HEMSON
Consulting Ltd.

30 St. Patrick Street, Suite 1000, Toronto, Ontario, Canada M5T 3A3
Facsimile (416) 595-7144 Telephone (416) 593-5090
e-mail: hemson@hemson.com

MEMORANDUM

To: Rod Fraser, Manager of Public Works; Kevin Bryant, Supervisor of Public Works; Lisa LaRocque, Financial Systems Advisor

From: Craig Binning, Andrew Mirabella and Jaclyn Hall, Hemson Consulting Ltd.

Date: August 5, 2016

Re: Working Analysis: Water and Wastewater Utility Rates (Updated from February 12, 2016)

Further to our discussion, Hemson Consulting Ltd. is pleased to submit this memorandum outlining the key assumptions used to derive the water and wastewater rates for each service area in the County. The MS-Excel financial model provides further details of the rate calculations. The model examines the period from 2016 to 2026, however, we would note that the base year of the analysis is 2017.

Please note the information contained in the memorandum is still considered to be draft and used for discussion purposes only. An updated memorandum will be prepared following discussions at the August 9th working session with staff and will be circulated in advance of the subsequent meeting with the County's Executive Committee and Council.

A. GROWTH IN CONNECTIONS AND CONSUMPTION

The first step in the utility rate calculation is to project the number of new connections anticipated to be serviced by water and wastewater services over the next 11-years (2016-2026). As the total number of year-end 2016 connections has not yet been determined an estimate has been provided. In addition, a forecast of water consumption and wastewater generation for each user class has been prepared. It

should be noted that wastewater generation is based on metered water consumption. The one exception being some industrial operations (i.e. concrete plants) are billed for water use but are not billed for wastewater – the consumption associated with these operations has been netted off the Hemson wastewater generation forecast.

1. Number of New Connections

The estimated growth in the total number of water and wastewater connections (or accounts) was informed through discussions with the County's Planning and Finance staff. At year-end 2015, the County had 1,002 water connections which is forecast to grow by approximately 200 additional connections over the 2016-2026 period. Overall, the majority of the growth in the County is forecast to occur in the Acheson Commercial and Acheson Big Lake service areas. Acheson Commercial is estimated to grow by approximately 8 connections annually, whereas Acheson Big Lake (residential) is estimated to grow at a slightly faster rate of approximately 9 connections a year. Recognizing the current economic environment in Alberta, the forecast assumes that growth will be slowed in the initial years of the forecast (2016 to 2017) and will begin to recover in 2018.

Moving forward, it is assumed that customers who connect to the County water system will also receive wastewater service – the exception being the areas only receiving wastewater service. Overall, approximately 205 new wastewater connections are anticipated to occur over the 2016-2026 period at an average annual growth rate of 1.5%. It should be noted that due to declining population and lack of anticipated development in the smaller service areas of Tomahawk and Duffield, no growth in connections is anticipated.

Table 1: Water Connections

Service Area	2015 Year-end Connections	2026 Estimated Connections	*Growth 2016-2026*
Acheson Commercial	276	364	*88*
Acheson Big Lake	495	593	*98*
Entwistle Commercial	12	17	*5*
Entwistle Residential	203	213	*10*
Commission Water	16	16	*0*
Tomahawk	0	0	*0*
Duffield	0	0	*0*
Atim Creek/Helenslea	0	0	*0*
Regional	0	0	*0*
Total	**1,002**	**1,203**	***201***

Table 2: Wastewater Connections			
Service Area	**2015 Year-end Connections**	**2026 Estimated Connections**	***Growth 2016-2026***
Acheson Commercial	266	354	*88*
Acheson Big Lake	495	593	*98*
Entwistle Commercial	12	17	*5*
Entwistle Residential	203	213	*10*
Entwistle Flat	6	6	*0*
Commission Wastewater	16	16	*0*
Tomahawk	47	47	*0*
Duffield	37	37	*0*
Atim Creek/Helenslea	102	106	*4*
Regional	2	2	0
Total	**1,186**	**1,391**	**205**

2. Growth in Consumption per Cubic Meter

For the purpose of setting a utility rate, "billed"[1] metered consumption for each service area is forecasted. The forecast of future consumption is primarily based on the last five years of billed consumption data while considering:

a) the trends observed in the most recent 2015-year end figures; and

b) ongoing residential and non-residential water conservation measures and declining usage patterns amongst Canadian municipalities.

