

**ANNUAL REPORT
OF THE
CITY ENGINEER**

1993

CITY OF FREDERICTON

PUBLIC WORKS DEPARTMENT

INDEX

	<u>PAGE</u>
Letter of Transmittal	1
Capital Programs	35
Common Services (General Fund)	7
Environmental Health Services	16
Parks and Trees Services	18
Public Health Services	17
Road Transport Services	7
Utility Fund (Sanitary Sewer & Water)	23
Water Quality - 1993	52

**TO HIS WORSHIP THE MAYOR AND COUNCILLORS
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 1993 01 01 to 1993 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	23.108	km
Sidewalk	7.988	km
New Street Construction	1.910	km
* New Pavement - Type "B" Asphalt Concrete	10.786	km
Resurface - Type "D" Asphalt Concrete	11.886	km
Gravity Sanitary Sewer Mains	6.418	km
Sanitary Sewer Force main	0.313	km
Storm Sewer Mains	5.337	km
Water Mains	6.346	km
* Type "D" asphalt was also placed on streets in new subdivisions. This was paid for by developers under Local Improvement Agreements.			

ALSO

- 236 Water services were installed
- 296 Sanitary sewer services were installed
- 1 Sprinkler line was installed
- 30 Water services were renewed
- 209 New water meters were installed
- 9 Existing water service installations were extended
- 9 Existing sanitary sewer service installations were extended
- 149 Frozen services were thawed
- 163 Storm sewer services were installed
- 5 Sanitary sewer services were renewed

Contractors under contract with the Engineering Department of the City of Fredericton in 1993 supplied materials, completed construction or began construction, as follows:

- M. W. Price and Sons Ltd. - Supply and Delivery of Bedding Sand
- Gorman Paving Inc. - Supply of Asphalt Concrete for Patching
- Phillip R. Roach Limited - Water & Sewer Services - Douglas Area Phase 4 - Storm, Sanitary Sewer, and Water Main Construction Willis Street and Royal Road area.
- College Brook Storm Sewer Phase 1
- Valley Aggregates Ltd. - Supply and Delivery of Granular Material
- Sandi-Co. Ltd. - Supply and Delivery of Bedding Sand
- Evans Brothers Ltd. - Supply and Delivery of Topsoil
- Hazen Thomas & Sons Contracting Ltd. - Services Upgrading Dewitt Acres
- QM Construction Ltd. - Municipal Services and Street Upgrading Lower St. Marys Phase 2
- Brunswick Street Trunk Sewer and Water Main Upgrading Phase 5
- Masontech (A Division of Maritime Bricklayers) - Longwood Reservoirs - Internal and External Rehabilitation
- MRB Contractors Ltd. - Addition and Renovations to Dundonald Street Maintenance Depot
- Charmac Construction Company Ltd. - Odell Park Drainage Improvements Phase 2
- Services Upgrading and Street Reconstruction Canada Street from Wellington Court to Perley Avenue
- Municipal Services and Street Upgrading Lower St. Marys - Phase 3
- Permanent Lafarge - Supply and Delivery of Concrete

Gorman Paving Ltd.	- Supply and Placement of Asphalt Concrete
Sandi-Co Ltd.	- Supply and Delivery of Winter Sand
Akzo Salt Ltd.	- Supply and Delivery of Highway Salt
Ibis Products Ltd.	- Supply of Traffic Lane Striping Paint
Trius Taxi Ltd.	- Garbage Collection Services
Gorman Paving Inc.	- Installation of Curb and Gutter and Sidewalk
Rainsford Contracting Ltd.	- Contract Services
Warren H. Dunn Construction Ltd.	- Reconstruction of Hildebrand Crescent - Installation of Storm Sewer on Derby Court
Redem Construction Ltd.	- Supply & Construction of an Addition to Equipment Storage Building - St. Mary's Street Depot
Hogan Paving Ltd.	- Supply of Asphalt Concrete for Patching
Dunham's Contracting Ltd.	- Supply and Delivery of Granular Material
Donald Noble & Sons Ltd.	- Supply and Delivery of Bedding Sand

General Fund expenditures for the period 1993 01 01 to 1993 12 31 were as follows:

Item	Budget	Net Expenditure	Over	Under
COMMON SERVICES (Public Works)	\$ 3 906 603	\$ 3 887 077	-	\$ 19 526
ROAD TRANSPORT SERVICES				
Administration	308 400	311 546	\$ 3 146	-
Roadway Surfaces	1 038 750	1 966 136	927 386 *	
Sidewalk Maintenance	552 500	461 467	-	91 033
Culverts, Ditching	40 550	61 322	20 772	-
Storm Sewer Maintenance	159 400	196 102	36 702	-
Street Cleaning	451 300	485 589	34 289	-
Spring Cleanup	27 150	20 268	-	6 882
Sanding & Salting & Snow Control	1 479 450	1 303 002	-	176 448
Street Lights	587 400	599 292	11 892	-
Traffic Services	510 500	495 923	-	14 577
ENVIRONMENTAL HEALTH SERVICES				
Garbage & Waste Disposal	466 470	472 896	6 426	-
Garbage & Waste Collection	570 100	525 265	-	44 835
Hazardous Waste	4 665	1 598	-	3 067
PUBLIC HEALTH SERVICES				
Old Burial Ground	15 250	10 201	-	5 049
Loyalist Burial Ground	400	245	-	155
PARKS & TREES SERVICES				
Wilmot Park	64 370	51 161	-	13 209
Odell Park	94 955	92 863	-	2 092
Carleton Park	11 470	8 149	-	3 321
Old Government House	18 800	16 190	-	2 610
Trees	382 500	387 267	4 767	-
Greens, Benches, other parks, etc.	188 200	200 096	11 896	-
TOTALS	\$ 10 879 183	\$ 11 553 655	\$ 1 057 276	\$ 382 804

OVER: \$ 674 472 *

* Includes an appropriation of 1993 Operating Surplus (\$ 830 392) which was allocated by Council motion for Capital expenditure in 1994.

Utility Fund expenditures for the period 1993 01 01 to 1993 12 31 were as follows:

Item	Budget	Net Expenditure	Over	Under
COMMON SERVICES				
General Equipment	\$ 517 700	\$ 521 597	\$ 3 897	\$ -
Safety & Benefits	243 500	269 448	25 948	-
Administration	146 700	137 594	-	9 106
WATER				
Purification & Treatment	306 100	268 278	-	37 822
Source of Supply	502 200	437 877	-	64 323
Power & Pumping	45 100	33 857	-	11 243
Maintenance of Equipment (Plant)	102 400	57 151	-	45 249
Transmission & Distribution (Oper)	328 500	355 130	26 630	-
Transmission & Distribution (Maint)	777 000	827 299	50 299	-
Billing & Collection	193 728	195 608	1 880	-
Meters	276 700	304 086	27 386	-
SANITARY SEWER				
Operation (Lift Stations)	181 100	109 773	-	71 327
Maintenance	518 300	376 979	-	141 321
Treatment & Disposal	1 819 200	1 467 489	-	351 711
TOTALS	\$ 5 958 228	\$ 5 362 166	\$ 136 040	\$ 732 102

UNDER: \$ 596 062

Following is a table giving total kilometrage (as of 93 12 31) of municipal roads and streets, provincial designated routes, and by-passes & ramps divided with respect to type of surface on the various streets.

