

**CITY OF FREDERICTON****PUBLIC WORKS DEPARTMENT****INDEX**

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# TO HIS WORSHIP THE MAYOR AND COUNCILORS OF THE CITY OF FREDERICTON

I submit herewith this report which is a statement of work done under the supervision of the City Engineer.

This report covers the period from 1996 01 01 to 1996 12 31 and is written for the purpose of maintaining an accurate record on file of the activities and costs associated with the various operations.

During the year, along with regular maintenance, City forces and Contractors constructed the following works:

Concrete Curb and Gutter		14.468 km
Sidewalk		8.059 km
New Street Construction		1.619 km
* New Pavement	- Type "B" Asphalt Concrete	3.257 km
Resurface	- Type "D" Asphalt Concrete	11.428 km
Gravity Sanitary Sewer Mains		4.809 km
Storm Sewer Mains		4.538 km
Water Mains		5.087 km
Sanitary Sewer Force main		0.055 km

\* Type "D" asphalt concrete was also placed on streets in new subdivisions. This was paid for by developers under Local Improvement Agreements.

## ALSO

- 164 Water services were installed
- 162 Sanitary sewer services were installed
- 145 Storm sewer services were installed
- 1407 New water meters were installed

**Contractors under contract with the Engineering Department of the City of Fredericton in 1996 supplied materials, completed construction or began construction, as follows:**

Warren H. Dunn Construction Ltd.	-	Rookwood/Waggoner's Intersection Upgrading
Warren (Maritimes) Limited	-	Supply of Asphalt Concrete for Patching
Charmac Construction Company Limited	-	Smythe/Waggoner's/Dundonald Intersection Upgrading
Diamond Construction (1961) Limited	-	Supply and Delivery of Granular Material
Dunham's Contracting Limited	-	Supply and Delivery of Granular Material
M.W. Price & Sons Ltd.	-	Supply and Delivery of Subsoil
Wendell Thomas & Sons Ltd.	-	Supply and Delivery of Bedding Sand
Dunham's Contracting Limited	-	Supply and Delivery of Subsoil
Smith Construction Ltd.	-	Nashwaak River Crossing Upgrade (Marysville Area)
Fairville Construction Ltd.	-	Brunswick Street Trunk Sewer and Water Main Upgrading Phase 8
Fairville Construction Ltd.	-	Smythe Street Storm Sewer and Street Upgrading Phase 5
Northside Ventures Ltd.	-	Supply and Delivery of Concrete
Elm City Paving Ltd.	-	Supply and Placement of Asphalt Concrete
Warren H. Dunn Construction Ltd.	-	Supply and Delivery of Winter Sand
Akzo Nobel Salt Ltd.	-	Supply and Delivery of Highway Salt
Laurentide Atlantic Limited	-	Supply of Traffic Lane Striping Paint
Trius Taxi Ltd.	-	Garbage Collection Services
501 932 N.B. Ltd.	-	Installation of Curb and Gutter and Sidewalk
K-Line Construction Ltd.	-	Contract Services

Fairville Construction Ltd.	Water and Sewer Services Douglas Area Phase 7
Charmac Construction Company Limited	Upgrading of Services Vanier Highway-Doak Road to Wilsey Road
Charmac Construction Company Limited	Water Main Extension Forest Hill Road (Forest Acres Area)
Masontech (A Division of Maritime Bricklayers)	Killarney Reservoir Repairs
Hogan Paving Ltd.	Supply and Placement of Asphalt Concrete on Municipal Trenches
Charmac Construction Company Limited	Storm and Sanitary Sewer and Water Main Upgrading - Sunset Drive Area

**General Fund** expenditures for the period 1996 01 01 to 1996 12 31 were as follows:

ITEM	BUDGET	NET EXPENDITURE	OVER	UNDER
<b>COMMON SERVICES</b>				
(Public Works)	\$ 3 928 950	\$ 3 930 637	\$ 1 687	\$ -
<b>ROAD TRANSPORT SERVICES</b>				
Administration	\$ 278 435	\$ 261 962	-	\$ 16 473
Roadway Surfaces	\$ 1 059 704	\$ 1 091 128	\$ 31 424	-
Sidewalk Maintenance	\$ 512 547	\$ 562 862	\$ 50 315	-
Culverts, Ditching	\$ 39 508	\$ 33 948	-	\$ 5 560
Storm Sewer Maintenance	\$ 165 945	\$ 199 046	\$ 33 101	-
Street Cleaning	\$ 422 831	\$ 429 440	\$ 6 609	-
Sanding & Salting & Snow Control	\$ 1 464 526	\$ 1 308 782	-	\$ 155 744
Street Lights	\$ 695 000	\$ 713 391	\$ 18 391	-
Traffic Services	\$ 628 254	\$ 611 917	-	\$ 16 337
<b>ENVIRONMENTAL HEALTH SERVICES</b>				
Garbage & Waste Disposal	\$ 481 700	\$ 524 930	\$ 43 230	-
Garbage & Waste Collection	\$ 451 500	\$ 455 701	\$ 4 201	-
Recycling	\$ 132 400	\$ 119 504	-	\$ 12 896
Hazardous Waste	\$ 6 000	\$ 3 426	-	\$ 2 574
Recycling Recovery	(\$ 7 000)	(\$ 7 575)	-	\$ 575
<b>PARKS &amp; TREES SERVICES</b>				
Wilmot Park	\$ 50 082	\$ 46 096	-	\$ 3 986
Odell Park	\$ 92 921	\$ 93 508	\$ 587	-
Carleton Park	\$ 10 216	\$ 7 582	-	\$ 2 634
Old Government House	\$ 11 896	\$ 12 965	\$ 1 069	-
Trees	\$ 443 482	\$ 462 454	\$ 18 972	-
Greens, Benches, Other Parks, etc.	\$ 263 241	\$ 254 579	-	\$ 8 662
Old Burial Ground	\$ 8 400	\$ 8 207	-	\$ 193
<b>TOTALS</b>	<b>\$11 140 538</b>	<b>\$11 124 490</b>	<b>\$209 586</b>	<b>\$225 634</b>

UNDER: \$ 16 048

Utility Fund expenditures for the period 1996 01 01 to 1996 12 31 were as follows:

ITEM	BUDGET	NET EXPENDITURE	OVER	UNDER
<b>COMMON SERVICES</b>				
General Equipment	\$ 631 500	\$ 532 220	-	\$ 108 280
Safety & Benefits	\$ 395 500	\$ 370 068	-	\$ 25 432
Administration	\$ 196 500	\$ 219 623	\$ 23 123	-
<b>WATER</b>				
Purification & Treatment	\$ 355 500	\$ 329 676	-	\$ 25 824
Source of Supply	\$ 457 800	\$ 400 037	-	\$ 57 763
Power & Plumbing	\$ 44 200	\$ 41 656	-	\$ 2 544
Maintenance of Equipment (Plant)	\$ 98 200	\$ 56 366	-	\$ 41 834
Transmission & Distribution (Oper)	\$ 294 000	\$ 303 150	\$ 9 150	-
Transmission & Distribution (Maint)	\$ 907 500	\$ 745 768	-	\$ 161 732
Billing & Collection	\$ 200 100	\$ 215 165	\$ 15 065	-
Meters	\$ 332 000	\$ 361 341	\$ 29 341	-
<b>SANITARY SEWER</b>				
Operation (Lift Stations)	\$ 128 000	\$ 103 185	-	\$ 24 815
Maintenance	\$ 545 000	\$ 540 202	-	\$ 4 798
Treatment & Disposal	\$ 1 654 500	\$ 1 652 212	-	\$ 2 288
<b>FISCAL SERVICES</b>				
Funding				
(Current Year's Capital Projects)	\$ 3 380 000	\$ 3 042 251	-	\$ 337 749
Capital Grant to Fredericton Area				
Pollution Control Commission	\$ 350 000	\$ 350 000	-	\$ -
<b>TOTAL</b>	<b>\$ 9 970 300</b>	<b>\$ 9 253 920</b>	<b>\$ 76 679</b>	<b>\$ 793 059</b>

UNDER: \$ 716 380

Following is a table giving total kilometrage (as of 96 12 31) of municipal roads and streets, provincial designated and regional highways and provincial by-passes & ramps divided with respect to type of surface on the various streets.

<b>LOCATION</b>	<b>MUNICIPAL ROADS &amp; STREETS</b>				<b>DESIGNATED &amp; REGIONAL HIGHWAYS (Asphalt)</b>	<b>T.C.H. BY-PASSES &amp; RAMPS (Asphalt)</b>
	<b>Asphalt</b>	<b>Gravel</b>	<b>Chip Seal</b>	<b>TOTAL</b>		
Fredericton South	110.103	1.069	3.423	114.595	21.191	27.932
Fredericton North	21.856	0.029	0.578	22.463	9.008	1.378
Nashwaaksis	57.921	0.945	1.700	60.566	2.580	8.194
Marysville	24.524	0.304	0.792	25.620	5.563	3.007
Barker's Point	8.267	-	0.418	8.685	2.037	4.428
Silverwood	4.428	-	0.184	4.612	-	2.748
Garden Creek	17.881	1.101	1.734	20.716	-	2.482
Douglas	3.871	0.191	0.359	4.421	2.560	-
Lincoln	3.633	0.502	0.879	5.014	6.695	2.458
Lower St. Marys	1.970	-	-	1.970	-	2.681
<b>TOTALS</b>	<b>254.454</b>	<b>4.141</b>	<b>10.067</b>	<b>268.662</b>	<b>49.634</b>	<b>55.308</b>

**TOTAL (Municipal, Designated & Regional Highways ) = 318.296**

Following in the body of this report is a detailed statement of the work done, associated expenditures and unit costs for the various operations. The report of any particular division may be found by referring to the index.

