

Missouri Clean Water Commission Meeting
Department of Natural Resources
Lewis and Clark State Office Building
LaCharrette/Nightingale Creek Conference Rooms
1101 Riverside Drive
Jefferson City, Missouri

July 9, 2014

City of Fulton Variance Request CWC-V-2-12
Fulton Wastewater Treatment Facility
Callaway County MO

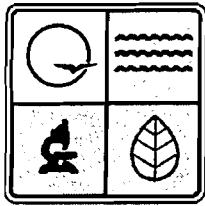
Issue: The city of Fulton submitted a variance request for which the Department seeks the Clean Water Commission's decision on approval. The variance is intended to facilitate compliance with water quality standards, as implemented through a total maximum daily load incorporated into their permit.

Background: The Department received a variance application from the city of Fulton, Missouri on November 7, 2013. The city submitted the application pursuant to Section 644.06 1, RSMo. Fulton's application requests variance from the underlying water quality standards utilized in the development of the Stinson Creek Total Maximum Daily Load (TMDL) Wasteload Allocations (WLA) for total nitrogen, total phosphorus, carbonaceous biochemical oxygen demand, and total suspended solids based on substantial and widespread economic and social impact. Additional information submitted on May 2, 2014 details social and economic data for the city as compared to cost for different levels of wastewater treatment and its impact to user rates over the average life of a wastewater treatment facility. The Stinson Creek TMDL was approved by the Environmental Protection Agency (EPA) on May 26, 2010. The city is planning an upgrade the current facility and believes that attainment of the WLA from the TMDL are not feasible thus leading to a substantial and widespread economic and social impact. The pollutant parameter values expressed in the variance request represent the highest attainable effluent quality that can be achieved without causing substantial and widespread economic and social impact. The variance documents included in the Commission packet were placed on a 30 day public notice on May 9, 2014. Comments received during the public notice are also included in the Commission packet.

Staff Recommendation: The Department recommends that the Missouri Clean Water Commission approve the variance as requested by the city based on the justifications outlined in the final variance document incorporating comments from EPA. The Primary basis for this decision is that the variance request meets the regulatory criteria associated with substantial and widespread economic and social impact.

List of Attachments:

- Final Variance incorporating Comments from EPA



Missouri Department of Natural Resources

City of Fulton Variance Request CWC-V-2-12 Fulton Wastewater Treatment Facility Callaway County, MO

The City of Fulton (City) submitted a variance request to the Missouri Department of Natural Resources (Department) on November 7, 2013, intended to facilitate compliance with water quality standards, as implemented through a Total Maximum Daily Load (TMDL) incorporated into their permit.

The application was submitted pursuant to Section 644.06 1, RSMo. The City's application requests variance from the underlying water quality standards utilized for the development of Stinson Creek TMDL Wasteload Allocations (WLA) for total nitrogen, total phosphorus, carbonaceous biochemical oxygen demand, and total suspended solids based on substantial and widespread economic and social impact. The Stinson Creek TMDL WLAs were established to address an impairment of the narrative water quality criteria associated with low dissolved oxygen and organic enrichment. Stinson Creek upstream of the Fulton discharge consists of very little flow, therefore the stream flow downstream of the discharge is largely effluent dominated. Additional information submitted with the variance application details social and economic data for the City as compared to cost for different levels of wastewater treatment and its impact to user rates over the average life of a wastewater treatment facility. The Stinson Creek TMDL was approved by the United States Environmental Protection Agency (USEPA) on May 26, 2010. The City is planning to upgrade the current facility and believes that attainment of underlying water quality standards utilized for the development of the WLA from the TMDL are not feasible thus leading to a substantial and widespread economic and social impact. The pollutant parameter values expressed in the variance request represent the highest attainable effluent quality that can be achieved without causing substantial and widespread economic and social impact.

Missouri regulations, 10 CSR 20-7.015(8)(C) states "When a wasteload allocation study is conducted for a stream or stream segment, all permits for discharge in the study area shall be modified to reflect the limits established in the wasteload allocation study." Additionally, Section 301 of the Clean Water Act and federal regulations at 40 CFR §122.44(d), which requires each National Pollution Discharge Elimination System (NPDES) permit to include effluent limitations developed to protect the narrative water quality criterion, a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by the USEPA pursuant to 40 CFR § 130.7. The Department reviewed and investigated the petition as required by 644.061.4, RSMo, and determined that the variance application is complete and meets the regulatory criteria associated with substantial and widespread economic and social impact as addressed by the City in its variance application. In the variance application the City requests that water quality standards for the variance period supports a modification of permit limits utilizing the WLA from the TMDL until December 31, 2035 as follows:

Table 1:

Pollutant Parameter	TMDL WLAs		Variance Limitations*
	Concentration	Mass	
Total Nitrogen	0.855 mg/L**	20.95 lbs/day	4.0 mg/L Quarterly Average
Total Phosphorus	0.092 mg/L**	2.25 lbs/day	0.10 mg/L Quarterly Average
Carbonaceous Biochemical Oxygen Demand	9 mg/L	200 lbs/day	9 mg/L Monthly Average
Total Suspended Solids	5 mg/L	122.51 lbs/day	5 mg/L Monthly Average

*Based on substantial and widespread economic and social impact

** WLA for nutrients were based on Eco Regional Criteria, <http://www2.epa.gov/nutrient-policy-data/ecoregional-criteria-documents>

The current treatment and effluent quality regarding total nitrogen (TN) and total phosphorus (TP) is estimated to be 17-26 mg/L for TN and 3-6 mg/L for TP.

Department Recommendation

The Department recommends that the Missouri Clean Water Commission (CWC) approve the variance as requested by the City based on the following justifications.

The Missouri Clean Water Commission is, among other things, legally authorized to grant individual variances from the requirements of the Missouri Clean Water Law and the regulations adopted under it, unless a variance is prohibited by any federal water pollution control act, and:

1. "...if...compliance...will result in an arbitrary and unreasonable taking of property or in the practical closing and elimination of any lawful business, occupation or activity, in either case without sufficient corresponding benefit or advantage to the people ..." (644.061.1, RSMo)

The Department believes that not granting this variance would result in substantial and widespread economic impacts per 40 CFR 131.10(g)(6). In order to meet the underlying water quality standards utilized for the development of wasteload allocations from the Stinson Creek TMDL, the City of Fulton would likely need to install biologic treatment, nutrient removal, and reverse osmosis of the entire effluent flow, thus spending over 80.7 million dollars in capital and 10.8 million dollars in annual operation and maintenance. This expenditure of funds could jeopardize the City's ability to provide wastewater treatment and other essential services to its residents.

2. "...no variance shall be granted where the effect of a variance will permit the continuance of a condition which may unreasonably cause or contribute to adverse health effects upon humans or upon fish or other aquatic life or upon game or other wildlife..." (644.061.1, RSMo)

The Department does not believe that the effect of this variance will permit the continuation of a condition that unreasonably poses a present or potential threat to human health or the environment. The variance proposes the highest attainable effluent quality that can be achieved without causing widespread social and economic impact. The values established in the variance will be evaluated periodically by the Department and City to ensure the attainment of the impaired uses which were the basis for the TMDL.

3. "...any variance so granted shall not be so construed as to relieve the person who receives the variance from any liability imposed by other law for the commission or maintenance of a nuisance." (644.061.1, RSMo)

The Department does not believe the issuance of this variance relieves the City of Fulton from any liability imposed by any other provisions of the Missouri Clean Water Law or other statutes of Missouri for the commission or maintenance of a nuisance.

4. "Variances shall be granted for such a period of time and under such terms and conditions as shall be specified in its order... in no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with sections 644.006 to 644.141... "

In order to fund a treatment facility upgrade in a phased approach that facilitates periodic stream use attainment evaluations the Department believes that a variance extending to December 31, 2035 is appropriate.

This variance request requires approval by the Environmental Protection Agency as it is considered a variance of water quality standards. The recent CWC approved amendment to the Missouri WQS states that a permittee or an applicant for a National Pollutant Discharge Elimination System (NPDES) or Missouri State Operating Permit may pursue a temporary variance to a water quality standard pursuant to either Section 644.061 or Section 644.062 RSMo. In order to obtain U.S. Environmental Protection Agency approval for a water quality standards variance for purposes of the federal Clean Water Act, the following additional provisions apply:

1. "A variance applies only to the applicant identified in such variance and only to the water quality standard specified in the variance. A variance does not modify an underlying water quality standard."

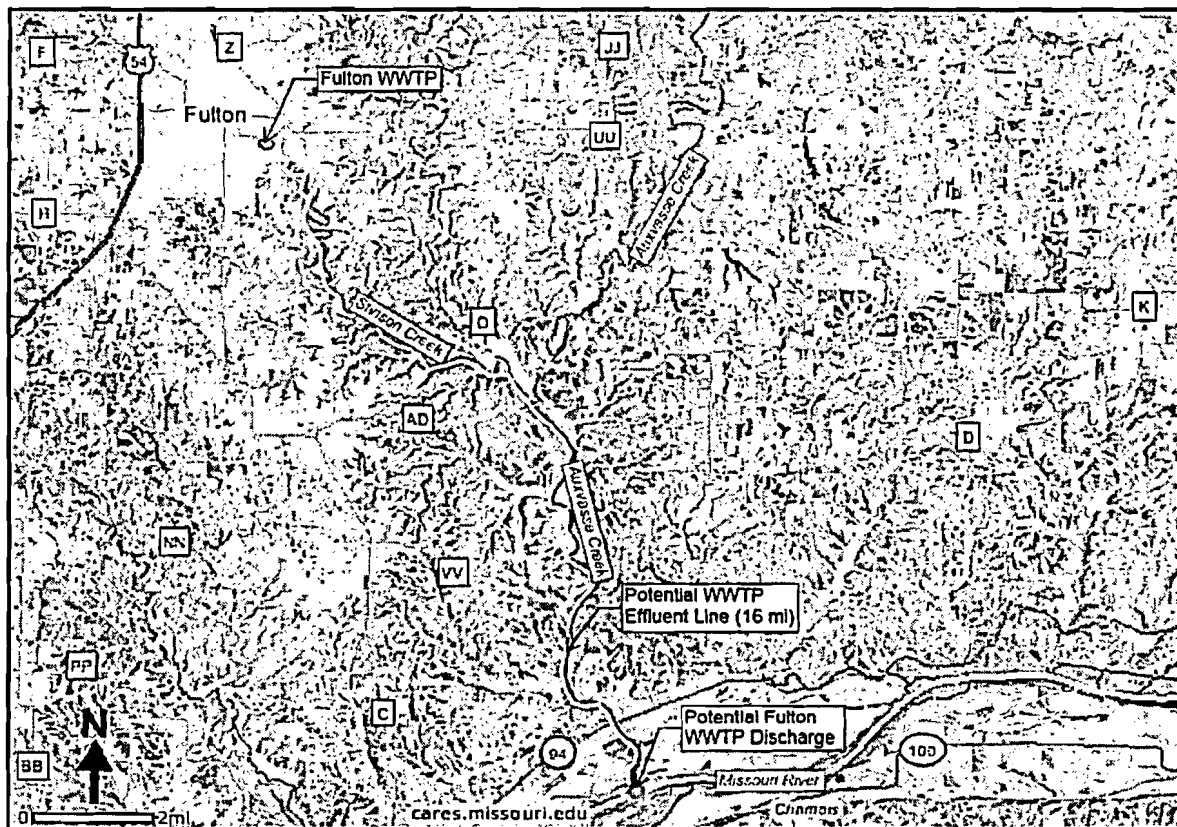
This variance applies only to the City of Fulton, Missouri State Operating Permit number MO-0103331. This variance does not modify any underlying Missouri Water Quality Standard.

2. "A variance shall not be granted if water quality standards will be attained by implementing technology-based effluent limits required under 10 CSR 20-7.015 of this rule and by implementing cost-effective and reasonable best management practices for non-point source control."

The underlying water quality standards utilized for the development of WLAs expressed in the TMDL, as well as the limitations requested via the variance are more stringent than those expressed in 10 CSR 20-7.015. Therefore it is acknowledged that limitations more stringent than technology based effluent limits are necessary to achieve compliance with water quality standards. The final permit limitations expressed in this variance represent the highest attainable effluent quality that can be achieved without causing a substantial and widespread economic and social impact. Technology in the form of reverse osmosis (RO) has been noted to achieve concentrations less than those expressed as final limitations in this variance; however, the cost associated with RO have been demonstrated by this request to cause a substantial and widespread economic and social impact. In addition, attainment of the underlying water quality standards utilized for the development of the TMDL total nitrogen WLA is uncertain even with RO treatment of the entire flow.

A discharge relocation alternative is often considered by communities facing costly treatment upgrades. Figure 1 provides a potential routing for the Fulton WWTP alternate discharge location. This proposed alternative would convey WWTP effluent 16 miles to the Missouri River through the addition of a new effluent pump station and effluent forcemain. Improved secondary treatment and wet weather controls would be required regardless of the potential discharge relocation. In addition, some level of nutrient removal would likely be required in the future to reduce nutrient loading to the Mississippi River basin or as a statewide technology-based requirement. However, these costs were not included in the following cost estimate.

Figure 1 - Fulton WWTP Improvements, Missouri River Alternate Discharge Location



To convey the proposed peak hydraulic throughput of the improved WWTP, the pump station and associated forcemain would be designed with an approximate capacity of 8 MGD. In order to reduce the significant total dynamic head that would be required by this alternative, a relatively low internal velocity between 2 - 3 feet per sec (fps) was selected for forcemain sizing, which results in a 30" diameter forcemain being recommended.

Due to the high level planning nature of this alternative and the potential unknown impacts regarding the proposed general alignment of the forcemain, a 30% contingency factor was utilized. A planning level cost for this alternative is estimated below.

Table 2 - Fulton WWTP Improvements, Missouri River Alternate Discharge Location, Cost Estimate

Item	Quantity	Unit	Unit Cost	Extension
WWTP Improvements (excludes proposed Effluent Pumping improvements)	1	LS	\$10,500,000	\$10,500,000
Effluent Pump Station	1	LS	\$1,750,000	\$1,750,000
Effluent Forcemain (assumes not in rock)	84,500	LF	\$285	\$24,080,000
Effluent Discharge Structure (@ MO River)	1	LS	\$250,000	\$250,000
Land Acquisition	100	AC	\$3,750	375,000
Subtotal				\$36,956,000
Contingency	1	LS	30%	\$11,087,000
Subtotal				\$48,043,000
Engineering and Legal	1	LS	17%	\$8,167,000
Total				\$56,210,000

The planning level cost estimate for this alternative represents an approximate cost increase of approximately 430% as compared to the recommended alternative and likely more costly than the contemplated RO treatment scenario.

3. "A variance shall not be granted for actions that will violate general criteria conditions prescribed by 10 CSR 20-7.031(4)."

This variance incorporates adaptive management techniques aimed at improving wastewater treatment and evaluating the general criteria conditions that lead to the impairment of Stinson Creek and will ultimately achieve compliance with the general criteria prescribed by 10 CSR 20-7.031(4).

4. "A variance shall not be granted that would likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of such species' critical habitat."

It is not anticipated that the granting of this variance will jeopardize threatened or endangered species or result in the destruction or adverse modification of such species' critical habitat. The results of a National Heritage Review of the facility and discharge location indicate that no federally-listed threatened or endangered species (including those species proposed for listing) or critical habitat (designated or proposed) are known to occur on or near the site. The U.S. Fish and Wildlife Service's response is provided under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543). Additionally, results of the same query of the location indicate that state endangered species, other species, or natural communities of conservation concern (e.g., prairie, glade, fen) are known to occur on or near the project site and may be impacted by project construction activities. The following is the state endangered species and the natural community of conservation concern associated with the site and discharge.

Gray Bats

Gray bats (*myotis grisescens*, Federally endangered, State endangered) are likely to occur in the project area, as they forage over streams, rivers, and reservoirs in this part of Missouri. See <http://mdc.mo.gov/104> for best management recommendations. The variance should not jeopardize Gray Bats as their habitat will not be impacted.

Karst

The project area occurs in a region of karst geology, characterized by subterranean water movement. Features like caves, springs, and sinkholes are common. Cave fauna are influenced by water pollution and other changes to water quality. Every effort should be made to protect groundwater in the project area. See <http://mdc.mo.gov/8452> for best management information. While the review notes that the discharge occurs in a region of karst geology, Stinson Creek is not classified as a losing stream.

5. "A variance may be granted if the applicant demonstrates that achieving the water quality standard is not feasible as supported by an analysis based on the factors provided in 40 CFR 131.10(g), or other appropriate factors."

The basis for the variance request is 40 CFR § 131.10(g) Factor 6, because meeting standards would result in substantial and widespread economic and social impact as supported by exhibit 2 of this document. In addition, attainment of the underlying water quality standards utilized for the development of TMDL total nitrogen WLA is uncertain even with RO treatment of the entire flow.

6. "In granting a variance, conditions and time limitations shall be set by the Department with the intent that progress be made toward attaining water quality standards."

This variance and the implementing Missouri State Operating Permit establish an adaptive management approach that bases subsequent upgrades on evaluations of Stinson Creek regarding the attainment of the beneficial use. If the use is not attained, subsequent upgrades to the treatment facility will occur. Additionally the Department and the City have entered into a memorandum of understanding that addresses the plant improvements and stream assessments as the variance progresses. The 2013 public noticed permit represents the first phase of implementation of the Stinson Creek TMDL as approved by USEPA. The phased adaptive management process is included within the Memorandum of Understanding (MOU) between the City of Fulton and Missouri Department Natural Resources dated March 18th, 2014. The process includes plant improvements followed by water quality studies to evaluate if water quality standards have been met or if TMDL revisions are appropriate. Each phase of improvements will be consistent with the City's investment and financing in wastewater infrastructure.

7. "Each variance shall be granted only after public notification and opportunity for public comment. Once any variance to water quality standards is granted, the Department shall submit the variance, with an Attorney General Certification that the Clean Water Commission adopted the variance in accordance with state law, to the U.S. Environmental Protection Agency for approval."

The variance application, factor 6 evaluation spreadsheet (exhibit 2), and Department recommendation will be placed on the Department's website for public notice for a period of 30 days. The variance and responses to comments will be provided to the commission for their decision and forwarded to the Missouri Attorney General for certification. The variance and

supporting documentation will then be forwarded to the U. S. Environmental Protection Agency for approval.

USEPA has approved the use of variances when the state demonstrates that the following items are fulfilled:

1. The individual variance is included in WQS.

The Department will incorporate this variance into the Missouri Water Quality Standard during the next WQS triennial review.

2. The variance is subject to the same public review as other changes in WQS.

Section 303(c)1 of the CWA and the applicable federal regulations at 40 CFR § 131.20 describe the states' requirement to hold a public hearing for the purpose of reviewing WQS, and notes that the information should be made available to the public prior to the hearing. It is USEPA's belief that variances, to be approved as changes to WQS, require the same opportunity for public review and comment. The Department is placing this variance on public notice for 30 days. At the April 2014 CWC meeting the Department will present their recommendation, along with the public notice comments and responses. This variance will be subject to additional public review during the next WQS triennial review as well as subsequent triennial reviews conducted by the Department until the variance expiration.

3. That meeting the standard is unattainable based on one or more of the factors listed in 40 CFR § 131.10(g) for removing a designated use.

As described in Section 5.3 of the USEPA Water Quality Standards Handbook (Second Edition, 1994), variances to WQS involve the same substantive and procedural requirements as removing a designated use, but specifically identify the applicable discharger(s), pollutant(s), and time limit. The substantive and procedural requirements include a use attainability demonstration identifying one of the factors listed in federal regulations (40 CFR § 131.10(g)) for removing a designated use and target achievement of the stream's highest attainable use and the associated criteria during the variance period. The variance application includes Exhibit 2 that demonstrates that meeting the assumptions and requirements of the Stinson Creek TMDL is unattainable based on one or more of these factors and submits the variance to USEPA as a change to WQS. The basis for the variance request is 40 CFR § 131.10(g) Factor 6 meeting standards would result in substantial and widespread economic and social impact.

4. The variance secures the highest level of water quality attainable short of achieving the standard.

A variance is sought since the most aggressive attempt to meet the underlying water quality standards utilized for the development of TMDL WLA, particularly the total nitrogen WLA, would cause substantial and widespread economic and social impact. The highest level of available technology (reverse osmosis) may be used to reduce effluent total nitrogen to approximately 2 mg/L on an annual basis. However, total nitrogen discharge quality from this unit process is uncertain given the current body of research. This treatment approach would include reverse osmosis treatment for the entire effluent flow, which was shown to be prohibitively expensive and would still not meet the underlying water quality standards utilized

for the development of the TMDL total nitrogen WLA. While this approach removes some fraction of total nitrogen from the effluent, this fraction would remain in the resulting brine which must be disposed of properly.

An adaptive management approach is proposed which includes iterative treatment upgrades followed by stream studies to determine if water quality impairments related to the discharges are resolved. Further treatment improvements will not be implemented if attainment of water quality standards is achieved. If preceding steps do not result in water quality standard attainment, variance nutrient limits of 4 mg/L for total nitrogen and 0.1 mg/L for total phosphorus will be implemented on a quarterly basis, taking effect on December 31, 2035. These total phosphorus and nitrogen values represent the highest effluent quality expected for enhanced nutrient removal (see Exhibit 2). Capital cost in 2013 dollars of achieving enhanced nutrient removal to meet 4 mg/L for total nitrogen and 0.1 mg/L for total phosphorus is 30 million dollars versus the cost associated with enhanced nutrient removal plus reverse osmosis treatment which is 80.7 million dollars. Annual operation and maintenance costs also increase dramatically (see Exhibit 2). The cost associated with reverse osmosis treatment would require monthly user rates far beyond levels that would cause substantial and widespread social and economic impacts (see Exhibit 2). Therefore, enhanced nutrient removal is selected for the final treatment step in the proposed adaptive management process.

5. That advanced treatment and alternative effluent control strategies have been considered.

The applicant evaluated various levels of advanced treatment alternatives ranging from biologic nutrient removal to reverse osmosis, the latter of which is unconventional for municipal wastewater treatment. The highest attainable effluent quality included in this variance is associated with enhanced nutrient removal, which would be the last step in the adaptive management process explained above. The original variance application evaluated the costs associated with reverse osmosis treatment of half the effluent flow. This treatment alternative was rejected due to extremely high capital costs, operational cost, operational complexity, energy consumption, associated greenhouse gas emission, and challenges associated with brine disposal resulting from the treatment. Prior to the public notice of this variance, the applicant evaluated the cost of treating the entire plant flow with reversed osmosis. This treatment alternative essentially doubles the cost impacts of partial reverse osmosis treatment. This alternative could also detrimentally impact aquatic life since the discharge would be deionized and devoid of essential minerals (e.g., calcium, magnesium, etc.) unless minerals were added to the effluent prior to discharge. The incrementally increased capital and annual O&M cost of complete reverse osmosis treatment is 51 and 5 million dollars, respectively, which is not affordable and would result in substantial and widespread economic impacts per 40 CFR 131.10(g)(6). Therefore, these considerations also form the basis to reject the reverse osmosis treatment option.

The estimated capital and O&M costs provided by HDR for treatment with RO are conservative estimates due to the lack of full-scale wastewater treatment systems utilizing this treatment technology. This is particularly true due to the lack of data with respect to the long term performance and costs of RO systems for wastewater treatment, including their associated ancillary systems needed for brine concentration and crystallization. Additionally, it is HDR's opinion that the unit costs provided are justified and possibly underestimates since they do not include items such as:

- *Capital cost for permeate conditioning facilities to add back salts and minerals prior to discharge.*

- *O&M cost for operating permeate conditioning facilities, including cost of salts and minerals.*
- *Additional land and pumping improvements that would be required to provide on-site storage of influent peak flows that would exceed the design peak capacity of the RO system.*

Variance Timeframe

The timeframe for this variance is that it shall remain effective until December 31, 2035. The timeframe as well as other aspects of this variance are subject to review during each water quality standard triennial review during the duration of the variance. This is to allow time to upgrade treatment facilities and conduct stream assessments. After each phase of WWTF improvements, the Department will perform an in-stream water quality study to determine whether applicable water quality standards have been attained in Stinson Creek. The timeframe and associated tasks associated with facility improvements are outlined in Table 3. As each milestone is implemented, the details such as timeframes and work complete must be submitted to the Department.

Table 3:

Task	Responsible Party	Target Completion Period
WWTF Improvements – 2013 Facility: Planning, Design, Construction, & Start-Up (Covered by AOC) • Bypass (Outfall 002) Elimination • Preliminary Treatment Upgrades • Ammonia Removal • Additional Clarification • Disinfection	City	Present - Dec 2016
Establish Water Quality Improvement Goals & Beneficial Use Assessment	MDNR & City	Present - Dec 2014
Develop Quality Assurance Project Plan (QAPP) for Water Quality Studies	MDNR & City	Aug 2016 – Dec 2016
This timeframe will be needed allow the stream to respond to the first round of plant upgrades that are required to occur as a result of the AOC between Department and the City		Dec 2016-May 2017
*Field Water Quality Studies: Dependent upon Stream Response & Hydrologic Conditions. Stream studies to evaluate the first round of upgrade will be concluded around September of 2018. Given the 305(b) report is a biennial report occurring on even number years, the first instance of removal from the report would occur after September 2018 would be in 2020. If at the end of September 2018 the Department decides that the data collected does not support removal from the 305(b) report the facility will proceed to the next stage of the schedule which is biological nutrient removal facility planning and design.	MDNR & City	May 2017 – Jan 2019
Remove the impairment from the biennial Integrated Missouri Water Quality Report (305(b) Report) if data supports use attainment.	MDNR & City	Jan 2019 - Dec 2020
WWTF Improvements – Biological Nutrient Removal Facility Public Outreach, Engineer Selection, Facility Planning, Bond Election, Financing, Planning, & Design, & Bidding (Tier 1 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	Dec 2020– May 2024

WWTF Improvements – Biological Nutrient Removal Contract Award, Construction & Start-Up (Tier 1 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	May 2024 - Dec 2026
Develop Revise Quality Assurance Project Plan (QAPP) for Water Quality Studies based upon prior water quality study findings and any new data quality objectives.	MDNR & City	Jan 2027 – May 2027
*Field Water Quality Studies: Dependent upon Stream Response & Hydrologic Conditions. Stream studies to evaluate the first round of upgrade will be concluded around September of 2028. Given the 305(b) report is a biennial report occurring on even number years, the first instance of removal from the report would occur after September 2028 would be in 2030. If at the end of September 2028 the Department decides that the data collected does not support removal from the 305(b) report the facility will proceed to the next stage of the schedule which is biological nutrient removal facility planning and design.	MDNR & City	May 2027 – Jan 2029
Remove the impairment from the biennial Integrated Missouri Water Quality Report (305(b) Report) if data supports use attainment	MDNR & City	Jan 2029 - Dec 2030
WWTF Improvements – Enhanced Nutrient Removal Public Outreach, Engineer Selection, Facility Planning, Bond Election, Financing, Design, Bidding Facility Planning & Design (Tier 2 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	Dec 2030 – May 2033
WWTF Improvements – Enhanced Removal Contract Award, Construction & Start Up (Tier 2 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	May 2033 – Dec 2035

This variance covers the timeframes needed to implement 3 tiers of wastewater treatment technology and implement an adaptive management approach regarding treatment technology installation and stream evaluation. As stated in table 3 the first step of general WWTF improvements will occur upon variance approval and permit issuance and December 2016. These improvements are required via an administrative order on consent (exhibit 5) between the Department and the city and include Bypass (Outfall 002) Elimination, Preliminary Treatment Upgrades, Ammonia Removal, Additional Clarification, and Disinfection.

The second set has been named Tier 1 improvements and are dependent on the adaptive management approach and stream evaluations. After treatment, general WWTF improvements to the stream will be allowed to acclimate to the new effluent quality until May 2017 when the Department and the city will conduct stream evaluations and data collection. This will occur over 16 months to evaluate the stream over a variety of seasonal conditions which is appropriate when evaluating nutrient impairments. If the stream study yields information that would allow the stream's status to be changed via the 305 (b) reporting process, the Department would submit the information via the biennial Integrated Missouri Water Quality Report in January 2019-December 2020. If the Department determines that the data from the field water quality studies does not support use attainment, the next phase of WWTF improvements shall be implemented as soon as practical.

If the general WWTF improvements do not succeed in the stream attaining the use the latest date Tier 1 improvements would occur is December 2020 -December 2026 this would include: WWTF Improvements – Biological Nutrient Removal Facility Public Outreach, Engineer Selection, Facility Planning, Bond Election, Financing, Planning, & Design, & Bidding and Biological Nutrient Removal Construction & Start-Up. As with the stream evaluation that

occurred post general WWTF improvements, the stream will be allowed to acclimate to the new effluent quality until May 2027 when the Department and the city will conduct stream evaluations and data collection. This will occur over 16 months to evaluate the stream over a variety of seasonal conditions. If the stream study yields information that would allow the streams status to be changed via the 305 (b) reporting process the Department would submit the information via the biennial Integrated Missouri Water Quality Report in January 2029-December 2030.

If the Tier 1 improvements do not succeed in the stream attaining the use Tier 2 improvements will be implemented. The latest date Tier 2 improvements would occur is January 2030-December 2035 this would include: WWTF Improvements – Enhanced Nutrient Removal Public Outreach, Engineer Selection, Facility Planning, Bond Election, Financing, Design, Bidding Facility Planning & Design and Enhanced Nutrient Removal Construction & Start-Up.

- * If the Department determines that the data from the field water quality studies does not support use attainment, the next phase of WWTF improvements shall be implemented as soon as practical. The interim steps for field water quality studies expressed in Table 3 are subject to approval by the Department and US EPA. If the Department determines the data does not support use attainment, the next phase of the WWTF improvements shall be implemented as soon as practical. Therefore, if the first set of WWTF improvements do not provide for use attainment of Stinson Creek, the Biological Nutrient Removal Facility Planning and Design for Tier 1 will begin in 2019 given the Department would not seek changing the stream's 305 (b) categorical listing. This would cause the entire schedule to change thus leading to future WWTF improvements occurring sooner than expressed in Table 3.

Additional Consideration

If, during the term of this variance, less expensive pollution control technology is developed and determined to be technologically and economically feasible, the Department will evaluate and consider options associated with the additional pollution control. Consideration must be given if prohibitive upgrades and financial commitments have occurred on the part of the City as set forth in the permit or this variance.

Department Response to Public Notice Comments

The Department received comments from the United States Environmental Protection Agency Region 7 (US EPA) which resulted in several clarifications to the variance. Those comments and resulting clarification are listed as follows. Additionally, in reviewing the following comments, it is important to review them in the context of the variance document that was public noticed and the letter submitted by USEPA given this resulting document page numbers and table numbers have changed.

US EPA's Specific Comments on the Text of the Variance;

1. EPA suggested wording clarification of the last sentence of page one. The Department agrees with the suggested language and has changed the sentence as suggested.
2. EPA suggests that clarification of answer 1 on page 2 and answer 5 on page 7, of the public notice is needed. The Department has deleted the wording "without commensurate benefit as it pertains to the pollutant loading of Stinson Creek" and clarified that the basis of the variance is that the cost of reverse osmosis of the entire wastewater flow would result in substantial and widespread economic impacts per the federal regulations.

3. EPA requests that data be provided with the variance to substantiate the claim that relocation of the outfall to an alternative receiving stream not feasible economically. Additional information pertaining to discharge relocation was incorporated as a result of this comment.
4. EPA requested a change in terminology when referring to limits resulting from the variance. The Department agrees with the terminology suggestion and has changed the word “final” to “variance” in reference to resulting limitations.

US EPA's Specific Comments on Public Noticed Table 2:

1. Dec 2016-May 2017 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR. *This timeframe will be needed to allow the stream to respond to the first round of plant upgrades that are required to occur as a result of the AOC between Department and the City.*
2. Sept 2018-Jan 2019 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR. *Stream studies to evaluate the first round of upgrade will be concluded around September of 2018. Given the 305(b) report is a biennial report occurring on even number years, the first instance of removal from the report after September 2018 would occur in 2020. If at the end of September 2018 the Department decides that the data collected does not support removal from the 305(b) report the facility will proceed to the next stage of the schedule which is biological nutrient removal facility planning and design.*
3. Jan 2019-Dec 2020 (Remove the Impairment) - Please explain why this task is associated with facility improvements and why it would take 2 years. The variance does not affect 303(d) attainment decisions or 305(b) reporting. *The Department agrees that the variance would not affect 303(d) attainment decision or 305(b) reporting; however, stream studies to evaluate the first round of upgrade will be concluded around September of 2018. Given the 305(b) report is a biennial report occurring on even numbered years, the first instance of removal from the report after September 2018 would occur in 2020. If at the end of September 2018 the Department decides that the data collected does not support removal from the 305(b) report, the facility will proceed to the next stage of the schedule which is biological nutrient removal facility planning and design.*
4. Dec 2020-May 2022 - There appears to be a 2-year gap in the schedule. Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR. *The timeframe for planning, financing, and design of the WWTF upgrades was adjusted to coincide with the previous milestone. This 18-month adjustment is provided to account for all of the processes required to gain public support and approval of these upgrades. The adjustment also accounts for engineer selection and construction bidding processes. This timeframe more accurately reflects the timeframes required for implementation of a municipal project. The construction timeframe was also adjusted to provide the period required to prepared construction contract documents and issue the notice-to-proceed.*
5. May 2024-Nov 2024 - Between December 2020 and May 2022, Jan 2027-May 2027 (Develop QAPP) Please explain why a new QAPP must be developed to replace the one developed in 2016. QAPP revision is included in 2027 to guide data collection efforts following BNR upgrades. *A revision process is included to account for findings from previous water quality studies and include modified data quality objectives, if necessary.*

6. Sept 2028-Jan 2029 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR. *Stream studies to evaluate the second round of upgrades will be concluded around September of 2028. Given the 305(b) report is a biennial report occurring on even numbered years, the first instance of removal from the report after September 2028 would occur in 2030. If at the end of September 2028 the Department decides that the data collected does not support removal from the 305(b) report the facility will proceed to the next stage of the schedule which is enhanced nutrient removal facility planning and design.*
7. Jan 2029-Dec 2030 (Remove the Impairment) - Again, please explain why this task is associated with facility improvements and why it would take 2 years. The variance does not affect 303(d) attainment decisions or 305(b) reporting. *The Department agrees that the variance would not affect 303(d) attainment decision or 305(b) reporting however, stream studies to evaluate the second round of upgrade will be concluded around September of 2028. Given the 305(b) report is a biennial report occurring on even numbered years, the first instance of removal from the report after September 2028 would occur in 2030. If at the end of September 2028 the Department decides that the data collected does not support removal from the 305(b) report the facility will proceed to the next stage of the schedule which is biological nutrient removal facility planning and design.*
8. Dec 2030-May 2031 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR. *The timeframe for planning, financing, and design of the WWTF upgrades was adjusted to coincide with the previous milestone. This adjustment is provided to account for all of the processes required to gain public support and approval of these upgrades. The adjustment also accounts for engineer selection and construction bidding processes. This timeframe more accurately reflects the timeframes required for implementation of a municipal project.*
9. May 2033-Nov 2033 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR. *The construction timeframe was also adjusted to provide the period required to prepared construction contract documents and issue the notice-to-proceed*

Enclosures:

- Exhibit 1 – November 7, 2013 Variance Application
- Exhibit 2 – May 2, 2014 HDR Request for Variance from Stinson Creek TMDL Report
- Exhibit 3 – Missouri State Operating Permit Public Notice June 2013
- Exhibit 4 – Memorandum of Understanding between MDNR and the City of Fulton
- Exhibit 5 – Abatement Order on Consent between MDNR and the City of Fulton
- Exhibit 6 - US EPA Region 7 Comment from the public notice
- Exhibit 7 – City of Fulton Comment from the public notice

Exhibit 1

RECEIVED

NOV 07 2013



MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION

VARIANCE APPLICATION - 644.061 RSMo 1986

WATER PROTECTION PROGRAM

FOR DEPARTMENT USE ONLY

DATE RECEIVED

11/7/13

This application must be accompanied by a \$250.00 filing fee. Make your check, money order, or bank draft payable to the State of Missouri. Cash cannot be accepted. Mail to:

Director of Staff
Missouri Clean Water Commission
Missouri Department of Natural Resources
Water Protection Program, Water Pollution Branch
P.O. Box 176
Jefferson City, MO 65102-0176

Please complete and return. Use separate sheets, if necessary.

COUNTY	PHONE WITH AREA CODE	FAX
Callaway	573-592-3111	
ADDRESS	STREET	CITY
18 East Fourth Street, Fulton MO, 65251		
FACILITY NAME		
Fulton, MO Wastewater Treatment Facility		
ADDRESS	STREET	CITY
1025 Worsham Circle, Fulton, MO 65251		
2. NPDES PERMIT NUMBER (IF APPLICABLE)		
MO- 0103331		
3. POINT OF DISCHARGE		
SW	NE	SEC 21
1/4	1/4	T 47N
R 9W		COUNTY Callaway
NAME OF RECEIVING STREAM		
Stinson Creek		
Classification of receiving stream: Class C (Waterbody ID - 0710) under Missouri Water Quality Standards 10 CSR 20-7.031.		
4. CITE SPECIFIC SECTION OF LAW OR REGULATION FOR WHICH A VARIANCE IS SOUGHT.		
Wasteload allocations for Total Nitrogen and Total Phosphorus presented in Table 10 of the Stinson Creek TMDL, Approved 5/26/10.		
5. IF VARIANCE PROPOSED A CHANGE OF POLLUTANT LIMITATION, LIST THE TYPE, QUALITY AND QUANTITY OF POLLUTANT AND PROPOSE ALTERNATE LIMITATIONS USING APPROPRIATE LIMITS.		
Total Nitrogen Wasteload Allocation from TMDL = 0.855 mg/L		
Final Total Nitrogen limit of 4.0 mg/L on a quarterly average proposed in Draft NPDES Permit Issued for Public Notice 6/28/13, if required based on adaptive management approach. Per the permit this limit would be effective 12/31/35.		
Total Phosphorus Wasteload Allocation from TMDL = 0.092 mg/L		
Final Total Phosphorus limit of 0.10 mg/L on a quarterly average proposed in Draft NPDES Permit Issued for Public Notice 6/28/13, if required based on adaptive management approach. Per the permit this limit would be effective 12/31/35.		
6. DESCRIBE THE WASTEWATER FACILITY.		
The existing facility consists of an influent pump station, screening and grit removal, two oxidation ditches with rotors, four final clarifiers, and an effluent pump station. Solids are aerobically digested and dewatered in a centrifuge. Sludge is land applied. An excess flow holding lagoon is adjacent to the plant.		

MO 750-0181 (06-04)

7. STATE THE REASON A VARIANCE IS BEING SOUGHT. BE SPECIFIC.

A variance is sought because the TMDL wasteload allocations (WLAs), particularly the Total Nitrogen WLA, are beyond the limits of available technology. Current technology can remove Total Nitrogen to approximately 2.0 mg/L on an annual average basis. This approach would include membrane treatment (reverse osmosis) for half of the effluent flow, which was shown to be prohibitively expensive and would still not meet the TMDL Total Nitrogen WLA. An adaptive management approach is proposed which includes iterative treatment investments followed by stream studies to determine if water quality standards related to nutrient discharges are achieved. Further treatment improvements will not be implemented if attainment of water quality standards is observed. If preceding steps do not result in water quality standards attainment, final nutrient limits of 4.0 mg/L (Total Nitrogen) and 0.1 mg/L (Total Phosphorus) will be implemented on a quarterly basis, taking effect on December 31, 2035. Specific information about this adaptive management approach is included within the TMDL Memorandum of Understanding between the City of Fulton and the Missouri Department of Natural Resources. Costs presented in Section 7a. are those associated with reverse osmosis treatment and enhanced nutrient removal processes to meet final effluent limits. Cost calculations for these treatment processes are attached. It should be noted that the cost for "Complying with the law or regulation" is the estimated cost for reverse osmosis treatment and would not meet the TMDL Total Nitrogen WLA.

7a. WILL COMPLIANCE WITH THE APPROPRIATE LAW OR REGULATION RESULT IN UNREASONABLE COST WITHOUT COMPARABLE PUBLIC BENEFIT?

☒ Yes ☐ No

If the answer is yes, provide a cost of the operation:

Complying with the law or regulation	\$ \$52,000,000
Using the proposed limitations	\$ \$25,000,000
Cost Difference	\$ \$27,000,000

Include consultant reports and vendor information supporting these costs.

7b. WILL THE LAW OR REGULATION RESULT IN ECONOMIC HARDSHIP FOR THE INDUSTRY?

☐ Yes ☒ No

If yes, attach the following information:

Federal income tax returns for each of the three years immediately preceding the application, or
an annual fiscal report, or
a list of the principal officers and their salaries, or
all income derived from the operation

This information may be submitted as confidential and the agency shall respect the confidential rights of the applicant

8. IF THIS IS AN EXISTING DISCHARGE, PROPOSE A COMPLIANCE SCHEDULE TO UPGRADE THIS FACILITY TO MEET THE APPLICABLE LAW OR REGULATION OR TO ELIMINATE THE DISCHARGE(S).