LOCATION	MUNICIPAL ROADS & STREETS				DESIGNATED & REGIONAL HIGHWAYS			T.C.H. BY-PASSES & RAMPS
	Asphalt	Gravel	Chip Seal	TOTAL	Asphalt	Chip Seal	TOTAL	
Fredericton South	103.036	0.574	5.694	109.304	19.914	-	19.914	30.772
Fredericton North	20.242	0.029	0.578	20.849	9.729	-	9.729	3.436
Nashwaaksis	55.629	0.480	2.047	58.156	2.455	-	2.455	8.194
Marysville	19.422	0.615	2.919	22.956	7.827	-	7.827	3.007
Barker's Point	8.028	-	0.657	8.685	2.037	-	2.037	4.428
Silverwood	4.343	0.085	0.184	4.612	-	-	-	2.748
Garden Creek	15.216	1.101	2.203	18.520	-	-	-	2.482
Douglas	1.979	0.191	2.191	4.361	2.560	-	2.560	-
Lincoln	5.256	1.314	0.879	7.449	4.649	2.123	6.772	2.458
Lower St. Marys	1.527	-	0.443	1.970	-	-	-	2.681
TOTALS	234.678	4.389	17.795	256.862	49.171	2.123	51.294	60.206

TOTAL (Municipal, Designated & Regional Highways) = 308.156 km

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. J. Bliss, P. Eng.
CITY ENGINEER

GENERAL FUND**COMMON SERVICES**

The total net expenditure under this heading was **\$ 3 887 077** made up as follows:

Administration	\$ 140 096
Engineering Services	510 252
General Equipment	2 028 594
Service Depots	460 128
Safety & Benefits	<u>748 007</u> \$ 3 887 077

ROAD TRANSPORT SERVICES

Road Transport Services is made up of the following items:

Administration	\$ 311 546
Roads & Streets	4 493 886
Street Lighting	599 292
Traffic Services	<u>495 923</u> \$ 5 900 647

- (a) **Administration:** The total net expenditure under this heading amounted to **\$ 311 546** 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)	\$ 1 966 136
(2) Sidewalk Maintenance	461 467
(3) Culverts & Ditching	61 322
(4) Storm Sewer Maintenance	196 102
(5) Street Cleaning (includes Spring Cleanup) ..	505 857
(6) Winter Maintenance	<u>1 303 002</u> \$ 4 493 886

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 \$ 1 966 136 was made up as follows:

Paved Streets	\$ 1 660 473
Curb & Gutter Repair	75 670
Driveway Entrances	5 175
Right-of-way Maintenance	<u>224 818</u> \$ 1 966 136

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 with Type "D" asphalt concrete in 1993.

Location	Length (metres)
Abbott Court	238
* Aberdeen Street - York Street to Carleton Street	197
Albert Street - Regent Street to York Street	442
Brookside Drive (selected sections)	286
Carleton Street - Queen Street to King Street	107
Crerar Court	116
Dobie Street - School Street to Carney Street	191
Forest Hill Road - Woodbridge Street to Kimble Court	436
Fraser Avenue	395
Hanwell Road - Parkhurst Drive to Hermitage Court	91
Hanwell Road (selected sections)	124
Hermitage Court	85
Hughes Street	402
King Street - Regent Street to Carleton Street	182
King Street - York Street to Carleton Street	181
Kings College Road - York Street to Smythe Street	620
Lincoln Road (selected sections)	271
* McConnell Street (Court portion)	33
McNair Drive	485
McLeod Hill Road (selected sections)	265
Mitchell Street - Albert Street to Civic # 781	420
Nashwaak Drive	250

Location	Length (metres)
Parkside Drive - Smythe Street to Meadow Green Court ..	360
Prospect Street near Zeller's entrance/exit	224
Queen Street - Westmorland Street to Northumberland Street	207
Rainsford Lane (selected sections)	261
River Street (selected sections)	329
Ryan Court	126
Smythe Street - Charlotte Street to Saunders Street	111
Smythe Street - Waggoners Lane to Odell Park entrance ..	294
Springhill Road (selected sections)	132
Squires Street	402
St. John Street - Brunswick Street to Aberdeen Street ..	445
St. Mary's Street - Maple Street to St. Mary's Depot	783
St. Mary's Street - (selected sections)	264
Thompson Field Access for Recreation Department	168
Veterans Drive	465
Vineland Street	258
Waterloo Row - Underpass to Lansdowne Street	535
Wellington Court	305
Wilsey Road - Vanier Highway to Shaw Masonry	400
TOTAL	11 886

11886 metres = 11.886 kilometres

* Type "B" asphalt was placed

(2) **Sidewalk Maintenance**

The net expenditure of \$ 461 467 for sidewalk repairs was made up as follows:

Personnel Costs	\$ 63 394
Materials	37 217
General Services (use of equipment & special projects)	<u>360 856</u> \$ 461 467

(3) **Culverts and Ditching**

- the maintenance and installation of culverts and ditches

The net expenditure of \$ 61 322 was made up as follows:

Personnel Costs	\$ 29 236
Materials	8 431
General Services (use of equipment & contract services)	<u>23 655</u> \$ 61 322

(4) **Storm Sewer Maintenance**

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

The net expenditure of \$ 196 102 was made up as follows:

Personnel Costs	\$ 81 707
Materials	46 445
General Services (use of equipment & contract services)	<u>67 950</u> \$ 196 102

(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 1993.

The net expenditure under this heading amounted to **\$ 505 857 *** and was made up as follows:

Personnel Costs	\$ 310 652
General Services (use of equipment & contract services)	166 079
Brooms - main & gutter	17 058
Brooms - hand	353
Anti-litter cans	1 141
Dust Control	<u>10 574</u>
	\$ 505 857

* Includes an amount of \$ 20 268 for Spring Cleanup.

(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, shovelling 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 327.783 km of roads and streets in 1993 (156.3 km on the north side and 171.483 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 1993, 173.487 km of sidewalk were plowed and sanded. (63.921 km on the north side and 109.566 km on the south side)

Streets:

The total net cost for plowing streets amounted to **\$ 689 241** and was made up as follows:

Personnel Costs	\$ 421 890
General Services (use & maintenance of equipment)	247 593
Goods	612
Fixed Assets (new equipment)	<u>19 146</u> \$ 689 241

The total net cost of sanding and salting streets amounted to **\$ 429 948** and was made up as follows:

Personnel Costs	\$ 117 569
General Services (use & maintenance of equipment)	73 161
Materials (salt and sand)	221 769
Fixed Assets (new equipment)	<u>17 449</u> \$ 429 948

The overall net expenditure of **\$ 1 119 189** for plowing, sanding, and salting City roads and streets was made up as follows:

Personnel Costs	\$ 539 459
General Services (use & maintenance of equipment)	320 754
Fixed Assets (new equipment)	36 595
Materials (salt & sand)	221 769 (1)
Goods	<u>612</u> \$ 1 119 189

Sidewalks:

The total net expenditure for plowing sidewalks amounted to **\$ 134 019** and was made up as follows:

Personnel Costs	\$ 84 378
General Services (use & maintenance of equipment)	49 519
Goods	<u>122</u> \$ 134 019

The total net expenditure for sanding sidewalks amounted to **\$ 49 794** and was made up as follows:

Personnel Costs	\$ 23 514
General Services (use & maintenance of equipment)	14 632
Materials (sand)	11 648 \$ 49 794

The overall net expenditure for snow plowing and sanding of sidewalks was **\$ 183 813** and was made up as follows:

Personnel Costs	\$ 107 892
General Services (use & maintenance of equipment)	64 151
Materials (sand)	11 648 (2)
Goods	<u>122</u> \$ 183 813

TOTAL NET COST OF WINTER MAINTENANCE - ADD (1) & (2) \$ 1 303 002

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

1989	Airport Weather Office	350.8 cm
1990	Airport Weather Office	290.4 cm
1991	Airport Weather Office	290.4 cm
1992	Airport Weather Office	205.7 cm
1993	Airport Weather Office	205.1 cm

(c) Street Lighting

The multiple lighting system for the City of Fredericton as of 1993 12 31 consisted of:

