

**SEWER USER CHARGE SYSTEM
WARREN SANITARY DISTRICT**

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PROPOSED SEWER USER CHARGE SYSTEM
FOR THE
WARREN SANITARY DISTRICT
WARREN, MAINE

INTRODUCTION

The Warren Sanitary District (WSD), with grants from the United States Environmental Protection Agency (EPA), the State of Maine Department of Environmental Protection (DEP) and the Farmers Home Administration (FmHA), has finished the design stage of its sewage treatment and collection system and has begun construction of the facilities. As required by the EPA special grant conditions, the WSD must submit and obtain approval of a Sewer User Charge System. The purpose of this report is to present the costs associated with the WSD's Wastewater Treatment and Collection System and propose a Sewer User Charge System to pay those costs not financed through grants.

PROJECT DESCRIPTION

The Warren Wastewater System includes two major components: the collection system, and the treatment facility. The collection system consists of approximately 27,000 feet of 8-inch diameter sewer, through which wastewater flows to Pump Station #1 in the Village. Approximately 23,500 feet of 8-inch ductile iron (D.I.) forcemain transmits the wastewater from the pump station to the treatment facility. Pump Station #2, located at the treatment facility, collects the Department of Corrections (DOC) owned prison facilities' wastewater and transmits it through 900 feet of 8-inch D.I. forcemain to the treatment facility. The treatment facility is a secondary treatment system with three partial mix aerated lagoons and a polishing lagoon, ultraviolet (UV) disinfection system and building, operations building and 460 feet of 8" diameter outfall pipe.

During the planning (Step 1) stage of the EPA's Construction Grants Program, it was determined that these wastewater collection and treatment facilities were the most economical and environmentally sound alternatives available to the WSD. The major advantage of this type of treatment facility is the relatively low operation and maintenance costs.

PROJECT COSTS

The purpose of a Sewer User Charge System is to provide the revenue necessary to pay four types of costs: 1) debt retirement or repayment of loans used to finance project costs not paid for by federal or state grants; 2) annual operation and maintenance costs associated with the wastewater collection and treatment systems; 3) fund reserve accounts for equipment replacement, sludge disposal, depreciation and relicensing costs in the future; and 4.) provide funds for future capital improvement programs. The Sewer User Charge System shall include a financial management system that accurately accounts for those expenditures discussed hereinbefore and revenues generated through user charges, readiness to serve charges and assessments.

Debt Retirement Costs: The WSD received grants from the EPA and DEP for the design of its wastewater collection and treatment systems. These grants covered a portion of the project design costs, but not all such costs. The remaining WSD design costs were paid with loan and grant funds from the FmHA. Design costs for wastewater treatment facility capacity attributable to the DOC Facilities is paid for by loans taken out by the WSD on behalf of the DOC.

Construction costs for the project are paid with grants from the EPA, DEP and FmHA, a local bond obtained by the WSD for DOC, and a FmHA loan. A portion of the FmHA loan is debt that has to be repaid from revenues generated by the WSD Sewer User Charge System. Debt service relating to the remainder of the FmHA loan and the local bond are paid by the DOC to the WSD in accordance with their user agreement.

A summary of estimated total project costs and funding distribution by agency is presented in Table 1. These costs do not match the actual available grant funding from the agencies. Grants established by DEP and EPA include funding for future construction of polishing facilities that can not be sized until the treatment facility is operational. The capital costs for this portion of the project will be paid in full by the DOC and by EPA and DEP grants. Therefore, these costs will not impact the WSD user charge from a debt retirement standpoint