Refer to the Draft Missouri State Operating Permit issued for public notice on June 28, 2013, which includes an adaptive management approach to lowering limits to 4.0 mg/L Total Nitrogen and 0.10 mg/L Total Phosphorus on a quarterly basis. Technology to remove Total Nitrogen to a level of 0.855 mg/L is not technically feasible at this time. As stated previously, Total Nitrogen values below 4.0 mg/L are prohibitively expensive.

9. FURNISH THE NAMES OF ALL ATTORNEYS, CONSULTANTS, VENDORS, AGENTS AND ALL OTHER PARTIES WHO HAVE RENDERED SERVICE OR FURNISHED INFORMATION. INCLUDE THEIR ADDRESSES, TELEPHONE NUMBER, AND NATURE OF SERVICE OR INFORMATION PROVIDED.

HDR Engineering, Inc.
c/o Patrick Denning
3741 NE Troon Drive
Lee's Summit MO, 64064.
816-347-1134

10. I believe that the above information is correct and complete.

SIGNATURE 		DATE Sept. 12, 2013
NOTARY PUBLIC EMBOSSED SEAL	STATE OF	COUNTY
SUBSCRIBED AND SWORN BEFORE ME,		
DAY OF		YEAR
NOTARY PUBLIC SIGNATURE	MY COMMISSION EXPIRES	USE RUBBER STAMP IN CLEAR AREA BELOW.
NOTARY PUBLIC NAME (TYPED OR PRINTED)		

MO 780-0181 (06-04)

VARIANCE APPLICATION
Summary of Section 644.061 RSMo 1986

1. Application form is complete.
2. \$250.00 filing fee paid.
3. The Executive Secretary shall investigate and make a recommendation to the Clean Water Commission within sixty days.
 - * Granted – go to 4, then 5.
 - * Denied – go to 4, then 6.
4. Notify petitioner of staff decision and send notification to those people on the mailing list from the petitioners county.
5. Recommendations to grant variance:
 - A. The Clean Water Commission may grant the variance without a hearing, at which time a 30 day public notice must be allowed to receive public comments. If a petition is filed against the variance, a hearing must be held. Go to 7.
 - B. The Clean Water Commission may set the matter for hearing. Go to 7.
6. If the staff recommends denial, the petitioner may request a hearing within the 30 day notice period to be held before the Clean Water Commission. Go to 7.
7. A hearing will be held according to Section 644.066 and the Administrative Procedures Act.

CONDITIONS OF A VARIANCE

1. No variance shall be granted where the effect of a variance will permit the continuance of a condition that may unreasonably cause or contribute to adverse health effects on humans or upon fish or other aquatic life or upon game or other wildlife.
2. The commission shall exercise a wide discretion in weighing the equities involved and the advantages and disadvantages to the applicant and to those affected by water contaminants emitted by the applicant.
3. Variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission.

NOV 07 2013
MISSOURI DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

VARIANCE APPLICATION - 644.061 RSMo 1986

WATER PROTECTION PROGRAM

FOR DEPARTMENT USE ONLY

DATE RECEIVED

11/7/13

This application must be accompanied by a \$250.00 filing fee. Make your check, money order, or bank draft payable to the State of Missouri. Cash cannot be accepted. Mail to:

Director of Staff
Missouri Clean Water Commission
Missouri Department of Natural Resources
Water Protection Program, Water Pollution Branch
P.O. Box 176
Jefferson City, MO 65102-0176

Please complete and return. Use separate sheets, if necessary.

COUNTY	PHONE WITH AREA CODE	FAX
Callaway	573-592-3111	

ADDRESS	STREET	CITY	STATE	ZIP
18 East Fourth Street,	Fulton MO,	65251		

FACILITY NAME
Fulton, MO Wastewater Treatment Facility

ADDRESS	STREET	CITY	STATE	ZIP
1025 Worsham Circle,	Fulton, MO	65251		

2 NPDES PERMIT NUMBER (IF APPLICABLE)
MO- 0103331

3 POINT OF DISCHARGE
SW 1/4, NE 1/4, SEC 21, T 47N, R 9W, COUNTY Callaway

NAME OF RECEIVING STREAM
Stinson Creek

Classification of receiving stream	Class C (Waterbody ID - 0710)	under Missouri Water Quality Standards 10 CSR 20-7.031.
------------------------------------	-------------------------------	---

4 CITE SPECIFIC SECTION OF LAW OR REGULATION FOR WHICH A VARIANCE IS SOUGHT.
Wasteload allocations for Total Nitrogen and Total Phosphorus presented in Table 10 of the Stinson Creek TMDL, Approved 5/26/10.

5 IF VARIANCE PROPOSED A CHANGE OF POLLUTANT LIMITATION, LIST THE TYPE, QUALITY AND QUANTITY OF POLLUTANT AND PROPOSE ALTERNATE LIMITATIONS USING APPROPRIATE LIMITS.
Total Nitrogen Wasteload Allocation from TMDL = 0.855 mg/L Final Total Nitrogen limit of 4.0 mg/L on a quarterly average proposed in Draft NPDES Permit Issued for Public Notice 6/28/13, if required based on adaptive management approach. Per the permit this limit would be effective 12/31/35. Total Phosphorus Wasteload Allocation from TMDL = 0.092 mg/L Final Total Phosphorus limit of 0.10 mg/L on a quarterly average proposed in Draft NPDES Permit Issued for Public Notice 6/28/13, if required based on adaptive management approach. Per the permit this limit would be effective 12/31/35.

CITY OF FULTON
GENERAL ACCOUNT
P.O. BOX 130
FULTON, MISSOURI 65251

CENTRAL BANK
FULTON, MISSOURI

80-63/865

132464

Date
11/05/2013

Amount
250.00

Pay: TWO HUNDRED FIFTY AND XX / 100

To the order of:

Mo Dept of Natural Resources
Water Protection Program
PO Box 176
Jefferson City, MO 65102-0176

VOID AFTER 180 DAYS

SECURITY FEATURES INCLUDED, DETAILS ON BACK.



ONE COMPANY

RECEIVED

May 8, 2013

NOV 07 2013

Mr. Chris Wieberg
Operating Permits Section Chief
Water Protection Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

WATER PROTECTION PROGRAM

Re: Fulton WWTP Nutrient Removal Costs

Dear Mr. Wieberg:

On March 29, 2013, the City of Fulton, MNDR, and HDR met to discuss the Fulton NPDES Permit, EPA objection, and the next steps forward. As a part of that meeting, you requested that HDR provide you with the expected construction costs for the "Tier 1" and "Tier 2" nutrient removal improvements to the Fulton WWTP. A discussion of each follows.

2013 Facility Plan Improvements

The 2013 Facility Plan improvements consist of improvements which will address issues identified in the Abatement Order on Consent (AOC) No. 2011-WPCB-1122. Improvements include the elimination of Outfall 002 as well as ammonia and disinfection improvements. Improvements are also designed to meet the current draft operating permit which reduces the allowable BOD and TSS limits. While this project will decrease the effluent ammonia levels and will be capable of being operated to achieve some denitrification, it will not significantly decrease the effluent Total Nitrogen (TN) and Total Phosphorus (TP) effluent levels. The expected capital cost of the project (in 2013 dollars) is \$12,980,000.

Tier 1 Improvements – Biological Nutrient Removal

Once the 2013 Facility Plan improvements are operational, it is proposed that the receiving stream (Stinson Creek) be allowed to assimilate and that the Stinson Creek TMDL be re-evaluated to determine if biological nutrient removal is necessary. If required, the biological nutrient removal improvements will consist of a RAS selector basin, aeration basin baffle walls and mixers, replacement of RAS pumps, aeration basin distribution box replacement, an alum system, and site piping modifications. These improvements are expected to limit effluent concentrations to a monthly average of 8 mg/L TN and 1.0 mg/L TP. The 2013 cost of the improvements is \$3,500,000. Per our discussions on implementation, biological nutrient removal improvements are proposed to be constructed by 2026. At a 3% cost inflation per year, the 2026 cost of the improvements is \$5,200,000.

Tier 2 Improvements – Enhanced Nutrient Removal

Once the Tier 1 biological nutrient removal improvements are operational, it is proposed that Stinson Creek again be allowed to assimilate and that the Stinson Creek TMDL again be re-evaluated to determine if enhanced nutrient removal is necessary. If required, the enhanced nutrient removal

improvements will consist of a denitrifying sand filtration facility, an intermediate pumping station, and associated sitework and site piping. These improvements are expected to limit effluent concentrations to a monthly average of 4 mg/L TN and 0.1 mg/L TP. The 2013 cost of the improvements is \$7,500,000. Per our discussions on implementation, enhanced nutrient removal improvements are proposed to be constructed by 2035, if required. At a 3% cost inflation per year, the 2035 cost of the improvements is \$14,400,000.

We appreciate the Department's efforts to work with the City to resolve these regulatory issues. Please let me know if you have any additional questions or concerns.

Respectfully Submitted:

A handwritten signature in black ink, appearing to read 'Stan Christopher', is written over a horizontal line.

Stan Christopher, PE
HDR Engineering, Inc.

CC: Bill Johnson, Fulton
Greg Hayes, Fulton
Darrell Dunlap, Fulton
Patrick Denning, HDR
Trent Stober, HDR

Biological Nutrient Removal - Cost Estimate

RAS Selector Basin	1 LS	\$370,000	\$370,000
Baffle Walls	187.5 CY	\$750	\$141,000
Piping to RAS Selector (18")	250 LF	\$280	\$70,000
RAS Pumps	2 EA	\$100,000	\$200,000
New Distribution Box	1 LS	\$90,000	\$90,000
Mixers	4 EA	\$40,000	\$160,000
Plug RAS ports in oxidation Ditch	1 LS	\$15,000	\$15,000
Alum System for TP	1 LS	\$250,000	\$250,000
Bypass Pumping	120 \$/Day	\$1,500	\$180,000
Piping from RAS Selector (12")	80 LF	\$220	\$18,000
Piping from Distribution Box (18")	200 LF	\$280	\$56,000
Alum Building for Storage	1 LS	\$150,000	\$150,000
Sitework (15%)	1 LS	\$255,000	\$255,000
Subtotal:			\$1,955,000
Electrical (25%)			\$489,000
Contingency (20%)			\$489,000
Engineering and Legal (17%)			\$499,000
Total (2013 Dollars):			\$3,432,000
Escalated Cost (2026 Dollars):			\$5,140,000

Enhanced Nutrient Removal - Cost Estimate

Intermediate Pump Station	1 LS	\$850,000	\$850,000
Denitrification Filters	1 LS	\$2,600,000	\$2,600,000
Piping for Improvements	250 LF	\$280	\$70,000
Sitework (20%)	1 LS	\$704,000	\$704,000
Subtotal:			\$4,224,000
Electrical (25%)			\$1,056,000
Contingency (20%)			\$1,056,000
Engineering and Legal (17%)			\$1,078,000
Total (2013 Dollars):			\$7,414,000
Escalated Cost (2026 Dollars):			\$14,371,000

REQUEST FOR VARIANCE FROM STINSON CREEK TOTAL MAXIMUM DAILY LOAD

PREPARED FOR:
CITY OF FULTON, MISSOURI

PREPARED BY:
HDR ENGINEERING, INC.

MAY 2, 2014

HDR No. 216226



Table of Contents

1	Introduction	1-1
2	Wastewater Treatment Alternatives And Cost Evaluation	2-1
2.1	Wastewater Treatment Alternatives Evaluation	2-1
2.1.1	Interim Effluent Limitations - Improved Secondary Treatment & Wet Weather Controls	2-1
2.1.2	Tier 1 Effluent Limitations - Biological Nutrient Removal (BNR)	2-2
2.1.3	Tier 2 Effluent Limitations - Enhanced Nutrient Removal (ENR).....	2-3
2.1.4	Highest Available Treatment to Pursue TMDL WLAs - Reverse Osmosis (RO).....	2-3
2.2	Wastewater Treatment Capital Cost Evaluation.....	2-5
2.2.1	Interim Effluent Limitations - Improved Secondary Treatment & Wet Weather Controls	2-5
2.2.2	Tier 1 Effluent Limitations - BNR	2-5
2.2.3	Tier 2 Effluent Limitations - ENR.....	2-5
2.2.4	Highest Available Treatment to Pursue TMDL WLAs - RO.....	2-5
2.3	Wastewater Treatment O&M Cost Evaluation.....	2-7
2.3.1	Interim Effluent Limitations - Improved Secondary Treatment & Wet Weather Controls	2-7
2.3.2	Tier 1 Effluent Limitations - BNR	2-7
2.3.3	Tier 2 Effluent Limitations - ENR.....	2-7
2.3.4	Highest Available Treatment to Pursue TMDL WLAs - Reverse Osmosis (RO).....	2-8
3	Financial Capabilities Assessment	3-1
3.1	Evaluation Of Substantial Impacts	3-1
3.1.1	Municipal Preliminary Screener	3-1
3.1.2	Secondary Test	3-3
3.1.3	Substantial Impacts Matrix.....	3-5
3.2	Evaluation Of Widespread Impacts.....	3-6
4	Conclusions	4-1
5	References	5-1

Tables

Table 1-1 TMDL Wasteload Allocations and Variance Request	1-2
Table 2-1 Levels of Treatment	2-1
Table 2-2 Treatment Technology Costs in 2013 Dollars for a 5-mgd Facility	2-6
Table 2-3 Capital and Operations and Maintenance Cost for Nutrient Removal Levels	2-8
Table 2-4 Wastewater System Estimated Total Annual O&M	2-9
Table 3-1 Secondary Test Indicators and Assessment Results for the City of Fulton	3-5
Table 3-2 Substantial Impacts Matrix	3-6

Figures

Figure 2-1 Interim Effluent Limitations - Improved Secondary Treatment & Wet Weather Controls.....	2-2
Figure 2-2 Tier 1 Effluent Limitations - Biological Nutrient Removal	2-2
Figure 2-3 Tier 2 Treatment Level - Enhanced Nutrient Removal	2-3
Figure 2-4 Highest Available Treatment to Pursue TMDL WLAs - Reverse Osmosis and Permeate Conditioning.....	2-4
Figure 3-1 Comparison of Existing and Potential Residential Wastewater Rates for the City of Fulton and Missouri Communities with Populations between 10,000 and 50,000	3-7

Appendices

Appendix A	Estimated Capital Costs
Appendix B	Estimated Annual O&M Costs
Appendix C	Financial Capability Assessment Inputs and Sources
Appendix D	Financial Capability Assessment Calculations

1 INTRODUCTION

The City of Fulton, Missouri is pursuing a variance from the wasteload allocations (WLA) for the City of Fulton (City) Wastewater Treatment Facility (WWTF) (MSOP MO-0103331) included within Stinson Creek Total Maximum Daily Load (TMDL) (MDNR 2010). The variance process is provided by both Missouri statute (RSMo §644.06 1) and regulations (10 CSR 20-7.031). The Stinson Creek TMDL was developed by the Missouri Department of Natural Resources (MDNR) and approved by the United States Environmental Protection Agency (USEPA) on May 26, 2010. The aquatic life impairment addressed by the TMDL was attributed to low dissolved oxygen (DO) levels and high amounts of organic sediment. The Stinson Creek TMDL primarily focused on meeting the statewide dissolved oxygen (DO) criterion of 5 mg/L. A DO model was developed to link 5-day carbonaceous biochemical oxygen (CBOD₅) and formed the basis for loading capacity (LC) and wasteload allocations targeting these pollutants. The TMDL also prescribed LCs and WLAs for total suspended solids (TSS), total phosphorus (TP), and total nitrogen (TN), based upon ecoregional reference values. The following are the individual WLAs for the Fulton WWTF.

- CBOD₅ – 9 mg/L – 220 lbs/day
- TSS – 5 mg/L – 122.51 lbs/day
- TP – 0.092 mg/L – 2.25 lbs/day
- TN – 0.855 mg/L - 20.95 lbs/day

The WLAs prescribed by the Stinson Creek TMDL pose wastewater treatment challenges with currently available proven technologies. First, the averaging period for each of these parameters must be considered when evaluating the capabilities of current treatment technologies to meeting these WLAs. If the averaging period is daily, then all parameters would be challenging to meet continuously due to the inherent fluctuations in treatment performance. If the averaging period is extended (e.g., annual or quarterly), then achievability of the TN WLA is the primary concern.

To address these technical complications, the City submitted a variance application to MDNR on November 7, 2013 pursuant to RSMo §644.06 1. The application requested a variance from the Stinson Creek TMDL WLAs for CBOD₅, TSS, TN, and TP based on substantial and widespread economic and social impact. Additional information submitted with the application provided initial costs and rate impacts of several levels of wastewater treatment technology (HDR 2013). This report provides additional detailed information related to the potential costs, rate impacts, and treatment efficacy of advanced treatment processes. The report also includes a financial capability assessment to understand the City's ability to afford implementing the highest available treatment to pursue the TMDL WLAs using USEPA guidance (USEPA 1995). This information supports that the pollutant parameter values provided in Table 1-1 represent the highest attainable effluent quality that can be achieved without causing substantial and widespread economic and social impact.

Table 1-1 TMDL Wasteload Allocations and Variance Request

Pollutant Parameter	TMDL Wasteload Allocations		Variance Requested Permit Final Limitations
	Concentration	Mass	
Total Nitrogen	0.855 mg/L	20.95 lbs/day	4.0 mg/L Quarterly Average
Total Phosphorus	0.092 mg/L	2.25 lbs/day	0.10 mg/L Quarterly Average
5-Day Carbonaceous Biochemical Oxygen Demand	9 mg/L	200 lbs/day	9 mg/L Monthly Average
Total Suspended Solids	5 mg/L	122.51 lbs/day	5 mg/L Monthly Average

2 WASTEWATER TREATMENT ALTERNATIVES AND COST EVALUATION

2.1 WASTEWATER TREATMENT ALTERNATIVES EVALUATION

Various levels of wastewater treatment were evaluated by the City and HDR Engineering, Inc. (HDR). The incremental implementation of these treatment levels represents an adaptive management approach to address water quality impairments in Stinson Creek. The levels of wastewater treatment evaluated range from improvements to the existing secondary treatment system and excess flow holding basin (EFHB) to reverse osmosis (RO) in order to address the TMDL WLAs. These treatment levels were separated into tiers and are presented in Table 2-1 below along with a recommended phased implementation schedule.

Table 2-1 Levels of Treatment

Phase	Effective Date	Effluent Limitations (mg/l)									
		CBOD		TSS		Ammonia				TN	TP
		AML	AWL	AWL	AWL	April - Sept		Oct - March		LTA	LTA
						AML	MDL	AML	MDL		
Interim	12/31/16	25	40	30	45	1.2	6	2.6	12	-	-
Tier 1	12/31/26	20	30	20	30	1.2	6	2.6	12	8	1
Tier 2	12/31/35	9	15	5	15	1.2	6	2.6	12	4	.1
TMDL	-									.855	.092

AML: Average Monthly Limit, AWL: Average Weekly Limit, MDL: Maximum Daily Limit, LTA: Long-Term Average (e.g., Quarterly or Annual Average)

2.1.1 INTERIM EFFLUENT LIMITATIONS - IMPROVED SECONDARY TREATMENT & WET WEATHER CONTROLS

The initial phase of project improvements includes modifications to the existing EFHB to increase the design storage capacity and provide the capability of returning stored flows to the WWTF. These improvements were identified as the first step in WWTF upgrades within the implementation planning section of the Stinson Creek TMDL. Improvements with respect to the liquid treatment train include:

- improved influent firm pumping capacity,
- new fine screening and grit removal,
- new aeration equipment to provide increased treatment capacity and operational control,
- additional secondary clarification capacity,
- new UV disinfection,
- additional effluent pumping capacity, and
- new Supervisory Control and Data Acquisition (SCADA) system.

Figure 2-1 depicts the process schematic associated with these improvements.

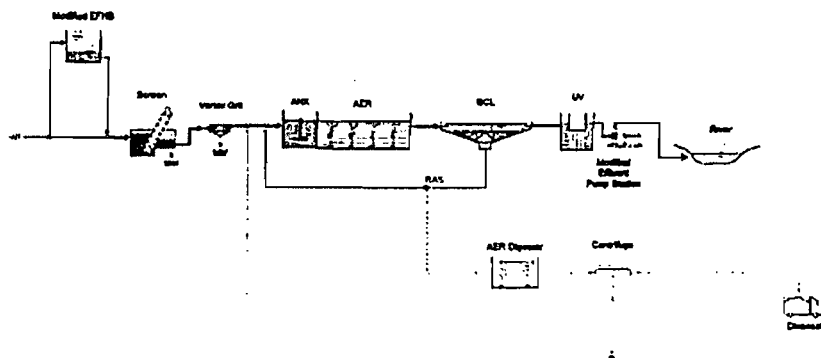


Figure 2-1 Interim Effluent Limitations - Improved Secondary Treatment & Wet Weather Controls

2.1.2 TIER 1 EFFLUENT LIMITATIONS - BIOLOGICAL NUTRIENT REMOVAL (BNR)

Future BNR improvements would most likely consist of the following improvements:

- addition of an anaerobic selector basin,
- return activated sludge (RAS) pumping/forcemain improvements,
- mixed liquor recycle,
- carbon source addition equipment,
- modifications of the aeration system including operational controls, monitoring, and
- zone baffling to create post anoxic and aerobic zones.

Figure 2-2 depicts the process schematic associated with these improvements.

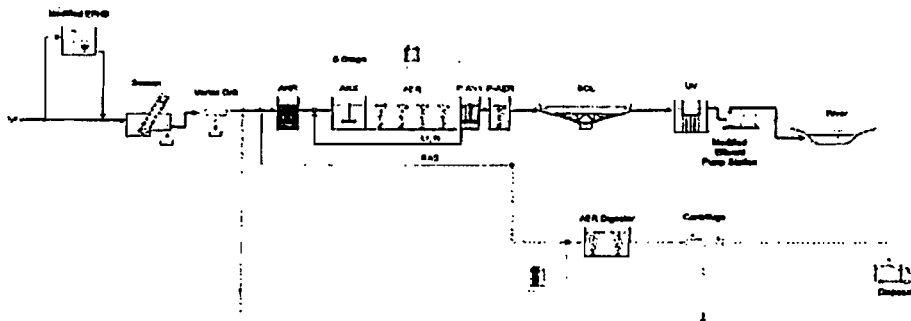


Figure 2-2 Tier 1 Effluent Limitations - Biological Nutrient Removal

Request for Variance From Stinson Creek TMDL – City of Fulton, MO
HDR No. 216226

2.1.3 TIER 2 EFFLUENT LIMITATIONS - ENHANCED NUTRIENT REMOVAL (ENR)

Future ENR improvements would most likely consist of the following improvements:

- chemical/polymer addition equipment including a rapid flocculation tank and associated tertiary clarification,
- intermediate pump station,
- carbon source addition equipment, and
- tertiary denitrification filtration equipment.

Figure 2-3 depicts the process schematic associated with these improvements. The unit processes included for this treatment tier are considered the current limit of technology (LOT).

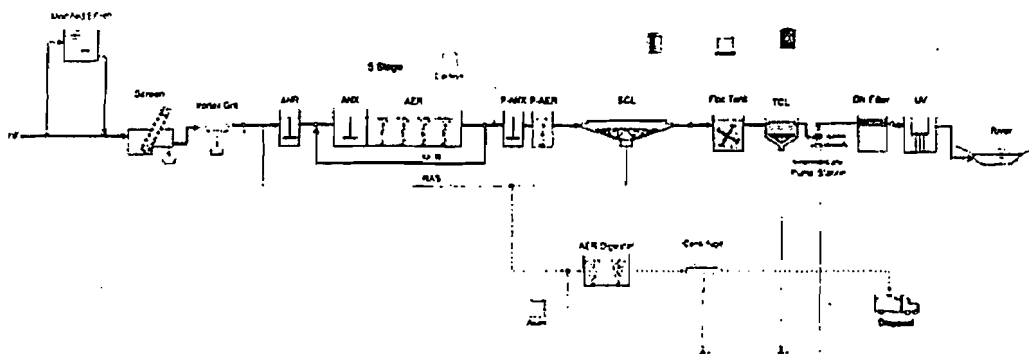


Figure 2-3 Tier 2 Effluent Limitations - Enhanced Nutrient Removal

2.1.4 HIGHEST AVAILABLE TREATMENT TO PURSUE TMDL WLAs - REVERSE OSMOSIS (RO)

RO represents the current highest form of treatment that could be used to further reduce effluent total nitrogen (TN) beyond the levels that can be achieved by ENR. However, RO is not a proven technology for use in municipal wastewater treatment applications with respect to effluent TN discharge quality due to its limited body of research.

According to WERF (2010), the current LOT for TN removal ranges between 3 mg/L and 4 mg/L for municipal wastewater treatment. The level of TN removal that any proven technology can achieve depends on the effluent refractory dissolved organic nitrogen (RDON) concentration. The level of effluent RDON for a typical municipal WWTP effluent can range from 1 to 2 mg/L, but higher concentrations are not uncommon and can be due to certain types of industrial contributions or may be generated as a byproduct of the treatment process. To yield an effluent TN near the TMDL WLA of 0.86 mg/l, effluent total inorganic nitrogen (TIN) concentrations of less than 0.8 mg/l would be required and the effluent RDON would have to be almost completely removed. According to WERF (2011), RO may have the potential to reduce RDON, and is known to remove nitrate and ammonia; however, depending on the membrane type, effluent RDON concentration reductions ranging from 50% and 90% are more likely. Therefore, it is unlikely effluent RDON concentrations could be reduced to a level required to meet the Request for Variance From Stinson Creek TMDL – City of Fulton, MO
HDR No. 216226

TMDL TN WLA. Also, such a low effluent TIN would require secondary and tertiary nitrogen removal processes with carbon addition capable of reducing total suspended solids (TSS) concentrations to less than 2 mg/l. Such a treatment train would require high levels of automation, highly skilled operations staff, and full redundancy throughout the liquid treatment process.

In addition to RO having very high operations and maintenance (O&M) cost, RO produces a deionized permeate that is toxic to aquatic life. To address this concern, initial treatment cost assumptions by HDR (2013) accounted for treating only 50% of the plant flow with RO. Therefore, it was assumed 50% of the future ENR effluent would receive further treatment through RO, and the remaining 50% of ENR effluent would bypass the RO process and be combined with RO effluent. Flow splitting in this manner should address concerns with toxic deionized permeate discharges. If required to treat 100% of the plant flow throughput with RO, an additional treatment step would be required to condition the permeate by adding back salts and minerals to the plant effluent prior to discharge. Treatment of 100% of the plant flow would result in high capital and O&M expenditures while still not likely attaining the effluent TN concentration required by the TMDL. Figure 2-4 depicts the addition of an RO treatment process to the ENR (Tier 2) treatment process schematic.

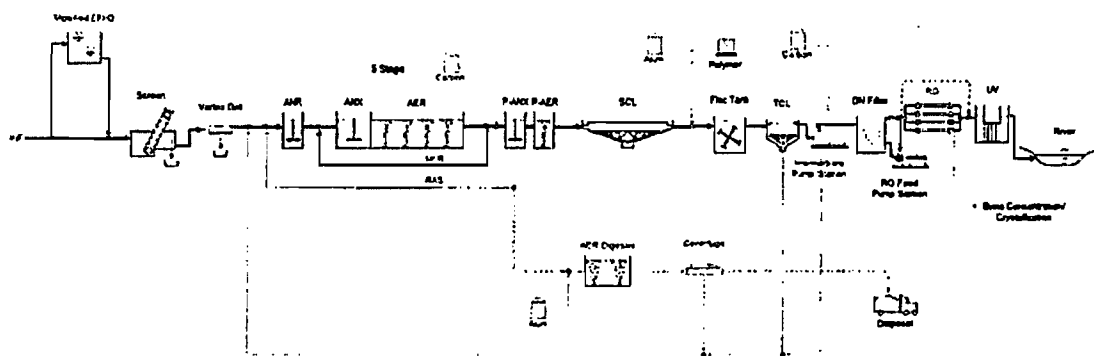


Figure 2-4 Highest Available Treatment to Pursue TMDL WLAs - RO

In addition to these concerns, RO also produces a reject brine that requires some form of disposal. Typical methods used for disposal of brine from an RO process consist of injection wells; however, the use of this disposal method is currently not allowed in the state of Missouri. Other methods of disposal such as evaporation ponds are not applicable for this climatic area. Therefore, brine concentration and crystallization would most likely be the required disposal method if using an RO process. The significant energy requirements associated with further concentration of the brine and subsequent heating for evaporation would result in a considerably higher capital and annual O&M cost as compared to injection wells. In addition, this residuals management process would produce much higher levels of greenhouse gas (GHG) emissions due to energy consumption.

2.2 WASTEWATER TREATMENT CAPITAL COST EVALUATION

Capital costs were estimated for each level of wastewater treatment. These costs are presented below in 2013 dollars. Treatment costs for the interim and Tier 1 effluent limitations were previously estimated by HDR (2013) and their applicable capital cost summaries are included in Appendix A for supporting information.

2.2.1 INTERIM EFFLUENT LIMITATIONS - IMPROVED SECONDARY TREATMENT & WET WEATHER CONTROLS

HDR (2013) presented capital cost for the interim effluent limitations improvements estimated at approximately \$13 million. The cost estimate associated with these improvements is included in Appendix A as Exhibit A-1.

2.2.2 TIER 1 EFFLUENT LIMITATIONS - BNR

HDR (2013) presented capital cost for the Tier 1 BNR improvements estimated at approximately \$3.4 million. The cost estimate associated with these improvements is included in Appendix A as Exhibit A-2.

2.2.3 TIER 2 EFFLUENT LIMITATIONS - ENR

To address the stringent Tier 2 effluent limitations for phosphorus and CBOD₅ and to provide a higher quality influent to an RO process, HDR has revised the proposed unit processes associated with this treatment tier. It is recommended that separate phosphorous removal facilities be included within the ENR alternative and therefore the estimated capital cost has been revised as such. The revised capital cost for the Tier 2 ENR improvements are estimated at approximately \$13.6 million. The cost estimate associated with these improvements is included in Appendix A as Exhibit A-3.

2.2.4 HIGHEST AVAILABLE TREATMENT TO PURSUE TMDL WLAs - RO

In USEPA (2013), USEPA's review of the City's variance documentation requested revised capital and O&M costs to reflect providing a treatment level capable of achieving the TMDL TN WLA. As stated in Section 2.1, it is HDR's opinion this level of treatment cannot be reliably achieved by any current proven technology for use in wastewater treatment. Furthermore, treating 100% of the plant flow throughput with RO in order to achieve a lower effluent TN would require permeate conditioning to prevent a discharge that is toxic to aquatic life. However, RO treatment of 100% of the plant flow is considered the highest available treatment to pursue the TMDL WLAs for this alternative analysis.

Due to the theoretical nature of this treatment alternative and the lack of established costs for the use of RO in municipal wastewater treatment, capital costs for this alternative were not estimated in the same manner as other alternatives evaluated. To address USEPA's comments with respect to providing 100% treatment of plant flow with RO, costs for this revised alternative were derived from Washington Associations (2013). Washington Associations (2013) provides incremental capital cost ranges associated with the addition of advanced treatment (consisting of microfiltration and RO) to conventional secondary treatment. Table 2-2 from Washington Associations (2013) is presented below:

Table 2-2 Treatment Technology Costs in 2013 Dollars for a 5-mgd Facility

Alternative	Total Construction Cost, 2013 dollars (\$ Million)	O&M Net Present Value, 2013 dollars (\$ Million)***	Total Net Present Value, 2013 dollars (\$ Million)	NPV Unit Cost, 2013 dollars (\$/gpd)
Baseline (Conventional Secondary Treatment)*	59 - 127	5 - 11	65 - 138	13 - 28
Incremental Increase to Advanced Treatment - MF/RO	48 - 104	26 - 56	75 - 160	15 - 32
Advanced Treatment - MF/RO**	108 - 231	31 - 67	139 - 298	28 - 60
Incremental Increase to Advanced Treatment - MF/GAC	71 - 153	45 - 97	117 - 250	23 - 50
Advanced Treatment - MF/GAC	131 - 280	50 - 108	181 - 388	36 - 78

* Assumed existing treatment for dischargers. The additional cost to increase the SRT to upwards of 30-days is about \$12 - 20 million additional dollars in total project cost for a 5 mgd design flow.

** Assumes zero liquid discharge for RO brine management, followed by evaporation ponds. Other options are available as listed in Section 4.4.2.

*** Does not include the cost for labor.

mgd=million gallons per day

MG=million gallons

MF/RO=membrane filtration/reverse osmosis

MF/GAC=membrane filtration/granulated activated carbon

O&M=operations and maintenance

Net Present Value = total financed cost assuming a 5% nominal discount rate over an assumed 25 year equipment life.

Source: Washington Associations (2013) Table ES-1, page ES-3.

The cost ranges provided in Table 2-2 assume 50% of the design flow receives advanced treatment as well as the use of a zero liquid discharge RO brine management system followed by evaporation ponds. This table provides a range of incremental unit capital costs in 2013 dollars of approximately \$10 to \$21 per gallon of treatment capacity. Utilizing a value within the upper third of this range, or \$17.3 per gallon, the resultant capital cost to treat 100% of the design flow with advanced treatment (microfiltration and RO) is approximately \$50.7 million (2.93 MGD * \$17.3 per gallon). The assumption that capital cost will be equivalent to the upper third value was made to roughly account for the additional cost associated with advanced thermal drying in lieu of a zero liquid discharge RO brine management system that is followed by evaporation ponds. This assumption is further supported in Washington Associations (2013), Table 6, page 27 which indicates the capital cost associated with brine disposal using evaporation ponds ranges from low to high, while advanced thermal evaporation (brine crystallization) would yield a high capital cost.

The estimated capital cost of approximately \$50.7 million excludes permeate conditioning facilities to add back salts and minerals to the plant effluent prior to discharge as well as the costs associated with providing additional on-site storage of influent peak flows that would exceed the design peak capacity of the RO system. Therefore, this incremental capital cost estimate is likely underestimated.

2.3 WASTEWATER TREATMENT O&M COST EVALUATION

Annual O&M costs were estimated for each level of wastewater treatment. These costs are presented below in 2013 dollars. The applicable incremental O&M cost summaries are included in Appendix B for supporting information.

2.3.1 INTERIM EFFLUENT LIMITATIONS - IMPROVED SECONDARY TREATMENT & WET WEATHER CONTROLS

An estimate of the annual O&M costs for the improved secondary treatment and wet weather controls was developed to account for all wastewater treatment costs. This cost excludes annual costs associated with collection system management and administrative expenses. The annual O&M cost associated with equipment repair/replacement, labor, sludge handling/disposal cost, etc., for the improved secondary WWTF is estimated at approximately \$650,000. This cost excludes electricity and chemical consumption. The estimated annual O&M cost associated with these improvements is included in Appendix B as Exhibit B-1.

2.3.2 TIER 1 EFFLUENT LIMITATIONS - BNR

An estimate of the incremental annual O&M costs associated with this level of treatment is included within Appendix B. The incremental annual O&M cost associated with equipment repair/replacement, labor, etc., for the Tier 1 improvements is estimated at approximately \$8,000. This cost excludes electricity and chemical consumption. The estimated annual O&M cost associated with these improvements is included in Appendix B as Exhibit B-2.

2.3.3 TIER 2 EFFLUENT LIMITATIONS - ENR

An estimate of the incremental annual O&M costs associated with this level of treatment is included within Appendix B. The incremental annual O&M cost associated with equipment repair/replacement, labor, etc., for the Tier 2 improvements is estimated at approximately \$104,000. This cost excludes electricity and chemical consumption. The estimated annual O&M cost associated with these improvements is included in Appendix B as Exhibit B-3.

2.3.4 HIGHEST AVAILABLE TREATMENT TO PURSUE TMDL WLAs - REVERSE OSMOSIS (RO)

Due to the conceptual nature of this treatment level, incremental annual O&M costs for treatment utilizing nutrient removal combined with RO were estimated from information contained in WERF (2011) and FWEAUC (2009). Table 2-3 presented below provides operations cost for various levels of wastewater treatment (WERF 2011).

Table 2-3 Capital and Operations and Maintenance Cost for Nutrient Removal Levels

Level	Capital Costs (\$/gpd)	Capital Costs for 10 mgd (Million \$)	Operations Cost (\$/MG Treated) *	Operations Cost (\$1,000/yr/ 10 MG Treated)*
1 (cBOD mode)	7.9	79	191	696
2 (8 mg N/L; 1 mg P/L)	13.5	135	335	1,222
3 (4-8 mg N/L; 0.1-0.3 mg P/L)	14.4	144	510	1,861
4 (3 mg N/L; <0.1 mg P/L P)	15.4	154	690	2,517
5 (2 mg N/L; <0.05 mg P/L)	21.6	216	1,183	4,319

Source: WERF (2011), Table 9, page 633.

WERF (2011) provides comparative operational costs for energy and chemical usage associated with various levels of nutrient removal, including RO. These findings suggest that these operational costs increase approximately six-fold for RO treatment compared to a conventional secondary treatment plant (increase from \$191 to \$1,183 per million gallons [MG] treated). These costs were based on treating 50% of the design average flow with MF/RO and assume brine reject is treated with deep well injection. WERF (2011) cautions that these operational costs include only energy demand and chemical usage, and exclude items such as labor, maintenance activities, equipment replacement, etc.

USEPA (2013) referenced O&M costs from FWEAUC (2009) for nutrient removal systems with RO treatment of \$1,105 per MG treated, which is quite comparable to WERF (2011) estimates (\$1,183 per MG). Therefore, it is assumed that the USEPA (2013) referenced cost from FWEAUC 2009 for nutrient removal systems with RO treatment are similar to WERF (2011) and do not include items such as labor, maintenance activities, equipment replacement, etc. USEPA (2013) also referenced O&M costs from FWEAUC (2009) of \$3,316 per MG treated for brine concentration and crystallization. It is assumed this per unit treatment cost also excludes items such as labor, maintenance activities, equipment replacement, etc.

Utilizing the FWEAUC (2009) per MG treated cost of \$4,421 ($\$1,105 + \$3,316 = \$4,421$) to estimate the operations cost (energy demand and chemical usage) for a nutrient removal system with RO and brine
Request for Variance From Stinson Creek TMDL – City of Fulton, MO
HDR No. 216226

concentrator with crystallizer results in an annual O&M cost of approximately \$4,728,000 ($\$4,421 / \text{MG} * 2.93 \text{ MGD} * 365 \text{ days}$). As stated previously, it is assumed this excludes O&M costs associated with labor, maintenance activities, equipment replacement, etc. The estimated annual cost for labor and maintenance is approximately \$191,000 (see Appendix B, Exhibit B-4). Therefore, the total incremental O&M cost associated with RO treatment and brine management is estimated at approximately \$4,919,000 ($\$4,728,000 + \$191,000$).

In summary, if required to provide the highest available treatment to pursue the TMDL WLAs, the total annual O&M cost for the City's wastewater system, is estimated at approximately \$7.0 million. A breakdown of this estimated total is presented in Table 2-4.

Table 2-4 Wastewater System Estimated Total Annual O&M

Description	Estimated Annual O&M Cost
Estimated Annual O&M Cost - Interim Effluent Limitations	\$650,000
Estimated Annual O&M Cost - Tier 1 BNR	\$8,000
Estimated Annual O&M Cost - Tier 2 ENR	\$104,000
Estimated Annual O&M Cost - Nutrient Removal with RO and Brine Concentrator/Crystallizer, including labor, equipment replacement etc.,	\$4,919,000
City Budgeted Annual Wastewater System O&M Cost (Excludes Wastewater Treatment)	\$1,330,000
Estimated Total Annual O&M Cost - Wastewater System	\$7,011,000

3 FINANCIAL CAPABILITIES ASSESSMENT

Variances from water quality standards may be granted if the necessary pollution controls beyond technology-based standards cause “substantial and widespread economic and social” impacts. USEPA’s guidance titled “Interim Economic Guidance for Water Quality Standards” provides methods to evaluate substantial and widespread impacts (USEPA 1995). USEPA (1995) suggests that “substantial” impacts analyses consider the community’s ability to afford for the water quality controls by comparing treatment costs to the financial strength of the community. “Widespread” impacts analyses consider magnitude and types of financial impacts that might occur with implementation of controls beyond technology-based standards (USEPA 1995). The following assessment uses the USEPA (1995) approach to evaluate the potential substantial and widespread economic and social impacts associated with implementing the highest available treatment to pursue the TMDL WLAs (i.e., RO treatment and brine management).

3.1 EVALUATION OF SUBSTANTIAL IMPACTS

USEPA (1995) suggests that two economic test be used to evaluate the likelihood that substantial impacts will occur as the result of implementing a particular wastewater treatment alternative. The first test, called the municipal preliminary screener (MPS), evaluates whether or not residents can afford a pollution control alternative by comparing the expected annual pollution control cost to the community median household income (MHI). If the MPS indicates substantial impacts are likely, the analysis proceeds to the second test. The Secondary Test relies on several indicators to assess the economic health of the community as a whole. Results from the MPS and Secondary Test are then jointly evaluated in the Substantial Impacts Matrix to determine whether the alternative is likely to have substantial economic impacts on the community. HDR used several sources for the substantial impacts analysis inputs, with care given to use the same source for comparable values (e.g., community and state MHI, community and national unemployment rates, etc.). The inputs and results from USEPA financial capability assessment tools are included as Appendices C and D, respectively.