20	-	100 Watt H.P.S.	@	\$ 162.21	per light per year
67	-	150 Watt H.P.S.	@	216.27	per light per year
491	-	100 Watt H.P.S.	@	126.00	per light per year
1	-	180 Watt L.P.S.	@	244.45	per light per year
34	-	400 Watt H.P.S.	@	288.61	per light per year
10	-	125 Watt M.V.	@	135.17	per light per year
2	-	175 Watt M.V.	@	191.87	per light per year
203	-	175 Watt M.V.	@	162.21	per light per year
150	-	175 Watt Ref. M.V.	@	126.00	per light per year
12	-	250 Watt M.V.	@	241.20	per light per year
4	-	250 Watt M.V.	@	211.54	per light per year
752	-	250 Watt M.V.	@	175.33	per light per year
316	-	400 Watt Ref. M.V.	@	245.50	per light per year
1	-	500 Watt Ref. M.V.	@	212.26	per light per year
2	-	400 Watt Flood Lights	@	299.62	per light per year
936	-	150 Watt H.P.S.	@	180.06	per light per year
234	-	200 Watt H.P.S.	@	215.80	per light per year
4	-	116 Watt Flashing Lt.	@	55.85	per light per year
1	-	400 Watt H.P.S.	@	176.82	per light per year
11	-	150 Watt H.P.S.	@	70.90	per light per year

The total street lighting costs for 1993 were as follows:

Salaries & Benefits	\$ (292)
Municipal Lighting System Contract	583 739
General Services - Maintenance of Equipment	
& Contract Services	6 023
Government Services (Power to City Owned Lights)	650
New Poles	8 942
New Bulbs	<u>230</u> \$ 599 292

(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 **\$90 519** made up as follows:

Personnel Costs	\$ 30 925
General Services (use of equipment & contract services)	10 275
Goods (posts, street sign purchases, etc.)	<u>49 319</u> \$ 90 519

(2) **Paint Department**

The net expenditure under this heading was **\$ 117 634** made up as follows:

Personnel Costs	\$ 59 604
General Services (use & maintenance of equipment & contract services)	20 459
Goods (paint & misc. supplies)	<u>37 571</u> \$ 117 634

(3) **Traffic Signals**

The net expenditure under this heading was **\$ 237 227** made up as follows:

Personnel Costs	\$ 77 878
General Services (use of equipment & contract services)	20 409
Government Services (electric power)	57 710
Goods (materials)	64 727
Fixed Assets (new equipment)	<u>16 503</u> \$ 237 227

(4) **Railway Crossings**

The net expenditure under this heading was **\$ 50 543** for maintenance done by railway companies.

ENVIRONMENTAL HEALTH SERVICES

The following items are included under the above heading.

- (1) Garbage and Waste Collection
- (2) Garbage and Waste Disposal
- (3) Hazardous Waste

(1) **Garbage and Waste Collection**

In 1993, the net amount paid for the garbage and waste collection operation was \$ 525 265 made up as follows:

General Services - (Garbage Collection Contract)	\$ 354 300
General Services - (Advertising)	5 243
General Services - (Recycling Collection Contract)	170 024
General Services - (Recovery Account)	<u>(4 302)</u> \$ 525 265

(2) **Garbage and Waste Disposal**

The net expenditure under this section was \$ 472 896 made up as follows:

General Services (recycling boxes & advertising, Solid Waste Commission payments, and land rental)	\$ 471 406
Government Services (taxes)	<u>1 490</u> \$ 472 896

(3) **Hazardous Waste**

Cleanup of oil spills from accidents, etc.

The net expenditure under this section was \$ 1598 made up as follows:

Personnel Costs	\$ 540
General Services (use of equipment & contract services)	370
Goods (materials)	<u>688</u> \$ 1 598

PUBLIC HEALTH SERVICES

The following items are included under the above heading:

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

(1) **Old Burial Ground**

The net expenditure under this section was **\$ 10 201** made up as follows:

Personnel Costs	\$ 8097
General Services (use of equipment)	366
Government Services (lighting)	564
Goods (materials)	<u>1174</u>
	\$ 10 201

(2) **Loyalist Burial Ground**

The net expenditure under this section was **\$ 245** made up as follows:

Personnel Costs	\$ 245
-----------------------	--------

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 \$ 51 161 made up as follows:

Personnel Costs	\$ 39 341
General Services (use & maintenance of equipment, building repairs)	(1 874)
Government Services (water & sewer rates, light & power)	3 313
Goods (materials; fuels & lubricants)	<u>10 381</u>
	\$ 51 161

(2) Odell Park

The net expenditure for this item was \$ 92 863 made up as follows:

Personnel Costs	\$ 59 720
General Services (use & maintenance of equipment, communications; building repairs)	4 540
Government Services (water & sewer rates, lights & power)	1 917
Goods (materials; fuels & lubricants)	<u>26 686</u>
	\$ 92 863

(3) Carleton Park

The net expenditure for this item was \$ 8 149 made up as follows:

Personnel Costs	\$ 4 085
General Services (use of equipment & land rental)	2 393
Goods (materials)	<u>1 671</u>

\$ 8 149

(4) **Old Government House**

The net expenditure for this item was \$ 16 190 made up as follows:

Personnel Costs	\$ 8 640
General Services (use of equipment)	728
Goods (materials & fuels & lubricants)	<u>6 822</u> \$ 16 190

(5) **Trees**

The net expenditure for this item was \$ 387 267 made up as follows:

Personnel Costs	\$ 290 538
General Services (use & maintenance of equipment & contract services)	46 725
Goods (fuels & lubricants, materials, new trees, small tools & equipment)	<u>50 004</u> \$ 387 267

In 1993, 145 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 1993:

Species	Number Removed
White Elm	35
Maple	58
Linden / Basswood	13
Ash	1
Oak	1
Poplar	16
Birch	7
Cedar	2
Apple	1
Beech	4
White Pine	3
Spruce	2
Cherry	1
Black Locust	1
TOTAL	145

In 1993, 18 trees were removed because of Dutch Elm Disease.

Following is a summary of Elm trees removed from 1964 to 1993:

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
TOTALS	5812	2838	8650

Trees were planted (first planting) at the following locations in 1993:

LOCATION	NUMBER OF TREES
Aberdeen Street (Civic # 249)	1
Angelview Park	20
Baxter Court	2
Beaverbrook Hotel	3
Biggs Street (Civic #40 & #95)	4
Birmingham Court (Civic #5 & #78)	3
Brunswick Street (Civic #391)	1
Canada Street (Civic #'s 205, 381, 500, 502)	4
Canterbury Drive (Civic # 685, & #691)	2
Carleton Park	10
Carrington Lane (Civic #57)	1
Charlotte Street	4
Coburn Drive	15
Colwell Drive (Irving Woodlot)	4
Dundonald Yard	1
Drammen Drive	50
Ferris Street	24
Flemming & Tilley	6
Gibson Street (Civic #247)	1
Gibson Trail	5
Gill Street (Civic #141)	1
Glengarry Place (Civic #883)	1
Golf Club Road	4
Hanwell Road (Civic #9)	3
Henry Street (Civic #141)	1
Herschel Court	8
King Street & Carleton Street	6
Kingswood Drive	2
Kimble Drive	6
Lincoln Road (Boat Club)	5
Longwood Drive (Civic # 126)	2
Maxwell Street	8
Monteith Drive	7
Neville Street	12
North Riverfront Drive	22
Northumberland Street	22
Odell Park	17
Old Government House	95
Orchard Drive (Civic #1)	1

LOCATION	NUMBER OF TREES
Pederson Crescent	16
Queen Street	19
Reading Street Park	5
Reading Street Tot Lot	8
Riverside Drive	10
Riverview Drive (Civic #135)	1
Sewell Street (Civic #234)	1
Smythe Street (Civic #420)	1
South Riverfront Drive	15
Stairs Street	32
Tilley Drive (Civic # 15 & #21)	2
Valley Trail	4
Waggoners Lane	18
Waterloo Row	3
Waterloo Row Greens	4
Water Treatment Plant	1
Well #7	11
Westmorland Street (Civic #376)	2
Westwood Drive (Civic #'s 1, 9, & 21)	3
Wetmore Road	9
Wilmot Park	40
TOTAL	589

256 Trees were planted at various locations to replace losses due to dry weather and vandalism.

Shrubs planted on City properties and park land - approximately 460

(6) Greens, Benches & Other Parks

The net expenditure for this item was \$ 200 096 made up as follows:

