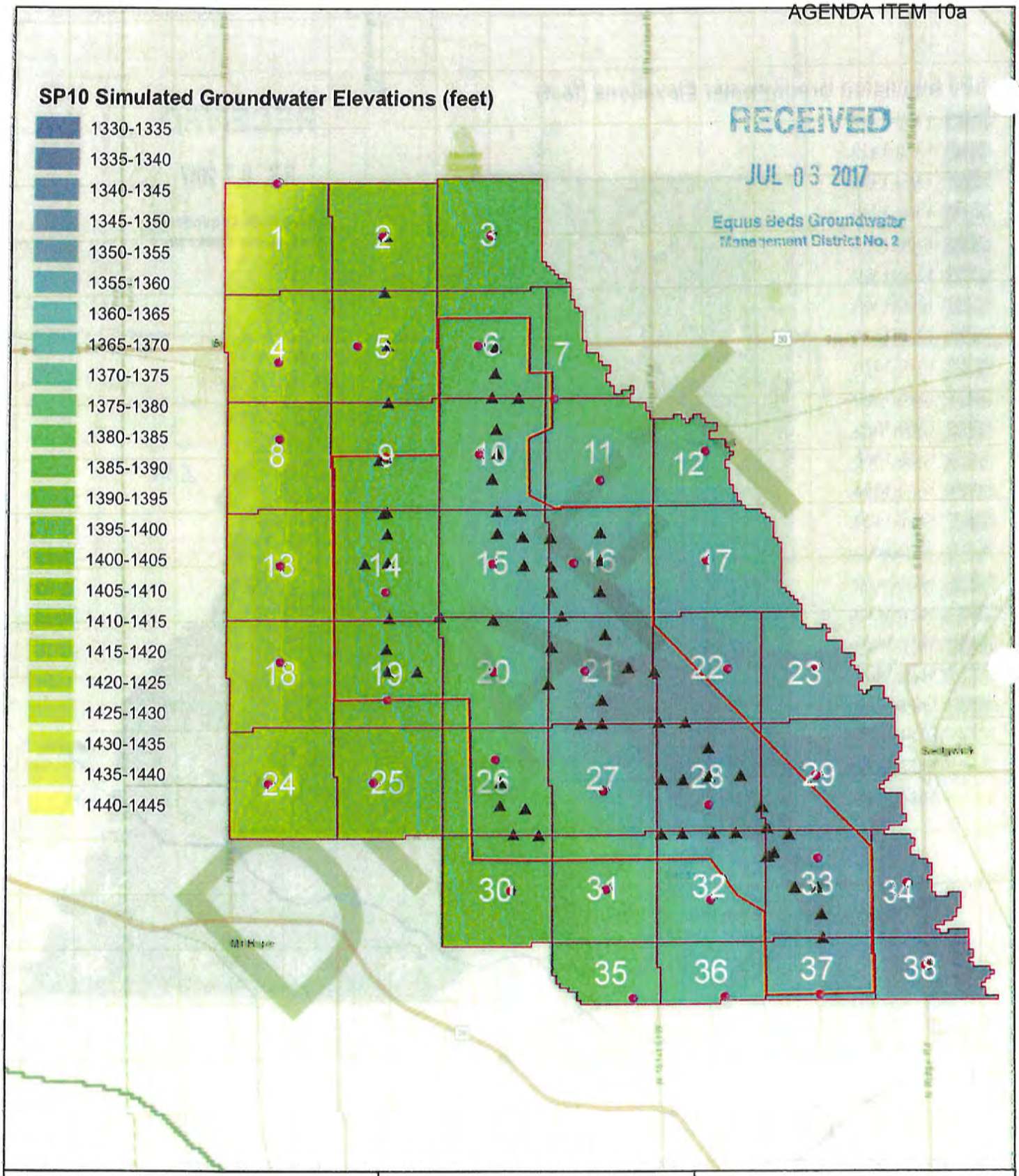
0 0.5 1 2
Miles

City of Wichita | Burns McDonnell

Figure 7
Simulated Groundwater Elevations
End of Recovery Year 1 (SP9)
Results Clipped to ASR BSA



Legend

- Boundary of Active Groundwater Model
- USGS Central Wellfield Study Area
- ASR Index Cells (Numbered)
- ASR Index Cell Monitoring Wells
- City of Wichita Groundwater Wells