3.1.1 MUNICIPAL PRELIMINARY SCREENER

USEPA guidance suggests calculating the MPS by dividing the average pollution control cost per household by the MHI in the community (USEPA 1995). The 2012 MHI for the City of Fulton was \$43,791 according to the US Census Bureau (USCB) (2014). The estimated 2013 MHI was \$44,431 using the 1.5% increase in the consumer price index to escalate the 2012 MHI into 2013 dollars (US Department of Labor 2013).

The average pollution control cost was derived by multiplying the current residential rate by the anticipated percent increase in revenue requirements resulting from the WWTF upgrade and collection system improvements.

Current Monthly Wastewater Bills and Existing Cost of Pollution Control – The City of Fulton owns and operates a publicly-owned WWTF that receives wastewater from residential and commercial sources inside its corporate limits. The facility has a design average day flow of 2.93 MGD and services 4,377 households (3,680 connections). The City’s current residential rate structure is a base rate of \$10.50 per month plus \$3.35 per 100 cubic feet of water consumption.

For a typical residential customer using 5,000 gallons per month, this rate structure equates to a monthly sewer bill of \$32.89 per month. Wastewater fees budgeted for 2013 is \$2,496,000 total and \$1,250,000 from residential customers (City of Fulton 2013b). In addition, the City budgeted receipt of \$737,500 from the water and wastewater capital improvement sales tax with approximately 50% assigned to wastewater improvements (\$369,000). Budgeted wastewater utility operating expenses were \$2,070,000 for 2013 (City of Fulton 2013b).

Additional Revenue Requirements – The capital and annual costs for upgrading the Fulton WWTF with RO for 100% of the design flow were estimated. The estimated additional annual revenue requirement is \$10,881,000, which is comprised of \$5,940,000 annual debt service and \$4,941,000 annual O&M expenses. The net annual O&M cost was calculated by deducting the current annual wastewater budget (\$2,070,000) from the estimated annual O&M estimate associated with RO treatment and brine management (\$7,011,000). Annualized capital costs were calculated using an interest rate of 4% assuming municipal bond financing without interest subsidization (e.g., without State Revolving Loan Fund [SRLF]). Interest subsidies were not assumed given the current uncertainties with continued funding of the SRLF and the high demand for this program. The increased annual costs posed by the potential implementation of RO treatment would represent a 525% increase compared to the existing cost of pollution controls.

Total Cost of Wastewater Service – Since the MPS is based upon the financial burden borne by residential customers, the relative contribution from residential customers to pay for the potential improvements was estimated. For estimating purposes, the potential residential burden was based upon the budgeted amount of residential revenue from sewer rates in addition to the entire amount of sales tax contribution to wastewater capital improvements. The addition of the sales tax amount is justified since most sales tax revenues are either paid directly or indirectly from citizens. The impact of adding sales tax revenues to the residential contribution raises the percentage applied to the residential burden by only 6.5% of the total wastewater revenues. While this increases the residential contribution or burden, this likely is counterbalanced by the increased wastewater expenses associated with infiltration and inflow controls, which are heavily influenced by private sources in most municipal systems. Based upon these calculations, residential customers would be expected to pay 56.5% of the total annual costs associated with RO treatment and brine management. Therefore, the improvements would result in an annual average cost per residential customer of \$1,672. This would impact annual wastewater expenditures as follows:

	Existing Cost of Pollution Control (\$/yr)	Additional Revenue Requirements for RO System (\$/yr)	Future Cost of Pollution Control for RO System (\$/yr)
Residential Cost	\$268	\$1,404	\$1,672

Results of Municipal Preliminary Screener – Results of the MPS show the annual cost of the highest available treatment to pursue the TMDL WLAs would be 3.8% of the MHI.

- **Total Annual Pollution Control Cost Per Household for RO System (2013 \$): \$1,672**
- **Estimated Median Household Income (2013): \$44,431**
- **Municipal Preliminary Screener: $\$1,672/\$44,431 = 3.8\%$**

3.1.2 SECONDARY TEST

In the Secondary Test, several economic indicators are evaluated and scored in order to describe the economic health of the overall community. Analysis of these indicators provides information regarding debt prior to additional pollution controls, socioeconomic conditions, and financial management in the community and helps in determining the economic impact of a pollution control project. Indicator results are scored according to benchmarks delineating strong, mid-range, and weak economic strength (USEPA 1995). The economic indicators suggested by USEPA are described in the following sections.

Debt Indicators

Bond Rating – Bond rating is one measure of a community's credit capacity (USEPA 1995) and reflects the community's capacity to take on debt. The City was quite strong during recent bond issues with ratings ranging from AA+ to AAA. **Fulton Score: Strong (3)**

Overall Net Debt as a Percent of Full Market Value of Taxable Property – Overall net debt is a community's debt that is repaid by property taxes. It excludes debt repaid by user fees. When compared to the full market value of taxable property, it provides a measurement of debt burden on residents and gauges the ability of the community to issue additional debt. The City current has \$10,390,000 in outstanding direct net and overlapping debt not associated with user fees. The full market value of taxable property is \$424,038,000 (City of Fulton 2013a). Therefore, the overall net debt as a percent of full market value of taxable property in 2012 was 2.45%. **Fulton Score: Mid-Range (2)**

Socioeconomic Condition Indicators

Unemployment Rate – The unemployment rate is the percent of a community's labor force that is unemployed. The unemployment rate is a measure of financial well-being of residents (USEPA 1995). Guidance suggests comparing the local unemployment rate to the national average to evaluate the community's financial well-being. The 2012 unemployment rate for the City of Fulton is 7.0% compared to that national rate of 9.3% (USCB 2012). While USEPA (1995) recommends using a comparison of the local and national unemployment rates, the prolonged economic recession makes such a comparison irrelevant. Rather a more appropriate measure is to compare the City's current unemployment rate to long-term national rates. This comparison should be considered if further analyses of substantial impacts are performed. **Fulton Score: Strong (3)**

Median Household Income – MHI is another measure of City residents' financial well-being and is an overall indicator of spending capacity (USEPA 1995). Guidance suggests comparing

the community's MHI to the MHI for the state. The 2012 MHI was \$43,791 for Fulton residents, which equates to 92.5% of the State of Missouri MHI of \$47,333 (USCB 2014). **Fulton Score: Mid-Range (2)**

Financial Management Indicators

In addition to the debt and socioeconomic indicators outlined above, USEPA (1995) suggests that two financial management indicators be calculated. Together these indicators are used to assess the community's ability to fund new expenditures with property taxes. However because any future improvements will be paid with revenue bonds supported by user fees, these financial management indicators are not necessarily applicable to the analysis.

Property Tax Revenues as a Percent of Full Market Value of Taxable Property – This indicator measures the burden that property taxes currently have on residents and helps in evaluating the funding capacity to support new expenditures (USEPA 1995). Property tax revenues for the City of Fulton in 2012 were \$522,000 (City of Fulton, 2013a); however, this accounts only for the City's portion of the property tax collected from property owners. The City property tax rate is 0.5291% of assessed value compared to the total property tax of 5.706%, which includes property taxes to the Fulton Public School District, Callaway County, and the State of Missouri (City of Fulton, 2014). Therefore, the total 2012 property tax revenues from City property owners was \$5,631,000, which equates to 1.33% of full market value of taxable property. **Fulton Score: Strong (3)**

Property Tax Collection Rate – The property tax collection rate measures the efficiency of the tax collection system (USEPA 1995). Indirectly, it measures whether or not the current property taxes are burdensome. Residents are more likely to avoid paying or pay late if the taxes are excessive. The City has an average property tax collection rate of 97.6% over the last ten years (City of Fulton 2013a). **Fulton Score: Mid-Range (2)**

The average of indicator scores was calculated to develop a cumulative assessment score and provided in Table 3-1 (USEPA 1995). For the City of Fulton, the cumulative assessment score (average) with all indicators is 2.5. According to guidance, a community with a cumulative assessment score less than 1.5 is weak, between 1.5 and 2.5 is mid-range, and greater than 2.5 is strong (USEPA 1995). The City's cumulative assessment score falls into the upper end of the mid-range category for economic strength.

Table 3-1 Secondary Test Indicators and Assessment Results for the City of Fulton

Secondary Indicator	Benchmarks			Fulton Value	Score
	Weak (a)	Mid-Range (b)	Strong (c)		
Bond Rating	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)	AA+ - AAA	3
Overall Net Debt as Percent of Full Market Value of Taxable Property	Above 5%	2% - 5%	Below 2%	2.45%	2
Unemployment Rate ¹	Above National Average	National Average	Below National Average	7.0% - 9.3%	3
Median Household Income ²	Below State Median	State Median	Above State Median	\$43,791 - \$47,333	2
Property Tax Revenues as a Percent of Full Market Value of Taxable Property	Above 4%	2% - 4%	Below 2%	1.33%	3
Property Tax Collection Rate	< 94%	94% - 98%	> 98%	97.6%	2
a. Weak is a score of 1 point b. Mid-Range is a score of 2 points c. Strong is a score of 3 points					
				SUM	15
				AVERAGE	2.5

¹ If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.

² If the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.

3.1.3 SUBSTANTIAL IMPACTS MATRIX

Results of the MPS and Secondary Test must be jointly evaluated to determine whether or not the project will have significant financial impacts on the community. USEPA (1995) recommends evaluating the results with a Substantial Impacts Matrix. In this matrix, the MPS for each treatment alternative is paired with the cumulative assessment score and plotted to estimate impacts. If a community's combined score falls in the upper right corner of the matrix (cells marked with an "X"), substantial financial impacts are expected to occur as a result of the pollution control project (USEPA 1995). Scores that fall in the lower left of the matrix (cells marked with "✓") indicate that the community is not expected to suffer substantial financial impacts. Scores falling in the categories marked with a "?" indicates that the impacts are unclear and may need to be evaluated in more detail (USEPA 1995). According to the results of the

MPS and Secondary Test evaluations for the City of Fulton, impacts from the required improvements are substantial (MPS = 3.8%, Secondary Score = 2.5).

Table 3-2 Substantial Impacts Matrix

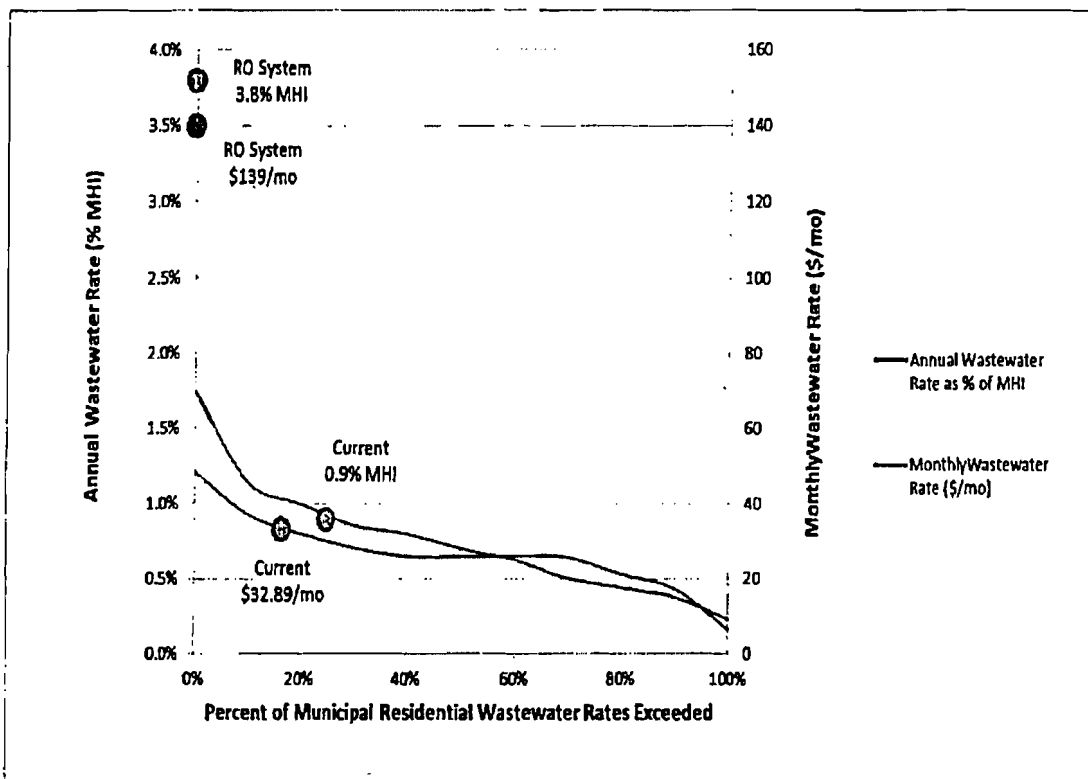
Secondary Score	Municipal Preliminary Screener		
	Less than 1%	1% to 2%	Greater than 2% <i>Fulton – 3.8%</i>
Less than 1.5	?	X	X
1.5 to 2.5 <i>Fulton – 2.5</i>	✓	?	
Greater than 2.5	✓	✓	?
Source: U.S. EPA (1995) X = impact is likely to be substantial ? = impact is borderline ✓ = impact is not likely to be substantial			

3.2 EVALUATION OF WIDESPREAD IMPACTS

Implementation of the highest available treatment to pursue the TMDL WLAs would cause widespread social and economic impacts in addition to the substantial economics. USEPA (1995) suggests that evaluation of the impacts to all segments of a community to demonstrate widespread impacts (e.g., low income households, large and small businesses, etc.). USEPA guidance does not provide specific criteria for widespread impact evaluations, as compared to the substantial impacts analysis. However, qualitative and quantitative analyses may be made to assess widespread social and economic impacts.

While the MPS calculated to assess substantial impacts focuses on the median household, low and fixed income households will be particularly impacted by the potential rate increases associated with constructing and operating the RO and brine management processes contemplated to pursue the TMDL WLAs. Approximately 13% of Fulton households receive federal assistance (e.g., Food Stamps/SNAP Benefits) and 17% of the citizenry live below the poverty level (USCB 2014). This low income segment will be disproportionately impacted by the excessive potential rates under consideration. The lower 20th percentile of Fulton households live on incomes below \$15,000 (USCB 2014). These households would ultimately pay over 11% of their household income if this highest available treatment is implemented, which would obviously be devastating.

Fulton businesses and industries would also be at a distinct disadvantage compared to businesses located in other communities of similar size. Figure 3-1 illustrates the comparison of Fulton's current and potential future rates associated with RO treatment to other Missouri communities with populations ranging from 10,000 to 50,000 (MPUA 2012). This comparison shows that Fulton's existing rates are in the upper quartile of representative municipal rates with respect to both monthly charges and as a percent of MHI. Rates associated with the highest available treatment would make Fulton's rates the highest by far in Missouri. This magnitude of rate increase would almost certainly cause relocation of some existing business and industries. In addition, the City would be at a distinct disadvantage of drawing in additional businesses to increase jobs and incomes.



Source: 2012 Missouri Public Utilities Association Municipal Water and Wastewater Rate Survey.

Figure 3-1 Comparison of Existing and Potential Residential Wastewater Rates for the City of Fulton and Missouri Communities with Populations between 10,000 and 50,000

In summary, the implementation of the highest available treatment to pursue the TMDL WLAs will cause not only substantial, but also widespread social and economic impacts. The potential excessive rates would greatly impact not only the average Fulton resident but devastate low income households and likely lead to widespread sewer bill delinquency. Rates would also be disproportionate to other Missouri communities potentially leading to relocation of existing businesses and industries and place the City at a distinct economic development disadvantage.

4 CONCLUSIONS

The Stinson Creek TMDL assigned WLAs that pose wastewater treatment challenges with currently available technologies. First, the averaging period for each of these parameters must be considered when evaluating the capabilities of current treatment technologies to meeting these WLAs. If the averaging period is daily, then all parameters would be challenging to meet continuously due to the inherent fluctuations in treatment performance. If the averaging is extended (e.g., annual or quarterly), then achievability of the TN WLA is the primary concern.

RO treatment with brine crystallization was evaluated potential substantial and widespread economic and social impact associated with this highest available treatment to pursue the Stinson Creek TMDL WLAs. While RO represents the highest available treatment process, attainment of the TN WLA is questionable. This analysis demonstrates that implementing these treatment and residuals management processes would certainly cause substantial and widespread economic and social impacts. In addition, these treatment processes would yield secondary environmental impacts from the markedly increased energy consumption and cause aquatic life toxic impacts unless necessary minerals are not added to the RO effluent.

Rather than implementing this highest available treatment process, the City recommends phased implementation of treatment process improvements to strive toward the TMDL WLAs, but more importantly improve stream conditions to restore beneficial uses. The recommended adaptive management approach is embodied within the 2013 MOU between MDNR and the City. This MOU includes incremental plant improvements followed by water quality studies and assessments until beneficial uses are restored, subsequent TMDL phases are developed, or the City implements the final phase of nutrient removal upgrades. The stepwise treatment upgrades are provided within the first three steps evaluated within the wastewater treatment alternative evaluation included in Section 2. If plant improvements are fully implemented, the Fulton WWTF would become the most advanced nutrient removal plant currently operated in Missouri while maintaining affordable treatment to City residents.

5 REFERENCES

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Appendix A
Estimated Capital Costs

**CITY OF FULTON, MO
WWTP IMPROVEMENTS
INTERIM EFFLUENT LIMITATIONS
PLANNING LEVEL PROJECT COST ESTIMATE - 04/23/14
EXHIBIT A-1**

Item	Cost (2012 \$)	Cost (2013 \$) ¹
Temporary Flow Meter	\$20,000	\$21,000
Influent Flow Meter	\$112,000	\$115,000
Influent Pumping	\$380,000	\$391,000
Headworks with Bar Screen and New Grit Removal System	\$1,650,000	\$1,700,000
Aeration System	\$1,242,000	\$1,279,000
Clarifiers	\$1,391,000	\$1,433,000
Ultraviolet Disinfection System	\$700,000	\$721,000
Effluent Pumping Modifications	\$190,000	\$196,000
Effluent Flow Meter in Vault	\$100,000	\$103,000
Splitter Box Improvements	\$115,000	\$118,000
RAS Pump Station Upgrades	\$117,000	\$121,000
Digester Decanting Upgrades	\$0	\$0
Excess Flow Holding Basin	\$120,000	\$124,000
Algae Control	\$0	\$0
Septage Receiving Station	\$45,000	\$46,000
Site Piping	15%	\$955,200
Subtotal:		\$7,323,200
Electrical	25%	\$1,831,000
Contingency	20%	\$1,831,000
Engineering and Legal	17%	\$1,868,000
Total (2013 Dollars):		\$12,853,200

Notes:

¹ Assumes 3% inflation factor.

CITY OF FULTON, MO
 WWTP IMPROVEMENTS
 TIER 1 - BNR
 PLANNING LEVEL PROJECT COST ESTIMATE - 04/23/14
 EXHIBIT A-2

Item	Quantity	Unit	Unit Cost	Extension
RAS Selector Basin	1	LS	\$370,000	\$370,000
Baffle Walls	187.5	CY	\$750	\$141,000
Piping to RAS Selector (18")	250	LF	\$280	\$70,000
RAS Pumps	2	EA	\$100,000	\$200,000
New Distribution Box	1	LS	\$90,000	\$90,000
Mixers	4	EA	\$40,000	\$160,000
Plug RAS ports in oxidation Ditch	1	LS	\$15,000	\$15,000
Carbon and Alum Addition Systems	1	LS	\$250,000	\$250,000
Bypass Pumping	120	\$/Day	\$1,500	\$180,000
Piping from RAS Selector (12")	80	LF	\$220	\$18,000
Piping from Distribution Box (18")	200	LF	\$280	\$56,000
Building for Storage of Carbon and Alum Addition Systems	1	LS	\$150,000	\$150,000
Sitework			15%	\$255,000
Subtotal:				\$1,955,000
Electrical			25%	\$489,000
Contingency			20%	\$489,000
Engineering and Legal			17%	\$499,000
Total (2013 Dollars):				\$3,432,000
Escalated Cost (2026 Dollars)¹:				\$5,041,000

Notes:

¹ Assumes 3% inflation factor.

CITY OF FULTON, MO
 WWTP IMPROVEMENTS
 TIER 2 - ENR
 PLANNING LEVEL PROJECT COST ESTIMATE - 04/23/14
 EXHIBIT A-3

Item	Quantity	Unit	Unit Cost	Extension
Carbon, Alum and Polymer Addition Systems	1	LS	\$350,000	\$350,000
Building for Storage of Carbon and Alum Addition Systems	1	LS	\$200,000	\$200,000
Flocculation Tank	1	LS	\$700,000	\$700,000
Tertiary Clarification	1	LS	\$1,700,000	\$1,700,000
Intermediate Pump Station	1	LS	\$850,000	\$850,000
Denitrification Filters	1	LS	\$2,600,000	\$2,600,000
Piping for Improvements	250	LF	\$280	\$70,000
Sitework			20%	\$1,294,000
Subtotal:				\$7,764,000
Electrical			25%	\$1,941,000
Contingency			20%	\$1,941,000
Engineering and Legal			17%	\$1,980,000
Total (2013 Dollars):				\$13,626,000
Escalated Cost (2035 Dollars)¹:				\$26,109,000

Notes:

¹ Assumes 3% inflation factor.

Appendix B
Estimated Annual O&M Costs

CITY OF FULTON, MO
WWTP IMPROVEMENTS
INTERIM EFFLUENT LIMITATIONS
OPERATIONS AND MAINTENANCE COST ESTIMATE - 04/23/14
EXHIBIT B-1

Estimated Repair and Replacement Cost

Inflation Rate (Assumed)

3%

Interest Rate (Assumed)

4%

Estimate of Repair and Replacement Cost (Design Year)

Item	5 YR	Assume % of Capital Cost	10 YR	Assume % of Capital Cost	15 YR	Assume % of Capital Cost	20 YR	Assume % of Capital Cost	Estimated Equipment Capital Cost
Pumps (Raw Wastewater Lift Station) ¹	\$93,750	25%	\$93,750	25%	\$93,750	25%	\$187,500	50%	\$375,000
Fine Screen (Headworks Building)	\$12,500	10%	\$31,250	25%	\$12,500	10%	\$62,500	50%	\$125,000
Washer/Compactor (Headworks Building)	\$5,000	10%	\$12,500	25%	\$5,000	10%	\$25,000	50%	\$50,000
Grit Pump (Headworks Building) ²	\$7,500	25%	\$7,500	25%	\$7,500	25%	\$15,000	50%	\$30,000
Grit Drive (Headworks Building)	\$2,500	10%	\$2,500	10%	\$2,500	10%	\$12,500	50%	\$25,000
Grit Classifier (Headworks Building)	\$5,000	10%	\$12,500	25%	\$5,000	10%	\$25,000	50%	\$50,000
Blowers (Aeration Basins)	\$25,000	10%	\$62,500	25%	\$25,000	10%	\$125,000	50%	\$250,000
Diffusers (Aeration Basins) ³	\$0		\$41,250		\$0		\$41,250		\$150,000
Mixers (Aeration Basins)	\$24,000	10%	\$60,000	25%	\$24,000	10%	\$120,000	50%	\$240,000
Drives (Secondary Clarifiers #1 - #5)	\$22,000	10%	\$22,000	10%	\$22,000	10%	\$110,000	50%	\$220,000
RAS Pumps (RAS/WAS Lift Station) ⁴	\$30,000	25%	\$30,000	25%	\$30,000	25%	\$60,000	50%	\$120,000
WAS Pumps (RAS/WAS Lift Station) ⁴	\$11,250	25%	\$11,250	25%	\$11,250	25%	\$22,500	50%	\$45,000
UV Bulbs / Badast / Wipers (UV Disinfection Building)	\$26,250	10%	\$26,250	10%	\$26,250	10%	\$26,250	10%	\$262,500
Effluent Pumps (Effluent Pump Station)	\$9,000	10%	\$22,500	25%	\$9,000	10%	\$45,000	50%	\$90,000
Sludge Dewatering and Storage Blowers ⁵	\$105,000	100%	\$10,500	10%	\$26,250	25%	\$10,500	10%	\$105,000
Sludge Dewatering System	\$15,000	10%	\$37,500	25%	\$15,000	10%	\$75,000	50%	\$150,000
Miscellaneous (Flow Gates, Valves, Cranes, Samplers, HVAC, Etc) ⁶	\$22,875	10%	\$57,188	25%	\$22,875	10%	\$114,375	50%	\$228,750
Total	\$416,625		\$540,938		\$337,675		\$1,077,375		

Estimated Future Repair and Replacement Cost

(Adjusted w/ inflation)

	Present Value	5 YR 1.16	10 YR 1.34	15 YR 1.55	20 YR 1.81
5 Year Equipment Cycle	\$416,625	\$482,983			
10 Year Equipment Cycle	\$540,938		\$726,975		
15 Year Equipment Cycle	\$337,675			\$526,398	
20 Year Equipment Cycle	\$1,077,375				\$1,945,859
Total	\$2,372,813	\$482,983	\$726,975	\$526,398	\$1,945,859

Repair and Replacement Account Deposit

(Includes Interest)

	Annual Factor	Annual Deposit	5 YR \$482,983	10 YR \$726,975	15 YR \$526,398	20 YR \$1,945,859
SFF - 5 yrs	0.1846	\$89,171.68	\$482,983	\$482,983	\$482,983	\$482,983
SFF - 10 yrs	0.0833	\$20,322.34		\$243,992	\$110,072	\$110,072
SFF - 15 yrs	0.0499	(\$3,328.91)			(\$66,657)	(\$18,030)
SFF - 20 yrs	0.0336	\$46,035.03				\$1,370,835
Total			\$482,983	\$726,975	\$526,398	\$1,945,859

Estimated Annual Repair and Replacement Cost

Estimated Operations Labor Cost

Component	Days Per Week	Hours Per Day	Personnel	Hours Per Year	Rate	Cost
Week Day Staff	5	8	3	6,240	\$45.00	\$280,800
Estimated Annual Operations Labor Cost						\$280,800

Estimated Electricity Usage Cost (Design Year)

Component	HP	Quantity Operating at Average Flow	Total HP	Watts	Hours/day	kW-hrs/year
Pumps (Raw Wastewater Lift Station)	50	1	50	37,285	24	326,617
Fine Screen (Headworks Building)	5	1	5	3,728	6	8,165
Washer/Compactor (Headworks Building)	7.5	1	7.5	5,593	8	16,331
Grit Pump (Headworks Building)	7.5	1	7.5	5,593	3	6,124
Grit Drive (Headworks Building)	1.0	1	1	746	24	6,532
Grit Classifier (Headworks Building)	1.0	1	1	746	6	1,633
Blowers (Aeration Basins)	250.0	0.75	187.5	139,819	24	1,224,812
Mixers (Aeration Basins)	3.5	8	28	20,880	24	182,905
Drives (Secondary Clarifiers #1 - #5)	1.0	3	3	2,237	24	19,597
RAS Pumps (RAS/WAS Lift Station)	30.0	1	30	22,371	24	195,970
WAS Pumps (RAS/WAS Lift Station)	5.0	1	5	3,728	4	5,444
UV Disinfection				11,000	24	96,360
Effluent Pumps (Effluent Pump Station)	30.0	1	30	22,371	1	8,165
Sludge Digestion and Storage Blowers	50.0	2	100	74,570	18	489,925
Sludge Dewatering System	10.0	1	10	7,457	8	21,774
Miscellaneous (Flow Gates, Valves, Cranes, Samplers, HVAC, Etc) ⁷	10.0	1	10	7,457	24	65,323
					kW-hrs/year =	2,675,678
					\$/kW-hrs =	\$0.07

Estimated Annual Electricity Usage Cost (Design Year, Not Adjusted For Inflation)

\$187,297

Estimated Sludge Disposal Cost

Component	Extension
EFHB Sludge Disposal ¹	\$15,000
WWTP Sludge Disposal ²	\$91,250
Estimated Annual Sludge Disposal Cost	\$106,250

Estimated Fuel Usage Cost

Component	Extension
Stand-by Generators Diesel Fuel ³	\$10,950
Proposed MJAU Natural Gas Use	\$60,000
Existing Natural Gas Use (From Actual 2013 Utility Billing)	\$3,800
Estimated Annual Fuel Usage Cost	\$74,750

Estimated Potable Water Usage Cost

Component	Units	Annual Consumption	Cost / 1,000 gallons	Extension
Potable Water (From Actual 2013 Utility Billings)				\$36,000

TOTAL \$837,298

TOTAL (Excluding Electricity and Chemical Consumption) \$650,000

Key Notes:

¹ Assumes higher % cost due to two of three pumps are existing and will require near term improvements or replacement.

² Assumes higher % cost due wear and tear on pump due to pumping grit.

³ Diffuser life estimated at 6 - 9 years. Per diffuser unit cost estimated at \$6 and replacement time estimate of 20 diffusers per hour.

⁴ Assumes higher % cost due to pumps are existing and will require near term improvements or replacement.

⁵ Assumes higher % cost due to blowers are existing and will require near term replacement.

⁶ Assumes 10% of total equipment cost for this line item to account for miscellaneous small equipment items.

⁷ Assumes 10 HP total average load for all miscellaneous items.

⁸ Assume removal of material at 5 year intervals, assume annual accumulation of 3" and removal cost of \$1,500 per dry ton. Yields approximately 10 dry tons per year, or 10 * \$1,500 = \$15,000 for an annual budgeting purpose.

⁹ Assume approximately 10 wet tons of biosolids produced daily (2.93 MGD, 250 mg/l Average Influent BOD, .7 Yield Factor) at a disposal cost of \$25 per wet ton.

¹⁰ Assumes an average of 15 min per day operation at 30 gal/hour consumption rate and \$4 per gallon for diesel fuel.

General Notes:

Excludes cost associated with building repairs such as roof maintenance, asphalt road repair, painting, etc.

Excludes Administrative costs.

**CITY OF FULTON, MO
WWTP IMPROVEMENTS
TIER 1 - BNR
OPERATIONS AND MAINTENANCE COST ESTIMATE - 04/23/14
EXHIBIT B-2**

Estimated Repair and Replacement Cost

Inflation Rate (Assumed)

3%

Interest Rate (Assumed)

4%

Estimate of Repair and Replacement Cost (Design Year)
Item

	5 YR	Assume % of Capital Cost	10 YR	Assume % of Capital Cost	15 YR	Assume % of Capital Cost	20 YR	Assume % of Capital Cost	Estimated Equipment Capital Cost
Anaerobic Basin Mixers	\$6,000	10%	\$15,000	25%	\$6,000	10%	\$30,000	50%	\$60,000
Mixed Liquor Recycle Pumps	\$7,000	10%	\$17,500	25%	\$7,000	10%	\$35,000	50%	\$70,000
Total	\$13,000		\$32,500		\$13,000		\$65,000		

Estimated Future Repair and Replacement Cost
(Adjusted w/ Inflation)

	Present Value	5 YR 1.16	10 YR 1.34	15 YR 1.56	20 YR 1.81
5 Year Equipment Cycle	\$13,000	\$15,071			
10 Year Equipment Cycle	\$32,500		\$43,677		
15 Year Equipment Cycle	\$13,000			\$20,254	
20 Year Equipment Cycle	\$65,000				\$117,397
Total	\$123,500	\$15,071	\$43,677	\$20,254	\$117,397

Repair and Replacement Account Deposit
(Includes Interest)

	Annual Factor	Annual Deposit	5 YR \$15,071	10 YR \$43,677	15 YR \$20,254	20 YR \$117,397
Future Replacement Funds						
SFF - 5 yrs	0.1846	\$2,782.43	\$15,071	\$15,071	\$15,071	\$15,071
SFF - 10 yrs	0.0833	\$2,382.68		\$28,607	\$12,905	\$12,905
SFF - 15 yrs	0.0499	(\$355.66)			(\$7,722)	(\$2,069)
SFF - 20 yrs	0.0338	\$3,073.07				\$91,510
Total			\$15,071	\$43,677	\$20,254	\$117,397
Estimated Annual Repair and Replacement Cost	Deposit	\$7,853				

TOTAL (Excluding Electricity and Chemical Consumption)

\$7,853

Key Notes:

General Notes:

CITY OF FULTON, MO
WWTP IMPROVEMENTS
TIER 2 - ENR
OPERATIONS AND MAINTENANCE COST ESTIMATE - 04/23/14
EXHIBIT B-3

Estimated Repair and Replacement Cost

Inflation Rate (Assumed)	3%
Interest Rate (Assumed)	4%

Estimated of Repair and Replacement Cost (Design Year)
Item

	5 YR	Assume % of Capital Cost	10 YR	Assume % of Capital Cost	15 YR	Assume % of Capital Cost	20 YR	Assume % of Capital Cost	Estimated Equipment Capital Cost
Pumps (Intermediate Lift Station)	\$20,000	10%	\$50,000	25%	\$20,000	10%	\$100,000	50%	\$200,000
Chemical Feed Equipment (Alum, Polymer, Carbon Source)	\$15,000	10%	\$37,500	25%	\$15,000	10%	\$75,000	50%	\$150,000
Floc Tank Motor	\$22,000	110%	\$25,000	125%	\$22,000	110%	\$30,000	150%	\$20,000
Tertiary Clarifier Drive	\$84,000	210%	\$90,000	225%	\$84,000	210%	\$100,000	250%	\$40,000
Filtration Equipment (Backwash Pumps, Media Addition, Misc Valves, Etc.)	\$25,000	10%	\$25,000	10%	\$25,000	10%	\$25,000	10%	\$250,000
Total	\$166,000		\$227,500		\$166,000		\$330,000		

Estimated Future Repair and Replacement Cost
(Adjusted w/ Inflation)

	Present Value	5 YR 1.16	10 YR 1.34	15 YR 1.55	20 YR 1.81
5 Year Equipment Cycle	\$166,000	\$192,439			
10 Year Equipment Cycle	\$227,500		\$305,741		
15 Year Equipment Cycle	\$166,000			\$258,623	
20 Year Equipment Cycle	\$330,000				\$596,017
Total	\$889,500	\$192,439	\$305,741	\$258,623	\$596,017

Repair and Replacement Account Deposit
(Includes Interest)

	Annual Factor	Annual Deposit	5 YR \$192,439	10 YR \$305,741	15 YR \$258,623	20 YR \$596,017
Future Replacement Funds						
SFF - 5 yrs	0.1846	\$35,629.55	\$192,439	\$192,439	\$192,439	\$192,439
SFF - 10 yrs	0.0833	\$9,436.99		\$113,301	\$51,114	\$51,114
SFF - 15 yrs	0.0499	\$752.58			\$15,069	\$4,076
SFF - 20 yrs	0.0336	\$11,699.45				\$348,387
Total			\$192,439	\$305,741	\$258,623	\$596,017

Estimated Annual Repair and Replacement Cost

Deposit	\$37,419
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Estimated Operations Labor Cost

Component	Days Per Week	Hours Per Day	Personnel	Hours Per Year	Rate	Cost
Week Day Staff	5	8	0.5	1,040	\$45.00	\$46,800
Estimated Annual Operations Labor Cost						\$46,800
TOTAL (Excluding Electricity and Chemical Consumption)						\$104,219

Key Notes:

General Notes:

**CITY OF FULTON, MO
WWTP IMPROVEMENTS
HIGHEST AVAILABLE TREATMENT TO PURSUE TMDL WLA'S
OPERATIONS AND MAINTENANCE COST ESTIMATE - 04/23/14
EXHIBIT B-4**

Estimated Annual Repair and Replacement Cost *

\$50,000

Estimated Operations Labor Cost

Component	Days Per Week	Hours Per Day	Additional Personnel	Hours Per Year	Rate	Cost
Week Day Staff	5	8	1.5	3,120	\$45.00	\$140,400
Estimated Annual Operations Labor Cost						\$140,400
TOTAL (Excluding Electricity and Chemical Consumption)						\$190,400

Key Notes:

* Includes cost for membrane replacement and associated RO equipment only, excludes components associated with brine crystallization and future building heating requirements

General Notes:

Appendix C

Financial Capability Assessment Inputs and Sources

City of Fulton, MO Financial Capabilities Analysis Assumptions and Sources

Variance Spreadsheet Entry	Value	Source
Current Capacity of Pollution Control System	2.33	Draft Operating Permit MO-0103331 (June 28, 2013) Page 2 of 10 - Actual Flow
Design Capacity of Pollution Control System	2.93	Draft Operating Permit MO-0103331 (June 28, 2013) Page 2 of 10 - Design Flow
Expected Excess Capacity after Completion of Project (%)	20.5%	Same as Current Excess Capacity - No additional dry weather capacity is planned, wet weather capacity will be increased to maximize secondary treatment during wet weather and eliminate Outfall #002.
Project Ground Breaking Day	10/1/2014	Draft Operating Permit MO-0103331 (June 28, 2013) Appendix 4: Abatement Order on Consent and Permit Requirement Implementation Schedule
Project Date of Completion	12/30/2016	Draft Operating Permit MO-0103331 (June 28, 2013) Appendix 4: Abatement Order on Consent and Permit Requirement Implementation Schedule; A detailed analysis on the length of construction of a Reverse Osmosis treatment facility was not undertaken, and may extend the construction timeframe.
Capital Cost of Project	\$80,700,000	Capital cost estimates provided in HDR (2014). Capital costs include the following costs (rounded to the nearest million dollars) : Step 1) \$13,000,000; Step 2) \$3,400,000; Step 3) \$13,600,000; and Step 4) \$50,700,000; Total = \$80,700,000 All costs are in 2013 dollars.
Capital Costs to be Paid by Grants	\$0	It is assumed that grants will not fund the project
Type of Financing	Revenue Bonds	Revenue Bonds are assumed due to the size of the project.
Interest Rate for Financing	4.0%	Revenue Bonds may vary from 4% - 5% based on current economic conditions.
Time Period of Financing (years)	20	Typical period of financing for revenue bonds.
Total Annual Costs of Operation and Maintenance	\$7,011,000	Annual operation and maintenance cost estimates provided in HDR (2014)
Additional Annual Costs of Operation and Maintenance	\$4,941,000	Projected total annual operation and maintenance minus total annual cost of existing pollution control.
Total Annual Cost of Existing Pollution Control	\$2,070,000	2013 City Budget - http://fultonmo.org/wp-content/uploads/2017/12/2013_COE_Budget.pdf
Amount of Existing Costs Paid by Households	\$1,170,000	Calculated from 2013 City Budget - http://fultonmo.org/wp-content/uploads/2017/12/2013_COE_Budget.pdf . Residential revenue budget was \$1,250,000 of a total of \$2,496,000. The 0.5% water and wastewater capital improvement sales tax budget was \$738,000. Assumed half of sales tax is devoted to wastewater = $\$369,000 \cdot (\$1,250,000 + \$369,000) / (\$2,496,000 + \$369,000) = 56.5\% \cdot \$2,070,000 = \$1,170,000$
Number of Households	4,377	U.S. Census Bureau, 2008-2012 American Community Survey
Median Household Income	\$43,791	U.S. Census Bureau, 2008-2012 American Community Survey
Current CPI	232.957	US Department of Labor, Bureau of Labor Statistics - http://ftp.bls.gov/pub/special.requests/cpi/cpiat.txt
CPI for the Year of the Census	229.594	US Department of Labor, Bureau of Labor Statistics - http://ftp.bls.gov/pub/special.requests/cpi/cpiat.txt
Direct Net Debt	\$1,075,000	City of Fulton, Missouri, 2012 Comprehensive Annual Financial Report
Overlapping Debt	\$9,315,285	City of Fulton, Missouri, 2012 Comprehensive Annual Financial Report
Property Tax Collection	\$5,630,648	City of Fulton, Missouri, 2012 Comprehensive Annual Financial Report
City Property Tax Rate (Assessed Value)	0.5291%	City of Fulton, Missouri 2014 Electronic Correspondence
Total Property Tax Rate (Assessed Value)	5.706%	City of Fulton, Missouri 2014 Electronic Correspondence
Market value of taxable property	\$102,266,244	Assessed Value - City of Fulton, Missouri, 2012 Comprehensive Annual Financial Report
	\$424,038,216	Estimated Fair Market Value - City of Fulton, Missouri, 2012 Comprehensive Annual Financial Report
Fulton unemployment	7.0%	U.S. Census Bureau, 2008-2012 American Community Survey
National unemployment	9.3%	U.S. Census Bureau, 2008-2012 American Community Survey
State MHI	\$47,333	U.S. Census Bureau, 2008-2012 American Community Survey
Property Collection Rate	97.63%	City of Fulton, Missouri, 2012 Comprehensive Annual Financial Report, 10 yr average (2003-2012)
Population	12,702	U.S. Census Bureau, 2008-2012 American Community Survey

Appendix D

Financial Capability Assessment Calculations

Pollution Control Project Summary Information (Worksheet A in the Guidance)
Description: This worksheet identifies and documents the pollution control project(s) needed to meet water quality standards. See the Guidance documentation below for more information. Instructions: Enter information in the cells marked with an asterisk (*) about the most cost-effective approach to meet water quality standards. The most accurate estimate of project costs may be available from the discharger's design engineers. If site-specific engineering cost estimates are not available, preliminary project cost estimates may be derived from a comparable project in the State or from the judgment of experienced water pollution control engineers. Discharge management options to consider include: • Pollution prevention • End-of-pipe treatment • Upgrades or additions to existing treatment. Types of pollution prevention activities to consider are: • Public education • Change in raw materials • Substitution of process chemicals • Change in process • Water recycling and reuse • Pretreatment requirements. Whatever the approach, the information should demonstrate that the proposed project is the most appropriate means of meeting water quality standards and fully document project cost estimates. If at least one of the options that meets water quality standards will not have a substantial financial impact, then do not proceed with the analysis.

