

FOA: BOR-DO-17-FO03

WaterSMART: Development of a Feasibility Study
under the Title XVI Water Reclamation and Reuse
Program for Fiscal Year 2017



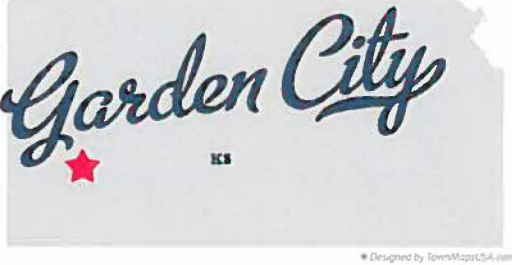
City of Garden City
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Technical Proposal and Evaluation Criteria



Executive Summary

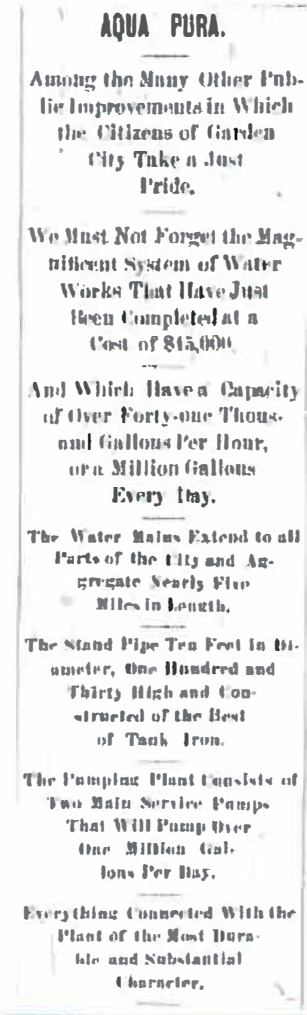
Garden City, Kansas is located in Finney County, in the southwest corner of the Sunflower State. Since 1887, the City has continued to

develop and grow at an astounding rate as the commerce hub of the area, and City leaders and stakeholders share a vested interest in ensuring adequate water resources and use practices are in place to sustain the community for future generations.

On the edge of the epicenter of the 1930's Dust Bowl, Garden City is all too familiar with the legacy impacts that drought has had and can have on the City and the surrounding communities. Garden City has long understood the delicate nature of their water supply and dependency on the rapidly declining and limited aquifers. Garden city utilizes seventeen groundwater wells, with all but three pumping from the Ogallala Aquifer.

Garden City is located in an arid region of the state, with an average of nineteen inches of precipitation per year. Surrounded by heavy agricultural irrigation, shared groundwater aquifers that have been mined since the 1960's are not sustainable, nor is the water future for the City. Garden City has the opportunity to be a leader in Kansas with the unique reuse opportunities available, and the commitment to pursue them if possible. Now is the time for action to secure the water future for the City, region, and economic viability of the State.

A WaterSMART feasibility study would provide the City with information regarding the current state of the fragile water supply and long-term supply outlook with eminent reuse opportunities. The scope of the study would provide the City with information to develop or enhance the following policies:



Garden City Weekly Herald,
September 22, 1887

- Determine most cost effective method to reuse the maximum quantity of water with the lowest cost impact and maximum benefit for long-term water availability. This would include a cost-benefit analysis that would weigh financial and supply considerations.
- Establish reuse partnerships based on the beneficial impact to City wells due to effluent reuse and offset of groundwater irrigation for agricultural production.
- Evaluate existing water conservation practices and policies based on information gathered from the study, providing opportunity for improved public information and messaging for increased awareness of water resource issues.
- Provide data for City staff to use in making decisions on infrastructure development needed to implement varying levels of reuse.
- Provide data for City staff to use in making decisions to acquire additional water rights in the future. Rights may be acquired for production or to create a buffer or conservation project to protect existing city rights.

The completion date of this feasibility study will be 18 months from the date of award.



Garden City is nestled between the sand hills of the Arkansas River valley and some of the most productive agricultural land in Finney County.

Study Description

Introduction

The City of Garden City, Kansas is a First-Class City and the county-seat of Finney County Kansas. The City has a population of approximately 31,000, requiring a peak demand of 13 MGD, and serves as a regional hub for services, shopping, and healthcare services. Historically the area has been home to numerous animal feeding and processing operations. The City has experienced major growth in manufacturing and industry over the past decade specifically in the energy and transportation sector including a 100 MGY ethanol plant and large facility that stages wind turbines and towers for rail to truck transfer.

Currently Dairy Farmers of America (DFA) are constructing a large milk drying facility to create milk powder for domestic and export use in the food industry. The construction of this facility is driving efforts to find effective and beneficial effluent re-use methods. As part of the development agreement the City has purchased exclusive access to the effluent water produced by the milk drying process.

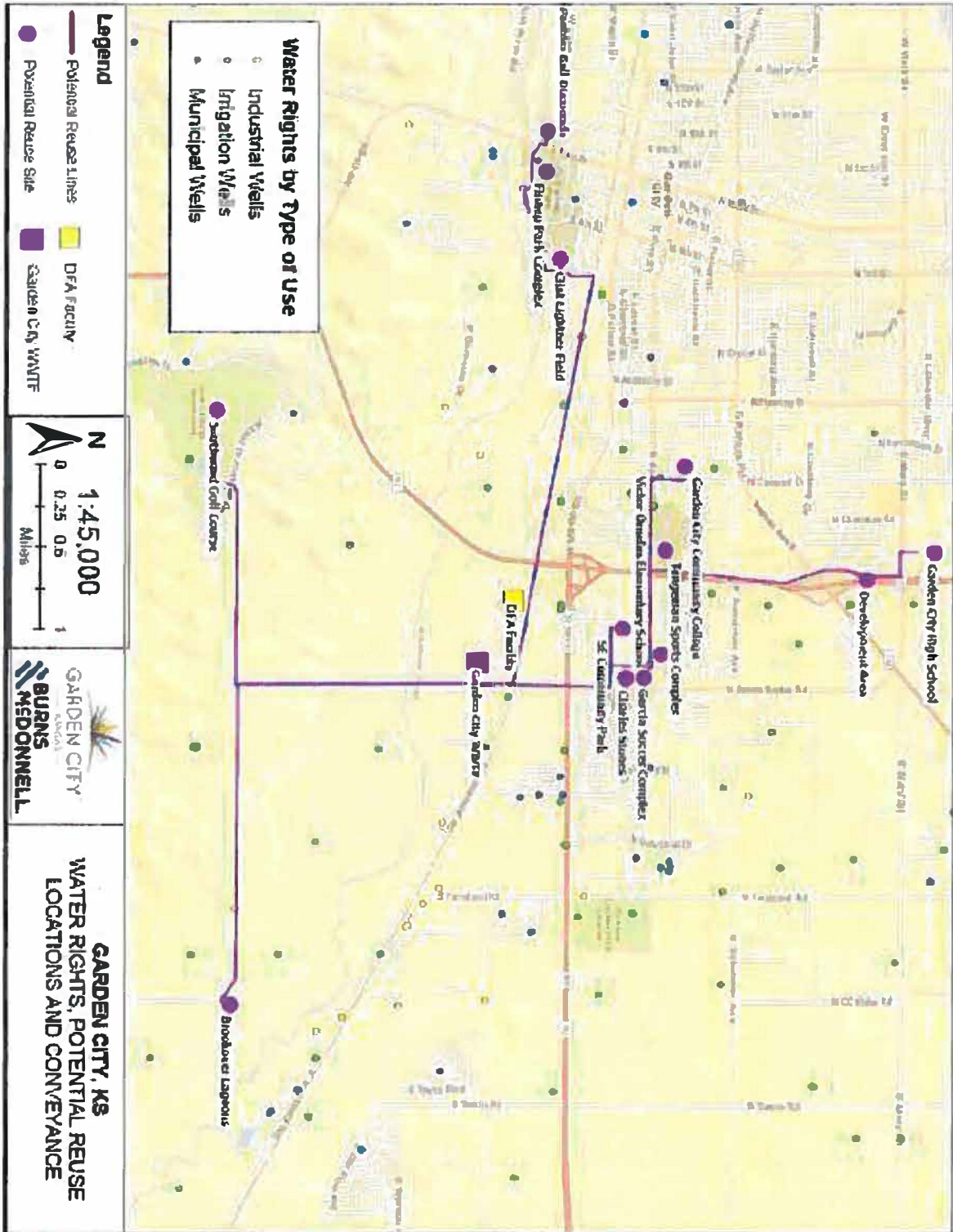
The City is served by numerous ground water rights and source wells providing an appropriation of 9,010 acre feet of water. The City also purchases an additional 951 acre feet of water from an area utility via a long term water treatment contract. This brings the communities total available water to 9,961 acre feet. The City is using approximately 67% of its available water each year. The City does not have any water delivery or purchase agreement with Bureau of Reclamation affiliated projects.

The City water delivery system consists of 164 miles of water main serving approximately 8,100 service connections. Total water delivery in 2015 was 5,753.9 acre feet.

