

SECTION 15.0

SUMMARY OF CONCEPTUAL COST ESTIMATES

15.1 INTRODUCTION

Two of the main objectives of the Nitrification Study are to provide the City of Winnipeg with an indication of the range of ammonia control alternatives available for its Water Pollution Control Centres (WPCCs) and to provide conceptual level estimates of the total cost of ownership of the alternatives. This information, combined with the results of the Ammonia Study, will be used by the City in its discussions with Manitoba Conservation in determining the appropriate levels of ammonia control to be provided at each facility.

In the previous sections of this report, the conceptual designs for plant upgrades to provide a number of levels of ammonia control for each WPCC have been developed. Estimates of the total cost of ownership for each alternative have been developed based on the conceptual designs.

In this section of the report, the estimates of the total cost of ownership are summarized to allow easy comparison.

15.2 AMMONIA CONTROL ALTERNATIVES

The cost estimates for the plant upgrades required to provide the various levels of ammonia control are summarized in Tables 15.1, 15.2 and 15.3. Capital costs, operating and maintenance (O&M) costs, and net present value costs are provided. All estimates are based on the conceptual designs and are considered to be sufficient for planning purposes.

Table 15.1: Summary of Estimated Costs - NEWPCC

	Centrate Treatment	Modest Level of Control	High Level of Control	Best Practicable Level of Control
Target Effluent Ammonia Concentration (Summer Dry Weather)	18 mg/L	14 mg/L	8 mg/L	2 mg/L
Capital Cost	\$9,300,000	\$84,100,000	\$92,900,000	\$112,000,000
O&M Cost	\$660,000	\$1,610,000	\$1,870,000	\$2,150,000
Total Cost (Net Present Value)	\$21,800,000	\$117,300,000	\$131,800,000	\$156,900,000

Table 15.2: Summary of Estimated Costs - SEWPCC

	Modest Level of Control	High Level of Control	Best Practicable Level of Control
Target Effluent Ammonia Concentration (Summer Dry Weather)	14 mg/L	8 mg/L	2 mg/L
Capital Cost	\$14,100,000	\$20,500,000	\$33,100,000
O&M Cost	\$439,000	\$492,000	\$613,000
Total Cost (Net Present Value)	\$23,300,000	\$30,900,000	\$46,000,000

Table 15.3: Estimated Costs - WEWPCC

	Modest Level of Control	High Level of Control	Best Practicable Level of Control
Target Effluent Ammonia Concentration (Summer Dry Weather)	14 mg/L	8 mg/L	2 mg/L
Capital Cost	\$0	\$0	\$3,910,000
O&M Cost	\$*	\$*	\$96,000
Total Cost (Net Present Value)	\$	\$	\$6,140,000

Notes: * O&M cost is expected to be negligible until cell desludging is required. Since this will only be required if the sludge in the bottom of the cells begins to impact effluent quality and the timing of this is indeterminate, no allocation for cost has been included at this time.

Estimates were calculated at 67 percent and 95 percent confidence limits. Figures in Tables 15.1, 15.2, and 15.3 are based on a 95 percent confidence limit.

NPV was calculated for discount rates of 4 percent, 7 percent, and 10 percent. Figures in Tables 15.1, 15.2, and 15.3 are based on a 4 percent discount rate.

The net present value costs represent the total cost of ownership to the City. The net present value costs are summarized graphically in Figures 15.1 and 15.2.

15.3 NUTRIENT REMOVAL ALTERNATIVES

Two approaches to nutrient removal were evaluated in the Study; Chemical Phosphorus Removal and Biological Nutrient Removal. The estimated costs for these two approaches to nutrient removal are summarized in Table 15.4.

Table 15.4: Summary of Costs of Nutrient Removal Alternatives

	NEWPCC	SEWPCC	WEWPCC
Chemical Phosphorus Removal			
Capital Cost	\$22,500,000	\$10,200,000	\$1,700,000
Operating & Maintenance Cost	\$2,630,000	\$1,101,000	\$315,000
Net Present Worth Cost	\$76,400,000	\$33,200,000	\$8,000,000
Biological Nutrient Removal			
Capital Cost	\$126,900,000	\$47,200,000	\$6,570,000
Operating & Maintenance Cost	\$1,800,000	\$582,000	\$119,000
Net Present Worth Cost	\$164,400,000	\$59,200,000	\$9,340,000