February 8th, 1967

Mr. Alex Cheveldave, B.C.L.S.,
33 Pine Street,
Post Office Box 813,
Castlegar, B. C.

Dear Alex:

Re: Computing Services

In reply to your enquiry regarding computer services, we have pleasure in forwarding you the following:

1. Booklet "Survey Calculations by SASSY" including:
   (a) Computer rates and approximate costs of various SASSY operations
   (b) Sample input and output sheets
2. Right-of-Way Design Programme:
   (a) Programme Abstract
   (b) Description of Input and Output
   (c) Input and Output sample with costs noted
   (d) Forms giving Input Format
3. General Description of Computer Services Available
4. Information on "TELEX" data transmission equipment, including rates

The assessment of costs is sometimes difficult, since it depends so much upon the complexity of the survey being computed. In general, the more complex the task the more the computer will save you.

If we consider the "SASSY" programme which does all the usual types of calculations, you will see from our tabulation that traverse courses vary in cost from 8¢ to 20¢, depending upon how much output you wish. If you only want to know if a parcel closes you write a traverse around it and ask for no output. If it closes within 0.015 feet each way, no closure will be printed;

if greater than this amount, the closing errors and the bearing and distance of the closing line are printed. You get this for 8¢ a course, plus the time it takes to print the closing course (about 10¢).

At the other end of traverse complexity you ask for lats., deps. and co-ordinates (balanced) and get this for 20¢ a course.

When I wrote a thesis on Computing in 1962, it cost a Surveyor 45¢ per course to do a balanced traverse, plus 18¢ more for area by D.M.Ds. You will see that the computer does the area for:

9¢ + 1¢ per point + 5¢ per arc.

Can you imagine where hand computed costs go if many arcs are involved and the Surveyor must solve $\frac{R^2}{2}$ (θ Rad - Sin θ) for each?

Intersections are also to be noted. The computer does them for an average of 20¢. This represents one inverse from two sets of co-ordinates, the solution of a triangle and the calculation of the co-ordinates of the intersected point.

Now let us consider the "Right-of-Way Programme." This is for rights-of-way without curves, is designed basically for transmission lines, and for handling them in large sections. The data storage and operating speed required make it necessary for this programme to run on a large computer. You cannot, without a plan, visualize the complexity of the sample job but you can see from the control and tie traverses entered how much computing there is. If the user had submitted his entire data without error, the 12.3 miles would have cost $72.80. Even allowing for the two reruns it still cost less than $12.00 per mile to compute.

So much for cost comparisons. The next point is, can you learn to use it quickly? Don't let the input and output bother you. If you start by using the "SASSY" Programme on a small survey you will find how easy it is. We all have work rejected by the computer, usually because we made the same mistake as when we did the work by hand, we made data errors. Because, when you offer the computer work there are usually many solutions, each depending upon the previous ones, there is an even greater need for checking the data presented. It is here, of course, where "TELEX" communication has much advantage besides that of rapid

answer return, a data error can be corrected by the user immediately and the computing job will not be held up.

We do, however, have numerous Surveyors who tender work by mail quite successfully. This is particularly so in subdivision design where, if a closed perimeter survey and sufficient internal data are supplied on a plan, we write the input from the plan. We certainly prefer the user to write up his own data, but we can do it the other way for new users. We, of course, have to make an hourly charge for this service, as noted in the "SASSY" information being sent to you.

In conclusion, there is only one way for you to know if our service will suit your operations, to try it on a small scale. I am certain that it can save you money.

Yours very truly,

UNDERHILL ENGINEERING CO. LTD.

A. T. Holmes

ATH/DEK

Enc.