The City has committed to taking a guaranteed quantity of water from the DFA on a daily basis starting in the 3rd quarter of 2017. As a result the City will be developing a Water Reuse Utility to distribute the water for beneficial use. The City has determined that it has three options, or a combination thereof, for the use of this effluent:

- Sell the effluent for Industrial, Commercial, or Agricultural Reuse
- Transport the effluent via pipeline to a location on the west side of Garden City where it can be used for a constructed wetlands and indirect potable recharge that would benefit three source wells that are used to supply the reverse osmosis water treatment facility that serves the City. This concept was developed in the late 1990's with the Army Corps of Engineers – Tulsa Office.

- Construct pipeline infrastructure to provide water to facilities for outdoor irrigation on park and recreation facilities, thereby directly offsetting potable water use. Excess water to be diverted for indirect potable recharge.



Statement of Problems and Needs, Watershed Perspective.

Garden City needs to continue to investigate reuse as a viable alternative to off-set use of the rapidly declining groundwater source of supply currently utilized. Conservation and securing additional water rights for new groundwater development may not be enough to support future demand for Garden City and this area of the State.

Garden City is centered in the heart of the Upper Arkansas (River) Regional Planning Area. This significant resource area is one of the fourteen regional planning areas in the State that were established in 2014 by the Kansas Water Authority in conjunction with the Long Term Vision for the Future of Water Supply in Kansas. In 2015, Regional Advisory Committee (RAC) members were approved for each of these 14 planning areas and began to establish their priority goals for their region. The City of Garden City is represented on this committee, which has established their priority regional goals as well as completed the development of their Regional Goal Action Plan. These goals and Action Plans are representative of the collaborative effort of diverse stakeholders along the Arkansas River and within the surrounding watershed on water quality and quantity issues.

1. **Extend the usable lifetime of the Ogallala Aquifer for at least 25 years in the planning region through the promotion of multiple Local Enhanced Management Areas (LEMAs), Water Conservation Areas (WCAs) and other incentive-based programs. Slow the depletion of the Ogallala Aquifer by 25% in 10 years in the planning region maximizing the opportunity to make use of emerging technologies. Encourage conservation through added flexibility. Find additional sources of water and a place to store water for irrigation and recharge. Increase the opportunity to use wastewater for other beneficial uses. Increase education of aquifer conditions.**
2. **By 2020, continue to re-establish and maintain flows along the Upper Arkansas River in the amount of one cubic feet per second at the USGS gage located at Dodge City for 100% of Kansas' share of compact water and a quantified share of high flows that is currently stored in Colorado that is over and above the compact amount through management of river flows and maintenance of open channel conveyance through 100% of tamarisk control. Ensure we maintain compact compliance and enforce the compact when necessary.**
3. **Maximize available water and promote conservation of municipal use through incentives, education and outreach, reduced water loss, and increased data availability to reduce gallons per capita per day usage.**
4. **Maximize available water and promote conservation of industrial use through incentives, education and outreach, benchmarking efforts, and increased data availability to reduce gallons per production unit usage.**

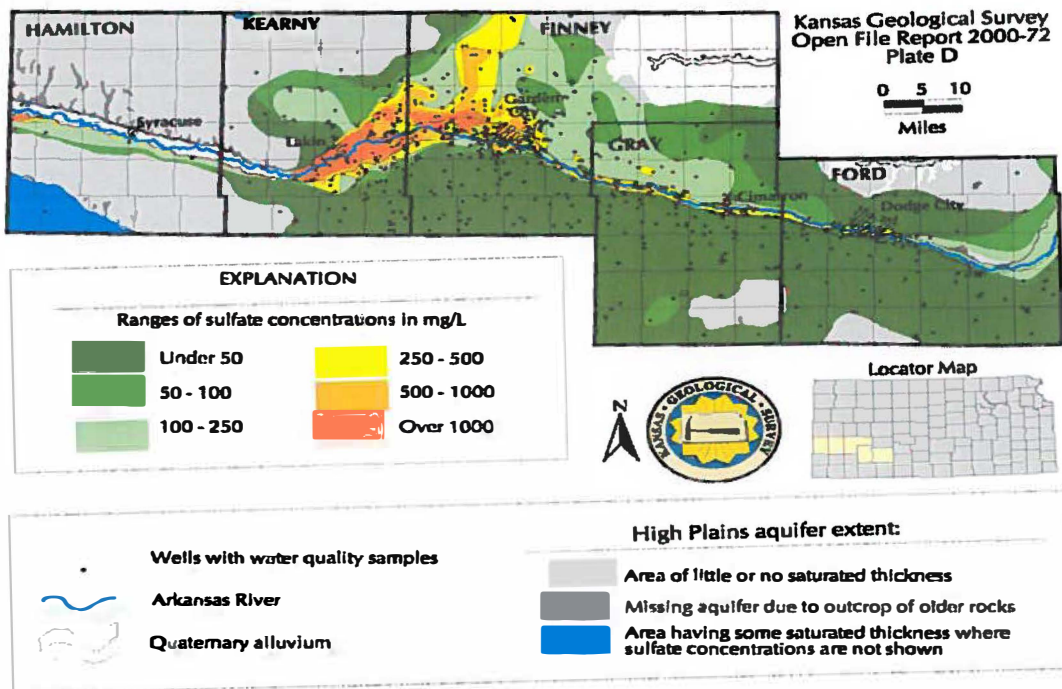
The Upper Arkansas RAC goals and Action Plans were developed collaboratively with watershed interests representing public water supply, agriculture, dairy, surface water irrigation, groundwater irrigation, industry/commerce, conservation and environment, groundwater management, and public at large.

Garden City recognizes the need for a watershed-based approach to not only resource management but for long-term solutions as well. Water reuse opportunities will not only help expand the water supply portfolio for the City, it will aid in achieving the regional goals of decreasing overall dependency on declining groundwater resources. This is a watershed-wide, regional-wide piece of the solution for the declining aquifers.

According to the Bureau of Reclamation Study, *Upper Arkansas River Basin Public Water Supply Alternatives Viability Analysis: Water Supply Alternatives for Hamilton, Kearny, and Finney Counties, Kansas*, regional water supply opportunities may exist for Garden City to supply water to neighboring communities for future sustainability related to water quality and quantity.

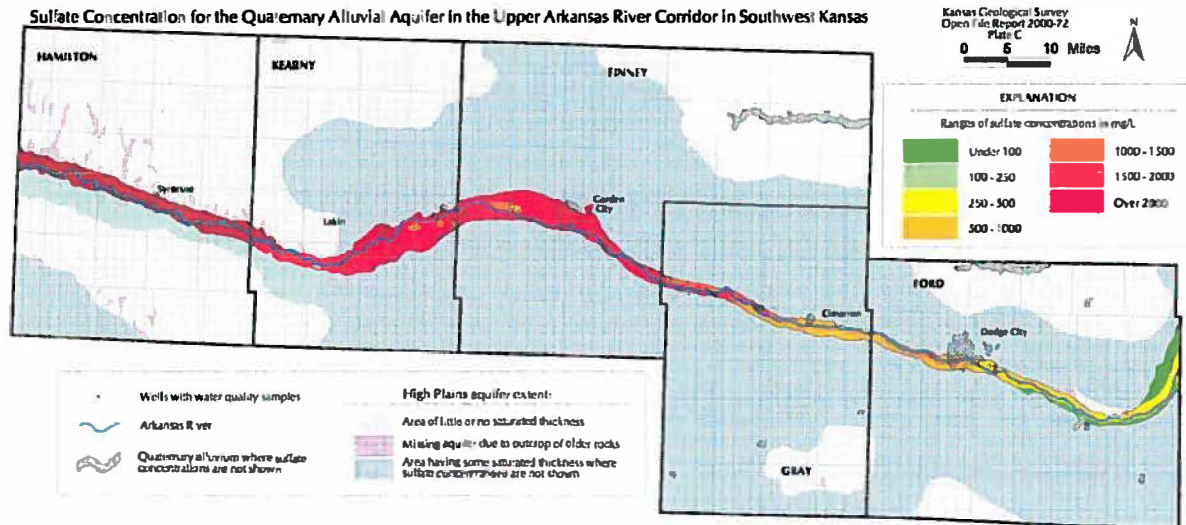
Water quality issues, in addition to quantity, make the area sensitive to future growth and may interfere with meeting near-term demands. Quality issues include excessive levels of sulfates, selenium and uranium. These quality issues may impact the ability of smaller neighboring communities to provide water that meets Safe Drinking Water Act Standards, which will necessitate the need for wastewater reuse options for Garden City to provide a source of supply, if necessary.