Respectfully submitted,

E. John Bliss, P. Eng.  
CITY ENGINEER

## **GENERAL FUND**

## COMMON SERVICES

The total net expenditure under this heading was **\$ 4 011 203** made up as follows:

Administration	\$ 129 894
Engineering Services	\$ 518 993
General Equipment	\$2 000 535
Service Depots	\$ 416 378
Safety & Benefits	<u>\$ 945 403</u>
	<b>\$ 4 011 203</b>

## ROAD TRANSPORT SERVICES

Road Transport Services is made up of the following items:

Administration	\$ 261 966
Roads & Streets	\$3 625 206
Street Lighting	\$ 713 391
Traffic Services	<u>\$ 611 917</u>
	<b>\$ 5 212 480</b>

(a) **Administration:** The total net expenditure under this heading amounted to **\$ 261 966** for personnel costs, general services, etc.

(b) **Roads & Streets:** The total net expenditure under this item was made up as follows:

(1) Roadway Surfaces (maintenance)	\$ 1 091 128
(2) Sidewalk Maintenance	\$ 562 862
(3) Culverts & Ditching	\$ 33 948
(4) Storm Sewer Maintenance	\$ 199 046
(5) Street Cleaning	\$ 429 440
(6) Winter Maintenance	<u>\$ 1 308 782</u>
	<b>\$ 3 625 206</b>

The expenditures for the above items, as well as a brief description of work done, are summarized as follows:

**(1) Roadway Surfaces (Maintenance)**

The net expenditure of **\$1 091 128** was made up as follows:

Paved Streets	\$ 751 987
Curb & Gutter Repair	\$ 138 022
Right-of-way Maintenance	<u>\$ 201 119</u>
	<b>\$ 1 091 128</b>

**Paved Streets** This includes the patching and repairing of pavement and the asphalt concrete resurfacing program.

The following streets or portions of streets were resurfaced in 1996. Class I Type "C" and Class II Type "D" asphalt concrete was used.

**CLASS I TYPE "C"**

<b>Location</b>	<b>Length (metres)</b>
Canada Street (RR Tracks at Veterans Drive to Civic #337)	1 092
Dundonald Street (Northumberland St. to Smythe St.)	157
Gibson Street (Union Street to RR Track near Civic # 192)	328
Main Street (Fulton Avenue to Lynn Street)	890
Regent Street (Queen Street to Brunswick Street)	231
Regent Street (Albert Street to Montgomery Street)	989
St. Marys Street (Selected Sections)	327
Wilmot Alley	101
Wilsey Road (South) (Selected Sections)	175
Woodstock Road (Smythe Street to Rookwood Avenue)	552
Woodstock Road (Golf Club road to Civic #797)	527
Woodstock Road (Angelview Court to the TCH)	<u>1 783</u>
<b>TOTAL</b>	<b>7 152</b>

7 152 metres = 7.152 kilometres

**CLASS II TYPE "D"**

Aberdeen Street (Church Street to RR Tracks)	107
Carleton Street (King Street to Brunswick Street)	103
Douglas Avenue (Maple Street to Broad Street)	369
Fulton Avenue (Main Street to Maple Street)	354

**CLASS II TYPE "D" (continued)**

Location	Length (metres)
Manchester Court	160
McKeen Street (Union Street to the River)	146
McLeod Hill Road (Selected Sections)	972
Pearl Street	457
Queen Street (Northumberland Street to Smythe Street)	200
Rainsford Lane (Selected Sections)	308
River Street (Area near end of curb)	80
Simcoe Court	291
Spruce Terrace	187
Tweedsmuir Street	117
Veterans Court (Veterans Drive to Civic # 25)	149
Willow Avenue (Maple Street to Hilltop Drive)	174
York Street (King Street to Brunswick Street)	102
<b>TOTAL</b>	<b>4 276</b>

**4 276 metres = 4.276 kilometres**

**(2) Sidewalk Maintenance**

The net expenditure of \$ 562 862 for sidewalk repairs was made up as follows:

Personnel Costs	\$ 162 742
Goods, Supplies, Materials	\$ 362 570
General Services (use of equipment & contract services)	\$ 37 550

\$ 562 862

**(3) Culverts and Ditching**

- The maintenance and installation of culverts and ditches.

The net expenditure of \$ 33 948 was made up as follows:

Personnel Costs	\$ 18 353
Materials	\$ 1 788
General Services (use of equipment & contract services)	\$ 13 807

\$ 33 948

**(4) Storm Sewer Maintenance**

- The flushing of mains, cleaning and repair of catch basins and the repair of mains.

The net expenditure of \$ 199 046 was made up as follows:

Personnel Costs	\$ 73 308
Materials	\$ 55 725
General Services (use of equipment & contract services)	\$ 70 013

\$ 199 046

**(5) Street Cleaning and Flushing**

The City of Fredericton used a number of sweepers, trackless units and a Vac-all unit for street cleaning purposes in 1996.

The net expenditure under this heading amounted to \$ 429 440 and was made up as follows:

Personnel Costs	\$ 252 725
General Services (use of equipment & contract services)	\$ 139 961
Goods (brooms, litter cans, dust control)	\$ 36 754

\$ 429 440

**(6) Winter Maintenance**

**(a) Sanding and Salting Streets and Sanding Sidewalks**

Storing sand and salt in winter storage piles and spreading same on slippery streets and sidewalks.

**(b) Snow Control**

Blowing, shoveling and hauling snow, plowing or scraping roads, cleaning gutters, thawing catch basins and any other means of snow control.

The City of Fredericton was responsible for plowing, sanding and salting 331.064 km of roads and streets in 1996 (159.671 km on the north side and 171.393 km on the south side). Included in these figures is the Westmorland Street Bridge along with adjacent highways and ramps which are maintained through an agreement with the Department of Transportation.

During the winter months of 1996, 185.702 km of sidewalk were plowed and sanded. (71.519 km on the north side and 114.183 km on the south side).

**Streets:**

The total net cost for **plowing streets** amounted to **\$ 622 994** and was made up as follows:

Personnel Costs	\$ 412 697
General Services (use & maintenance of equipment)	\$ 194 683
Goods	\$ 459
Fixed Assets (new equipment)	<u>\$ 15 155</u> \$ 622 994

The total net cost of **sanding and salting streets** amounted to **\$ 476 026** and was made up as follows:

Personnel Costs	\$ 197 495
General Services (use & maintenance of equipment)	\$ 64 762
Materials (salt and sand)	<u>\$ 213 769</u> \$ 476 026

The overall net expenditure of **\$ 1 099 020** for **plowing, sanding and salting** City roads and streets was made up as follows:

Personnel Costs	\$ 610 192
General Services (use & maintenance of equipment)	\$ 259 445
Fixed Assets (new equipment)	\$ 15 155
Materials (salt & sand)	\$ 213 769
Goods	<u>\$ 459</u> (1) \$ 1 099 020

**Sidewalks:**

The total net expenditure for **plowing sidewalks** amounted to \$ 121 477 and was made up as follows:

Personnel Costs	\$ 82 540
General Services (use & maintenance of equipment)	\$ 38 937

The total net expenditure for **sanding sidewalks** amounted to \$ 88 285 and was made up as follows:

Personnel Costs	\$ 39 499
General Services (use & maintenance of equipment)	\$ 12 952
Materials (sand)	\$ 8 766
Fixed Assets (new equipment)	\$ 27 068
	\$ 88 285

The overall net expenditure for snow plowing and sanding of sidewalks was \$ 209 762 and was made up of as follows:

Personnel Costs	\$ 122 039
General Services (use & maintenance of equipment)	\$ 51 889
Materials (sand)	\$ 8 766 (2)
Fixed Assets (new equipment)	<u>\$ 27 068</u> \$ 209 762

**TOTAL NET COST OF WINTER MAINTENANCE - ADD (1) & (2)** \$1 308 782

Snowfall in Fredericton for the last five years was as follows:

1992	Airport Weather Office	205.7 cm
1993	Airport Weather Office	205.1 cm
1994	Airport Weather Office	250.4 cm
1995	Airport Weather Office	292.7 cm
1996	Airport Weather Office	214.8 cm

**(c) Street Lighting**

The total street lighting costs for 1996 were as follows:

**(d) Traffic Services**

The expenditure under this heading is made up as follows:

- 1) Street Signs
- 2) Paint Department
- 3) Traffic Signals

**(1) Street Signs**

Purchasing, repairing and installing street signs on City Streets.

The net expenditure under this heading amounted to \$ 111 134 made up as follows:

Personnel Costs	\$ 54 321
General Services (use of equipment & contract services)	\$ 11 617
Goods (posts, street sign purchases, etc.)	<u>\$ 45 196</u>
	<b>\$ 111 134</b>

**(2) Paint Department**

The net expenditure under this heading was \$ 126 104 made up as follows:

Personnel Costs	\$ 68 322
General Services (use & maintenance of equipment & contract services)	\$ 17 995
Goods (paint & miscellaneous supplies)	\$ 34 295
Fixed Assets (new equipment)	<u>\$ 5 492</u>
	<b>\$ 126 104</b>

**(3) Traffic Signals**

The net expenditure under this heading was \$ 259 679 made up as follows:

Personnel Costs	\$ 107 866
General Services (use of equipment & contract services)	\$ 31 932
Government Services (electric power)	\$ 81 548
Goods (material)	\$ 34 948
Fixed Assets (new equipment)	<u>\$ 3 385</u>
	<b>\$ 259 679</b>

## ENVIRONMENTAL HEALTH SERVICES

The following items are included under the above heading.

