

ANNUAL REPORT
OF THE
CITY ENGINEER

1984

CITY OF FREDERICTON

PUBLIC WORKS DEPARTMENT

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TO HIS WORSHIP THE MAYOR & COUNCILLORS
OF THE CITY OF FREDERICTON

Madam and Gentlemen:

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

This report covers the period from 1984 01 01 to 1984 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	7.676 km
Sidewalk Reconstruction	0.846 km
New Concrete Sidewalk	1.884 km
New Street Construction	1.227 km
New Pavement - Type "B" Asphalt Concrete	2.608 km
Resurface - Type "D" Asphalt Concrete.....	4.472 km
Resurface - Type "E" Asphalt Concrete.....	5.717 km
Gravity Sanitary Sewer Mains	2.006 km
Sanitary Sewer Force main	0.420 km
Storm Sewer Mains	2.157 km
Water Mains	1.470 km

ALSO

- 149 Water Services were installed
- 143 Sanitary Sewer Services were installed
- 2 Sprinkler Lines were installed
- 33 Water Services were renewed
- 3 Sanitary Sewer Services were renewed
- 135 New Water Meters were installed
- 3 Existing Services were extended

Contractors under contract with the Public Works Department of the City of Fredericton in 1984 constructed, completed construction or began construction, on the following projects:

- | | |
|----------------------------|--|
| Wendell Thomas & Sons Ltd. | - supply and delivery of bedding sand |
| Wendell Thomas & Sons Ltd. | - supply and delivery of topsoil |
| Northside Ready Mix Ltd. | - supply and delivery of concrete |
| Forbes & Sloat Limited | - supply and delivery of granular material |

- John MacBean
- Diamond Construction (1961) Ltd.
- Sandi-Co Ltd.
- Iroquois Salt Products Ltd.
- Shell Canada Ltd.
- Norlantic Paints (Maritimes) Ltd.
- P.D. Moore Landscaping Ltd.
- Gerard Burns
- Shell Canada Ltd.
- Multi-Ventures Ltd.
- Atlas Construction
- Diamond Construction (1961) Ltd.
- Maillet & Hillman Masonry Ltd.
- Charmac Construction Co. Ltd.
- John Kilburn & Sons Ltd.
- Charmac Construction Co. Ltd.
- Maritime Sanitation Services
- Irving Oil Limited
- supply and delivery of granular material
 - supply and placement of asphalt concrete
 - supply and delivery of winter sand
 - supply and delivery of highway salt
 - supply and delivery of gasoline and diesel fuel
 - supply of traffic lane striping paint
 - supply and delivery of cover material at sanitary landfill
 - bulldozing services - sanitary landfill
 - supply and delivery of furnace oil
 - installation of Garden Creek Pollution Control Facility
 - installation of Manganese Removal Plant
 - supply and installation of concrete for Main Street Program on King Street
 - installation of brick for Main Street Program on King Street
 - installation of storm sewer on St. Marys Street
 - installation of storm sewer on the Back Drain
 - installation of storm sewer on Bailey Ave., Willis St., and McGrand Ct.
 - garbage collection services
 - supply and delivery of furnace oil

General Fund expenditures for the period 1984 01 01 to
1984 12 31 were as follows:

Item	Budget	Net Expenditure	Over	Under
<u>TRANSPORTATION SERVICES</u>				
Common Services	\$ 1 703 110	\$ 1 916 387	\$ 213 277	\$ -
Road Transport (Admin.)	27 480	25 113	-	2 367
Roads & Streets	945 092	784 957	-	160 135
Sidewalk Maintenance	52 240	29 025	-	23 215
Culverts, Ditching	40 150	33 841	-	6 309
Storm Sewer Maintenance	131 350	106 144	-	25 206
Street Cleaning	242 975	247 156	4 181	-
Spring Cleanup	20 000	20 235	235	-
Snow & Ice Removal	920 500	1 037 752	117 252	-
Street Lights	438 700	429 158	-	9 542
Traffic Services	310 934	254 998	-	55 936
Recovery Account - Rentals	(400 000)	*(501 481)	-	101 481
<u>ENVIRONMENTAL HEALTH SERVICES</u>				
Garbage & Waste Disposal	344 950	341 767	-	3 183
Garbage & Waste Collection	325 000	324 711	-	289
<u>PUBLIC HEALTH SERVICES</u>				
Old Burial Ground	13 025	7 637	-	5 388
Loyalist Burial Ground	333	284	-	49
<u>PARKS & TREES SERVICES</u>				
Wilmot Park	32 560	29 660	-	2 900
Odell Park	40 740	44 539	3 799	-
Carleton Park	13 635	6 656	-	6 979
Riverfront Greens	35 905	37 063	1 158	-
Development of Park Areas	2 145	4 517	2 372	-
Other Parks	4 600	7 637	3 037	-
Trees	340 240	267 160	-	73 080
Greens, Benches, etc.	37 650	39 636	1 986	-
Totals	\$ 5 623 314	\$ 5 494 552	\$ 347 297	\$ 476 059

Under : \$ 128 762

* An additional amount of \$179 271 was transferred to General Fund Revenue during the auditing process.

Utility Fund expenditures for the period 1984 01 01 to 1984 12 31 were as follows:

Item	Budget	Net Expenditure	Over	Under
<u>COMMON SERVICES</u>				
General Equipment	\$ 210 420	\$ 210 576	\$ 156	\$ -
Safety & Benefits	123 400	130 339	6 939	-
Administration	92 791	93 213	422	-
Recovery Account - Rentals	(238 000)	(204 321)	33 679	-
<u>WATER</u>				
Purification & Treatment	153 900	145 402	-	8 498
Source of Supply	345 650	274 751	-	70 899
Power & Pumping	74 600	78 394	3 794	-
Maintenance of Equipment (Plant)	23 722	19 862	-	3 860
Transmission & Distribution (Oper)	165 200	129 415	-	35 785
Transmission & Distribution (Maint)	568 600	544 778	-	23 822
Billing & Collection	168 900	175 628	6 728	-
Meters	188 400	150 098	-	38 302
<u>SANITARY SEWER</u>				
Operation (Lift Stations)	120 850	64 277	-	56 573
Maintenance	402 600	351 411	-	51 189
Treatment & Disposal	981 600	868 010	-	113 590
Other (Insurance)	700	280	-	420
Totals	\$ 3 383 333	\$ 3 032 113	\$ 51 718	\$ 402 938

* Under: \$ 351 220

* Does not reflect debt charges or revenue other than that shown as recovery account - rentals.

Following is a table giving total kilometrage of municipal roads and streets, provincial routes, by-passes, and ramps divided with respect to type of surface on the various streets.

Location	MUNICIPAL ROADS & STREETS				DESIGNATED ROUTES			T.C.H., By-Passes & Ramps
	Asphalt	Gravel	Chip Seal	Total	Asphalt	Gravel	Total	
Fredericton South	89.681	4.217	6.244	100.142	20.067	2.583	22.650	22.697
Fredericton North	19.224	1.218	-	20.442	4.770	-	4.770	3.416
Nashwaaksis	38.303	2.344	9.859	50.506	2.533	-	2.533	8.214
Marysville	15.427	1.093	4.919	21.439	8.216	-	8.216	3.460
Barker's Point	3.119	0.394	3.288	6.801	4.643	-	4.643	1.275
Silverwood	3.473	0.395	0.644	4.512	-	-	-	2.757
Garden Creek	7.061	1.863	6.590	15.514	6.294	-	6.294	8.771
Douglas	-	0.191	3.910	4.101	2.554	-	2.554	-
Lincoln	2.923	1.750	3.032	7.705	1.332	-	1.332	-
Lower St. Marys	-	-	1.970	1.970	-	-	-	-
Killarney Road	0.332	-	-	0.332	4.230	-	4.230	-
Totals	179.543	13.465	40.456	233.464	54.639	2.583	57.222	50.590

Total (Municipal and Designated Routes) = 290.686 km

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

Respectfully submitted,



E. J. BLISS, P. ENG.
CITY ENGINEER

TRANSPORTATION SERVICES

The expenditure under this item is subdivided under two main headings:

- (1) Common Services
- (2) Road Transport

(1) COMMON SERVICES

The total net expenditure under this heading was \$ 1 916 387 made up as follows:

Administration	\$ 53 503
Engineering Services	169 910
General Equipment	1 011 326
Service Depots	232 704
Safety & Benefits	<u>448 944</u>
	\$ 1 916 387

(2) ROAD TRANSPORT

Road Transport is made up of the following items:

Administration	\$ 25 113
Roads & Streets	2 259 110
Street Lighting	429 158
Traffic Services	254 998
Recovery Account - Rentals	<u>(680 752)</u>
	\$ 2 287 627

(a) Administration: The total net expenditure under this heading amounted to \$25 113 for wages, pensions, general services, etc.

