UNPUBLISHED REPORT 1968/10

Upper dam site Whitewater Creek, Kingston: Proposed investigation program 1968–69

by W. R. Moore

The following program is proposed for the 1968–69 financial year, with the aim of arriving at a conclusion as to the feasibility of a dam of the order of 100–120 feet high at the upper site on Whitewater Creek, Kingston.

It will be realised that such a program is tentative, as the results of each stage necessarily influence those of the following stages. Further, because exposures are so poor at this dam site, a conservative approach to its geological problems has been adopted and much of the investigation is devoted to exposing bedrock. Only when the site is finally sluiced clear of all overburden will it be possible to make a final analysis of the dam's potential leakage and the suitability of the foundation on which the dam is to be built.

The program is set out in the order in which it is thought best to proceed. This order appears to allow the maximum information to be collected without committing all of the available funds at one period, as well as retaining enough flexibility for the program to be amended at any stage, or at its worst to abandon the site at any stage.

SITE INVESTIGATION PROGRAM

A: Trenching program

1. To expose bedrock from BH8 upstream to first outcrop of mudstone present in Whitewater Creek (length of trench 650 feet approximately).
2. From BH8 downstream to BH2 and to the downstream toe position of the dam (600 feet). This trench should be wide enough to expose the shattered zone and trend of the joints.
3. Trench across the dam site centre line. Length of this trench is dependant on the height of the proposed dam.
4. Trench across the downstream fault (100–150 feet).

B: Drilling program

1. To complete the original drilling program of 1967 with one extra hole (BH10).
   BH9 = 200–300 feet at 40–50°
   BH7 = 120 feet (changed from 150–200 feet at 30° to 120 feet vertical hole)
   BH10 = 150 feet at 30°N.
2. Three extra vertical holes depending on the results of the trenching along the centreline and the length of the dam required. These holes to be placed north of BH3 and south of BH4.
3. Further drilling may be required to trace the line of the faults and shatter zones, particularly north of Whitewater Creek and along the stream valley where the potential leakage paths are short.
4. If the leakage of the upper dam site appears to be excessive it would appear prudent at this stage to drill and pump test at least two vertical holes in the lower dam site in order to evaluate it as a potential site.

C: Trial grouting program

To be undertaken in the worst exposed shatter area. The number of holes drilled and grouted should be sufficient to estimate the effectiveness of the grout over a known area.

D. Quarry Site

The quarry site should be selected while the grouting program is being carried out and if the results of the above are satisfactory the quarry site should be drilled to find the amount and the suitability of the material available (a minimum of six vertical holes). A seismic survey will probably be necessary across the quarry site and the cost of explosives (approximately $200) should be included in the costing of the investigation.

E. Testing of clay seams in the foundation rocks at the site should be carried out because of the potential danger of bedding plane slip along thin clay beds.

F. Sluicing and clearing of all overburden at the site.

SUMMARY

A: Trenching	1,400 feet approximately.		
B: Drilling	Definite	1967 program	500 feet
		Quarry site	400 feet
		Total	900 feet
	Tentative	Extension of C/L	350 feet
		Tracing faults	400 feet
		Lower dam site	250 feet
		Total	1,000 feet

All drilling at the dam site should be N.M.L.C size and water pump tested. At the quarry N.M.L.C. size testing without water pump testing.

C: Trial grouting program.

D: Quarry site investigation – seismic survey.

E: Testing clay seams.

F: Sluicing dam site.

[15 February 1968]