Current Capacity of the Pollution Control System (MGD)	2.33	*
Design Capacity of the Pollution Control System (MGD)	2.93	*
Current Excess Capacity (%)	20.5%	
Expected Excess Capacity after Completion of Project (%)	20.5%	*
Projected Groundbreaking Date (MM/DD/YYYY)	10/1/2014	*
Projected Date of Completion (MM/DD/YYYY)	12/30/2016	*

Describe the proposed pollution control project. The proposed pollution control project is an adaptive management approach to meeting the TMDL limits based on the limits of technology. The proposed pollution control alternative consists of three steps 1) Improved Secondary Treatment and Wet Weather Controls, 2) Tier 1 Biological Nutrient Removal, and 3) Tier 2 Enhanced Nutrient Removal. After each step, the receiving stream is to re-evaluated to determine if an impairment remains. If impairment remains, the next step is implemented through Step 3. Step 4 would be the highest available treatment to pursue TMDL wasteload allocations, which would be reverse osmosis with brine crystallization. Step 4 constitutes the limits of available technology and is not viable due to capital costs, operational costs, operational complexity, and the challenges associated with brine disposal.
Describe the other pollution control options considered, explaining why each option was rejected. Step 4, described above, is not viable due to capital costs, operational costs, operational complexity, and challenges associated with brine disposal. For the purposes of this financial capability analysis, Step 4 will be evaluated. Step 4 requires the implementation of Steps 1-3. Step 4 capital costs include the following costs (2013 Dollars) : Step 1) \$13,000,000; Step 2) \$3,400,000; Step 3) \$13,600,000; and Step 4) \$50,700,000; Total = \$80,700,000.

Guidance Documentation		
Component	Section	Page
Verify Project Costs	2.1.a	2-3
Documentation of Other Options Considered	2.1.a	2-3
Annual Cost of Pollution Control (overview)	2.1.b	2-4

Data Needed to Calculate the MPS (Worksheets B and C in the Guidance)		
Description: This worksheet contains the information needed to calculate the municipal preliminary screener (MPS). The MPS is the average annualized pollution control cost per household in the affected community. The MPS helps to determine whether or not the community can clearly pay for the project without incurring any substantial impacts. See the Guidance documentation below for additional information.		
Instructions: Enter the requested information into the cells marked with an asterisk (*). The affected community is the governmental jurisdiction or jurisdictions responsible for paying compliance costs. Current costs of pollution controls can also be considered in addition to the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from municipal records. If project costs are estimated for a prior year, these costs should be adjusted to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period available from the Bureau of Labor Statistics.		
Capital Cost		
Capital Cost of Project (\$)	\$80,700,000 *	
Other One-Time Costs of Project (list below, if any):		
<i>Description of Cost Element</i>	<i>Cost (\$)</i>	
	*	
	*	
	*	
	*	
Capital Costs to be Paid by Grants (\$)	\$0 *	
Type of Financing (e.g., G.O. bond, revenue bond, bank loan)	Revenue Bonds *	
Interest Rate for Financing (%)	4.00% *	
Time Period of Financing (years)	20 *	
Annual costs of operation and maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement; list below.)		
<i>Description of Cost Element</i>	<i>Cost (\$)</i>	
Additional annual O&M cost with highest available treatment to pursue TMDL WLA	\$4,941,000 *	
	*	
	*	
	*	
	*	
	*	
Total Annual Cost of Existing Pollution Control (\$)	\$2,070,000 *	
Amount of Existing Costs Paid by Households (\$)	\$1,170,000 *	
Number of Households (do not use number of hook-ups)	4,377 *	
Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control? (Check a, b or c, below.)		
☒ a) Yes *		
☐ b) No, they will pay a different percentage. Enter to right. *		
☐ c) No, they will pay based on flow. Answer three questions to right. (Corresponds to Worksheet C, Option A.)	1. Total Usage of Project (e.g., MGD for wastewater treatment)	*
	2. Usage Due to Household Use (MGD of household wastewater)	*
	3. Industrial Surcharges, if any (\$ total per year)	*
Median Household Income (from Census)	\$43,791 *	
Current CPI	232.95 *	
CPI for the year of the Census	229.59 *	
Adjustment Factor [current CPI / CPI for the year of the Census]	1.0146	
Adjusted Median Household Income [Median Household Income x Adjustment Factor]	\$44,431	

Municipal Preliminary Screener (Worksheet D in the Guidance)

Description: This worksheet calculates and displays the Municipal Preliminary Screener (MPS), which is the total annual pollution control costs per household (existing annual cost per household plus the incremental cost related to the proposed project) as a percentage of median household income.

$$\text{Total Annual Pollution Control Cost per Household} / \text{Adjusted Median Household Income} \times 100$$

The MPS indicates if a public entity would clearly not incur substantial economic impacts as a result of the proposed pollution control project.

Instructions: Evaluate the MPS by noting which cell is highlighted in orange and marked with an asterisk (*). If the MPS is less than 1.0 percent of median household income, the EPA does not expect the pollution control project to impose a substantial economic impact on the community; do not continue to the secondary affordability test. If the MPS is greater than 2.0 percent of median household income, then the pollution control project may result in a substantial economic impact to the community; continue to the secondary affordability test. If the MPS is between 1.0 and 2.0 percent of median household income, the community may incur a mid-range economic impact; continuing to the secondary affordability test is optional. See the Guidance documentation below for more information.

A. Calculation of the MPS

Total Annual Pollution Control Cost per Household [Worksheet C, (11) or Worksheet C: Option A, (10)]	\$1,672.16	(1)
Adjusted Median Household Income	\$44,431	(2)
MPS $[(1) / (2)] \times 100$	3.8%	(3)

B. Evaluation of the MPS

Note column of cell highlighted in orange and marked with an asterisk (*) below:

Little Impact Less than 1.0%	Mid-Range Impact 1.0% - 2.0%	Large Impact Greater than 2.0%
Indication of no substantial economic impacts	Proceed to Secondary Test	

Guidance Documentation

Component	Section	Page
MPS	2.3	2-6
Annual Pollution Control Cost per Household	2.2	2-5
Median Household Income	2.3	2-7
Census	2.3	2-7
Interpreting MPS	2.3	2-7
Determining Need for Secondary Test	2.3	2-7

Data Needed to Calculate the Secondary Test Score (Worksheet E in the Guidance)
Description: This worksheet contains the numerical data necessary to calculate the secondary test score. The secondary test score characterizes the community's current financial and socioeconomic condition. See the Guidance documentation below for additional information. Instructions: If the MPS indicates substantial impacts may occur (i.e. it exceeds 1.0%), proceed with the secondary test by entering socioeconomic data for the affected community in the cells marked with an asterisk (*). Additional information on potential sources of data are provided in the tab named: "Potential Data Sources," and example data sources are provided in the tab named: "Example Data Sources." If one or more of the six indicators is not developed, provide an explanation as to why the indicator is not appropriate or not available.

A. Socioeconomic Data			
Data	Potential Source	Value	
Direct Net Debt (\$)	Community Financial Statements Town, County or State Assessor's Office	\$1,075,000	* 1
Overlapping Debt (\$)	Community Financial Statements Town, County or State Assessor's Office	\$9,315,295	* 2
Market Value of Taxable Property (\$)	Community Financial Statements Town, County or State Assessor's Office	\$424,039,216	* 3
Bond Rating (for uninsured bonds)	Standard and Poor's or Moody's	AA+	* 4
Community Unemployment Rate (%)	Census of Population Regional Data Centers	7.0%	* 5
National Unemployment Rate (%)	Bureau of Labor Statistics	9.3%	* 6
Community Median Household Income (not adjusted for inflation)	Census of Population	\$43,791	* 7
State Median Household Income (for same time period as Community MHI) (\$)	Census of Population	\$47,333	* 8
Property Tax Collection Rate (%)	Community Financial Statements Town, County or State Assessor's Office	97.5%	* 9
Property Tax Revenues (\$)	Community Financial Statements Town, County or State Assessor's Office	\$5,630,648	* 10

If any cell above is left blank, explain why the indicator is not appropriate or not available:

--

Some states have statutory limits on property tax collections and/or rates, or data on full-market value of taxable property are not available. If this is the case, select "yes" below and provide the number of people residing in the affected community.

Are there statutory limits on property tax collections and/or rates in the state, or are data on the full-market value of taxable property not available?

☒ a) No

☐ b) Yes (enter the number of residents in the affected community below)

Population (#)	Census of Population	12,702	* 11
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B. Calculated Indicators (for informational purposes only)

1. Overall Net Debt as a Percent of Full Market Value of Taxable Property	
Overall Net Debt: [(1) + (2)]	\$10,390,295
Overall Net Debt as a Percent of Full Market Value of Taxable Property [(11)/(3)] × 100	2.45%
1a. Overall Net Debt Per Capita (Alternative Indicator)	
Overall Net Debt Per Capita [(11) / (Pop)] × 100	\$818
2. Property Tax Revenues as a Percent of Full Market Value of Taxable Property	
Property Tax Revenues as a Percent of Full Market Value of Taxable Property [(10)/(3)] × 100	1.33%

Guidance Documentation		
Component	Section	Page
Secondary Test (overview)	2.4	2-7
Net and Overlapping Debt	2.4	2-9
Bond Rating	2.4	2-5
Unemployment Rate	2.4	2-9
Median Household Income	2.4	2-10
Property Tax	2.4	2-10
Alternative Indicators	2.4	2-11
Use of Secondary Test	2.4	2-11

Calculation of the Secondary Test Score (Worksheet F in the Guidance)

Description: This worksheet calculates the secondary test score, which characterizes the affected community's current financial and socioeconomic condition. The secondary test score is used in combination with the MPS to evaluate whether or not substantial economic impacts are likely to occur. See the Guidance documentation below for additional information.

Instructions: Verify that the appropriate cell is selected in each row and in the "Score" column to be summed below (highlighted in orange and marked with an asterisk (*)).

Indicator	Secondary Indicators			Score
	Weak ^a	Mid-Range ^b	Strong ^c	
Bond Rating Worksheet T, (4)	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)	
Overall Net Debt as Percent of Full Market Value of Taxable Property Worksheet T, (12)	Above 5%	2% - 5%	Below 2%	
Overall Net Debt Per Capita ¹ Worksheet T, (12 Alt.)	Greater than \$3,000	\$1,000 - \$3,000	Less than \$1,000	N/A
Unemployment ² Worksheet T, (5) & (6)	Above National Average	National Average	Below National Average	
Median Household Income ³ Worksheet T, (7) & (8)	Below State Median	State Median	Above State Median	
Property Tax Revenues as a Percent of Full Market Value of Taxable Property ⁴ Worksheet T, (13)	Above 4%	2% - 4%	Below 2%	
Property Tax Collection Rate ⁴ Worksheet T, (9)	< 94%		> 98%	
Average of Financial Management Indicators ⁴ Worksheet T, (13) and (9)				N/A
a. Weak is a score of 1 point b. Mid-Range is a score of 2 points c. Strong is a score of 3 points			SUM	15
			AVERAGE	2.5

Notes:

¹ If the state has statutory limits on property tax collections and/or rates or data on full-market value of taxable property are not available, "Overall Net Debt as Percent of Full Market Value of Taxable Property" is replaced with "Overall Net Debt Per Capita" and "Property Tax Revenues as a Percent of Full-Market Value of Taxable Property" is dropped.

² If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.

³ If the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.

⁴ If one of the debt or socioeconomic indicators is not available, the two financial management indicators are averaged and this averaged value is used as a single indicator with the remaining indicators.

Guidance Documentation

Component	Section	Page
Calculating Secondary Test Score	2.4	2-11
Interpreting Secondary Test Score	2.4	2-11
Missing Indicators	2.4	2-12
Determining Need for Widespread Analysis	2.5; Figure 2-1	2-12; 2-14

Conclusion for Community
Description: This matrix evaluates the likelihood of substantial economic impacts due to implementation of the pollution control costs. See the Guidance documentation below for additional information. Instructions: Evaluate the combined results of the MPS and the secondary test by noting which cell in the Substantial Impacts Matrix below is highlighted in orange and marked with an asterisk (*). If the matrix indicates the pollution control project is <u>not</u> likely to impose a substantial economic impact on the community, do not continue to the widespread analysis. If the matrix indicates the pollution control project is likely to impose a substantial economic impact on the community, continue to the widespread analysis. If the matrix indicates the pollution control project may or may not impose a substantial economic impact on the community, continuing to the widespread analysis is optional.

Assessment of Substantial Impacts Matrix (Table 5-2 from the Guidance)			
MPS:	3.8%		
Secondary Test Score:	2.5		
Secondary Test Score	MPS		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X
Greater than 2.5	✓	✓	?

Key:
✓ : Impact is <u>not</u> likely to be substantial
X : Impact is likely to be substantial
? : Impact is unclear

Guidance Documentation		
Component	Section	Page
Using Substantial Impacts Matrix	2.5	2-12
Determining Need for Widespread Analysis	2.5; Figure 2-1	2-12; 2-14

**Qualitative Description of Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs
(Worksheet M in the Guidance)**

Description: This worksheet indicates whether the substantial economic impacts will also be widespread. The EPA considers substantial economic impacts to be widespread if they will have significant adverse impacts on the local community. See the Guidance documentation below for additional information.

Instructions: Enter information in the cells marked with an asterisk (*) to determine if the substantial economic impacts would result in widespread adverse economic impacts to the local community. Because there are no standard economic tests or benchmarks that evaluate socioeconomic impacts for the widespread demonstration, describe the relative changes in indicators such as unemployment, the local economy, household income, tax revenues, indirect effects on other businesses, and sewer fees. This worksheet will help collect and organize the types of information that can be used to determine and demonstrate whether substantial economic impacts will also be widespread.

Estimated change in Median Household Income (MHI)	No significant change to MHI is expected.	*
Estimated change in the unemployment rate	Unemployment could rise as industrial and commercial base may move due to extremely high sewer rates needed to fund and operate wastewater improvements.	*
Estimated change in overall net debt as a percent of full market value of taxable property	Project would increase municipal debt significantly without accounting for other needed investments in City needs (e.g., education, transportation, water, emergency services, etc.).	*
Estimated change in % of households below the poverty line	No significant change in households below poverty line is expected.	*
Impact on commercial development potential	Commercial and industrial development would be severely impacted by high wastewater utility rates.	*
Impact on property values	Property values would decrease as high wastewater utility rates could result in flight of residences from the City.	*

Calculation of Total Annualized Project Costs (Worksheet B in the Guidance)

Description: This worksheet displays the total annualized project costs. This worksheet is for informational purposes only. No input is required.

A. Capital Costs

Capital Cost of Project	\$80,700,000	
Other One-Time Costs of Project (please list, if any):		
	\$0	
	\$0	
	\$0	
Total Capital Costs (sum column)	\$80,700,000	(1)
Portion of Capital Costs to be Paid with Grant Monies	\$0	(2)
Capital Costs to be Financed [(1) - (2)]	\$80,700,000	(3)
Type of Financing (e.g., G.O. bond, revenue bond, bank loan)	Revenue Bonds	
Interest Rate for Financing	4.00%	(i)
Time Period of Financing (in years)	20	(n)
Annualization Factor = $1/((1+i)^n - 1) + i$	0.0736	(4)
Annualized Capital Cost [(3) × (4)]	\$5,938,047	(5)

B. Operating and Maintenance Costs

Annual Costs of Operation and Maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement; list below).

Additional annual O&M cost with highest available treatment to pursue TMDL WLA	\$4,941,000	
	\$0	
	\$0	
	\$0	
	\$0	
Total Annual O & M Costs (sum column)	\$4,941,000	(6)

C. Total Annual Cost of Pollution Control Project

Total Annual Cost of Pollution Control Project [(5) + (6)]	\$10,879,047	(7)
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Calculation of Total Annual Pollution Control Costs Per Household (Worksheet C)

Description: This worksheet displays the total annual pollution control costs per household calculated from data entered in other spreadsheets. This worksheet is for informational purposes only. No input is required.

If the option in the tab named "2. MPS Inputs" indicates that households will provide revenues for the pollution control project in the same or different proportion that they support existing pollution control (choice a or b), then the spreadsheet uses **Worksheet C** parts A, B, and C. However, if households pay based on flow (choice c), then the spreadsheet uses **Worksheet C** part A and **Worksheet C: Option A**.

A. Current Pollution Control Costs

Total Annual Cost of Existing Pollution Control	\$2,070,000	(1)
Amount of Existing Costs Paid by Households	\$1,170,000	(2)
Percent of Existing Costs Paid by Households	56.5%	(3)
Number of Households *	4,377	(4)
Annual Cost Per Household [(2)/(4)]	\$267.31	(5)

* Do not use number of hook-ups.

B. New Pollution Control Costs

Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control?

X	a) Yes [fill in percent from (3)]	56.5%	(6a)
	b) No, they will pay	0.00%	(6b)
	c) No, they will pay based on flow. (Continue on Calculation of Total Annual Pollution Control Costs Per Household Based on Flow.)		
Total Annual Cost of Pollution Control Project [Line (7), Worksheet B]		\$10,879,047	(7)
Proportion of Costs Paid by Households [(6a) or (6b)]		0.57	(8)
Amount to be Paid by Households [(7) x (8)]		\$6,149,027	(9)
Annual Cost per Household [(9)/(4)]		\$1,404.85	(10)

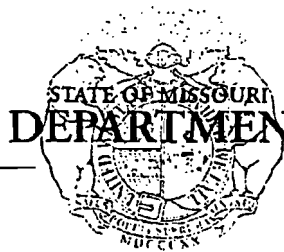
C. Total Annual Pollution Control Cost per Household

Total Annual Cost of Pollution Control Project per Household [(5) + (10)]	\$1,672.16	(11)
---	------------	------

Calculation of Total Annual Pollution Control Costs Per Household Based on Flow (Worksheet Q: Option A)		
A. Calculating Project Costs Incurred by Households Based on Flow		
Total Usage of Project (e.g., MGD for wastewater treatment)	0.0	(1)
Usage Due to Household Use (MGD of household wastewater)	0.0	(2)
Percent of Usage Due to Household Use [(2)/(1)]	0.00%	(3)
Total Annual Cost of Pollution Control Project	\$10,879,047	(4)
Industrial Surcharges, if any	\$0	(5)
Costs to be Allocated [(4) - (5)]	\$10,879,047	(6)
Amount to be Paid by Households [(3) x (6)]	\$0	(7)
Annual Project Cost per Household [(7) / Worksheet C, (4)]	\$0.00	(8)

C. Total Annual Pollution Control Cost per Household		
Annual Existing Costs per Household [Worksheet C, (5)]	\$267.31	(9)
Total Annual Cost of Pollution Control per Household [(8) + (9)]	\$267.31	(10)

Guidance Documentation		
Component	Section	Page
Defining Affected Community	2.2	2-5
Adjusting Prior Year's Estimates	2.2	2-5
Impact of Cost Distribution in Community	2.2	2-6
Approaches to Calculating Current Costs	2.2	2-6
Total Annual Cost of Pollution Control Project	2.1.a	2-3
Industrial Surcharges	2.2	2-6



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

JUN 28 2013

City of Fulton
P.O. Box 130
Fulton, MO 65251

Subject: Public Notice for Proposed State Operating Permit for Fulton WWTP

Dear Permittee:

The enclosed public notice pertains to your proposed State Operating Permit.

Federal regulations required issuance of this public notice to inform interested persons of the agency's intent to issue an operating permit to discharge, and allows a 30-day period for comment. This public notice package should be posted on a bulletin board at your place of business. If response to the public notice indicates significant interest, a public hearing or adjudicatory hearing may be held. Based on comments received, or the results of a hearing, the proposed permit will be modified and issued or possibly denied.

Any questions you may have should be sent to the address indicated on the enclosed public notice.

Sincerely,

WATER PROTECTION PROGRAM

A handwritten signature in cursive script, reading "John Madras", is written over the typed name.

John Madras
Director

JM/sb

Enclosure



FULTON WWTP
MO0103331, Callaway County



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

JUN 28 2013

Postmaster
United States Post Office
Fulton, MO 65251

Subject: Public Notice for Proposed State Operating Permit for Fulton WWTP

Enclosed is a public notice regarding a proposed State Operating Permit. It is required that this notice be posted in the post office and "public places of the municipality nearest the proposed discharge" in accordance with 10 CSR 20-6.020(1)(E)1. We will appreciate your assistance in posting this notice on a public bulletin board in your office until the expiration date for public comment stated therein. Please sign and return the enclosed card to this agency.

Sincerely,

WATER PROTECTION PROGRAM

A handwritten signature in black ink that reads "John Madras". The signature is written in a cursive style.

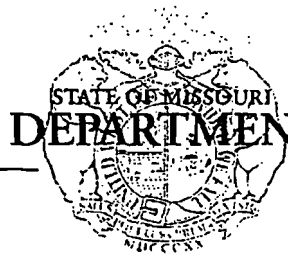
John Madras
Director

JM/sb

Enclosure



FULTON WWTP
MO0103331, Callaway County



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

JUN 28 2013

Carolyn Laswell
18 E. 4th Market Street
P.O. Box 130
Fulton, MO 65251

Subject: Public Notice for Proposed State Operating Permit for Fulton WWTP

Enclosed is a public notice regarding a proposed State Operating Permit. It is required that this notice be posted in the "public places of the municipality nearest the proposed discharge" in accordance with 10 CSR 20-6.020(1)(E)1. We will appreciate your assistance in posting this notice on a public bulletin board in your office until the expiration date for public comment stated therein.

In order that we may be assured of fulfilling all legal requirements, we ask that the enclosed card be signed and returned within seven (7) days.

Thank you for your cooperation in this matter.

Sincerely,

WATER PROTECTION PROGRAM

A handwritten signature in cursive script that reads "John Madras".

John Madras
Director

JM/sb

Enclosure





Missouri Department of Natural Resources

PUBLIC NOTICE

DRAFT MISSOURI STATE OPERATING PERMIT

DATE: June 28, 2013

In accordance with the state Clean Water Law, Chapter 644, RSMo, Missouri Clean Water Commission regulation 10 CSR 20-6.010, and the Federal Clean Water Act, the applicants listed herein have applied for authorization to either discharge to waters of the state, or to operate a no-discharge wastewater treatment facility. The proposed permits for these operations are consistent with applicable water quality standards, effluent standards and/or treatment requirements or suitable timetables to meet these requirements (see 10 CSR 20-7.015 and 7.031). All permits will be issued for a period of five years unless noted otherwise in the Public Notice for that discharge.

On the basis of preliminary staff review and the application of applicable standards and regulations, the Missouri Department of Natural Resources (MDNR), as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions. The proposed determinations are tentative pending public comment.

Persons wishing to comment on the proposed permit conditions are invited to submit them in writing to: Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102, ATTN: NPDES Permits and Engineering Section/Permit Comments. Please include the permit number in all comment letters.

Comments should be confined to the issues relating to the proposed action and permit(s) and the effect on water quality. The MDNR may not consider as relevant comments or objections to a permit based on issues outside the authority of the Missouri Clean Water Commission, (see Curdt v. Mo. Clean Water Commission, 586 S.W.2d 58 Mo. App. 1979).

All comments must be received or postmarked by 5:00 p.m. on July 29, 2013. MDNR will consider all written comments, including e-mails, faxes and letters, in the formulation of all final determinations regarding the applications. E-mail comments will be accepted at the following address: publicnoticenpdes@dnr.mo.gov. If response to this notice indicates significant public interest, a public meeting or hearing may be held after due notice for the purpose of receiving public comment on the proposed permit or determination. Public hearings and/or issuance of the permit will be conducted or processed according to 10 CSR 20-6.020.

Copies of all draft permits and other information including copies of applicable regulations are available for inspection and copying at MDNR's Website: <http://www.dnr.mo.gov/env/wpp/permits/permit-pn.htm>, or at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102, between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday.

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0103331
Owner:	City of Fulton
Address:	P.O. Box 130, Fulton, MO 65251
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Fulton WWTF
Facility Address:	1025 Worsham Circle, Fulton, MO 65251
Legal Description:	SE ¼, NW ¼, NE ¼, Sec. 21, T47N, R9W, Callaway County
UTM Coordinates:	X= 592755.590, Y= 4299234.181
Receiving Stream:	Stinson Creek (C)
First Classified Stream and ID:	Stinson Creek (C) (0710)
USGS Basin & Sub-watershed No.:	(10300102-1508)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

See Page 2

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

Effective Date

Sara Parker Pauley, Director, Department of Natural Resources

March 31, 2015

Expiration Date

John Madras, Director, Water Protection Program

FACILITY DESCRIPTION (continued)

Outfall #001 – POTW - SIC #4952

The use or operation of this facility shall be by or under the supervision of a **Certified B Operator**

Oxidation ditch/sludge holding tanks/aerobic digesters/dewatering centrifuge/ backup vacuum sand dewatering beds/disinfection effective December 2014/ sludge is land applied

Design population equivalent is 47,500.

Design flow is 2.93 MGD.

Actual flow is 2.33 MGD.

Design sludge production is 975 dry tons/year.

Actual sludge production is 430 dry tons/year.

Outfall #002 – Discharge from this outfall is no longer authorized, and shall be subject to 40 CFR 122.41(m) and reported according to 40 CFR 122.41(m)(3)(i) & (ii).

Outfall SM1 – In-stream Monitoring. SM1 is located 30 yards downstream from Outfall #001.

Legal Description:	NE ¼, SW ¼, NE ¼, Sec. 21, T47N, R9W, Callaway County
UTM Coordinates:	X= 593011, Y= 4299209
Receiving Stream:	Stinson Creek (C)
First Classified Stream and ID:	Stinson Creek (C) (0710)
USGS Basin & Sub-watershed No.:	(10300102-1508)

TABLE A-1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 3 of 10	
					PERMIT NUMBER MO-0103331	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	DAILY MINIMUM	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>OUTFALL 001</u>						
Flow	MGD	*		*	once/day	24 hr. total
pH – Units	SU	***		***	once/week	grab
Oil & Grease	mg/L	15		10	once/month	grab
<u>SM1</u>						
Total Ammonia Nitrogen	MGD	*		*	once/month	grab
Dissolved Oxygen	mg/L		*		once/month	grab
Total Phosphorus	mg/L	*		*	once/month	grab
Total Nitrogen	mg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #16			once/year	24 hr. comp.**
<u>WET TEST</u> REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> .						

OUTFALL #001	TABLE A-2. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect through <u>December 31, 2013</u> . Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<i>E. coli</i> (Note 1, Page 6)	#/100 ml		*	*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

OUTFALL #001	TABLE A-3. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective <u>January 1, 2014</u> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
E. coli (Note 1, Page 6)	#/100 ml		1030	206	once/week	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

OUTFALL #001	TABLE A-4. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				PAGE NUMBER 4 of 10	
					PERMIT NUMBER MO-0103331	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect through <u>December 30, 2016</u> . Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Ammonia as N	mg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

OUTFALL #001	TABLE A-5. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <u>December 31, 2016</u> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Ammonia as N (April 1 – Sept 30)	mg/L	6		1.2	once/month	grab
(Oct 1 – March 31)		12		2.6		
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

OUTFALL #001	TABLE A-6. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect through <u>December 30, 2026</u> . Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Carbonaceous Biochemical Oxygen Demand ₅	mg/L		40	25	once/week	24 hr. comp.**
Total Suspended Solids	mg/L		45	30	once/week	24 hr. comp.**
Total Phosphorus	mg/L	*		*	once/week	grab
Total Nitrogen	mg/L	*		*	once/week	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
EFFLUENT PARAMETER(S)	UNITS	DAILY MAXIMUM	MONTHLY AVERAGE	QUARTERLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Copper	µg/L	*	*		once/quarter****	24 hr. comp.**
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>MONTH 28, 20XX</u> .						

OUTFALL #001	TABLE A-7. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 5 of 10
		PERMIT NUMBER MO-0103331

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective December 31, 2026 and remain in effect through December 30, 2035. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	TIER 1 EFFLUENT LIMITATIONS (Nutrient Removal)			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Carbonaceous Biochemical Oxygen Demand,	mg/L		30	20	once/week	24 hr. comp.**
Total Suspended Solids	mg/L		30	20	once/week	24 hr. comp.**

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MONTH 28, 20XX. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

EFFLUENT PARAMETER(S)	UNITS	DAILY MAXIMUM	MONTHLY AVERAGE	QUARTERLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Copper	µg/L	40.5	19.3		once/quarter****	24 hr. comp.**
Total Phosphorus	mg/L	*		1.0	once/week	grab
Total Nitrogen	mg/L	*		8.0	once/week	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE MONTH 28, 20XX.

OUTFALL #001	TABLE A-8. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS
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The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective December 31, 2035. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	TIER 2 EFFLUENT LIMITATIONS (Nutrient Removal)			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Carbonaceous Biochemical Oxygen Demand,	mg/L		15	9	once/week	24 hr. comp.**
Total Suspended Solids	mg/L		15	5	once/week	24 hr. comp.**

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE MONTH 28, 20XX. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

EFFLUENT PARAMETER(S)	UNITS	DAILY MAXIMUM	MONTHLY AVERAGE	QUARTERLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Total Phosphorus	mg/L	*		0.1	once/week	grab
Total Nitrogen	mg/L	*		4.0	once/week	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE MONTH 28, 20XX.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- * Monitoring requirement only.
- ** A 24-hour composite sample is composed of a minimum of 48 aliquots (subsamples) collected at routine intervals.
- *** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.5-9.0 pH units.
- **** See table below for quarterly sampling:

Sample discharge at least once for the months of:	Report is due:
January, February, March (1st Quarter)	April 28
April, May, June (2nd Quarter)	July 28
July, August, September (3rd Quarter)	October 28
October, November, December (4th Quarter)	January 28

***** Quarterly average value shall consist of the average of the weekly individual sample data collected for the calendar quarter.

Note 1 - Final limitations and monitoring requirements for *E. coli* are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

TABLE B. INFLUENT MONITORING REQUIREMENTS

The facility is required to meet a removal efficiency of 85% or more as a monthly average. The monitoring requirements shall become effective upon issuance and remain in effect until expiration of the permit. To determine removal efficiencies, the influent wastewater shall be monitored by the permittee as specified below:

SAMPLING LOCATION AND PARAMETER(S)	UNITS	MONITORING REQUIREMENTS	
		MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Influent</u>			
Biochemical Oxygen Demand,	mg/L	once/month	24 hr. comp.**
Total Suspended Solids	mg/L	once/month	24 hr. comp.**

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE _____.

C. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I, II, & III standard conditions dated October 1, 1980, May 1, 2013, and August 15, 1994, and hereby incorporated as though fully set forth herein.

D. SPECIAL CONDITIONS

1. The permittee shall implement all items of the ADMINISTRATIVE ORDER ON CONSENT AOC No. 2013-WPCB-1241, which includes, but is not limited to, developing and implementing an Information Collection and Utilization computer tracking system, a I & I Assessment and Reduction Plan, a Maintenance and Repair Program, and plant improvements to meet disinfection and ammonia limits, and adhering to the AOC's Appendix A, No. 5, Reporting and Record Keeping Section. The AOC is hereby incorporated by reference.
2. This permit may be reopened and modified, or alternatively revoked and reissued, to:
 - (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
 - (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
 - (2) controls any pollutant not limited in the permit.
 - (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
 - (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.
 - (d) Incorporate the requirement to develop a pretreatment program pursuant to 40 CFR 403.8(a) when the Director of the Water Protection Program determines that a pretreatment program is necessary due to any new introduction of pollutants into the Publicly Owned Treatment Works or any substantial change in the volume or character of pollutants being introduced.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

D. SPECIAL CONDITIONS (continued)

3. All outfalls must be clearly marked in the field.
 4. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.
 5. Changes in Discharges of Toxic Substances
The permittee shall notify the Director as soon as it knows or has reason to believe:
 - (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) One hundred micrograms per liter (100 µg/L);
 - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
 - (4) The level established in Part A of the permit by the Director.
 - (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.
 6. Report as no-discharge when a discharge does not occur during the report period.
 7. Water Quality Standards
 - (a) To the extent required by law, discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
 - (b) General Criteria. To the extent required by law, the following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
 - (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
 - (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
 - (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
 - (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
 - (5) There shall be no significant human health hazard from incidental contact with the water;
 - (6) There shall be no acute toxicity to livestock or wildlife watering;
 - (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
 - (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.
 8. The permittee shall comply with any applicable requirements listed in 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the department for review and, if deemed necessary, approval.
 9. Bypasses are not authorized at this facility and are subject to 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3)(i), and with Standard Condition Part I, Section B, subsection 2.b.
 10. The facility must be sufficiently secured to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.
 11. A least one gate must be provided to access the wastewater treatment facility and provide for maintenance and mowing. The gate shall remain closed except when temporarily opened by; the permittee to access the facility, perform operational monitoring, sampling, maintenance, mowing, or for inspections by the Department. The gate shall be closed and locked when the facility is not staffed.
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D. SPECIAL CONDITIONS (continued)

12. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. There shall also be one (1) sign placed for every five hundred feet (500') (150 m) of the perimeter fence. A sign shall also be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.
13. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.
14. An all-weather access road shall be provided to the treatment facility.
15. The discharge from the wastewater treatment facility shall be conveyed to the receiving stream via a closed pipe or a paved or rip-rapped open channel. Sheet or meandering drainage is not acceptable. The outfall sewer shall be protected against the effects of floodwater, ice or other hazards as to reasonably insure its structural stability and freedom from stoppage. The outfall shall be maintained so that a sample of the effluent can be obtained at a point after the final treatment process and before the discharge mixes with the receiving waters.
16. Whole Effluent Toxicity (WET) Test shall be conducted as follows:

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT				
OUTFALL	AEC	FREQUENCY	SAMPLE TYPE	MONTH
001	100%	Once/year	24 hr. composite*	Any

* A 24-hour composite sample is composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampler.

Dilution Series						
AEC%= 100% effluent	50% effluent	25% effluent	12.5% effluent	6.25% effluent	(Control) 100% upstream, if available	(Control) 100% Lab Water, also called synthetic water

(a) Test Schedule and Follow-Up Requirements

- (1) Perform a MULTIPLE-dilution acute WET test in the months and at the frequency specified above. For tests which are successfully passed, submit test results using the Department's WET test report form #MO-780-1899 along with complete copies of the test reports as received from the laboratory, including copies of chain-of-custody forms within 30 calendar days of availability to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102. If the effluent passes the test, do not repeat the test until the next test period.
 - (a) Chemical and physical analysis of the upstream control and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping.
 - (b) Any and all chemical or physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% Effluent concentration in addition to analysis performed upon any other effluent concentration.
 - (c) All chemical analyses included in the Missouri Department of Natural Resources WET test report form #MO-780-1899 shall be performed and results shall be recorded in the appropriate field of the report form.
- (2) The WET test will be considered a failure if mortality observed in effluent concentrations for either specie, equal to or less than the AEC, is significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available, synthetic laboratory control water may be used.
- (3) All failing test results along with complete copies of the test reports as received from the laboratory, INCLUDING THOSE TESTS CONDUCTED UNDER CONDITION (3) BELOW, shall be reported to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the availability of the results.
- (4) If the effluent fails the test for BOTH test species, a multiple dilution test shall be performed for BOTH test species within 30 calendar days and biweekly thereafter (for storm water, tests shall be performed on the next and subsequent storm water discharges as they occur, but not less than 7 days apart) until one of the following conditions are met: Note: Written request regarding single species multiple dilution accelerated testing will be address by THE WATER PROTECTION PROGRAM on a case by case basis.
 - (i) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.
 - (ii) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.

D. SPECIAL CONDITIONS (continued)

- (5) Follow-up tests do not negate an initial failed test.
 - (6) The permittee shall submit a summary of all test results for the test series along with complete copies of the test reports as received from the laboratory to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.
 - (7) Additionally, the following shall apply upon failure of the third follow up MULTIPLE DILUTION test The permittee should contact THE WATER PROTECTION PROGRAM within 14 calendar days from availability of the test results to ascertain as to whether a TIE or TRE is appropriate. If the permittee does not contact THE WATER PROTECTION PROGRAM upon the third follow up test failure, a toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permittee shall submit a plan for conducting a TIE or TRE to the WATER PROTECTION PROGRAM within 60 calendar days of the date of the automatic trigger or DNR's direction to perform either a TIE or TRE. This plan must be approved by DNR before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.
 - (8) Upon DNR's approval, the TIE/TRE schedule may be modified if toxicity is intermittent during the TIE/TRE investigations. A revised WET test schedule may be established by DNR for this period.
 - (9) If a previously completed TIE has clearly identified the cause of toxicity, additional TIEs will not be required as long as effluent characteristics remain essentially unchanged and the permittee is proceeding according to a DNR approved schedule to complete a TRE and reduce toxicity. Regularly scheduled WET testing as required in the permit, without the follow-up requirements, will be required during this period.
 - (10) When WET test sampling is required to run over one DMR period, each DMR report shall contain a copy of the Department's WET test report form that was generated during the reporting period.
 - (11) Submit a concise summary in tabular format of all WET test results with the annual report.
- (b) Test Conditions
- (1) Test Type: Acute Static non-renewal
 - (2) All tests, including repeat tests for previous failures, shall include both test species listed below unless approved by the department on a case by case basis.
 - (3) Test species: Ceriodaphnia dubia and Pimephales promelas (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.
 - (4) Test period: 48 hours at the "Allowable Effluent Concentration" (AEC) specified above.
 - (5) Upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.
 - (6) Tests will be run with 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent, and reconstituted water.
 - (7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
 - (8) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.
 - (9) Whole-effluent-toxicity test shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms

E. RECEIVING WATER MONITORING CONDITIONS

1. In-stream samples should be taken at the location(s) specified on page 2 of this permit. In the event that a safe, accessible location is not present at this location, a suitable location can be negotiated with the department. Samples should be taken at least four feet from the bank or from the middle of the stream (whichever is less) and 6-inches below the surface. The downstream receiving water sample should be collected at a point where effluent is fully mixed and the water is visibly flowing down stream.
2. When conducting in-stream monitoring, the permittee shall record observations that include: the time of day, weather conditions, unusual stream characteristics (e.g., septic conditions, algae growth, etc.) and the type of stream segment (e.g., riffle, pool or run) or where the sample was collected. These observations shall be submitted with the sample results.
3. Samples shall not be collected from areas with especially turbulent flow, still water or from the stream bank, unless these conditions are representative of the stream reach or no other areas are available for sample collection. Sampling should not be made when significant precipitation has occurred recently. The sampling event should be terminated and rescheduled if any of the following conditions occur:
 - If turbidity in the stream increases notably; or
 - If rainfall over the past two weeks exceeds 2.5 inches or exceeds 1 inch in the last 24 hours

E. RECEIVING WATER MONITORING CONDITIONS (continued)

4. Always use the correct sampling technique and handling procedure specified for the parameter of interest. Please refer to the latest edition of Standard Methods for the Examination of Water and Wastewater for further discussion of proper sampling techniques. All analyses must be conducted in accordance with an approved EPA method. Field meters shall be calibrated immediately (within 1 hour) prior to the sampling event.
5. To obtain accurate measurements, D.O., temperature and pH analyses should be performed on-site in the receiving stream where possible. However, due to high flow conditions, access, etc., it may be necessary to collect a sample in a bucket or other container. When this is necessary, care must be taken not to aerate the sample upon collection. If for any reason samples must be collected from an alternate site from the one listed in the permit, the permittee shall report the location with the sample results.
6. Dissolved oxygen measurements are to be taken during the period from one hour prior to sunrise to one and one-half hour after sunrise.

