October 3, 2016

The Honorable Usha Reddi, Mayor
City of Manhattan
1101 Poyntz Avenue
Manhattan, KS 66502-5497

Subject: Water and Sewer User Charge Analysis Report

Dear Mayor Reddi:

Attached is your water and sewer rate analysis report package. Before I address that, I want to say this to you, the commission and everyone else who will read this.

Rate analysis is data intensive – big volumes of data and many kinds of data. Necessarily, city staffs must gather that data for me. Randy DeWitt, PE, was my main contact with the City. He did a fantastic job of gathering the right data, he did it quickly and he coordinated with others to gather data. Mr. DeWitt interpreted much of the data and plans for me and gave me insights that enabled my analyses to go to the heart of what the City is trying to accomplish. He checked preliminary submittals for me and caught several data errors that I had no way of knowing about. In short, without his help, this project would not be possible and the quality of the results would not be possible. On top of all of that, Mr. DeWitt was always wonderful to deal with. The people of Manhattan are truly lucky to have someone of his caliber and demeanor serving them.

All of that is not to say that Mr. DeWitt did everything. I worked with and met with Mr. Dewitt and Gulten Celebi frequently but I also occasionally met with other staff all the way up to the City Administrator. All helped to shape my analyses. All were great to work with. And I know that others who handle billing and other functions, who I never met, gathered data behind the scenes. Manhattan really is blessed to have such fine staff up and down the line. But, there is a report to discuss.

The report is a bit long and parts of it are complex, mainly because I included all of your background data from the models. And so you can learn in summary fashion what I recommend you do, I included the most important and immediate action items in the narrative report. Some things will still be a bit difficult to figure out and others really need some discussion in person. When I meet with you and the commission soon, we will thoroughly cover everything you want to cover. In order to move forward with changes, you all need to have a sense of what underpins the rates, fees and policies I recommend.

Just to be clear, this report covers water and sewer. Stormwater will follow later. To analyze stormwater rates I need certain tract data to base rates upon. That data does not actually exist yet. So some of your staff are creating that data now.

Finally, I am sure you and the commission members know of cities and districts that also need rate setting help. As you run into these folks at league of cities meetings and other venues, I hope you will tell them about me. I get almost all of my business by referrals from past clients and I hope to be able to trace several future clients back to my work with Manhattan.

Best regards,
GettingGreatRates.com

Carl E. Brown
President

Enclosures

Water and Sewer Rate Analysis Report

City of Manhattan, Kansas

Prepared October 3, 2016

Carl Brown, President
GettingGreatRates.com, LLC

Executive Summary

GettingGreatRates.com was engaged to analyze the water, sewer and stormwater rates and fees of the City of Manhattan, Kansas. Additional data is needed to complete the stormwater rate analysis so that report will follow at a later time. As to water and sewer rates, the subjects of this report, we found that the current rates are not structured as fairly as they should be. Rate and fee revenues for both; however, are currently adequate if you disregard costs that are likely to be incurred but that are currently unspecified. This report lays out how rates should be adjusted to achieve the Commission's goals of adopting rates that will be adequate to cover all expected and expectable costs and rates that are fairly structured – cost of service rates. **The recommended rates are modeled in Water Scenario 1 and Sewer Scenario 3.**

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Introduction

In 2014, the City of Manhattan, Kansas, later called "the City" or "you," hired GettingGreatRates.com, later called "me," "we" or "I" to produce a "state of the utilities" assessment and report for its water, sewer and stormwater utilities. I completed that project and delivered to the City a report of my findings dated February 27, 2015.

In follow up to that assessment, the City hired me to perform rate analyses of the water, sewer and stormwater utilities and produce a report of my findings and recommendations, provide guidance on rate setting and convey to the City licenses to the models I created to produce the results. This report fulfills the first part of that charge for the water and sewer utilities. (Stormwater will be reported separately when additional required data becomes available.) Software licenses can be delivered once the models are finalized and made more user-friendly. However, the City may opt to forgo the licenses and use that additional available time to have me occasionally produce updates and model changes as the need for changes becomes apparent. I will also provide guidance over the next few months as you move through the stages of doing rate and fee adjustments.

Most of the rest of this report will cover my findings and rate adjustment recommendations.

As I developed rate models and discussed early findings with City staff, they were able to give me additional direction on desirable goals. Those include a rate structure that, if possible, does not reduce the unit charges currently being assessed and a rate structure that, if possible, reduces the volatility of income production. The second goal simply means that incomes would be less subject to the ups and downs of irrigation water use caused by dry and wet years. The two goals conflict but both are understandable.

My modeling revealed that to make rates fairly structured, all water minimum charges need to go up, progressively more for larger meter sizes. However, unit charges need to go down slightly. Therefore, bills for very high-volume customers, which are rare, would go down slightly. All others would go up.

Sewer minimum charges for residential customers with meters smaller than 1.5 inches need to go down. Sewer minimum charges for all customers with meters larger than 1.5 inches need to go up, progressively more as meter size goes up. Unit charges also need to go up. Therefore, low-volume residential sewer customers' bills would go down while all others would go up.

The resulting rates are more fairly structured and they will lead to safer reserve levels in that reserves would be increased from their current levels.

City staff has tracked past costs, showing how costs have been escalating. Staff has also projected future costs. These trends are important for this basic reason – costs have been going up and there is every reason to believe they will continue to go up. This is nothing new to city management and the City's elected officials. In fact, I must commend all for incrementally increasing rates regularly so the utilities' incomes can continue to track with inflation. In the models, I used future costs as projected by City staff. Therefore, future user rates and other fees will need to inflate, as well.

This narrative report covers water first and sewer last. Many things or issues that apply to one utility also apply to the other utility. In the interest of brevity, when an issue applies to both utilities, I expound upon it in the water subsections but only mention the issue in the sewer subsections of the report.

The report package is composed of two parts. The first is a narrative report that tells readers what should be done to each utility's rates and why. The narrative report covers overarching issues, then issues specific to water and last, issues specific to sewer.

The second part of the report package is composed of printouts of the spreadsheet models for each utility. These are simply a set of integrated calculations that mathematically depict or "model" the utilities' situations in order to arrive at the recommended and alternative rates for each. The models are named:

- "City of Manhattan, KS, Water Rates Scenario 2016-1," the rate structure that eliminates the current 200 cubic foot usage allowance,
- "City of Manhattan, KS, Water Rates Scenario 2016-2," the rate structure that retains the allowance,
- "City of Manhattan, KS, Sewer Rates Scenario 2016-3," that eliminates the current 200 cubic foot usage allowance, and
- "City of Manhattan, KS, Sewer Rates Scenario 2016-4," the rate structure that retains the allowance.

Later in this report these names will be shortened to "Water Scenario 1," Water Scenario 2," "Sewer Scenario 3" and "Sewer Scenario 4." Within each subsection the applicable model will often simply be referred to as "the model."

Water Scenario 1 and Sewer Scenario 3, are the models from which I recommend you adopt rates. These rates are in a cost to serve structure. This rate structure results in higher bills for the average residential customer; however, the main driver of the higher bills is elimination of the usage allowance because that increases the volumes such customers must pay unit charges on. Elimination of the allowance will be a big change from your current rate structure but one that will lead to fairly structured rates.

Water Scenario 2 and Sewer Scenario 4, retain the usage allowance. I included models of rates that include your current usage allowance for two reasons:

1. Many will want this baseline for comparison to see how the usage allowance skews minimum and unit charges, and
2. Because you may actually prefer to retain the allowance for one or both utilities.

If you do retain any or all of the usage allowance, I recommend you reduce it and gradually eliminate it over time.

You will notice that Scenarios 2 and 4 do not include many of the pages and tables in Scenarios 1 and 3, respectively. That is because those sheets that I left out of the report package are duplicates or near duplicates of the other models. Incomes, expenses, capital improvements, etc. are not dependent upon the rate structure modeled because I modeled rate levels so they will bring in almost exactly the same revenues. Therefore, I left the duplicative pages out of the report simply to make it shorter and less confusing.

In the first subsection of the report I discuss the Water Scenario 1 rates and their effects. In the second subsection I discuss the Water Scenario 2 rates and effects. Because most things are not affected by the two different rate structures, or they are affected very little, there is little to discuss that is different in the Scenario 2 subsection. Therefore, that subsection very brief. But, if you want to consider the effects of Scenario 2 rates in detail, you can review the model closely. I have organized subsections 3 and 4, concerning sewer rates, just like those concerning water.

As you read this report, please keep this in mind. This report does not *direct* the City to do anything. Actions you take or do not take are strictly up to you. The report is meant to inform and educate so you can then make well-informed decisions about actions to take. And the report and model are not legal recommendations. For legal issues consult your attorney.

Cost-based Rate Calculations

To give you the "bigger picture" of rate analysis, and to make it easier for you to read and understand the rest of this narrative report and the analysis models, a tutorial on my methodology is in order.

When I analyze utility rates I use a cost-based approach. In the industry the term for rates that result from this approach are called, "cost to serve" or "cost of service" rates. Simply stated, the costs for a target time period, usually in the near future, are classified as "fixed," "variable," "capacity to serve" or some combination of the three. Fixed costs are converted to a minimum charge. Variable costs are converted to a unit charge. Capacity costs are converted to some combination of system development charges and surcharges to the minimum charge.

Cost to serve rates are considered by many, including me, to be the most mathematically fair and defensible rate structure. However, there are often good reasons to adopt rates that are at least somewhat different from true cost to serve rates. Thus, a cost-based rate analysis often is just the starting point for calculating the rates that a particular utility may eventually decide to adopt.

I usually recommend meter size-based minimum charges composed of two parts:

- One is the basic cost to make any level of service available to any customer. Billing, general administration and similar costs that are the same for all customers, regardless of "size," make up this part of the minimum charge. To make it easier to understand this concept, I use catch phrases. For this type of cost, the phrase is: ***These costs are related to the fact that someone is a customer.***

- The other part of the minimum charge is a surcharge intended to recover all or part of excess or unusual capacity costs. These are almost always based upon water meter size because the ability of the different water meter sizes to sustainably pass peak flows (as determined by American Water Works Association studies) relate well to the cost of building infrastructure "big enough" to handle peak flows. ***Capacity costs are related to the fact that a particular customer has a certain capacity to demand flow or service, regardless of how much flow or service they actually use.***

With this structure, the smallest meter size customers end up paying the lowest minimum charge. As meter size goes up, a larger capacity surcharge is added to the basic minimum charge resulting in ever higher total minimum charges for larger meter size customers. Remember: It's not just how much water such customers use that determines how much they cost the utility. It's how big and robust they cause the utility to be built, because it has to be built robust enough to handle their maximum demand should they try to draw it.

Unit charges are related to the volume of service received. While unit charges can be structured in various ways, the revenues they generate should be adequate to pay those costs that are related to the flow that customers actually use. There are three main unit charge structures that I recommend in different situations:

- Many systems need, or their administrations simply like the notion of encouraging customers to use less of the utility's services – "conservation rates." In this rate structure the unit charge goes up as volume used goes up. Most of us respond to, or at least we think twice about it, when we are assessed a higher price to buy more of something. Conservation rates are most appropriate in areas with limited water supplies or in utilities that are bumping up against their capacity to produce water. Conservation rates are almost never used for pricing sewer service.

The City of Manhattan does not have conditions in play that call for conservation rates. You do not have a limited water supply and infrastructure to produce and deliver water is not limiting. Therefore, I do not recommend you adopt conservation rates, at least at this time. The critical rate changes you need to make early on concern right-sizing and right-structuring of system development fees, minimum charges and a level unit charge, each of which recovers the cost components related to them.

In the future your water supply or infrastructure situation could change. If indicated then, a conservation rate structure could be adopted in the future. Conservation rates are not new. In fact, they are fairly common, even in the mid-west. There are several structures you might use. The appropriate structure would just depend upon your situation at the time. Conservation rates, of course, promote conservation but they usually increase revenues, as well.

- The majority of systems use, and should use, level unit charges – a unit charge that is the same regardless of how much volume a customer uses. With level unit charges everyone is assessed unit charges at the average unit cost. Such rates are the easiest to calculate, they are the easiest for a clerk to explain to a complaining customer on the phone and the revenues such rates will produce next year are the easiest to accurately predict. I like to tell most of my clients that if they are going to err either on the side of complex rates that precisely assess costs to each customer or simpler rates that round off some of the accuracy corners but are easier to administer, choose simple rates. Most water and almost all sewer service is assessed using level unit charges.
- The last major unit charge structure is called, "declining" rates. These are the reverse of conservation rates. I often call them, "use encouragement" rates. It is popular these days for many to belittle those who do not conserve resources at every opportunity. Declining rates are often scorned for that reason. However, if you have ample water supply, ample infrastructure to produce and distribute it, doing so will not cause unintended bad (mostly environmental) consequences, and if you want to encourage high use (which often entails such users hiring more or better paid workers), declining rates make good sense. Declining rates are most appropriate in areas that have a high concentration of high water using industry, or folks in that area want to attract such users.

To complicate the aforesaid just a bit, rate setting is, indeed, about recovering costs. Job one of utility rates is to pay the utility's costs. But usually proper rate setting is also about building adequate reserves; preparing for expensive capital improvements; catching up on needed equipment repair, refurbishment and replacement; and covering similar needs. Thus, these soon-to-be-experienced costs or likely-to-be-experienced costs need to be factored into rates and fees, as well. Because time marches on and costs usually inflate over time, rate setting should take into account the need for future incremental increases to cover inflation. And, you cannot just assume that because the utility needs more revenue that your ratepayers will be glad to pay higher rates. Rate affordability, and the public's perception of affordability, must be addressed, too.

For the techie reader, the analysis model we use – a Microsoft Excel spreadsheet application we call, "CBGreatRates" – is usually 3.8 mega-bites in size. Each rate analysis includes one of these sheets.

For a 1,000 connection utility, for example, we use another spreadsheet, 12.1 mega-bites in size, to sort and calculate customer volume use. We use one of these sheets for each rate class. There are usually five or so for the simplest rates. Each of these sheets is linked to the client's usage data file, usually a few mega-bites in size, for importing usage data. Thus, an analysis for a 1,000 connection utility totals 65 or so mega-bites in size.

For some of our larger client utilities with more rate classes and more customers, total size of all the linked spreadsheets runs over 250 mega-bites. We run computers with lots of RAM and memory but some of the calculations for larger utilities can take around 90 minutes to run. When usage data sheet runtimes get long we usually switch to a database format application to speed up the heavy number crunching.

To account for all these factors, even the simplest rates situation requires some complex, integrated calculations. For that reason, I build a spreadsheet model for each analysis that depicts, in virtual reality, the utility's real-life financial and rates situation.

These models are dynamic – when the initial rate increase is set to be higher, future inflationary increases can be lower; when minimum charges are set lower, unit or other charges need to be set higher to make up the shortfall, when system development charges are assessed more of the utility's capacity costs, minimum charge surcharges and/or other charges can be lower as a result. Such modeling enables me to do dynamic "what-if" scenario calculations. That enables me to arrive at the best fit rates for each utility fairly quickly.

As you read through this report and examine the modeling, you will probably be struck by the complexity of it all. Please keep the above summary of cost-based rate calculations in mind as you read on. At their heart, the calculations are aimed at producing adequate and fairly structured rates. Trust the math. Having the math done for you, you can focus on the really important things that you need to do – adopt adequate and fair rate structures. These will serve your ratepayers and your utility well.

Please keep two more things in mind:

- Time is money, often very big money, when it comes to rate setting. A rate increase delayed is a rate increase that must be even higher to reach the same reserve target. Get to know this report well but do not spend months mulling it over. Time will not make your rate setting task easier. Proceed deliberately but pretty quickly and make the needed changes.
- You will get some complaints because some customers' bills will go up, some markedly. In my experience, most of the time, when the math is laid out for all to see, a few people will complain about higher rates for a month or two. But then they go on with their busy lives. We find that the typical residential customer's bill increase usually works out to a few dollars per month initially and a few dimes per month each following years. That pales in comparison to what is happening to the cost of almost everything else they buy every month. Water and sewer service is a bargain almost everywhere, people know it and most folks don't want to waste their valuable time dickering about the "small stuff." Prepare to take a few hits for a short while and trust that it will pass soon.

Principles

I use several guiding principles when I help systems set their utility rates, fees and policies. As you read the report and the analysis models, keep in mind that my recommendations have been weighed against these principles:

1. Water, sewer and all other utilities are businesses, regardless of who owns them. Businesses must cash flow properly. Otherwise, they go out of business and your customers do not want that.

2. In addition to functioning in a business-like manner, a utility has a responsibility to its customers to nearly guarantee its long-term prosperity for their benefit. The customers expect the service to be there whenever they want to use it. Thus, a utility must err on the conservative side by maintaining strong reserves that will enable it to weather financial storms.
3. If a service costs the utility money, the utility should recover that cost from the most logical "person" if that makes good business and community administration sense. For example, generally "growth should pay for growth." Developers should fairly pay for their consumption of utility capacity by paying commensurate system development charges. Likewise, service users should pay for what they use. Each user or class of users should pay their fair share of service costs.
4. Sometimes contradicting point 3 above, if adjusting a rate, fee or policy will turn currently "good" customers into "bad" customers, or discourage development that the community desires, consider the necessity of the change carefully before making it. For example, while it may be warranted, raising the minimum charge markedly to your residential customers may make it very difficult for fixed, low-income customers to pay their utility bill. That may cause more of them to pay late or not pay at all. That may trigger the utility's attorney to write collection letters to those customers and eventually require shutoff of service. Thus, in the attempt to generate more net revenue by raising rates, net revenues may actually go down due to non-payment and payment collection costs. Likewise, stifling development with uncompetitive system development charges costs a utility in the form of additional paying customers. That forces existing customers to pay all the costs of the utility rather than sharing them with new customers.

General Issues

Concerning construction of the models, they all are essentially the same, only being customized as needed to fit the differences of the different types of utilities. The models were built to match the systems' actual financial statements as much as possible. However, the intent of rate modeling is to see to it that the resulting rates are adequate to pay all system expenses for the next 10 years, build and maintain responsible reserves and collect fees from customers on a fair basis. Because incomes and expenses in your financial statements were not always grouped in such a way as to enable the required rate calculation methodology, the models do not always match your statements.

For modeling purposes, it does not matter whether funds are held in the general system account, a debt service sinking fund, repair and replacement fund, etc. Therefore, the model accounts for funds in a more simplified way than you do. When it comes to segregating funds, staff knows best how to do that so the model does little in this regard and leaves the segregating up to staff.

Several line graph charts in the analysis model graphically depict some things which would be difficult to pick out of the tables. In all the charts the **blue line** represents what would happen under the **recommended** rates and the **red line** under the **current** rates. Trends for the red lines are (generally) bad. Those for the blue lines are (generally) good. Review the definitions section of the model to learn the meaning of terms used in the charts.

One thing you will notice in viewing the charts is that sometimes, only one of the lines shows up. When that occurs it means that all of the lines are taking the same path (they are superimposed). For example, Chart 5, Water Scenario 1, page 47, shows only one line for the working capital goal. At the level of costs of the water utility and the cash reserves it has on hand now and that it is projected to have on hand at both the current rates and the proposed rates, the level of reserves now and in the future will meet the goal amounts but go no higher. That is because, in the model, I programmed all funds in excess of what is needed to meet the working capital goal to "spill over" into the CIP and Debt Service fund. Since the starting balance was greater than the goal and the current and proposed rates will both continue to meet this goal, only the goal line appears. But rest assured, the other two lines are underneath the goal line and that is a good thing.

Charts 6 and 7 do the same thing. But, note that in Chart 8, which depicts total reserves, the different rates perform differently. The proposed rates generate more revenue and, thus, produce stronger total reserves. Since the working capital reserve gets truncated at a certain level, the differences in the total reserves show up in the CIP and Debt Service fund balances. These balances appear near the bottom of Table 6 in each model.

As you set and later reset rates I suggest you follow the guidance I give in my book, "How to Get Great Rates." I gave a copy to Mr. DeWitt so check with him about reviewing it. You may also want to consider using the "Replacement Scheduler©" spreadsheet for future equipment replacement scheduling. It is available for free download from gettinggreatrates.com.

Action Recommendations for Policy and General Issues

Use the following as a checklist of "to-do" tasks. Many if not all of these things you are already doing but they bear repeating.

1. Periodically determine how long, on average, it takes to perform the various services you provide in the field, such as after-hours service, meter disconnects and reconnects, special meter readings, etc. Be sure to include all the time you actually pay staff for performing these services. Then determine how much it costs the utility per hour, on average, to have staff perform these services. This includes benefits, taxes, use of utility vehicles, tools and minor equipment, etc. It should also include a fair amount to cover the time that office staff devotes to working on these services to track them, bill for them, etc. This should be the hourly rate or a set fee you will charge for these services. In addition, set a minimum that you will charge for showing up, whether the service takes an hour to perform or 10 minutes. In essence, set your fees in the same way plumbers and similar technicians do – a set fee for showing up, which buys the customer a set amount of time, and an hourly rate if the job takes longer than the show up charge will

cover. While accounting for time and other investments in the various functions is important, do not make the process burdensome. For many functions you likely can just estimate your time occasionally and charge fees based upon those estimates.

2. Retain required funds in interest bearing debt service and debt reserve accounts when required by your lender(s).
3. Have me conduct a full rate analysis again when your actual financial performance and my projection of future performance diverges markedly. That may be up to five years from now or whenever a new, large financial upset or change is looming. As an alternative, you may prefer to engage me more frequently, perhaps annually, to update your rates based upon new budget figures as they are developed each year.
4. Continue to more fully adopt management strategies that are included in what is most commonly called, "advanced asset management." These strategies can yield better service and reduced costs for utilities, especially those looking to build new facilities or replace existing facilities soon, which is a critical issue for your utilities.
5. Continue to track your volume usage, incomes and expenses on a regular basis so the data and information you generate will support future rate adjustments as well as they did this one.
6. As a reminder, check with your attorney for language and legality of all charges and issues discussed.

Subsection 1: Discussion Concerning Water Scenario 1 Issues

Water rate revenues are currently adequate to pay those costs you currently expect to incur. However, things break, become obsolete or become needed due to new State and federal regulatory requirements. Many of these things will be quite expensive. You cannot always predict what these things will be but you can be sure that things will come along. Therefore, I have included in my modeling a set of "place keeper" capital improvement projects for such unplanned events. These are called, "TBD CIP Projects and Early Debt Retirement."

Rates also should be restructured so they are in a cost to serve structure. Unit charges should go down slightly, the usage allowance should be eliminated and minimum charges for customers with larger water meters need to go up so that those customers will pay for more of the fixed and capacity costs that they cause. An increase in minimum charges means that more of your revenue stream will be dependable – not subject to changing weather and how much customers water lawns, for example. That will reduce the degree to which revenues swing from one year to the next.

Capital Improvements and Equipment Repair and Replacement

Your capital improvements are a major driver of rates. Capital improvement costs will consume approximately 40 percent of future budgets. Because capital improvements are such a major cost for the water utility, we chose to show each item that you track in your capital improvement plans (CIP) just as you showed them in your own plans. That makes for a cumbersome Table 4, page 34, but it is easy to compare both sets of plans side by side.

You include in your CIP, items that are customarily considered to be equipment "repair and replacement," or "R&R" items. While R&R items should be paid for on a saved ahead of time basis, and we advocate using a R&R schedule that generates an annual annuity to do that, we kept R&R costs in our listing of your CIP needs to be consistent with your list. Handling CIP and R&R in a combined fashion seems to work for you so we do not propose that you change that process at this time.

All of your CIP and R&R planned items and costs are included in the calculation of the rates that we recommended. That needs a bit more explanation.

We classified all costs – administration, operating, CIP, R&R – as to their nature as either "fixed," "variable," "capacity-related" or a combination of these types. Because you have so many CIP items and we do not know the nature of each, we enlisted Randy DeWitt to classify those costs. Mr. DeWitt has intimate knowledge of the nature of these items. Thus, we classified all other operating and administration costs and then used both classifications to determine the cost of service rate structure. That structure was applied to your costs going forward to arrive at the rates we recommended. Classification is detailed in Table 14, page 54.

Finally, note that in Table 4, page 34, at the bottom of the projects list there is a yellow highlighted item called, "TBD CIP Projects and Early Debt Retirement" with an annual cost of $1,000,000. This is a place keeper for improvement needs that will come along that you are currently not anticipating. If unknown projects do not materialize at the level that would consume the entire set-aside, the unused funds should then be used for early retirement of existing debt. That would lower the utilities' future costs and hold down the need for future rate increases.

Debt, System Development Charges and Capacity Surcharges

You pay for the most expensive CIP items with ten year bonds or notes. That is just a bit unusual in a good way because many cities use 20 year bonds. Thus, you pay for the most expensive items more rapidly than most utilities – excellent. I am sure you end up saving significant interest expense by using the shortened the loan term so I encourage you to continue this practice.

You pay for less expensive CIP items with four year notes. That is pretty rare. Using such short-term notes for these items probably does not smooth out your balances much and you have sufficiently high balances to cover these expenses if paid from reserves anyway. And, I am sure you have to pay interest and initiation fees to sell these notes so your funding expenses for the moderately expensive items is probably higher than it needs to be. I suggest you compare the costs and benefits of using the four year notes and decide how to proceed based upon those results.

You have substantial debt and that will probably not change. It is just the lot of large, mature utilities. Because much of that debt is incurred to build extra or peak flow capacity, you have options in how to charge customers for debt – ownership – costs for this kind of capacity. As briefly alluded to in the previous subsection, I recommend you assess system development charges and capacity surcharges that recover at least part of these capacity costs, and do it based upon water meter size, as further described in the following.

System Development Charges

Throughout this report and the rate analysis models you will see the terms "tap fee," "tap-on fee" and "connection charges." There are other names for these and similar fees.

Most small systems and those that are less sophisticated than Manhattan set "tap-on fees" and similar fees anecdotally, and almost always too low, as well. They almost never attempt to recover the full cost of the infrastructure capacity they dedicate to each customer when they authorize them to "tap on." Rarely do they even have much of an idea what that capacity costs.

Failing to assess development costs to development is a problem because with each dedication of capacity to customers, the capacity of the utility gets "used up." That hastens the day when new capacity must be built. If that capacity cost is not assessed to those who cause it, it will be assessed by default to all customers. That forces existing customers to subsidize development, and that is a rate structure fairness issue.

I recommend you handle system development and the fees used to pay for it differently. Start this way. **In your ordinances and elsewhere: rename the fees assessed to new customers as "system development charges."** This will descriptively tell developers and new customers what they are paying for. It is not just an arbitrary fee. They are actually buying something of great value. Then, **assess full cost to system development charges, or as much of that cost as you can and still be competitive with comparable cities.**

Later in this report when you see "tap-on fee" and those other terms, think, "system development charge." And when you talk with customers and others about this fee, make sure they know this is not just "government assessing another kind of tax." This is a utility having customers fairly pay for what they are buying – capacity to serve them.

1. You should assess system development charges that recover as much of the peak capacity costs as possible, but at the same time they should be at least somewhat competitive with system development charges (tap-on fees) of other nearby, similar utilities. I modeled your system development charges so that the fee for a five-eighths or three-quarter inch water meter (the most common residential meter size) would be $750. That is about three times more than your current tap-on fee for such a customer but I suspect it is well below the actual cost of capacity for these meter sizes. Larger meter sizes would be assessed higher system development charges based upon the maximum sustainable flow rate of each meter as determined by flow studies done by the American Water Works Association. In total, as shown in Table 9, page 49, in a full year at the expected growth rate, you would collect $370,000 in system development charges. That is 42 percent of the cost of capacity as classified. (By the way, system development charges are the only type of fee that I commonly recommend utilities price in competition with other utilities.)
2. You should assess part of the capacity costs through a minimum charge surcharge, again, based upon water meter size. Surcharges collect revenue over time as customers use the system. To reduce the degree by which most customers' bills will increase, these fees were modeled to recover the remaining 58 percent of the capacity-related part of the system's CIP and R&R costs.

Specifically concerning system development charges (SDC), the model calculated standardized fees all the way from the smallest possible customer meter to a 16-inch meter. I recommend that you adopt a set of SDC fees (a table) and that, as a matter of policy, you let the standard fees for all meter sizes below a chosen level be controlling. In other words, let city staff handle the "retail stuff" of small meter connections. I suggest that all connections with meters of two inches or less be paid for off the SDC fees table. Almost all larger meter connections should be handled that way, as well.

However, the commission has the authority and should on occasion exercise its prerogative to accept new connections for some other SDC amount and/or for other considerations offered by a potential new customer. Most commonly, the issue will be economic development and job creation by a new customer needing a large meter size. There are city-wide benefits to allowing such new customers to build or expand in the city that outweigh the possible loss in SDC revenues. I suggest that, in your ordinance that includes the SDC fees table, you include a statement that the commission retains the authority to allow new connections for fees or other considerations that, in the view of the commission, are beneficial to the city as a whole.

Finally, I recommend you assess the same SDC to five-eighth and three-quarter inch meters because these are the most common meter sizes for residential customers and almost all of these meters are in use by residential customers. Thus, setting the same SDC for these two meter sizes will simplify administration of the SDC fee program. Doing so will cause the minimum charge for these two meter sizes to be the same, as well.

Target Reserve Levels

You currently maintain rather substantial reserves for the water utility, higher than many I assist. I applaud you for that. However, I actually recommend you target slightly higher reserves that are intended for two main purposes, as follows:

- Unobligated cash and cash equivalent reserves equal to at least 35 percent of the annual operating costs, not including debt service. Why? Most funding sources, rate analysts and organizations associated with the water and waste water industries recommend that most systems maintain operating reserves equivalent to three months' worth of the system's operating costs.
- Capital improvement and repair and replacement (R&R) reserves at the end of the tenth year, after debt is paid, that are equal to that year's capital, R&R and debt payment costs. Why? Again, most funders and experts in the water and waste water industries require or recommend a debt coverage reserve of 20 percent of the total annual debt payments. Some require more. When R&R costs are modeled over the usual 20-year period and reserves accrued that will pay those costs when they come due, at the ten year mark most R&R reserves end up being equal to five times or more of the average annual R&R cost. You handle CIP and R&R costs together so to be safe, I recommend you maintain a full year's worth of CIP and R&R costs in reserve.

You already maintain substantial reserves so the reserve targets I selected are not so much a matter of increasing your reserves. It is more a matter of maintaining reserves on the order that you already have. Because your current reserves are fairly near those I have targeted, the slightly higher reserves have almost no effect on rates.

Lines on the bottom of Table 6, page 41 of the model show your reserve balances expected for the next 10 years.

Minimum Charge, Unit Charge and Usage Allowance Rate Structures

You currently assess one minimum charge to in-city customers and a minimum charge to out of city customers that is 200 percent of (double) the in-city rate. You do the same for unit charges. You have some special minimum and unit charges to contracted customers that are set at 125 percent, 150 percent and 200 percent of the in-city rates. Because these rates are contracted at these formulas, I retained the same formulas in my modeling, so I will not discuss contracted customer rates further.

You also have a usage allowance for all customers of 200 cubic feet of water per month. In other words, by paying their minimum charge, each customer gets 200 gallons of water for no additional charge.

I recommend the following changes:

- You should assess escalating minimum charges, based upon water meter size, as reflected in Table 1 near the end of this report section,
- Retain the current percentage differentials for out of city and contracted customers' rates, also reflected in Table 1, and
- Eliminate the usage allowance for all customers. Because your average residential use is approximately 1,100 cubic feet per month, a 200 cubic foot allowance amounts to approximately 18 percent of your potential billable flow to most residential customers and something less to most other customers. That percentage of "give-away water" is substantial and it skews unit charges substantially.

These rates are as close to a true "cost to serve" structure as you practically can make them at this time.

Rate Affordability

As shown near the top of Table 6, page 41 and graphically in Chart 4, page 46, the affordability index of your current rates, at 0.57 percent, is just over half of the approximate national average of 1.0 percent. The rates I think you should adopt from Water Scenario 1 would be a bit higher at an affordability index of 0.72 percent. With inflationary increases to future rates modeled at slightly less than the rate at which incomes are rising, the affordability index would go down gradually and by the tenth year be 0.66 percent.

Affordability Index: The monthly charge for (typically) 5,000 gallons of residential service divided by the median monthly household income for the area served by the system. An index of 1.0, meaning a household pays one percent of its income to pay its bill for 5,000 gallons of service, is generally considered affordable. Affordability index is a primary factor in determining grant and loan eligibility and grant amount.

The affordability index is useful but it does not depict how new rates will affect everyone. Table 7 of Water Scenario 1, page 42, shows how customers' bills at several example volume ranges will be affected by the recommended rates. Due to restructuring, most low volume customers' bills will go up and higher volume customers' bills will go up slightly and very high volume customers' bills, which there are very few of, will go down slightly. However, please note that in the comparisons table, we only showed the resulting bills of the more common meter size customers. Higher volume customers' bills will go up more, or go down less because their minimum charges will be proportionately higher.

Table 7B, page 43, combines the water and sewer bills from Scenarios 1 and 3; the "eliminate the usage allowance" rates alternatives. These are the rate structures I recommend. Because some of the sewer bills will go in the opposite direction of the equivalent volume water bills, many of the rate adjustments partially cancel each other out. Thus, this table gives a better picture of what will happen to many of the combined bill of water and sewer customers.

However, there is a caveat. Most residential sewer customers contribute less sewer volume to the sewer system than the water volume they draw. Thus, actual sewer bills for most residential customers will be lower than the bills depicted in Table 7. Therefore, their new combined water and sewer bills will be somewhat lower than the bills depicted in Table 7B. Still, Table 7B is illustrative of the basic trend in combined water and sewer bills.

Recommendations for Water Rates

Water Scenario 1 contains all of my rates-related recommendations and shows what they are built upon. However, the model is complex, plus it does not cover policy issues. Therefore, I have summarized my recommendations as follows.

Action Recommendations for Rates and Fees

1. *You should assess the meter size-based monthly minimum charges and unit charges shown in Table 1 that follows this list.*
2. *The calculations assumed you will make these adjustments early enough to enable you to collect at these rates for the January 1, 2017, billing (you would pass a revised ordinance at least one billing cycle before that).*
3. *Assess system development charges as shown in Table 9, page 49. Note: You currently use terms like "connection fee" and "tap fee" in your ordinances. I recommend you change the name of the fee related to the cost of system capacity to "system development charge." Continue to sell equipment and provide services like inspection of installations and continue to charge for that equipment and those services. But, charges related to system capacity should be referred to as "system development charges."*
    a) *I recommend that almost all new connections, especially all those made with water meters two inches in diameter or less, be paid for at the rates included in your system development charge rate table. However, the Commission should retain the authority to waive the standard system development charge or adjust that charge for certain of those customers (primarily large meter size, high employment new customers) that, due to other offsetting values they would bring to the community (primarily economic development) and those values would substantially benefit the community as a whole.*
4. *Include in future capital improvement plans a contingent amount, which in the model is called, "TBD CIP Projects and Early Debt Retirement," in the amount of $1,000,000 per year. This contingency is intended to cover capital improvement needs that, regardless of the rigor of capital improvement planning, will likely "pop up." Should such needs not materialize, use the funds that accrue for early debt retirement.*
5. *Modify your current late payment/non-payment ordinance language so that it effectively accomplishes what is described in the following bullet points:*
    - *If payment is insufficient to cover all amounts billed for water, sewer and stormwater services, plus any other fees assessed by the City, the payment will first be applied to stormwater and the other non-water related services, then to sewer service and last to water service.*

- *A late payment penalty of 10 percent of the outstanding balance or $10.00, whichever is greater, will be assessed to the customer's account each month.*
- *Water service, and any other service that may also be in arrears, will be shut off in accordance with, and at the earliest time allowed by State law.*
- *Reconnection after non-payment will only be done after the customer has paid all fees and penalties owed, plus a reconnection fee that is 50 percent higher than the usual reconnection fee after shutoff to make repairs, transfer property to a new owner, change tenants and similar events not related to non-payment.*
- *If a customer is disconnected for non-payment a second time in a one-year period, in addition to the above fees and penalties, you should collect an additional deposit from that customer in an amount you deem appropriate. Such deposit should only be expended to pay the customer's outstanding bill, fees and penalties in the case where the outstanding bill, fees and penalties cannot be collected. A customer moving away without paying is such a circumstance this deposit is meant to guard against.*

6. *If all goes as modeled, on the one-year anniversary of making the rate adjustments called for above, and for several years thereafter, raise all rates and fees across the board by 2.0 percent. Otherwise, follow the instructions in Chapter 9 or the book, "How to Get Great Rates."*
7. *You should examine your shut off and reconnection, meter charges and similar fees to determine if they are high enough to recover the related costs. Revenue generation is not the goal for such programs. It is a fairness issue because if these fees do not recover their related full costs, regular customers will have to make up the difference in the form of higher user fees.*

Table 1: Manhattan, KS Water Minimum, Usage Allowance and Unit Charges

Table 1: Recommended Manhattan, KS Water Minimum, Usage Allowance and Unit Charges (Out of City Rates Are Doubled)

Water Meter Size in Inches, or Special Customer	Minimum Charge/Month	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft
0.625	$9.98	0	$2.41
0.750	$9.98	0	$2.41
1.000	$11.57	0	$2.41
1.500	$14.23	0	$2.41
2.000	$25.92	0	$2.41
3.000	$55.14	0	$2.41
4.000	$88.61	0	$2.41
6.000	$178.93	0	$2.41
8.000	$306.45	0	$2.41
10.000	$455.22	0	$2.41
12.000	$572.11	0	$2.41
16.000	$719.61	0	$2.41
Hunter's Island & Moehlman Bottoms	$13.37	0	$3.62
Konza Valley WP & TD	$11.14	0	$3.02
Rural Water Districts	$11.14	0	$3.02
Blue Township RWD	$17.83	0	$4.83

The modeled rates above are not directly comparable with the current rates because the current rates are not meter size-based.

Closing

I recommend you adopt the rates calculated in Water Scenario 1. These rates will enable you to build appropriately strong reserves, cover increasing costs, repay debt, be prepared for contingencies and do so using fairly structured rates.

Finally, as you address issues raised in this report and the analyses, you will have questions. Ask them. My goal is to help you set and keep adequate, fair and appropriately simple or complex rates. That takes time and effort and it may stretch out beyond the "conclusion" of the project. I'm in it for the long haul with you. Unless you ask for something that takes substantial or very different work, you will owe me no extra fees for that help.

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Subsection 2: Discussion Concerning Water Scenario 2 Issues

Scenario 2 rates would have you continue to "give away" significant volume of otherwise billable product – water. Because there is no "free lunch" in water service, this volume is not really given away. It is simply paid for differently and to a degree, by different customers. That is not to say this is not a legitimate pricing strategy. In fact, usage allowances are quite common. If your customers understand the practice and its effects and "approve" of the strategy, they have defined it as fair.

As mentioned before, this subsection will only discuss those issues and effects that are different from those discussed in subsection 1. The only difference is that the Scenario 2 rates retain your current 200 cubic foot usage allowance whereas the Scenario 1 rates eliminate the allowance.

Rate Affordability

If you retain the usage allowance, rate affordability will be affected slightly. As shown near the top of Table 6, page 57 and graphically in Chart 4, page 62, the affordability index of your current rates, at 0.57 percent. Water Scenario 2 rates would be slightly higher than that and slightly lower than the Scenario 1 rates at an affordability index of 0.62 percent. With inflationary increases to future rates modeled at slightly less than the rate at which incomes are rising, the affordability index would go down gradually and by the tenth year be 0.57 percent.

The affordability index of the Scenario 1 rates is higher than that for the Scenario 2 rates. Translation: The water bill for a 5,000 gallon per month residential customer would be more under Scenario 1 rates than Scenario 2 rates.

Table 7 of Water Scenario 2, page 58, shows how customers' bills at several volume ranges would be affected by the recommended rates. As compared to the Scenario 1 rates, retaining the usage allowance would flatten the rate adjustments a bit. Reducing the degree of change to ratepayers has its appeal. But, Scenario 2 rates would be further away from a true cost to serve rate structure than those of Scenario 1.

Just as I combined bills for Scenario 1 and 3 rates, I also combined bills for Scenario 2 and 4 rates. The same caveat applies to these scenarios, too. That is, most residential sewer customers contribute less sewer volume to the sewer system than the water volume they draw. Thus, actual sewer bills for most residential customers will be lower than the bills depicted in Table 7. Therefore, their new combined water and sewer bills will be somewhat lower than the bills depicted in Table 7B. Still, Table 7B is illustrative of the basic trend in combined water and sewer bills if rates from Scenarios 2 and 4 are adopted.

Water Scenario 2 Rate and Fee Adjustments

Water Scenario 2 fee and policy changes would be the same as those for Water Scenario 1. Only the user charge rates would be different, as shown in the following table.

Table 2: Water Minimum, Usage Allowance and Unit Charges

Table 2: Manhattan, KS Water Minimum, Usage Allowance and Unit Charges (Out of City Rates Are Doubled)

Water Meter Size in Inches, or Special Customer	Minimum Charge/Month	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft
0.625	$9.98	2	$2.67
0.750	$9.98	2	$2.67
1.000	$11.57	2	$2.67
1.500	$14.23	2	$2.67
2.000	$25.92	2	$2.67
3.000	$55.14	2	$2.67
4.000	$88.61	2	$2.67
6.000	$178.93	2	$2.67
8.000	$306.45	2	$2.67
10.000	$455.22	2	$2.67
12.000	$572.11	2	$2.67
16.000	$719.61	2	$2.67
Hunter's Island & Moehlman Bottoms	$13.37	2	$4.01
Konza Valley WP & TD	$11.14	2	$3.34
Rural Water Districts	$11.14	2	$3.34
Blue Township RWD	$17.83	2	$5.34

The modeled rates above are not directly comparable with the current rates because the current rates are not meter size-based.

Closing

I recommend you adopt the rates calculated in Water Scenario 1. But, the rates in Scenario 2 would reduce the degree by which customers' rates would change.

*****

Subsection 3: Discussion Concerning Sewer Scenario 3 Issues

Sewer Scenario 3 issues are nearly identical to those for Water Scenario 1, with the exception that you currently assess one sewer minimum charge to in-city customers and a minimum charge to out of city customers that is 150 percent of the in-city rate (50 percent higher, rather than the 100 percent higher for water). You do the same for unit charges. I retained the same rate differentials for sewer rates that you currently have.

Rate Affordability

As shown near the top of Table 6, page 79 and graphically in Chart 4, page 83, the affordability index of your current rates, at 1.0 percent, is right at the approximate national average of 1.0 percent. The rates I think you should adopt from Sewer Scenario 3 would be a bit higher at an affordability index of 1.01 percent. With inflationary increases to future rates modeled at slightly less than the rate at which incomes are rising, the affordability index would fall gradually and by the tenth year be 0.92 percent. For more rate change comparisons, see Table 7, page 80.

Sewer Scenario 3 Rate and Fee Adjustments

Sewer Scenario 3 fee and policy changes, other than those regarding consumptive use of water, which you already handle well, would be the same as those for Water Scenario 1. Therefore, sewer user charge rates should be set as shown in the following table.

Table 3: Sewer Minimum, Usage Allowance and Unit Charges

Table 3: Sewer Minimum, Usage Allowance and Unit Charges (Out of City Rates Are 50% Higher)

Water Meter Size in Inches, or Special Customer	Minimum Charge/Month	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft
0.625	$10.96	0	$3.84
0.750	$10.96	0	$3.84
1.000	$15.88	0	$3.84
1.500	$24.09	0	$3.84
2.000	$60.21	0	$3.84
3.000	$150.50	0	$3.84
4.000	$253.92	0	$3.84
6.000	$533.00	0	$3.84
8.000	$926.99	0	$3.84
10.000	$1,386.64	0	$3.84
12.000	$1,747.80	0	$3.84
16.000	$2,203.55	0	$3.84

The modeled rates above are not directly comparable with the current rates because the current rates are not meter size-based.

Closing

I recommend you adopt the rates calculated in Sewer Scenario 3. These rates will enable you to build appropriately strong reserves, cover increasing costs, repay debt, be prepared for contingencies and do so using fairly structured rates.

*****

Subsection 4: Discussion Concerning Water Scenario 4 Issues

Scenario 4 issues are the same as those for Sewer Scenario 3, with one exception. These rates include continuing the 200 cubic foot usage allowance. That moves the rate structure away from cost to serve and affects rate affordability.

Rate Affordability

If you retain the usage allowance, rate affordability will be affected somewhat. As shown near the top of Table 6, page 95 and graphically in Chart 4, page 99, the affordability index of your current rates is 1.0 percent. Sewer Scenario 4 rates would be lower at an affordability index of 0.90 percent. With inflationary increases to future rates modeled at slightly less than the rate at which incomes are rising, the affordability index would go down gradually and by the tenth year it would be 0.82 percent. However, other customers' bills would be higher to make up the shortfall in revenues collected from the 5,000 gallon per month residential customers. For more rate change comparisons, see Table 7, page 96.

Sewer Scenario 4 Rate and Fee Adjustments

Sewer Scenario 4 user charge rates would be as shown in the following table.

Table 4: Sewer Minimum, Usage Allowance and Unit Charges

Table 4: Sewer Minimum, Usage Allowance and Unit Charges (Out of City Rates Are 50% Higher)

Water Meter Size in Inches, or Special Customer	Minimum Charge/Month	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft
0.625	$10.96	2	$4.60
0.750	$10.96	2	$4.60
1.000	$15.88	2	$4.60
1.500	$24.09	2	$4.60
2.000	$60.21	2	$4.60
3.000	$150.50	2	$4.60
4.000	$253.92	2	$4.60
6.000	$533.00	2	$4.60
8.000	$926.99	2	$4.60
10.000	$1,386.64	2	$4.60
12.000	$1,747.80	2	$4.60
16.000	$2,203.55	2	$4.60

The modeled rates above are not directly comparable with the current rates because the current rates are not meter size-based.