In our most recent water and wastewater rate studies, we have found that customer profiles have been changing over time: generally, water consumption patterns have been declining, even with the addition of new residential and non-residential units – similar to the trend seen in jurisdictions across Alberta and other provinces. The reduced level of water consumption can largely be related to:

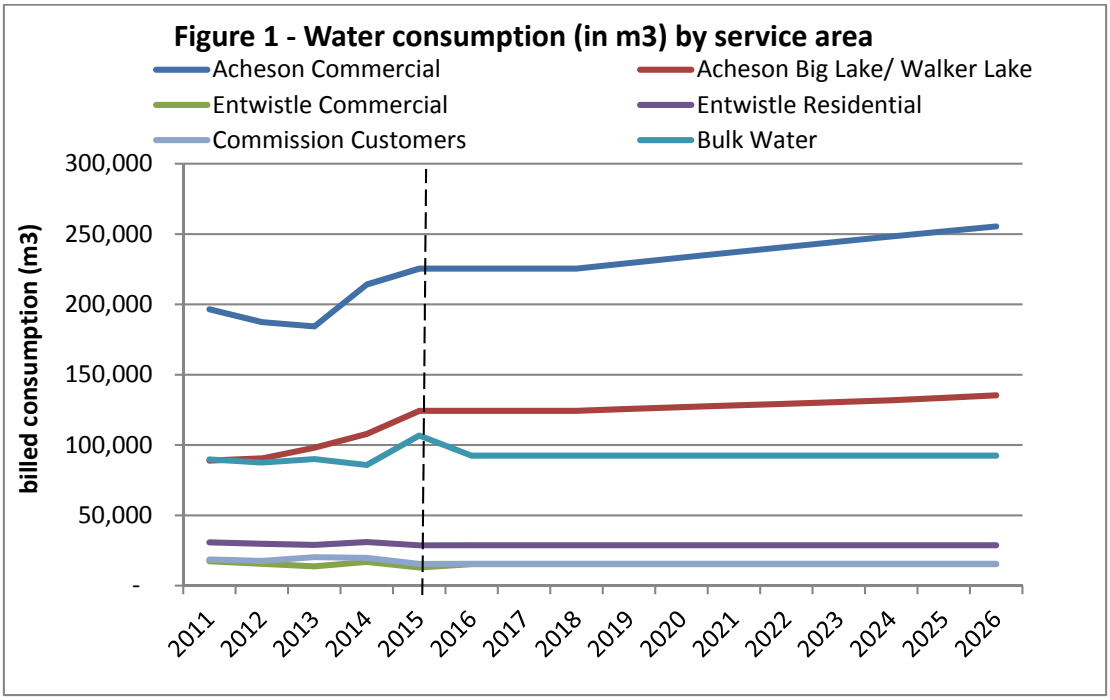
1. Demographic changes and household formation sizes – there are fewer people residing in each dwelling unit ultimately reducing the water use in each household;
2. Industrial/commercial operations continue to adapt their business processes to be more efficient and environmentally friendly; and
3. A variety of efficiency improvements for household appliances have noticeably reduced demand: present-day dishwashers and washing machines are very economical in terms of water use.

Conversely, water consumption activity in Parkland County, and more specifically the Acheson Commercial and Big Lake service area has not followed this trend. This service area has seen fairly substantial increases in year-to-year billed consumption which can largely be attributed to the significant amount of new commercial/industrial

[1] *Billed consumption is referred to as water which is actually provided to the end-user and not what is produced at the plant.*

units coming online (44% growth since 2011) in addition to the construction of new residential dwelling units (30% growth since 2011) which has outweighed any water conservation measures and adjustments from the existing serviced population. Mindful of the above noted consumption trends, future billed consumption in Acheson Commercial and Big Lake will continue to increase, although at a much more moderate pace than historical trends. The remaining service areas are projected to see little changes in year-to-year billed consumption, despite new growth.

Figure 1 on the following page illustrates the forecasted water consumption trends for each service area.