F. SCHEDULE OF COMPLIANCE

1. The facility shall attain compliance with final effluent limitations for *E. coli* as soon as reasonably achievable or by January 1, 2014.
2. The facility shall attain compliance with final effluent limitations for ammonia as soon as reasonably achievable or by December 31, 2016 as specified in the Abatement Order on Consent AOC No. 2013-WPCB-1241 dated June 12, 2013.
 - a. Within one year of the effective date of this permit, the permittee shall report progress made in attaining compliance with the final effluent limits.
 - b. Within two years of the effective date of this permit, the permittee shall submit a report detailing progress made in attaining compliance with the final effluent limits.
 - c. By December 31, 2016, the facility will have attained compliance with final effluent limits for ammonia.
3. The facility shall attain compliance with Tier 1 Final Effluent Limitations for Carbonaceous Biochemical Oxygen Demand, Total Suspended Solids, Ammonia and Nutrient Removal for Total Nitrogen and Total Phosphorus, at the time that Tier 1 improvements are constructed and operations optimized but no later than December 31, 2026.
 - a. By December 31st 2021, the permittee shall submit a report detailing progress made in attaining compliance with the final effluent limits.
 - b. By December 31st, 2023, the permittee shall submit a report detailing progress made in attaining compliance with the final effluent limits.
 - c. By December 31, 2026, the permittee shall attain compliance with Tier 1 final effluent limits for Carbonaceous Biochemical Oxygen Demand, Total Suspended Solids, Ammonia and Nutrient Removal for Total Nitrogen and Total Phosphorus.
4. The facility shall attain compliance with Tier 2 Final Effluent Limitations for Carbonaceous Biochemical Oxygen Demand, Total Suspended Solids and Nutrient Removal for Total Nitrogen and Total Phosphorus at the time that Tier 2 improvements are constructed and operations optimized but no later than December 31, 2035.
 - a. By December 31st, 2030, the permittee shall submit a report detailing progress made in attaining compliance with the final effluent limits.
 - b. By December 31st, 2032, the permittee shall submit a report detailing progress made in attaining compliance with the final effluent limits.
 - c. By December 31st 2035, the permittee shall attain compliance with Tier 2 final effluent limits for Nutrient Removal for Total Nitrogen and Total Phosphorus.

Please submit progress reports to the Missouri Department of Natural Resources, Northeast Regional Office, 1700 Prospect Drive, Macon, Missouri, 63552-2602.

**Missouri Department of Natural Resources
FACT SHEET
FOR THE PURPOSE OF RENEWAL
OF
MO-0103331
FULTON WWTF**

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of storm water from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Major ☒

Part I – Facility Information

Facility Type: POTW
Facility SIC Code(s): 4952

Facility Description:

Oxidation ditch/sludge holding tanks/aerobic digesters/vacuum sand dewatering beds/sludge is land applied

Have any changes occurred at this facility or in the receiving water body that effects effluent limit derivation?

☒ - No.

Application Date: 8/19/10
Expiration Date: 8/11/10
Last Inspection: No inspections since March, 2010

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	4.5415	secondary	municipal	0

Outfall #001

UTM Coordinates: X= 592755.590, Y= 4299234.181
Receiving Stream: Stinson Creek (C)
First Classified Stream and ID: Stinson Creek (C) (710)
USGS Basin & Sub-watershed No.: (10300102-1508)

Receiving Water Body's Water Quality & Facility Performance History:

EPA approved a TMDL for Stinson Creek on May 26, 2010. This permit will implement a phased implementation of the TMDL.

Part II – Operator Certification Requirements

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.010(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Check boxes below that are applicable to the facility;

- Owned or operated by or for:
- Municipalities ☒

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200) and/or fifty (50) or more service connections.

This facility currently requires an operator with a "B" Certification Level at a minimum. Please see Appendix #1 - Classification Worksheet Modifications made to the wastewater treatment facility may cause the classification to be modified.

Operator's Name: Joseph Chism
Certification Number: 6572
Certification Level: WW – A

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate Department records and determined that the name listed on the operating permit application has the correct and applicable Certification Level.

Part III – Receiving Stream Information

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:

As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

All Other Waters [10 CSR 20-7.015(8)]:



10 CSR 20-7.031 Missouri Water Quality Standards, the Department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1st classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

RECEIVING STREAM(S) TABLE:

WATERBODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	EDU**
Stinson Creek	C	710	LWW, AQL, WBC(B)	10300102-1508	Ozark/Moreau/Loutre

* Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery (CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

** Ecological Drainage Unit

RECEIVING STREAM(S) LOW-FLOW VALUES TABLE:

RECEIVING STREAM (U, C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Stinson Creek (C)	0	0	0.1

MIXING CONSIDERATIONS:

Mixing Zone: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].
Zone of Initial Dilution: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(b)].

RECEIVING STREAM MONITORING REQUIREMENTS:

In-stream monitoring is being included to comply with the Stinson Creek TMDL.

SM1 - Downstream

PARAMETER(S)	SAMPLING FREQUENCY	SAMPLE TYPE	LOCATION
Total Ammonia Nitrogen	monthly	grab	30 yards below outfall #001
Dissolved Oxygen			
Temperature			
pH			

Part IV – Rationale and Derivation of Effluent Limitations & Permit Conditions

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:

As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

Not Applicable ☒;

The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:

A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - All limits in this operating permit are at least as protective as those previously established; therefore, backsliding does not apply.

ANTIDEGRADATION:

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - Renewal no degradation proposed and no further review necessary.

AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:

As per [10 CSR 20-6.010(3)(B)], ...An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

BIO-SOLIDS, SLUDGE, & SEWAGE SLUDGE:

Bio-solids are solid materials resulting from wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sludge is any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address: <http://dnr.mo.gov/env/wpp/pub/index.html>, items WQ422 through WQ449.

☒ - Permittee land applies biosolids in accordance with Standard Conditions III and a Department approved biosolids management plan.

COMPLIANCE AND ENFORCEMENT:

Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

Applicable ☒;

The permittee/facility is currently under Compliance and Enforcement action. Effective June 12, 2013, the Department issued the City of Fulton an ADMINISTRATIVE ORDER ON CONSENT AOC No. 2013-WPCB-1241. As part of the AOC, the City of Fulton shall develop and/or implement an Information Collection and Utilization computer tracking system, a I & I Assessment and Reduction Plan; a Maintenance and Repair Program, adhere to the AOC's Appendix A, No. 5, Reporting and Record Keeping Section and meet ammonia removal and disinfection requirements.

PRETREATMENT PROGRAM:

The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)].

Not Applicable ☒;

The permittee, at this time, is not required to have a Pretreatment Program or does not have an approved pretreatment program.

REASONABLE POTENTIAL ANALYSIS (RPA):

Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

In accordance with [40 CFR Part 122.44(d)(iii)] if the permit writer determines that any give pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

Applicable ☒;

A RPA was conducted on appropriate parameters. Please see APPENDIX #2 – RPA RESULTS.

REMOVAL EFFICIENCY:

Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD₅) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals. Please see the United States Environmental Protection Agency's (EPA) website for interpretation of percent removal requirements for National Pollutant Discharge Elimination System Permit Application Requirements for Publicly Owned Treatment Works and Other Treatment Works Treating Domestic Sewage @ www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm.

Applicable ☒; Secondary Treatment is 85% removal [40 CFR Part 133.102(a)(3) & (b)(3)].

SANITARY SEWER OVERFLOWS (SSO) AND INFLOW AND INFILTRATION (I&I):

Sanitary Sewer Overflows (SSOs) are defined as an untreated or partially treated sewage release are considered bypassing under state regulation [10 CSR 20-2.010(11)] and should not be confused with the federal definition of bypass. SSO's have a variety of causes including blockages, line breaks, and sewer defects that allow excess storm water and ground water to (1) enter and overload the collection system, and (2) overload the treatment facility. Additionally, SSO's can be also be caused by lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. SSOs also include overflows out of manholes and onto city streets, sidewalks, and other terrestrial locations.

Additionally, Missouri RSMo §644.026.1 mandates that the Department require proper maintenance and operation of treatment facilities and sewer systems and proper disposal of residual waste from all such facilities.

☒ - In accordance with Missouri RSMo §644.026.1.(15) and 40 CFR Part 122.41(e), the permittee is required to develop and/or implement a program for maintenance and repair of the collection system and shall be required in this operating permit by either means of a Special Condition or Schedule of Compliance. In addition, the Department considers the development of this program as an implementation of this condition. Additionally, 40 CFR Part 403.3(o) defines a POTW to include any device and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW Treatment Plant.

At this time, the Department recommends the US EPA's Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (Document # EPA 305-B-05-002). The CMOM identifies some of the criteria used by the EPA to evaluate a collection system's management, operation, and maintenance and was intended for use by the EPA, state, regulated community, and/or third party entities. The CMOM is applicable to small, medium, and large systems; both public and privately owned; and both regional and satellite collection systems. The CMOM does not substitute for the Clean Water Act, the Missouri Clean Water Law, and both federal and state regulations, as it is not a regulation.

SCHEDULE OF COMPLIANCE (SOC):

A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit.

Applicable ☒:

The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(10)] and as specified in the City's Abatement Order on Consent dated June 12, 2013. The initial schedule of compliance is needed since the City must pass a bond, design the facility, apply for funding through the State Revolving Fund, and construct the facility. The City will implement the TMDL through a phased approach requiring facility planning, new construction and/or modifications to the plant and plant performance evaluations. The phased adaptive management process is included within the Memorandum of Understanding between the City of Fulton and Missouri Department Natural Resources dated _____. The MOU (Appendix 5) agreed upon by the Department and the City is reflected in the permit's schedule of compliance and deemed practicable given the iterative nature of the adaptive management process. The schedule of compliance requires the city to undergo 3 significant plant upgrades over the next 22 years which will cost the city roughly 33 million dollars in capital costs. The implementation of phases 2 and 3 of the schedule depends on demonstrating that water quality standards are being met and Stinson Creek is fully attaining its aquatic life use. If the department determines after data collection that the impairment persists, the City will implement the next phase of improvement. The schedule has time built in for the department to prepare the data for submission for EPA approval. If data indicate that the impairment persists, the next improvements to the facility should be implemented.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP):

In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities; (2) Authorized under section 402(p) of the CWA for the control of storm water discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

Not Applicable ☒:

At this time, the permittee is not required to develop and implement a SWPPP.

VARIANCE:

As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

Not Applicable ☒;

This operating permit is not drafted under premises of a petition for variance. The department intends to develop a multi-discharger variance request to obtain variance from the implementation of water quality based nutrient WLA expressed in TMDLs that are beyond the limit of treatment technology or affordability. The City of Fulton will be included in this request and provide supporting information for the statewide variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:

As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

Applicable ☒;

Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

Where C = downstream concentration

Cs = upstream concentration

Qs = upstream flow

Ce = effluent concentration

Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Number of Samples "n":

Additionally, in accordance with the TSD for water quality-based permitting, effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying distribution or treatment performance, which should be, at a minimum, be targeted to comply with the values dictated by the WLA. Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of "n" for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for "n" must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is "n = 4" at a minimum. For Total Ammonia as Nitrogen, "n = 30" is used.

WLA MODELING:

There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

Applicable ☒;

A WLA study including model was submitted to the Department by the Environmental Protection Agency. The WLA study determined that there needs to be in-stream monitoring for dissolved oxygen, temperature, chlorophyll a, and ammonia. Waste loads for carbonaceous biochemical oxygen demand and total suspended solids were established. Technology based nutrient effluent limits and WLA for CBOD₅, TSS, Ammonia, will be implemented as a phased approach in the permit and the Memorandum of Understanding between the City of Fulton and Missouri Department of Natural Resources dated _____.

WATER QUALITY STANDARDS:

Per [10 CSR 20-7.031(3)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

WHOLE EFFLUENT TOXICITY (WET) TEST:

A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

Applicable ☒;

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7. and the Water Quality Standards 10 CSR 20-7.031(3)(D),(F),(G),(I)2.A & B are being met. Under [10 CSR 20-6.010(8)(A)4], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc...); and 644.051.5 is the basic authority to require testing conditions. WET test will be required by all facilities meeting the following criteria:

- ☒ Facility is a designated Major.
- ☒ Facility is a municipality or domestic discharger with a Design Flow $\geq$ 22,500 gpd.

40 CFR 122.41(M) - BYPASSES:

The federal Clean Water Act (CWA), Section 402 prohibits wastewater dischargers from "bypassing" untreated or partially treated sewage (wastewater) beyond the headworks. A bypass, which includes blending, is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-2.010(11) defines a bypass as the diversion of wastewater from any portion of wastewater treatment facility or sewer system to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting required in 40 CFR 122.41(l)(6) and per Missouri's Standard Conditions I, Section B, part 2.b. Additionally, Anticipated Bypasses include bypasses from peak flow basins or similar.

- ☒ - Outfall #002 is no longer authorized to discharge as it is a Bypass.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):

Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can assimilate before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

Applicable ☒;

Stinson Creek was listed on the 2008 Missouri 303(d) List for low dissolved oxygen and organic sediment which impaired the aquatic life use. Stinson Creek is now subject to the Stinson Creek TMDL.

- ☒ - This facility is considered to be a source of or has the potential to contribute to the above listed conditions or pollutant(s). This permit represents the first phase of implementation of the Stinson Creek TMDL as approved by EPA. The phased adaptive management process is included within the Memorandum of Understanding (MOU) between the City of Fulton and Missouri Department Natural Resources dated _____. The process includes plant improvements followed by water quality studies to evaluate if water quality standards have been met or TMDL revisions are appropriate. Each phase of improvements will be consistent with the City's investment and financing in wastewater infrastructure.

This permit includes a phased implementation for technology based nutrient limits. The Department believes that the implementation of these limits in this manner is an appropriate course of action at this time. Once initial upgrades occur at the facility, the Department believes that the water quality standards for Stinson Creek will be attained.

The Department and the City of Fulton are certain that the final technology based effluent limits set forth in this permit will restore use attainment in Stinson Creek and ultimately lead to the re-categorization of this stream from the 305 (b) report. Nutrient WLA concentrations expressed in the TMDL were based on the design capacity of the facility. Since the facility typically operates at a flow less than that used to determine the WLA, the concentrations expressed in the permit are more closely aligned with TMDL loads.

Wasteload allocations developed in the TMDL were used to derive new effluent limitations for Carbonaceous Biochemical Oxygen Demand₅ (CBOD₅). Because organic sediment is one component of Total Suspended Solids (TSS), wasteload allocations were also developed for TSS that reduce organic sediment and are protective of the dissolved oxygen criterion and aquatic life in Stinson Creek.

The Department anticipates numeric and narrative water quality criteria will be met after bypass elimination and the new effluent limits for CBOD₅ and TSS have been achieved at the Fulton Wastewater Treatment Facility. Implementation of these effluent limits will require continued proper operation and maintenance of the facility and additional plant improvements to address reductions in CBOD₅ and TSS. The City will also make modifications to eliminate Outfall #002 and pursue inflow and infiltration reduction. Elimination of Outfall #002 will further address the reductions in CBOD₅ and TSS in Stinson Creek.

In-stream monitoring for dissolved oxygen, temperature, pH and ammonia will be a permit condition to evaluate attainment of water quality criteria in the stream before and after implementation of new effluent limitations and facility upgrades. If post TMDL monitoring indicates that point source reductions are not achieving the desired improvements in water quality, the Department will reevaluate the TMDL for further appropriate actions. These actions may include additional permit conditions on the Fulton Wastewater Treatment Plant, including revised permit conditions on the Fulton municipal separate storm sewer system and other facilities, and further control of nonpoint sources through a nonpoint source management plan.

Part V – Effluent Limits Determination

Outfall #001 – Main Facility Outfall

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	QUARTERLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
FLOW	MGD	1	*		*			
BOD ₅	MG/L	1		15	9		YES	45/30
TSS	MG/L	1		15	5		YES	45/30
PH	SU	1	6.5-9.0		6.5-9.0		YES	6-9
AMMONIA AS N (APRIL 1 – SEPT 30)	MG/L	2/3/5	6		1.2		YES	*/*
AMMONIA AS N (OCT 1 – MARCH 31)	MG/L	2/3/5	12		2.6		YES	*/*
ESCHERICHIA COLI	**	1/2		1030	206		YES	*/*
OIL & GREASE (MG/L)	MG/L	1	15		10		YES	NONE
TOTAL PHOSPHORUS (TIER 2 FINAL LIMITS)	MG/L	TBEL	*			0.1	YES	***
TOTAL NITROGEN (TIER 2 FINAL LIMITS)	MG/L	TBEL	*			4	YES	***
COPPER, TOTAL RECOVERABLE	µg/L	2	40.5		19.3		YES	*/*
WHOLE EFFLUENT TOXICITY (WET) TEST	% Survival	11	Please see WET Test in the Derivation and Discussion Section below.					
MONITORING FREQUENCY	Please see Minimum Sampling and Reporting Frequency Requirements in the Derivation and Discussion Section below.							

* - Monitoring requirement only.

** - # of colonies/100mL; the Monthly Average for *E. coli* is a geometric mean.

*** - Parameter not previously established in previous state operating permit.

Basis for Limitations Codes:

- | | |
|--|------------------------------------|
| 1. State or Federal Regulation/Law | 7. Antidegradation Policy |
| 2. Water Quality Standard (includes RPA) | 8. Water Quality Model |
| 3. Water Quality Based Effluent Limits | 9. Best Professional Judgment |
| 4. Lagoon Policy | 10. TMDL or Permit in lieu of TMDL |
| 5. Ammonia Policy | 11. WET Test Policy |
| 6. Dissolved Oxygen Policy | 12. Antidegradation Review |

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow.** In accordance with [40 CFR Part 122.44(i) (1) (ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.
- **Carbonaceous Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS).**
Technology based, advanced treatment limits are being placed in the permits of facilities that have to upgrade to meet very low CBOD/BOD limits with nutrient WLAs.

Total Phosphorus, Total Nitrogen.

The TMDL for Stinson Creek states that to address nutrient levels in Stinson Creek the EPA nutrient eco-region reference concentrations for the Southeastern Temperate Forested Plains and Hills Eco-region IX were used. These eco-regional values were used to establish a waste load allocation/permit limit for total N and total P in the TMDL. The intent of EPA's recommended eco-regional nutrient criteria is to identify baseline conditions of surface waters that are minimally impacted by human activities and protect against the adverse effects of nutrient over enrichment from cultural eutrophication. These EPA recommended water quality criteria are suggested baselines which should be used by states and tribes to help identify problem areas, serve as a basis for state and tribal water quality criteria for nutrients, and evaluate relative success in reducing cultural eutrophication. The development document for the Eco region IX states that EPA does not recommend identifying nutrient concentrations that must be met at all times, rather a seasonal or annual averaging period (e.g., based on weekly measurements) is considered appropriate. Therefore the permit establishes a quarterly average limitation for total nitrogen and total phosphorus and requires weekly monitoring.

Tier 1 and 2 final limits have been established in this permit as part of the phased implementation of the Stinson Creek TMDL. These limits are technology based. Establishing appropriate permit limits that implement nitrogen and phosphorus waste load allocations that are based on eco-region nutrient values are different from setting limits for other parameters such as toxic or conventional pollutants. Toxic pollutants are subject to short term limitations to address acute toxicity and conventional pollutants are subject to technology based requirements which have been determined to be achievable as a short term permit requirement. The seasonal nature of nutrients versus the constant loading of toxic and conservative pollutants also lends itself to innovative implementation. The TMDL sets wasteload allocations beyond what can be achieved via the current treatment technologies economically available at the time of the permits issuance. The department has chosen to establish limitations that reflect what can be achieved via technology rather than the water quality based (eco-region) nutrient criteria/waste load allocations expressed in the TMDL. Given that the requirements expressed in the permit for nitrogen and phosphorus are technology based it is appropriate to establish the limit as a quarterly long term average.

Use attainment for nutrient impairment is appropriately evaluated quarterly given the long-term biological and physical processes that occur in a stream receiving nutrient discharges. Therefore, developing effluent limitations requires innovative implementation procedures. The efficiency of treatment of nutrients by biological nutrient removal is highly sensitive to ambient temperature and is not effective at lower temperatures. Thus, the effluent loading of nutrients is not constant due to seasonal temperature fluctuations in Missouri climates. Even a simple steady-state model for permit development such as dividing quarterly limit by 3 and establishing that value as the monthly limit is therefore, not appropriate. Such a limit does not account for fluctuations in effluent loading. Because of the effect of temperature on the treatment efficiency and the normal variation in ambient temperature over shorter time periods, it is impractical to develop appropriate daily, weekly or monthly limits for nutrients.

Tier 1 Improvements- Biological Nutrient Removal:

Once the 2013 Facility Plan improvements are operational, it is proposed that the receiving stream (Stinson Creek) be allowed to assimilate and that the Water quality in Stinson Creek will be reassessed against applicable water quality standards to determine if biological nutrient removal is necessary. The biological nutrient removal improvements will consist of a Return Activated Sludge (RAS) selector basin, aeration basin baffle walls and mixers, replacement of RAS pumps, aeration basin distribution box replacement, a chemical (e.g., alum) addition system, and site piping modifications. These improvements are expected to limit effluent concentrations to an annual average of 8 mg/L TN and 1.0 mg/L TP. The 2013 cost of the improvements is \$3,500,000. Biological nutrient removal improvements are proposed to be constructed by 2026. At a 3% cost inflation per year, the 2026 cost of the improvements is \$5,200,000.

Tier 2 Improvements- Enhanced Nutrient Removal:

Once the Tier 1 biological nutrient removal improvements are operational, it is proposed that Stinson Creek again be allowed to assimilate and that the Water quality in Stinson Creek will be reassessed against applicable water quality standards to determine if enhanced nutrient removal is necessary. The enhanced nutrient removal improvements will consist of a denitrifying sand filtration facility, an intermediate pumping station, and associated site work and site piping. These improvements are expected to

limit effluent concentrations to an annual average of 4 mg/L TN and 0.1mg/L TP. The 2013 cost of the improvements is \$7,500,000. Enhanced nutrient removal improvements are proposed to be constructed by 2035. At a 3% cost inflation per year, the 2035 cost of the improvements is \$14,400,000.

A third tier of nutrient removal phase was considered but deemed impractical and unaffordable. Tier 3 would consist of running half of the effluent flow through a membrane treatment plant. The combined effluent would likely have limits of 2 mg/L TN and 0.05 TP (Striking a Balance Between Nutrient Removal and Sustainability¹). This would require the installation of microfiltration and reverse osmosis (RO) membranes. Additionally, the RO brine would require disposal. The estimated capital cost for a membrane plant to treat half of Fulton's peak day flow would be approximately \$30-40 million dollars, in 2013 dollars, assuming deep well injection is an appropriate RO brine disposal method. The \$30-40 million dollars would be in addition to the disinfection and ammonia, Tier 1, and Tier 2 improvements, while representing very marginal nutrient removal (approximately 2 mg/L TN and 0.05 mg/L TP). Operating costs would double over the Tier 2 operating costs. The authors of the referenced paper cite that using RO to remove TN and TP is, "impractical due to high costs, significant impacts on GHG (greenhouse gasses), and brine disposal challenges." (pg 635).

¹Falk MW, Reardon DJ, Jimenez J, Neethling JB. Water Environment Federation. Presented at the Nutrient Recovery and Management Conference, 2011.

- **pH.** Effluent limitation range is 6.5 – 9.0 Standard pH Units (SU), as per the applicable section of 10 CSR 20-7.015. pH is not to be averaged.
- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3] default pH 7.8 SU No mixing considerations allowed; therefore, WLA = appropriate criterion.

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: May 1 – October 31

Chronic WLA: $C_e = ((4.5415 + 0.0)1.5 - (0.0 * 0.01))/4.5415$
 $C_e = 1.5 \text{ mg/L}$

Acute WLA: $C_e = ((4.5415 + 0.0)12.1 - (0.0 * 0.01))/4.5415$
 $C_e = 12.1 \text{ mg/L}$

$LTA_c = 1.5 \text{ mg/L } (0.448) = 0.672 \text{ mg/L}$

[CV = 2.13, 99th Percentile, 30 day avg.]

$LTA_a = 12.1 \text{ mg/L } (0.112) = 1.4 \text{ mg/L}$

[CV = 2.13, 99th Percentile]

Use most protective number of LTA_c or LTA_a .

$MDL = 0.672 \text{ mg/L } (8.91) = 6 \text{ mg/L}$

[CV = 2.13, 99th Percentile]

$AML = 0.672 \text{ mg/L } (1.73) = 1.2 \text{ mg/L}$

[CV = 2.13, 95th Percentile, n =30]

Winter: November 1 – April 30

Chronic WLA: $C_e = ((4.5415 + 0.0)3.1 - (0.0 * 0.01))/4.5415$
 $C_e = 3.1 \text{ mg/L}$

Acute WLA: $C_e = ((4.5415 + 0.0)12.1 - (0.0 * 0.01))/4.5415$
 $C_e = 12.1 \text{ mg/L}$

$LTA_c = 3.1 \text{ mg/L } (0.548) = 1.7 \text{ mg/L}$

[CV = 1.54, 99th Percentile, 30 day avg.]

$LTA_a = 12.1 \text{ mg/L } (0.142) = 1.7 \text{ mg/L}$

[CV = 1.54, 99th Percentile]

Use most protective number of LTA_c or LTA_a .

$MDL = 1.7 \text{ mg/L } (7.06) = 12 \text{ mg/L}$

[CV = 1.54, 99th Percentile]

$AML = 1.7 \text{ mg/L } (1.51) = 2.6 \text{ mg/L}$

[CV = 1.54, 95th Percentile, n =30]

- **Escherichia coliform (E. coli).** Monthly average of 206 per 100 ml as a geometric mean and Weekly Average of 1030 during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (B) designated use of the receiving stream, as per 10 CSR 20-7.031(4)(C). An effluent limit for both monthly average and weekly average is required by 40 CFR 122.45(d). If more than one (1) sample is collected in a calendar week, then the result is to be reported as a geometric mean.
- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

Metals

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in the "Technical Support Document For Water Quality-based Toxic Controls" (EPA/505/2-90-001) and "The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion" (EPA 823-B-96-007). General warm-water fishery criteria apply and a water hardness of 306 mg/L is used in the conversion below.

- Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and absorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the Department, partitioning evaluations may be considered and site-specific translators developed.

METAL	CONVERSION FACTORS	
	ACUTE	CHRONIC
Copper	0.960	0.960

Values calculated using equation found in Section 1.3 of EPA 823-B-96-007 and hardness = 306 mg/L.

- **Cadmium, Chromium, Lead, Nickel.** Effluent monitoring data for the previous 4 years showed all non-detects for these metals. Therefore, monitoring will be removed from the permit.
- **Zinc, Total Recoverable.** Effluent monitoring data for the previous 4 years showed no reasonable potential to violate water quality standards. Therefore, monitoring will be removed from the permit.
- **Copper, Total Recoverable.** Protection of Aquatic Life Chronic Criteria = 23 µg/L, Acute Criteria = 39 µg/L. DMR data for the last 4 years showed a reasonable potential to exceed water quality standards.

$$\text{Chronic} = 23/0.960 = 24 \mu\text{g/L}$$

$$\text{Acute} = 39/0.960 = 40.6 \mu\text{g/L}$$

$$\begin{aligned} \text{Chronic WLA: } C_e &= ((4.5415 + 0.0)24 - (0.0 * 0.0))/4.5415 \\ C_e &= 24 \mu\text{g/L} \end{aligned}$$

$$\begin{aligned} \text{Acute WLA: } C_e &= ((4.5415 + 0.0)40.6 - (0.0 * 0.0))/4.5415 \\ C_e &= 40.6 \mu\text{g/L} \end{aligned}$$

$$\text{LTA}_c = 24 (0.497) = 11.9 \mu\text{g/L}$$

$$\text{LTA}_a = 40.6 (0.294) = 11.9 \mu\text{g/L}$$

$$[\text{CV} = 0.664, 99^{\text{th}} \text{ Percentile}]$$

$$[\text{CV} = 0.664, 99^{\text{th}} \text{ Percentile}]$$

Use most protective number of LTA_c or LTA_a .

$$\text{MDL} = 11.9 (3.4) = 40.5 \mu\text{g/L}$$

$$\text{AML} = 11.9 (1.62) = 19.3 \mu\text{g/L}$$

$$[\text{CV} = 0.664, 99^{\text{th}} \text{ Percentile}]$$

$$[\text{CV} = 0.664, 95^{\text{th}} \text{ Percentile}, n = 4]$$

- **WET Test.** WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring*. It is recommended that WET testing be conducted during the period of lowest stream flow.
 - ☒ Acute (default)
 - ☒ **No less than ONCE/YEAR:**
 - ☒ Facility is designated as a Major facility or has a design flow ≥ 1.0 MGD.
- **Minimum Sampling and Reporting Frequency Requirements.** Sampling and reporting frequency requirements have been retained from previous state operating permit.

Part VII – Finding of Affordability

Pursuant to Section 644.145, RSMo., the Department is required to determine whether a permit or decision is affordable and makes a finding of affordability for certain permitting and enforcement decisions. This requirement applies to discharges from combined or separate sanitary sewer systems or publically-owned treatment works.

☒ Applicable; The Department is required to determine findings of affordability because the permit applies to a combined or separate sanitary sewer system for a publically-owned treatment works.

Finding of affordability - The department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the Department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644.145.3. See Appendix #3 – Affordability Analysis

Part VI – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:

The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together and will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the department to explore a watershed based permitting effort at some point in the future.

PUBLIC NOTICE:

The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

DATE OF FACT SHEET: 06/14/2013

COMPLETED BY:

CHRIS WIEBERG
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
OPERATING PERMITS SECTION
(573) 751-7326
chris.wieberg@dnr.mo.gov

Appendices

APPENDIX #1 - CLASSIFICATION WORKSHEET:

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Maximum Population Equivalent (P.E.) served (Max 10 pts.)	1 pt./10,000 PE or major fraction thereof.	5
Maximum: 10 pt Design Flow (avg. day) or peak month; use greater (Max 10 pts.)	1 pt. / MGD or major fraction thereof.	5
EFFLUENT DISCHARGE RECEIVING WATER SENSITIVITY:		
Missouri or Mississippi River	0	
All other stream discharges except to losing streams and stream reaches supporting whole body contact	1	
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	3
PRELIMINARY TREATMENT - Headworks		
Screening and/or comminution	3	3
Grit removal	3	
Plant pumping of main flow (lift station at the headworks)	3	
PRIMARY TREATMENT		
Primary clarifiers	5	
Combined sedimentation/digestion	5	
Chemical addition (except chlorine, enzymes)	4	
REQUIRED LABORATORY CONTROL – performed by plant personnel (highest level only)		
Push – button or visual methods for simple test such as pH, Settleable solids	3	
Additional procedures such as DO, COD, BOD, titrations, solids, volatile content	5	5
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	7	
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	
ALTERNATIVE FATE OF EFFLUENT		
Direct reuse or recycle of effluent	6	
Land Disposal – low rate	3	
High rate	5	
Overland flow	4	
Total from page ONE (1)	—	21

APPENDIX #1 - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)		
Variation do not exceed those normally or typically expected	0	
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	
Raw wastes subject to toxic waste discharge	6	
SECONDARY TREATMENT		
Trickling filter and other fixed film media with secondary clarifiers	10	
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	15
Stabilization ponds without aeration	5	
Aerated lagoon	8	
Advanced Waste Treatment Polishing Pond	2	
Chemical/physical – without secondary	15	
Chemical/physical – following secondary	10	
Biological or chemical/biological	12	
Carbon regeneration	4	
DISINFECTION		
Chlorination or comparable	5	
Dechlorination	2	
On-site generation of disinfectant (except UV light)	5	
UV light	4	
SOLIDS HANDLING - SLUDGE		
Solids Handling Thickening	5	
Anaerobic digestion	10	
Aerobic digestion	6	6
Evaporative sludge drying	2	
Mechanical dewatering	8	8
Solids reduction (incineration, wet oxidation)	12	
Land application	6	6
Total from page TWO (2)	---	35
Total from page ONE (1)	---	21
Grand Total	---	56

- ☐ - A: 71 points and greater
☒ - B: 51 points – 70 points
☐ - C: 26 points – 50 points
☐ - D: 0 points – 25 points

APPENDIX #2 – RPA RESULTS:

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.1	13.1	1.5	13.1	55	0.01-3.9	2.131	3.337	Yes
Total Ammonia as Nitrogen (Winter) mg/L	12.1	11	3.1	11	55	0.06-4	1.536	2.756	Yes
Copper, Total Recoverable	40.6	77.7	24	77.7	16	2.5-30	0.664	2.589	Yes

N/A – Not Applicable

* - Units are (µg/L) unless otherwise noted.

** - If the number of samples is greater than 10, then the CV value must be used in the WQBEL for the applicable constituent.

*** - Coefficient of Variation (CV) is calculated by dividing the Standard Deviation of the sample set by the Mean of the same sample set.

RWC – Receiving Water Concentration. It is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (if applicable).

n – Is the number of samples.

MF – Multiplying Factor. 99% Confidence Level and 99% Probability Basis.

RP – Reasonable Potential. It is where an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).

Reasonable Potential Analysis is conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2). A more detailed version including calculations of this RPA is available upon request.

APPENDIX #3 – AFFORDABILITY:

**Missouri Department of Natural Resources
Water Protection Program
Affordability Determination and Finding
(In accordance with RSMo 644.145)**

City of Fulton
Residential Connections: 3,667
Commercial Connections: 626, including 15 Industrial and 25 City
Total Connections: 4,293

Introduction & Scope

Section 644.145 RSMo requires the Missouri Department of Natural Resources (Department) to make a “finding of affordability” when “issuing permits under” or “enforcing provisions of” state or federal clean water laws “pertaining to any portion of a combined or separate sanitary sewer system or publicly-owned treatment works.”

The City of Fulton (City) has entered into Abatement Order on Consent AOC No. 2013-WPCB-1241 with the Department, which requires the City to complete improvements to its collection system that will eliminate inflow and infiltration (I/I) and reduce the amount of Sanitary Sewer Overflows (SSOs) the wastewater treatment facility (facility) experiences. These improvements also include eliminating all discharges from the facility’s peak flow clarifier. In addition, the City will construct upgrades to its current facility that will enable the effluent to comply with all permitted effluent limitations contained in draft Missouri State Operating Permit (MSOP) No. MO-0103331. The AOC further provides an extension of time for the City to comply with *Escherichia Coliform* and ammonia limits as set forth in draft MSOP No. MO-0103331. The City has explained to the Department that it is not beneficial for the City to invest its finances in completing the upgrades to its facility until the City determines its design flow after completing I/I improvements to the collection system.

This affordability finding covers the City’s initial obligations to implement its I/I Program and complete upgrades to its facility that will enable the effluent to comply with all permitted effluent limitations contained in draft MSOP No. MO-0103331.

The City plans to spend at least \$693,000.00 for capital improvement items to address I/I in its collection system.

The 2013 Facility Plan improvements consist of improvements which will address issues identified in the Abatement Order on Consent (AOC) No. 2011-WPCB-1122. Improvements include the elimination of Outfall 002 as well as ammonia and disinfection improvements. Improvements are also designed to meet the current draft operating permit which reduces the allowable BOD and TSS limits. While this project will decrease the effluent ammonia levels and will be capable of being operated to achieve some denitrification, it will not significantly decrease the effluent Total Nitrogen (TN) and Total Phosphorus (TP) effluent levels. The expected capital cost of the project (in 2013 dollars) is \$12,980,000.

Once the 2013 Facility Plan improvements are operational, it is proposed that the receiving stream (Stinson Creek) be allowed to assimilate and that the Stinson Creek TMDL be re-evaluated to determine if biological nutrient removal is necessary. If required, the biological nutrient removal improvements will consist of a RAS selector basin, aeration basin baffle walls and mixers, replacement of RAS pumps, aeration basin distribution box replacement, an alum system, and site piping modifications. These improvements are expected to limit effluent concentrations to an annual average of 8 mg/L TN and 1.0 mg/L TP. The 2013 cost of the improvements is \$3,500,000. Biological nutrient removal improvements are proposed to be constructed by 2026. At a 3% cost inflation per year, the 2026 cost of the improvements is \$5,200,000.

Once the Tier 1 biological nutrient removal improvements are operational, it is proposed that Stinson Creek again be allowed to assimilate and that the Stinson Creek TMDL again be re-evaluated to determine if enhanced nutrient removal is necessary. If required, the enhanced nutrient removal improvements will consist of a denitrifying sand filtration facility, an intermediate pumping station, and associated site work and site piping. These improvements are expected to limit effluent concentrations to an annual average of 4 mg/L TN and 0.1mg/L TP. The 2013 cost of the improvements is \$7,500,000. Enhanced nutrient removal improvements are proposed to be constructed by 2035, if required. At a 3% cost inflation per year, the 2035 cost of the improvements is \$14,400,000.

A third tier of nutrient removal phase was considered but deemed impractical and unaffordable. Tier 3 would consist of running half of the effluent flow through a membrane treatment plant. The combined effluent would likely have limits of 2 mg/L TN and 0.05 TP (Striking a Balance Between Nutrient Removal and Sustainability¹). This would require the installation of microfiltration and reverse osmosis (RO) membranes. Additionally, the RO brine would require disposal. The estimated capital cost for a membrane plant to treat half of Fulton’s peak day flow would be approximately \$30-40 million dollars, in 2013 dollars, assuming deep well injection is

an appropriate RO brine disposal method. The \$30-40 million dollars would be in addition to the disinfection and ammonia, Tier 1, and Tier 2 improvements, while representing very marginal nutrient removal (approximately 2 mg/L TN and 0.05 mg/L TP). Operating costs would double over the Tier 2 operating costs. The authors of the referenced paper cite that using RO to remove TN and TP is, "impractical due to high costs, significant impacts on GHG (greenhouse gasses), and brine disposal challenges." (pg 635).

¹Falk MW, Reardon DJ, Jimenez J, Neethling JB. Water Environment Federation. Presented at the Nutrient Recovery and Management Conference, 2011.

Statutory Criteria

(1) A community's financial capability and ability to raise or secure necessary funding

Municipal Bond Rating (if applicable):	<u>No Bond Rating</u>
Bonding Capacity:	<u>\$10 Million</u>
(General Obligation Bond capacity allowed by constitution:	
cities=up to 20% of taxable tangible property	
sewer districts=up to 5% of taxable tangible property)	
Current outstanding debt:	<u>\$16.915 Million¹</u>

As of January 2012, the City has an obligation to pay \$2.165 million to the State Revolving Fund (SRF) for sewer projects. The City estimates that the remaining sewer SRF loan, in the amount of \$2,165,000, will be paid off in 2021 and the Drinking Water SRF loan will be paid off in 2029.

The City operates the Wastewater Department on the monthly charge for the average residential household using 5,000 gallons per month. The City passed a 25% rate increase in December 2010 and an additional rate increase of 25% was passed in December 2011. This gave the City approximately \$400,000.00 annually to spend towards I/I improvements in its collection system. Currently, the sewer rate is \$32.86 a month, not including a half-cent sales tax from the City's Capital Improvement Plan, which is approximately \$6.50 a month for sewer, and an additional \$6.50 per month for drinking water. According to the City, this rate structure is sufficient to pay for the I/I Improvements. Therefore the City has demonstrated financial capability to raise and secure the necessary funding.

(2) Affordability of pollution control options for the individuals or households of the community

Current annual operating costs (exclude depreciation):	<u>\$1,226,843.00</u>
Current user rate:	<u>\$39.36</u>
Estimated capital cost of pollution control options:	<u>\$33,273,000.00</u>
Annual costs of additional once 2016 upgrades completed	<u>\$1,600,000.00</u>
Annual costs of additional once 2016 upgrades completed	<u>Unknown</u>
Annual costs of additional once 2016 upgrades completed	<u>Unknown</u>
Estimated resulting monthly user rate after the 2016 upgrades:	<u>47.03</u>
Estimated resulting monthly user rate after the 2036 upgrades:	<u>\$73.21</u>
Adjusted Median Household Income:	<u>\$44,303.00</u>
Resulting User Rate as a percent of Median Household Income:	<u>1.98%</u> (does not include future operational cost increases for Tiers 1 and 2 for nutrient removal)

(Annual Rate/MHI)

	Financial Impact	Residential Indicator (Usage Rate as a percent of Median Household Income)
	Low	Less than 1% MHI
	Medium	Between 1% and 2% MHI
X	High	Greater than 2% MHI, (The percentage of MHI as calculated above does not consider operational costs of nutrient removal therefore it is assumed that the percentage is greater than 2%)

The residential user rate is 1.98% of MHI and will be a high burden for most customers.

¹ Per e-mail from City on 3/14/2012

(3) *An evaluation of the overall costs and environmental benefits of the control technologies*
Under the Missouri Clean Water Law and the Federal Clean Water Act, SSOs are prohibited because they cause public health and environmental hazards. Effective June 30, 2010, a revision to 10 CSR 20-7.015, Effluent Regulations eliminated the provision that allowed facilities to discharge effluent from their peak flow clarifiers, because these discharges bypass secondary treatment, a requirement of the Clean Water Act. Additionally, draft MSOP No. MO-0103331 requires disinfection to treat bacteria, and establishes stringent effluent limitations on the receiving stream, Stinson Creek, a Class C receiving stream, which is protected for warm water aquatic life, human health-fish consumption, whole body contact recreation, and livestock and wildlife watering. Stinson Creek was also on the 2008 Missouri 303(d) list for low dissolved oxygen and organic sediment and is now subject to the Stinson Creek TMDL. The City plans to spend approximately \$12,980,000 toward I/I improvements and facility upgrades over the next 13 years.