Personnel Costs	\$ 121 239
General Services (use & maintenance of equipment and special projects)	23 689
Goods (fuels & lubricants materials, small tools & equipment)	44 716
Fixed Assets (new equipment)	<u>10 452</u> \$ 200 096

UTILITY FUND

The above item is made up of the following headings:

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

(1) COMMON SERVICES

In 1993 the net expenditure for this item was \$ 928 639 made up as follows:

General Equipment	\$ 521 597
Safety & Benefits	269 448
Administration	137 594 \$ 928 639

(2) SANITARY SEWER

In 1993 the net expenditure for this item was \$ 2 016 431 made up as follows:

Operating: Lift Stations

Personnel Costs	\$ 41 380
General Services (use & maintenance of equipment)	54 183
Government Services (light & power)	12 117
Goods (materials)	2 093
		\$ 109 773

Maintenance:

Personnel Costs \$ 255 687
 General Services (use & maintenance of equipment
 & contract services) 91 002
 Goods (repair parts & tools) 30 290 \$ 376 979

Sewage Treatment & Disposal:

Personnel Costs	\$ 14 258
General Services -use & maintenance of equipment	4 568
- treatment (F.A.P.C.C.)	1 410 319
Government Services: Water & Sewer Rates	994
Lights & Power	37 053
Goods (Miscellaneous Supplies)	<u>297</u> \$ 1 467 489

Debt Charges:

Principal	\$ 56 235
Interest	<u>5 955</u> \$ 62 190

TOTAL \$ 2 016 431

The Fredericton sanitary sewer system consists of approximately **280** Kilometres of mains made up as follows:

SIZE	SILVERWOOD GARDEN CREEK	NASHWAAKSIS DOUGLAS	MARYSVILLE	LR.ST.MARY'S BARKER'S PT.	FREDERICTON	TOTAL
100 mm	-	0.158	-	-	-	0.158
100 mm F.M.	0.013	-	-	-	1.103	1.116
150 mm	-	1.433	0.314	-	0.253	2.000
150 mm F.M.	0.031	0.417	0.539	0.712	3.008	4.707
200 mm	16.045	39.498	18.417	10.864	118.124	202.948
200 mm F.M.	0.254	0.463	0.314	-	0.064	1.095
250 mm	1.959	3.665	0.955	0.298	9.430	16.307
250 mm F.M.	1.178	-	-	-	-	1.178
300 mm	1.267	3.953	1.006	1.868	17.858	25.952
300 mm F.M.	0.420	0.457	-	-	0.739	1.616
350 mm	0.287	0.765	-	-	0.713	1.765
350 mm F.M.	-	-	0.528	-	0.254	0.782
375 mm	1.138	2.472	0.500	0.174	2.613	6.897
400 mm	0.018	0.122	-	-	0.210	0.350
450 mm	1.039	0.031	1.350	-	2.877	5.297
500 mm	2.979	-	-	-	-	2.979
600 mm	0.156	0.264	-	-	2.688	3.108
750 mm	-	-	-	-	0.322	0.322
900 mm	-	-	-	-	1.432	1.432
TOTALS	26.784	53.698	23.923	13.916	161.688	280.009

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 21 wells (11 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 94% 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 pressures) 5 emergency wells	8540 kL
South Intermediate	South Low via Booster	9090 kL
South High	South Interm. 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
Vanier South Intermediate	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	2 Wells Direct 1 Emergency Well	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)	\$ 195 608
(2)	Water Ordinary (including meters)	1 486 515
(3)	Water Treatment Plant	797 163
(4)	Debt Charges - Principal	164 083
(5)	Debt Charges - Interest	<u>27 140 \$ 2 670 509</u>

(1) WATER ADMINISTRATION (BILLING & COLLECTION)

The net expenditure of **\$ 195 608** was made up as follows:

Office Salaries & Benefits	\$ 132 148
Postage	31 621
Professional Services	11 519
Office Supplies	12 055
Computer Equipment	4 463
Other Office Equipment	<u>3 802 \$ 195 608</u>

(2) WATER ORDINARY (INCLUDING METERS)

The net expenditure of **\$ 1 486 515** was made up as follows:

Transmission & Distribution (Operation)

Personnel Costs	\$ 44 760
General Services	
(use & maintenance of equipment) ..	181 341
Government Services (light & power, provincial taxes)	109 051
Goods (materials)	<u>19 978 \$ 355 130</u>

Transmission & Distribution (Maintenance)

Personnel Costs	\$ 517 409
General Services (use & maintenance of equipment & hydrants & contract services)	124 826
Goods (fuels & lubricants, tools, materials, parts)	<u>185 064</u> \$ 827 299

Meters

Personnel Costs	\$ 132 362
Meter Parts, miscellaneous supplies, & tools	11 188
Use of Equipment	37 109
Fixed Assets (new meters)	<u>123 427</u> \$ 304 086
TOTAL	\$ 1 486 515

On 1993 12 31 there were 12 740 water services on meter and 217 on flat rate, making a total of **12 957**.

209 new meters were installed in 1993, 37 regular register meters changed to remote reading type, and 21 automatic reading and billing meters changed to remote reading type. 9 flat rate services were metered.

In 1993, 16 discontinued services were excavated and shut off at the main, 184 stopped meters were replaced and 44 frozen meters were replaced. There were also 860 meters replaced due to their age.

The following sprinkler was installed in 1993:

598 Queen Street (Regency Park) - 1

There are in the City, as of 1993 12 31, 1674 hydrants situated in the following areas:

Fredericton South	773
Fredericton North	166
Nashwaaksis / Douglas	320
Marysville	154
Barker's Point / Lower St. Marys	84
Silverwood / Garden Creek	<u>27</u>
 SUB TOTAL	1524
 LOCATED ON PRIVATE PROPERTY	<u>150</u>
 TOTAL	1674 1690

Hydrants were installed at the following locations in 1993:

Location	Number
Alderwood Drive	2
Barbara Court	2
Canada Street (at school)	1
Clements Drive	2
Cowperthwaite Street	1
Forest Hill Road	3
Gabriel Drive	3
Gesner Lane	1
Granada Avenue	1
Kimble Drive	3
Proposed Street (Mooer's Subdivision)	1
Ramey Street	1
Riverside Drive	2
Ross Terrace	6
Sacobie Court	1
Watson Drive	1
Willis Street	<u>1</u>
 TOTAL	32

The Fredericton distribution system consists of approximately **308** kilometres of water main, made up as follows:

SIZE	MARYSVILLE	NASHWAAKSIS DOUGLAS	LR. ST. MARY'S BARKER'S POINT	SILVERWOOD GARDEN CREEK	FREDERICTON	TOTAL
32 mm	-	0.153	-	-	-	0.153
38 mm	-	0.072	-	-	0.234	0.306
50 mm	-	-	-	0.154	-	0.154
75 mm	-	-	-	-	0.435	0.435
100 mm	0.753	2.232	-	2.508	10.608	16.101
150 mm	12.578	21.061	4.053	4.835	57.957	100.484
200 mm	7.019	24.106	2.266	7.812	44.685	85.888
250 mm	3.071	7.762	5.169	0.966	23.525	40.493
300 mm	1.113	4.889	1.070	7.776	29.566	44.414
350 mm	-	0.220	-	-	5.190	5.410
400 mm	-	2.169	-	-	7.127	9.296
450 mm	-	-	-	-	1.965	1.965
500 mm	-	-	-	-	2.380	2.380
600 mm	-	-	-	-	0.427	0.427
Unknown	0.146	-	-	-	-	0.146
TOTALS	24.680	62.664	12.558	24.051	184.099	308.052

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 \$ 797 163 was made up as follows:

Source of Supply

Personnel Costs	\$ 110 960
Use of Equipment	17 045
Maintenance - Wells	66 863
Communications	12 900
Power - Wells	220 588
Materials - Wells	<u>9 521</u>
	\$ 437 877

Power & Pumping (Plant)

Personnel Costs	\$ 26 735
Communications	390
Light & Power	3 388
Supplies	<u>3 344</u>
	\$ 33 857