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

(1) Roadway Surfaces (maintenance)	\$ 784 957
(2) Sidewalk Maintenance	29 025
(3) Culverts & Ditching	33 841
(4) Storm Sewer Maintenance	106 144
(5) Street Cleaning & Flushing (includes Spring Cleanup)	267 391
(6) Snow Control (snow & ice removal) ..	689 986
(7) Sanding & Salting	<u>347 766</u>
	\$ 2 259 110

The expenditures for the above items as well as a brief description of work done are summarized below.

(1) Roadway Surfaces (maintenance)

The net expenditure of \$ 784 957 was made up as follows:

Gravel Roads & Chip Seal	\$ 48 066
Paved Streets Maintenance	380 278
Asphalt Resurface Program	256 045
Curb & Gutter Repair	40 811
Driveway Entrances	6 165
Rights-of-way Maintenance	<u>53 592</u>
	\$ 784 957

Gravel Roads & Chip Seal - general maintenance and repairs to gravel roads and roadway surfaces.

There was no chip sealing done in 1984.

Paved Streets Maintenance - patching and repairing pavement, applying seal coat, light tar or asphalt to pavement.

Asphalt Resurface Program

Under this item, the following streets were resurfaced with Type "E" (10 mm) asphalt concrete in 1984.

Location	Length (metres)
Forest Hill Road - Civic #97 to Forest Acres Ct.	198
King Street - Westmorland St. to Northumberland St.	192
Union Street - Smith St. to Douglas Ave.	445
Brunswick Street - York St. to Underpass	1009
Alexandra Street	420
Kaine Street - Canada St. to Miller St.	238
Northumberland Street - Dundonald St. to King St.	948
Dundonald Street - York St. to Northumberland St.	411
Wilsey Road - Lincoln Rd. to CPR Tracks	670
Kings College Road - Regent St. to Windsor St.	380
Woodbridge St. - Forest Hill Rd. to Civic #190	402
Smythe Street - Lynhaven St. to Smythe Booster Station	170
Gibson Street - Union Street Intersection	25
Watters Drive near Riverside Drive	35
Regent Street - Beaverbrook Intersection	96
Waggoners Lane near Smythe Street	78
* Prospect Street - end of curbing to Hanwell Road	910
* King Street - St. John St. to Queen St.	275
* Glengarry Place	1212
** Henry Street Extension	<u>46</u>
Total	8160

* Type "D" Asphalt concrete was placed.

** Type "B" Asphalt concrete was placed.

Type "E" total = 5717 metres or 5.717 km

Type "D" total = 2397 metres or 2.397 km

Type "B" total = 46 metres or 0.046 km

Curb and Gutter repair - replacement of sections of curb and gutter on various streets.

Driveway Entrances - placement of asphalt between curb line and street right-of-way primarily on streets curbed in recent years.

Rights-of-way Maintenance - sodding and seeding, rip rapping, grass cutting, repair and placement of guide rails and clearing of rights-of-way.

(2) Sidewalk Maintenance

The net expenditure of \$ 29 025 for sidewalk repairs was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 17 830
Materials	5 390
General Services (trucking & equipment)	<u>5 805</u>

(3) Culverts and Ditching - the maintenance and installation of culverts and ditches.

The net expenditure of \$ 33 841 was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 17 469
Materials	12 884
General Services (trucking & equipment)	<u>3 488</u>

(4) Storm Sewer Maintenance - the flushing of mains, cleaning and repair of catch basins and the repair of breaks to mains.

The net expenditure of \$ 106 144 was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 51 824
Materials	27 042
General Services (trucking & equipment)	<u>27 278</u>

(5) Street Cleaning and Flushing

The City of Fredericton used three sweepers for street cleaning purposes in 1984. International Sweeper #49 worked 544 hours between April 10 and November 16, Wayne Sweeper #50 worked 159 hours between April 16 and May 15, and Sunvac Sweeper #51 worked 708.5 hours between June 5 and December 3.

The net expenditure under this heading amounted to * \$ 267 391 and was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 174 650
General Services (trucking & repairs)	90 170
Gas, oil, grease	-
Brooms - main & gutter	1 479
Brooms - hand	-
Anti-litter cans	128
Dust Control	<u>964</u>
	\$ 267 391

* Includes an amount of \$ 20 235 for Spring Cleanup.

(6) and (7) Sanding & Salting and Snow Control

(a) Sanding and Salting Streets and Sanding Sidewalks

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

Streets:

Personnel (labour, pensions, workmen's compensation)	\$ 92 597
General Services (vehicle repairs) ...	59 220
Materials (salt, gas, oil & lub, sand)	147 759
Fixed Assets (new equipment)	<u>13 200</u>
	\$ 312 776

Sidewalks:

Personnel (labour, pensions, workmen's compensation)	\$ 18 519
General Services (vehicle repairs)	11 844
Materials (gas, oil & lubs, sand)	<u>4 627</u>
	\$ 34 990

(b) Snow Control

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

Streets:

The total net cost of snow control (streets) amounted to \$ 575 885 and was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 312 204
General Services (repairs & maintenance of vehicles, hired trucks & machinery)	258 130
Materials (fuel & lubricants)	437
Fixed Assets (new equipment)	<u>5 114</u> \$ 575 885

The City of Fredericton was responsible for plowing, sanding, and salting 306.836 km of roads and streets in 1984 (145.150 km on the north side and 161.686 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.

The overall net expenditure for plowing, sanding and salting City roads and streets was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 404 801
General Services (repairs & maintenance of vehicles, hired trucks & machinery)	317 350
Fixed Assets (new equipment)	18 314
Materials (gas, oil & lub, salt, sand)	<u>148 196</u> \$ 888 661 (1)

Sidewalks:

144.844 km of sidewalk were plowed during the winter months of 1984. (48.470 km on the north side and 96.374 km on the south side)

The total net expenditure for plowing amounted to \$ 114 101 and was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 62 440
General Services (repairs & maintenance of vehicles)	51 573
Materials (fuel & lubricants)	<u>88</u> \$ 114 101

The overall net expenditure for plowing and sanding sidewalks was \$ 149 091 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 80 959
General Services (repairs & maintenance of vehicles)	63 417
Materials (fuel & lubricants, sand)	<u>4 715</u> \$ 149 091 (2)

TOTAL NET COST OF SNOW CONTROL - ADD (1) & (2) \$ 1 037 752

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

1980	Agriculture Canada	189.20 cm
	Airport Weather Office	209.70 cm
1981	Agriculture Canada	282.30 cm
	Airport Weather Office	249.10 cm
1982	Agriculture Canada	305.10 cm
	Airport Weather Office	297.20 cm
1983	Agriculture Canada	139.30 cm
	Airport Weather Office	179.20 cm
1984	Agriculture Canada	297.50 cm
	Airport Weather Office	332.90 cm

(c) Street Lighting

The multiple lighting system for the City of Fredericton as of 1984 12 31 consisted of:

34-100 Watt H.P. Sodium	@	\$ 102.36 per light per year
1-180 Watt L.P. Sodium	@	198.60 per light per year
35-400 Watt L.P. Sodium	@	234.48 per light per year
10-125 Watt M.V. Wood	@	109.68 per light per year
2-175 Watt M.V. Conc.	@	155.76 per light per year
201-175 Watt Ref. Wood	@	131.64 per light per year
350-175 Watt Ref. M.V.	@	102.36 per light per year
12-250 Watt M.V. Conc.	@	195.84 per light per year
4-250 Watt M.V. Wood	@	171.72 per light per year
1710-250 Watt M.V.	@	142.44 per light per year
573-400 Watt Ref. M.V.	@	199.44 per light per year
1-500 Watt Ref. M.V.	@	172.44 per light per year
2-400 Watt Flood Lights	@	0.64 per light per year
1-150 Watt H.P. Sodium	@	146.28 per light per year

The total street lighting costs for 1984 were as follows:

Multiple Lighting System Contract	\$ 428 046
Government Services (Other Power).....	1 904
New Poles	(806)
New Bulbs	<u>14</u>
	\$ 429 158

(d) Traffic Services

The expenditure under this heading is made up as follows:

- (1) Street Signs
- (2) Paint Department
- (3) Traffic Signals
- (4) Railway Crossings

(1) Street Signs

Purchasing, repairing and installing street signs on City streets.

