2007-P039-111

STAGE 1 ARCHAEOLOGICAL ASSESSMENT OF THE BALACLAVA DAM LOT 8 CONCESSION 2 GRATTAN TWP. (GEO.) BONNECHERE VALLEY TOWNSHIP, RENFREW COUNTY

prepared for: Mr. William Grandy
Trow Associates Inc.
1595 Clark Boulevard
Brampton, ON L6T 4V1
Tel.: (905) 793-9809 Fax.: (905) 793-0641

prepared by: Ken Swayze
Archaeological Consultant (Lic. # P039)
R. R. # 5
Cobden, ON K0J 1K0
(613) 791-4391 Fax.: (613) 646-2700

February 2007

Summary: Ken Swayze 2007-P039-111 Kinickinick Heritage Consultants, February 2007

STAGE 1 ARCHAEOLOGICAL ASSESSMENT OF THE BALACLAVA DAM LOT 8 CONCESSION 2 GRATTAN TWP. (GEO.), BONNECHERE VALLEY TOWNSHIP, RENFREW COUNTY

In January 2007 Kinickinick Heritage Consultants was engaged by Trow Associates Ltd. to prepare a Stage 1 archaeological assessment of the Balaclava Dam in Grattan geographic township in Renfrew County. The Ministry of Natural Resources owns the dam and plans to replace it with a new structure. A Stage 1 assessment is a background review of surficial geology, post-glacial landscape evolution, historical land use, and the present condition of the development zone and a review of archaeological sites regionally and locally. The Stage 1 assessment uses geographic methods of terrain analysis to assess the potential for pre-contact archaeological sites, while the potential for historical Euro-Canadian archaeological deposits is determined by a consideration of land tenure records, historical description and association, historical maps, and aerial photograph interpretation.

The study area is the footings of the dam across Constant Creek in Balaclava, a hamlet located at the outlet of Constant Lake. Balaclava, once busy pioneer settlement, is now almost a "ghost town". The original outlet of Constant Lake was about 1 km NW and the pre-dam stream meandered through sandy terrain to a bedrock sill, where the present dam is situated. The dam has raised the lake level about 1.5 m, so that the former banks of Constant Creek are now "drowned land". The dam site is bracketed by two built heritage structures that represent early 20th century architecture and economy. The Richards sawmill is on south side of the dam, and a red frame shop fronts the mill pond. Both buildings are now abandoned.

The dam is about 30 m long by 8 m wide and Highway 513 is built on top. The structure is in deteriorating condition and MNR is considering constructing a new dam upstream of the existing dam. In order to do this, a temporary cofferdam will be put in place to divert traffic and create a dry environment for construction of the new dam and the new bridge. The proposed construction of cofferdam, new dam, new bridge, and extension of erosion protection will be confined to Provincially owned land and the right-of-way (ROW) of Highway 513 and should not affect the built heritage.

It is estimated there were about one thousand water-powered mills in Upper Canada in 1850 and the mill at Balaclava is one of the few that still exist. Duncan Ferguson and Donald Cameron opened a sawmill at this location in 1861. Ferguson was also a merchant and sold goods in Balaclava. In 1868 William Richards purchased the sawmill and dam and the Richards family operated it for 89 years. In the early 20th century, the mill was subject of the first pollution lawsuit in the Ottawa Valley and the first sawdust burner in the Province still stands nearby.

Constant Creek was an important transportation corridor in the historic and pre-contact period and it makes direct link from Calabogie Lake to Lake Clear and Highland Lake. Constant Lake, at the base of the Opeongo Mountain graben, is a shallow warm water fishery, with pike, bass and walleye, although historically the eel fishery was important. The immediate vicinity is a bedrock nick point or sill. The pre-contact stream bank may have been the end of a portage where canoes could be launched into the stream, about 1 km south of the pre-dam Constant Lake.

The Provincial land around the Balaclava Dam has moderate to high archaeological potential and Stage 2 field tests, to determine the presence, or absence, of archaeological material, cultural features, or human remains, are warranted. Stage 2 tests should be carried out by a licenced archaeological consultant. The procedure should entail the manual excavation of testpits at 5 m intervals, to parent (till) material. The drowned land can be tested when the waterlevel has been drawn down, or when a cofferdam has dewatered the construction zone. There are areas of archaeological potential that are peripheral to the construction zone that may be affected by related roadway improvement projects.

TABLE OF CONTENTS

LIST OF FIGURES

Ken Swayze 2007-P039-111 Kinickinick Heritage Consultants, February 2007

STAGE 1 ARCHAEOLOGICAL ASSESSMENT OF THE BALACLAVA DAM LOT 8 CONCESSION 2 GRATTAN TWP. (GEO.), BONNECHERE VALLEY TOWNSHIP, RENFREW COUNTY

Introduction

In late January 2007, the writer, a licenced archaeological consultant with Kinickinick Heritage Consultants, was engaged by Mr. William Grandy, of Trow Associates Ltd., in Brampton, to prepare a Stage 1 archaeological assessment of the Balaclava Dam in Bonnechere Valley Township, in the geographic township of Grattan, in Renfrew County (Figures 1 and 2). The Ministry of Natural Resources (MNR) owns the dam (Figure 3) and plans to replace it with a new structure, to be built immediately upstream from the present dam (Figures 4&5).

According to the archaeological fieldwork standards and guidelines of the Ontario Ministry of Culture (OMCL 2006), a Stage 1 assessment includes a background review of surficial geology, post-glacial landscape evolution, historical land use, and the present condition of the study area. It also reviews the OMCL data file on archaeological sites and previous archaeological studies regionally and locally. The Stage 1 assessment uses geographic methods of terrain analysis to assess the potential for pre-contact archaeological sites, while the potential for historical Euro-Canadian archaeological deposits is determined by land tenure records, historical description and association, historical maps, and aerial photograph interpretation.

STAGE 1

1.0 Description of the Dam Setting and Land Use History

The study area is the footings of the dam across Constant Creek in Balaclava, a hamlet located at the outlet of Constant Lake. Balaclava was a busy settlement in the late 19th and early 20th centuries but now, although there are two occupied dwellings, it is almost a "ghost town", with a street scape dominated by abandoned historical buildings.

The original outlet of Constant Lake was about 1 km northwest of the study area and the pre-dam stream meandered through sandy terrain to a bedrock "nick point", or sill, where the present dam is situated. The dam was built to provide power for a sawmill and it has raised the lake level about 1.5 m, so that the former banks of Constant Creek are now "drowned land". Aerial photographs, and visual inspection on January 31st, suggest that the drowned land, or the original bank of Constant Creek, persists up to the present dam footings. The dam site is bracketed by two built heritage structures that represent early 20th century architecture and economy. The Richards sawmill (Figure 11) is on the west bank of Constant Creek, on the south side of the dam, and a red frame building (Figure 10) fronts the mill pond on the east bank. Both buildings are now abandoned.

The present dam is about 30 m long by 8 m wide and Highway 513 is built on top (Figure 3). There are three stoplog bays in the structure, one for the sawmill flume and two for overflow control. The present dam was built in 1927 to replace the original 19th century structure built by Ferguson and Cameron. MNR took over the management of the dam in 1983. A recent inspection by MNR determined that the present dam is in deteriorating condition and several course of action options were identified, including; 1) do nothing, and allow the original waterline to prevail; 2) rebuild the dam on the present site; 3A) convert the structure to a weir at the present site; 3B) reconstruct the dam immediately upstream from the present configuration and build a new bridge at the present site; and 4) decommission and remove the dam and build a new bridge (MNR 2006). The EA project scoping plan (MNR 2006) selected option 3B, to build a new dam upstream of the present structure, as the best course of action. In order to do this, a temporary cofferdam (Figure 4) will be put in place to divert traffic and create a dry environment for construction of the new dam and the new bridge (Figure 5). The proposed construction of cofferdam, new dam, new bridge, and extension of erosion protection will be confined to Provincially owned land and the right-of-way (ROW) of Highway 513 and should not affect the built heritage.

