



THE CORPORATION OF THE MUNICIPALITY OF LAMBTON SHORES  
Grand Bend and Area Joint Sewage Board  
AGENDA

Meeting #: 05-2017  
Date: Friday, November 3, 2017  
Time: 9:30 a.m.  
Location: South Huron Town Hall - Carling Room, Exeter

Pages

1. Call to Order
2. Declaration of Pecuniary Interest
3. Approval of the Agenda

**RECOMMENDATION:**

THAT the agenda for the November 3, 2017 meeting of the Grand Bend and Area Joint Sewage Board as presented, be accepted.

4. Minutes of Previous Meeting

4.1 Minutes of the October 6, 2017 Meeting for Approval

3 - 5

**RECOMMENDATION:**

THAT the minutes of the Grand Bend and Area Joint Sewage Board meeting held on the 6th of October, 2017 as presented, be adopted.

5. Correspondence

There was no correspondence received.

6. Presentations & Delegations

6.1 Presentation - Steve Burns, P. Eng. - GBSTF Reserve Fund Contribution Report

6.2 Delegation - Bob Sharen - Life Cycle Reserve Fund

**7. Staff Reports**

**7.1 Report 08-2017 - Capital Replacement Reserve Fund**

6 - 29

**RECOMMENDATION:**

**THAT** Report STB 08-2017 regarding the “Capital Replacement and Rehabilitation Fund” be received; and

**THAT** the Grand Bend Area Joint Sewage Board establish a Capital Replacement and Rehabilitation Reserve Fund with a 2018 budget commitment of \$(TBD) increasing by 2% per annum to be reviewed in 2022.

**8. Other Business**

**9. Closed Session**

**10. Adjournment**



# The Municipality of Lambton Shores

## The Municipality of Lambton Shores Grand Bend and Area Joint Sewage Board

### Minutes

Friday, October 6, 2017  
8:30 a.m.

Member Present: Chair, Tom Tomes, South Huron  
Member, Maureen Cole, South Huron  
Member, Marissa Vaughan, South Huron  
Member, Dave Maguire, Lambton Shores  
Member Bill Weber

Member Absent: Member, Gerry Rupke, Lambton Shores

Staff Present: Steve McAuley, Director of Community Services, Lambton Shores  
Don Giberson, Environmental Services Director, South Huron  
Karen Cameron, Administrative Assistant, Lambton Shores

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#### 1. Call to Order

Chair Tom Tomes called the meeting to order at 8:30 a.m.

#### 2. Declaration of Pecuniary Interest

The Chair asked members to declare any pecuniary interest that they might have with the business itemized on the agenda and none were declared.

#### 3. Agenda Approval

**17-1006-01**

**Moved By:** Member Maguire

**Seconded By:** Member Vaughan

**THAT** the agenda for the October 6, 2017 meeting of the Grand Bend and Area Joint Sewage Board as presented, be adopted.

**Carried**

#### 4. Minutes of Previous Meeting

**17-1006-02**

**Moved By:** Member Weber

**Seconded By:** Member Maguire

**THAT** the minutes of the Grand Bend and Area Joint Sewage Board meeting held on August 4, 2017 as presented, be adopted as amended to delete alternate members from the attendee list unless present.

**Carried**

**5. Correspondence**

There was no correspondence received.

**6. Presentations**

There were no presentations.

**7. Staff Reports**

**7.1 Report STB 07-2017 - GBJSB - 2018 Budget.**

**17-1006-03**

**Moved By:** Member Weber

**Seconded By:** Member Maguire

**THAT** Report STB 07 - 2017 regarding a "Grand Bend Area Sewage System proposed 2018 Budget" be received for discussion.

**Carried**

**17-1006-04**

**Moved By:** Member Weber

**Seconded By:** Member Vaughan

**THAT** the attached 2018 draft budget be circulated to the Councils' of Lambton Shores and South Huron for comment, and

**THAT** the Board considers the 2018 final budget and Council comments at the November 17, 2017 scheduled board meeting.

**Carried**

**17-1006-05**

**Moved By:** Member Vaughan

**Seconded By:** Member Maguire

**THAT** the Board consider including \$20,000.00 in the 2018 budget for a consultant energy audit to address the costs of energy at the STF.

**Carried**

**17-1006-06**

**Moved By:** Member Cole

**Seconded By:** Member Maguire

**THAT** staff prepare a report by February 2018 regarding the amount of invasive species on grounds and the plan to control and eradicate.

**Carried**

## **7.2 Capital Replacement Fund**

Steve McAuley reported to the Board that the Consultant's report for the Capital Replacement Fund was still not available prior to this meeting. Steve McAuley mentioned that he would like to see the Board start thinking about this process and what it might mean to the budget for this year and the years to come.

The Board agreed to meet again on Friday, October 27, 2017 at 9:30 a.m. at the South Huron Town Hall, Carling Room, Exeter to review the consultant report.

## **8. Other Business**

**Moved By:** Member Weber

**Seconded By:** Member Cole

**THAT** the two motions regarding the draft budget be included with the draft budget to Councils for comments.

**Carried**

## **9. Adjournment**

**17-1006-07**

**Moved By:** Member Weber

**Seconded By:** Member Vaughan

**THAT** the October 6, 2017 Grand Bend and Area Joint Sewage Board meeting adjourn at 9:50 a.m.

**Carried**

## GRAND BEND AREA JOINT SEWAGE BOARD

**Report STB 08-2017**

**Board Meeting Date: November 3, 2017**

**TO:** Chair Tomes and Board Members

**FROM:** Steve McAuley, Director of Community Services, Lambton Shores

**RE:** Capital Replacement and Rehabilitation Fund

**RECOMMENDATION:**

**THAT** Report STB 08-2017 regarding the “Capital Replacement and Rehabilitation Fund” be received; and

**THAT** the Grand Bend Area Joint Sewage Board establish a Capital Replacement and Rehabilitation Reserve Fund with a 2018 budget commitment of \$(TBD) increasing by 2% per annum to be reviewed in 2022.

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### **SUMMARY**

The Tri-party agreement requires that a Capital Replacement and Rehabilitation Fund be established for the future capital costs requirements of the plant. BMRoss and Associates Limited has completed a report that includes analysis of the future cost requirements and presented options for various funding levels based on set criteria. A copy of the BMRoss report is attached for the Board’s review.

### **BACKGROUND**

BMRoss completed a report that outlined the future capital costs required for the plant and various scenarios for funding these costs. The scenarios presented are based on the following set criteria:

- Individual component costs for the plant
- Estimated useful life of the components
- Future funding availability
- Inflationary rate
- Interest earning rate
- Method of contributing (one set contribution or escalating contributions)

Individual components were broken out of the plant based on the actual amounts paid during the construction of the plant. Based on the fact the plant was recently completed, these costs were deemed to be an accurate costs for replacement calculations. The estimated useful life (EUL) used to determine when the components would need to be replaced was based on the asset management plan adopted by Lambton Shores.

