Exhibit 4

Economic Impact

Introduction

The City of Keene is a community of approximately 23,000 people and funding a facility that would meet the proposed permit limits for phosphorus could have a significant financial impact on its sewer users. The impact of this multi million dollar expense when combined with the existing sewer infrastructure rehabilitation projects as required by the City's 2004 Administrative Order, would cause a dramatic increase in the City's sewer rates. In its attempt to balance its environmental stewardship responsibilities with those of its fiscal responsibility to its rate payers, the City offers the following economic analysis as one more reason why EPA should be very certain that the limits it imposes are the correct ones.

As shown in Table 1, the City of Keene has spent or will spend more than $14 million from 2005 through 2012 on wastewater-related projects, not including phosphorus removal. More than $10 million of that total is as a direct result of the 2004 Administrative Order.

Some of the City's capital projects are funded with bonds, some through the operating budget, and some are funded through the City's capital reserve funds. To pay for capital projects, and the annual operating costs of its POTW, the City has created an enterprise fund, the "Sewer Fund", that is funded through user fees. The user fee structure was evaluated and changed in 2005 to fairly allocate costs among the users.

The user fee consists of two parts, the fixed meter fee and the volume cost. The meter fee is directly proportional to the size of the user's water meter, and reflects the Sewer Fund's debt service costs. The meter fee is assessed quarterly and changes with the debt service costs. Due to the distribution of meters sizes, the residential user, loosely represented by the number of 5/8" meters, bears approximately 62 percent of the debt service costs. The volume fee is based on the Sewer Fund's annual operating costs and the user is charged based on the amount of water used. The same volume unit cost applies to all customers.

Based on the volume billed to the 5/8" meters, the residential users bear approximately 64% of the operating costs. The average of the meter and volume percentages, 63%, is used as the percent of total costs borne by the household user in this analysis.

Table 1: Capital Projects

FY	2005	06	07	08	09	10	11	12	project cost
Demolition of old pump station buildings	$185,000								$185,000
Motor and control upgrade at main pump station	$34,000	170000							$34,000
Priority cleaning/ televising			$220,000	$242,000	$266,200	$292,820	$322,102		$1,343,122*
Structural accessibility - install and rehab manholes			$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$1,500,000*
Software/ Computer		$50,000							$50,000*
Sewer Improvements project	$250,000	$1,309,950	$1,181,978	$1,006,794	$1,257,750	$1,000,000	$1,000,000	$1,000,000	$8,006,472*
Sewer rehabilitation	$375,685	$0	$131,250	$231,000	$157,500	$200,000	$125,000	$105,000	$1,325,435
Railroad Property support		$193,541	$63,922						$257,463
Channel grinder replacement						$185,940			$185,940
Clarifier drive replacement		$49,500			$108,900				$158,400
Disinfection system replacement	$56,000				$481,900				$537,900
Emergency generator replacement			$5,000	$21,700					$26,700
Polymer unit replacement						$160,000			$160,000
Sewer camera								$90,000	$90,000*
Solids dewatering equipment		$20,000		$92,568	$906,754				$1,019,322
Electric transfer switch replacement					$5,000	$22,300			$27,300
Wastewater infrastructure security			$29,957		$38,378				$68,335
Total of AO-related projects									10,989,594
Total of all projects	$681,685	$1,732,991	$1,992,107	$1,954,062	$3,582,382	$2,221,060	$1,807,102	$1,555,000	$14,756,389
* indicates the project is a result of the 2004 Administrative Order									

Analysis

Stantec Engineers performed a technology screening evaluation for different phosphorus removal technologies (Attachment 1) that would allow the City to meet the proposed permit limits. In performing this review, Stantec reviewed Keene's WWTP operating conditions and typical wastewater characteristics, and based its cost estimates on similar sized facilities in 2006 dollars.

Stantec concluded that the City should use enhanced biological phosphorus removal combined with either tertiary clarification and two stage filtration or tertiary ballasted floc removal. The estimated screening level costs for these treatment options are summarized in Table 2 below.

Table 2 – Phosphorus Removal Options, Screening Level Cost Estimates

Process/Technology	Description	Effluent phosphorus limit achievable	Estimated 2006 construction costs	Estimated 2010 construction costs including engineering and contingency
Enhanced biological phosphorus removal	Anaerobic zone at the beginning of the activated sludge process	0.8 to 1.2 mg/L	$2,500,000	$4,474709
Tertiary clarification with two stage filtration	Chemical precipitation with contact clarifiers and two stage filtration	0.03 top 0.1 mg/L	$7,455,000	$13,343,582
Tertiary ballasted floc	Ballasted clarification process	0.01 to 0.1 mg/L	$6,530,000	$11,687,940

The Stantec cost estimates do not reflect actual installation costs at the Keene WWTP because of the level of effort required and the time available to perform the analysis. Instead, they reflect recent construction projects in similar sized communities. The Stantec cost estimates also do not include engineering or contingency fees. To account for these costs, adjustments of 23% for engineering and 30% for contingency and the unknown of retrofitting the Keene plant were made to the Stantec construction estimates. In Worksheet B, the adjusted 2006 costs were further increased by a 4% inflation factor for each year from 2006 through 2010.

