

### COST DATA ON ROADWAYS OF QUEEN VICTORIA NIAGARA FALLS PARK SYSTEM

THE following cost data covering the construction and maintenance of roadways under the jurisdiction of the Queen Victoria Niagara Falls Park Commission are taken from the 31st annual report of that body:—

#### Concrete Pavement

Section No. 5A—Bridgeburg: Area of concrete surface, 10,430 sq. yds.; width of concrete surface, 18 ft.; thickness of concrete, sides, 6 ins., middle, 8 ins.; area of cross-section, 11.125 sq. ft.; subgrade, flat; concrete mixture, 1:2:3; cost per square yard concrete surface, \$2.13.

Costs				Cts. per sq. yd.
	Labor.	Material.	Total.	
Grading .....	\$ 3,361	\$ 27	\$ 3,388	32.5
Drainage .....	576	503	1,079	10.3
Concrete .....	4,058	9,410	13,468	129.3
Curing, etc. ..	471	....	471	4.5
Shoulders .....	674	1,009	1,683	16.1
Cement tests ..	88	....	88	.8
Inspection ...	288	....	288	2.7
Engineering ..	560	....	560	5.4
Incidentals ...	803	357	1,160	11.1
	\$10,879	\$11,306	\$22,185	212.7

Reinforcement: 1,577 square yards of pavement reinforced with expanded metal cost \$295 = 19c. per square yard.

Shore Protection: 1,000 lineal feet of riprap placed at a cost of \$1.17 per lineal foot.

Macadam Roadway: 600 square yards of macadam, 18 feet wide put down for \$588 = 98c. per square yard.

Excavation: Amount of earth secured from cutting, 1,162 cubic yards; amount of earth borrowed, 2,512 cubic yards. Total amount of fill used, 3,674 cubic yards.

Section No. 5B—Fort Erie: Area of concrete surface, 7,129 sq. yds.; width of concrete surface, 18 ft.; thickness of concrete, sides, 6 ins., middle, 8 ins.; area of cross-section, 11.125 sq. ft.; subgrade, flat; concrete mixture, 1:2:3; cost per square yard of concrete surface, \$2.11.

Costs				Cts. per sq. yd.
	Labor.	Material.	Total.	
Grading .....	\$1,637	....	\$ 1,637	23.0
Drainage .....	362	\$ 366	728	10.2
Concrete .....	3,001	7,779	10,780	151.2
Curing, etc. ...	197	....	197	2.8
Shoulders .....	355	284	639	9.0
Cement tests ..	51	....	51	.7
Inspection .....	170	....	170	2.4
Engineering ...	317	....	317	4.4
Incidentals ....	270	232	502	7.0
	\$6,360	\$8,661	\$15,021	210.7

Reinforcement: 1,434 square yards of pavement reinforced with expanded metal cost \$278 = 19¼c. per square yard.

Shore Protection: 106 lineal feet of riprap placed at a cost of \$1.17 per lineal foot.

Excavation: Amount of earth secured from cutting, 916 cubic yards; amount of fill required, 862 cubic yards. Amount of earth available for Section 5A fill, 54 cubic yards.

Section 5 Complete; from Bowen Road, Bridgeburg, to Ferry Landing, Fort Erie: Area of concrete surface, 17,559 sq. yds.; width of concrete surface, 18 ft.; thickness of concrete, sides, 6 ins., middle, 8 ins.; area of cross-section, 11.125 sq. ft.; subgrade, flat; concrete mixture, 1:2:3; cost per square yard of concrete surface, \$2.12.

#### Costs

	Labor.	Material.	Total.	Cts. per sq. yd.
Grading .....	\$ 4,998	\$ 27	\$ 5,025	28.6
Drainage .....	938	869	1,807	10.3
Concrete .....	7,059	17,189	24,248	138.1
Curing, etc. ...	668	....	668	3.8
Shoulders ...	1,029	1,293	2,322	13.2
Cement tests ..	139	....	139	.8
Inspection ...	458	....	458	2.6
Engineering ..	877	....	877	5.0
Incidentals ...	1,073	589	1,662	9.5
	\$17,239	\$19,967	\$37,206	211.9

Reinforcement: 2,991 square yards of pavement reinforced with expanded metal, cost \$573 = 19.2c. per square yard.

Shore Protection: 1,106 lineal feet of riprap cost \$1,291 = \$1.17 per lineal foot.

#### Maintenance of Roadways—Niagara River Boulevard

Tarvia "A" Treatment: Time, September, 1916; location, station 660 to 800 (shipyard to Bridgeburg); average haul, 1½ miles; surface treated, 18 feet wide, 14,000 feet long (28,000 square yards.).

#### LABOR

	Total.	Per sq. yd.
Teaming ½ in. stone .....	\$192.20	.69
Loading and spreading stone .....	157.50	.56
Sweeping and brushing roadway ..	29.30	.10
Heating Tarvia .....	112.90	.40
Distributing and rolling .....	27.10	.10
Miscellaneous .....	24.00	.09
	\$543.00	1.94c.

#### MATERIALS

	Total.	Per sq. yd.
½ in. stone chips, 348 tons at \$1.10	\$383.00	1.37
Tarvia "A", 6,500 gals. at 10c. ..	650.00	2.32
Freight, \$115, car service, \$19 ...	134.00	.48
Coal, 19.7 tons at \$7 .....	138.00	.49
	\$1,305.00	4.66c.

#### SUMMARY

	Total.	Per sq. yd.
Labor .....	\$ 543.00	1.94
Materials .....	1,305.00	4.66
	\$1,848.00	6.60c.

Cost per square yard, 6.6c.; cost per mile (18 feet wide), \$700; distribution of Tarvia, 23 gals. per square yard; distribution of stone chips, 1 cubic yard on 97 square yards.

Wage Rates: Teams, 45c. per hour; laborers, 20c. per hour; foremen, 30c. per hour.

The Bethlehem Steel Corporation has received orders from the United States Government for over 150 torpedo boats, to cost about \$1,500,000 each. This would make the total value of the order approximately \$225,000,000, which is the largest contract awarded by the Government since war was declared.