Assumptions related to the availability of future grant funding have the largest impact on the contribution levels required. BMRoss has shown four (4) levels of potential funding, from 0% funding to 66.6% (2/3rds) funding. The existing plant was built with funding from the Federal and Provincial governments that equaled 66.6%. Historically senior government funding has been available for water and waste water work. Levels of funding have ranged as high as 85% in the 70's and 80's. Recent funding levels by higher levels of government seem to have settled on the idea of 1/3<sup>rd</sup> funding from the Federal, Provincial and Municipal levels of government. However there are no guarantees that grant funding will exist or be maintained at current levels.

For the purposes of calculating reserve contributions, an inflation rate of 2% is being used with an interest earned rate of 1.5% per annum.

Two (2) methods of contribution were presented for the Boards consideration.

1. The first method, called the Uniform Sinking Fund Approach, results in a single set contribution for the life of the fund (80 years). Any funding received proportionately reduces the contribution. While this approach has the advantage of establishing a set rate that will never increase, it will front load the contributions in terms of actual dollar value. As a result of this the users of the system today would pay a much higher dollar value as compared to the users contributing near the end of the fund.
2. The second option is the Annual Increasing Contributions Approach. This approach is based on a starting contribution value that increases annually by an amount that is similar to inflation. This approach would seem to more equitably distribute the replacement and rehabilitation costs to the users of the system over the life of the system.

While it would be nice to think that we could predict the future, and that the replacement and rehabilitation funding model will work for the next eighty years, it is only reasonable that we assume that the calculations will need to be revisited every 5-10 years in order to assess the ability of the fund to achieve the long term objectives. In order to conduct that assessment, it is important that the base criteria be established as opposed to randomly selecting a contribution amount. By having criteria that the calculation is based on, staff can compare individual factors such as historical interest rates, inflation rates etc. to determine if changes to the formula need to be made. That said, staff also recommend that the funding model implemented at this time assume that some amount of grant funding would remain available in the future. As/if the assumptions need to be changed, the reserve funding model can be adjusted by the Board in the future.

## **ALTERNATIVES TO CONSIDER**

This report presents information that could be used to support a number of funding alternatives. For example, instead of assuming that a 66.6% grant will be available, the Board may wish to be more conservative, and assume only a 50% future grant contribution will be available and increase the Board budgeted contribution level to \$102,300. Alternately the Board could consider other methods or formulas, and assumptions. The requirement to create the fund is stipulated in the Tri-party Agreement.

## **RECOMMENDED ACTIONS**

THAT Report STB 08-2017 regarding the “Capital Replacement and Rehabilitation Fund” be received; and

THAT the Grand Bend Area Joint Sewage Board establish a Capital Replacement and Rehabilitation Reserve Fund with a 2018 budget commitment of \$(TBD) increasing by 2% per annum to be reviewed in 2022.

## **FINANCIAL IMPACT**

The contribution to the Replacement and Rehabilitation Fund will form part of the 2018 budget. As the purpose of the fund is to replace the assets of the plant, the contribution would be split between the Participating Municipalities based on the capital contribution to the plant. This split is outlined in the Tri-party Agreement as follows:

64.7% - Lambton Shores  
35.3% – South Huron

The following charts show the individual contributions from each municipality based the two approaches recommended, using the base criteria outlined in the BMRoss Report but assuming different levels of funding:

### Uniform Series Sinking Fund Approach

Grant Funding %	Total Contribution	Lambton Shores Share	South Huron Share
0%	\$424,500	\$274,651.50	\$149,848.50
25%	\$318,400	\$206,004.80	\$112,395.20
50%	\$212,300	\$137,358.10	\$74,941.90
66.6%	\$141,800	\$91,744.60	\$50,055.40



Annual Increasing Contribution Approach (2018 amount increasing 2%/annum)

Grant Funding %	Total Contribution	Lambton Shores Share	South Huron Share
0%	\$205,000	\$132,635.00	\$72,365.00
25%	\$153,400	\$99,249.80	\$54,150.20
50%	\$102,300	\$66,188.10	\$36,111.90
66.6%	\$68,500	\$44,319.50	\$24,180.50

**CONSULTATION**

South Huron  
BMRoss and Associates Limited

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**REPORT ON RESERVE FUND  
CONTRIBUTION FOR THE GRAND BEND  
SEWAGE TREATMENT FACILITY**

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**REPORT ON RESERVE FUND CONTRIBUTION  
FOR THE GRAND BEND  
SEWAGE TREATMENT FACILITY**

**For the Joint Sewage Board**

October 26, 2017

B. M. ROSS AND ASSOCIATES LIMITED  
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File No. 17285

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## **REPORT ON RESERVE FUND CONTRIBUTION FOR THE GRAND BEND SEWAGE TREATMENT FACILITY**

### **1.0 INTRODUCTION**

B. M. Ross and Associates Ltd. (BMROSS) was retained by the Municipality of Lambton Shores to develop a value for a Reserve Fund Contribution consistent with the requirements of Sections 23 and 25 of the Agreement currently in place to administer the Facility. This requirement was included in the Agreement to ensure future funds will be available to replace and upgrade sewage system components as they begin to reach the end of their service life.

BMROSS prepared two options for the Joint Sewage Board to review. Staff presented these two options at the October 16, 2017 meeting of the Joint Sewage Board as a preliminary introduction to the concept of the Capital Reserve Fund Contribution. This report is meant to further explain the options and discuss the significance of the variables and assumptions inherent to the options.

### **2.0 PURPOSE OF THE RESERVE**

The reserve fund contribution satisfies requirements under Sections 23 and 25 of the GBSTF Joint Sewage Board Agreement, which state:

*“23. Capital Replacement and Rehabilitation Budget*

*The Capital Replacement and Rehabilitation Budget will project capital replacement and rehabilitation expenditures in accordance with all legislative requirements and the terms of the funding for the New Facility. For clarity, only members of the Joint Sewage Board that represent the Participating Municipalities that are contributing flows to the New Facility shall vote on the Capital Replacement and Rehabilitation Budget.”*

*“25. Capital Replacement and Rehabilitation Reserve Fund*

*A Capital Replacement and Rehabilitation Reserve Fund will be held by the Joint Sewage Board for the purpose of ensuring that sufficient funds are held to properly maintain the System. The Joint Sewage Board will hold this fund in a dedicated interest-bearing account. For clarity, only members of the Joint Sewage Board that represent the Participating Municipalities that are contributing flows to the New Facility shall vote on the Capital Replacement and Rehabilitation Reserve Fund.”*

### **3.0 THE ASSETS**

“The System” noted in Section 25 of the Agreement includes the new tertiary mechanical treatment facility (i.e. the GBSTF) on Mollard Line, the Main Sewage Pumping Station (SPS) in Grand Bend and 2,920m of 350mm dia. forcemain connecting the Main SPS with the GBSTF.

