

ITEM SUPP. 18
MANAGER'S REPORT NO. 27
COUNCIL MEETING 1984 04 09

RE: WATERCOURSE RAVINE EROSION PROTECTION MEASURES
ROBERT BURNABY CREEK AND WATERCOURSE AT NORTH
FOOT OF WALTHAM AVENUE

MUNICIPAL MANAGER'S RECOMMENDATION:

1. THAT the recommendation of the Director Engineering be adopted.

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TO: MUNICIPAL MANAGER 84 04 04

FROM: DIRECTOR ENGINEERING

SUBJECT: WATERCOURSE RAVINE EROSION PROTECTION MEASURES -
ROBERT BURNABY CREEK AND WATERCOURSE AT NORTH
FOOT OF WALTHAM AVENUE

RECOMMENDATION:

1. THAT Council approve of carrying out the ravine protection works as described in this report by purchasing materials as required through Purchase Orders, and by employing Alantic Contractors Ltd. on a labor payment and equipment rental basis for both the Robert Burnaby Creek ravine and the ravine at the north foot of Waltham Avenue.

BACKGROUND:

Council, at its meeting of 1983 November 14, considered Item #6, Manager's Report #67, 1983 November 07 (copy attached) and referred the matter of Robert Burnaby Creek ravine to the Director Engineering. Another watercourse ravine, at the north foot of Waltham Avenue, has been giving us a considerable amount of concern from two points of view, firstly, its hazard to the public in its present condition which is steadily worsening through accelerated rates of erosion and, secondly, in its contribution of undesirable amounts of silt to Deer Lake. Because of the similarity of conditions in both ravines, then, this report covers both of them as being deserving of similar restorative work. Each ravine requires approximately 300 to 400 feet of treatment and the total cost is split approximately equally between the two ravines.

REPORT:

The concerns expressed by Council at its meeting of 1983 November 14 centered on the report's recommendation that an approximately 300-foot section of Robert Burnaby Creek be enclosed with pipe. The main concern was that such action is contrary to Council's expressed policy of preserving watercourses in an open state in as close to a natural condition as is possible. Council further expressed interest in the Engineer giving consideration to the various options which may be available to combat the problem of erosion while at the same time adhering to Council's policy of keeping watercourses open. One additional concern not expressed by Council but nevertheless of great importance is the potential hazard to the public in both ravines, but more particularly in the Waltham Avenue ravine. Robert Burnaby Park is used extensively by members

of the public and so is the area at the north foot of Waltham Avenue although it is not part of the official park trail system. **188**

Both ravines have steep grades and continually worsening erosion has caused them to be both deeper and wider than they were originally, with the attendant problem of public hazard. There is no likelihood of the erosion being arrested unless corrective measures are taken. Although the drainage areas tributary to each ravine have not altered, there is no doubt that the rate of runoff has increased over the years because of urban development build-up within those tributary areas.

The Engineering Department considered a number of possible options which appeared to have merit in preventing erosion in open watercourses. Options such as retaining walls, gunniting (spraying concrete on ground surfaces), and flattening out the ravine slopes were rejected because of cost, ground support shortcomings, and/or doubtful efficacy in solving the basic problem.

The Engineering Department considers that the only reasonable solution to the erosion problem is to place select sizes of fractured rock on the ravine slopes to produce a blanket of sharp-angled interlocking rocks which is effectively able to resist erosion while being stable in its own right. Prior to placing the blanket, however, preparatory work is required, involving clearing out brush and fallen trees, removing topsoil and other deleterious material, sloping the banks, and placing fill to raise the invert elevations of the creek channels to restore, at least partially, the original invert elevations of the watercourses.

This manner of treatment is not unlike that which was employed recently in the Buckingham and Nursery watercourses. There are some minor differences because each watercourse requires a particular treatment tailor-made to its specific peculiarities.