The net expenditure under this heading amounted to \$ 17 008 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 2 923
General Services (repairs & maintenance)	1 914
Goods (posts, street sign purchases, etc)	<u>12 171</u>

\$ 17 008

(2) Paint Department

The net expenditure under this heading was \$ 93 149 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 50 922
General Services (equipment repairs, vehicle maintenance, rent, etc.)	14 283
Goods (paint, gas & oil, misc. supplies, signs)	27 944
Fixed Assets (new equipment)	<u>-</u>

\$ 93 149

(3) Traffic Signals

The net expenditure under this heading was \$ 106 243 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 26 910
General Services (vehicle maintenance, etc.)	5 852
Government Services (electric power)...	54 046
Goods (gas & oil, materials)	19 082
Fixed Assets (new equipment)	<u>353</u>

\$ 106 243

(4) Railway Crossings

The net expenditure under this heading was \$ 38 598 for maintenance.

ENVIRONMENTAL HEALTH SERVICES

The following items are included under the above heading:

- (1) Garbage and Waste Collection
- (2) Garbage and Waste Disposal - Sanitary Landfill

(1) Garbage and Waste Collection

In 1984, the net amount paid for the garbage and waste collection operation was \$324 711 made up as follows:

General Services (Contract Services)	\$ 324 165
General Services (Advertising)	<u>546</u>
	\$ 324 711

(2) Garbage and Waste Disposal - Sanitary Landfill

The net expenditure under this section was \$ 341 767 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 7 502
General Services (equipment services and land rentals)	138 296
Government Services (taxes)	1 390
Goods (gravel and cover material)	<u>194 579</u>
	\$ 341 767

PUBLIC HEALTH SERVICES

The following items are included under the above heading:

- (1) The Old Burial Ground
- (2) The Loyalist Burial Ground

(1) The Old Burial Ground

The net expenditure under this section was \$7637 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 6 847
General Services (machinery)	205
Government Services (lighting)	513
Goods (materials, tools)	<u>72</u>
	\$ 7 637

(2) The Loyalist Burial Ground

The net expenditure under this section was \$ 284 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 284
General Services (machinery)	<u>-</u>
	\$ 284

PARKS AND TREES SERVICES

The following items are included under the above heading:

- | | |
|-----------------------|-------------------------------|
| (1) Wilmot Park | (5) Development of Park Areas |
| (2) Odell Park | (6) Other Parks |
| (3) Carleton Park | (7) Trees |
| (4) Riverfront Greens | (8) Greens, Benches & Other |

(1) Wilmot Park

The net expenditure for this item was \$ 29 660 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 19 735
General Services (machinery, equipment repairs)	3 938
Government Services (water & sewer rates, lights & power)	2 212
Goods (gas & oil, materials)	<u>3 775</u> \$ 29 660

(2) Odell Park

The net expenditure for this item was \$ 44 539 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 28 710
General Services (telephone, machinery, equipment repairs).....	11 895
Government Services (water & sewer rates, lights & power)	450
Goods (fuels & lubricants, materials)	<u>3 484</u> \$ 44 539

(3) Carleton Park

The net expenditure for this item was \$ 6656 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 2 963
General Services (machinery & land rental)	3 401
Goods (materials, gas & oil)	<u>292</u> \$ 6 656

(4) Riverfront Greens

The net expenditure for this item was \$ 37 063 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 22 010
General Services (machinery, etc.)	9 408
Goods (gas & oil, materials, new trees) ..	5 645
Fixed Assets (new equipment)	<u>-</u>
	\$ 37 063

(5) Development of Park Areas

The net expenditure for this item was \$ 4517 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 2 908
General Services (machinery)	965
Goods (gas & lubricants, materials)	<u>644</u>
	\$ 4 517

(6) Other Parks

The net expenditure for this item was \$7637 made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 5 157
General Services (machinery, repairs & maintenance)	1 596
Goods (materials)	<u>884</u>
	\$ 7 637

(7) Trees

The net expenditure for this item was \$ 267 160 made up as follows:

Personnel (labour, pensions, UIC, workmen's compensation)	\$ 194 935
General Services (machinery & trucking, equipment maintenance, building rental) ..	43 094
Goods (gas & oil, materials, new trees, small tools)	28 027
Fixed Assets (new equipment)	<u>1 104</u>
	\$ 267 160

In 1984, 220 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 1984:

<u>Species</u>	<u>Number Removed</u>
Elm	191
Maple	17
Hornbeam	1
Spruce	2
Birch	1
Willow	3
Poplar	4
Beech	1
TOTAL	220

In 1984, 121 trees were removed with Dutch Elm Disease in the City of Fredericton.

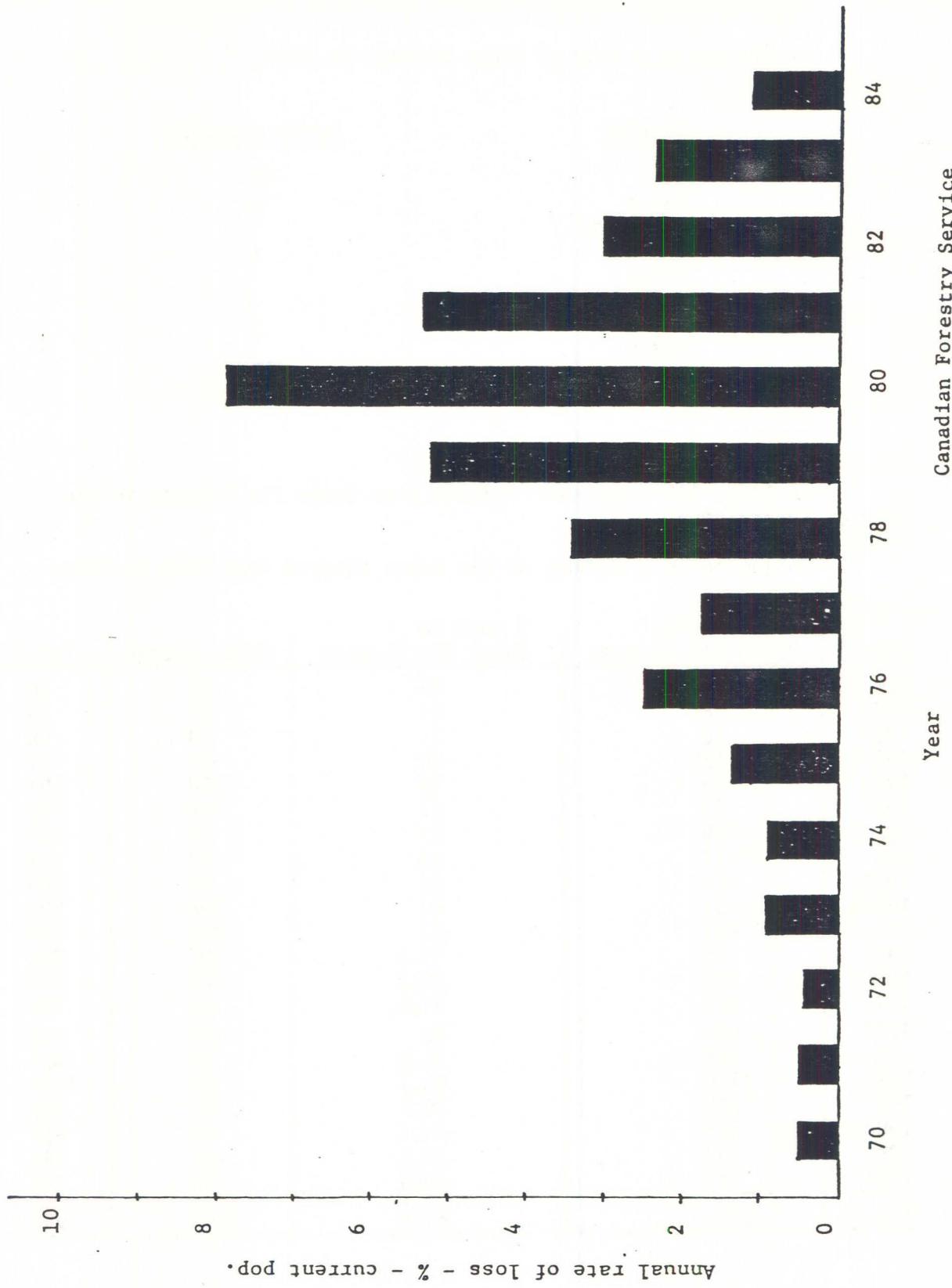
Following is a summary of Elm trees removed from 1964 to 1984:

Year	No. Lost To Dutch Elm Disease	% Lost To Dutch Elm Disease	Other Causes	Total
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
Totals	5384	67.4	2609	7993

DUTCH ELM DISEASE - FREDERICTON, N. B.