Closing

I recommend you adopt the rates calculated in Sewer Scenario 3. But, the rates in Scenario 4 would reduce the degree by which customers' rates would change, which has some value.

Comparison of Water and Sewer Bills for the Average Residential Customer

Prior comparisons were made using the national standard of residential use at 5,000 gallons of water or sewer per month. While this is a useful indicator of cost to residential customers, it is not based upon the actual average residential use in the City of Manhattan.

The following table compares water and sewer bills, and combinations of those bills, based upon the actual average residential water and sewer use in Manhattan during the test year. Of course, these volumes, especially the water use volume, will change from year to year based upon weather (lawn irrigation needs) and other factors. And, average use will change over time. But, you should still find these comparisons to be very useful.

Table 5: Water and Sewer Bill Combinations

Table 5: Water and Sewer Bill Combinations

This table shows the modeled water and sewer bills for the average in-city residential customer based upon their average water use of 8,095 gallons per month and sewer use of 5,734 gallons per month. Rates from Scenarios 1 and 3 have no usage allowance. Rates from Scenarios 2 and 4 retain the current 200 cubic feet per month usage allowance. The highlighted rate combinations are in the same rate structure.

Possible Scenario (Rate) Combinations	Water Bill	Sewer Bill	Combined Bill
Water Scenario 1 and Sewer Scenario 3	$36.09	$40.39	$76.48
Water Scenario 1 and Sewer Scenario 4	$36.09	$37.01	$73.10
Water Scenario 2 and Sewer Scenario 3	$33.33	$40.39	$73.72
Water Scenario 2 and Sewer Scenario 4	$33.33	$37.01	$70.34

Overall User Rate Adjustment Recommendation

Cost to serve rates are the fairest rate structure in that they recover costs from customers in direct proportion to the costs each customer causes the utility to incur. Cost to serve rates are cost and mathematics-based.

Therefore, **I recommend the City adopt the rates calculated in Water Scenario 1 and Sewer Scenario 3.**

Manhattan, KS; Water Rates Scenario 2016-1 Modeling Results

(Eliminate Usage Allowance)

This document contains the calculations that were performed to arrive at new user rates and fees for the next 10 years. These calculations are complex so key issues are also described in a narrative report that accompanies this model.

This analysis was conducted so as to establish user rates that are adequate to pay all reasonably expectable costs while charging rates that are fairly structured and appropriately simple or complex.

Scenario Description: This analysis model assumes the current method of basing rates on type of customer would be discontinued. Instead, minimum charges would be based on water meter size and unit charges would be the same for all volumes of use for all customers. However, several tables continue to show rates in that structure simply to make rate comparisons "head to head." Out of city and contracted customers would still be assessed higher minimum and unit charges.

For most, the best way to read and understand what this model means is this. Scan the "Index of Tables, Charts and Other Results" to see how the model is laid out. Scan the "Definitions" for any terms you are not already familiar with. Read and even ponder Table 1 and the line graph charts. These will show you how the proposed rate adjustments will affect ratepayers and the system. If you need more detail than that, review the entire model. Finally, rate setting involves much more than just rates so you need to read the accompanying narrative report to understand what you need to do and why.

Several tables in this model depict volume usage and user rates for the various customer classes. The model includes a continuum of volumes but many volume categories had no users. Most of these lines have been hidden simply to make the tables less voluminous. However, all volume classes that had use or that are break points for rate blocks are shown. For volume classes that are not shown, rates will be the same as the previous rate that is shown.

September 28, 2016

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Index of Tables, Charts and Other Results

Note: When a numbered table or chart is missing from the list below and this model package, that was not a mistake. It simply means that table or chart from our master program was not needed in this situation.

Name	What Each is or Does
Definitions	The meaning of terms used in this report and in rate setting generally
Return on Investment	A summary of financial outcomes produced by the proposed rates
Table 1 - Modeled Unit Charges	User rates depicted in this model for each user class
Table 2 - User Base Data and Operating Incomes	Basic user statistics and operating revenues, projected for next 10 years, based upon adopting modeled rates and future inflationary increases
Table 3 - Operating Costs and Net Income	Operating costs projected for next 10 years, excluding debt service
Table 4 - Capital Improvement Program	Capital improvements and how they will be paid over next 10 years, including debt service
Table 5 - Capacity Cost; Its Amount and How it Will be Recovered	Capacity costs incurred on behalf of new connections, if applicable
Table 6 - Financial Capacity Indicators and Reserves	Balances and financial health indicators as a result of adopting the modeled rates
Table 7 - Bill Comparisons Before and After Rate Adjustments	Illustrates effects of modeled rates on bill increases or decreases for use at various levels
Table 8 - User Statistics	Depicts usage and revenue statistics brought on by the modeled rates
Chart 1 - Operating Ratio	Graph of operating ratio for next 10 years if modeled rates are adopted
Chart 2 - Coverage Ratio	Graph of coverage ratio for next 10 years if modeled rates are adopted
Chart 3 - 5,000 Gallon Residential User's Bill	Graph of bill for a 5,000 gallon per month residential user, with smallest available meter size, for next 10 years at modeled rates (used in grant and loan eligibility determinations)
Chart 4 - Affordability Index	Graph of affordability index of residential user's bill for next 10 years at modeled rates (used in grant and loan eligibility determinations)
Chart 5 - Working Capital vs Goal	Graph of total (unobligated) cash assets for next 10 years at modeled rates compared to the goal for total cash assets
Chart 6 - Value of Cash Assets Before Inflation	Graph of total (unobligated) cash assets NOT adjusted for inflation for next 10 years at modeled rates
Chart 7 - Value of Cash Assets After Inflation	Graph of total (unobligated) cash assets adjusted for inflation for next 10 years at modeled rates
Table 9 - System Development Charges Based on Meter Size	Calculation of tap fees based upon meter or connection size, if applicable
Table 10 - System Development Surcharges Based on Meter Size	Calculation of surcharges to apply to minimum charges, based upon meter or connection size, that will recoup part or all of the costs incurred to provide high-flow capacity, if applicable
Table 11 - Initial Rate Adjustments and Resulting Revenues	Recitation of current rates, and calculation of modeled rates and blended revenues they will produce during the year following the test year (usually this year in real time)
Table 12 - Test Year Usage	Compilation of actual volume of service used by customers during the test year
Table 13 - Rates at End of Test Year	The user rate table in effect at the end of the test year
Table 14 - Average Cost Classification	Sumation of a specified year's costs and calculation of "cost of service" basis for recovery of fixed costs and variable costs.
Table 15 - Marginal Cost Classification	Incremetal (marginal) costs that would be incurred if the system produced incrementally more volume of service, the system brought on a new customer or did something similar, if applicable

Definitions

Affordability Index	The monthly charge for (typically) 5,000 gallons of residential service divided by the median monthly household income for the area served by the system. An index of 1.0, meaning a household pays one percent of its income to pay its bill for 5,000 gallons of service, is generally considered affordable. Affordability index is a primary factor in determining grant and loan eligibility and grant amount.
Capacity Charge, System Development Charge, Impact Fee or Availability Charge	A charge that buys a new customer system capacity. This is a charge levied on a new customer that recovers all or part of the capital costs to build capacity to be able to serve that customer's actual or potential demand. This charge may be a few thousand dollars for a residential customer to many thousands of dollars for a large industrial customer.
Capital Improvement Plan or Program (CIP)	A schedule of anticipated capital improvements. These are the more expensive items such as water towers, treatment plants and lines that generally require bond or grant funding. They do not include equipment replacement items.
Capital Improvement Reserves	Cash reserves dedicated to funding the CIP
Comprehensive Rate Analysis	A thorough examination of a system's operating, capital improvement, equipment replacement and all other costs, revenues, current rates, number of users and their use of the system, growth rates and all other issues surrounding the system. This examination will determine how rates and fees should be set in the future to cash-flow the system properly, to build appropriate reserves and to be fair the ratepayers. It also will determine how policies should be adjusted to enable the system to operate well now, operate well in the medium-range future (about 10 years) and prepare for expected and expectable events such as capital improvements and equipment replacement.
Connection Charge	A charge that buys a new customer connection to the system. This charge is levied on a new customer to recover all or part of the costs a system incurs in the course of connecting the new customer to the system. This may include labor costs for staff or others on-site; equipment sold by the system to the new customer for making the connection; equipment, tools and supplies used by system staff for making the connection; and the like. This charge may be a few hundred dollars for a residential customer to thousands of dollars for a large industrial customer.
Conservation (Inclining) Rates	Unit charges that go up as the volume used goes up
Cost to Produce	There are several ways to define cost to produce. Each is acceptable for different purposes. Generally, cost to produce is the total of all variable costs required to get service to a utility's customers during one year divided by the total units of service delivered during that year. In a proportional to use rate structure, this will be the variable cost. See "Cost Calculations" at the bottom of Chart 19.
Cost to Serve Rates	Rates where fixed and variable costs generated by each user class are paid by that class with minimum and unit charges, respectively.
Cost Types; Fixed and Variable	The two main types of costs are fixed - those that are related to the fact that someone is a customer; and variable - those that are related to the volume of the commodity delivered to customers. Generally, fixed costs should be recovered with minimum charges and variable costs with unit charges.
Coverage Ratio (CR)	Incomes available to pay debt divided by the amount of the debt for that year. Most systems should have a CR of 1.25 or higher. Note: the CR in this model also includes reserves available to pay debt in the CR calculation, which is a more realistic approach to debt coverage.
Current Position	For a year, the sum of all incomes and undedicated reserves minus all current financial obligations for that year. Future obligations (next year's loan payments) and depreciation are not included. Current position is a good measure of overall financial health.
Declining Rates	Rates where unit charges go down as the volume used goes up
Flat Rates	Rates where all users pay exactly the same fee regardless of the volume of service they use
Equivalent Dwelling Unit (EDU) or Equivalent Residential Unit (ERU)	Based upon number of water using fixtures, average flow, potential flow or similar criteria; the consumption rate of the average single family home is rated at one EDU. All other types of customers are then compared on this measuring basis and the EDUs are calculated. Generally the purpose of this exercise is to calculate fees that each EDU must pay.
Incremental Rate Adjustments	Rate increases done, generally annually, following the initial rate adjustment. The goal of these rate increases is to keep the system's income and reserve levels on track. Rate structure fairness is a small issue, if it is an issue at all. Such increases are usually small, in the two to five percent per year range.

Definitions

Initial Rate Adjustments	Rate adjustments done in follow up on the comprehensive rate analysis. Generally, the goal of such adjustments is to establish rates that put the system's income and reserve levels on track with the system's financial needs and do it with a structure that is fair to the ratepayers.
Inflow & Infiltration (I&I)	In a sewer system, water that gets into the collection system by way of illicit connections (inflow) such as gutter downspouts and leaks in manholes and sewer lines (infiltration)
Infrastructure	Hard assets, such as water towers, treatment plants and lines needed to provide service to customers connected to the system
Life-cycle Cost	The total cost to design, build, operate, maintain and eventually dispose of an asset. One asset may cost less to build but be more expensive to operate and maintain, yielding a higher life-cycle cost.
Marginal Costs	The part of fixed and/or variable costs that are unavoidable should use go up marginally, should an additional large-volume customer be added at a discounted but still profitable fee or for other reasons. Generally marginal costs are less than the average fixed and variable costs but when extra use requires a system upsizing, they can be greater. These costs are especially useful when considering selling service at wholesale.
Operating Costs	Definitions and calculations vary. For rate setting purposes operating costs are costs incurred because a system is operated. Such costs are generally recovered through unit charges.
Operating Revenues	Revenues generated by user fees
Operating Ratio (OR)	Current incomes divided by current expenses, not including debt. An OR of 1.0 is "break even." Most systems should have an OR of 1.25 or higher. Note: the OR calculation in this model also included undedicated reserves, which is a more realistic approach to covering operating costs. However, most lenders, for example, disallow reserves from being considered in the operating ratio calculation.
Payback Period	Time required for the investment made to get this analysis to return that investment through increased user and other fees
Potential Demand	The volume of service that a user could demand for a short period of time at full volume use. The potential demand limiting factor is usually the size of the customer's meter or service line.
Proportional to Use Rates	Rates where the minimum charge recovers all fixed costs, the unit charge recovers all variable costs, the unit charge is the same for all volume sold, and there is no usage allowance in the minimum charge.
Replacement Schedule	A timetable that describes equipment replacement and important repairs that are too infrequent and/or too expensive to cover as annual operating costs but not so expensive that they need to be covered as capital improvements.
Replacement Reserves	Cash reserves used to fund the Replacement Schedule
Return on Investment	The dollar amount or percentage of revenue gain enabled by this analysis
Tap Fee, also called a Hook up Fee or Connection Fee	See Capacity Charge
Test Year	The one year period from which data was gathered to be the basis of the rate analysis
Usage Allowance	The volume, if any, that is "given away" with the minimum charge. Most systems give away no volume. Those that give away an unlimited volume have what are called "flat rates."
User Fee, User Charge, User Rates	Fees assessed to customers for use of the system. Does not include tap, capacity or connection fees, late payment penalties or other types of charges.
Water Loss	Measured by volume or percent, the part of a water system's net water production that does not get to customers. This loss also includes billable volume lost due to under-registering customer meters.
Working Capital, Net Income	The amount left in the operating fund after paying all costs due during that month, year or other time period. Working capital of $0 is "break even."
Working Capital Goal	The desired percentage in excess of "break even" for the operating fund. Small systems (a few hundred connections) generally should target 35 percent or greater. Larger systems can target less, down to a minimum of about 20 percent for systems with 5,000 or more connections but the goal for each system should be based upon the needs of that system.

Table 1 - Modeled Rates

Manhattan, KS; Water Rates Scenario 2016-1

Adopt the unit charges shown in this table. However, minimum charges will be based upon the meter size of each customer so assess minimum charges from Table 10 based upon each customer's meter size.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Usage Allowance in 100 Cu Ft	Unit Charge per 100 Cu Ft
In City Residential	0	1	0.000	$2.41
	2	19	0.000	$2.41
	20	399	0.000	$2.41
	400	999,999	0.000	$2.41
In City Business	0	1	0.000	$2.41
	2	19	0.000	$2.41
	20	399	0.000	$2.41
	400	999,999	0.000	$2.41
Out of City Residential	0	1	0.000	$4.83
	2	19	0.000	$4.83
	20	399	0.000	$4.83
	400	999,999	0.000	$4.83
Out of City Business	0	1	0.000	$4.83
	2	19	0.000	$4.83
	20	399	0.000	$4.83
	400	999,999	0.000	$4.83
Hunter's Island & Moehlman Bottoms	0	1	0.000	$3.62
	2	19	0.000	$3.62
	20	399	0.000	$3.62
	400	999,999	0.000	$3.62
Konza Valley WP & TD	0	1	0.000	$3.02
	2	19	0.000	$3.02
	20	399	0.000	$3.02
	400	999,999	0.000	$3.02
Rural Water Districts	0	1	0.000	$3.02
	2	19	0.000	$3.02
	20	399	0.000	$3.02
	400	999,999	0.000	$3.02
Free Water	0	1	0.000	$2.41
	2	19	0.000	$2.41
	20	399	0.000	$2.41
	400	999,999	0.000	$2.41
Blue Township RWD	0	1	0.000	$4.83
	2	19	0.000	$4.83
	20	399	0.000	$4.83
	400	999,999	0.000	$4.83

Table 2 - User Base Data and Operating Incomes

Manhattan, KS; Water Rates Scenario 2016-1

This table depicts user statistics, customer growth, and system incomes and across the board "inflationary" style rate increases through the 10th year.

Annual Median Household Income (AMHI)

$42,305	Census Bureau estimate of AMHI for the year:	2013
$30,463	Census Bureau estimate of AMHI for the year:	2000
$11,842	AMHI growth during this time period	
2.99%	Simple annual income growth rate during this time period (used to project incomes into the future)	

Test Year Growth of Customer Base and Average Tap Fee (SDC) Paid per Connection

266	Number of new customer connections made during the test year
$255	Average hook up fee (SDC) assessed during the test year

The gray highlighted row below shows the rate revenue increase for "This Year" (heading highlighted blue). However, for "This Year," each customer's bill will go up or down based upon how the new rates apply to their actual use and demand. In future years it is assumed that all rates and fees will go up, either by a simple inflationary factor shown on this line or restructured rates that produce this level of income increases.

In the "This Year" column below (heading highlighted blue), revenues will be collected at the now-current rates for the first part of the year and the modeled rates for the last part of the year starting on the date near the top of Table 12. Thus, the revenues shown in the last column of the table are "blended" revenues; part collected at the old rates and part collected at the new rates. It was then assumed that all rate adjustments made after the initial (major) adjustment will be done in time each year so fees can be collected from the first day of each new year at the (annually) adjusted rates.

User Base

(First year balances and incomes are actual, subsequent years are projected.)	Infla./De-flation (–) Factor	Test Year Year Starting 1/1/15	This Year Year Starting 1/1/16	2nd Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
Average Users for the Year	NA	15,596	15,892	16,142	16,392	16,642	16,892	17,142	17,392	17,642	17,892	18,142
New Connections Made During the Year	NA	266.0	296.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
User Growth or Loss Rate	NA	1.71%	1.86%	1.55%	1.55%	1.50%	1.48%	1.46%	1.44%	1.42%	1.40%	1.38%
Rate Increases Projected for Future Years	NA	NA	NA	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

How User Charge Fees Were Calculated, Accounting for New Customers and Future Rate Increases

Test Year Actual, Other Years Calculated Sales Revenues		$8,411,789	$8,666,208	$10,130,977	$10,493,641	$10,869,288	$11,253,223	$11,648,167	$12,054,408	$12,472,240	$12,901,963	$13,343,886
Additional Sales Revenues From New Customers			$161,417	$156,906	$162,523	$163,283	$166,549	$169,880	$173,278	$176,743	$180,278	$183,884
Total Calculated Revenues		$8,411,789	$8,827,625	$10,287,884	$10,656,165	$11,032,571	$11,419,772	$11,818,047	$12,227,686	$12,648,983	$13,082,241	$13,527,769

Operating Incomes

User Charge Fees	NA	$8,411,789	$8,827,625	$10,287,884	$10,656,165	$11,032,571	$11,419,772	$11,818,047	$12,227,686	$12,648,983	$13,082,241	$13,527,769
Delinquent	NA	$24,810	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
System Development Charge (SDC) or Hook up Fees	% Above	$67,800	$69,834	$0	$0	$0	$0	$0	$0	$0	$0	$0
Meter-size Based SDC Fees (Table 9)	% Above	$0	$0	$370,308	$377,714	$385,268	$392,974	$400,833	$408,850	$417,027	$425,367	$433,875
Investment Interest	NA	$10,280	$3,000	$34,745	$36,568	$37,970	$39,918	$41,824	$43,864	$46,094	$48,379	$50,880
Water Sold at Plant	NA	$15,892	$20,000	$20,000	$20,000	$20,000	$20,000	$7,500	$7,500	$7,500	$7,500	$7,500
Initiating	NA	$59,355	$61,136	$62,970	$64,859	$66,805	$68,809	$70,873	$72,999	$75,189	$77,445	$79,768
REVENUE BOND PROCEEDS	NA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Surcharge (State Fee - Projected by City)	NA	$70,500	$72,615	$74,793	$77,037	$79,348	$81,729	$84,181	$86,706	$89,307	$91,986	$94,746
Sales Tax	NA	$218,981	$240,879	$264,967	$291,464	$320,611	$352,672	$387,939	$426,733	$469,406	$516,347	$567,981
Locate Fee	NA	$70,495	$76,721	$78,358	$80,247	$82,193	$84,195	$86,257	$88,381	$90,569	$92,822	$95,145
Tap & Meter Services (Sale of Materials, Meters, Service Installation, etc. - Projected by City)	NA	$383,000	$386,830	$398,434	$410,387	$422,699	$435,380	$448,441	$461,895	$475,752	$490,024	$504,725
Tower Communication Rent	NA	$227,587	$234,415	$241,447	$248,691	$256,151	$263,836	$271,751	$279,903	$288,300	$296,949	$305,858
DAMAGES TO CITY PROPERT	NA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous	NA	$72,692	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Blue Township Fees for Customer Volume Use Above Test Year Level, and Before 25% Discount	NA	$0	$42,573	$418,957	$655,178	$702,347	$752,878	$807,011	$865,016	$927,136	$993,682	$1,064,966
Blue Township 25% Rate Discount Starting in 2017 After All Customers are Connected	NA	$0	$0	$0	-$172,896	-$184,870	-$197,688	-$211,411	-$226,105	-$241,832	-$258,670	-$276,696
Supplies Sold	NA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Corolla WTP Design Loan	NA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Operating Incomes		$9,633,180	$10,065,628	$12,282,863	$12,775,415	$13,251,093	$13,744,474	$14,243,246	$14,773,427	$15,323,431	$15,894,072	$16,486,516

Table 3 - Operating Costs and Net Income

Manhattan, KS; Water Rates Scenario 2016-1

This table depicts expenses during the test year and for the next 10 years.
("Test Year" costs and net incomes are actual, subsequent years are budgeted or projected.)

	Infla./De-flation (–) Factor	Test Year Year Starting 1/1/15	This Year Year Starting 1/1/16	2nd Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
(Note: Some future costs will experience inflation. Those costs that go up as use goes up are also increased by the growth rate in users and the percentage by which that cost is variable as reported in Chart 4.)												
Administration-All Functions	N.A.	$695,322	$782,295	$770,684	$790,835	$816,687	$839,737	$869,027	$895,472	$928,765	$959,200	$997,165
All Operations Staff and Related Expenses	N.A.	$1,525,389	$1,602,401	$1,663,812	$1,727,641	$1,793,985	$1,862,942	$1,934,617	$2,009,116	$2,086,551	$2,167,038	$2,250,699
Building Maintenance	N.A.	$5,821	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500
CLEAN WATER FUND FEE	N.A.	$66,113	$72,000	$75,600	$79,380	$83,349	$87,516	$91,892	$96,487	$101,311	$106,377	$111,696
Construction Projects	N.A.	$5,711	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000
Equipment Maintenance	N.A.	$89,767	$118,001	$120,761	$123,653	$126,684	$129,859	$133,186	$136,672	$140,325	$144,154	$148,166
Gas, Electric, Chemicals, Lime, Similar Variable Costs	N.A.	$1,240,280	$1,662,500	$1,799,500	$1,943,440	$2,105,426	$2,276,668	$2,463,490	$2,667,343	$2,889,814	$3,132,642	$3,397,728
Konza Water Service -KDHE Loan	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Laboratory Costs	N.A.	$41,388	$42,105	$42,859	$43,650	$44,481	$45,353	$46,269	$47,231	$48,241	$49,301	$50,415
LEGAL PUBLICATIONS	N.A.	$538	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Meter Rep. Program-KDHE Loan	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Metering-All Functions	N.A.	$194,239	$209,723	$235,896	$244,563	$253,714	$263,380	$273,596	$284,400	$295,833	$307,939	$320,764
Operating Supplies, Fuel and Lube	N.A.	$99,710	$114,873	$122,388	$130,456	$139,122	$148,435	$158,450	$169,225	$180,824	$193,317	$206,779
OTHER	N.A.	$457	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500
Piping, Valves, Fittings	N.A.	$194,589	$205,318	$215,534	$226,261	$237,524	$249,350	$261,768	$274,806	$288,496	$302,871	$317,965
ostage, Trash, Computers and Software, Similar Fixed Costs	N.A.	$50,645	$54,960	$55,439	$55,972	$56,526	$56,163	$56,742	$57,344	$57,970	$58,621	$59,298
Professional Services, Legal, Planning Studies	N.A.	$0	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500
SALES TAX EXP.	N.A.	$240,321	$264,353	$290,788	$319,867	$351,854	$387,039	$425,743	$468,318	$515,149	$566,664	$623,331
STATE SURCHARGE	N.A.	$70,520	$77,000	$80,850	$84,893	$89,137	$93,594	$98,274	$103,187	$108,347	$113,764	$119,452
Transfer to Capital Projects	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Transfer to Debt Service	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
TRANSFER TO ENTERPRISE	N.A.	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350
TRANSFER TO GENERAL FUND	N.A.	$1,214,027	$1,220,502	$1,248,036	$1,276,672	$1,306,452	$1,337,424	$1,350,799	$1,364,307	$1,377,950	$1,391,729	$1,405,647
TRANSFER TO TRUST & AGENCY	N.A.	$62,000	$62,000	$62,000	$62,000	$62,000	$62,000	$62,000	$62,000	$62,000	$62,000	$62,000
Utility Location-All Functions and One-Call	N.A.	$72,293	$76,771	$78,408	$80,297	$82,243	$84,245	$86,307	$88,431	$90,619	$92,872	$95,195
WTP Clearwell and Pump Station Improvements WA015P/WA1403, Backup Generator 2 MW Generator - WTP-WA121E	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Adjustment to Reconcile to Budget	N.A.			$60,000								
WTP KDHE Loan	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
User Charge Analysis Services	5.0%	$0	$10,420	$0	$0	$11,489	$0	$0	$12,666	$0	$0	$13,964
CIP Spending Plan	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Total Operating Costs		$5,875,482	$6,618,074	$6,965,406	$7,232,431	$7,603,521	$7,966,555	$8,355,009	$8,779,855	$9,215,046	$9,691,339	$10,223,113
Net Income (or Loss)		$3,757,698	$3,447,555	$5,317,457	$5,542,984	$5,647,572	$5,777,919	$5,888,237	$5,993,572	$6,108,385	$6,202,733	$6,263,403
Working Capital Goal: 35%	In Dollars, That is:	$2,056,419	$2,316,326	$2,437,892	$2,531,351	$2,661,233	$2,788,294	$2,924,253	$3,072,949	$3,225,266	$3,391,969	$3,578,090

Table 4 - Capital Improvement Program

Manhattan, KS; Water Rates Scenario 2016-1

This table depicts capital improvements and their funding. Costs reflect inflation.

CIP Spending Plan	This Year Year Starting 1/1/15	This Year Year Starting 1/1/16	Next Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
	Note: The utility has, and will continue to pay for certain improvements with debt financing. However, in order to make this table match the utility's financial statements, all system improvement, refurbishment and repair and replacement costs have been listed in the next section just as they appear in the utility's statements.										
Capital Improvements to be Paid With Debt											
Total Capital Improvements to be Paid With Debt	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Note: All system improvement, refurbishment and repair and replacement costs, including debt payments made to fund some of those improvements, have been listed in this section just as they appear in the utility's statements.										
Capital Improvements to be Paid With Cash											
KDHE Loan											
WTP Upgrade ($17,975,861.36) SP1009, WAX90	$1,268,880	$1,271,977	$1,271,977	$1,271,977	$1,271,977	$1,271,977	$1,271,977	$1,271,977	$1,271,977	$1,271,977	$1,271,977
Corollo WTP Design (1,263,202)											
Konza Water Service KDHE loan, City Portion = 1395461-284319 =1,111,142 - WA1006	$24,293	$24,293	$24,293	$24,293	$24,293	$24,293	$24,293	$24,293	$24,293	$24,293	$24,293
Meter Replacement Program, $1,850,549 with 40% of forgiveness (Total cost of the project is $3084249)	$126,569	$231,788	$210,439	$210,439	$210,439	$210,439	$210,439	$210,439	$210,439	$210,439	$105,219
WTP Improvements WA015P/WA1403, Backup Generator 2 MW Generator - WTP - WA121E	$105,219	$105,219	$105,219	$454,066	$454,066	$454,066	$454,066	$454,066	$454,066	$454,066	$454,066
Transfer to Debt Service/10 year Bonding											
7400 - Non Operating 501-7400-492.90-20											
Current Obligations											
Heritage Square project, WA0614	$81,438	$83,988	$81,175	$82,800	$0	$0	$0	$0			
2007 New & Parallel Line Cons. Ph.1 (WA705)	$64,400	$63,300	$61,925	$65,550	$63,750	$66,950					
Miller Parkway Water Line, $1,121,463	$131,750	$133,900	$130,900	$131,900	$132,700	$133,300	$133,700	$133,900	$133,900		
K-18 Water Lines Relocation, Phase IV											
- Scenic Drive, $594,198.50, WA1106	$60,750	$63,750	$61,500	$59,250	$62,000	$61,000	$64,000	$61,800	$59,600	$62,400	
- Miller Parkway/ Davis Drive, $152,933, WA1109	$21,900	$21,150	$20,400	$19,650	$18,900	$18,600	$18,000	$22,400	$21,600	$20,800	
Bluemont Hill Water Line, WA1211/2007 NPWL PH3				$9,641	$73,000	$71,000	$69,000	$72,000	$69,800	$72,600	$70,200
Water Line Improvement 2012 - WA1202				$82,600	$85,400	$83,000	$85,600	$83,000	$85,400	$87,600	$84,600
Westwood/Elm/Walnut Water Line Replacement WA084/WA1308, WA1309				$141,800	$148,000	$143,800	$144,600	$145,200	$145,600	$145,800	$145,800
Eureka Valley Transmission Waterline Improvement (Miller Ranch Tower to TecPark) WA125P (2015-2016) WA1406					$75,854	$557,960	$557,880	$558,200	$557,880	$557,920	$557,280
Blue Township Waterline Extension						$226,400	$226,280	$225,920	$226,320	$226,440	$226,280
Northwest Transmission Main Phase 1 - Marlatt Avenue (College Avenue To Tuttle Creek Blvd)								$25,067	$184,800	$184,800	$184,600
Tuttle Creek Main Engineering/Const. (2017 &2018) - WA003P											
Re-allocate (Marlatt Transmission Line) Low Service Transmission Main to Sunset and Tecumseh Stations (2017-2018) WA047P											
Booster Station and Water Storage Tank Design - Scenic Drive											
Re-allocate (Marlatt Transmission Line) Barnes Rd. and Casement Rd. Trans. Line Loop (2019&2020) - WA014P											
Northwest Transmission Main Phase 2 – Tuttle Creek Boulevard (Marlatt Avenue To Kimball Avenue), WA146P									$37,642	$279,800	$277,200

Table 4 - Capital Improvement Program

	Year Starting 1/1/15	This Year Year Starting 1/1/16	Next Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
Anderson Av. from Wickham to Oakdale - Replace Water Main, WA086P									$14,084	$103,600	$105,800
Booster Station Capacity Upgrade 2020-2021										$23,893	$177,000
Northwest Transmission Main Phase 3 - Marlatt Avenue (College Avenue To Northwest Water Tower), WA147P										$71,847	$531,400
Northwest Transmission Main Phase 4 – Tuttle Creek Boulevard (Kimball Avenue To WTP)											$40,660
4 year Temp. Note											
7400 - Non Operating 501-7400-492.90-25											
Utility Maintenance Facility - 11 Bay Garage WA138P		$40,000	$40,000	$40,000	$40,000						
FBO/General Aviation Improvements, WA1408		$71,403									
Mc Call Rd 24" Water Line Hostetler to WTP, WA1104	$49,740										
Candlewood Inn & Suites - Parking Lot, ST1208	$49,893										
POYNTZ AVE - WATERLINE WA1301	$20,080										
Fourth Street and Pottawatomie Avenue Water Line Replacement - WA1309											
Eureka Valley Commercial Waterline Improvements (Airport Terminal Section) WA1401	$138,889	$106,025	$136,261	$134,754							
Water Line Improvements 2017, WA137, WA123, WA150				$185,156	$185,688	$183,438	$186,156	$0			
Grand Mere Parkway Waterline, WA150P		$0									
Sunset Lane Main - Replace 6" WA123P		$0									
Water Wells-Purchase Land (2018), WA019P					$142,906	$144,438	$142,688	$145,906			
Water Line Improvements-2019, WA139, WA141, WA142, WA145						$111,063	$113,375	$112,000	$105,656		
Elaine - Todd Neighborhood Water Main Improvements, WA160P						$84,734	$87,656	$86,594	$85,531		
Replace Water Main – Judson Street (Allen Road To Casement Road), WA144P						$73,938	$72,188	$71,313	$70,438		
WTP Office and Lab Improvements, WA050P									$116,188	$113,438	$112,063
Transfer to Capital Project with cash payment											
Western Interceptor Water Line Replacement (Exposed a 6 inch water Line replace with 12" water line) WA1212	$9,193										
Replace Waterlines - Allen Road Waterline (Sloan To Casement), WA132P		$198,000									
West Anderson Avenue Improvements, EN084P		$100,000									
WTP Bulk Water Filling Station, WA134P		$100,000									
Update Zoning and Subdivision Regulations			$35,000								
Replace Water Main – Moro Street (11th Street To 13th Street)						$17,500	$85,000				
Replace Water Main - Hunting Avenue (Harris Avenue To Denison Avenue), WA085P								$46,000	$229,000		
501-7400-492-72-98											
Lee Mill Village Addition-Unit 4, ph1 City-at large payment											
Northwing Addition, Unit1											
Willow Ridge Development Agreement - WA1517	$0	$18,848									
Wyndham Heights Neighborhood Water System Improvements, WA155P			$37,500								

Table 4 - Capital Improvement Program

	Year Starting 1/1/15	This Year Year Starting 1/1/16	Next Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
Bellerive Addition, WA1113	$38,473										
7000 - General Administration											
501-7000-491.73-25											
Network Backup/Disaster Recovery Solution (BDR) (IS040E)			$12,500	$12,500	$12,875	$12,875	$13,262				
Storage Area Network (SAN), IS043P			$12,500								
LIDAR Update Plus Software Update, EN045P	$9,000								$4,000		
Disc Backup For ISeries/AS400, IS044P		$3,000									
Replace 2007 GPS Base Station and GPS Rover, EN067E		$12,000									
Large Format Scanner/Plotter Replace EN056E			$3,750								
Public Works Replacement Server (COM GIS), EN079P			$5,000								
Midrange Computer System Upgrade, IS001E				$13,500							
Update/Replace Firewall, IS046E				$8,333							
2007 Robotic Total Station - Survey Equipment- Replace, EN011E				$10,500							
Service Managed Hosting, IS052P									$40,000	$40,000	$40,000
SunGard PS Upgrade or Replace						$15,000					
501-7000-491.75-45											
FCIP											
Water Cost of Services Update											
W. Anderson Improvements Plans And Specification Revisions, EN083P		$20,000									
Feasibility Study For New Public Works Street And Fleet And Parks Maintenance And Forestry Division, ST063P		$22,500									
501-7100-492.72-05											
Meter Replacement Program	$112,827	$192,000	$175,000	$183,750	$192,938	$202,584	$212,714	$223,349	$234,517	$246,243	$258,555
7200 - Supply & Treatment											
501-7200-492.70-05											
Land for WTP											
501-7200-492.70-10											
CICO Tank Landscape Improvements, WA151P			$60,000								
501-7200-492.72-05											
501-7200-492.73-10											
Replace Filter Consoles - WTP, WA118E				$60,000							
Security Alarm@ Sunset &Tecumseh Boosters Station, WA032E				$30,000							
Water Booster Station Backup Emergency Generator Capacity Upgrades, WA152E					$150,000						

Table 4 - Capital Improvement Program

	Year Starting 1/1/15	This Year Year Starting 1/1/16	Next Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
501-7200-492.75-05											
Well Rehab. & Maintenance Annual	$83,202	$70,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000
Tank Asset. Management Program & Tank washing	$127,828	$127,829	$127,829	$127,829	$127,829	$127,829	$100,000	$100,000	$100,000	$100,000	$100,000
Water Pump Station Pump and Motor Rehabilitation Program, WA1513	$23,652	$50,000	$50,000	$50,000	$50,000	$50,000					
WTP Maintenance	$24,287	$150,000	$154,500	$159,135	$163,909	$168,826	$173,891	$179,108	$184,481	$190,016	$195,716
WTP Clarifier and Drive Rehabilitation, WA124P	$157,875	$216,100	$200,000								
Water Treatment Plant - Filter Valve Replacement, WA153E			$40,000	$40,000			$40,000	$40,000			
Replace WTP High Service Pump Discharge Piping - WA128P - WA1511 - WA1513	$23,651										
Water Treatment Plant - Lime Feed Tubes Replacement and Rerouting, WA126E - WA1507	$68,775										
SP1401 ELECTRICAL SERVICES 14	$12,106										
Add Stairs to Wells 14; 19-22. Improve Maintenance Safety and Access. WA117P, WA161P			$200,000								
Construct Well Vaults at Old Wellfield (PWS Wells 8, 10, 11, 23, and 24) WA129P				$100,000							
Wellfield Houses and Elevated Platforms - Paint						$75,000					
501-7200-492.75-45											
Booster Pump Station Capacity Upgrade Study, WA154P			$30,000								
Seth Child Corridor Transient Pressure Surge Analysis, WA133P	$0	$50,000									
Water And Wastewater Facilities Master Plan Update, WW143P	$0	$150,000									
7300 - Distribution											
501-7300-492.70-05											
Miller Parkway Water Line/Hunter Tract Land Acquisition											
Water & Sewer Maintenance Facility - Demolish Fire Station Hose Tower, WA149P		$12,500									
Water and Sewer Maintenance Facility - Replace Roof Coatings, WW157		$35,000									
501-7300-492-72.05											
501-7300-492-75.05											
Hydrant and Valve Replacement Project	$107,123	$100,000	$115,000	$115,000	$115,000	$115,000	$115,000	$115,000	$115,000	$115,000	$115,000
PRV Maintenance		$5,000									
Water Main Replacement & Rehab Program	$35,525	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
501-7300-492-75-45											
Water System Model (2009 New & Parallel Water Lines)											
501-7300-492-73.10											
Replace Air Compressor and Trailer, WA113E											
Utiltiy Cut Skid Steer, WA131E	$25,041										
Utility Maintenance Garage Emergency Backup Generator, WA162E				$12,500							
West Anderson Street Project - Relocate 6 Valve Boxes, WA092P	$0										
Compact Excavator, WA081E											

Table 4 - Capital Improvement Program

	Year Starting 1/1/15	This Year Year Starting 1/1/16	Next Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
501-7300-492-90-25											
Vehicles:											
7000 - Administration											
New 1/2 Ton 2-Wheel Drive Pick-up, SW074E		$7,250									
Replace 2007 1/2 Ton, 2WD, Regular Cab Truck (Unit #37), WA158E			$15,000								
Replace 2011 1/2 Ton, 2WD, Regular Cab Truck (Unit #209), WW172E							$15,000				
7100 - Meter Department											
Replace 2007 1/2 Ton Regular Cab Truck (Unit #15), WA114E						$19,000					
Replace 2013 1/2 Ton, 2WD Regular Cab Truck (Unit #48), WAXXXE									$19,000		
Replace 2013 1/2 Ton, 2WD Regular Cab Truck (Unit #173), WAXXXE									$19,000		
7200 - Supply & Treatment											
Replace 2007 1/2 Ton, 2WD Regular Cab Truck (Unit #57), WA065E			$20,000								
New 2017 1/2 Ton, 2WD, Regular Cab Truck (Instrumentation Technician), WW160E			$10,500								
Replace 2009 1/2 Ton, 2WD, Regular Cab Truck, (Unit #20), WA048E					$20,000						
Replace 2010 3/4 Ton, 4WD, Regular Cab Truck, (Unit #193), WA089E						$35,000					
Replace 2011 1/2 Ton, 2WD, Regular Cab Truck (Unit #207), WAXXXE							$19,000				
7300 - Distribution											
1999 Backhoe #227 - Replacement					$80,000						
2000 Trencher, (Unit #450), WA005E				$68,000							
2015 Tandem-Axle 10-yard Dump Truck (Unit #283), WA130E	$51,994										$60,000
2015 1/2 Ton Pickup, EN066 (The funding source split for the Project Coordinator)	$5,375										
2015 One Ton 2WD Regular Cab Utility Truck, (Unit #47), WA033E										$60,000	
2015 One Ton 2WD Regular Cab Utility Truck, (Unit #42), WA034E										$60,000	
All purpose service body - 1 Ton Truck (Unit #42 and #47)										$75,000	
Replace JCB Backhoe (Unit #45), WA094E					$80,000						
Replace 2009 Single Axle Dump Truck (Unit #180), WA093E					$100,000						
Replace 2010 Single Axle, 2WD Dump Truck (Unit #440), WA156E						$100,000					
Replace 2010 1/2 Ton 2WD Extended Cab Truck (Unit #39), WA095E						$22,000					
Replace 2011 One Ton, 2WD, Regular Cab Truck (Unit# 56), WA157E							$40,000				
All purpose service body - 1 Ton Truck (Unit #56), WA098E							$35,000			$75,000	
Replace 2011 1/2 Ton, 2WD, Extended Cab Truck (Unit# 208),WA163E							$21,000				
TBD CIP Projects and Early Debt Retirement			$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Total Cap Improvements to be Paid With Cash	$3,059,726	$3,956,820	$4,623,168	$5,079,923	$5,256,524	$6,056,009	$5,906,764	$5,582,531	$5,995,212	$6,047,971	$6,312,709
Total CIP Spending, Cash and Debt	$3,059,726	$3,956,820	$4,623,168	$5,079,923	$5,256,524	$6,056,009	$5,906,764	$5,582,531	$5,995,212	$6,047,971	$6,312,709

Table 4 - Capital Improvement Program

	Year Starting 1/1/15	This Year Year Starting 1/1/16	Next Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
CIP Funding Plan (Disregard KDHE loans and other outside sources because City staff have already reduced such sources to annual payments, shown in the next section below.)											
CIP and Debt Service Reserves Starting Balance	$0	$4,833,356	$4,209,185	$4,908,182	$5,425,030	$5,848,948	$5,619,264	$5,633,356	$6,064,702	$6,207,499	$6,381,784
Working Capital Transferred to CIP and Debt Service Reserves	$7,893,083	$3,187,647	$5,195,890	$5,449,525	$5,517,690	$5,650,857	$5,752,278	$5,844,876	$5,956,068	$6,036,031	$6,077,282
CIP and Debt Service Reserves Interest Earned (or Paid)	$0	$145,001	$126,276	$147,245	$162,751	$175,468	$168,578	$169,001	$181,941	$186,225	$191,454
Total CIP Reserve and Income Sources	$7,893,083	$8,166,004	$9,531,351	$10,504,953	$11,105,471	$11,675,273	$11,540,120	$11,647,233	$12,202,711	$12,429,755	$12,650,520
CIP Debt Payment Plan											
(Debt payments are listed in the "Capital Improvements to be Paid With Cash" subsection above)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Debt Payments	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total CIP Spending, Cash and Debt	$3,059,726	$3,956,820	$4,623,168	$5,079,923	$5,256,524	$6,056,009	$5,906,764	$5,582,531	$5,995,212	$6,047,971	$6,312,709
CIP and Debt Service Reserves Balance	$4,833,356	$4,209,185	$4,908,182	$5,425,030	$5,848,948	$5,619,264	$5,633,356	$6,064,702	$6,207,499	$6,381,784	$6,337,810

Notes: The City plans many improvement projects over the next 10 years and equipment repair and replacements over the next 20 years. These costs were incorporated into this schedule. Because this schedule includes very little detail about these projects, refer to the City's plans and projections for details on these projects.

Table 5 - Capacity Cost; Its Amount and How it Will be Recovered

Manhattan, KS; Water Rates Scenario 2016-1

This table shows tap and capacity costs to expect. From these costs, tap fees and capacity demand charges will be developed in Table 5 and Table 8, respectively.

(First year figures are actual, subsequent years are projected.)	Infla./De-flation (–) Factor	Year Starting 1/1/15	Year Starting 1/1/16	Year Starting 1/1/17	Year Starting 1/1/18	Year Starting 1/1/19	Year Starting 1/1/20	Year Starting 1/1/21	Year Starting 1/1/22	Year Starting 1/1/23	Year Starting 1/1/24	Year Starting 1/1/25
Tap Fee Revenues												
Customers (Taps) Added During the Year		266	296	250	250	250	250	250	250	250	250	250
Weighted Average Fee per New Tap	2.0%	$255	$236	$1,481	$1,511	$1,541	$1,572	$1,603	$1,635	$1,668	$1,701	$1,735
Total Tap Fee Revenues	N.A.	$67,800	$69,834	$370,308	$377,714	$385,268	$392,974	$400,833	$408,850	$417,027	$425,367	$433,875
Operating Costs Associated With Making New Connections												
Field Costs for New Connections	N.A.	$13,300	$15,096	$13,005	$13,265	$13,530	$13,801	$14,077	$14,359	$14,646	$14,939	$14,939
Administration Costs	N.A.	$6,650	$7,548	$6,503	$6,633	$6,765	$6,901	$7,039	$7,179	$7,323	$7,469	$7,469
Total Direct Costs for New Connections		$19,950	$22,644	$19,508	$19,898	$20,296	$20,702	$21,116	$21,538	$21,969	$22,408	$22,408
Net Tap Fee Revenues												
Revenues Net of Operating Costs		$47,850	$47,190	$350,800	$357,816	$364,973	$372,272	$379,717	$387,312	$395,058	$402,959	$411,467
Cum Rev Net of Operating Costs		$47,850	$95,040	$445,840	$803,656	$1,168,629	$1,540,901	$1,920,619	$2,307,930	$2,702,988	$3,105,948	$3,517,414
Capital Costs Attributable to Growth and Capacity Development (Debt Service, Cash-paid Capital Improvements and/or Depreciation)												
20-year Avg Debt Service and Cash-paid CIP for Capacity Upgrades Attributable to New Capacity Demand	27.24%	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470
Annualized Capacity Cost (Depreciation)		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sum of Capital Costs for Capacity		$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470	$874,470
Target % to Recover From System Development Charges	41.57%											
Target % to Recover From System Development Surcharges to the Minimum Charge	58.43%											

Note: These costs should be recovered by fees charged for making new taps (usually called, "tap fees") regardless of the demand capacity (commonly meter size) of each new tap made.