Although the system consists of the above three components, historical cost information on the Main SPS and the forcemain is incomplete and determining 2017 replacement estimates would be complex. For the purposes of determining a reserve fund contribution only the GBSTF has been considered at this time.

#### **3.1 Source of Assets and Value Data**

For the GBSTF the asset inventory was developed using Payment Certificate information developed during construction.

#### **3.2 Assets Included**

For a complete list of the GBSTF assets that were included in the reserve fund contribution calculation, refer to Appendix A. The list in Appendix A also includes the Estimate Useful Life (EUL), the unit price (2016 \$), and the required annual reserve contribution using a Sinking Fund analysis for each asset.

#### **3.3 Assets and Costs Excluded**

The list of assets in Appendix A does not include any items associated with either the Main SPS in Grand Bend, or the 2,920m long, 350mm dia. forcemain.

Additionally, the inventory list for the GBSTF was reduced by eliminating items that would not reasonably need to be replaced in the future (i.e. site grading). The sum of all costs is \$13,508,434. The total used in the Reserve calculation is approximately \$9,518,868 (70% of total). Potential engineering and project management costs related to future replacement have not been considered.

Furthermore, we note that the annual reserve contributions noted for each of the assets in Appendix A are based on the asset being replaced once, at the end of its EUL. Some assets will need to be replaced multiple times before other assets have reached their respective EULs. This is not reflected in the individual asset annual reserve contribution values in the Appendix.

#### **3.4 Asset Life Expectancy**

The asset list in Appendix A was summarized using similar component descriptions as used on the Asset Management Policy adopted by Lambton Shores has used previously in their Water and Wastewater (W&WW) Asset Inventory. Likewise, EULs applied to the asset list are based on the same policy.

#### 4.0 UNIFORM SERIES SINKING FUND APPROACH

As noted in Section 1.0, BMROSS has suggested two different approaches to generating a reserve fund contribution for the GBSTF. The first, as demonstrated by Figure 1, uses a uniform series sinking fund approach and was called “Option 1”.

A uniform series sinking fund approach is used to determine a constant number that if deposited and invested annually will be equivalent to a given future amount. This formula assumes future expenditures will cost more than they do today, as a result of inflation. It also assumes that the money saved today, will grow as a result of interest earned. The formula is:

$$A = F[i]/((1+i)^N - 1)]$$

Where A = Annual contribution

F = Future amount (note F is the present amount inflated over period N)

N = The period considered (i.e. the EUL)

i = Annual interest earned

Option 1 has assumed an interest rate of 1.5%, an inflation rate of 2.0% and a period of 20 to 80 years depending on the predicted asset life expectancy. 80 years is the maximum EUL in the inventory.

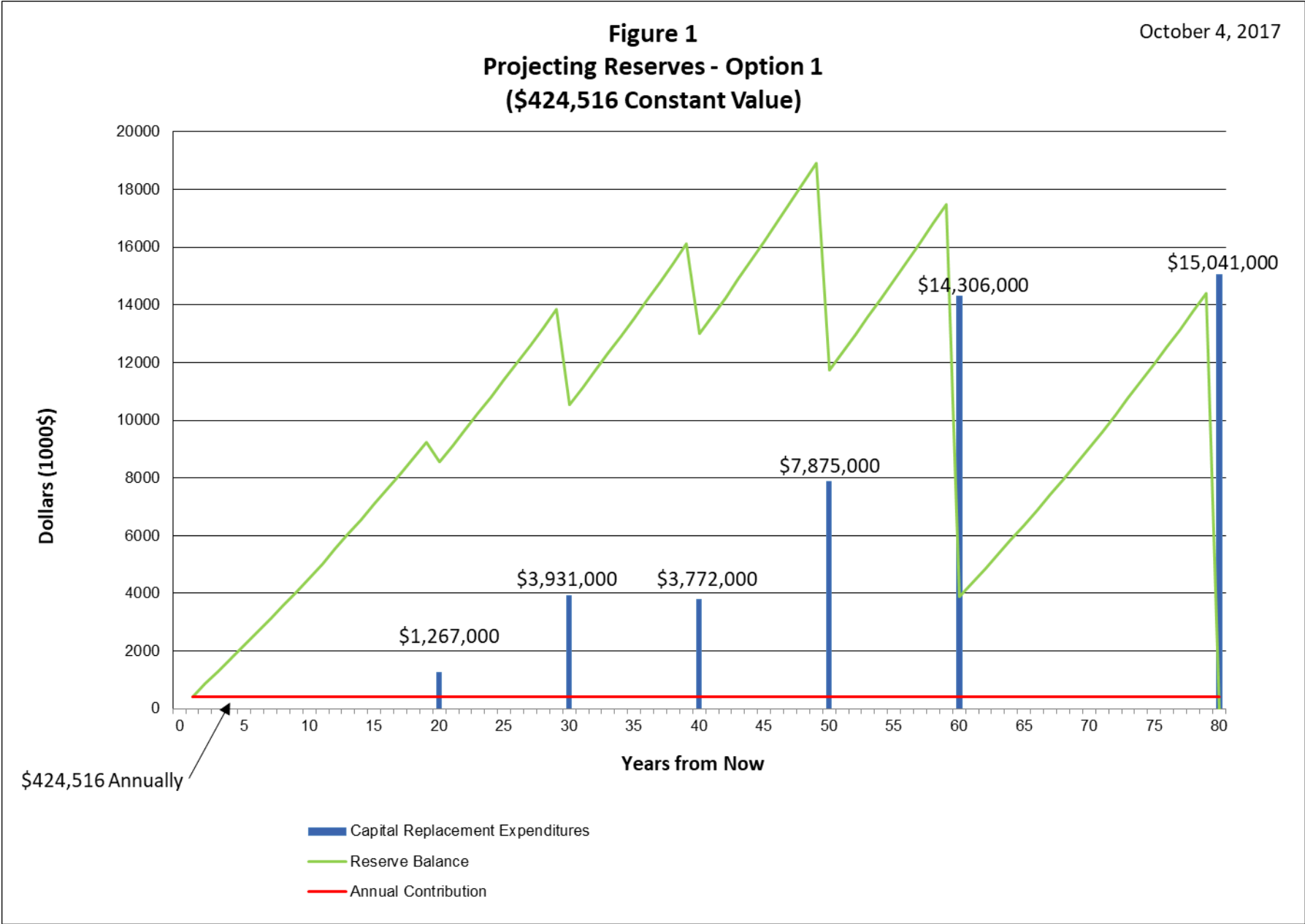
**Table 1**  
**Timing and Costs of Future Asset Replacements at the GBSTF**

<b>Years from Now</b>	<b>Estimated Expenditures <sup>1</sup></b>
20	\$1,266,400
30	\$3,930,300
40	\$3,771,900
50	\$7,875,100
60	\$14,305,900
80	\$15,040,300

Note: 1. Values presented are in future (i.e. inflated) dollars.