Disease Management Area

Annual rate of loss - % - current population base



Canadian Forestry Service

Trees were planted (first planting) at the following locations
in 1984:

Location	Number of Trees
Hillcourt Drive	25
Bruce Street	10
Moss Avenue	14
Bloor Street	12
Capital Manor	14
Legion Drive	12
Oak Avenue	33
Willow Avenue	17
Cedar Avenue	20
Pugh Street	23
MacFarlane Street	49
Clarence Avenue	25
Cherry Avenue	10
Preston Drive	42
Fir Court	10
201 Aberdeen Street	2
182 Brunswick Street	1
575 Hanwell Road	1
487 Northumberland Street	2
236 Medley Street	1
167 Henry Street	1
23 Lawson Court	1
McAdam Avenue	24
Eagle Court	13
Birdie Court	12
Mitchell Street	15
Liverpool Street	9
Golf Club Road	1
Juniper Court	12
Cameron Court	1
86 Colonial Heights	1
Marysville Cenotaph	18
Barker's Point Cenotaph	3
Wilmot Park	12
Odell Park	5
Nashwaaksis Jr. High	5
Riverfront Drive	42
Arboretum	22
Canterbury Drive	17
King Street	21
Carleton Park	3
Mulberry Court	11
Total	572

124 trees were planted at various locations to replace losses due to dry weather and vandalism.

42 trees were planted on the Riverfront Drive.

A number of trees were also trimmed in 1984. The number and class of trees were as follows:

- (a) Trees above 14 m in height - approximately 300 mixed species.
- (b) Trees 6 m to 14 m in height - approximately 700 mixed species.
- (c) Trees under 6 m in height - approximately 3000 mixed species.

Stumps removed, topsoiled and seeded - 170

Shrubs planted on the Riverfront Drive - 526

Shrubs planted in other locations - 71

(8) Greens, Benches & Other

The net expenditure for this item was \$ 39 636 made up as follows:

Personnel (labour, pensions, workmen's compensation)..	\$ 19 036
General Services (communications, machinery & trucking, equipment maintenance)	10 270
Goods (gas & oil, materials, small tools)	10 330
Fixed Assets (new equipment)	\$ 39 636

UTILITY FUND

The above item is made up of the following headings:

- (1) Common Services
- (2) Sanitary Sewer
- (3) Water

(1) COMMON SERVICES

The net expenditure for this item in 1984 was \$ 446 953. This expenditure was made up as follows:

General Equipment	\$ 210 576
Safety & Benefits	143 164
Administration	93 213
	\$ 446 953

(2) SANITARY SEWER

In 1984 the net expenditure for this item was \$1 609 502 made up as follows:

Operating: Lift Stations

Personnel (labour, pensions, workmen's compensation)	\$ 28 228
General Services (repairs & maintenance)	21 387
Government Services (light & power)	13 197
Goods (materials)	1 465
	\$ 64 277

Maintenance:

Personnel (labour, pensions, workmen's compensation)	\$ 222 237
General Services (trucking & machinery)	79 106
Government Services (telephone)	1 050
Goods (materials, fuels & lubricants)	49 017
Fixed Assets (new equipment)	-
	\$ 351 410

Sewage Treatment & Disposal:

Personnel (labour, workmen's compensation) ..	\$ 537
General Services: repairs & maintenance	1 173
Treatment (F.P.C.C.)	847 421
Government Services: Water & Sewer Rates ...	3 584
Lights & Power	15 095
Goods:	200
	\$ 868 010

Debt Charges:

Principal	\$ 149 148
Interest	<u>176 377</u>
	\$ 325 525
<u>Other:</u>	
General Services (Insurance)	<u>280</u>
	TOTAL \$ 1 609 502

New customers connected to the City sewer system in 1984 143

The Fredericton sanitary sewer system consists of approximately 239 kilometres of mains made up as follows:

Size	Silverwood Garden Creek	Nashwaaksis	Marysville	Barker's Point	Fredericton	Total
100 mm	-	0.158	-	-	-	0.158
100 mm F.M.	0.013	-	-	-	1.103	1.116
150 mm	-	1.433	0.314	-	0.108	1.855
150 mm F.M.	0.031	0.417	0.539	0.068	3.008	4.063
200 mm	9.740	31.803	16.825	7.559	108.139	174.066
200 mm F.M.	0.254	-	0.314	-	0.064	0.632
250 mm	1.959	3.158	0.607	0.298	8.325	14.347
250 mm F.M.	1.178	-	-	-	-	1.178
300 mm	1.267	3.200	1.006	1.868	12.669	20.010
300 mm F.M.	0.420	-	-	-	0.739	1.159
350 mm	0.287	0.686	-	-	0.713	1.686
350 mm F.M.	-	-	0.528	-	0.254	0.782
375 mm	-	2.163	0.500	0.174	2.449	5.286
400 mm	0.018	0.076	-	-	0.193	0.287
450 mm	0.800	0.031	1.350	-	3.463	5.644
500 mm	2.979	-	-	-	-	2.979
600 mm	0.156	-	-	-	1.510	1.666
750 mm	-	-	-	-	0.322	0.322
900 mm	-	-	-	-	1.432	1.432
TOTALS	19.102	43.125	21.983	9.967	144.491	238.668

NOTE: Fredericton includes the Lincoln area.

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

(3) WATER

There are at present 23 active wells, 16 reservoirs, and 5 booster stations in the City of Fredericton water supply system as noted below.

Location	Wells	Reservoirs	Booster Stations
South Fredericton System	6	8	5
Hanwell System	1	1	0
Rainsford Park Area	1	0	0
Silverwood System	2	1	0
North Fredericton Low Level System	8	4	0
Killarney System	2	1	0
Marysville System	3	1	0
TOTALS	23	16	5

Following is a list of reservoirs and their capacities which provide water storage for the City of Fredericton water system:

Fredericton South

Location	No. of Reservoirs	Full Capacity (cubic metres)	Useful Capacity (cubic metres)
Silverwood	1	245	245
Regent Street	1	1140	1140
Montgomery Street	2	9090	4545
Smythe Street	2	18180	18180
Forest Hill (Canterbury Drive)	2	1105	1105
Flemming Road	1	3750	1880
Hanwell Road	1	460	270
Sub Total	10	33970	27365

Fredericton North

	No. of Reservoirs	Full Capacity (cubic metres)	Useful Capacity (cubic metres)
Nashwaaksis	2	2865	2865
Barker's Point	1	1140	1140
Marysville	1	2840	2840
Devon	1	4545	4545
Killarney Road	1	3750	3750
Sub Total	6	15140	15140
TOTALS	16	49110	42505

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) ..	\$ 162 803
(2)	Water Ordinary (including meters)	824 290
(3)	Water Treatment Facility & Well Production Costs...	523 393
(4)	Debt Charges - Principal	337 963
(5)	Debt Charges - Interest	<u>375 496</u> \$2 223 945

(1) WATER ADMINISTRATION (BILLING & COLLECTION)

The net expenditure of \$ 162 803 was made up as follows:

Office salaries & benefits	\$ 97 629
Postage	16 053
Machinery Rental	15 893
Office Rental	993
Materials	14 495
New Equipment	<u>17 740</u> \$ 162 803

(2) WATER ORDINARY (INCLUDING METERS)

The net expenditure of \$ 824 290 was made up as follows:

Transmission & Distribution (Operation)

Labour- Boosters	\$ 58 070
Trucking and Machinery	6 716
Equipment Maintenance-Boosters	780
Power - Boosters	49 605
Taxes - Boosters	6 541
Materials - Boosters	<u>7 702</u> \$ 129 414

Transmission & Distribution (Maintenance)

Personal (labour, pensions, etc.)	\$ 267 153
Workmen's Compensation	7 665
Distribution Repair Parts	50 040
Trucks (maintenance)	87 129
Materials, labour, trucking	118 308
Hydrant Parts	13 961
Fixed Assets (new equipment)	<u>523</u> \$ 544 779

Meters

Labour - Reading	\$ 26 785
Labour - Repairs	3 164
Labour - Installation	52 177
Meter Parts	5 665
Miscellaneous Parts	1 957
Trucking	16 103
Fixed Assets (new meters)	<u>44 246</u> \$ 150 097
TOTAL	
	\$ 824 290

On 1984 12 31 there were 11791 water services on meter and 333 on flat rate, making a total of 12124.