The 2006 estimated costs for the recommended phosphorus removal options range from $9.03 to 9.955 million. Adjusting for engineering and contingency costs, the 2006

project cost range is $13.8 to $15.2 million. Using a 4% estimated construction inflation rate, the 2010 project cost is $16.2 to $17.8 dollars.

In the following analysis, the City used EPA's March 1995 publication "Interim Economic Guidance for Water Quality Standards" (the Economic Guidance) not to request a waiver of water quality standards, but to further its argument that funding a phosphorus treatment removal technology is not an inexpensive option and to demonstrate the potential impact of an inaccurate phosphorus limit on the community and the surrounding towns. A copy of the guidance is presented as Exhibit A. Copies of the completed Worksheets are found in Exhibit B.

As directed in section 2.1 of the Economic Guidance, the City verified the project costs and calculated the annual cost of the new project. As described above, the project cost is estimated to be approximately $17 million and it is assumed that a 20% State Aid Grant would be awarded by the State of NH for the capital cost of this project. The estimated increases in operating costs in 2006 dollars are:

Chemical	$200,000
Personnel	$128,000
Solids production	$100,000
Electricity	$20,000
Total	$448,000

These costs were inflated by 4% per year as a conservative reflection of the inflation of operating costs. In the past 2 years the City has seen an increase in unit chemical costs greater than 30% and solids disposal of 6%. These price increases are due to increased energy costs and shortage of raw materials. The estimated 2010 operating costs incurred by the phosphorus removal project is $545,061.

The information requested on Worksheet A is included in the Stantec Report. Although Keene's WWTP average daily flow of 3.2 MGD is approximately one-half of its design flow, an upgrade would be designed for the full 6 MGD flow per the guidance from the NHDES (Exhibit C, communication from Steve Roberts, NHDES). Camp, Dresser, and McKee estimates that the average wastewater flows in Keene in 2020 would be 4.14 MGD, with a peak of 9.5 MGD.

Worksheet B, the calculation of total annualized project costs shows a total annual cost of the phosphorus removal project of $1,779,249.

Worksheet C, Calculation of Total Annual Pollution Control Costs per household estimates that the total annual pollution control cost per household for 2010, if phosphorus removal to 0.2 mg/L is implemented, is $487.41. The year 2010 was used for comparison because it would be the first full year of principal and interest payment for the phosphorus removal project. This cost also includes the work scheduled for the collection system under the 2004 Administrative Order and the other sewer fund projects shown in Table 1.

The median household income (MHI) was determined according to the Economic Guidance, using the consumer price index (CPI) as an annual adjustment although the City does not agree that the CPI is an accurate reflection of the increase in household income. In the 2000 census, Keene's MHI was reported to be $37,033. This value was adjusted by the consumer price index (CPI) as published by the Bureau of Labor Statistics (BLS) to determine the current MHI. The BLS information used is the Northeast urban area, not seasonally adjusted. To determine the MHI in 2010, the first full year that the bond for the advanced treatment system would begin to be paid, the City estimated the CPI at 3.0 percent, the average of the years from 2001 to 2005. This information is presented in Table 3.

Table 3 – Estimated Median Household Income

median household income	**median household income**	**Year**	**CPI**	**CPI change**	
Obtained from 2000 census:	$37,033	2000	179.4		
Calculated using CPI	$38,065	2001	184.4	1.028	
Calculated using CPI	$38,850	2002	188.2	1.021	
Calculated using CPI	$39,944	2003	193.5	1.028	
Calculated using CPI	$41,327	2004	200.2	1.035	
Calculated using CPI	$42,834	2005	207.5	1.036	
Estimated using 3% CPI	$44,119	2006		1.030	estimated
Estimated using 3% CPI	$45,442	2007		1.030	estimated
Estimated using 3% CPI	$46,805	2008		1.030	estimated
Estimated using 3% CPI	$48,210	**2009**		**1.030**	estimated
Estimated using 3% CPI	$49,656	**2010**		**1.030**	estimated

The Municipal Preliminary Screener equation was applied:

$$\frac{\text{Average total pollution control cost per household (from Worksheet C)}}{\text{Median household income (from Table 4 below)}}$$

$$= \frac{\$487.41}{\$49,656} = 1.0\%$$

According to Economic Guidance, section 2.3, and Worksheet D, the resulting 1% ratio is at the level at which the community might be expected to incur mid-range impacts. To determine whether the impact would be deemed "substantial", the City applied the Secondary Test as directed by the Economic Guidance.