Water Treatment Plant

Personnel Costs	\$ 137 277
Insurance	30 000
Maintenance	39 243
Power	7 940
Taxes	35 980
Materials	10 261
Goods (Chlorine, Soda Ash, Lime, etc.)	<u>64 728</u>
	\$ 325 429

TOTAL **\$ 797 163**

The total amount of water pumped into the City's distribution systems from 1993 01 01 to 1993 12 31 for the entire City was 8023 megalitres. The amount of water produced by the Water Treatment Plant in 1993 was 7500 megalitres or 94% of the total City demand. The average daily demand for the City is 22 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
1984	7368	523 393	71
1985	7880	646 991	82
1986	7781	732 141	94
1987	8177	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

The total net expenditure for transmission and distribution of water for the City from 1993 01 01 to 1993 12 31 was determined from the following:

Transmission & Distribution:

Operation	\$ 355 130	
Maintenance	<u>827 298</u>	\$ 1 182 428

Therefore, the net expenditure for transmission and distribution of one megalitre of water from 1993 01 01 to 1993 12 31 was:

$$\frac{\$ 1\,182\,428}{8023} = \$ 147$$

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

TRANSMISSION AND DISTRIBUTION COSTS

YEAR	NET EXPENDITURE PER MEGLALITRE
1984	92
1985	99
1986	88
1987	89
1988	93
1989	126
1990	106
1991	117
1992	121
1993	147

The total net expenditure for administration costs and debt charges for the City from 1993 01 01 to 1993 12 31 was determined from the following:

Water Administration

(1) Billing & Collection	\$ 195 608
(2) Meters (Installation, Reading, Repairs)	304 086
<u>Debt Charges (Principal & Interest)</u>	<u>191 223</u>
	\$ 690 917

Administration costs per megalitre of water produced:

$$\frac{\$ 499 694}{8023} = \$ 62.28$$

Debt charges per megalitre of water produced:

$$\frac{\$ 191 223}{8023} = \$ 23.83$$

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
1984	42	97
1985	43	94
1986	43	75
1987	37	52
1988	39	46
1989	44	46
1990	44	43
1991	45	43
1992	46	38
1993	62	24

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
1984	71	92	42	97	302
1985	82	99	43	94	318
1986	94	88	43	75	300
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

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

S U M M A R Y**WATER AND SEWER REVENUE & EXPENDITURES****1993**

ITEM	NET EXPENDITURE	REVENUE
COMMON SERVICES (WATER & SEWER)		
General Equipment	\$ 521 597	\$ 440 041
Safety & Benefits	269 448	
Administration	137 594	
WATER		
Water Administration (Billing & Collection)	195 608	
Water Ordinary (Including Meters)	1 486 515	4 670 124
Water Treatment Facility & Well Production Costs	797 163	
Debt Charges - Principal & Interest	191 223	
SANITARY SEWER		
Operating & Maintenance	486 752	
Sewage Treatment & Disposal	1 467 489	3 428 753
Debt Charges	62 190	
TOTALS	\$ 5 615 579	\$ 8 538 918

1993 SURPLUS:	\$ 2 923 339
SURPLUS @ BEGINNING OF 1993:	<u>1 003 879</u>
OVERALL SURPLUS:	\$ 3 927 218

NOTE: \$ 2 622 813 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 1993:

WATER:

In 1993, water mains were installed in Lower St. Marys on Alderwood Drive, Hazelwood Drive, Ross Terrace, Quinn Court, Watson Drive and Ramey Street; in the Douglas area on Clements Drive and Gesner Lane; on Dewitt Acres; on Brunswick Street between Church Street and St. John Street; and from Royal Road to Willis Street.

Streets such as Queen Street between Regent Street and St. John Street; Queen Street between Northumberland Street and Smythe Street; Regent Street between Queen Street and King Street; Palmer Street; and Windsor Street between Beaverbrook Street and Albert Street had their water mains upgraded or installed under the System Replacement and oversizing account.

New mains were also installed by developers in the Chippins Riverview Subdivision Phase III. (Kimble Drive, Forest Hill Road, Barbara Court) and the D & R Cowperthwaite Subdivision Section 7 (Granada Avenue, Mason Avenue, Cowperthwaite Street).

New mains were also installed on the Devon Indian Reserve on Gabriel Drive and Sacobie Court.

Following are lengths and sizes of water mains installed in 1993:

LOCATION	LENGTH OF MAINS - metres					
	150 mm D.I.	200 mm D.I. & P.V.C.	250 mm D.I.	300 mm D.I.	400 mm D.I.	500 mm D.I.
* Queen St. - Regent to St. John	8	7	189			
* Queen St. - Northumberland to Smythe	8		173			
* Regent St. - Queen to King			80			
* Palmer Street	11	333	75			
Brunswick St. Trunk	4	30				200
Douglas Area	11			463		
Royal Road to Willis St.	10	33	96	244	265	
Lower St. Marys (Phase II) (Alderwood, Hazelwood, Ross Terrace, Watson, Ramey, Quinn)	66	1223		495		
** Riverview Subdivision Phase III (Kimble, Forest Hill, Barbara)	53	100	963			
Dewitt Acres			3	68		
** D & R Cowperthwaite Subdivision Section 7 (Granada, Mason, Cowperthwaite)	5	338		63		
*** Devon Indian Reserve (Gabriel, Sacobie)	23	101	505			
* Windsor Street - Beaverbrook to Albert		100				
TOTALS	199	2265	2084	1333	265	200

OVERALL TOTAL - 6346 metres = 6.346 kilometres

- * Done under system replacement and oversizing.
- ** Paid for by the developer through Local Improvement Agreement.
- *** Paid for by the Department of Indian and Northern Affairs.

SANITARY SEWER:

In 1993, sanitary sewer mains were installed in Lower St. Marys on Alderwood Drive, Hazelwood Drive, Ross Terrace, Quinn Court, Watson Drive and Ramey Street; in the Douglas area on Clements Drive and Gesner Lane; on Dewitt Acres; on Brunswick Street between Church Street and St. John Street; and from Royal Road to Willis Street.

Streets such as Palmer Street and Canada Street from Wellington Street to Perley Avenue had their sanitary sewer mains upgraded or installed under the System Replacement and Oversizing Account.

New mains were also installed by developers in the Chippins Riverview Subdivision Phase III (Kimble Drive, Forest Hill Road, Barbara Court) and the D & R Cowperthwaite Subdivision Section 7 (Granada Avenue, Mason Avenue, Cowperthwaite Street).

New mains were also installed on the Devon Indian Reserve on Gabriel Drive and Sacobie Court.

Following are lengths and sizes of sanitary sewer mains installed in 1993:

LOCATION	LENGTH OF MAINS - metres							
	200 mm P.V.C.	250 mm P.V.C. & D.I.	350 mm D.I.	375 mm P.V.C. & D.I.	400 mm D.I.	600 mm P.V.C. & Conc.	150 mm D.I.F.M.	
* Palmer Street	347	12						
** Riverview Subdivision Phase III (Kimble, Forest Hill, Barbara)	719							
Lower St. Marys Phase II (Alderwood, Hazelwood, Ross Terrace, Watson, Ramay, Quinn)	2145							313
Brunswick Street Trunk						203		
Douglas Area	5	173		288				
Royal Road to Willis	31	334	46		46	264		
** D & R Cowperthwaite Subdivision Section 7 (Granada, Mason, Cowperthwaite)	355							
Dewitt Acres	721							
* Canada St.-Wellington to Perley	97							
*** Devon Indian Reserve (Gabriel; Sacobie)	632							
TOTAL	5052	519	46	288	46	467	313	

OVERALL TOTAL - 6731 metres = 6.731 kilometres

- * Done under system replacement and oversizing.
- ** Paid for by the developer through Local Improvement Agreement.
- *** Paid for by the Department of Indian and Northern Affairs.