3. Non-Revenue Water

The Acheson and Big Lake water distribution system is serviced through two reservoir-pumphouses. The reservoir pumphouse are both located near the Capital Region Parkland Water Services Commission (CRPWSC) water line where the County purchases its water which is then supplied to its customers. Customers in the Entwistle service area receive potable water from the plant located in Entwistle which is owned and operated by the County. As part of the rate study analysis, the estimated non-revenue water from these systems has also been examined.

Non-revenue water or "unaccounted for water" is defined to reflect the distributed volume of water that is not reflected in customer billings. This variance (distributed water vs. billed water) can be associated by two key components:

1) unbilled authorized consumption: water which is used for internal use such as firefighting, flushing, etc. and;

2) Apparent/or real losses – water lost through system leakages, customer meter inaccuracies, unauthorized consumption, etc.

The following tables provide an overview of the historical non-revenue water in the County for both the Acheson and Entwistle systems.

Acheson Water System					
	2011	**2012**	**2013**	**2014**	**2015**
Plant Production	453,833	435,529	456,215	510,396	585,845
Billed Consumption[1]	375,353	365,527	372,573	408,024	456,684
Water Loss	**17%**	**16%**	**18%**	**20%**	**22%**

[1] Includes residential, commercial and bulk water consumption

Entwistle Water System					
	2011	**2012[2]**	**2013[2],**	**2014**	**2015**
Plant Production	65,763	82,353	70,111	58,841	53,860
Billed Consumption[1]	48,517	45,558	43,013	48,203	41,989
Water Loss	**26%**	**45%**	**39%**	**18%**	**22%**

[1] Includes residential, commercial and flat consumption

[2] 2012 and 2013 data appears to be skewed and should be omitted from average. To confirm with staff.

In recent years, non-revenue water for both the Acheson and Entwistle systems has averaged between 20-22%. By mitigating and/or reducing the amount of water that is unaccounted for the County will benefit from annual costs savings, have increased opportunities for the deferral of capital expenditures, and increased system capacity. We would recommend that the County continue to monitor its non-revenue water on an annual basis.

B. OPERATING ASSUMPTIONS

The approved 2017 draft budget was used as the base budget to estimate future operating expenditures. As part of the operating analysis, a number of adjustment factors have been applied to the 2017 operating budget to estimate future expenditures and non-user rate revenues over the forecast period to 2026. It should be noted that for each non-rate revenue or expenditure item, the same adjustment factor is applied uniformly to each service area in the County. A summary of the budget item, the applied adjustment factor and the source, are provided in the table below.

Table 3: Adjustment Factors		
Budget Item	**Adjustment Factor**	**Source**
Non-Rate Revenues		
Special Taxes (Acheson/Big Lake)	2%	General Inflation: see note below
Sales	0%	
Interest on Investments	0%	
Utilities	2%	General Inflation
Fees	2%	General Inflation
Provincial Capital	0% (One Time Revenue)	
Expenditures		
Salaries	3%	Council approve cost of living adjustment
Employer Contributions	3%	Council approve cost of living adjustment
General Services	2%	Inflation
Telephone	2%	Inflation
Other Professional Fees	2%	Inflation
Repairs	2%	Inflation
Contracts	2%	Inflation
Rentals-Mach & Equip	2%	Inflation
Supplies, Oil, Parts, Gravel, Tools, Non-Capital	2%	Inflation
Administration Costs	2%	Inflation
Internal Rent Charge for City Equipment	2%	Inflation
Utilities, Natural Gas	5%	Reflection of recent trends
Water and Sewer Purchases	Specific to each area	See comments below

1. Waterworks Levy – Acheson Special Tax

The Acheson special taxes are a levy charged to water users in the Acheson Commercial and Big Lake servicing area. Currently, the revenue generated from the tax is used to offset in-year operating and capital expenditures. Consistent with current practice, this revenue has been incorporated into the model and shown as a reoccurring revenue and adjusted to increase at a rate of 2% per annum over the planning period. Through discussions with staff, it was determined that overtime, the tax may be eliminated and the County may be required to incorporate the "lost revenue" through the water rates. The model has been created to recalculate the user rates which can be inclusive of the special tax revenues (status quo) or alternatively, the lost revenue be recouped through the utility rates.

2. Water Purchasing/Wastewater Treatment Cost Assumptions

Hemson has projected the water purchase and wastewater treatment costs for each service area based on:

1. The amount of water billed to each consumer (see figure 1). Consistent with current practice, water purchased is based on actual billed consumption and not what has been produced at the plant.