- 1) Garbage and Waste Collection
- 2) Garbage and Waste Disposal
- 3) Recycling
- 4) Hazardous Waste
- 5) Old Burial Ground

**(1) Garbage and Waste Collection**

In 1996, the net amount paid for the garbage and waste collection operation was \$ 455 701 made up as follows:

Personnel Costs	\$ 180
General Services (Garbage Collection Contract)	\$ 447 433
General Services (Advertising)	<u>\$ 8 088</u>
	\$ 455 701

**(2) Garbage and Waste Disposal**

The net expenditure under this section was \$ 524 930 made up as follows:

General Services (Solid Waste Commission payments)	\$ 518 340
General Services (Land rental)	\$ 5 000
Government Services (Taxes)	<u>\$ 1 590</u>
	\$ 524 930

**(3) Recycling**

The net expenditure under this section was \$ 111 929 made up as follows:

Goods (Blue Boxes)	\$ 5 016
General Services (Recycling Collection Contract)	\$ 114 488
General Services (Recovery Account)	<u>\$ (7 575)</u>
	\$ 111 929

**(4) Hazardous Waste**

Cleanup of oil spills from accidents, etc.

The next expenditure under this section was \$ 3 426 made up as follows:

Personnel Costs	\$ 403
General Services (use of equipment & contract services)	\$ 2 183
Goods (materials)	<u>\$ 840</u>
	\$ 3 426

## (5) Old Burial Ground

The net expenditure under this section was \$ 8 207 made up as follows:

Personnel Costs	\$ 6 430
General Services (use of equipment)	\$ 609
Goods (materials)	\$ 1 168

\$ 8 207

## PARKS AND TREES SERVICES

The following items are included under the above heading:

- 1) Wilmot Park
- 2) Odell Park
- 3) Carleton Park
- 4) Old Government House
- 5) Trees
- 6) Greens, Benches & Other Parks

#### **(1) Wilmot Park**

The net expenditure for this item was **\$ 46 096** made up as follows:

Personnel Costs	\$ 38 489
General Services (use & maintenance of equipment, building repairs)	\$ 1 575
Government Services (water & sewer rates, lights & power)	\$ 392
Goods (materials, fuels & lubricants)	<u>\$ 5 540</u>
	<b>\$ 46 096</b>

#### **(2) Odell Park**

The net expenditure for this item was **\$ 93 508** made up as follows:

Personnel Costs	\$ 69 941
General Services (use & maintenance of equipment, communications; building repairs)	\$ 7 194
Government Services (water & sewer rates, lights & power)	\$ 2 271
Goods (materials, fuels & lubricants)	<u>\$ 14 102</u>
	<b>\$ 93 508</b>

#### **(3) Carleton Park**

The net expenditure for this item was **\$ 7 582** made up as follows:

Personnel Costs	\$ 4 546
General Services (use of equipment & land rentals)	\$ 2 622
Goods (materials)	\$ 402
Government Services (lights & power)	<u>\$ 12</u>
	<b>\$ 7 582</b>

#### **(4) Old Government House**

The net expenditure for this item was \$ 12 965 made up as follows:

Personnel Costs	\$ 6 003
General Services (use of equipment)	\$ 1 390
Goods (materials)	\$ 5 382
Government Services (lights & power)	\$ 190
	\$ 12 965

### (5) Trees

The net expenditure for this item was \$ 462 454 made up as follows:

Personnel Costs	\$ 337 494
General Services (use & maintenance of equipment & contract services)	\$ 85 030
Goods (fuels & lubricants, materials, new trees, small tools & equipment)	\$ 39 930
	\$ 462 454

### TREE REMOVAL

In 1996, 304 trees were removed. These trees were either in a decadent condition, a menace to public safety or possible breeding places for the Elm Bark Beetle.

Following is a list of trees removed in 1996:

Species	Number Removed
Ash	3
Birch	7
Elm	160
Ironwood	5
Linden	23
Manitoba Maple	6
Norway Maple	12
Red Maple	2
Silver Maple	8
Sugar Maple	23
Poplar	15
Red Oak	6
Softwoods	17
Other Hardwoods	17
	—
TOTAL	304

In 1996, 108 trees were removed because of Dutch Elm Disease.

Following is a summary of Elm trees removed from 1964 to 1996:

Year	No. Lost (% Lost) To Dutch Elm Disease	No. Removed For Other Reasons	Total No. Removed
1964	14 (29%)	34	48
1965	8 (24%)	25	33
1966	12 (21%)	44	56
1967	18 (20%)	73	91
1968	33 (16%)	174	207
1969	30 (21%)	108	138
1970	49 (39%)	78	127
1971	57 (42%)	77	134
1972	61 (42%)	84	145
1973	92 (46%)	108	200
1974	132 (33%)	266	398
1975	75 (19.6%)	307	382
1976	118 (28.2%)	300	418
1977	681 (91.6%)	62	743
1978	680 (92%)	56	736
1979	937 (91.8%)	84	1021
1980	1146 (95.7%)	51	1197
1981	500 (59.7%)	327	827
1982	487 (90.7%)	50	537
1983	133 (36.5%)	231	364
1984	121 (63.4%)	70	191
1985	77 (80.2%)	19	96
1986	45 (60.8%)	29	74
1987	49 (53.8%)	42	91
1988	43 (54.4%)	36	79
1989	47 (48.0%)	51	98
1990	55 (79.7%)	14	69
1991	42 (89.4%)	5	47
1992	52 (76.5%)	16	68
1993	18 (51.4%)	17	35
1994	39 (52.7%)	35	74
1995	23 (27.7%)	60	83
1996	108 (67.5%)	52	160
<b>TOTAL</b>	<b>5 982</b>	<b>2 985</b>	<b>8 967</b>

#### TREE PLANTING

There were 570 trees planted (520 new plantings and 50 replacements) along City Streets and in parks in 1996. Street trees were planted in new subdivisions as well as on newly curbed streets.

Over 280 shrubs were planted in City parks and City-owned properties in various beautification projects.

In addition, over 500 seedlings received from the Canadian Forest Service were planted along the North side Trail system from Gibson Street to the City limits in Douglas.

#### (6) Greens, Benches & Other Parks

The net expenditure for this item was **\$ 254 579** made up as follows:

Personnel Costs	\$ 159 284
General Services (use & maintenance of equipment and special projects)	\$ 19 308
Goods (fuels & lubricant materials, small tools & equipment)	\$ 56 708
Fixed Assets (new equipment)	<u>\$ 19 279</u>
	<b>\$ 254 579</b>

#### UTILITY FUND

The above item is made up of the following headings:

1. Common Services
2. Sanitary Sewer
3. Water

## (1) COMMON SERVICES

In 1996 the net expenditure for this item was \$1 112 911 made up as follows:

General Equipment	\$ 523 220
Safety & Benefits	\$ 370 068
Administration	<u>\$ 219 623</u>
	<b>\$ 1 112 911</b>

## (2) SANITARY SEWER

In 1996 the net expenditure for this item was \$ 2 295 599 made up as follows:

### Operating: Lift Stations

Personnel Costs	\$ 43 188
General Services (use & maintenance of equipment)	\$ 31 263
Government Services (light & power)	\$ 26 573
Goods (materials)	<u>\$ 2 161</u>
	<b>\$ 103 185</b>

### Maintenance:

Personnel Costs	\$ 315 888
General Services (use & maintenance of equipment & contract services)	\$ 98 565
Goods (repair parts & tools)	<u>\$ 125 749</u>
	<b>\$ 540 202</b>

### Sewage Treatment & Disposal

Personnel Costs	\$ 23 486
General Services (use & maintenance of equipment)	\$ 19 465
(Treatment (F.A.P.C.C.))	\$ 1 585 367
Government Services - Water & Sewer rates	\$ 689
Lights & Power	\$ 21 592
Goods (Miscellaneous Supplies)	<u>\$ 1 613</u>
	<b>\$1 652 212</b>
<b>TOTAL</b>	<b>\$ 2 295 599</b>

The Fredericton sanitary sewer system consists of approximately 291 kilometres of mains made up as follows:

SIZE	SILVERWOOD GARDEN CREEK	NASHWAAKSIS DOUGLAS	MARYSVILLE	LR.ST.MARYS BARKER'S PT.	FREDERICTON	TOTAL
100mm	-	0.158	-	-	-	0.158
100mm F.M.	0.013	-	-	-	1.103	1.116
150mm	-	1.433	0.314	-	0.253	2.000
150mm F.M.	0.031	1.071	0.539	0.712	3.008	5.361
200mm	16.045	40.997	18.417	10.864	120.239	206.562
200mm F.M.	0.254	0.463	0.314	-	0.064	1.095
250mm	1.959	5.096	0.955	0.298	10.101	18.409
250mm F.M.	1.178	-	-	-	-	1.178
300mm	1.267	4.077	1.006	1.868	17.858	26.076
300mm F.M.	0.420	0.489	-	-	0.739	1.648
350mm	0.287	0.765	-	-	0.713	1.765
350mm F.M.	-	-	0.528	-	0.254	0.782
375mm	1.138	3.614	0.500	0.174	2.193	7.619
400mm	0.018	0.122	-	-	0.210	0.350
450mm	1.039	0.117	1.350	-	2.683	5.189
500mm	2.979	-	-	-	-	2.979
525mm	-	2.420	-	-	0.310	2.730
600mm	0.156	0.964	-	-	3.304	4.424
750mm	-	-	-	-	0.322	0.322
900mm	-	-	-	-	1.432	1.432
<b>TOTALS</b>	<b>26.784</b>	<b>61.786</b>	<b>23.923</b>	<b>13.916</b>	<b>164.786</b>	<b>291.195</b>

**NOTE:** Fredericton includes the Lincoln area.

The above figures do not include mains at the Fredericton Exhibition Grounds, U.N.B. and St. Anne's Point on the Woodstock Road or the Fredericton Area Pollution Control Commission sewer system which has approximately 11.4 kilometres of main.