Sulfate Concentration for the High Plains Aquifer in the Upper Arkansas River Corridor in Southwest Kansas



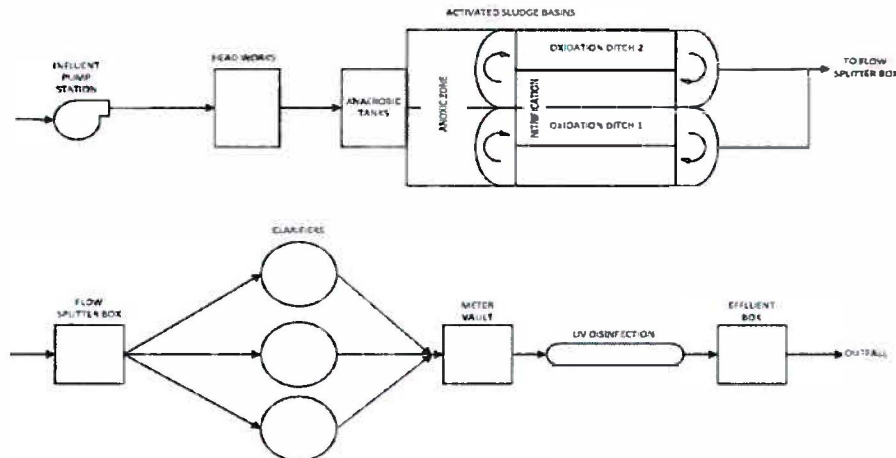
“The Arkansas River in western Kansas is among the most saline in the country.....Data from the U.S. Geological Survey and the Kansas Geological Survey (KGS) show uranium concentrations in the river during saline low flows generally exceeding the Environmental Protection Agency (EPA) drinking water standards. The dissolved concentrations of uranium are well correlated with sodium, sulfate, and chloride concentrations. In general, selenium and uranium concentrations increase with increasing salinity of the surface and ground waters. Just as the primary source of the sulfate in the waters is natural (leaching of rocks and soils), the primary source of the uranium is natural. However, the high concentrations of both sulfate and uranium in the Arkansas River surface water and

ground water affected by the river are not natural but the result of the evapotranspiration consumption of water in Colorado, leaving the residual salts dissolved in a much smaller volume of water. The saline water from the Arkansas River seeps into the subsurface alluvial aquifer and then the Ogallala-High Plains aquifer in Kansas, thereby contaminating the ground water with high sulfate and uranium concentrations.”¹



Now is the time to secure the water future for the City of Garden City through reuse opportunities from the current wastewater treatment facility (WWTF) and the DFA facility.

The existing WWTF operates under NPDES Permit KS0038962. The facility is permitted to discharge 4.0 MGD. The average treatment capacity of the facility is 6 MGD and the peak treatment capacity is 12 MGD. The existing process is a biological nutrient removal system, which includes an activated sludge process consisting of anaerobic, anoxic and aerobic zones, followed by secondary clarification and UV disinfection prior to discharge. A process flow diagram for the WWTF is shown:



¹ 2009 Kansas Water Plan

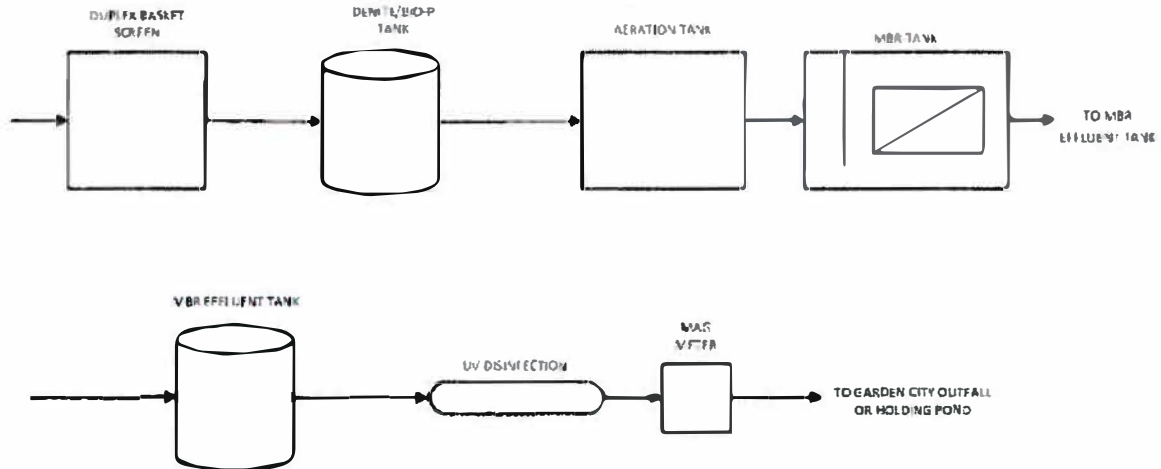
The average monthly WWTF effluent characteristics from May 2014 through June 2016 are shown in the following table. Data was provided by Sarah Unruh, P.E., of Professional Engineering Consultants (PEC):

Average Garden City WWTF Effluent Quality

Parameter	Units	Average (May '14-Jun '16)
BOD	mg / L	4.7
TSS	mg / L	5.0
Ammonia	mg / L	1.5
NO ₂ +NO ₃	mg / L	1.8
TKN	mg / L	2.6
Total Nitrogen	mg / L	4.4
Total Phosphorus	mg / L	1.2
SO ₄	mg / L	270
Chlorides	mg / L	213
Boron	ppb	292
pH	SU	7.4
DO	mg / L	3.4
E.C. geometric mean	MPN / 100 mL	18.7
Wet IC25 percent	fish	100
Wet IC25 percent	water flea	100
Alkalinity	mg / L	150
Conductivity	dS/m	1.5
TDS	mg / L	1145
Hardness	mg / L	356
Antimony	ppb	1.0
Arsenic	ppb	1.3
Beryllium	ppb	1.0
Cadmium	ppb	0.5
Chromium	ppb	5.0
Copper	ppb	10.0
Lead	ppb	1.0
Nickel	ppb	5.0
Selenium	ppb	1.8
Silver	ppb	0.5
Thallium	ppb	1.0
Zinc	ppb	48.4
Mercury	ppb	0.2

The DFA milk drying plant discussed earlier will use a membrane bioreactor (MBR) process and UV disinfection; the anticipated process flow diagram is shown in the following diagram:

: Anticipated DFA Facility Process Overview



The estimated average effluent quality is shown in the following table. Both the anticipated process and average effluent quality was provided by the DFA engineers via Sarah Unruh, P.E., of PEC:

DFA Average Estimated Effluent Quality

Parameter	Units	Estimated Value
BOD	mg / L	4
SBOD	mg / L	2
TSS	mg / L	1
TKN	mg / L	1
Total Phosphorus	mg / L	1
TDS	mg / L	1090
Alkalinity	mg / L	200

There are currently no anticipated effluent water quality concerns with respect to potential irrigation applications. The WWTF effluent water is anticipated to fall into the “slight to moderate” degree of restriction on irrigation; however, it is noted that limited data is currently available regarding the DFA Facility’s effluent. As the facility is brought online and additional information becomes available, the water quality can be compared

to the values listed in this table to determine whether there are specific water quality concerns for the selected application.

Water Reclamation and Reuse Opportunities, Stretching Water Supplies, Environment and Water Quality, Energy Efficiency.

The City's purchase of effluent water from the DFA facility requires development of a strategic plan for water reuse. Beneficial reuse of the effluent water from the DFA facility as well as the City's wastewater treatment plant (WWTP) to offset irrigation pumping at several irrigation well sites will be evaluated as part of this Feasibility Study. This effort will also include an evaluation of the aquifer conditions around Garden City. As mentioned previously, the fragile condition of this shared aquifer(s) reach beyond the boundaries of Garden City alone. This Feasibility Study will provide the City with the opportunity to evaluate reuse opportunities to decrease total dependence on declining groundwater sources while strengthening the position of the City to make critical decisions related to future water rights needs, the development of a Water Conservation Area, and the feasibility of potable reuse alternatives.

The City of Garden City is uniquely positioned to continue to support and embrace rapid economic development, industrial growth and conservation-minded consumptive uses of water, all while expanding their wastewater reuse opportunities to develop one of the most innovative and diverse water and wastewater portfolios in the State of Kansas. This Reuse Feasibility Study will continue to further that path for Garden City and lay the groundwork for future specific reuse project considerations and implementation opportunities. The reuse alternatives outlined previously, and that will be expanded upon in this study, have been given priority by the City. This study will focus on key elements for consideration when evaluating alternatives, and offers an economic evaluation of the alternatives.

The City has identified two unique sources of water that have the potential to augment existing potable water sources: the Dairy Farmers of America (DFA) Facility and the City's WWTF. The DFA Facility is anticipated to produce between 0.6 to 1.0 million gallons per day (MGD) of wastewater, of which the full amount will be available to the City for reuse applications. The WWTF produces approximately 2.5 MGD (on average) of effluent. Currently, Wheatland Electric is under contract with the City to acquire up to 2.0 MGD, and the contract expires in 2025. Data from the last 10 years indicated usage of 199 MGY / 468 MGY, with an annual use of 342.9 MGY, and a median use 350 MGY.

In the next five years, the most practical option for reusing wastewater effluent may be for irrigation purposes. This Feasibility Study will confirm/refine this. Reducing dependency on groundwater (both raw and treated) to irrigate farmland, ballfields, and parks, as well as for livestock watering, will allow the City to conserve this precious resource and offer an energy savings component as well. The anticipated water quality from the DFA Facility is deemed to be suitable for these purposes; however, limited water quality data is available as the facility is still under construction. Upon start-up of the DFA Facility, water samples should be obtained to confirm the quality is acceptable for the intended use. As use of WWTF effluent is contractually obligated to Wheatland Electric until 2025, this source of water should not be considered a firm source of supply for short-term options. When the Wheatland Electric contract expires in 2025, this additional source of supply would become available to the City.