135 new meters were installed in 1984, 259 regular meters changed to TRT or RRT, and 18 ARB meters changed to TRT or RRT.

In 1984, 12 discontinued services were excavated and shut off at the main, 233 stopped meters replaced and 32 frozen meters replaced.

The following sprinklers were installed in 1984:

Brunswick Street Jail - 668 Brunswick Street
Fredericton Medical Clinic - 1015 Regent Street

There are in the City as of 1984 12 13, 1359 hydrants situated in the following areas:

Fredericton South	630
Fredericton North	143
Nashwaaksis	250
Marysville	131
Barker's Point	66
Silverwood	<u>22</u>
Sub Total	1242
Located on private property	<u>117</u>
Total	1359

Hydrants were installed or added to City totals at the following locations in 1984:

Location	Number
Bridge Street	1
Broad Street	3
Cherry Avenue	2
Thorndale Court	2
Marysville Place - McGloin Street	1
Fredericton Medical Clinic - Regent Street	1
Total	10

There was also one hydrant removed from Jaffrey Street and one removed from St. Mary's Street.

Distribution System

New Services installed in 1984	149
Old Services relayed in 1984	33
Frozen Services that had to be thawed	17

The Fredericton Distribution System consists of approximately 254 kilometres of water main, made up as follows:

Size	Marysville	Nashwaaksis	Barker's Point	Silverwood Garden Creek	Fredericton	Total
25 mm	-	-	-	-	0.030	0.030
32 mm	-	0.153	-	-	-	0.153
38 mm	-	0.072	-	-	-	0.072
50 mm	-	-	-	0.154	-	0.154
75 mm	-	-	-	-	0.435	0.435
100 mm	0.753	2.232	-	2.508	10.291	15.784
150 mm	12.054	20.695	3.915	4.072	56.481	97.217
200 mm	5.859	17.375	0.954	2.791	37.658	64.637
250 mm	2.465	6.546	5.163	0.964	19.611	34.749
300 mm	0.616	2.074	0.031	4.558	23.385	30.664
350 mm	-	0.207	-	-	3.466	3.673
400 mm	-	-	-	-	4.079	4.079
450 mm	-	-	-	-	1.965	1.965
500 mm	-	-	-	-	0.035	0.035
600 mm	-	-	-	-	0.395	0.395
Unknown	0.249	-	-	-	-	0.249
Total	21.996	49.354	10.063	15.047	157.831	254.291

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

The above kilometrages do not include water mains installed at the Exhibition Grounds; the University of New Brunswick; St. Anne's Point Barracks on the Woodstock Road and the low rental housing development in Fredericton North.

(3) WATER TREATMENT FACILITY & WELL PRODUCTION COSTS

The net expenditure of \$ 523 393 was made up as follows:

Source of Supply

Labour - Wells	\$ 37 896
Trucking & Machinery	10 562
Maintenance - Wells	14 792
Telephone Co. Services	9 781
Power - Wells	202 359
Materials - Wells	<u>4 345</u> \$ 279 735

Power & Pumping (Plant)

Labour	\$ 64 792
Workmen's Compensation	856
Telephone Co. Services	981
Light & Power	2 924
Diesel Fuel & Lubricants	36
Supplies	2 449
Miscellaneous	6 356
	\$ 78 394

Maintenance of Equipment (Plant)

Labour	\$ 1 629
Insurance (Plant)	8 569
Maintenance (Equipment)	6 700
Taxes (Plant)	2 622
Materials	342
	\$ 19 862

Purification & Treatment

Labour	\$ 75 728
Maintenance of Equipment	2 156
Power	11 388
Provincial Taxes	14 538
Goods (Chlorine, Soda Ash, Lime, etc.)	41 592
	\$ 145 402

TOTAL \$ 523 393

COMPARISON OF WATER PUMPED AND COSTS FOR
FREDERICTON FOR THE LAST TEN YEARS

Year	Cubic Metres Produced	Production Expenditure	Production Cost per cubic metre
1975	6 394 385	\$ 165 319.34	2.6 cents
1976	6 459 340	207 272.52	3.2 cents
1977	6 463 520	215 683.16	3.3 cents
1978	6 307 295	246 509.77	3.9 cents
1979	6 628 241	303 364.45	4.6 cents
1980	7 037 407	360 611.00	5.1 cents
1981	6 907 216	355 321.00	5.1 cents
1982	7 029 560	432 326.00	6.15 cents
1983	7 225 102	435 929.00	6.03 cents
1984	7 368 351	523 393.00	7.10 cents

The total amount of water pumped from 1984 01 01 to 1984 12 31 for the entire City was 7 368 350.84 cubic metres divided as follows:

Fredericton South (Wilmot Park)	4 939 745.00
Hanwell	32 258.45
Fredericton North	397 277.39
Nashwaaksis	809 537.00
Marysville	371 241.00
Barker's Point	250 017.00
Duval	339 213.00
Silverwood	57 397.00
Rainsford Lane Park	13 836.00
Killarney	<u>157 829.00</u>
TOTAL	7 368 350.84

The total net water expenditure (operating) for the City from 1984 01 01 to 1984 12 31 was determined from the following:

Source of Supply	\$ 279 735
Power & Pumping	78 394
Maintenance of Equipment	19 862
Purification & Treatment	145 402
Transmission & Distribution (operation)	129 414
Transmission & Distribution (maintenance)	<u>544 779</u> \$ 1 197 586

Therefore, the net operating cost to pump and deliver to the customer one cubic metre of water from 1984 01 01 to 1984 12 31 was:

$$\frac{\$ 1 197 586}{7 368 351} = \$ 0.162$$

The cost of one cubic metre of water delivered including principal and interest charges was calculated as follows:

Total net Administration & Operating costs	\$ 1 510 486
Principal and Interest	<u>713 459</u>
	\$ 2 223 945

The cost of water per cubic metre:

$$\frac{\$ 2 223 945}{7 368 351} = \$ 0.302$$

Principal and Interest costs per cubic metre:

$$\$ \frac{713\ 459}{7\ 368\ 351} = \$ 0.097$$

Administration and operating costs per cubic metre:

$$\$ \frac{1\ 510\ 486}{7\ 368\ 351} = \$ 0.205$$

Following is a table showing a comparison of net operating costs, administration and operating costs, principal and interest costs, and total costs per cubic metre from 1968 to 1984:

COSTS PER CUBIC METRE

Year	Net Operating	Administration & Operating	Principal & Interest	* Total Cost
1968	\$ 0.042	\$ 0.053	\$ 0.055	\$ 0.108
1969	0.064	0.080	0.039	0.119
1970	0.043	0.058	0.042	0.100
1971	0.047	0.061	0.049	0.110
1972	0.053	0.067	0.040	0.107
1973	0.041	0.064	0.040	0.104
** 1974	0.064	0.092	0.051	0.143
** 1975	0.073	0.106	0.059	0.165
** 1976	0.075	0.114	0.108	0.222
** 1977	0.081	0.119	0.132	0.251
** 1978	0.088	0.125	0.125	0.250
** 1979	0.103	0.145	0.119	0.264
** 1980	0.124	0.163	0.104	0.267
** 1981	0.121	0.165	0.100	0.265
** 1982	0.136	0.180	0.096	0.276
** 1983	0.148	0.200	0.106	0.306
** 1984	0.162	0.205	0.097	0.302

* Total Cost = Administration & Operating + Principal & Interest

** Values from 1968 to 1973 are for pre-amalgamated City only while values from 1974 onwards are for the amalgamated City.