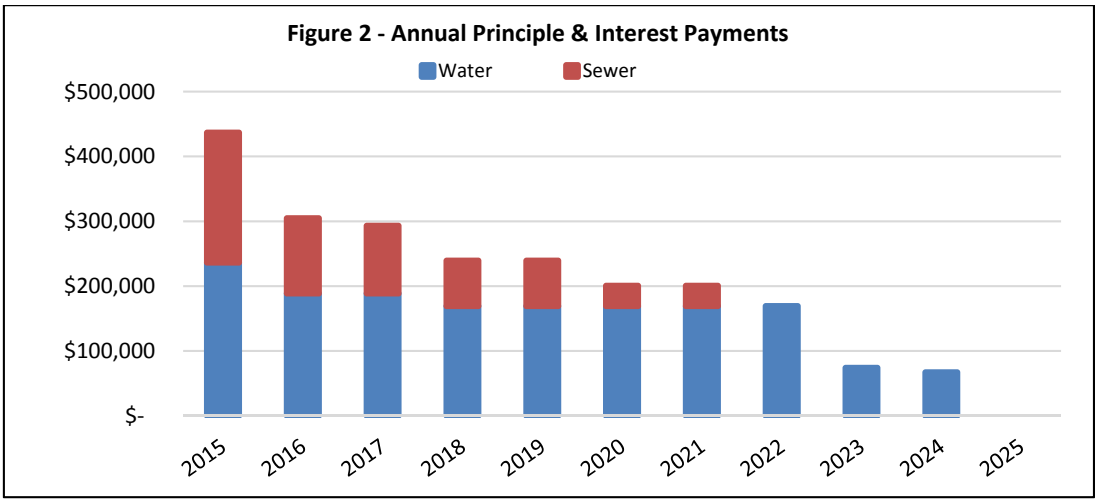
2. The utility rates ($/m3) are based on the Alberta Capital Region Wastewater Commission and Capital Region Parkland Water Services Commission flow rate projection costs as of January 2015. Table 4 below outlines the charge per cubic metre for water and wastewater.

Table 4: Forecast Purchasing/Treatment Costs per Cubic Metre		
Year	**ACRWC**	**CRPWC***
2016	$1.01	$1.49
2017	$1.06	$1.67
2018	$1.11	$1.85
2019	$1.16	$2.03
2020	$1.21	$2.07
2021	$1.26	$2.17
2022	$1.31	$2.28
2023	$1.36	$2.40
2024	$1.41	$2.52
2025	$1.46	$2.64
2026	$1.51	$2.77

** Rates from 2016-2020 have been provided by CRPWC, rates for 2021 to 2026 have been forecast based on a 5% annual increase as identified through discussions with staff*

3. Existing Debentures

The County's current utility rate debentures, as indicated in Figure 2, have been incorporated into the utility rate calculations. The debt is reflective of only County water and wastewater infrastructure – all existing utility rate related debt will be retired by 2025. No new debt is anticipated under the current analysis.



4. Forecast of Local Improvement Charge Revenue

The analysis assumes that the Local Improvement Charge (LIC) revenue will be used to offset annual principal and interest payments to which the LIC are being collected. The outstanding debt payments related to Acheson Sewer, the Duffield Sewage System, Hunter's Extension, Parkland Village Sewer and Parkland Village Wastewater will be paid for by way of LIC.

5. Off-site Levy (i.e. Development Charge) Revenues

The 2016 operating budget identifies Off-site levy (or development charge) revenues for the Acheson Big Lake water service area in the amount of approximately $21,500. The off-site levy revenue is used to fund the debentures relating to the Big Lake Water Line Extension projects (account number 17323 and 17324).

For the purposes of the operating forecast, it has been assumed that the off-site levy revenue will continue to be transferred from the Acheson Big Lake reserve until the closing balance has reached close to nil (See Table 5).

Table 5: Big Lake Water Line (Recovery) Reserve Forecast

Year	Opening Balance	Transfer from Reserve	Closing Balance
2016	$176,690	$21,496	$155,194
2017	$155,194	$21,496	$133,698
2018	$133,698	$21,496	$112,202
2019	$112,202	$21,496	$90,706
2020	$90,706	$21,496	$69,210
2021	$69,210	$21,496	$47,714
2022	$47,714	$21,496	$26,218
2023	$26,218	$21,496	$4,722

The forecast assumptions for the treatment of off-site levy revenue in relation to the Acheson/Big Lake area can be further refined through discussions with County staff.