Through the evaluation of the feasibility of offsetting existing irrigation pumping through beneficial reuse of effluent water from the DFA facility, opportunities for improved energy efficiency and energy savings will be considered. Irrigation pumping reductions will directly correlate with energy savings.

The following locations/partners have been identified as opportunities for reusing wastewater effluent. The Feasibility Study will assist in refining the ability to provide reuse water and determine the desired partnership from those identified:

- Irrigation of land directly south of the DFA Facility and WWTF:
 - Brookover Feed Yards (3000 acres of center-pivot irrigated corn, potatoes, wheat, soybeans, alfalfa, rye and triticale for cattle pasturing); and
 - The Southwind development area and Golf Club at Southwind (approximately 200 acres).
- Irrigation of land in the Fynnup Park Complex area (110 acres);
- Irrigation of land in the vicinity of the Southeast community park, or USD 457 and the Garden City Community College (50 fully irrigated acres);
- A constructed wetland and water feature to replicate the Arkansas River and provide beneficial recreational and educational opportunities, as well as improving the quality of wastewater effluent for beneficial purposes;
- Corridor along the new development area near US 50/83/400 Bypass Highway;

- Landscape impoundment/water feature associated with potential commercial development.

In addition to the potential use of wastewater effluent for irrigation purposes, major industrial facilities in the City could also benefit. While the specific water quality requirements of the industrial users are not currently known, engaging in discussions with these entities could yield positive results. Some industrial uses may include:

- Cooling towers;
- Boiler feed water;
- Transport and cleaning; and
- Conveyor belt lubrication.

Several potential industrial users were identified due to their high consumption of potable water; however, the most likely application for recycled water for the foreseeable future is for irrigation purposes. Regardless, several local industries in the Garden City area are located favorably and likely involve processes that may be able to use recycled water to offset the use of potable water. These industrial facilities are good candidates for a future industrial water reuse evaluation and that candidacy will be vetted during this Feasibility Study.

Discussions to be held with these entities to discuss the following:

- Gage their interest in converting from potable water to wastewater effluent from a water quality perspective: the processes at these facilities likely include cooling towers, boiler feed water, transport and cleaning, and/or conveyor belt lubrication. These types of industrial facilities will operate their processes based on a pre-determined water quality. Changing from potable water to wastewater effluent would most likely require modifications to their existing processes or require the installation of additional water treatment equipment based on their specific needs.
- Discuss the potential impact to rates: existing rates with local industries could potentially be modified based on a lower cost of “producing” wastewater effluent without additional treatment; however, the cost of providing wastewater effluent in lieu of potable water could be met with resistance from local industries due to a

perceived reduction in water quality. This potential detriment could be overcome if uses for water are not based on potable water quality.

Discussions have been held with KDHE regarding the potential for implementing potable reuse (either indirect or direct). The regulatory landscape in Kansas is currently not favorable for this application; however, the opportunity exists to engage KDHE in detailed discussions centered on the identification and treatment of both regulated and non-regulated contaminants that may be present in wastewater effluent. Treatment processes traditionally used in potable reuse applications may consist of coagulation/filtration, micro/ultrafiltration, reverse osmosis, and advanced oxidation.

The most likely use for reclaimed water for the City may be for irrigation purposes. The following table provides the total approximate demand based on known areas for the listed irrigation application and anticipated irrigation period.

Anticipated Irrigation Requirements South of the WWTF

Location	Plant	KDHE Annual Irrigation Requirement (inches/year) ¹	Area irrigated (acres)	Anticipated Irrigation Demand (GPD)	Anticipated Irrigation Demand (gpm)
Brookover Feed Yards	Corn, potatoes, wheat, soybeans, alfalfa, rye, triticale	22.5	3000	5,088,200	3530 ²
Southwind Golf Course	Grass	22.5	200	505,400	1050 ³
Southeast Community Park	Grass	22.5	50	126,300	260 ³

¹ Based on Minimum Standards of Design for Water Pollution Control Facilities, August 17th, 1978

² Assumes 365 days of irrigation and a 24 hour irrigation period (water directed to holding basin)

³ Assumes 245 days of irrigation (March through October) and an 8 hour irrigation period

Several other irrigation water demands were provided through the Water Conservation Field Services Program application submitted in February of 2016 and are listed in the table below. Some of these irrigation demands are from actual meter information, and others are estimated, as indicated. All anticipated water reuse demands listed in this table are for landscape irrigation.

Location	Annual Irrigation (Gallons)	Daily Irrigation (GPD)	Anticipated Irrigation Demand (GPM) ¹
Charles Stones Intermediate School	1,213,500	4,953	10
Victor Ornelas Elementary School	5,167,800	21,093	44
Garcia Soccer Complex	3,887,400	15,867	33
Southeast Community Park	9,156,413	37,373	78
Development Area (US 83 Frontage)	4,200,000 (est.)	17,143	36
Finnup Park Complex	31,000,000 (est.)	126,531	264
Tangeman Sports Complex	15,000,000 (est.)	61,224	128

¹ Assumes 245 days of irrigation (March through October) and an 8-hour irrigation period.

These demands, subject to the limitations of total effluent produced by the DFA Facility and the WWTF, will be used as the basis of conceptual design for treatment, transmission and storage evaluation in subsequent sections of this study.

A constructed wetland has also been identified as a potential application for recycled water for the City. A traditional constructed wetlands project can be adapted to provide multiple benefits to the community and environment. Wetlands could be designed to provide flow equalization, runoff detention or storage for irrigation, as well as wildlife habitat and recreational opportunities. One option is to utilize the project as a source of supply for irrigation. A pumping system could be used to deliver water that has been stored in the wetland to an adjacent feature, such as a park complex, golf course or other commercial development area. This opportunity would be further refined through the scope of the Reuse Feasibility Study.

Constructed wetlands mimic natural wetlands and the treatment they provide. Wetlands polish and improve the quality of natural or recycled water primarily through treatment provided by plants, such as reeds, cattails and other riparian plantings. These plants reduce suspended solids, metals, trace elements and other wastewater constituents, including nitrogen and phosphorous.

Constructed wetlands typically are categorized as either free surface water systems or subsurface water systems. Free surface water systems promote shallow (less than three

feet) flow in constructed basins or channels. Typically, free surface water systems require larger areas for treatment of flow. Subsurface systems utilize porous media to store water below the ground surface. While more compact, subsurface systems are generally more costly to construct due to the costs of excavation and the porous media.

Constructed wetlands are considered a best management practice (BMP) for storm water. As a buffer between a runoff source and receiving stream, they can afford the storm water quality benefits of filtering and absorbing pollutants. In addition, constructed wetlands also enhance habitat for fish, birds and other wildlife. They can provide a natural landscape in an urban environment and can be used to educate people about the workings of the ecosystem. This wetland concept will be further vetted in this Feasibility Study.

Frazier Park Lake, in the Ulysses, Kansas, is an example of how an engineered wetland can provide multiple benefits to a community. Water levels in Frazier Lake had declined due to drought and irrigation demand. Coupled with years of sediment accumulation, the lake provided little water storage or recreational value to the community. For this project, a series of treatment wetlands and channels were constructed to rehabilitate the lake. Improvements included a new irrigation intake pump station, eight acres of wetland ponds, three acres of stream channels, a small equalization basin, and a flood control dike to eliminate river flood waters and sediment from entering the lake. The stream channels served as a habitat for the Arkansas Darter, a threatened species of fish, and several other elements such as fish brush piles, bird and bat houses and various riparian plantings. These elements were incorporated along the lake shore and stream channels along with several informational stations. In addition, the lake serves the local golf course and the park was improved to include a 1.5-mile paved trail system, shade trees, hiking trails, biking trails, playgrounds and shelter areas. The area now serves as a gathering place and popular community amenity. Additional environmental impacts evaluated included the potential to recharge the aquifer in which the City's wells are located. The benefits of enhanced groundwater supply from indirect streambed infiltration of wastewater are defined by variables, such as quantity of waste water discharged, permeability of the river

bed, connection of the river to the underlying and surrounding aquifer, and proximity of wells intended to benefit from potential infiltration.

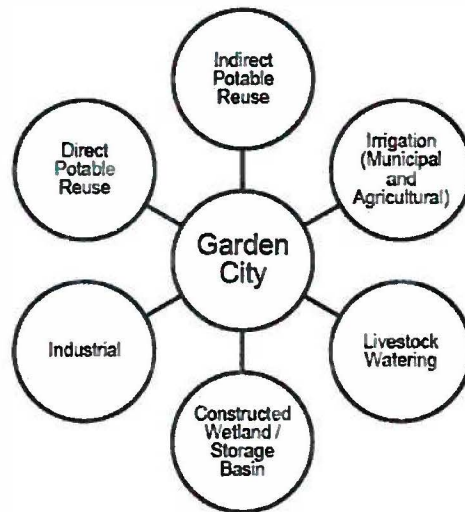
In the case of Garden City, it is estimated that the recharge of the local alluvium is followed by transfer to the underlying or surrounding aquifer system. In order to take advantage of this recharge as an additional water supply, the City would likely need to site new groundwater wells immediately adjacent to river, and this Feasibility Study is necessary for the completion of this alternative.