It is estimated there were about one thousand water-powered mills in Upper Canada in 1850. The Balaclava dam was built about 1854, when the village was settled shortly after the Crimean War, and it is one of the few remaining examples of this type of built heritage. Joan Finnigan (2004) discusses the history of Balaclava in *Life Along the Opeongo Line* in the chapter called "Deviations". Duncan Ferguson and Donald Cameron opened a sawmill at this location in 1861. Ferguson was also a merchant and sold goods in Balaclava. Cameron soon sold his share of the venture to Ferguson and in 1868 William Richards purchased the sawmill and dam. The Richards family operated the mill for 89 years. Soon after the sawmill at Balaclava began operations, William Hunter built a grist mill about 2 km downstream, where the gradient of Constant Creek flattens into an area of poorly drained glacial outwash (Figures 2&8). In the early 20th century, Richards and Hunter became involved in "the first pollution lawsuit in the Ottawa Valley" when the latter complained that sawdust from the mill upstream affected his gristmill operation (Finnigan 2004:197). In 1903 Richards erected the first sawdust burner in the Province, a structure which still stands. Edith Macfie, a grandchild of William Hunter remembered that "he caught eels in the slide and took them home, where he smoked them in his little smoke-house" (*Ibid.*:199). An enlargement of part of historical aerial photograph A3968-53 shows Balaclava in the early 1930s, shortly after the dam was rebuilt. At that time the same two built heritage buildings—the sawmill and the red frame shop—stood cater-corners to each other across the roadway-dam, but to the east of the shop two small buildings are apparent, instead of the narrow long building of today (Figure 12).

Constant Creek basin was an important transportation corridor in the early historic and pre-contact period and it makes direct link from Calabogie Lake to Lake Clear and Highland Lake. For many stretches between Calabogie Lake and Constant Lake,

it was a navigable waterway. Constant Creek drainage rises from multiple first order streams in the mountains between Highland Lake and Lake Clear and the Perrault Lakes in the hilly moraine that forms the interfleuve between the Bonnechere drainage and the Constant Creek Drainage. Constant Lake basin, at the base of the Opeongo Mountain graben, is a shallow warm water fishery, with pike, bass and walleye, although historically the eel fishery was important. Constant Lake has many marshes and swamps around the upper end that were shallow bays in the early postglacial period, when the lake was considerably larger. From about Dacre to Constos (Ferguson) Lake, Constant Creek follows the edge of a train of glacial outwash that marks the channel of the much larger postglacial stream (Figure 7).

2.0 Surficial Geology and Post-Glacial Landscape Evolution

The following account references the dates of geological episodes to cultural time periods in order to underline the effect these processes had upon the relative attractiveness of the property for human use, either for habitation or specific resource exploitation activities. The cultural periods referred to, and their approximate dates before present (BP) are: Palaeo-Indian 11,500-10,000 BP; Early Archaic 10,000-6,000 BP; Middle Archaic 6,000-4,500 BP; Late Archaic 4,500-2,500 BP; Woodland 2,500 BP-1,600 AD and Historic 1600-1900 AD.

The most significant and dramatic effect of deglaciation, in eastern Ontario, was the creation of the Champlain Sea, which existed for almost two millennia and its recession, through a series of riverine lakes, for another millennium. Beginning about 12,700 BP the entire St. Lawrence Lowlands was submerged under the Champlain Sea (Gilbert 1994:6). The maximum extent of the Champlain Sea has been radio-carbon dated (from shells) to 11,400 BP, at 170 m a.s.l. near Shawville, and to 11,000, at 160 m near Martindale in the Gatineau Valley—dates are approximate—and at Almonte and Rigaud, the high water level has been dated, to 11,200 BP, at 154 m, and 160 m a.s.l., respectively (Fulton and Richard (1987: Table 7). Thus, the period of maximum extent of the Champlain Sea corresponded with the (Clovis) Palaeo-Indian period. Over the next millennium the delta of an enormous river prograded down the Ottawa Valley from Petawawa to Hawksbury. But then, as the sea level rose, the land rebounded from the weight of the ice-sheet until, by 10,000 BP—Late Palaeo-Indian/Early Archaic—the Ancestral Ottawa River flowed into a riverine/lacustrine body of water called Lake Lampsilis. This post-glacial lake was still much higher than the Ottawa River today. According to Fulton and Richard (1987:25) the level of this body of water was still as high as 94 m a.s.l. at Deschênes in 10,100 BP. It has been dated from three locations in the Ottawa vicinity to between 7,870 BP and 8,830 BP at 60 to 70 m a.s.l. (Fulton and Richard 1987:26, Table 7).

During the Palaeo-Indian and Early Archaic periods, the entire Upper Great Lakes, and northern Ontario and northern Québec, drained through the Ottawa Valley, first debouching solely through the Barron and Petawawa Rivers, and later also via the North Bay/Mattawa route. The volume of water through the Ottawa system was enormous—almost inconceivable—relative to today. This gargantuan flow was

compounded at intervals, between 10,800-10,000 BP and again between 9,500-8,000 BP, by 'slugs' of flood water from post-glacial Lake Agassiz, which then occupied much of the prairie provinces (Teller 1988). These 'slugs', with additional volumes of 500 km^3 to 4,000 km^3, would obviously have been of catastrophic in nature, and would have affected the habitability of the shorelines of the recessional stages of the Champlain Sea and the Ancestral Ottawa River. Lewis and Anderson (1989) have estimated that the flow of the Ancestral Ottawa River during one of these slugs was 200,000 m^3/s, or 200 times the average flow today. The floodwaters almost certainly had an effect upon the archaeological record of low lying areas, scouring some away, and deeply burying others.

After about 8,000 BP (in Middle Archaic times) post-glacial Lakes Agassiz and Barlow-Ojibway ceased to support recessional Lake Lampsilis in the Ottawa drainage basin but the upper Great Lakes still contributed to the flow of the Ancestral Ottawa, until about 5,500, when two other outlets also began to drain them to the south. By about 4,700 BP the flow over the Nipissing-Mattawa threshold ceased and the modern continental drainages—and environment—became established (Fulton and Richard 1987:28).

The footings of the present dam and bridge at Balaclava are on bedrock knob terrain covered by sandy, gravely, glacial outwash (Figure 8). The immediate vicinity is a bedrock nick point or sill, where the Constant Creek gradient increases abruptly for 2.5 km. The pre-contact stream bank probably marked the end of a portage where canoes could be launched into the stream, about 1 km south of the pre-dam Constant Lake.

3.0 Previous Archaeological Research and Known Sites in the Vicinity

The relevance of this section lies in the fact that if known archaeological sites, or unsubstantiated reported sites, are within the vicinity of the development zone, or share similar terrain characteristics with it, then the site discovery potential of the Balaclava Dam constuction zone is enhanced.

Charles Borden (1952) designed a site registration system that is used throughout Canada. A "Borden Block" is ten degrees latitude long and ten degrees longitude wide is named by a co-ordinate system, which uses upper and lower case letters. Canadian archaeologists refer to "Borden Blocks" and "Borden Numbers" and "Bordenize" sites when they register them. Sites within a Borden Block are numbered sequentially. The Balaclava dam is in BiGf.

Ottawa Valley Regional Summary

Regionally, in the upper Ottawa Valley, there are only a few areas where archaeological sites are documented.

The Allumette Lake sites were discovered and documented primarily by Clyde Kennedy over 30 years ago (Kennedy 1965; 1966; Clermont and Chapdelaine 1998).

They are located on Morrison and Allumette Islands and span the cultural time periods from Late Archaic, through the Middle Woodland, to the Late Woodland—a span of over 5,000 years. Of particular interest and importance were the Archaic burials, with their elaborate grave goods of native copper, and other exotic materials.

The Wilbur Lake sites, centring on the Kant site (BjGg-l), have attracted the attention of archaeologists for over 80 years, beginning with Wintemberg (1917; n.d.) and later Emerson (1949) and Pendergast (1957). However, the most comprehensive research on the Kant-related sites has been carried out by Barry Mitchell (1987; 1988; 1989; 1990; 1991). Although primarily related to aspects of the Middle Woodland cultural period, the Wilbur Lake sites also span five millennia from Archaic to Late Woodland.

The suite of sites discovered and documented at Mud Lake, in the Muskrat River Basin, are a result of the research of Robertson and Croft (1971; 1973; 1974; 1975) and Croft (1986). Once again, these sites span the last 5,000 years, although a Middle Woodland manifestation predominates.

Mitchell *et al.* (1970) reported 13 small deposits found along the upper Petawawa River (including Travers Lake and Montgomery Lake), dating from Shield Archaic to Historic Algonquin and Iroquois. (Later, Mitchell excavated some of the Montgomery Lake sites—as did Kennedy, independently). At the same time that Mitchell was conducting the Petawawa River small sites survey, Hurley and Kenyon (1970) were locating and testing sites on Grand Lake, the headwaters of the Indian River. Kennedy also conducted survey on Grand Lake. J-Andersen (1995) provides a review many of these studies: around Round Lake (Ballantine 1982), the upper Madawaska River (Wright 1977), Basin Lake (Ross 1975), and Highland Lake (von Gernet 1991).

Other 'inland' sites include: two isolated finds reported by Swayze (n.d.) near the Snake River Marsh, and a first order stream in Bromley Twp., and three similar finds reported by Croft (1986; 1987a; b). Wintemberg (1917; n.d.) also mentions several 'inland' finds, some in the Pembroke vicinity and some along the Bonnechere River. Kennedy (1965) also reports small sites on the Bonnechere River, near the Fourth Chute.