(4) *An Inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations:*

Potentially Distressed Populations	
Unemployment ² for [Fulton, Callaway County]	6.8%
Adjusted Median Household Income ³ [Fulton, Callaway County]	\$44,303.00
Percent Population Growth/Decline ⁴ (1990-2010)	+25.8%
Percent of Households in Poverty ⁵	13.0%

(5) *An assessment of other community investments relating to environmental improvements*

The City has no other obligations under this AOC.

(6) *An assessment of factors set forth in the United States Environmental Protection Agency's (EPA) guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards*

See Section (2) of this analysis for the residential indicator as outlined in the above-referenced EPA guidance.

Secondary indicators for consideration:

Socioeconomic, Debt and Financial Indicators				
Indicators	Strong (3 points)	Mid-Range (2 points)	Weak (1 point)	Score
Bond rating indicator ⁶	Above BBB or Baa	BBB or Baa	Below BBB or Baa	N/A ⁶
Overall net debt ⁷ as a % of full market property value ⁸	Below 2% 1.58%	2% - 5%	Above 5%	3
Unemployment Rate	>1% below Missouri's average	± 1% of Missouri's average	>1% above Missouri's average	2
Median household income	More than 25% above Missouri's MHI	± 25% of Missouri's MHI	More than 25% below Missouri's MHI	2
Property tax revenues ⁹ as a % of full market property value	Below 2% 0.5%	2% - 4%	Above 4%	3

² Unemployment data from Missouri Department of Economic Development for December 2011 -

<http://www.missourieconomy.org/pdfs/urc1112.pdf>

³ Median Household Income data from American Community Survey - Median income in the past 12 months -

<http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

Note: The median household income is adjusted for inflation according to the method suggested in the EPA CSO guidance for financial capability assessment and schedule development (<http://www.epa.gov/nepdes/pubs/csofc.pdf>)

⁴ 2010 Census Population Data - <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

2000 Census Population Data - <http://www.census.gov/popest/data/cities/totals/2009/tables/SUB-EST2009-04-29.xls> 1990 Census Population Data - <http://www.census.gov/prod/cen1990/cpl/cp-1-27.pdf>

⁵ Poverty data - American Community Survey - <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

⁶ City of Fulton has never had a bond rating (per Mayor Benton on 3/14/2012)

⁷ 2010 Fulton Comprehensive Annual Financial Report (Table 13 - page 73)

⁸ 2010 Fulton Comprehensive Annual Financial Report (Table 13 - page 73)

⁹ 2010 Fulton Comprehensive Annual Financial Report (Table 9 - page 69)

Property tax collection rate ¹⁰	Above 98% 106.4%	94% - 98%	Below 94%	3
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Average Score for Financial Capability Matrix: 2.6

Residential Indicator (from Criteria #2 above): 1.98% (The percentage of MHI as calculated above does not consider operational costs of nutrient removal therefore it is assumed that the percentage is greater than 2%)

Financial Capability Indicators Score from above ↓	Financial Capability Matrix Residential Indicator (User rate as a % of MHI)		
	Low (Below 1%)	Mid-Range (Between 1.0% and 2.0%)	High (Above 2.0%)
Weak (below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 – 2.5)	Low Burden	Medium Burden	High Burden
Strong (above 2.5)	Low Burden	Low Burden	X Medium Burden

Suggested Financial Burden:

Medium Burden

(7) An assessment of any other relevant local community economic condition

Fulton's population grew 25.8% from 1990-2010. In terms of economic strength, Callaway County is fairly above average when compared to other counties in the State. The percentage of labor force is 2% above the State average, the per capita wealth¹¹ is 2% above the State average, and per capita income is 23% below the State's average.

In terms of retail sales, Callaway County loses retail customers to surrounding counties and the County residents spend less than the state average on retail goods and services. The buying power index of Callaway County residents is about average when compared to the rest of the regional economy¹².

Conclusion

As a result of reviewing the above criteria, the Department hereby finds that the action described above will result in a medium burden with regard to the community's overall financial capability and a financial impact for most individual customers/households.

New Permit Requirements or Requirements Now Being Enforced:

The proposed new permit requirements may require the design, construction and operation of new technology. The facility is required to; upgrade to meet TMDL effluent limits for Carbonaceous Biochemical Oxygen Demand, Total Suspended Solids, Total Nitrogen and Total Phosphorus.

¹⁰ 2010 Fulton Comprehensive Annual Financial Report (Table 9 – page 69)

¹¹ Per capita wealth is calculated by taking a sum of appraised value of residential property, mobile homes and motor vehicles and this sum is then divided by County population.

¹² Source: http://www.missourieconomy.org/pdfs/central_wia_retail_trade_analysis.pdf

468

Appendix 5: Stinson Creek TMDL Implementation MOU

Stinson Creek Total Maximum Daily Load Implementation Memorandum of Understanding

The parties to this Stinson Creek Total Maximum Daily Load ("TMDL") Implementation Memorandum of Understanding ("MOU") are the Missouri Department of Natural Resources ("MDNR") and the City of Fulton, Missouri ("City"). The City and MDNR may collectively be referred to as the "Parties".

1. **Background.** The City of Fulton is the continuing authority for the Fulton Wastewater Treatment Plant ("WWTP"), which is operated under the Missouri State Operating Permit MO-0103331 ("NPDES permit"). The Parties entered into an Abatement Order on Consent ("AOC") on August 2, 2011 that includes obligations under a wastewater collection system and treatment facilities correction and management program. The Parties are currently revising the AOC to modify schedules for program implementation.

The Fulton WWTP discharges to Stinson Creek, which was first listed on Missouri's Section 303(d) List of impaired waters in 1994 due to low dissolved oxygen and high volatile suspended solids levels. MDNR and US Environmental Protection Agency ("USEPA") developed a TMDL to ultimately restore stream conditions and attain water quality standards. MDNR placed the proposed Stinson Creek TMDL on public notice on September 28, 2009. TMDL comments were provided by the City, the Missouri Public Utilities Alliance ("MPUA"), and USEPA with concerns over various scientific and implementation issues. The final Stinson Creek TMDL was approved by the USEPA on May 26, 2010. On January 11, 2013, MDNR placed the Fulton WWTP NPDES permit renewal on public notice, which was consistent with the approved TMDL implementation plan. USEPA made an interim objection to the draft NPDES permit during the public notice period, requesting that MDNR demonstrate that the draft permit is consistent with TMDL wasteload allocation ("WLA") assumptions. The Parties are currently developing a draft permit along with the AOC update and this MOU to resolve USEPA's interim objection.

2. **Total Maximum Daily Load Implementation Overview.** This MOU establishes phased implementation of the Stinson Creek TMDL using an adaptive management approach, in which plant improvements are followed by water quality studies and assessments until beneficial uses are restored, subsequent TMDL phases are developed, or the City implements the final phase of nutrient removal upgrades (Tier 2 as referenced in the June 2013 draft NPDES permit). Revisions to the TMDL may be considered following development of new water quality standards for dissolved oxygen and/or nutrient criteria for Stinson Creek, and review and approval of these criteria by the department, the Missouri Clean Water Commission and U.S. EPA. If new data demonstrate that these new water quality criteria may be attained with revised TMDL wasteload allocations, then subsequent TMDL phases may be developed by MDNR and/or the City.
3. **Implementation of Wastewater Treatment Facility Improvements.** Each phase of WWTP improvements are established within this MOU and are consistent with the effective NPDES operating permit and the City's investment and financing in wastewater infrastructure. The NPDES permit's schedule of compliance may be modified upon application if the City is not financially capable of implementing the next phase of upgrades. Alternatively, a discharger-specific variance may be granted upon application if the City is found to be financial incapable to implement the next phase of upgrades. This permit may be reopened and modified if changes become necessary to assure compliance with Missouri's Water Quality Standards.

MDNR will develop a multi-discharger variance for facilities subject to TMDLs that include WLAs for nutrients that are beyond the limits of technology and/or affordability. The City, in collaboration with MDNR, will provide

information for the WWTP's inclusion in this multi-discharger variance. Inclusion in the variance will be based upon the sequences covered in this MOU and will be consistent with the process within the 10 CSR 20-7.031 rulemaking proposed in June 2013. The variance will resolve the difference between the existing TMDL WLAs and the final limits established in the permit for enhanced nutrient removal (Tier 2 as referenced in the June 2013 draft NPDES permit). After MDNR concurrence, the variance will be presented to the Missouri Clean Water Commission ("MCWC") for approval. MDNR will submit the variance to USEPA for approval after MCWC approval.

4. **Stream Assessments, Impairment Decisions, and Subsequent TMDL Phases.** After each phase of WWTP improvements and water quality studies, MDNR will conduct stream assessment to determine attainment of water quality standards/uses and stream restorations and seek to remove the water quality standards impairment in the next biennial Integrated Missouri Water Quality Report (305(b) Report) if attainment is demonstrated. Assessment of Stinson Creek for attainment of applicable water quality standards will be conducted using the "Methodology for the Development of the Section 303(d) List" approved and in effect at the time of the assessment. MDNR will work collaboratively with the City to design and schedule monitoring activities. The Parties will meet to present and discuss stream assessment findings at least 90 days prior to MDNR's public notice of the impairment decision (305(b) Report or 303(d) List).

MDNR and/or the City may also develop a subsequent phase of the TMDL if new data demonstrate that water quality standards may be attained with revised load capacities or allocations. Phased limits and improvements may also be modified if new data or analysis reasonably demonstrates that water quality standards may be attained by different receiving water quality targets (e.g., enhanced nitrogen removal may be delayed if enhanced phosphorus removal is demonstrated to result in adequate receiving water conditions).

5. **MOU Implementation Schedule.** The Parties will implement the MOU commitments within the timeframes included in Attachment 1. Schedules may be modified due to various circumstances including, but not limited to, monitoring delays due to adverse hydrologic conditions, sequencing of next 305(b) Report, data not supporting 305(b) report removal, time requirements for criteria or TMDL approval, and MDNR or City funding limitations.
6. **NPDES Permit Modifications and MOU Termination.** If MOU timelines are adjusted during implementation, MDNR will modify NPDES permit schedules of compliance upon the application for modification by the City. In addition, MDNR will modify the City's NPDES permit upon application to establish a longer schedule of compliance, when practical, if MDNR does not perform stream assessments, the Parties disagree on assessment findings, or if USEPA disapproves the use attainment or stream restoration, or a subsequent TMDL phase. If water quality standards are attained, the City will apply for NPDES permit modification to remove future permit limits and schedules of compliance and maintain the effluent limitations and requirements that resulted in water quality standards attainment. MDNR will not unreasonably withhold any permit modification requests under these provisions. This MOU will be fulfilled and terminated after water quality standards are attained and permit modification is complete. Should future upgrades be necessary the city may utilize new socio-economic data to evaluate affordability and seek additional variance from water quality standards.

- 7. Correspondence.** Correspondence or documentation with regard to the conditions outlined in this MOU shall be directed to:

Mr. Bill Johnson
City of Fulton, Missouri
East 4th Street
P.O. Box 130
Fulton, MO 65251

Mr. John Madras
Water Protection Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Agreed to this __ day of _____, 2013

John Madras, Director
Water Protection Program
Missouri Department of Natural Resources

Agreed to this __ day of _____, 2013

The Honorable Mayor LeRoy Benton
City of Fulton, Missouri

ATTACHMENT 1

MOU IMPLEMENTATION SCHEDULE

MOU Task	Responsible Party	Target Completion Period
WWTP Improvements – 2013 Facility: Planning, Design, Construction, & Start-Up (Covered by AOC) • Bypass (Outfall 002) Elimination • Preliminary Treatment Upgrades • Ammonia Removal • Additional Clarification • Disinfection	City	May 2013 - Dec 2016
Establish Water Quality Improvement Goals & Beneficial Use/Stream Restoration Assessment	MDNR & City	Jul 2013 - Dec 2013
Prepare WQS Multi-Discharger Variance Package from Current TMDL WLAs to Enhanced Nutrient Removal Improvements	City	Aug 2013 – Jan 2014
Develop Quality Assurance Project Plan (QAPP) for Water Quality Studies	MDNR & City	Aug 2016 – Dec 2016
*Field Water Quality Studies: Dependent upon Stream Response & Hydrologic Conditions	MDNR & City	May 2017 – Sep 2018
Remove the impairment from the biennial Integrated Missouri Water Quality Report (305(b) Report) if data supports use attainment or stream restoration	MDNR & City	Jan 2019 - Dec 2020
WWTP Improvements – Biological Nutrient Removal Facility Planning & Design (Tier 1 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment or stream restoration)	City	May 2022 – May 2024
WWTP Improvements – Biological Nutrient Removal Construction & Start-Up (Tier 1 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment or stream restoration)	City	Nov 2024 - Dec 2026
Develop Quality Assurance Project Plan (QAPP) for Water Quality Studies	MDNR & City	Jan 2027 – May 2027
*Field Water Quality Studies: Dependent upon Stream Response & Hydrologic Conditions	MDNR & City	May 2027 – Sep 2028
Remove the impairment from the biennial Integrated Missouri Water Quality Report (305(b) Report) if data supports use attainment or stream restoration	MDNR & City	Jan 2029 - Dec 2030
WWTP Improvements – Enhanced Nutrient Removal Facility Planning & Design (Tier 2 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment or stream restoration)	City	May 2031 – May 2033
WWTP Improvements – Enhanced Removal Construction & Start Up (Tier 2 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment or stream restoration)	City	Nov 2033 – Dec 2035

*If the Department determines that the data from the field water quality studies does not support use attainment or stream restoration, the next phase of WWTF improvements shall be implemented as soon as practical.

Stinson Creek Total Maximum Daily Load Implementation Memorandum of Understanding

The parties to this Stinson Creek Total Maximum Daily Load ("TMDL") Implementation Memorandum of Understanding ("MOU") are the Missouri Department of Natural Resources ("MDNR") and the City of Fulton, Missouri ("City"). The City and MDNR may collectively be referred to as the "Parties".

1. **Background.** The City of Fulton is the continuing authority for the Fulton Wastewater Treatment Facility ("WWTF"), which is operated under the Missouri State Operating Permit MO-0103331 ("NPDES permit"). The Parties entered into an Abatement Order on Consent ("AOC") on August 2, 2011 that includes obligations under a wastewater collection system and treatment facilities correction and management program. The Parties revised the AOC to modify schedules for program implementation which was fully executed on August 21, 2013.

The Fulton WWTF discharges to Stinson Creek, which was first listed on Missouri's Section 303(d) List of impaired waters in 1994 due to low dissolved oxygen and violation of general criteria due to high volatile suspended solids levels. MDNR and the United States Environmental Protection Agency ("USEPA") developed a TMDL to ultimately restore stream conditions and attain water quality standards. MDNR placed the proposed Stinson Creek TMDL on public notice on September 28, 2009. TMDL comments were provided by the City, the Missouri Public Utilities Alliance ("MPUA"), and USEPA with concerns over various scientific and implementation issues. The final Stinson Creek TMDL was approved by the USEPA on May 26, 2010. On January 11, 2013, MDNR placed the Fulton WWTF NPDES permit renewal on public notice, which was consistent with the approved TMDL implementation plan. USEPA made an interim objection to the draft NPDES permit during the public notice period, requesting that MDNR demonstrate that the draft permit is consistent with TMDL wasteload allocation ("WLA") assumptions. The City's draft NPDES permit was revised and went through public notice from June 28 to July 29, 2013 and the Parties entered into a revised AOC and this MOU to resolve USEPA's interim objection.

2. **Total Maximum Daily Load Implementation Overview.** This MOU establishes phased implementation of the Stinson Creek TMDL using an adaptive management approach, in which plant improvements are followed by water quality studies and assessments until beneficial uses are restored, subsequent TMDL phases are developed, or the City implements the final phase of nutrient removal upgrades (Tier 2 as referenced in the June 2013 draft NPDES permit). Revisions to the TMDL, including revised wasteload and load allocations, may be undertaken in the event that new dissolved oxygen criteria and/or nutrient criteria are established for Stinson Creek. Any new site-specific DO or Nutrient criteria would need to be approved by the Missouri Clean Water Commission ("MCWC") and USEPA.

RECEIVED

MAR 13 2014

WATER PROTECTION PROGRAM

3. **Implementation of Wastewater Treatment Facility Improvements.** Each phase of WWTF improvements are established within this MOU and are consistent with the renewed NPDES operating permit and the City's investment and financing in wastewater infrastructure. The NPDES permit's schedule of compliance may be modified upon application if the City is ~~not~~ financially incapable of implementing the next phase of upgrades. Alternatively, a discharger-specific variance may be granted upon application if the City is found to be financial incapable to implement the next phase of upgrades. This permit may be reopened and modified if changes become necessary to assure compliance with Missouri's Water Quality Standards.

The City will develop a UAA Factor 6 variance related to the nutrient WLAs that are beyond the limits of technology and/or affordability. The variance will be based upon the sequences covered in this MOU and will be consistent with the process within the 10 CSR 20-7.031 rulemaking proposed in June 2013. The variance will resolve the difference between the existing TMDL WLAs and the final limits established in the permit for enhanced nutrient removal (Tier 2 as referenced in the June 2013 draft NPDES permit). The variance will be presented to the MCWC for approval. If approved by the MCWC, MDNR will submit the variance to USEPA for approval.

4. **Stream Assessments, Impairment Decisions, and Subsequent TMDL Phases.** After each phase of WWTF Improvements, MDNR will perform an in-stream water quality study to determine whether applicable water quality standards have been attained in Stinson Creek.
 - a. Attainment will be assessed by: (1) comparing monitoring results to the state's numeric criteria for dissolved oxygen and narrative criteria for the protection of aquatic life, as translated using the Missouri Stream Condition Index (MSCI) scale described in the February 2002 MDNR document "Biological Criteria for Wadeable/Perennial Streams In Missouri" (or subsequently developed methods agreed to by the department and the city) and (2) applying procedures described in that version of the MDNR "Methodology for the Development of the Section 303(d) List" in effect at the time of the assessment. MSCI scores will be compared to those of reference streams applicable to Stinson Creek (e.g., size, geology, etc.) contained within the Ozark/Moreau/Loutre Ecological Drainage Unit. The City will pursue continued implementation consistent with the phased approach outlined in this Agreement if Stinson Creek is found to continue to be impaired. If narrative criteria for the protection of aquatic life are attained and statewide dissolved oxygen criteria are not attained, then these findings may form the basis for development of site-specific dissolved oxygen criteria. MDNR will work collaboratively with the City to design and schedule monitoring activities. The Parties will meet to present and discuss stream assessment findings at least 90 days prior to MDNR's public notice of the impairment decision during the next biennial Integrated Missouri Water Quality Report (305(b) Report).

- b. If Stinson Creek is determined to be attaining applicable water quality standards, then MDNR will remove Stinson Creek from Category 4 during the next 305(b) Report and no further additional actions shall be required under this MOU or the TMDL.
 - c. Phased limits and improvements may also be modified if new data or analyses reasonably demonstrate that water quality standards may be attained by different receiving water quality targets or improvements (e.g., enhanced nitrogen removal may be delayed if enhanced phosphorus removal is demonstrated to lead to attainment of water quality standards or habitat improvements may result in use attainment). In addition, phased limits and improvements may be modified if a demonstration is made that factors other than point source nutrient or organic loading cause the impairment (e.g., habitat, nonpoint source pollution or impacts, etc.).
- 5. **MOU Implementation Schedule.** The Parties will implement the MOU commitments within the timeframes included in Attachment 1. Schedules may be modified due to various circumstances including, but not limited to, monitoring delays due to adverse hydrologic conditions, sequencing of the next 305(b) Reports, time requirements for criteria or TMDL approval, and MDNR or City funding limitations.
- 6. **NPDES Permit Modifications and MOU Termination.** If MOU timelines are adjusted during implementation, MDNR will modify the NPDES permit schedule of compliance upon the application for modification by the City. In addition, MDNR will modify the City's NPDES permit upon application to establish a longer schedule of compliance, when practical, if MDNR does not perform stream assessments, the Parties disagree on assessment findings, or if USEPA disapproves the use attainment decision or a subsequent TMDL phase. If water quality standards are attained, the City will apply for NPDES permit modification to remove future permit limits and schedules of compliance. In addition, the effluent limitations and requirements that resulted in water quality standards attainment will be maintained. MDNR will not unreasonably withhold any permit modification requests under these provisions. This MOU will be fulfilled and terminated after water quality standards are attained and permit modification is complete. Should future upgrades be necessary, the City may utilize new socio-economic data to evaluate affordability and seek additional variance from water quality standards.

7. **Correspondence.** Correspondence or documentation with regard to the conditions outlined in this MOU shall be directed to:

Mr. Bill Johnson
City of Fulton, Missouri
East 4th Street
P.O. Box 130
Fulton, MO 65251

Mr. John Madras
Water Protection Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Agreed to this 18th day of March, ~~2013~~ 2014



John Madras, Director
Water Protection Program
Missouri Department of Natural Resources

Agreed to this 8 day of January, ~~2013~~ 2014



The Honorable Mayor LeRoy Benton
City of Fulton, Missouri

ATTACHMENT 1 **MOU IMPLEMENTATION SCHEDULE**

MOU Task	Responsible Party	Target Completion Period
WWTF Improvements – 2013 Facility: Planning, Design, Construction, & Start-Up (Covered by AOC) • Bypass (Outfall 002) Elimination • Preliminary Treatment Upgrades • Ammonia Removal • Additional Clarification • Disinfection	City	May 2013 - Dec 2016
Establish Water Quality Improvement Goals & Beneficial Use Assessment	MDNR & City	Jul 2013 - Dec 2013
Develop Quality Assurance Project Plan (QAPP) for Water Quality Studies	MDNR & City	Aug 2016 – Dec 2016
*Field Water Quality Studies: Dependent upon Stream Response & Hydrologic Conditions	MDNR & City	May 2017 – Sep 2018
Remove the Impairment from the biennial Integrated Missouri Water Quality Report (305(b) Report) if data supports use attainment	MDNR & City	Jan 2019 - Dec 2020
WWTF Improvements – Biological Nutrient Removal Facility Planning & Design (Tier 1 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	May 2022 – May 2024
WWTF Improvements – Biological Nutrient Removal Construction & Start-Up (Tier 1 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	Nov 2024 - Dec 2026
Develop Quality Assurance Project Plan (QAPP) for Water Quality Studies	MDNR & City	Jan 2027 – May 2027
*Field Water Quality Studies: Dependent upon Stream Response & Hydrologic Conditions	MDNR & City	May 2027 – Sep 2028
Remove the impairment from the biennial Integrated Missouri Water Quality Report (305(b) Report) if data supports use attainment	MDNR & City	Jan 2029 - Dec 2030
WWTF Improvements – Enhanced Nutrient Removal Facility Planning & Design (Tier 2 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	May 2031 – May 2033
WWTF Improvements – Enhanced Removal Construction & Start Up (Tier 2 as referenced in the June 2013 draft NPDES permit, only if needed depending upon use attainment)	City	Nov 2033 – Dec 2035

*If the Department determines that the data from the field water quality studies does not support use attainment, the next phase of WWTF Improvements shall be implemented as soon as practical.

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

www.dnr.mo.gov

SEP -3 2013

CERTIFIED MAIL: 7009 0080 0000 1909 4829
RETURN RECEIPT REQUESTED

The Honorable Leroy Benton, Mayor
City Of Fulton
P.o. Box 130
18 E 4th St
Fulton, MO 65251-1705

RE: City of Fulton Wastewater Treatment Facility, MO-0103331, Callaway County

Dear Mayor Benton:

Enclosed, please find the fully executed revised Abatement Order on Consent (AOC) No. 2013-WPCB-1241 between the city of Fulton and the Missouri Department of Natural Resources. As part of the AOC, the city agrees to continue completing the requirements of Appendix A.

In addition, as part of the revised AOC, the city agrees to submit to the Department, for review and approval by October 1, 2013, a Facility Plan developed by a professional engineer registered in the state of Missouri recommending upgrades or replacement of the city's wastewater treatment facility to enable the effluent to comply with the final permitted limitations for Ammonia as N and E. coli as contained in Missouri State Operating Permit No. MO-0103331. The city further agrees to submit a complete application for a construction permit, including engineering plans and specifications, to the Department within 365 days of the Department's approval of the Facility Plan and complete all construction activities, including eliminating discharges from Outfall No. 002, on or before **December 31, 2016**. A revised summary schedule is enclosed for the city's reference. Please note this AOC also includes a schedule for implementation of the facility's phased biological nutrient removal to address the Stinson Creek Total Maximum Daily Load, as shown in Exhibit "A". Finally, the city has agreed to comply with the Missouri Clean Water Law and its implementing regulations for any and all future operations in the state of Missouri.



The Honorable LeRoy Benton
Page 2

If you have any questions concerning this letter, you may contact Ms. Joan Doerhoff at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65201-0176, or (573) 522-3779, or at joan.doerhoff@dnr.mo.gov.

Thank you for your cooperation in this matter.

Sincerely,

WATER PROTECTION PROGRAM



Paul Dickerson, Chief
Compliance and Enforcement Section

PD:jdww

Enclosure

- c: Ms. Irene Crawford, Director, Northeast Regional Office (w/enclosure)
Mr. Bill Johnson, City of Fulton, Director of Administration, 18 East 4th Street, Fulton,
MO 65251 (w/enclosure)
Mr. Darrell Dunlap, City of Fulton, Superintendent of Utilities, 18 East 4th Street, Fulton,
MO 65251 (w/enclosure)
Mr. Chris Wieberg, Water Protection Program (w/enclosure)
Mr. John Hoke, Water Protection Program (w/enclosure)

Summary Schedule for City of Fulton Abatement Order on Consent No. 2013-WPCB-1241

Deliverables	Scheduled Due Date
1. Submit to the Department, for review and approval, a Facility Plan developed by a professional engineer licensed to practice in the state of Missouri recommending upgrading or replacement of the facility to enable the effluent to comply with final limitations for Total Ammonia N. and E. coli as contained in the operating permit.	October 1, 2013
2. Submit to the Department, for review and approval, a complete application for a construction permit, including engineering plans and specifications for upgrades to the facility to enable the effluent to comply with final limitations for Total Ammonia N. and E. coli as contained in the operating permit.	Within 365 days' of the Department's approval of the Facility Plan
3. Complete all construction activities and achieve compliance with final permitted effluent limitations for Total Ammonia N. and E. coli as contained in the operating permit.	December 31, 2016
4. Submit to the Department: a) a Statement of Work Completed Form, signed, sealed and dated by a professional engineer registered in the State of Missouri certifying that the project was completed in accordance with Department approved plans and specifications and b) a complete application for the modified MSOP No. MO-0103331.	Within 15 days of completing construction
5. Eliminate all discharges from Outfall No. 002	December 31, 2016
6. Submit to the Department, a letter certifying that all the activities detailed in the Capital Improvement Plan (CIP) have been completed as approved by the Department.	Within 30 days of completing all activities in the CIP
7. Semi Annual Reporting. Submit to the Department a status report on or before the 28th day of the month following the end of the six (6) month period. This report shall contain a summary of the progress and status of all projects and programs required by this Appendix A. See appendix for report requirements.	By the 28 th day of the month following the 6 month period

AOC 19-001

**BEFORE THE
DEPARTMENT OF NATURAL RESOURCES
STATE OF MISSOURI**

IN THE MATTER OF:

The City of Fulton

Wastewater Treatment Facility

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)

)

No. 2013-WPCB-1241

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SERVE:

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)

The Honorable LeRoy Benton, Mayor

The City of Fulton

)

)

)

ABATEMENT ORDER ON CONSENT

- I. Upon the effective date of Abatement Order on Consent (AOC) No. 2013-WPCB-1241, AOC No. 2013-WPCB-1241 will supersede AOC No. 2011-WPCB-1122 issued on August 2, 2011. AOC No. 2011-WPCB-1122 is now null and void and of no further force of effect.

II. NOTICE TO RECIPIENTS OF ABATEMENT ORDERS

The issuing of this Abatement Order on Consent (AOC) number 2013-WPCB-1241, by the Missouri Department of Natural Resources, is a formal administrative action by the State of Missouri and is being issued because the wastewater treatment facility and its corresponding collection system serving the city of Fulton is in violation of the Missouri Clean Water Law (MCWL) and its implementing regulations. This AOC is issued under the authorities of Sections 640.130, 640.131, 644.056 and 644.079, RSMo. Failure to

comply with this AOC is, by itself, a violation of the MCWL Section 644.076.1, RSMo. Litigation may occur without further administrative notice if there is not compliance with the requirements of this AOC. This AOC does not constitute a waiver or a modification of any requirements for the MCWL, or its implementing regulations, all of which remain in full force and effect. Compliance with the terms of this AOC shall not relieve the city of liability for, or preclude the Department from, initiating an administrative or judicial enforcement action to recover civil penalties for any future violations of the MCWL, or to seek injunctive relief, pursuant to Chapter 644, RSMo.

III. FINDINGS OF FACT

- A. The city is a municipality with a population of approximately 12,128. As part of the services it provides its citizens, the city owns and operates a wastewater treatment facility, located in the SE ¼, NW ¼, NE ¼, Section 21, Township 47 North, Range 3 East, in Callaway County, Missouri. The city's facility consists of an oxidation ditch with sludge holding tanks and aerobic digesters. The design population equivalent is 47,500; the design flow is 2.93 million gallons per day (MGD), with an actual flow of 1.7 MGD. The facility also consists of a single cell lagoon used for inflow and infiltration (I/I), with an actual flow dependent upon rainfall. The city also maintains sewer lines throughout the city that collect and carry wastewater from residential, commercial, and industrial sources to its facility.
- B. The Department issued Missouri State Operating Permit (MSOP) No. MO-0103331 to the city with an effective date of August 12, 2005. The August 12, 2005, MSOP No. MO-0103331 contains specific effluent limitations for Outfall's no. 001 and 002. Effluent from the city's facility discharges from Outfall no. 001 to Stinson Creek, a class C receiving stream, pursuant to the requirements of MSOP no. MO-0103331. Effluent discharges from the facility's single cell lagoon during wet weather events, through Outfall No. 002, into Stinson Creek, pursuant to the requirements of MSOP No. MO-0103331.
- C. Stinson Creek was listed on the 2008 303(d) list for low dissolved oxygen and organic sediment, but was removed from the 2012 303(d) list since the Total Maximum Daily Load (TMDL) has been written.
- D. Stinson Creek is waters of the state as defined by Section 644.016 (27) RSMo.
- E. On August 24, 2009, Department staff conducted a compliance inspection of the facility and collection system. During the inspection of the facility, Department staff observed that one baffle was missing on the outer ring on a rotor in the

oxidation ditch and observed partially treated wastewater leaking from clarifier no. 4 and onto concrete below the clarifier.

- F. Department staff also observed that the South lift station was only equipped with one operational pump; the Hawk Lake lift station did not contain an operational phone dialer alarm; and the fence surrounding the Hawk Lake lift station did not have warning signs posted on all four (4) sides.
- G. As part of this inspection, staff reviewed the city's Sanitary Sewer Overflow (SSO) records and Discharge Monitoring Reports and documented that the city's collection system experiences increased flows during wet weather events.
- H. On March 5, 2010, Department staff conducted an investigation of a reported SSO from the city's collection system and observed evidence that sewage had overflowed from the Route O lift station and nearby manhole, which entered Smith Branch.
- I. Smith Branch is waters of the state as defined by Section 644.016 (27), RSMo.
- J. On March 12, 2010, the Department received an SSO reporting form from the city estimating the volume of untreated wastewater discharged during the March 5, 2010, incident to be 846,000 gallons.
- K. Based upon the violations documented by Department staff during the March 5, 2010, investigation, the Department issued Notice of Violation (NOV) No. NER2010031514215166 to the city on April 6, 2010.
- L. MCWL and Section 644.096, RSMo, authorize the state, or any political subdivision or agency to recover actual damages, including all costs and expenses necessary to establish or collect any sums under Sections 644.006 to 644.141, RSMo, and the costs and expenses of restoring any waters of the state to their condition as they existed before violation, sustained by it because of any violation.
- M. The Department dispatched employees to investigate the March 5, 2010, SSO. In doing so, the Department incurred costs and expenses, including but not limited to, water sampling and analysis, photographs, and travel expenses. These costs incurred by the Department total three thousand two hundred thirty-eight dollars and seventy-eight cents (\$3,238.78).
- N. On December 13, 2010, the Department received a cashier's check in the amount of three thousand two hundred thirty-eight dollars and seventy-eight cents (\$3,238.78) made payable to the "State of Missouri" from the city as payment for the Department's investigative costs.

- O. On December 13, 2010, the Department received a cashier's check in the amount of twenty-thousand dollars and no cents (\$20,000.00) made payable to the "Callaway County Treasurer, as custodian of the Callaway County School Fund" from the city for payment of a civil penalty to resolve the past violations of the MCWL and its implementing regulations.
- P. On May 5, 2011, city representatives met with Department staff to discuss concerns regarding the draft of MSOP no. MO0103331, which was sent to the city for consideration on April 14, 2011. During this meeting, city officials explained that it's not beneficial for the city to invest its finances in completing the upgrades to its facility until the city determines the design flow after completing all the city's I/I reduction program. The city further requested an additional two (2) years to meet the final effluent limitations from Outfall no. 001 for Escherichia coliform (E. coli) and Total Ammonia Nitrogen (N).
- Q. On June 28, 2011, the city submitted to the Department, a formal request for extension to comply with the final effluent limitations for E. coli and Total Ammonia (N). In this correspondence, the city explained that the currently proposed final effluent limitations in the draft operating permit are not achievable within the timeframes proposed. In addition, the city requested that the Department allow additional time to reduce peak flows and to design a properly-sized and effective wastewater treatment system at a lower cost for the city. Finally, the city requested that AOC No. 1080 be modified to extend the timelines for obtaining compliance with the final effluent limitations for E. coli and Total Ammonia (N).
- R. On May 20, 2013, Department staff met to discuss the draft operating permit, sent to the city on April 19, 2013, which represents the first phase of implementation of the Stinson Creek TMDL. The phased adaptive management approach includes facility improvements followed by water quality studies to evaluate if water quality standards for Stinson Creek have been attained. The draft operating permit also includes a phased implementation for technology based nutrient limits. During this meeting, city representatives requested that improvements to the facility which enable the effluent to comply with final limits for E. coli and Total Ammonia as N and elimination of all discharges from Outfall No. 002 be completed by December 31, 2016. City officials also presented a schedule to the Department that includes timeframes for construction of disinfection facilities, ammonia improvements, and implementation of nutrient removal, which extends to the year 2035, if applicable, after implementation of the phased improvement(s). (see attached Exhibit "A")

IV. CONCLUSIONS OF LAW

The violations of the MCWL and its implementing regulations alleged herein and found to have been committed by the city at its facility and its collection system are as follows:

1. Placed or caused or permitted to be placed, water contaminants in a location where they are reasonably certain to cause pollution of waters of the state, in violation of Sections 644.051.1(1) and 644.076.1, RSMo; and
2. Failed to prevent a bypass of wastewater from the collection system of the facility, in violation of the Standard Conditions, Part III, Section C, of MSOP No. MO-0103331 and Section 644.076.1, RSMo.

V. AGREEMENT

- A. The Department and the city desire to amicably resolve all claims that might be brought against the city for the violations alleged above in Section IV, Conclusions of Law, without the city admitting the validity or accuracy of such claims.
- B. The provisions of this AOC shall apply to and be binding upon the parties executing this AOC, their successors, assigns, agents, subsidiaries, affiliates, and lessees, including the officers, agents, servants, corporations, and any persons acting under, through, or for the parties. Any changes in ownership or corporate status, including but not limited to any transfer of assets or real or personal property, shall not affect the responsibilities of the city under this AOC. If the city sells or otherwise transfers the Facility, then the city shall cause as a condition of such sale or transfer, that the buyer will assume the obligations of the city under this AOC in writing. In such event, the city shall provide thirty (30) days prior written notice of such assumption to the Department.
- C. The city shall complete improvements to its collection system to work toward eliminating incidents of SSOs from its collection system and discharges from Outfall No. 002. The city shall fully implement all of the requirements of Appendix A of this AOC, Wastewater Collection System and Treatment Facilities Correction and Management Program in accordance with the timeline submitted pursuant to Appendix A, Paragraph 3.A. All documents submitted to the Department pursuant to Appendix A, shall be subject to review and approval. By the Department and shall be fully implemented by the city upon approval. If the Department comments and/or requests modification of any documents submitted to the Department, pursuant to Appendix A, the city shall submit a written response to the Department to address and satisfy said Department comments.

The written response shall be submitted within thirty (30) days of receipt of said comments or within the time frame specified in the Department's correspondence, whichever is earlier. The city shall implement the I/I Assessment and Corrective Action Plan as approved by the Department on June 7, 2011, which became fully effective upon the date the Department approved the schedule in writing and the schedule shall be enforceable as a condition of compliance with this AOC.

- D. Immediately upon becoming aware that a deadline or milestone as set forth in this AOC will not be completed by the required deadline, the city shall notify the Department by telephone or electronic mail i) identifying the deadline that will not be completed; ii) identifying the reason for failing to meet the deadline; and iii) proposing an extension to the deadline. Within five (5) days of notifying the Department, the city shall submit to the Department for review and approval, a written request containing the same basic provisions of i, ii, and iii listed above. The Department may grant an extension if it deems appropriate. Failure to submit a written notice to the Department may constitute a waiver of the city's right to request an extension and may be grounds for the Department to deny the city an extension.
- E. Should the city fail to meet the terms of this AOC, including the terms set out in paragraph C and Appendix A, the city shall pay stipulated penalties in the following amount:

<u>Days of Violation</u>	<u>Amount of Penalty</u>
1 to 30 days	\$500.00 per day
31 to 90 days	\$1,000.00 per day
91 days and above	\$2,500.00 per day

Stipulated penalties will be paid in the form of a certified or cashier's check made payable to "Callaway County Treasurer, as custodian of the Callaway County School Fund." Any such stipulated penalty shall be paid within ten (10) days of demand by the Missouri Department of Natural Resources and shall be delivered to:

Accounting Program
Missouri Department of Natural Resources
P.O. Box 477
Jefferson City, MO 65102-0176

- F. The stipulated penalties provided for in this AOC shall be in addition to any other rights, remedies or sanction available to the Department for the city's violation of this AOC.
- G. Nothing in this AOC forgives the city from future non-compliance with the laws of the state of Missouri, nor requires the Department or state of Missouri to forego pursuing by any legal means for any noncompliance with the laws of the State of Missouri. The terms stated herein constitute the entire and exclusive agreement of the parties. There are no other obligations of the parties, be they express or implied, oral or written, except those expressly set forth herein. The terms of this AOC supersede all previous memoranda or understanding, notes, conversations, and agreements, express or implied. This AOC may not be modified verbally.
- H. By signing this AOC, all signatories assert that they have read and understood the terms of this AOC, and that they have the authority to sign this AOC on behalf of their respective parties.
- I. The effective date of the AOC shall be the date the Department signs the Agreement. The Department shall send a fully executed copy of this AOC to the city for its records.
- J. The city shall comply with the MCWL, Chapter 644, RSMo and its implementing regulations at all times in the future.

VI. TERMINATION

Upon completion of all requirements contained in AOC No. 2013-WPCB-1241, the city may submit a written request to the Department to terminate the AOC. The termination request shall include documentation of all activities the city has undergone to complete all requirements and conditions of the AOC. In the event the Department fails to respond to the city's termination request within thirty (30) days receipt of the request, AOC No. 2013-WPCB-1241 shall hereby terminate. This AOC does not cover implementation of the TMDL, as outlined in the schedule contained in Exhibit "A".

VII. FINDING OF AFFORDABILITY

Pursuant to Section 644.145 (2) (c), the city hereby waives the requirement for the Department to develop an affordability finding with respect to the requirements required by this AOC No. 2013-WPCB-1241.

VIII. RIGHT OF APPEAL

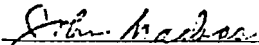
By signing this AOC No. 2013-WPCB-1241, the city consents to its terms and waives any right to appeal, seek judicial review, or otherwise challenge the terms and conditions of this AOC pursuant to Sections 621.250, 640.010, 640.013, 644.056.3, 644.079.2, Chapter 536 RSMo, 644.145, 10 CSR 20-1.020, 10 CSR 20-3.010, 10 CSR 20-6.020 (5), the Missouri Constitution, or any other source of law.

VIV. CORRESPONDENCE AND DOCUMENTATION

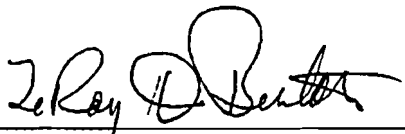
Correspondence or documentation with regard to conditions outlined in this AOC shall be directed to:

Ms. Joan Doerhoff
Compliance and Enforcement Section
Water Protection Program
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Agreed to and Ordered this 21st day of August, 2013


John Madras, Director
Water Protection Program
Missouri Department of Natural Resources

Agreed to and Ordered this 13th day of August, 2013


The Honorable Mayor LeRoy Benton

Copies of the foregoing served by certified mail to:

The Honorable LeRoy Benton
Mayor of City of Fulton
East 4th Street
P.O. Box 130
Fulton, MO 65251-0130

CERTIFIED MAIL

- c. Ms. Diane Huffman, Environmental Protection Agency
Mr. Chris Wieberg, Chief, Operating Permits Section
Ms. Irene Crawford, Director, Northeast Regional Office
Missouri Clean Water Commission

APPENDIX A

WASTEWATER COLLECTION SYSTEM AND TREATMENT FACILITIES CORRECTION AND MANAGEMENT PROGRAM

All documents required by Appendix A shall be submitted to the Missouri Department of Natural Resources for review and approval. Upon the date the Department approves of these documents the city shall implement the provisions of each document as a condition of compliance with the Abatement Order on Consent.