Groundwater recharge to the underlying and surrounding Ogallala aquifer is limited to few inches or feet of movement per day. The capture of any recharged water and benefit to existing City wells over an extended period of time is further complicated by declining water levels and interception by other competing wells in the area (domestic, agriculture, industrial, etc).

Water Reclamation and Reuse Feasibility Study Scope of Work:

The following items will be evaluated and completed as part of the Reuse Feasibility Study:

- Kickoff meeting
- Review existing local and regional groundwater studies with a focus on the local hydrogeology near Garden City and the DFA reuse area.
 - Identify a range of aquifer properties for the Arkansas River alluvial aquifer and the High Plains aquifer that are appropriate for a planning scale study.
 - Perform calculations to estimate the beneficial impact to the aquifer that will result from the reduced irrigation pumping.
- Review existing water rights near Garden City.
 - Develop maps showing permitted water rights and wells.
 - Develop maps that identify permitted water rights by aquifer.

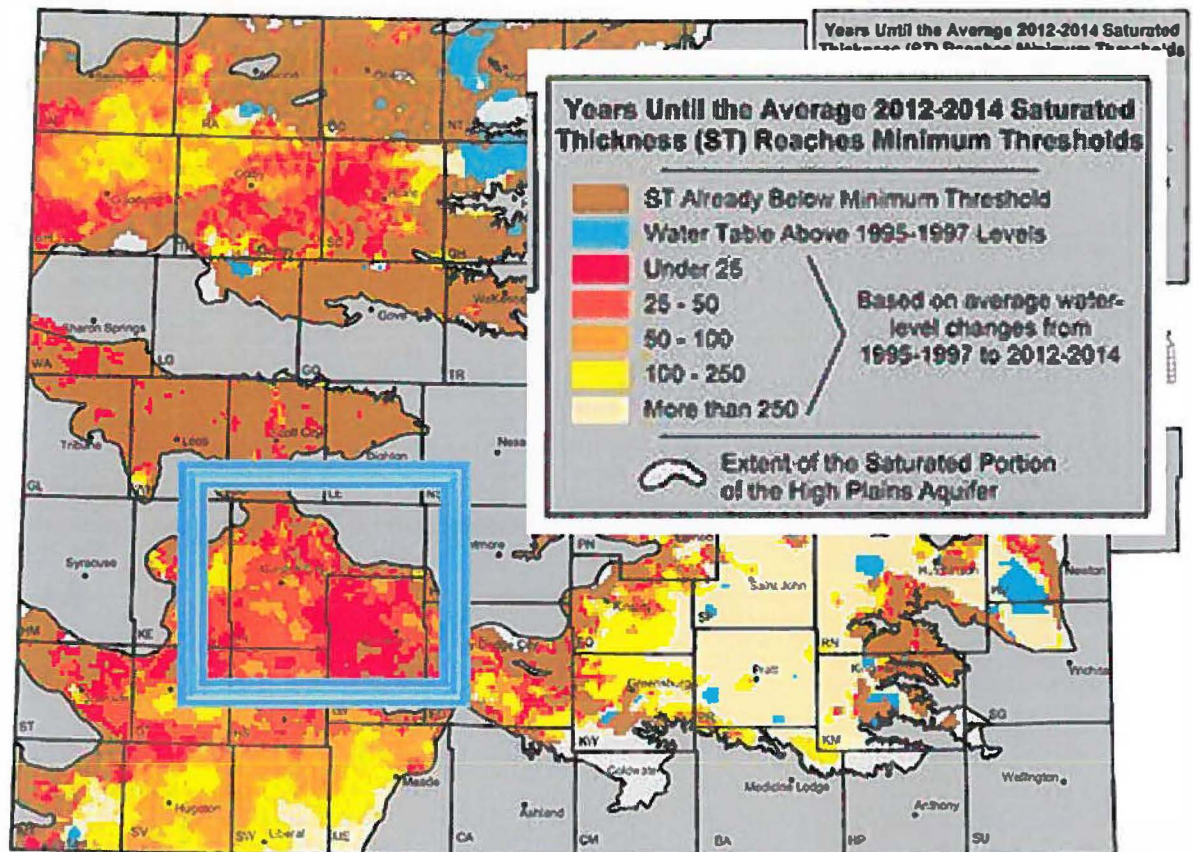


- Evaluate the feasibility of offsetting existing irrigation pumping through beneficial reuse of effluent water from the DFA facility.
 - Meet with Kansas Division of Water Resources (DWR) and Kansas Department of Health and Environment (KDHE) to gather information and discuss permitting/regulatory requirements.
- Meet with Kansas DWR and Groundwater Management District (GMD) 3 staff to discuss the potential beneficial impact to the City's water rights portfolio that could result from offsetting irrigation pumping with DFA effluent water.
 - Identify if this practice will be considered a decrease in consumptive use.
 - Establish if and where the City can extract the water that was not pumped by the irrigation wells.
- Identify potential water reuse partnerships based on the beneficial impact to City wells due to effluent reuse and offset of groundwater irrigation for agricultural production.
- Evaluate existing water conservation practices and policies based on information gathered from the Study.
- Identify the requirements and potential benefits to establishing a formally recognized Water Conservation Area, through the Kansas DWR.
 - A Water Conservation Area (WCA) is a designated area with an approved management plan developed by a water right owner or group of water right owners with the consent of the Chief Engineer of DWR. Participation within a WCA may afford flexibilities that are not available to water right owners outside of a WCA, which can include: creating multi-year allocations, allowing the movement of allocations between enrolled water rights, or the allowing use of water for new uses.
 - Evaluate feasibility of establishing a WCA in Garden City.
 - Establish a conservation goal.
 - Evaluate potential partners in the development of the WCA.
- Determine the feasibility of potable reuse of DFA and City WWTP effluent.
 - Meet with KDHE to discuss treatment technologies as required to meet regulatory requirements associated with Potable Reuse.

- Develop proposed treatment process as required to meet regulatory requirements associated with Potable Reuse.
- Develop order-of-magnitude opinions of probable cost for Potable Reuse treatment process based on anticipated flow rates of wastewater effluent.
- Re-evaluate previously developed order-of-magnitude opinions of probable cost for up to three alternatives designed to deliver wastewater effluent to the irrigators, as required.
- Reporting
 - Develop a Paired Comparison Analysis utilizing the following:
 - Cost to convey wastewater effluent to potential agricultural users
 - Cost to convey additional groundwater sources to the City
 - Cost to treat wastewater effluent for direct/indirect uses
 - Availability of additional groundwater resources
 - Public perception
 - Draft report
 - Final report

Description of Alternatives.

Local aquifers are declining and the ability to permit new wells is very limited. New water supplies around Garden City are essentially limited to converting irrigation rights into municipal rights. The water reuse project would offset irrigation pumping, which will reduce demand on local aquifer, sustaining the future of the water supply for Garden City and this region of Kansas.



“..large-volume pumping from this aquifer has led to steadily declining water levels in the western portion of the region, and the area faces several critical water-related issues.”

Rex C. Buchanan, B. Brownie Wilson, Robert R. Buddemeier, and James J. Butler, Jr., “The High Plains Aquifer,” Kansas Geological Survey, Lawrence, KS, Public Information Circular 18, Jan. 2015.

Legal and Institutional Requirements.

This Feasibility Study will address legal and water rights issues associated with a reuse project as outlined in these particular scope items:

- Review existing water rights near Garden City.
 - Develop maps showing permitted water rights and wells.

- Develop maps that identify permitted water rights by aquifer.
- Evaluate the feasibility of offsetting existing irrigation pumping through beneficial reuse of effluent water from the DFA facility.
 - Meet with Kansas Division of Water Resources (DWR) and Kansas Department of Health and Environment (KDHE) to gather information and discuss permitting/regulatory requirements.
- Meet with Kansas DWR and Groundwater Management District (GMD) 3 staff to discuss the potential beneficial impact to the City’s water rights portfolio that could result from offsetting irrigation pumping with DFA effluent water.
 - Identify if this practice will be considered a decrease in consumptive use.
 - Establish if and where the City can extract the water that was not pumped by the irrigation wells.

Financial Capability of Sponsor.

The City of Garden City has the financial capacity to provide matching funds for this project, in addition to funds provided by partners of this project pursuit. The project schedule is as follows:

PROJECT SCHEDULE	PROJECT MONTH														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Project Kickoff	█														
Hydrogeology/Water Rights	█	█	█	█											
Meet w/ DWR, GMD, KDHE	█	█													
Identify Water Reuse Partnerships		█	█	█											
Water Conservation Practices/Policy			█	█	█	█	█								
Offset Irrigation vs Beneficial Reuse			█	█	█	█	█	█	█						
Water Conservation Area						█	█	█	█	█	█	█			
Potable Reuse Feasibility							█	█	█	█	█	█	█	█	
Final Report												█	█	█	█

Research Needs.

This study will include established and proven technologies and conventional system components. No further research will be necessary to complete this study.