The result of the calculation is a requirement to set aside approximately **\$424,500** annually. Major expenditures are estimated to occur as identified in Table 1. The expenditures assume multiple replacement of assets as required based on the EULs.

The uniform series sinking fund approach will generate enough revenue to cover the above expenditures. At the end of the 80 year period, reserves are anticipated to be at or near \$0.





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## 5.0 ANNUALLY INCREASING CONTRIBUTIONS APPROACH

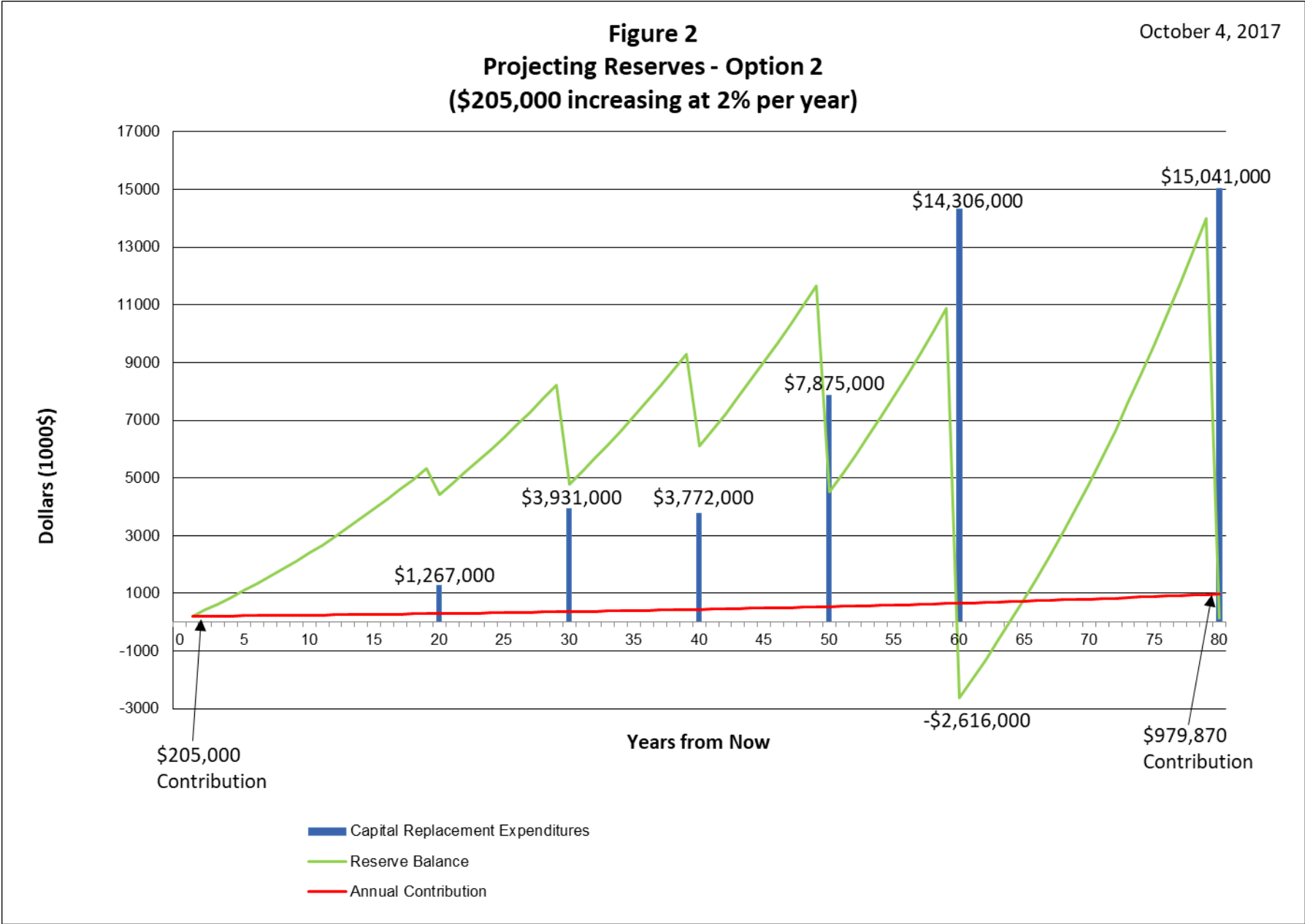
The other approach suggested for generating a reserve fund contribution for the GBSTF was to, in lieu of a constant value, annually increase the amount of reserve contribution. This option is demonstrated by Figure 2 and called “Option 2”.

Option 2 recognizes that the uniform series sinking fund approach (Option 1) requires proportionately significant investment upfront, when compared to annual operating costs. The 2017 operations budget is \$423,811 which is almost identical to the annual reserve contribution amount of \$424,500 for Option 1. However, the operations budget is expected to increase over time. If we assume it increases by inflation (2%), it would be \$2,066,300 in 80 years. So, although the annual reserve contribution amounts to approximately 100% of the operating budget in year 1, by Year 80 it equates to only 20% of that budget.

For Option 2, it was suggested to start with a lower amount in Year 1 and inflate the annual reserve contribution amount over the 80 year period. Actual expenditures are expected to remain the same as those identified in Table 1. We assumed that the annual reserve contribution amount would increase at a rate similar to inflation (2%).

The equation, solved by trial and error, results in a requirement to set aside approximately **\$205,000** in Year 1. By Year 80, this amount will increase to \$979,900. Annually, the value would be just under 50% of the expected operating budget.

Similar to Option 1, Option 2 will generate sufficient revenue to cover the required expenditures. Expected expenditures at Year 60 are significant enough that some short-term borrowing would be required. At the end of the 80 year period, reserves are anticipated to be at or close to \$0.



## 6.0 OUTCOMES

As noted in the earlier sections, two options for reserve fund contributions for the GBSTF were evaluated. The target goals for both options were similar:

1. Accumulate enough revenue to address future expenditures over an 80 year period.
2. By the end of the 80 year period, maintain a positive or near zero reserve balance.