SUMMARY

WATER AND SEWER REVENUE & EXPENDITURES

1984

Item	Net Expenditure	Revenue
<u>COMMON SERVICES (WATER & SEWER):</u>		
General Equipment	\$ 210 576	\$ 204 321
Safety & Benefits	143 164	
Administration	93 213	
<u>WATER:</u>		
Water Administration (Billing & Collection)	162 803	
Water Ordinary (Including Meters)	824 290	2 937 857
Water Treatment Facility & Well Production Costs	523 393	
Debt Charges - Principal & Interest	713 459	
<u>SANITARY SEWER:</u>		
Operating & Maintenance	415 687	2 210 464
Sewage Treatment & Disposal	468 290	
Debt Charges	325 525	
TOTALS	\$ 4 280 400	\$ 5 352 642

SURPLUS: \$ 1 072 242

NOTE: The above surplus was transferred to the Utility Capital Fund.

CAPITAL PROGRAMS

The following gives brief descriptions of capital projects done in 1984. Some of these projects were begun in 1983 and finalized in 1984 while others will be finalized in 1985.

WATER:

In 1984 construction of the Manganese Water Treatment Facility was finalized.

In conjunction with the Main Street Revitalization Program, the water main on King Street between Carleton Street and Regent Street was upgraded. New main installations were installed in the Chippins Ltd. (Broad Street) Subdivision, Sabine Heights (Cherry Avenue) Subdivision, and Rosewood Estates (Talisman Crescent and Thorndale Court) Subdivision.

Following are lengths and sizes of mains installed in 1984:

Location	LENGTH OF MAINS - metres		
	150 mm D.I.	200 mm D.I.	250 mm D.I.
* Bailey Avenue		33	
** Broad Street	16	368	
** Cherry Avenue	10	310	
** Rosewood Estates	143	211	
*** King Street-Carleton to Regent	46		333
TOTALS	215	922	333

1470 metres = 1.470 km

- * In conjunction with storm sewer construction
- ** Entire cost paid by developers through Local Improvement Agreement
- *** Upgrading in conjunction with the Main Street Revitalization Program.
(approximately 250 m of Old 150 mm main was removed from service)

SANITARY SEWER:

1984 saw the installation of new sanitary sewer mains in the Chippin's Ltd. (Broad Street) Subdivision, Sabine Heights (Cherry Avenue) Subdivision, and Rosewood Estates (Talisman Crescent and Thorndale Court) Subdivision.

Construction of the Garden Creek sewage treatment facility and installation of related piping was substantially completed in 1984. Final landscaping will be done in 1985.

Following are lengths and sizes of mains installed in 1984.

Location	LENGTH OF MAINS - metres							
	200 mm PVC	300 mm PVC	300 mm D.I.	350 mm PVC	350 mm D.I.	400 mm D.I.	450 mm PVC	300 mm D.I.F.M.
* Bailey Avenue	66							
** Broad Street	335							
** Cherry Avenue	311							
** Rosewood Estates	320							
Garden Creek Sewage Treatment	2	89	735	10	118	18	2	420
TOTALS	1034	89	735	10	118	18	2	420

2426 metres = 2.426 km (Gravity plus forcemain)

- * In conjunction with storm sewer construction. Portions of existing sanitary mains had to be upgraded.
- ** Entire cost paid by developers through Local Improvement Agreement.

STORM SEWER:

1984 saw the installation of new storm mains in the Chippin's Ltd. (Broad Street) Subdivision, Sabine Heights (Cherry Avenue) Subdivision, Rosewood Estates (Talisman Crescent and Thorndale Court) Subdivision, and the Bailey Avenue-Willis Street-McGrand Court area. New mains were also placed on a section of the Back Drain from Kings College Road to Pembroke Crescent.

In conjunction with the Designated Route Program, new mains were placed on St. Mary's Street in the area near Chippin's Limited quarry.

Following are lengths and sizes of mains installed in 1984.

Location	LENGTH OF MAINS - metres						
	250 mm PVC	300 mm Conc.	375 mm Conc.	450 mm Conc.	600 mm Conc.	900 mm Conc.	1050 mm Conc.
Back Drain				3		20	95
*Victory Avenue	33						
**Broad Street	43	68	149	165			
**Cherry Avenue	42	16	69	228			
**Rosewood Estates	44	169	104	157			
***St. Mary's Street			2		186	21	
Bailey-Willis-McGrand	47	131	25	340			
TOTALS	209	384	349	893	186	41	95

2157 metres = 2.157 km

- * Placed under normal maintenance in General Fund budget.
- ** Entire cost paid by developers through Local Improvement Agreement.
- *** Designated Route Program

CURB & GUTTER:

Concrete curb and gutter was constructed at the following locations in 1984:

Location	Length (metres)
Ascot Drive	745
Ascot Court	297
Hatheway Street - Blair to Emmerson	129
Emmerson Street (Chippin's Subd.)	319
*King Street - Carleton St. to Regent St.	249
Tower Road	447
Fisher Avenue (loop area)	1025
Foster Street	451
Miller Street - Lapointe St. to Foster St.	205
Long Court	260
**Canada Street - Ramsay St. to Civic #129 (one side)	202
Sunset Drive - Airport Road to Wilkins Avenue	277
Union Street - St. Mary's Street to Civic #385	435
Cliffe Street - Union Street to McLaren Avenue	619
Tamarack Terrace	286
Talmadge Court	204
Sewell Street - McLaren Avenue to Lawson Court	661
**Watters Drive (one side)	331

Curb & Gutter (continued)

Location	Length (metres)
MacLaren Avenue- Cliffe Street to Hughes Street	265
Carleton Street - Queen Street to Campbell Street (one side)	101
Gregory Avenue (portion)	168
TOTAL	7676

7676 metres = 7.676 km

* Done in conjunction with the Main Street Program.

** Designated Route Program

All the above curb and gutter was constructed by City forces.
Concrete was obtained from Northside Ready-Mix for \$97 per cubic metre.

PAVING:

In 1984, Diamond Construction (1961) Limited was awarded a contract to supply and place asphalt concrete on a number of City streets.

The street preparatory work, other than the laying in place of the premixed material, was done by regular City forces.

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

- (1) Binder Course (20 mm) - Type "B" @ \$40 per tonne in place
- (2) Surface Course (13 mm) - Type "D" @ \$30 per tonne in place

(1) Binder Course - Type "B"

The following streets were paved with Type "B" asphalt concrete in 1984.

Location	Length (metres)
* King Street - Regent Street to Carleton Street	192
Fisher Avenue - Loop area beginning near Civic #35	460
Tamarack Terrace	131
Long Court	116
Tower Road	227
Emmerson Street (Chippin Subdivision)	169
Hatheway Street	61
Ascot Drive	381
Ascot Court	137
Talmadge Court	93
Foster Street	183
Miller Street	83
Sewell Street - MacLaren Avenue to Lawson Court	<u>329</u>
TOTAL	2562

2562 metres = 2.562 km

* Done in conjunction with the Main Street Program.

(2) Surface Course - Type "D"

The following streets were paved with Type "D" asphalt concrete in 1984.

Location	Length (metres)
* Woodstock Road - Smythe Street to Hanwell Road	1408
Sunset Drive - Airport Road to Wilkins Avenue	138
Union Street - St. Mary's Street to Civic #385	195
Cliffe Street - Union Street to MacLaren Avenue	<u>334</u>
TOTAL	2075

2075 metres = 2.075 km

* Designated Route Program

CONCRETE SIDEWALKS

Sidewalks were constructed at the following locations in 1984:

Location	Length (metres)
* Canada Street - Civic #129 to Ramsay Street	185
* Union Street - Cliffe Street to Jaffrey Street (northside)	328
* Sunset Drive - Shell Service Station to Wilkins Avenue	163
* Cliffe Street - Union Street to R.R. Tracks	170
Murray Avenue - Canada Street to Grant Street	447
William Street - Royal Road to Lombardi Lane	289
Barton Crescent - Royal Road to end of apt. bldgs.	313
Ascot Drive	345
Sewell Street - MacLaren Avenue to Lawson Court	331
Liverpool Street - Norfolk Drive to Canterbury Drive	159
TOTAL ...	2730

2730 metres = 2.730 km

* Reconstruction of existing (0.846 km)

WORKS FACILITIES:

The installation of a pump island at Dundonald Street Yard was the major project done under this account.