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1:150,000

0 0.5 1 2

Miles

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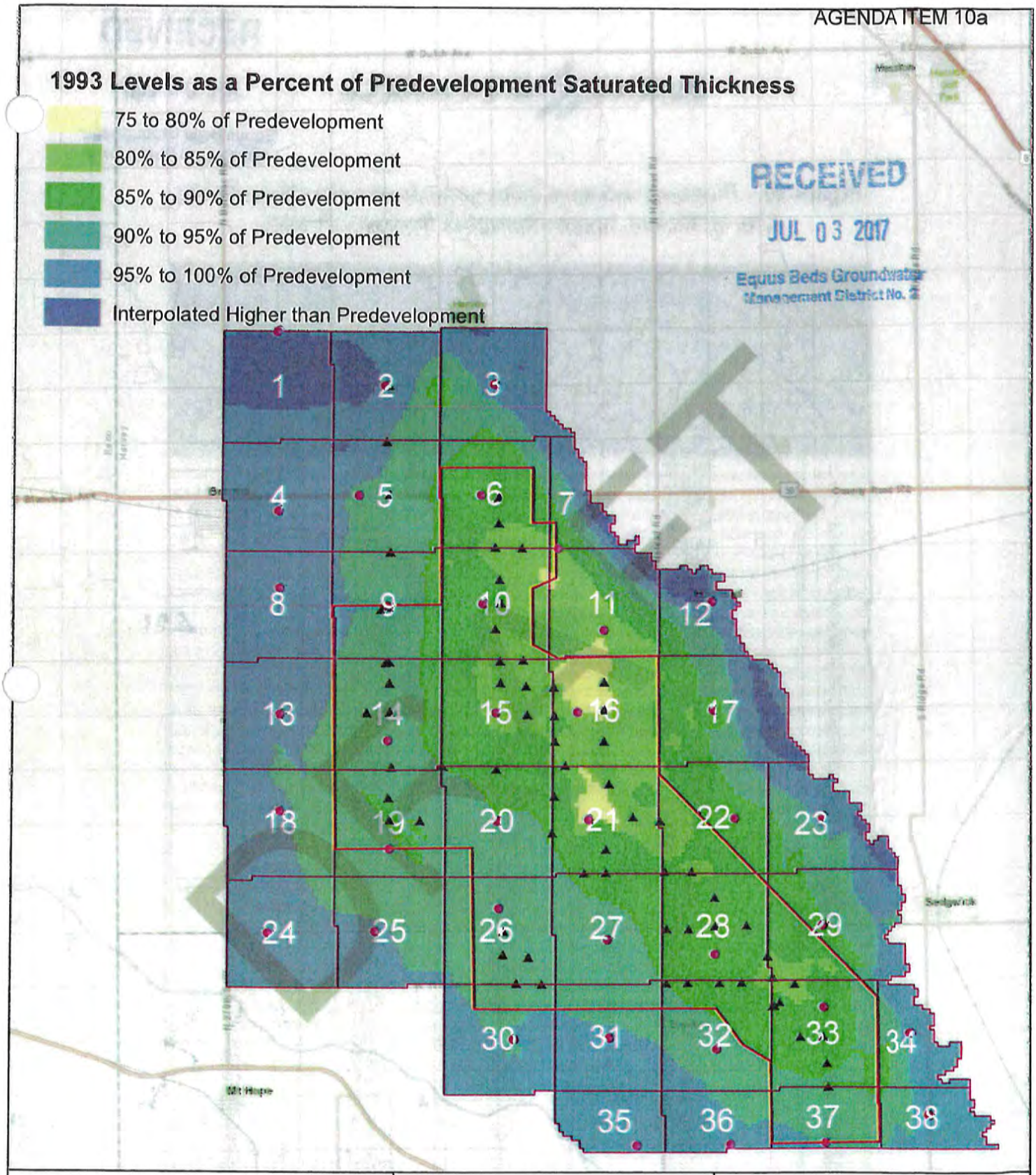
Figure 8
Simulated Groundwater Elevations
End of Recovery Year 2 (SP10)
Results Clipped to ASR BSA



Legend

- Boundary of Active Groundwater Model
- USGS Central Wellfield Study Area
- ASR Index Cells (Numbered)
- ASR Index Cell Monitoring Wells
- City of Wichita Groundwater Wells

N

1:150,000

0 0.5 1 2

Miles

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Figure 9
1993 Levels as a Percentage of Predevelopment Saturated Thickness Clipped to ASR BSA