TABLE 1
 WARREN SANITARY DISTRICT
 PROJECTED PROJECT COST & FUNDING SUMMARY

COST DESCRIPTION	PROJECT TOTAL	EPA	DEP	WSD/FMHA	BPI/FMHA	BPI/WSD
CONSTRUCTION:						
Contract 1 - WWTF	\$1,760,900	\$332,961	\$272,423	\$0	\$1,155,516	\$0
Contingency	\$88,045	\$16,648	\$13,621	\$0	\$57,776	\$0
Contract 1 Total	\$1,848,945	\$349,609	\$286,044	\$0	\$1,213,292	\$0
Contract 2 - Coll. System	\$3,191,777	\$1,755,477	\$1,012,575	\$423,725	\$0	\$0
Contingency	\$159,589	\$87,774	\$50,629	\$21,186	\$0	\$0
Contract 2 Total	\$3,351,366	\$1,843,251	\$1,063,204	\$444,911	\$0	\$0
Filtration Contingency	\$1,000,000	\$361,000	\$361,000	\$0	\$278,000	\$0
MDOT Road Fees	\$98,325	\$54,079	\$43,259	\$988	\$0	\$0
Miscellaneous Const.	\$170,000	\$44,000	\$36,000	\$0	\$90,000	\$0
CONSTRUCTION TOTAL	\$6,468,636	\$2,651,939	\$1,789,506	\$445,899	\$1,581,292	\$0
PLANNING & PERMITTING	\$165,821	\$0	\$0	\$65,000	\$100,821	\$0
DESIGN ENGINEERING	\$875,000	\$138,000	\$110,000	\$342,000	\$285,000	\$0
CONSTRUCTION ENGINEERING:						
Contract 1 - WWTF	\$325,920	\$61,664	\$50,452	\$0	\$213,804	\$0
Contract 2 - Sewers	\$319,701	\$175,836	\$123,964	\$19,901	\$0	\$0
UV Operations	\$73,319	\$40,325	\$32,994	\$0	\$0	\$0
Const. Engineering Totals	\$718,940	\$277,825	\$207,410	\$19,901	\$213,804	\$0
EQUIPMENT	\$65,000	\$22,000	\$18,000	\$9,675	\$15,325	\$0
MISC. PROJECT COSTS:						
Interest	\$100,000	\$0	\$0	\$73,800	\$26,200	\$0
Legal	\$75,000	\$0	\$0	\$55,350	\$19,650	\$0
Administrative	\$10,000	\$2,841	\$2,325	\$2,000	\$2,834	\$0
Land	\$50,250	\$0	\$0	\$22,512	\$27,738	\$0
Misc. Project Costs Total	\$235,250	\$2,841	\$2,325	\$153,662	\$76,422	\$0
ESTIMATED TOTAL COST	\$8,528,647	\$3,092,605	\$2,127,241	\$1,036,137	\$2,272,664	\$0

The WSD's total debt obligation to the FmHA for construction of the wastewater collection and treatment systems is \$1,928,000. These funds were loaned to the WSD by the FmHA at 5% interest for a term of approximately 36 years. The WSD's share of this loan to be paid for under this Sewer User Charge System is \$228,000 in principal. The remaining \$1,700,000 of the FmHA loan and the local bond obtained by the WSD for the DOC will be paid in full by the DOC. The total annual debt retirement cost to the DOC can not be determined at this time because the total project cost is not yet finalized. The annual costs for debt retirement paid by the WSD under this Sewer User Charge System equals $\$228,000 \times (A/P, 5\%, 36 \text{ years}) = \$13,779$. Note that the actual annual debt retirement cost for the WSD may vary from this amount if the loan term differs from 36 years at loan closing.

Operation and Maintenance Costs: Operation and maintenance costs include both fixed and variable costs. Fixed operation and maintenance costs are those costs that do not proportionally increase or decrease with changes in the amount or volume of wastewater collected and treated. Variable operation and maintenance costs proportionally increase or decrease with changes in the amount or volume of wastewater collected and treated. Examples of fixed and variable operation and maintenance costs include administrative and power costs, respectively. Estimated operation and maintenance costs, both fixed and variable, for the first three years of service are presented in Table 2. Both fixed and variable operation and maintenance costs are to be shared between the WSD and the DOC based on percent of flow originating from each, except that the WSD's share of these costs are not to exceed fifty percent (50%) of the total.

Reserve Costs: Over the life of the wastewater collection and treatment systems, variations will occur primarily in the maintenance costs for motor replacement, pump repair, pipe repair, etc. These type of costs will be virtually non-existent for the first few years of operation but will increase with the age of the systems. Therefore, in order to help dampen these future costs, a sinking fund (or escrow account) is established to provide funds for equipment repair and replacement in the future. Separate sinking funds for lagoon cleaning/sludge disposal, licensing and permitting are also budgeted for herein. The amounts set aside in sinking funds for these purposes should be periodically reviewed and adjusted to compensate for the effects of inflation. The need for additional reserve funds should also be periodically reviewed by the WSD and established if needed. A summary of recommended reserve

costs to be funded as part of the Sewer User Charge System are presented in Table 2. Reserve costs are to be shared between the WSD and the DOC based on percent of flow originating from each; except that the WSD's share of these costs are not to exceed fifty percent (50%) of the total.