C. CAPITAL AND CONTRIBUTIONS TO RESERVES

The approved 2016 capital budget, Tangible Capital Asset information, discussions with County staff and the Entwistle Infrastructure Assessment report prepared by AECOM in 2014 was used as the basis for the preparation of the 11-year capital forecast. In addition to the in-year capital requirements, Hemson has included annual provisions to reserves which would allow the County the ability to save for the future repair and replacement of existing infrastructure.

1. Capital Forecast

The tables below identify project timing, cost, funding source and amount to be funded through water and wastewater rates for each service area. Over the forecast period, the service areas of Acheson and Entwistle are anticipated to undertake capital projects

that will be, at least in part, funded through utility rates. While capital projects for other service areas have been identified, funding from other sources such as federal/provincial gas tax or off-site levies, have been identified as the primary funding tool and are therefore not included in the rate calculation. The rate supported capital projects for each service area are identified in the tables below.

The water capital projects relating to the Acheson Commercial and Acheson Big Lake service areas have been informed through discussions with County staff. Over the next eleven-years about $150,000 would have to be funded through the utility rates as shown in Table 6.

Table 6: Capital Projects Acheson– Water

Project	Timing	Cost	Funding	Rate Share
Walker Lake - Lakeshore Waterloop	2016	$30,000	Off-Site Levy	$0
Acheson Water Line Main (600 mm)	2017	$100,000	Off-Site Levy	$0
Acheson Reservoir Expansion (Zone 4)	2017	$250,000	Off-Site Levy	$0
Walker Lake - Lakeshore Waterloop	2017	$120,000	Off-Site Levy	$0
Acheson Water Line Main (600 mm)	2018	$1,000,000	Off-Site Levy	$0
Acheson Water Study - 5 yr Update	2019	$75,000	Utility Rates	$75,000
Acheson Water Study - 5 yr Update	2024	$75,000	Utility Rates	$75,000
Total		**$1,650,000**		**$150,000**

As shown in Table 7, with respect to the Acheson wastewater service area, $100,000 in capital expenditures will have to be funded through the wastewater rates over the next 11-years.

Table 7: Capital Projects Acheson – Wastewater

Project	Timing	Cost	Funding	Rate Share
Acheson Waste-Water Study - 5 yr Update	2019	$50,000	Utility Rates	$50,000
Acheson Waste-Water Study - 5 yr Update	2024	$50,000	Utility Rates	$50,000
Total		**$100,000**		**$100,000**

The water and wastewater capital projects identified for Entwistle are based on the *Entwistle Infrastructure Assessment* report prepared by AECOM in 2014. The report identifies $543,000 in capital requirements (priority projects) to maintain current levels of service.

As shown in Table 8, over the 2016 to 2026 period, approximately $243,600 will need to be funded through the Entwistle water rates. It should be noted that the County's 2016 budget includes capital expenditures of $233,410 relating to the Entwistle Water System Assessment Upgrades which is to be funded through gas tax funds. This

amount has been netted off of the Priority 1 project costs included in the rate calculation ($272,000 - $233,410 = $38,590).

Table 8: Capital Projects Entwistle - Water					
Priority	**Project**	**Timing**	**Cost**	**Funding**	**Rate Share**
Priority 1 [(1)]	- Raise Well 3 casing - Replace WTP building ventilation system - Replace all WTP electrical equipment, control panel etc.	2018	$272,000	Gas Tax/ Utility Rates	$38,590
Priority 2	- Replace Well 3 control panel and level transmitter, add radio - New backwash pump - Well yield tests - Hydrogeological study to locate new well - Install new well	2019-2021	$103,000	Utility Rates	$103,000
Priority 3	- Add isolation valve for treated water flow meter - Prefabricated building extension for electrical equipment	2022-2026	$102,000	Utility Rates	$102,000
	Total		**$243,590**		**$243,590**

Source: Entwistle Infrastructure Assessment, 2014, Table 7.2

Note 1: Gas tax funds equal to $233,410 have been applied to fund a large component of priority 1 works of $272,000.