Known and Reported Sites in the Madawaska Valley Vicinity

The first archaeological research in the Madawaska drainage was by W. J. Wintemberg (1917), then of the Geological Survey of Canada. Although he does not elaborate on his methods, it seems clear that his survey of the Madawaska was not intensive, but consisted mostly of interviews with local informants. Clyde Kennedy (1965:6) mentions visiting the area, and notes that it should be studied more intensively. He also indicates that he visited the upper Madawaska River valley some years earlier with T. E. Lee, who was then with the National Museum of Man. J. V. Wright (also of the NMM) and Milt Wright worked briefly in the Black Donald and Calabogie Lake area in 1968. Phill Wright (1977) and Jamieson and J-Andersen (1981) have also worked in the Madawaska valley. Although the latter reported sites

in Borden Block BhGh the discoveries were located on the main stem of the Madawaska River.

There are some unsubstantiated, or rumoured, sites reported from this area of the Madawaska system. In the 1940s, Reuben Popkie found a complete Late Woodland pot in a rock shelter, on a small lake north of Black Donald Lake. This artifact, now damaged, is in the Arnprior and District Museum (cat.# 88.10.1). Two ground stone adzes, also at the Arnprior Museum (cat. # 88. 10. 4), were found at Stewartsville, downstream on the Madawaska. More vague, but closer to the study area, are reports by Wintemberg (1917) that archaeological material was once found at "Wilson Point" on Calabogie Lake (according to local information, there were many Wilson families on the point of land between Grassy Bay and Barryvale—but according to the land registry abstracts, the W½ of Lot 16 Concession 11 was in the tenure of a family of Wilsons from 1878 to the 1950s. Harlan I. Smith (n.d.) has reported the discovery of archaeological material from two rock shelters on McCool's Lake, in the BhGf Borden block to the west of Calabogie Lake. Smith searched for these sites but was unable to relocate them.

BiGh-1 Highland Lake site is located about 20 km west of Balaclava. The site was sampled by Dr. Alexander von Gernet of the University of Toronto in 1990 and 1991. The site produced an assemblage of Late Woodland period ceramic pots and pipes that von Gernet (1991) ascribes, on stylistic grounds, to a far-flung St. Lawrence Iroquois hunting party; but one that others (Pendergast 1999) suggest is Matouescarini Algonquin "look-alike" ware. Highland lake is at a drainage divide at a height of land. The highest first order streams of Constant Creek originate a short distance from it.

Also relevant to this study, are discoveries on rock knob terrain on Lot 17 Concession 11 Bagot twp (geo), at the outlet of Calabogie Lake, called BhGe-2 O'Neill Peak, BhGe-3 O'Neill Terrace, and BhGe-4 O'Neill Cottage (Swayze 2002). BhGe-2 is a probable Late Woodland lookout or hunting campsite and BhGe-3 consisted of quartz and slate artifacts from a terrace overlooking what is now the lake outlet where the depth of the drift was sufficient for a burial. The consultant returned to monitor the installation of a cottage foundation (Swayze 2004) and, although no burial or cultural feature was disturbed, he found three more artifacts. BhGe-4 is a very disturbed deposit on the point of land at the narrows at the outlet of Calabogie Lake. In 2005 Kinickinick Heritage Consultants discovered three pre-contact archaeological deposits at Bluff Point on the east side of the narrows at the outlet of Calabogie Lake that have been registered in the OMCL archaeological site data base as BhGe-5, 6, & 7. BhGe-5 Grassy Bay is an important site because there is a high density of well preserved, widespread, artifacts and organics. BhGe-6 Palaeo-Shore is important because of the presumed antiquity of the prehistoric component and because lithic artifacts are widespread. A historical component may be associated with the Calabogie Mining Company. Although it is a small remnant, BhGe-7 Middle Knoll is an important archaeological deposit because of it's antiquity, artifact density, and depositional integrity.

Pastway Heritage (2006) has recorded two historical sites, BhGe-8&9 Holden Farm, on the east bank of the Madawaska, about 5 km downstream from the outlet of Calabogie Lake, where a residential subdivision is proposed. At the same place, positive testpits with quartz artifacts occurred at about 155 m a.s.l. (Brenda Kennett, pers. comm.).

Balaclava is in the BiGf Borden Block. There are no previous sites recorded in this Borden Block, or anywhere else in the Constant Creek drainage basin, a result, no doubt, of the lack of any previous systematic survey, rather than a lack of resources to be recorded. Only a few historical archaeological resources of the upper Ottawa Valley have been described. These stem from the efforts of the Friends of Bonnechere Park, the Ottawa Chapter of the Ontario Archaeological Society, and Ontario Parks. Test excavations and Stage 1 assessments of a number of sites on the Bonnechere River, including Basin Depot, the LaFleur Homestead, and the McIntyre site, all on the Little Bonnechere River. MacKay (2004) has systematically located and tested BkGl-1, the Egan Depot Farm in Algonquin Park. In terms of water-powered mills, only very limited work has been done. A Stage 1 Archaeological assessment of the Charles H. Merrick grist mill at Fourth Chute (Swayze 2004a) determined it had high archaeological potential, even though there is no built heritage component, as there is at Balaclava. A Stage 1 assessment was carried out at the Milldam site on the Little Bonnechere and the few extant ruins of the Cannon woollen mill at the lower Mississippi River Falls in Almonte. These records consist of "as found" photographs and drawing prepared in advance of a new electric generation plant (Swayze 2007). The Almonte mill site is on water-scoured bedrock and has no buried archaeological deposits.

4.0 Archaeological Potential

Figure 9 shows the archaeological discovery potential of the construction zone in Provincial land. Also shown are peripheral areas that may be affected by development activities. Zone A (red) has moderate to high potential for the discovery of historical and/or pre-contact archaeological artifacts, cultural features, or human remains. Stage 2 field tests warranted, testpits at 5 m intervals, to parent material. Part of Zone A is shown in Figure 10, a photograph of the north side of the dam. Zone B (green) is drowned land, the pre-dam stream bank. It has moderate to high potential for the discovery of historical and/or pre-contact archaeological artifacts or cultural features. Stage 2 field tests are warranted, when the lake level has been drawn down. Testpits, should be excavated manually, at 5 m intervals, to parent material. Zone C (yellow) are areas of archaeological potential that are peripheral to the construct zone in Provincial land. Any portion of C that lies within the County ROW should be included in A and should be sampled by testpits at 5 m intervals An example of Zone C is pictured in the foreground of Figure 11. Zone D (white) are areas of nil (structures) or low (former stream bed) archaeological potential.

Historical archaeological discovery potential stems from the proximity of built heritage buildings, with association with historical figures such as Duncan Ferguson and Hunter family, to the development zone. Terrain analysis indicates that the pre-contact archaeological potential of the study area is moderate. Constant Lake has high biomass and supports a wide variety of plants, including wild rice, and animal resources, such as migratory eels (Finnigan 2004:199), known to be economically important to historic and pre-contact hunter-gatherers. The dam site, originally may have been at the upper end of a portage.

5.0 Conclusion and Recommendation

The Provincial land around the Balaclava Dam has moderate to high archaeological potential and Stage 2 field tests, to determine the presence, or absence, of archaeological material, cultural features, or human remains, are recommended. The potential for historic archaeological remains stems from proximity to historical buildings. The potential for prehistoric archaeological deposits is due to the location of the study area at the outlet of Constant Lake. The banks of the pre-dam creek were well-drained till, suitable for an encampment, and the dam site is probably at the end of a former portage. Stage 2 tests should be carried out by a licenced archaeological consultant. The procedure should entail the manual excavation of testpits at 5 m intervals, to parent (till) material. The drowned land can only be tested when the waterlevel has been drawn down, or when a temporary cofferdam has dewatered the construction zone. There are areas of potential that are peripheral to the construction zone that may be affected by related roadway improvement projects.

6.0 References

Ballantine, Thomas A.
1982 "Archaeological Surveys of Three Projects at Round Lake WP209-79-01, Bonnechere to the Richards-Fraser Line WP139-81-01, and Byer's Creek to Round Lake Centre WP2728-78-01". Report on file with OMCL, Toronto.

Barnett, P.J. and W.S. Clark
1980 "Quaternary Geology of the Renfrew Area, Southern Ontario" Ontario Geological Survey Preliminary Map P. 2365, Quaternary Geology Series, Scale 1:50,000. Geology 1977 Ontario Ministry of Natural Resources, Toronto

Borden, C. E.
1952 "A Uniform Site Designation Scheme for Canada" *Anthropology in British Columbia* vol. 3:44-48, Victoria.