Capital Improvements Costs: Capital improvements are typically required over the life of wastewater collection and treatment systems to accommodate for growth within the WSD, provide for transport and treatment of increased flows and loadings to the treatment facility, and meet more stringent monitoring or discharge license requirements. Examples of capital improvement projects include operations building expansion, pump station capacity increase, sewer line extension and aeration system capacity increase.

**TABLE 2
WARREN SANITARY DISTRICT
PROJECTED OPERATION, MAINTENANCE AND RESERVE COSTS**

COST DESCRIPTION	ANNUAL BUDGET ESTIMATE*				
	1992-93	1993-94	1994-95	1995-96	1996-97
Fixed Operation & Maintenance Costs:					
Labor	\$50,000	\$52,000	\$54,080	\$56,243	\$58,493
Other Utilities	\$5,430	\$5,647	\$5,873	\$6,108	\$6,352
Repair & Maintenance	\$3,250	\$3,380	\$3,515	\$3,656	\$3,802
Lab Supplies & Equipment	\$660	\$686	\$714	\$742	\$772
Misc. Supplies & Equipment	\$3,410	\$3,546	\$3,688	\$3,836	\$3,989
Misc. Expenses & Outside Services	\$16,790	\$17,462	\$18,160	\$18,886	\$19,642
Administrative & Legal	\$8,000	\$8,320	\$8,653	\$8,999	\$9,359
Insurance	\$2,500	\$2,600	\$2,704	\$2,812	\$2,925
Subtotal:	\$90,040	\$93,642	\$97,387	\$101,283	\$105,334
Variable Operation & Maintenance Costs:					
Power	\$24,500	\$25,480	\$26,499	\$27,559	\$28,662
Chemicals	\$1,930	\$2,007	\$2,087	\$2,171	\$2,258
Subtotal:	\$26,430	\$27,487	\$28,587	\$29,730	\$30,919
Total Operation & Maintenance Costs:	\$116,470	\$121,129	\$125,974	\$131,013	\$136,253
Reserve Account Costs:					
Equipment Replacement	\$9,000	\$9,360	\$9,734	\$10,124	\$10,529
Sludge Disposal	\$5,000	\$5,200	\$5,408	\$5,624	\$5,849
Permitting	\$300	\$312	\$324	\$337	\$351
Total Reserve Cost:	\$14,300	\$14,872	\$15,467	\$16,086	\$16,729
Total Operation, Maintenance & Reserve Cost:	\$130,770	\$136,001	\$141,441	\$147,098	\$152,982

* 4.0% Annual Increase in Costs Assumed

USER CHARGE SYSTEM BASIS

As discussed previously, the Sewer User Charge System needs to provide revenues to pay four types of costs: 1) debt retirement, which will be a fixed annual expenditure; and 2) annual operation and maintenance, which will be variable; 3) funding of reserve accounts, which will be variable; and 4.) capital improvements. Revenues to fund these various costs are obtained through user charges, readiness to serve charges and assessments as explained hereinafter. The purpose of these charges is to provide a fair and equitable means of collecting the costs associated with the wastewater collection and treatment systems from those serviced and/or benefitted by the wastewater collection and treatment systems.

The amount charged under the Sewer User Charge System is based upon proportionate use or allotted capacity of the wastewater collection and treatment systems required by an equivalent user. Since the sewer system will primarily serve residential dwellings, a convenient definition for "one equivalent user" is the sewer and treatment capacity needed for one single family dwelling space. For example, a single family home will be charged for one equivalent user. Houses with separate apartments or multi-family dwellings will be charged at a rate of one equivalent user per dwelling unit. Non-residential users will be charged on the basis of Table 3, Schedule of Equivalent Users.

User Charge: A user charge will be invoiced on a quarterly basis by the WSD to all users connected to the wastewater collection system. Cost components included in the user charge will include debt retirement, fixed and variable operation and maintenance costs, and reserve funding costs. Capital improvement costs will not be included in the user charge prior to the WSD actually incurring the capital cost and beginning debt retirement payments.