### (3) WATER

There are, at year's end, 14 separately monitored water systems, comprising 22 wells (9 active), 19 reservoir tanks or cells on 12 reservoir sites, 6 active booster stations and the Water Treatment Plant.

The Water Treatment Plant treats the water from the 7 Wilmot park wells, which provide 95% of the City's water. The following describes the 14 water systems and their normal sources.

SYSTEM	SOURCE	STORAGE
South Low	7 wells via W.T.P. 1 emergency standby well	18200 kL
North Low	South Low via River Crossing (same top reservoir elevations) 5 emergency wells	8540 kL
South Intermediate	South Low via Booster	9090 kL
South High	South Intermediate via Booster	4550 kL
Golf Club Road	South High via Pressure Reducing Valve	0 kL
Rosewood	South Low via Booster	0 kL
Lincoln	South Low via Booster	3750 kL
Alison	South High via Pressure Reducing Valve	0 kL
Hanwell	South High via Pressure Reducing Valve 1 Emergency Well	460 kL
Silverwood	2 Wells Direct	2550 kL
Rainsford	Golf Club road via Booster 1 Emergency Well	0 kL
Killarney	South Low via Booster 2 Emergency Wells	3750 kL
Marysville	North Low Via Booster 3 Emergency Wells	6580 kL
Canterbury	South High via Altitude Valve	1070 kL

The water account includes all expenditures other than capital expenditures for water.

Water costs for the City of Fredericton were made up as follows:

1. Water Administration (Billing & Collection)	\$ 215 165
2. Water Ordinary (including meters)	\$1 410 259
3. Water Production Costs	<u>\$ 827 735</u>

#### (1) WATER ADMINISTRATION (BILLING & COLLECTION)

The net expenditure of \$ 215 165 was made up as follows:

Personnel Costs	\$ 133 794
General Service (Postage, Professional Services, Rental of Equipment, Computer External Services)	\$ 59 314
Goods (Computer & Office Supplies)	<u>\$ 22 057</u>

#### (2) WATER ORDINARY (INCLUDING METERS)

The net expenditure of \$1 410 259 was made up as follows:

##### Transmission & Distribution (Operation)

Personnel Costs	\$ 63 324
General Services (use & maintenance of equipment)	\$ 104 301
Government Services (light & power, provincial taxes)	\$ 127 334
Goods (materials)	<u>\$ 8 191</u>

##### Transmission & Distribution (Maintenance)

Personnel Costs	\$ 417 831
General Services (use & maintenance of equipment & hydrants & contract services)	\$ 142 689
Goods (fuels & lubricants, tools, materials, parts)	<u>\$ 185 248</u>

##### Meters

Personnel Costs	\$ 212 508
Goods (meter parts, miscellaneous supplies & tools)	\$ 7 875
General Services (use of equipment)	\$ 48 231
Fixed Assets (new meters)	<u>\$ 92 727</u>

**TOTAL** \$1 410 259

At the end of 1996 there were 13 221 water services on meter and 201 on flat rate, making a total of 13 422.

156 new meters (new construction and former flat rate) were installed in 1996.

In 1996, 10 discontinued services were excavated and shut off at the main and 19 frozen meters were replaced. There were also 1232 meters replaced due to their age.

At the end of 1996 there were 3300 units on the Automated Meter Reading (AMR) System.

There are in the City, as of 1996 12 31, 1730 hydrants situated in the following areas:

Fredericton South	790
Fredericton North	168
Nashwaaksis/Douglas	350
Marysville	155
Barker's Point/Lower St. Marys	85
Silverwood/Garden Creek	27
<b>SUB TOTAL</b>	<b>1575</b>
<b>LOCATED ON PRIVATE PROPERTY</b>	<b><u>156</u></b>
<b>TOTAL</b>	<b>1730</b>

Hydrants were installed at the following locations in 1996:

<u>Location</u>	<u>Number</u>
Clements Drive	4
Diamond Street	2
Downing Street	1
Draco Road	1
Goodine Street	4
Leisure Avenue	2
Main Street Canadian Tire (Private)	1
Manresa Drive	3
McGloin Street	1
Ramsay Street	1
Rookwood Avenue	1
Spiro Drive	1
Wilsey Road	1
<b>TOTAL</b>	<b>23</b>

The Fredericton distribution system consists of approximately 318 kilometres of water main, made up as follows:

SIZE	MARYSVILLE	NASHWAAKSIS DOUGLAS	LR. ST. MARYS BARKER'S POINT	SILVERWOOD GARDEN CREEK	FREDERICTON	TOTAL
32mm	-	0.153	-	-	-	0.153
38mm	-	0.072	-	-	0.153	0.225
50mm	-	-	-	0.154	-	0.154
75mm	-	-	-	-	0.205	0.205
100mm	0.753	2.232	-	2.508	11.081	16.574
150mm	12.583	21.211	4.053	4.835	57.638	100.320
200mm	7.055	25.165	2.266	7.812	44.584	86.882
250mm	3.201	8.143	5.169	0.966	26.275	43.754
300mm	1.332	7.490	1.070	7.776	29.701	47.369
350mm	-	0.840	-	-	6.222	7.062
400mm	-	2.241	-	-	7.127	9.368
450mm	-	-	-	-	1.965	1.965
500mm	-	-	-	-	2.993	2.993
600mm	-	-	-	-	0.427	0.427
Unknown	0.146	-	-	-	-	0.146
<b>TOTALS</b>	<b>25.070</b>	<b>67.547</b>	<b>12.558</b>	<b>24.051</b>	<b>188.371</b>	<b>317.597</b>

Figures for Marysville, Nashwaaksis, Barker's Point and Silverwood are approximate only, due to measurement from maps in some instances.

The above figures do not include water mains installed at the Exhibition Grounds; the University of New Brunswick and St. Anne's Point Barracks on the Woodstock Road.

### (3) WATER PRODUCTION COSTS

The net expenditure of **\$ 827 735** was made up as follows:

**Source of Supply**

Personnel Costs	\$ 95 382
Use of Equipment	\$ 19 616
Maintenance - Wells	\$ 44 164
Power - Wells	\$ 235 808
Materials - Wells	\$ 5 067
	<b>\$ 400 037</b>

**Power & Pumping (Plant)**

Personnel Costs	\$ 33 466
Communications	\$ 273
Light & Power	\$ 6 008
Supplies	\$ 1 909
	<b>\$ 41 656</b>

**Water Treatment Plant**

Personnel Costs	\$ 115 415
Insurance	\$ 28 110
Maintenance	\$ 79 220
Power	\$ 10 524
Taxes	\$ 37 754
Goods (Chlorine, Soda Ash, Lime, etc.)	\$ 115 019
	<b>\$ 386 042</b>
<b>TOTAL</b>	<b>\$ 827 735</b>

The total amount of water pumped into the City's distribution systems from 1996 01 01 to 1996 12 31 for the entire City was 8270 megalitres. The amount of water produced by the Water Treatment Plant in

1996 was 8200 megalitres or 99% of the total City demand. The average daily demand for the City is 22.8 megalitres.

The following table gives a comparison of water production costs for the last ten years:

#### WATER PRODUCTION COSTS

YEAR	MEGALITRES PRODUCED	PRODUCTION EXPENDITURE	PRODUCTION COST PER MEGALITRE
1987	8 177	\$ 712 102	\$ 87
1988	8740	743 604	85
1989	8440	734 658	87
1990	8600	679 440	79
1991	8450	823 353	97
1992	8570	828 783	97
1993	8023	794 406	99
1994	8340	874 562	105
1995	8160	839 058	103
1996	8270	827 735	100

The total net expenditure for transmission and distribution of water for the City from 1996 01 01 to 1996 12 31 was determined from the following:

**Transmission & Distribution:**

Operation	\$ 303 150	
Maintenance	<u>\$ 745 768</u>	<b>\$ 1 048 918</b>

Therefore, the net expenditure for transmission and distribution of one megalitre of water from 1996 01 01 to 1996 12 31 was:

$$\frac{\$ 1 048 918}{8270} = \$ 126.83$$

The following table gives a comparison of net expenditures for transmission and distribution of one megalitre of water for the last ten years:

YEAR	NET EXPENDITURE PER MEGLALITRE
1987	\$ 89
1988	\$ 93
1989	\$ 126
1990	\$ 106
1991	\$ 117
1992	\$ 121
1993	\$ 147
1994	\$ 125
1995	\$ 114
1996	\$ 127

The total net expenditure for water administration costs for the City from 1996 01 01 to 1996 12 31 was determined from the following:

### Water Administration

(1) Billing & Collection	\$ 215 165
(2) Meters (Installation, Reading, Repairs)	\$ 361 341
	<b>\$ 576 506</b>

Administration costs per megalitre of water produced:

$$\frac{\$ 576\,506}{8270} = \$69.71$$

The following table gives a comparison of administration costs and debt charges per megalitre of water produced for the last ten years:

**ADMINISTRATION COSTS AND DEBT CHARGES PER MEGLITRE**  
**(Rounded to nearest dollar)**

YEAR	ADMINISTRATION (BILLING & COLLECTION & METERS)	DEBT CHARGES
1987	\$ 37	\$ 52
1988	\$ 39	\$ 46
1989	\$ 44	\$ 46
1990	\$ 44	\$ 43
1991	\$ 45	\$ 43
1992	\$ 46	\$ 38
1993	\$ 62	\$ 24
1994	\$ 63	\$ 19
1995	\$ 67	\$ 12
1996	\$ 70	\$ -

The following table gives a comparison of total water costs per megalitre of water produced for the last ten years:

**TOTAL COSTS PER MEGLITRE**

YEAR	PRODUCTION COSTS	TRANSMISSION & DISTRIBUTION COSTS	ADMINISTRATION	DEBT CHARGES	*TOTAL
1987	\$ 87	\$ 89	\$ 37	\$ 52	\$ 265
1988	\$ 85	\$ 93	\$ 39	\$ 46	\$ 263
1989	\$ 87	\$ 126	\$ 44	\$ 46	\$ 303
1990	\$ 79	\$ 106	\$ 44	\$ 43	\$ 272
1991	\$ 97	\$ 117	\$ 45	\$ 43	\$ 302
1992	\$ 97	\$ 121	\$ 46	\$ 38	\$ 302
1993	\$ 99	\$ 147	\$ 62	\$ 24	\$ 332
1994	\$ 105	\$ 125	\$ 63	\$ 19	\$ 312
1995	\$ 103	\$ 114	\$ 67	\$ 12	\$ 296
1996	\$ 100	\$ 127	\$ 70	\$ -	\$ 297

\*TOTAL COST = Production Costs + Transmission & Distribution Costs  
+ Administration Costs + Debt Charges

**SUMMARY**

**WATER AND SEWER REVENUE & EXPENDITURES**  
**1996**

ITEM	NET EXPENDITURE	REVENUE
<b><u>COMMON SERVICES (WATER &amp; SEWER)</u></b>		
General Equipment	\$ 523 220	\$ 411 866
Safety & Benefits	\$ 370 068	
Administration	\$ 219 623	
<b><u>WATER</u></b>		
Water Administration (Billing & Collection)	\$ 215 165	\$ 4 968 785
Water Ordinary (Including Meters)	\$ 1 410 259	
Water Treatment Facility & Well Production Costs	\$ 827 735	
<b><u>SANITARY SEWER</u></b>		
Operating & Maintenance Sewage Treatment & Disposal	\$ 643 387 \$ 1 652 212	\$ 3 816 253
<b>TOTAL</b>	<b>\$ 5 861 669</b>	<b>\$ 9 196 904</b>

1996 SURPLUS: \$ 3 335 235

**PLUS: SECOND PREVIOUS YEAR'S SURPLUS @ BEGINNING OF YEAR** \$ 966 177

**OVERALL SURPLUS:** \$ 4 301 412

**LESS: CAPITAL PROJECT FUNDING & F.A.P.C.C. GRANT** \$ 3 392 251  
**NET SURPLUS** \$ 909 161

**NOTE:** \$ 3 042 251 of the above noted overall surplus was appropriated for utility capital expenditures.

#### CAPITAL PROGRAMS

The following gives brief descriptions of capital projects begun or completed in 1996.

## WATER

In 1996, water mains were installed on Clements Drive in the Douglas area; on Brunswick Street between Carleton Street and York Streets; in the Forest Hill Road/Forest Acres Court area; on Sunset Drive near Claremont Drive; in the Rookwood Avenue/Waggoner's Lane intersection; and on Vanier Highway between Doak Road and Wilsey Road. The Nashwaak River was also crossed with a new water main between McGloin Street and the Bridge Street/Mill Street intersection.

Streets such as King Street between Northumberland Street and Smythe Street and St. John Street and Church Street; Connaught Street between York Street and Westmorland Street; Ramsay Street; Pine Street; and Northumberland Street between King Street and Brunswick Street had their water mains upgraded or installed under the System Replacement and Oversizing Account.

New Mains were also installed in the Lincoln Heights Subdivision, Phase 3 (Goodine Street; Leisure Avenue; Rhonda Lane; Faith Court; Spiro Drive; Dora Drive) and the Northwood Park Subdivision Phase II (Manresa Drive; McAdam Avenue) by developers under Local Improvement Agreements.

The following are lengths and sizes of water mains installed in 1996.

LENGTH OF MAINS - metres

LOCATION	100mm D.I.	150mm D.I.	200mm D.I. & P.V.C.	250mm D.I.	300mm D.I.	350mm D.I.	500mm D.I.
*King St.- Northumberland St. to Smythe St.		6			189		
*King St.- St. John St. to Church St.		5			174		
*Connaught St.- York St. to Westmorland St.		12			363		
*Northumberland St.- King St. to Brunswick St.					85		
*Ramsay St.	2	22					
*Pine St.	79	2					
Douglas Area (Clements Drive)		12			636		
Brunswick St.-Carleton St. to York St.	10	20		25			196
Forest Hill Rd./Forest Acres Area				755			
Sunset Drive near Claremont Dr.			45				
Rookwood/Waggoner's Intersection	10						
Vanier Highway - Doak Road to Wilsey Road	2			101			362
Nashwaak River Crossing (Mill St. to McGloin)	3	8		2		219	
**Lincoln Hts Subdivision (Goodine; Leisure; Rhonda; Faith; Spiro; Dora)	83	48	616		129	419	
**Northwood Park Subdivision (Manresa; McAdam)	30	62			355		
<b>TOTALS</b>	<b>162</b>	<b>142</b>	<b>773</b>	<b>1694</b>	<b>1339</b>	<b>781</b>	<b>196</b>

**OVERALL TITLE - 5087 metres = 5.087 kilometres**

\* Done under system replacement and oversizing

\*\* Paid for by the developer through Local Improvement Agreement

**SANITARY SEWER:**

In 1996, sanitary sewer mains were installed on Clements Drive in the Douglas Area; on Brunswick Street between Carleton Street and York Street; on Sunset Drive between Drammen Drive and Currie Avenue; and on portions of Doak Road, Wilsey Road and the Vanier Highway between Doak Road and Wilsey Road.

Streets such as Connaught Street between York Street and Westmorland Street and MacLaren Avenue between Carney Street and Clark Street had their sanitary sewer mains upgraded under the System Replacement and Oversizing Account.

New mains were also installed in the Lincoln Heights Subdivision Phase 3 (Goodine Street; Leisure Avenue; Rhonda Lane; Faith Court; Spiro Drive; Dora Drive) and the Northwood Park Subdivision Phase II (Manresa Drive; McAdam Avenue) by developers under Local Improvement Agreements.

The following are lengths and sizes of sanitary sewer mains installed in 1996.

LOCATION	LENGTH OF MAINS - metres					
	200mm PVC	250mm PVC & D.I.	300mm PVC	375mm PVC & D.I.	525mm PVC	600mm PVC
Douglas Area (Clements Drive)						
Brunswick St.-Carleton St. to York St.	41					
Sunset Dr.-Drammen Dr. to Currie Ave.	298					
Vanier Highway - Doak Rd. to Wilsey Road	503	3				
*Comnaught St. - York St. to Westmorland St.	120	134				
*MacLaren Ave.-Clark St. to Carney St.	232		76			
**Lincoln Hts. Subdivision (Goodine;Leisure;Rhonda;Faith;Spiro;Dora)	765	367				
**Northwood Park Subdivision (Manresa;McAdam)	50	298				
<b>TOTALS</b>	<b>2009</b>	<b>802</b>	<b>76</b>	<b>609</b>	<b>1117</b>	<b>196</b>
						<b>55</b>

**OVERALL TOTAL - 4864 metres = 4.864 kilometres**

\* Done under System Replacement and Oversizing  
 \*\* Paid for by the developer through Local Improvement Agreements

**STORM SEWER:**

In 1996, storm sewer mains were installed on Clements Drive in the Douglas Area; on Sunset Drive between Drammen Drive and Currie Avenue; on Smythe Street between Montgomery Street and Parkside Drive; at the Smythe/Waggoner's/Dundonald intersection and at the Rookwood/Waggoner's intersection.

Connaught Street between York Street and Westmorland Street had its storm sewer main upgraded under the System Replacement and Upgrading Account and Brunswick Street between Carleton Street and York Street had its storm sewer main upgraded under the Street Reconstruction Account.

New mains were also installed in the Lincoln Heights Subdivision Phase 3 (Goodine Street; Leisure Avenue; Rhonda Lane; Faith Court; Spiro Drive; Dora Drive) and the Northwood Park Subdivision Phase II (Manresa Drive; McAdam Avenue) by developers under Local Improvement Agreements.

The following are lengths and sizes of storm sewer mains installed in 1996.