STORM SEWER:

In 1993, storm sewer mains were installed in Lower St. Marys on Alderwood Drive, Quinn Court, and Ramey Street; in the Douglas area on Clements Drive and Gesner Lane; on Dewitt Acres; on Brunswick Street between Church Street and St. John Street; on Derby Court; in Odell Park; on College Brook; and on Palmer Street in conjunction with the installation of new water and sanitary sewer mains.

Storm sewer was also installed on Canada Street between Wellington Court and Perley Avenue and at Forest Hill Road/Biggs Street associated with street reconstruction.

New mains were also installed by developers in the Chippins Riverview Subdivision Phase III (Kimble Drive, Forest Hill Road, Barbara Court) and the D & R Cowperthwaite Subdivision Section 7 (Granada Avenue, Mason Avenue, Cowperthwaite Street).

New mains were also installed on the Devon Indian Reserve on Gabriel Drive and Sacobie Court.

Following are lengths and sizes of storm sewer mains installed in 1993:

LOCATION	LENGTH OF MAINS - metres							
	250 mm	300 mm	375 mm	450 mm	600 mm	750 mm	900 mm	1050 mm
Brunswick Trunk	45	78						
Douglas Area	4			167				
Royal Road to Willis		113	91	54			27	170
Palmer Street	21	304	15					
Lower St. Marys (Phase II) (Alderwood, Ramey, Quinn)								
Dewitt Acres	135	371	67					
Riverview Subd. (City)	25	404		131				
Smythe St./Odell Park					7		238	
** Riverview Subdivision Phase III (Kimble, Forest Hill, Barbara)	142	724	43					
D & R Cowperthwaite Subd. Section 7 (Granada, Mason, Cowperthwaite)	79	242		152				
College Brook								64
* Forest Hill; Biggs; Kimble	110							
* Canada - Wellington to Perley	22					62		
Derty Court		5					107	2
*** Devon Indian Reserve (Gabriel; Sacobie)	103	247	342					
TOTALS	681	2498	558	504	69	27	569	105
								8
								313

OVERALL TOTAL - 5337 metres = 5.337 kilometres

* Done under Capital Street Reconstruction.
** Paid for by the developer through Local Improvement Agreement.

CURB AND GUTTER

Concrete curb and gutter was constructed at the following locations in 1993:
 (Notes indicate budget item under which work was done)

	Location	Length (metres)
(1)	Alderwood Drive / Timber Lane	758
	Amberwood Lane	287
(2)	Bailey Avenue / McAdam Avenue	840
(3)	Beaverbrook Street / Regent Street Intersection	85
(4)	Bowlen Street / Cliffe Street	172
(1)	Brunswick Street - St. John Street to Church Street	437
(4)	Canada Street - Bridge Street northward	447
(1)	Canada Street - Wellington Street to Perley Avenue	528
(2)	Carrington Lane Subdivision Phase 3	2735
	Carrington Lane; Douglas Avenue; Lexington Lane; Mannington lane; Rosemere Drive	2367
(1)	Claudie Road Phase 2	732
(1)	Downing Street	761
	Estey Lane; Evans Street; Douglas Avenue	211
(1)	Forest Hill Road / Biggs Street	698
(2)	Forest Hill Road / Kimble Drive	861
(2)	Giles Street / Selkirk Crescent	1055
(4)	Greenwood Drive - end of existing to Dewitt Acres	122
(1)	Hildebrand Crescent (north)	493
(4)	Jaffrey Street	113
(2)	James Street; Jeremy Street; Randolph Street	813
	Jewett Street - Sunset Drive to existing	735
(2)	Karelyn Place Subdivision (Avonlea; Bishop; Lian)	1427
	Kimberly Street; Randolph Street; Jeremy Street	874
	Kimble Court	194
(3)	Lincoln Road / Wilsey Road Intersection	82
(5)	Mainstreet Program (Queen Street - Regent St. to St. John Street) Mason Avenue	521 299
(4)	McKeen Street	101
(1)	Murray Avenue - Canada Street to Grant Street	1006
(4)	Riverside Drive / Watters Drive Intersection	142
(2)	Rose Court	441
(4)	St. Marys Street (near Union Street)	122
(6)	Union Street (Hughes Street to Neill Street)	1095
(1)	Windsor Street	987
(3)	Woodstock Road / Hanwell Road Intersection	567
	TOTAL	23 108

23 108 metres = 23.108 kilometres

CURB AND GUTTER (continued)

- (1) Done under Capital Street Reconstruction.
- (2) Paid for by developer through Local Improvement Agreement.
- (3) Done under Capital Traffic Management.
- (4) Done in conjunction with sidewalk construction.
- (5) Reconstruction of existing under Capital Mainstreet Program.
- (6) Done under Capital Designated Routes.

PAVING:

In 1993, Gorman Paving Inc. 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 - Type "B" at \$ 30.62 plus G.S.T. per tonne in place
- 2) Surface Course - Type "D" at \$ 33.49 plus G.S.T. per tonne in place

(1) **BINDER COURSE - TYPE "B"**

The following streets were paved with Type "B" asphalt concrete in 1993:

	LOCATION	Length (metres)
(1)	Alderwood Drive (1992 Construction area)	160
	Amberwood Lane	160
	Avonlea Court	315
(2)	Bailey Avenue - existing to McAdam Avenue	281
(1)	Biggs Street - existing to Forest Hill Road	75
(2)	Bishop Drive (new development)	218
(1)	Brunswick Street - Church St. to St. John Street . .	213
(1)	Canada Street - Wellington St. to Perley Ave.	250
	Carrington Lane - existing to Douglas Ave.	38
(1)	Claudie Road - existing to the end of built-up area .	410
(2)	Columbus Court	52
	Douglas Avenue - Carrington Lane to the end	186
(2)	Douglas Avenue - Broad St. to Carrington Lane . . .	949
(1)	Downing Street	335
(2)	Estey Lane - Wiggins Dr. to Douglas Ave.	112
(2)	Evans Street - Wiggins Dr. to Douglas Ave.	211
(1)	Forest Hill Road - Kimble Ct. to Kimble Dr.	270
(2)	Giles Street	284
(1)	Hildebrand Crescent (north)	230
(2)	James Street	264
(3)	Jeremy Street	186
	Jewett Street / Bamberg Court	382
	Kimberly Street	274
	Kimble Court	52
(2)	Kimble Drive (new development)	350
	Lexington Lane	489
(2)	Lian Street	182
	Mannington Lane	323
	Mason Avenue - Cowperthwaite St. to end	185
(2)	McAdam Avenue - end of existing to the end	149
(1)	Murray Avenue - Canada St. to Grant St.	505
(3)	Randolph Street	214
(2)	Rose Court	219
	Rosemere Drive	175
(2)	Selkirk Crescent	283
(1)	Timber Lane	235
(5)	Union Street - Hughes St. to Neill St.	615
(2)	Wiggins Drive - existing to the end	180
(1)	Windsor Street - Beaverbrook St. to Kings College Road	525
(4)	Woodstock Rd. / Hanwell Rd. Intersection	250
	TOTAL	10 786

BINDER COURSE - TYPE "B" (continued)

- (1) Done under Capital Street Reconstruction.
- (2) Paid for by developer through Local Improvement Agreement. Type "D" asphalt was also placed on these streets.
- (3) Portions of these streets have only Type "B" asphalt.
- (4) Done under Capital Traffic Management. Type "D" asphalt was also placed.
- (5) Done under Capital Designated Routes.