A special user charge will be assessed to industrial firms or organizations which discharge sewage of a volume, strength or unusual characteristic which would disrupt the sewers or treatment systems in any way. At the present time, there are no known firms which will discharge such sewage into the Warren wastewater collection and treatment systems.

Readiness To Serve Charge: A readiness to serve charge will be invoiced on a quarterly basis by the WSD to all users located within two hundred feet of the wastewater collection system but not connected to it. Cost components included in the readiness to serve charge will include debt retirement, fixed operation and maintenance costs, and reserve funding costs. Capital improvement costs will not be included in the readiness to serve charge prior to the WSD actually incurring the capital cost and beginning debt retirement payments. Variable operation and maintenance costs are not included in the readiness to serve charge charge.

Assessment Charge: Users not in existence at the time of adoption of this Sewer User Charge System by the WSD will be required to pay the WSD an assessment charge of \$3,500 per equivalent user prior to receiving permission to connect to the wastewater collection system. Funds raised through assessment charges will be used by the WSD for capital improvement projects only.

TABLE 3

SCHEDULE OF EQUIVALENT USERS

Single Family Dwelling	1 Equivalent User
Each Additional Dwelling Unit	1 Equivalent User
20 School Students	1 Equivalent User
2 Motel, Hotel or B&B Rooms*	1 Equivalent User
6 Conventional Restaurant Seats	1 Equivalent User
12 Disposable Utensils Restaurant Seats	1 Equivalent User
1 Church	1 Equivalent User
40 Club Members	1 Equivalent User
40 Assembly Hall/Public Bldg. Seats	1 Equivalent User
10 Commercial or Industrial Employees	1 Equivalent User
1 Gas Station Island with Public Restroom	2 Equivalent Users
1 Gas Station Island without Public Restroom	1 Equivalent User
40 Theater or Playhouse Seats	1 Equivalent User
1 Laundromat Washing Machine	2 Equivalent Users
10 Cocktail Lounge Seats	1 Equivalent User
2 Beauty or Barber Shop Sinks	1 Equivalent User
1 Car Wash Bay	1 Equivalent User
2 Hospital, Nursing or Boarding Home Beds	1 Equivalent User
1 Store w/Public Restroom	2 Equivalent Users
1 Store without Public Restroom	1 Equivalent User

*If the establishment is seasonal, the Warren Sanitary District may be petitioned to reduce the number of equivalent users. If approved, the number of equivalent users will be prorated on a quarterly basis.

Note: Equivalent User Allocations to sewer users shall be calculated to the nearest whole unit based on the above schedule.

USER CHARGE SYSTEM COST ALLOCATION

This section of the Sewer User Charge System presents sample user cost determinations for the WSD and DOC for the first five years of operation. Debt retirement costs for the WSD and DOC are estimated herein but can not be finalized until all project costs are determined and loan closings take place. Reserve account costs, and operation and maintenance costs are shared between the WSD and DOC based on percent of flow originating from each; except that the WSD's share of these is not to exceed fifty percent of the total. Assumptions used in determining annual user costs for the WSD and DOC are as follows:

<u>Parameter</u>	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>1995-96</u>	<u>1996-97</u>
• WSD Share of Total Flow	40%	40%	40%	50%	50%
• DOC Share of Total Flow	60%	60%	60%	50%	50%
• WSD Number Users	242	242	242	242	242
• WSD Number Equivalent Users	290	290	290	290	290
• WSD Number Equivalent Users Connected to System	190	250	250	250	280
• WSD Number Equivalent Users Not Connected to System	100	40	40	40	10

These assumptions are used in combination with projected operation, maintenance and reserve costs from Table 2 to estimate the user costs presented in Table 4.