Similarly, the identified wastewater-related infrastructure projects for the Entwistle area were also identified through the findings in the *Entwistle Infrastructure Assessment* report. The County's 2016 budget identified approximately $410,000 in gas tax funding to be allocated to the Collection System Upgrade in Entwistle and is therefore not proposed to be recovered through the utility rates. The analysis incorporates the remaining priority projects (net of the 2016 budget amount) over the forecast period.

Table 9: Capital Projects Entwistle - Wastewater					
Priority	**Project**	**Timing**	**Cost**	**Funding**	**Rate Share**
Priority 1	- Replace control structures for Anaerobic cells	2017	$21,000	Utility Rates	$21,000
Priority 2	- Collection system upgrade	2017	$410,000	Gas Tax	$0
Priority 2	- CCTV force main near lagoon - Survey lagoon monitoring well elevations - Ground water well monitoring	2018-2020	$15,000	Utility Rates	$15,000
Priority 3	- Add isolation valve for treated water flow meter - Prefabricated building extension for electrical equipment	2021-2025	$30,000	Utility Rates	$30,000
	Total		**$476,000**		**$66,000**

Source: Entwistle Infrastructure Assessment, 2014, Table 7.2

In addition to the known capital works, an annual provision to reserves is included in the rate calculations in an effort to save for the future repair and eventual replacement of existing assets. This concept is explained in the following section.

2. Asset Repair and Replacement Provision

The current replacement value of all County water and wastewater infrastructure amounts to approximately $76.3 million[2]. Parkland County, like many municipalities in Alberta, has a relatively new inventory of water and wastewater infrastructure, which by virtue of each asset engineered design life would not have to be replaced for some time. That being said, it is fiscally responsible that the County contribute to reserves in order to save for the future repair and replacement of these assets. Capital expenditures to carry out the rehabilitation and replacement of aging infrastructure are not growth related, and therefore, would not receive funding through off-site levy revenues or other developer contributions. When the assets require rehabilitation or are due for replacement, the source of funds is essentially limited to reserves or contributions from operating.

Based on the information obtained through the County's inventory of assets, the average annual capital provision for water and wastewater related infrastructure across all service areas is calculated to be $1.93 million. This level of expenditures is approximately $1.6 million higher than the $300,000 included in the draft 2017 budget (related to the net contribution to reserve). Provisions for infrastructure replacement are initially calculated for each asset based on their remaining useful life

[2] *The replacement value of assets was based on the historical asset values provided then inflated to current dollars using an average annual inflation rate of 2.5%.*

and the anticipated cost of replacement. The aggregate of all individual provisions form the required annual capital contribution. In calculating the annual provisions, a number of assumptions are made to account for inflation (2.5%) and interest (3.5%). Tables 10 and 11 below show a breakdown of the calculated contribution by area.

Table 10: Calculated Annual Capital Contribution - Water	
Water Service Area	**Annual Capital Contribution**
Acheson	$709,300
Entwistle	$109,500
Commission	$9,200
Total Water	**$828,000**

Table 11: Calculated Annual Capital Contribution - Wastewater	
Wastewater Service Area	**Annual Capital Contribution**
Acheson	$506,900
Big Lake [(1)]	$119,400
Entwistle	$299,800
Duffield	$72,500
Tomahawk	$72,900
Regional	$14,700
Commission	$14,000
Total Wastewater	**$1,100,300**

Note1: Helenslea service area capital assets are included in Big Lake infrastructure

D. VERIFIED RESULTS – MODEL CHECK

In an effort to ensure Hemson properly recognizes the relationship between the utility rates levied and the revenue generated by service area, Hemson has undertaken extensive financial checks to ensure the most accurate results. A summary of the variance between Hemson's 2015 rate calculation revenues and the County's actual year-end revenues is summarized by service area in Table 12.

Table 12 – Comparison of Actual 2015 County Revenue vs. Hemson Calculations		
Service Area	**Variance ($)**	**Variance (%)**
Acheson Water	-$21,900	-1.5%
Entwistle Water	$4,900	3.6%
Commission Water	$4,100	1.1%
Acheson Wastewater	$6,100	1.7%
Big Lake Wastewater	$7,500	2.7%
Entwistle Wastewater	$2,500	2.7%
Commission Wastewater	$4,100	2.7%
Helenslea Wastewater	$2,300	4.1%
Tomahawk Wastewater	$1,000	5.0%
Duffield Wastewater	$145	0.8%

E. RATE STRUCTURE HARMONIZATION OPTIONS

Harmonization options have also been developed which will be tested in the calculation of the draft water and wastewater rates. Through discussions with staff, Hemson has been directed to review the two harmonization options as shown in the tables below.