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Figure 10 – *Proposed minimum index groundwater elevations for the City of Wichita Aquifer Storage & Recovery Project*

Index Cell Number	Existing ASR Minimum Index Level USGS. DWR. GMD2 Jointly Developed January 1993 Interpolated Groundwater Elevations (feet)	Proposed ASR Minimum Index Level Groundwater Elevation (feet)	Difference Between Existing and Proposed Minimum Index Level Elevation (feet)	Proposed ASR Minimum Index Level Remaining Aquifer Saturated Thickness (feet)
	*Lower Aquifer	*Lower Aquifer		
1	1413.42	1390	-23.42	80
2	1410.52	1390	-20.52	190
3	1396.93	1380	-16.93	136
4	1417.60	1407	-10.60	218
5	1407.23	1398	-9.23	135
6	1388.74	1370	-18.74	149
7	1369.95	1360	-9.95	126
8	1417.56	1408	-9.56	224
9	1394.10	1385	-9.10	222
10	1375.09	1358	-17.09	107
11	1363.75	1354	-9.75	125
12	1365.78	1355	-10.78	102
13	1418.27	1407	-11.27	127
14	1396.56	1377	-19.56	193
15	1369.75	1354	-15.75	178
16	1360.21	1344	-16.21	114
17	1360.59	1351	-9.59	75
18	1421.40	1407	-14.40	98
19	1398.95	1386	-12.95	113
20	1376.05	1363	-13.05	192
21	1363.04	1342	-21.04	124
22	1354.92	1344	-10.92	126
23	1355.55	1345	-10.55	123
24	1418.96	1406	-12.96	157
25	1407.27	1393	-14.27	96
26	1374.89	1364	-10.89	181
27	1360.92	1350	-10.92	208
28	1349.14	1334	-15.14	139
29	1349.51	1340	-9.51	105
30	1379.77	1370	-9.77	91
31	1366.06	1356	-10.06	190
32	1356.51	1346	-10.51	152
33	1344.68	1334	-10.68	120
34	1344.24	1335	-9.24	106
35	1366.76	1356	-10.76	89
36	1360.13	1350	-10.13	161
37	1350.51	1340	-10.51	134
38	1344.65	1333	-11.65	67

**Groundwater elevations sourced from: Revised Shallow and Deep Water-Level and Storage-Volume Changes in the Equus Beds Aquifer near Wichita, Kansas, Predevelopment to 1993 USGS Scientific Investigations Report 2013-5170 (Hansen C.V., Lanning-Rush J.L., and Ziegler A.C., 2013*

Tim Boese

From: Tim Boese [tboese@gmd2.org]
Sent: Tuesday, July 18, 2017 6:33 PM
To: 'Henry, Don'; 'King, Alan'; 'Pajor, Joseph'; 'Macey, Scott'; 'Meier, Brian'; 'Clement, Daniel W'
Cc: 'Barfield, David'; 'Lane.Letourneau@KDA.KS.GOV'; Steve Flaherty (sflaherty@gmd2.org)
Subject: RE: Draft Report - ASR Modified Minimum Index Water Levels

Thank you for the opportunity to begin reviewing the draft ASR Minimum Index Levels Report, attachments, and cover letter in advance of the July 19th meeting. District staff has completed an initial review of the information and has several questions and comments as noted below. As you are well aware of, there is a lot of information to review and I am sure there will be more questions, comments, and discussion items as the District, City of Wichita, DWR, and others continue reviewing the information, model inputs and outputs, and proposed modifications to ASR permit conditions. Our initial questions / comments are:

1. The cover and report advise that the City would not have access to recharge credits during prolonged drought periods under the current minimum Index water-levels. This is a fairly general statement. It would be very helpful to have model outputs showing at what point (year) would recharge credits not be available from individual Index Cells. It would also be helpful to quantity how much recharge credits, by percentage or projected acre-feet, would not be available each year.

2. The District previously recommended that the model starting water-levels be made accurate, especially in the Sand Hills region. The City advised that modifying the model water-levels in not an appropriate means of resolving the differences in observed and modeled heads. The District is curious why this in appropriate, and if it is not, then what is appropriate to resolve the head values differences? The cover letter also advises that there "has been very limited improvement in observed data density in the this area since the model was compiled in 200s by USGS." With the addition of the monitoring well network installed for the McPherson BPU water permit applications, more data points and data is available that may help improve the accuracy of the model in the Sand Hills.