Option 1 – The “Uniform Series Sinking Fund Approach” resulted in a suggested annual reserve contribution of **\$424,500** over the 80 year period.

Option 2 – The “Annually Increasing Contributions Approach” resulted in a suggested reserve contribution of **\$205,000** in year 1, increasing to **\$979,900** by year 80.

We note that with Option 1 the reserve balance is anticipated to remain positive over the entire 80 year period. However, with Option 2, it is anticipated that some borrowing will be required for a short period at the 60 year mark.

## 7.0 IMPACTS OF ASSUMPTIONS ON EACH APPROACH

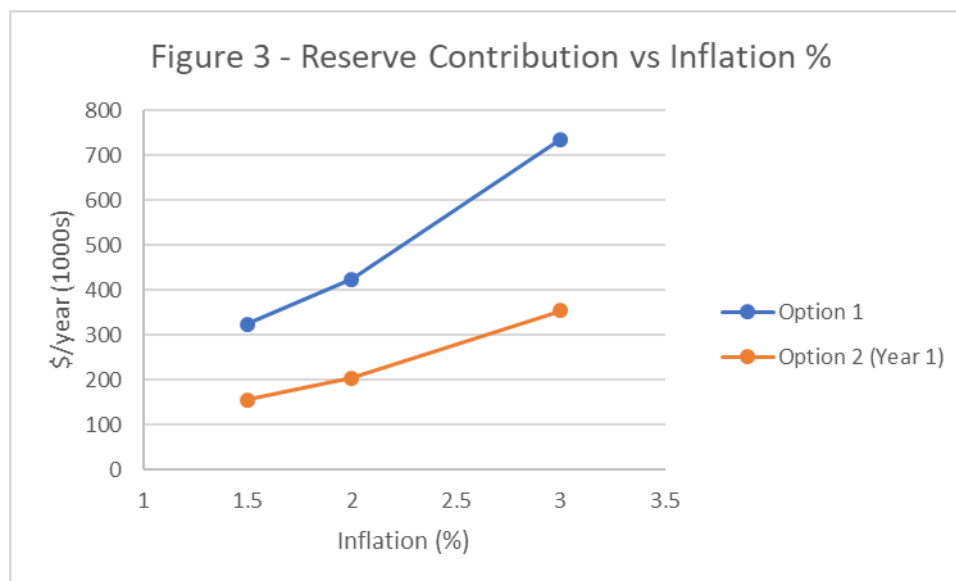
The following sections discuss the sensitivity of each of the assumptions applied to Options 1 and 2.

### 7.1 Inflation

As noted in earlier sections, an inflation rate of 2% was assumed in Sections 4.0 and 5.0. Table 2 and Figure 3 demonstrate the impact that having a higher (3%) or lower (1.5%) inflation rate will have on the two options.

**Table 2**  
**Impact of a Different Inflation Rate**

Inflation Rate (%)	Option 1 Reserve Contribution (\$/yr)	Option 2	
		Reserve Contribution, Year 1 (\$/yr)	Reserve Contribution, Year 80 (\$/yr)
1.5	325,400	156,800	749,400
2.0	424,500	205,000	979,900
3.0	736,200	354,700	1,695,500



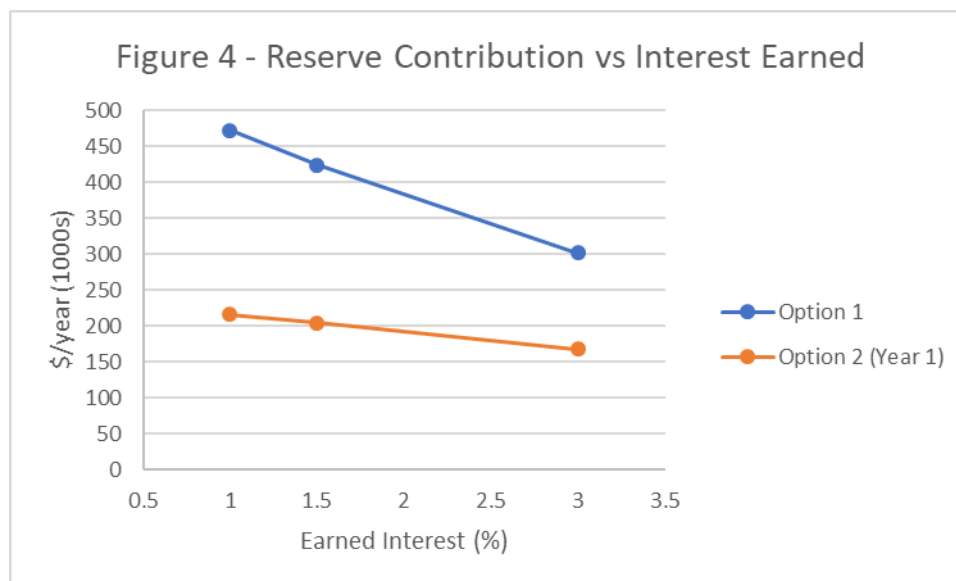
From Table 2, it is apparent that the required reserve contribution is very sensitive to the inflation rate. Proportionately both Options are impacted equally. Presumably Option 2, which requires an annually increasing contribution, would permit better monitoring and adjustment for inflation.

## 7.2 Earned Interest

As noted in earlier sections, an earned interest rate of 1.5% was assumed in Sections 4.0 and 5.0. Table 3 and Figure 4 demonstrate the impact that having a higher (3%) or lower (1.0%) earned interest rate will have on the two options.

**Table 3**  
**Impact of a Different Earned Interest Rate**

Earned Interest Rate (%)	Option 1 Reserve Contribution (\$/yr)	Option 2	
		Reserve Contribution, Year 1 (\$/yr)	Reserve Contribution, Year 80 (\$/yr)
1.0	472,500	216,200	1,033,600
1.5	424,500	205,000	979,900
3.0	301,800	168,200	804,100