1. Definitions

A. **Building/Private Property Backup.** Any release of wastewater from the city's Sanitary Sewer System to buildings or private property. The city is not responsible for any backup caused by blockages, flow conditions, or malfunctions of a private service connection or other piping/conveyance system that is not owned or operationally controlled by the city or overland flooding not emanating from the city's Sanitary Sewer System.

B. **Bypass.** The diversion of waste streams from any portion of a wastewater treatment facility or sewer system including any discharge from the wastewater treatment facility that receives less than secondary treatment, whether or not authorized by the MSOP.

C. **Collection System and Sanitary Sewer System.** The sewage collection and transmission system including all pipes, force mains, gravity sewer lines, pumping stations, manholes, and appurtenances thereto that are owned or operated by the city and designed to convey wastewater to the city's wastewater treatment facility or to one or more points of discharge.

D. **Infiltration.** Water other than wastewater that enters a Sanitary Sewer System, including entry through sewer service connections and foundation drains, from the ground through such means as defective pipes, pipe joints, connections, or manholes.

E. **Inflow.** Storm water that enters a Sanitary Sewer System, including service connections, from sources such as, but not limited to, roof leaders, cellar, yard, and area drains, manholes, cross connections between storm and sanitary sewers, catch basins, and cooling towers, and storm water surface runoff.

F. **Inflow and Infiltration (I/I).** The total quantity of water from inflow and infiltration without distinguishing the source.

G. **Private Service Connection.** The portion of the Collection System, not owned by the city, used to convey wastewater from building or buildings to that portion of the Collection System owned by the city.

H. **Sanitary Sewer Overflow (SSO).** An overflow, spill, diversion, or release of wastewater from the city's Collection System to waters of the state, as well as to public or private

property including Building/Private Property Backups. Wastewater backups into buildings that are caused by blockages, flow conditions, or malfunctions in a building lateral, other piping or conveyance system that is not owned or operationally controlled by the city or that are the result of overland, surface flooding not emanating from the city's sewer system, are not SSOs for the purpose of this AOC.

I. **Wastewater Treatment Facility (WWTF).** The sewage treatment plant operated by the city and all components of such sewage treatment plant.

2. Information Collection and Utilization

SSO, Bypass and Basement Backup Tracking and Data Management System (Tracking and Management System). On May 10, 2011, the city submitted to the Department a description of a written or electronic Tracking and Management System that documents information regarding SSO events, bypasses and basement backups; and allows the city to organize and analyze information regarding SSO events, bypasses and basement backups collected by the city. On June 9, 2011, the Department sent correspondence to the city providing comments and approving the submitted Tracking and Management System. The city has been implementing the provisions of the Tracking and Management System since receiving the Department's approval and to the extent practicable, incorporating this system into a computer-based program that allows authorized city personnel access to the information.

The Tracking and Management System includes all information necessary for the city to establish an effective and useful information collection and management system for SSOs, bypasses, backup events, and response to such events. The Tracking and Management System is designed and operated in a manner that allows the city to use the system for operation and maintenance activities, long term management of the city's wastewater treatment system, and development of the I/I Assessment and Corrective Action Plan pursuant to Section 3 of this Appendix and the Maintenance and Repair Program provisions required by Section 4 of this Appendix. The Tracking and Management System also incorporates the quality assurance and quality control practices the city will follow to ensure the accuracy and reliability of data collected and managed. The Tracking and Management System includes, but is not limited to, the following:

- (1) The date and time (or best estimate) that the SSO, bypass or backup event began;
- (2) Precipitation data (including intensity and duration);
- (3) The source of information for the SSO, bypass or backup event, e.g., employee observation, electronic reporting or warning system, citizen complaint;
- (4) The specific and general location of the SSO, bypass or backup (i.e., street address and specific basin or geographic area of the city);
- (5) The best estimate (unless monitored) of the duration of the discharge, including the ending date and time;

- (6) The best estimate (unless monitored) of the volume discharged, including flow metering data, where applicable;
- (7) Sampling results from any sampling performed;
- (8) If applicable, the water body into which the wastewater was released;
- (9) The specific cause(s) of the discharge or backups, if known, whether it was caused by the city's collection system or private service connections;
- (10) Actions taken to respond to the discharge event and minimize the duration and/or impacts of the discharge;
- (11) The specific actions the city will use to prevent recurrence of the discharge;
- (12) The date and time a repair crew arrived on-site and the personnel involved, if repair was required; and
- (13) The date and time of notification to the Department's Regional Office.

3. I/I Assessment and Corrective Action Plan

A. On May 27, 2011, the Department received a copy of the city's I/I Assessment and Corrective Action Plan which was developed by a professional engineer registered in the State of Missouri, to assess I/I. The I/I Assessment Plan divided the collection system into three (3) designated areas that were prioritized by the city based on known problem areas and included a schedule to inspect the lines in the designated areas. Sewer lines that were installed within the last fifteen (15) years may be excluded from the plan unless the city has reason to believe they are a major source of I/I. On June 7, 2011, the Department sent correspondence to the city providing comments and approving the submitted I/I Assessment Plan.

B. On December 6, 2012, the Department received correspondence from the city documenting that all the required work contained in the Department approved I/I Assessment Plan has been completed according to the approved Plan.

C. On April 4, 2013, the city submitted a Capital Improvement Plan (CIP) to the Department for review and approval. The CIP was developed by a professional engineer registered in the State of Missouri and recommends and prioritizes I/I improvements. The CIP also included a schedule to obtain construction permits, if necessary, and complete the recommended improvements and requirements of the I/I Assessment and Corrective Action Plan. On June 12, 2013, the Department sent correspondence to the city commenting on the CIP and on July 17, 2013, the city submitted a revised CIP to the Department for review and approval.

D. Within thirty (30) days of completing all of the activities of the CIP the city shall submit to the Department a letter certifying that all of the activities detailed in the CIP have been completed as approved by the Department.

E. The city agrees that its development and implementation of the I/I Assessment Plan will be considered as part of the city's efforts to address eliminating all discharges of effluent from Outfall No. 002 and the city shall complete all projects required to eliminate all discharges of effluent from Outfall No. 002 by December 31, 2016. In the event the city

demonstrates to the Department that its I/I improvements have showed significant progress toward reducing I/I in the collection system yet the city is unable to eliminate all discharges of effluent from Outfall No. 002 by December 31, 2016, the city shall submit to the Department, a written request for extension for eliminating the discharges from Outfall No. 002, that includes a detailed explanation for requesting the extension, within thirty (30) days prior to the due date for the completion schedule as stated above. Upon Department receipt of the request for extension, the Department will consider granting the city's request as it deems appropriate.

F. By October 1, 2013, the city agrees to submit to the Department, for review and approval, a Facility Plan developed by a professional engineer licensed to practice in the State of Missouri recommending upgrading or replacement of the city's facility to enable the effluent discharging from the facility to comply with the final permitted effluent limitations for Total Ammonia N and E. coli as contained in MSOP No. MO-013331 (see attached Exhibit "B").

G. Within 365 days of the date the Department's approval of the Facility Plan, the city agrees to submit to the Department, for review and approval, a complete application for a construction permit, including engineering plans and specifications, for providing upgrades or replacement of the city's facility to enable the effluent discharging from the facility to comply with all final permitted effluent limitations for Total Ammonia N and E. coli as contained in MSOP No. MO-013331 (see attached Exhibit "B").

H. By December 31, 2016, the city agrees to complete all construction activities and achieve compliance with the final permitted effluent limitations for Total Ammonia N and E. coli as set forth in MSOP No. MO-0103331 (see attached Exhibit "B").

I. Within fifteen (15) days of completing all construction activities, the city agrees to submit to the Department, a letter of authorization, Statement of Work Completed, or a certification of construction from a professional engineer registered in the State of Missouri certifying that the project has been completed in accordance with the approved plans and specification and a complete application to modify MSOP No. MO-0103331.

4. Maintenance and Repair Program

A. On February 6, 2012, the city submitted a Maintenance and Repair Program (M&R Program) for its wastewater collection system to the Department for review and approval. The M&R Program was based upon the United States Environmental Protection Agency's (EPA) Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (Document No. EPA 305-B-05-002). The city's M&R Program included a schedule for routine and systematic inspection, maintenance and repair of the collection system. B. The city's M&R Program included a process to reevaluate the assumptions, schedules, and conclusions of its M&R Program, including information developed through implementation of the I/I Assessment Plan, and revise the M&R Program as necessary to ensure it continues to function as a viable planning tool that enables the city to continue to effectively and efficiently operate its wastewater treatment system and comply with its MSOP.

The reevaluation process shall be planned no less frequently than every two years after preparation of the city's M&R Program.

5. Reporting and Record Keeping

A. Immediate Reporting. The city shall verbally notify the Department within twenty-four (24) hours from the time the city becomes aware of any discharges from the WWTF that receives less than secondary treatment, regardless of whether or not the discharge is a violation of the city's MSOP and each SSO event, with the exception of backups that are contained within a building. The city also agrees to submit a written report to the Department within five (5) days from the time the city becomes aware of any dry or wet weather bypasses or SSOs.

1. The written report shall contain the date, time, location, and estimated volume of the event, precipitation amount and duration, if any, and any additional information the city determines helpful in explaining the event and its circumstances or impacts.
2. Reporting required under this Subsection to the Department is in addition to any reporting required by the city's MSOP.

B. Semi Annual Reporting. Within six (6) months of the effective date of this Agreement, and each six (6) month period thereafter, the city shall submit to the Department a status report on or before the 28th day of the month following the end of the six (6) month period. This report shall contain a summary of the progress and status of all projects and programs required by this Appendix, including, but not limited to:

1. A summary of information collected pursuant to Section 2 of this Appendix, including a tabulation of each SSO, bypass and backup event.
2. A list of all confirmed I/I sources, the date (best estimate) of confirmation, whether the I/I source is on private or public property, and the removal or correction date. If the source has not yet been removed or corrected then include the expected date. If the source is located on private property, identify all actions taken by the city and the date taken to secure the source(s) removal or correction.
3. A description of all preventative maintenance activities undertaken by the city. This shall include information identifying specific pipe segments, manholes, pump stations or other structures within the collection system which were inspected, cleaned, repaired or replaced. Where available, maps shall be submitted documenting the information provided in the report.
4. The status of implementation of all plans required by Sections 3 and 4 of this Appendix, including a statement as to whether specific scheduled milestone dates in the schedules included in each approved plan were met. Upon completion of a specific project in the approved plans, the city shall submit a certification that the

specified work has been completed, including the following documentation of the completed work to the Department:

- a. For work performed by a private contractor city personnel shall complete an inspection report for the completed project and certification by the city's Engineer that the specified work has been completed;
- b. For work performed by the city's personnel a copy of the work order for the project verified by the city's Engineer as complete; and
- c. A list of all MSOP violations occurring within the six (6) month period. This tabular listing shall include the date of the violation, the parameter exceeded, the permit limit, the reported concentration, and any additional relevant information included in each DMR, within the six (6) month period, or on the cover letter for the DMR (i.e., claim of upset, etc.).

C. The city shall maintain copies of all written submissions prepared pursuant to this Agreement and this Appendix for at least thirty-six (36) months.

6. Requesting Termination of Reporting Requirements

Upon successful completion of all construction activities identified within the approved I/I Assessment Plan under Section 3 of this Appendix; full and successful implementation of all action required pursuant to Sections 2 and 4 of this Appendix; and reporting as required by Section 5 of this Appendix, the city may submit a report to the Department demonstrating such compliance and implementation of the required actions and request termination of the reporting requirements contained in Section 5.B. of this Appendix. The Department will consider termination of the reporting requirements contained in Section 5.B. of this Appendix when all actions identified above have been completed and the city demonstrates that it has corrected deficiencies within the physical structures comprising the city's wastewater treatment system, has significantly improved operation and maintenance processes, data collection and utilization, and has eliminated, to the extent feasible, SSOs, bypasses and backups. The reporting requirements of this Appendix shall remain in effect until a written notice of termination is issued by the Department.

EXHIBIT A

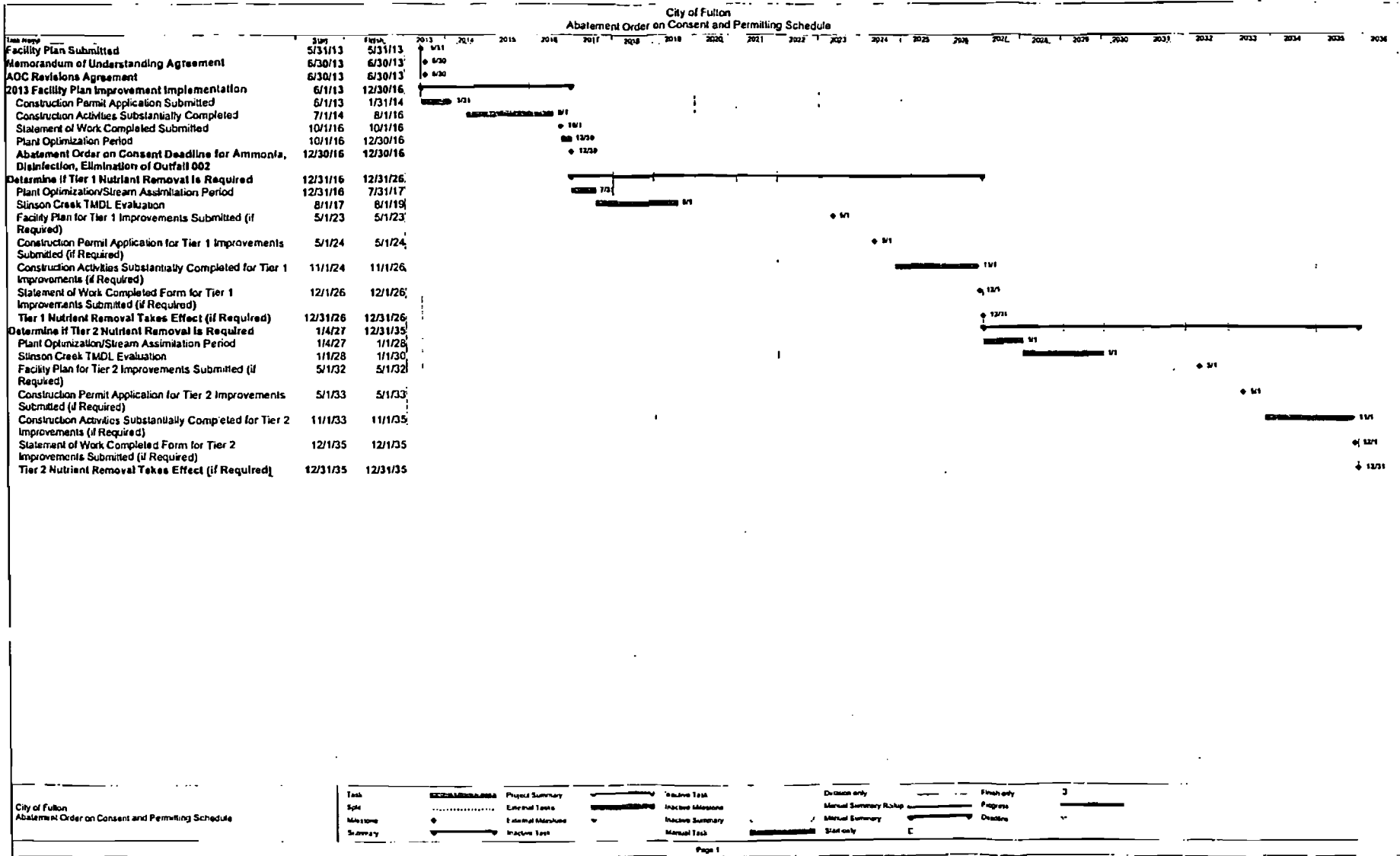


EXHIBIT B

MONITORING FREQUENCY	Please see Minimum Sampling and Reporting Frequency Requirements in the Derivation and Discussion Section below.	
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- * - Monitoring requirement only.
- ** - # of colonies/100mL; the Monthly Average for *E. coli* is a geometric mean.
- *** - Parameter not previously established in previous state operating permit.

Basis for Limitations Codes:

- | | |
|--|------------------------------------|
| 1. State or Federal Regulation/Law | 7. Antidegradation Policy |
| 2. Water Quality Standard (includes RPA) | 8. Water Quality Model |
| 3. Water Quality Based Effluent Limits | 9. Best Professional Judgment |
| 4. Lagoon Policy | 10. TMDL or Permit in lieu of TMDL |
| 5. Ammonia Policy | 11. WET Test Policy |
| 6. Dissolved Oxygen Policy | 12. Antidegradation Review |

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow.** In accordance with [40 CFR Part 122.44(i) (1) (ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.
- **Carbonaceous Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS).**
Technology based, advanced treatment limits are being placed in the permits of facilities that have to upgrade to meet very low CBOD/BOD limits with nutrient WLAs.

Total Phosphorus, Total Nitrogen.

The TMDL for Stinson Creek states that to address nutrient levels in Stinson Creek the EPA nutrient eco-region reference concentrations for the Southeastern Temperate Forested Plains and Hills Eco-region IX were used. These eco-regional values were used to establish a waste load allocation/permit limit for total N and total P in the TMDL. The intent of EPA's recommended eco-regional nutrient criteria is to identify baseline conditions of surface waters that are minimally impacted by human activities and protect against the adverse effects of nutrient over enrichment from cultural eutrophication. These EPA recommended water quality criteria are suggested baselines which should be used by state and tribes to help identify problem areas, serve as a basis for state and tribal water quality criteria for nutrients, and evaluate relative success in reducing cultural eutrophication. The development document for the Eco region IX states that EPA does not recommend identifying nutrient concentrations that must be met at all times, rather a seasonal or annual averaging period (e.g., based on weekly measurements) is considered appropriate. Therefore the permit establishes an annual average limitation for total nitrogen and total phosphorus and requires weekly monitoring.

The application of annual average permit limits to nutrients is appropriate to reconcile consistent permit compliance requirements with biological nutrient removal system variability when attempting to achieve low effluent concentrations (WEF/WERF Study of BNR Plants Achieving Very Low N and P Limits: Evaluation of Technology Performance and Process Reliability¹). Biological nutrient removal efficiency is particularly dependent on temperature, which must be accounted for in midwestern climates. The use of annual averages for nutrient limits is consistent with the nutrient permitting approaches in numerous states, including Kansas and Iowa (proposed) within Region 7.

¹Bott CB, Parker DS, Jimenez J, Miller MW, Neethling JB. Water Sci Technol. 2012;65(5):808-15.

Tier 1 and 2 final limits have been established in this permit as part of the phased implementation of the Stinson Creek TMDL. These limits are technology based. Establishing appropriate permit limits that implement nitrogen and phosphorus waste load allocations that are based on eco-region nutrient values are different from setting limits for other parameters such as toxic or conventional pollutants. Toxics pollutants are subject to short term limitations to address acute toxicity and conventional pollutants are subject to technology based requirements which have been determined to be achievable as a short term permit requirement. The season nature of nutrients versus the constant loading of toxic and conservative pollutants also lends itself to innovative implementation. The TMDL sets waste load allocations beyond what can be achieved via the current treatment technologies economically available at the time of the permits issuance. The department has chosen to establish limitations that reflect what can be achieved via technology rather than the water quality based (eco-region) nutrient criteria/waste load allocations expressed in the TMDL. Given that the requirements expressed in the permit for nitrogen and phosphorus are technology based it is appropriate to establish the limit as an annual long term average.

Use attainment for nutrient impairment is appropriately evaluated annually given the long term nutrient biological and physical processes that occur in a stream receiving nutrient discharges. Therefore, developing effluent limitations require innovative implementation procedures. The efficiency of treatment of nutrients by biological nutrient removal is highly sensitive to ambient temperature and is not effective at lower temperatures. Thus, the effluent loading of nutrients is not constant due to seasonal temperature fluctuations in Missouri climates. Even a simple steady-state model for permit development such as

dividing the annual limit by 12 and establishing that value as the monthly limit is therefore, not appropriate. Such a limit does not account for seasonal fluctuations in effluent loading. Because of the effect of temperature on the treatment efficiency and the normal variation in ambient temperature over shorter time periods, it is impracticable to develop appropriate daily, weekly or monthly limits for nutrients.

Tier 1 Improvements- Biological Nutrient Removal:

Once the 2013 Facility Plan improvements are operational, it is proposed that the receiving stream (Stinson Creek) be allowed to assimilate and that the Water quality in Stinson Creek will be reassessed against applicable water quality standards to determine if biological nutrient removal is necessary. The biological nutrient removal improvements will consist of a RAS selector basin, aeration basin baffle walls and mixers, replacement of RAS pumps, aeration basin distribution box replacement, a chemical (e.g., alum) addition system, and site piping modifications. These improvements are expected to limit effluent concentrations to an annual average of 8 mg/L TN and 1.0 mg/L TP. The 2013 cost of the improvements is \$3,500,000. Biological nutrient removal improvements are proposed to be constructed by 2026. At a 3% cost inflation per year, the 2026 cost of the improvements is \$5,200,000.

Tier 2 Improvements- Enhanced Nutrient Removal:

Once the Tier 1 biological nutrient removal improvements are operational, it is proposed that Stinson Creek again be allowed to assimilate and that the Water quality in Stinson Creek will be reassessed against applicable water quality standards to determine if enhanced nutrient removal is necessary. The enhanced nutrient removal improvements will consist of a denitrifying sand filtration facility, an intermediate pumping station, and associated site work and site piping. These improvements are expected to limit effluent concentrations to an annual average of 4 mg/L TN and 0.1mg/L TP. The 2013 cost of the improvements is \$7,500,000. Enhanced nutrient removal improvements are proposed to be constructed by 2035. At a 3% cost inflation per year, the 2035 cost of the improvements is \$14,400,000.

A third tier of nutrient removal phase was considered but deemed impracticable and unaffordable. Tier 3 would consist of running half of the effluent flow through a membrane treatment plant. The combined effluent would likely have limits of 2 mg/L TN and 0.05 TP (Striking a Balance Between Nutrient Removal and Sustainability¹). This would require the installation of microfiltration and reverse osmosis (RO) membranes. Additionally, the RO brine would require disposal. The estimated capital cost for a membrane plant to treat half of Fulton's peak day flow would be approximately \$30-40 million dollars, in 2013 dollars, assuming deep well injection is an appropriate RO brine disposal method. The \$30-40 million dollars would be in addition to the disinfection and ammonia, Tier 1, and Tier 2 improvements, while representing very marginal nutrient removal (approximately 2 mg/L TN and 0.05 mg/L TP). Operating costs would double over the Tier 2 operating costs. The authors of the referenced paper cite that using RO to remove TN and TP is, "impractical due to high costs, significant impacts on GHG (greenhouse gasses), and brine disposal challenges." (pg 635).

¹Falk MW, Reardon DJ, Jimenez J, Neethling JB. Water Environment Federation. Presented at the Nutrient Recovery and Management Conference, 2011.

- **pH.** Effluent limitation range is ≥ 6.5 or $6.5 - 9.0$ Standard pH Units (SU), as per the applicable section of 10 CSR 20-7.015. pH is not to be averaged.
- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3] default pH 7.8 SU. No mixing considerations allowed; therefore, WLA = appropriate criterion.

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: May 1 – October 31

Chronic WLA: $C_c = ((4.5415 + 0.0)1.5 - (0.0 * 0.01))/4.5415$
 $C_c = 1.5 \text{ mg/L}$

Acute WLA: $C_c = ((4.5415 + 0.0)12.1 - (0.0 * 0.01))/4.5415$
 $C_c = 12.1 \text{ mg/L}$

$LTA_c = 1.5 \text{ mg/L } (0.448) = 0.672 \text{ mg/L}$

$LTA_s = 12.1 \text{ mg/L } (0.112) = 1.4 \text{ mg/L}$

$[CV = 2.13, 99^{\text{th}} \text{ Percentile, 30 day avg.}]$

$[CV = 2.13, 99^{\text{th}} \text{ Percentile}]$

Use most protective number of LTA_c or LTA_s .

APPENDIX #2 – RPA RESULTS:

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.1	13.1	1.5	13.1	55	0.01-3.9	2.131	3.337	Yes
Total Ammonia as Nitrogen (Winter) mg/L	12.1	11	3.1	11	55	0.06-4	1.536	2.756	Yes
Copper, Total Recoverable	40.6	77.7	24	77.7	16	2.5-30	0.664	2.589	Yes

N/A – Not Applicable

* - Units are (µg/L) unless otherwise noted.

** - If the number of samples is greater than 10, then the CV value must be used in the WQBEL for the applicable constituent.

*** - Coefficient of Variation (CV) is calculated by dividing the Standard Deviation of the sample set by the Mean of the same sample set.

RWC – Receiving Water Concentration. It is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (if applicable).

n – Is the number of samples.

MF – Multiplying Factor. 99% Confidence Level and 99% Probability Basis.

RP – Reasonable Potential. It is where an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).

Reasonable Potential Analysis is conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2). A more detailed version including calculations of this RPA is available upon request.

**Missouri Department of Natural Resources
Water Protection Program
Affordability Determination and Finding
(In accordance with RSMo 644.145)**

City of Fulton
Residential Connections: 3,667
Commercial Connections: 626, including 15 Industrial and 25 City
Total Connections: 4,293

Introduction & Scope

Section 644.145 RSMo requires the Missouri Department of Natural Resources (Department) to make a "finding of affordability" when "issuing permits under" or "enforcing provisions of" state or federal clean water laws "pertaining to any portion of a combined or separate sanitary sewer system or publicly-owned treatment works."

The City of Fulton (City) has entered into Abatement Order on Consent AOC No. 2013-WPCB-1241 with the Department, which requires the City to complete improvements to its collection system that will eliminate inflow and infiltration (I/I) and reduce the amount of Sanitary Sewer Overflows (SSOs) the wastewater treatment facility (facility) experiences. These improvements also include eliminating all discharges from the facility's peak flow clarifier. In addition, the City will construct upgrades to its current facility that will enable the effluent to comply with all permitted effluent limitations contained in draft Missouri State Operating Permit (MSOP) No. MO-0103331. The AOC further provides an extension of time for the City to comply with *Escherichia Coliform* and ammonia limits as set forth in draft MSOP No. MO-0103331. The City has explained to the Department that it is not beneficial for the City to invest its finances in completing the upgrades to its facility until the City determines its design flow after completing I/I improvements to the collection system. The Department has not renewed the MSOP for the City's facility at this time, as the financial affordability analysis from the Permitting Section has not been completed yet.

This affordability finding covers the City's initial obligations to implement its I/I Program and complete upgrades to its facility that will enable the effluent to comply with all permitted effluent limitations contained in draft MSOP No. MO-0103331.

The City plans to spend at least \$693,000.00 for capital improvement items to address I/I in its collection system.

The 2013 Facility Plan improvements consist of improvements which will address issues identified in the Abatement Order on Consent (AOC) No. 2011-WPCB-1122. Improvements include the elimination of Outfall 002 as well as ammonia and disinfection improvements. Improvements are also designed to meet the current draft operating permit which reduces the allowable BOD and TSS limits. While this project will decrease the effluent ammonia levels and will be capable of being operated to achieve some denitrification, it will not significantly decrease the effluent Total Nitrogen (TN) and Total Phosphorus (TP) effluent levels. The expected capital cost of the project (in 2013 dollars) is \$12,980,000.

Once the 2013 Facility Plan improvements are operational, it is proposed that the receiving stream (Stinson Creek) be allowed to assimilate and that the Stinson Creek TMDL be re-evaluated to determine if biological nutrient removal is necessary. If required, the biological nutrient removal improvements will consist of a RAS selector basin, aeration basin baffle walls and mixers, replacement of RAS pumps, aeration basin distribution box replacement, an alum system, and site piping modifications. These improvements are expected to limit effluent concentrations to an annual average of 8 mg/L TN and 1.0 mg/L TP. The 2013 cost of the improvements is \$3,500,000. Biological nutrient removal improvements are proposed to be constructed by 2026. At a 3% cost inflation per year, the 2026 cost of the improvements is \$5,200,000.

Once the Tier 1 biological nutrient removal improvements are operational, it is proposed that Stinson Creek again be allowed to assimilate and that the Stinson Creek TMDL again be re-evaluated to determine if enhanced nutrient removal is necessary. If required, the enhanced nutrient removal improvements will consist of a denitrifying sand filtration facility, an intermediate pumping station, and associated site work and site piping. These improvements are expected to limit effluent concentrations to an annual average of 4 mg/L TN and 0.1 mg/L TP. The 2013 cost of the improvements is \$7,500,000. Enhanced nutrient removal improvements are proposed to be constructed by 2035, if required. At a 3% cost inflation per year, the 2035 cost of the improvements is \$14,400,000.

A third tier of nutrient removal phase was considered but deemed impracticable and unaffordable. Tier 3 would consist of running half of the effluent flow through a membrane treatment plant. The combined effluent would likely have limits of 2 mg/L TN and 0.05 TP (Striking a Balance Between Nutrient Removal and Sustainability). This would require the installation of microfiltration and reverse osmosis (RO) membranes. Additionally, the RO brine would require disposal. The estimated capital cost for a membrane plant to treat half of Fulton's peak day flow would be approximately \$30-40 million dollars, in 2013 dollars, assuming deep well

injection is an appropriate RO brine disposal method. The \$30-40 million dollars would be in addition to the disinfection and ammonia, Tier 1, and Tier 2 improvements, while representing very marginal nutrient removal (approximately 2 mg/L TN and 0.05 mg/L TP). Operating costs would double over the Tier 2 operating costs. The authors of the referenced paper cite that using RO to remove TN and TP is, "impractical due to high costs, significant impacts on GHG (greenhouse gasses), and brine disposal challenges." (pg 635).

¹Falk MW, Reardon DJ, Jimenez J, Neethling JB. Water Environment Federation. Presented at the Nutrient Recovery and Management Conference, 2011.

Statutory Criteria

(1) A community's financial capability and ability to raise or secure necessary funding

Municipal Bond Rating (if applicable):

No Bond Rating

Bonding Capacity:

\$10 Million

(General Obligation Bond capacity allowed by constitution:

cities=up to 20% of taxable tangible property

sewer districts=up to 5% of taxable tangible property)

Current outstanding debt:

\$16.915 Million¹

As of January 2012, the City has an obligation to pay \$2.165 million to the State Revolving Fund (SRF) for sewer projects. The City estimates that the remaining sewer SRF loan, in the amount of \$2,165,000, will be paid off in 2021 and the Drinking Water SRF loan will be paid off in 2029.

The City operates the Wastewater Department on the monthly charge for the average residential household using 5,000 gallons per month. The City passed a 25% rate increase in December 2010 and an additional rate increase of 25% was passed in December 2011. This gave the City approximately \$400,000.00 annually to spend towards I/I improvements in its collection system. Currently, the sewer rate is \$32.86 a month, not including a half-cent sales tax from the City's Capital Improvement Plan, which is approximately \$6.50 a month for sewer, and an additional \$6.50 per month for drinking water. According to the City, this rate structure is sufficient to pay for the I/I Improvements. Therefore the City has demonstrated financial capability to raise and secure the necessary funding.

(2) Affordability of pollution control options for the individuals or households of the community

Current annual operating costs (exclude depreciation):

\$1,226,843.00

Current user rate:

\$39.36

Estimated capital cost of pollution control options:

\$33,273,000.00

Annual costs of additional once 2016 upgrades completed

\$1,600,000.00

Annual costs of additional once 2016 upgrades completed

Unknown

Annual costs of additional once 2016 upgrades completed

Unknown

Estimated resulting monthly user rate after the 2016 upgrades:

47.03

Estimated resulting monthly user rate after the 2036 upgrades:

\$73.21

Adjusted Median Household Income:

\$44,303.00

Resulting User Rate as a percent of Median Household Income:

1.98% (does not include future operational cost increases for Tiers 1 and 2 for nutrient removal)

(Annual Rate/MHI)

	Financial Impact	Residential Indicator (Usage Rate as a percent of Median Household Income)
	Low	Less than 1% MHI
	Medium	Between 1% and 2% MHI
X	High	Greater than 2% MHI, (The percentage of MHI as calculated above does not consider operational costs of nutrient removal) therefore it is assumed that the percentage is greater than 2%)

The residential user rate is 1.98% of MHI and will be a medium burden for most customers.

(3) An evaluation of the overall costs and environmental benefits of the control technologies

Under the Missouri Clean Water Law and the Federal Clean Water Act, SSOs are prohibited because they cause public health and environmental hazards. Effective June 30, 2010, a revision to 10 CSR 20-7.015, Effluent Regulations eliminated the provision

¹ Per e-mail from City on 3/14/2012

that allowed facilities to discharge effluent from their peak flow clarifiers, because these discharges bypass secondary treatment, a requirement of the Clean Water Act. Additionally, draft MSOP No. MO-0103331 requires disinfection to treat bacteria, and establishes stringent effluent limitations on the receiving stream, Stinson Creek, a Class C receiving stream, which is protected for warm water aquatic life, human health-fish consumption, whole body contact recreation, and livestock and wildlife watering. Stinson Creek was also on the 2008 Missouri 303(d) list for low dissolved oxygen and organic sediment and is now subject to the Stinson Creek TMDL. The City plans to spend approximately \$12,980,000 toward I/I improvements and facility upgrades over the next 13 years.

- (4) *An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations:*

Potentially Distressed Populations	
Unemployment ² for [Fulton, Callaway County]	6.8%
Adjusted Median Household Income ³ [Fulton, Callaway County]	\$44,303.00
Percent Population Growth/Decline ⁴ (1990-2010)	+25.8%
Percent of Households in Poverty ⁵	13.0%

- (5) *An assessment of other community investments relating to environmental improvements*
The City has no other obligations under this AOC.

- (6) *An assessment of factors set forth in the United States Environmental Protection Agency's (EPA) guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards*

See Section (2) of this analysis for the residential indicator as outlined in the above-referenced EPA guidance.
Secondary indicators for consideration:

Socioeconomic, Debt and Financial Indicators				
Indicators	Strong (3 points)	Mid-Range (2 points)	Weak (1 point)	Score
Bond rating indicator ⁶	Above BBB or Baa	BBB or Baa	Below BBB or Baa	N/A ⁶
Overall net debt ⁷ as a % of full market property value ⁸	Below 2% 1.58%	2% - 5%	Above 5%	3
Unemployment Rate	>1% below Missouri's average	± 1% of Missouri's average	>1% above Missouri's average	2
Median household income	More than 25% above Missouri's MHI	± 25% of Missouri's MHI	More than 25% below Missouri's MHI	2
Property tax revenues ⁹ as a % of full market property value	Below 2% 0.5%	2% - 4%	Above 4%	3
Property tax collection rate ¹⁰	Above 98% 106.4%	94% - 98%	Below 94%	3

² Unemployment data from Missouri Department of Economic Development for December 2011 - <http://www.missourieconomy.org/pdfs/ure11112.pdf>

³ Median Household Income data from American Community Survey - Median income in the past 12 months <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

Note: The median household income is adjusted for inflation according to the method suggested in the EPA CSO guidance for financial capability assessment and schedule development (<http://www.epa.gov/nepdes/pubs/csoc.pdf>)

⁴ 2010 Census Population Data - <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

2000 Census Population Data - <http://www.census.gov/popest/data/cities/totals/2009/tables/SUB-EST2009-04-29.xls> 1990 Census Population Data - <http://www.census.gov/prod/cen1990/cp1/cp-1-27.pdf>

⁵ Poverty data - American Community Survey - <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

⁶ City of Fulton has never had a bond rating (per Mayor Benton on 3/14/2012)

⁷ 2010 Fulton Comprehensive Annual Financial Report (Table 13 - page 73)

⁸ 2010 Fulton Comprehensive Annual Financial Report (Table 13 - page 73)

⁹ 2010 Fulton Comprehensive Annual Financial Report (Table 9 - page 69)

¹⁰ 2010 Fulton Comprehensive Annual Financial Report (Table 9 - page 69)

Average Score for Financial Capability Matrix: 2.6
Residential Indicator (from Criteria #2 above): 1.98% (The percentage of MHI as calculated above does not consider operational costs of nutrient removal therefore it is assumed that the percentage is greater than 2%)

Financial Capability Matrix			
Financial Capability Indicators Score from above ↓	Residential Indicator (User rate as a % of MHI)		
	Low (Below 1%)	Mid-Range (Between 1.0% and 2.0%)	High (Above 2.0%)
Weak (below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 – 2.5)	Low Burden	Medium Burden	High Burden
Strong (above 2.5)	Low Burden	Low Burden	X Medium Burden

Suggested Financial Burden: Medium Burden

- (7) *An assessment of any other relevant local community economic condition*
Fulton's population grew 25.8% from 1990-2010. In terms of economic strength, Callaway County is fairly above average when compared to other counties in the State. The percentage of labor force is 2% above the State average, the per capita wealth¹¹ is 2% above the State average, and per capita income is 23% below the State's average.

In terms of retail sales, Callaway County loses retail customers to surrounding counties and the County residents spend less than the state average on retail goods and services. The buying power index of Callaway County residents is about average when compared to the rest of the regional economy¹².

Conclusion

As a result of reviewing the above criteria, the Department hereby finds that the action described above will result in a medium burden with regard to the community's overall financial capability and a financial impact for most individual customers/households.

New Permit Requirements or Requirements Now Being Enforced:

The proposed new permit requirements may require the design, construction and operation of new technology. The facility is required to; upgrade to meet TMDL effluent limits for Carbonaceous Biochemical Oxygen Demand, Total Suspended Solids, Total Nitrogen and Total Phosphorus.

¹¹ Per capita wealth is calculated by taking a sum of appraised value of residential property, mobile homes and motor vehicles and this sum is then divided by County population.

¹² Source: http://www.missourieconomy.org/pdfs/central_wia_retail_trade_analysis.pdf



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7**

11201 Renner Boulevard
Lenexa, Kansas 66219

JUN 09 2014

Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, Missouri 65102

ATTN: NPDES Permits and Engineering Section/Permit Comments
Variance Request CWC-V-2-12

The Missouri Department of Natural Resources recently placed variance request CWC-V-2-12 on public notice and invited the public and interested stakeholders to submit written comments on this variance request through June 9, 2014. The City of Fulton submitted to MDNR a discharger-specific variance on November 7, 2013, to address the aquatic life designated use and applicable criteria for total nitrogen, total phosphorus, carbonaceous biochemical oxygen demand and total suspended solids based on a determination that water quality based controls to address these water quality standards would result in substantial and widespread economic and social impact consistent with 40 CFR § 131.10(g). The City of Fulton has an NPDES permit for its discharges into Stinson Creek, which currently has a TMDL addressing the impaired aquatic life use/low dissolved oxygen and organic sediment at issue in this variance. This letter transmits the U.S. Environmental Agency's comments on the variance request.

General Comments

The EPA appreciates the opportunity to comment on the proposed variance and looks forward to Missouri's submission of the variance to the EPA for review consistent with Section 303(c) of the CWA and its implementing regulations at 40 CFR § 131.

The EPA conducted its own analysis of substantial and widespread social and economic impact and the report is enclosed with this letter for your information.

Specific Comments

Many of the EPA's comments below contain the word "answer" which refers to MDNR's italicized "answer" language contained in pages 3-6 of the May 9, 2014 Public Notice.

Page 1, last sentence - The variance description here ("...the City requests that permit limits developed utilizing the WLA from the TMDL be modified..."), and in some other portions of the document, is inaccurate. A water quality variance is a *temporary* change in a State/Tribe's water quality standards and its relevant criteria (it is not a "modification to permit limits"), usually regarding a specific pollutant or pollutants. The underlying water quality standards remain in place for longer periods of time not addressed by the terms of the variance. MDNR should phrase the request as "In the variance application, the City requests that water quality standards for the variance period support a modification of permits limits utilizing the WLA from the TMDL until December 31, 2035 as follows."

Page 2, answer to #1. - The basis for the variance is that the cost of reverse osmosis (RO) would result in substantial and widespread economic impacts [per 40 CFR § 131.10(g)(6)] not that RO use would be "without commensurate benefit as it pertains to the pollutant loading to Stinson Creek." This needs to be made clear upon submission to the EPA for review.

Page 3, answer to #2. - The text states that, "[t]he City of Fulton dismissed a relocation alternative early on given the distance to an alternative receiving stream as well as the cost of associated to [sic] relocation." Please provide the data and rationale the City used to make this decision.

Page 6, answer to #4. - The text states that "*final* (emphasis added) nutrient limits of 4 mg/L for total nitrogen and 0.1 mg/L for total phosphorus will be implemented on a quarterly basis, taking effect on December 31, 2035." The variance is a *temporary* change to the State's WQS; to make the variance targets *final* limits would require a permanent change to the designated use. The 4 mg/L TN and 0.1 mg/L TP are the varied criteria which should be applicable *immediately* upon approval of the variance. Perhaps a more apt description of the 4 mg/L TN and 0.1 mg/L TP would be "*variance* nutrient limits." This needs to be made clear upon submission to the EPA for review.