Clermont, N. and C. Chapdelaine
1998 *Île Morrison: Lieu Sacré et Atelier de lArchaïque dans l'Outaouais.* Paléo-Québec 28. Recherches amérindiennes au Québec.

Croft, D.J.A.
n.d. "untitled"—field notes on the McLaren site,1986 and 1987a,b; notes on the Faught site; notes on the Dewal site—on file with OMCL, Toronto.

Emerson, J.N.
1949 "Preliminary report on the excavations of the Kant site, Renfrew Co. Ontario" *National Museum of Man* Bulletin No.113, Ottawa.

Engelbrecht, P. and P. Wright
n.d. "Test excavations at Highland Creek" report on file with OMCL, Toronto.

Finnigan, Joan
2004 *Life Along the Opeongo Line*, Penumbra Press.

Fulton, R.J. and S.H. Richard
1987 "Chronology of late Quaternary events in the Ottawa region" In: R.J. Fulton (ed.) *Quaternary Geology of the Ottawa Region, Ontario and Québec*, G.S.C. Paper 86-23, pp. 24-30.

Gilbert, R. (compiler)
1994 "A Field Guide to the Glacial and Postglacial Landscape of Southeastern Ontario and Part of Québec" *Geological Survey of Canada*, Bulletin 453, Ottawa Canada.

Hurley, Wm. A. and Ian Kenyon
1970 "Algonquin Park Archaeology, 1970". Report on file with OMCL, Toronto.

J-Andersen, Chris
1995 "The Cultural Heritage Resources of Bonnechere Provincial Park and Environs: an initial appraisal" Report on file with OMCL, Toronto.

Jamieson, J. B. and J.-C. Andersen
1981 "The Madawaska Archaeological Survey Project 1981" report on file, OMCL, Toronto.

Kennedy, C.C.
1965 "Summary of 1965 fieldwork in the Ottawa and related areas", notes on file at the archives of the Canadian Museum of Civilization, Hull Québec.

1966 "Preliminary report on the Morrison Island-6 site", National Museum of Canada, Ottawa, Bulletin No. 206, *Contributions to Anthropology, 1963-1964,* Part I, March, pp. 100-124.

Lewis C.F.M. and T.W. Anderson

1989 "Oscillations of levels and cool phases of the Laurentian Great Lakes caused by inflows from glacial Lake Agassiz and Barlow-Ojibway" *Journal of Palaeolimnology* v.2:99-146.

MNR (Ministry of Natural Resources, Ontario)
2006 "Balaclava Dam Class EA Study" Ministry of Natural Resources, Pembroke District. Engineering consultants: Trow Associates Ltd. Brampton Ontario

MacKay, Roderick
2004 "Continued Stage 2 Investigations at the Egan Farm BkGl-1, Clancy Township, Algonquin Provincial park, 2003" Report on file with OMCL, Toronto.

Mitchell, B.M.
n.d. "untitled"—reports on field work, 1987; 1988; 1989; 1990; 1991, relating to the Wilber Lake sites—reports on file with OMCL, Toronto.

Mitchell, B.M., Croft, D.A., Butler P.J. and R.J. Cawthorn
1970 "The Petawawa Small Sites Report" *Ontario Archaeology* v. 15 pp. 20-55, Toronto.

OMCL (Ontario, Ministry of Culture)
2006 *Standards and Guidelines for Consultant Archaeologists: Archaeological Fieldwork Final Draft (including Appendix A, The Discovery of Human Remains—Best Practices)* Ontario Ministry of Culture, Heritage Policy and Program Development Branch, 400 University Avenue, Toronto.

Pendergast, J.F.
1957 "Report on the Kant site, BjGh-l (sic)". MS on file in the archives of the Canadian Museum of Civilization, Hull Québec.

1999 "The Ottawa River Algonquin Bands in a St. Lawrence Iroquoian Context" *Canadian Journal of Archaeology* vol. 23 (1&2):63-136.

Robertson, D.S. and D.J.A. Croft
n.d. "untitled"—field notes relating to the Mud Lake sites, 1971; 1973;1974; 1975, on file with OMCL, Toronto.

Roed, M.A., Ringrose, S.M., and Sauriol, J.
1990 Southern Ontario Engineering Geology Terrain Study, Data Base Map, Renfrew, Ontario Geological Survey, Map 5511, scale 1:100,000, Toronto.

Ross, Wm. A.
1975 "Basin Lake Area: Archaeological Resource Inventory" Report on file

with OMCL, Toronto.

Smith H. I.
n.d. "untitled"—notes on archaeological sites in Renfrew Co.; on file in the archives of the CMC under 'Wintemberg, Renfrew Co.'.

Swayze, J.K.
n.d. "untitled"—site forms relating to the Egan Site and the Sammon Site. In. OMCL site database.

2002 "CIF046-010 A Stage 1&2 archaeological assessment of the O'Neill Family Subdivision on Calabogie Lake on part of Lot 17 Concession 11 Bagot Twp (geo) Renfrew County" report on file at OMCL, Toronto.

2003 "A Stage 1 Archaeological Assessment and Revisit of BkGl-2 Milldam and BkGl-3 Milldam Ranger Cabin on the Little Bonnechere River, in Algonquin Park, Clancy Township, Nipissing District" Report on file with OMCL, Toronto.

2004a "CIF P039-043 A Stage 3 Monitorship at the O'Neill Terrace site BhGe-3 on part of lot 17 concession 11 Bagot twp (geo), Calabogie Lake, Renfrew County" report on file with OMCL, Toronto.

2004b "P039-019 A Stage 1 Archaeological Assessment of the Bonnechere Caves Property At Fourth Chute, South part Lot 6 Concession 2 Wilberforce Twp (geo.), Renfrew County" Report on file with OMCL, Toronto.

2004c A Stage 1&2 Archaeological Assessment of BkGl-5 McIntyre Site, Lot 11 Concession 1, Niven Twp., Nipissing District, Algonquin Park" Report on file with OMCL, Toronto.

2005 "CIF P039-058 A Stage 1&2 Archaeological Assessment of Proposed Pedley Subdivision Part Lot 16 Concession 11 Bagot Twp (Geo) Greater Madawaska Township, Renfrew County" report on file at OMCL, Toronto.

2007 "CIF P039-102 A Stage 2 Archaeological Assessment of the Mississippi River Power Corporation—Almonte Generating Station Expansion on part lot 16 Concession 9 Ramsay Township (geo.) Town of Mississippi Mills, Lanark County" Report on file with OMCL, Toronto.

Teller, J.T.
1988 "Lake Agassiz and its Contribution to Flow Through the Ottawa - St. Lawrence System", In Gadd, N.R. (ed.) *The Late Quaternary Development of the Champlain Sea,* Geological Association of Canada

Special Paper 35, pp. 281-289.

von Gernet, A.
1991 "1990-1991 Excavations at the Highland Lake Site". Report on file with OMCL, Toronto.

Wintemberg, W.J.W.
n.d. "untitled"—notes on file in the archives of the Canadian Museum of Civilization, Hull Québec.

1917 "Archaeology of the Madawaska, Bonnechere and Ottawa Valley, Ontario" unpublished Ms. on file in the archives of the Canadian Museum of Civilization, Hull Québec.

Wright, P.
1977 "A Preliminary Archaeological Survey of the Madawaska River from Combermere to Griffith". Report on file with OMCL, Toronto.