A difference of 0.1 percent, or less than $50 per year in user fees would push the City into the next category of impact. This increase could be manifested through continued extreme increases in the cost of fuel or materials as the City has experienced over the past

36 months. Conservative inflation increases of 4% were used in this analysis, but actual increases in the next few years may be much higher.

Worksheet E shows the data used in the Secondary Test. Where available, 2005 data was used. A discussion of each of the data points follows.

1. Direct net debt was calculated as directed without including revenue debt. However, it is important to note that more than 90% of the City's taxpayers also pay water and sewer fees which include the debt for those funds.

Table 4: City Debt Obligations

Outstanding Debt Analysis and Reconciliation:		
OUTSTANDING		
General Purpose Debt: City	$18,642,816	
School Debt	$19,712,475	
Water Fund: City	$4,039,851	
Sewer Fund: City	$1,016,164	
Parking Fund: City	$1,623,000	
Solid Waste Fund: City	$1,553,098	
Subtotal	**$46,587,404**	
November, 2005 Issue	$10,887,549	
Total: Outstanding Debt	$57,474,953	
Less: School Debt covered by		
State School Building Aid Grants	($8,628,089)	
Total Net Debt	**$48,846,864**	
ADD: Cheshire County: Overlapping Debt	$640,637	
Total Debt plus Overlapping Debt	**$49,487,501**	Born by Tax and rate payers
Reconciliation to Bond Issue Statement		
Total Net Debt	**$48,846,864.00**	
Less:		
Water Fund: City	($4,039,851.00)	
Sewer Fund: City	($1,016,164.00)	
Parking Fund: City	($1,623,000.00)	
Solid Waste Fund: City	($1,553,098.00)	
Sewer Fund: City, share of Nov. 2005 Issue	($1,700,000.00)	
Statement:		
Total Net Debt, tax supported	**$38,914,751.00**	

- The overlapping debt as shown in Table 4 above is the Cheshire County debt obligation.

- The market value of the City's property was received from the City Tax Assessor's office and reflects the total assessed value for 2005.

- The City's bond rating is A1. It was recently downgraded from Aa3. Excerpts from Moody's last rating report include:

> The downgrade to an A1 rating reflects a trend of declining General Fund balance, decreasing by more than half to $3.7 million in fiscal 2005, a healthy 14.8% of General Fund revenues, from a peak of approximately $7.8 million in fiscal 1998, or an ample 45% of General Fund revenues. The A1 rating also incorporates the city's moderately-sized and growing tax base, wealth and income levels that are below state medians, and average debt burden.
>
> Wealth and Income levels are below average, with per capita and median family incomes at 86.2% and 86.7% of the state, respectively, and with full value per capita at a moderate $75,345, slightly below the median for similarly rated municipalities in the nation.

- The information on the community unemployment rate was obtained during a phone conversation with the Economic and Labor Market Information Bureau, and reflects the 2005 value for Keene. Information was also received for the State of NH, and for the Keene area which includes Alstead, Chesterfield, Fitzwilliam, Gilsum, Harrisville, Keene, Marlborough, Marlow, Nelson, Richmond, Roxbury, Stoddard, Sullivan, Surry, Swanzey, Troy, Walpole, Westmoreland, and Winchester. Both the community and Keene's unemployment rates are more than one percent below the national unemployment rate.

- The national unemployment rate was obtained from the US Department of Labor, Bureau of Labor Statistics and is for the calendar year 2005.

- The State and community median household incomes were obtained from the US Census Bureau. Keene's adjusted median household income was calculated as shown in Table 3 above. It is based on the 2000 census, adjusted by the Northeast CPI.

- The City's property tax collection rate was obtained from the City's Tax Collector and is current for April 20, 2006.

- The value for the City's property tax revenues was obtained from the City's Tax Collector, and reflects 2005 revenues.

The data referenced above is shown in Worksheet E, and its supporting documentation is found in Exhibit B, and was used in Worksheet F to calculate a Secondary Score of 2.3. According to Table 2-2 of the Economic Guidance, with a municipal Preliminary screener score between 1 and 2 percent, and a secondary score between 1.5 and 2.5, the City falls into the category where EPA will rely on additional information supplied by the City to determine the severity of the economic impact.