Required Permits or Approvals

KDHE provides regulations for agricultural application of wastewater or sludge. Overall, there are a low number of water reuse applications in the State of Kansas and reuse applications are evaluated on a case-by-case basis according to the anticipated extent of public access and the intended application of the reuse water.

An analysis of multiple recent NPDES permits was conducted to determine the range of requirements for several different irrigation applications. The following table provides a synopsis of requirements from these NPDES permits, and would likely be reflective of permits needed by Garden City upon implementation of this Reuse Study:

KDHE Existing NPDES Permits with Water Reuse for Irrigation

Location and Treatment Process	Permit Dates (Issued / Expired)	Irrigation Location	Requirements
City of Dodge City, KS Membrane bioreactor (MBR) with UV disinfection Irrigation holding pond	June 1, 2012 / December 31, 2014	Baseball fields High school athletic field College athletic fields Cemetery and Casino	Irrigation of crops produced for direct human consumption is prohibited Irrigation must occur only during times when public access is restricted.
City of Beloit, KS Extended aeration activated sludge basin with UV disinfection Irrigation holding pond	September 1, 2016 / November 30, 2019	Golf course	Avoid runoff to adjacent landowners and any ponding on site. Spray is prohibited from falling or drifting on areas with public drinking fountains, hose bibs or picnic areas.
City of Hayes, KS Activated sludge treatment (5 stage with secondary clarifiers and tertiary filtration or 4-stage MBR) with UV disinfection Reclaimed water storage basin	January 1, 2016 / December 31, 2020	Golf course Sports park complex Baseball field	Signs posted to notify public of reclaimed wastewater, do not drink (or swim, as applicable). Signs posted to notify public of times and areas irrigated with reclaimed wastewater. Signs to indicate reclaimed wastewater at any impoundments. Signs to notify public not to drink at any hose bibs that can discharge effluent water.
City of Hudson, KS Three cell wastewater stabilization lagoon system	November 1, 2013 / October 31, 2018	Crop and pasture land	Irrigation of crops produced for direct human consumption is prohibited. Provide tailwater control to prevent runoff to surface waters of the State. Draw water only from the final cell.

KDHE regulates water reuse based on achieving specified effluent quality requirements at designated sampling points. Sampling points may include constructed storage basins,

irrigation ponds, and at sprinkler heads. The following table lists various limits and monitoring locations associated with the different NPDES permits and reuse applications:

KDHE Existing NPDES Permits Monitoring and Reporting Limits

Parameter	Limit	Frequency	Type	Sampling Location
E. coli – Colonies MPN /100 mL - Monthly Geometric Average	262	2/month	Grab	Outfall discharging to reuse irrigation holding ponds
pH – Standard Units	6.0-9.0	2/month	Grab	Outfall discharging to reuse irrigation holding ponds
E. coli – Colonies MPN /100 mL - Monthly Geometric Average	Monitor	2/month	Grab	Sprinkler head or sampling tap at end of sprinkler distribution system
Effluent Irrigation Flow	Monitor	1/month	Observe	N/A

The permits provided typically do not define the UV dose required for disinfection with one exception: the permit with irrigation at the sports park complex listed a required UV dose of 100 mJ/cm² applied to the recycled water prior to distribution for irrigation to assure proper disinfection of the reclaimed water. It is anticipated that the City can expect similar monitoring and reporting requirements.

Letters of Project Support

STATE OF KANSAS
HOUSE OF REPRESENTATIVES

STATE CAPITOL, ROOM 512-N
TOPEKA, KANSAS 66612
(785) 296-7380
john.doll@house.ks.gov

2927 CLIFF PLACE
GARDEN CITY, KANSAS 67846
(620) 275-9304



COMMITTEE ASSIGNMENTS
INSURANCE
TRANSPORTATION
UTILITIES & TELECOMMUNICATIONS

JOHN DOLL
123RD DISTRICT

Fred Jones, Water Resource Manager
City of Garden City
Box 998
Garden City, KS 67846

Dear Mr. Jones,

It is my understanding the City of Garden City is submitting a funding proposal to the Bureau of Reclamation for the development of an effluent water reuse feasibility study. Specifically, the City is seeking to utilize the WaterSMART: Development of Feasibility Studies grant under the Title XVI Water Reclamation and Reuse Program for Fiscal Year 2017.

Please pass along this letter as part of your submitted material to indicate my support of your application. The City of Garden City is an innovative local government providing a full complement of municipal services to residents and visitors of Southwest Kansas's largest community. Its latest innovation comes in the establishment of a Water Re-use Utility. It has arranged to receive effluent water resources from Meadowlark Dairy Nutrition, LLC a subsidiary of Dairy Farmers of America in late 2017 and wishes to utilize the feasibility study as a planning tool to provide critical decision-making information regarding water reuse and water conservation as it relates to the specifics of Garden City's effluent water resources. It is anticipated the City will annually receive 300 million gallons of effluent water via the Meadowlark Dairy Nutrition, LLC facility. When combined with other effluent water produced by the City, there is the potential to "re-use" effluent to replace approximately 1 billion gallons of water from the City's potable system or are groundwater irrigation wells. This will help preserve the Ogallala Aquifer and save money for public and private entities currently paying a premium for potable water for non-potable uses.

Sincerely,

A handwritten signature in blue ink, appearing to read "John Doll".

Rep. John Doll
Kansas House of Representatives – 123rd District



Bureau of Reclamation
Attn: Matthew Reichert
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Klplng Street
Denver, Colorado 80225

December 30, 2016

CITY COMMISSION

To Whom It May Concern,

J. CHRISTOPHER LAW,
Mayor

The City of Garden City recognizes the importance of adequate, affordable, sustainable water supplies in Western Kansas and for the growing community of Garden City. It is also recognized that alternative sources of supply and innovative planning, including options for effluent reuse, are extremely important when addressing the production and distribution of this highly valued resource to our community.

JANET A. DOLL

The City will receive effluent water resources from Meadowlark Dairy Nutrition, LLC a subsidiary of Dairy Farmers of America in 2017. We anticipate the City will have access to 300 million gallons of effluent water via the Meadowlark Dairy Nutrition facility. When combined with other effluent water produced by the city, there are over 1 billion gallons of water produced annually in our effluent portfolio.

ROY CESSNA

A feasibility study would provide the City with information regarding the current state of the water supply and long-term supply outlook. The scope of the study would provide the City with information to develop or enhance the following policies:

MELVIN L. DALE

DAN FANKHAUSER

- Determine most cost effective method to reuse the maximum quantity of water with the lowest cost impact and maximum benefit for long-term water availability. This would include some form of cost-benefit analysis that would weigh financial and supply considerations.
- Establish reuse partnerships based on the beneficial impact to City wells due to effluent reuse and offset of groundwater irrigation for agricultural production.
- Evaluate existing water conservation practices and policies based on information gathered from the study. A more in-depth study will also allow us to share information with the public and improve messaging and awareness of water resource issues.
- Provide data for City staff to use in making decisions on infrastructure development needed to implement varying levels of reuse.
- Provide data for City staff to use in making decisions to acquire additional water rights in the future. Rights may be acquired for production, or to create a buffer/conservation project to protect existing rights.

In our positions as Mayor (Chief Elected Official) and as City Manager (Chief Administrative Officer), we offer our full support of the application for WaterSMART Title XVI Reclamation and Reuse from the City of Garden City.

Sincerely,

J. Christopher Law
Mayor

Matthew C. Allen
City Manager

CITY ADMINISTRATIVE
CENTER

301 N. 8TH

P.O. Box 998

GARDEN CITY, KS

67846-0998

January 4, 2017

Fred Jones, Water Resource Manager
City of Garden City
Box 998
Garden City, KS 67846

Dear Mr. Jones,

I am writing to express my support for your funding proposal to the Bureau of Reclamation for the development of an effluent water reuse feasibility study, from the WaterSMART: Development of Feasibility Studies grant under the Title XVI Water Reclamation and Reuse Program for Fiscal Year 2017.

The City of Garden City is an innovative local government providing a full complement of municipal services to residents and visitors of Southwest Kansas' largest community. Its latest innovation comes in the establishment of a Water Re-Use Utility. It has arranged to receive effluent water resources from Meadowlark Dairy Nutrition, LLC, a subsidiary of Dairy Farmers of America late 2017 and wishes to utilize the feasibility study as a planning tool to provide critical decision making information regarding water reuse and water conservation as it relates to the specifics of Garden City's effluent water resources. It is anticipated the City will annually receive 300 million gallons of effluent water via the Meadowlark Dairy Nutrition, LLC, facility. When combined with other effluent water produced by the city, there is the potential to "re-use" effluent water to replace approximately 1 billion gallons of water from the city potable system or area groundwater irrigation wells. This could help preserve the Ogallala Aquifer and save money for public and private entities currently paying a premium for potable water.