Note: Connection charges should almost always cover at least the operating costs to make connections. Thus, cumulative revenues net of operating costs (immediately above) should be positive. If they are negative, you are subsidizing new taps.

Note: Capacity and connection costs WILL be recovered in one way by default, or a combination of ways by design: through regular user fees, in which case existing customers pay the costs to bring on new customers; through "tap" or system development charge fees, in which case new customers pay "up front" for the costs they cause the system to incur; through on-going demand or system development surcharges to the minimum charge, preferably based upon meter or connection size, in which case all customers pay for the capacity costs they cause over time; or some combination of these.

Table 6 - Financial Capacity Indicators and Reserves

Manhattan, KS; Water Rates Scenario 2016-1

This table depicts the affordability of future rates, the financial health of the system and the ending balances in various accounts for the test year and the next 10 years.

Capacity Indicators	Year Starting 1/1/15	Year Starting 1/1/16	Year Starting 1/1/17	Year Starting 1/1/18	Year Starting 1/1/19	Year Starting 1/1/20	Year Starting 1/1/21	Year Starting 1/1/22	Year Starting 1/1/23	Year Starting 1/1/24	Year Starting 1/1/25
Equivalent Final Monthly Bill for a 5,000 gal per Month Residential User	$20.24	$26.10	$26.63	$27.16	$27.70	$28.26	$28.82	$29.40	$29.99	$30.59	$31.20
Annual Median Household Income (AMHI)	$42,305	$43,570	$44,873	$46,215	$47,597	$49,020	$50,486	$51,995	$53,550	$55,151	$56,801
Affordability Index: Current Rates First Column, Then Proposed Rates	0.57%	0.72%	0.71%	0.71%	0.70%	0.69%	0.69%	0.68%	0.67%	0.67%	0.66%
Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the percent of AMHI needed by a 5,000 gallon per month residential user to pay their bill. Rates near 1.0% are common in the U.S. and are generally considered affordable. Federal grant agencies generally will not consider awarding grants if this indicator is less than 2.0%.											
Estimated Operating Ratio: Current Rates First Column, Then Proposed Rates	1.12	0.92	1.10	1.06	1.05	0.97	1.00	1.05	1.01	1.02	1.00
1.0 is break even for Operating Ratio. Below 1.0 indicates operating in the "red." Generally, the operating ratio should be at least 1.15 for large systems, 1.30 or more for medium systems and perhaps as high as 2.0 for small systems.											
Estimated Coverage Ratio: Current Rates First Column, Then Proposed Rates	1.33	0.77	1.32	1.16	1.13	0.93	1.00	1.11	1.03	1.04	0.99
Coverage Ratio applies only to years with debt service. 1.0 is break even. Generally, the coverage ratio should be at least 1.25.											

Reserves	Balance Ending on 12/31/14	Balance Ending on 12/31/15	Balance Ending on 12/31/16	Balance Ending on 12/31/17	Balance Ending on 12/31/18	Balance Ending on 12/31/19	Balance Ending on 12/31/20	Balance Ending on 12/31/21	Balance Ending on 12/31/22	Balance Ending on 12/31/23	Balance Ending on 12/31/24	Balance Ending on 12/31/25
Current Position	$6,191,803	$2,056,419	$2,316,326	$2,437,892	$2,531,351	$2,661,233	$2,788,294	$2,924,253	$3,072,949	$3,225,266	$3,391,969	$3,578,090
Total Cash Assets (Excluding Dedicated Reserves) Before Inflation	$6,191,803	$2,056,419	$2,316,326	$2,437,892	$2,531,351	$2,661,233	$2,788,294	$2,924,253	$3,072,949	$3,225,266	$3,391,969	$3,578,090
Total Cash Assets (Excluding Dedicated Reserves) Discounted for Inflation (Future Unrestricted Purchasing Power)	$6,191,803	$2,056,419	$2,316,326	$2,389,134	$2,431,109	$2,504,731	$2,571,834	$2,643,293	$2,722,149	$2,799,936	$2,885,762	$2,983,224
CIP and Debt Service Reserves	$0	$4,833,356	$4,209,185	$4,908,182	$5,425,030	$5,848,948	$5,619,264	$5,633,356	$6,064,702	$6,207,499	$6,381,784	$6,337,810
Sum of All Reserves	$6,191,803	$6,889,775	$6,525,511	$7,346,075	$7,956,381	$8,510,180	$8,407,558	$8,557,610	$9,137,651	$9,432,765	$9,773,753	$9,915,900

Table 7 - Bill Comparisons Before and After Rate Adjustments

Manhattan, KS; Water Rates Scenario 2016-1

This table compares bills for various volumes at the current rates and billing frequency with what the same volumes would cost at the equivalent modeled rates for that same billing frequency. (An "apples to apples" comparison.) Minimum charge surcharges were calculated for these same classes of users and these bills include those surcharges. However, not all meter sizes are shown.

Note: The weighted-average bill increase for all customers combined will be: 11.7%

Customer or Rate Class, or Meter Size	Cu Ft of Use	Customers Above This Volume and Below Next	Cumulative Customers	Current Bill	Modeled Bill	Bill Increase or Decrease (-)	Percent Increase or Decrease (-)
In City Residential, Assuming 3/4 Inch Meter	0	2,694	2,694	$8.27	$9.98	$1.70	21%
	2	9,563	12,256	$8.27	$14.80	$6.53	79%
	20	953	13,210	$54.25	$58.23	$3.98	7%
	400	2	13,212	$1,024.92	$975.14	-$49.78	-5%
In City Business, Assuming 1.5 Inch Meter	0	610	610	$8.27	$14.23	$5.96	72%
	2	728	1,338	$8.27	$19.05	$10.78	130%
	20	848	2,186	$54.25	$62.48	$8.23	15%
	400	37	2,224	$1,024.92	$979.39	-$45.53	-4%
Out of City Residential, Assuming 3/4 Inch Meter	0	17	17	$16.54	$19.95	$3.41	21%
	2	115	132	$16.54	$29.60	$13.06	79%
	20	2	133	$108.50	$116.47	$7.97	7%
	400	0	133	$2,049.84	$1,950.28	-$99.56	-5%
Out of City Business, Assuming 1.5 Inch Meter	0	2	2	$16.54	$28.45	$11.91	72%
	2	7	8	$16.54	$38.10	$21.56	130%
	20	8	16	$108.50	$124.97	$16.47	15%
	400	0	16	$2,049.84	$1,958.78	-$91.06	-4%
Hunter's Island & Moehlman Bottoms	0	0	0	$12.41	$13.37	$0.96	8%
	2	0	0	$12.41	$20.61	$8.20	66%
	20	0	0	$81.38	$85.76	$4.38	5%
	400	1	1	$1,537.38	$1,461.12	-$76.27	-5%
Konza Valley WP & TD	0	0	0	$10.34	$11.14	$0.80	8%
	2	0	0	$10.34	$17.17	$6.83	66%
	20	1	1	$67.81	$71.46	$3.65	5%
	400	1	2	$1,281.15	$1,217.60	-$63.56	-5%
Rural Water Districts	0	0	0	$10.34	$11.14	$0.80	8%
	2	0	0	$10.34	$17.17	$6.83	66%
	20	0	0	$67.81	$71.46	$3.65	5%
	400	2	2	$1,281.15	$1,217.60	-$63.56	-5%
Free Water, Assuming 3/4 Inch Meter	0	4	4	$0.00	$9.98	$9.98	N.A.
	2	0	5	$0.00	$14.80	$14.80	N.A.
	20	1	5	$0.00	$58.23	$58.23	N.A.
	400	1	6	$0.00	$975.14	$975.14	N.A.
Blue Township RWD	0	0	0	$16.54	$17.83	$1.28	8%
	2	0	0	$16.54	$27.48	$10.94	66%
	20	0	0	$108.50	$114.34	$5.84	5%
	400	0	0	$2,049.84	$1,948.16	-$101.69	-5%

Manhattan, KS

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Table 7B - Combined Water Scenario 1 and Sewer Scenario 3 Bills

This table shows how combined water and sewer bills will be affected by the modeled rate adjustments.

Customer or Rate Class, or Meter Size	Volume in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Average Customer Count	Current Average Combined Bill	Proposed Average Combined Bill	Combined Bill Increase or Decrease (-) After Rate Adjustment	Percent Increase or Decrease (-) After Rate Adjustment
In City Residential, Assuming 3/4 Inch Meter	0	1	2,257	$28.87	$20.93	-$7.93	-27%
	2	19	11,407	$28.87	$33.44	$4.57	16%
	20	399	7,134	$130.62	$145.99	$15.37	12%
	400	999,999	6,659	$2,278.78	$2,522.04	$243.26	11%
In City Business, Assuming 1.5 Inch Meter	0	1	488	$28.87	$38.32	$9.45	33%
	2	19	882	$28.87	$50.83	$21.96	76%
	20	399	1,291	$130.62	$163.38	$32.75	25%
	400	999,999	895	$2,278.78	$2,539.42	$260.64	11%
Out of City Residential, Assuming 3/4 Inch Meter	0	1	12	$47.43	$36.39	-$11.05	-23%
	2	19	143	$47.44	$61.41	$13.97	29%
	20	399	87	$223.06	$286.51	$63.44	28%
	400	999,999	87	$3,930.63	$5,038.59	$1,107.96	28%
Out of City Business, Assuming 1.5 Inch Meter	0	1	11	$47.43	$64.59	$17.15	36%
	2	19	18	$47.44	$89.61	$42.17	89%
	20	399	21	$223.06	$314.71	$91.64	41%
	400	999,999	17	$3,930.63	$5,066.79	$1,136.16	29%

Table 8 - User Statistics

Manhattan, KS; Water Rates Scenario 2016-1

This table shows measures of equitability of the rates as modeled in Table 11.

If your rates are absolutely proportional to use on a volumetric basis, your % of usage and % of revenues figures will be the same within all the classes. That is not possible if you have any minimum charge and having no minimum charge is almost unheard of.

Normally, the % of usage figure will be lower than the % of revenue for the lower volumes of use. That will switch for the higher volumes of use. Even for declining rate structures, this switch should occur near the volume of the average residential user, typically near 5,000 gallons/month (668 cu ft).

In urban and suburban areas the average monthly use for residential or general customers can be twice that used by their rural and "old town" counterparts. Use is largely dependent upon who lives in a community. Older people living in longer established neighborhoods tend to use less volume than younger people living in more recently developed areas. As you make comparisons between different customers and customer classes, keep that, and the following in mind:

11 in 100 Cu Ft Billable units - This is the average residential customer's usage per Monthly billing cycle.

Usage allowance is the volume "given away" with the minimum charge. The higher the allowance, the less volume the utility can sell to generate income.

3,245,794 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was available to be sold by the utility during the test year.

340,565 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was given away as a usage allowance during the test year.

$853,044 At the unit charge rate in effect during the test year, this was what it cost the utility to give away this volume.

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Average Volume Used Within Each Volume Range in 100 Cu Ft	Total Annual Use Within Each Volume Range in 100 Cu Ft	Customers Within This Volume Range	% Users	% Usage	Cumulative Use in This Class From Low to High Volume	Cumulative Use in This Class From High to Low Volume	% Revenue at Current Rates	% Revenue at Modeled Rates
In City Residential	0	1	1.851	293,388.0	2,693.6	17.3%	9.0%	17.1%	100.0%	10.1%	10.3%
	2	19	5.929	748,375.0	9,562.8	61.3%	23.1%	60.7%	82.9%	25.1%	29.3%
	20	399	23.971	274,782.0	953.2	6.1%	8.5%	76.7%	39.3%	8.1%	7.9%
	400	999,999	15,968.280	399,207.0	2.1	0.0%	12.3%	100.0%	23.3%	11.2%	10.0%
	Totals for Class			1,715,752.0	13,211.7	84.7%	52.9%			54.5%	57.5%
In City Business	0	1	1.635	43,637.0	609.9	3.9%	1.3%	3.2%	100.0%	1.8%	1.8%
	2	19	13.134	254,345.0	728.2	4.7%	7.8%	21.7%	96.8%	7.5%	7.2%
	20	399	71.846	763,577.0	848.3	5.4%	23.5%	77.4%	78.3%	21.9%	20.0%
	400	999,999	691.783	309,919.0	37.3	0.2%	9.5%	100.0%	22.6%	8.7%	7.8%
	Totals for Class			1,371,478.0	2,223.8	14.3%	42.3%			39.8%	36.7%
Out of City Residential	0	1	0.305	3,011.0	17.3	0.1%	0.1%	30.5%	100.0%	0.2%	0.2%
	2	19	0.695	6,714.0	114.6	0.7%	0.2%	98.4%	69.5%	0.5%	0.6%
	20	399	0.309	161.0	1.5	0.0%	0.0%	100.0%	1.6%	0.0%	0.0%
	400	999,999	0.000	0.0	0.0	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
	Totals for Class			9,886.0	133.4	0.9%	0.3%			0.7%	0.8%
Out of City Business	0	1	1.910	361.0	1.6	0.0%	0.0%	3.3%	100.0%	0.0%	0.0%
	2	19	12.847	2,184.0	6.5	0.0%	0.1%	23.0%	96.7%	0.1%	0.1%
	20	399	79.152	7,282.0	7.5	0.0%	0.2%	88.9%	77.0%	0.4%	0.4%
	400	999,999	611.000	1,222.0	0.2	0.0%	0.0%	100.0%	11.1%	0.1%	0.1%
	Totals for Class			11,049.0	15.8	0.1%	0.3%			0.6%	0.6%
Hunter's Island & Moehlman Bottoms	0	1	2.000	24.0	0.0	0.0%	0.0%	0.4%	100.0%	0.0%	0.0%
	2	19	18.000	216.0	0.0	0.0%	0.0%	4.0%	99.6%	0.0%	0.0%
	20	399	368.917	4,427.0	0.3	0.0%	0.1%	78.5%	96.0%	0.2%	0.2%
	400	999,999	159.500	1,276.0	0.7	0.0%	0.0%	100.0%	21.5%	0.1%	0.0%
	Totals for Class			5,943.0	1.0	0.0%	0.2%			0.3%	0.2%
Konza Valley WP & TD	0	1	2.000	48.0	0.0	0.0%	0.0%	0.5%	100.0%	0.0%	0.0%
	2	19	18.000	432.0	0.0	0.0%	0.0%	5.3%	99.5%	0.0%	0.0%
	20	399	242.500	5,820.0	1.0	0.0%	0.2%	69.0%	94.7%	0.2%	0.2%
	400	999,999	235.750	2,829.0	1.0	0.0%	0.1%	100.0%	31.0%	0.1%	0.1%
	Totals for Class			9,129.0	2.0	0.0%	0.3%			0.3%	0.3%
Rural Water Districts	0	1	2.000	48.0	0.0	0.0%	0.0%	0.1%	100.0%	0.0%	0.0%
	2	19	18.000	432.0	0.0	0.0%	0.0%	0.5%	99.9%	0.0%	0.0%
	20	399	380.000	9,120.0	0.0	0.0%	0.3%	10.2%	99.5%	0.3%	0.3%
	400	999,999	3,524.792	84,595.0	2.0	0.0%	2.6%	100.0%	89.8%	3.0%	2.6%
	Totals for Class			94,195.0	2.0	0.0%	2.9%			3.3%	2.9%
Free Water	0	1	0.571	40.0	4.3	0.0%	0.0%	0.2%	100.0%	0.0%	0.0%
	2	19	16.833	303.0	0.2	0.0%	0.0%	1.6%	99.8%	0.0%	0.0%
	20	399	282.063	4,513.0	0.5	0.0%	0.1%	23.0%	98.4%	0.0%	0.1%
	400	999,999	1,627.000	16,270.0	0.8	0.0%	0.5%	100.0%	77.0%	0.0%	0.4%
	Totals for Class			21,126.0	5.8	0.0%	0.7%			0.0%	0.5%
Blue Township RWD	0	1	2.000	8.0	0.0	0.0%	0.0%	0.1%	100.0%	0.0%	0.0%
	2	19	18.000	72.0	0.0	0.0%	0.0%	1.1%	99.9%	0.0%	0.0%
	20	399	380.000	1,520.0	0.0	0.0%	0.0%	22.1%	98.9%	0.1%	0.1%
	400	999,999	1,409.000	5,636.0	0.3	0.0%	0.2%	100.0%	77.9%	0.3%	0.3%
	Totals for Class			7,236.0	0.3	0.0%	0.2%			0.4%	0.4%
	Grand Totals			3,245,794.0		100.00%	100.00%			100.00%	100.00%

Chart 1 - Operating Ratio

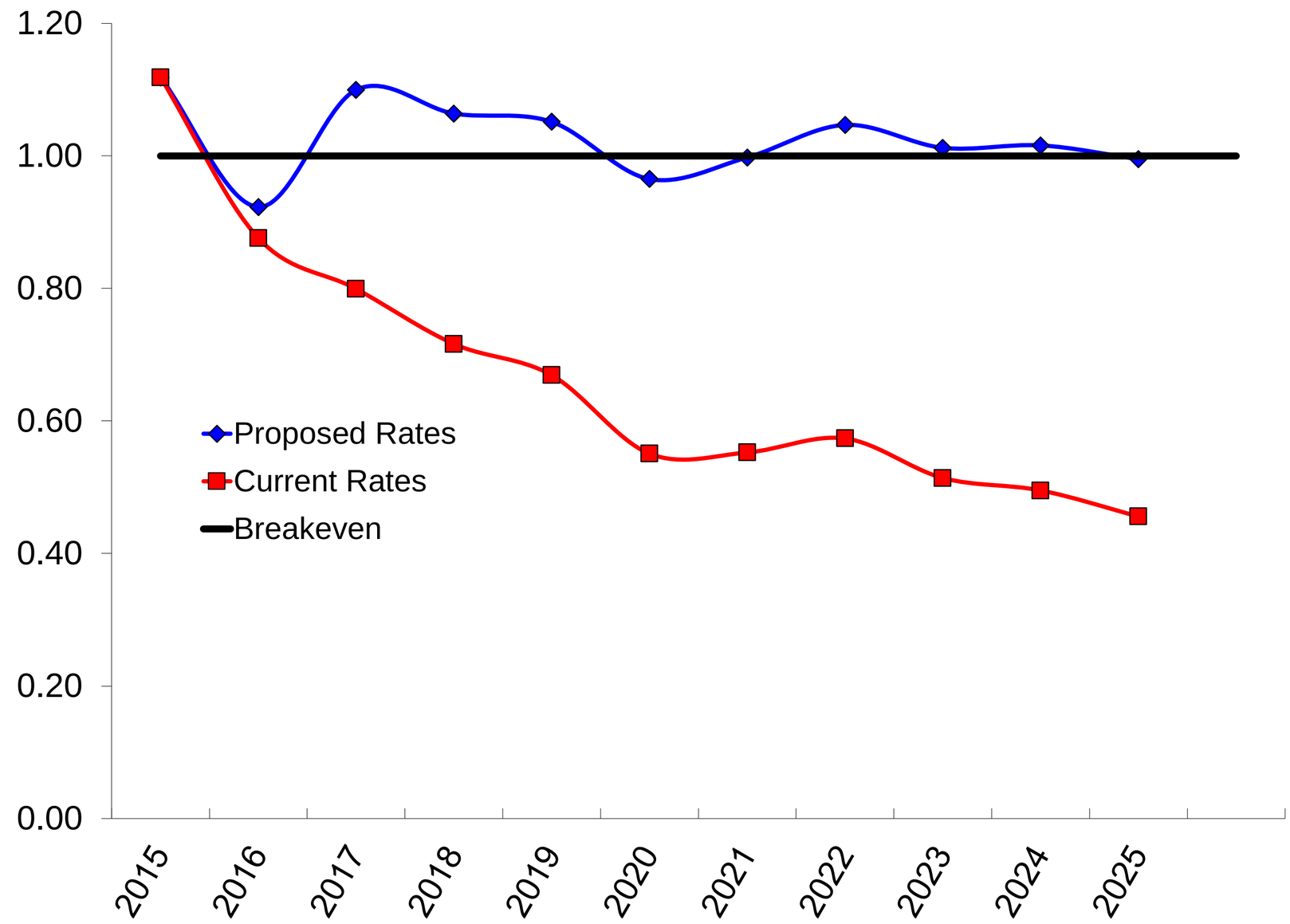

Chart 2 - Coverage Ratio

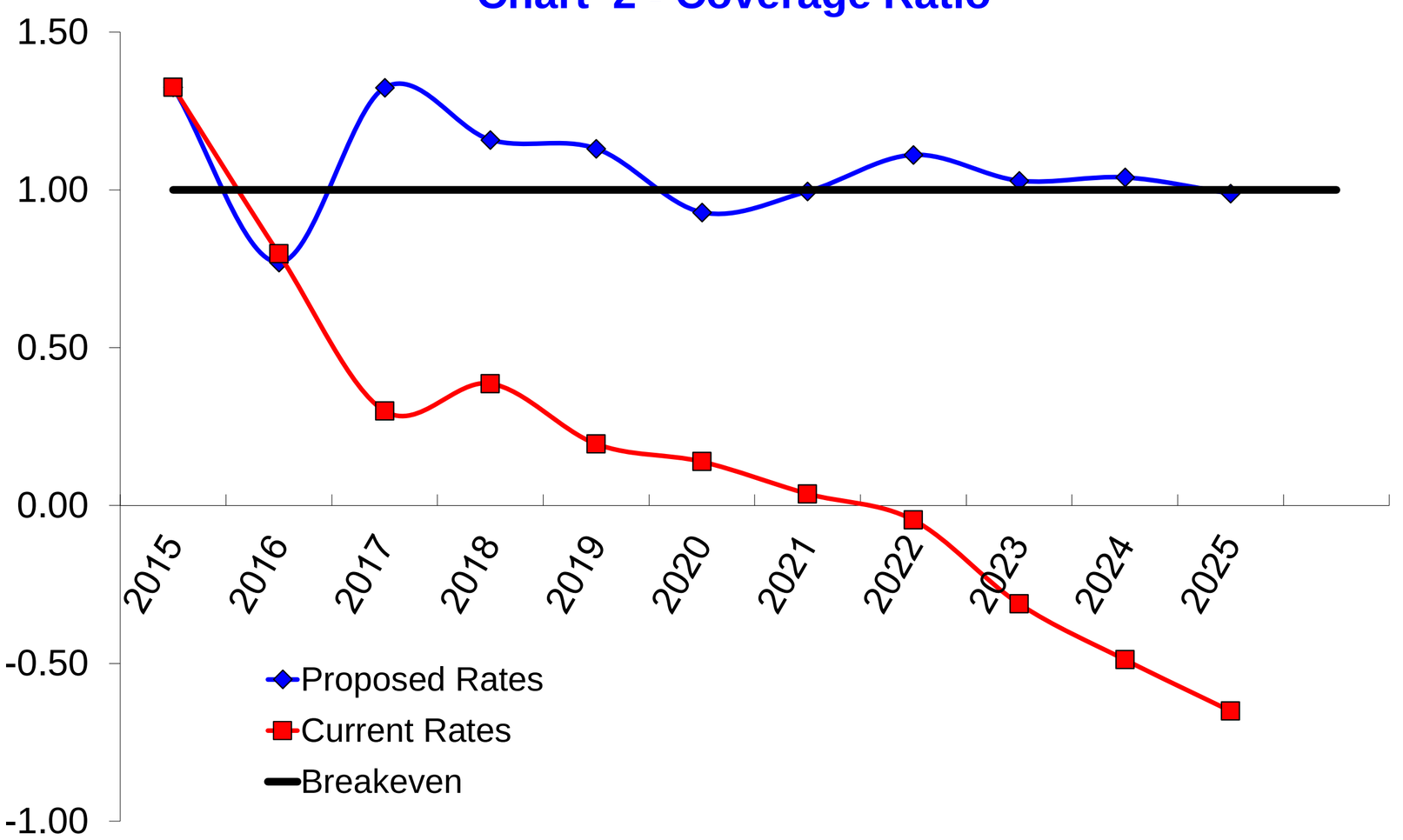

Chart 3 - 5,000 Gal Residential User's Bill

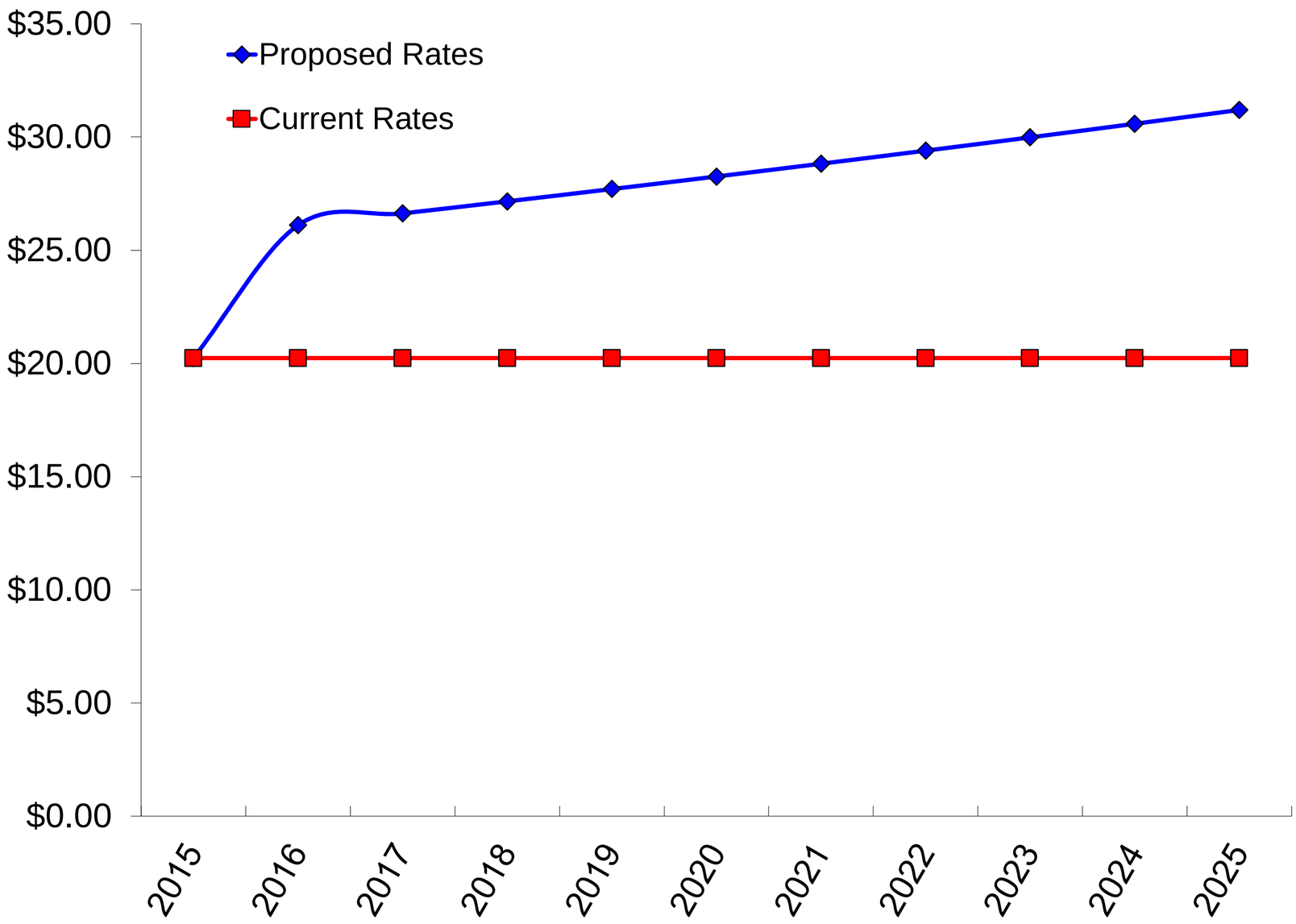

Chart 4 - Affordability Index

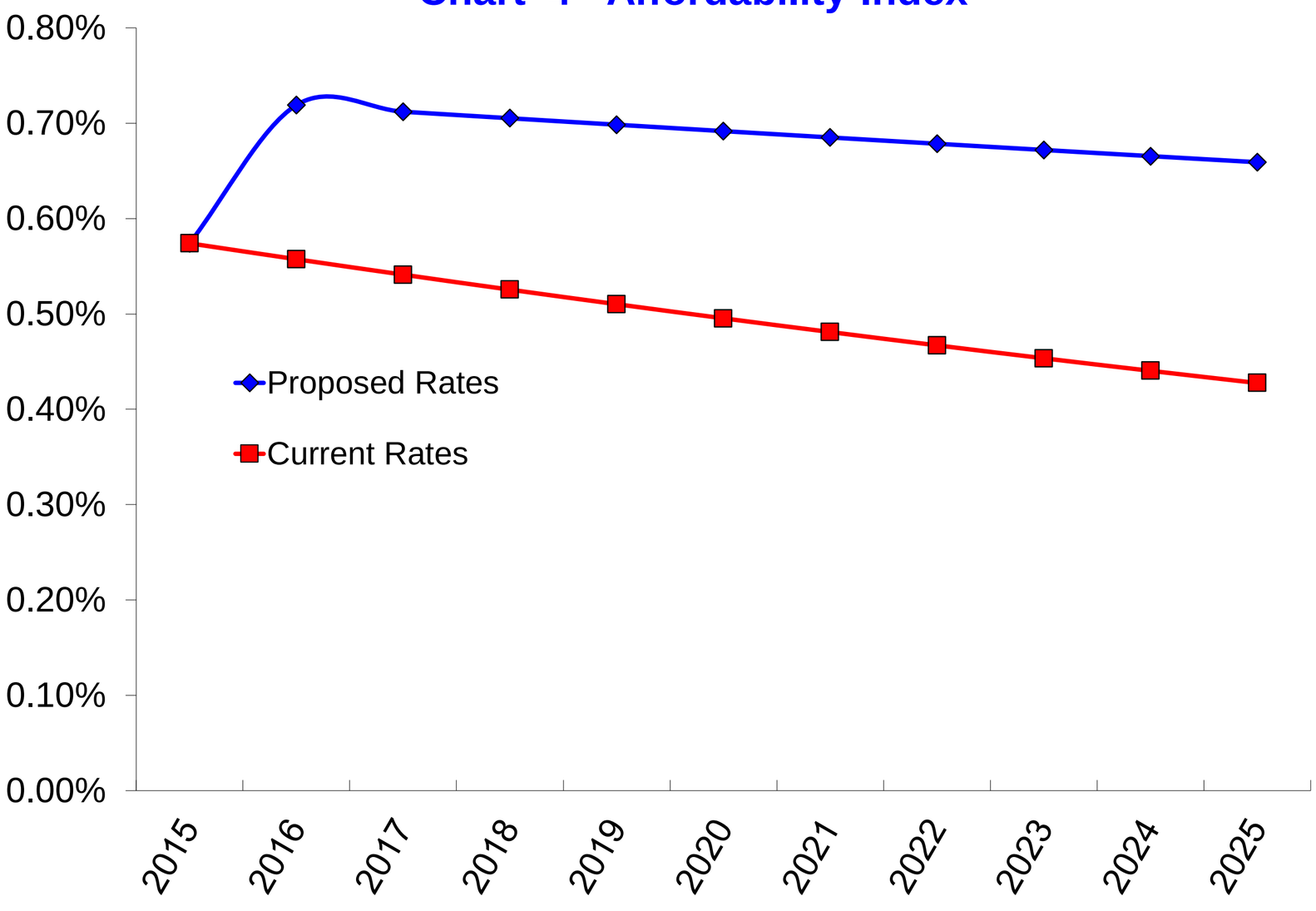

Chart 5 - Working Capital vs Goal

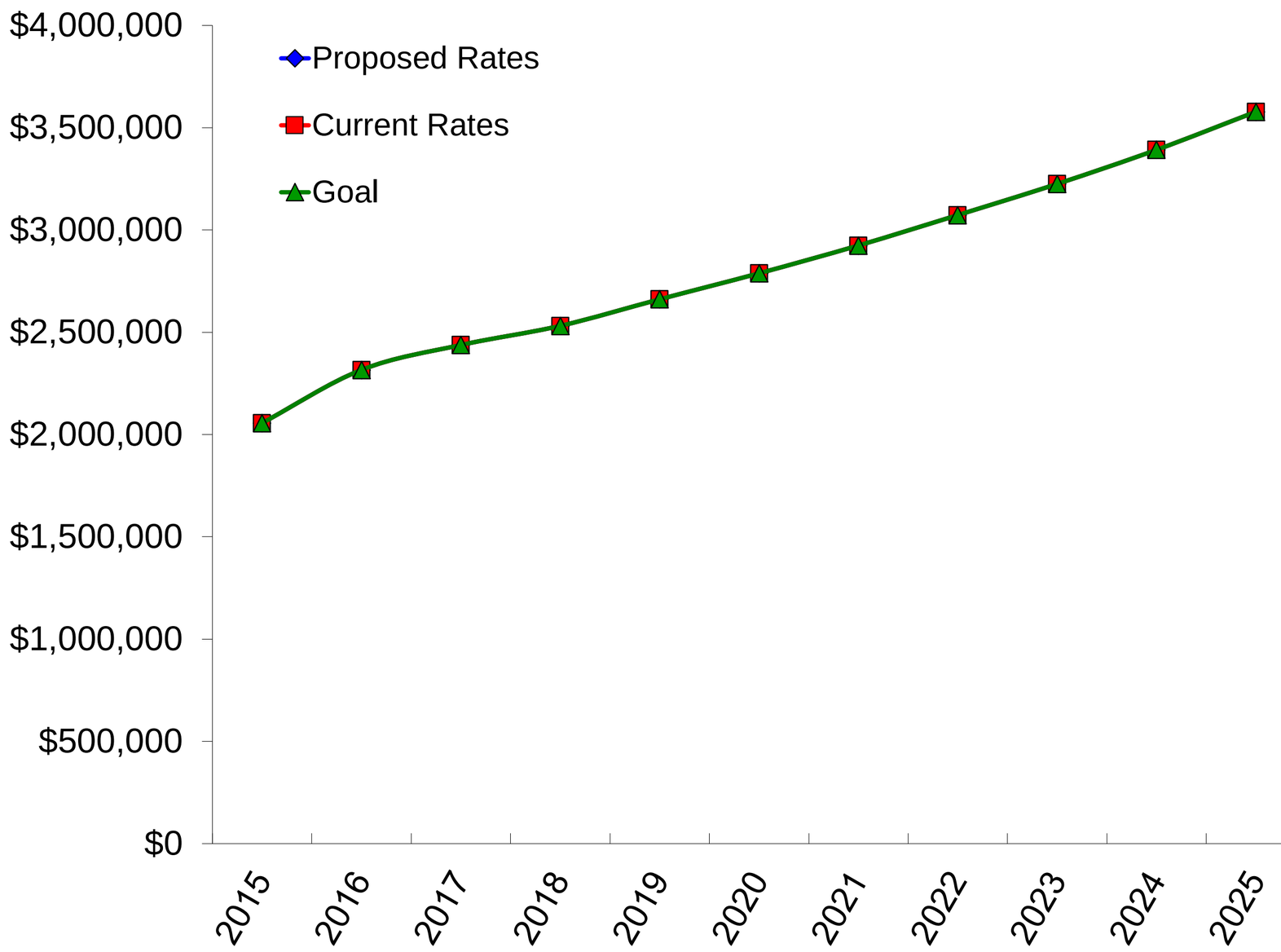

Chart 6 - Value of Cash Assets Before Inflation

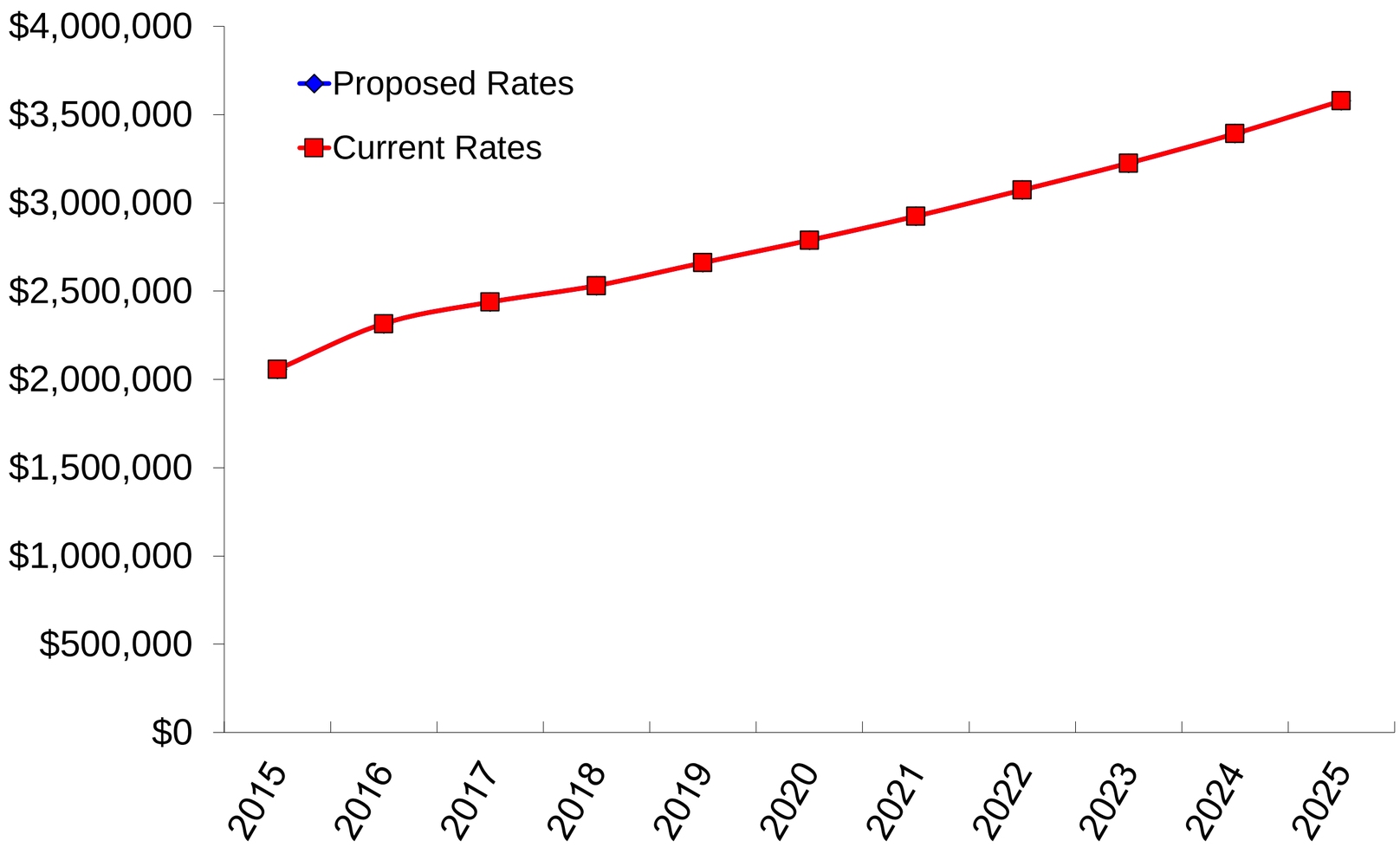

Chart 7 - Value of Cash Assets After Inflation

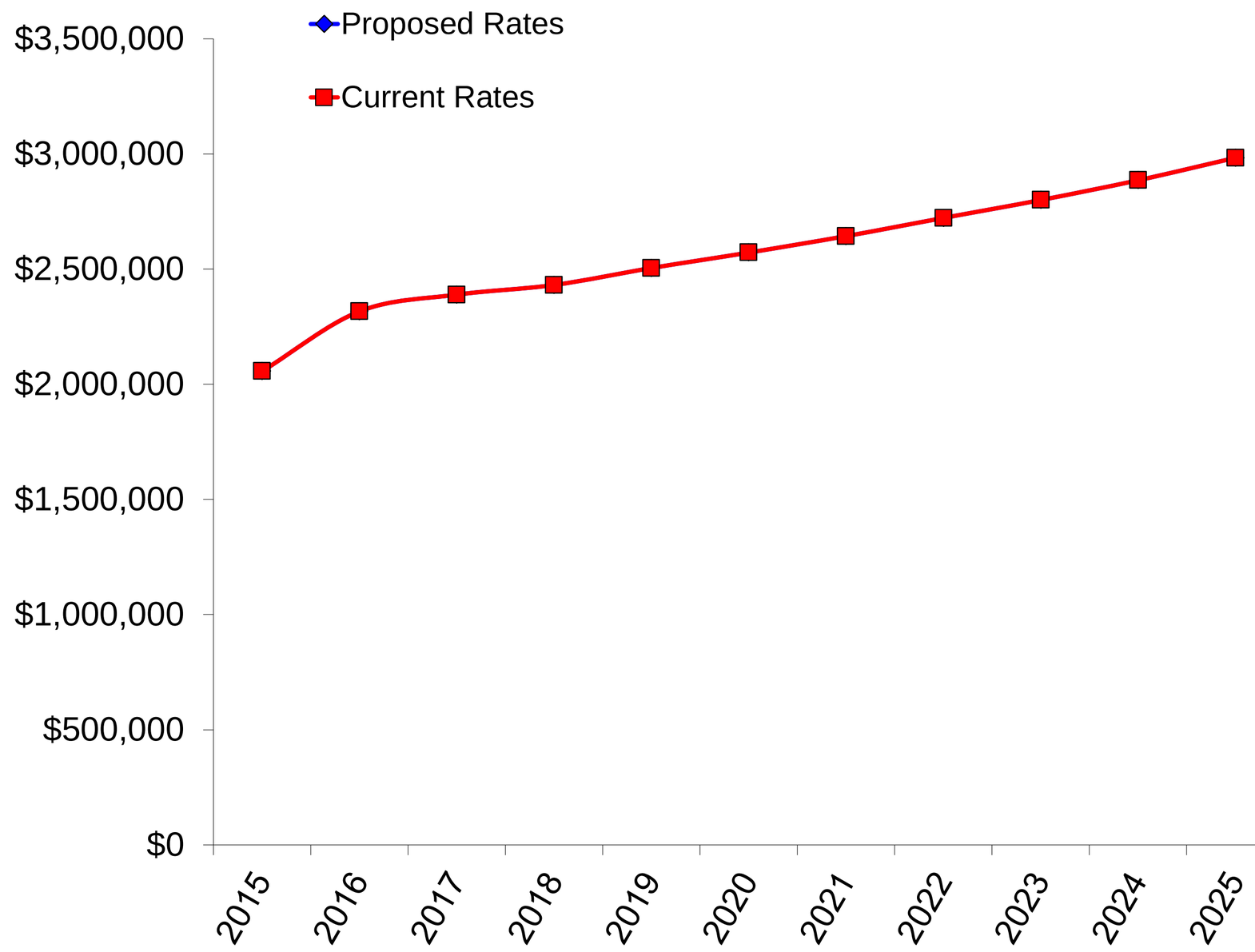

Chart 8 - Total Reserves

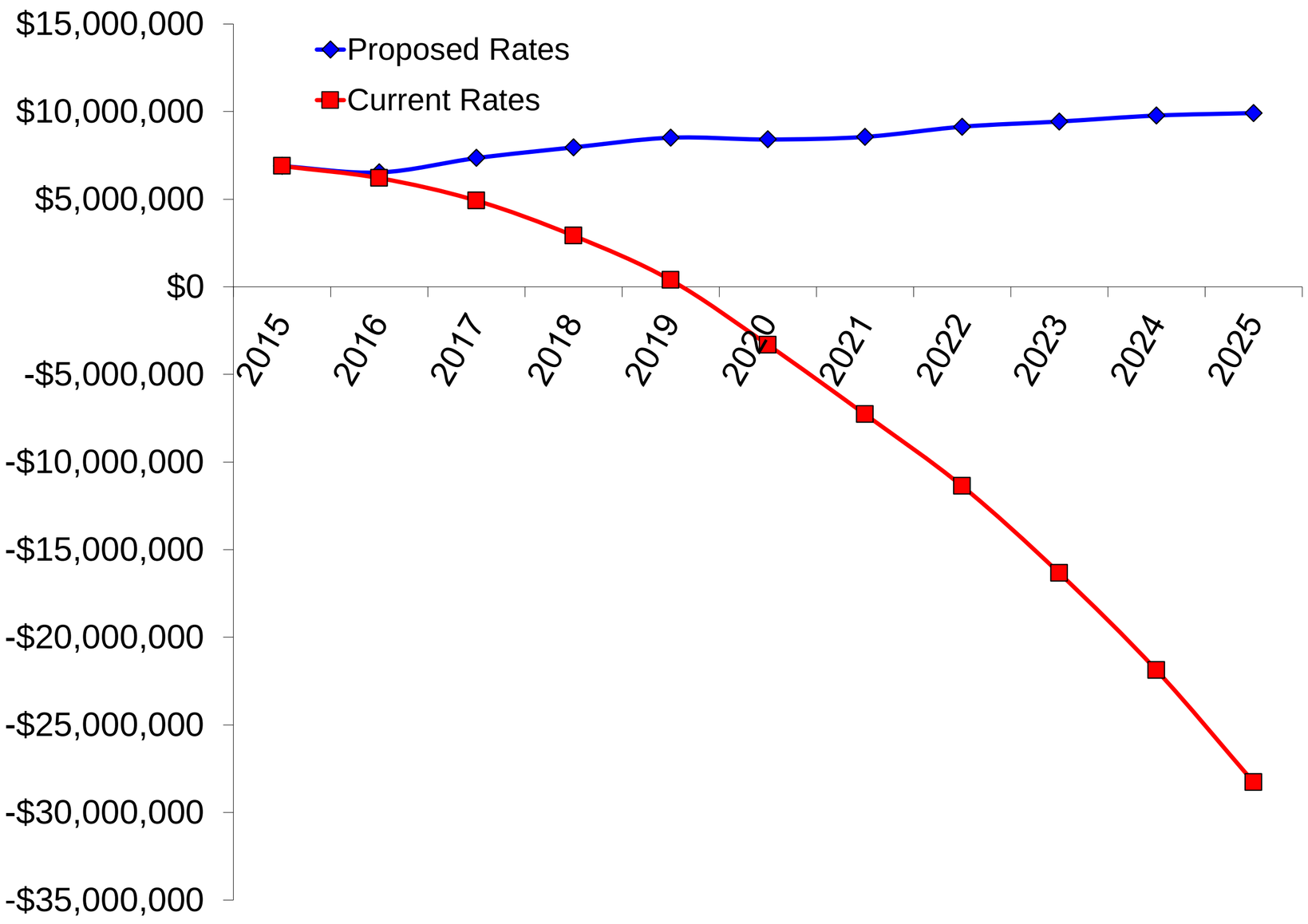

Table 9 - System Development Charges Based on Meter Size

Manhattan, KS; Water Rates Scenario 2016-1

This table calculates system development charges (SDC) to assess to each meter size and total revenues those charges would generate during one full year following initial adjustment. This table only covers meter size-based development charges. Share purchase is not included in this calculation.