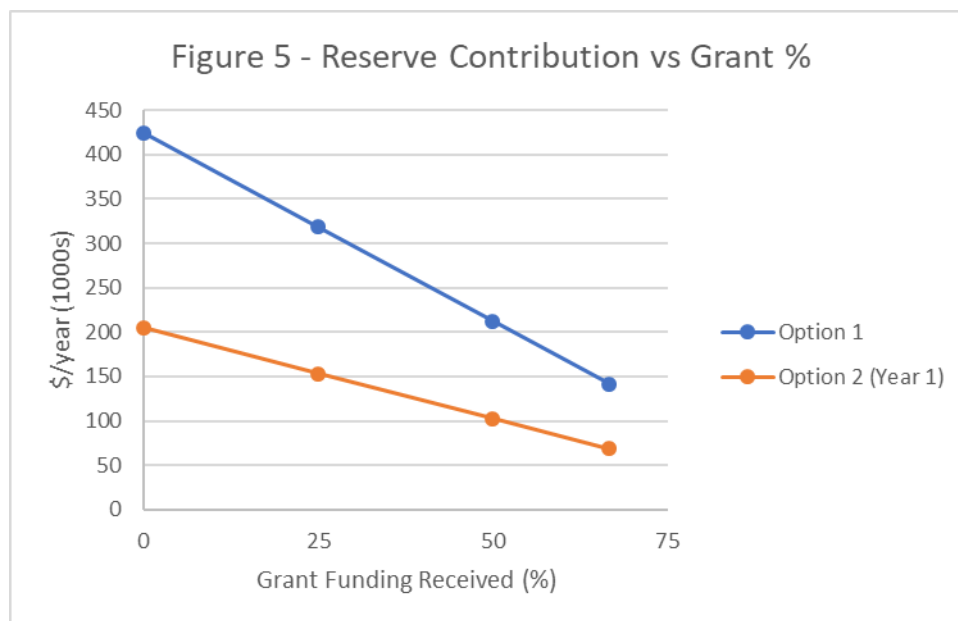
The amount of interest earned on the Reserve Fund account is a significant factor. In the base condition we have assumed interest earned (1.5%) is actually less than inflation (2.0%). This is the true case for 2017. Presumably, at some point, interest earned could equal or exceed inflation, thus permitting lower contributions. Option 1, which has a greater contribution in the earlier years, benefits more by an increase in Interest Earned. Option 2, with its annual adjustment, permits better monitoring and response to rate changes.

### 7.3 Grants

The calculations used in Sections 4.0 and 5.0 assumed no (0%) grant funding and all of the money necessary to fund the asset replacements comes from reserves. Using the base case of an earned interest rate of 1.5%, an inflation rate of 2.0%, and a period of 80 years, Table 4 and Figure 5 demonstrate what impact receiving 25%, 50% or 66.6% grant money on all of the anticipated expenditures will have on the two options.

**Table 4**  
**Impact of Receiving Grant Funding**

Grant Funding Received (%)	Option 1 Reserve Contribution (\$/yr)	Option 2	
		Reserve Contribution, Year 1 (\$/yr)	Reserve Contribution, Year 80 (\$/yr)
0	424,500	205,000	979,900
25	318,400	153,400	733,200
50	212,300	102,300	488,800
66.6	141,800	68,500	327,300



The Reserve Fund Contributions for both options respond linearly to grant funding and both respond in the same proportion. Assuming a grant is available is the same as assuming costs will be less and correspondingly less must be saved.

#### 7.4 Period of Planning

The calculations used in Sections 4.0 and 5.0 assumed an 80 year planning period consistent with the longest EUL. Table 5 and Figure 6 demonstrate what impact assuming a 60 or 100 year planning period will have on the two options.

**Table 5**  
**Impact of Adjusting the Planning Period**

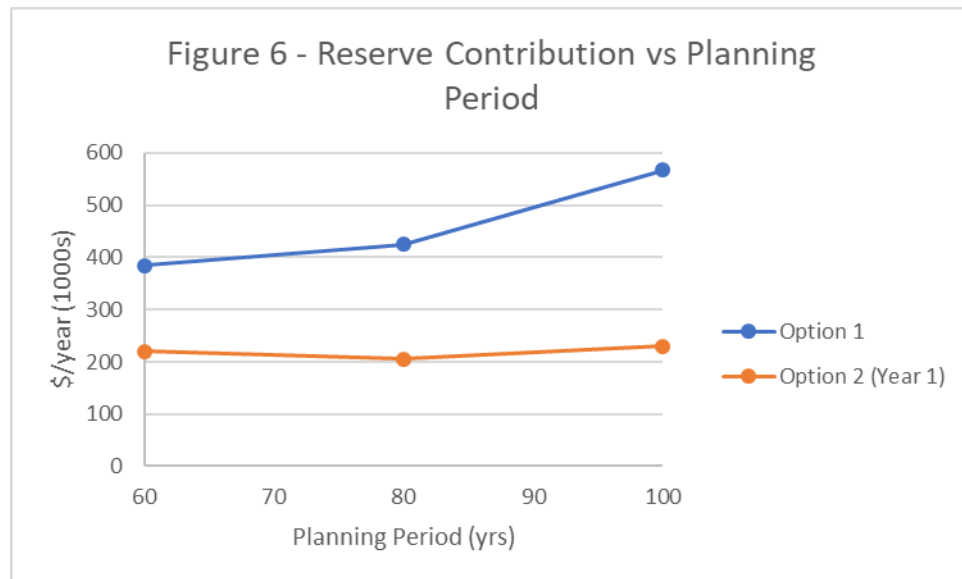
Planning Period (yrs)	Option 1 Reserve Contribution (\$/yr)	Option 2	
		Reserve Contribution, Year 1 (\$/yr)	Reserve Contribution, Year 80 (\$/yr)
60	384,200	220,600	1,054,500
80	424,500	205,000	979,900
100	566,600	230,500	1,101,800

The “Planning Period” is the period of years that the Reserve Fund will pay for replacement of the facilities. As set out in Appendix A, asset EULs have been defined as 20, 30, 40, 50, 60 and 80 years. A 60 year Planning Period will account for all costs up to 60 years including 3 cycles of the 20 Year EULs and 2 cycles of the 30 Year EULs. A 60 Year Planning Period does not account for assets to be replaced at 80 years. A 100 year Planning Period accounts for all assets plus an additional cycle of the 20, 30 and 50 year assets.

The Reserve contribution is impacted by inflation and also by interest earned. For example, less interest is earned over a 60 year period than 80 year period thus requiring greater annual contributions.

The analysis demonstrates:

- Option 2 is affected less than Option 1 by the Planning Period assumption.
- The optimum Planning Period in terms of Reserve contributions for Option 2 is 80 years.