TABLE 4
WARREN SANITARY DISTRICT
SAMPLE USER CHARGE CALCULATION

COST DESCRIPTION	TOTAL ANNUAL COSTS	DCC	WSD	WSD	WSD
		COST SHARE Total \$	COST SHARE Total \$	User Charge \$/Equivalent User	Readiness To Serve \$/Equivalent User
1992 - 93 Costs:					
Fixed O & M Cost	\$90,040	\$54,024	\$36,016	\$124	\$124
Variable O & M Cost	\$26,430	\$15,858	\$10,572	\$56	\$0
O & M Subtotal:	\$116,470	\$69,882	\$46,588	\$180	\$124
Reserve Fund Cost	\$14,300	\$8,580	\$5,720	\$20	\$20
O & M, Reserve Subtotal:	\$130,770	\$78,462	\$52,308	\$200	\$144
Debt Retirement	\$183,779	\$170,000	\$13,779	\$48	\$48
Total Annual Cost:	\$314,549	\$248,462	\$66,087	\$248	\$192
Quarterly Charge:	-	-	\$16,522	\$62	\$48
1993 - 94 Costs:					
Fixed O & M Cost	\$93,642	\$56,185	\$37,457	\$129	\$129
Variable O & M Cost	\$27,487	\$16,492	\$10,995	\$44	\$0
O & M Subtotal:	\$121,129	\$72,677	\$48,452	\$173	\$129
Reserve Fund Cost	\$14,872	\$8,923	\$5,949	\$21	\$21
O & M, Reserve Subtotal:	\$136,001	\$81,600	\$54,400	\$194	\$150
Debt Retirement	\$183,779	\$170,000	\$13,779	\$48	\$48
Total Annual Cost:	\$319,780	\$251,600	\$68,179	\$242	\$198
Quarterly Charge:	-	-	\$17,045	\$61	\$50
1994 - 95 Costs:					
Fixed O & M Cost	\$97,387	\$58,432	\$38,955	\$134	\$134
Variable O & M Cost	\$28,587	\$17,152	\$11,435	\$46	\$0
O & M Subtotal:	\$125,974	\$75,584	\$50,390	\$180	\$134
Reserve Fund Cost	\$15,467	\$9,280	\$6,187	\$21	\$21
O & M, Reserve Subtotal:	\$141,441	\$84,864	\$56,576	\$201	\$156
Debt Retirement	\$183,779	\$170,000	\$13,779	\$48	\$48
Total Annual Cost:	\$325,220	\$254,864	\$70,355	\$249	\$203
Quarterly Charge:	-	-	\$17,589	\$62	\$51
1995 - 96 Costs:					
Fixed O & M Cost	\$101,283	\$50,641	\$50,641	\$175	\$175
Variable O & M Cost	\$29,730	\$14,865	\$14,865	\$59	\$0
O & M Subtotal:	\$131,013	\$65,506	\$65,506	\$234	\$175
Reserve Fund Cost	\$16,086	\$8,043	\$8,043	\$28	\$28
O & M, Reserve Subtotal:	\$147,098	\$73,549	\$73,549	\$262	\$202
Debt Retirement	\$183,779	\$170,000	\$13,779	\$48	\$48
Total Annual Cost:	\$330,877	\$243,549	\$87,328	\$309	\$250
Quarterly Charge:	-	-	\$21,832	\$77	\$62
1996 - 97 Costs:					
Fixed O & M Cost	\$105,334	\$52,667	\$52,667	\$182	\$182
Variable O & M Cost	\$30,919	\$15,460	\$15,460	\$55	\$0
O & M Subtotal:	\$136,253	\$68,127	\$68,127	\$237	\$182
Reserve Fund Cost	\$16,729	\$8,364	\$8,364	\$29	\$29
O & M, Reserve Subtotal:	\$152,982	\$76,491	\$76,491	\$266	\$210
Debt Retirement	\$183,779	\$170,000	\$13,779	\$48	\$48
Total Annual Cost:	\$336,761	\$246,491	\$90,270	\$313	\$258
Quarterly Charge:	-	-	\$22,568	\$78	\$64

RECOMMENDATIONS

Based on the information presented herein, our recommendations are that the District:

1. Adopt a Sewer User Charge System which assesses debt retirement, operation and maintenance, and reserve costs on an "equivalent user" basis.
2. Establish reserve funds to cover future expenditures for repairs and/or replacement of equipment, lagoon cleaning and sludge disposal, and facility relicensing.
3. Issue sewer user charge and readiness to serve invoices on a quarterly basis and itemize each bill as follows:
 - Debt Retirement Cost
 - Fixed and Variable Operation and Maintenance Costs.
 - Reserve Fund Costs
4. Adopt a Sewer User Charge System that includes "equivalent user" based assessment charges as a funding mechanism for capital improvement projects.
5. Review and revise the "equivalent user" status of users a minimum of once per year.
6. Apply any excess revenues obtained in any given year to future user charges or reserve accounts.
7. Review the Sewer User Charge System on an annual basis and revise it as necessary.