The Buckingham Creek treatment was carried out by utilizing an external consulting process of engineering design and inspection of the work. The Nursery watercourse was not formally designed but rather was "field-designed" and adjusted as the work proceeded; inspection was performed "in-house" by Municipal staff. The experience gained in both of these watercourses has indicated that full engineering design and inspection by an outside firm is of marginal value as to both basic requirement and return on the investment.

There are serious difficulties in adapting the work required to be done in these two particular ravines to the tendering process because there is no practicable way to produce a meaningful design on which to base tenders. This work is one of those types that are very rare in public works projects wherein the primary need here is in the particular acquired skills and the "artisan" capabilities of the person performing the work. Because of these characteristics of the work, they are suited to being done in total "in-house" but Burnaby does not keep the necessary type of equipment on hand nor does it have the skills and particular work expertise required.

(cont'd)

Lacking the ability to produce a meaningful set of tender documents and lacking equipment and expertise to perform the work "in-house", a third alternative is available in the form of what is commonly referred to as a "day-labor" arrangement. This calls for a bringing together of the best individual means of selecting labor, materials, and equipment and in optimizing their combined application to getting the work done.

The work in both the Buckingham Creek and Nursery water-courses was performed by Atlantic Contractors Ltd. in a most able, efficient, and economic manner utilizing the particular skills and capabilities mentioned above. The Engineering Department is of the opinion that a blending of the best aspects of public and private sector expertise should be used in carrying out the required work; this could best be done by providing inspection and cost control "in-house" and by drawing upon the well-proven skills and capabilities of Atlantic Contractors Ltd. in this particular work. The most fruitful areas for saving money on these projects are in efficient use of equipment and in judicious use of materials; the Contractor is able to provide these savings by having direct experience in the type of work involved.

The process of blending of expertise allows for:

1. Developing field "design" and method changes as the work proceeds without incurring "extras" which would arise in the case of making changes in a tendered contract,
2. Enhancing cost management aspects by the Municipality being in direct and constant control of the work,
3. Ordering specific tailor-made materials directly on Municipal Purchase Orders from the best sources,
4. Labour and equipment rates competitive with those currently charged for works of this nature.
5. Equipment use efficiency results from the owner of the equipment exhibiting a responsible attitude towards optimum deployment of his own equipment but always with control for Burnaby by "in-house" inspection.

By carrying out the work in the manner described above, overall risks would be minimized because of elimination of some of the unknowns which would be inherent in attempting to tender this type of work. The work method described above allows for latitude in selecting the best material at the best price and in maximizing the benefits of utilizing Atlantic's equipment which is personally supervised by the Company's principal and hired at competitive updated rates currently on file with the Corporation.

The cost of the work would be broken down into the various components approximately as follows: Materials 30%, Labour 25%, Equipment 45%.

The Director Engineering feels that the overall savings in using the process described would be approximately 25%, which would be realized through savings in engineering design and inspection and in eliminating bidding risks brought on by unknown problems which are better dealt with on the job on an at cost basis as the work progresses.

It is felt that the work in both ravines can be done for approximately \$300,000. The order of magnitude of this figure was determined by taking off the lineal cost of the work in Buckingham Creek and making allowances for the physical differences in the respective ravines.

The 1984 Capital Budget has been prepared showing a transfer of the 1983 Capital Surplus of \$316,760 to Code 60, Storm Extensions. Although the final total cost of the work is difficult to estimate with accuracy because of the unusual nature of the work, it is considered that the amount of the surplus will be sufficient for the purpose. As additional information, approximately \$240,000 of the \$316,760 capital surplus for 1983 originated in the Engineering Department public works area.

It is recommended that the work proceed as detailed in this report as soon as it can be arranged.


DIRECTOR ENGINEERING

EEO:sp
Attach.

cc: () Director Finance
() Director Planning & Building Inspection
() Director Recreation & Cultural Services

ITEM
MANAGER'S REPORT NO. 67
COUNCIL MEETING 1983 11 07

RE: ROBERT BURNABY CREEK
PROPOSED PIPING OF A PORTION OF WATERCOURSE
(4th ST. AND ELWELL ST.)