To better illustrate the effect of the expense that would be incurred through this project, the City offers an analysis of its expected sewer rates as calculated by its sewer model.

Using the year 2007 as a baseline, Table 5 shows the anticipated rate increases for the years 2010 and 2011, with and without phosphorus removal for the average 5/8" meter customer. In Keene, single and two family homes and some small businesses have 5/8" meter. The 2004 Water/Sewer Rate Study performed by Camp, Dresser and McKee identified 30 HCF per quarter as representative of the usage of the average 5/8" meter customer. (See Exhibit D, page 8.)

Table 5: Expected increase in sewer rates

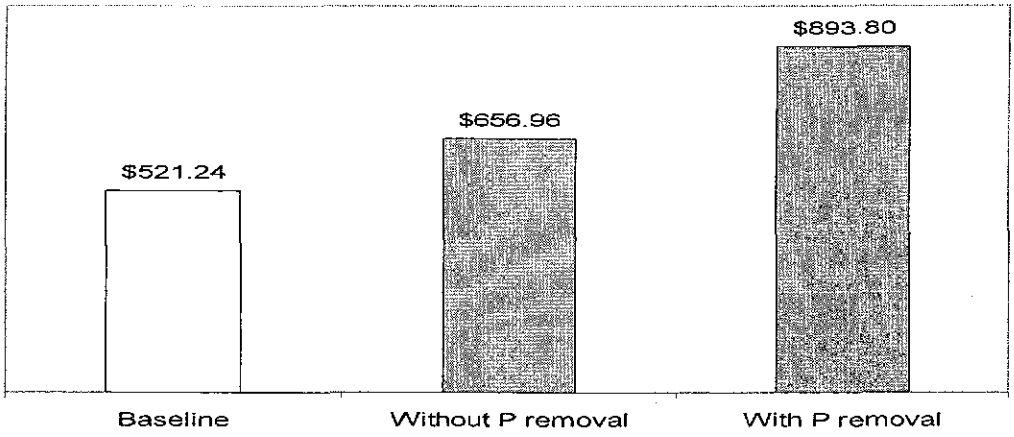
5/8 inch meter		**Meter charge/ quarter**	**Volume charge /HCF**	**Annual bill for 5/8" meter and 30 HCF per quarter**	**%increase from 2007**
Baseline	2007	$13.31	$3.90	$521.24	0.0
Without P removal	2010	$24.74	$4.65	$656.96	26.0
With P removal	**2010**	**$80.05**	**$4.78**	**$893.80**	**71.5**
2 inch meter				**Annual bill for 2" meter and 200 HCF per quarter**	
2007 Baseline	2007	$136.29	$3.90	$3,665.16	0.0
2010 Without P removal	2010	$253.37	$4.65	$4,733.48	29.1
2010 With P removal	**2010**	**$819.69**	**$4.78**	**$7,102.76**	**93.8**

The residential sewer bill as shown in Table 1 and in Chart 1 below is already expected to increase 26% between 2007 and 2010 due to the City's sewer infrastructure projects as shown in Table 1 above – not including any cost for phosphorus removal. Seventy one

percent of the capital project dollar value can be directly attributed to sewer infrastructure improvements as required by the 2004 Administrative Order.

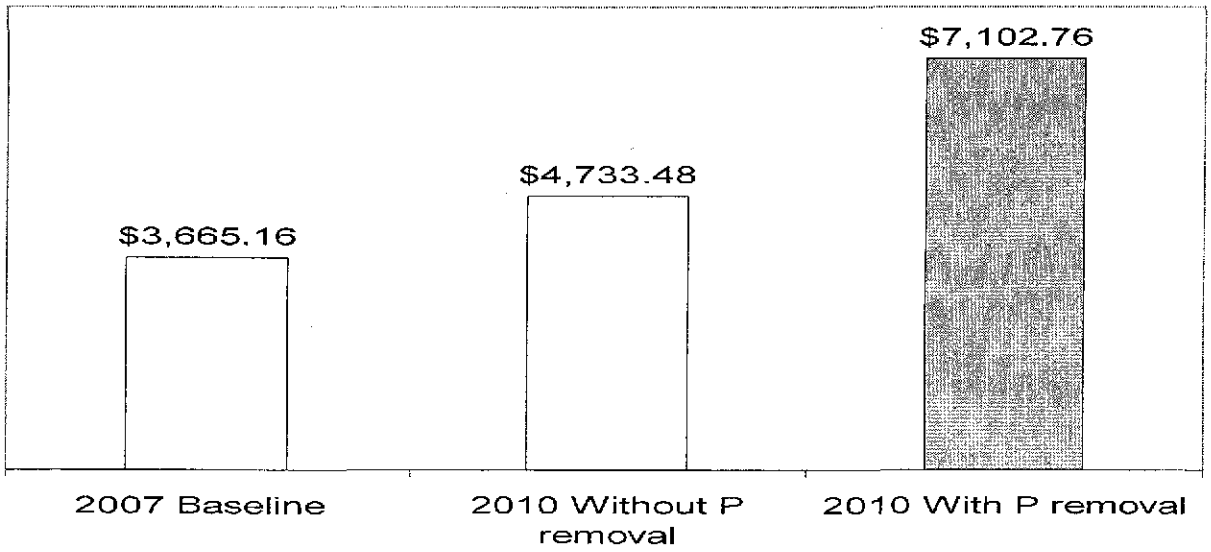
If the City is forced to upgrade its WWTP to meet the 0.2 mg/L phosphorus limit, the average resident will see a 72 percent increase in his sewer bill in 2010. These rates were calculated assuming a 20% principal and interest repayment grant from the State Aid Grant fund. The details are shown in Exhibit E.