LOCATION	250mm	300mm	375mm	450mm	600mm	750mm
Douglas Area (Clements Drive)				90	78	503
Sunset Drive - Drammen Dr. to Currie Ave.	129	247	61	299	192	9
Smythe St.-Montgomery St. to Parkside Dr.	71	26	31		92	390
*** Smythe St./Waggoner's Ln./Dundonald Intersection	10					
****Rookwood/Waggoner's Intersection	18			154		
*Connaught St.-York St. to Westmorland St.	32	132		20	140	
Brunswick St.-Carleton St. to York St.	68	69			30	
** Lincoln Heights Subdivision (Goodine,Leisure,Rhonda,Faith,Spiro,Dora)	155	650	315		62	
**Northwood Park Subdivision (Manresa ,McAdam)	118	347				
<b>TOTALS</b>	<b>601</b>	<b>1471</b>	<b>407</b>	<b>655</b>	<b>502</b>	<b>902</b>

### OVERALL TOTAL - 4538 metres = 4.538 kilometres

- \* Done under System Replacement and Upgrading
- \*\* Paid for by developer through Local Improvement Agreement
- \*\*\* Done under Capital Special Projects
- \*\*\*\* Done under Capital Traffic Management

**CURB AND GUTTER:**

Concrete curb and gutter was constructed at the following locations in 1996. (Notes indicate budget item under which work was done)

	Location	Length (metres)
(1)	Albert Street-Connaught Street to York Street	787
(8)	Barker Street (Pollution Control Plant)	320
(5)	Brentwood Drive/Coburn Drive	754
(1)	Brunswick Street-Carleton Street to York Street	453
(6)	Canada Street - Marysville Street to Civic #506	808
(2)	Charm Court	326
(1)	Clearview Avenue	679
(4)	Devon Area (Athlone, Coombes, Carney, Medley, McEvoy, Etc.)	179
	Downing Street (Turn-A-Round)	173
	Forest Hill Road	147
(1)	Foster Street - Civic #98 to Civic #138	183
(5)	Gervais Court	280
	Kimble Drive School Site	919
(5)	Marlborough Drive/Southall Court	621
(1)	Marshall Street	829
(1)	MacLaren Avenue-Carney Street to Clark Street	1050
	McLeod Hill Road @ Royal Road	105
	Nashwaaksis Junior High Parking Lot	179
(7)	R.R. Crossing Improvements (Various Locations)	678
(1)	Ramsay Street	590
	Rankine Street (Court Area)	93
(6)	Regent Street in front of Fredericton Inn (Civic #1315)	185
(3)	Rookwood/Waggoner's Intersection	417
(4)	Smith Street	299
(7)	Smythe/Dundonald Intersection	256
(3)	Smythe/Brunswick Intersection	112
(1)	Smythe St.- Montgomery Street to Parkside Drive	1045
(4)	Town Plat (King Street; Kings College Road)	664
(4)	Union/Smith Street Area	399
	Veterans Court - Civic #7 to Civic #17	278
(4)	Waterloo Row - Civic #711 to Civic #717	40
(5)	Wesbett Street	620
<b>TOTAL</b>		<b>14 468</b>

- 1) Done under Capital Street Reconstruction.
- 2) Paid for by developer through Local Improvement Agreements.
- 3) Done under Capital Traffic Management.
- 4) Done in conjunction with sidewalk construction.
- 5) Done under Capital Curb & Gutter & Paving.
- 6) Done under Capital Designated Routes.
- 7) Done under Capital Special Projects.
- 8) Done in conjunction with Barker Street Plant Improvements.

**PAVING:**

In 1996, Elm City Paving Ltd. was awarded a contract to supply and place asphalt concrete on a number of City Streets.

The street preparatory work was done by City forces.

The paving program required the supply and placement of the following grades of asphalt concrete:

- 1) Binder Course -      Class I Type "B" @ \$40.00 plus G.S.T. per tonne in place  
                              Class II Type "B" @ \$40.00 plus G.S.T. per tonne in place
- 2) Surface Course -     Class I Type "C" @ \$41.00 plus G.S.T. per tonne in place  
                              Class II Type "D" @ \$42.00 plus G.S.T. per tonne in place

(See Page 10 for a list of streets which received a surface course)

#### BINDER COURSE - TYPE "B"

The following streets were paved with Class I or Class II Type "B" asphalt concrete in 1996.

Location	Length (metres)
(1) Albert Street - Connaught Street to York Street	400
(3) Brentwood Drive	321
(1) Brunswick Street - Carleton Street to York Street	202
(2) Charm Court	162
(1) Clearview Avenue	410
(3) Coburn Drive - Kingswood Drive to Brentwood Drive	60
(1) Downing Street - Rice Street to the end	85
(1) Foster Street - Civic #98 to Civic #138	107
(3) Gervais Court	108
(3) Marlborough Drive - Civic # 121 to the end	205
(1) Marshall Street/Duke Street (Fisher Street to Marshall Street)	347
(1) Ramsay Street Smith Street	267
(3) Southall Court	119
(3) Wesbett Street	309
<b>TOTAL</b>	<b>3257</b>

1. Done under Capital Street Reconstruction.
2. Paid for by developer through Local Improvement Agreements.  
Type "D" Asphalt was also placed on these streets.
3. Done under Capital Curb and Gutter.

#### CONCRETE SIDEWALKS:

New sidewalks were constructed at the following locations in 1996.

	<b>Location</b>	<b>Length (metres)</b>
(3)	Albert Street- Connaught Street to York Street	390
(2)	Brentwood Drive/Coburn Drive	357
(3)	Brunswick Street - Carleton Street to York Street	408
(3)	Canada Street near Ramsay Street	83
(4)	Devon Area (Carney; Coombes; Medley;Hillcrest; Forbes; Dobie; Neill)	502
(2)	Douglas Avenue Area (Douglas, Estey, Evans)	510
	Douglas Avenue Area near Main Street	284
(2)	Edward Street/Goodine Street	280
(2)	Kingswood Drive	202
(2)	Marlborough Drive - Civic # 121 to the end	187
(3)	Marshall Street/Duke/Fisher/Bridge	486
(3)	MacLaren Avenue - Clark Street to Carney Street	465
(6)	R.R. Crossing Improvements (Various locations - North side)	240
(6)	Smythe Street/Dundonald Street Intersection	108
(1)	Smythe Street- Brunswick Street to George Street	119
(3)	Smythe Street-Montgomery Street to Parkside Drive	901
(4)	Town Plat (King St.;Kings College Road)	599
(4)	Union Street/Smith Street area	206
(4)	Union Street - Civic #618 to Civic #752	459
(4)	University Avenue area	399
(5)	Waggoner's Lane - Simpson Court to Odell park Entrance	354
(4)	Waterloo Row - Civic #711 to Civic #753	165
(4)	William Street - End of existing to Calder Avenue	355
<b>TOTAL</b>		<b>8059</b>

- 1) Reconstruction of existing sidewalk under O & M Budget.
- 2) Paid for by developer through Local Improvement Agreement.
- 3) Done under Capital Street Reconstruction.
- 4) Capital Sidewalk Construction done under O & M Budget.
- 5) Done under Capital Traffic Management.
- 6) Done under Capital Special Projects.

#### **PASSIVE PARKS:**

In 1996, work was done on North Side Trails; the Devon connection to the Gibson Trail; a section of the Valley Trail; and in the Botanical Garden.

**STREET RECONSTRUCTION:**

In 1996, a number of streets were upgraded with curb and gutter and paving and in some instances sidewalks. These streets included Brunswick Street between Carleton Street and York Street; Albert Street between Connaught Street and York Street; Smythe Street; between Montgomery Street and Parkside Drive; Marshall Street; Ramsay Street; Clearview Avenue; a portion of Foster Street; and MacLaren Avenue between Carney Street and Clark Street.

**TRAFFIC MANAGEMENT:**

In 1996, the Rookwood Avenue and Waggoner's Lane intersection was upgraded and land was also acquired at the York Street/Dundonald and the Brunswick Street/King Street/ Smythe Street intersections for future and ongoing traffic management improvements on these streets.

**SPECIAL PROJECTS:**

In 1996, work was finalized on the realignment of the Smythe/Waggoner's/Dundonald intersection; improvements were made to the vertical alignment of a number of former railway crossings; and additional improvements were made to the G.I.S. system under this account.

**MAIN STREET PROGRAM:**

In 1996, purchase of ornamental light fixtures, tree guards, planter tubs and waste receptacles was done under this account.

**NEW STREET CONSTRUCTION:**

The following new streets or portions of streets were constructed in 1996.

Location	Length (metres)
Dora Drive	48
Downing Street Extension	85
Faith Court	84
Goodine Street	405
Leisure Avenue	314
Manresa Drive	378
McAdam Avenue	87
Rhonda Lane	173
Spiro Drive	45
<b>TOTAL</b>	<b>1619</b>

**1619 metres = 1.619 kilometres**

**PROVINCIAL DESIGNATED AND REGIONAL HIGHWAYS**

In 1996 the City of Fredericton had a total of 48.2 km of provincial designated and regional highways within its boundaries. In 1996, the Provincial Government paid \$320.13 (winter) and \$80.78(summer) per lane kilometre towards maintenance of the routes. If any improvements such as new curb and gutter, paving or storm sewer installations are done to these routes, authorization by the Department of Transportation is required.

The following authorized projects were undertaken in 1996.