In-City Customers

Meter Size	Meter Size in Square Inches	Mix of New Connections in a Typical Year	AWWA Capacity Multiplier for Each Meter Size	Total AWWA Capacity "Shares" Attributable to Each Meter Size Group	AWWA-based Capacity Cost Each Meter Size	Out of City Surcharge Factor	Total New SDC Fees Each Meter Size	Full-year SDC Fee Income From Each Size Class
Five Eighths	0.31	105.3	1.0	105.3	$740	100%	$740	$77,959
Three Quarters	0.44	103.9	1.5	155.8	$740	100%	$740	$76,893
One Inch	0.79	24.2	2.5	60.6	$1,480	100%	$1,480	$35,883
One & a Half Inch	1.77	4.1	5.0	20.5	$2,961	100%	$2,961	$12,158
Two Inch	3.14	6.9	16.0	111.0	$9,475	100%	$9,475	$65,760
Two & One Half Inch	4.91	0.0	29.8 *	0.5	$17,617	100%	$17,617	$270
Three Inch	7.07	0.5	43.5	21.3	$25,759	100%	$25,759	$12,629
Four Inch	12.57	0.4	75.0	27.6	$44,413	100%	$44,413	$16,331
Six Inch	28.27	0.3	160.0	51.5	$94,747	100%	$94,747	$30,485
Eight Inch	50.27	0.1	280.0	21.5	$165,807	100%	$165,807	$12,702
Ten Inch	78.54	0.0	420.0	6.4	$248,710	100%	$248,710	$3,811
Twelve Inch	113.10	0.0	530.0	0.0	$313,849	100%	$313,849	$0
Sixteen Inch	201.06	0.0	668.8 *	20.5	$396,047	100%	$396,047	$12,136
	Subtotal:	245.8		602.5				$357,016

* Not included in AWWA study results, so these values are estimates

Out of City Customers

Five Eighths	0.31	3.5	1.0	3.5	$592	200%	$1,184	$4,192
Three Quarters	0.44	0.3	1.5	0.4	$592	200%	$1,184	$345
One Inch	0.79	0.2	2.5	0.4	$1,480	200%	$2,961	$454
One & a Half Inch	1.77	0.0	5.0	0.2	$2,961	200%	$5,922	$181
Two Inch	3.14	0.1	16.0	1.2	$9,475	200%	$18,949	$1,452
Two & One Half Inch	4.91	0.0	29.8 *	0.0	$17,617	200%	$35,234	$0
Three Inch	7.07	0.1	43.5	3.3	$25,759	200%	$51,519	$3,947
Four Inch	12.57	0.0	75.0	2.3	$44,413	200%	$88,825	$2,722
Six Inch	28.27	0.0	160.0	0.0	$94,747	200%	$189,494	$0
Eight Inch	50.27	0.0	280.0	0.0	$165,807	200%	$331,614	$0
Ten Inch	78.54	0.0	420.0	0.0	$248,710	200%	$497,421	$0
Twelve Inch	113.10	0.0	530.0	0.0	$313,849	200%	$627,698	$0
Sixteen Inch	201.06	0.0	668.8 *	0.0	$396,047	200%	$792,095	$0
	Subtotal:	4.2		11.4				$13,292
	Total:	250.0		613.9		Projected SDC Fees for One Full Year Following Initial Adjustment		$370,308
Economy of Scale Factor:	0.0%		Capacity Cost to Recover per AWWA Capacity Multiplier Unit:		$592.17	Prorated SDC Fees to Collect This Year		$1,012

(This amount is the full-year tap fee prorated to account for time of year when rates will be adjusted initially. This amount is included in Table 2 where it is called, "Meter-size Based SDC Fees.")

Notes:

Because growth rates and meter sizes to be installed in future years cannot be predicted with certainty, SDC fee revenues are also uncertain. However, the projections above are based upon historical growth and meter sizes so they should be reasonable estimates. Generally, SDC fees should only be used to pay for capital improvements so there is usually time to make adjustments in fee levels.

Economy of Scale Discount Rate - Generally the cost of infrastructure to serve a customer does not go up as quickly as their capacity (meter size) goes up. That is called economy of scale. This value is an estimate of the economy of scale the system enjoys as meter size goes up. Generally this factor should be no more than about 7%.

In the interest of simplicity, 3/4 inch meters, which are usually residential meters, may have been calculated at the 5/8 inch meter capacity for tap fee calculation purposes.

Table 10 - Capacity Charges Based on Meter Size

Manhattan, KS; Water Rates Scenario 2016-1

This table depicts minimum charges that are commensurate with the potential of each customer, based on their connection or meter size, to place flow demands on the system.

In-City Customers

Meter Size	Number Meters This Size	Total AWWA Capacity "Shares" Attributable to Each Meter Size Group	AWWA-based Annual Capacity Cost Each Meter Size	Capacity Surcharge per Meter per Billing Period	Economy of Scale Discount Rate	Adjusted Capacity Costs per Meter per Billing Period	Uniform Adjustment to Minimum Charge	Out of City Surcharge Factor	New Minimum Charge Base Rate From Table 11	Total Surcharged Minimum Charge per Billing Period[1]	Total Annual Capacity Surcharges for Each Meter Size[2]	"Snow Bird" Fee by Meter Size
Five Eighths	6,874	6,874	$13	$1.06	100%	$1.06	$0.00	100%	$8.91	$9.98	$87,654	$5.53
Three Quarters	6,780	10,170	$19	$1.59	100%	$1.06	$0.00	100%	$8.91	$9.98	$86,456	$5.53
One Inch	1,582	3,955	$32	$2.66	100%	$2.66	$0.00	100%	$8.91	$11.57	$50,433	$6.41
One & a Half Inch	268	1,340	$64	$5.31	100%	$5.31	$0.00	100%	$8.91	$14.23	$17,087	$7.89
Two Inch	453	7,248	$204	$17.00	100%	$17.00	$0.00	100%	$8.91	$25.92	$92,424	$14.37
Two & One Half Inch	1 *	30	$379	$31.61	100%	$31.61	$0.00	100%	$8.91	$40.53	$379	$22.47
Three Inch	32	1,392	$555	$46.22	100%	$46.22	$0.00	100%	$8.91	$55.14	$17,750	$30.57
Four Inch	24	1,800	$956	$79.70	100%	$79.70	$0.00	100%	$8.91	$88.61	$22,953	$49.13
Six Inch	21	3,360	$2,040	$170.02	100%	$170.02	$0.00	100%	$8.91	$178.93	$42,845	$99.21
Eight Inch	5	1,400	$3,570	$297.54	100%	$297.54	$0.00	100%	$8.91	$306.45	$17,852	$169.91
Ten Inch	1	420	$5,356	$446.31	100%	$446.31	$0.00	100%	$8.91	$455.22	$5,356	$252.39
Twelve Inch	0	0	$6,758	$563.20	100%	$563.20	$0.00	100%	$8.91	$572.11	$0	$317.20
Sixteen Inch	2 *	1,338	$8,528	$710.70	100%	$710.70	$0.00	100%	$8.91	$719.61	$17,057	$398.98
	16,043	39,326									$458,246	

* Not included in AWWA study results, so these values are estimated

Out of City Customers

Five Eighths	231	231	$13	$1.06	100%	$1.06	$0.00	200%	$8.91	$19.95	$5,891	$11.06
Three Quarters	19	29	$19	$1.59	100%	$1.06	$0.00	200%	$8.91	$19.95	$485	$11.06
One Inch	10	25	$32	$2.66	100%	$2.66	$0.00	200%	$8.91	$23.14	$638	$12.83
One & a Half Inch	2	10	$64	$5.31	100%	$5.31	$0.00	200%	$8.91	$28.45	$255	$15.78
Two Inch	5	80	$204	$17.00	100%	$17.00	$0.00	200%	$8.91	$51.83	$2,040	$28.74
Two & One Half Inch	0 *	0	$379	$31.61	100%	$31.61	$0.00	200%	$8.91	$81.05	$0	$44.94
Three Inch	5	218	$555	$46.22	100%	$46.22	$0.00	200%	$8.91	$110.28	$5,547	$61.14
Four Inch	2	150	$956	$79.70	100%	$79.70	$0.00	200%	$8.91	$177.22	$3,825	$98.26
Six Inch	0	0	$2,040	$170.02	100%	$170.02	$0.00	200%	$8.91	$357.87	$0	$198.42
Eight Inch	0	0	$3,570	$297.54	100%	$297.54	$0.00	200%	$8.91	$612.90	$0	$339.82
Ten Inch	0	0	$5,356	$446.31	100%	$446.31	$0.00	200%	$8.91	$910.44	$0	$504.79
Twelve Inch	0	0	$6,758	$563.20	100%	$563.20	$0.00	200%	$8.91	$1,144.22	$0	$634.40
Sixteen Inch	0 *	0	$8,528	$710.70	100%	$710.70	$0.00	200%	$8.91	$1,439.22	$0	$797.97
	274	742									$18,681	
Total:	16,317	40,068								Full Year of Capacity Surcharges	$476,927	
Economy of Scale Factor:	0.0%									Prorated Capacity Surcharges	$1,303	

The prorated minimum and capacity surcharges amount immediately above is the amount to be collected after rates are adjusted. If rates in Table 12 are meter sized-based, this amount is filtered into the calculated rate revenues of Table 12 for each rate class. Otherwise, it is included as a separate amount at the bottom of that table.

[1] Total Surcharged Minimum Charge per Billing Period - If minimum charge fees are to be based upon meter size, use the charges in this column if different from those in Table 1.

[2] Total Annual Capacity Surcharges for Each Meter Size - The sum at the bottom of this column is the dollar amount that meter size based surcharges will generate in one full year.

Table 11 - Initial Rate Adjustments and Resulting Revenues

Manhattan, KS; Water Rates Scenario 2016-1

This table depicts how rates would be set and the revenues they would generate.

After rate adjustments are made, general customers will be billed monthly.

Sales to be billed this year: Sales at the current (Test Year) rates (gray highlighted column) will apply until rates are adjusted. Sales at the modeled rates (yellow highlighted column) would apply if the modeled rates are adopted. The grand total "blended" sales revenues are the total revneues generated by the two different sets of rates. Those show in the right-most column.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Sales This Year at Current Rates	Customers Above This Volume and Below Next	New Minimum Charge Base Rates[1]	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
In City Residential	0	1	$909,665	2,694	$8.91	0.000	$2.41	$2,721	$912,387
	2	19	$2,268,298	9,563	$8.91	0.000	$2.41	$7,728	$2,276,027
	20	399	$736,055	953	$8.91	0.000	$2.41	$2,090	$738,145
	400	999,999	$1,017,027	2	$8.91	0.000	$2.41	$2,632	$1,019,659
In City Business	0	1	$159,036	610	$8.91	0.000	$2.41	$466	$159,502
	2	19	$675,479	728	$8.91	0.000	$2.41	$1,890	$677,368
	20	399	$1,977,254	848	$8.91	0.000	$2.41	$5,282	$1,982,536
	400	999,999	$790,907	37	$8.91	0.000	$2.41	$2,054	$792,961
Out of City Residential	0	1	$17,626	17	$17.83	0.000	$4.83	$50	$17,675
	2	19	$42,879	115	$17.83	0.000	$4.83	$155	$43,034
	20	399	$934	2	$17.83	0.000	$4.83	$3	$937
	400	999,999	$0	0	$17.83	0.000	$4.83	$0	$0
Out of City Business	0	1	$2,046	2	$17.83	0.000	$4.83	$6	$2,051
	2	19	$11,619	7	$17.83	0.000	$4.83	$33	$11,652
	20	399	$37,668	8	$17.83	0.000	$4.83	$100	$37,769
	400	999,999	$6,239	0	$17.83	0.000	$4.83	$16	$6,255
Hunter's Island & Moehlman Bottoms	0	1	$92	0	$13.37	0.000	$3.62	$0	$92
	2	19	$825	0	$13.37	0.000	$3.62	$2	$828
	20	399	$16,935	0	$13.37	0.000	$3.62	$44	$16,979
	400	999,999	$4,914	1	$13.37	0.000	$3.62	$13	$4,927
Konza Valley WP & TD	0	1	$153	0	$11.14	0.000	$3.02	$0	$153
	2	19	$1,376	0	$11.14	0.000	$3.02	$4	$1,379
	20	399	$18,580	1	$11.14	0.000	$3.02	$48	$18,628
	400	999,999	$9,056	1	$11.14	0.000	$3.02	$24	$9,079
Rural Water Districts	0	1	$153	0	$11.14	0.000	$3.02	$0	$153
	2	19	$1,376	0	$11.14	0.000	$3.02	$4	$1,379
	20	399	$29,041	0	$11.14	0.000	$3.02	$75	$29,116
	400	999,999	$269,468	2	$11.14	0.000	$3.02	$698	$270,166
Free Water	0	1	$0	4	$8.91	0.000	$2.41	$2	$2
	2	19	$0	0	$8.91	0.000	$2.41	$2	$2
	20	399	$0	1	$8.91	0.000	$2.41	$30	$30
	400	999,999	$0	1	$8.91	0.000	$2.41	$108	$108
Blue Township RWD	0	1	$41	0	$17.83	0.000	$4.83	$0	$41
	2	19	$367	0	$17.83	0.000	$4.83	$1	$368
	20	399	$7,744	0	$17.83	0.000	$4.83	$20	$7,764
	400	999,999	$28,740	0	$17.83	0.000	$4.83	$75	$28,814
		Total Rate Rev at Current Rates	$9,041,589				Total Rate Rev at Modeled Rates	$26,376	
				Prorated capacity surcharges from Table 10, because minimum charges above do not include them					$1,303
								Total Blended Rate Revenues for the Year [2]	$9,069,268

Note 1, New Minimum Charge Base Rates: Meter size-based minimum charges are being recommended so the amounts shown in this column are only the fixed operating costs portion of your minimum charges. For the full minimum charges to adopt, see Table 10.

Note 2, Blended Rate Revenues: During the year when rates will be adjusted, rate revenues generated will be "blended" revenues - part collected at the current rates and part collected at the adjusted rates. The table above calculates both kinds of revenue and totals them in the right-most column. Therefore, the anticipated timing of rate adjustment shown at the top of this table will cause rates to be charged as follows:

12.0	months at the old user charge rates	and	0.0	months at the new user charge rates.

Table 12 - Test Year Usage

Manhattan, KS; Water Rates Scenario 2016-1

This table shows usage by all customers during the test year.

Residential Meter Readings per year: 12

Date this scenario created: 1/12/2016

Test year, the one-year period being analyzed starts: 1/1/2015

Other Customer Meter Readings per year: 12

Bills sent per year: 12

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Conversion Factor for Billable Units	Average Volume Used Within Each Volume Range in 100 Cu Ft	Count of Bills With ANY Volume Within Each Range	Total Annual Use Within Each Volume Range in 100 Cu Ft	Count of Bills Only Where Volume "Maxed Out" Within Each Range	Volume of Only Those Bills Where Volume "Maxed Out" Within Each Range	Number of Customers With Volume That "Maxed Out" Within Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
In City Residential	0	1	1	1.851	158,540	293,388	32,323	40,954	2,694	17.3%	9.0%
	2	19	1	5.929	126,217	748,375	114,754	771,549	9,563	61.3%	23.1%
	20	399	1	23.971	11,463	274,782	11,438	494,042	953	6.1%	8.5%
	400	999,999	1	15,968.280	25	399,207	25	409,207	2	0.0%	12.3%
			Monthly and Annual Subtotals:		296,245	1,715,752	158,540	1,715,752	13,212	84.7%	52.9%
In City Business	0	1	1	1.635	26,685	43,637	7,319	4,905	610	3.9%	1.3%
	2	19	1	13.134	19,366	254,345	8,738	80,517	728	4.7%	7.8%
	20	399	1	71.846	10,628	763,577	10,180	796,937	848	5.4%	23.5%
	400	999,999	1	691.783	448	309,919	448	489,119	37	0.2%	9.5%
			Monthly and Annual Subtotals:		57,127	1,371,478	26,685	1,371,478	2,224	14.3%	42.3%
Out of City Residential	0	1	1	0.305	9,886	3,011	208	225	17	0.1%	0.1%
	2	19	1	0.695	9,661	6,714	1,375	9,140	115	0.7%	0.2%
	20	399	1	0.309	521	161	18	521	2	0.0%	0.0%
	400	999,999	1	0.000	0	0	0	0	0	0.0%	0.0%
			Monthly and Annual Subtotals:		20,068	9,886	1,601	9,886	133	0.9%	0.3%
Out of City Business	0	1	1	1.910	189	361	19	21	2	0.0%	0.0%
	2	19	1	12.847	170	2,184	78	684	7	0.0%	0.1%
	20	399	1	79.152	92	7,282	90	8,322	8	0.0%	0.2%
	400	999,999	1	611.000	2	1,222	2	2,022	0	0.0%	0.0%
			Monthly and Annual Subtotals:		453	11,049	189	11,049	16	0.1%	0.3%
Hunter's Island & Moehlman Bottoms	0	1	1	2.000	12	24	0	0	0	0.0%	0.0%
	2	19	1	18.000	12	216	0	0	0	0.0%	0.0%
	20	399	1	368.917	12	4,427	4	1,467	0	0.0%	0.1%
	400	999,999	1	159.500	8	1,276	8	4,476	1	0.0%	0.0%
			Monthly and Annual Subtotals:		44	5,943	12	5,943	1	0.0%	0.2%
Konza Valley WP & TD	0	1	1	2.000	24	48	0	0	0	0.0%	0.0%
	2	19	1	18.000	24	432	0	0	0	0.0%	0.0%
	20	399	1	242.500	24	5,820	12	1,500	1	0.0%	0.2%
	400	999,999	1	235.750	12	2,829	12	7,629	1	0.0%	0.1%
			Monthly and Annual Subtotals:		84	9,129	24	9,129	2	0.0%	0.3%
Rural Water Districts	0	1	1	2.000	24	48	0	0	0	0.0%	0.0%
	2	19	1	18.000	24	432	0	0	0	0.0%	0.0%
	20	399	1	380.000	24	9,120	0	0	0	0.0%	0.3%
	400	999,999	1	3,524.792	24	84,595	24	94,195	2	0.0%	2.6%
			Monthly and Annual Subtotals:		96	94,195	24	94,195	2	0.0%	2.9%
Free Water	0	1	1	0.571	70	40	52	4	4	0.0%	0.0%
	2	19	1	16.833	18	303	2	19	0	0.0%	0.0%
	20	399	1	282.063	16	4,513	6	833	1	0.0%	0.1%
	400	999,999	1	1,627.000	10	16,270	10	20,270	1	0.0%	0.5%
			Monthly and Annual Subtotals:		114	21,126	70	21,126	6	0.0%	0.7%
Blue Township RWD	0	1	1	2.000	4	8	0	0	0	0.0%	0.0%
	2	19	1	18.000	4	72	0	0	0	0.0%	0.0%
	20	399	1	380.000	4	1,520	0	0	0	0.0%	0.0%
	400	999,999	1	1,409.000	4	5,636	4	7,236	0	0.0%	0.2%
			Monthly and Annual Subtotals:		16	7,236	4	7,236	0	0.0%	0.2%
			Monthly and Annual Grand Totals:		374,247	3,245,794	187,149		15,596	100%	100%

Table 13 - Rates at End of Test Year

Manhattan, KS; Water Rates Scenario 2016-1

This table shows user rates at the end of the test year. Rates for volume ranges that are not shown are the same as the next lowest volume range rates. Rates for customers with no recorded meter size were assumed to be charged the same as those for the smallest meter size customer.

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Minimum Charge	Usage Allowance in 100 Cu Ft	Unit Charge per 100 Cu Ft
In City Residential	0	1	$8.27	2.000	$2.55
	2	19	$8.27	2.000	$2.55
	20	399	$8.27	2.000	$2.55
	400	999,999	$8.27	2.000	$2.55
In City Business	0	1	$8.27	2.000	$2.55
	2	19	$8.27	2.000	$2.55
	20	399	$8.27	2.000	$2.55
	400	999,999	$8.27	2.000	$2.55
Out of City Residential	0	1	$16.54	2.000	$5.11
	2	19	$16.54	2.000	$5.11
	20	399	$16.54	2.000	$5.11
	400	999,999	$16.54	2.000	$5.11
Out of City Business	0	1	$16.54	2.000	$5.11
	2	19	$16.54	2.000	$5.11
	20	399	$16.54	2.000	$5.11
	400	999,999	$16.54	2.000	$5.11
Hunter's Island & Moehlman Bottoms	0	1	$12.41	2.000	$3.83
	2	19	$12.41	2.000	$3.83
	20	399	$12.41	2.000	$3.83
	400	999,999	$12.41	2.000	$3.83
Konza Valley WP & TD	0	1	$10.34	2.000	$3.19
	2	19	$10.34	2.000	$3.19
	20	399	$10.34	2.000	$3.19
	400	999,999	$10.34	2.000	$3.19
Rural Water Districts	0	1	$10.34	2.000	$3.19
	2	19	$10.34	2.000	$3.19
	20	399	$10.34	2.000	$3.19
	400	999,999	$10.34	2.000	$3.19
Free Water	0	1	$0.00	0.000	$0.00
	2	19	$0.00	0.000	$0.00
	20	399	$0.00	0.000	$0.00
	400	999,999	$0.00	0.000	$0.00
Blue Township RWD	0	1	$16.54	2.000	$5.11
	2	19	$16.54	2.000	$5.11
	20	399	$16.54	2.000	$5.11
	400	999,999	$16.54	2.000	$5.11

Table 14 - Average Cost Classification

Table 14 - Average Cost Classification

Manhattan, KS; Water Rates Scenario 2016-1

This table distributes costs from a representative year (the "target" year) to fixed and variable categories (see Definitions) in order to calculate the "proportional to use" or "cost of service" rate structure based upon the cost breakdown for that year.

The rate structure target year runs from 1/1/2018 through 12/31/2018

Operating Costs	Amount	Fixed Cost %	Variable Cost %	Capacity Cost %	Fixed Cost Amount	Variable Cost Amount	Capacity Cost Amount
Administration-All Functions	$770,684	100.0%	0.0%	0.0%	$770,684	$0	$0
All Operations Staff and Related Expenses	$1,663,812	20.0%	80.0%	0.0%	$332,762	$1,331,049	$0
Building Maintenance	$8,500	37.8%	62.2%	0.0%	$3,213	$5,287	$0
CLEAN WATER FUND FEE	$75,600	0.0%	100.0%	0.0%	$0	$75,600	$0
Construction Projects	$15,000	20.0%	80.0%	0.0%	$3,000	$12,000	$0
Equipment Maintenance	$120,761	20.0%	80.0%	0.0%	$24,152	$96,609	$0
Gas, Electric, Chemicals, Lime, Similar Variable Costs	$1,799,500	0.0%	100.0%	0.0%	$0	$1,799,500	$0
Konza Water Service -KDHE Loan	Disregard	20.0%	80.0%	0.0%	$0	$0	$0
Laboratory Costs	$42,859	20.0%	80.0%	0.0%	$8,572	$34,287	$0
LEGAL PUBLICATIONS	$5,000	100.0%	0.0%	0.0%	$5,000	$0	$0
Meter Rep. Program-KDHE Loan	Table 4	20.0%	80.0%	0.0%	$0	$0	$0
Metering-All Functions	$235,896	0.0%	100.0%	0.0%	$0	$235,896	$0
Operating Supplies, Fuel and Lube	$122,388	20.0%	80.0%	0.0%	$24,478	$97,910	$0
OTHER	$7,500	0.0%	100.0%	0.0%	$0	$7,500	$0
Piping, Valves, Fittings	$215,534	20.0%	80.0%	0.0%	$43,107	$172,427	$0
Postage, Trash, Computers and Software, Similar Fixed Costs	$55,439	100.0%	0.0%	0.0%	$55,439	$0	$0
Professional Services, Legal, Planning Studies	$500	100.0%	0.0%	0.0%	$500	$0	$0
SALES TAX EXP.	$290,788	37.8%	62.2%	0.0%	$109,918	$180,870	$0
STATE SURCHARGE	$80,850	37.8%	62.2%	0.0%	$30,561	$50,289	$0
Transfer to Capital Projects	Table 4	52.2%	20.6%	27.2%	$0	$0	$0
Transfer to Debt Service	Table 4	52.2%	20.6%	27.2%	$0	$0	$0
TRANSFER TO ENTERPRISE	$6,350	20.0%	80.0%	0.0%	$1,270	$5,080	$0
TRANSFER TO GENERAL FUND	$1,248,036	37.8%	62.2%	0.0%	$471,758	$776,279	$0
TRANSFER TO TRUST & AGENCY	$62,000	52.2%	20.6%	27.2%	$32,354	$12,759	$16,887
Utility Location-All Functions and One-Call	$78,408	20.0%	80.0%	0.0%	$15,682	$62,726	$0
WTP Clearwell and Pump Station Improvements WA015P/WA1403, Backup Generator 2 MW Generator - WTP-WA121E	Table 4	52.2%	20.6%	27.2%	$0	$0	$0
WTP KDHE Loan	Table 4	52.2%	20.6%	27.2%	$0	$0	$0
User Charge Analysis Services	$0	37.8%	62.2%	0.0%	$0	$0	$0
Total CIP Spending, Cash and Debt (Table 4)	$4,623,168	52.2%	20.6%	27.2%	$2,412,552	$951,432	$1,259,185
Offset for Capacity Surcharges (Table 10)	-$476,927	52.2%	20.6%	27.2%	-$248,879	-$98,150	-$129,898
Grand Total Costs, Weighted Avg Percentages	$11,051,647	37.1%	52.6%	10.4%	$4,096,122	$5,809,352	$1,146,173
			100%		$11,051,647		

"Proportional to Use" Rate Structure Cost Basis

Average Fixed Cost/User/Month =	$21.89
Average Variable Cost to Produce/100 Cu Ft =	$1.79
Cu Ft/Billing Cycle Used by Average Residential Customer =	11

Water Loss is Estimated at	0%
Cost of Water Loss is Estimated at	72%
Resulting Cost of Water Loss	$0
Test Year Customer Metered Usage (in Cu Ft)	3,245,794
+ Test Year Water Loss	0
Total Test Year Volume	3,245,794

Manhattan, KS; Water Rates Scenario 2016-2
Modeling Results

(Keep Usage Allowance)

This document contains the calculations that were performed to arrive at new user rates and fees for the next 10 years. These calculations are complex so key issues are also described in a narrative report that accompanies this model.

This analysis was conducted so as to establish user rates that are adequate to pay all reasonably expectable costs while charging rates that are fairly structured and appropriately simple or complex.

Scenario Description: This analysis model is the same as Water Scenario 1 except the usage allowance of 200 cubic feet per month would be retained. Consequently, minimum and unit charges must be higher.

For most, the best way to read and understand what this model means is this. Scan the "Index of Tables, Charts and Other Results" to see how the model is laid out. Scan the "Definitions" for any terms you are not already familiar with. Read and even ponder Table 1 and the line graph charts. These will show you how the proposed rate adjustments will affect ratepayers and the system. If you need more detail than that, review the entire model. Finally, rate setting involves much more than just rates so you need to read the accompanying narrative report to understand what you need to do and why.

Several tables in this model depict volume usage and user rates for the various customer classes. The model includes a continuum of volumes but many volume categories had no users. Most of these lines have been hidden simply to make the tables less voluminous. However, all volume classes that had use or that are break points for rate blocks are shown. For volume classes that are not shown, rates will be the same as the previous rate that is shown.

September 28, 2016

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Table 1 - Modeled Rates

Manhattan, KS; Water Rates Scenario 2016-2

Adopt the unit charges shown in this table. However, minimum charges will be based upon the meter size of each customer so assess minimum charges from Table 10 based upon each customer's meter size.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Usage Allowance in 100 Cu Ft	Unit Charge per 100 Cu Ft
In City Residential	0	1	2.000	$2.67
	2	19	2.000	$2.67
	20	399	2.000	$2.67
	400	999,999	2.000	$2.67
In City Business	0	1	2.000	$2.67
	2	19	2.000	$2.67
	20	399	2.000	$2.67
	400	999,999	2.000	$2.67
Out of City Residential	0	1	2.000	$5.34
	2	19	2.000	$5.34
	20	399	2.000	$5.34
	400	999,999	2.000	$5.34
Out of City Business	0	1	2.000	$5.34
	2	19	2.000	$5.34
	20	399	2.000	$5.34
	400	999,999	2.000	$5.34
Hunter's Island & Moehlman Bottoms	0	1	2.000	$4.01
	2	19	2.000	$4.01
	20	399	2.000	$4.01
	400	999,999	2.000	$4.01
Konza Valley WP & TD	0	1	2.000	$3.34
	2	19	2.000	$3.34
	20	399	2.000	$3.34
	400	999,999	2.000	$3.34
Rural Water Districts	0	1	2.000	$3.34
	2	19	2.000	$3.34
	20	399	2.000	$3.34
	400	999,999	2.000	$3.34
Free Water	0	1	2.000	$2.67
	2	19	2.000	$2.67
	20	399	2.000	$2.67
	400	999,999	2.000	$2.67
Blue Township RWD	0	1	2.000	$5.34
	2	19	2.000	$5.34
	20	399	2.000	$5.34
	400	999,999	2.000	$5.34

Table 6 - Financial Capacity Indicators and Reserves

Manhattan, KS; Water Rates Scenario 2016-2

This table depicts the affordability of future rates, the financial health of the system and the ending balances in various accounts for the test year and the next 10 years.

Capacity Indicators	Year Starting 1/1/15	Year Starting 1/1/16	Year Starting 1/1/17	Year Starting 1/1/18	Year Starting 1/1/19	Year Starting 1/1/20	Year Starting 1/1/21	Year Starting 1/1/22	Year Starting 1/1/23	Year Starting 1/1/24	Year Starting 1/1/25
Equivalent Final Monthly Bill for a 5,000 gal per Month Residential User	$20.24	$22.48	$22.93	$23.39	$23.86	$24.34	$24.82	$25.32	$25.83	$26.34	$26.87
Annual Median Household Income (AMHI)	$42,305	$43,570	$44,873	$46,215	$47,597	$49,020	$50,486	$51,995	$53,550	$55,151	$56,801
Affordability Index: Current Rates First Column, Then Proposed Rates	0.57%	0.62%	0.61%	0.61%	0.60%	0.60%	0.59%	0.58%	0.58%	0.57%	0.57%
Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the percent of AMHI needed by a 5,000 gallon per month residential user to pay their bill. Rates near 1.0% are common in the U.S. and are generally considered affordable. Federal grant agencies generally will not consider awarding grants if this indicator is less than 2.0%.											
Estimated Operating Ratio: Current Rates First Column, Then Proposed Rates	1.12	0.92	1.09	1.06	1.05	0.96	1.00	1.05	1.01	1.01	0.99
1.0 is break even for Operating Ratio. Below 1.0 indicates operating in the "red." Generally, the operating ratio should be at least 1.15 for large systems, 1.30 or more for medium systems and perhaps as high as 2.0 for small systems.											
Estimated Coverage Ratio: Current Rates First Column, Then Proposed Rates	1.33	0.89	1.90	1.46	1.50	1.20	1.29	1.31	1.28	1.34	1.43
Coverage Ratio applies only to years with debt service. 1.0 is break even. Generally, the coverage ratio should be at least 1.25.											

Reserves	Balance Ending on 12/31/14	Balance Ending on 12/31/15	Balance Ending on 12/31/16	Balance Ending on 12/31/17	Balance Ending on 12/31/18	Balance Ending on 12/31/19	Balance Ending on 12/31/20	Balance Ending on 12/31/21	Balance Ending on 12/31/22	Balance Ending on 12/31/23	Balance Ending on 12/31/24	Balance Ending on 12/31/25
Current Position	$6,191,803	$2,056,419	$2,316,326	$2,437,892	$2,531,351	$2,661,233	$2,788,294	$2,924,253	$3,072,949	$3,225,266	$3,391,969	$3,578,090
Total Cash Assets (Excluding Dedicated Reserves) Before Inflation	$6,191,803	$2,056,419	$2,316,326	$2,437,892	$2,531,351	$2,661,233	$2,788,294	$2,924,253	$3,072,949	$3,225,266	$3,391,969	$3,578,090
Total Cash Assets (Excluding Dedicated Reserves) Discounted for Inflation (Future Unrestricted Purchasing Power)	$6,191,803	$2,056,419	$2,316,326	$2,389,134	$2,431,109	$2,504,731	$2,571,834	$2,643,293	$2,722,149	$2,799,936	$2,885,762	$2,983,224
CIP and Debt Service Reserves	$0	$4,833,356	$4,209,006	$4,835,867	$5,330,415	$5,732,561	$5,481,844	$5,475,872	$5,888,381	$6,013,855	$6,172,641	$6,115,341
Sum of All Reserves	$6,191,803	$6,889,775	$6,525,331	$7,273,759	$7,861,766	$8,393,794	$8,270,138	$8,400,125	$8,961,331	$9,239,121	$9,564,610	$9,693,431

Table 7 - Bill Comparisons Before and After Rate Adjustments

Manhattan, KS; Water Rates Scenario 2016-2

This table compares bills for various volumes at the current rates and billing frequency with what the same volumes would cost at the equivalent modeled rates for that same billing frequency. (An "apples to apples" comparison.) Minimum charge surcharges were calculated for these same classes of users and these bills include those surcharges. However, not all meter sizes are shown.

Note: The weighted-average bill increase for all customers combined will be: 11.0%

Customer or Rate Class, or Meter Size	Cu Ft of Use	Customers Above This Volume and Below Next	Cumulative Customers	Current Bill	Modeled Bill	Bill Increase or Decrease (-)	Percent Increase or Decrease (-)
In City Residential, Assuming 3/4 Inch Meter	0	2,694	2,694	$8.27	$9.98	$1.70	21%
	2	9,563	12,256	$8.27	$9.98	$1.70	21%
	20	953	13,210	$54.25	$58.04	$3.79	7%
	400	2	13,212	$1,024.92	$1,072.64	$47.72	5%
In City Business, Assuming 1.5 Inch Meter	0	610	610	$8.27	$14.23	$5.96	72%
	2	728	1,338	$8.27	$14.23	$5.96	72%
	20	848	2,186	$54.25	$62.29	$8.04	15%
	400	37	2,224	$1,024.92	$1,076.90	$51.97	5%
Out of City Residential, Assuming 3/4 Inch Meter	0	17	17	$16.54	$19.95	$3.41	21%
	2	115	132	$16.54	$19.95	$3.41	21%
	20	2	133	$108.50	$116.07	$7.57	7%
	400	0	133	$2,049.84	$2,145.29	$95.44	5%
Out of City Business, Assuming 1.5 Inch Meter	0	2	2	$16.54	$28.45	$11.91	72%
	2	7	8	$16.54	$28.45	$11.91	72%
	20	8	16	$108.50	$124.57	$16.07	15%
	400	0	16	$2,049.84	$2,153.79	$103.95	5%
Hunter's Island & Moehlman Bottoms	0	0	0	$12.41	$13.37	$0.96	8%
	2	0	0	$12.41	$13.37	$0.96	8%
	20	0	0	$81.38	$85.46	$4.08	5%
	400	1	1	$1,537.38	$1,607.37	$69.99	5%
Konza Valley WP & TD	0	0	0	$10.34	$11.14	$0.80	8%
	2	0	0	$10.34	$11.14	$0.80	8%
	20	1	1	$67.81	$71.22	$3.40	5%
	400	1	2	$1,281.15	$1,339.48	$58.32	5%
Rural Water Districts	0	0	0	$10.34	$11.14	$0.80	8%
	2	0	0	$10.34	$11.14	$0.80	8%
	20	0	0	$67.81	$71.22	$3.40	5%
	400	2	2	$1,281.15	$1,339.48	$58.32	5%
Free Water, Assuming 3/4 Inch Meter	0	4	4	$0.00	$9.98	$9.98	N.A.
	2	0	5	$0.00	$9.98	$9.98	N.A.
	20	1	5	$0.00	$58.04	$58.04	N.A.
	400	1	6	$0.00	$1,072.64	$1,072.64	N.A.
Blue Township RWD	0	0	0	$16.54	$17.83	$1.28	8%
	2	0	0	$16.54	$17.83	$1.28	8%
	20	0	0	$108.50	$113.95	$5.45	5%
	400	0	0	$2,049.84	$2,143.16	$93.32	5%

Manhattan, KS

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Table 7B - Combined Water Scenario 2 and Sewer Scenario 4 Bills

This table shows how combined water and sewer bills will be affected by the modeled rate adjustments.

Customer or Rate Class, or Meter Size	Volume in 100 Cu Ft	Current Average Combined Bill	Proposed Average Combined Bill	Combined Bill Increase or Decrease (-) After Rate Adjustment	Percent Increase or Decrease (-) After Rate Adjustment
In City Residential, Assuming 3/4 Inch Meter	0	$28.87	$20.93	-$7.93	-27%
	2	$28.87	$20.93	-$7.94	-27%
	20	$130.62	$151.76	$21.14	16%
	400	$2,278.78	$2,913.76	$634.98	28%
In City Business, Assuming 1.5 Inch Meter	0	$28.87	$38.32	$9.45	33%
	2	$28.87	$38.32	$9.45	33%
	20	$130.62	$169.15	$38.52	29%
	400	$2,278.78	$2,931.14	$652.36	29%
Out of City Residential, Assuming 3/4 Inch Meter	0	$47.43	$36.39	-$11.05	-23%
	2	$47.44	$36.39	-$11.05	-23%
	20	$223.06	$298.05	$74.99	34%
	400	$3,930.63	$5,822.04	$1,891.41	48%
Out of City Business, Assuming 1.5 Inch Meter	0	$47.43	$64.59	$17.15	36%
	2	$47.44	$64.59	$17.15	36%
	20	$223.06	$326.25	$103.19	46%
	400	$3,930.63	$5,850.24	$1,919.61	49%

Table 8 - User Statistics

Manhattan, KS; Water Rates Scenario 2016-2

This table shows measures of equitability of the rates as modeled in Table 11.

If your rates are absolutely proportional to use on a volumetric basis, your % of usage and % of revenues figures will be the same within all the classes. That is not possible if you have any minimum charge and having no minimum charge is almost unheard of.

Normally, the % of usage figure will be lower than the % of revenue for the lower volumes of use. That will switch for the higher volumes of use. Even for declining rate structures, this switch should occur near the volume of the average residential user, typically near 5,000 gallons/month (668 cu ft).

In urban and suburban areas the average monthly use for residential or general customers can be twice that used by their rural and "old town" counterparts. Use is largely dependent upon who lives in a community. Older people living in longer established neighborhoods tend to use less volume than younger people living in more recently developed areas. As you make comparisons between different customers and customer classes, keep that, and the following in mind:

11 in 100 Cu Ft Billable units - This is the average residential customer's usage per Monthly billing cycle.

Usage allowance is the volume "given away" with the minimum charge. The higher the allowance, the less volume the utility can sell to generate income.

3,245,794 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was available to be sold by the utility during the test year.

340,565 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was given away as a usage allowance during the test year.

$853,044 At the unit charge rate in effect during the test year, this was what it cost the utility to give away this volume.