Figure 1: Regional location

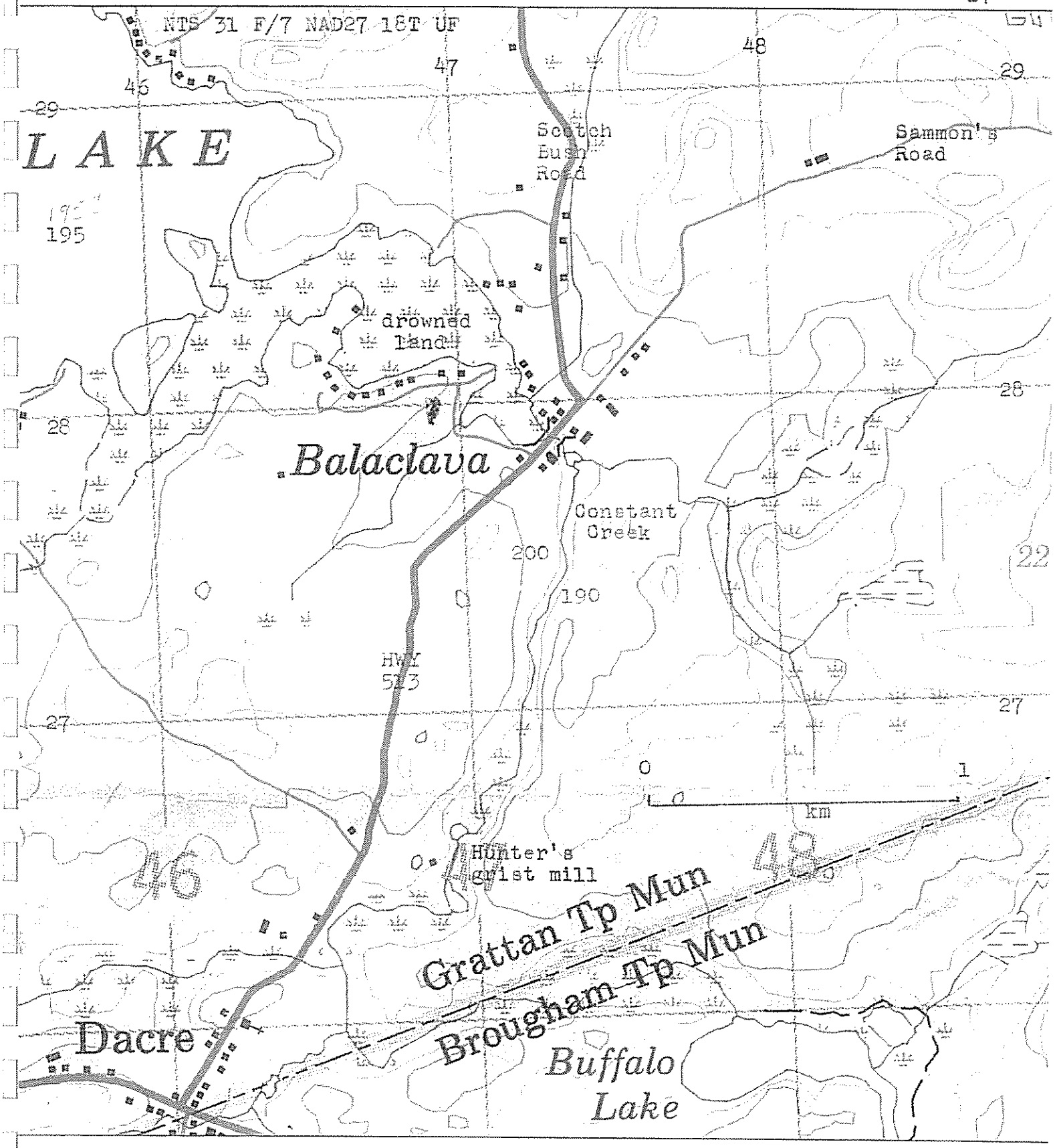


Figure 2: NTS Map 31 F/7 NAD27

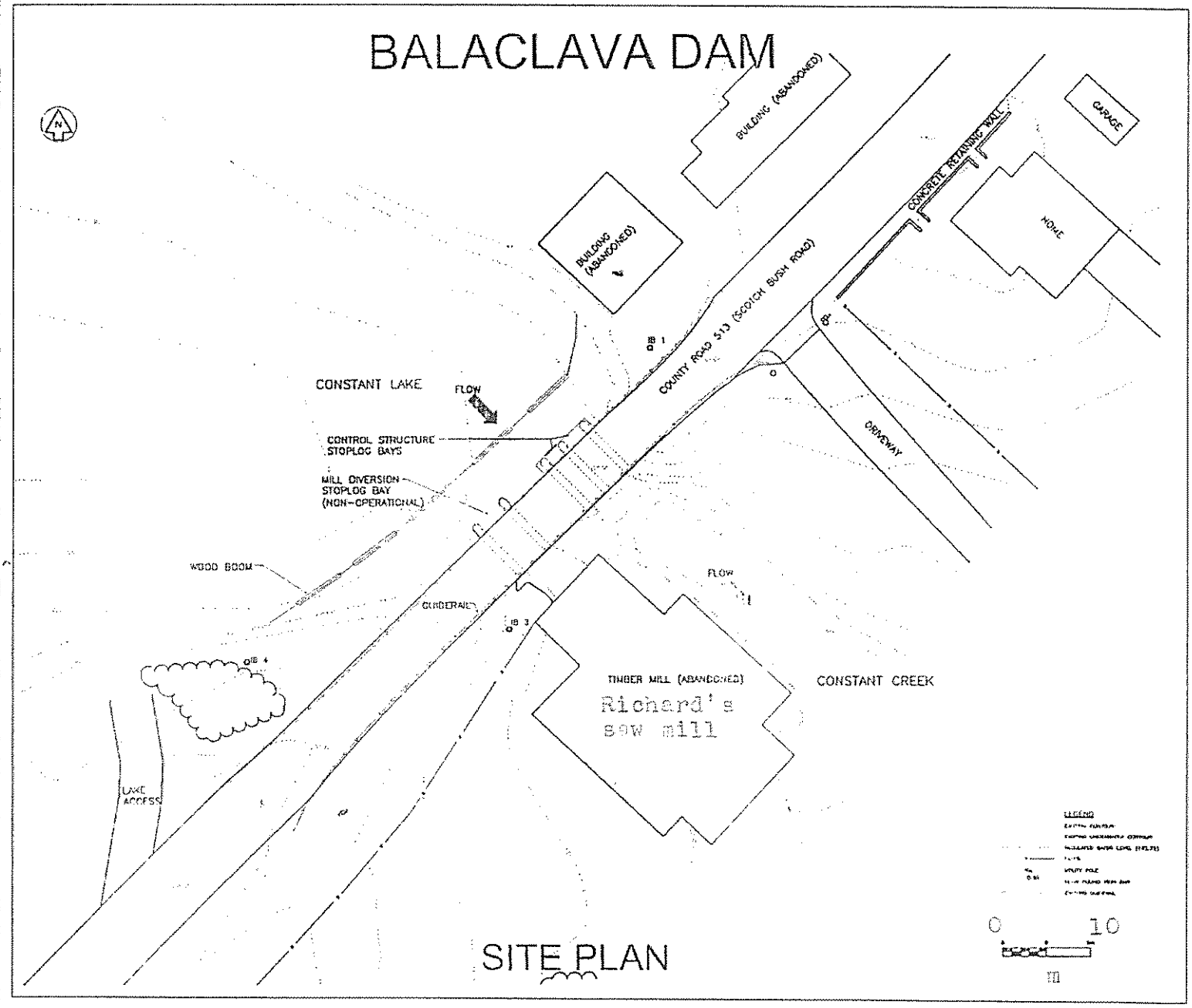


Figure 3: Balaclava dam site plan, existing features