(1)	Route 8 - Canada Street Marysville Street to Civic #506 Curb and Gutter	\$ 113 879
(2)	Route 101 - Regent Street South (Fredericton Inn) Curb & Gutter	\$ 44 594
	TOTAL	\$ 158 473

ITEM	BUDGET	EXPENDITURE	REMARKS
<b>UTILITY FUND</b>			
System Replacement & Oversizing-Water & Sanitary Sewer	\$ 500 000	\$ 540 639	
Automation of Meter Reading - Water	\$ 300 000	\$ 283 860	
Barker Street Plant Improvements-Sanitary Sewer	\$ 350 000	\$ 350 000	
Water Treatment Plant (Filter No.6)-Water	\$ 200 000	\$ 197 627	
Customer Information Service - Water	\$ 60 000	\$ 106 022	
Wilmet Park Well Field (Property acquisition)- Water	\$ 250 000	\$ 458	Purchase was not made
Nashwaak River Crossing Upgrade - Water	\$ 200 000	\$ 214 840	
Forest Hill Road (Forest Acres Area) - Water	\$ 250 000	\$ 200 280	
Brunswick Street Trunk - Water & Sanitary Sewer	\$ 340 000	\$ 216 481	
Sunset-Burpee Trunk (Drammen to Currie)-Sanitary Sewer	\$ 450 000	\$ 375 211	
Douglas Area (Spencer to Diamond) - Water & Sanitary Sewer	\$ 250 000	\$ 275 938	
Vanier (Doak to Wilsey)-Water	\$ 230 000	\$ 318 557	
Killarney Reservoir (Repairs)-Water	\$ 200 000	\$ 162 335	
High Tech Park Services - Water & Sanitary Sewer	\$ 150 000	-	Deferred to 1997
<b>GENERAL FUND</b>			
Northside Trails - Passive Parks	\$ 40 000	\$ 21 826	
Devon Connection to Gibson Trail-Passive Parks	\$ 30 000	\$ 19 777	
Valley Trail-Passive Parks	\$ 20 000	\$ 19 004	
Botanical Garden - Passive Parks	\$ 10 000	\$ 33 567	
System Replacement & Upgrading - Storm Sewer	\$ 200 000	\$ 152 565	
Storm Water Management Planning-Storm Sewer	\$ 50 000	\$ 11 822	
Douglas Area (includes associated roadway)-Storm Sewer	\$ 190 000	\$ 165 511	
Smythe Street - Storm Sewer	\$ 320 000	\$ 220 616	
Sunset Drive (Drammen to Currie)-Storm Sewer	\$ 330 000	\$ 256 704	
Fredericton Industrial Park	\$ 50 000	\$ 40 133	
Storm Water Management Study-Storm Sewer			
Wesbett Street - Curb & Gutter & Paving	\$ 80 000	\$ 61 465	
<b>ITEM</b>		<b>BUDGET</b>	<b>EXPENDITURE</b>
			<b>REMARKS</b>

**GENERAL FUND (Continued)**

	<b>ITEM</b>	<b>BUDGET</b>	<b>EXPENDITURE</b>	<b>REMARKS</b>
<b>NEW SIDEWALKS (DONE UNDER O &amp; M BUDGET)</b>				
Marlborough Drive & Southall Court-Curb&Gutter&Paving	\$ 90 000		\$ 69 299	
Gervais Court - Curb & Gutter & Paving	\$ 40 000		\$ 30 367	
Albert Street (Connaught to York) - Street Reconstruction	\$ 210 000		\$ 141 515	
Brunswick St. (Carleton to York ) - Street Reconstruction	\$ 280 000		\$ 194 232	
Smythe St.(Associated with Storm Sewer) - Street Reconstruction	\$ 480 000		\$ 414 821	
Marshall St.(Including Bridge St.) - Street Reconstruction	\$ 200 000		\$ 242 265	
Ramsay Street- Street Reconstruction	\$ 120 000		\$ 108 836	
Clearview Avenue - Street Reconstruction	\$ 250 000		\$ 171 918	
MacLaren Ave. (Carney to Clark) - Street Reconstruction	\$ 400 000		\$ 320 201	
Foster Street - Street Reconstruction	\$ 60 000		\$ 60 603	
Regent St. South - Designated Provincial Routes	\$ 80 000		\$ 44 594	To be finalized in 1997
Canada Street - Designated Provincial Routes	\$ 100 000		\$ 113 879	
Woodstock Rd.(Golf Club Rd. to T.C.H.) - Designated Provincial Routes	\$ 150 000		\$ 114 128	
Union Street (@ Devon Mall (Signals) - Traffic Management	\$ 60 000		\$ 24 583	
York & Dundonald (Land Acquisition)-Traffic Management	\$ 250 000		\$ 249 542	
Bishop Dr. (Land Acquisition) - Traffic Management	\$ 150 000		\$ 132 097	
Miscellaneous Land Acquisition - Traffic Management	\$ 150 000		\$ 76 017	
Rookwood & Waggoner's - Traffic Management	\$ 170 000		\$ 219 090	
Brunswick/King/Smythe - Traffic Management	\$ 20 000		\$ 22 014	
Smythe & Dundonald Intersections (completion) - Special Projects	\$ 350 000		\$ 293 928	
G.I.S. System Improvement - Special Projects	\$ 80 000		\$ 74 737	
Mainstreet Program - Special Projects	\$ 69 000		\$ 55 275	
Railroad Crossing Improvements - Special Projects	\$ 50 000		\$ 184 020	Deferred to 1997
Hi-Tech Park - Special Projects	\$ 350 000		\$	Deferred to 1997
Government House - Special Projects	\$ 500 000		\$	

<b>AND LOCAL IMPROVEMENT</b>				
Waterloo Row (near P.M. Bridge)	\$ 20 000			\$ 31 374
Devon Area (Forbes, Hillcrest, Coombes, Medley)	\$ 50 000			\$ 31 379
William Street (Lombardy Lane to Calder Avenue)	\$ 40 000			\$ 33 669
Union Street (South side)	\$ 50 000			\$ 39 365
Union/Smith Street Area	\$ 50 000			\$ 46 526
University Avenue Area	\$ 50 000			\$ 15 054
Town Plat - South side (Hill Area)	\$ 100 000			\$ 115 670
Marlborough Drive	\$ 12 000			\$ 9 788
Edward Street/Goodine Street	\$ 15 000			\$ 15 633
Kingswood Drive	\$ 10 000			\$ 8 966
Brentwood Drive/Coburn Drive	\$ 18 000			\$ 19 052
Waggoner's Lane (Simpson Ct. to Odell Park)	\$ 25 000			\$ 16 171

## CITY OF FREDERICTON 1996 WATER PUMPING RECORD

### WATER SUPPLY

The City of Fredericton is supplied with water from twenty-two (22) municipally owned wells. Nine (9) of these wells were regularly active, while the remaining thirteen (13) were on emergency standby duty at year end. The names of these wells, water analyses, and 1996 pumpages are compiled on the last page of this report.

### THE FREDERICTON WATER TREATMENT PLANT

The Water Treatment Plant was put on line in July of 1984. It initially treated water from five Wilmot Park wells. A sixth well was fully developed and running in January 1991, and a seventh well was in production in May 1993.

The filter room was doubled in size during 1992, with equipment to double capacity added over the next two years, bringing capacity to 50 ML/d.. The plant removes iron and manganese, stabilizes sulfur compounds, decreases corrosiveness, and provides water with a free chlorine residual which meets federal and provincial drinking water guidelines.

### DISTRIBUTION SYSTEMS

There are fourteen (14) individually metered water systems in the city. Together they make up the following statistics:

Total kilometres of mains	-	318
Hydrants	-	
City owned	-	1 575
Private	-	155
Total	-	1 730
Water Services	-	13 422
Sprinkler Services	-	198
Total Storage, ML	-	58

Detailed system descriptions follow:

#### South Fredericton Low Level System

This system services the south side of the city below elevation 38 m near Kings College Road and from Monteith Drive to the Fredericton Boat Club on the Lincoln Road. Its water supply is received from eight (8) wells; four (4) in Wilmot Park, the fifth, sixth, and seventh located at Saint Anne's Point, and the eighth, an emergency well, located opposite Angelview Court on Woodstock Road.

The seven (7) active wells pump water through the Water Treatment Plant and into the system. Pressure control and storage is provided by two 9090 kL in-ground reservoirs on Smythe Street.

Eleven (11) other separately metered systems are directly or indirectly supplied by this system:

South Intermediate System  
South High System  
Rosewood System  
Lincoln System  
Canterbury System  
Golf Club Road System  
Hanwell System  
North Low System  
North High System  
Rainsford System  
Marysville System

A twelfth area, Vanier South, is separate but not metered. It is supplied through a P.R.V. from the South High Level System.

### **South Intermediate System**

This system serves an area generally bounded by elevation 38 m, elevation 76 m, Odell Park, and the eastern side of the University of New Brunswick. The water is received via the Smythe Street Booster Station from the low level system. Pressure control and storage are provided by two 4540 kL reservoirs with a top water level of 105.6 m. These are located in Odell Park at Montgomery Street.

### **South High Level System**

The Montgomery Street booster draws water from the intermediate system to supply the area above elevation 76 m. The south high level system stretches from Hanwell Road to Kimble Road, and extends to the City Depot on Regent Street. Pressure control and storage are provided by two (2) 2300 kL reservoirs, one at the top of Smythe Street and a second one at the top of Regent Street. Both have a top water level of 146.1 m.

### **Hanwell System**

A section of Hanwell Road, the upper reaches of Colonial Heights, and Cameron, Foley, Burnham and Eagle Courts, are served by the Hanwell system. Supply is via an altitude valve from the south high system, and a 460 kL reservoir with a top water elevation of 81.9 m is connected to the system above Cameron Court. A well on Cameron Court provides emergency supply.

### **Canterbury System**

The Canterbury system is supplied from the South High System through a meter and altitude valve at Canterbury Drive. This valve maintains the water level within the Canterbury reservoirs at 99.76 m. These reservoirs, with a total capacity of 1070 kL, serve lower Skyline Acres, Dunns Crossing Road, and the area eastward to and including Wetmore Road. This area contains the former Flemming System, which was connected in 1989. Emergency water supply is available to this system from the Lincoln water system via two electric pumps at the Flemming Booster Station.