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Average Volume Used Within Each Volume Range in 100 Cu Ft	Total Annual Use Within Each Volume Range in 100 Cu Ft	Customers Within This Volume Range	% Users	% Usage	Cumulative Use in This Class From Low to High Volume	Cumulative Use in This Class From High to Low Volume	% Revenue at Current Rates	% Revenue at Modeled Rates
In City Residential	0	1	1.851	293,388.0	2,693.6	17.3%	9.0%	17.1%	100.0%	10.1%	10.0%
	2	19	5.929	748,375.0	9,562.8	61.3%	23.1%	60.7%	82.9%	25.1%	25.1%
	20	399	23.971	274,782.0	953.2	6.1%	8.5%	76.7%	39.3%	8.1%	8.1%
	400	999,999	15,968.280	399,207.0	2.1	0.0%	12.3%	100.0%	23.3%	11.2%	11.1%
	Totals for Class			1,715,752.0	13,211.7	84.7%	52.9%			54.5%	54.4%
In City Business	0	1	1.635	43,637.0	609.9	3.9%	1.3%	3.2%	100.0%	1.8%	1.8%
	2	19	13.134	254,345.0	728.2	4.7%	7.8%	21.7%	96.8%	7.5%	7.4%
	20	399	71.846	763,577.0	848.3	5.4%	23.5%	77.4%	78.3%	21.9%	21.6%
	400	999,999	691.783	309,919.0	37.3	0.2%	9.5%	100.0%	22.6%	8.7%	8.6%
	Totals for Class			1,371,478.0	2,223.8	14.3%	42.3%			39.8%	39.5%
Out of City Residential	0	1	0.305	3,011.0	17.3	0.1%	0.1%	30.5%	100.0%	0.2%	0.2%
	2	19	0.695	6,714.0	114.6	0.7%	0.2%	98.4%	69.5%	0.5%	0.5%
	20	399	0.309	161.0	1.5	0.0%	0.0%	100.0%	1.6%	0.0%	0.0%
	400	999,999	0.000	0.0	0.0	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
	Totals for Class			9,886.0	133.4	0.9%	0.3%			0.7%	0.7%
Out of City Business	0	1	1.910	361.0	1.6	0.0%	0.0%	3.3%	100.0%	0.0%	0.0%
	2	19	12.847	2,184.0	6.5	0.0%	0.1%	23.0%	96.7%	0.1%	0.1%
	20	399	79.152	7,282.0	7.5	0.0%	0.2%	88.9%	77.0%	0.4%	0.4%
	400	999,999	611.000	1,222.0	0.2	0.0%	0.0%	100.0%	11.1%	0.1%	0.1%
	Totals for Class			11,049.0	15.8	0.1%	0.3%			0.6%	0.7%
Hunter's Island & Moehlman Bottoms	0	1	2.000	24.0	0.0	0.0%	0.0%	0.4%	100.0%	0.0%	0.0%
	2	19	18.000	216.0	0.0	0.0%	0.0%	4.0%	99.6%	0.0%	0.0%
	20	399	368.917	4,427.0	0.3	0.0%	0.1%	78.5%	96.0%	0.2%	0.2%
	400	999,999	159.500	1,276.0	0.7	0.0%	0.0%	100.0%	21.5%	0.1%	0.1%
	Totals for Class			5,943.0	1.0	0.0%	0.2%			0.3%	0.2%
Konza Valley WP & TD	0	1	2.000	48.0	0.0	0.0%	0.0%	0.5%	100.0%	0.0%	0.0%
	2	19	18.000	432.0	0.0	0.0%	0.0%	5.3%	99.5%	0.0%	0.0%
	20	399	242.500	5,820.0	1.0	0.0%	0.2%	69.0%	94.7%	0.2%	0.2%
	400	999,999	235.750	2,829.0	1.0	0.0%	0.1%	100.0%	31.0%	0.1%	0.1%
	Totals for Class			9,129.0	2.0	0.0%	0.3%			0.3%	0.3%
Rural Water Districts	0	1	2.000	48.0	0.0	0.0%	0.0%	0.1%	100.0%	0.0%	0.0%
	2	19	18.000	432.0	0.0	0.0%	0.0%	0.5%	99.9%	0.0%	0.0%
	20	399	380.000	9,120.0	0.0	0.0%	0.3%	10.2%	99.5%	0.3%	0.3%
	400	999,999	3,524.792	84,595.0	2.0	0.0%	2.6%	100.0%	89.8%	3.0%	2.9%
	Totals for Class			94,195.0	2.0	0.0%	2.9%			3.3%	3.3%
Free Water	0	1	0.571	40.0	4.3	0.0%	0.0%	0.2%	100.0%	0.0%	0.0%
	2	19	16.833	303.0	0.2	0.0%	0.0%	1.6%	99.8%	0.0%	0.0%
	20	399	282.063	4,513.0	0.5	0.0%	0.1%	23.0%	98.4%	0.0%	0.1%
	400	999,999	1,627.000	16,270.0	0.8	0.0%	0.5%	100.0%	77.0%	0.0%	0.5%
	Totals for Class			21,126.0	5.8	0.0%	0.7%			0.0%	0.6%
Blue Township RWD	0	1	2.000	8.0	0.0	0.0%	0.0%	0.1%	100.0%	0.0%	0.0%
	2	19	18.000	72.0	0.0	0.0%	0.0%	1.1%	99.9%	0.0%	0.0%
	20	399	380.000	1,520.0	0.0	0.0%	0.0%	22.1%	98.9%	0.1%	0.1%
	400	999,999	1,409.000	5,636.0	0.3	0.0%	0.2%	100.0%	77.9%	0.3%	0.3%
	Totals for Class			7,236.0	0.3	0.0%	0.2%			0.4%	0.4%
	Grand Totals			3,245,794.0		100.00%	100.00%			100.00%	100.00%

Chart 1 - Operating Ratio

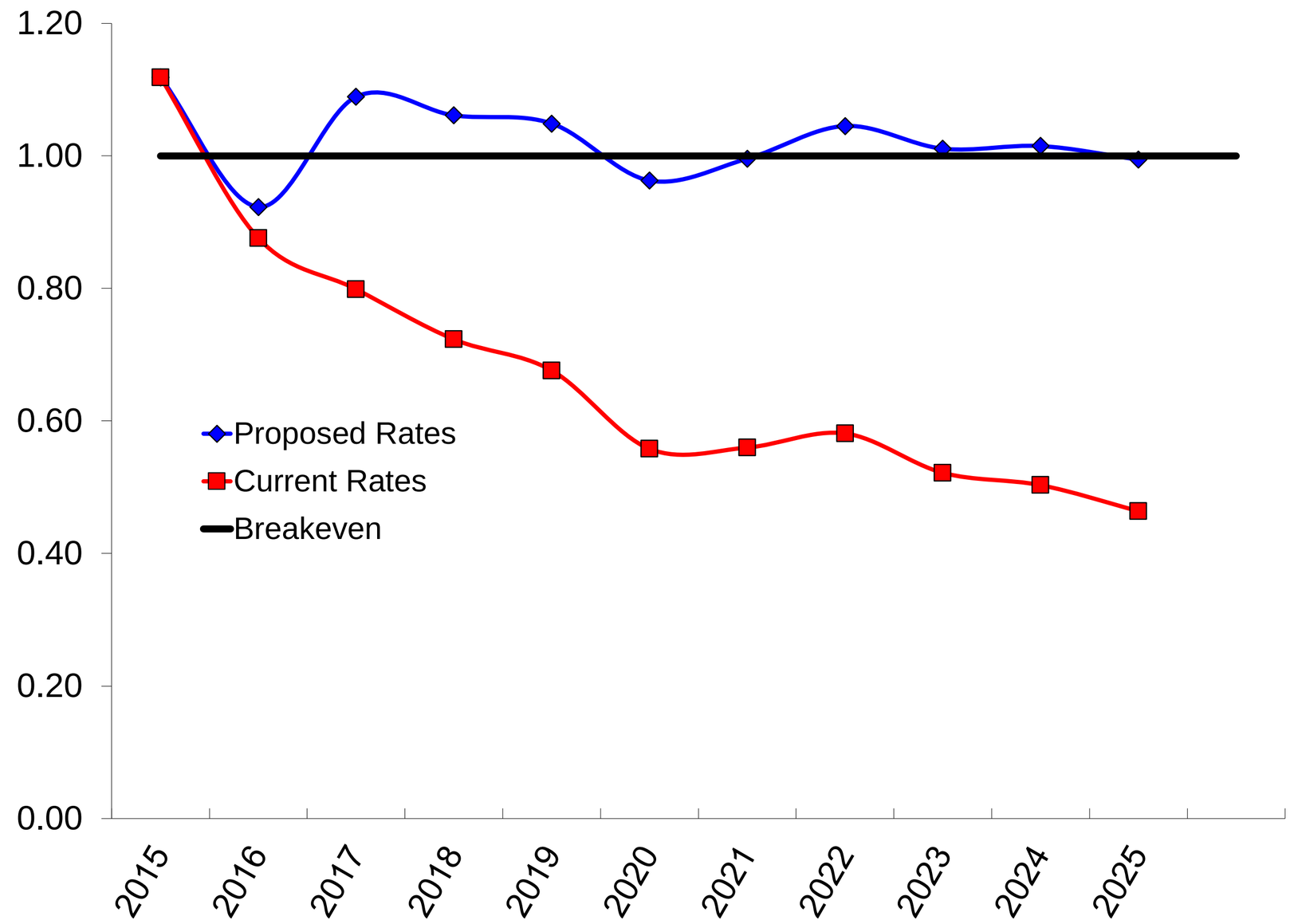

Chart 2 - Coverage Ratio

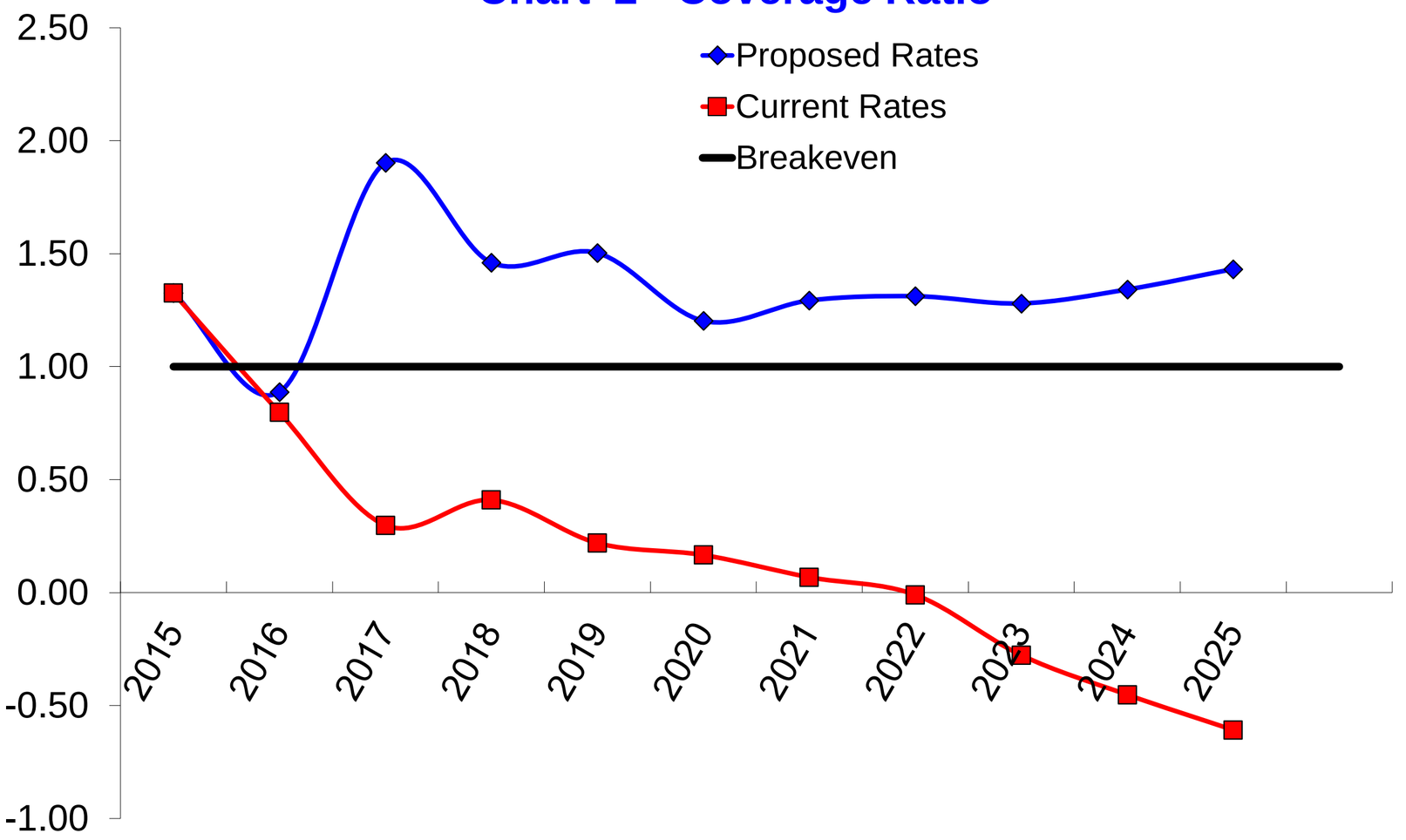

Chart 3 - 5,000 Gal Residential User's Bill

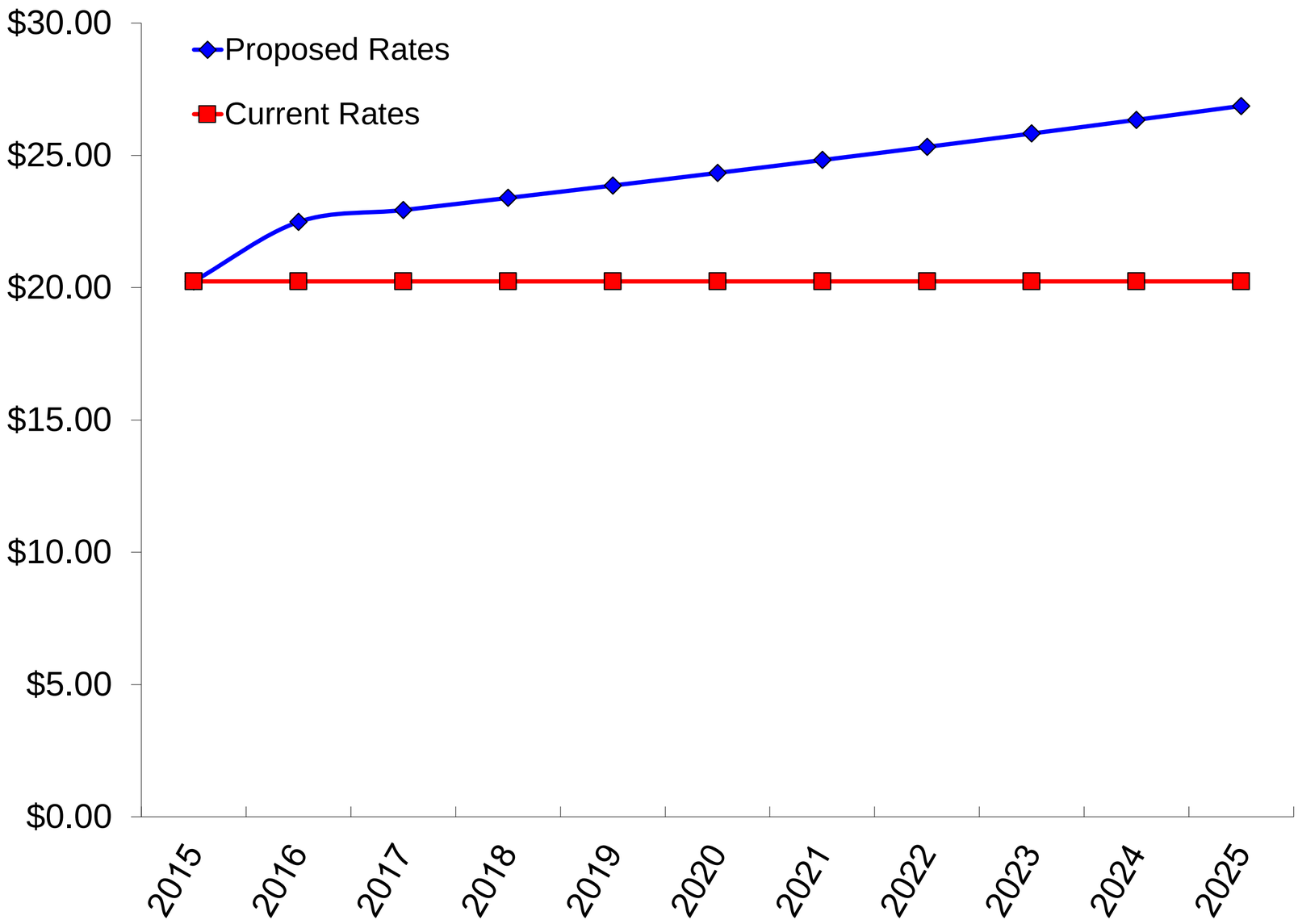

Chart 4 - Affordability Index

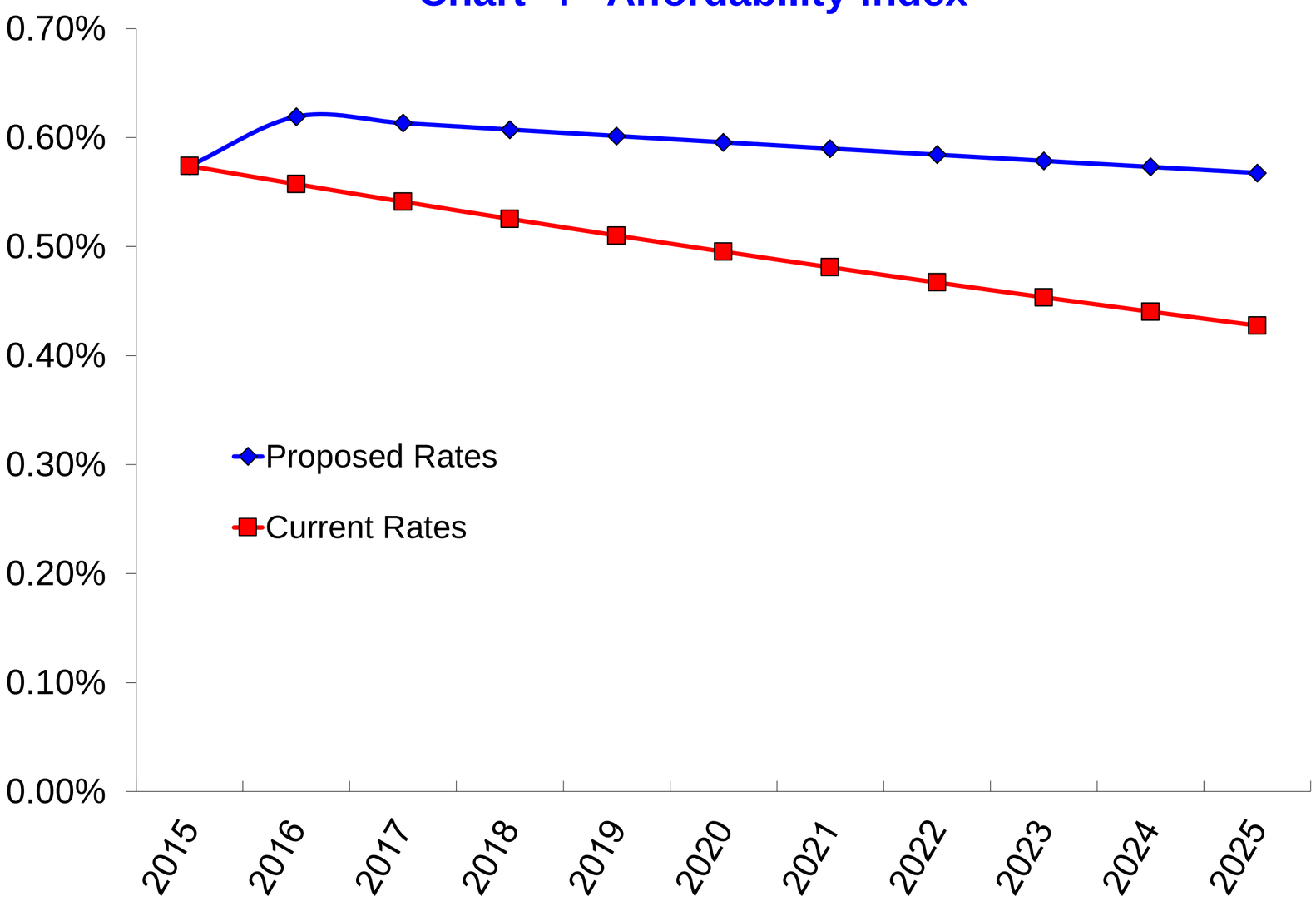

Chart 5 - Working Capital vs Goal

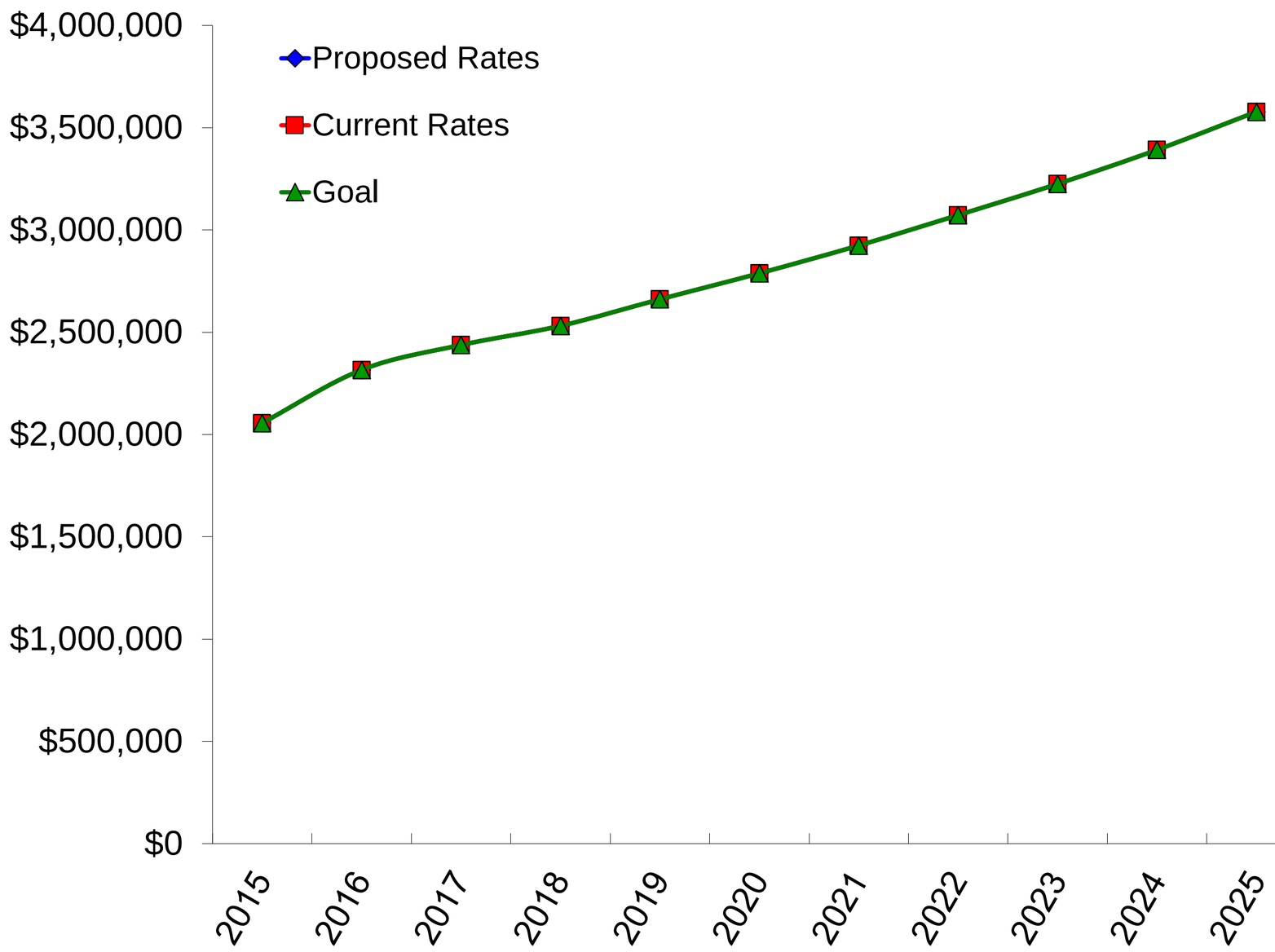

Chart 6 - Value of Cash Assets Before Inflation

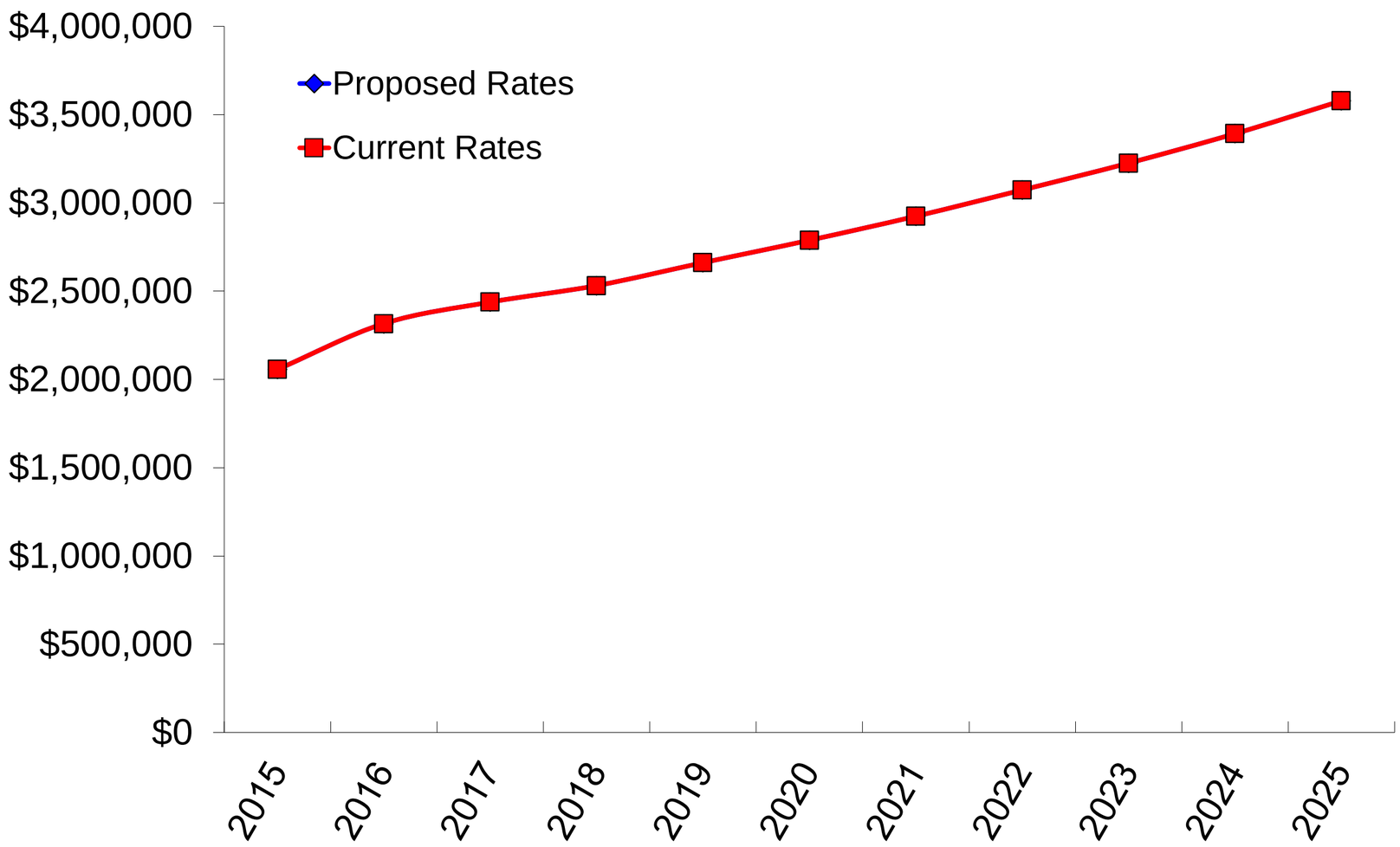

Chart 7 - Value of Cash Assets After Inflation

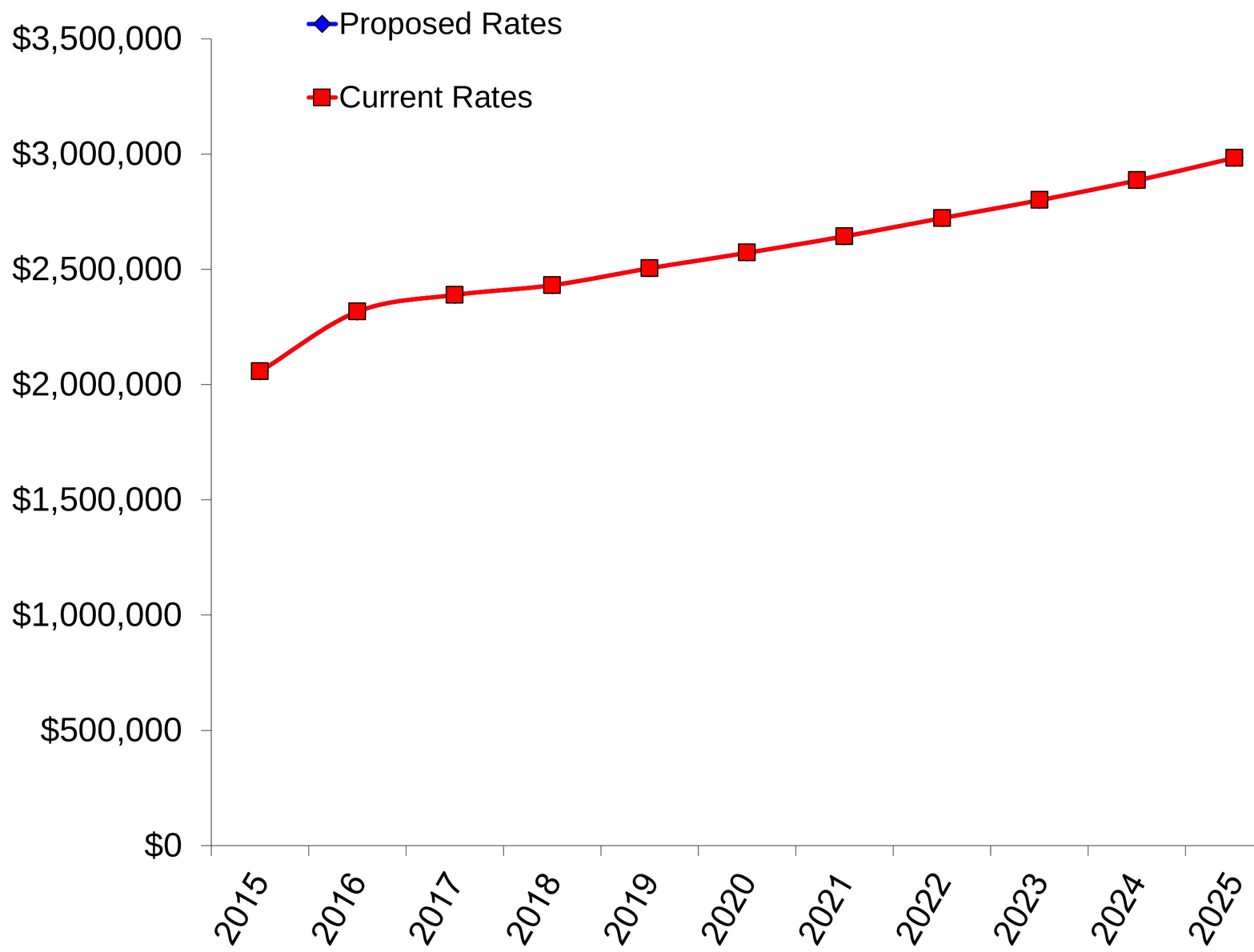

Chart 8 - Total Reserves

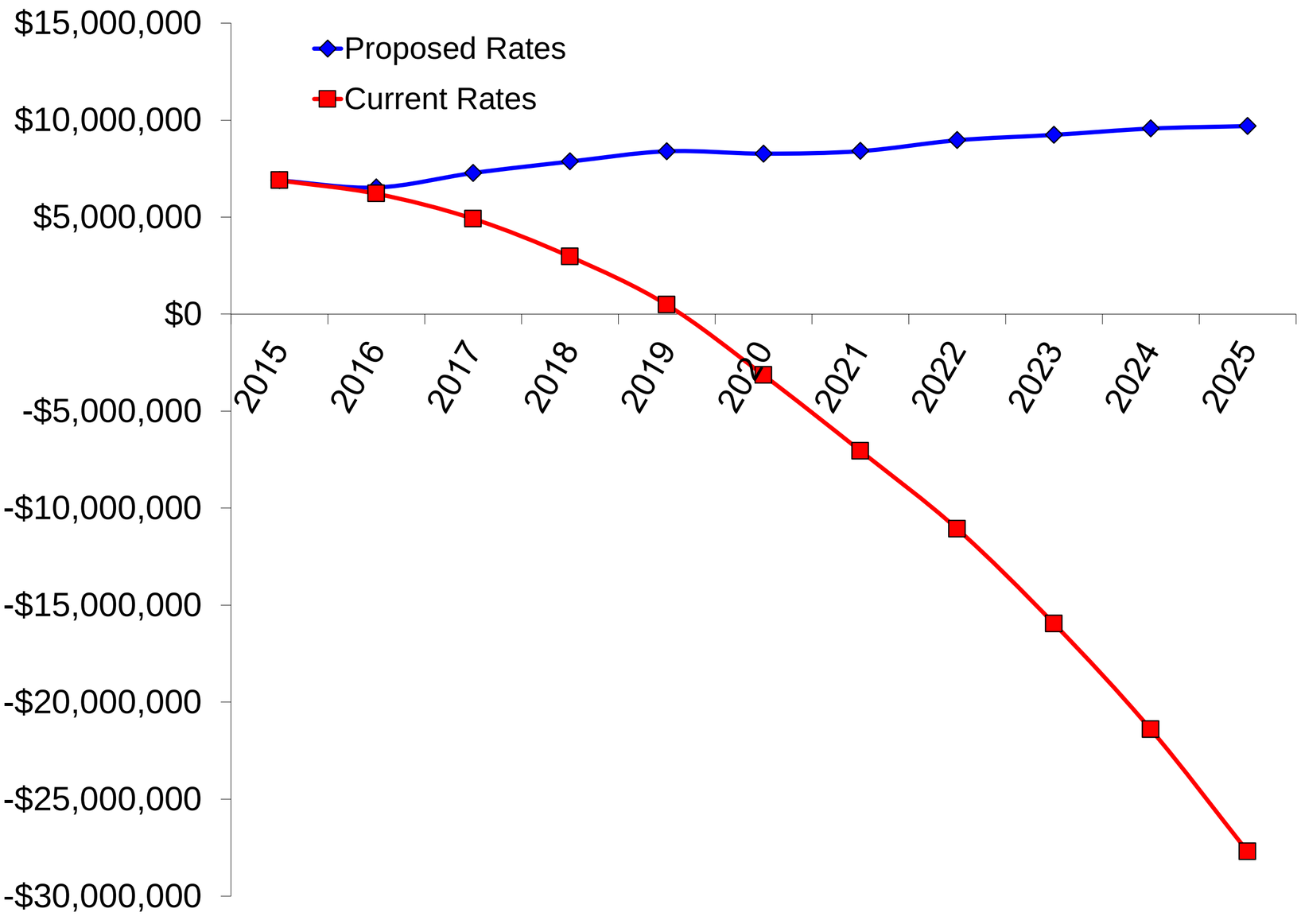

Table 11 - Initial Rate Adjustments and Resulting Revenues

Manhattan, KS; Water Rates Scenario 2016-2

This table depicts how rates would be set and the revenues they would generate.

After rate adjustments are made, general customers will be billed monthly.

Sales to be billed this year: Sales at the current (Test Year) rates (gray highlighted column) will apply until rates are adjusted. Sales at the modeled rates (yellow highlighted column) would apply if the modeled rates are adopted. The grand total "blended" sales revenues are the total revneues generated by the two different sets of rates. Those show in the right-most column.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Sales This Year at Current Rates	Customers Above This Volume and Below Next	New Minimum Charge Base Rates[1]	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
In City Residential	0	1	$909,665	2,694	$8.91	2.000	$2.67	$2,629	$912,294
	2	19	$2,268,298	9,563	$8.91	2.000	$2.67	$6,580	$2,274,878
	20	399	$736,055	953	$8.91	2.000	$2.67	$2,116	$738,171
	400	999,999	$1,017,027	2	$8.91	2.000	$2.67	$2,913	$1,019,940
In City Business	0	1	$159,036	610	$8.91	2.000	$2.67	$461	$159,497
	2	19	$675,479	728	$8.91	2.000	$2.67	$1,941	$677,419
	20	399	$1,977,254	848	$8.91	2.000	$2.67	$5,670	$1,982,924
	400	999,999	$790,907	37	$8.91	2.000	$2.67	$2,265	$793,172
Out of City Residential	0	1	$17,626	17	$17.83	2.000	$5.34	$51	$17,676
	2	19	$42,879	115	$17.83	2.000	$5.34	$125	$43,004
	20	399	$934	2	$17.83	2.000	$5.34	$3	$936
	400	999,999	$0	0	$17.83	2.000	$5.34	$0	$0
Out of City Business	0	1	$2,046	2	$17.83	2.000	$5.34	$6	$2,052
	2	19	$11,619	7	$17.83	2.000	$5.34	$36	$11,655
	20	399	$37,668	8	$17.83	2.000	$5.34	$111	$37,779
	400	999,999	$6,239	0	$17.83	2.000	$5.34	$18	$6,256
Hunter's Island & Moehlman Bottoms	0	1	$92	0	$13.37	2.000	$4.01	$0	$92
	2	19	$825	0	$13.37	2.000	$4.01	$2	$828
	20	399	$16,935	0	$13.37	2.000	$4.01	$49	$16,984
	400	999,999	$4,914	1	$13.37	2.000	$4.01	$14	$4,928
Konza Valley WP & TD	0	1	$153	0	$11.14	2.000	$3.34	$0	$153
	2	19	$1,376	0	$11.14	2.000	$3.34	$4	$1,380
	20	399	$18,580	1	$11.14	2.000	$3.34	$53	$18,633
	400	999,999	$9,056	1	$11.14	2.000	$3.34	$26	$9,082
Rural Water Districts	0	1	$153	0	$11.14	2.000	$3.34	$0	$153
	2	19	$1,376	0	$11.14	2.000	$3.34	$4	$1,380
	20	399	$29,041	0	$11.14	2.000	$3.34	$83	$29,124
	400	999,999	$269,468	2	$11.14	2.000	$3.34	$772	$270,240
Free Water	0	1	$0	4	$8.91	2.000	$2.67	$2	$2
	2	19	$0	0	$8.91	2.000	$2.67	$2	$2
	20	399	$0	1	$8.91	2.000	$2.67	$33	$33
	400	999,999	$0	1	$8.91	2.000	$2.67	$119	$119
Blue Township RWD	0	1	$41	0	$17.83	2.000	$5.34	$0	$41
	2	19	$367	0	$17.83	2.000	$5.34	$1	$368
	20	399	$7,744	0	$17.83	2.000	$5.34	$22	$7,766
	400	999,999	$28,740	0	$17.83	2.000	$5.34	$82	$28,822
Total Rate Rev at Current Rates			$9,041,589			Total Rate Rev at Modeled Rates		$26,192	
Prorated capacity surcharges from Table 10, because minimum charges above do not include them									$1,303
								Total Blended Rate Revenues for the Year [2]	$9,069,084

Note 1, New Minimum Charge Base Rates: Meter size-based minimum charges are being recommended so the amounts shown in this column are only the fixed operating costs portion of your minimum charges. For the full minimum charges to adopt, see Table 10.

Note 2, Blended Rate Revenues: During the year when rates will be adjusted, rate revenues generated will be "blended" revenues - part collected at the current rates and part collected at the adjusted rates. The table above calculates both kinds of revenue and totals them in the right-most column. Therefore, the anticipated timing of rate adjustment shown at the top of this table will cause rates to be charged as follows:

12.0	months at the old user charge rates	and	0.0	months at the new user charge rates.

Manhattan, KS; Sewer Rates Scenario 2016-3 Modeling Results

(Eliminate Usage Allowance)

This document contains the calculations that were performed to arrive at new user rates and fees for the next 10 years. These calculations are complex so key issues are also described in a narrative report that accompanies this model.

This analysis was conducted so as to establish user rates that are adequate to pay all reasonably expectable costs while charging rates that are fairly structured and appropriately simple or complex.

Scenario Description: This analysis model assumes the current method of basing rates on type of customer would be discontinued. Instead, minimum charges would be based on water meter size and unit charges would be the same for all volumes of use for all customers. However, several tables continue to show rates in that structure simple to make rate comparisons "head to head." Out of city customers would still be assessed a surcharged minimum charge.

For most, the best way to read and understand what this model means is this. Scan the "Index of Tables, Charts and Other Results" to see how the model is laid out. Scan the "Definitions" for any terms you are not already familiar with. Read and even ponder Table 1 and the line graph charts. These will show you how the proposed rate adjustments will affect ratepayers and the system. If you need more detail than that, review the entire model. Finally, rate setting involves much more than just rates so you need to read the accompanying narrative report to understand what you need to do and why.

Several tables in this model depict volume usage and user rates for the various customer classes. The model includes a continuum of volumes but many volume categories had no users. Most of these lines have been hidden simply to make the tables less voluminous. However, all volume classes that had use or that are break points for rate blocks are shown. For volume classes that are not shown, rates will be the same as the previous rate that is shown.

September 28, 2016

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Return on Investment

Manhattan, KS; Sewer Rates Scenario 2016-3

The rates depicted in this model will produce various returns on investment or paybacks. Usually the most important payback, at least to ratepayers, is a rate structure that is demonstrably fair. For the system, however, making sure that revenue will be adequate to pay all expected, expectable and many unexpectable costs is the the most important return. If revenue will increase as a result of this analysis, which is almost always the case, one can calculate a return on investment.

The following calculations show what was invested and what the returns will be over two periods; five years and 10 years. Five years is a reasonable period for return projections. Ten years is a good basic planning horizon but you should not bank on amounts or returns projected that far out. Besides, most systems should have their analyses redone long before then.

Consider these key points about return on investment. Higher rates will fund more improvements, better repair and replacement and more. Most increases in revenue end up being used for such expenses. Thus, few systems end up with a dramatic increase in their cash reserves but they do markedly improve their financial position. In addition, fairer and higher rates generally enable systems to qualify for grant and loan funding that they otherwise would not. That increases the importation of "other people's money," which is a drain on the state and federal levels, where the money comes from, but it is very desirable at the utility level.

Also note that rates in this model have been modeled to be adjusted during the year following the test year or even later. That year is included in the first five-year return on investment calculation. Thus, the first year of returns calculated below include most or all of one year where rates will not have been changed yet, lowering the calculated return on investment but not the real rate of return.

Calculations

$10,420	Fees to GettingGreatRates.com
$1,000	Estimated value of system staff time and incidentals to assemble needed information
$11,420	Total Investment for This Analysis
$13,876,844	Five-year Increase in Revenue Due at Least Partly to This Analysis
121508%	Five-year Return on Investment (increase in revenues / investment)
$33,055,390	Ten-year Improvement in Cash Position Due at Least Partly to This Analysis
289440%	Ten-year Return on Investment (increase in revenues / investment)

Table 1 - Modeled Rates

Manhattan, KS; Sewer Rates Scenario 2016-3

Adopt the unit charges shown in this table. However, minimum charges will be based upon the meter size of each customer so assess minimum charges from Table 10 based upon each customer's meter size.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Usage Allowance in 100 Cu Ft	Unit Charge per 100 Cu Ft
In City Res	0	2	0.000	$3.84
	2	20	0.000	$3.84
	20	400	0.000	$3.84
	400	999,999	0.000	$3.84
In City Business	0	2	0.000	$3.84
	2	20	0.000	$3.84
	20	400	0.000	$3.84
	400	999,999	0.000	$3.84
Out City Res	0	2	0.000	$7.68
	2	20	0.000	$7.68
	20	400	0.000	$7.68
	400	999,999	0.000	$7.68
Out City Business	0	2	0.000	$7.68
	2	20	0.000	$7.68
	20	400	0.000	$7.68
	400	999,999	0.000	$7.68
K State?	0	2	0.000	$3.84
	2	20	0.000	$3.84
	20	400	0.000	$3.84
	400	999,999	0.000	$3.84

Table 2 - User Base Data and Operating Incomes

Manhattan, KS; Sewer Rates Scenario 2016-3

This table depicts user statistics, customer growth, and system incomes and across the board "inflationary" style rate increases through the 10th year.

Annual Median Household Income (AMHI)

$42,305	Census Bureau estimate of AMHI for the year:	2013
$30,463	Census Bureau estimate of AMHI for the year:	2000
$11,842	AMHI growth during this time period	
2.99%	Simple annual income growth rate during this time period (used to project incomes into the future)	

Test Year Growth of Customer Base and Average Tap Fee (SDC) Paid per Connection

266	Number of hook ups (new installations) made during the test year
$257	Average hook up fee (SDC) assessed during the test year

The gray highlighted row below shows the rate revenue increase for "This Year" (heading highlighted blue). However, for "This Year," each customer's bill will go up or down based upon how the new rates apply to their actual use and demand. In future years it is assumed that all rates and fees will go up, either by a simple inflationary factor shown on this line or restructured rates that produce this level of income increases.

In the "This Year" column below (heading highlighted blue), revenues will be collected at the now-current rates for the first part of the year and the modeled rates for the last part of the year starting on the date near the top of Table 12. Thus, the revenues shown in the last column of the table are "blended" revenues; part collected at the old rates and part collected at the new rates. It was then assumed that all rate adjustments made after the initial (major) adjustment will be done in time each year so fees can be collected from the first day of each new year at the (annually) adjusted rates.

User Base

(First year balances and incomes are actual, subsequent years are projected.)	Infla./De-flation (–) Factor	Test Year Year Starting 1/1/15	This Year Year Starting 1/1/16	2nd Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
Average Users for the Year	NA	15,277	15,543	15,793	16,043	16,293	16,543	16,793	17,043	17,293	17,543	17,793
New Connections Made During the Year	NA	266.0	266.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
User Growth or Loss Rate	NA	1.74%	1.71%	1.58%	1.58%	1.53%	1.51%	1.49%	1.47%	1.45%	1.43%	1.41%
Rate Increases Projected for Future Years	NA	NA	NA	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

How User Charge Fees Were Calculated, Accounting for New Customers and Future Rate Increases

Test Year Actual, Other Years Calculated Sales Revenues		$9,109,028	$9,386,095	$11,020,668	$11,419,022	$11,831,776	$12,253,587	$12,687,537	$13,133,944	$13,593,132	$14,065,434	$14,551,191
Additional Sales Revenues From New Customers			$160,629	$174,452	$180,758	$181,544	$185,175	$188,879	$192,656	$196,509	$200,439	$204,448
Total Calculated Revenues		$9,109,028	$9,546,725	$11,195,120	$11,599,780	$12,013,320	$12,438,762	$12,876,415	$13,326,600	$13,789,641	$14,265,873	$14,755,639
Operating Incomes												
User Charge Fees	NA	$9,109,028	$9,546,725	$11,195,120	$11,599,780	$12,013,320	$12,438,762	$12,876,415	$13,326,600	$13,789,641	$14,265,873	$14,755,639
Delinquent	NA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
System Development Charge (SDC) or Hook up Fees	% Above	$68,478	$68,478	$0	$0	$0	$0	$0	$0	$0	$0	$0
Meter-size Based SDC Fees (Table 9)	% Above	$0	$0	$374,293	$381,778	$389,414	$397,202	$405,146	$413,249	$421,514	$429,945	$438,543
Investment Interest	NA	$5,509	$4,000	$29,181	$30,291	$31,503	$32,823	$34,073	$35,436	$36,920	$38,328	$39,861
Sewer Fees Revenue Adj. (Included in User Charge Fees Above)	NA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Bluetownship Sewer Revenue at Main Pump Station	NA	$284,060	$298,263	$304,228	$310,312	$316,519	$322,849	$329,306	$335,892	$342,610	$349,462	$356,451
Konza Sewer	NA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Locate Fee	NA	$70,495	$81,294	$83,868	$86,554	$89,336	$92,217	$95,198	$98,288	$101,492	$104,814	$108,260
Gease Management Program	NA	$5,575	$5,000	$5,100	$5,202	$5,306	$5,412	$5,520	$5,631	$5,743	$5,858	$5,975
Farm Income	NA	$56,359	$25,000	$25,000	$25,000	$25,000	$25,000	$25,001	$25,002	$25,003	$25,004	$25,005
Reimbursement of Expenses/Other	NA	$22,273	$24,367	$24,921	$25,426	$25,950	$26,493	$27,053	$27,634	$28,237	$28,864	$29,515
Miscellaneous	NA	$40,354	$10,000	$10,000	$10,000	$10,000	$10,000	$10,001	$10,002	$10,003	$10,004	$10,005
Cancel by Encumbrances	NA	$450	$0	$0	$0	$0	$0	$1	$2	$3	$4	$5
Total Operating Incomes		$9,662,582	$10,063,127	$12,051,710	$12,474,344	$12,906,347	$13,350,759	$13,807,716	$14,277,736	$14,761,167	$15,258,156	$15,769,260

Table 3 - Operating Costs and Net Income

Manhattan, KS; Sewer Rates Scenario 2016-3

This table depicts expenses during the test year and for the next 10 years.
("Test Year" costs and net incomes are actual, subsequent years are budgeted or projected.)