Page 7, answer to #5 - The text states that one of the considerations that form the basis of rejecting RO is that it is not "commensurate to the minimal improvement in effluent quality." Again, the basis for this variance is the cost of reverse osmosis (RO) would result in substantial and widespread economic impacts [per 40 CFR 131.10(g)(6)]. This needs to be made clear upon submission to the EPA for review.

Comments on Table 2:

General comment - The EPA understands and appreciates the adaptive management approach MDNR is taking with respect to actions to ultimately meet applicable water quality standards in both an effective and efficient manner. To appropriately implement such an approach in a variance and justify the timeframe, each step in the schedule needs to reflect either 1) time to plan an action, 2) time to implement an action, or 3) time to evaluate the outcome of an action. The EPA recognizes and appreciates the contingency described on page 9, whereby the schedule could be accelerated. The EPA encourages MDNR to retain this provision. However, the EPA does need to see the base schedule that reflects actions and specific steps that correspond to the three categories above.

Specific Comments:

Dec 2016-May 2017 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR.

Sept 2018-Jan 2019 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR.

Jan 2019-Dec 2020 (Remove the Impairment) - Please explain why this task is associated with facility improvements and why it would take 2 years. The variance does not affect 303(d) attainment decisions or 305(b) reporting.

Dec 2020-May 2022 - There appears to be a 2-year gap in the schedule. Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR.

May 2024-Nov 2024 - Between December 2020 and May 2022, Jan 2027-May 2027 (Develop QAPP) - Please explain why a new QAPP must be developed to replace the one developed in 2016.

Sept 2028-Jan 2029 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR.

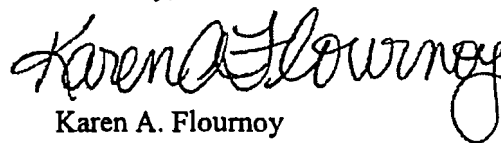
Jan 2029-Dec 2030 (Remove the Impairment) - Again, please explain why this task is associated with facility improvements and why it would take 2 years. The variance does not affect 303(d) attainment decisions or 305(b) reporting.

Dec 2030-May 2031 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR.

May 2033-Nov 2033 - Please explain why there is a gap in the schedule or list the tasks that will take place during this time period. As each milestone is implemented, the details such as timeframes must be submitted to MDNR.

The EPA appreciates Missouri's continuing efforts to protect and restore water quality. We look forward to working with the MDNR on the variance considered in this letter. If you would like to discuss the above comments, please contact John DeLashmit, Chief, Water Quality Management Branch, at (913) 551-7821.

Sincerely,



Karen A. Flournoy
Director

Water, Wetlands and Pesticides Division

Enclosure

Review of Request for Variance from Water Quality Based Effluent Limits for Nitrogen and Phosphorus: City of Fulton, Missouri Wastewater Treatment Plant

The municipal wastewater treatment plant (WWTP) for the City of Fulton, Missouri discharges to Stinson Creek, which is impaired for dissolved oxygen (DO) and organic sediment. The Missouri Department of Natural Resources (MODNR) completed and EPA approved a total maximum daily load (TMDL) for Stinson Creek in May 2010. The TMDL sets the following wasteload allocations (WLA) for the WWTP:

- Total nitrogen (TN) – 20.95 lbs/day
- Total phosphorus (TP) – 2.25 lbs/day
- Total suspended solids (TSS) – 122.51 lbs/day
- Carboneous biochemical oxygen demand (CBOD) – 200 lbs/day

The City is requesting a variance from water quality based effluent limits (WQBELs) reflective of the TMDL WLAs. MODNR published the request for public comment on May 9, 2014. The request is based on the potential for compliance with WQBELs to result in substantial and widespread economic and social impacts, based on an independent consultant analysis (HDR, 2014).

EPA has requested a review of the variance request. Specifically, EPA is interested in:

- Whether the economic and financial data are accurate and complete;
- Whether the cost estimates and other assumptions are reasonable;
- Whether the conclusions are reasonable and justified by the information provided and other available information;
- Recommendations for correcting any errors or deficiencies.

Abt Associates reviewed the analysis for consistency with EPA's Interim Economic Guidance for Water Quality Standards (U.S. EPA, 1995). We present a summary of the analysis and our conclusions below. We limited our review to consistency with the 1995 Guidance. As such, we did not review the appropriateness of the water quality targets and resulting WLAs or the draft National Pollutant Discharge Elimination System (NPDES) permit and proposed compliance schedules.

1 Background

The City of Fulton, Missouri operates the Fulton WWTP that discharges to Stinson Creek in Callaway County, Missouri. The draft permit for the Fulton WWTP indicates that the facility has a design flow of 2.93 million gallons per day (mgd) (MODNR, 2013a). The existing treatment train consists of an oxidation ditch, sludge holding tanks, aerobic digesters, a dewatering centrifuge, backup vacuum sand dewatering beds, and disinfection. Based on the flow records from January of 2011 through May of 2014, the facility discharges an average of 1.97 mgd to Stinson Creek.

Exhibit 1-1 shows the projected concentration-based effluent limits for the WWTP based on the load-based allocations in the TMDL for TN and TP.

Form

Exhibit 1-1: Projected Effluent Limits, City of Fulton Wastewater Treatment Plant¹

Pollutant	Projected Limit (mg/L)
Total Nitrogen	0.855
Total Phosphorus	0.092

mg/L = milligrams per liter
 mgd = million gallons per day
 1. Based on wasteload allocations under the total maximum daily loads for dissolved oxygen and organic sediment, converted from pounds per day to milligrams per liter based on design flow (2.93 mgd).

The City requested a variance from WQBELs under 40 CFR 131.10(g)(6), indicating that controls more stringent than those required by sections 301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impacts. EPA's (1995) Interim Economic Guidance for Water Quality Standards addresses analysis of such impacts (see Appendix). The Guidance includes tests to determine if compliance with water quality standards would have substantial financial impacts on the entity (substantial impacts) that would result in adverse economic and social impacts on the surrounding community (widespread impacts).

2 Project Information

Determining if impacts are likely to be substantial involves estimating compliance costs. To meet the TMDL WLAs for TN and TP, the City estimates the need for four levels/steps of control.

Exhibit 2-1 summarizes the City's proposed controls.

Exhibit 2-1: City of Fulton's Proposed Controls for Meeting the Wasteload Allocations for Total Nitrogen and Total Phosphorus (July 2013\$)

Level	Description	Effluent Levels	Capital	Annual O&M
Step 1 ¹	Bypass elimination, ammonia removal, UV disinfection, and meet draft permit limits for BOD and TSS.	No TN or TP reductions expected	\$12,853,200	\$650,000
Step 2	Biological nutrient removal - return activated sludge (RAS) selector basin, aeration basin baffle walls and mixers, replacement RAS pumps, aeration basin distribution box replacement, alum system, and site piping modifications.	TN - 8 mg/L TP - 1 mg/L	\$3,432,000	\$7,853
Step 3	Enhanced nutrient removal - denitrifying sand filtration, intermediate pumping station, chemical phosphorus removal, and site work/piping.	TN - 4 mg/L TP - 0.1 mg/L	\$13,626,000	\$104,219
Step 4	Reverse osmosis with microfiltration pretreatment to treat half of plant flow.	TN - <2 mg/L TP - 0.05 mg/L	\$50,700,000	\$4,918,400 ²

Exhibit 2-1: City of Fulton's Proposed Controls for Meeting the Wasteload Allocations for Total Nitrogen and Total Phosphorus (July 2013\$)

Level	Description	Effluent Levels	Capital	Annual O&M
Source: HDR (2014). BOD = biological oxygen demand mg/L = milligrams per liter O&M = operation and maintenance TN = total nitrogen TP = total phosphorus TSS = total suspended solids 1. Abatement Order on Consent No. 2013-WPCB-1241 requires these improvements. 2. Includes energy and chemical costs for Steps 2 through 4 combined of \$4,728,000 from FWEUAC (2009) as well as labor and equipment replacement for RO only; see Section 3.2 for detailed description of O&M costs.				

3 Verifying Project Controls and Costs

This section provides our review of the control cost estimates.

3.1 Capital Costs

The estimate of capital costs for Step 2 (\$3.4 million; 2013\$) is similar to unit costs from EPA (2008) for biological nutrient removal (BNR). For example, the City estimates capital unit costs for BNR of approximately \$1.17 per gallon treated per day (gpd) ($\$3,432,000 \div 2,930,000 \text{ gpd}$). EPA (2008) indicates that costs for similar treatment (e.g., phased isolation ditches or modified Ludzack-Ettinger coupled with 1-point chemical addition systems) could be approximately \$1.38 per gpd (escalated from 2007\$ dollars to July 2013\$¹ using the ENR CCI, $9551.78 \div 7966=1.20$). Note that EPA (2008) indicates that the treatment options for BNR achieve TN of less than 5 mg/L. The City estimated costs based on achieving TN of 8 mg/L, which may account for the higher costs from EPA (2008).

For Step 3, which entails enhanced nutrient removal consisting of a denitrification filter and phosphorus removal through chemical processes, the estimated unit capital cost is approximately \$4.65 per gpd (2013\$; $\$13,626,000 \div 2,930,000 \text{ gpd}$). EPA (2008) indicates that costs for denitrification filters with chemical phosphorus removal at a 5 mgd WWTP in Florida were approximately \$3.35 per gpd (escalated from 2007\$ to July 2013\$ using the ENR CCI, $9551.78 \div 7966=1.20$). However, these unit costs do not include costs for the additional clarifier included in Step 3. Based on the City's estimates, costs for the clarifier account for approximately \$4.7 million, or \$1.59 per gpd of the total \$4.65 per gpd unit cost. Adding \$1.59 per gpd to the EPA (2008) unit costs results in approximately \$4.94 per gpd.

¹ We escalate to July 2013 dollars for consistency with the City's estimates based on FWEAUC (2009), which are also escalated to July 2013 dollars.

Exhibit 3-1 provides a summary of the comparison of costs for BNR and enhanced nutrient removal.

Exhibit 3-1: Comparison of Estimated Capital Unit Costs (2013 Dollars)¹

Technology	City of Fulton ²	Alternate Estimate ³
Biological nutrient removal (Step 2)	\$1.17	\$1.38
Enhanced nutrient removal (Step 3)	\$4.65	\$4.94 ⁴
1. Updated from original year dollars using the Engineering News Record Construction Cost Index. 2. Estimated by dividing total estimated cost by design flow of 2.93 million gallons per day (design flow as indicated in the Fulton WWTP NPDES permit). 3. Source: Based on U.S. Environmental Protection Agency (2008). 4. Includes tertiary clarifier that is included in the City's estimates; the clarifier accounts for \$1.59 per gpd of the City's total unit cost.		

For Step 4, the City indicates that costs are for treating 100% of the flow with RO and microfiltration, with thermal evaporators (concentrators and crystallizers) for brine disposal. The City uses unit capital costs of \$17.3 per gpd (Washington Associates, 2013), based on the upper third of the range of \$10 to \$21 per gpd to reflect a more costly disposal option (brine concentrators and crystallizers rather than the brine concentrators coupled with evaporation ponds reflected in the estimates).

However, the unit costs represent costs of treating 100% of the flow with microfiltration, and 50% of the flow with RO (Washington Associates, 2013). The City multiplies the unit cost by the design flow. As such, this estimate represents the cost to treat 50% of the Fulton WWTP flow with RO (not 100% of the flow). However, doubling the Washington Associates (2013) unit costs would not be appropriate either because then the microfiltration portion of the unit costs would be twice as high as necessary.

Washington Associates (2013) does not provide any details on how the costs are developed, or the breakdown of the various cost components such as microfiltration, RO, brine disposal, site work, or contingencies. Thus, there is no way to adjust the costs to reflect treatment with microfiltration and RO on 100% of the effluent. Therefore, we use an alternative RO cost estimate for comparison.

WERF (2011) estimates capital unit cost for RO to be approximately \$7 per gpd (escalated from October 2010\$ to July 2013\$ using the ENR CCI, $9551.78 \div 8921=1.07$). However, this estimate includes brine disposal via deep well injection and not thermal brine concentrators and crystallizers as proposed by the City.

The Florida Water Environment Association Utility Council (FWEAUC, 2009) provides capital cost estimates for increasing treatment controls from enhanced nutrient removal to RO with microfiltration of approximately \$5.53 per gpd (escalated from December 2009\$ to July 2013\$ using the ENR CCI, $9551.78 \div 8641=1.11$). FWEAUC (2009) estimates that an additional \$3.43

per gpd (July 2013\$) would be needed for a brine concentrator and crystallizer. Thus, total capital costs would be approximately \$8.95 per gpd.

The City's unit costs are almost twice as much as these unit costs. However, the FWEAUC (2009) costs are based on bid-data available from 11 WWTP using microfiltration and RO, the details of which are not available. The sources of cost data for RO applicable to WWTPs are limited most likely due to the fact that there are no applications in the United States of RO at a WWTP to meet water quality standards (there are examples of RO being used to treat wastewater for groundwater recharge but none for direct discharge to surface water).

3.2 Operation and Maintenance Costs

The estimates of O&M costs for Step 1 are for equipment repair, labor, and sludge handling; the costs exclude chemicals and energy consumption (HDR, 2014). For Steps 2 through 4, the estimates are from FWEUAC (2009). The City assumes that the FWEAUC costs only include chemicals and energy consumption. Therefore, to account for the assumed exclusion of equipment repair/replacement, labor, and maintenance activities, the City independently estimates costs based on a percent of capital equipment costs for each step.

The City also includes the 2013 budgeted amount for non-wastewater treatment expenses (e.g., administrative services, insurance, line maintenance, collection expenses, non-treatment plant labor).

Exhibit 3-2 summarizes the total O&M costs.

Form

Exhibit 3-2: City of Fulton's Estimated O&M Costs for BNR and RO Treatment Processes

Treatment	Fulton O&M Estimates
Step 1	\$650,000
Step 2 (BNR; labor and equipment) ¹	\$8,000
Step 3 (ENR; labor and equipment) ¹	\$104,00
Step 4 (RO; labor and equipment) ¹	\$190,000*
Steps 2-4 (chemicals and energy) ²	\$4,730,000
2013 Budgeted System Cost (excludes wastewater treatment costs)	\$1,330,000
Total	\$7,011,000
Source: HDR (2014)	
*City reports \$190,400 in Appendix B but rounds to \$191,000 in the text.	
1. Represents costs for labor and equipment replacements that the City assumes was excluded from the FWEUAC (2009) estimates.	
2. Based on estimates from FWEUAC (2009) for advanced biological nutrient removal, microfiltration, RO, and brine concentrators and crystallizers.	

The City subtracts out total current operating expenses of \$2.1 million per year (City of Fulton, 2013) to estimate total incremental O&M costs of \$4.9 million (\$7.0 million - \$2.1 million).

In calculating the O&M costs based on FWEAUC (2009), the City multiplies the unit cost of \$4,421 per million gallon treated by the design flow of 2.93 mgd. Annual O&M should be based on average flows to represent the actual amount of chemicals, energy, labor and replacement membranes needed. Flow records from January of 2011 through April of 2014 indicate that the facility discharges an average of 1.97 mgd. The City also indicates that average flow will decrease slightly upon completion of inflow/infiltration controls (e.g., less than 5%). A decrease in average flows will result in reduced O&M costs (e.g., due to reduced chemical use, lower energy costs, less frequent backwashing, decreased volume of disposed residuals). Thus, using the actual average flow over the last 3 years, annual O&M costs based on unit costs from FWEAUC (2009) would be approximately \$3.2 million per year (or almost \$2 million less than the City's estimate).

Also, FWEUAC (2009) does not clearly describe the components included in its O&M estimates. Thus, adding in additional O&M for equipment replacement, labor, and maintenance may overstate O&M costs by over \$300,000 per year (\$8,000 + \$104,000 + \$190,000).

3.3 Alternative Cost of Pollution Controls

Based on the analysis above, we estimate alternative pollution controls costs shown in **Exhibit 3-3**.

Exhibit 3-3: Estimated Costs of Proposed Pollution Controls (Millions 2013\$)

Treatment	City of Fulton ¹		Alternate Estimate	
	Capital	O&M	Capital ²	O&M ³
Step 1 - AOC Controls	\$12.9	\$0.65	\$12.9	\$0.65
Step 2 - BNR	\$3.4	\$0.008	\$3.4	NA
Step 3 - Enhanced BNR	\$13.6	\$0.10	\$13.6	NA
Step 4 - RO	\$50.7	\$0.19	\$26.2 ⁴	NA
Step 2 - 4 (combined)	NA	\$4.7	NA	\$3.2 ⁴
Budgeted Non-Treatment Expenses	NA	\$1.3	NA	NA
Subtotal	\$80.6	\$7.0	\$56.1	\$3.8
Less Total Budgeted Expenses	NA	\$2.1	NA	NA
Total	\$80.6	\$4.9	\$56.1	\$3.8

AOC = Abatement Order on Consent
 BNR = biological nutrient removal
 mgd = million gallons per day
 NA = Not applicable
 O&M = operation and maintenance
 RO = reverse osmosis
 1. Source: HDR (2014).
 2. Unit cost multiplied by design flow of 2.93 mgd.
 3. Unit cost multiplied by average flow of 1.97 mgd.
 4. Estimates based on unit costs in FWEAUC (2009).

4 Determining Substantial Impacts

To demonstrate that the costs of pollution control would result in substantial and widespread economic and social impacts justifying a variance, the discharger (in this case, the City of Fulton) must first demonstrate that it would face substantial financial impacts through a two part test, including a municipal preliminary screener (MPS) and Secondary Test.

4.1 Municipal Preliminary Screener

The first step in determining whether impacts will be substantial involves combining the estimated compliance costs with existing pollution control costs, and comparing the result to median household income (MHI) to obtain an MPS value. The City uses the 2013 budget (City of Fulton, 2013) to estimate current household wastewater expenses, and the household share of estimated project costs.

The budgeted wastewater fund operating revenue for 2013 was \$2.496 million, with \$1.250 million coming from residential service fees. Additionally, the City states that \$369,000 in sales tax revenue is dedicated to wastewater expenses.² Using this information, the City estimates that households bear 56.5% of costs $[(\$1.250 \text{ million} + \$0.369 \text{ million}) / (\$2.496 \text{ million} + \$0.369 \text{ million})]$, and applies this percentage to the 2013 total budgeted wastewater expenses (\$2,070,589 rounded down to \$2,070,000) to estimate existing costs to households (\$1,170,000). Given a service population of 4,377, this method yields an average current wastewater cost per household of approximately \$267.

Note that the budget shows that \$390,000 in sales tax revenue was explicitly budgeted for sewer upgrades in 2013, rather than \$369,000. In addition, not all sales taxes are borne by households (e.g., some are paid by visitors to the City, or by businesses that make local purchases), and the share that is borne by households is disproportionate. Higher income residents can and do buy more, and thus, pay more sales taxes. However, following the same general approach that the City uses, we conservatively assume that households in the City bear all sales tax (\$390,000), and that this expense is borne evenly among all households.³

As an alternative to the City's approach, we estimate the share of operating expenses attributable to households by calculating the household share of revenues (\$1.250 million out of \$2.496 million, or 50.1%), and applying that percentage to operating expenses (\$2,070,600). Based on this method, the household share of operating expenses is \$1,037,000. Adding the sales tax to the operating expenses, the existing costs to households is \$1,427,000 out of a total expense of

² Based on the assumption that 50% of the budgeted receipt of the sales tax revenue (\$737,500) would go to wastewater improvements.

³ Note that the tax, which is included in the existing costs under the City's analysis and our alternative analysis, may not continue in perpetuity beyond the scheduled expiration of 2025.

\$2,460,000 (\$2,070,000 + \$390,000), or 58%.⁴ Given a service population of 4,377, this method yields an average existing wastewater cost per household of \$326.

The next step in calculating the MPS is to calculate how much of the project costs will be borne by households. This step entails annualizing the capital cost of the project using an interest rate representative of the likely financing mechanism used by the community (e.g., revenue bonds), adding the annual O&M costs, determining what share of the project costs will be borne by households, and calculating a cost per-household (project costs borne by households divided by the number of households).

The City assumes that it will need revenue bonds to fund the capital portion of the project, at an interest rate of 4%. However, there may be funding with lower interest rates available through alternative programs. The Missouri State Revolving Loan Fund (SRFL) is a fund administered by MODNR for financing clean water programs with low interest loans (MODNR, 2013b). For Fiscal Year 2014, the target interest rate is 30% of the market rate as determined by a bond index from The Bond Buyer, plus a 1% fee charged by the department. The most recent Bond Index (May 2014) is 4.8%. Thus, if the SRLF funded the project, the interest rate would be lower, at approximately 2.44% ($4.8\% \times 30\% + 1\%$).

The City notes that there is uncertainty regarding continued funding of the SRLF as well as high demand for the program. As such, the City assumes that financing for the project would be provided outside of the program. According to MODNR (2013b), however, 40% of the available funding is reserved for “outstate” Missouri, defined as service area population of less than 75,000. This project may qualify for high priority under the SRLF program. Additionally, it is unclear why the City views continued funding of the SRLF to be uncertain. As such, we assume that a lower interest rate consistent with the rates associated with this program, 2.44%, is feasible for this project.⁵

Additionally, the City assumes that households will bear project costs in the same proportion that they bear existing costs (56.5%). However, as the sales tax will not increase as a result of pollution control, the share of project costs would not be the same as the share of existing costs borne by households. Rather, the project costs would be paid through increased sewer rates for residential, commercial, and industrial users. As such, households will provide revenues for the project in the same proportion that they contribute to operating expenses currently, or 50.1%.

⁴ Alternatively, the facility plan states that the typical monthly household sewer bill is \$32.89, plus approximately \$6.50 in sales tax. Using these figures results in a current pollution control cost to households of about \$2,068,920 annually across all households (assuming there are 4,377 households). This amount is substantially higher than what the City estimates using the budget figures, although the reason for this discrepancy is unclear.

⁵ MODNR (2013b) also notes that it will prioritize grant awards to “entities that would otherwise be unable to afford the proposed project with a loan only” (p. 12). However, for this analysis, we conservatively assumed that grant funding would not be available, and that the City would fund the project with loans only. A grant would not have to be repaid, thereby reducing the estimated MPS.

Exhibit 4-1 shows the City's MPS assumptions and calculations, which result in an MPS of 3.8%. In comparison, using alternative assumptions (also shown in the Exhibit) about current household costs, project costs (see Section 3), the share of pollution control that will be borne by households, and revenue bond interest rate, we calculate an MPS of 2.6%.

Exhibit 4-1: Comparison of Municipal Preliminary Screener Assumptions

Variable	City Analysis ¹	Alternative Analysis
Capital costs	\$80.7 million	\$56.1 million (see Section 3)
Annual O&M costs	\$4.941 million	\$3.8 million (see Section 3)
Sales tax revenue to sewer	\$369,000; based on 50% of 2013 budgeted sales tax revenue from 2013 City Budget ² (page 124)	\$390,000; based on budgeted amount of sales tax dedicated to sewer from 2013 City Budget (page 124) ³
Total annual cost of existing pollution control	\$2,070,000; 2013 budgeted expenses (rounded down from \$2,070,589) based on 2013 City Budget (page 102)	\$2,460,000; 2013 budgeted operating expenses (page 102 of the 2013 City Budget) plus sales tax dedicated to sewer projects
Amount of existing costs paid by households	\$1,170,000; residential share of 2013 budgeted operating expenses (56.5% based on residential share of revenues plus tax revenue divided by total revenue plus tax revenue)	\$1,427,000; residential share of 2013 budgeted operating expenses (50.1% based on residential share of revenue on page 98 of 2013 City Budget, applied to operating expenses on page 102) plus sales tax dedicated to sewer projects
Number of households	4,377; from ACS QuickFacts	Same
Existing annual household costs (existing costs paid by households divided by number of households)	\$267	\$326
Interest rate for revenue bonds (for annualizing capital costs)	4%	2.44% based on Missouri State Revolving Fund interest rates
Time period of financing (for annualizing capital costs)	20 years	Same
Median Household Income	\$44,431 from ACS QuickFacts (\$43,791 adjusted from 2012\$ to 2013\$ using the CPI ⁴)	Same
Annual project costs (annualized capital plus annual O&M)	\$10.879 million	\$7.378 million

Exhibit 4-1: Comparison of Municipal Preliminary Screener Assumptions

Variable	City Analysis¹	Alternative Analysis
Household share of new pollution control project costs	56.5%; based on residential share of operating revenue from the 2013 City Budget (page 98) plus sales tax divided by total annual cost of existing control plus sales tax	50.1% based on household share of operating revenues from 2013 City Budget (page 98)
Household share of annual project costs (annualized project costs times household share)	\$6.147 million	\$3.697 million
Annual household pollution control project cost (household share of annual costs divided by number of households)	\$1,405	\$845
Total annual cost of pollution control per household (household existing costs plus project costs)	\$1,672	\$1,171
Municipal Preliminary Screener (MPS)	3.8%	2.6%
ACS = American Community Survey (2008-2012 5-year estimate) CPI = Consumer Price Index O&M = operation and maintenance 1. Source: HDR (2014). 2. City of Fulton (2013). 3. Assuming that all sales tax revenues are attributable to households likely results in an overestimate of impacts. 4. 2013 = 232.95; 2012 = 229.59.		

4.2 Secondary Test

If the MPS indicates that the economic effects of the pollution control project may be substantial with a “large impact” being over 2%, the next step is to use the Secondary Test to evaluate the community’s ability to obtain financing as well as general socioeconomic health. For more information on the need for and calculation of the Secondary Test, see the Appendix and U.S. EPA (1995). In calculating the Secondary Score, the City primarily relied on the U.S. Census Bureau’s 5-year American Community Survey (ACS; for the 2008 to 2012 period) together with the 2012 Comprehensive Annual Financial Report (CAFR; City of Fulton, 2012). These sources provide documentation for a verifiable and reproducible analysis.

Consistent with data provided in the ACS (Community QuickFacts as well as Census Table DP03), the City assumes that the MHI in Fulton is \$43,791 compared to a state MHI of \$47,333, and an unemployment rate of 7.0% compared to a national rate of 9.3%. The City also notes that it had strong ratings during recent bond issues, with top ratings (AA+ to AAA), as verified by Moody's.

The CAFR shows that the City has a debt of \$1.075 million for the golf course, \$9.315 million in overlapping debt for the school district (for a combined overall net debt of \$10.39 million), \$424 million in full market value of taxable property, and \$525,000⁶ in collected taxes. However, the City notes that this accounts only for property taxes collected from property owners, at a rate of 0.591% of assessed value, while the total property tax rate is 5.706% inclusive of property taxes collected from Fulton Public School District, Callaway County, and the State of Missouri. According to the City, the total 2012 property tax revenues were \$5.631 million.⁷

The CAFR show that the property tax collection rate was 99.9% in 2012. However, rather than using the most recent data available, the City uses the average of the prior 10 years (2003 to 2012) to calculate a tax collection rate of 97.6%. It is unclear why the City used this approach rather than using the most recent data available, particularly since the 2007 collection rate (93%) seems to represent a particularly low outlier. Excluding that year, the average rate is above 98% (i.e., a "strong" score on the Secondary Test rather than mid-range).

Exhibit 4-2 ~~Exhibit 4-2~~ shows the City's assumptions and calculations for the Secondary Test, in comparison with our alternative analysis. The City calculated a Secondary Score of 2.5. However, using the tax collection rate of 99.9% (or 98.1%) rather than the 10-year average of 97.6%, the Secondary Score is 2.7. Exhibit 4-3 ~~Exhibit 4-3~~ provides a comparison of the Secondary Score metrics in the City's analysis to the alternative analysis.

Forn

Exhibit 4-2: Comparison of Secondary Test Assumptions

Variable	City Analysis ¹	Alternative Analysis
Median Household Income ¹	\$43,791 from ACS QuickFacts	Same
State Median Household Income ¹	\$47,333; from ACS QuickFacts	Same
City unemployment rate	7.0%; from ACS DP03	Same
National unemployment rate	9.3%; from ACS DP03	Same
Market value of taxable property	\$424.0 million; based on CAFR (page 67)	Same

⁶ The City's secondary screener analysis uses collected taxes of \$522,000 rather than the \$525,000 shown in the CAFR. The reason for this discrepancy is unclear, but it does not meaningfully affect the results of this metric.

⁷ This information was provided by the City Financial Advisor, Kathy Holschlag, in an electronic communication. We have not verified it.

Exhibit 4-2: Comparison of Secondary Test Assumptions

Variable	City Analysis ¹	Alternative Analysis
Property tax collection rate	97.6%; based on 10-year average in CAFR (page 71)	99.9%; based on most recent data in CAFR (page 71) (98.1% based on 10-year average excluding 2007 outlier)
Direct net debt	\$1.075 million; based on CAFR (page 75)	Same
Overlapping debt	\$9.315 million; based on CAFR (page 76)	Same
Property tax revenues	\$5.631 million; based on tax collected from property owners (\$522,000 from CAFR) adjusted for additional property taxes collected from public entities (based on a personal communication from the City Financial Officer)	Same (note that CAFR has \$525,000 rather than \$522,000; however, this does not change results meaningfully)
ACS = American Community Survey (2008-2012 5-year estimate) CAFR = Comprehensive Annual Financial Report (City of Fulton, 2012). 1. Source: HDR (2014). 2. Not updated to 2013\$ for the Secondary Test.		

Exhibit 4-3: Comparison of Secondary Score Metrics

Indicator	City Analysis ¹		Alternative Analysis	
	Result	Score	Result	Score
Bond Rating	AA+ to AAA	3	Same	Same
Overall Net Debt as Percent of Full Market Value of Taxable Property	2.45% [(\$1.075 million + \$9.315 million)/\$424.0 million]	2	Same	Same
Unemployment	7.0% [compared to 9.3% nationally]	3	Same	Same
Median Household Income ¹	\$43,791 [compared to \$47,333 statewide]	2	Same	Same
Property Tax Revenues as a Percent of Full Market Value of Taxable Property	1.33% [\$5.631 million/\$424.0 million]	3	Same	Same
Property Tax Collection Rate	97.6%	2	99.9% (or 98.1%) ³	3
Secondary Score		2.5		2.7
1. HDR (2014). 2. Not updated to 2013\$ for the Secondary Test. 3. 99.9% is the most recent rate, while 98.1% is the 10-year average excluding 2007, which is a low outlier.				

4.3 Alternative Substantial Impact Analysis

Using alternative assumptions for the MPS and the alternative tax collection rates for the Secondary Test yields a result of “borderline impact” on the Substantial Impacts Matrix (Exhibit 4-4), rather than the “substantial impact” conclusion reached by the City.⁸ For communities that fall into the “?” or borderline impact category, U.S. EPA (1995) states that the community should move into the category closest to it, and that communities falling into either the borderline or substantial impact categories should proceed to the next step in the analysis to determine whether impacts will also be widespread.

Exhibit 4-4. Substantial Impacts Matrix

Secondary Score	Municipal Preliminary Screener		
	Less than 1%	1% to 2%	Greater than 2%
Less than 1.5	?	X	X
1.5 to 2.5	✓	?	X
Greater than 2.5	✓	✓	?
Source: U.S. EPA (1995) X = impact is likely to be substantial ? = impact is borderline ✓ = impact is not likely to be substantial			

5 Determination of Widespread Impacts

If the impacts of the pollution control project are borderline or likely to be substantial, the next step is to determine whether they would also be widespread. The City uses the Missouri Public Utilities Association (MPUA) Municipal Water and Wastewater Rate Survey from 2012 to show Fulton’s current and potential future rates in comparison with communities in the same size range (10,000 to 50,000 people). According to the data, Fulton’s existing rates are in the upper quartile of representative municipal rates with respect to monthly charges and as a percent of MHI. With the addition of RO, the rates would be by far the highest in Missouri.

The City concludes that having the highest sewer rates for comparable municipalities in the state would likely result in relocation of businesses and industries outside the area, and inability to attract new investments. This impact would result in disadvantages for the City in attracting employment and income. However, according to the City’s plan, the final steps in the pollution control plan (RO) would not be fully implemented until 2035. As such, it is inappropriate to compare 2012 sewer rates for other communities throughout the state to the estimated potential rate for the City of Fulton over 20 years in the future.

Projected trends in sewer rates statewide over the next several decades would be a more relevant comparison and metric for assessing the potential for widespread impacts. Municipalities

⁸ This difference is driven by the alternative tax collection rate (99.9% or 98.1% instead of 97.6%), which moves the Secondary Score into the “greater than 2.5” range.

nationwide increasingly have to address nutrient impairments through improvements in treatment controls. If rates increase by similar amounts in nearby areas, then the impacts to the City would be mitigated. For example, nearby Jefferson City expects to increase residential utility rates by almost 24% between 2013 and 2017.⁹ Another nearby town, Mexico, is also raising sewer rates by 12% to pay for operations, maintenance, and capital projects.¹⁰

Similarly, the City notes that 13% of Fulton households receive federal assistance of some kind and 17% of citizens live below the poverty level. The lower 20th percentile of Fulton households make less than \$15,000, and for these households the proposed pollution control would cause sewer bills to represent 11% of household income. However, this discussion reflects the assumptions that household incomes will not change relative to other prices for the next 21 years such that poverty levels will remain the same; the regional economy will not change in the next 21 years; and that sewer rates have a large enough impact on business operating costs to affect business location decisions. These assumptions are speculative.

A 21-year planning period gives the City an opportunity to mitigate the impact in a variety of ways. On the cost side, it can seek alternatives to reduce costs either by technology selection or strategic financing (e.g., SRF grant request or other innovative financing options). Indeed, within the next 21 years the relative cost of RO could decline or there could be an alternative, lower-cost technology that enters the market. In addition, residents and businesses can reduce sewer rates through conservation measures. Finally, it is possible that the number of households will change in the next 21 years, and most likely increase, which would reduce per-household costs.

6 Conclusion

Based on a review of the proposed controls, costs, and available data on economic indicators for evaluating the City of Fulton's ability to comply with the WLAs in the TMDL for Stinson Creek, compliance may result in substantial and widespread economic impacts. However, there are a number of uncertainties that could impact these findings and result in an overestimate or an underestimate of the impacts.

For example, the nutrient removal cost estimates from EPA (2008) to which we compare the City's estimates biological and enhanced nutrient removal costs (Step 2 and Step 3) may not represent the exact treatment controls and components needed at the Fulton WWTP. However, these figures do provide general estimates of the cost of achieving similar effluent concentrations. In addition, the RO estimates from FWEAUC (2009) are not well documented, resulting in uncertainties in both capital and O&M estimates. Site-specific factors or constraints at the Fulton WWTP could result in actual costs being higher or lower than the FWEAUC (2009) estimates. It is also unclear why the City added in part of the existing budgeted O&M

⁹ <http://www.jeffcitymo.org/finance/scwerrates.html>

¹⁰ <http://www.mexicoledger.com/article/20120925/NEWS/120929321>

expenses and then subtracted out the total budgeted O&M in calculating the O&M attributable to the additional treatment controls.

Additionally, further analysis of future trends in income, future costs, and statewide wastewater pollution control costs may be necessary to demonstrate that impacts will be widespread.

7 References

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8 Appendix: Description of the Economic Guidance for Water Quality Standards

In order to demonstrate that there would be substantial and widespread economic and social impacts justifying a variance, the discharger (in this case, the City of Fulton) must demonstrate that it would face substantial financial impacts, and that the affected community would have significant adverse impacts as a result (i.e., widespread impacts). EPA's 1995 Guidance (U.S. EPA, 1995) outlines the specific steps that the discharger must follow to make these demonstrations. This appendix provides a brief overview of the Guidance as applicable to an entity in the public sector. For a more detailed description of the analysis, see U.S. EPA (1995).

First, to determine whether the pollution control project would entail a substantial impact to an entity in the public sector, there is a two part test. The first part of the test, called the Municipal Preliminary Screener (MPS), is a screening-level ratio designed to trigger additional tests or screen out the possibility of substantial impacts. Since municipalities will pass costs on to households and businesses, this screening is based on how household pollution control costs compare to household income. Generally, if the MPS is less than 1% (i.e. annual household pollution control costs would be less than 1% of median household income), there will not be a substantial economic impact. If the MPS is higher than 1%, then the impacts may be substantial and the discharger proceeds to the second part of the test.

The second part of the test involves calculating multiple indicators (e.g., bond rating, debt ratio, and tax collection ratio) designed to characterize the financial health and socioeconomic status of the community that will bear the costs of the pollution control. This is the Secondary Test.

Exhibit 8-1 shows the indicators used in the Secondary Test and the scores associated with them.¹¹ The overall Secondary Score is the average of the indicators used.

Form

Exhibit 8-1. Secondary Test Indicators in EPA's Guidance

Indicator	Secondary Indicator Scores		
	Weak (Score of 1)	Mid-Range (Score of 2)	Strong (Score of 3)
Bond Rating	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)
Overall Net Debt as Percent of Full Market Value of Taxable Property	Above 5%	2% - 5%	Below 2%
Overall Net Debt Per Capita	Greater than \$3,000	\$1,000 - \$3,000	Less than \$1,000
Unemployment	More than 1% above national average	National average	More than 1% below national average

¹¹ In some cases, if data for a particular indicator is not available, the Guidance directs users to alternative indicators. See U.S. EPA (1995) for more details.

Exhibit 8-1. Secondary Test Indicators in EPA's Guidance

Indicator	Secondary Indicator Scores		
	Weak (Score of 1)	Mid-Range (Score of 2)	Strong (Score of 3)
Median Household Income	More than 10% below state median	State median	More than 10% above state median
Property Tax Revenues as a Percent of Full Market Value of Taxable Property	Above 4%	2% - 4%	Below 2%
Property Tax Collection Rate	< 94%	94% - 98%	> 98%

The MPS and Secondary Test results are evaluated jointly, using the Substantial Impacts Matrix, as shown in Exhibit 8-2.

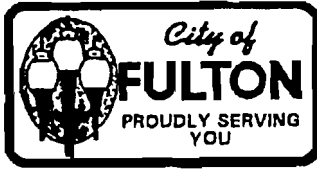
For

Exhibit 8-2. Substantial Impacts Matrix

Secondary Score	Municipal Preliminary Screener		
	Less than 1%	1% to 2%	Greater than 2%
Less than 1.5	?	X	X
1.5 to 2.5	✓	?	X
Greater than 2.5	✓	✓	?

Source: U.S. EPA (1995)
X = impact is likely to be substantial
? = impact is borderline
✓ = impact is not likely to be substantial

If the evaluation indicates that the pollution control project will place substantial economic burdens on the discharger, the next step is to determine whether the impacts will also be widespread in the surrounding community. This step involves estimating socioeconomic changes due to pollution control costs, such as loss of employment, changes in property values, and higher taxes. In this step, the analysis should consider the direct and indirect effects of control costs. Also, expenditures on pollution control costs are not likely to vanish from the community. These expenditures become business revenues and household incomes that can offset adverse financial impacts experienced by the affected entities.



CITY OF FULTON, MISSOURI

LEROY D. BENTON

Mayor

June 6, 2014

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Telephone: (573) 592-3111 FAX: (573) 592-3119

Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, MO 65102
ATTN: Chris Wieberg

RECEIVED

JUN 9 2014

WATER PROTECTION PROGRAM

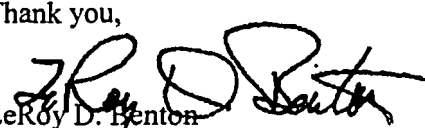
RE: City of Fulton Variance Request, CWC-V-2-12
NPDES Permits and Engineering Section/Permit Comments
publicnoticenpdes@dnr.mo.gov

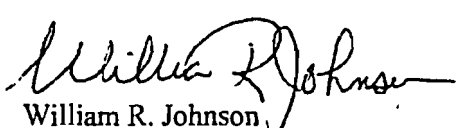
Dear Mr. Wieberg:

On behalf of the City of Fulton, I would like to sincerely thank the Department and the Clean Water Commission for their assistance with Variance Request CWC-V-2-12, Stinson Creek Total Maximum Daily Load, for the upcoming City of Fulton wastewater treatment plant improvements project. The City feels strongly that the process outlined by the variance with phased permit limitations and Stinson Creek memorandum of understanding provides an effective mechanism to improve water quality within Stinson Creek through reasonable and sustainable means. The City looks forward to working with the Department and Clean Water Commission through the implementation of our upcoming improvements project as well as through follow up assessments of the receiving stream to determine if the stream beneficial uses are attained. In our opinion, this process shows the value of a collaborative working relationship between the City and the Department.

Please feel free to contact us with any further comments or questions and let us know how the City can further support the Department and the Clean Water Commission in this effort.

Thank you,


Leroy D. Benton
Mayor


William R. Johnson
Director of Administration

Cc:

Trent Stober - HDR

Stan Christopher - HDR

Brandon Coleman - HDR