### Golf Club Road System

This system serves the general area of Golf Club Road and Glengarry Place. It works similarly and serves the same elevations as the South Intermediate System, but presently has no storage. The system receives water from the south high level system through a pressure reducing valve assembly near the Prospect/Hanwell intersection which is capable of providing reasonable fire protection.

### Rainsford Park System

This system supplies the Rainsford Park subdivision only, and has no reservoir. Prior to 1983 this system was privately owned. 1991 construction provided a tie between this system and the Golf Club Road system. The connection, which was activated on 1992 01 20, provides domestic flows through a small booster station and lower pressure fire flows through a check valve. Fire hydrants were installed in 1991. The original well and pressure tanks still serve as emergency supply and control.

### Rosewood System

The Rosewood Booster Station pumps water from the South Low Level System for use by the upper elevations of the Rosewood and Monteith subdivisions. As the Rosewood System has no reservoir, a jockey pump system has been installed to maintain pressures.

### Lincoln System

This system receives its supply from the South Low Level System, through the Lincoln Booster Station situated across from the Fredericton Boat Club on Lincoln Road.

The system, which extends almost to the city boundary and includes the Vanier Industrial Park and the Wilsey Road area, is served by the 3750 kL reservoir on Flemming Road. The top water level is 85.45 m.

### Silverwood System

Silverwood is supplied by two wells; one at the intersection of Mountain Drive and Fairview Drive; and another above Silverwood outside the City limits. The two celled reservoir on the top of the system holds 2250 kL and has a top water elevation of 134 m. Presently, for better turn-over of storage, only one cell is in use. Pressure control valves halfway down Orchard Drive and Fairview Drive separate the system into two parts, allowing both to develop reasonable static pressures.

### North Fredericton Low System

In November 1987, the St. John River Crossing water main was activated, and this system began receiving water from the south low system. There are also five (5) wells available on emergency standby duty to serve this system. A sixth well, Greenwood Well #1, was demolished in 1992.

As well, a pressure reducing valve can provide water to the North Low System from the North High System on an emergency basis.

The system serves all areas of north Fredericton below elevation 37 m. Four reservoirs, all with a top water elevation of 57.9 m float on the system. These are:

Highland Avenue Reservoir	-	4500 kL
Longwood Reservoir #1	-	1300 kL
Longwood Reservoir #2	-	1500 kL
Dewitt Reservoir	-	1140 kL

With the commissioning of the Longwood Booster Station on 1990 12 09, this system provides water to the North High Level System. Also, on 1996 01 15, Young's Crossing Booster Station began supplying the Marysville System with water from this system.

A check valve separates this system and the Marysville System to provide water to a limited portion of Marysville should its water supply fail.

### North Fredericton High System

Until 1991 12 09, this system received its supply from two wells situated on the west side of St. Marys Street, 2.8 km north of Maple Street. On that date, the new Longwood Booster Station was commissioned, providing water from the north low system. Storage for the north high level system is provided by a 3800 kL reservoir on the south side of Killarney Lake with a top water elevation of 97.3 m. This system serves upper St. Mary's Street and Nashwaaksis above elevation 38 m.

### Marysville System

The Marysville system is now supplied with water from the North Low System via the new Young's Crossing Booster Station, which began pumping on 1996 01 15. The two wells on Tower Road now join the McGloin Street well as emergency supply wells.

**TABLES**

The following pages provide the pumpage from Wilmot Park Wells, the Net System Demands, the Annual Chemical Dosages and Costs for the Water Treatment Plant.

**1996 PUMPAGE - WILMOT PARK WELLS, ML**

MONTH	WELL 1	WELL 2	WELL 3	WELL 4	WELL 5	WELL 6	WELL 7	MONTHLY TOTALS
January	70	130	96	44	169	88	104	701
February	42	97	94	42	157	155	103	690
March	120	94	100	9	125	83	97	628
April	121	106	26	16	107	165	130	671
May	168	193	68	33	114	72	86	734
June	174	176	106	48	155	88	1	748
July	106	181	124	3	75	76	124	689
August	60	187	110	21	173	85	87	723
September	140	119	92	17	84	152	111	715
October	159	141	77	11	20	147	158	713
November	58	70	79	38	164	179	109	697
December	35	183	123	0	147	115	98	701
<b>TOTALS</b>	<b>1253</b>	<b>1677</b>	<b>1095</b>	<b>282</b>	<b>1490</b>	<b>1405</b>	<b>1208</b>	<b>8410</b>

## 1996 NET SYSTEM DEMANDS, ML

SYSTEM ZONE	QUARTERS, 1996				AVERAGE DAILY DEMAND
	1ST	2ND	3RD	4TH	
SOUTH LOW	874	926	890	871	3561
SOUTH INTERMEDIATE	183	145	143	149	620
SOUTH HIGH	255	264	265	271	1055
CANTERBURY	79	76	76	80	311
LINCOLN	59	63	62	63	247
ROSEWOOD	10	11	10	10	41
GOLF CLUB ROAD	21	11	10	11	53
HANWELL	7	9	10	10	36
RAINSFORD	4	4	5	4	17
SILVERWOOD	15	16	16	14	61
NORTH LOW	406	382	381	411	1580
NORTH HIGH	76	110	124	77	387
MARYSVILLE	91	93	84	84	352
<b>QUARTERLY TOTALS</b>	<b>2080</b>	<b>2110</b>	<b>2076</b>	<b>2055</b>	<b>8321</b>
					<b>22.8</b>

NOTES:

1. As a result of metering improvements, North Low demand values are higher while South Low demand values are lower.
2. High Golf Club Road system demands in the first quarter resulted from a water break which was difficult to locate.
3. During repairs to the Killarney Reservoir between 1996 06 04 and 1996 08 10, excess pressure in the North High system was controlled by releasing water into the North Low system via a pressure relief valve. This resulted in higher values in the second and third quarter.

**FREDERICTON WATER TREATMENT PLANT  
CHEMICAL DOSAGE AND COSTS, 1996**

CHEMICAL	UNIT COST \$/t	ANNUAL USAGE, t	ANNUAL COST	DOSAGE mg/L	COST / ML OF WATER	COST / DAY
CHLORINE	866	25	24 000	3.0	2.68	60
SULFUR DIOXIDE	249	4	10 500	0.5	1.38	31
LIME	134.80	178	25 300	21.0	2.92	66
SODA ASH	326.52	32	10 500	3.8	1.28	29
<b>TOTALS</b>			<b>68 000</b>		<b>8.27</b>	<b>186</b>

**NOTES:**

- (1) DOSAGES ARE BASED ON PLANT INFLUENT:
- (2) COST / ML ARE BASED ON PLANT EFFLUENT:

8489 ML  
8197 ML

## WATER QUALITY - 1996

### General

Fredericton's Water Treatment Plant was put into service in July 1984, and with the commissioning of the pipeline to Fredericton North in late 1987, the commissioning of the Longwood Booster Station in late 1990 and the commissioning of the Young's Crossing Booster Station in January 1996, is now treating approximately 99% of the City supply. The plant removes iron and manganese and raises the pH to approximately 8 pH units, thus reducing the damage by corrosion to the water system, and controlling the leaching of harmful heavy metals from plumbing. The chlorine content of the treated water is 1.0-1.4 mg/L as it leaves the Water Treatment Plant measured as free chlorine. This water is odourless, colourless, and has an agreeable taste.

Breakpoint chlorination began in Silverwood, the only area not served by the Water Treatment Plant, during March of 1988; and in the Killarney and Marysville water systems during May 1989.

Layers of biofilm, manganese, and corrosion byproducts left in parts of the distribution system by less treated water supplies tend to decrease the free chlorine residual until their own chlorine demand is satisfied. When the resultant chlorine residual is low, reaction byproducts with chemical or bleach like odours can be sensed by the public. As chlorine residuals have continued to rise throughout the systems served by the Water Treatment Plant, complaints concerning objectionable tastes and odours have continued to decrease.

### Bacterial Analysis

Coliform bacteria counts are accepted as a good index of the degree of bacteriologic safety of water. Although they are not themselves disease producers, coliform bacteria are found in densities roughly proportional to the degree of fecal pollution in polluted water. When members of the coliform group are present, other kinds of microorganisms capable of causing disease may also be present. The absence of coliform bacteria from water is an indication that water is bacteriologically safe for human consumption, since coliform bacteria are more hardy than disease-causing bacteria.

Nine (9) locations related to supply and treatment, twenty-six (26) distribution system locations, and twelve (12) emergency supply wells are each sampled by water operators, once per month. All samples are tested for total coliform by the membrane filtration technique, by the water operators, and results are monitored by Health and Community Services.

The test results indicated that all water which was delivered was biologically safe. Further, tests done in conjunction with sampling indicate that a stable free chlorine residual was maintained within the distribution system.

## WATER QUALITY 1996

### Inorganic Analysis

Most recent samples for inorganic analysis were taken from wells and the distribution system in June, 1996 and analysed by Environment New Brunswick's laboratory. Results are displayed on the following page. All water delivered to the distribution system meets the Guidelines for Canadian Drinking Water Quality, Health & Welfare Canada.

One column concerning annual pumpage is added for quick reference.

### Organic Analysis

The nine (9) active wells, twelve (12) stand-by wells, Water Treatment Plant influent and effluent, and five (5) distribution system locations were sampled and analysed for fifteen (15) contaminants in June, 1996. With the exception of a few low levels of trihalomethanes, a byproduct of chlorination, no contaminants were detected.