CONCRETE SIDEWALKS:

New sidewalks were constructed at the following locations in 1993:

LOCATION	Length (metres)
(3) Alderwood Drive / Timber Lane	335
(2) Bailey Avenue; McAdam Avenue	432
(4) Beaverbrook Street / Regent Street Intersection ..	127
(3) Brunswick Street - Church Street to St. John Street	403
Canada Street - Bridge Street northward	447
(3) Canada Street - Wellington Street to Perley Avenue	188
(2) Carrington Lane; Douglas Avenue; Lexington Lane; Mannington Lane; Rosemere Drive	988
(3) Claudio Road Phase 2	368
(3) Downing Street	359
(2) Forest Hill Road / Biggs Street	387
Greenwood Drive - end of existing to Dewitt Acres	132
(2) Jewett Street - Sunset Drive to existing	336
(2) Kimberly Street; Jeremy Street; Randolph Street ..	585
(1) Mainstreet Program (Queen Street - Regent to St. John Street and Westmorland Street - Queen Street to King St. east side)	467
(2) Mason Avenue	150
Priestman Street near York Street	40
Riverside Drive / Watters Drive Intersection	195
Tilley Drive - Flemming Road to Emmerson Street ..	238
Union Street - Hughes Street to Neill Street	729
Union Street / Jaffrey Street area	442
(3) Windsor Street - Albert Street to Kings College Road	404
Waggoner's Lane near Simpson Court	<u>236</u>
TOTAL	7988

- (1) Reconstruction of existing sidewalk under Capital Mainstreet Program.
- (2) Paid for by developer through Local Improvement Agreement.
- (3) Done under Capital Street Reconstruction.
- (4) Done under Capital Traffic Management.

STREET RECONSTRUCTION:

In 1993, a number of streets were upgraded with curb and gutter and paving and in some instances, sidewalk. These streets included Timber lane and Alderwood Drive (to end of 1992 construction); Brunswick Street between Church Street and St. John Street; Windsor Street between Beaverbrook Street and Kings College Road; Claudie Road Phase II; Canada Street from Wellington Street to Perley Avenue; Hildebrand Crescent (north section); Downing Street; Murray Avenue from Canada Street to Grant Street; and Forest Hill Road/Biggs Street intersection.

TRAFFIC MANAGEMENT:

In 1993, the northwest corner of the Regent/Beaverbrook intersection; the Woodstock/Hanwell intersection; and the Lincoln/Wilsey intersection were upgraded under this account. Traffic signals were also installed at the Main/Sunset and York/Priestman intersections and property was purchased at the Brookside/Main intersection under this account.

SPECIAL PROJECT:

In 1993, all financial obligations were finalized on the Regent Street upgrading between Montgomery Street and the Trans Canada Highway.

MAINSTREET PROGRAM:

In 1993, the upgrading of the downtown of the City continued. Work was finalized on Queen Street between Regent Street and St. John Street and on the east side of Westmorland Street between Queen Street and King Street.

WORKS FACILITIES

In 1993, lunch and washroom facilities were added to the Dundonald Street maintenance depot and four storage bays were added at the St. Mary's Street depot under this account.

NEW STREET CONSTRUCTION:

The following new streets or portions of streets were constructed in 1993:

LOCATION	Length (metres)
Barbara Court	193
Cowperthwaite Street	65
Forest Hill Road	372
Gabriel Drive	509
Granada Avenue	210
Kimble Drive	350
Mason Avenue	110
Sacolie Court	<u>101</u>
 TOTAL	 1910

1910 metres = 1.91 kilometres

PROVINCIAL DESIGNATED AND REGIONAL HIGHWAYS

The City of Fredericton has a total of 51.294 km of provincial designated and regional highways within its boundaries. In 1993, the Provincial Government paid \$ 333.34 (winter) and \$ 84.11 (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 project was undertaken in 1993:

(1)	Route 105 - Union Street (Hughes Street to Neill Street) Curb, Gutter & Paving	\$ 160 867
(2)	St. Mary's Street (Maple Street to City Depot) Resurfacing	<u>26 983</u>
	TOTAL	\$ 187 850

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
UTILITY FUND			
Dewitt Acres - WATER & SANITARY SEWER	\$ 110 000	\$ 158 618	
Well No. 7 - WATER	300 000	341 560	Continued from 1992
Water Treatment Plant Addition - WATER	600 000	608 317	Continued from 1992
System Replacement & Oversizing - WATER & SANITARY SEWER	400 000	421 999	
Lower St. Marys Phase 2 - WATER & SANITARY SEWER	1 000 000	986 637	
Nashwaaksis Reservoir Repairs - WATER	150 000	116 686	
Douglas Area - WATER & SANITARY SEWER	200 000	249 661	
Brunswick Street Trunk - WATER & SANITARY SEWER	300 000	235 937	
Royal Road to Willis Street - WATER & SANITARY SEWER	430 000	594 790	
GENERAL FUND			
Dewitt Acres - STORM SEWER	110 000	110 000	
Woodstock / Hanwell Intersection - TRAFFIC MANAGEMENT	164 084	271 513	Budget includes 1992 carry over. Expenditure includes cost of property acquisition.
Lincoln / Wilsey Intersection - TRAFFIC MANAGEMENT	60 000	44 831	
Waggoner's Lane (Hanwell Road to Post Office Bldg.) STREET RECONSTRUCTION	480 000	556 263	Includes 1991 & 1992 expenditures. Continued from 1992.
Forest Hill Road (Biggs to Kimble Court) - STREET RECONSTRUCTION	110 000	303 513	Includes \$80 250 for property acquisition. Portion from Biggs to Kimble Dr. also constructed.

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
GENERAL FUND (continued)			
Lower St. Marys Phase I - STREET RECONSTRUCTION	110 000	92 505	
Lower St. Marys Phase II - STORM SEWER	100 000	95 975	
Lower St. Marys Phase II - STREET RECONSTRUCTION	200 000	180 053	
Douglas Area - STORM SEWER	100 000	118 447	
Brunswick Street - STORM SEWER & STREET RECONSTRUCTION	120 000	116 931	
Union St. (Hughes to Neill) - DESIGNATED ROUTE	200 000	160 867	
St. Mary's Street (Maple to City depot) - DESIGNATED ROUTE	50 000	26 983	
Gibson Trail Phase I - PASSIVE PARK	20 000	23 852	
CN ROW Walking Path (Rookwood to Angelview Park) PASSIVE PARK	20 000	27 534	
North Riverfront Drive Path Extension - PASSIVE PARK	20 000	3 105	
Odell Park (Fence for deer pen) - PASSIVE PARK	30 000	26 898	
Riverview Subdivision (City property) - STORM SEWER	70 000	70 000	
Smythe Street - Odell Park - STORM SEWER	250 000	200 076	Continued from 1992
College Brook - STORM SEWER	320 000	354 339	
Evans; Estey; Douglas - CURB & GUTTER & PAVING	30 000	35 725	
Kimberley; Randolph; Jeremy - CURB & GUTTER & PAVING	100 000	75 794	
Jewett Street - CURB & GUTTER & PAVING	90 000	66 423	

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
GENERAL FUND (continued)			
Carrington; Douglas; Lexington; Mannington; Rosemere - CURB & GUTTER & PAVING	280 000	207 154	
Mason Avenue - CURB & GUTTER & PAVING	40 000	25 557	
Amberwood Lane - CURB & GUTTER & PAVING	60 000	27 961	
Windsor St. (Beaverbrook to Kings College Rd.) - STREET RECONSTRUCTION	170 000	160 171	
Claudie Road Phase II - STREET RECONSTRUCTION	120 000	109 525	
Canada St. (Wellington to Perley) - STREET RECONSTRUCTION	150 000	216 582	
Hildebrand Crescent (upper portion) - STREET RECONSTRUCTION	170 000	130 135	
Downing Street - STREET RECONSTRUCTION	200 000	165 693	
Murray Ave. (Canada St. to Grant St.) - STREET RECONSTRUCTION	180 000	134 248	
Dundonald St. Yard - WORKS FACILITIES	80 000	113 019	
St. Marys St. Storage Bays - WORKS FACILITIES	200 000	132 199	\$50 000 of budgeted figure re allocated to fuel dispensing system
Beaverbrook / Regent Intersection - TRAFFIC MANAGEMENT	494 480	327 215	
Waterloo, Beaverbrook; Forest Hill - TRAFFIC MANAGEMENT	300 000	5 391	Project not done. Funds reallocated.
Main Street / Sunset Drive (signals) - TRAFFIC MANAGEMENT	30 000	43 425	