	Infla./De-flation (–) Factor	Test Year Year Starting 1/1/15	This Year Year Starting 1/1/16	2nd Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
(Note: Some future costs will experience inflation. Those costs that go up as use goes up are also increased by the growth rate in users and the percentage by which that cost is variable as reported in Chart 4.)												
Administration-All Functions	4.0%	$623,520	$648,461	$674,399	$701,375	$729,430	$758,607	$788,951	$820,510	$853,330	$887,463	$922,962
All Operations Staff and Related Expenses	4.0%	$2,357,957	$2,452,276	$2,550,367	$2,652,381	$2,758,477	$2,868,816	$2,983,568	$3,102,911	$3,227,028	$3,356,109	$3,490,353
Blue Township	4.0%	$27,772	$28,882	$30,038	$31,239	$32,489	$33,788	$35,140	$36,545	$38,007	$39,528	$41,109
Blue Township Treatment	4.0%	$1,232	$1,281	$1,333	$1,386	$1,441	$1,499	$1,559	$1,621	$1,686	$1,754	$1,824
BLUE TOWNSHIP EXPENSES	4.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Building Maintenance	4.0%	$1,489	$1,549	$1,611	$1,675	$1,742	$1,812	$1,885	$1,960	$2,038	$2,120	$2,205
Equipment Maintenance	4.0%	$106,966	$111,245	$115,695	$120,323	$125,136	$130,141	$135,347	$140,760	$146,391	$152,247	$158,336
Gas, Electric, Chemicals, Lime, Similar Variable Costs	4.0%	$676,363	$703,417	$731,554	$760,816	$791,249	$822,899	$855,815	$890,047	$925,649	$962,675	$1,001,182
Infrastructure and Infrastructure Maintenance	4.0%	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Laboratory Costs	4.0%	$15,824	$16,457	$17,115	$17,800	$18,512	$19,253	$20,023	$20,824	$21,657	$22,523	$23,424
LIFTSTATION TELECOMMUNICATION	4.0%	$7,224	$7,513	$7,814	$8,126	$8,451	$8,789	$9,141	$9,507	$9,887	$10,282	$10,694
MOTOR VEHICLES	4.0%	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Postage, Trash, Computers and Software, Similar Fixed Costs	4.0%	$32,628	$33,933	$35,291	$36,702	$38,170	$39,697	$41,285	$42,937	$44,654	$46,440	$48,298
Professional Services, Legal, Planning Studies	4.0%	$1,168	$1,215	$1,264	$1,314	$1,367	$1,422	$1,478	$1,538	$1,599	$1,663	$1,730
PROJECT PAY-OFF	4.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PUMP STATION MAINTENANCE	4.0%	$41,381	$43,036	$44,757	$46,548	$48,410	$50,346	$52,360	$54,454	$56,632	$58,898	$61,254
TRANSFER TO CAPITAL PROJECT	4.0%	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Transfer to Debt Service	4.0%	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
TRANSFER TO GENERAL FUND	4.0%	$1,214,028	$1,262,590	$1,313,093	$1,365,617	$1,420,241	$1,477,051	$1,536,133	$1,597,579	$1,661,482	$1,727,941	$1,797,059
TRANSFER TO SPEC REVENUE	4.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TRANSFER TO TRUST & AGENCY	4.0%	$62,000	$64,480	$67,059	$69,742	$72,531	$75,432	$78,450	$81,588	$84,851	$88,245	$91,775
Utility Location-All Functions and One-Call	4.0%	$74,990	$77,989	$81,109	$84,353	$87,728	$91,237	$94,886	$98,682	$102,629	$106,734	$111,003
WWTP Expansion	4.0%	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
2003 WWTP & Biosolids Farm Imp.	4.0%	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
User Charge Analysis Services	5.0%	$0	$10,420	$0	$0	$11,489	$0	$0	$12,666	$0	$0	$13,964
0	N.A.	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4	Table 4
Total Operating Costs		$5,334,435	$5,558,232	$5,769,724	$6,000,513	$6,252,022	$6,490,155	$6,749,761	$7,032,418	$7,300,542	$7,592,564	$7,910,231
Net Operating Income (or Loss)		$4,328,148	$4,504,894	$6,281,985	$6,473,830	$6,654,324	$6,860,603	$7,057,954	$7,245,318	$7,460,625	$7,665,592	$7,859,030
Working Capital Goal: 35% In Dollars, That is:		$1,867,052	$1,945,381	$2,019,404	$2,100,180	$2,188,208	$2,271,554	$2,362,417	$2,461,346	$2,555,190	$2,657,397	$2,768,581

Table 4 - Capital Improvement Program

Manhattan, KS; Sewer Rates Scenario 2016-3

This table depicts capital improvements and their funding. Costs reflect inflation.

	This Year	Next Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year
	Year Starting	Year Starting	Year Starting	Year Starting	Year Starting	Year Starting	Year Starting	Year Starting	Year Starting	Year Starting
	1/1/15	1/1/16	1/1/17	1/1/18	1/1/19	1/1/20	1/1/21	1/1/22	1/1/23	1/1/24	1/1/25
CIP Spending Plan	Note: The utility has, and will continue to pay for certain improvements with debt financing. However, in order to make this table match the utility's financial statements, all system improvement, refurbishment and repair and replacement costs have been listed in the next section just as they appear in the utility's statements.										
Capital Improvements to be Paid With Debt											
Total Capital Improvements to be Paid With Debt	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Improvements to be Paid With Cash	Note: All system improvement, refurbishment and repair and replacement costs, including debt payments made to fund some of those improvements, have been listed in this section just as they appear in the utility's statements.										
KDHE Loan											
2001 WWTP & Biosolids Farm Imp.	$592,463	$592,463	$592,463	$592,463	$592,463	$592,463	$592,463	$592,463	$0	$0	$0
WWTP Upgrade & Expansion Engineering	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
,36,732,684.05 $ WWTP Upgrade and Expansion Const./Insp	$2,302,592	$2,302,592	$2,302,592	$2,302,592	$2,302,592	$2,302,592	$2,302,592	$2,302,592	$2,302,592	$2,302,592	$2,302,592
Blue Township Improvements (New Loan) (SS1001)	$89,891	$89,891	$89,891	$89,891	$89,891	$89,891	$89,891	$89,891	$89,891	$89,891	$89,891
TRANSFER TO DEBT SERVICE/ 10 Year Bonding											
521-7400-493.90-20											
Highland Meadows	$75,800	$78,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
North 4th St. Sanitary Sewer, (bonded in November 2009)	$104,100	$101,400	$103,700	$100,850	$103,000	$0	$0	$0	$0	$0	$0
Siphon Odor control SP0702,(bonded in November 2009)	$51,900	$50,550	$49,200	$47,850	$51,500	$0	$0	$0	$0	$0	$0
Lee Mill Village Lift Station (City-at-Large)	$23,000	$22,400	$21,800	$21,200	$20,600	$0	$0	$0	$0	$0	$0
Konza Basin Imp. SS1002 (bond Nov2010)	$58,575	$57,575	$61,325	$59,950	$58,300	$56,650	$0	$0	$0	$0	$0
Wildcat Creek Lift Station, Phase I, Pump Rep.SP0604(Nov2010 bond)	$93,950	$97,350	$95,225	$93,100	$95,550	$97,850	$0	$0	$0	$0	$0
Smith Street and Manfax Avenue(bonded in May-2011)	$58,700	$62,700	$61,600	$60,500	$59,400	$58,025	$56,650	$0	$0	$0	$0
Wildcat Ridge Sanitary Sewer System Replacement,SS1308,SS1307 900 block of Old Claflin Sanitary Sewer Line Replacement,SS1307	$0	$0	$0	$58,600	$62,000	$55,200	$58,600	$56,800	$55,000	$58,200	$56,200
Wildcat Lift Station Ph 2, Pump Replacement, WW016P	$0	$0	$0	$126,600	$133,200	$129,400	$125,600	$126,800	$127,800	$128,600	$129,200
Central Basin Imp., WW010P	$0	$0	$0	$24,732	$154,000	$154,250	$154,250	$154,000	$153,500	$152,750	$151,750
Northview Sewer Imp.(2015-2016), WW003P	$0	$0	$0	$0	$13,665	$100,600	$100,880	$100,040	$100,120	$100,080	$100,920
WWTP Mechanical, Electrical and Plumbing Replacement and Upgrade (2017), WW179E	$0	$0	$0	$0	$0	$22,216	$168,000	$163,400	$163,800	$164,000	$164,000
WWTP Pumping Station Pump Replacement and Upgrade (2018), WW178E	$0	$0	$0	$0	$0	$0	$27,330	$205,200	$199,600	$199,000	$203,200
Seth Child Sanitary Sewer Interceptor Improvement (2018), WW159P	$0	$0	$0	$0	$0	$0	$52,146	$384,400	$384,000	$383,200	$382,000
Meadownbrook & Wreath Avenue Sewer Improvement (2020), WW158P	$0	$0	$0	$0	$0	$0	$0	$0	$57,595	$427,400	$425,800

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TRANSFER TO CAPITAL PROJECT/ 4 Year TN 521-7400-493.90-25											
DAFT Upgrade , SS1402	$27,212	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWTP EXPANSION	$29,017	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
WESTERN INT RELIEF SEWER	$18,608	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Candlewood Inn & Suites - Parking Lot, ST1208	$49,893	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Arbor-Sewer Reloacation-SS1108-K-18 ph.4	$68,758	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sunnyslope Lane and 10th Street Sanitary Sewer Improvements, WW162E	$0	$0	$60,000	$0	$0	$0	$0	$0	$0	$0	$0
WWTP Storage Building, WW149P	$0	$0	$150,000	$0	$0	$0	$0	$0	$0	$0	$0
Update Zoning and Subdivision Regulations	$0	$0	$35,000	$0	$0	$0	$0	$0	$0	$0	$0
Eureka Valley Commercial Sewer Improvements (Airport Terminal Section) SS1401	$78,779	$77,283	$76,428	$0	$0	$0	$0	$0	$0	$0	$0
West Anderson Avenue Improvements EN084P	$0	$100,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
17th and Houston Sanitary Sewer CAL, SS1204	$0	$85,165	$0	$0	$0	$0	$0	$0	$0	$0	$0
FBO Sanitary, SS1409	$0	$134,088	$0	$0	$0	$0	$0	$0	$0	$0	$0
Utility Maintenance Facility - 11 Bay Garage WA138P	$0	$40,000	$40,000	$40,000	$40,000	$0	$0	$0	$0	$0	$0
Wildcat Creek Lift Station, Ph 2A (Bank Stabilization)(2016),SS1424	$0	$0	$73,938	$72,188	$71,313	$70,438	$0	$0	$0	$0	$0
West Anderson Ave. Interceptor Extension (2016), WW026P	$0	$0	$142,828	$144,375	$142,625	$126,788	$0	$0	$0	$0	$0
Rebuild WWTP Clarifier No. 3 (2018), WW062E	$0	$0	$0	$0	$132,109	$133,938	$127,344	$125,781	$0	$0	$0
7000 - General Administration 521-7000-491.73-25											
Upgrade/Replace Main File Server& &HQ Fire Station Server	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Network Backup/Disaster Recovery Solution (BDR) (IS040E)	$0	$16,250	$12,500	$12,500	$12,875	$12,875	$13,262	$0	$0	$0	$0
LIDAR Update Plus Software Update	$12,973	$0	$0	$0	$0	$0	$0	$0	$4,000	$0	$0
Disc Backup For ISeries/AS400	$0	$3,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Replace 2007 GPS Base Station and GPS Rover, EN067E	$0	$12,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
City Commission Room Projectors,IS049P	$0	$0	$2,500	$0	$0	$0	$0	$0	$0	$0	$0
Large Format Scanner/Plotter Replace EN056	$0	$0	$3,750	$0	$0	$0	$0	$0	$0	$0	$0
Public Works Replacement Server (COM GIS) ,EN079P	$0	$0	$5,000	$0	$0	$0	$0	$0	$0	$0	$0
Midrange Computer System Upgrade, IS001E	$0	$0	$0	$13,500	$0	$0	$0	$0	$0	$0	$0
Update/Replace Firewall	$0	$0	$0	$8,333	$0	$0	$0	$0	$0	$0	$0
2007 Robotic Total Station - Survey Equipment-Replace,EN011E	$0	$0	$0	$10,500	$0	$0	$0	$0	$0	$0	$0
SunGard PS Upgrade or Replace	$0	$0	$0	$0	$0	$15,000	$0	$0	$0	$0	$0

Table 4 - Capital Improvement Program

	Year Starting 1/1/15	This Year Year Starting 1/1/16	Next Year Year Starting 1/1/17	3rd Year Year Starting 1/1/18	4th Year Year Starting 1/1/19	5th Year Year Starting 1/1/20	6th Year Year Starting 1/1/21	7th Year Year Starting 1/1/22	8th Year Year Starting 1/1/23	9th Year Year Starting 1/1/24	10th Year Year Starting 1/1/25
521-7000-491.75-45											
Costs of Services and WW Facilities Plant Update	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
W. Anderson Improvements Plans And Specification Revisions	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Feasibility Study For New Public Works Street And Fleet And Parks Maintenance And Forestry Division	$0	$22,500	$0	$0	$0	$0	$0	$0	$0	$0	$0
7700 - Treatment											
521-7700-493.72-05											
Highland Meadows And Stone Point Lift Station Platforms,WW151P	$0	$30,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Overlay Entrance Road to the Wastewater Treatment Plant, WW073P	$0	$0	$0	$0	$100,000	$0	$0	$0	$0	$0	$0
Replace Roof Coatings - WWTP Facilities, WW089E	$0	$0	$0	$0	$150,000	$0	$0	$0	$0	$0	$0
521-7700-493.73-10											
Biosolids Tractor Tracks	$16,263	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0
WWTP DAF Air Compressor, WW155P	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWTP Pump/Motor Shaft Laser Alignment Tool, WW154P	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWTP Aeriation Basin Diffuser Replacement Project	$0	$0	$150,000	$0	$0	$0	$0	$0	$0	$0	$0
Replace WWTP Laboratory Equipment, WW084E	$0	$0	$50,000	$0	$0	$0	$0	$0	$0	$0	$0
Eureka Valley Lift Station Ozone Odor Control System Replacement, WW169E	$0	$0	$40,000	$0	$0	$0	$0	$0	$0	$0	$0
Replace 660 feet of 4 1/2" application hose for the Biosolids Tractor,WW071E	$0	$0	$0	$10,000	$0	$0	$0	$0	$0	$0	$0
Replace the Caterpillar Engine & Pump at the Biosolids Farm, WW087E	$0	$0	$0	$25,000	$0	$0	$0	$0	$0	$0	$0
Replace 1998 Gidings Soil Core Drilling machine at the Biosolids Farm,WW079E	$0	$0	$0	$20,000	$0	$0	$0	$0	$0	$0	$0
Replace 1989 John Deere 1250 Tractor,WW059E	$0	$0	$0	$50,000	$0	$0	$0	$0	$0	$0	$0
Replace the 1998 John Deere 450 Crawler Tractor with a Tracked Tractor and New Application Plow,WW090E	$0	$0	$0	$275,000	$0	$0	$0	$0	$0	$0	$0
Replace John Deere Gator(Biosolids), WW054E	$0	$0	$0	$10,000	$0	$0	$0	$0	$0	$0	$0
WWTP Clarifier Launder Covers, WW168P	$0	$0	$0	$30,000	$30,000	$30,000	$0	$0	$0	$0	$0
WWTP Biosolids Farm Electrical Service, WW167	$0	$0	$0	$20,000	$20,000	$20,000	$0	$0	$0	$0	$0
WWTP Bar Screen and Step Screen Improvements , WW166E	$0	$0	$0	$0	$75,000	$0	$0	$0	$0	$0	$0
WWTP Training Room AV Equipment, WW150E	$0	$0	$0	$0	$15,000	$0	$0	$0	$0	$0	$0
Replace 2007 John Deere 2305 Commercial Tractor, WW060E	$0	$0	$0	$0	$15,000	$0	$0	$0	$0	$0	$0
Replace 2004 Vintage Biosolids Dredge, WW092E	$0	$0	$0	$0	$225,000	$0	$0	$0	$0	$0	$0
WWTP Portable Emergency Bypass Pump, WW152E	$0	$0	$0	$0	$0	$50,000	$0	$0	$0	$0	$0
WWTP Pump Station Sump Pump Replacement , WW165E	$0	$0	$0	$0	$0	$40,000	$0	$0	$0	$0	$0

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521-7700-493.75-05											
WWTP Maintenance	$196,321	$200,000	$206,000	$212,180	$218,545	$225,102	$231,855	$238,810	$245,975	$253,354	$260,955
WWTP FILTER REPLACEMENT SS1410	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
SCENIC MEADOWS #3,PH 3 , ST1421	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tattarax Hills Grinder Pump Station Improvements, WW127E/SS1505	$55,470	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWTP Biosolids Farm Lagoon Desludging, WW153P	$0	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Replace Davis Lift Station, WW132E	$0	$63,880	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rebuild WWTP and Lift Station Pumps, Motors and Blowers, WW085E	$0	$50,000	$0	$50,000	$0	$50,000	$0	$50,000	$0	$50,000	$0
Replacement of U.V bulbs and equipment maintenance	$0	$30,000	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0
Replace Transfer Station Lift Station, WW133E	$0	$0	$0	$70,000	$0	$0	$0	$0	$0	$0	$0
521-7700-493.75-25											
Wastewater Treatment Plant Door and Window Replacement Project, WW128P	$63,429	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
521-7700-493.75-45											
Water And Wastewater Facilities Master Plan Update	$0	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWTP Maximum Headworks Loading Analysis, WW164P	$0	$0	$40,000	$0	$0	$0	$0	$0	$0	$0	$0
521-7700-493.79-25											
WWTP SCADA System Computer & Software Upgrade,WW145P	$0	$60,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
7800 - Maintenance											
521-7800-493.70-05											
Water & Sewer Maintenance Facility - Demolish Fire Station Hose Tower,WA149P	$0	$12,500	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water and Sewer Maintenance Facility - Replace Roof Coatings	$0	$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
521-7800-493.72-05											
Flush Tank Elimination Project, SS1407	$1,840	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Sanitary Sewer Crossings and Supports Replacement, WW099P	$0	$0	$75,000	$75,000	$0	$0	$0	$0	$0	$0	$0
Poyntz Avenue (1900 Block) Sanitary Sewer , WW161E	$0	$0	$0	$0	$50,000	$0	$0	$0	$0	$0	$0
521-7800-493.72-25											
Sewer Inflow Prevention (CIPP)	$374,348	$458,000	$473,000	$487,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
521-7800-493.73-10											
Utility Cut, Skid Steer 1/2 of the cost ,WA131E	$25,041	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sewer Maintenance Easement Machine,WW139P	$0	$60,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Sewer Main Acoustic Rapid Assessment Tool, WW176E	$0	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Sewer CCTV Truck Technology Upgrade, WW140E	$0	$0	$0	$0	$30,000	$0	$0	$0	$0	$0	$0

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521-7800-493.75-05											
Manhole Rehab	$53,800	$55,000	$55,000	$55,000	$55,000	$55,000	$55,000	$55,000	$55,000	$55,000	$55,000
Casement Interceptor Sewer - Large Line Cleaning And Inspection,WW142P	$0	$0	$150,000	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Sewer Blind Connection Removal Project, WW141p	$0	$0	$60,000	$0	$60,000	$0	$0	$0	$0	$0	$0
Manhole Lid and Frame Replacement Program	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$0	$0	$0	$0	$0
Large Line Cleaning	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Sewer Maintenance	$42,407	$50,000	$100,000	$103,000	$106,090	$109,273	$112,551	$115,927	$119,405	$122,987	$126,677
521-7800-493.75-45											
Sewer Maintenance and I & I Reduction Program Analysis ,WW163P	$0	$0	$50,000	$0	$0	$0	$0	$0	$0	$0	$0
Vehicles											
7000 - Administration											
2016 1/2 Ton, 2WD Regular Cab Truck (Stormwater Officer), SW074E	$0	$7,250	$0	$0	$0	$0	$0	$0	$0	$0	$0
Replace 2007 1/2 Ton, 2WD, Regular Cab Truck (Unit #37)(Electrician), WA158E	$0	$0	$15,000	$0	$0	$0	$0	$0	$0	$0	$0
Replace 2011 1/2 Ton, 2WD, Regular Cab Truck (Unit #209)(Electrician), WW172E	$0	$0	$0	$0	$0	$0	$15,000	$0	$0	$0	$0
7700 - Treatment											
Replace 2001 1/2 Ton, 2WD, Regular Cab Truck (Unit #59)(Environmental Compliance), WW116E	$0	$20,500	$0	$0	$0	$0	$0	$0	$0	$0	$0
New 1/2 Ton, 2WD, Regular Cab Truck (Unit #TBD)(Instrumentation Technician) ,WW160E	$0	$0	$10,500	$0	$0	$0	$0	$0	$0	$0	$0
Replace 2007 1/2 Ton, 4WD, Regular Cab Truck (Unit #91)(Biosolids Tech), WW088E	$0	$0	$0	$0	$20,000	$0	$0	$0	$0	$0	$0
Replace 2010 1 Ton, 4WD, Regular Cab Truck with Flatbed (Unit# 198)(Lift Station Tech), WW171E	$0	$0	$0	$0	$0	$30,000	$0	$0	$0	$0	$0
Replace 2012 3/4 Ton, 4WD,Extended Cab Truck (Unit #90)(Mechanics Truck), WWXXXE	$0	$0	$0	$0	$0	$0	$0	$25,000	$0	$0	$0
Replace 2014 Crossover SUV (Unit #3) (Superintendent-Replace with Truck), WWXXXE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$0
7800 - Maintenance											
Replace 1999 Sewer Jet Machine (Unit #537)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2015 1/2 2WD Regular Cab Truck (Unit #XXX)(Engeering Project Coordinator, EN066E	$5,375	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2015 Tandem Axle Dump (Unit #283), WA130E	$51,994	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Replace 2005 One Ton, 4WD, Regular Cab Truck with Flatbed Dump (Unit #26), WW055E	$0	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Replace 2005 VactorTruck , (Unit #155), WW056E	$0	$0	$0	$275,000	$0	$0	$0	$0	$0	$0	$0
Replace 2010 1/2 Ton, 2WD, Extended Cab Truck (Unit #50)(Utility Locates), WW106E	$0	$0	$0	$20,000	$0	$0	$0	$0	$0	$0	$0
2015 CCTV Truck (Unit #52), WW004E	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Replace 2010 1/2 Ton, 2WD, Regular Cab Truck (Unit #178)(Crew Leader/Supervisor), WW170E	$0	$0	$0	$0	$0	$20,000	$0	$0	$0	$0	$0

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Replace 2010 1/2 Ton, 4WD Extended Cab Truck (Unit #51)(Superintendent), WW107E	$0	$0	$0	$0	$0	$22,000	$0	$0	$0	$0	$0
Replace 2010 One Ton, 4WD, Regular Cab Truck with Flatbed Dump (Unit #191), WW108E	$0	$0	$0	$0	$0	$65,000	$0	$0	$0	$0	$0
Replace 2011 Truck-Mounted Sewer Jet (Unit #53), WW072E	$0	$0	$0	$0	$0	$0	$200,000	$0	$0	$0	$0
Replace 2012 One Ton, 4WD, Regular Cab Truck with Flatbed Dump (Unit #55), WW001E	$0	$0	$0	$0	$0	$0	$0	$35,000	$0	$0	$0
Replace 2015 Truck-Mounted Sewer Jet (Unit #282), WWXXXE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$200,000
TBD CIP Projects and Early Debt Retirement			$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Total Cap Improvements to be Paid With Cash	$4,637,499	$5,542,337	$6,584,240	$6,746,904	$6,854,719	$6,284,550	$6,008,415	$6,346,106	$5,583,279	$6,032,055	$6,173,185
Total CIP Spending, Cash and Debt	$4,637,499	$5,542,337	$6,584,240	$6,746,904	$6,854,719	$6,284,550	$6,008,415	$6,346,106	$5,583,279	$6,032,055	$6,173,185
CIP Funding Plan (Disregard KDHE loans and other outside sources because City staff have already reduced such sources to annual payments, shown in the next section below.)											
CIP and Debt Service Reserves Starting Balance	$0	$988,562	-$97,553	-$476,756	-$844,909	-$1,158,679	-$700,733	$236,922	$1,044,312	$2,859,144	$4,476,248
Working Capital Transferred to CIP and Debt Service Reserves	$5,626,061	$4,426,565	$6,207,963	$6,393,054	$6,566,296	$6,777,257	$6,967,092	$7,146,388	$7,366,781	$7,563,385	$7,747,846
CIP and Debt Service Reserves Interest Earned (or Paid)	$0	$29,657	-$2,927	-$14,303	-$25,347	-$34,760	-$21,022	$7,108	$31,329	$85,774	$134,287
Total CIP Reserve and Income Sources	$5,626,061	$5,444,784	$6,107,484	$5,901,995	$5,696,040	$5,583,817	$6,245,337	$7,390,418	$8,442,423	$10,508,303	$12,358,382
CIP Debt Payment Plan											
(Debt payments are listed in the "Capital Improvements to be Paid With Cash" subsection above)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Debt Payments	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total CIP Spending, Cash and Debt	$4,637,499	$5,542,337	$6,584,240	$6,746,904	$6,854,719	$6,284,550	$6,008,415	$6,346,106	$5,583,279	$6,032,055	$6,173,185
CIP and Debt Service Reserves Balance	$988,562	-$97,553	-$476,756	-$844,909	-$1,158,679	-$700,733	$236,922	$1,044,312	$2,859,144	$4,476,248	$6,185,197

Notes: The City plans many improvement projects over the next 10 years and equipment repair and replacements over the next 20 years. These costs were incorporated into this schedule. Because this schedule includes very little detail about these projects, refer to the City's plans and projections for details on these projects.

Table 5 - Capacity Cost; Its Amount and How it Will be Recovered

Manhattan, KS; Sewer Rates Scenario 2016-3

This table shows tap and capacity costs to expect. From these costs, tap fees and capacity demand charges will be developed in Table 5 and Table 8, respectively.

(First year figures are actual, subsequent years are projected.)	Infla./De-flation (–) Factor	Year Starting 1/1/15	Year Starting 1/1/16	Year Starting 1/1/17	Year Starting 1/1/18	Year Starting 1/1/19	Year Starting 1/1/20	Year Starting 1/1/21	Year Starting 1/1/22	Year Starting 1/1/23	Year Starting 1/1/24	Year Starting 1/1/25
Tap Fee Revenues												
Customers (Taps) Added During the Year		266	266	250	250	250	250	250	250	250	250	250
Weighted Average Fee per New Tap	2.0%	$257	$257	$1,497	$1,527	$1,558	$1,589	$1,621	$1,653	$1,686	$1,720	$1,754
Total Tap Fee Revenues	N.A.	$68,478	$68,478	$374,293	$381,778	$389,414	$397,202	$405,146	$413,249	$421,514	$429,945	$438,543
Operating Costs Associated With Making New Connections												
Field Costs for New Connections	4.0%	$13,300	$13,566	$13,005	$13,265	$13,530	$13,801	$14,077	$14,359	$14,646	$14,939	$14,939
Administration Costs	4.0%	$6,650	$6,783	$6,503	$6,633	$6,765	$6,901	$7,039	$7,179	$7,323	$7,469	$7,469
Total Direct Costs for New Connections		$19,950	$20,349	$19,508	$19,898	$20,296	$20,702	$21,116	$21,538	$21,969	$22,408	$22,408
Net Tap Fee Revenues												
Revenues Net of Operating Costs		$48,528	$48,129	$354,785	$361,881	$369,118	$376,501	$384,031	$391,711	$399,546	$407,537	$416,135
Cum Rev Net of Operating Costs		$48,528	$96,657	$451,442	$813,323	$1,182,441	$1,558,942	$1,942,973	$2,334,684	$2,734,230	$3,141,767	$3,557,902
Capital Costs Attributable to Growth and Capacity Development (Debt Service, Cash-paid Capital Improvements and/or Depreciation)												
20-year Avg Debt Service and Cash-paid CIP for Capacity Upgrades Attributable to New Capacity Demand	57.94%	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290
Annualized Capacity Cost (Depreciation)		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sum of Capital Costs for Capacity		$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290	$1,802,290
Target % to Recover From System Development Charges	20.50%											
Target % to Recover From System Development Surcharges to the Minimum Charge	79.50%											

Note: These costs should be recovered by fees charged for making new taps (usually called, "tap fees") regardless of the demand capacity (commonly meter size) of each new tap made.

Note: Connection charges should almost always cover at least the operating costs to make connections. Thus, cumulative revenues net of operating costs (immediately above) should be positive. If they are negative, you are subsidizing new taps.

Note: Capacity and connection costs WILL be recovered in one way by default, or a combination of ways by design: through regular user fees, in which case existing customers pay the costs to bring on new customers; through "tap" or system development charge fees, in which case new customers pay "up front" for the costs they cause the system to incur; through on-going demand or system development surcharges to the minimum charge, preferably based upon meter or connection size, in which case all customers pay for the capacity costs they cause over time; or some combination of these.

Table 6 - Financial Capacity Indicators and Reserves

Manhattan, KS; Sewer Rates Scenario 2016-3

This table depicts the affordability of future rates, the financial health of the system and the ending balances in various accounts for the test year and the next 10 years.

Capacity Indicators	Year Starting 1/1/15	Year Starting 1/1/16	Year Starting 1/1/17	Year Starting 1/1/18	Year Starting 1/1/19	Year Starting 1/1/20	Year Starting 1/1/21	Year Starting 1/1/22	Year Starting 1/1/23	Year Starting 1/1/24	Year Starting 1/1/25
Equivalent Final Monthly Bill for a 5,000 gal per Month Residential User	$35.11	$36.63	$37.36	$38.10	$38.87	$39.64	$40.44	$41.25	$42.07	$42.91	$43.77
Annual Median Household Income (AMHI)	$42,305	$43,570	$44,873	$46,215	$47,597	$49,020	$50,486	$51,995	$53,550	$55,151	$56,801
Affordability Index: Current Rates First Column, Then Proposed Rates	1.00%	1.01%	1.00%	0.99%	0.98%	0.97%	0.96%	0.95%	0.94%	0.93%	0.92%
Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the percent of AMHI needed by a 5,000 gallon per month residential user to pay their bill. Rates near 1.0% are common in the U.S. and are generally considered affordable. Federal grant agencies generally will not consider awarding grants if this indicator is less than 2.0%.											
Estimated Operating Ratio: Current Rates First Column, Then Proposed Rates	0.94	0.81	0.95	0.95	0.97	1.09	1.16	1.13	1.26	1.22	1.21
1.0 is break even for Operating Ratio. Below 1.0 indicates operating in the "red." Generally, the operating ratio should be at least 1.15 for large systems, 1.30 or more for medium systems and perhaps as high as 2.0 for small systems.											
Estimated Coverage Ratio: Current Rates First Column, Then Proposed Rates	-0.07	-0.19	-0.05	-0.04	-0.03	0.09	0.17	0.14	0.34	0.27	0.27
Coverage Ratio applies only to years with debt service. 1.0 is break even. Generally, the coverage ratio should be at least 1.25.											

Reserves	Balance Ending on 12/31/14	Balance Ending on 12/31/15	Balance Ending on 12/31/16	Balance Ending on 12/31/17	Balance Ending on 12/31/18	Balance Ending on 12/31/19	Balance Ending on 12/31/20	Balance Ending on 12/31/21	Balance Ending on 12/31/22	Balance Ending on 12/31/23	Balance Ending on 12/31/24	Balance Ending on 12/31/25
Current Position	$3,164,965	$1,867,052	$1,945,381	$2,019,404	$2,100,180	$2,188,208	$2,271,554	$2,362,417	$2,461,346	$2,555,190	$2,657,397	$2,768,581
Total Cash Assets (Excluding Dedicated Reserves) Before Inflation	$3,164,965	$1,867,052	$1,945,381	$2,019,404	$2,100,180	$2,188,208	$2,271,554	$2,362,417	$2,461,346	$2,555,190	$2,657,397	$2,768,581
Total Cash Assets (Excluding Dedicated Reserves) Discounted for Inflation (Future Unrestricted Purchasing Power)	$3,164,965	$1,867,052	$1,945,381	$1,979,015	$2,017,013	$2,059,524	$2,095,209	$2,135,437	$2,180,365	$2,218,225	$2,260,815	$2,308,298
CIP and Debt Service Reserves	$0	$988,562	-$97,553	-$476,756	-$844,909	-$1,158,679	-$700,733	$236,922	$1,044,312	$2,859,144	$4,476,248	$6,185,197
Sum of All Reserves	$3,164,965	$2,855,614	$1,847,829	$1,542,647	$1,255,271	$1,029,528	$1,570,821	$2,599,339	$3,505,658	$5,414,334	$7,133,645	$8,953,778

Table 7 - Bill Comparisons Before and After Rate Adjustments

Manhattan, KS; Sewer Rates Scenario 2016-3

This table compares bills for various volumes at the current rates and billing frequency with what the same volumes would cost at the equivalent modeled rates for that same billing frequency. (An "apples to apples" comparison.) Minimum charge surcharges were calculated for these same classes of users and these bills include those surcharges. However, not all meter sizes are shown.

Note: The weighted-average bill increase for all customers combined will be: 17.8%

Customer or Rate Class, or Meter Size	100 Cu Ft of Use	Customers Above This Volume and Below Next	Cumulative Customers	Current Bill	Modeled Bill	Bill Increase or Decrease (-)	Percent Increase or Decrease (-)
In City Res, Assuming 3/4 Inch Meter	0	1,820	1,820	$20.60	$10.96	-$9.64	-47%
	2	11,431	13,251	$20.60	$18.64	-$1.96	-10%
	20	63	13,314	$76.37	$87.76	$11.38	15%
	400	2	13,316	$1,253.86	$1,546.89	$293.04	23%
In City Business, Assuming 1.5 Inch Meter	0	366	366	$20.60	$24.09	$3.50	17%
	2	669	1,036	$20.60	$31.77	$11.18	54%
	20	698	1,734	$76.37	$100.89	$24.52	32%
	400	19	1,753	$1,253.86	$1,560.03	$306.17	24%
Out of City Residential, Assuming 3/4 Inch Meter	0	6	6	$30.89	$16.44	-$14.46	-47%
	2	166	172	$30.90	$31.80	$0.91	3%
	20	1	173	$114.56	$170.04	$55.48	48%
	400	1	174	$1,880.78	$3,088.31	$1,207.53	64%
Out City Business, Assuming 1.5 Inch Meter	0	20	20	$30.89	$36.14	$5.24	17%
	2	10	30	$30.90	$51.50	$20.61	67%
	20	5	35	$114.56	$189.74	$75.18	66%
	400	0	35	$1,880.78	$3,108.01	$1,227.23	65%

Table 8 - User Statistics

Manhattan, KS; Sewer Rates Scenario 2016-3

This table shows measures of equitability of the rates as modeled in Table 11.

If your rates are absolutely proportional to use on a volumetric basis, your % of usage and % of revenues figures will be the same within all the classes. That is not possible if you have any minimum charge and having no minimum charge is almost unheard of.

Normally, the % of usage figure will be lower than the % of revenue for the lower volumes of use. That will switch for the higher volumes of use. Even for declining rate structures, this switch should occur near the volume of the average residential user, typically near 5,000 gallons/month (668 cu ft).

In urban and suburban areas the average monthly use for residential or general customers can be twice that used by their rural and "old town" counterparts. Use is largely dependent upon who lives in a community. Older people living in longer established neighborhoods tend to use less volume than younger people living in more recently developed areas. As you make comparisons between different customers and customer classes, keep that, and the following in mind:

8 in 100 Cu Ft Billable units - This is the average residential customer's usage per Monthly billing cycle.

Usage allowance is the volume "given away" with the minimum charge. The higher the allowance, the less volume the utility can sell to generate income.

2,129,613 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was available to be sold by the utility during the test year.

351,814 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was given away as a usage allowance during the test year.

$1,065,678 At the unit charge rate in effect during the test year, this was what it cost the utility to give away this volume.

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Average Volume Used Within Each Volume Range in 100 Cu Ft	Total Annual Use Within Each Volume Range in 100 Cu Ft	Customers Within This Volume Range	% Users	% Usage	Cumulative Use in This Class From Low to High Volume	Cumulative Use in This Class From High to Low Volume	% Revenue at Current Rates	% Revenue at Modeled Rates
In City Res	0.000	2.000	1.936	309,430.7	1,820.0	11.9%	14.5%	25.3%	100.0%	4.8%	13.9%
	2.001	20.000	4.379	604,134.9	11,431.3	74.8%	28.4%	74.6%	74.7%	50.2%	34.7%
	20.001	400.000	18.712	14,520.8	62.7	0.4%	0.7%	75.8%	25.4%	0.6%	0.6%
	400.001	999,999.000	12,364.999	296,760.0	2.0	0.0%	13.9%	100.0%	24.2%	9.8%	11.7%
		Totals for Class		1,224,846.4	13,316.0	87.2%	57.5%			65.5%	61.0%
In City Business	0.000	2.000	1.795	37,752.6	366.3	2.4%	1.8%	4.3%	100.0%	1.0%	1.8%
	2.001	20.000	12.780	212,578.2	669.3	4.4%	10.0%	28.7%	95.7%	8.8%	9.0%
	20.001	400.000	59.147	508,779.6	698.3	4.6%	23.9%	87.0%	71.3%	18.7%	20.8%
	400.001	999,999.000	506.506	112,950.8	18.6	0.1%	5.3%	100.0%	13.0%	3.8%	4.5%
		Totals for Class		872,061.3	1,752.5	11.5%	40.9%			32.3%	36.1%
Out City Res	0.000	2.000	1.983	4,140.3	6.0	0.0%	0.2%	16.1%	100.0%	0.0%	0.3%
	2.001	20.000	5.304	10,692.1	166.0	1.1%	0.5%	57.5%	83.9%	1.2%	1.1%
	20.001	400.000	193.001	4,632.0	1.0	0.0%	0.2%	75.5%	42.5%	0.2%	0.4%
	400.001	999,999.000	525.866	6,310.4	1.0	0.0%	0.3%	100.0%	24.5%	0.3%	0.5%
		Totals for Class		25,774.8	174.0	1.1%	1.2%			1.8%	2.3%
Out City Business	0.000	2.000	1.552	647.1	20.0	0.1%	0.0%	9.3%	100.0%	0.1%	0.1%
	2.001	20.000	9.481	1,678.2	9.9	0.1%	0.1%	33.5%	90.7%	0.1%	0.1%
	20.001	400.000	79.029	4,583.7	4.8	0.0%	0.2%	99.7%	66.5%	0.2%	0.4%
	400.001	999,999.000	21.999	22.0	0.1	0.0%	0.0%	100.0%	0.3%	0.0%	0.0%
		Totals for Class		6,930.9	34.8	0.2%	0.3%			0.4%	0.6%
K State?	0.000	2.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
	2.001	20.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
	20.001	400.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
	400.001	999,999.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
		Totals for Class		0.0	0.0	0.0%	0.0%			0.0%	0.0%