F. DRAFT CALCULATED RATES AND IMPACTS

To be discussed at meeting.

PARKLAND COUNTY

WATER AND WASTEWATER RATE STRUCTURE HARMONIZATION OPTIONS: DRAFT FOR DISCUSSION PURPOSES

WASTEWATER SERVICES

Wastewater Services: Metered Users			
Service Areas Considered for Harmonization	**Rate Structure Options**		**Notes and Rational:**
	Option 1	**Option 2**	
Entwistle Acheson Big Lake Parkland Village* Commission*	**Residential** *Fixed Service Charge ($/month)* *Usage Charge ($/m^3)* **Non-Residential** *Fixed Service Charge ($/month)* *Usage Charge ($/m^3)*	**All Properties** *Fixed Service Charge ($/month)* *Usage Charge ($/m^3)*	**Option 1:** County maintains relationship between residential and non-residential properties. The same fixed charge and usage charge would be applicable to all metered properties in the noted service areas. **Option 2:** A fixed charge and usage charge would be applied to all metered properties in the noted service areas regardless of property type.

**Parkland Village and Commission customers would continue to be subject to the usage charge ($/per m3) only*

Wastewater Services: Non-Metered Users			
Service Areas Considered for Harmonization	**Rate Structure Options**		**Notes and Rational:**
	Option 1	**Option 2**	
Entwistle* Tomahawk* Duffield* Helenslea	**All Properties** *Fixed Service Charge ($/month)* - Same rate for all property types	**All Properties** *Fixed Service Charge ($/month)* *differentiated by type:* -Low User -Med User -High User	**Option 1:** The various individual rates by property type across all service areas is eliminated. A simple fixed fee would be applied uniformly across all service areas noted, to each property **Option 2:** The rate structure maintains a relationship between various user groups - all properties can be classified into three different usage categories. The parameters to classify each property into the proper category would have to be established by County and Hemson - Preliminary thoughts would be to categorize each user (low-med-high) based on service size and consumption

Note: The wastewater hauled/discharged fee under the current model is already consistent within each service area and therefore no change is recommended for this specific fee*

Wastewater Services: Other Remaining Charges		
Service Area and Fees	**Rate Structure**	**Notes and Rational:**
Entiwistle - Wastewater Treatment Upgrade Charge (2001)	Status Quo	No changes are proposed to structure
Regional Customers	Status Quo	No changes are proposed to structure
Alberta Capital Region Wastewater Commission	Status Quo	No changes are proposed to structure

PARKLAND COUNTY

WATER AND WASTEWATER RATE STRUCTURE HARMONIZATION OPTIONS: DRAFT FOR DISCUSSION PURPOSES

WATER SERVICES

Water Services: Metered Users			
Service Areas Considered for Harmonization	**Rate Structure Options**		**Notes and Rational:**
	Option 1	**Option 2**	
Acheson Commercial/Industrial Big Lake Residential Entwistle	**Residential** *Fixed Service Charge ($/month)* *Usage Charge ($/m^3)* **Non-Residential** *Fixed Service Charge ($/month)* *Usage Charge ($/m^3)*	**All Properties** *Fixed Service Charge ($/month)* *Usage Charge ($/m^3)*	**Option 1:** County maintains relationship between residential and non-residential properties. The same fixed charge and usage charge would be applicable to all metered properties in the noted service areas. **Option 2:** A fixed charge and usage charge would be applied to all metered properties in the noted service areas regardless of property type.

Water Services: Other Remaining Charges		
Service Area and Fees	**Rate Structure**	**Notes and Rational:**
Parkland Village*	Status Quo	No changes are proposed to structure
Commission Customers	Status Quo	No changes are proposed to structure
Bulk Water	Status Quo	No changes are proposed to structure

Note: As the Parkland Village rate is based on the usage charge employed by the City of Spruce Grove, no change is proposed*