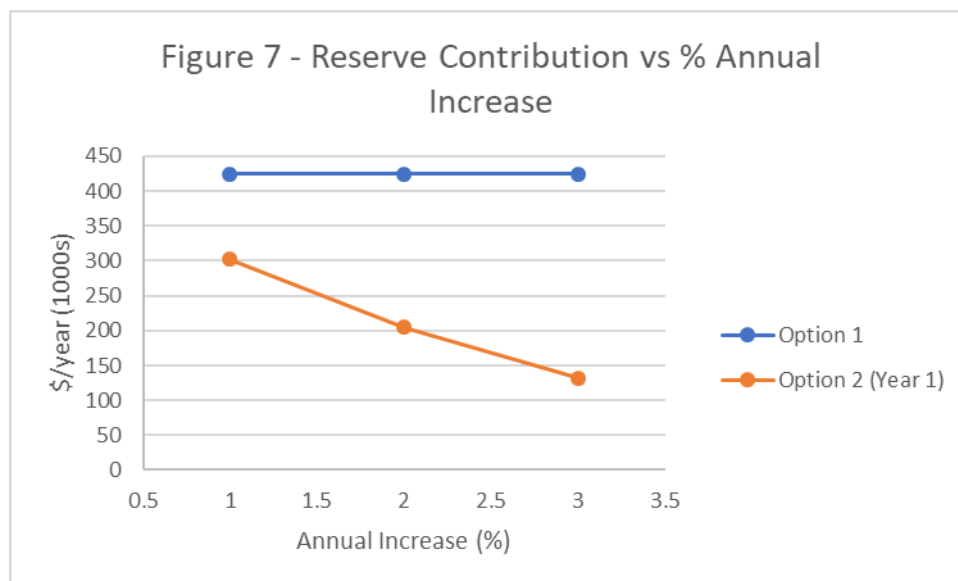
## 7.5 Annual Increase

The calculation used in Section 5.0 assumed that the annual contribution for Option 2 would increase by a rate similar to inflation (2%) over the entire 80 year planning period. Table 6 and Figure 7 demonstrate what impact assuming a 1% or 3% increase will have on Option 2.

**Table 6**  
**Impact of Adjusting the Annual Increase on Option 2**

Annual Increase (%)	Option 1 Reserve Contribution (\$/yr)	Option 2	
		Reserve Contribution, Year 1 (\$/yr)	Reserve Contribution, Year 80 (\$/yr)
1.0	424,500	301,800	662,400
2.0	424,500	205,000	979,900
3.0	424,500	132,300	1,366,800

The base case for Option 2 assumed an annual increase in the contribution of 2% based on matching the assumed cost of inflation. Table 6 provides a picture of the impact (negative or positive) of contributing less or more than inflation. The effect is significant. The contribution for Option 1 is not affected by this because the principle for Option 1 is a constant uniform contribution.



## 8.0 SUMMARY

BMROSS was retained to develop a value for a Reserve Fund Contribution consistent with the requirements of Sections 23 and 25 of the Joint Sewage Board's Agreement for the Grand Bend Sewage Treatment Facility. This requirement was included in the Agreement to ensure future funds will be available to replace and upgrade sewage system components as the assets reach the end of their service life.

The analysis is for the sewage treatment facility only and excludes the Main SPS and forcemain.

Two options are presented.

- **Option 1** – The “Uniform Series Sinking Fund Approach” results in a suggested annual reserve contribution of **\$424,500** over the 80 year period.
- **Option 2** – The “Annually Increasing Contributions Approach” results in a suggested reserve contribution of **\$205,000** in Year 1, increasing to **\$979,900** by year 80.

The target goals for both options were to:

- Accumulate enough revenue to address future expenditures over an 80 year period.
- By the end of the 80 year period, maintain a positive or near zero reserve balance.

The assumptions made for both options were identical and included:

- An inflation rate of 2.0% on future replacement values.
- An earned interest rate of 1.5% on reserves.
- No grant money available for future replacements.
- A planning period of 80 years.
- An annual increase in reserve contributions of 2% (for Option 2 only)



Sections 7.1 to 7.5 of this Report provide an indication of the sensitivity of each of the above assumptions on the Reserve Contribution for Options 1 and 2. Table 7 summarizes the significance of the assumption.

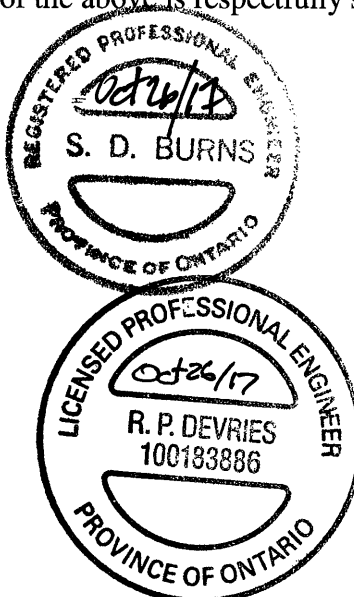
**Table 7**  
**Sensitivity of Assumptions**

Assumption	Base Case	Impact on	
		Option 1 (Fixed Contribution)	Option 2 (Increasing Contribution)
Inflation	2%	Significant	Less significant
Earned Interest	1.5%	Significant	Less significant
Grant Contribution	0%	Very significant	Very significant
Planning Period	80 years	Significant	Not significant
Increase in Contribution	0% for Option 1 2% for Option 2	Not applicable	Significant


In summary the most significant assumption is the % grant available. Option 2 is less sensitive to changes in inflation or interest earned because there is an annual opportunity to adjust the contribution to match conditions.

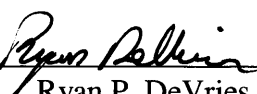
Option 2 also has the advantage of deferring higher contributions to later years when there are more customers.

All of the above is respectfully submitted.



B. M. ROSS AND ASSOCIATES LIMITED

Per   
Stephen D. Burns, P. Eng.

Per   
Ryan P. DeVries, P. Eng.

**APPENDIX A**

**LIST OF GBSTF ASSETS  
USED IN CALCULATION**

**Lambton Shores W&WW Financials**  
**Reserve Calculation for Grand Bend WWTF**

Inflation Allowance (%) = 2.0  
Earned Interest Allowance (%) = 1.5

Note - Annual Reserve Contribution values have not been adjusted to account  
for when assets need to be replaced multiple times over 80 years.