Sincerely,



Pat Roberts



**Southwest Kansas
Groundwater Management District No. 3**
2009 E. Spruce Street
Garden City, Kansas 67846
(620) 275-7147 phone (620) 272-3001 cell
www.gmd3.org

January 3, 2017

Fred Jones, Water Resource Manager
City of Garden City
140 Harvest St. / Box 998
Garden City, KS 67846

**RE: Support for Feasibility Studies:
Title XVI Water Reclamation and Reuse
Program for Fiscal Year 2017.**

FRED
Dear Mr. Jones,

The interest of the City of Garden City to pursue the development of water reclamation and reuse projects to supplement the municipal and irrigation water supply is a very logical management initiative that we highly support. The projects, if found feasible, would help achieve both use efficiency and maximum value for the water under the City management. Drought resilience for the growing City water demands and the work to meet future area water demands in a region where a declining High Plains/Ogallala Aquifer is the principle supply will certainly require diversification of City water sources and forward thinking to capitalize on some local reuse opportunities and making every precious drop count.

We have had very favorable experiences working with Reclamation staff on several projects. Those projects include a multi-state regional Basin Plan of Study grant, an Appraisal Investigation for Improving Drinking Water Standards upstream of Garden City along the Arkansas River valley, and a Systems Optimization Review of the river delivery system to surface water irrigation ditches up stream of Garden City. We support your efforts to investigate feasibility of water reclamation and reuse as work consistent with this prior work. With growing water quality concerns for the surface water that we do receive and the effects it has on depleting the usability of the local High Plains Aquifer, preserving and reusing good quality water under City management is an important and achievable initiative we must support and partner on as appropriate.

We hope you will be successful in a continued partnership with Reclamation. Please let us know how we may assist you and Reclamation as this potential work moves forward. Thank you for leadership to benefit the future of Garden City and people in our neighborhood of the High Plains/Ogallala Aquifer.

Sincerely,

Mark E. Rude
Executive Director



900 SW Jackson Street, Suite 404
Topeka, KS 66612

Phone: (785)-296-3185
Fax: (785)-296-0878
www.kwo.org

Tracy Streeter, Director

Sam Brownback, Governor

January 3, 2017

Mr. Fred Jones, Water Resource Manager
City of Garden City
106 S 11th Street
Garden City, KS 67846

RE: Letter of Support – Bureau of Reclamation Title XVI Funding Request

Dear Fred,

The Kansas Water Office applauds the city of Garden City's efforts to further incorporate the reuse of wastewater into its' future water supply plans. As you know, a major focus of the Governor's *Vision for the Future of Water Supply in Kansas* is conservation of the Ogallala Aquifer and increased reuse of lower quality waters. Congratulations to the city of Garden City for being named a 2016 "Be The Vision" honoree at the recent Governor's Water Conference, recognizing your commitment to water conservation and reuse.

The city's commitment to reclaiming wastewater not only from existing infrastructure, but also incorporating the future waste stream from the Dairy Farmers of America Milk Processing Facility will support economic growth in your community without significantly increasing the reliance on pumping from the Ogallala. The city also is to be commended for those efforts.

I have reviewed the feasibility study proposal to be submitted to the Bureau of Reclamation for Title XVI Water Reclamation and Reuse Program funding and am happy to pledge our full endorsement to this proposal and offer this letter of support. As we have discussed, the Water Office is also very interested in providing direct matching fund support to the proposal as well as any in-kind assistance that you may need.

Thank you for your commitment to extend the life of the Ogallala Aquifer and the wise use of our water resources. If I can be of further assistance, please let me know.

Sincerely,

Tracy Streeter

cc: Matt Allen, City Manager, Garden City

1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700



900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

December 22, 2016

Fred Jones
Water Resource Manager
City of Garden City
140 Harvest Street, Box 998
Garden City, KS 67846

Mr. Jones;

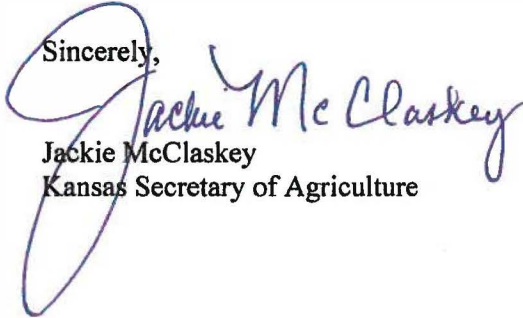
As the Secretary of the Kansas Department of Agriculture, I want to convey my support to Garden City and express the need for the development of feasibility studies under the U.S. Bureau of Reclamation's WaterSMART Water Reclamation and Reuse Program.

In 2015, based on input from the citizens of the state, Kansas completed the development of a long-term Vision for the future of water supply. Recognizing that water and the Kansas economy are directly linked, an action item from the Vision is to coordinate economic development efforts designed to recruit business and industry committed to water reuse or utilization of lower quality sources of water. Garden City has been a pioneer and leader in encouraging conservation planning in economic development and business recruitment. For this reason, they were the recipient of the *2016 Be the Vision* award – a recognition reserved for individuals, communities or industries that have gone above and beyond in implementing the state's water Vision.

Agriculture is the largest industry and economic driver in Kansas, contributing nearly \$63 billion to our state's economy. That's equivalent to 43 percent of the Kansas economy, and agriculture employs more than 12 percent of our state's workforce. The economy of Garden City is also driven largely by agriculture - as home to several feedlots, grain elevators, an ethanol plant, a meat processing plant, and most recently a large milk processing plant. The availability of a reliable water supply today and in the future is key to the continued success of the city and the entire region.

In partnership with the U.S. Bureau of Reclamation through the WaterSMART program, Garden City has the opportunity to improve water efficiency and diversify the sources available for future supply. I commend the city for your efforts to identify innovative ways to provide a dependable source of clean water to your community while promoting water efficiency.

Sincerely,


Jackie McClaskey
Kansas Secretary of Agriculture

Official Resolution



**PUBLIC UTILITIES
DEPARTMENT**

MIKE MUIRHEAD
Public Utilities
Director
301 N 8th St
620.276.1160

UTILITIES SERVICE CENTER
140 Harvest St
PO Box 998
Garden City, KS 67846

CLIFF SONNENBERG
Electric Superintendent
KENT POTTORF
Electrical Engineering/
SCADA Manager
620.276.1290
620.276.1132 fax

FRED JONES
Water Resource Manager
TONY HURTADO
Water Superintendent
620.276.1291
620.276.1132 fax

ED BORGMAN
Wastewater
Superintendent
BRANDON CRAWFORD
Wastewater
Foreman
345 S Jennie Barker Rd
620.276.1281
620.276.1288 fax

www.garden-city.org

Bureau of Reclamation
Attn: Matthew Reichert
Denver Federal Center
Bldg. 67, Rm. 152
6th Avenue and Kipling St
Denver, CO 80225

January 4, 2017

To Whom it May Concern:

The City of Garden City is submitting a grant application package to the Bureau of Reclamation for Funding Opportunity Announcement No. BOR-DO-17-F003, WaterSMART: Development of Feasibility Studies under the Title XVI Water Reclamation and Reuse Program for Fiscal Year 2017.

At the December 20, 2016, meeting of the Garden City Commission, I presented an update to the Commissioners regarding our efforts to submit a proposal for the above-mentioned funding. The commission was receptive and supportive of our efforts, as it aligns with the Commission Goal to: "Address water regionally in a manner that preserves the quality and quantity of the resource" development of reuse strategies for effluent is a specific objective within this goal.

We have prepared a resolution of support to be presented to the Governing Body at the next regular business meeting on January 17, 2017. I have attached a draft of that resolution for your information. We will forward the executed instrument to the Bureau of Reclamation after the meeting on January 17th.

Sincerely,

Fred Jones
Water Resource Manager

RESOLUTION NO. _____

A RESOLUTION AUTHORIZING AND DIRECTING THE MAYOR, CITY ADMINISTRATOR AND CITY STAFF TO PARTICIPATE IN DEVELOPMENT OF A FEASIBILITY STUDY UNDER THE TITLE XVI WATER RECLAMATION AND REUSE PROGRAM FOR FISCAL YEAR 2017.

WHEREAS, the City of Garden City operates a Waste Water Utility and is responsible for the disposal of treated effluent water in accordance with the laws of the State of Kansas and all applicable State and Federal regulations regarding treated effluent water; and

WHEREAS, the City of Garden City has ample effluent water resources that may be reclaimed for beneficial use to the citizens of the City; and

WHEREAS, the development of a strategic plan for effluent water reuse will be beneficial in helping the City make decisions that will promote water reuse and conservation for future generations; and

WHEREAS, the Governing Body of the City of Garden City has reviewed and supports the application submitted to the Bureau of Reclamation; and

WHEREAS, the City is willing to support the project with the necessary matching funding to ensure the application requirements of Bureau of Reclamation are met; and

NOW THEREFORE, BE IT RESOLVED that the Mayor, City Administrator, and designated staff members of the City of Garden City are hereby authorized and directed to develop a Strategic Plan for Reuse of Effluent Water Resources in Garden City, Kansas and Vicinity as a Feasibility Study under the Title XVI Water Reclamation and Reuse Program administered by the Bureau of Reclamation.

PASSED AND APPROVED by the Governing Body of the City of Garden City, Kansas, on this ____ day of _____, 2017.

CHRIS LAW, MAYOR

ATTEST:

Celyn Hurtado, CITY CLERK

Study Budget

Funding Plan and Letters of Commitment

All non-federal funding will be provided directly by the City of Garden City, Kansas. No funding requests have been made, or will be received from, other Federal partners. Reclamation is the only source of Federal funding.