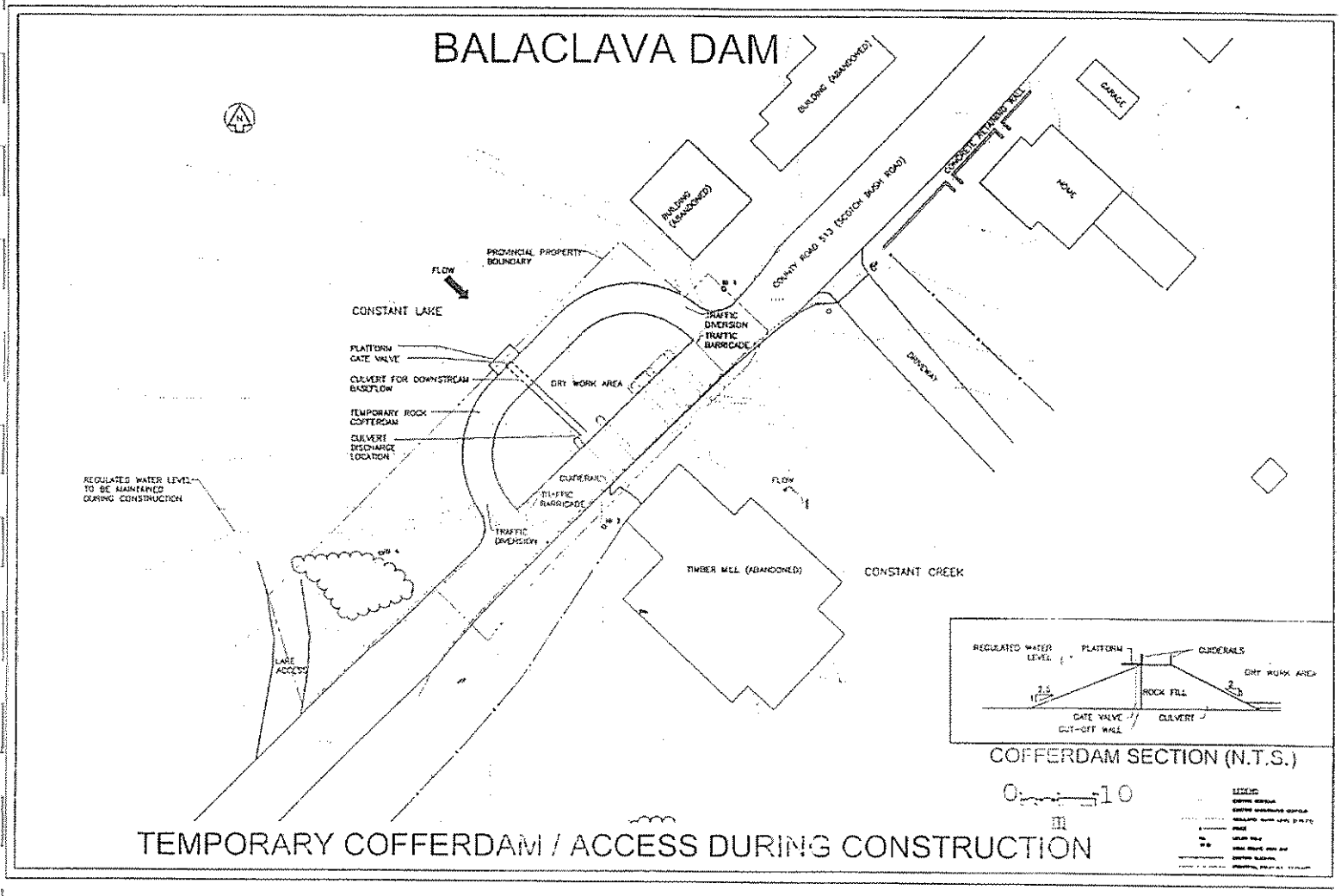
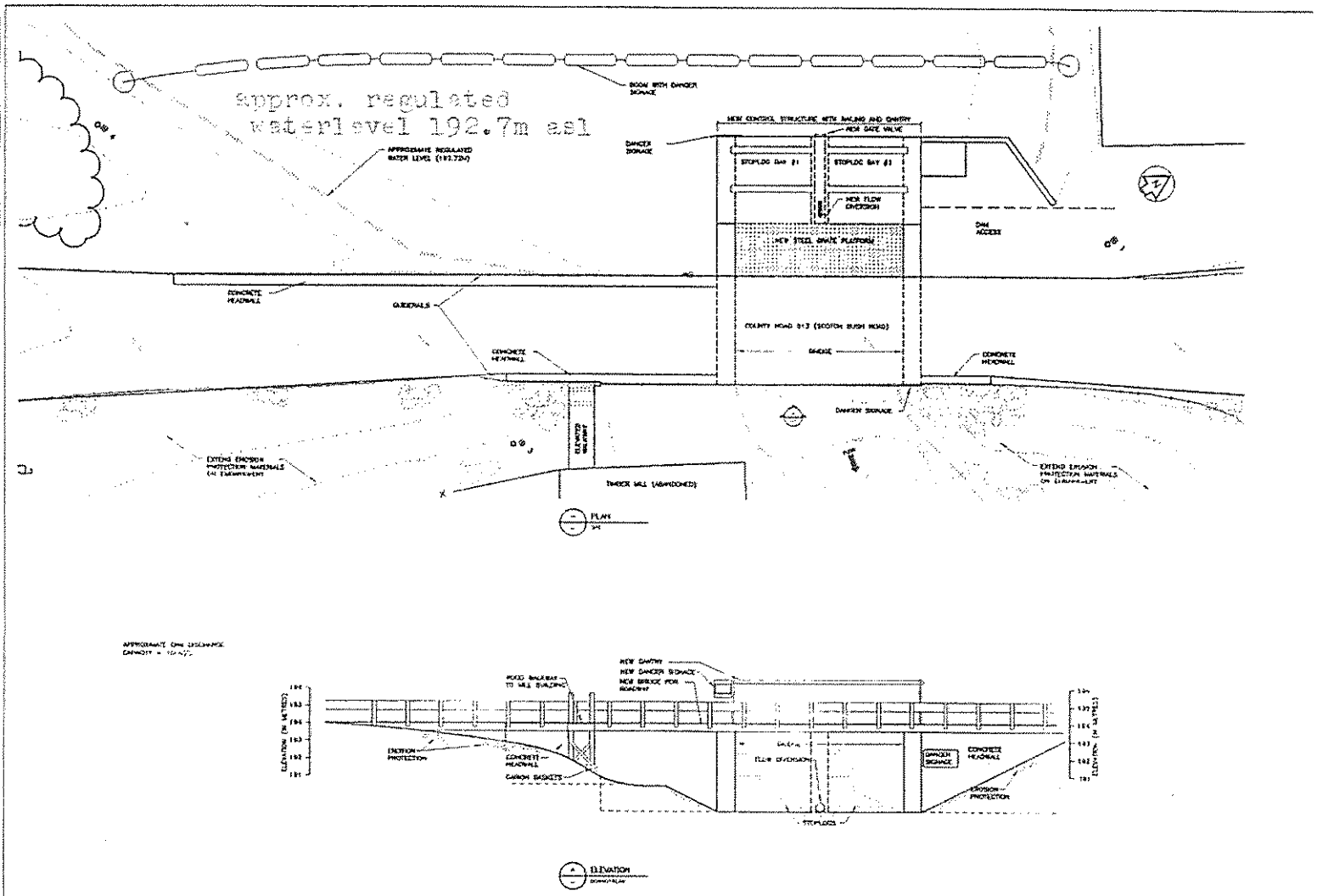


Figure 4: Temporary cofferdam and access during construction



ALTERNATIVE 3B - RECONSTRUCTION (DAM UPSTREAM OF ROADWAY)