Work on a salt storage shed at St. Mary's Street Depot was also begun in 1984. This work took the form of constructing the granular base for the shed.

TRAFFIC LIGHTS:

In 1984 the upgrading of traffic light installations at the Brunswick Street - Westmorland Street, Brunswick Street - Regent Street, and Regent Street - George Street intersections began. This took the form of purchasing of materials such as poles, arms and controllers. Installation will be completed in 1985.

Also in 1984, a complete new installation was begun at the St. Mary's Street - Union Street intersection. This will be completed in 1985.

MAIN STREET PROGRAM:

In 1984, King Street between Carleton Street and Regent Street was upgraded through a cost sharing venture with the Department of Commerce and Development. This upgrading included new concrete curb and gutter, concrete and brick sidewalks, concrete and brick intersections, the planting of trees, installation of street lights and paving.

NEW STREET CONSTRUCTION:

The following new streets were constructed in 1985:

Location	Length (metres)
Broad Street	307
Case Street	287
Cherry Avenue	289
Talisman Crescent	102
Thorndale Court	242
TOTAL	1227

1227 metres = 1.227 km

NOTE: All of the above streets were constructed through Local Improvement Agreements

DESIGNATED ROUTES

The City of Fredericton has a total of 57.222 km of provincial designated highways within its boundaries. In 1984, the Provincial Government paid \$ 279.44 and \$ 70.51 per lane kilometre towards winter and summer maintenance of the routes respectively. If any improvements such as new curb and gutter, paving or storm sewer installations are done to these routes, they have to be authorized by the Department of Transportation. If so authorized, the Provincial Government may assist the City in paying for the construction should finances be available.

The following authorized projects were undertaken in 1984:

1)	Installation of curb & gutter - Route 10 - Watters Drive	\$ 28 942.93
2)	Installation of curb & gutter - Route 8 - Canada Street	26 351.71
3)	Installation of storm sewer - St. Mary's Street (above Highland Avenue)	50 686.51
4)	Resurfacing - Route 102 - Woodstock Road from Smythe Street to Hanwell Road	58 937.91
5)	Resurfacing - Route 102 - Brunswick Street from York Street to Underpass	51 676.35
6)	Resurfacing - Forest Hill Road	10 621.05
7)	Resurfacing - Watters Drive near Riverside Drive	1 771.55
8)	Resurfacing - Gibson - Union Intersection	5 303.10
9)	Resurfacing - Regent - Beaverbrook Intersection	<u>5 299.25</u>
	TOTAL	\$ 239 590.36

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

Item	Budget	Expenditure	Remarks
UTILITY			
Garden Creek Sewage Treatment	\$ 700 000	\$ 1 198 901	Budget reflects 50% of cost. to be continued in 1985.
Manganese Treatment Facility	3 170 000	3 331 860	Continued from 1983
System Plan - Sanitary Sewer	50 000	49 338	Continued from 1983
Engineering for Lamson Court Services	20 000	648	To be continued in 1985
Golf Club trunk sanitary sewer	120 000	119 985	Continued from 1983
King St. Main replacement - Regent to Carleton	110 000	96 709	
Cleaning and replacement of old mains	100 000	35 958	To be continued in 1985
GENERAL FUND			
Intersection Improvements	67 000	50 287	Continued from 1983
Brunswick-York Traffic Lights	30 000	22 197	Continued from 1983
Regent-King Traffic Lights	30 000	18 408	Continued from 1983
Canada St.-Civic #129 to Gilbert St.-sidewalk	20 000	7 590	To be continued in 1985
Back Drain Phase II- Storm Sewer	100 000	43 174	To be continued in 1985
Regent-Priestman Intersection Curb & Gutter & Paving	40 000	-	To be continued in 1985
Murray Ave.-Canada St. to Grant St.- sidewalk	40 000	27 806	To be continued in 1985
Brunswick St. & Westmorland St.- Traffic Lights	30 000	15 264	To be continued in 1985
Brunswick St. & Regent St.- Traffic Lights	30 000	16 694	To be continued in 1985
Regent St. & George St.- Traffic Lights	30 000	16 701	To be continued in 1985

Capital Programs - Summary of Expenditures (continued)

Item	Budget	Expenditure	Remarks
St. Mary's St. & Union St.- Traffic Lights	30 000	19 382	To be continued in 1985
Preliminary Engineering	30 000	-	To be continued in 1985
Right-of-way Acquisition (Regent St.)	40 000	-	Purchase authorized -Property sold to private party
Bailey Ave.-Willis St.-McGrand Ct. - Storm Sewer	190 000	182 608	
Fisher Ave.(loop)- Curb & Gutter & Paving	150 000	112 089	
Sunset Dr.-Airport Rd. to Wilkins Ave. (Curb & Gutter & Paving & Sidewalk)	60 000	32 725	
Union St.-St. Mary's to #385- Curb & Gutter & Paving	60 000	48 973	
Cliffe St.- Union St. to MacLaren Ave.(Curb & Gutter & Paving)	80 000	57 803	
Tamarack Terrace - Curb & Gutter & Paving	30 000	27 073	
Long Ct.- Curb & Gutter & Paving	30 000	28 755	
Tower Rd. - Curb & Gutter & Paving	40 000	40 129	
Emmerson St. & Hatheway St.- Curb & Gutter & Paving	40 000	36 377	
Ascot Dr. & Ascot Ct.- Curb & Gutter & Paving & Sidewalk	120 000	107 599	
Talmadge Court - Curb & Gutter & Paving	20 000	16 489	
Foster St. & Miller St. - Curb & Gutter & Paving	50 000	48 631	
Sewell St.-MacLaren to Lawson Ct.- Curb & Gutter & Paving & Sidewalk	90 000	71 385	
Union St.- Hughes to St.Marys Sidewalk	25 000	20 360	
William St.- Royal Rd. to Lombardi- Sidewalk	20 000	12 192	
Liverpool St.- Norfolk to Canterbury- Sidewalk	10 000	8 117	

Capital Programs - Summary of Expenditures (continued)

Item	Budget	Expenditure	Remarks
Barton Cres.- Royal Rd. to end of apt. bldgs- sidewalk	20 000	14 291	
Pump Island-Dundonald St.	40 000	38 296	
Salt Storage Shed(northside)	10 000	1 229	To be continued in 1985
Carleton St.- Queen to Campbell- Curb & Gutter	25 000	10 464	
<u>MAIN STREET PROGRAM</u>			
King St.- Carleton St. to Regent St.	140 000	318 894	Budget reflects 50% of cost
<u>DESIGNATED ROUTES</u>			
Watters Dr.- Storm Sewer, Curb & Gutter & Paving	60 000	28 943	It was determined that existing storm sewer main could be utilized.
Canada St.- Ramsay St. to Civic #129- Curb & Gutter	20 000	26 352	
St. Mary's St.- above Highland Ave.- storm sewer	60 000	50 687	
Woodstock Rd.- Smythe St. to Hanwell Rd.	100 000	58 938	Extremely good price for asphalt type "D" and thickness changed.

WATER QUALITY - 1984

BACTERIAL ANALYSIS

Coliform bacteria 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 the water is bacteriologically safe for human consumption, since coliform bacteria are more hardy than disease-causing bacteria.

Samples for coliform analysis were taken monthly from the wells in service and various distribution points in the City water system. All samples were tested for total coliform by the membrane filtration technique.

The following is a description of those samples which developed coliform colonies:

<u>Date</u>	<u>Location</u>	<u>No. Coliform</u>
84 01 26	Cameron Ct. Well	1
84 04 11	578 MacLaren	1
84 06 13	Regent Depot Well	4
84 06 15	Silverwood #2 Well	4

All locations whose corresponding samples tested positively were resampled and retested with no coliform present.

The significant decrease in positive tests over 1983 may be attributed to a better sampling procedure using "whirl pak" sampling bags.