There are no pending funding requests.

The City's contribution to the cost-share requirement will be monetary. The source of these funds will be from the City's Operating Budget under the "Engineering" line item. There are adequate funds available.

Project expenditures have been incurred prior to the anticipated award date.

- This project expenditure was associated with the development of a Phase I Reuse Feasibility Study for the City of Garden City, Kansas.
- The expenditure was in the form of monetary payment for completion of the study.
- The Phase I Feasibility Study contract was executed on July 7, 2016. The kickoff meeting was held on July 22, 2016. The Final Report was issued to the City on November 23, 2016.
- The general scope of work for the completed Phase I Reuse Feasibility Study included the following tasks:
 - Project kickoff meeting
 - Research and evaluation of existing data and information
 - Identification of advantages of reuse for Garden City
 - Identification of potential locations for application/use of wastewater effluent
 - Conveyance and treatment requirements
 - Permitting
 - Order-of-magnitude opinion of probable cost
 - Identification of potential funding opportunities
 - Reporting
 - Project communication
- The development of the Phase I Reuse Feasibility Study allowed the City to further its understanding of the following items:
 - Water quality of the City's existing wastewater treatment facility
 - Anticipated wastewater effluent quality of a proposed milk drying facility
 - A regulatory review of KDHE standards and US EPA guidelines
 - Potential recycled water uses and demands
 - Treatment, transmission, and storage requirements for conveyance of wastewater effluent to potential users.
 - An economic analysis and funding options associated with reusing wastewater effluent

- The work proposed as part of this funding application seeks to expand upon the work completed to date for the City of Garden City. Upon completion of the Phase 1 Reuse Feasibility Study, it was determined that additional work should be performed to further understanding of the potential for potable reuse in the City. There will be no duplication of work.

Table 1.—Summary of Non-Federal and Federal Funding Sources

Funding Sources	Funding Amount
Non-Federal Entities	
City of Garden City, Kansas (cash)	\$ 27,718.50
*City of Garden City, Kansas (in-kind)	\$ 37,650.00
Non-Federal Subtotal	\$ 65,368.50
Other Federal Entities	
1. N/A	\$ -
Other Federal Subtotal	\$ -
Requested Reclamation Funding	\$ 65,368.50
Total Study Funding	\$ 130,737

Budget Proposal

Table 2.— Budget Proposal

Budget Item Description	Computation		Quantity Type (hours/days)	Total Cost
	\$/Unit	Quantity		
Salaries and Wages				
N/A	\$ -			\$ -
Fringe Benefits				
N/A	\$ -			\$ -
Travel				
N/A	\$ -			\$ -
Equipment				
N/A	\$ -			\$ -
Materials/Supplies				
N/A	\$ -			\$ -
Contractual/Construction				
Burns & McDonnell	\$ 93,087	1	Hourly not to exceed	\$ 93,087
Feasibility Study (completed)	\$ 37,650	1	Report	\$ 37,650
Other				
N/A	\$ -			\$ -
Total Direct Costs				\$ 130,737
Indirect Costs				\$ -
Total Project Costs				\$ 130,737

Budget Narrative

Salaries and Wages

It is not anticipated that any specific funds associated with the salary and wages of the Garden City program manager will be dedicated to this project. Therefore, for the purpose of project budgeting, these items are estimated to be \$0.

Fringe Benefits

Fringe Benefits of the Garden City program manager are expected to be minimal. Therefore, for the purpose of project budgeting, these items are estimated to be \$0.

Travel

No travel is anticipated.

Equipment

No equipment is anticipated.

Materials and Supplies

No materials or supplies are anticipated.

Contractual

The City of Garden City, Kansas will be contracting with Burns & McDonnell to perform the tasks outlined in Table 3 below. Their water resources, engineering, and sustainable planning expertise will drive the Feasibility Study effort. Contractual fees are indicated in Table 3 below. Specifically, Burns & McDonnell will be responsible for the following identified tasks led by key individuals:

- Project Management and Lead Treatment Process – Jake White
- Lead Groundwater Hydrologist – Luca Deangelis
- Assistant Treatment Process – Jessica Borries
- Assistant Groundwater Hydrologist – Daniel Clement
- Assistant Groundwater Hydrologist – Anna Smith
- Quality Control: Treatment Process – Kerrie Greenfelder
- Quality Control: Groundwater Hydrology – Paul McCormick

Information provided in Table 3 reflects the general project budget associated with the development of the Feasibility Study as referenced in this application.

Expenses are associated with travel and printing. Task #13 identifies a feasibility study that was completed in December 2016. The contract to begin this work was executed on July 5, 2016, and the Project Kickoff Meeting was held on July 22, 2016. The general scope of work for the completed feasibility study included the following tasks:

- Project Kickoff Meeting
- Research and evaluation of existing data and information
- Identify advantages of reuse
- Identify potential locations for application/use of wastewater effluent
- Conveyance and treatment requirements
- Permitting
- Order-of-Magnitude opinion of probable cost
- Funding opportunities
- Reporting
- Project Communication

Work completed to date, and work completed within the allowable timeframe as defined in this funding opportunity, created a firm foundation for the work proposed as part of this application. As a result of the previously completed feasibility study, it was determined that additional work should be performed in order to further the knowledge base of Garden City in terms of beneficial reuse. A copy of this completed report can be made available to Reclamation if requested.

Table 3.—Contractual Budget by Task

Task No.	Task Name	Task Cost	Estimated Hours	Avg. Contractual Billing Rate	Expenses
1	Project Kickoff Meeting	\$ 6,650	28	\$ 211	\$ 746
2	Review Existing Groundwater Studies	\$ 6,996	36	\$ 194	\$ -
3	Review Existing Water Rights	\$ 6,364	36	\$ 177	\$ -
4	Evaluate Offsetting of Irrigation Pumping	\$ 7,904	40	\$ 198	\$ -
5	Meetings with DWR and GMD	\$ 4,832	24	\$ 194	\$ 168
6	Evaluate Water Reuse Partnerships	\$ 3,498	18	\$ 194	\$ -
7	Evaluate Water Conservation Plan	\$ 7,272	40	\$ 182	\$ -
8	Evaluate Water Conservation Area	\$ 6,620	36	\$ 184	\$ -
9	Evaluate Feasibility of Potable Reuse	\$ 16,720	86	\$ 193	\$ 138
10	Reporting	\$ 20,784	102	\$ 195	\$ 846
11	Quality Control	\$ 3,632	16	\$ 227	\$ -
12	Project Management & Coordination	\$ 1,816	8	\$ 227	\$ -
Subtotal		\$ 93,087	470	\$ 198.06	\$ 1,897
13	Completed Study	\$ 37,650			
Total		\$ 130,737			

Other Expenses

No Other Expenses are anticipated.

Indirect Costs

No Indirect Costs are anticipated.

*Total Costs***Table 4.—Total Cost and Funding by Source**

Funding Sources	% of Total Study Cost	Total Cost by Source
Recipient Funding	50%	\$ 65,368.50
Reclamation Funding	50%	\$ 65,368.50
Other Federal Funding	0%	\$ -
Totals	100%	\$ 130,737

BUDGET INFORMATION - Non-Construction Programs

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Development of Possibility study		\$ 65,368.50	\$ 65,368.50			\$ 130,737.00
2.		0.00				0.00
3.		0.00				0.00
4.		0.00				0.00
5. Totals		\$ 65,368.50	\$ 65,368.50			\$ 130,737.00

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
a. Personnel	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>
b. Fringe Benefits	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
c. Travel	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
d. Equipment	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
e. Supplies	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
f. Contractual	<input type="text" value="130,737.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="130,737.00"/>
g. Construction	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
h. Other	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
i. Total Direct Charges (sum of 6a-6h)	<input type="text" value="130,737.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	\$ <input type="text" value="130,737.00"/>
j. Indirect Charges	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	\$ <input type="text"/>
k. TOTALS (sum of 6i and 6j)	\$ <input type="text" value="130,737.00"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text" value="130,737.00"/>
7. Program Income	\$ <input type="text" value="130,737.00"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text"/>	\$ <input type="text" value="130,737.00"/>

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8. Feasibility study	\$ 65,368.50	\$	\$	\$ 65,368.50	
9.					
10.					
11.					
12. TOTAL (sum of lines 8-11)	\$ 65,368.50	\$	\$	\$ 65,368.50	
SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 65,368.50	\$ 16,342.13	\$ 16,342.13	\$ 16,342.13	\$ 16,342.11
14. Non-Federal	\$ 65,368.50	44,579.63	6,929.63	6,929.63	6,929.61
15. TOTAL (sum of lines 13 and 14)	\$ 130,737.00	\$ 60,921.76	\$ 23,271.76	\$ 23,271.76	\$ 23,271.72
SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)				
	(b) First	(c) Second	(d) Third	(e) Fourth	
16.	\$	\$	\$	\$	
17.					
18.					
19.					
20. TOTAL (sum of lines 16 - 19)	\$	\$	\$	\$	
SECTION F - OTHER BUDGET INFORMATION					
21. Direct Charges:		22. Indirect Charges:			
23. Remarks:					