Chart 1 - Operating Ratio

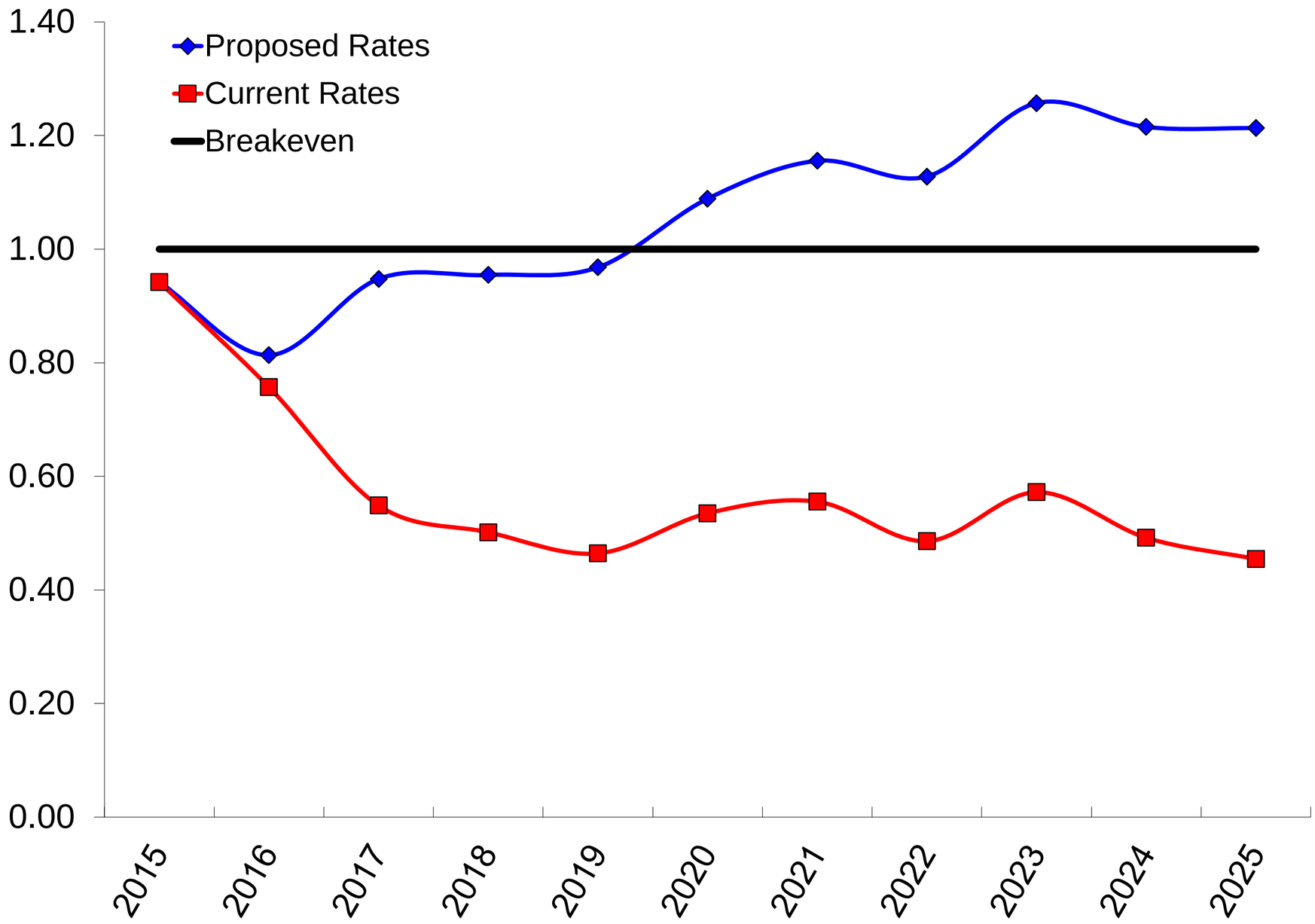

Chart 2 - Coverage Ratio

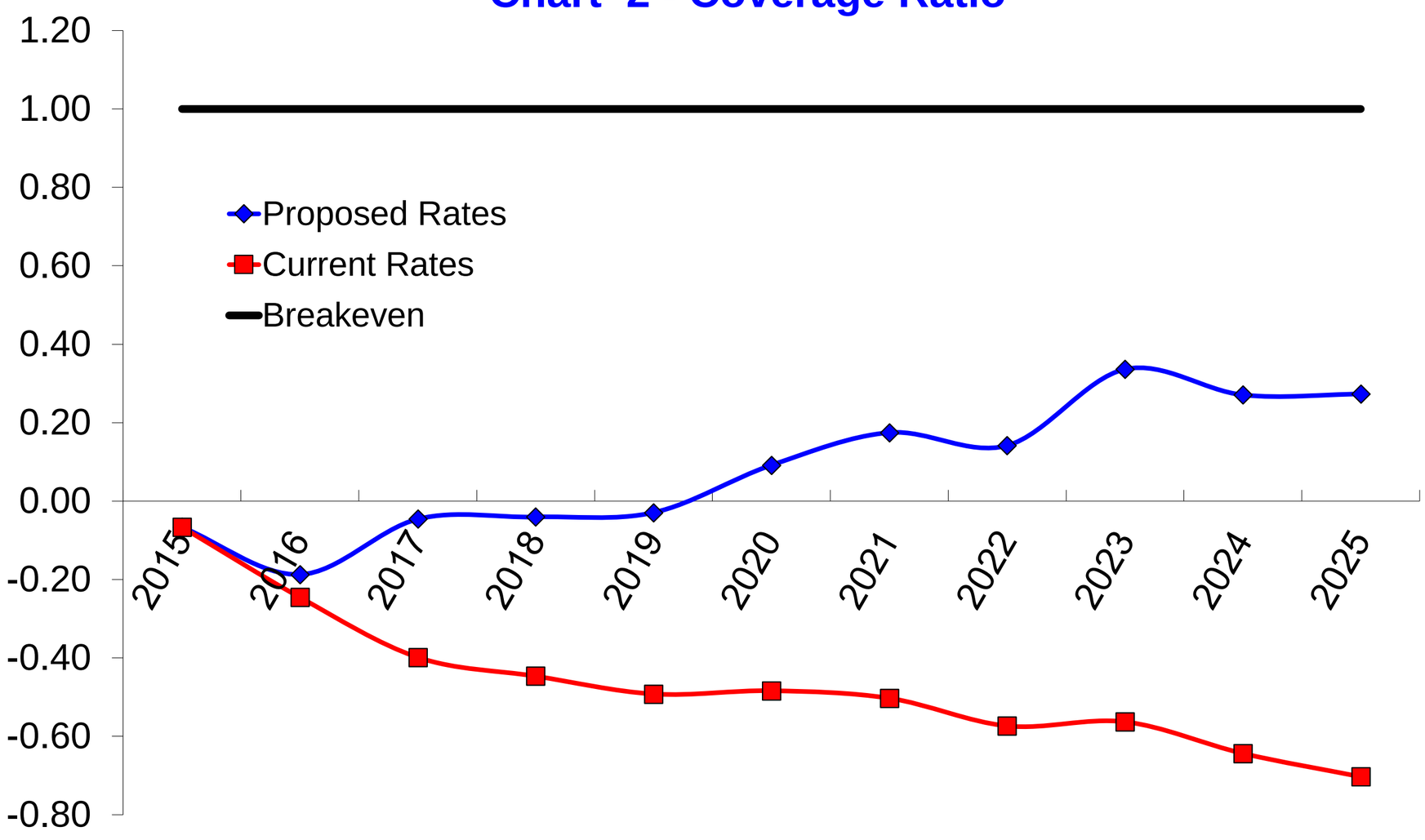

Chart 3 - 5,000 Gal Residential User's Bill

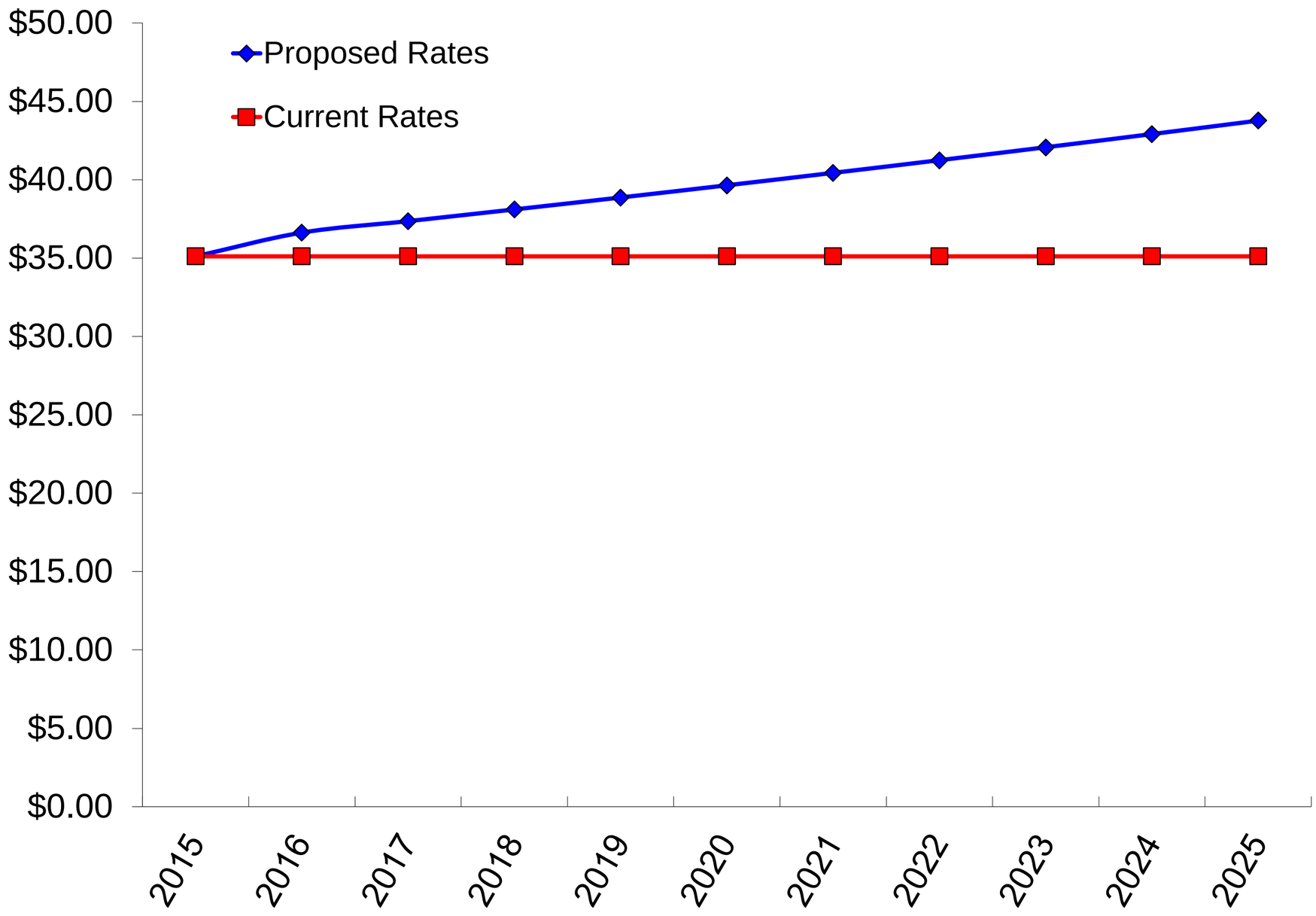

Chart 4 - Affordability Index

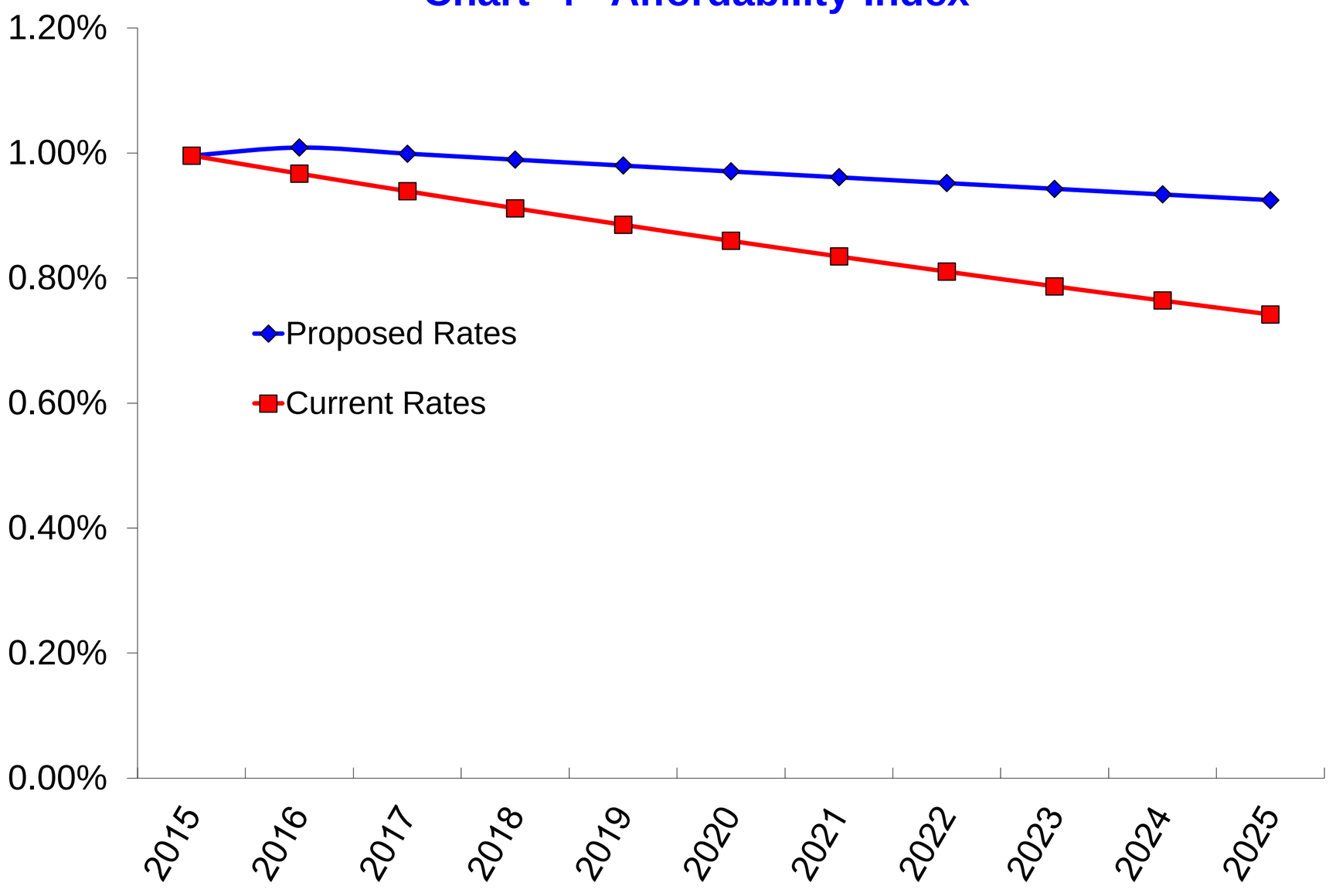

Chart 5 - Working Capital vs Goal

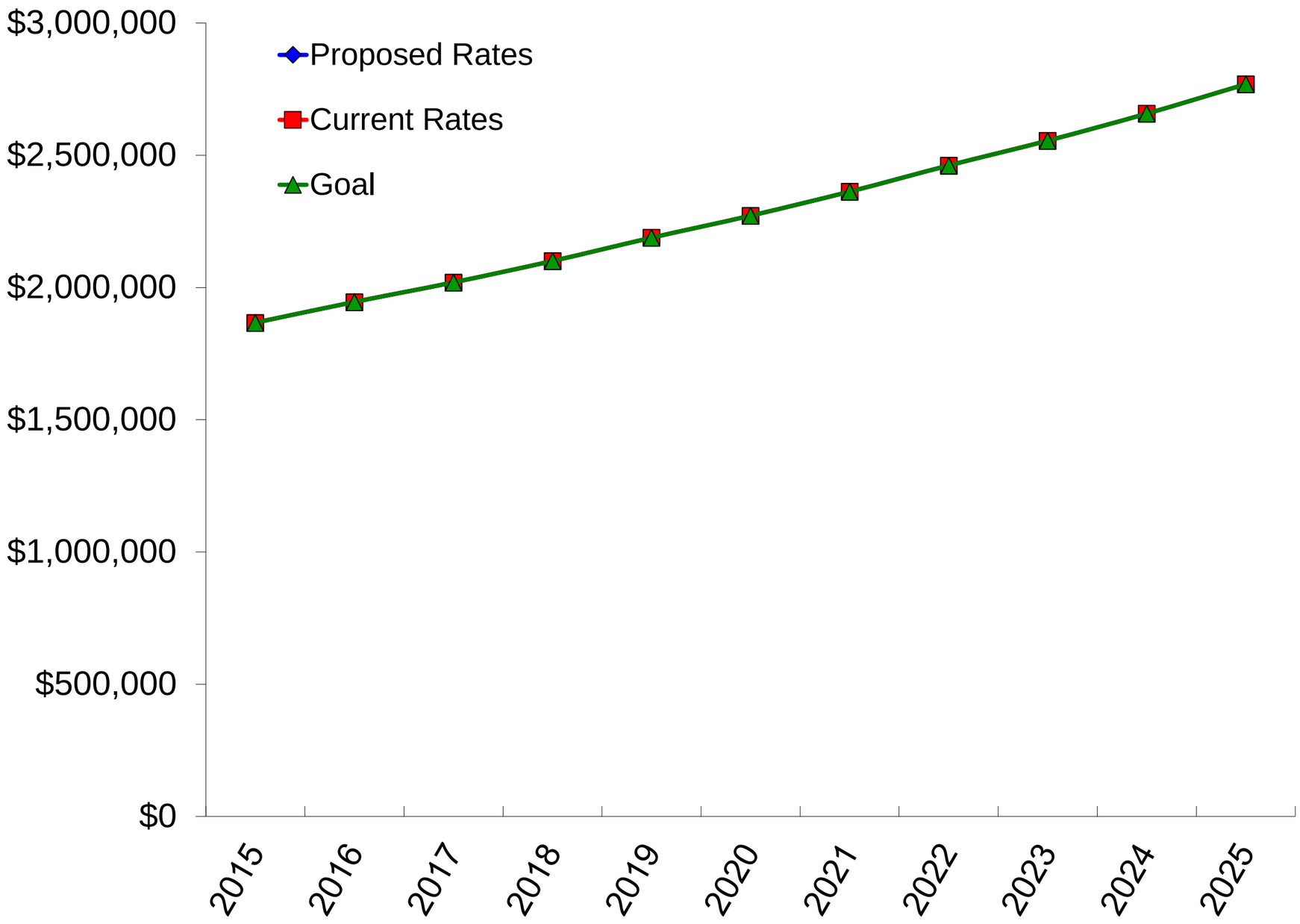

Chart 6 - Value of Cash Assets Before Inflation

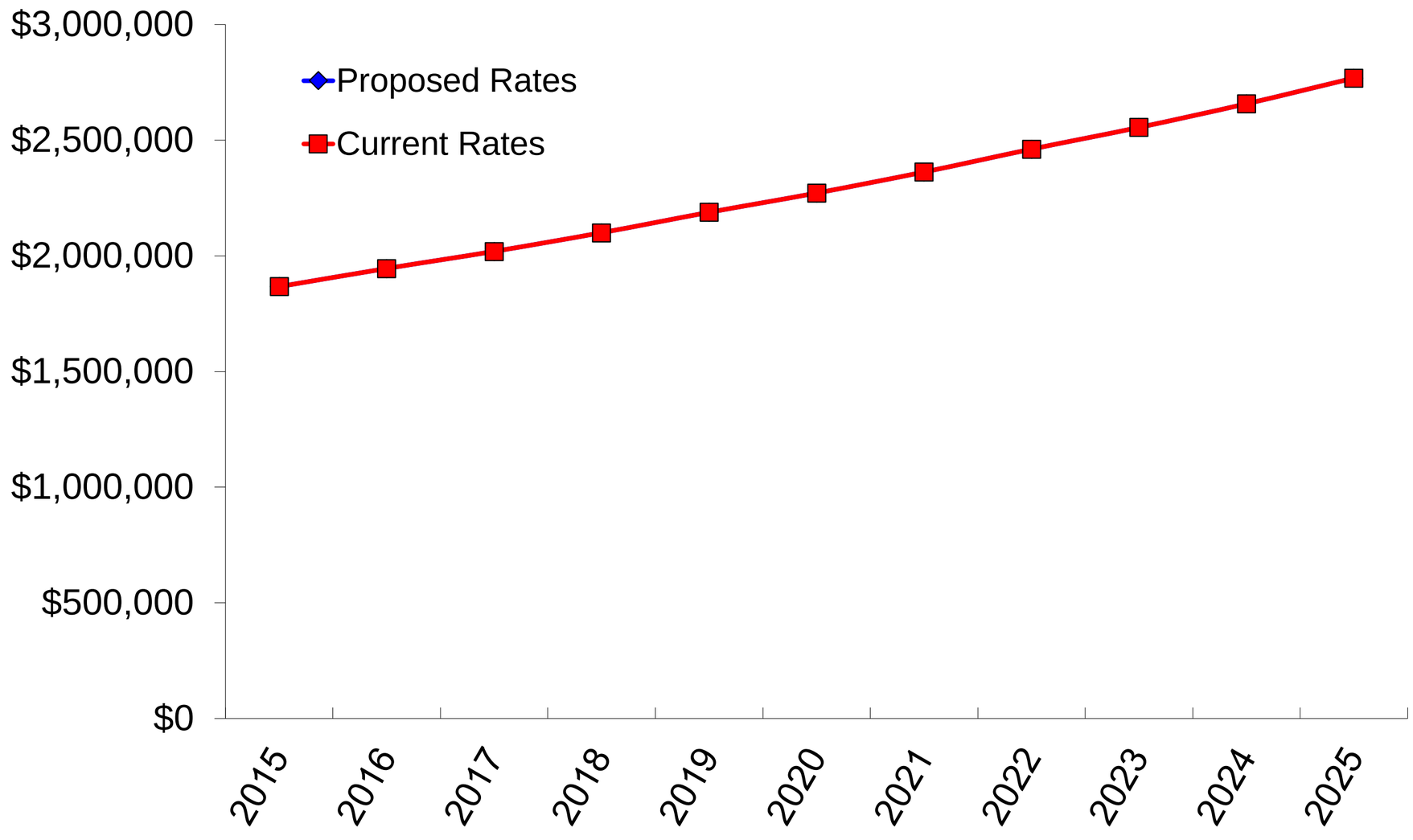

Chart 7 - Value of Cash Assets After Inflation

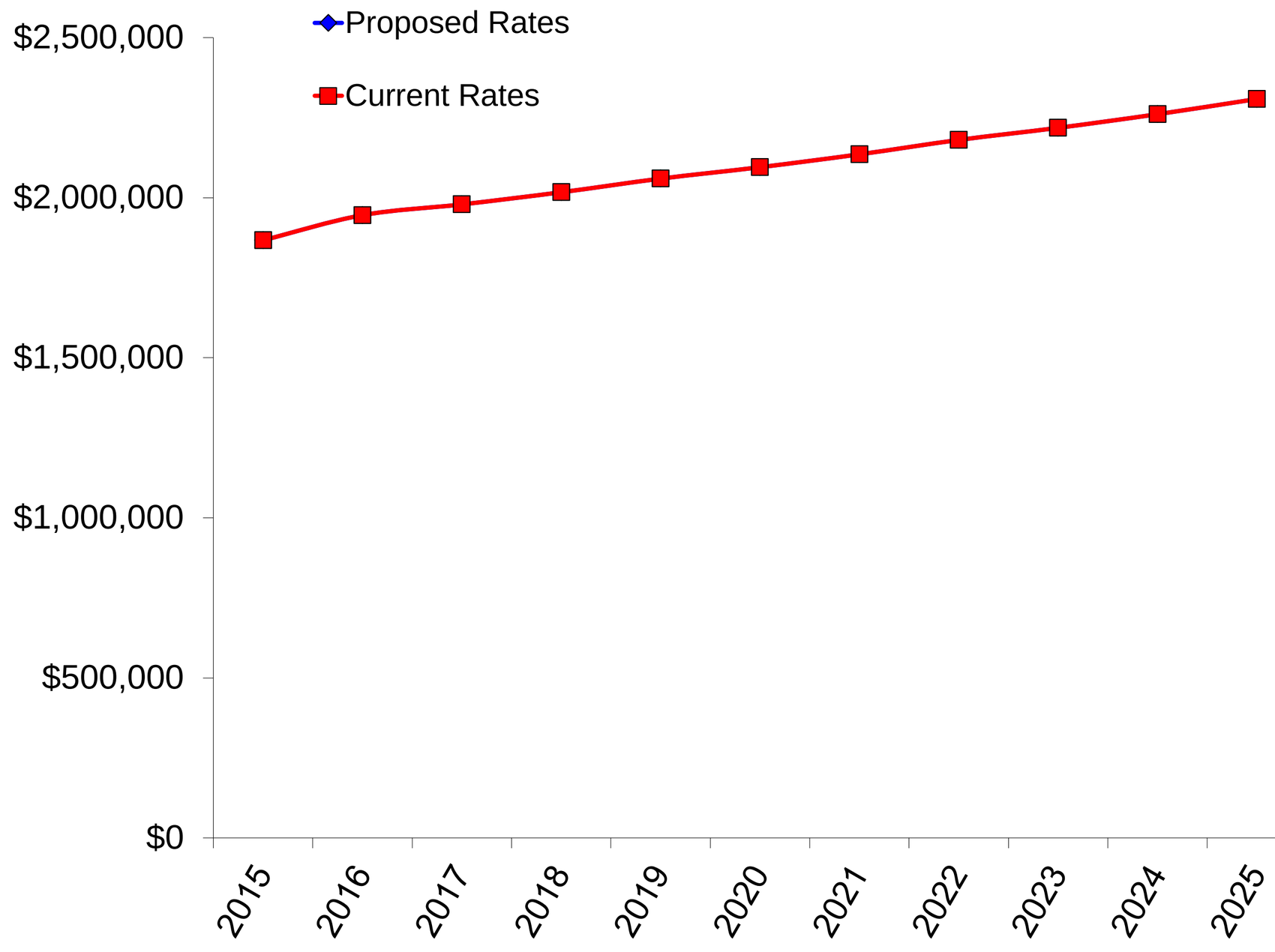

Chart 8 - Total Reserves

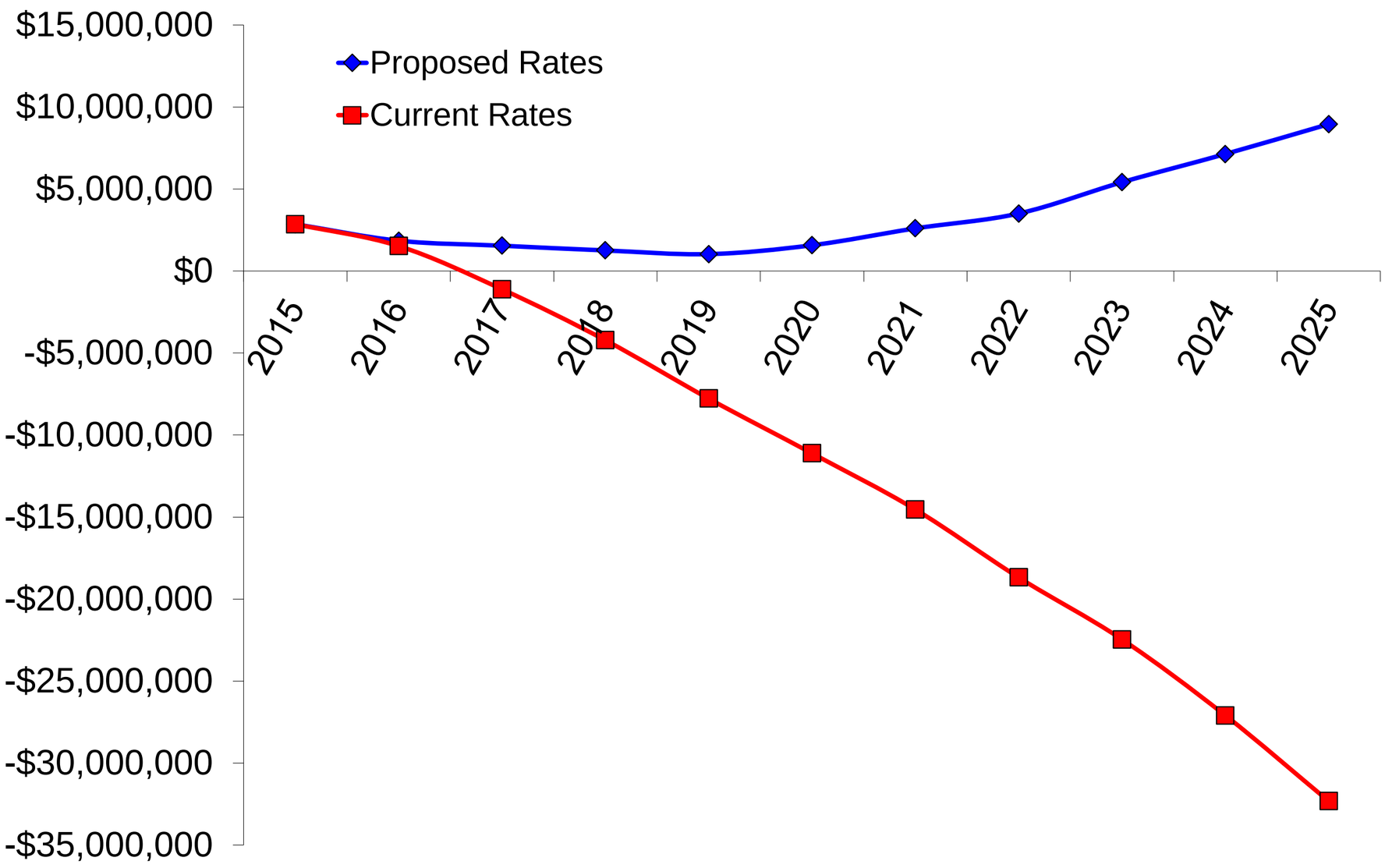

Table 9 - System Development Charges Based on Meter Size

Manhattan, KS; Sewer Rates Scenario 2016-3

This table calculates system development charges (SDC) to assess to each meter size and total revenues those charges would generate during one full year following initial adjustment. This table only covers meter size-based development charges. Share purchase is not included in this calculation.

In-City Customers

Meter Size	Meter Size in Square Inches	Mix of New Connections in a Typical Year	AWWA Capacity Multiplier for Each Meter Size	Total AWWA Capacity "Shares" Attributable to Each Meter Size Group	AWWA-based Capacity Cost Each Meter Size	Out of City Surcharge Factor	Total New SDC Fees Each Meter Size	Full-year SDC Fee Income From Each Size Class
Five Eighths	0.31	115.5	1.0	115.5	$750	100%	$750	$86,635
Three Quarters	0.44	113.3	1.5	170.0	$750	100%	$750	$85,035
One Inch	0.79	23.2	2.5	58.1	$1,501	100%	$1,501	$34,847
One & a Half Inch	1.77	3.6	5.0	18.0	$3,001	100%	$3,001	$10,820
Two Inch	3.14	6.4	16.0	102.1	$9,603	100%	$9,603	$61,282
Two & One Half Inch	4.91	0.0	29.8 *	0.0	$17,856	100%	$17,856	$0
Three Inch	7.07	0.5	43.5	22.8	$26,109	100%	$26,109	$13,700
Four Inch	12.57	0.4	75.0	27.9	$45,016	100%	$45,016	$16,763
Six Inch	28.27	0.3	160.0	48.7	$96,034	100%	$96,034	$29,259
Eight Inch	50.27	0.1	280.0	19.0	$168,060	100%	$168,060	$11,379
Ten Inch	78.54	0.0	420.0	7.1	$252,090	100%	$252,090	$4,267
Twelve Inch	113.10	0.0	530.0	0.0	$318,113	100%	$318,113	$0
Sixteen Inch	201.06	0.0	668.8 *	11.3	$401,429	100%	$401,429	$6,795
	Subtotal:	263.3		600.6				$360,783

* Not included in AWWA study results, so these values are estimates

Out of City Customers

							$0	
Five Eighths	0.31	2.0	1.0	2.0	$600	150%	$900	$1,768
Three Quarters	0.44	0.3	1.5	0.5	$900	150%	$1,350	$434
One Inch	0.79	0.2	2.5	0.4	$1,501	150%	$2,251	$381
One & a Half Inch	1.77	0.0	5.0	0.1	$3,001	150%	$4,502	$76
Two Inch	3.14	0.1	16.0	1.4	$9,603	150%	$14,405	$1,219
Two & One Half Inch	4.91	0.0	29.8 *	0.0	$17,856	150%	$26,785	$0
Three Inch	7.07	0.0	43.5	1.5	$26,109	150%	$39,164	$1,326
Four Inch	12.57	0.1	75.0	3.8	$45,016	150%	$67,524	$3,429
Six Inch	28.27	0.0	160.0	5.4	$96,034	150%	$144,051	$4,877
Eight Inch	50.27	0.0	280.0	0.0	$168,060	150%	$252,090	$0
Ten Inch	78.54	0.0	420.0	0.0	$252,090	150%	$378,135	$0
Twelve Inch	113.10	0.0	530.0	0.0	$318,113	150%	$477,170	$0
Sixteen Inch	201.06	0.0	668.8 *	0.0	$401,429	150%	$602,143	$0
0.0	0.00	0.0	0.0	0.0	$0	150%	$0	$0
	Subtotal:	2.7		15.0				$13,510
	Total:	266.0		615.6			Projected SDC Fees for One Full Year Following Initial Adjustment	$374,293

Economy of Scale Factor:	0.0%	Capacity Cost to Recover per AWWA Capacity Multiplier Unit:	$600	Prorated SDC Fees to Collect This Year	$1,023

(This amount is the full-year tap fee prorated to account for time of year when rates will be adjusted initially. This amount is included in Table 2 where it is called, "Meter-size Based Tap Fees.")

Notes:

Because growth rates and meter sizes to be installed in future years cannot be predicted with certainty, SDC fee revenues are also uncertain. However, the projections above are based upon historical growth and meter sizes so they should be reasonable estimates. Generally, SDC fees should only be used to pay for capital improvements so there is usually time to make adjustments in fee levels.

Economy of Scale Discount Rate - Generally the cost of infrastructure to serve a customer does not go up as quickly as their capacity (meter size) goes up. That is called economy of scale. This value is an estimate of the economy of scale the system enjoys as meter size goes up. Generally this factor should be no more than about 7%.

In the interest of simplicity, 3/4 inch meters, which are usually residential meters, may have been calculated at the 5/8 inch meter capacity for tap fee calculation purposes.

Table 10 - Capacity Charges Based on Meter Size

Manhattan, KS; Sewer Rates Scenario 2016-3

This table depicts minimum charges that are commensurate with the potential of each customer, based on their connection or meter size, to place flow demands on the system.

In-City Customers

Meter Size	Number Meters This Size	Total AWWA Capacity "Shares" Attributable to Each Meter Size Group	AWWA-based Annual Capacity Cost Each Meter Size	Capacity Charge per Meter per Billing Period	Economy of Scale Discount Rate	Adjusted Capacity Costs per Meter per Billing Period	Uniform Adjustment to Minimum Charge	Out of City Surcharge Factor	New Minimum Charge Base Rate From Table 11	Total Surcharged Minimum Charge per Billing Period[1]	Total Annual Capacity Surcharges for Each Meter Size[2]	"Snow Bird" Fee by Meter Size
Five Eighths	6,822	6,822	$39	$3.28	100%	$3.28	$0.00	100%	$7.67	$10.96	$268,781	$5.39
Three Quarters	6,696	10,044	$59	$4.92	100%	$3.28	$0.00	100%	$7.67	$10.96	$263,816	$5.39
One Inch	1,372	3,430	$98	$8.21	100%	$8.21	$0.00	100%	$7.67	$15.88	$135,139	$7.82
One & a Half Inch	213	1,065	$197	$16.42	100%	$16.42	$0.00	100%	$7.67	$24.09	$41,960	$11.86
Two Inch	377	6,032	$630	$52.53	100%	$52.53	$0.00	100%	$7.67	$60.21	$237,655	$29.64
Two & One Half Inch	0 *	0	$1,172	$97.68	100%	$97.68	$0.00	100%	$7.67	$105.35	$0	$51.86
Three Inch	31	1,349	$1,714	$142.82	100%	$142.82	$0.00	100%	$7.67	$150.50	$53,130	$74.09
Four Inch	22	1,650	$2,955	$246.24	100%	$246.24	$0.00	100%	$7.67	$253.92	$65,009	$125.00
Six Inch	18	2,880	$6,304	$525.32	100%	$525.32	$0.00	100%	$7.67	$533.00	$113,469	$262.39
Eight Inch	4	1,120	$11,032	$919.31	100%	$919.31	$0.00	100%	$7.67	$926.99	$44,127	$456.34
Ten Inch	1	420	$16,548	$1,378.97	100%	$1,378.97	$0.00	100%	$7.67	$1,386.64	$16,548	$682.62
Twelve Inch	0	0	$20,882	$1,740.13	100%	$1,740.13	$0.00	100%	$7.67	$1,747.80	$0	$860.42
Sixteen Inch	1 *	669	$26,351	$2,195.88	100%	$2,195.88	$0.00	100%	$7.67	$2,203.55	$26,351	$1,084.77
Subtotal:	15,557	35,480									$1,265,985	

* Not included in AWWA study results, so these values are estimated

Out of City Customers

Five Eighths	116	116	$39	$3.28	100%	$3.28	$0.00	150%	$7.67	$16.44	$4,570	$8.09
Three Quarters	19	29	$59	$4.92	100%	$3.28	$0.00	150%	$7.67	$16.44	$749	$8.09
One Inch	10	25	$98	$8.21	100%	$8.21	$0.00	150%	$7.67	$23.82	$985	$11.73
One & a Half Inch	1	5	$197	$16.42	100%	$16.42	$0.00	150%	$7.67	$36.14	$197	$17.79
Two Inch	5	80	$630	$52.53	100%	$52.53	$0.00	150%	$7.67	$90.31	$3,152	$44.46
Two & One Half Inch	0 *	0	$1,172	$97.68	100%	$97.68	$0.00	150%	$7.67	$158.03	$0	$77.79
Three Inch	2	87	$1,714	$142.82	100%	$142.82	$0.00	150%	$7.67	$225.74	$3,428	$111.13
Four Inch	3	225	$2,955	$246.24	100%	$246.24	$0.00	150%	$7.67	$380.88	$8,865	$187.50
Six Inch	2	320	$6,304	$525.32	100%	$525.32	$0.00	150%	$7.67	$799.49	$12,608	$393.58
Eight Inch	0	0	$11,032	$919.31	100%	$919.31	$0.00	150%	$7.67	$1,390.48	$0	$684.51
Ten Inch	0	0	$16,548	$1,378.97	100%	$1,378.97	$0.00	150%	$7.67	$2,079.97	$0	$1,023.94
Twelve Inch	0	0	$20,882	$1,740.13	100%	$1,740.13	$0.00	150%	$7.67	$2,621.70	$0	$1,290.62
Sixteen Inch	0 *	0	$26,351	$2,195.88	100%	$2,195.88	$0.00	150%	$7.67	$3,305.33	$0	$1,627.16
	158	887									$34,553	
Total:	15,715	36,367								Full Year of Capacity Surcharges	$1,300,538	
Economy of Scale Factor:		0.0%								Prorated Capacity Surcharges	$3,553	

The prorated minimum and capacity surcharges amount immediately above is the amount to be collected after rates are adjusted. If rates in Table 12 are meter sized-based, this amount is filtered into the calculated rate revenues of Table 12 for each rate class. Otherwise, it is included as a separate amount at the bottom of that table.

[1] Total Surcharged Minimum Charge per Billing Period - If minimum charge fees are to be based upon meter size, use the charges in this column if different from those in Table 1.

[2] Total Annual Capacity Surcharges for Each Meter Size - The sum at the bottom of this column is the dollar amount that meter size based surcharges will generate in one full year.

Table 11 - Initial Rate Adjustments and Resulting Revenues

Manhattan, KS; Sewer Rates Scenario 2016-3

This table depicts how rates would be set and the revenues they would generate.

After rate adjustments are made, general customers will be billed monthly.

Sales to be billed this year: Sales at the current (Test Year) rates (gray highlighted column) will apply until rates are adjusted. Sales at the modeled rates (yellow highlighted column) would apply if the modeled rates are adopted. The grand total "blended" sales revenues are the total revneues generated by the two different sets of rates. Those show in the right-most column.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Sales This Year at Current Rates	Customers Above This Volume and Below Next	New Minimum Charge Base Rates[1]	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
In City Res	0	2	$449,002	1,820	$7.67	0.000	$3.84	$3,704	$452,706
	2	20	$4,684,365	11,431	$7.67	0.000	$3.84	$9,215	$4,693,579
	20	400	$60,317	63	$7.67	0.000	$3.84	$168	$60,485
	400	999,999	$917,532	2	$7.67	0.000	$3.84	$3,114	$920,646
In City Business	0	2	$90,342	366	$7.67	0.000	$3.84	$488	$90,830
	2	20	$821,874	669	$7.67	0.000	$3.84	$2,399	$824,273
	20	400	$1,744,314	698	$7.67	0.000	$3.84	$5,513	$1,749,828
	400	999,999	$353,618	19	$7.67	0.000	$3.84	$1,190	$354,807
Out City Res	0	2	$2,228	6	$11.51	0.000	$7.68	$89	$2,317
	2	20	$110,932	166	$11.51	0.000	$7.68	$287	$111,219
	20	400	$21,840	1	$11.51	0.000	$7.68	$98	$21,938
	400	999,999	$29,620	1	$11.51	0.000	$7.68	$133	$29,753
Out City Business	0	2	$7,395	20	$11.51	0.000	$7.68	$21	$7,416
	2	20	$11,445	10	$11.51	0.000	$7.68	$39	$11,484
	20	400	$23,003	5	$11.51	0.000	$7.68	$98	$23,101
	400	999,999	$133	0	$11.51	0.000	$7.68	$0	$133
K State?	0	2	$0	0	$7.67	0.000	$3.84	$0	$0
	2	20	$0	0	$7.67	0.000	$3.84	$0	$0
	20	400	$0	0	$7.67	0.000	$3.84	$0	$0
	400	999,999	$0	0	$7.67	0.000	$3.84	$0	$0
Total Rate Rev at Current Rates			$9,327,959		Total Rate Rev at Modeled Rates			$26,556	
Prorated capacity surcharges from Table 10, because minimum charges above do not include them									$3,553
Total Blended Rate Revenues for the Year [2]									$9,358,069

Note 1, New Minimum Charge Base Rates: Meter size-based minimum charges are being recommended so the amounts shown in this column are only the fixed operating costs portion of your minimum charges. For the full minimum charges to adopt, see Table 10.

Note 2, Blended Rate Revenues: During the year when rates will be adjusted, rate revenues generated will be "blended" revenues - part collected at the current rates and part collected at the adjusted rates. The table above calculates both kinds of revenue and totals them in the right-most column. Therefore, the anticipated timing of rate adjustment shown at the top of this table will cause rates to be charged as follows:

12.0 months at the old user charge rates and 0.0 months at the new user charge rates.

Table 12 - Test Year Usage

Manhattan, KS; Sewer Rates Scenario 2016-3

This table shows usage by all customers during the test year.

Residential Meter Readings per year: 3

Date this scenario created: 10/20/2015

Test year, the one-year period being analyzed starts: 1/1/2015

Meter Readings per year: 12

Bills sent per year: 12

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Conversion Factor for Billable Units	Average Volume Used Within Each Volume Range in 100 Cu Ft	Count of Bills With ANY Volume Within Each Range	Total Annual Use Within Each Volume Range in 100 Cu Ft	Count of Bills Only Where Volume "Maxed Out" Within Each Range	Volume of Only Those Bills Where Volume "Maxed Out" Within Each Range	Number of Customers With Volume That "Maxed Out" Within Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
In City Res	0.000	2.000	1	1.936	159,792	309,431	21,840	33,389	1,820	11.9%	14.5%
	2.001	20.000	1	4.379	137,952	604,135	137,176	864,656	11,431	74.8%	28.4%
	20.001	400.000	1	18.712	776	14,521	752	20,442	63	0.4%	0.7%
	400.001	999,999	1	12,364.999	24	296,760	24	306,360	2	0.0%	13.9%
			Monthly and Annual Subtotals:		298,544	1,224,846	159,792	1,224,846	13,316	87.2%	57.5%
In City Business	0.000	2.000	1	1.795	21,030	37,753	4,396	4,468	366	2.4%	1.8%
	2.001	20.000	1	12.780	16,634	212,578	8,032	73,814	669	4.4%	10.0%
	20.001	400.000	1	59.147	8,602	508,780	8,379	591,628	698	4.6%	23.9%
	400.001	999,999	1	506.506	223	112,951	223	202,151	19	0.1%	5.3%
			Monthly and Annual Subtotals:		46,489	872,061	21,030	872,061	1,753	11.5%	40.9%
Out City Res	0.000	2.000	1	1.983	2,088	4,140	72	106	6	0.0%	0.2%
	2.001	20.000	1	5.304	2,016	10,692	1,992	14,246	166	1.1%	0.5%
	20.001	400.000	1	193.001	24	4,632	12	312	1	0.0%	0.2%
	400.001	999,999	1	525.866	12	6,310	12	11,110	1	0.0%	0.3%
			Monthly and Annual Subtotals:		4,140	25,775	2,088	25,775	174	1.1%	1.2%
Out City Business	0.000	2.000	1	1.552	417	647	240	293	20	0.1%	0.0%
	2.001	20.000	1	9.481	177	1,678	119	872	10	0.1%	0.1%
	20.001	400.000	1	79.029	58	4,584	57	5,344	5	0.0%	0.2%
	400.001	999,999	1	21.999	1	22	1	422	0	0.0%	0.0%
			Monthly and Annual Subtotals:		653	6,931	417	6,931	35	0.2%	0.3%
			Monthly and Annual Grand Totals:		349,826	2,129,613	183,327		15,277	100%	100%

Table 13 - Rates at End of Test Year

Manhattan, KS; Sewer Rates Scenario 2016-3

This table shows user rates at the end of the test year. Rates for volume ranges that are not shown are the same as the next lowest volume range rates. Rates for customers with no recorded meter size were assumed to be charged the same as those for the smallest meter size customer.

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Minimum Charge	Usage Allowance in 100 Cu Ft	Unit Charge per 100 Cu Ft
In City Res	0.000	2.000	$20.60	2.000	$3.10
	2.001	20.000	$20.60	2.000	$3.10
	20.001	400.000	$20.60	2.000	$3.10
	400.001	999,999.000	$20.60	2.000	$3.10
In City Business	0.000	2.000	$20.60	2.000	$3.10
	2.001	20.000	$20.60	2.000	$3.10
	20.001	400.000	$20.60	2.000	$3.10
	400.001	999,999.000	$20.60	2.000	$3.10
Out City Res	0.000	2.000	$30.89	2.000	$4.65
	2.001	20.000	$30.89	2.000	$4.65
	20.001	400.000	$30.89	2.000	$4.65
	400.001	999,999.000	$30.89	2.000	$4.65
Out City Business	0.000	2.000	$30.89	2.000	$4.65
	2.001	20.000	$30.89	2.000	$4.65
	20.001	400.000	$30.89	2.000	$4.65
	400.001	999,999.000	$30.89	2.000	$4.65
K State?	0.000	2.000	$20.60	2.000	$3.10
	2.001	20.000	$20.60	2.000	$3.10
	20.001	400.000	$20.60	2.000	$3.10
	400.001	999,999.000	$20.60	2.000	$3.10

Table 14 - Average Cost Classification

Manhattan, KS; Sewer Rates Scenario 2016-3

This table distributes costs from a representative year (the "target" year) to fixed and variable categories (see Definitions) in order to calculate the "proportional to use" or "cost of service" rate structure based upon the cost breakdown for that year.

The rate structure target year runs from 1/1/2018 through 12/31/2018

Operating Costs	Amount	Fixed Cost %	Variable Cost %	Capacity Cost %	Fixed Cost Amount	Variable Cost Amount	Capacity Cost Amount
Administration-All Functions	$701,375	100.0%	0.0%	0.0%	$701,375	$0	$0
All Operations Staff and Related Expenses	$2,652,381	20.0%	80.0%	0.0%	$530,476	$2,121,905	$0
Blue Township	Disregard	20.0%	80.0%	0.0%	$0	$0	$0
Blue Township Improvements	Disregard	28.5%	13.6%	57.9%	$0	$0	$0
Blue Township Treatment	Disregard	28.5%	13.6%	57.9%	$0	$0	$0
BLUE TOWNSHIP EXPENSES	Disregard	20.0%	80.0%	0.0%	$0	$0	$0
Building Maintenance	$1,675	100.0%	0.0%	0.0%	$1,675	$0	$0
Equipment Maintenance	$120,323	20.0%	80.0%	0.0%	$24,065	$96,258	$0
Gas, Electric, Chemicals, Lime, Similar Variable Costs	$760,816	0.0%	100.0%	0.0%	$0	$760,816	$0
Infrastructure and Infrastructure Maintenance	Table 4	28.5%	13.6%	57.9%	$0	$0	$0
Laboratory Costs	$17,800	20.0%	80.0%	0.0%	$3,560	$14,240	$0
LIFTSTATION TELECOMMUNICATION	$8,126	28.5%	13.6%	57.9%	$2,316	$1,102	$4,709
MOTOR VEHICLES	Table 4	28.5%	13.6%	57.9%	$0	$0	$0
Postage, Trash, Computers and Software, Similar Fixed Costs	$36,702	100.0%	0.0%	0.0%	$36,702	$0	$0
Professional Services, Legal, Planning Studies	$1,314	100.0%	0.0%	0.0%	$1,314	$0	$0
PROJECT PAY-OFF	$0	28.5%	13.6%	57.9%	$0	$0	$0
PUMP STATION MAINTENANCE	$46,548	28.5%	13.6%	57.9%	$13,265	$6,311	$26,972
TRANSFER TO CAPITAL PROJECT	Table 4	28.5%	13.6%	57.9%	$0	$0	$0
Transfer to Debt Service	Table 4	28.5%	13.6%	57.9%	$0	$0	$0
TRANSFER TO GENERAL FUND	$1,365,617	29.2%	70.8%	0.0%	$398,760	$966,857	$0
TRANSFER TO SPEC REVENUE	$0	29.2%	70.8%	0.0%	$0	$0	$0
TRANSFER TO TRUST & AGENCY	$69,742	28.5%	13.6%	57.9%	$19,874	$9,456	$40,412
Utility Location-All Functions and One-Call	$84,353	20.0%	80.0%	0.0%	$16,871	$67,483	$0
WWTP Expansion	Table 4	28.5%	13.6%	57.9%	$0	$0	$0
2003 WWTP & Biosolids Farm Imp.	Table 4	20.0%	80.0%	0.0%	$0	$0	$0
User Charge Analysis Services	$0	20.0%	80.0%	0.0%	$0	$0	$0
Total CIP Spending, Cash and Debt (Table 4)	$6,584,240	28.5%	13.6%	57.9%	$1,876,297	$892,719	$3,815,224
Offset for Capacity Surcharges (Table 10)	-$1,300,538	28.5%	13.6%	57.9%	-$370,612	-$176,332	-$753,594
Grand Total Costs, Weighted Avg Percentages	$11,150,476	29.2%	42.7%	28.1%	$3,255,939	$4,760,814	$3,133,723

"Proportional to Use" Rate Structure Cost Basis	
Average Fixed Cost/User/Month =	$17.76
Average Variable Cost to Produce/100 Cu Ft =	$2.24
Cu Ft/Billing Cycle Used by Average Residential Customer =	8

100%	$11,150,476	
	Inflow and Infiltration is Estimated at	0%
	Cost of Inflow and Infiltration is Estimated at	52%
	Resulting Cost of Inflow and Infiltration	$0
	Test Year Customer Metered Usage (in Cu Ft)	2,129,613
	+ Test Year Inflow and Infiltration	0
	Total Test Year Volume	2,129,613

Manhattan, KS; Sewer Rates Scenario 2016-4 Modeling Results

(Retain Usage Allowance)

This document contains the calculations that were performed to arrive at new user rates and fees for the next 10 years. These calculations are complex so key issues are also described in a narrative report that accompanies this model.

This analysis was conducted so as to establish user rates that are adequate to pay all reasonably expectable costs while charging rates that are fairly structured and appropriately simple or complex.

Scenario Description: This analysis model assumes the current method of basing rates on type of customer would be discontinued. Instead, minimum charges would be based on water meter size and unit charges would be the same for all volumes of use for all customers. However, several tables continue to show rates in that structure simple to make rate comparisons "head to head." Out of city customers would still be assessed a surcharged minimum charge.