The test results indicate that our water system is healthy and reasonably free from pathogenic bacteria.

WATER TREATMENT PLANT

Fredericton's new water treatment plant was put on line in July of 1984 and is now treating 92% of the water produced on the south of Fredericton and 67% of the City's potable water. The plant removes iron and manganese and raises the pH to approximately 8 pH units, thus decreasing corrosion rates. The chlorine content of the effluent is 0.80 mg/L measured as free chlorine. This water is odourless, colourless, and has an agreeable taste when it leaves the plant.

Impurities which may coat the inside of pipelines can combine with this water to form trichloramines, which may have a metallic or chemical taste, and an odour similar to that given off by bleaching agents. This effect seems to be occurring in Fredericton and is expected to decline over a two year period. We expect to be left with a free chlorine residual throughout our system, without objectionable tastes.

CHEMICAL ANALYSIS

Samples for chemical analysis were taken from all wells in January 1985 and analysed by Environment New Brunswick's laboratory. Results are displayed on the following page.

Two columns concerning the 1984 pumpages are added for quick reference. The first column gives the actual pumpages, while the second proportions each output to the total 1984 City supply. These are not intended to be indications of the maximum possible output of each well.

SAMPLE POINT	pH (pH units)	Conductivity ($\mu\text{s}/\text{cm}$)	Turbidity (NTU)	Calcium as Ca (mg/L)	Magnesium as Mg (mg/L)	Sodium as Na (mg/L)	Potassium as K (mg/L)	Chloride as Cl ⁻ (mg/L)	Fluoride as F (mg/L)	Nitrate-Nitrite as N (mg/L)	Sulfate as SO ₄ ²⁻ (mg/L)	Iron as Fe (mg/L)	Manganese as Mn (mg/L)	Copper as Cu (mg/L)	Cadmium as Cd (mg/L)	Total Alk. as CaCO ₃ (mg/L)	Lead as Pb (ug/L)	Nitrite as N (mg/L)	Zinc as Zn (mg/L)	1984 Overall Pumpage (ML)	% of Total Supply (%)	
Wilmet #1 Well	7.04	138	0.15	14.8	2.09	45.56	6.25	.963	5.9	0.11	<.01	9.5	9.3	<.05	.647	<.01	53.2	<2.0	<.01	.03	945	12.8
Wilmet #2 Well	6.84	209	0.15	21.4	2.29	66.98	7.70	10.0	0.23	<.01	15.4	10.1	2.32	2.32	<.01	84.7	2.3	<.01	.05	11	0.1	
Wilmet #3 Well	6.97	240	0.68	27.1	3.34	81.42	9.71	2.290	19.3	<.10	.43	21.7	10.5	1.13	1.22	<.01	70.8	12.0	<.01	.03	1438	19.5
Wilmet #4 Well	6.74	208	0.06	20.7	2.73	62.93	11.50	1.630	18.5	<.10	.35	19.2	10.3	<.05	.369	<.01	54.2	<2.0	<.01	.02	1059	14.4
Wilmet #5 Well	7.15	139	0.11	16.3	2.08	49.26	4.87	1.020	5.2	<.10	<.01	9.0	8.5	<.05	1.350	<.01	55.8	6.9	<.01	.02	1487	20.2
W.T.P. Influent	6.96	154	0.11	17.2	2.23	52.13	6.75	1.070	8.1	<.10	<.01	11.6	9.1	<.05	.802	<.01	54.6	4.4	<.01	.01	4940	0
W.T.P. Effluent	8.57	183	0.04	21.4	2.15	62.29	9.45	1.100	10.9	<.10	<.01	13.1	9.3	<.05	.905	<.01	65.6	15.0	<.01	<.01	0	0
Duval Well	7.82	312	0.03	29.1	2.75	83.98	27.50	.860	22.8	0.18	<.01	18.4	9.8	<.05	.045	<.01	50.1	113.0	<2.0	<.01	0	0
Woodbridge Dom.Tap	8.07	258	0.05	29.7	2.74	85.44	12.40	1.660	18.3	<.10	<.01	19.5	9.8	<.05	.010	<.05	50.1	86.4	21.0	<2.0	<.01	.02
Cameron Ct. Well	7.04	322	0.30	32.6	4.10	98.28	19.10	.680	43.7	0.10	.63	14.8	10.5	<.05	<.01	<.01	50.1	76.8	16.0	<2.0	<.01	32
Rainsford Well	7.03	198	0.14	26.9	2.44	77.22	6.0	.464	5.58	<.10	.12	17.6	10.3	<.05	<.01	<.01	50.1	79.5	12.0	<2.0	<.01	14
Silverwood No. 2 Well	7.92	434	0.41	35.4	22.60	181.40	15.40	.826	22.1	<.10	.06	23.0	7.4	<.05	<.01	<.01	50.1	189.0	14.0	<2.0	<.01	29
Silverwood No. 3 Well	8.12	212	0.10	18.9	13.50	102.80	3.65	.478	55.0	<.10	.08	12.2	7.6	<.05	<.01	<.01	50.1	105.0	8.5	<2.0	<.01	53
Maple No. 1 Well	7.81	490	0.04	46.8	3.06	129.50	42.40	.706	53.3	<.03	<.01	63.0	11.6	<.05	.079	<.01	50.1	105.6	2.0	<2.0	<.01	340
Maple No. 2 Well	7.47	368	0.13	46.8	3.16	129.90	24.20	.799	29.1	0.20	.17	44.8	12.1	<.05	.029	<.01	50.1	103.0	4.3	<2.0	<.01	99
Maple No. 3 Well	7.95	412	0.06	43.6	1.66	115.70	32.40	.661	22.4	<.06	<.01	80.3	10.6	<.05	.079	<.01	50.1	97.2	1.6	<2.0	<.01	370
McKeen Well	8.14	486	0.14	52.7	3.26	145.00	40.80	.898	48.3	0.15	<.01	55.9	11.6	<.05	.224	<.01	50.1	133.0	6.3	<2.0	<.01	168
Highland Well	8.41	249	0.20	52.7	3.26	145.00	40.80	.898	48.3	0.15	<.01	18.4	10.5	<.05	.024	<.01	50.1	110.0	2.0	<2.0	<.01	144
Cliffe Well	7.83	318	0.08	37.6	2.29	103.30	18.40	.780	20.1	0.18	<.01	35.8	10.4	<.05	.041	<.01	50.1	98.9	4.5	<2.0	<.01	86
Barker's Pt. No. 1 Well	9.11	290	1.16	1.5	.07	4.04	64.90	.178	10.7	0.75	<.01	16.0	7.8	<.05	.010	<.01	50.1	126	2	<2.0	<.01	242
Barker's Pt. No. 2 Well	9.11	290	1.16	1.5	.07	4.04	64.90	.178	10.7	0.75	<.01	12.0	11.0	<.05	<.01	<.01	50.1	76.2	4.2	<2.0	<.01	8
Killarney No. 1 Well	7.41	168	0.08	21.3	2.37	62.90	6.25	.499	55.0	0.10	<.01	15.1	11.4	<.05	<.01	<.01	50.1	94.4	4.0	<2.0	<.01	83
Killarney No. 10 Well	7.75	206	0.05	24.0	2.45	70.06	11.90	.547	45.0	0.14	<.01	15.1	11.4	<.05	<.01	<.01	50.1	86.0	6.6	<2.0	<.01	52
Marysville No. 1 Well	7.71	286	0.17	30.7	2.68	87.69	17.70	.550	17.5	0.18	<.01	35.1	11.1	<.05	.046	<.01	50.1	68.6	3.4	<2.0	<.01	319
Marysville No. 2 Well	7.54	258	0.12	29.0	3.63	87.36	12.50	.587	32.6	0.10	<.01	14.0	12.2	<.05	<.01	<.01	50.1	89.2	30.0	<2.0	<.01	4.3
Marysville No. 3 Well	7.30	337	4.85	29.5	3.51	88.11	28.90	.897	34.9	0.22	<.07	32.2	12.7	<.08	.284	<.01	50.1	89.2	30.0	<2.0	<.01	0
Maximum Limits	6.5 8.5	5.0 200	150	200	270	250	1.5	10	500	0.3	0.05	1.0	.005	50	1.0	5.0						