Chart 1: Estimated sewer bill for the average residential customer



Further, the Rate Study identified many of the City's commercial customers as having a 2" meter and a representative volume was identified as 200 HCF per quarter. The City's commercial customers are businesses that include larger apartment houses and restaurants. The impact to these customers is illustrated in the chart below.

Chart 2: Annual bill for 2" meter customer using 200 HCF per quarter



To determine whether the economic impacts of a significant increase in sewer rates are widespread, EPA must consider Keene's geographic and economic position in the State of NH and particularly in the southwest portion of the State. As the largest community in the county, the City of Keene is a hub for the county, the region, and the tri-state area, both socially and economically. During the daytime, the population in Keene doubles due to people from the surrounding communities coming to Keene to work, shop, dine out, and enjoy recreational opportunities according to the City's Planning Director.

The City's sewer rates increased approximately 30 percent in 2005, and existing projects, as outlined in Table 4 are expected to cause additional rate increases of approximately 8 percent per year. With the phosphorus removal project, the City estimates that the sewer charge for its larger users will increase an additional 60 percent.

An increase in sewer rates would have an impact on more than just the Keene residents; it would affect its businesses and businesses and residents in the surrounding communities. This is because the increase in business expense in Keene would either be passed on to customers, or would be manifested by a decrease in the number of business start ups or the loss of borderline enterprises. Because of its importance in the region, these impacts would not only be felt in Keene, but throughout the area.

The impact of increased sewer rates on the City's major employers must be considered. Generally personnel costs are one of the largest costs for an employer according to the City's Planning Director. If the fixed costs (including sewer rates) increase, employers often respond by cutting other costs, including personnel.

According to the Southwest Regional Planning Commission, all 6 of the region's top employers are located in Keene. See Worksheet N for documentation.

The employers, Cheshire Medical Center, Timken (MPB) Corporation, Markem Corporation, National Grange Mutual, Keene State College, and Smith Industrial Medical Systems are also among the City's largest water users. Table 5 below shows the volume of wastewater charged to each user and its ranking by volume among Keene's wastewater dischargers.

Table 6 –Wastewater use of the Top Employers in the Southwest New Hampshire Region

Employer	**Number of Employees**	**Ranking in Keene's Wastewater Dischargers by Volume**
Cheshire Medical Center	1,196	2
Keene State College	600	4
Timken (MPP) Corporation	950	5
National Grange Mutual	606	8
Smith Industrial Medical Systems	525	10
Markem Corporation	680	13

Keene has an extreme housing shortage with an occupancy rate near 100%, and slow new housing growth. As a result, the cost of housing is very high, and often one third of an average household's income is used for mortgage costs. Due to the lack of housing, rental housing costs are also high; the average is close to $1,000 per month. (Exhibit F – Keene Community Profile). Keene is also home to a large number of the region's low income families who would be particularly negatively influenced by any utility rate increase according to the City's Planning Director.

The above information clearly shows that because of Keene's position in the region, any economic change is felt throughout the region. A substantial increase in sewer rates, especially when the proposed permit limit is unsubstantiated would negatively impact the region. It is yet another reason to wait until the TMDL study is complete and a full, clear understanding of the river's capacity is determined.

Exhibits:

Exhibit A: Interim Economic Guidance for Water Quality Standards
Exhibit B: Completed Worksheets
Exhibit C: Email from Steve Roberts, NHDES
Exhibit D: CDM Rate Study
Exhibit E: Sewer Model Spreadsheets
Exhibit F: Keene Community Profile