For most, the best way to read and understand what this model means is this. Scan the "Index of Tables, Charts and Other Results" to see how the model is laid out. Scan the "Definitions" for any terms you are not already familiar with. Read and even ponder Table 1 and the line graph charts. These will show you how the proposed rate adjustments will affect ratepayers and the system. If you need more detail than that, review the entire model. Finally, rate setting involves much more than just rates so you need to read the accompanying narrative report to understand what you need to do and why.

Several tables in this model depict volume usage and user rates for the various customer classes. The model includes a continuum of volumes but many volume categories had no users. Most of these lines have been hidden simply to make the tables less voluminous. However, all volume classes that had use or that are break points for rate blocks are shown. For volume classes that are not shown, rates will be the same as the previous rate that is shown.

September 20, 2016

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Table 1 - Modeled Rates

Manhattan, KS; Sewer Rates Scenario 2016-4

Adopt the unit charges shown in this table. However, minimum charges will be based upon the meter size of each customer so assess minimum charges from Table 10 based upon each customer's meter size.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Usage Allowance in 100 Cu Ft	Unit Charge per 100 Cu Ft
In City Res	0	2	2.000	$4.60
	2	20	2.000	$4.60
	20	400	2.000	$4.60
	400	999,999	2.000	$4.60
In City Business	0	2	2.000	$4.60
	2	20	2.000	$4.60
	20	400	2.000	$4.60
	400	999,999	2.000	$4.60
Out City Res	0	2	2.000	$9.20
	2	20	2.000	$9.20
	20	400	2.000	$9.20
	400	999,999	2.000	$9.20
Out City Business	0	2	2.000	$9.20
	2	20	2.000	$9.20
	20	400	2.000	$9.20
	400	999,999	2.000	$9.20
K State?	0	2	2.000	$4.60
	2	20	2.000	$4.60
	20	400	2.000	$4.60
	400	999,999	2.000	$4.60

Table 6 - Financial Capacity Indicators and Reserves

Manhattan, KS; Sewer Rates Scenario 2016-4

This table depicts the affordability of future rates, the financial health of the system and the ending balances in various accounts for the test year and the next 10 years.

Capacity Indicators	Year Starting 1/1/15	Year Starting 1/1/16	Year Starting 1/1/17	Year Starting 1/1/18	Year Starting 1/1/19	Year Starting 1/1/20	Year Starting 1/1/21	Year Starting 1/1/22	Year Starting 1/1/23	Year Starting 1/1/24	Year Starting 1/1/25
Equivalent Final Monthly Bill for a 5,000 gal per Month Residential User	$35.11	$32.50	$33.15	$33.81	$34.49	$35.18	$35.88	$36.60	$37.33	$38.08	$38.84
Annual Median Household Income (AMHI)	$42,305	$43,570	$44,873	$46,215	$47,597	$49,020	$50,486	$51,995	$53,550	$55,151	$56,801
Affordability Index: Current Rates First Column, Then Proposed Rates	1.00%	0.90%	0.89%	0.88%	0.87%	0.86%	0.85%	0.84%	0.84%	0.83%	0.82%
Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the percent of AMHI needed by a 5,000 gallon per month residential user to pay their bill. Rates near 1.0% are common in the U.S. and are generally considered affordable. Federal grant agencies generally will not consider awarding grants if this indicator is less than 2.0%.											
Estimated Operating Ratio: Current Rates First Column, Then Proposed Rates	0.94	0.81	0.95	0.95	0.97	1.09	1.16	1.13	1.26	1.22	1.21
1.0 is break even for Operating Ratio. Below 1.0 indicates operating in the "red." Generally, the operating ratio should be at least 1.15 for large systems, 1.30 or more for medium systems and perhaps as high as 2.0 for small systems.											
Estimated Coverage Ratio: Current Rates First Column, Then Proposed Rates	-0.07	-0.19	-0.05	-0.04	-0.03	0.09	0.17	0.14	0.34	0.27	0.27
Coverage Ratio applies only to years with debt service. 1.0 is break even. Generally, the coverage ratio should be at least 1.25.											

Reserves	Balance Ending on 12/31/14	Balance Ending on 12/31/15	Balance Ending on 12/31/16	Balance Ending on 12/31/17	Balance Ending on 12/31/18	Balance Ending on 12/31/19	Balance Ending on 12/31/20	Balance Ending on 12/31/21	Balance Ending on 12/31/22	Balance Ending on 12/31/23	Balance Ending on 12/31/24	Balance Ending on 12/31/25
Current Position	$3,164,965	$1,867,052	$1,945,381	$2,019,404	$2,100,180	$2,188,208	$2,271,554	$2,362,417	$2,461,346	$2,555,190	$2,657,397	$2,768,581
Total Cash Assets (Excluding Dedicated Reserves) Before Inflation	$3,164,965	$1,867,052	$1,945,381	$2,019,404	$2,100,180	$2,188,208	$2,271,554	$2,362,417	$2,461,346	$2,555,190	$2,657,397	$2,768,581
Total Cash Assets (Excluding Dedicated Reserves) Discounted for Inflation (Future Unrestricted Purchasing Power)	$3,164,965	$1,867,052	$1,945,381	$1,979,015	$2,017,013	$2,059,524	$2,095,209	$2,135,437	$2,180,365	$2,218,225	$2,260,815	$2,308,298
CIP and Debt Service Reserves	$0	$988,562	-$97,551	-$476,306	-$843,980	-$1,157,241	-$698,753	$239,478	$1,047,479	$2,862,959	$4,480,750	$6,190,425
Sum of All Reserves	$3,164,965	$2,855,614	$1,847,830	$1,543,097	$1,256,200	$1,030,967	$1,572,801	$2,601,895	$3,508,825	$5,418,149	$7,138,147	$8,959,006

Table 7 - Bill Comparisons Before and After Rate Adjustments

Manhattan, KS; Sewer Rates Scenario 2016-4

This table compares bills for various volumes at the current rates and billing frequency with what the same volumes would cost at the equivalent modeled rates for that same billing frequency. (An "apples to apples" comparison.) Minimum charge surcharges were calculated for these same classes of users and these bills include those surcharges. However, not all meter sizes are shown.

Note: The weighted-average bill increase for all customers combined will be: 17.8%

Customer or Rate Class, or Meter Size	100 Cu Ft of Use	Customers Above This Volume and Below Next	Cumulative Customers	Current Bill	Modeled Bill	Bill Increase or Decrease (-)	Percent Increase or Decrease (-)
In City Res, Assuming 3/4 Inch Meter	0	1,820	1,820	$20.60	$10.96	-$9.64	-47%
	2	11,431	13,251	$20.60	$10.96	-$9.64	-47%
	20	63	13,314	$76.37	$93.73	$17.35	23%
	400	2	13,316	$1,253.86	$1,841.11	$587.26	47%
In City Business, Assuming 1.5 Inch Meter	0	366	366	$20.60	$24.09	$3.50	17%
	2	669	1,036	$20.60	$24.09	$3.49	17%
	20	698	1,734	$76.37	$106.86	$30.49	40%
	400	19	1,753	$1,253.86	$1,854.25	$600.39	48%
Out of City Residential, Assuming 3/4 Inch Meter	0	6	6	$30.89	$16.44	-$14.46	-47%
	2	166	172	$30.90	$16.44	-$14.46	-47%
	20	1	173	$114.56	$181.98	$67.42	59%
	400	1	174	$1,880.78	$3,676.75	$1,795.96	95%
Out City Business, Assuming 1.5 Inch Meter	0	20	20	$30.89	$36.14	$5.24	17%
	2	10	30	$30.90	$36.14	$5.24	17%
	20	5	35	$114.56	$201.68	$87.12	76%
	400	0	35	$1,880.78	$3,696.45	$1,815.66	97%

Table 8 - User Statistics

Manhattan, KS; Sewer Rates Scenario 2016-4

This table shows measures of equitability of the rates as modeled in Table 11.

If your rates are absolutely proportional to use on a volumetric basis, your % of usage and % of revenues figures will be the same within all the classes. That is not possible if you have any minimum charge and having no minimum charge is almost unheard of.

Normally, the % of usage figure will be lower than the % of revenue for the lower volumes of use. That will switch for the higher volumes of use. Even for declining rate structures, this switch should occur near the volume of the average residential user, typically near 5,000 gallons/month (668 cu ft).

In urban and suburban areas the average monthly use for residential or general customers can be twice that used by their rural and "old town" counterparts. Use is largely dependent upon who lives in a community. Older people living in longer established neighborhoods tend to use less volume than younger people living in more recently developed areas. As you make comparisons between different customers and customer classes, keep that, and the following in mind:

8 in 100 Cu Ft Billable units - This is the average residential customer's usage per Monthly billing cycle.

Usage allowance is the volume "given away" with the minimum charge. The higher the allowance, the less volume the utility can sell to generate income.

2,129,613 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was available to be sold by the utility during the test year.

351,814 in 100 Cu Ft Billable units - This is the volume metered through customer meters that was given away as a usage allowance during the test year.

$1,065,678 At the unit charge rate in effect during the test year, this was what it cost the utility to give away this volume.

Customer or Rate Class, or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Average Volume Used Within Each Volume Range in 100 Cu Ft	Total Annual Use Within Each Volume Range in 100 Cu Ft	Customers Within This Volume Range	% Users	% Usage	Cumulative Use in This Class From Low to High Volume	Cumulative Use in This Class From High to Low Volume	% Revenue at Current Rates	% Revenue at Modeled Rates
In City Res	0.000	2.000	1.936	309,430.7	1,820.0	11.9%	14.5%	25.3%	100.0%	4.8%	1.7%
	2.001	20.000	4.379	604,134.9	11,431.3	74.8%	28.4%	74.6%	74.7%	50.2%	39.4%
	20.001	400.000	18.712	14,520.8	62.7	0.4%	0.7%	75.8%	25.4%	0.6%	0.7%
	400.001	999,999.000	12,364.999	296,760.0	2.0	0.0%	13.9%	100.0%	24.2%	9.8%	14.0%
		Totals for Class		1,224,846.4	13,316.0	87.2%	57.5%			65.5%	55.9%
In City Business	0.000	2.000	1.795	37,752.6	366.3	2.4%	1.8%	4.3%	100.0%	1.0%	0.3%
	2.001	20.000	12.780	212,578.2	669.3	4.4%	10.0%	28.7%	95.7%	8.8%	10.7%
	20.001	400.000	59.147	508,779.6	698.3	4.6%	23.9%	87.0%	71.3%	18.7%	24.7%
	400.001	999,999.000	506.506	112,950.8	18.6	0.1%	5.3%	100.0%	13.0%	3.8%	5.4%
		Totals for Class		872,061.3	1,752.5	11.5%	40.9%			32.3%	41.1%
Out City Res	0.000	2.000	1.983	4,140.3	6.0	0.0%	0.2%	16.1%	100.0%	0.0%	0.0%
	2.001	20.000	5.304	10,692.1	166.0	1.1%	0.5%	57.5%	83.9%	1.2%	1.2%
	20.001	400.000	193.001	4,632.0	1.0	0.0%	0.2%	75.5%	42.5%	0.2%	0.4%
	400.001	999,999.000	525.866	6,310.4	1.0	0.0%	0.3%	100.0%	24.5%	0.3%	0.6%
		Totals for Class		25,774.8	174.0	1.1%	1.2%			1.8%	2.3%
Out City Business	0.000	2.000	1.552	647.1	20.0	0.1%	0.0%	9.3%	100.0%	0.1%	0.0%
	2.001	20.000	9.481	1,678.2	9.9	0.1%	0.1%	33.5%	90.7%	0.1%	0.2%
	20.001	400.000	79.029	4,583.7	4.8	0.0%	0.2%	99.7%	66.5%	0.2%	0.4%
	400.001	999,999.000	21.999	22.0	0.1	0.0%	0.0%	100.0%	0.3%	0.0%	0.0%
		Totals for Class		6,930.9	34.8	0.2%	0.3%			0.4%	0.6%
K State?	0.000	2.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
	2.001	20.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
	20.001	400.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
	400.001	999,999.000	0.000	0.0	0.0	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
		Totals for Class		0.0	0.0	0.0%	0.0%			0.0%	0.0%

Chart 1 - Operating Ratio

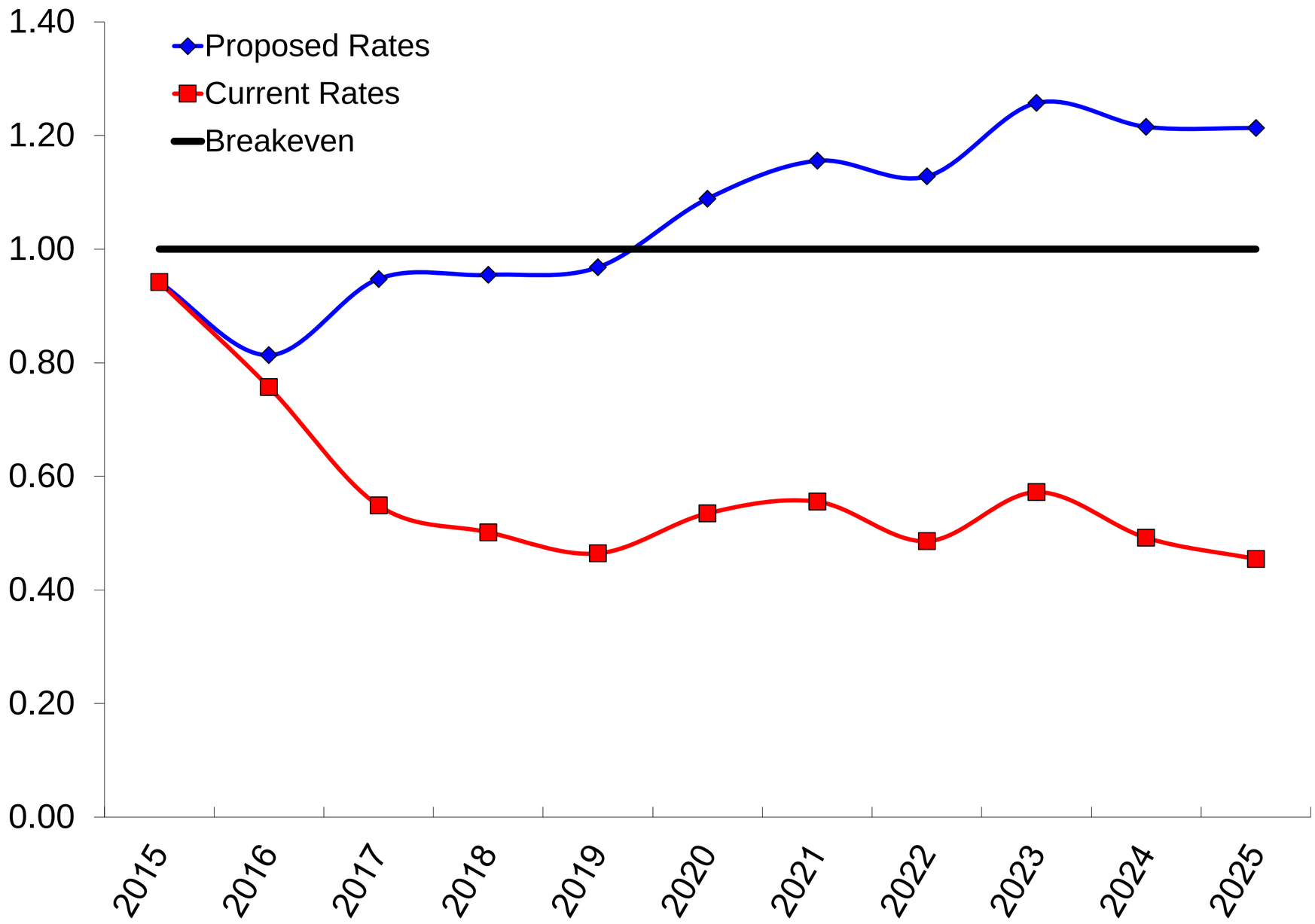

Chart 2 - Coverage Ratio

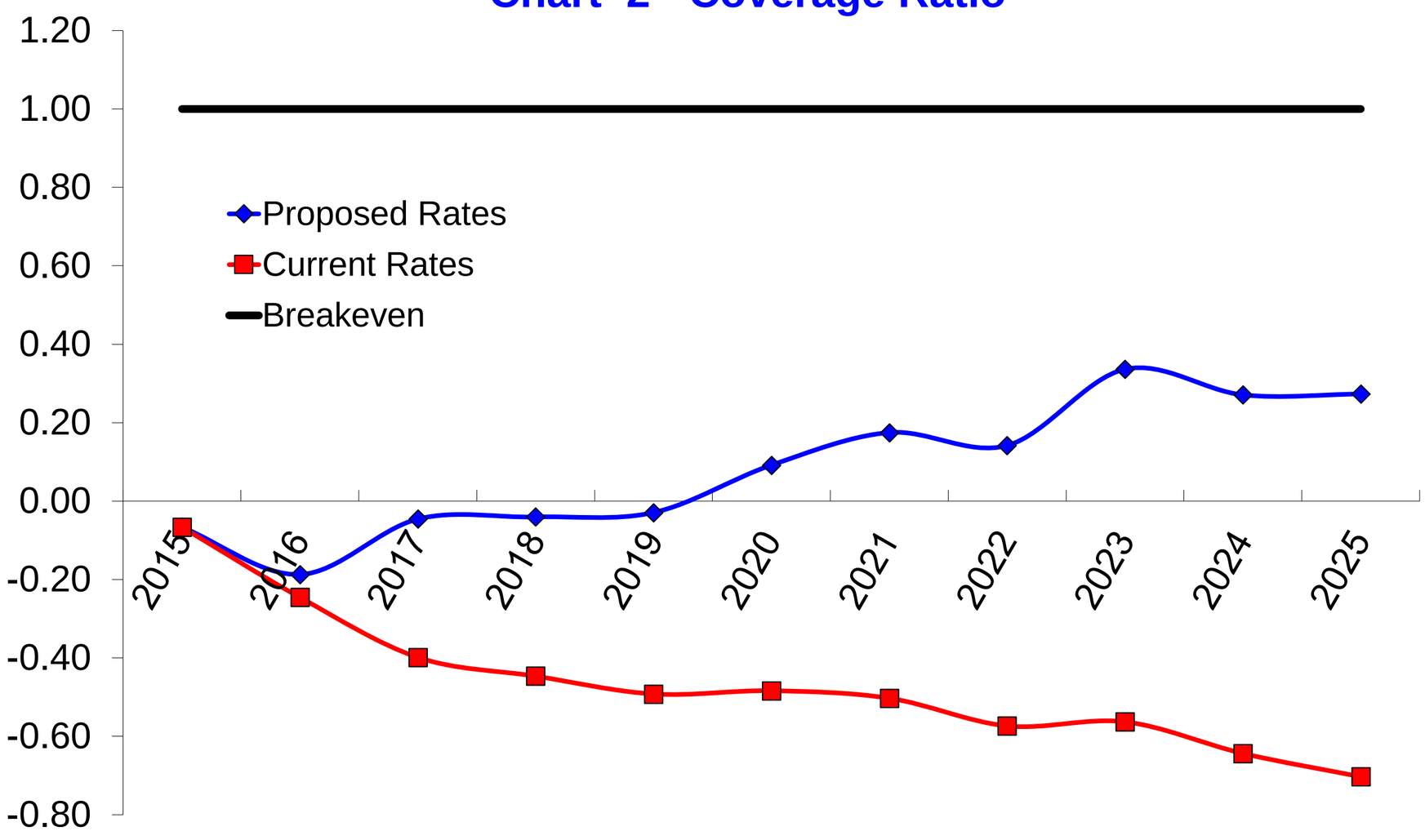

Chart 3 - 5,000 Gal Residential User's Bill

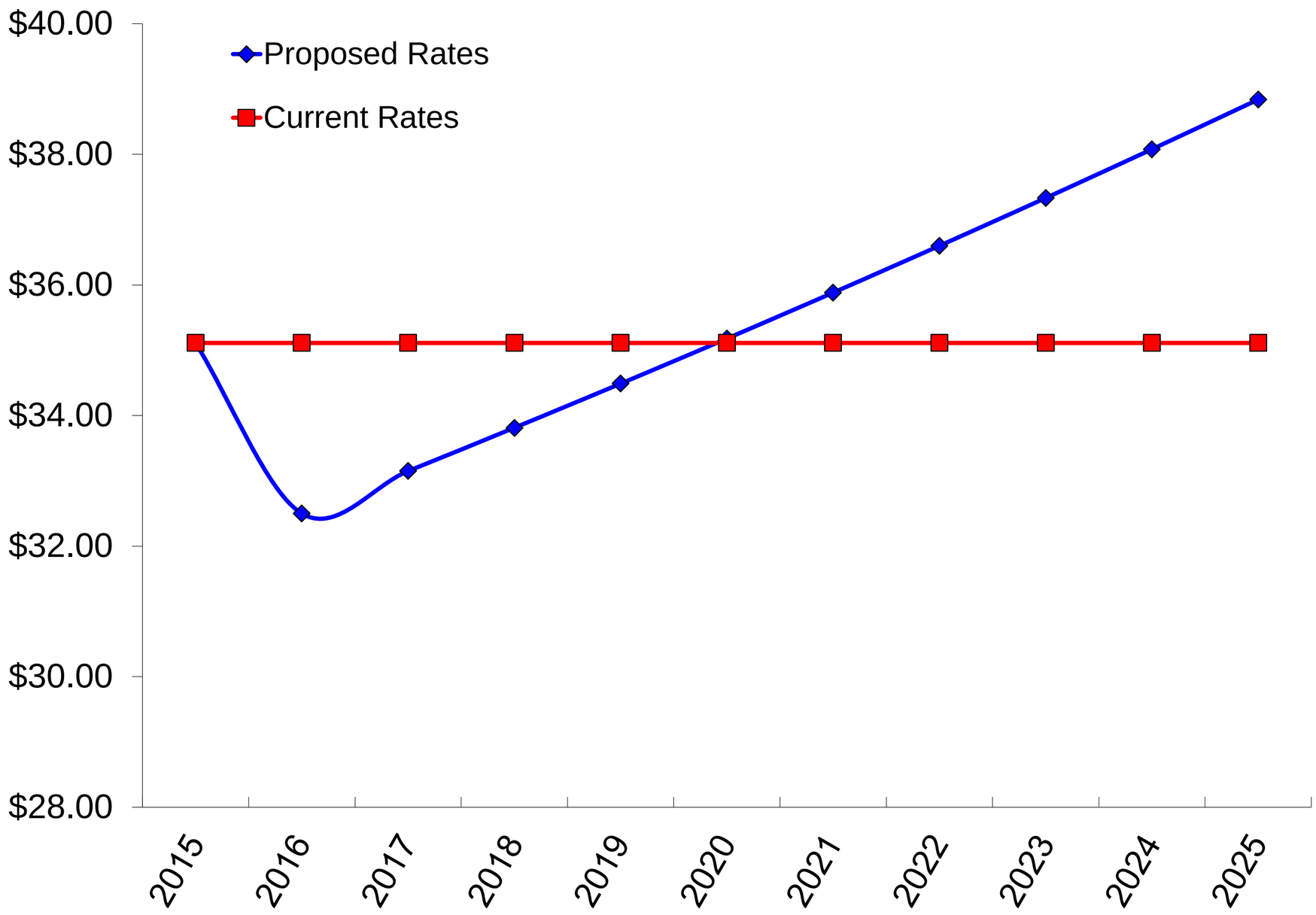

Chart 4 - Affordability Index

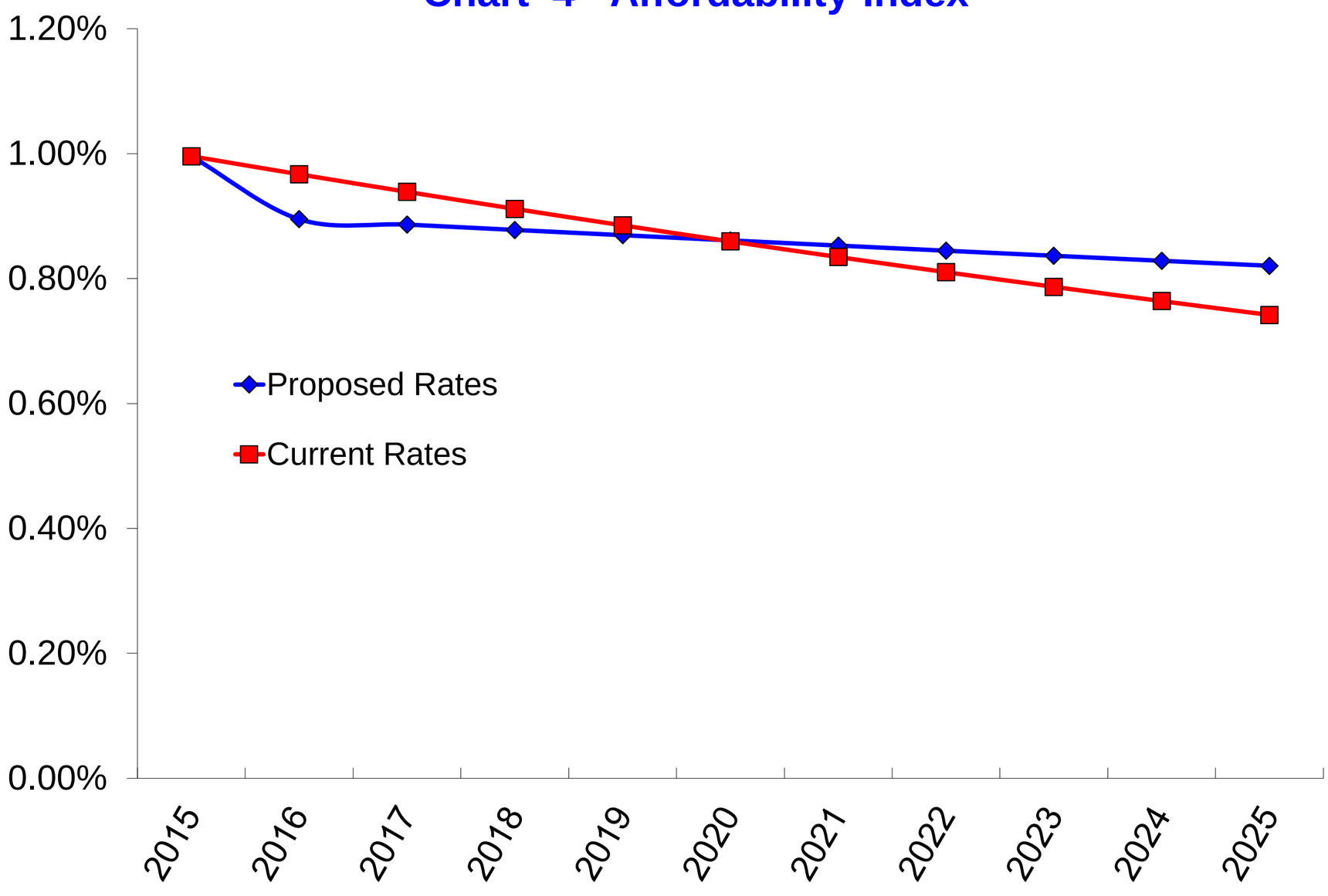

Chart 5 - Working Capital vs Goal

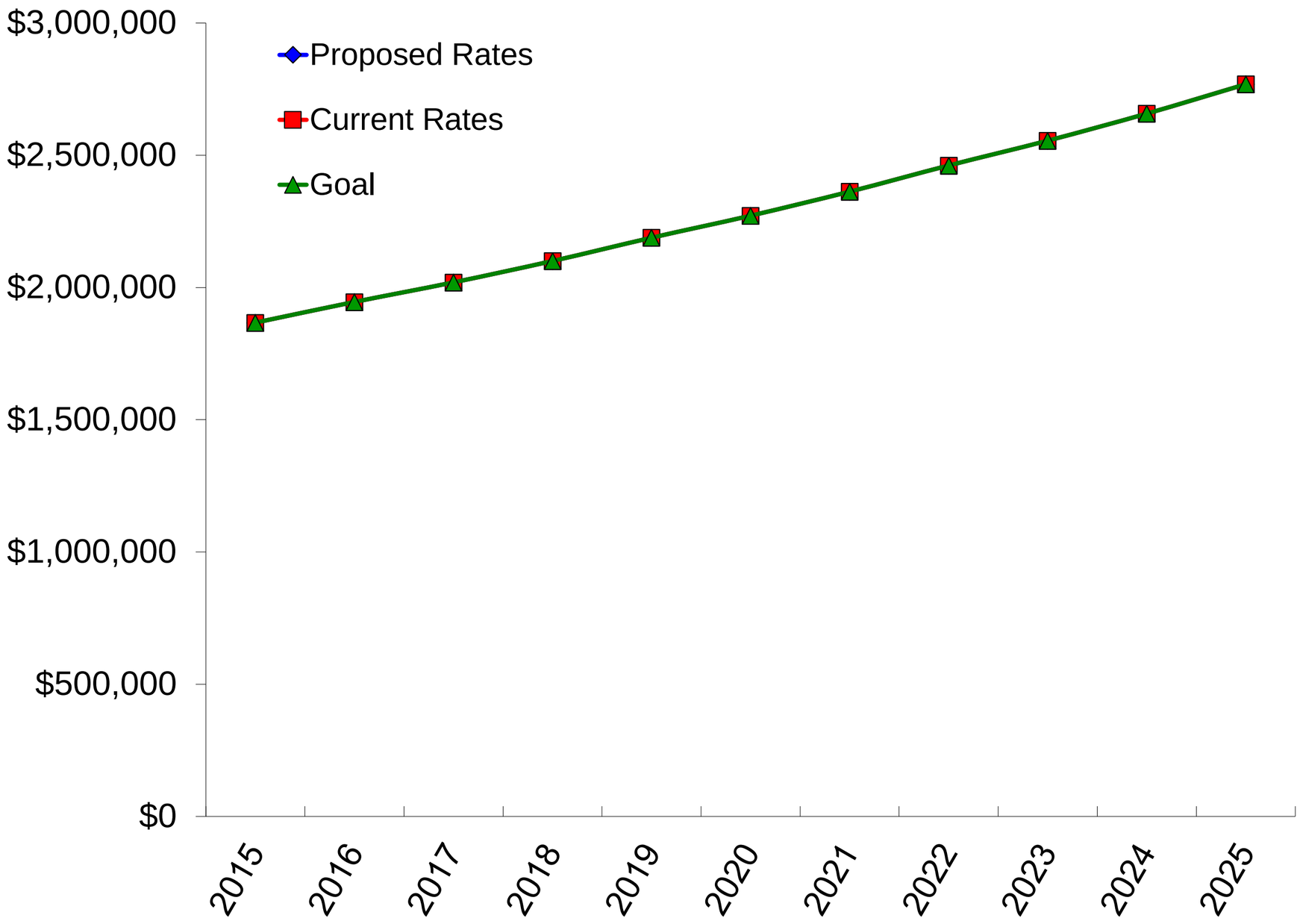

Chart 6 - Value of Cash Assets Before Inflation

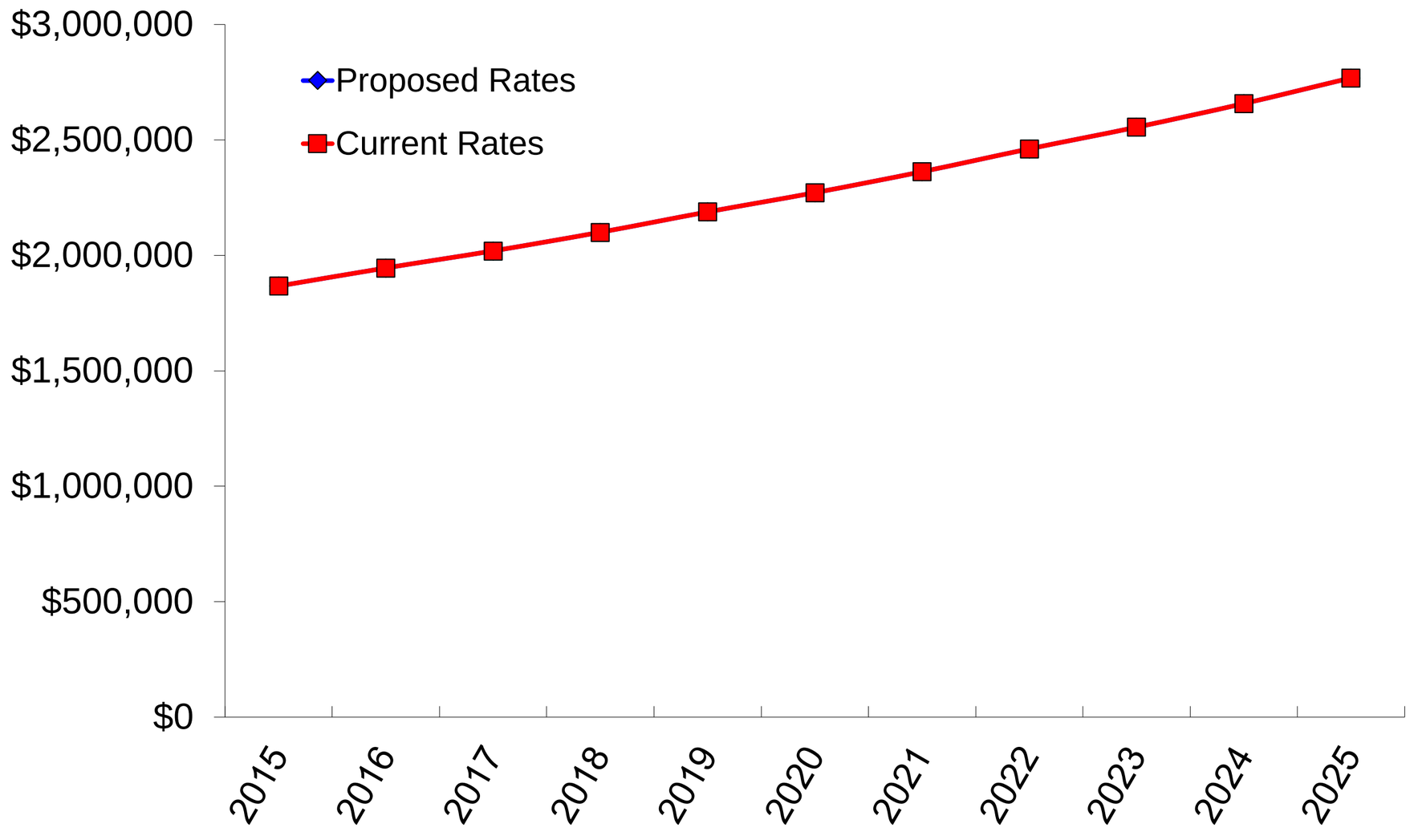

Chart 7 - Value of Cash Assets After Inflation

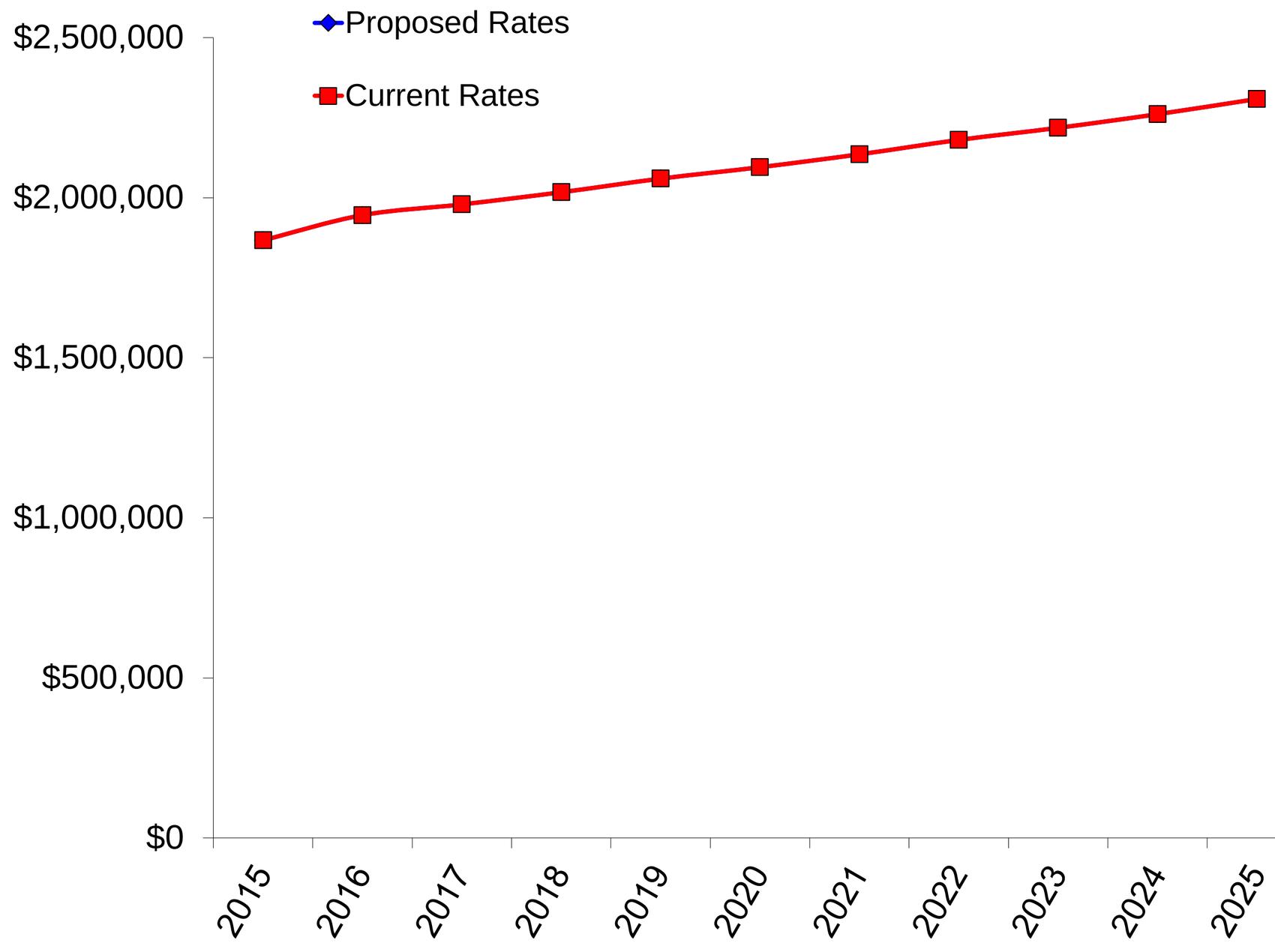

Chart 8 - Total Reserves

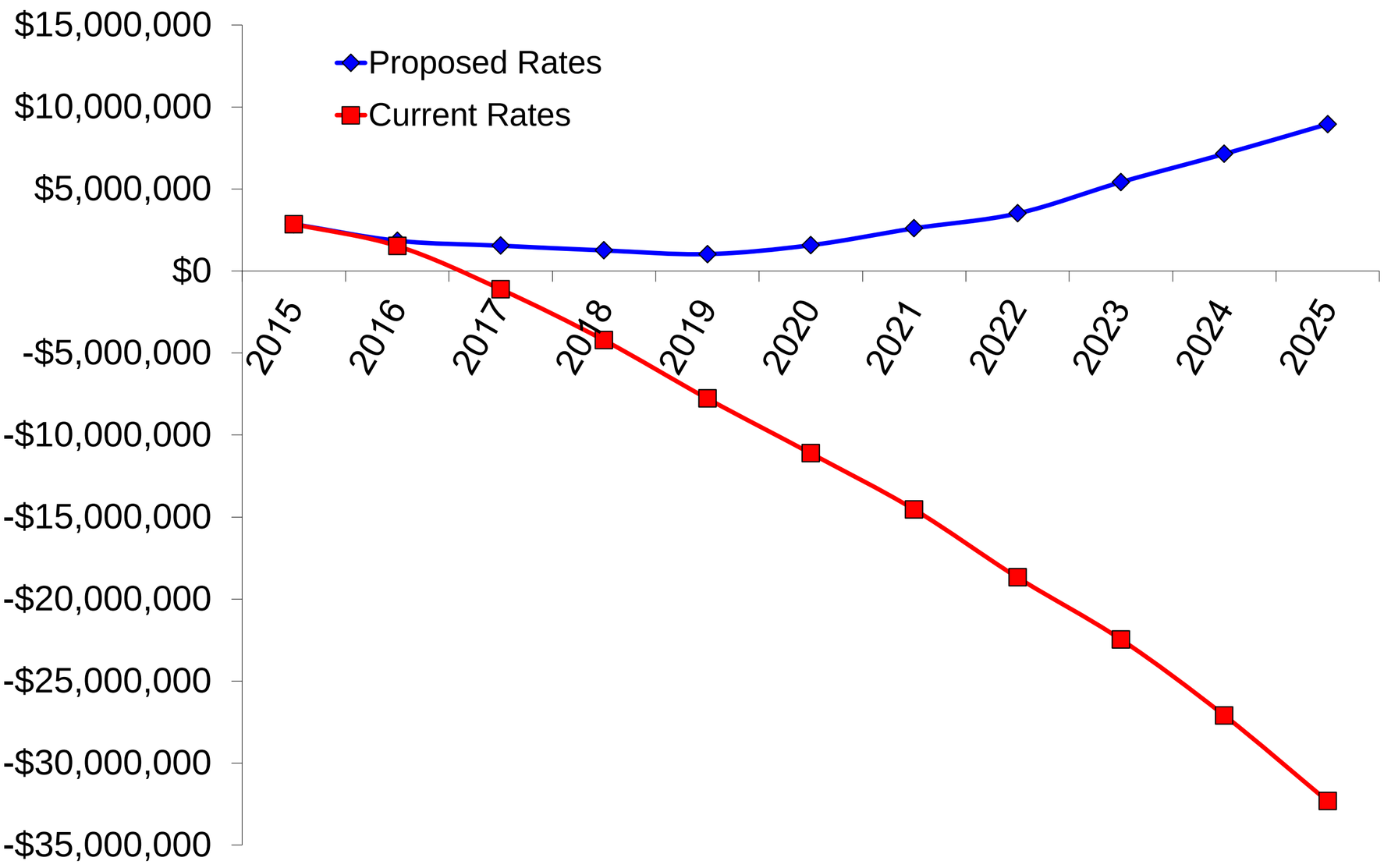

Table 11 - Initial Rate Adjustments and Resulting Revenues

Manhattan, KS; Sewer Rates Scenario 2016-4

This table depicts how rates would be set and the revenues they would generate.

After rate adjustments are made, general customers will be billed monthly.

Sales to be billed this year: Sales at the current (Test Year) rates (gray highlighted column) will apply until rates are adjusted. Sales at the modeled rates (yellow highlighted column) would apply if the modeled rates are adopted. The grand total "blended" sales revenues are the total revneues generated by the two different sets of rates. Those show in the right-most column.

Customer Class, Rate Class or Meter Size	Bottom of Volume Range in 100 Cu Ft	Top of Volume Range in 100 Cu Ft	Sales This Year at Current Rates	Customers Above This Volume and Below Next	New Minimum Charge Base Rates[1]	New Usage Allowance in 100 Cu Ft	New Unit Charge per 100 Cu Ft	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
In City Res	0	2	$449,002	1,820	$7.67	2.000	$4.60	$460	$449,462
	2	20	$4,684,365	11,431	$7.67	2.000	$4.60	$10,467	$4,694,831
	20	400	$60,317	63	$7.67	2.000	$4.60	$198	$60,515
	400	999,999	$917,532	2	$7.67	2.000	$4.60	$3,729	$921,261
In City Business	0	2	$90,342	366	$7.67	2.000	$4.60	$92	$90,434
	2	20	$821,874	669	$7.67	2.000	$4.60	$2,839	$824,713
	20	400	$1,744,314	698	$7.67	2.000	$4.60	$6,568	$1,750,882
	400	999,999	$353,618	19	$7.67	2.000	$4.60	$1,424	$355,041
Out City Res	0	2	$2,228	6	$11.51	2.000	$9.20	$2	$2,230
	2	20	$110,932	166	$11.51	2.000	$9.20	$331	$111,263
	20	400	$21,840	1	$11.51	2.000	$9.20	$117	$21,957
	400	999,999	$29,620	1	$11.51	2.000	$9.20	$159	$29,779
Out City Business	0	2	$7,395	20	$11.51	2.000	$9.20	$8	$7,402
	2	20	$11,445	10	$11.51	2.000	$9.20	$46	$11,491
	20	400	$23,003	5	$11.51	2.000	$9.20	$117	$23,120
	400	999,999	$133	0	$11.51	2.000	$9.20	$1	$133
K State?	0	2	$0	0	$7.67	2.000	$4.60	$0	$0
	2	20	$0	0	$7.67	2.000	$4.60	$0	$0
	20	400	$0	0	$7.67	2.000	$4.60	$0	$0
	400	999,999	$0	0	$7.67	2.000	$4.60	$0	$0
Total Rate Rev at Current Rates			$9,327,959		Total Rate Rev at Modeled Rates			$26,557	
Prorated capacity surcharges from Table 10, because minimum charges above do not include them									$3,553
Total Blended Rate Revenues for the Year [2]									$9,358,070

Note 1, New Minimum Charge Base Rates: Meter size-based minimum charges are being recommended so the amounts shown in this column are only the fixed operating costs portion of your minimum charges. For the full minimum charges to adopt, see Table 10.

Note 2, Blended Rate Revenues: During the year when rates will be adjusted, rate revenues generated will be "blended" revenues - part collected at the current rates and part collected at the adjusted rates. The table above calculates both kinds of revenue and totals them in the right-most column. Therefore, the anticipated timing of rate adjustment shown at the top of this table will cause rates to be charged as follows:

12.0 months at the old user charge rates and 0.0 months at the new user charge rates.