PC Item No.	Description	EUL (years)	Unit Price (2016)	Annual Reserve Contribution
<b>Wastewater Treatment Facility Site Works &amp; Tankage (WWTF Site)</b>				
2.5	Process Yard Piping (Pressure Pipe)	50	\$747,000	\$27,287
2.7	Site Drainage Piping	50	\$262,000	\$9,571
2.10	Sidewalks	50	\$16,100	\$588
2.11	Fencing & Gates	50	\$32,253	\$1,178
3.1	CIP-Reactor-Clarifier Tanks	80	\$1,155,000	\$36,874
3.2	CIP-Equipment and Pipe Support Pads	80	\$25,000	\$798
3.3	Pre-Cast Maintenance Holes & Chambers	80	\$85,000	\$2,714
3.4	Pre-Cast Pumping Station Chambers	80	\$50,000	\$1,596
3.5	Other Items Required to Complete Div 3	80	\$61,646	\$1,968
5.1	Structural Steel, Lintels and Accessories	50	\$70,705	\$2,583
5.2	Platforms, Gratings and Handrails-Reactor Clarifiers	50	\$65,060	\$2,377
5.3	Access Hatches	50	\$52,300	\$1,910
7.2	Waterproofing (concrete tanks)	50	\$33,500	\$1,224
9.2	Other Items Required to Complete Div 9	20	\$18,200	\$1,170
11.1	Submersible Pumps (RASP, WASP & SCP)			
11.1.1	Supply	30	\$200,000	\$9,651
11.1.2	Install	30	\$20,000	\$965
11.2	Clarifier Mechanisms			
11.2.1	Supply	30	\$290,000	\$13,993
11.2.2	Install	30	\$80,000	\$3,860
11.3	Fine Bubble Diffusers			
11.3.1	Supply	30	\$35,000	\$1,689
11.4	PS Submersible Pumps (WEB, DCP, EQP & DRP)			
11.4.1	Supply	30	\$50,000	\$2,413
11.4.2	Install	30	\$10,000	\$483
11.5	Other Items Required to Complete Div 11	30	\$50,000	\$2,413
14.1	Lifting Davits	30	\$5,790	\$279
15.1	Process Piping	50	\$226,000	\$8,256
15.2	Process Valves	50	\$50,000	\$1,826
15.3	Process and Mechanical Identification	50	\$2,000	\$73
15.4	Pipe Insulation	50	\$50,000	\$1,826
15.5	Plumbing & Drainage	50	\$10,000	\$365
15.6	Process Piping Testing	50	\$5,000	\$183
16.1	Electrical Services	40	\$36,000	\$1,465
16.2	Electrical Distribution	40	\$77,000	\$3,133
16.3	Process Electrical	40	\$8,000	\$326

PC Item No.	Description	EUL (years)	Unit Price (2016)	Annual Reserve Contribution
16.4	Instrumentation	20	\$30,000	\$1,928
<b>Wastewater Treatment Plant Admin &amp; Process Building (WWTF Admin)</b>				
3.1	CIP - Admin/Process Building	60	\$445,000	\$15,175
3.2	CIP - Equipment & Pipe Support Pads	60	\$12,000	\$409
3.3	Other Items Required to Complete Div 3	60	\$18,500	\$631
4.1	Masonry (Cavity Wall c/w Insulation)	60	\$140,000	\$4,774
4.2	Masonry (Concrete Block)	60	\$117,646	\$4,012
5.1	Structural Steel, Lintels & Accessories	50	\$28,465	\$1,040
5.3	Grating	50	\$7,850	\$287
6.1	Rough Carpentry	50	\$4,000	\$146
6.2	Finish Carpentry	50	\$1,000	\$37
7.1	Foundation Insulation	50	\$9,077	\$332
7.2	Fire Stopping & Smoke Seals	50	\$2,500	\$91
7.3	Metal Flashing & Trim	50	\$5,000	\$183
7.4	Sealants	50	\$2,500	\$91
8.1	Metal Doors and Frames	50	\$21,844	\$798
8.2	Aluminum Doors and Frames	50	\$19,220	\$702
8.3	Sectional Overhead Doors	50	\$14,995	\$548
8.4	Aluminum Windows	50	\$29,265	\$1,069
8.5	Finish Hardware	50	\$16,656	\$608
8.6	Glazing (Interior Windows)	50	\$3,459	\$126
8.7	Other Items Required to Complete Div 8	50	\$2,970	\$108
9.1	Acoustical Suspension Systems	50		\$0
9.2	Gypsum Board (Metal Studs & Insulation)	50	\$97,598	\$3,565
9.3	Acoustical Panels & Ties	50	\$38,375	\$1,402
9.4	Epoxy Flooring	50	\$25,000	\$913
9.5	Chemical Resistant Coating (inc in 9.4)			
9.6	Painting (Walls)	50	\$48,000	\$1,753
9.7	Painting Epoxy (Steel)	50	\$5,400	\$197
9.8	Other Items Required to Complete Div 9	50	\$10,900	\$398
10.1	Manufactured Specialties	20	\$14,923	\$959
10.2	Toilet Partions	20	\$850	\$55
10.3	Washroom Accessoreis	20	\$1,784	\$115
10.4	Identifying Devices	20	\$1,500	\$96
11.1	Submersible Pumps			
11.1.1	Supply	30	\$100,000	\$4,825
11.1.2	Install	30	\$15,000	\$724
11.2	Screen and Grit Removal System			
11.2.1	Supply	30	\$650,000	\$31,365
11.2.2	Install	30	\$20,000	\$965
11.3	Aeration Blowers			
11.3.1	Supply	30	\$60,000	\$2,895
11.3.2	Install	30	\$10,000	\$483
11.4	Filters			
11.4.1	Supply	30	\$500,000	\$24,127
11.4.2	Install	30	\$10,000	\$483

PC Item No.	Description	EUL (years)	Unit Price (2016)	Annual Reserve Contribution
11.5	UV Disinfection Equipment Package			
11.5.1	Supply	20	\$230,000	\$14,780
11.5.2	Install	20	\$5,000	\$321
11.7	Chemical Feed System			
11.7.1	Supply	20	\$110,000	\$7,069
11.7.2	Install	20	\$5,000	\$321
13.2	Pre-Engineered Building	60	\$605,000	\$20,631
14.1	Lifting Davits	50	\$32,725	\$1,195
14.2	Gantry Crane	50	\$29,102	\$1,063
15.1	Process Piping	50	\$429,000	\$15,671
15.2	Process Valves	50	\$350,000	\$12,785
15.3	Process and Mechanical Identification	50	\$2,000	\$73
15.4	Pipe Insulation	50	\$50,000	\$1,826
15.5	HVAC System - Administration	20	\$50,000	\$3,213
15.6	HVAC System - Plant	20	\$250,000	\$16,065
15.7	HVAC Balancing Reports	20	\$5,000	\$321
15.8	Plumbing and Drainage	50	\$17,000	\$621
16.1	Electrical Services	40	\$295,000	\$12,003
16.2	Electrical Distribution	40	\$160,000	\$6,510
16.3	Standby Generator	30	\$64,000	\$3,088
16.4	Process Electrical	40	\$30,000	\$1,221
16.5	Building Services Electrical	40	\$250,000	\$10,172
16.6	Instrumentation	20	\$100,000	\$6,426
16.7	SCADA (Entire Plant - All Areas)	20	\$30,000	\$1,928
		<b>Total</b>	<b>\$9,518,658</b>	<b>\$390,756</b>