3. The District recommended the model be calibrated and the City finds this to unreasonable and unnecessary based primarily on the Root Mean Square (RMS) error of 2.74. An average RMS error may provide some insight as to the overall accuracy of the model, however it does little to demonstrate if there are areas of the model that are inaccurate to a point of needing revisions. Additionally, the cover letter states that the RMS is within established reasonable standards, yet these standards are not described...i.e. what reasonable standards?

4. The City of Wichita – Future Raw Water Demand assessment section of the draft report advised that the "most likely" scenario of future growth is the medium growth scenario. Why was this chosen instead of the low or high growth scenario?

5. Why was Cheney started at 110% full for the 1% Drought Simulation MODSIM-DSS update? Wouldn't it be more reasonable to start at 100% or less?

6. Is using 1933-1940 stream flow, precipitation, and evaporation data for the MODSIM-DSS appropriate or is there better data available for the 1950s and/or 2011-2012 droughts? Additionally, stream flow may be impacted by groundwater development that has occurred after 1940, rendering the 1933-1940 stream flow data inaccurate for drought simulation.

7. In the Groundwater Modeling Setup – 1% Drought Simulation, it is stated that the extremely limited availability of hydrologic data (ET, stream flow, precipitation) for 1933-1940 drought period makes the groundwater modeling unworkable for that period. How can the 1933-1940 hydrologic data be complete enough for the MODSIM for Cheney, but not for the groundwater model?

8. Why is Cheney starting at 110% full for the model run, but the aquifer only starting at 91% full based on 1998 groundwater levels? It is stated in the report that the 1998 groundwater levels are the minimum groundwater levels to maintain 30 MGD of physical ASR recharge capacity. However, if the City was able to use aquifer maintenance credits (AMC) (aka passive recharge credits), then the aquifer could be maintained at a fuller level, as the City would not feel it necessary to pump the aquifer down to create ASR storage area.

9. Are the Net irrigation values in Table 6 appropriate for drought times – does as much irrigation water return the aquifer during drought times? Since Drought Term Permits were used in 2011 and 2012 primarily for irrigation water rights, are the 2011 and 2012 water use and therefore the Net irrigation values appropriate? Drought Term permits are no longer available, so the pattern of one year high, the next year low, repeated 4 times may not be appropriate. With MYFAs now available, the irrigation pattern in an extended drought will most certainly not be the same as it was in 2011 – 2012.

10. Why are shallow water-levels used in the model, when the minimum Index water levels are based on the deep aquifer levels?

11. The average groundwater level change from the beginning to end of the drought simulation model results is noted. However, this does not demonstrate the change from year to year and also not from cell to cell. The average does little to show the impacts of drought and recharge credits withdrawals from each cell, as some cells have little or no recharge credits pumped. A table showing the change by cell per year would be most helpful.

12. The draft states that the model run shows the water-levels will fall below the ASR currently permitted minimum Index levels at an average of only two years. However, a review of the model hydrographs show that in some cells the water-level does not fall below the minimum Index level ever during the drought. Again, it would be best to show at what year the water-level falls below and the minimum index level per cell AND how much recharge credits are limited because of this. For example, it matters much more if an Index Cell with a large amount recharge credits falls below the minimum Index levels compared to a cell with little or no recharge credits.

13. An additional 10 feet was subtracted from the modeled lowest groundwater elevations for each Index Well Site, except for IW1 & IW2. Additional justification may be needed for this adjustment. Additionally, the District identified that 16 of the 38 IW sites were modified from the original draft we received at the June 21, 2017, meeting. The modifications were an additional subtraction of 1 to 10 feet. An explanation of these adjustments is needed. Did the June 21st draft have 16 errors for the proposed minimum index levels, or was more than 10 feet subtracted for these 16 cells?

I apologize for the length and number of questions/comments, but thought I would try to put some of our initial review thoughts in writing to facilitate our discussion tomorrow and in the future. I am in no way suggesting that the City or their consultant have answers/responses to any or all of these questions/comments tomorrow. I am also sure that we have missed some points of discussion and quite possibly misunderstood parts of the report and perhaps missed the clarification in the report to some of our questions.

I am looking forward to continuing to work together on this important issue.

Thanks.