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
GENERAL FUND (continued)			
Brookside / Main (property) - TRAFFIC MANAGEMENT	200 000	143 197	
Mainstreet Program - SPECIAL PROJECTS	100 000	410 089	Cost shared with DDFI and ACOA
Greenwood / Marysville By-Pass - TRAFFIC SIGNALS	40 000	40 524	Paid for by D.O.T.
Derby Court - STORM SEWER	50 000	49 304	To be finalized in 1994.
York / Priestman Intersection - TRAFFIC SIGNALS	30 000	11 986	
NEW SIDEWALK (DONE UNDER O & M BUDGET AND LOCAL IMPROVEMENT)			
Union Street - Neill to Hughes	80 000	62 547	
Riverside / Watters	40 000	30 367	
Canada Street (Bridge St. northward)	100 000	66 268	
Union / Jaffrey area	60 000	79 628	
Smythe Street (Priestman to K-Mart)	20 000	145	Dependent upon land acquisition.
Tilley Drive (Flemming to Emmerson)	20 000	15 593	
Greenwood Dr. (existing to Dewitt)	50 000	49 427	
Forest Hill Road (Kimble Ct. to Kimble Dr.) / Biggs Street	25 000	23 406	

WATER QUALITY - 1993

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, and the commissioning of the Longwood Booster Station in late 1990, is now treating approximately 95% 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 measured as free chlorine. This water is odourless, colourless, and has an agreeable taste.

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.

Breakpoint chlorination began in Silverwood during March of 1988, and in the Killarney and Marysville water systems during May, 1989. As chlorine residuals made their way through the systems, some taste and odour complaints were received. These have also 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 the water is bacteriologically safe for human consumption, since coliform bacteria are more hardy than disease-causing bacteria.

Forty-two locations, including all active and emergency wells and key distribution system locations, are each sampled by water operators twice each month. All samples are tested for total coliform by the membrane filtration technique.

Tests showing positive with small numbers of coliform are not uncommon, and are usually attributed to poor sampling conditions, slight contamination of sample tap, or inexperience of sampler. In such cases, resampling and reanalysis is carried out. During 1993, no samples contained more than a few coliform and no location provided positive results on resampling.

CHEMICAL ANALYSIS

Most recent samples for chemical analysis were taken from wells and the distribution system in March, 1993 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.

1993 ANALYSES
(Sampled: 1993 04 29)

LOCATION	pH pH units	Alk. Tot CaCO ₃	Hardness mgf./CaCO ₃	Ca mg/L	Cl mg/L	Cond. µS/cm	Cu mg/L	F mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	N mg/L	Pb ug/L	SO ₄ mg/L	Turb NTU	Zn mg/L	1993 PUMPAGE ML ACTIVE WELLS
Wilmet #1 Well	7.20	51.98	55.2	18.2	4.77	142.	0.03	0.16	0.04	0.92	2.39	1.03	6.30		8.07	0.1	0.02	1373	
Wilmet #2 Well	6.84	40.21	44.0	13.9	4.53	124.6	0.03	0.16	0.11	0.59	2.21	0.92	7.00		10.36	0.1	0.04	1245	
Wilmet #3 Well	7.17	85.47	142.2	47.4	45.84	379.	0.02	0.13	0.00	3.21	5.79	0.04	18.02		22.73	0.3	0.01	896	
Wilmet #4 Well	6.86	57.16	75.3	24.9	18.78	211.	0.01	0.14	0.01	1.48	3.17	0.61	11.14	0.35	0.6	12.08	0.013	749	
Wilmet #5 Well	7.02	48.19	54.1	17.9	5.44	138.	0.02	0.11	0.01	0.86	2.24	0.57	4.91	0.20	8.69		0.015	1240	
Wilmet #6 Well	6.90	34.75	37.3	12.2	2.76	97.7	0.01	0.16	0.01	0.48	1.69	0.28	4.45	0.22	6.21	0.5	0.009	1355	
Wilmet #7 Well	7.22	61.77	65.8	22.2	3.39	158.	0.01	0.25	0.04	0.45	2.49	1.18	4.77		1.9	9.60	0.2	0.003	927
WTP Influent	7.00	70.35	113.7	37.8	30.68	287.	0.19	0.13	0.00	2.50	4.71	0.20	15.03	0.53	19.9	17.52	0.4	0.010	
WTP Effluent	8.17	82.67	103.9	36.2	20.84	264.	0.02	0.14	0.00	1.49	3.27	0.01	11.80	0.38		13.26	0.2	0.002	
Silverwood #2 Well	7.49	144.	161.2	35.5	41.54	429.	0.01	0.10	0.02	0.70	17.64	0.00	25.29	0.39	0.1	11.05	0.2	0.256	9.4
Silverwood #3 Well	7.74	102.	113.2	25.6	7.61	231.	0.02	0.09	0.02	0.43	11.94	0.00	4.49	0.05		6.00	0.8	0.036	53.2
Cameron Ct. Well *	7.26	103.	120.7	40.9	41.86	376.	0.01	0.19	0.02	0.74	4.53	0.00	28.46	0.50	0.4	14.45	0.3	0.016	
Daval Well *	7.76	148.	190.6	66.3	45.13	474.	0.01	0.22	0.07	1.16	6.07	0.17	22.43	0.10	0.8	19.94			
Rainford *																			
Tower Rd. #1 Well	7.36	74.84	104.7	36.0	11.1	269.	0.02	0.19	0.00	0.53	3.58	0.02	13.71	0.02		39.14	0.3	0.014	114.8
Tower Rd. #2 Well	7.20	70.32	94.8	31.2	26.5	259.	0.01	0.15	0.00	0.57	4.09	0.00	14.09	0.05		12.66		0.005	265.0
Modion Well *	7.65	80.60	85.4	29.2	11.3	238.	0.01	0.22	0.15	0.74	3.06	0.16	15.39	0.32	0.0	18.51	0.6	0.014	
Cliffe Well *	7.57	90.65	85.6	31.3	2.3	205.	0.02	0.14	0.02	0.57	1.78	0.17	8.57			10.80	0.1	0.033	
Highland Well *	6.99	64.69	76.3	26.4	10.6	199.	0.02	0.13	0.03	0.63	2.51	0.01	7.42	0.09		13.62	0.2	0.030	
Maple #1 Well *	7.32	91.24	122.1	41.9	42.5	369.	0.02	0.20	0.19	0.81	4.25	0.03	24.45	0.38		20.20	0.2	0.052	
Maple #3 Well *	7.81	103.	132.5	47.9	30.4	347.	0.02	0.16	0.01	0.79	3.13	0.03	17.44			20.67	1.6	0.011	
Killarney K1 Well *	7.28	79.32	86.0	28.8	2.1	185.	0.01	0.11	0.43	0.59	3.39	0.01	4.42	0.05	0.8	12.02	1.2	0.036	
Killarney K10 Well *	7.63	124.	120.7	40.8	3.8	268.	0.01	0.16	0.11	0.67	4.55	1.01	9.38		0.4	9.89	0.4	0.037	
NBHC Bunker **	7.35	69.03	95.7	31.6	27.1	261.	0.07	0.16	0.01	0.59	4.08	0.00	14.05	0.06	5.0	13.75		0.015	
Trudell Bldg., Paplin **	8.12	71.89	85.9	28.1	12.8	210.	0.08	0.14	0.01	0.92	3.79	0.01	9.38	0.21		12.39		0.007	
Park St. School **	7.85	78.89	99.5	34.5	19.6	251.	0.02	0.14	0.01	1.36	3.27	0.01	10.91	0.33		13.04	0.1	0.004	
Woodbridge Rehab **	8.01	76.71	92.2	30.9	17.6	238.	0.02	0.14	0.01	1.13	3.69	0.01	9.87	0.29	0.2	13.07	0.1	0.009	
York Minster, Sunseed **	8.02	80.27	98.7	34.2	20.1	256.	0.04	0.14	0.01	1.37	3.23	0.01	10.88	0.33	0.3	13.26	0.1	0.003	

* These wells are on emergency standby duty.
** Sample points within distribution system.