Figure 5: Reconstructed dam

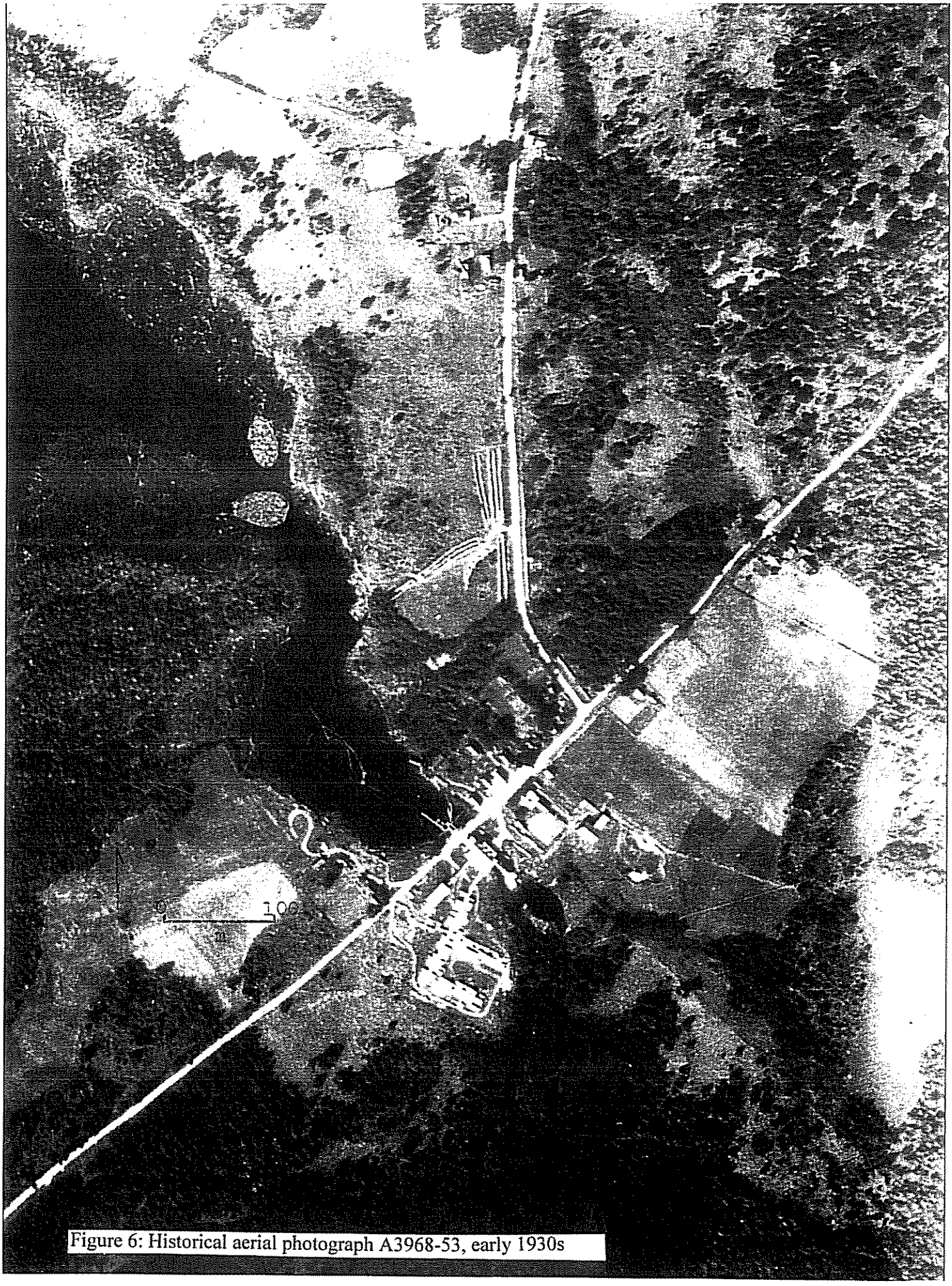
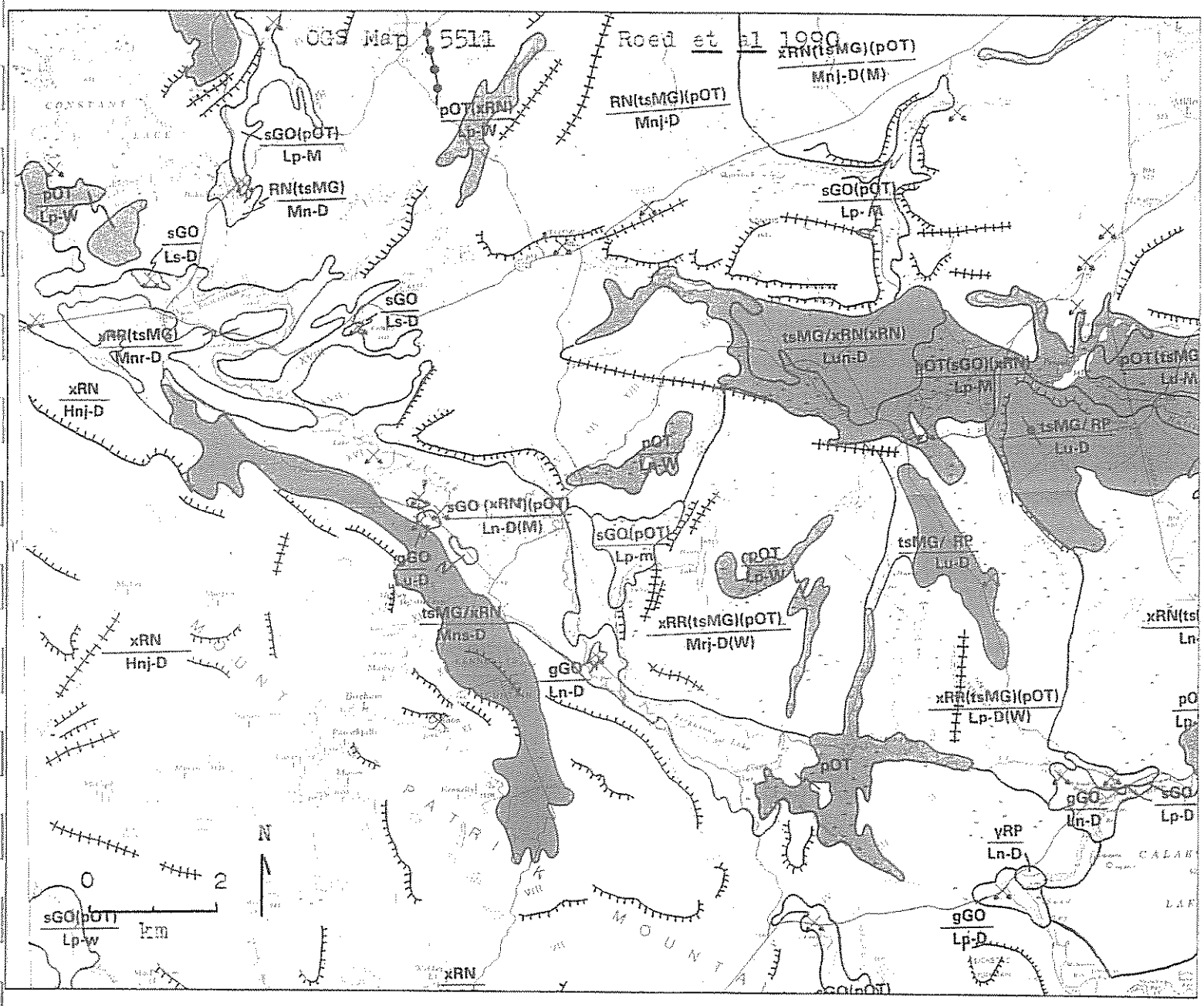


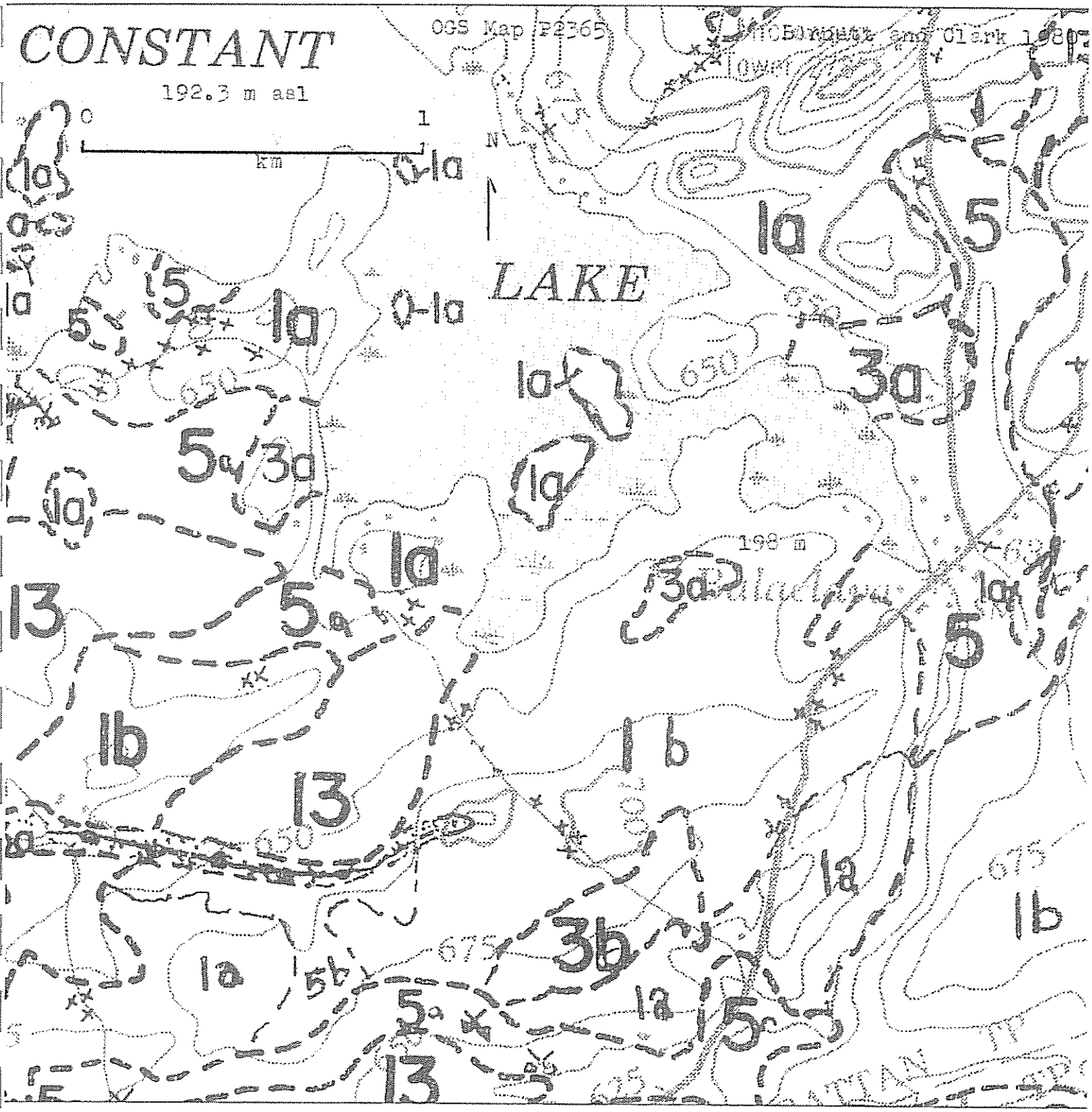
Figure 6: Historical aerial photograph A3968-53, early 1930s



RN(tsMG) / Mn-D — rock-knob terrain, sand and till, ground moraine moderate local relief, hummocky, dry excessive drainage mixed with organic terrain