Tim Boese, Manager
Equus Beds GMD2
313 Spruce, Halstead, Kansas 67056
316-835-2224

EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2
MONTHLY PUBLIC SERVICE REQUEST
FOR THE MONTH OF JULY 2017

1. How the request for assistance was received.	TDB	DDR	RSW	STF	TOTAL
Office	11	0	4	8	23
Telephone	19	7	10	18	54
Field	0	2	0	0	2
Mail	0	0	0	4	4
Fax	0	0	0	0	0
E-Mail	36	2	0	3	41
Other	2	0	0	0	2
TOTAL	**68**	**11**	**14**	**33**	**93**

2. Type of assistance requested.

A. INFORMATION	TDB	DDR	RSW	STF	TOTAL
Abandoned Well	1	1	1	0	3
Agency	19	0	0	0	19
Appeal	0	0	0	0	0
Assessment Inquiry	0	0	0	0	0
Cathodic Hole	4	0	0	0	4
Committee	1	0	0	0	1
Water Use / Conservation	0	0	2	4	6
Data	2	0	0	1	3
Inactive Well	0	0	0	0	0
Management Program	0	0	0	2	2
Meter Information	2	0	1	2	5
Meter Order	0	0	0	0	0
Meter Service & Repair	0	6	3	2	11
Presentations	1	0	0	0	1
Safe-yield Evaluation	0	0	2	4	6
Law / Regs	7	0	0	1	8
Verified Claim	0	0	0	0	0
Water Permit Consultation	13	0	0	0	13
Water Quality	1	0	0	0	1
Meter Tube Order	0	1	0	0	1
SUBTOTAL	**51**	**8**	**9**	**16**	**68**

B. INSPECTION / ANALYSIS	TDB	DDR	RSW	STF	TOTAL
Abandoned Wells	0	1	1	0	2
Cathodic Holes	0	0	0	0	0
Compliance	0	0	0	0	0
Inactive Wells	0	0	0	0	0
Meter	0	3	0	0	3
Waste of Water	0	4	0	0	4
Water Quality	0	0	0	0	0
Unpermitted Wells	0	0	0	0	0
Water Quality Analyses	0	0	0	0	0
SUBTOTAL	**0**	**8**	**1**	**0**	**9**

C. APPLICATION ASSISTANCE	TDB	DDR	RSW	STF	TOTAL
Division	0	0	0	0	0
Cathodic	1	0	1	0	2
Change Place of Use	0	0	0	1	1
Change Point of Diversion	0	0	0	0	0
Change Use	0	0	0	0	0
New Application	1	0	0	1	2
WRCP	0	0	0	0	0
Term / Temp	3	0	0	0	3
Completion of Works	0	0	0	0	0
Review	0	0	0	3	3
SUBTOTAL	**5**	**0**	**1**	**5**	**11**

D. OTHER	TDB	DDR	RSW	STF	TOTAL
General Information	5	0	3	11	19
News Media	4	0	0	0	4
Legislative	0	0	0	0	0
ASR	3	0	0	0	3
SUBTOTAL	**12**	**0**	**3**	**11**	**26**
TOTAL REQUESTS	**68**	**16**	**14**	**32**	**114**
WORKDAYS IN MONTH	20	20	20	20	20
ASSISTANCE PER DAY	**3.40**	**0.80**	**0.70**	**1.60**	**5.70**

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EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2
MONTHLY ADMINISTRATIVE PROCESSING REPORT
JULY 2017

Advanced Copies	1
15-day Comment Letters	4
Approval of Permit	2
Change Point of Diversion	2
Change Place of Use	0
Notice & Proof	0
Certificates	4
Change in Ownership	1
Address Changes	0
Dismissals	1
Findings & Order	0
Correctional Order	0
Temporary	1
VI Card	8
Invoices	13
Other - MYFA, Extensions, V.C.	5
TOTAL REQUESTS	42
WORKDAYS IN MONTH	20
PROCESSED PER DAY	2.10

DWR Processing
Website Updates
Assessment Lists (Certified for counties)

MONTHLY FIELD WORK REPORT
JULY 2017

Water Quality Sample	26
Meter Inspections	3
Abandoned/Inactive Wells	1
Water Level Measurements	505
TOTAL REQUESTS	535
WORKDAYS IN MONTH	20
PROCESSED PER DAY	26.75

Water-Level Measurements
Meter Inspections
Waste of Water Investigations
Meter Service & Repair