ITEM SUPP 18
MANAGER'S REPORT NO. 27
COUNCIL MEETING 1984 04 09

MUNICIPAL MANAGER'S RECOMMENDATION:

1. THAT the recommendation of the Director Planning & Building Inspection be adopted.

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TO: MUNICIPAL MANAGER 1983 NOVEMBER 02

FROM: DIRECTOR, PLANNING & BUILDING INSPECTION.

RE: ROBERT BURNABY CREEK
PROPOSED PIPING OF A PORTION OF WATERCOURSE (4TH ST. & ELWELL ST.)

RECOMMENDATION:

1. THAT Council authorize the enclosure and piping of a 300 foot section of Robert Burnaby Creek subject to the conditions outlined in this report.

SUMMARY:

In order to prevent further erosion of the ravine banks caused by the rapid fall of the creek, it has been requested that the existing storm sewer pipe be extended into Robert Burnaby Creek ravine. Council approval is necessary for the proposed piping of an approximately 300 foot section of the creek.

REPORT

BACKGROUND:

We received a request from the Recreation & Cultural Services Department to extend the existing 24" storm sewer pipe an additional 300 feet further into Robert Burnaby Creek ravine (where it enters the ravine at Elwell and Fourth Streets as shown on the attached sketch).

Apparently, when this area of the park was developed some twenty years ago, the existing parking lot and immediate east side of the ravine was filled with graded material and stumps from the development of the park site. This has continued to cause alarm through natural settling and decaying of this material which creates underground caverns that collapse and require re-filling.

Toward the end of the proposed piped area is a steep cliff approximately 30 to 40 feet in height. This hazard would be eliminated by the piping. The west side borders a road allowance (4th Street and Elwell) and it is this side that continues, on a regular basis in wet weather, to break off and slide into the ravine and creek taking with it Alder, Cedar and Vine Maple trees.

These blockages of the creek increase erosion into the bank and eventually cause more slides.

The installation of this pipe and two dropped manholes at 100 foot intervals would eliminate all these hazards. The area will be left with a natural swale when completed.

The Recreation & Cultural Services Department have applied to the Provincial Water Management Board for approval and have also met, on site, with Mr. John VanHove, Habitat Protection Technician with the Fish and Wildlife Management Department. They have no objection to the culverting of this portion of the creek and have provided some guidelines to follow.

EXISTING SITUATION:

Upon receipt of this request, Planning sought comments from the Environmental Health and Engineering Department.

The Chief Public Health Inspector reported that given the guidelines specified by the Provincial Fish and Wildlife Department, he had no objections to the proposal.

The Director Engineering reported that he had no objections to the proposed piping provided the grade was in excess of 3% and the design incorporated energy dissipation devices.

This information was conveyed to the Recreation & Cultural Services Department and we added that we would have no objections provided that the following criteria were met:

1. Selective fill material is used to ensure that a similar situation of settling and decaying of substandard material does not occur in this steeply sloping section.
2. A minimum amount of disruption occurs to the surrounding trees and vegetation, particularly to the west, during the filling and piping process. These areas should be adequately protected.
3. The fill area is properly restored (i.e. treed and grassed). Some terracing may be required due to the very steep terrain.
4. A dissipater is installed at the end of the new pipe that will discharge into the remaining open section of the creek.

We have received a written concurrence from the Recreation & Cultural Services Department to the above conditions.

An estimated amount of \$11,000 has been allocated from the Parks 1983 Capital Budget (Maintenance and Energy Improvements) for this work.

The Parks and Recreation Commission approved the foregoing recommendations, funds and source of funds, at their meeting on 1983 November 02.



A. L. Parr,
DIRECTOR PLANNING &
BUILDING INSPECTION.

CW:mdw

Att.

C.C.

Director Recreation & Cultural Services
Director Engineering
Chief Public Health Inspector

ITEM	6
MANAGER'S REPORT NO.	67
COUNCIL MEETING	1983 11 07

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