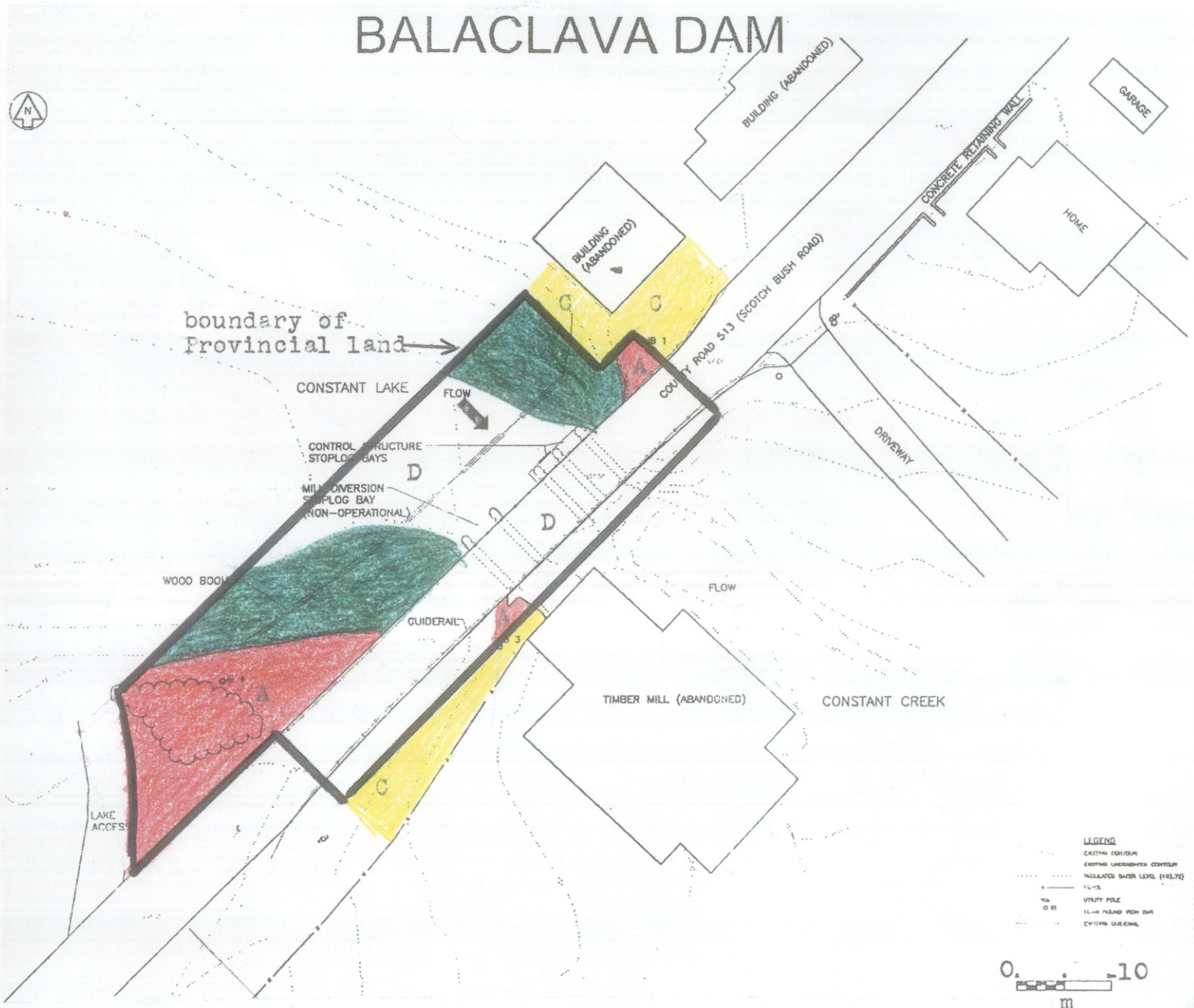
sGO(pOT) / Lp-M — sandy, glacial outwash, with peat, muck, organic terrain mixed with glaciolacustrine plain, mixed wet and dry drainage

Figure 7: Terrain analysis of Constant Creek



5 - glaciofluvial outwash and deltaic deposits; gravel, gravelly sand, and sand

Figure 8: Surficial geology of the Balaclava vicinity



Archaeological Potential Legend

- A (red) moderate to high potential for the discovery of historical and/or pre-contact archaeological artifacts, cultural features, or human remains. Stage 2 field tests warranted, testpits at 5 m intervals, to parent material.
- B (green) drowned land with moderate to high potential for the discovery of historical and/or pre-contact archaeological artifacts or cultural features. Stage 2 field tests warranted, when lake level has been drawn down. Testpits, manually, at 5 m intervals, to parent material.
- C (yellow) areas of archaeological potential peripheral to the construct zone and Provincial land. Any portion within the County ROW should be included in A and testpitted at 5 m intervals.
- D (white) areas of nil (structures) or low (former stream bed) archaeological potential.

Figure 9: Archaeological potential of the Balaclava Dam

Figure 10: Photograph of the upstream construction area

Figure 11: Photograph of the downstream construction area

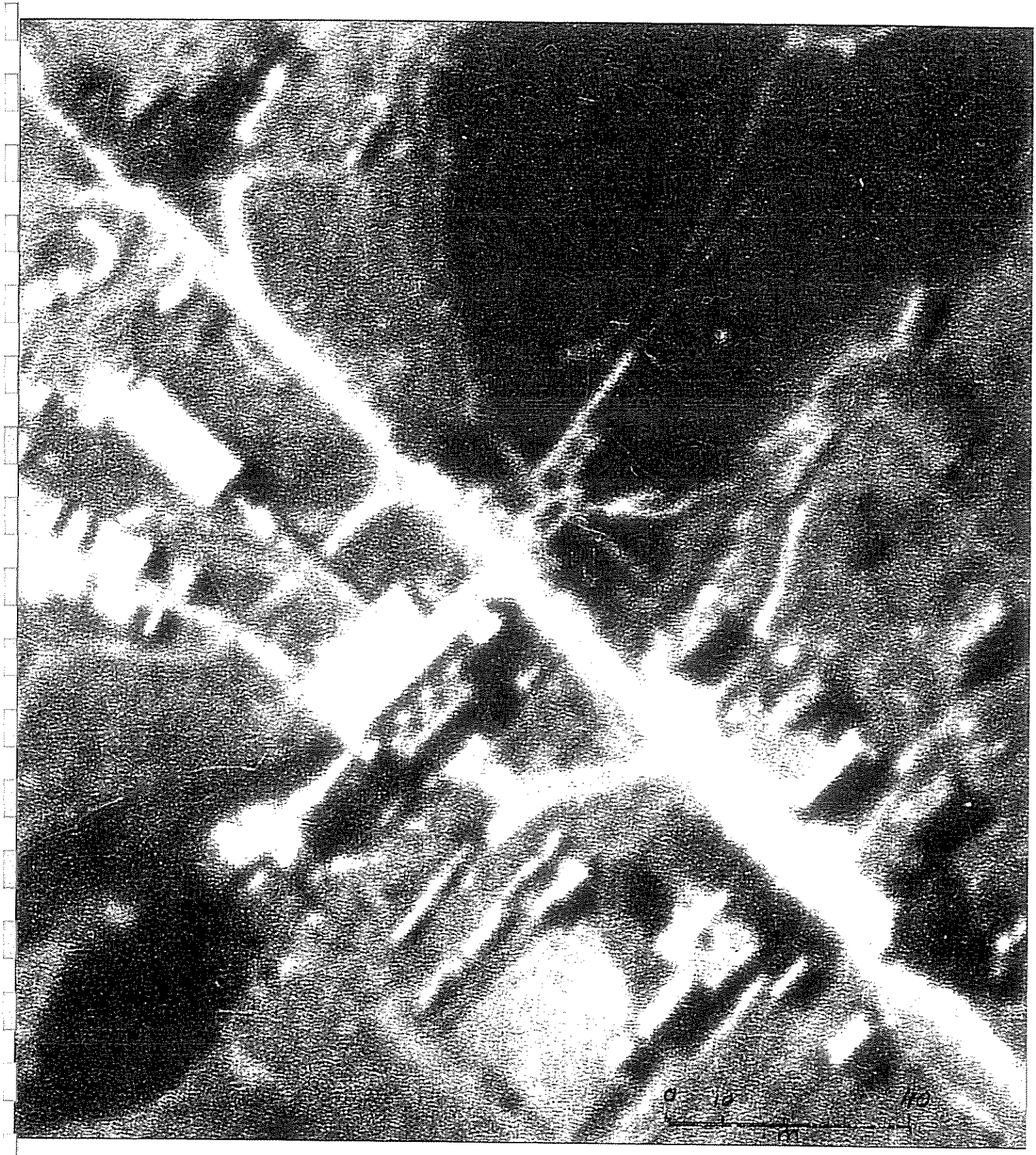


Figure 12: Enlargement of A3968-53 showing dam in early 1930s